U.S. Department
of Transportation

**Federal Aviation
Administration**

800 Independence Ave., SW.
Washington, DC 20591

MARKET SURVEY/REQUEST FOR INFORMATION (RFI)
AIR/GROUND DATA COMMUNICATIONS IN THE EN ROUTE DOMAIN

This announcement is a Market Survey/Request for Information. This announcement IS NOT A SCREENING INFORMATION REQUEST (SIR) OR REQUEST FOR PROPOSAL (RFP) of any kind. Further, the FAA is not seeking or accepting unsolicited proposals.

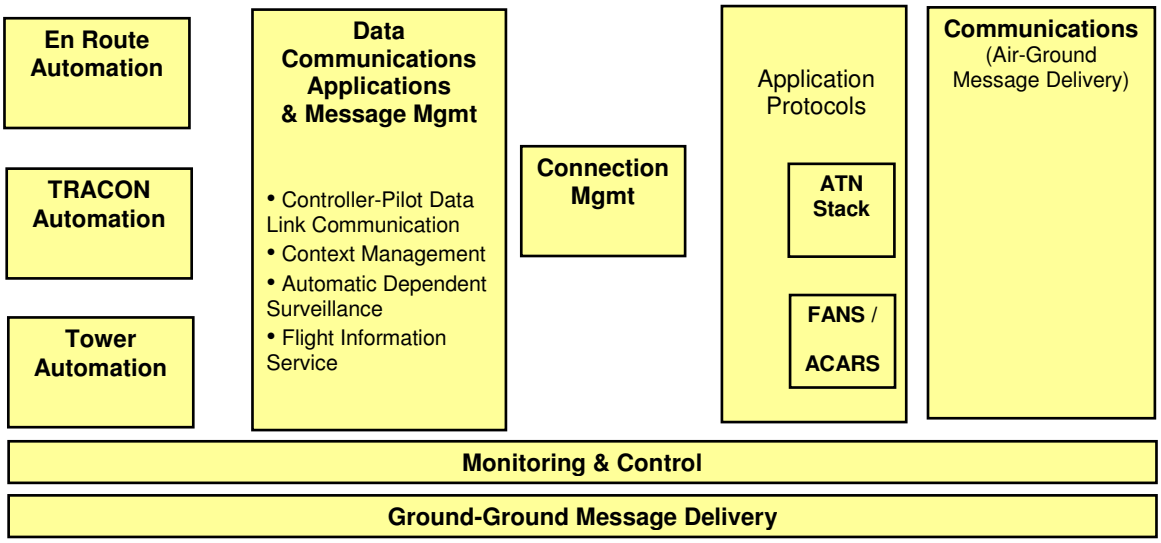
All interested parties are advised that the FAA will not pay for any responses submitted, or reimburse any costs incurred that are associated with any response received from interested party's in response to this Market Survey/RFI. Therefore, any costs associated with Market Survey/Request for Information submissions will be solely at the interested party's expense.

The Federal Aviation Administration (FAA) has initiated an investment analysis process to evaluate the alternatives for a Data Communications program to provide Air/Ground services with the aircraft as a critical element of achieving the Next Generation Air Transportation System (NextGen) vision for air traffic control. These services are described in Appendix B, Data Communications Preliminary Program Requirements (PPR).

The Data Communications program is currently phased into 3 segments. The first segment will provide for ATS services using data communications as a supplement to voice communications. For segment 1 operations, services will be implemented in en route airspace and selected towers compliant with the safety, performance, and interoperability requirements stipulated in the RTCA DO-290 with Change 1 and DO-280A. Aircraft equipped with FANS-1/A+ are being investigated for accommodation, in segment 1, using the interoperability requirements stipulated in RTCA SC-189 PU-40. The second segment will provide updates and improvements to standards, expansion of service to selected TRACON environments and additional services to expand the use of 4D-trajectory-based operations. The third segment will provide new services beyond segment 2 capabilities as the final step towards the NextGen vision for ATS Data Communications.

The FAA is expecting to begin initial Segment 1 operations of the Data Communications program in the 2013-2015 timeframe migrating to Segment 2 starting in the 2018-2019 timeframe. The Data Communications program assumes there will be exclusionary airspace established for Segment 2 and beyond, but that the geographic and temporal definition of this airspace has not yet been established. Segment 1 will utilize VDL Mode 2 for the data subnetwork including ATN networking. Segment 3 is currently envisioned to be supported by VDL Mode 2, although a future communications system may be necessary if future services require greater performance.

The purpose of this Market Survey/RFI is to improve the Government's understanding of the current marketplace, obtain information on available technology and innovative approaches that may fulfill its mission need, and gain insight into industry capabilities and best practices. This RFI seeks industry perspectives regarding provision of the ground system elements to include the en-route automation, data communications applications, connection management, application protocols, and portions of the Monitoring & Control in support of the formulation of the program. The major functional components for the ground subsystem elements of the end-to-end data communications system are shown in the graphic below. The FAA released an RFI in March 2007 seeking industry perspectives regarding how the capabilities/services might be acquired for the communications subnet (air/ground message delivery) portion.



This Market Survey/RFI seeks industry input to identify the technical viability for providing the desired functional and performance capabilities for the remaining portion of the Data Communications program excluding TRACON and Tower automation. Information collected from this process will be used to further define the program and validate when operational service-based operations will be available; the ease or difficulty of transitioning to using a future service-based operation, and the benefits, risks, and projected costs for the service. Responses to this Market Survey/RFI will be factored into Data Communications investment decisions.

The following four appendices provide relevant Data Communications information to support this Market Survey/RFI:

Appendix A, Standards Pertaining to the Data Communication Program

Appendix B, FAA Preliminary Program Requirements

Appendix C, FAA Data Communications Functional Architecture

Appendix D, Data Communications Program Alternatives

Attachment 1 is the template that should be completed by interested parties. Interested parties are requested to provide full and complete responses to the items in Attachment 1. Special emphasis is being placed on identifying innovative technical solutions to meet our initial requirements and identifying performance criteria and best practices that will improve the quality of the FAA's Investment Analysis efforts and the forthcoming acquisition. Excessively elaborate responses containing marketing materials are not desired and may be discarded without review. Respondents to the Market Survey/RFI may be requested to provide additional information at the option of the Government. No evaluation of vendors will occur and vendor participation in any informational session is not a promise for future business with the FAA.

All responses (one response per company) are to be provided on company letterhead and limited to a total of 30 pages. No type font less than 12-point should be used. Any proprietary information submitted will be protected if appropriately marked. Responses must be received no later than October 26, 2007, 3:00 p.m., Eastern Standard Time. If there are questions, please contact the FAA Contracting Officer, Mr. Daniel B. Lear, at (202) 385-8410, or via e-mail at **daniel.lear@faa.gov**.

The FAA prefers that all submittals, including attachments, be submitted electronically to the following email address: daniel.lear@faa.gov. The FAA would prefer that responses be submitted in a portable document format (pdf), however, Microsoft Word is acceptable. If you cannot respond electronically, please send to:

Federal Aviation Administration
ATTN: Daniel Lear, AJA-46
800 Independence Avenue, SW
Washington, DC 20591

Sincerely,

Daniel B. Lear
Contracting Officer

ATTACHMENT 1
MARKET SURVEY/RFI
RESPONSE TEMPLATE

Availability of Technology and/or Innovative Approach/Solutions

Respondents are requested to provide a white paper response identifying innovative technical approach/solutions to the draft data communications En Route air/ground communications requirements (see appendices). The response must:

1. Include an Executive Summary.

2. Describe how the requirements will be met.
   a. What is your proposed approach for allocating requirements to the system elements (please provide an example)?

3. Identify tasks that need to be performed.

4. Describe any related on-going efforts.

5. Describe available technology that can be used or modified to meet the data communications requirements.

6. Evaluate the three alternative architectures.
   a. Discuss pro's, con's, risks, and opportunities associated with each identified alternative.
   b. Discuss pro's, con's, risks, and opportunities associated with including the Application Protocols element with the En Route acquisition or with the Communications Subnet acquisition.

7. Describe the key technical challenges of the approach.
   a. How would your potential solution integrate/interface technically and operationally with the existing FAA En Route system
   b. How would you evolve the system over time from Segment 1 to Segment 2 and from Segment 2 to Segment 3 (see the attached Initial Program Requirements document) to:
      i. Incorporate evolving services as defined in the iPR?
      ii. Address the increasing levels of system availability and integrity?
      iii. Integrate with existing and anticipated decision support tools for NextGen?

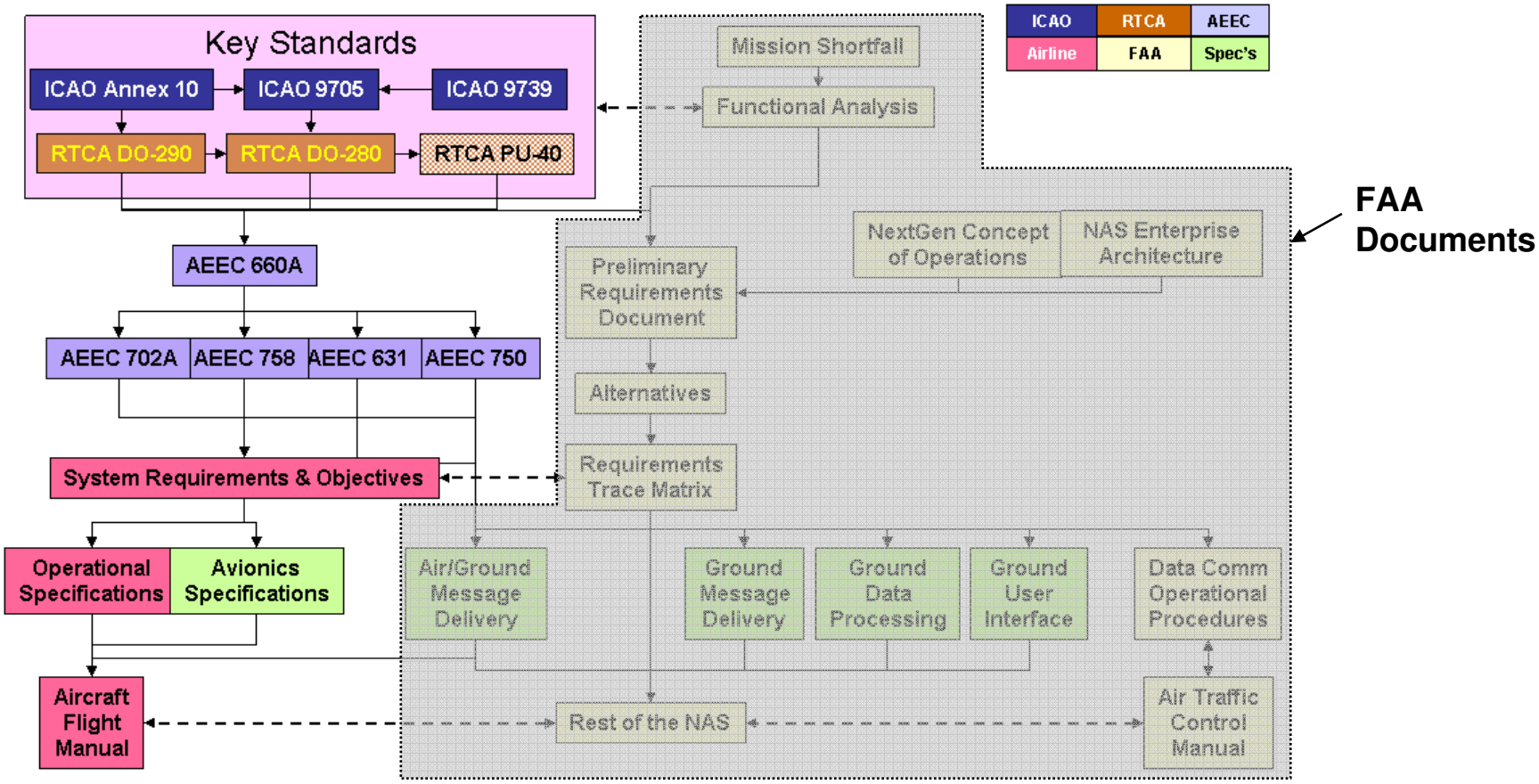
8. Describe how system safety and any applicable regulatory approval will be addressed.
   a. Identify any system safety hazards associated with the approach
   b. If the FAA were to determine that DO-278 design assurance Level AL4 applied to the system, how would you envision this affecting your offering?
   c. If the FAA were to determine that DO-278 design assurance Level AL3 applied to the system, how would you envision this affecting your offering?

9. Provide input on potential acquisition strategies from a contractor's perspective to include:
    a. How would you characterize the applicability of the acquisition strategy on each of the target subsystem elements in terms of the following:
        iv. Viability of the strategy as reflected by the likelihood of COTS offerings in the marketplace;
        v. Acceptability of the strategy to the vendor;
        vi. Allocation of risk between the vendor and the FAA ATO;
    b. How would you integrate contractually with the existing FAA En Route system.
    c. What is the feasibility of performance based services acquisition methodologies as applied to this acquisition?
    d. If deemed feasible, how would you propose to structure the acquisition

10. Identify key milestone dates from contract award for the design, development, deployment, and IOC of the identified approach.
    a. Identify risk levels and mitigations

Key Data Communications Standards

- **Key standards are known and in place, however modifications are required**
  - **Low level of effort required for Segment 1 (Interoperability documents)**
  - **More significant effort required for Segment 2 primary use (Interop docs & SPR)**



Preliminary Program Requirements
for
Data Communications in Support of NGATS

July 28, 2006

Federal Aviation Administration
800 Independence Avenue SW
Washington, DC 20591

Program Requirements

for

Data Communications in Support of NGATS

Approved by: _____ Date: _____

Vice President, Operations Planning (ATO-P)

Approved by: _____ Date: _____

Vice President, Technical Operations (ATO-W)

Approved by: _____ Date: _____

Vice President, En Route and Oceanic Operations (ATO-E)

Approved by: _____ Date: _____

Vice President, Terminal Operations (ATO-T)

Approved by: _____ Date: _____

Vice President, System Operations (ATO-R)

Concurrence by: _____ Date: _____

Director, Office of Systems Engineering, ATO-P

Submitted by: _____ Date: _____

Manager, ATC Communications Services, System Engineering & Requirements Group, ATO-W

Focal Point

Gregg Anderson

Technical Operations, ATC Communications, AJW-52

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1. BACKGROUND

1.1 Mission Need

The Federal Aviation Administration (FAA) has established an operational plan for the Air Traffic Management (ATM) system of the twenty-first century. In this plan the National Airspace System (NAS) will rely increasingly on advanced capabilities provided by ground and airborne Air Traffic Services (ATS) Provider (ATSP) Systems. NAS Concept of Operations and Vision for the Future of Aviation and the Joint Planning and Development Office (JPDO) concepts of use, require transmission of complex trajectory clearances, weather information and air traffic advisories.

In the future ATM environment it will no longer be possible to rely exclusively on voice messages for the exchange of information. Transition from voice for pilot-controller communication to a predominance of data communication has been identified as a key goal for Air Traffic Control (ATC).

The addition of data communications will support improvements in airspace use and capacity. Data communications will:

- Provide for a more efficient air/ground (A/G) information exchange mechanism
- Provide an additional means of communication between pilots and controllers
- Reduce congestion on the voice channels
- Reduce operational errors and pilot deviations resulting from misunderstood instructions and read back errors
- Enable trajectory based operations
- Reduce controller and flight crew workload.

The evolution of data communications in the U. S. air transportation system is anticipated to occur in three segments. The first segment will facilitate data communications deployment and introduce initial 4-D (four dimensional; latitude, longitude, altitude, and time) routes. The second segment will introduce conformance management and initial 4-D agreements. The third segment will expand 4-D agreements and provide an operational environment that allows the transfer of some separation assurance tasks from the ground to the air.

1.1.1 Mission Shortfall

As the NAS transforms to achieve the JPDO Next Generation Air Transportation System (NGATS) vision, and concepts of use for trajectory-based flight and Information Management, most of the planned operational improvements will be implemented via data communications.

The overall shortfall is that the current NAS does not have an air/ground data communications capability.

Specific related performance gaps include the following:

- Safety shortfalls
- Capacity shortfalls

- Efficiency and productivity shortfalls

It is recognized that the scope of the mission shortfalls identified herein are broader than will be addressed solely by a data communications capability. During the course of investment analysis, an understanding of the joint contributions of a portfolio of capabilities will need to be addressed; for example, an assessment of trajectory based operations will need to encompass the joint effects of data communication, automation, traffic flow management, and required navigation performance. None of these discrete investments can deliver their full potential benefits without the synergies arising from their joint integration. This mission shortfall statement is a step in the process of defining the entire mission shortfalls to be addressed in realizing the NGATS concept of operations.

1.1.1.1 Safety Shortfalls

Current communication capabilities cannot adequately convey the information required between air traffic controllers and airspace users to assure that target levels of safety can be provided in an environment of increased demand for access to airspace. The ability to issue complex clearances to manage aircraft-to-aircraft and aircraft-to-airspace conflicts, as well as implementation of weather avoidance strategies, is limited. Expanded aircraft status reporting, real-time airspace access support and new ground decision support system integration is needed. Some symptoms of this shortfall include:

- Peak communication workload demands on the Radar controller take a larger portion of the controller's available cognitive resources.
- Situations conducive to producing errors, confusion, read-back and hear-back errors arising from frequency congestion and voice communication quality.
- Inability to implement a coherent "sector resource management" concept for the sector team where air/ground communication workload can be shared.
- Alternate means to enable air/ground communication support for contingency plans when the primary voice communication capability is not available. For example, when a catastrophic event results in the loss of air/ground voice communication at an Air Route Traffic Control Center (ARTCC) or during transient events such as a “stuck microphone” in the cockpit.

Eliminating these shortfalls will result in fewer air/ground communication errors which lead to operational errors and pilot deviations.

1.1.1.2 Capacity Shortfalls

Key capabilities needed to support NGATS operational demands are not resident in the existing air/ground communication systems. Performance gaps include:

- The capability to rapidly and accurately communicate complex clearances containing multiple latitude/longitude-defined route elements, such as those associated with High Altitude Airspace Design; arrival and approach procedure names; and, speed, altitude, and heading instructions and preferences.
- The ability to more effectively manage inter- and intra-facility sector air/ground voice communication transfer.

- The ability to efficiently communicate air traffic instructions such as altimeter settings and aircraft beacon codes.
- The ability to disseminate efficiently, airspace congestion and weather advisories; and NAS infrastructure status information.
- The ability to efficiently communicate complete departure clearances and revisions necessitated by traffic management initiatives.
- The ability to provide for the maximum efficient use of the airspace and strategic plans by adjusting individual flights to reduce contention for resources and assure no resource is allowed to remain idle in the face of demand.
- Limited ability to use the preferred trajectory associated with flight objects and the airspace plan to identify areas of congestion, and the potential need for flow control initiatives to mitigate severe congestion.
- No ability to perform delegated separation, spacing, and merging tasks.
- Limited ability to precisely issue four-dimensional trajectories.

Potential solutions for capacity capability shortfalls must address applicable end-to-end performance and technical interoperability requirements, as defined through the appropriate regulatory process.

1.1.1.3 Efficiency and Productivity Shortfalls

Critical operational capabilities are not available in the existing communication infrastructure. The ATO operations cost for communication capabilities is therefore affected by several factors. Performance gaps include:

- Ability to support airspace user. Avionics and airframe manufacturers need consistent global communication capabilities requirements.
- Ability to exchange user preferred trajectories in real time. There are limited decision support tools to communicate and insure user preferred routing, integrated sequencing, and spacing of arrivals and departures in terminal airspace.
- On-board avionics, such as Flight Management Systems are not synchronized with ground Flight Data Processing Systems – impacting predictability. Increased predictability for flights will allow aircraft operators to reduce costs.
- Anticipated growth in the number of sectors and areas of specialization that must be supported for a given airspace and the high cost for hiring additional/maintaining current controller staff to meet growth in airspace user demand.
- Currently, air/ground communication capabilities are not integrated with other aspects of the automation environment. Instructions to and requests from airspace users must be independently exchanged via voice air/ground communications and then manually updated in automation systems such as the flight data processor.
- Ability to handle multiple, simultaneous traffic management initiated trajectory changes is limited to single voice transmissions.
- Inability to automate many repetitive and time-consuming tasks, allowing labor resources to be focused on more productive tasks.
- The current communication system lacks the capabilities inherent in modern, network-based communications and therefore limits more dynamic resource management.

Better service to customers will result in less airspace user delays; increased flexibility of the NAS in response to airspace user demands; better knowledge-sharing; and increased predictability for airspace user operations.

Potential solutions for productivity capability shortfalls must address applicable ATO business case expectations and be in consonance with the Joint Planning and Development Office (JPDO) NGATS Integrated Plan.

1.1.2 Technology Opportunity

The JPDO NGATS vision identifies technology opportunities for the implementation and use of data communications as an enabling service for conflict probe (CP) and traffic flow management (TFM) automation capabilities.

A data communications architecture is envisioned that will employ a globally interoperable message set integrated with both ground and air automation. Implementation is expected in multiple segments leading to the implementation of trajectory based operations.

2. OPERATIONAL CONCEPT

2.1 Operations

Data communications will take on an ever increasing role in controller to flight crew communication, contributing significantly to the increased efficiency, capacity, and safety of the National Airspace System (NAS). The evolution of data communications in the operational environment will be based upon the incremental implementation of advanced communication capabilities. Data communications represents the first phase of the transition from the current analog voice system to an International Civil Aviation Organization (ICAO) compliant system in which digital communication becomes an alternate and eventually predominant mode of communication.

The Next Generation Air Transportation System (NGATS) will make use of Four Dimensional (4-D) Trajectory Management as the core concept for Air Traffic Management (ATM) in 2025. Use of 4-D trajectory management acknowledges that all basic decisions, across all time horizons, are fundamentally related to the trajectory. 4-D trajectories are exchanged via data communications between aircraft/aircraft operators and ground automation systems.

Data communications capabilities will be fully integrated into controller workstations and the flight deck. Data communications will provide an additional means for two-way exchange between controllers and flight crews for ATC clearances, instructions, advisories, flight crew requests and reports. Routine communication will be increasingly handled by data communications for appropriately equipped users.

NGATS will affect sector resource management and the coordination amongst the sector control team, traffic flow management personnel, and automation. Research is currently being planned and conducted (e.g. Multi-Sector Planner) to determine the extent to which data communications functions can be shared amongst members of the control team, traffic flow management personnel, automation or other ATC entities. Whichever methodology proves to be most cost beneficial, the data communications system remains largely independent of these functional architecture boundaries and can operate in various modes simultaneously, provided appropriate interfaces are established to access the data communications functions.

Rulemaking is envisioned to be required in order to develop performance-based airspace and have aircraft data communications equipage in place to handle the anticipated air traffic growth while maintaining an acceptable level of system efficiency.

Data communications in the NAS is envisioned to be implemented in three segments to meet the mission shortfalls in a practical, evolutionary approach to achieve the NGATS vision. The basis of the functions in this document is the *Communications Operating Concept and Requirements for the Future Radio System*, COCR Version 1.0, dated March 6, 2006. The following sections describe the services and capabilities envisioned for each segment of the data communications in support of NGATS.

Figure 2-1 shows a typical flight profile and the ATS services supporting the user in each domain. The Segment Two and Three services will not be available until after the timeframe of

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Segment 1. These Segment Two and Three services replace many of the Segment One services in the operational scenarios. By the end of Segment Three all services are expected to be widely available.

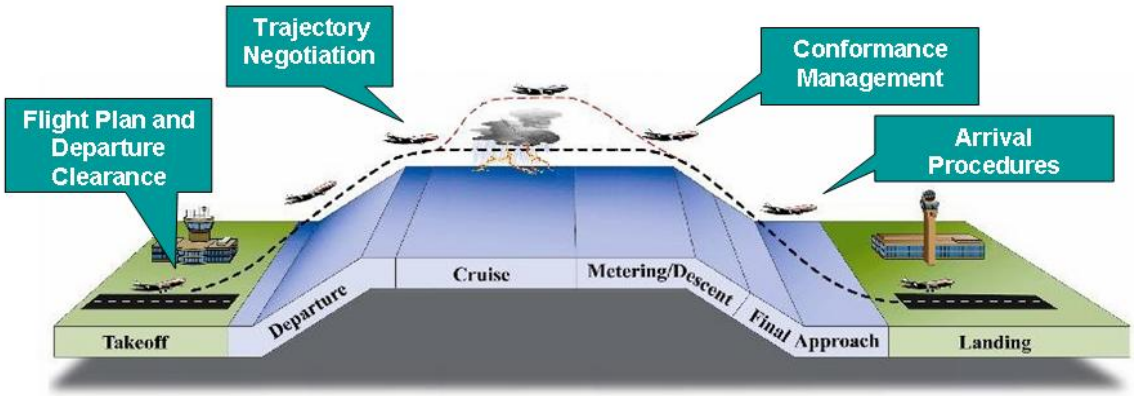

Figure 2-1 Data Communications Services by Flight Phase

2.1.1 Segment One (2012)

The first segment in implementing data communications will provide the basic capabilities for controllers and flight crews to transfer ATC clearances, requests, instructions, notifications, voice frequency communications transfers, and flight crew reports as a supplement to voice. Procedures using initial 4-D routes to manage continuous descent approaches will be implemented on a limited basis at certain airports with aircraft meeting capability requirements.

The initial capabilities will concentrate on implementation in the Tower and En Route environments and will serve as the initial building block for trajectory based operations.

2.1.2 Segment Two (2017)

Segment Two data communications is focused on transitioning the Segment One Tower and En Route data communications capabilities to the Terminal domain. In addition, an implementing rule will become effective requiring data communications capabilities to be part of the aircraft's minimum equipment requirements for access to performance-based airspace. The implementing rule will ensure a level of aircraft equipage such that the benefits of data communications in

performance-based airspace will be realized. This expansion, including the rulemaking and implementation of enhanced data communications, provides the basis for evolving the NAS from tactical control to management-by-planning and intervention-by-exception. This is also the time when traffic levels are projected to rise to the point where voice communications is anticipated to restrict air traffic growth, and therefore data communications will evolve to become the necessary means of air-ground communications.

Segment One data communications capabilities will be expanded to include implementation of 4-D trajectory agreements in performance-based airspace where the predictability of the user's 4-D trajectory over some future time frame is agreed to be stable, conflict free and will only change for exceptions.

Segment Two also adds trajectory conformance management to monitor the trajectory agreements in performance-based airspace. Data communications facilitates conformance management by providing the means for the aircraft and the ground system to exchange the detailed data necessary to perform conformance management without the direct involvement of the flight crew or controller. Three types of agreements are envisioned: periodic, event-based and on-demand. The aircraft's capability to accurately fly its cleared route of flight and improvements in conformance predictability, either through ground automation improvements, interaction with traffic flow management and flight operations centers or through the provision of aircraft intent data, will increase the precision of trajectory modeling and enable new concepts in separation assurance.

The exact mechanism for this capability (e.g. automatic dependent surveillance broadcast, point to point addressed applications, ground automation conflict prediction improvements) is still to be determined. Research will determine the most cost-effective and technically superior approach to increasing the certainty of an aircraft's future position. The data communications system design will be flexible enough to accommodate the chosen approach, either through the exchange of aircraft intent data or the provision of revised trajectories needed to eliminate predicted conflicts in all domains.

2.1.3 Segment Three (2022)

Segment Three will add data communications capability that will support delegation of separation responsibility to the flight crew and guidance for zero visibility surface operations. Ground automation enhancements have increased the time horizon for detection of conflicts further than was available in Segment Two. This provides even longer term predictability to the 4-D trajectory agreements which are now commonplace.

2.1.4 Operational Scenarios

The following scenarios illustrate how the capabilities described above will be used in the operational environment as the implementation of data communications evolves in the NAS.

2.1.4.1 Segment One Data Communications Operational Scenario

2.1.4.1.1 Pre-Departure

The flight crew prepares the aircraft for the flight and, in particular, they initiate data services with the ground data communications system which recognizes the initiation and responds with appropriate data communication information.

In response to a flight crew request, and where available via data communications, the ground provides relevant weather information, field conditions, approach and departure runways, plus local notices to airmen related to the departure airfield.

The flight crew requests a departure clearance from the clearance delivery position. The ground system delivers the request to the assigned controller. The controller uses the automation system that provides arrival/departure sequence information and any traffic flow constraints related to the aircraft, to formulate the departure clearance that is sent to the flight crew via data communications. The routing information supports multiple formats e.g., ATS routes, fix names, or 4-D trajectories. Should the route of flight change prior to departure, a revision will be issued through data communications or by voice.

2.1.4.1.2 Departure Taxi

Once the departure clearance has been compared to the filed flight plan, the flight crew requests a taxi clearance using data communications. The assigned controller provides a predefined taxi clearance, based on a named procedure, via data communications. Unless a revised taxi route or departure clearance occurs, this is the last controller-flight crew data exchange on the airport surface. This is because the surface is a fast paced and highly dynamic environment, which demands quicker controller-pilot exchanges.

The flight crew receives takeoff clearance and voice frequency communications transfer via voice.

2.1.4.1.3 Departure in Terminal Airspace

When the aircraft is airborne, the flight crew follows the departure clearance and contacts the departure controller using voice. All communication services in the departure terminal airspace are conducted via voice in the Segment One timeframe. Handoff to the first en route sector is via voice. [1]

[1] *During the transition from domains which **are** equipped for data communications to those that **are not**, the data communications system must have knowledge of what control position/facility is equipped to provide data communications services. Managing the*

2.1.4.1.4 Domestic En Route Airspace

Communications with the first en route controller is conducted through data communications**.** The controller takes necessary action to alleviate conflicts using air traffic control voice or data communications clearance services as appropriate. The flight crew responds in the same mode and flies the aircraft according to the instructions given. The controller employs decision support tools to assist in implementing traffic management initiatives or routings based on local constraints. New route clearances, are uplinked through data communications. The flight crew enters the new routing into the aircraft flight management system and follows the new clearance. The flight crew requests and is provided relevant information via data communications, including the weather, arrival airport field conditions, plus the local notices to airmen for the destination airport.

At this time, the controller determines that the voice channel in use has been blocked. In order to address this concern and free the voice channel for communications, the controller initiates a data communications up link requesting that all aircraft with which communication is required check for radio malfunction. Within moments, the blockage of the frequency is resolved and the controller re-establishes voice communications for tactical instructions as necessary.

In conjunction with the ground automation handoff, data communications provides the next frequency to the flight crew, and transfers the data communications eligibility to the next sector or en route facility.

As the aircraft approaches the descent point, the appropriate controller provides scheduled time of arrival information to the flight crew via data communications. The flight crew then downlinks a route request to the en route controller, through data communications, which consists of a tailored 4-D trajectory based on the aircraft's performance. The controller coordinates the request with the arrival terminal airspace via ground-to-ground communications and the en route controller initiates the transmission of a data communications response containing the confirmed clearance. The en route controller generates a handoff to the terminal airspace and data communications provides the voice frequency for the terminal airspace arrival sector to the flight crew who contacts the terminal airspace controller. At the appropriate transition point, data communications terminates controller-flight crew data communications operations.

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data communications eligibility transfer to that control position in a manner which protects the integrity of data communications to ensure that errors are not introduced by inadvertent data communications exchanges before eligibility is established is of paramount importance and will be a key requirement of the FAA's Data Communications infrastructure.

2.1.4.1.5 Arrival Terminal Airspace

The aircraft flight management system flies the trajectory using a continuous descent profile. The controller can intervene via voice if a situation requires immediate action. All controller-flight crew communications are issued via voice in the arrival terminal airspace during Segment One timeframe.

2.1.4.1.6 Arrival Airport

All controller-flight crew communications are via voice. The flight crew contacts the tower runway controller who monitors the traffic situation and intervenes if required. The tower runway controller issues the landing clearance to the flight crew, provides a recommended runway exit, and directs the flight crew to contact the ground controller.

2.1.4.1.7 Arrival Taxi

All controller-flight crew communications are via voice. The flight crew contacts the tower ground controller who issues taxi information. The flight crew then maneuvers the aircraft to the arrival gate.

2.1.4.2 Segment Two Data Communications Operational Scenario

The use of data communications in this segment begins as an alternative to voice and transitions to the preferred method of communications enabling trajectory based operations in larger volumes of airspace. Equipage requirements for entry into performance-based airspace are now in effect resulting in more aircraft being equipped with data communications capability. The data communications capability includes integration of the aircraft communications functions and the Flight Management System navigation function for direct transfer of the clearance information. Expansion of the data communications capability, including conformance management into terminal airspace has occurred by the end of the Segment Two timeframe.

Changes in services from Segment One are identified by **bold face** type.

2.1.4.2.1 Pre-Departure

The flight crew prepares the aircraft for the flight and, in particular, they initiate data services with ground data communications which recognizes the initiation and responds with appropriate data communications information.

In response to a flight crew request, and where available, the ground provides relevant weather information, field conditions, approach and departure runways, plus local notices to airmen related to the departure airfield via data communications.

Surface operations are enhanced by providing a **static airfield map** uplinked to the aircraft showing current taxiway/runway closures, construction areas, obstructions, etc. **At the request of the flight crew, ATM-related operational data for the flight (e.g. departure sequence, collaborative decision making agreements, and slot-time allocations) are relayed by data communications to the flight crew in preparation for departure.**

The flight crew requests a departure clearance from the clearance delivery position. Data communications delivers the request to the assigned controller. The controller uses the tower automation system that provides arrival/departure sequence information and any traffic flow constraints related to the aircraft, to formulate the departure clearance that is sent to the flight crew via data communications. The routing information supports multiple formats e.g., ATS routes, fix names, or 4-D trajectories. Should the route of flight change prior to departure, a revision will be issued through data communications or via voice. After issuance of the departure clearance, **the automation system generates a request via data communications to the aircraft automation to report its active route. This information is compared with the departure clearance to verify consistency.**

2.1.4.2.2 Departure Taxi

The flight crew requests approval to taxi the aircraft using data communications. In response, the assigned controller provides a **detailed taxi clearance containing specific directions to follow** in response. Unless a revised taxi route or departure clearance occurs, this is the last controller-flight crew data exchange on the airport surface. This is because the surface is a fast paced and highly dynamic environment, which demands quicker controller-pilot exchanges.

The flight crew receives takeoff clearance and voice frequency communications transfer via voice. Data communications manages the data communications eligibility transfer to the next control position.

2.1.4.2.3 Departure in Terminal Airspace

When the aircraft is airborne, the flight crew follows the departure clearance and **contacts the departure controller using data communications**. Depending on the time criticality of a given clearance, communication services in the departure terminal airspace are conducted via a mixture of voice **and data. Typical exchanges via data communications for a departing aircraft include altitude and direct routing assignments. Voice frequency changes are communicated via data communications based on the handoff. Data communications manages the data communications eligibility transfer to the next control position.**

The terminal automation system **monitors the aircraft behavior as required, current and future, to assure conformance with the given trajectory either through ground automation improvements or through the provision of aircraft intent data that increases the precision of trajectory modeling or enables new concepts in separation assurance.**

2.1.4.2.4 Domestic En Route Airspace

Communications with the first en route controller is conducted through data communications**.** Routine clearances with aircraft are communicated via data communications while time critical clearances continue do be communicated by voice. There is also a mix of capabilities operating in the airspace. **In performance-based airspace, aircraft are highly equipped and are managed by exception**. In the remaining airspace lesser equipped aircraft continue to be managed using Segment One data communications services and tactical control.

The controller assesses any trajectory changes generated by traffic management initiatives and takes necessary action, through data communications, to alleviate conflicts **by sending a new trajectory to the flight crew. After checking whether the aircraft is capable of complying with the proposal through the Flight Management System, in this particular case the flight crew responds with an alternative trajectory. The ground automation confirms the proposal is conflict free and provides a new trajectory agreement to the aircraft. To prevent mistakes on re-entry of the trajectory clearance information, the data communications airborne system and the Flight Management System navigation function are interfaced, allowing direct transfer of clearance data.**

The en route automation system **monitors the aircraft trajectory intent as required, current and future, to assure conformance with the given trajectory either through ground automation improvements or through the provision of aircraft intent data that increases the precision of trajectory modeling or enables new concepts in separation assurance.**

The flight crew requests relevant information for the weather, airport field conditions plus the local notices to airmen for the destination airport through data communications. **Selected aircraft parameters are monitored by downlinking through data communications to decrease controller and flight crew workload and improve surveillance performance.**

In conjunction with the ground automation handoff, data communications provides the next frequency to the flight crew, and transfers the data communications eligibility to the next sector or Center.

As the aircraft approaches the Top of Descent position, the appropriate controller provides scheduled time of arrival information to the flight crew via data communications. The flight crew then downlinks a route request to the en route controller, through data communications, which is composed of a tailored 4-D trajectory based on the aircraft's performance. The controller coordinates the request with the arrival terminal airspace via ground-to-ground communications and the en route controller initiates the transmission of a data communications response containing the confirmed clearance.

The en route controller generates a handoff to the terminal airspace and data communications provides the voice frequency for the terminal airspace arrival sector to the flight crew **and manages the data communications eligibility transfer.**

2.1.4.2.5 Arrival Terminal Airspace

The flight crew **contacts the terminal airspace controller via data communications**. **The terminal airspace controller replies with the initial information on approach expectations, potential airport information changes, and initial clearances.** The aircraft flight management system flies the trajectory using a continuous descent profile. Selected **aircraft parameters are monitored by downlinking through data communications to decrease controller and flight crew workload and improve surveillance performance. Routine clearances are communicated via data communications** while time critical clearances continue to be issued via voice if a situation requires near term action. Once the aircraft receives voice instructions to change its course, the 4-D trajectory agreement is nullified and must be re-established if desired.

As the aircraft stabilizes for the approach to the airport, **the tower automation generates a message to be sent through data communications to the aircraft containing the expected taxi route.** Once the aircraft is established on the approach, **a data clearance to execute the approach is issued. An instruction to monitor the tower voice communication frequency is subsequently issued via data communications. At the appropriate transition point data communications terminates controller-flight crew data communications operations.**

2.1.4.2.6 Arrival Airport

All controller-flight crew communications are issued via voice. The tower runway controller contacts the flight crew to provide relevant traffic and landing clearance information while monitoring the traffic situation. After the aircraft lands, the tower runway controller confirms the previously issued runway exit and directs the flight crew to contact the ground controller.

2.1.4.2.7 Arrival Taxi

All controller-flight crew communications are issued via voice. The tower ground controller clears the flight crew to continue in accordance with the previously issued taxi route and monitors the traffic situation as they maneuver the aircraft to the arrival gate.

2.1.4.3 Segment Three Operational Scenario

In Segment Three, aircraft will have an even wider range of capabilities than in Segment Two, supporting varying levels of total system performance via on-board capabilities and associated crew training leading to a further expansion of performance-based airspace. This will include the ability to perform delegated separation, spacing, and merging tasks and to precisely navigate and execute 4-D trajectories.

The mode of operation described under the Segment Two scenario is now in common use for all aircraft. The ground automation capability for detecting and planning conflict free trajectories has extended the time horizon predictability for these agreements. Every aircraft seeking to operate in performance-based airspace is now equipped with a cockpit display capable of high definition graphics. This allows the use of advanced concepts in ATM, based on graphical depictions of the surrounding aircraft and airport situation. These advances allow ATM to be conducted on a Management by Planning and Intervention by Exception basis for much of the separation assurance function.

2.1.4.3.1 Pre-Departure

The flight crew prepares the aircraft for the flight and, in particular, they initiate data services with ground data communications which recognizes the initiation and responds with appropriate data communication information.

In response to a flight crew request, and where available, the ground provides relevant weather information, field conditions, approach and departure runways, plus local notices to airmen related to the departure airfield via data communications.

At the request of the flight crew, ATM-related operational data for the flight (e.g. departure sequence, collaborative decision making agreements, and slot-time allocations) are relayed by data communications to the flight crew in preparation for departure.

In advance of a planned departure, users now file 4-D trajectory-based flight plans for operations in performance-based airspace. Users and air traffic service providers collaboratively negotiate 4-D trajectory agreements from take-off to approach, based on user requests and anticipated constraints. This agreement is embedded in the departure clearance. The final point in the clearance also includes the required time constraint for the arrival fix.

After issuance of the departure clearance, the ground automation system generates a request via data communications to the aircraft automation to report its active route. This information is compared with the departure clearance to verify consistency.

2.1.4.3.2 Departure Taxi

The flight crew requests approval to taxi the aircraft using data communications. The assigned controller provides a detailed taxi clearance response, containing specific directions to follow. Surface operations are **enhanced by providing the taxi route overlaid on the static airfield map. Information, provided by data communications and cockpit displays, is of such high integrity that operations may be conducted in zero visibility conditions.**

Unless a revised taxi route or departure clearance occurs, this is the last controller-flight crew data exchange on the airport surface as the timeliness of data communications in this highly dynamic environment demands much quicker voice responses for many of the tactical communications.

The flight crew receives takeoff clearance via voice. **Data communications provides the voice frequency communications transfer** and manages the data communications eligibility transfer to the next control position.

2.1.4.3.3 Departure in Terminal Airspace

The aircraft follows the 4-D trajectory previously negotiated. Trajectory negotiations conducted pre-departure typically leave some conflicts unresolved such that maximum use of the airspace resource can be affected. Therefore the controller takes necessary action via data communications to alleviate potential conflicts through the revision of the 4-D agreement, assignment of delegated separation services e.g. Crossing and Passing. On an exception basis tactical control is conducted via voice communications.

The voice frequency and data communications eligibility transfers **are conducted automatically without the need for human interaction.**

2.1.4.3.4 Domestic En Route Airspace

As communications services and the nature of air traffic control have evolved, the communications requirements have evolved also. Trust in the system's performance is increased. Routine exchanges are minimized. Almost everything the flight must do is embedded in the 4-D agreement. **A**greements between the aircraft system and the ground automation are now in place with all aircraft in performance-based airspace and **non-conformance reports are only generated when an event occurs** beyond the parameters set in the agreement. Changes are more in the context of overall trajectory maintenance. Conflict management is still required in the en route environment so as not to over constrain the system in high density operations.

Data communications supports aircraft clearances to use the appropriate services to self-separate e.g. Crossing and Passing, Sequencing and Merging or In Trail Procedures. Aircraft transmit data on their wake vortex characteristics to enable wake vortex-based separation. Separation responsibility is delegated to the flight crew for this function.

ATM flight information (e.g. arrival sequence, collaborative decision making agreements, and slot-time allocations) is now provided by subscription.

2.1.4.3.5 Arrival Terminal Airspace

Aircraft employ continuous descent profiles from the en route Top of Descent constraint. Arrival at the final required constraint terminates trajectory based operations. **When necessary due to the traffic density, aircraft use the appropriate data communications services (e.g. Sequencing and Merging or Paired Approach) to self-separate in the final approach phase from traffic landing on the same or closely spaced parallel runways. Aircraft on adjacent parallel approaches transmit data on their wake vortex characteristics to enable wake vortex-based separation. Separation responsibility is delegated to the flight crew for this function.**

2.1.4.3.6 Arrival Airport

The arrival taxi phase is established before the aircraft begins the final approach for landing. All the functions introduced under previous segments continue to be in use for Segment Three equipped aircraft.

The tower runway controller contacts the flight crew to provide relevant traffic and landing clearance information while monitoring the traffic situation. After the aircraft lands, the tower runway controller confirms the previously provided runway exit and **directs the flight crew to contact the ground controller via data communications.**

2.1.4.3.7 Arrival Taxi

The surface map and taxi route previously sent via data communications is now of such integrity that taxiing in zero-zero weather conditions is now feasible. The tower ground controller clears the flight crew to continue in accordance with the previously issued taxi route and monitors the traffic situation as they maneuver the aircraft to the arrival gate.

2.2 Maintenance

The maintenance concepts will be further clarified and defined based on cost and alternatives approved by ATO. Additionally, there is potential that in the Segment Two and Three timeframes, the NAS maintenance concept may change.

2.3 Quantities and Locations

The operational deployment is planned as follows:

Segment One: Data communications will be available at all en route facilities. Additionally, it will be available in a number of tower facilities e.g. the 72 tower data link services sites as determined in the investment analysis.

Segment Two: Data communications will be available at all the facilities from Segment One plus, it will be implemented in a number of terminal facilities as determined in the investment analysis.

Segment Three: Data communications will be available at some number of ATC facilities across the NAS consistent with the NGATS concept.

2.4 Schedule Constraints

Initial Operational Capability (IOC) at the key site(s) is planned for each of the three segments as follows:

- Segment One: FY 2012
- Segment Two: FY 2017
- Segment Three: FY 2022

3. TECHNICAL PERFORMANCE

3.1 Operational and Functional Requirements

This document identifies requirements associated with the provision of data communications in the NAS. The requirements identified in this document may be allocated to any new NAS system elements specific to the provision of data communications and/or to existing or planned elements in the NAS. Figure 3-1 shows the high level functional architecture for data communications.

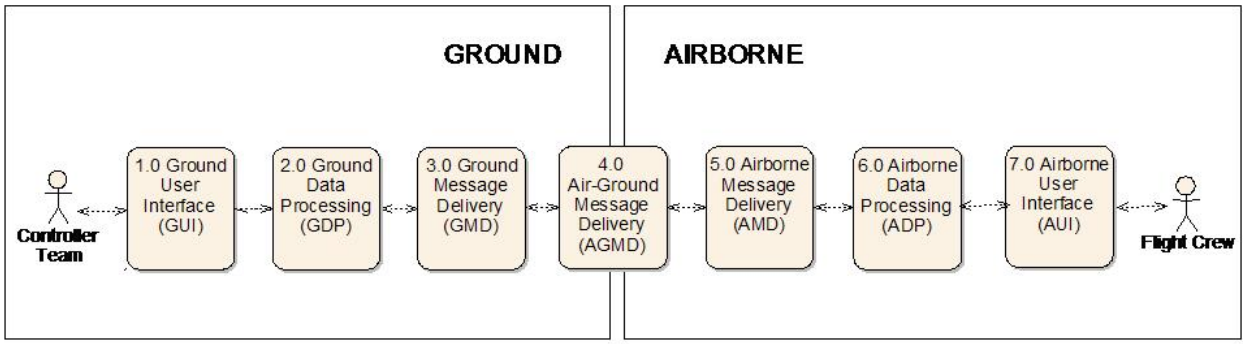

Figure 3-1 High Level Functional Architecture Diagram

3.1.1 Segment One Requirements

3.1.1.1 Messaging Requirements

3.1.1.1.1 Data communications shall provide tools for pilot/controller composition of messages.

3.1.1.1.2 Data communications shall compose messages for:

a. pilot/controller approval or

b. automated transmission of non-trajectory changing messages without pilot/controller intervention.

3.1.1.1.3 Data communications shall**:**

a. provide tools for composition of predefined messages,

b. store predefined messages, and

c. retrieve predefined messages.

3.1.1.1.4 Data communications shall provide tools for controller deferral of messages.

3.1.1.1.5 Data communications shall provide tools for controller rejection of messages.

3.1.1.1.6 Data communications shall provide tools for controller editing of messages.

3.1.1.1.7 Data communications shall:

a. validate and

b. error check

messages.

3.1.1.1.8 Data communications shall provide tools to:

a. transmit messages and

b. process responses to those messages.

3.1.1.2 Unique Identification Requirements

3.1.1.2.1 Data communications shall uniquely identify elements (e.g. aircraft, automation systems, control positions, applications) performing data communications.

3.1.1.2.2 Data communications shall identify the element's data communications capabilities.

3.1.1.2.3 Data communications shall use the identified data communications capabilities of each element to determine what services are offered to that element.

3.1.1.2.4 Data communications shall associate aircraft with flight plans (and/or flight objects, if available).

3.1.1.3 Data Communications Requirements

3.1.1.3.1 Data communications shall deliver information to intended recipient(s).

3.1.1.3.2 Data communications shall:

a. initiate,

b. maintain, and

c. terminate

service between the elements of the system.

3.1.1.3.3 Data communications shall make the data communications status of each system element available to ground system elements.

3.1.1.3.4 Data communications shall assign the authority to exchange data communications messages between an aircraft and a ground element(s).

3.1.1.3.5 Data communications shall assign eligibility to exchange data communications messages between the authorized ground element(s) and the aircraft.

3.1.1.3.6 Data communications shall report on the status of data communications messages.

3.1.1.3.7 Data communications shall transfer data communications eligibility between control positions.

3.1.1.3.8 Data communications shall provide tools to send voice frequency assignments to aircraft with instructions to monitor the next frequency.

3.1.1.3.9 Data communications shall provide tools to send voice frequency assignments to aircraft with instructions to contact the controller on the assigned frequency.

3.1.1.3.10 Data communications shall provide tools for confirmation of the aircraft's assigned altitude.

3.1.1.3.11 Data communications shall provide tools to notify aircraft that a voice frequency is blocked.

3.1.1.4 Clearance Requirements

3.1.1.4.1 Data communications shall ensure that only one control position is authorized to issue clearances to an eligible aircraft at any given time.

3.1.1.4.2 Data communications shall ensure that clearances are sent to aircraft only from the control position having eligibility for that aircraft.

3.1.1.4.3 Data communications shall provide tools for the controller to:

a. accept,

b. process requests for, and

c. provide

route modifications to eligible aircraft.

3.1.1.4.4 Data communications shall provide tools for the controller to:

a. accept,

b. process requests for, and

c. provide

vertical clearances to eligible aircraft.

3.1.1.4.5 Data communications shall provide tools for the controller to:

a. accept,

b. process requests for, and

c. provide

speed changes to eligible aircraft.

3.1.1.4.6 Data communications shall provide tools for the controller to:

a. accept,

b. process requests for, and

c. provide

heading changes to eligible aircraft.

3.1.1.4.7 Data communications shall provide tools for the controller to:

a. accept,

b. process requests for, and

c. provide

crossing constraints to eligible aircraft.

3.1.1.4.8 Data communications shall provide tools for the controller to:

a. accept,

b. process requests for, and

c. provide

lateral offsets to eligible aircraft.

3.1.1.4.9 Data communications shall provide tools for the controller to:

a. accept,

b. process requests for, and

c. provide

arrival, approach, and departure procedures to eligible aircraft.

3.1.1.5 Instructions, Advisories, and Report Request Responses Requirements

3.1.1.5.1 Data communications shall ensure that only one control position is authorized to issue instructions to an eligible aircraft at any given time.

3.1.1.5.2 Data communications shall ensure that instructions are sent to aircraft only from the control position having eligibility for that aircraft.

3.1.1.5.3 Data communications shall provide tools for the controller to:

a. compose and

b. send

instructions to eligible aircraft.

3.1.1.5.4 Data communications shall provide tools for the controller to:

a. accept and

b. process

reports from eligible aircraft.

3.1.1.5.5 Data communications shall provide tools for the controller to issue air traffic advisories to eligible aircraft.

3.1.1.6 Departure and Taxi Clearance Requirements

3.1.1.6.1 Data communications shall ensure that only one control position is authorized to issue departure and taxi clearances to an eligible aircraft at any given time.

3.1.1.6.2 Data communications shall ensure that departure and taxi clearances are sent to aircraft only from the control position having eligibility for that aircraft.

3.1.1.6.3 Data communications shall provide tools for the controller to:

a. accept,

b. process requests for, and

c. provide

departure clearances to eligible aircraft.

3.1.1.6.4 Data communications shall provide tools for the controller to:

a. accept,

b. process requests for, and

c. provide

revisions to departure clearances to eligible aircraft.

3.1.1.6.5 Data communications shall provide tools for the controller to provide predefined departure taxi clearances to eligible aircraft.

3.1.1.7 Automatic Terminal Information Service Requirements

3.1.1.7.1 Data communications shall:

a. accept requests for, and

b. provide

current terminal information to aircraft.

3.1.1.7.2 Data communications shall provide tools for an authorized user to:

a. compose,

b. edit, and

c. verify

the content of the terminal information.

3.1.1.7.3 Voice provided terminal information shall be identical to the data communications generated digital Automatic Terminal Information Service (ATIS) terminal information.

3.1.1.8 Integration Requirements

3.1.1.8.1 Data communications shall electronically exchange information with external systems without requiring manual reentry.

3.1.1.9 Recording of Messages, Statistical, and Performance Data

3.1.1.9.1 Data communications shall record all:

a. sent and

b. received

data communications messages.

3.1.1.9.2 Data communications shall:

a. collect and

b. store

data communications service, system, and subsystem statistical and performance data.

3.1.1.9.3 Data communications shall provide tools to:

a. retrieve and

b. analyze

stored message, statistical, and performance data.

3.1.1.9.4 Data communications shall provide the capability for:

a. monitoring and

b. control

of data communications resources.

3.1.2 Segment Two Requirements

Note: The requirements in this section are for Segment Two capabilities which will be built on the capabilities implemented in Segment One.

3.1.2.1 Data communications shall provide tools for the controller to:

a. accept,

b. process, and

c. respond to

user preferences from eligible aircraft.

3.1.2.2 In response to flight crew requests, data communications shall provide a current airfield map that includes taxiway closures and obstructions.

3.1.2.3 Data communications shall exchange 4-dimensional trajectory information between system elements.

3.1.2.4 Data communications shall interact with decision support tools to evaluate proposed constraints or routes for acceptability.

3.1.2.5 Data communications shall provide tools for the controller to establish trajectory agreements for the 4-D portions of the planned route for eligible aircraft.

3.1.2.6 Data communications shall establish agreements for aircraft-generated flight path, trajectory, and status information.

3.1.2.7 Data communications shall provide aircraft-generated flight path, trajectory, and status information to decision support tools.

3.1.2.8 Data communications shall provide means to determine conformance management.

3.1.2.9 Data communications shall:

a. notify,

b. generate, and

c. display to the controller

proposed resolution(s) to trajectories that are identified as out of conformance with established trajectory agreements.

3.1.2.10 Data communications shall provide tools for the controller to provide taxi information and taxi clearances to eligible aircraft.

3.1.3 Segment Three Requirements

Note: The requirements in this section are for Segment Three capabilities which will be built on the capabilities implemented in Segment Two.

3.1.3.1 Data communications shall evaluate active trajectories for acceptability for no less than a two hour time horizon.

3.1.3.2 Data communications shall provide current, routine system wide information to aircraft without human intervention.

3.1.3.3 Data communications shall:

a. accept,

b. process requests for, and

c. provide

for automated transmission of messages without pilot/controller intervention.

3.1.3.4 Data communications shall exchange information in support of delegated separation operations for eligible aircraft.

3.1.3.5 Data communications shall:

a. accept and

b. process

wake vortex characteristics data from aircraft to enable wake vortex-based separation.

3.1.3.6 In response to requests, data communications shall provide a current airfield map that includes surface traffic, the taxi route, the taxi clearance limit(s), taxiway closures and obstructions to eligible aircraft for surface navigation.

3.2 Product Characteristics and Performance Requirements

3.2.1 General Product Characteristics and Performance Requirements

3.2.1.1 Data Communications Message Exchange Rates

3.2.1.1.1 Data communications shall meet all performance requirements with the expected quantity and mix of data communications messages for each segment.

3.2.2 Segment One Product Characteristics and Performance Requirements

3.2.2.1 Data communications shall provide service that is classified essential as defined in NAS-SR-1000, National Airspace System, System Requirements Specification.

3.2.2.2 Continuity

3.2.2.2.1 Data communications shall provide a continuity of 0.9975 (OSA to validate) or greater.

3.2.2.3 Service Data Integrity

3.2.2.3.1 The service data integrity for data communications shall be 10^{-5} (OSA to validate) or less.

3.2.2.4 Availability

3.2.2.4.1 Data communications availability shall be 0.999 (OSA to validate) or greater.

3.2.2.5 Latency

3.2.2.5.1 Data communications shall meet the 95th percentile one way transit times ($RCTP_{95}$) (OSA to validate) as follows:

Domain	Threshold	Objective
En Route	8.0 secs	3.0 secs
Tower	8.0 secs	3.0 secs

Note: The threshold values are derived from DO-290. The objective values are a fraction of the threshold values. The objective values for Segment One become the threshold values for the subsequent segments.

3.2.2.5.2 Data communications expiration time shall be 250.0 secs (OSA to validate) or less. Expiration time is defined as the maximum time for completion of a transaction after which peer parties should revert to an alternative procedure.

3.2.2.6 Number of Aircraft Supported

3.2.2.6.1 Data communications shall be capable of providing simultaneous service to no fewer than 41 aircraft per en route control position.

3.2.2.6.2 Data communications shall be capable of providing simultaneous service to no fewer than X1 en route control positions.

3.2.2.6.3 Data communications shall be capable of providing simultaneous service to no fewer than 200 aircraft per tower facility.

3.2.3 Segment Two Product Characteristics and Performance Requirements

Note: The requirements in this section are for Segment Two capabilities which will be built on the capabilities implemented in Segment One.

3.2.3.1 Data communications shall be classified critical as defined in NAS-SR-1000, National Airspace System, System Requirements Specification.

3.2.3.2 Continuity

3.2.3.2.1 Data communications shall provide a continuity of 0.9975 (OSA to validate) or greater.

3.2.3.3 Service Data Integrity

3.2.3.3.1 The service data integrity for data communications shall be 10^{-5} (OSA to validate) or less.

3.2.3.4 Availability

3.2.3.4.1 Data communications availability shall be 0.99999 (OSA to validate) or greater.

3.2.3.5 Latency

3.2.3.5.1 Data communications shall meet the 95th percentile one way transit times ($RCTP_{95}$) (OSA to validate) as follows:

Domain	Threshold	Objective
En Route	3.0 secs	1.5 secs
Tower	3.0 secs	1.5 secs
Terminal	3.0 secs	1.5 secs

Note: The threshold values are set to the objective values from Segment One. The objective values are a fraction of the threshold values.

3.2.3.6 Number of Aircraft Supported

3.2.3.6.1 Data communications shall be capable of providing simultaneous service to no fewer than 41 aircraft per en route control position.

3.2.3.6.2 Data communications shall be capable of providing simultaneous service to no fewer than X2 en route control positions.

3.2.3.6.3 Data communications shall be capable of providing simultaneous service to no fewer than:

a. 134 aircraft for clearance delivery control position,

b. 48 aircraft for ground control position, and

c. 18 aircraft for tower runway control position.

3.2.3.6.4 Data communications shall be capable of providing simultaneous service to no fewer than 16 aircraft per terminal control position.

3.2.3.6.5 Data communications shall be capable of providing simultaneous service to no fewer than X3 terminal control positions.

3.2.4 Segment Three Product Characteristics and Performance Requirements

Note: The requirements in this section are for Segment Three capabilities which will be built on the capabilities implemented in Segment Two.

3.2.4.1 Continuity

3.2.4.1.1 Data communications shall provide a continuity of 0.9975 (OSA to validate) or greater.

3.2.4.2 Service Data Integrity

3.2.4.2.1 The service data integrity for data communications shall be 10^{-7} (OSA to validate) or less.

3.2.4.3 Availability

3.2.4.3.1 Data communications availability shall be 0.99999 (OSA to validate) or greater.

3.2.4.4 Latency

3.2.4.4.1 Data communications shall meet the 95th percentile one way transit times ($RCTP_{95}$) (OSA to validate) as follows:

Domain	Threshold	Objective
En Route	3.0 secs	1.5 secs
Tower	3.0 secs	1.5 secs
Terminal	3.0 secs	1.5 secs
Addressed air-to-air	0.3 secs	0.15 secs

Note: The threshold values are set to the objective values from Segment One for the En Route, Tower, and Terminal Domains. The objective values are a fraction of the threshold values.

3.2.4.5 Number of Aircraft Supported

3.2.4.5.1 Data communications shall be capable of providing simultaneous service to no fewer than 95 aircraft per en route control position.

3.2.4.5.2 Data communications shall be capable of providing simultaneous service to no fewer than X4 en route control positions.

3.2.4.5.3 Data communications shall be capable of providing simultaneous service to no fewer than:

a. 134 aircraft for clearance delivery control position,

b. 48 aircraft for ground control position, and

c. 18 aircraft for tower runway control position.

3.2.4.5.4 Data communications shall be capable of providing simultaneous service to no fewer than 44 aircraft per terminal control position.

3.2.4.5.5 Data communications shall be capable of providing simultaneous service to no fewer than X5 terminal control positions.

4. PHYSICAL INTEGRATION

Note: Physical integration of data communications will be planned to ensure minimal disruption to ATO operations and will involve coordination with FAA functional divisions (facility management, environmental, energy, safety, and power).

4.1 Real Property

4.1.1 FAA owned data communications ground-based unique equipment shall be integrated into existing NAS facilities.

4.2 RESERVED

4.3 Environmental

4.3.1 Data communications ground-based unique equipment shall comply with:

a. Code of Federal Regulations (CFR), Title 40, Environmental Protection, and

b. state,

c. local,

d. Department of Transportation (DOT), and

e. FAA

environmental orders and directives.

4.4 Energy Conservation

4.4.1 Data communications ground-based unique equipment shall meet the requirements of Executive Order 13123, *Greening the Government Through Efficient Energy Management*, dated June 3, 1999.

4.5 Heating, Ventilation, and Air Conditioning

4.5.1 Equipment Operating Environment

4.5.1.1 Data communications ground-based unique equipment shall be designed to meet the non-operating and operating environment requirements defined in FAA-G-2100G, *Electronics Equipment, General Requirements*.

4.5.2 Impact on Equipment Operating Environment

4.5.2.1 Data communications ground-based unique equipment shall operate with existing facility Heating, Ventilation, and Air Conditioning (HVAC).

4.6 Grounding, Bonding, Shielding, and Lightning Protection

4.6.1 All grounding and bonding of data communications ground-based unique equipment shall comply with:

a. FAA-STD-019E, *Lightning and Surge Protection, Grounding, Bonding and Shielding Requirements for Facilities and Equipment*,

b. FAA Order 6950.19, *Practices and Procedures for Lightning Protection Grounding, Bonding, and Shielding Implementation*,

c. FAA Order 6950.20 *Fundamental Considerations of Lightning Protection Grounding, Bonding, and Shielding*, and ANSI/IEEE 1100-1992, *Grounding Shielding and Bonding*, and

d. FAA-G-2100G, *Electronics Equipment, General Requirements*.

4.7 Cables

4.7.1 Data communications ground-based unique equipment shall meet the requirements of:

a. National Fire Protection Association (NFPA) Standard 70, *National Electric Code*,

b. FAA Order 6630.4, *En Route Communications Installation Standards Handbook*,

c. FAA Order 6950.22, *Maintenance of Electrical Power and Control Cables*,

d. FAA-C-1217, *Electrical Work, Interior*, and

e. FAA-G-2100G, *Electronic Equipment, General Requirements*.

4.8 Hazardous Materials

4.8.1 Data communications ground-based unique equipment shall be free of hazardous material, to include:

- Asbestos
- Polychlorinated biphenols (PCBs)
- Lead
- Class 1 Ozone Depleting Substances.

4.9 Power Systems and Commercial Power

4.9.1 Data communications ground-based unique equipment shall connect to facility critical power buses for primary system power.

4.9.2 Data communications ground-based unique equipment shall meet the requirements of:

a. FAA-G-2100G, *Electronic Equipment, General Requirements*.

4.10 Telecommunications

4.10.1 Data communications shall:

a. interface with the telecommunications infrastructure and

b. comply with the appropriate FAA interface requirements documents (IRDs) and

c. interface control documents (ICDs).

4.11 Special Considerations

4.11.1 {reserved}

4.11.2 Occupational Safety and Health Administration

4.11.2.1 Physical integration of data communications ground-based unique equipment shall be accomplished in such a manner as to maintain facility compliance with Occupational Safety and Health Administration (OSHA) regulations.

4.11.3 Space

4.11.3.1 Installation of data communications ground-based unique equipment shall comply with Section 6.2 of the National Fire Protection Association Standard 70, *National Electric Code*.

4.11.4 Electrostatic and Electromagnetic

4.11.4.1 Electrostatic Discharge

4.11.4.1.1 Data communications ground-based unique equipment shall meet Electrostatic Discharge (ESD) requirements referenced in FAA-STD-019E, *Lightning and Surge Protection, Grounding, Bonding and Shielding Requirements for Facilities and Equipment*.

4.11.4.2 Electromagnetic Compatibility

4.11.4.2.1 Data communications ground-based unique equipment shall meet electromagnetic compatibility requirements referenced in:

a. MIL-HDBK-464, *Electromagnetic Environmental Effects Requirements for Systems*, and

b. FAA-G-2100G, *Electronics Equipment, General Requirements*.

5. FUNCTIONAL INTEGRATION

5.1 Integration With Other FAA Enterprise Architecture Elements

5.1.1 Remote Maintenance Monitoring System Interface Capabilities

5.1.1.1 Data communications shall interface to the existing automation monitor and control system(s) to allow the Air Traffic System Specialist (ATSS) to assess the following remotely:

1. Operating Status
2. Fault Isolation
3. Link Quality.

5.1.2 Controller Display System Interface Capability

5.1.2.1 Data communications shall exchange information with Display System(s) to allow the ATSS to perform data communications maintenance activities.

5.1.3 Supervisor Interface Capability

5.1.3.1 Data communications shall provide an interface to allow Air Traffic Management supervisors to perform all supervisory data communications activities at supervisor work stations.

5.2 Information Requirements

5.3 Software Integration

5.3.1 Software

5.3.1.1 The FAA shall have

a. access to or

b. option to acquire

the data communications application software reprocurement data package.

5.3.1.2 Data communications software shall be designed to permit the controller to accept recommended uplink messages from other applications without requiring the message to be copied or re-keyed.

5.3.1.3 Data communications Human Machine Interface (HMI) shall integrate ATC uplink messages from other applications intended for use by controllers using data communications.

5.3.1.4 The contents of data communications messages shall be available for other applications without requiring the message contents to be copied and re-keyed.

5.3.1.5 Data communications shall incorporate support software tools for the purpose of:

a. configuration management,

b. system administration,

c. adaptation,

d. system build,

e. test,

f. data capture and storage, and

g. data reduction and analysis (DR&A).

5.3.2 Adaptation

5.3.2.1 Data communications shall be adaptable to suit:

a. local and

b. national

operational or procedural requirements.

5.4 Spectrum Management

5.4.1 Data communications shall employ properly allocated radio spectrum protected for aeronautical safety services.

5.5 Standardization

5.5.1 Data communications shall exchange information using non-proprietary protocols.

6. HUMAN INTEGRATION

6.1 Human Factors Program

6.1.1 A Human Factors Program shall be established for the data communications program in accordance with the *FAA Human Factors Job Aid*.

6.1.2 Data communications shall conform with the following, including their addenda:

a. FAA System Safety Handbook, and

b. the FAA Human Factors Design Standard (HFDS), HF-STD-001, chapters 2-10, 12, and 14.

6.1.3 Data communications Segment One shall comply with:

a. RTCA, DO-256, Minimum Human Factors Standards for Air Traffic Services Provided Via Data Communications Utilizing the ATN, Builds I and IA and

b. RTCA, DO-238, Human Engineering Guidance for Data Link Systems.

6.2 Human/Machine Interface

6.2.1 Data communications human-system interfaces shall comply with HFDS requirements for:

a. usability,

b. operational suitability,

c. function allocation,

d. automation,

e. degraded mode operation,

f. fail-safe design,

g. human error resistance and tolerance,

h. ease of handling infrequent critical tasks,

i. computer-human interface design, and

j. workload.

6.2.2 Lifecycle Factors

Human factors considerations will be applied to data communications from development and design through fielding and operational test.

6.2.3 Human Factors Applications

6.2.3.1 The human factors program and requirements shall apply to data communications user interfaces for:

a. ATC,

b. air crew, and

c. technician/maintainer personnel,

and to the associated interactions and procedures within and between ATC and air crew personnel.

6.2.3.2 Human factors application for data communications shall consider:

a. the system operator (air traffic control specialist staffing an operational position),

b. the system maintainer, and

c. the pilot.

6.3 Employee Safety and Health

Human factors issues are critical to safety, availability, and the effectiveness of data communications.

6.3.1 Early human-in-the-loop prototyping of the human interfaces shall be accomplished prior to major design commitments.

6.3.2 LRUs in data communications ground-based unique equipment shall be designed to permit removal and replacement by one person in accordance with the Human Factors Design Standard.

6.4 Specialized Skills and Capabilities

Any specialized skills or training required for controllers to use/operate data communications will be provided prior to commencement of operations. Data communications operations will be an integral part of the controllers/supervisors training.

7. SECURITY

The data communication Preliminary Security Risk Assessment was performed to determine the minimum security requirements which are identified in this section.

7.1 Information System Security Program

7.1.1 The data communications program shall implement an information system security program in accordance with FAA Order 1370.82, *FAA Information Systems Security Program.*

7.2 Integration into Existing Automation

7.2.1 The data communications program shall implement security controls that are compatible with those controls implemented in existing automation.

7.3 Impact on Operations

7.3.1 Data communications security controls shall be non-disruptive to ATC operations.

7.4 Physical Security

7.4.1 The data communications program shall ensure that the physical security controls for data communications ground components comply with:

a. FAA Order 1600.6, *Physical Security Management Program* and

b. FAA Order 1600.69, *FAA Facility Security Management Program*.

7.5 Data Management

7.5.1 Data communications shall support data management in accordance with:

a. FAA Order 1375.1C, *Data Management* and

b. FAA Order 1200.22C, *NAS Data and Interface Equipment Used by Outside Interests*.

7.6 Internet Access

7.6.1 Data communications shall protect any access to the Internet in accordance with:

a. FAA Order 1370.83, *Internet Access Points* and

b. FAA Order 1370.84 *Internet Services*.

7.7 Personnel Security

7.7.1 The data communications program shall provide security controls in accordance with FAA Order 1600.1, *Personnel Security Program*.

7.7.2 The data communications program shall provide contractor and industrial personnel security controls in accordance with FAA Order 1600.72, *Contractor and Industrial Security Program*.

7.8 Technical Controls

7.8.1 Access Controls

7.8.1.1 Data communications shall limit information system access to:

a. authorized users,

b. processes acting on behalf of authorized users,

c. devices (including other information systems) and

d. the types of transactions and functions that authorized users are permitted to exercise.

7.8.2 Audit and Accountability

7.8.2.1 Data communications shall:

a. create,

b. protect, and

c. retain

information system audit records to the extent needed to enable the

d. monitoring,

e. analysis,

f. investigation, and

g. reporting

of unlawful, unauthorized, or inappropriate information system activity.

7.8.2.2 Data communications shall ensure that the actions of individual information system users can be uniquely traced to those users so they can be held accountable for their actions.

7.8.3 Identification and Authentication

7.8.3.1 Data communications shall identify:

a. information system users,

b. processes acting on behalf of users, and

c. devices

to authenticate (or verify) the identities of those

d. users,

e. processes, and

f. devices,

as a prerequisite to allowing access to organizational information systems.

7.8.4 System and Communications Protection

7.8.4.1 Data communications shall:

a. monitor,

b. control, and

c. protect

organizational communications (i.e., information transmitted or received by organizational information systems) at the:

d. external boundaries and

e. key internal boundaries

of the information system.

7.8.4.2 Data communications shall employ:

a. architectural designs,

b. software development techniques, and

c. systems engineering principles

that promote effective information security within organizational information systems.

7.9 Management Controls

7.9.1 Certification, Accreditation and Security Assessments

7.9.1.1 The data communications program shall periodically assess the security controls in organizational information systems to determine whether or not the controls are effective in their application.

7.9.1.2 The data communications program shall:

a. develop and

b. implement

plans of action designed to

c. correct deficiencies and

d. reduce or eliminate vulnerabilities

in organizational information systems,

7.9.1.3 The data communications program shall authorize the operation of

a. organizational information systems and

b. any associated information system connections.

7.9.1.4 The data communications program shall monitor information system security controls on an ongoing basis to ensure the continued effectiveness of the controls.

7.9.2 Planning

7.9.2.1 The data communications program shall:

a. develop,

b. document,

c. periodically update, and

d. implement

security plans for organizational information systems that describe the security controls

e. in place or

f. planned

for the information systems and the rules of behavior for individuals accessing the information systems.

7.9.3 Risk Assessment/Mitigation

7.9.3.1 The data communications program shall periodically assess the risk to:

a. organizational operations (including mission, functions, image, or reputation),

b. organizational assets, and

c. individuals

resulting from the operation of organizational information systems and the associated

d. processing,

e. storage, or

f. transmission

of organizational information.

7.9.3.2 The data communications program shall ensure that

a. technical,

b. operational, and

c. management

controls are taken to mitigate risks to an acceptable level based upon the risk assessment.

7.9.4 System Services Acquisition

7.9.4.1 The data communications program shall:

a. allocate sufficient resources to adequately protect organizational information systems,

b. employ system development life cycle processes that incorporate information security considerations,

c. employ software usage and installation restrictions, and

d. ensure that third-party providers employ adequate security measures to protect information, applications, and services outsourced from the organization.

7.10 Operational Controls

7.10.1 Awareness and Training

7.10.1.1 The data communications program shall ensure that:

a. managers and

b. users

of organizational information systems are made aware of

c. the security risks associated with their activities,

d. the applicable laws,

e. Executive Orders,

f. directives,

g. policies,

h. standards,

i. instructions,

j. regulations, or

k. procedures

related to the security of organizational information systems.

7.10.1.2 The data communications program shall ensure that organizational personnel are adequately trained to carry out their assigned information security-related

a. duties and

b. responsibilities.

7.10.2 Configuration Management

7.10.2.1 The data communications program shall:

a. establish and

b. maintain

c. baseline configurations and

d. inventories

of organizational information systems (including hardware, software, firmware, and documentation) throughout the respective system development life cycles.

7.10.2.2 The data communications program shall:

a. establish and

b. enforce

security configuration settings for information technology products employed in organizational information systems.

7.10.3 Contingency Planning

7.10.3.1 The data communications program shall

a. establish,

b. maintain, and

c. implement

plans for

d. emergency response,

e. backup operations, and

f. post-disaster recovery

for organizational information systems to ensure

g. the availability of critical information resources and

h. continuity of operations

in emergency situations.

7.10.4 Incident Response

7.10.4.1 The data communications program shall establish an operational incident handling capability for organizational information systems that includes

a. adequate preparation,

b. detection,

c. analysis,

d. containment,

e. recovery, and

f. user response activities.

7.10.4.2 The data communications program shall:

a. track,

b. document, and

c. report

incidents to appropriate organizational

d. officials and

e. authorities.

7.10.5 Maintenance

7.10.5.1 The data communications program shall perform:

a. periodic and

b. timely

maintenance on organizational information systems and provide effective controls on the

c. tools,

d. techniques,

e. mechanisms, and

f. personnel

used to conduct information system maintenance.

7.10.6 Media Protection

7.10.6.1 The data communications program shall:

a. protect information system media, both paper and digital,

b. limit access to information on information system media to authorized users, and

c. sanitize or destroy information system media before disposal or release for reuse.

7.10.7 Physical and Environmental Protection

7.10.7.1 The data communications program shall limit physical access to

a. information systems,

b. equipment, and

c. the respective operating environments

to authorized individuals.

7.10.7.2 The data communications program shall protect

a. protect the physical plant and

b. support infrastructure

for information systems.

7.10.7.3 The data communications program shall provide supporting utilities for information systems.

7.10.7.4 The data communications program shall protect information systems against environmental hazards.

7.10.7.5 The data communications program shall provide appropriate environmental controls in facilities containing information systems.

7.10.8 Personnel Security

7.10.8.1 The data communications program shall ensure that individuals occupying positions of responsibility within organizations (including third-party service providers) are trustworthy and meet established security criteria for those positions.

7.10.8.2 The data communications program shall ensure that

a. organizational information and

b. information systems

are protected

c. during and

d. after

personnel actions such as

e. terminations and

f. transfers.

7.10.8.3 The data communications program shall employ formal sanctions for personnel failing to comply with organizational security policies and procedures.

7.10.9 System and Information Integrity

7.10.9.1 The data communications program shall:

a. identify,

b. report, and

c. correct

d. information and

e. information system flaws

in a timely manner.

7.10.9.2 The data communications program shall provide protection from malicious code at appropriate locations within the information system.

7.10.9.3 The data communications program shall provide the capability to produce information system security

a. alerts, and

b. advisories.

8. IN-SERVICE SUPPORT

An Integrated Logistics Support (ILS) program will be established in accordance with FAA Acquisition Management System (AMS) guidance to ensure that integrated logistics support requirements are uniformly identified, acquired, allocated, controlled, and maintained.

8.1 Staffing

Support staffing for the data communications will be in accordance with FAA Order 1380.40, Airway Facilities Sector Level Staffing Standard System.

8.1.1 The

a. operation and

b. maintenance

of data communications shall minimize:

a. NAS site,

b. second-level engineering, and

c. depot

human resource requirements.

8.2 Supply Support

8.2.1 Initial Site and Depot Spares

Data communications ground-based unique equipment will be delivered with initial site and depot spares in accordance with FAA Order 6000.38, Policy to Determine NAS Equipment Sparing Requirements for Airways Facilities Work Centers.

8.3 Support Equipment

8.3.1 Data communications ground-based unique equipment shall be designed to:

a. maximize use of support equipment, test equipment, and tools in the FAA inventory, and

b. minimize requirements for additional or unique support and test equipment,

to the extent practical.

8.4 Technical Data

8.4.1 Technical Instruction Books

Technical manuals will be provided for data communications maintenance for all levels of FAA maintenance, as required. Manuals and applicable Commercial Off-the-Shelf (COTS) documentation will be delivered to each data communications site both electronically and in hardcopy.

8.4.1.1 Data communications Technical Instruction Books (TIBs) shall reflect the as-accepted configuration of data communications.

8.4.2 Second-Level Hardware and Software Maintenance Documentation

Second-level hardware and software maintenance documentation will be delivered to the operational support organization prior to deployment of data communications ground-based unique equipment.

8.4.3 Re-procurement Data Package

An option to receive all or part of the data communications Re-procurement Data Package will be available to ensure the FAA's ability to acquire replacement equipment.

8.5 Training and Training Support

Training will be developed in accordance with FAA-STD-028C, Contract Training Programs, (as modified by the Government) to provide ATO personnel with the knowledge and skills to operate, maintain and monitor data communications in accordance with the implementation, operations and maintenance concepts of the program.

8.5.1 Course Development

The data communications program shall provide for a minimum of two operational try-outs of the ATO personnel training curriculum.

8.6 First- and Second-Level Repair

Data communications ground-based unique equipment will be maintained in accordance with FAA Order 6000.30, National Airspace System Maintenance Policy and FAA Order 6000.15, General Maintenance Handbook for Airway Facilities. Contractor assisted maintenance for data communications will be in accordance with FAA Order 6000.41, Policy Governing Contractor-Assisted Maintenance For The National Airspace System. Maintenance and logistics support will be provided at government acceptance for each site.

8.6.1 Second-Level Engineering support for data communications hardware and software, if required, shall be provided in accordance with:

a. FAA Order 6000.30, National Airspace System Maintenance Policy and

b. FAA Order 1100.157, National Systems Engineering Divisions Maintenance Program Procedures, Operational Support.

8.7 Depot Maintenance

8.7.1 A life cycle cost trade off analysis shall be performed to determine the repair policy for data communications ground-based unique equipment components.

8.7.2 Any

a. unique and

b. developmental

hardware shall be

c. treated as a developmental item,

d. be provisioned, and

e. be a candidate for depot repair.

8.7.3 The FAA Logistics Center (FAALC) shall manage all vendor repair contracts for data communications ground-based unique equipment.

8.8 Packaging, Handling, Storage, and Transportation

8.8.1 Data communications Packaging, Handling, Storage, and Transportation shall be in accordance with:

a. FAA Order 4650.31, Vendor Shipments of Nationally Furnished Operations-Funded Material,

b. FAA Order 4770.3, Transportation and Traffic Management of Government Property,

c. American Society for Testing and Materials (ASTM)-D3951, Standard Practice for Commercial Packaging and

d. MIL-STD-2073-1, DOD Material Procedures for Development and Application of Packaging Requirements.

8.8.2 Disposal

A disposal plan will be developed in accordance with FAA Order 4800.2, Utilization and Disposal of Excess and Surplus Personal Property, and be coordinated with the NAS Logistics Property Management Division.

8.8.3 Data Communications Lifecycle

8.8.3.1 Data communications ground-based unique equipment life cycle shall be no less than that required for government acceptance.

Periodic technology refreshment of hardware and COTS software may occur at the end of its Economic Service Life (ESL) to ensure satisfactory performance and supportability at affordable costs.

8.8.4 Facility Codes

A facility identification code will be assigned to data communications in accordance with FAA Order 1375.4, Standard Data Elements.

8.8.4.1 Data communications shall have a profile in the Facilities, Services, and Equipment Profiles (FSEP).

8.8.4.2 Facility Reference Data File (FRDF) information shall be disseminated for data communications in accordance with FAA Order 6030.45, Facility Reference Data.

8.8.5 Project Material Management

8.8.5.1 Data communications facilities and equipment project material shall be managed in accordance with:

a. FAA Order 4630.2, Standard Allowance of Supplies and Working Equipment for National Airspace System Facilities,

b. FAA Order 4650.7, Management of NAS F&E Project Material and

c. FAA Order 4630.30, Management and Control of NAS F&E Project Material.

8.8.5.2 Data communications project material shall be managed in accordance with FAA Order 4140.1, Integrated Material Management Program.

8.8.5.3 National stock numbers shall be assigned to data communications material in accordance with FAA Order 4500.3, Federal Catalog and Standardization Programs (FCSP).

8.8.5.4 Contractor depot inventories of operating material shall be maintained in accordance with FAA Order 4630.1, Management of Depot Inventories of Operating Material.

8.8.5.5 Data communications material shall be inventoried in accordance with FAA Order 4633.1, Physical Inventory.

8.8.5.6 Lost, damaged, misplaced, and destroyed material shall be removed from inventory in accordance with FAA Order 4630.3, Survey of Lost, Damaged, or Destroyed Personal Government Personal Property.

8.9 Technical Operations Certification

8.9.1 The service and systems of data communications meeting the criteria stated in FAA Order 6000.15, General Maintenance Handbook for Airways Facilities, shall be certified.

8.9.2 Data communications shall be certified in accordance with FAA Order 6000.15, General Maintenance Handbook for Airway Facilities.

9. TEST AND EVALUATION

9.1 Critical Operational Issues

Note: Test planning and conduct will involve all the stakeholders.

9.1.1 Testing shall be conducted to:

a. ensure that functional and subnetwork performance requirements can be met in an operational environment and

b. to resolve the following Critical Operational Issues (COIs):

c. COI 1: Does data communications interface and operate with existing equipment and systems?

d. COI 2: Can data communications be used without disruption or degradation to ATC operations?

e. COI 3: Does data communications provide the required level of reliability, maintainability and availability?

f. COI 4: Can data communications be maintained without disruption or degradation of current ATC operations?

g. COI 5: Does data communications maintain at least the current level of efficiency and accuracy of communications between the controller and pilot?

h. COI 6: Does data communications time performance allow for effective exchange of controller and pilot communications?

i. COI 7: Does data communications CHI effectively support the ATO?

j. COI 8: Is sufficient training provided for ATO to effectively operate data communications?

9.2 Test and Evaluation Requirements

Test and Evaluation (T&E) is conducted by the FAA, in accordance with *Acquisition Management System (AMS) Test & Evaluation Process Guidelines*, to evaluate the subsystem operational effectiveness and suitability including compatibility, interoperability, degraded operations, maintainability and supportability. T&E also identifies deficiencies in NAS hardware, software, human performance factors, COIs and/or operational concepts.

9.2.1 System Test

The following categories and classes of tests may be conducted for data communications:

1. Functional Testing - This testing will verify all functional threads. The objective is to verify the complete message set and associated functions have been properly implemented. Testing will be conducted in a simulated environment.

2. Performance/Load Testing - Simulation will be used as required to create realistic levels of traffic on the FAA portion of the ground-based system.

3. Up-level/Regression Testing - This testing will ensure that data communications application changes have been integrated into data communications without adversely affecting the baseline system.

4. End-to-End Testing - This testing will be conducted using the air-ground subnetwork and avionics. This testing will verify end-to-end operational and technical interoperability using scenarios that exercise complete end-to-end data communications.

5. Independent Network Test - This testing will determine subnetwork performance independent of data communications messages.

6. Operational Suitability and Effectiveness - This testing will evaluate the operational suitability and effectiveness of data communications with respect to ATC controller operations, flight deck operations, ground/air communications network, aircraft operator, FAA maintenance and FAA support functions.

9.2.2 Field Familiarization

ATO site personnel perform field familiarization to confirm readiness for integration of the system into each NAS site, leading to system commissioning.

10. IMPLEMENTATION AND TRANSITION

10.1 Deployment Planning

10.1.1 Deployment planning shall be conducted in accordance with the Acquisition Management System policy and guidance in order to obtain the in-service decision prior to delivery of data communications into the NAS.

10.1.2 The In-Service Review Checklist template shall be:

a. tailored and

b. used

to assess operational readiness and suitability prior to deploying data communications.

10.1.3 Project Implementation Plan

10.1.3.1 A project implementation plan shall be generated using current guidelines consisting of those activities necessary to:

a. prepare the site,

b. deliver,

c. install,

d. integrate,

e. test, and

f. commission

data communications into NAS operations.

10.1.3.2 An implementation approach for Physical Equipment and Facilities shall be provided.

10.1.3.3 ATC operational capability shall be maintained during data communications implementation activities.

10.1.4 Site Surveys

10.1.4.1 Site surveys shall be completed to determine needed modifications to assigned space and other site preparations necessary for the:

a. installation and

b. integration

of data communications into the en route facility.

10.1.4.2

a. Site surveys and

b. system specifications

shall identify:

a. office,

b. administrative,

c. contractor, and

d. FAA

workspace.

10.1.5 Site Preparation

10.1.5.1 A Generic Site Implementation Plan (GSIP) shall be prepared in accordance with current guidelines.

10.1.5.2 Site preparation for data communications shall be:

a. planned,

b. scheduled, and

c. overseen

by facility personnel.

10.1.5.3 The FAA shall:

a. provide site preparation engineering support and

b. prepare generic and site-specific engineering packages

to support data communications.

10.1.5.4 Contractors and program offices shall provide revisions to specific site preparation and requirement activities in time to allow their incorporation prior to system delivery.

10.1.6 Facility Modifications

10.1.6.1 The FAA shall:

a. plan,

b. schedule, and

c. oversee

construction of site-specific facility modifications.

10.1.7 Fit-up Activities

10.1.7.1 Contractor fit-up activities shall not degrade air traffic operations.

10.1.7.2 Contractor fit-up work shall be in accordance with:

a. FAA-G-2100G, NFPA 70, and

b. state and

c. local

codes.

10.1.8 Equipment Delivery

10.1.8.1 Equipment delivery shall be coordinated to ensure that:

a. personnel and

b. internal and external space

are available to accept deliveries at established times.

10.1.8.2 Contractors shall be responsible for determining the conditions necessary for interim storage and security of delivered equipment and supplies.

10.1.8.3 Contractors shall be:

a. responsible for moving data communications equipment into the facility and

b. placing and

c. installing

it.

10.1.9 Power-up Test and Compatibility

10.1.9.1 Initial power-up testing shall be accomplished, except on operationally active critical power centers.

10.1.9.2 Electrical equipment shall be tested for power compatibility prior to connection to FAA critical power panels.

10.1.9.3 Electrical equipment shall be tested for compliance with

a. FAA-G-2100, *Electronic Equipment, General Requirements* and

b. 6950.2, *Electrical Power Policy Implementation, NAS Facilities*.

10.2 Ground Infrastructure Implementation

10.2.1 Integration

10.2.1.1 An integration strategy for:

a. Physical Equipment and

b. Facilities

shall be provided.

10.2.1.2 The integration strategy shall cover:

a. facility equipment,

b. space,

c. operations, and

d. personnel

impacts and procedures.

10.2.1.3 The integration strategy shall ensure that integration has no adverse impact on:

a. ATC and

b. airspace user

operations.

10.2.1.4 The integration strategy shall provide for the continuity of:

a. full ATC and

b. airspace user

services.

10.2.1.5 The integration strategy shall allow for the:

a. integration and

b. acceptance testing

of data communications.

10.2.1.6 The integration strategy shall provide for:

a. interfaces and

b. external facilities

to ensure the continuity of En Route air traffic control services.

10.2.1.7 The integration process shall provide capabilities for:

a. redundancy, and

b. fallback.

10.2.1.8 The integration strategy shall provide:

a. procedures and

b. a methodology

for the physical integration of data communications into the NAS.

10.2.1.9 The FAA shall provide human resources for:

a. integration and

b. test

activities.

10.2.1.10 Required operational interruptions or changes in operational procedures shall be:

a. defined,

b. examined,

c. evaluated, and

d. managed

through an integration plan.

10.2.1.11 FAA site personnel shall have consent authority over site-specific system integration issues.

10.3 Transition

10.3.1 The transition approach shall include:

a. a process for moving between systems, elements and components, as well as

b. a fallback process

that is operationally acceptable.

10.3.2 A transition plan shall be developed that allows for:

a. facility equipment,

b. space,

c. operations, and

d. personnel

impacts and procedures.

10.3.3 The transition plan shall ensure that the transition has no adverse impact on:

a. ATC and

b. airspace user

operations.

10.3.4 The transition plan shall allow for the:

a. installation,

b. integration, and

c. acceptance testing

of the equipment.

10.3.5 The transition plan shall provide:

a. procedures and

b. methodology

for the

a. logical and

b. physical

transition of data communications into the NAS and where applicable, for transition of the legacy system out of the NAS.

10.3.6 The transition plan shall include the approach for:

a. Operations,

b. Physical Equipment, and

c. Facilities.

10.3.7 The transition plan shall provide for continuity of full ATC services.

10.3.8 The transition process shall provide for:

a. redundancy, and

b. fallback.

10.4 In-service Transition

10.4.1 Data communications shall provide for in-service transition activities with related systems.

10.4.2 Air traffic operational capability shall be maintained during transition.

10.4.3 The data communications transition strategy shall provide for:

a. interfaces and

b. external facilities

to ensure the continuity of Air Traffic Control Services.

10.4.4 Required

a. operational interruptions or

b. changes in operational procedures

shall be:

c. defined,

d. examined,

e. evaluated, and

f. managed

through a transition plan.

10.5 ATC Facilities Interface

10.5.1 Data communications shall be capable of interfacing with all appropriate ATC facilities regardless of the:

a. transition state or

b. level of technical evolution

of each site.

10.6 Data Presented to Service Providers

10.6.1 The data presented to any communication service provider during initial system transition shall be consistent with industry standards for the communication service provider interface.

10.7 Coexistence with Present System

10.7.1 The installation and operation of data communications shall produce no adverse impact upon the other NAS subsystems with which it interfaces.

10.8 Implementation Considerations

10.8.1 The following are potential methods of compliance with the above requirements:

a. ICAO 9705-AN/956, Manual of Technical Provisions for the Aeronautical Telecommunication Network, Second Edition and the Proposed Defect Reports (PDRs),

b. RTCA-DO-290, Safety and Performance Requirements Standard for Air Traffic Data Link Services in Continental Airspace,

c. RTCA DO-280A, Interoperability Requirements Standard For ATN Baseline 1 (INTEROP ATN B1), and

d. RTCA-PU-40, FANS 1/A-ATN INTEROP Standard.

10.8.1.1.1 The message composition tools should consider the following:

a. RTCA, DO-256, Minimum Human Factors Standards for Air Traffic Services Provided Via Data Communications Utilizing the ATN, Builds I and IA and

b. RTCA, DO-238, Human Engineering Guidance for Data Link Systems.

11. QUALITY ASSURANCE

11.1 The data communications Quality Assurance Program (QAP) shall be:

a. established and

b. maintained

in accordance with FAA-STD-018, Computer Software Quality Control Program, and provide:

c. A quality assurance organization that has sufficient responsibility and authority to identify and evaluate quality problems, and to initiate, recommend, or provide solutions.

d. Procedures and controls to assure adequate configuration management during all operations through final acceptance.

e. Controls to assure that all inspection and testing is performed in compliance with contract requirements and that all test data is complete, correct, traceable, repeatable, and acceptable.

f. Maintenance of proper record keeping function to provide objective evidence and traceability of operations performed.

g. If applicable, procedures and controls for assuring that all software products or services procured from subcontractors conform to contract requirements.

h. Procedures and controls to assure that all documentation is adequately reviewed and meets contract requirements.

i. Procedures and controls for the prevention of software deficiencies, detection and analysis of deficiencies when they do occur, as well as procedures for corrective action.

A system of periodic internal quality audits or reviews to verify quality activities and related results are in compliance with planned arrangements, and to verify that the QAP is performing effectively.

12. CONFIGURATION MANAGEMENT

12.1 NAS Configuration Management Change Control Procedures

12.1.1 Data communications Configuration Management shall be in accordance with FAA-STD-021, Configuration Management.

12.2 Bar Coding and Asset Tracking

12.2.1 Data communications ground-based unique equipment shall use the FAA:

a. bar code asset serial number symbology,

b. quality and

c. format

specifications contained in the latest edition of the FAA Bar Coding Specification available at the time this requirement is baselined in the contractors' deliverable, to bar code system components at the line replaceable/repairable unit, including all site spares.

13. IN-SERVICE MANAGEMENT

13.1 Product Baseline

13.1.1 The product baseline for data communications shall be updated as a result of technology refreshment, pre-planned product improvement, upgrade Engineering Change Proposals, NAS Change Proposals (NCPs), and requests for deviation and waiver.

13.2 Performance Monitoring

13.2.1 Performance shall be:

a. monitored and

b. provided

using data obtained in Section 5.1.1, Remote Maintenance Monitoring System Interface Capabilities of this document.

14. SYSTEM SAFETY MANAGEMENT

14.1 Program Safety Management

Program Safety Management will be in accordance with FAA Order 8040.4, Safety Risk Management, the FAA Safety Management System Manual, and the ASD-100-SSE-1, NAS Modernization System Safety Management Program.

14.2 Safety Assessments

14.2.1 Program safety assessments shall be conducted in accordance with:

a. the Safety Management System Manual and

b. ASD-100-SSE-1, FAA System Safety Management Program.

14.2.2 An Operational Safety Assessment (OSA) shall be included in the Program IARD requirements.

14.2.3 A Comparative Safety Assessment (CSA) shall be conducted on the identified Program alternatives to support the Initial investment decision if warranted.

14.2.4 A Preliminary Hazard Analysis (PHA) shall be conducted on the preferred alternative to support the Final investment decision.

Additional safety risk analysis requirements will be developed in accordance with the Integrated Safety Plan (ISP).

14.3 Integrated Safety Plan

14.3.1 A Preliminary Integrated Safety Plan (pISP) shall be developed for the Program IARD requirements.

14.3.2 A final ISP shall be developed for the final investment decision in accordance with ASD-100-SSE-1, FAA System Safety Management Program.

14.3.3 The ISP shall include utilization of a Hazard Tracking and Risk Resolution (HTRR) System.

The ISP may include a Sub-System Hazard Analysis (SSHA), System Hazard Analysis (SHA), Operations and Support Hazard Analysis (O&SHA), and Health Hazard Assessment (HHA).

14.4 Risk Acceptance and Safety Documentation Approval

14.4.1 Program Risk Acceptance and Documentation Approval procedures shall be conducted in accordance with:

a. ASD-100-SSE-1, FAA System Safety Management Program, and

b. the Safety Management System Manual.

14.5 Occupational Safety Standards

The data communications program will ensure that data communications will comply with:

1. Executive Order 12196, *Occupational Safety and Health Program for Federal Employees* (establishes and maintains occupational safety and health programs to meet requirements of PL 91-596, Section 19, *Occupational Safety and Health Act*);
2. Title 29 CFR 1960, *Basic Program Elements For Federal Employee Safety And Health Programs And Related Matters*;

3. FAA Order 3900.19, *Occupational Safety and Health Program*, (states policy and provides the basic guidance for implementing the FAA Occupational Safety Program in full conformance with Executive Order 12196); and
4. FAA Order 3900.19, *Occupational Safety and Health Program*, Chapter 3, paragraph 27 (addresses the correction of unsafe conditions and practices (abatement) and establishes the requirement for an abatement plan in the event that corrections cannot be accomplished within 30 working days).

Appendix A Mission Shortfall Correlation Matrix

The Mission Shortfall Statement/Requirements correlation matrix below traces shortfall statements from the Mission Shortfall Statement for Data Communications in Support of NGATS to the Preliminary Program Requirements for Data Communications in Support of NGATS. The shortfall statements are called out below and section/sub-section numbers are used to direct the reader to the appropriate section of the Mission Shortfall Statement (MSS).

Those shortfall statements for which no trace to the requirements is shown, are related to the infrastructure improvement needs and are not specifically addressed in the *Preliminary Program Requirements for Data Communications in Support of NGATS.*

MSS Section	MSS Sub-Section	Shortfall Statement	PPR Section or Sub-Section
2.0 SERVICE IMPROVEMENT MISSION NEED	2.1.1 Safety Technology Opportunity	The current NAS voice air/ground communications system requires controllers to issue and verify instructions to pilots. This workload-intensive, voice-based process can generate miscommunications, which can contribute to operational errors.	3.1.1.1 Messaging Requirements 3.1.1.3 Data Communications Requirements 3.1.1.4 Clearance Requirements 3.1.1.5 Instructions, Advisories, and Report Request Responses Requirements 3.1.1.6 Departure and Taxi Clearance Requirements 3.1.1.7 Automatic Terminal Information Service Requirements
2.0 SERVICE IMPROVEMENT MISSION NEED	2.1.2 Productivity Shortfall	Data communications achieves these results by automating repetitive tasks, replacing voice communications with less workload-intensive data communications, and enabling ground systems to use real-time aircraft data to improve traffic management efficiency.	3.1.1.3 Data Communications Requirements 3.1.1.4 Clearance Requirements 3.1.1.5 Instructions, Advisories, and Report Request Responses Requirements 3.1.1.6 Departure and Taxi Clearance Requirements 3.1.1.7 Automatic Terminal Information Service Requirements 3.1.1.8 Integration Requirements

MSS Section	MSS Sub-Section	Shortfall Statement	PPR Section or Sub-Section
2.0 SERVICE IMPROVEMENT MISSION NEED	2.1.3 Capacity Shortfall	The 1996 *Terminal Data Benefits Study*, bolstered by recent Eurocontrol research and trials, showed slightly larger capacity gains were possible when data communications were introduced in bottleneck approach and departure airspace.	3.1.3 Segment Three Requirements
2.0 SERVICE IMPROVEMENT MISSION NEED	2.1.3 Capacity Shortfall	Advanced concepts such as 4 dimensional flight path management, higher density operations, and "management by planning/intervention by exception", will be possible when data communications are robust and universal. Only then can the NAS realize the system capacity required to meet ever-increasing demand for air travel	3.1.1.4 Clearance Requirements 3.1.1.8 Integration Requirements 3.1.2 Segment Two Requirements 3.1.3 Segment Three Requirements 3.2.1.1 Data Communications Message Exchange Rates 3.2.3 Segment Two Product Characteristics and Performance Requirements 3.2.3.2 Continuity 3.2.3.3 Service Data Integrity 3.2.3.4 Availability 3.2.3.5 Latency 3.2.3.6 Number of Aircraft Supported 3.2.4.1 Continuity 3.2.4.2 Service Data Integrity 3.2.4.3 Availability 3.2.4.4 Latency 3.2.4.5 Number of Aircraft Supported
2.0 SERVICE IMPROVEMENT MISSION NEED	2.1.3 Capacity Shortfall	Solutions to meet these performance gaps must be operationally and technically interoperable between airspace users and the ATO; and, be globally harmonized.	10.8 Implementation Considerations
3.0 INFRASTRUCTURE IMPROVEMENT MISSION NEED	3.1.2 Ground User Interfaces	Additional functions in the controller and supervisor workstations will be required.	

MSS Section	MSS Sub-Section	Shortfall Statement	PPR Section or Sub-Section
3.0 INFRASTRUCTURE IMPROVEMENT MISSION NEED	3.1.2 Ground User Interfaces	It is also expected that, depending on systems engineering decisions, other displays, such as traffic management unit displays and maintenance/support user interfaces will require additional functionality in order to support data communications.	
3.0 INFRASTRUCTURE IMPROVEMENT MISSION NEED	3.1.3 Ground Data Processing	Data Communications will require new functions (controller pilot data communications, flight information functions, and the ability to uniquely identify aircraft capable of data communications) which directly support data communications (shown in subsequent paragraphs).	3.1.1.8 Integration Requirements
3.0 INFRASTRUCTURE IMPROVEMENT MISSION NEED	3.1.3 Ground Data Processing	For example, the flight data processor interfaces directly with controller-pilot data communications function.	3.1.1.8 Integration Requirements
3.0 INFRASTRUCTURE IMPROVEMENT MISSION NEED	3.1.3 Ground Data Processing	The flight data processor will also require new functionality (e.g. data verification, eligible controller/aircraft identification).	
3.0 INFRASTRUCTURE IMPROVEMENT MISSION NEED	3.1.3 Ground Data Processing	Enhancements to the accuracy of conflict probes, as well as timely and accurate interchanges with Traffic Flow Management and various Weather Systems, could be provided through direct interfaces or through System Wide Information Management (SWIM) system.	3.1.3 Segment Three Requirements
3.0 INFRASTRUCTURE IMPROVEMENT MISSION NEED	3.1.3 Ground Data Processing	This new functionality will provide by 2017 to allow for the transfer to expanded airport information to include the transfer to static airport maps to the cockpit. Additional functionality will later be added which provides for an enhanced map support zero visibility ground operations.	3.1.2 Segment Two Requirements 3.1.3 Segment Three Requirements

MSS Section	MSS Sub-Section	Shortfall Statement	PPR Section or Sub-Section
3.0 INFRASTRUCTURE IMPROVEMENT MISSION NEED	3.1.3.1 Identifying Data Communications Capable Aircraft and Ground Systems	Providing controllers, flight crews and various automation systems a single point to identify data communications capable aircraft and ground systems is essential for the safe and efficient operation of a data communications system.	3.1.1.2 Unique Identification Requirements
3.0 INFRASTRUCTURE IMPROVEMENT MISSION NEED	3.1.3.2 Controller Flight Crew Communications	This application will provide the capability to establish, manage, and terminate controller-flight crew communications between ATS ground and aircraft system peers. Once a connection is established it will provide the capability to exchange clearances, data requests, informational message exchanges which includes the automation of processes which today's systems require manual controller intervention.	3.1.1.1 Messaging Requirements 3.1.1.2 Unique Identification Requirements 3.1.1.3 Data Communications Requirements 3.1.1.4 Clearance Requirements 3.1.1.5 Instructions, Advisories, and Report Request Responses Requirements 3.1.1.6 Departure and Taxi Clearance Requirements 3.1.1.7 Automatic Terminal Information Service Requirements
3.0 INFRASTRUCTURE IMPROVEMENT MISSION NEED	3.1.3.2 Controller Flight Crew Communications	Specifically, this function enables the transmission of aircraft state and parametric information to the ground system (on an automated basis) to enable the ground to perform enhanced trajectory management and more accurate conflict detection .	3.1.2 Segment Two Requirements 3.1.3 Segment Three Requirements
3.0 INFRASTRUCTURE IMPROVEMENT MISSION NEED	3.1.4 Ground Message Delivery	The existing functionality may require additional capacity as the use of data communications grows in the NAS.	3.2.3.6 Number of Aircraft Supported 3.2.4.5 Number of Aircraft Supported
3.0 INFRASTRUCTURE IMPROVEMENT MISSION NEED	3.1.5 Air-Ground Message Delivery	This air/ground network includes the ground and air radio systems as well as the routing and communications management functions which directly support the establishment and management of the radio link.	

Appendix B Acronyms

4-D	Four Dimensional (latitude, longitude, altitude, and time)
A/G	Air/Ground
ACL	Air Traffic Clearance
ACM	ATC Communications Management
AMC	ATC Microphone Check
AMS	Acquisition Management System
ARTCC	Air Route Traffic Control Center
ASTM	American Society for Testing and Materials
ATC	Air Traffic Control
ATIS	Automatic Terminal Information Service
ATM	Air Traffic Management
ATN	Aeronautical Telecommunication Network
ATO	Air Traffic Organization
ATS	Air Traffic Services
ATSP	ATS Provider
ATSS	Air Traffic System Specialist
C&P	Crossing and Passing
CDA	Current Data Authority
CFR	Code of Federal Regulations
CHI	Computer Human Interface
CNS/ATM	Communications, Navigation, Surveillance and Air Traffic Management
COI	Critical Operational Issue
COTS	Commercial Off-the-Shelf
CP	Conflict Probe
D-ATIS	Data Link Automatic Terminal Information Service
D-FLUP	Data Link Flight Update
D-SIG	Data Link Surface Information Guidance
D-TAXI	Data Link Taxi
DCL	Departure Clearance
DLL	Data Link Logon
DOT	Department of Transportation
DR&A	Data Reduction and Analysis
DSC	Down Stream Clearance
ESD	Electrostatic Discharge
ESL	Economic Service Life
ETD	Estimated Time of Departure
FAA	Federal Aviation Administration
FAALC	FAA Logistics Center
FCSP	Federal Catalog and Standardization Programs
FLIPINT	Flight Path Intent
FRDF	Facility Reference Data File
FSEP	Facilities, Services, and Equipment Profiles
GSIP	Generic Site Implementation Plan
HVAC	Heating, Ventilation, and Air Conditioning
ICAO	International Civil Aviation Organization

ICD	Interface Control Document
ILS	Integrated Logistics Support
IPT	Integrated Product Team
IRD	Interface Requirements Document
ISP	Integrated Safety Plan
ITP	In-Trail Procedure
JPDO	Joint Planning and Development Office
LRU	Lowest Replaceable Unit
M&C	Monitor and Control
MNS	Mission Need Statement
MSS	Mission Shortfall Statement
MTBF	Mean Time Between Failure
NAS	National Airspace System; NAS Area Specialist
NCP	NAS Change Proposal
NDA	Next Data Authority
NFPA	National Fire Protection Association
NGATS	Next Generation Air Transportation System
OSHA	Occupational Safety and Health Administration
PAIRAPP	Paired Approach
PCB	Polychlorinated biphenols
PDR	Proposed Defect Report
PPD	Pilot Preferences Downlink
QAP	Quality Assurance Program
$RCTP_{95}$	Required Communications Technical Performance 95th Percentile
S&M	Sequencing and Merging
SAP	System Access Parameters
SARPs	Standards And Recommended Practices
T&E	Test and Evaluation
TIB	Technical Instruction Book

Appendix C Definitions

Aircraft Identification: A group of letters, figures or a combination thereof which is identical to or the code equivalent of the aircraft call sign. It is used in Field 7 of the ICAO model flight plan.

Aircraft Address: A unique combination of 24 bits available for assignment to an aircraft for the purpose of air-ground communications, navigation, and surveillance.

Availability (non-security): Availability is the probability that data communications with all appropriately equipped aircraft in the area is in service.

Availability (security): Ensuring timely and reliable access to and use of information.

Certification: The technical verification performed prior to commissioning and/or service restoration of the ground system after a scheduled/unscheduled interruption affecting certification parameters, and periodically thereafter inclusive of the insertion of the prescribed entry in the facility maintenance log. The certification validates that the ground system is providing an advertised service to the user, and/or that the system/equipment is capable of providing that advertised service. It includes independent determination about when a system/equipment should be continued in, restored to, or removed from service.

Certification Parameter: Ground system certification parameters are selected critical indicators of the quality of the required or advertised services being provided to the user of systems, subsystems, and equipment.

Confidentiality: Preserving authorized restrictions on access and disclosure, including means for protecting personal privacy and proprietary information.

Continuity: Continuity is the probability that the transaction will be completed before the transaction expiration time, assuming that data communication is available when the transaction is initiated.

Control Position: A control position encompasses all sector air traffic controllers working at a sector.

Current Data Authority: The ground authority permitted to conduct a data communications session with an aircraft.

Data Communications: A data link application that provides a means of communication between controller and pilot using digital data link for ATC communications.

Data Communications End-to-End Service: The capability for controllers and pilots or maintainers and test devices to exchange ATC messages in a digital data format.

Data Communications End-to-End System: The end-to-end infrastructure (including hardware and software) that enables the capability for controllers and pilots to exchange Air Traffic Control (ATC) messages in digital format. This includes aircraft avionics, ground system, and

any service provider. The term digital format does not preclude the possible use of voice recognition and synthesis technology.

Data Communications Ground System: All ground based hardware and software that support the Data Communications End-to-End Service.

Data Communications Ground Based Unique Equipment: Any piece of FAA ground equipment whose sole purpose is to support data communications service.

Data Communications: All hardware and software procured by the data communications program that supports the Data Communications End-to-End Service. Data communications includes:

- Display System
- Data communications ground-based unique equipment

Display System: FAA ground equipment that displays flight and surveillance data to the ARTCC sector team.

Eligible Controller: The individual responsible for providing ATC services to aircraft within a specified area.

End-to-End: Pertaining to or relating to an entire communication path, typically from (1) the interface between the information source and the communication system at the transmitting end to (2) the interface between the communication system and the information user or processor or application at the receiving end.

End-to-End Data: Data that is passed between the processor at the controller's position and the airborne processor.

End-to-End Transfer Delay: The period elapsed from the time at which the originating user initiates the triggering event until the time the transmitted information is available for display to the intended recipient.

End User: An ultimate source and/or consumer of information.

Enhanceability: The capability of a system to interface with additional unspecified systems, process data from those systems, and accommodate improvements to hardware and software elements, with the original architecture (no system or architecture modifications required).

Estimated Off Block Time: The ICAO terminology for "Estimated Time of Departure" (ETD).

FAA Telecommunications Infrastructure: FAA ground equipment that is used to interconnect the data communications system with ATN communications service providers. It is also used for interfacility communications.

Failure: The event or inoperable state in which any function, within a subsystem that is being used as an integral part of the NAS primary function, does not or would not perform as specified.

Integrity (non-security): Integrity is the acceptable rate of transactions completed with undetected error.

> ***Note: Integrity relates to the trust which can be placed in the correctness of the information provided.***

Integrity (security): Guarding against improper information modification or destruction, and includes ensuring information non-repudiation and authenticity.

Key Parameter: Requirements that must be met to provide a minimally acceptable level of service. When key parameters are not met the program will be subject to termination by the Joint Resources Council.

Lowest Replaceable Unit: The lowest replaceable component at the site.

M&C: The FAA ground equipment that displays system monitor and control information to the ARTCC airway facilities team.

Mean Time Between Failures: A basic measure of reliability for items: The mean number of life units during which all parts of the item perform within their specified limits, during a particular measurement interval under stated conditions.

Mean Time to Repair: Mean Time to Repair includes diagnostic time, removal of the failed LRU, replacement and installation of the new LRU including any adjustments or data loading necessary to initialize the LRU, and all adjustments required to return the subsystem to normal operation and to perform certification.

Mean Time to Restore Service: The mean time required to restore functionality, performance, and the operational state existing prior to any failure.

Next Data Authority: The ground system that provides for the establishment and maintenance of a transport connection for the purposes of rapid switching to the Current Data Authority (CDA) state and conducting a data communications dialogue pertaining to the services of the receiving Air Traffic Services unit when the aircraft designates it as the CDA.

Normal Termination: The intentional discontinuation of service.

Outstanding Messages: Messages that have not received a qualified response from the intended recipient.

Qualification: Evaluation of the implementation and performance to its requirements document.

Reliability: A characteristic of a system element or service expressed as the MTBF. MTBF is computed as the mean time from an initial instant when the element or service is available until the next failure event.

Security Controls: The management, operational, and technical controls (safeguards or countermeasures) prescribed for an information system, which taken together, adequately protect the confidentiality, integrity, and availability of the system, its data, and information.

Threshold: Minimum or maximum acceptable operational value for system capability or characteristic that, in the user's judgment, is necessary to provide an operational capability that will satisfy the mission need.

Tools: An application that supports the operation of the NAS. A tool generally has an interface to the user for input, output, or both, but may perform some functions directly between systems without user interaction. Data communications tools allow the controller and flight crew to initiate the transfer of data between the air and the ground and to monitor responses for the opposing system.

Trajectory Agreement: A trajectory agreement consists of a 4-D route and the conformance parameters for that route.

Appendix D References

Note: The latest version of all referenced material will be used. Where there is conflict between the documents FAA Orders will take precedence.

AC 20-140, *Guidelines for Design Approval of Aircraft Data Communications Systems*, dated 8/16/99

AC 120-70, *Initial Air Carrier Operational Approval for Use of Digital Communication Systems*, dated 2/17/00

Acquisition Management System (AMS) Test & Evaluation Process Guidelines

ANSI/IEEE 1100-1992, *Grounding Shielding and Bonding*

ASD-100-SSE-1, *NAS Modernization System Safety Management Program*

ASTM-D3951, *Standard Practice for Commercial Packaging*

Air Traffic Service (ATS*) Concept of Operations for the National Airspace System in 2005*

ATS Concept of Operations for the National Airspace System in 2005

Department of Transportation VNSTC-FAA-95-3, *Human Factors in the Design and Evaluation of Air Traffic Control Systems*

Department of Transportation /FAA/CT-96/1, *FAA Human Factors Design Guide*

DOT/FAA/CT-TN96/01, *FAA Human Factors Design Guide Update: A Revision to Chapter 5: Automation Guidelines*

DOT/FAA/CT-TN00/30, *Computer-Human Interface Guidelines: A Revision to Chapter 8 of the Human Factors Design Guide*

En Route/Oceanic Domain Mission Need Statement, Revalidated MNS-309

Executive Order 12196, *Occupational Safety and Health Program for Federal Employees*

Executive Order 13123, *Greening the Government Through Efficient Energy Management*, dated June 3, 1999

FAA-BCATS-96-001, *Bar Code Asset Serial Number Symbology, Quality and Format Specifications*

FAA-BCATS-97-002, *Bar Code Serial Shipping Container Label Symbology, Quality And Format Specifications*

FAA-C-1217, *Electrical Work, Interior*

FAA-D-2494/b, *Technical Instruction Book Manuscript: Electronic, Electrical, and Mechanical Equipment, Requirements for Preparation of Manuscript and Production of Books*

FAA-G-2100G, *Electronic Equipment, General Requirements*

FAA Human Factors Job Aid

FAA Order 1100.157, *National Systems Engineering Divisions Maintenance Program Procedures, Operational Support (AOS)*

FAA Order 1200.22C, *NAS Data and Interface Equipment Used by Outside Interests*

FAA Order 1370.82, *FAA Information Systems Security Program*

FAA Order 1370.83, *Internet AccessPoints*

FAA Order 1370.84 *Internet Services*

FAA Order 1375.1C, *Data Management*

FAA Order 1380.40, *Airway Facilities Sector Level Staffing Standard System*

FAA Order 1600.1, *Personnel Security Program*

FAA Order 1600.6, *Physical Security Management Program*

FAA Order 1600.69, *FAA Facility Security Management Program*

FAA Order 1600.72, *Contractor and Industrial Security Program*

FAA Order 1800.58, *National Airspace Integrated Logistics Support Policy*

FAA Order 3900.19, *Occupational Safety and Health Program*

FAA Order 4140.1, *Integrated Material Management Program*

FAA Order 4500.3, *Federal Catalog and Standardization Programs (FCSP)*

FAA Order 4630.1, *Management of Depot Inventories of Operating Material*

FAA Order 4630.2, *Standard Allowance of Supplies and Working Equipment for National Airspace System Facilities*

FAA Order 4630.3, *Survey of Lost, Damaged, or Destroyed Personal Government Personal Property*

FAA Order 4630.30, *Management and Control of NAS F&E Project Material*

FAA Order 4633.1, *Physical Inventory*

FAA Order 4650.31, *Vendor Shipments of Nationally Furnished Operations-Funded Material*

FAA Order 4650.7, *Management of NAS F&E Project Material*

FAA Order 4770.3, *Transportation and Traffic Management of Government Property*

FAA Order 4800.2, *Utilization and Disposal of Excess and Surplus Personal Property*

FAA Order 6000.15, *General Maintenance Handbook for Airway Facilities*

FAA Order 6000.30, *National Airspace System Maintenance Policy*

FAA Order 6000.38, *Policy to Determine NAS Equipment Sparing Requirements for Airways Facilities Work Centers*

FAA Order 6000.41, *Policy Governing Contractor-Assisted Maintenance For The National Airspace System*

FAA Order 6030.20, *Electrical Power Policy*

FAA Order 6030.45, *Facility Reference Data*

FAA Order 6630.4, *En Route Communications Installation Standards Handbook*

FAA Order 6950.2, *Electrical Power Policy Implementation, NAS Facilities*

FAA Order 6950.19, *Practices and Procedures for Lightning Protection Grounding, Bonding, and Shielding Implementation*

FAA Order 6950.20, *Fundamental Considerations of Lightning Protection Grounding, Bonding, and Shielding*

FAA Order 6950.22, *Maintenance of Electrical Power and Control Cables*

FAA Order 6950.25, *Use of Electrical Power Conditioning Devices at FAA Facilities*

FAA Order, 7110.65, *Air Traffic Control*

FAA Order 8040.4, *Safety Risk Management.*

FAA Safety Management System Manual

FAA-STD-018, *Computer Software Quality Control Program*

FAA-STD-019E, *Lightning and Surge Protection, Grounding, Bonding and Shielding Requirements for Facilities and Equipment*

FAA-STD-020, *Transient Protection, Grounding, Bonding and Shielding Requirements for Electrical Equipment.*

FAA-STD-021, *Configuration Management*

FAA-STD-028C, *Contract Training Programs*

FAA-STD-032, *Design Standards for National Airspace System Facilities*

FAA-STD-036, *Preparation of Project Implementation Plans*

ICAO 9705-AN/956, *Manual of Technical Provisions for the Aeronautical Telecommunication Network, Second Edition*

ICAO SARPs, *Aeronautical Telecommunication Network (ATN), Volume II, Part II, Communications Procedures, Chapter 5, Aeronautical Mobile Service, Second Edition.*

ICAO Standards and Recommended Practices (SARPs), Aeronautical Telecommunications, Annex 10 to the Convention on International Civil Aviation, Volume III, Part I, Digital Communication Systems, Chapter 3, Aeronautical Telecommunication Network (ATN)

International Telecommunication Union Radio Regulation Article S1.54

International Standards and Recommended Practices and Procedures for Air Navigation Services, Annex 10 to the Convention on International Civil Aviation, Aeronautical Telecommunications, Volume II, Communications Procedures including those with PANS status

Joint Government/Industry Operational Concept for the Evolution of Free Flight.

MIL-HDBK-464, *Electromagnetic Environmental Effects Requirements for Systems*

MIL-STD-1472F, Design Criteria Standard *Human Engineering*

MIL-STD-1686, *Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts, Assemblies, and Equipment*

MIL-STD-2073-1, *DOD Material Procedures for Development and Application of Packaging Requirements*

NAS-SR-1000, *National Airspace System, System Requirements Specification*

NAS-SS-1000, *FAA NAS System Specification, Volume I*

National Fire Protection Association Standard 70, *National Electric Code*

OMB Circular A-11, *Preparation of Budget Estimates*

RTCA DO 238, *Human Engineering Guidance for Data Link Systems*

RTCA DO 256, *Minimum Human Factors Standards for Air Traffic Services Provided via Data Communications Utilizing the ATN, Builds I and IA*

RTCA DO-264, *Guidelines for Approval of the Provision and Use of Air Traffic Services Supported by Data Communications*

RTCA DO-278, *Guidelines for Communication, Navigation, Surveillance and Air Traffic Management (CNS/ATM) Systems Software Integrity Assurance*

RTCA DO-280A, *Interoperability Requirements Standard For ATN Baseline 1 (INTEROP ATN B1)*

RTCA DO-281, *Minimum Operational Performance Standards For Aircraft VDL Mode 2 Physical, Link, and Network Layer*

RTCA/DO-290, *Safety and Performance Requirements Standard for Air Traffic Data Link Services in Continental Airspace (Continental SPR Standard)*

Title 29 CFR 1960, *Basic Program Elements For Federal Employee Safety And Health Programs And Related Matters*

Appendix E COCR Mapping to Data Communications Services

The following table is a mapping of the COCR identified services to the NAS data communications services.

Data Communications Functional Service	**COCR Capability**	**Data Communications Service Availability**		
		Segment One	**Segment Two**	**Segment Three**
ATC Clearances	ATC Clearance Service (ACL)	X	X	X
Free Text (e.g., ATC Microphone Check)	ATC Microphone Check Service (AMC)	X	X	X
Initial 4-D Trajectories in mixed airspace.	Common Trajectory Coordination Service (COTRAC)	X	X	X
Unique Identification	Data Link Logon Service (DLL)	X	X	X
D-ATIS	Data Link Automatic Terminal Information Service (D-ATIS)	X	X	X
Departure Clearances	Departure Clearance Service (DCL)	X	X	X
Automatic Hand-Off Generation (providing frequency for voice and connection mgmt for data)	ATC Communication Management Service (ACM)	X	X	X
Departure Taxi Clearances (Coded taxi route in Segment One, then detailed in Segments Two and Three)	Data Link Taxi Service (D-TAXI)	X	X	X
Uplink Controlled Time of Arrival to aircraft.	Arrival Manager Information Delivery Service (ARMAND)	X	X	X
Aircrew Preferences (Aircraft capabilities)	Pilot preference Downlink (PPD)		X	X
Arrival Taxi Instructions	D-TAXI		X	X
4-D Trajectory Agreements in Performance-Based Airspace (e.g. 30 mins. conflict free)	COTRAC		X	X
Down Stream Clearance service (G-G implementation)	Down Stream Clearance Service (DSC)		X	X
Conformance Management (ADS-C)	Flight Path Intent Service (FLIPINT)		X	X

Flight Performance Information (Assumes ADS-C)	System Access Parameters Service (SAP)		X	X
Info on Delays/Constraints (D-FLUP)	Data Link Flight Update Service (D-FLUP)		X	X
Uplink of Static Airport Map	Data Link Surface Information Guidance Service (D-SIG)		X	
Augmented Surface Map Update (high integrity / availability with taxi route)	Data Link Surface Information Guidance Service (D-SIG)			X
S&M, C&P, ITP services dependent on ACL messages	ASAS S&M, C&P, ITP			X
Widespread use of 4-D Trajectory Agreements down to Paired Approach (e.g. 2 hr. conflict free)	COTRAC			X
Paired Approaches	Paired Approaches (PAIRAPP)			X
Wake Vortex Footprint	WAKE			X

In the table above an X in a box indicates that service is planned to be available in that Data Communications segment.

Federal Aviation

Administration

Fully Releasable

Version 2.0

Date

Functional Architecture for the Data Communication System

Air Traffic Organization
Technical Operations Service
ATC Communications Services
Air-Ground Communications Solution Development

Approved By:

_____ Date _____
Manager, Air-Ground Communications Solution Development,
ATC Communications Services,
Technical Operations Service, Air Traffic Organization

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Data Communications Overview

Data communications in the NAS is envisioned to be implemented in three segments to meet the mission shortfalls in a practical, evolutionary approach to achieve the NGATS vision. The basis of the functions in this document are the data communications services described in the *Communications Operating Concept and Requirements for the Future Radio System*, COCR Version 1.0, dated March 6, 2006. The following sections describe the services and capabilities envisioned for each segment in the Data Communications in Support of NGATS Program.

Segment One (2012-2017)

The first segment in implementing data communications will provide the basic capabilities for controllers and flight crews to transfer ATC clearances, requests, instructions, notifications, voice frequency communications transfers, and flight crew reports as a supplement to voice. Procedures using trajectories to manage continuous descent approaches will be implemented on a limited basis at certain airports with aircraft meeting capability requirements.

The initial capabilities will concentrate on implementation in the Tower and En Route environments. These capabilities within Segment One serve as the initial building block for trajectory based operations.

Tower functionality for segment 1 is limited to a single option whicle En Route functionality has 3 different alternatives. Tower functionality is split between tower and national-level functions following the existing and currently planned architecture in the Tower environment.

Segment Two (2017-2022)

Segment Two data communications is focused on transitioning data communications capabilities to all domains e.g. Terminal, Tower and En Route. In addition, an implementing rule will become effective requiring data communications capabilities to be part of the aircrafts minimum equipment requirements for access to certain areas of airspace. This expansion, including the rulemaking and implementation of enhanced data communications services, provides the basis for evolving the NAS from tactical control to management-by-planning and intervention-by-exception. This is also the time when traffic levels are projected to rise to the point where voice communications is anticipated to restrict air traffic growth, and therefore data communications will evolve to become the necessary means of air-ground communications.

Segment One data communications capabilities will be expanded to include implementation of agreements in performance-based airspace where the predictability of the user's 4-D trajectory over some future time frame is agreed to be stable and will only change for exceptions.

Segment Two also adds trajectory conformance management to monitor the trajectory agreements in performance-based airspace. The aircraft's capability to accurately fly its cleared route of flight and improvements in conformance predictability, either through ground automation improvements or through the provision of aircraft intent data, will increase the precision of trajectory modeling or enable new concepts in separation assurance.

Terminal architecture in Segment 2 is limited to a single alternative. Tower functionality remains similar to segment 1 functionality while TRACON functionality is limited to the TRACON. TRACON

functionality is very high level since further research and TRACON automation architecture details are developed by terminal operators and systems architects.

Segment Three (2022-2027)

In addition to Segment Two capabilities, Segment Three will add data communications capability that will support delegation of separation responsibility to the flight crew, common use of trajectory agreements, and data communications guidance for zero visibility surface operations.

Research is being conducted on wake-vortex footprint broadcasts to support reduced separation enabling higher density operations. Rulemaking will expand the volume of performance-based airspace to a much larger vertical and lateral area encompassing preferential departure and arrival airspace.

Model Documentation

The Functional Model documents the Functional Architecture for the Data Communication System (DCS). It includes architectural diagrams, interactions, notes and references to related action items (TODOs) and assumptions (ASUMs).

The DCS will provide data communication connectivity and functionality between ground and airborne users. The DCS will be implemented in three incremental segments. Diagrams, functions and interdependencies that are applicable in a particular segment are labeled with [Sx] where 'x' indicates the applicable segment (1,2 or 3). Diagrams, functions and interdependencies that are applicable for all three segments do not have a segment label.

In general, functional interdependencies and/or data flows are shown only for DCS related activities.

Functional Architecture (Summary View) - *(CompositeStructure diagram)*
Created By: on 5/12/2006
Last Modified: 2/3/2007
Version: 1.0. False
GUID: {99F2E373-6B19-4082-9252-D41F2F40F77A}

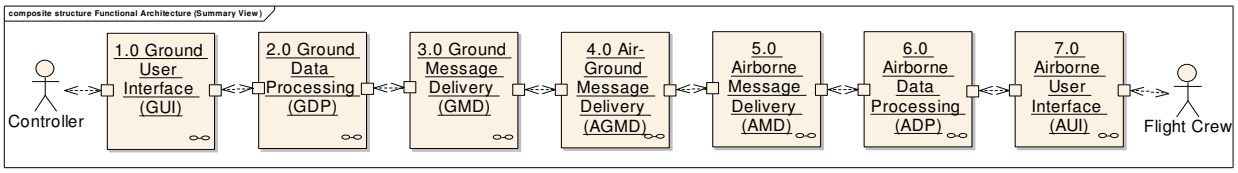


Figure: 1

Functional Architecture (Detailed View) - *(CompositeStructure diagram)*
Created By: on 5/4/2006
Last Modified: 2/3/2007
Version: 1.0. False
GUID: {C687B209-1ADC-4bd0-B832-901DE1BF9A21}

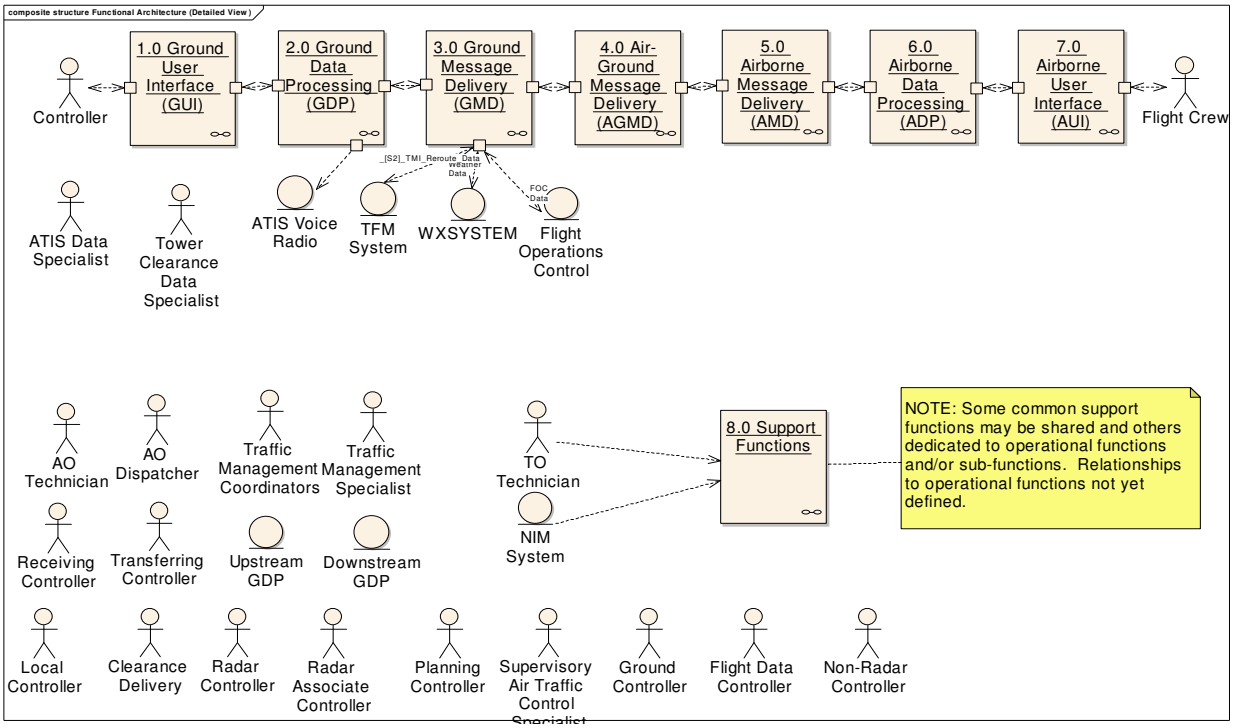


Figure: 2

1.0 Ground User Interface (GUI)

Type: **Package**
Status: Proposed. Version . Phase 1.0.
Package: Functional Model
Detail: *Created on* 9/29/2006 4:12:48 PM. *Last modified on* 9/29/2006 4:12:48 PM
GUID: {6951BF9D-6EC2-45e2-8784-3EEB64C41EA4}

1.0 Ground User Interface (GUI)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 1.0 Ground User Interface (GUI) *Keywords:*
Detail: *Created on* 5/4/2006. *Last modified on*.9/28/2006.
GUID: {65D98F56-4E8C-414d-9F5D-1AD9C8503FBE}

This function supports the human interface with the ground data processing functions. It supports the acceptances of user commands and displays system information.

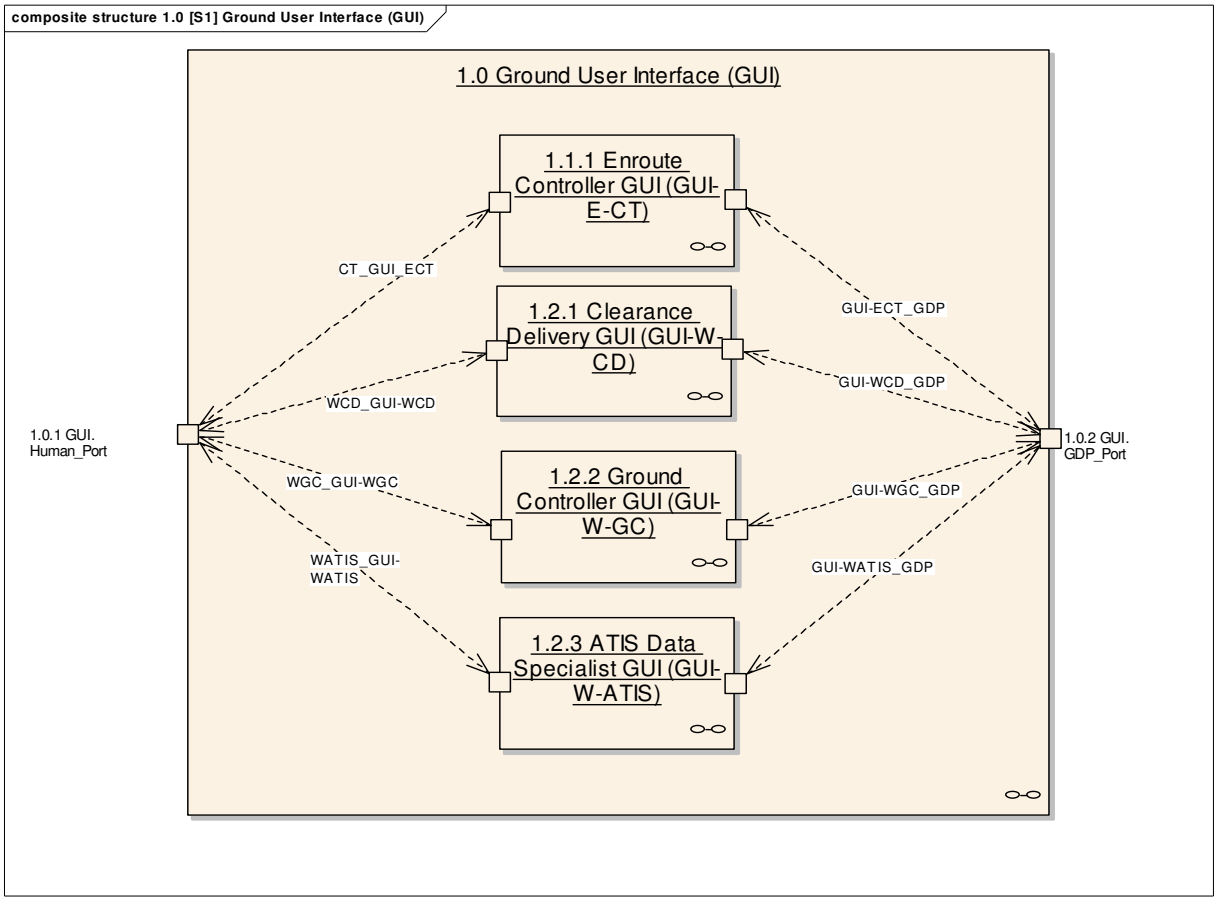
Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.0 Ground User Interface (GUI) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00044: Need Consistent use of 'Forwarding' function Element.Type= Requirement	

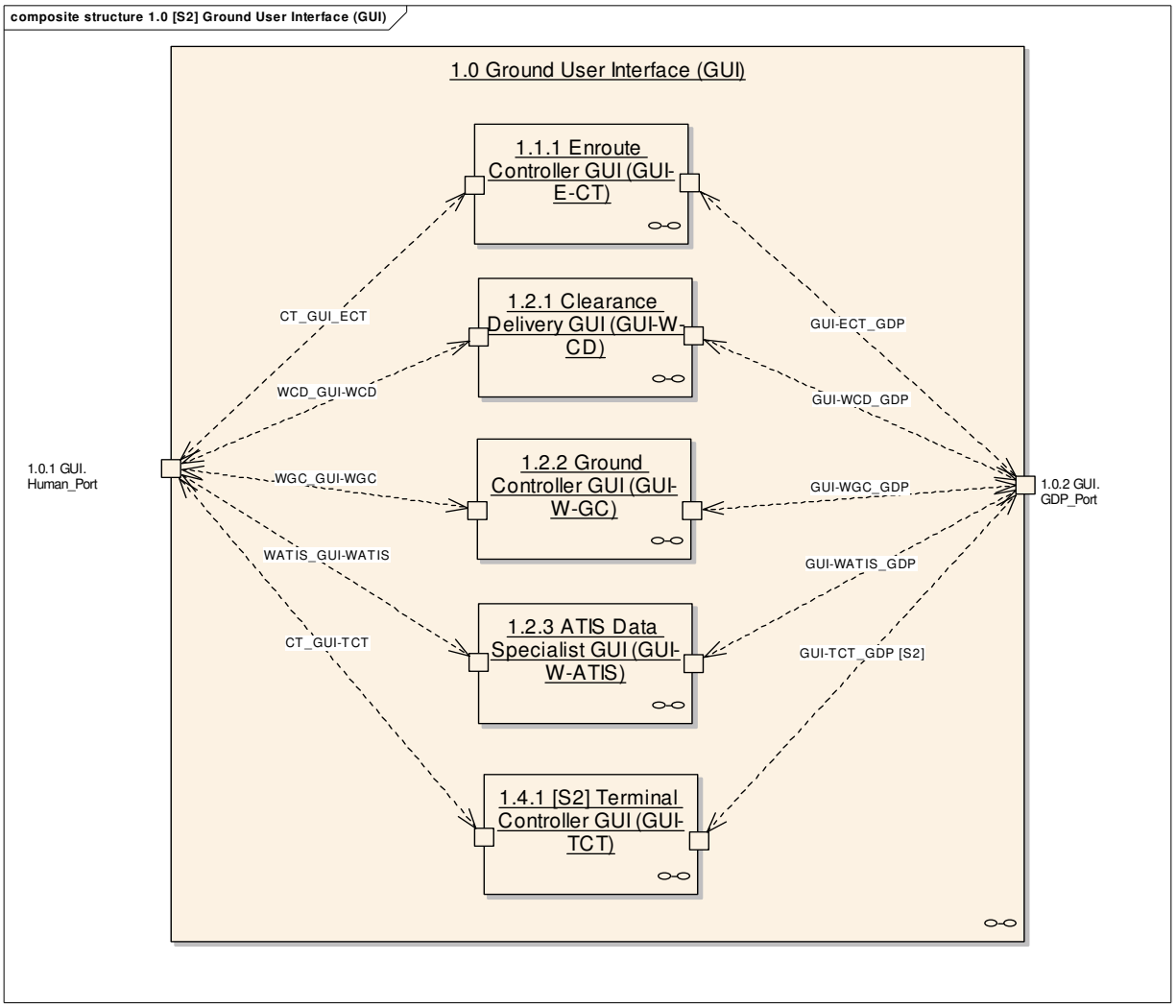
Embedded Elements

Element	Detail	Notes
Port 1.0.1 GUI.Human_Port	1.0	This functional port supports communication between actors and the GUI functional block.
Port 1.0.2 GUI.GDP_Port	1.0	This functional port supports communication between GUI and GDP functional blocks.

CompositeStructure diagram: 1.0 [S1] Ground User Interface (GUI)



CompositeStructure diagram: 1.0 [S2] Ground User Interface (GUI)



1.1 Enroute Ground User Interfaces (GUI-E)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 1.0 Ground User Interface (GUI) *Keywords:*
Detail: *Created on* 11/26/2006. *Last modified on*.11/26/2006.
GUID: {D16C3262-8427-45e7-B56B-A6196F543623}

1.1.1 Enroute Controller GUI (GUI-E-CT)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 1.0 Ground User Interface (GUI) *Keywords:*
Detail: *Created on* 5/4/2006. *Last modified on*.11/26/2006.
GUID: {8DC2FA2B-DA4C-4253-A948-731339A549F1}

This GUI supports the Enroute Controller.

Connections

Connector	Source	Target	Notes
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1 Enroute Controller GUI (GUI-E-CT) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= DCSR-00001: Controller Composition Tools Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role	ConnTarget.Scope= Public ConnTarget.Role=	

Connector	Source	Target	Notes
	ConnSource.RoleNote Element.Name= 1.1.1 Enroute Controller GUI (GUI-E-CT) Element.Type= Object	ConnTarget.RoleNote= Element.Name= DCSR-00011: Aircraft/Flight Plan Association Element.Type= Requirement	
Sequence Compose Clearance Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= Controller Element.Type= Actor	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.1.1 Enroute Controller GUI (GUI-E-CT) Element.Type= Object	
Sequence Display Validated Msg Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1 Enroute Controller GUI (GUI-E-CT) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= Controller Element.Type= Actor	
Sequence Clearance Request Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= Controller Element.Type= Actor	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.1.1 Enroute Controller GUI (GUI-E-CT) Element.Type= Object	Includes: - data elements, ACID, FLID
Sequence TX Cmd Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= Controller Element.Type= Actor	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.1.1 Enroute Controller GUI (GUI-E-CT) Element.Type= Object	

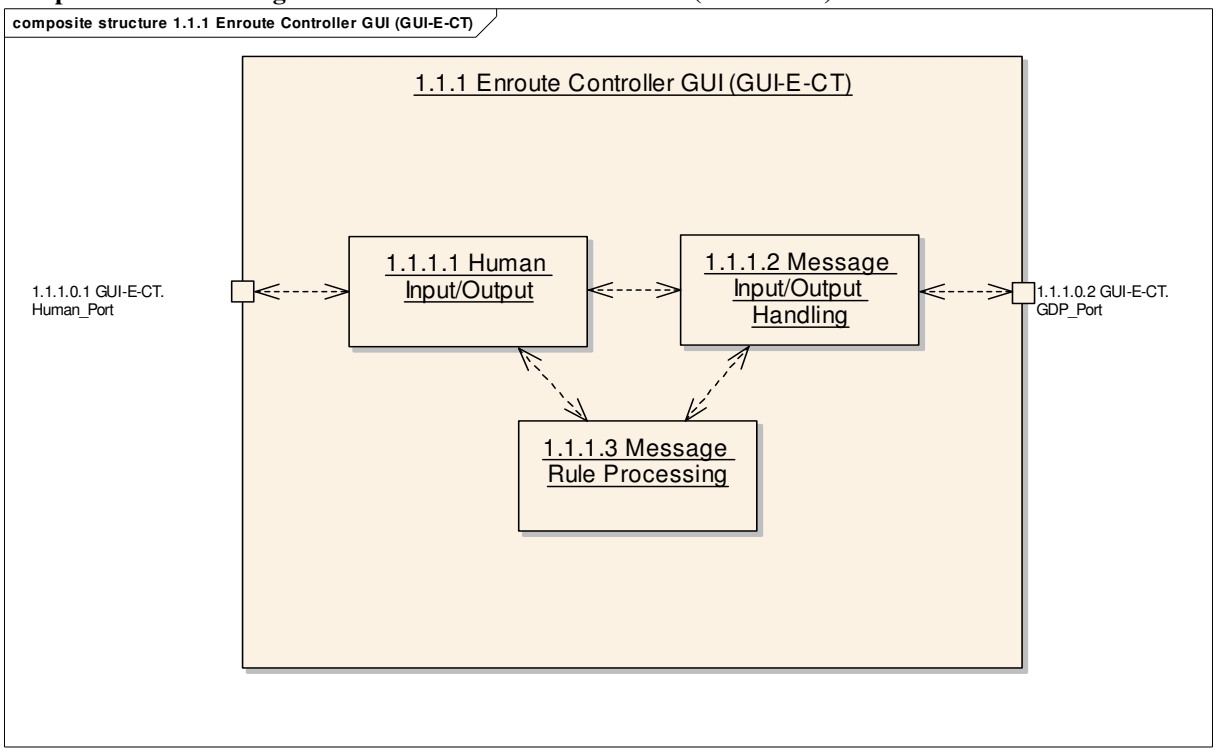
Connector	Source	Target	Notes
Sequence Test Message Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1 Enroute Controller GUI (GUI-E-CT) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 2.1 Enroute Ground Data Processing (GDP-E) Element.Type= Object	
Sequence Wilco Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.1.2 LEGACY Controller-Pilot Data Communication - Enroute (CPDC-E) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.1.1 Enroute Controller GUI (GUI-E-CT) Element.Type= Object	
Sequence Display Wilco Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1 Enroute Controller GUI (GUI-E-CT) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= Controller Element.Type= Actor	
Sequence Wilco Received Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1 Enroute Controller GUI (GUI-E-CT) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 2.1.2 LEGACY Controller-Pilot Data Communication - Enroute (CPDC-E) Element.Type= Object	
Sequence Wilco Latency Okay Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.1.2 LEGACY	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name=	

Connector	Source	Target	Notes
	Controller-Pilot Data Communication - Enroute (CPDC-E) Element.Type= Object	1.1.1 Enroute Controller GUI (GUI-E-CT) Element.Type= Object	
Sequence Wilco Latency Okay Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1 Enroute Controller GUI (GUI-E-CT) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= Controller Element.Type= Actor	

Embedded Elements

Element	Detail	Notes
Port 1.1.1.0.1 GUI-E-CT.Human_Port	1.0	
Port 1.1.1.0.2 GUI-E-CT.GDP_Port	1.0	

CompositeStructure diagram: 1.1.1 Enroute Controller GUI (GUI-E-CT)



1.1.1.1 Human Input/Output

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 1.0 Ground User Interface (GUI) *Keywords:*
Detail: *Created on* 5/4/2006. *Last modified on*.5/8/2006.
GUID: {8A767007-76D3-42d5-AEFA-726E20C34896}

Includes:
- keyboard
- display
- audible devices (This function produce audible alerts or annunciations, e.g., to indicate when a message has arrived for consideration).
- trackball
- joystick
- mice
- touchscreens

This function may also incorporate 'rules' by constraining the display of certain options to the user (e.g. built into display window or submenus, etc).

Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.4.6 Heading Changes Element.Type= Requirement	
Realisation	ConnSource.Scope=	ConnTarget.Scope=	

Connector	Source	Target	Notes
Source -> Destination	Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.4.5 Speed Changes Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.1 Message Composition Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.4.4 Vertical Clearances Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.4.3 Route Modificiations Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.3.9 Voice Frequency Contact Element.Type= Requirement	
Realisation	ConnSource.Scope=	ConnTarget.Scope=	

Connector	Source	Target	Notes
Source -> Destination	Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.3.7 Eligibility Transfer Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.3.11 Voice Frequency Blockage Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.3.10 Altitude Confirmation Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.3.8 Voice Frequency Monitor Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.4.7 Crossing Constraints Element.Type= Requirement	
Realisation	ConnSource.Scope=	ConnTarget.Scope=	

Connector	Source	Target	Notes
Source -> Destination	Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.8 Message Transmission Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.2.9 [S2] Conformance Resolution Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.2.1 [S2] User Preferences Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.9.4 Monitoring and Control Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.9.1 Recording of Messages Element.Type= Requirement	

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.2.3.1 [S1] Integrity Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.2.2.1 [S1] Continuity Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.2.1 [S1] Essential System Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.1.1.1 Message Exchange Rates Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.4.9 Clearance Requirements Element.Type= Requirement	

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.4.8 Lateral Offsets Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.2 Message Approval Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.3 Message Predefined Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.5 Message Deferral Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.4 Message Deferral Element.Type= Requirement	

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.5.5 Controller Aircraft Advisories Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.6 Message Editing Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.7.3.1 Operational Impact Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.7.2.1 Automation Integration Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.4.2.1 [S3] Integrity Element.Type=	

Connector	Source	Target	Notes
		Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.4.1.1 [S3] Continuity Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.3.2.1 [S2] Continuity Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.3.5.1 [S2] Latency Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.4.3.1 [S3] Availability Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.3.3.1 [S2] Integrity Element.Type=	

Connector	Source	Target	Notes
		Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.4.4.1 [S3] Latency Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.3.1 [S2] Critical System Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.3.4.1 [S2] Availability Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.3.6.1 [S2] Aircraft per Enroute Position Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type=	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.4.5.1 [S3] Aicraft per Enroute	

Connector	Source	Target	Notes
	Object	Position Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.5.4 Aircraft Reports Element.Type= Requirement	
Dependency Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= DCSR-00002: Automatic Generation of Message Proposals Element.Type= Requirement	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.0.1 GUI-E-CT.Human_Port Element.Type= Port	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name=	

Connector	Source	Target	Notes
	Input/Output Element.Type= Object	1.1.1.2 Message Input/Output Handling Element.Type= Object	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.5.3 Controller Message Composition Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.2.4.1 [S1] Availability Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.2.5.1 [S1] Latency Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.2.5.2 [S1] Expiration Time Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name=	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote=	

Connector	Source	Target	Notes
	1.1.1.1 Human Input/Output Element.Type= Object	Element.Name= PPR.3.2.2.6.1 [S1] Aircraft per Enroute Position Element.Type= Requirement	

1.1.1.3 Message Rule Processing

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 1.0 Ground User Interface (GUI) *Keywords:*
Detail: *Created on* 5/4/2006. *Last modified on*.5/8/2006.
GUID: {795527F2-E7D1-4ed9-9569-343BCEA56573}

This function may include rule processing beyond that which can be captured in a standard user interface, i.e. the Human Input/Output function (e.g., maybe CPDC rules or application specific rules).

Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.3.10 Altitude Confirmation Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public	ConnTarget.Scope= Public	

Connector	Source	Target	Notes
	ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.7 Message Validation Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.3 Message Predefined Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.6 Message Editing Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.3.8 Voice Frequency Monitor Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.5.3.1.2 Data Reentry Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public	ConnTarget.Scope= Public	

Connector	Source	Target	Notes
	ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.4.1.1 [S3] Continuity Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.3.6.1 [S2] Aircraft per Enroute Position Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.3.5.1 [S2] Latency Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.4.2.1 [S3] Integrity Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.3.4.1 [S2] Availability Element.Type= Requirement	
Realisation	ConnSource.Scope=	ConnTarget.Scope=	

Connector	Source	Target	Notes
Source -> Destination	Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.3.2.1 [S2] Continuity Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.3.1 [S2] Critical System Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.2.2.1 [S1] Continuity Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.2.1 [S1] Essential System Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.1.1.1 Message Exchange Rates Element.Type= Requirement	
Realisation	ConnSource.Scope=	ConnTarget.Scope=	

Connector	Source	Target	Notes
Source -> Destination	Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.2.6.1 [S1] Aircraft per Enroute Position Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.2.5.2 [S1] Expiration Time Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.2.5.1 [S1] Latency Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.3.3.1 [S2] Integrity Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.2.3.1 [S1] Integrity Element.Type= Requirement	

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.4.5.1 [S3] Aicraft per Enroute Position Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.4.4.1 [S3] Latency Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.4.3.1 [S3] Availability Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.2.4.1 [S1] Availability Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.3.9 Voice Frequency Contact Element.Type= Requirement	

Connector	Source	Target	Notes
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	
Dependency Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= DCSR-00004: Message Activation or Deferral Element.Type= Requirement	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	

1.1.1.2 Message Input/Output Handling

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 1.0 Ground User Interface (GUI) *Keywords:*
Detail: *Created on* 5/4/2006. *Last modified on*.5/8/2006.
GUID: {0414483B-8B75-47da-B400-AD16F615A8C0}

Translates GUI messages into format compatible with GDP functions (e.g., communication protocols and message formats). This function should be able to be replaced/updated to account for changes in message format changes or protocol changes.

Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.3.11 Voice Frequency Blockage Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.2.9 [S2] Conformance Resolution Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.3 Message Predefined Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name=	

Connector	Source	Target	Notes
	Input/Output Handling Element.Type= Object	PPR.3.1.1.1.2 Message Approval Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.5.5 Controller Aircraft Advisories Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.5.4 Aircraft Reports Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.5.3 Controller Message Composition Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.4.9 Clearance Requirements Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role	ConnTarget.Scope= Public ConnTarget.Role=	

Connector	Source	Target	Notes
	ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.RoleNote= Element.Name= PPR.3.1.1.4.8 Lateral Offsets Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.4.7 Crossing Constraints Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.4.6 Heading Changes Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.4.5.1 [S3] Aicraft per Enroute Position Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.3.4.1 [S2] Availability Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public	ConnTarget.Scope= Public	

Connector	Source	Target	Notes
	ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.6.2.3.2 HF Considerations Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.5.3.1.3 Software Integration (Inbound) Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.7.2.1 Automation Integration Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.4.4.1 [S3] Latency Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.4.3.1 [S3] Availability Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public	ConnTarget.Scope= Public	

Connector	Source	Target	Notes
	ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.3.3.1 [S2] Integrity Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.7.3.1 Operational Impact Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.3.6.1 [S2] Aircraft per Enroute Position Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.3.5.1 [S2] Latency Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.2.6.1 [S1] Aircraft per Enroute Position Element.Type= Requirement	

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.2.5.2 [S1] Expiration Time Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.2.5.1 [S1] Latency Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.5.3.1.2 Data Reentry Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.3.2.1 [S2] Continuity Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.3.1 [S2] Critical System Element.Type= Requirement	

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.4.1.1 NAS Facilities Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.4.2.1 [S3] Integrity Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.4.1.1 [S3] Continuity Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.2.2.1 [S1] Continuity Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.2.3.1 [S1] Integrity Element.Type= Requirement	

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.2.4.1 [S1] Availability Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.4.4 Vertical Clearances Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.4.3 Route Modificiations Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.3.9 Voice Frequency Contact Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.3.8 Voice Frequency Monitor Element.Type= Requirement	

Connector	Source	Target	Notes
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	
Dependency Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= DCSR-00003: Pre-Defined Messages Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.9.1 Recording of Messages Element.Type= Requirement	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.1.1.0.2 GUI-E-CT.GDP_Port Element.Type= Port	

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.4.5 Speed Changes Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.2.1 [S1] Essential System Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.9.4 Monitoring and Control Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.2.1 [S2] User Preferences Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.2.1.1.1 Message Exchange Rates Element.Type= Requirement	

1.5 Common Ground User Interfaces (GUI-C)

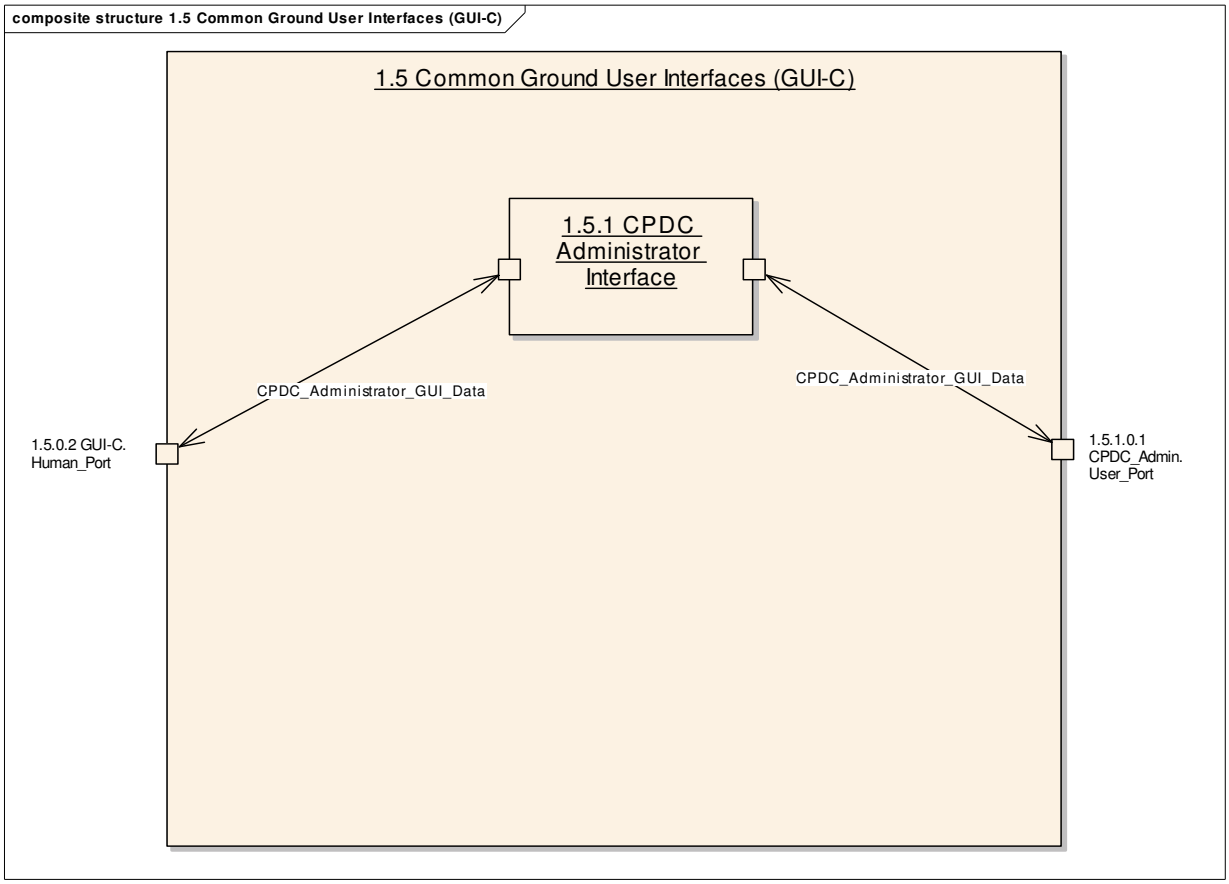
Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 1.0 Ground User Interface (GUI) *Keywords:*
Detail: *Created on* 11/26/2006. *Last modified on*.11/26/2006.
GUID: {464124E0-929B-43cf-8683-61DAB4C72E2E}

This function provides computer-human interfaces (CHIs) for all 'common' ground data processing functions (e.g. the common CPDC function).

Embedded Elements

Element	Detail	Notes
Port 1.5.1.0.1 CPDC_Admin.User_Port	1.0	
Port 1.5.0.2 GUI-C.Human_Port	1.0	

CompositeStructure diagram: 1.5 Common Ground User Interfaces (GUI-C)



1.5.1 CPDC Administrator Interface

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 1.0 Ground User Interface (GUI) *Keywords:*
Detail: *Created on* 11/26/2006. *Last modified on*.11/26/2006.
GUID: {07C97228-0E74-4168-847F-0CABF57EC286}

This function supports the entry and display of CPDC administration data (e.g., permitted user lists, FDP Address, etc).

Embedded Elements

Element	Detail	Notes
Port 1.5.1.0.1 CPDC_Admin.Human_Port	1.0	
Port 1.5.1.0.2 CPDC_Admin.GDP_Port	1.0	

1.2 Tower Ground User Interfaces (GUI-W)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 1.0 Ground User Interface (GUI) *Keywords:*
Detail: *Created on* 11/26/2006. *Last modified on*.11/26/2006.
GUID: {2B19B0A0-F8B1-43c0-94A9-0A866F127157}

1.2.1 Clearance Delivery GUI (GUI-W-CD)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 1.0 Ground User Interface (GUI) *Keywords:*
Detail: *Created on* 5/4/2006. *Last modified on*.11/26/2006.
GUID: {6E03EBFD-F921-482c-8A0C-139B30237D41}

This GUI supports the Clearance Delivery controller

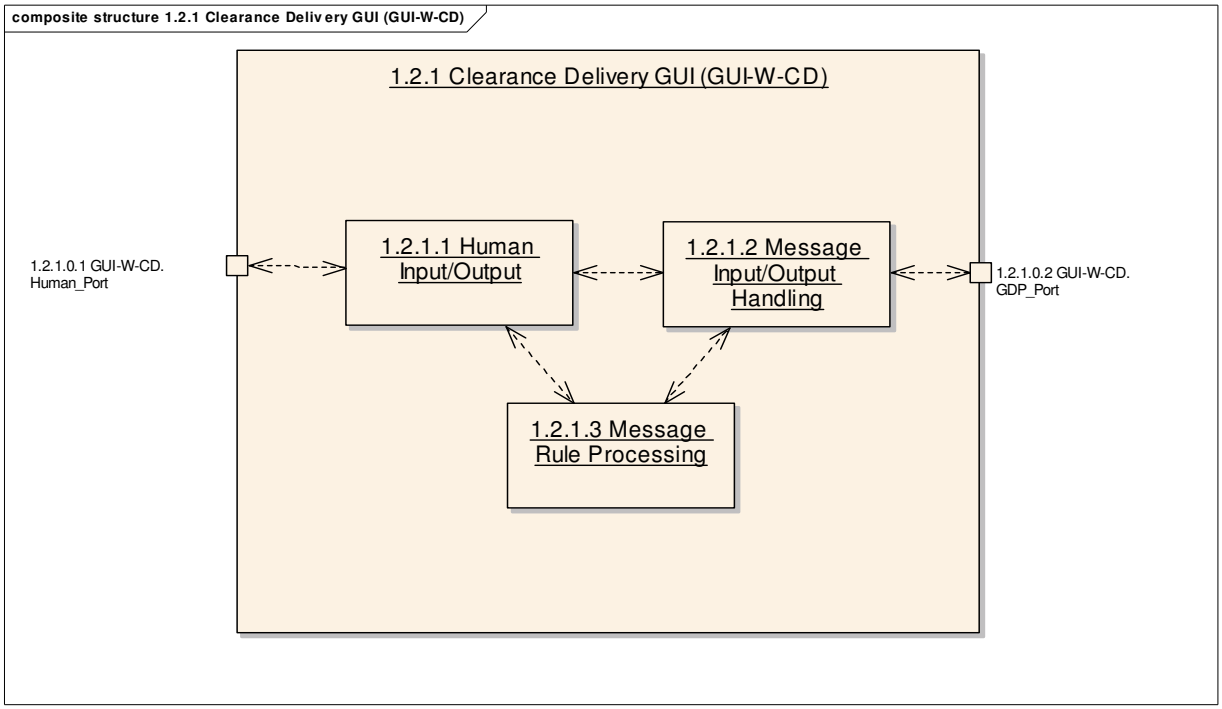
Connections

Connector	Source	Target	Notes
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.1 Clearance Delivery GUI (GUI-W-CD) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= DCSR-00001: Controller Composition Tools Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.1 Clearance Delivery GUI (GUI-W-CD) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= DCSR-00010: Version Compatibility Element.Type= Requirement	

Embedded Elements

Element	Detail	Notes
Port 1.2.1.0.1 GUI-W-CD.Human_Port	1.0	
Port 1.2.1.0.2 GUI-W-CD.GDP_Port	1.0	

CompositeStructure diagram: 1.2.1 Clearance Delivery GUI (GUI-W-CD)



1.2.1.1 Human Input/Output

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 1.0 Ground User Interface (GUI) *Keywords:*
Detail: *Created on* 5/4/2006. *Last modified on*.5/8/2006.
GUID: {85E2BE3D-0432-42c3-9ACE-539D31BC3AA5}

Includes:
- keyboard
- display
- audible devices (This function produce audible alerts or annunciations, e.g., to indicate when a message has arrived for consideration).
- trackball
- joystick
- mice
- touchscreens

This function may also incorporate 'rules' by constraining the display of certain options to the user (e.g. built into display window or submenus, etc).

Connections

Connector	Source	Target	Notes
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.2.1.2 Message Input/Output Handling Element.Type= Object	
Dependency Destination -> Source	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= DCSR-00002: Automatic Generation of Message Proposals Element.Type= Requirement	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.2.1.3 Message Rule Processing Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.1.0.1 GUI-W-CD.Human_Port Element.Type= Port	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.2.1.1 Human Input/Output Element.Type=	

Connector	Source	Target	Notes
		Object	

1.2.1.3 Message Rule Processing

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 1.0 Ground User Interface (GUI) *Keywords:*
Detail: *Created on* 5/4/2006. *Last modified on*.5/8/2006.
GUID: {FB16D747-D1E9-4608-8EEB-14BB6675B35D}

This function may include rule processing beyond that which can be captured in a standard user interface, i.e. the Human Input/Output function (e.g., maybe CPDC rules or application specific rules).

Connections

Connector	Source	Target	Notes
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.2.1.3 Message Rule Processing Element.Type= Object	
Dependency Destination -> Source	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.1.3 Message Rule Processing	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= DCSR-00004: Message	

Connector	Source	Target	Notes
	Element.Type= Object	Activation or Deferral Element.Type= Requirement	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.1.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.2.1.2 Message Input/Output Handling Element.Type= Object	

1.2.1.2 Message Input/Output Handling

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 1.0 Ground User Interface (GUI) *Keywords:*
Detail: *Created on* 5/4/2006. *Last modified on*.5/8/2006.
GUID: {5BB21861-C30C-45a4-808E-5E365AC8D941}

Translates GUI messages into format compatible with GDP functions (e.g., communication protocols and message formats). This function should be able to be replaced/updated to account for changes in message format changes or protocol changes.

Connections

Connector	Source	Target	Notes
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role	ConnTarget.Scope= Public ConnTarget.Role=	

Connector	Source	Target	Notes
	ConnSource.RoleNote Element.Name= 1.2.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.RoleNote= Element.Name= 1.2.1.0.2 GUI-W-CD.GDP_Port Element.Type= Port	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.1.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.2.1.2 Message Input/Output Handling Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.1.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.2.1.2 Message Input/Output Handling Element.Type= Object	
Dependency Destination -> Source	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.1.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= DCSR-00003: Pre-Defined Messages Element.Type= Requirement	

1.2.2 Ground Controller GUI (GUI-W-GC)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 1.0 Ground User Interface (GUI) *Keywords:*
Detail: *Created on* 5/4/2006. *Last modified on*.11/26/2006.
GUID: {7855B32E-2B46-43bc-BF27-EE7F8F03658F}

This GUI supports the issuance of ground taxi instructions.

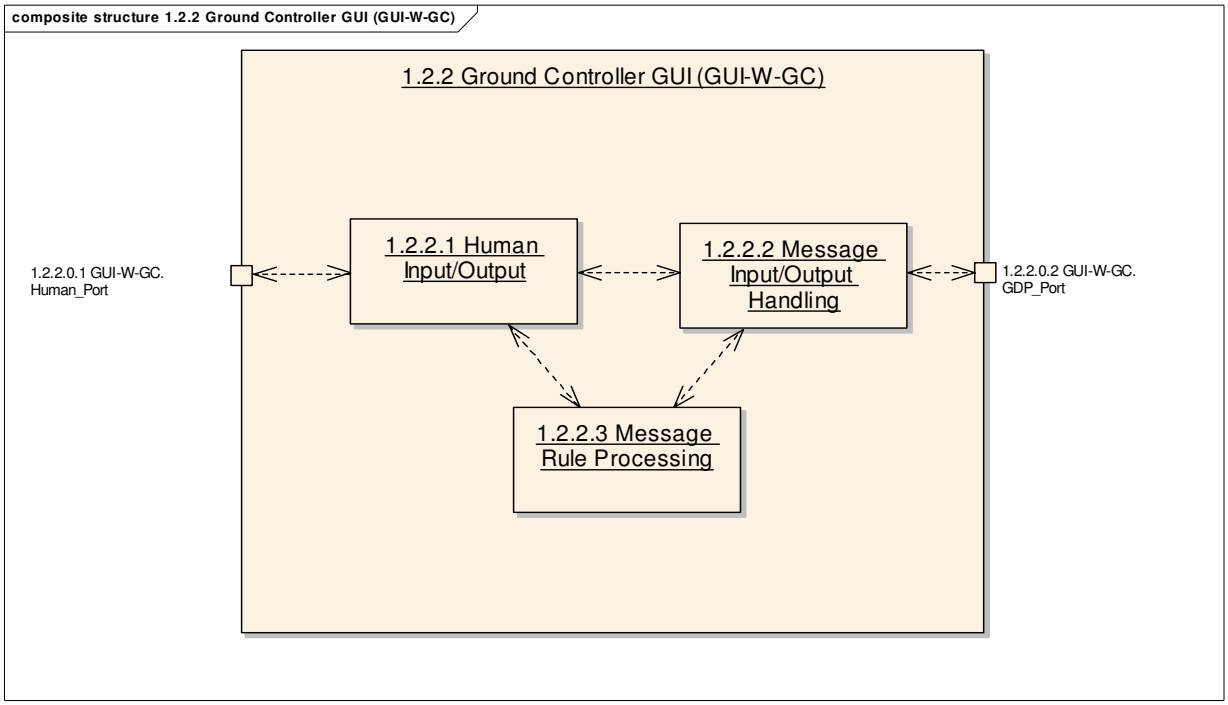
Connections

Connector	Source	Target	Notes
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2 Ground Controller GUI (GUI-W-GC) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= DCSR-00001: Controller Composition Tools Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2 Ground Controller GUI (GUI-W-GC) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= DCSR-00009: Element Capabilities Element.Type= Requirement	

Embedded Elements

Element	Detail	Notes
Port 1.2.2.0.1 GUI-W-GC.Human_Port	1.0	
Port 1.2.2.0.2 GUI-W-GC.GDP_Port	1.0	

CompositeStructure diagram: 1.2.2 Ground Controller GUI (GUI-W-GC)



1.2.2.1 Human Input/Output

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 1.0 Ground User Interface (GUI) *Keywords:*
Detail: *Created on* 5/4/2006. *Last modified on*.5/8/2006.
GUID: {1D2D5E91-7CF4-4c18-8F08-19CA71E76E3C}

Includes:
- keyboard
- display
- audible devices (This function produce audible alerts or annunciations, e.g., to indicate when a message has arrived for consideration).
- trackball
- joystick
- mice
- touchscreens

This function may also incorporate 'rules' by constraining the display of certain options to the user (e.g. built into display window or submenus, etc).

Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.8 Message Transmission Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.6.3 Messaging (Departure and Taxi) Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.2 Message Approval Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.1 Message Composition Element.Type= Requirement	

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.4 Message Deferral Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.5 Message Deferral Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.6 Message Editing Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.6.5 Predefined Clearances (Departure and Taxi) Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.4.9 Clearance Requirements	

Connector	Source	Target	Notes
		Element.Type= Requirement	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.0.1 GUI-W-GC.Human_Port Element.Type= Port	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.2.2.1 Human Input/Output Element.Type= Object	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.6.4 Clearance Revisions (Departure and Taxi) Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.2.10 [S2] Taxi Information and Clearances Element.Type= Requirement	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.2.2.2 Message Input/Output Handling Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.1 Human	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name=	

Connector	Source	Target	Notes
	Input/Output Element.Type= Object	1.2.2.3 Message Rule Processing Element.Type= Object	
Dependency Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= DCSR-00002: Automatic Generation of Message Proposals Element.Type= Requirement	

1.2.2.2 Message Input/Output Handling

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 1.0 Ground User Interface (GUI) *Keywords:*
Detail: *Created on* 5/4/2006. *Last modified on*.5/8/2006.
GUID: {AB3CAFB8-988F-4213-B9A7-23000B0206E2}

Translates GUI messages into format compatible with GDP functions (e.g., communication protocols and message formats). This function should be able to be replaced/updated to account for changes in message format changes or protocol changes.

Connections

Connector	Source	Target	Notes
Realisation	ConnSource.Scope=	ConnTarget.Scope=	

Connector	Source	Target	Notes
Source -> Destination	Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.2 Message Input/Output Handling Element.Type= Object	Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.8 Message Transmission Element.Type= Requirement	
Dependency Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= DCSR-00003: Pre-Defined Messages Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.2 Message Approval Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.1 Message Composition Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.6 Message Editing Element.Type= Requirement	
Realisation	ConnSource.Scope=	ConnTarget.Scope=	

Connector	Source	Target	Notes
Source -> Destination	Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.2 Message Input/Output Handling Element.Type= Object	Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.3 Message Predefined Element.Type= Requirement	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.2.2.0.2 GUI-W-GC.GDP_Port Element.Type= Port	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.6.5 Predefined Clearances (Departure and Taxi) Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.6.4 Clearance Revisions (Departure and Taxi) Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.6.3 Messaging (Departure and Taxi) Element.Type=	

Connector	Source	Target	Notes
		Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.4.9 Clearance Requirements Element.Type= Requirement	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.2.2.2 Message Input/Output Handling Element.Type= Object	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.2.10 [S2] Taxi Information and Clearances Element.Type= Requirement	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.2.2.2 Message Input/Output Handling Element.Type= Object	

1.2.2.3 Message Rule Processing

Type: **Object**

Status: Proposed. Version 1.0. Phase 1.0.
Package: 1.0 Ground User Interface (GUI) *Keywords:*
Detail: *Created on* 5/4/2006. *Last modified on*.5/8/2006.
GUID: {5749C82C-0CC2-47f3-BD54-34DE4FA9182F}

This function may include rule processing beyond that which can be captured in a standard user interface, i.e. the Human Input/Output function (e.g., maybe CPDC rules or application specific rules).

Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.7 Message Validation Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.1 Message Composition Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.3 Message Rule	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name=	

Connector	Source	Target	Notes
	Processing Element.Type= Object	PPR.3.1.1.1.3 Message Predefined Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.6 Message Editing Element.Type= Requirement	
Dependency Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= DCSR-00004: Message Activation or Deferral Element.Type= Requirement	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.2.2.2 Message Input/Output Handling Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.2.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.2.2.3 Message Rule Processing Element.Type= Object	

1.2.3 ATIS Data Specialist GUI (GUI-W-ATIS)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 1.0 Ground User Interface (GUI) *Keywords:*
Detail: *Created on* 5/4/2006. *Last modified on*.11/26/2006.
GUID: {45082ACB-A5BC-445e-982E-0BFEC686E689}

This GUI supports the development of ATIS information

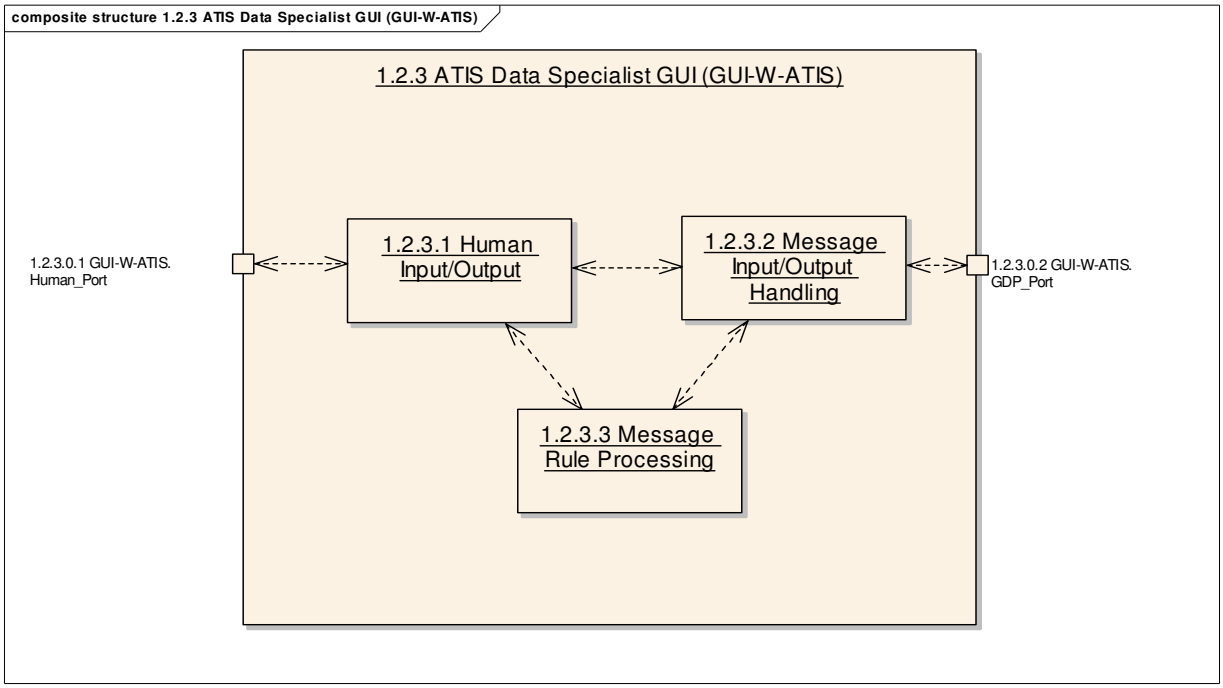
Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.3 ATIS Data Specialist GUI (GUI-W-ATIS) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0017A: ATIS GUI supports sound file play/record Element.Type= Requirement	

Embedded Elements

Element	Detail	Notes
Port 1.2.3.0.1 GUI-W-ATIS.Human_Port	1.0	
Port 1.2.3.0.2 GUI-W-ATIS.GDP_Port	1.0	

CompositeStructure diagram: 1.2.3 ATIS Data Specialist GUI (GUI-W-ATIS)



1.2.3.2 Message Input/Output Handling

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 1.0 Ground User Interface (GUI) *Keywords:*
Detail: *Created on* 5/4/2006. *Last modified on*.5/8/2006.
GUID: {9A67A9D9-9421-4f42-B749-C01B0C2F1F41}

Translates GUI messages into format compatible with GDP functions (e.g., communication protocols and message formats). This function should be able to be replaced/updated to account for changes in message format changes or protocol changes.

Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.3.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.6 Message Editing Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.3.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.8 Message Transmission Element.Type= Requirement	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.3.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.2.3.2 Message Input/Output Handling Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.3.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.2.3.2 Message Input/Output Handling Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.3.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.2.3.0.2 GUI-W-ATIS.GDP_Port Element.Type=	

Connector	Source	Target	Notes
		Port	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.3.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.1 Message Composition Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.3.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.3 Message Predefined Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.3.2 Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.2 Message Approval Element.Type= Requirement	

1.2.3.1 Human Input/Output

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 1.0 Ground User Interface (GUI) *Keywords:*
Detail: *Created on* 5/4/2006. *Last modified on*.5/8/2006.
GUID: {F7F128B4-AA60-4dbd-88C4-50E1435B8B08}

Includes:
- keyboard
- display
- audible devices (This function produce audible alerts or annunciations, e.g., to indicate when a message has arrived for consideration).
- trackball
- joystick
- mice

- touchscreens
- speakers & microphone (for voice ATIS support)

This function may also incorporate 'rules' by constraining the display of certain options to the user (e.g. built into display window or submenus, etc).

Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.3.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.7.2 ATIS Message Composition Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.3.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.6 Message Editing Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.3.1 Human Input/Output	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.7.1 ATIS	

Connector	Source	Target	Notes
	Element.Type= Object	Communication Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.3.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.8 Message Transmission Element.Type= Requirement	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.3.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.2.3.2 Message Input/Output Handling Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.3.0.1 GUI-W- ATIS.Human_Port Element.Type= Port	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.2.3.1 Human Input/Output Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.3.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.2.3.3 Message Rule Processing Element.Type= Object	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.3.1 Human Input/Output	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.1 Message	

Connector	Source	Target	Notes
	Element.Type= Object	Composition Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.3.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.4 Message Deferral Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.3.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.3 Message Predefined Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.3.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.5 Message Deferral Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.3.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.2 Message Approval Element.Type= Requirement	

1.2.3.3 Message Rule Processing

Type: **Object**

Status: Proposed. Version 1.0. Phase 1.0.
Package: 1.0 Ground User Interface (GUI) *Keywords:*
Detail: *Created on* 5/4/2006. *Last modified on*.5/8/2006.
GUID: {4618CB69-337E-4f42-8C97-154469F46701}

This function may include rule processing beyond that which can be captured in a standard user interface, i.e. the Human Input/Output function (e.g., maybe CPDC rules or application specific rules).

Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.3.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.7 Message Validation Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.3.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.6 Message Editing Element.Type= Requirement	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.3.3 Message Rule	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name=	

Connector	Source	Target	Notes
	Processing Element.Type= Object	1.2.3.2 Message Input/Output Handling Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.3.1 Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.2.3.3 Message Rule Processing Element.Type= Object	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.3.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.1 Message Composition Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.2.3.3 Message Rule Processing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.1.1.3 Message Predefined Element.Type= Requirement	

1.4 [S2] TRACON Ground User Interfaces (GUI-T)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 1.0 Ground User Interface (GUI) *Keywords:*
Detail: *Created on* 11/26/2006. *Last modified on*.11/26/2006.
GUID: {A9402145-5A8B-4a2b-AD3A-0E71CF53B9E0}

1.4.1 [S2] Terminal Controller GUI (GUI-TCT)

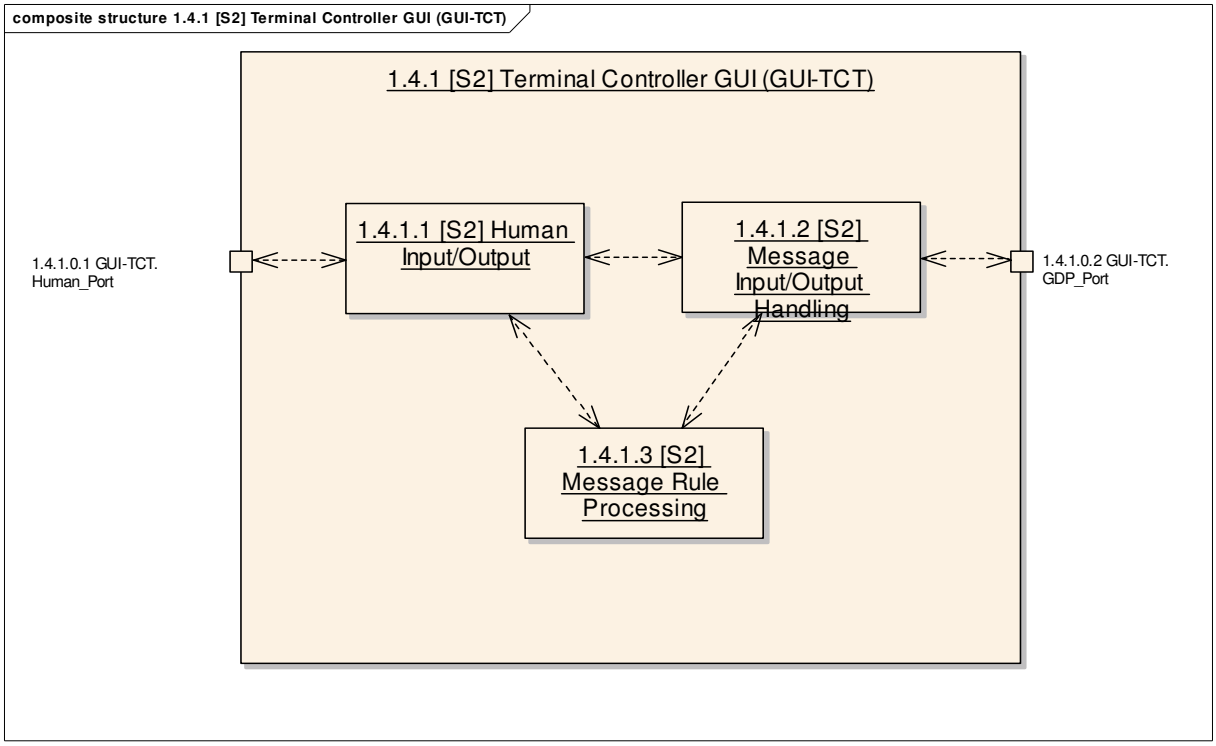
Type: **Object**
Status: Proposed. Version 1.0. Phase 2.0.
Package: 1.0 Ground User Interface (GUI) *Keywords:*
Detail: *Created on* 5/4/2006. *Last modified on*.11/26/2006.
GUID: {8181CC04-32A4-4fe5-9299-D1F19BF35230}

This GUI supports the Terminal Controller.

Embedded Elements

Element	Detail	Notes
Port 1.4.1.0.1 GUI-TCT.Human_Port	1.0	
Port 1.4.1.0.2 GUI-TCT.GDP_Port	1.0	

CompositeStructure diagram: 1.4.1 [S2] Terminal Controller GUI (GUI-TCT)



1.4.1.1 [S2] Human Input/Output

Type: **Object**
Status: Proposed. Version 1.0. Phase 2.0.
Package: 1.0 Ground User Interface (GUI) *Keywords:*
Detail: *Created on* 5/4/2006. *Last modified on*.5/8/2006.
GUID: {091BBD0A-8CF1-4c6f-A7C0-E09802CC92E6}

Includes:
- keyboard
- display
- audible devices (This function produce audible alerts or annunciations, e.g., to indicate when a message has arrived for consideration).
- trackball
- joystick
- mice
- touchscreens
- speakers & microphone (for voice ATIS support)

This function may also incorporate 'rules' by constraining the display of certain options to the user (e.g. built into display window or submenus, etc).

Connections

Connector	Source	Target	Notes
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.4.1.0.1 GUI-TCT.Human_Port Element.Type= Port	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.4.1.1 [S2] Human Input/Output Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.4.1.1 [S2] Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.4.1.3 [S2] Message Rule Processing Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.4.1.1 [S2] Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.4.1.2 [S2] Message Input/Output Handling Element.Type= Object	

1.4.1.2 [S2] Message Input/Output Handling

Type: **Object**
Status: Proposed. Version 1.0. Phase 2.0.

Package: 1.0 Ground User Interface (GUI) *Keywords:*
Detail: *Created on* 5/4/2006. *Last modified on*.11/26/2006.
GUID: {5827B074-D6DB-4fd8-BAE5-10653F887381}

Translates GUI messages into format compatible with GDP functions (e.g., communication protocols and message formats). This function should be able to be replaced/updated to account for changes in message format changes or protocol changes.

Connections

Connector	Source	Target	Notes
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.4.1.2 [S2] Message Input/Output Handling Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.4.1.0.2 GUI-TCT.GDP_Port Element.Type= Port	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.4.1.1 [S2] Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.4.1.2 [S2] Message Input/Output Handling Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name=	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote=	

Connector	Source	Target	Notes
	1.4.1.3 [S2] Message Rule Processing Element.Type= Object	Element.Name= 1.4.1.2 [S2] Message Input/Output Handling Element.Type= Object	

1.4.1.3 [S2] Message Rule Processing

Type: **Object**
Status: Proposed. Version 1.0. Phase 2.0.
Package: 1.0 Ground User Interface (GUI) *Keywords:*
Detail: *Created on* 5/4/2006. *Last modified on*.5/8/2006.
GUID: {CE211058-1544-4a60-867D-EE27A2EBA69C}

This function may include rule processing beyond that which can be captured in a standard user interface, i.e. the Human Input/Output function (e.g., maybe CPDC rules or application specific rules).

Connections

Connector	Source	Target	Notes
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.4.1.1 [S2] Human Input/Output Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.4.1.3 [S2] Message Rule Processing Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role	ConnTarget.Scope= Public ConnTarget.Role=	

Connector	Source	Target	Notes
	ConnSource.RoleNote Element.Name= 1.4.1.3 [S2] Message Rule Processing Element.Type= Object	ConnTarget.RoleNote= Element.Name= 1.4.1.2 [S2] Message Input/Output Handling Element.Type= Object	

1.3 National Ground User Interfaces (GUI-N)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 1.0 Ground User Interface (GUI) *Keywords:*
Detail: *Created on* 11/26/2006. *Last modified on*.11/26/2006.
GUID: {0B6A8125-7F70-4b42-A892-9A13D11CB4B6}

The National Ground User Interface(s) (GUI-N) are TODO.

2.0 Ground Data Processing (GDP)

Type: **Package**
Status: Proposed. Version . Phase 1.0.
Package: Functional Model
Detail: *Created on* 9/28/2006 4:48:10 PM. *Last modified on* 9/28/2006 4:48:10 PM
GUID: {E71BED4F-8CBF-4cd1-9945-D564873908BB}

2.0 Ground Data Processing (GDP)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.

Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/4/2006. *Last modified on*.9/28/2006.
GUID: {C166A255-092B-4b3b-A4C4-B9F46805E3D3}

Connections

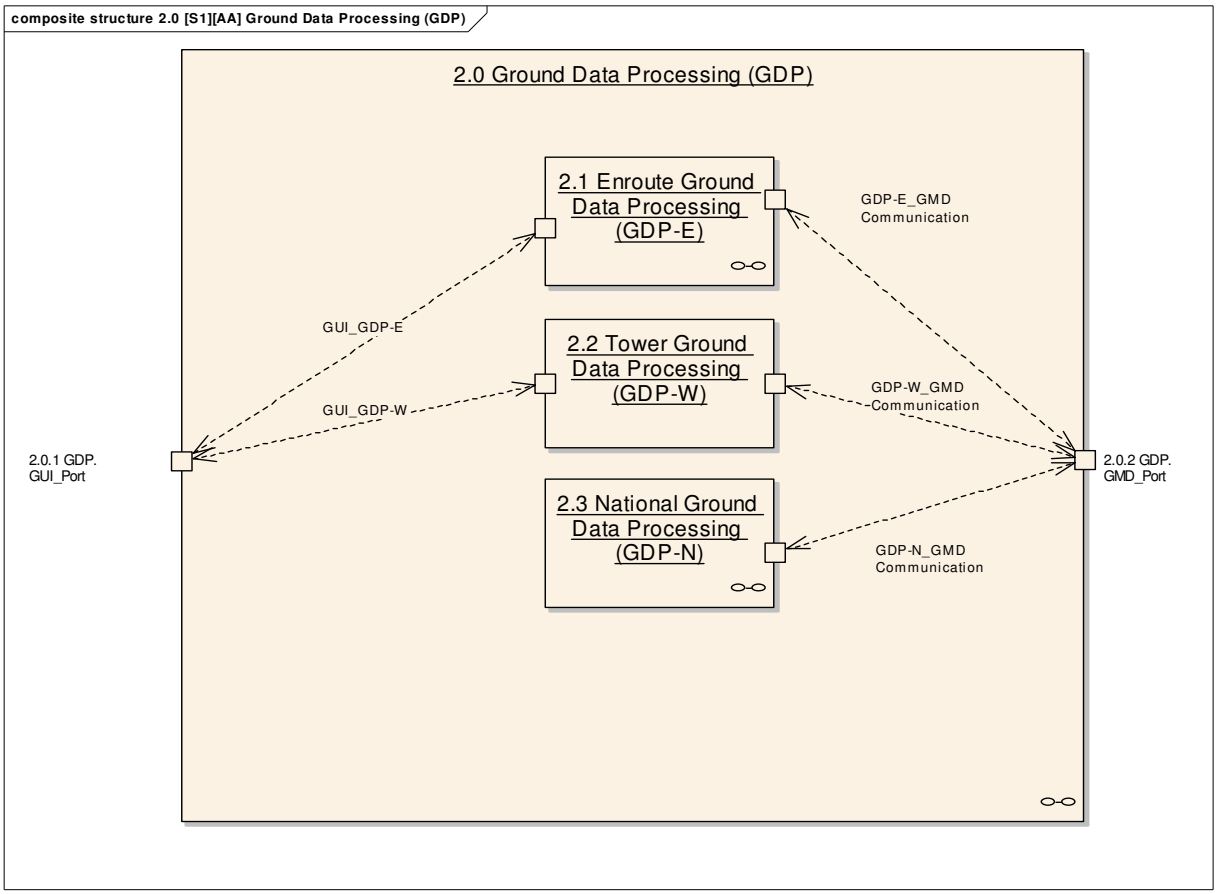
Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.0 Ground Data Processing (GDP) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0009A: Unique Configuration/Adaptation functions Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.0 Ground Data Processing (GDP) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00044: Need Consistent use of 'Forwarding' function Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.0 Ground Data	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name=	

Connector	Source	Target	Notes
	Processing (GDP) Element.Type= Object	TODO-00007: DCS Adaptation Data Requirements Element.Type= Requirement	
Dependency Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.0 Ground Data Processing (GDP) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= DCSR-00001: Controller Composition Tools Element.Type= Requirement	

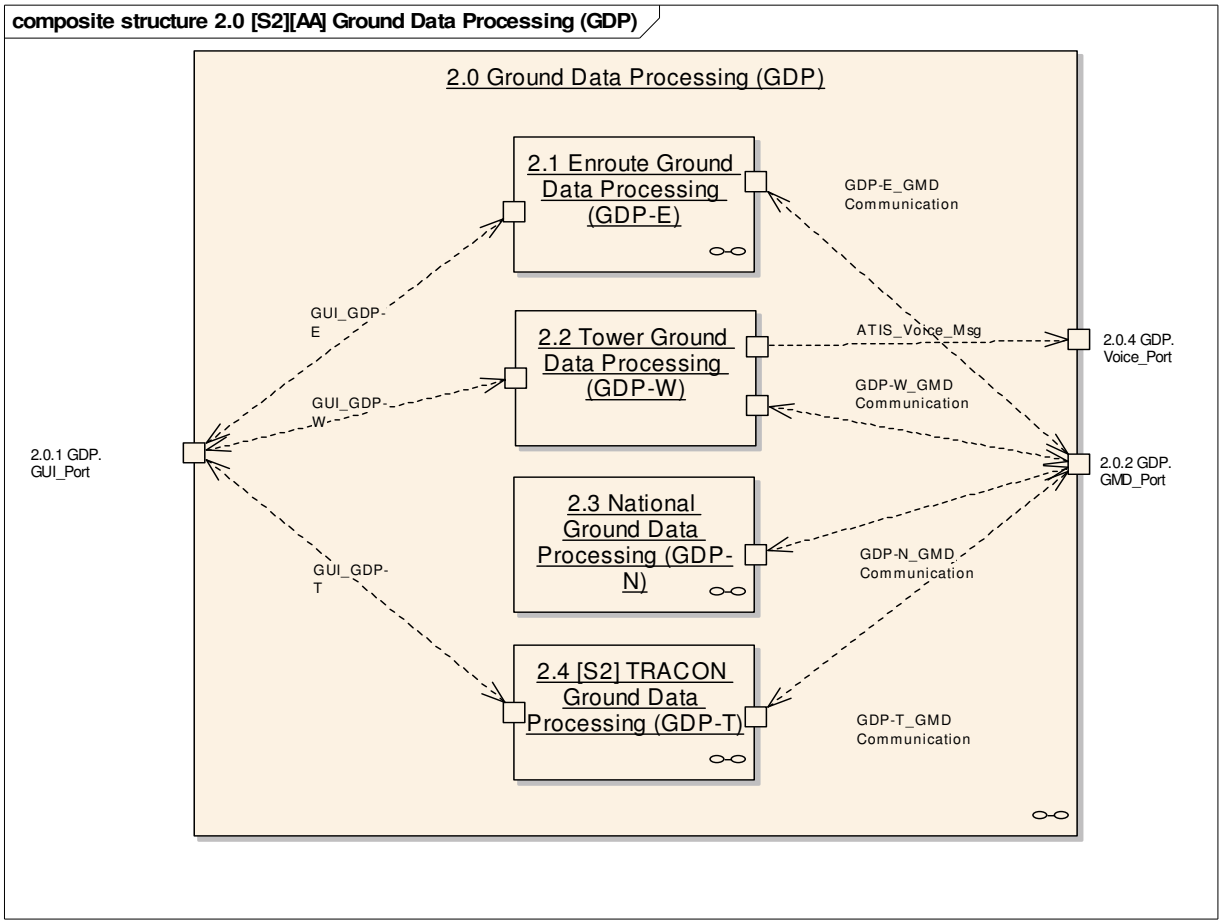
Embedded Elements

Element	Detail	Notes
Port 2.0.1 GDP.GUI_Port	1.0	
Port 2.0.2 GDP.GMD_Port	1.0	
Port 2.0.4 GDP.Voice_Port	1.0	

CompositeStructure diagram: 2.0 [S1][AA] Ground Data Processing (GDP)



CompositeStructure diagram: 2.0 [S2][AA] Ground Data Processing (GDP)



2.1 Enroute Ground Data Processing (GDP-E)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/8/2006. *Last modified on*.11/29/2006.
GUID: {1B3AF1FE-1B23-40f7-A5CB-91F211ABCD7E}

This function performs ground data processing on a center-wide basis. If there are 20 centers, there would be 20 instances of this function.

Note: Although all centers would be within the context of the Data Communication Program, the functions within a single instance would treat other centers as external entities. A specific example would be handoffs to the next center for which an FDP function may need to communicate with another FDP function.

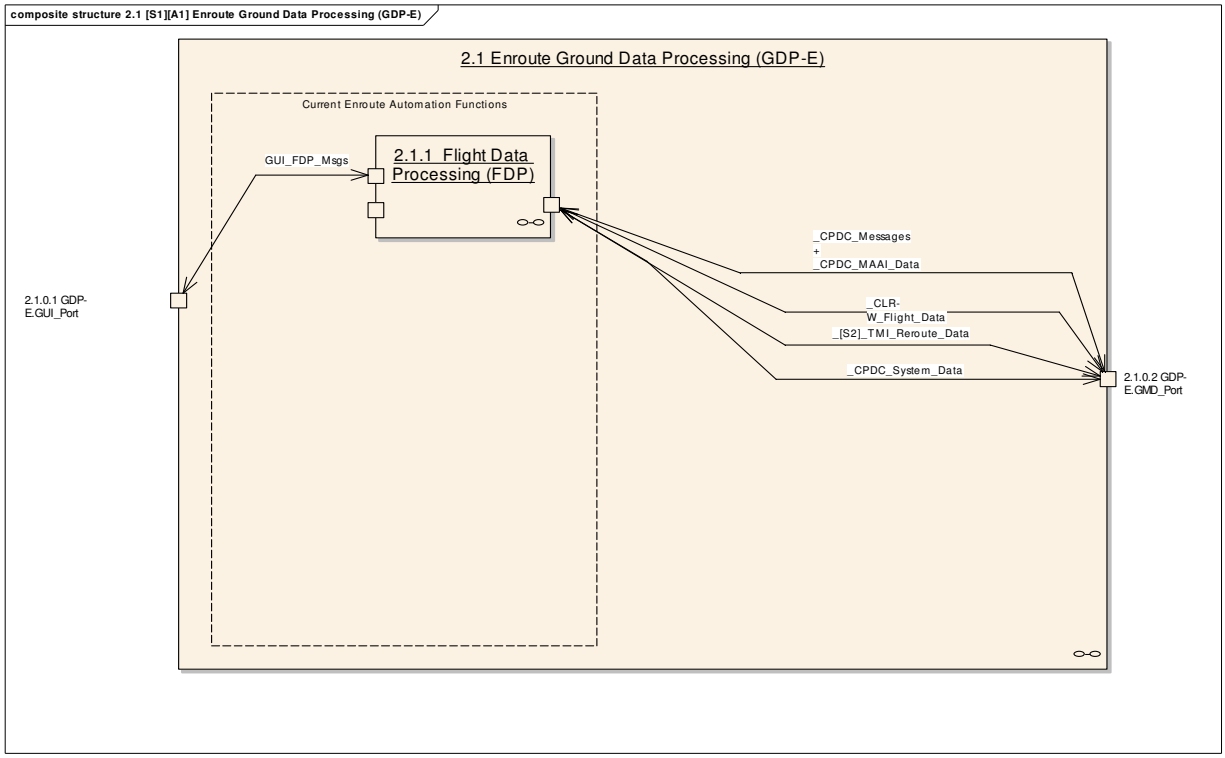
Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.1 Enroute Ground Data Processing (GDP-E) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0001A: CPDC as separate GDP function Element.Type= Requirement	
Sequence Test Message Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1 Enroute Controller GUI (GUI-E-CT) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 2.1 Enroute Ground Data Processing (GDP-E) Element.Type= Object	

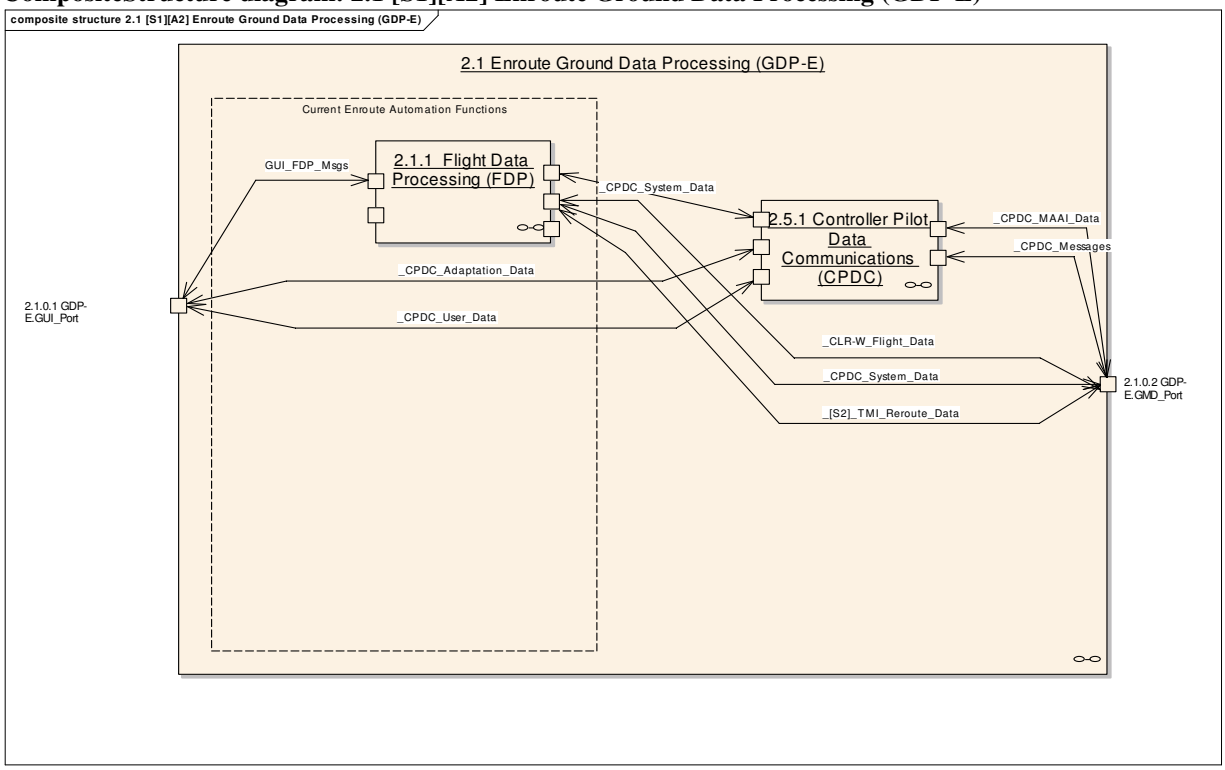
Embedded Elements

Element	Detail	Notes
Port 2.1.0.1 GDP-E.GUI_Port	1.0	
Port 2.1.0.2 GDP-E.GMD_Port	1.0	

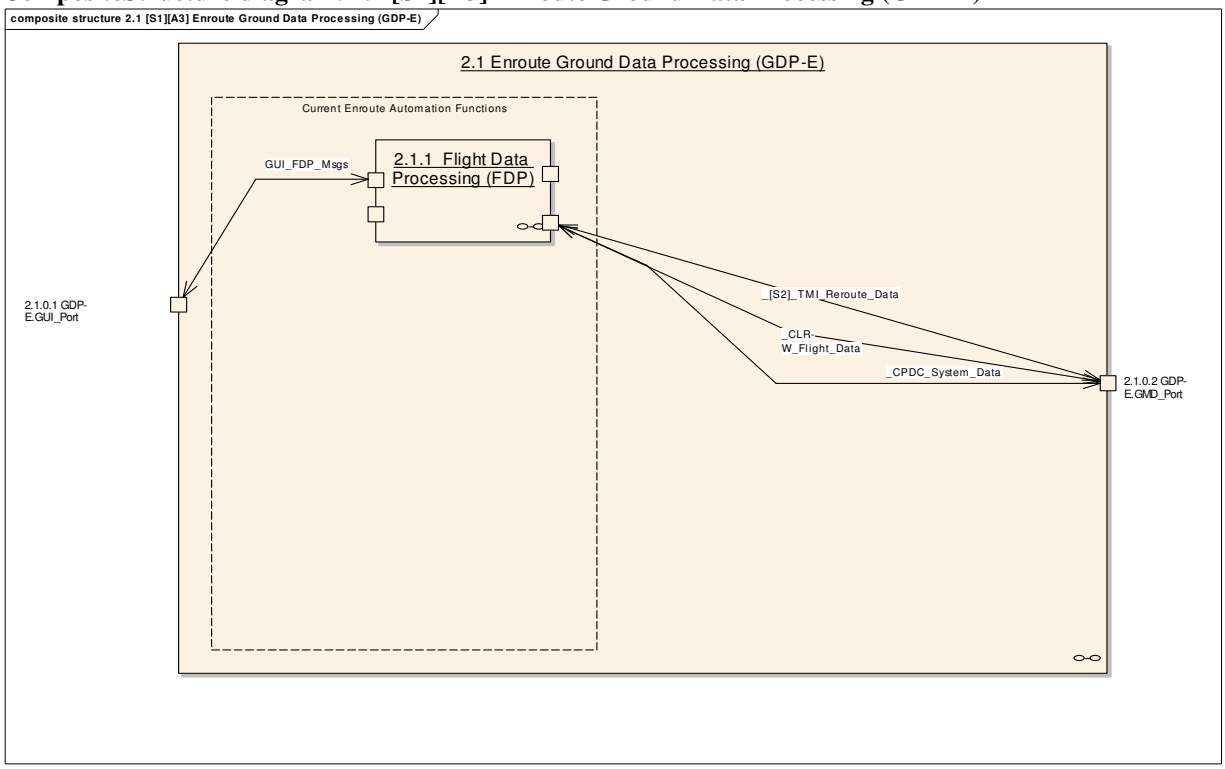
CompositeStructure diagram: 2.1 [S1][A1] Enroute Ground Data Processing (GDP-E)



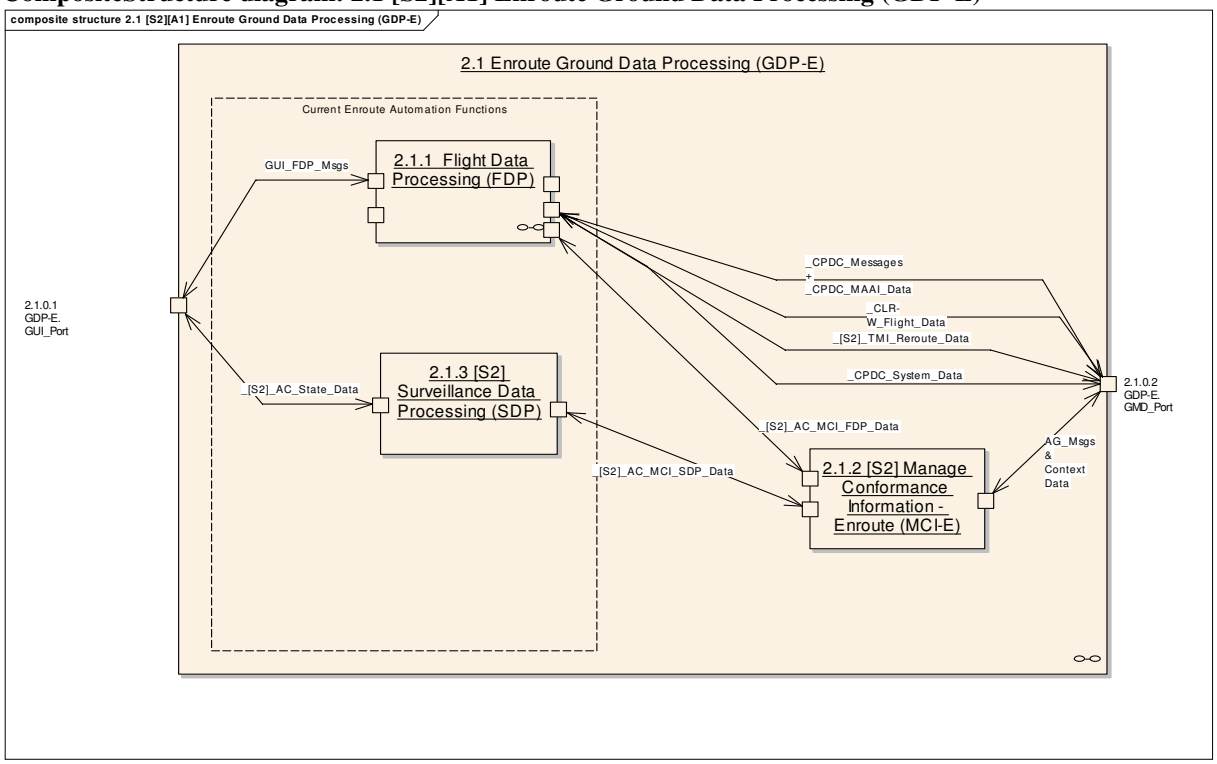
CompositeStructure diagram: 2.1 [S1][A2] Enroute Ground Data Processing (GDP-E)



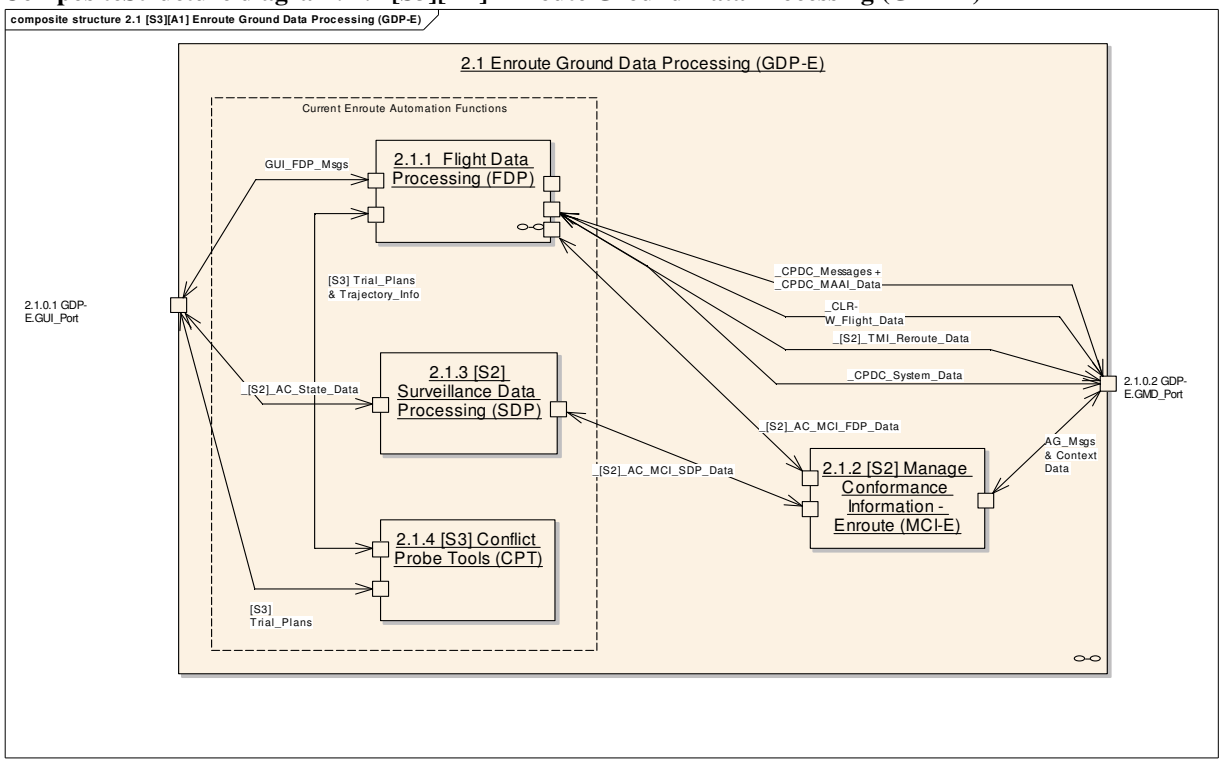
CompositeStructure diagram: 2.1 [S1][A3] Enroute Ground Data Processing (GDP-E)



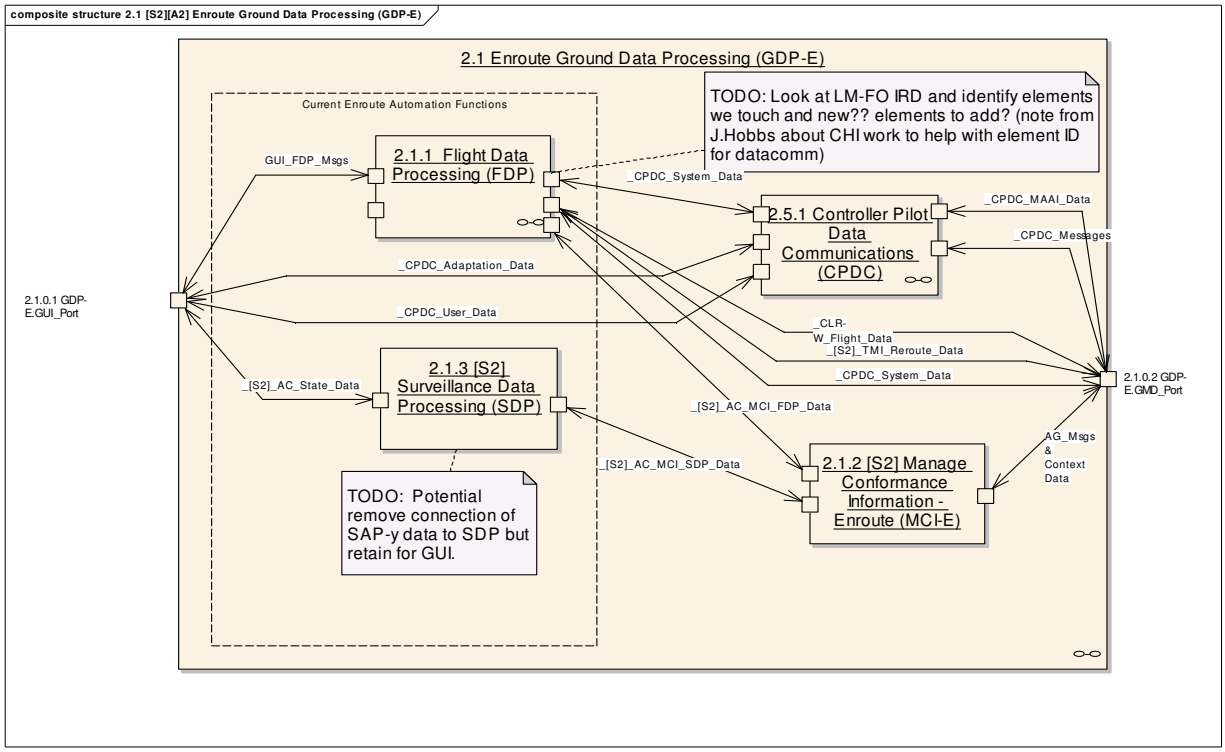
CompositeStructure diagram: 2.1 [S2][A1] Enroute Ground Data Processing (GDP-E)



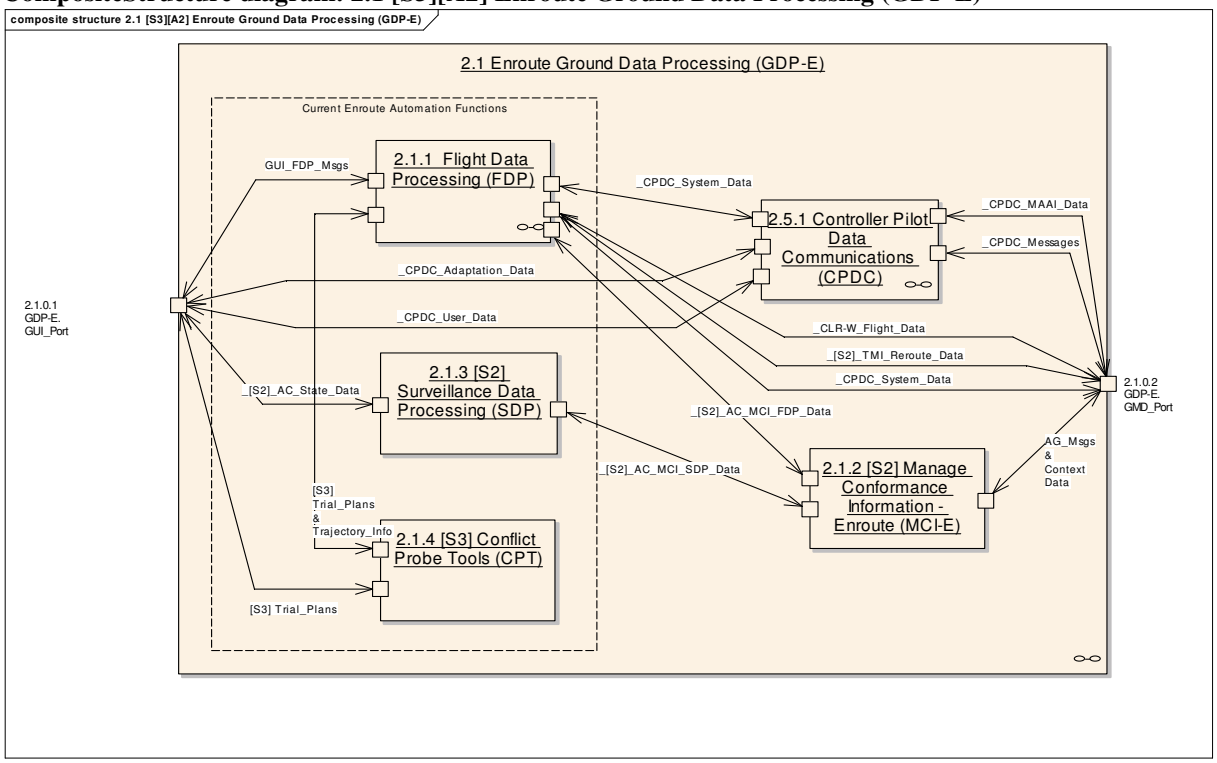
CompositeStructure diagram: 2.1 [S3][A1] Enroute Ground Data Processing (GDP-E)



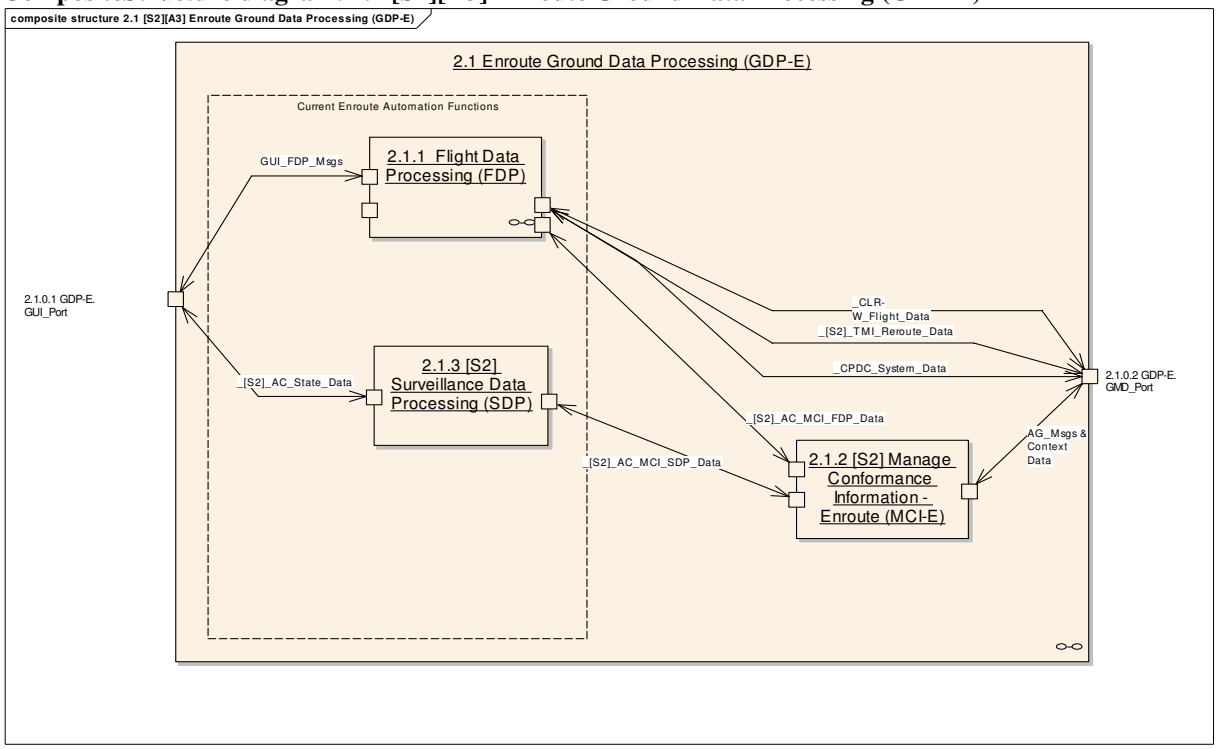
CompositeStructure diagram: 2.1 [S2][A2] Enroute Ground Data Processing (GDP-E)



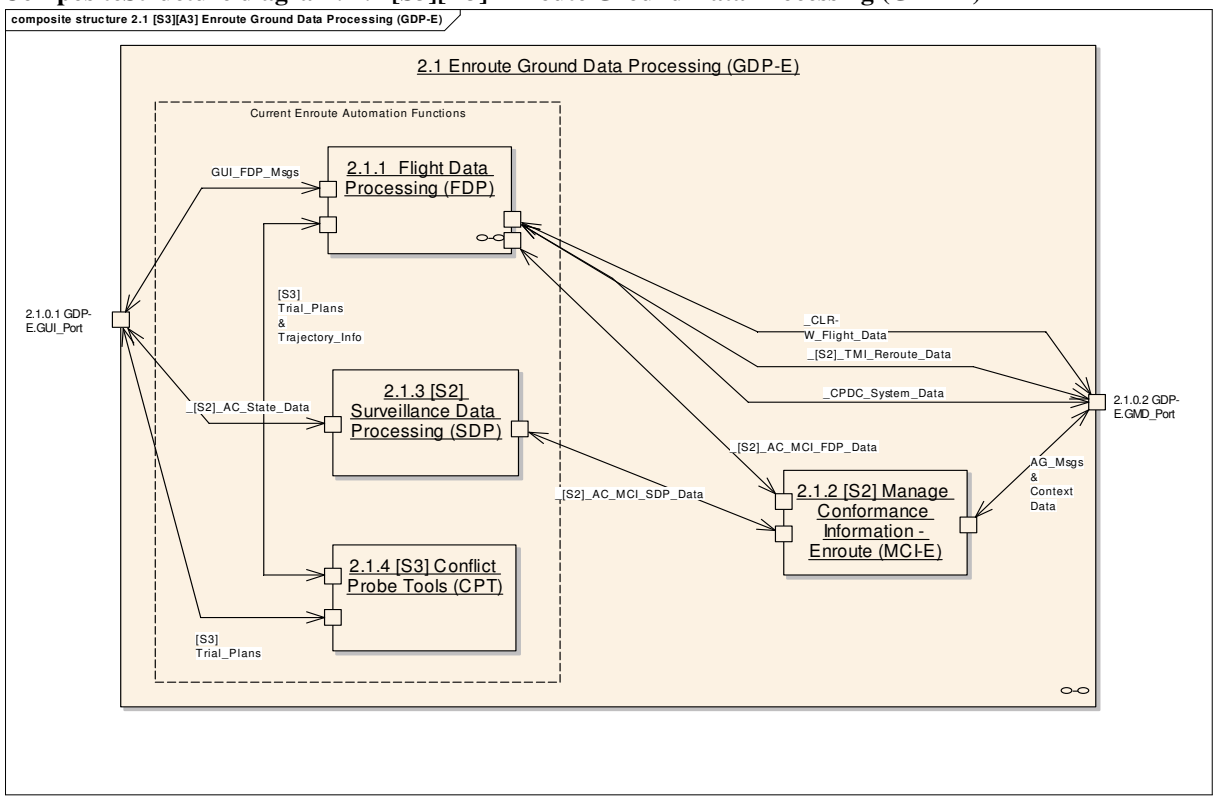
CompositeStructure diagram: 2.1 [S3][A2] Enroute Ground Data Processing (GDP-E)



CompositeStructure diagram: 2.1 [S2][A3] Enroute Ground Data Processing (GDP-E)



CompositeStructure diagram: 2.1 [S3][A3] Enroute Ground Data Processing (GDP-E)



2.1.2 [S2] Manage Conformance Information - Enroute (MCI-E)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/10/2006. *Last modified on*.11/26/2006.
GUID: {4CE3F528-AB23-4e55-B21E-B67712C9F708}

This function enables the transmission of aircraft state and parametric information to the ground system (on an automated basis) to enable the ground the perform enhanced trajectory management.

Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.1.2 [S2] Manage Conformance Information - Enroute (MCI-E) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0024A: Segment 2 Service Binning Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.1.2 [S2] Manage Conformance Information - Enroute (MCI-E)	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0025A: Segment 3 Service Binning	

Connector	Source	Target	Notes
	Element.Type= Object	Element.Type= Requirement	

Embedded Elements

Element	Detail	Notes
Port 2.1.2.0.1 [S2] MCI-E.FDP_Port	1.0	
Port 2.1.2.0.3 [S2] MCI-E.GMD_Port	1.0	
Port 2.1.2.0.2 [S2] MCI-E.SDP_Port	1.0	

2.1.1 Flight Data Processing (FDP)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/10/2006. *Last modified on*.2/3/2007.
GUID: {213E0931-2013-482d-8664-7EF9612CA9E0}

This function accepts flight plans and flight plan amendments from controllers, airspace users, U.S. ATC Facilities, Non-U.S. ATC Facilities and other systems in the ARTCC. The FDP function generates a converted route and trajectory for each plan. For active flights, the FDP function determines whether the aircraft is in conformance with the trajectory by comparing track data received from the SDP function against the trajectory. If the aircraft is out of conformance, the controller is notified, and an adherence trajectory is created to best predict how the aircraft will return to conformance of its flight plan. The FDP function distributes flight data to GUI function interfacing facilities, provides automatic and manual handoff functions, and supports airspace sectorization.
[from ERAM SADD, Section 4.2]

The FDP provides equivalent flight data processing capability as provided in Host Computer System (HCS). These capabilities include: flight plan processing, track to flight plan pairing, and transfer of control. Improvements to capabilities such as beacon code assignment, the use of beacon code matching and comparison of current track position to predicted trajectory position for track to flight plan pairing, direct route conversion, four-dimensional trajectory modeling (altitude, latitude, longitude, and time), and the use of trajectory data to project boundary crossings for automatic handoff initiation are provided in FDP. Additional FDP capabilities that are introduced include full ICAO message integration, Area of Interest (AOI) flight plans, and flight strip posting based on flight plan trajectory passing through adaptable posting airspace.
[from ERAM SADD, Section 4.2.2]

[S1][A1]: The FDP will host the CPDC function.
[S1][A2][A3]: The FDP will be enhanced to support an interface with CPDC function.

[S2][AA]: The FDP will accept aircraft reroute information from TFM as a result of TMIs. The new route will be proposed to the current eligible controller for uplink to aircraft.

[S3]: The FDP will be augmented to account for better accuracy over a longer time horizon (e.g. minimum 2 hour high accuracy). The use of trajectory agreements will reduce controller/system perturbation of flight paths. Use of aircraft provided FMS Trajectory information will increase accuracy of ground based trajectory modelling.

Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.1.1 Flight Data Processing (FDP) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.2.3 [S2] 4D Trajectory Exchange Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.1.1 Flight Data Processing (FDP) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.2.4 [S2] Decision Support Tools Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.1.1 Flight Data Processing (FDP) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.2.5 [S2] 4D Trajectory Agreements Element.Type= Requirement	
NoteLink Source -> Destination	ConnSource.Scope= Public	ConnTarget.Scope= Public	

Connector	Source	Target	Notes
	ConnSource.Role ConnSource.RoleNote Element.Name= <anonymous> Element.Type= Note	ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 2.1.1 Flight Data Processing (FDP) Element.Type= Object	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.1.1 Flight Data Processing (FDP) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00037: [DONE] CP/FDP ATW Functionality Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.1.1 Flight Data Processing (FDP) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00025: Eligibility Questions Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.1.1 Flight Data Processing (FDP) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00001: FDP/GUI to CPDC Data Exchanges Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.1.1 Flight Data Processing (FDP) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00024: Equippage from FP vs MAAI logon Element.Type= Requirement	

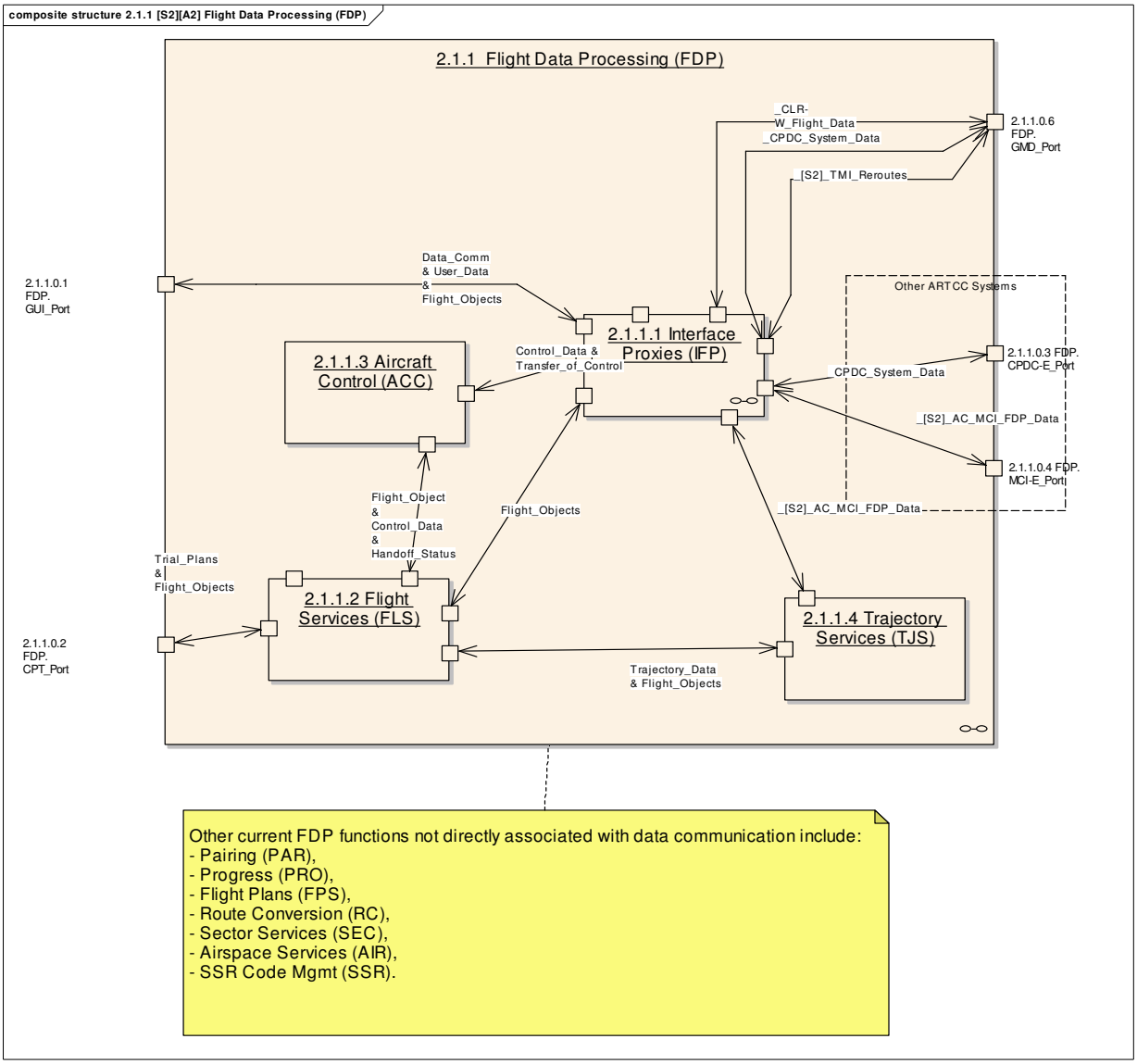
Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.1.1 Flight Data Processing (FDP) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00009: [DONE] Source of Altimeter Settings Element.Type= Requirement	
NoteLink Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= Note Element.Type= Note	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 2.1.1 Flight Data Processing (FDP) Element.Type= Object	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.1.1 Flight Data Processing (FDP) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.2.6 [S2] Aircraft Trajectory Agreements Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.1.1 Flight Data Processing (FDP) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.2.9 [S2] Conformance Resolution Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.1.1 Flight Data Processing (FDP)	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.2.8 [S2]	

Connector	Source	Target	Notes
	Element.Type= Object	Conformance Management Element.Type= Requirement	

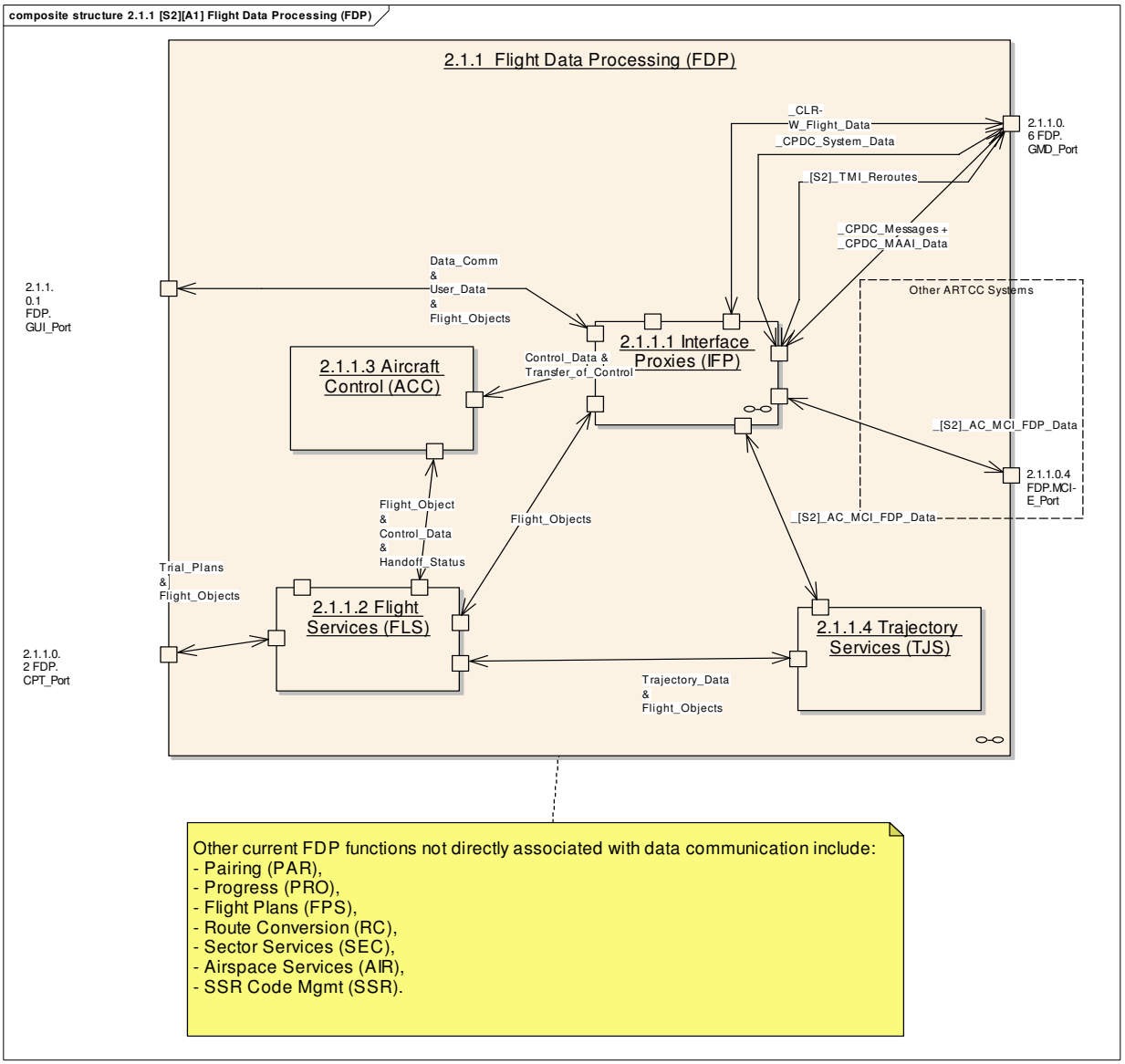
Embedded Elements

Element	Detail	Notes
Port 2.1.1.0.3 FDP.CPDC-E_Port	1.0	
Port 2.1.1.0.2 FDP.CPT_Port	1.0	
Port 2.1.1.0.4 FDP.MCI-E_Port	1.0	
Port 2.1.1.0.1 FDP.GUI_Port	1.0	
Port 2.1.1.0.6 FDP.GMD_Port	1.0	

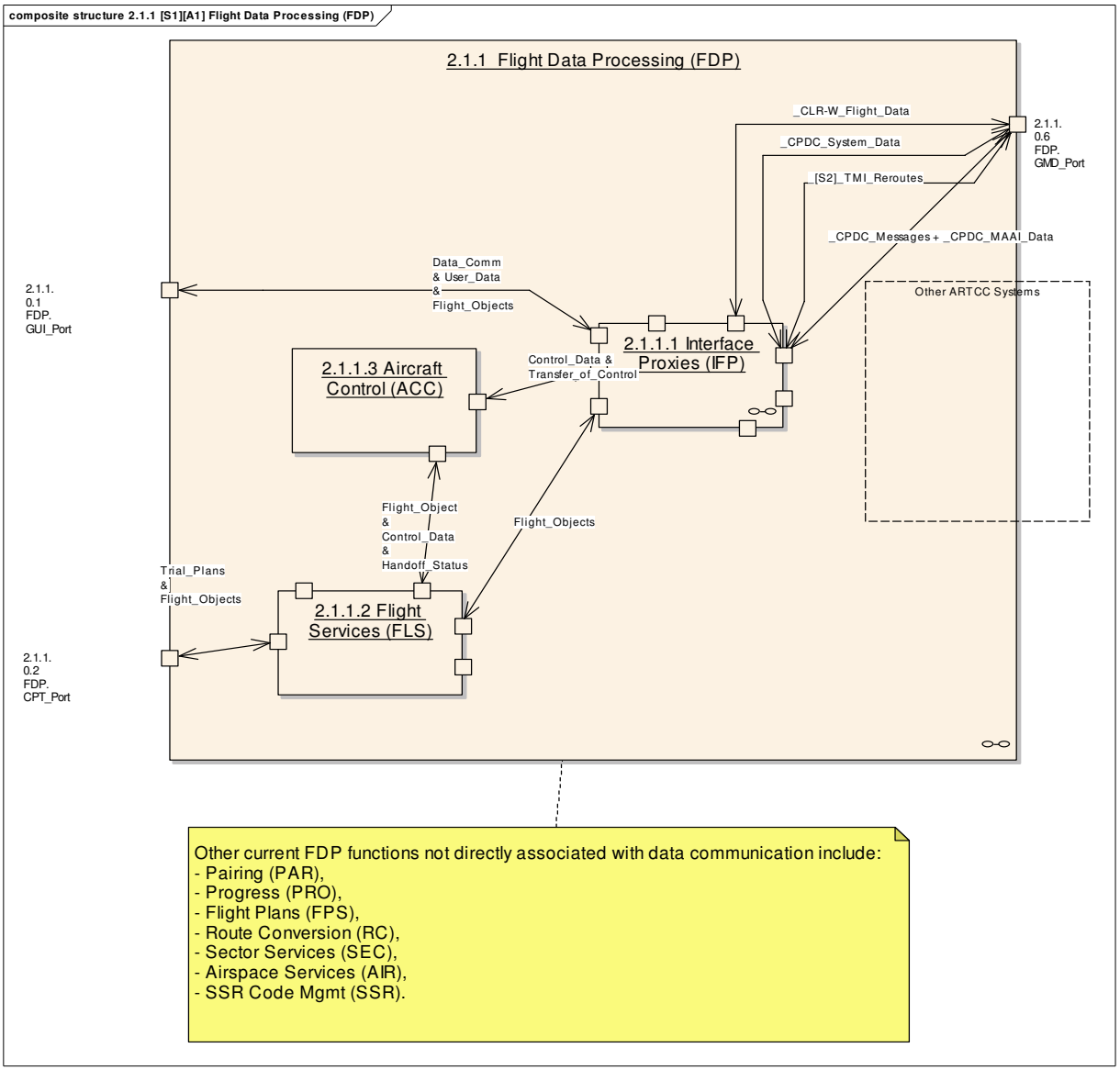
CompositeStructure diagram: 2.1.1 [S2][A2] Flight Data Processing (FDP)



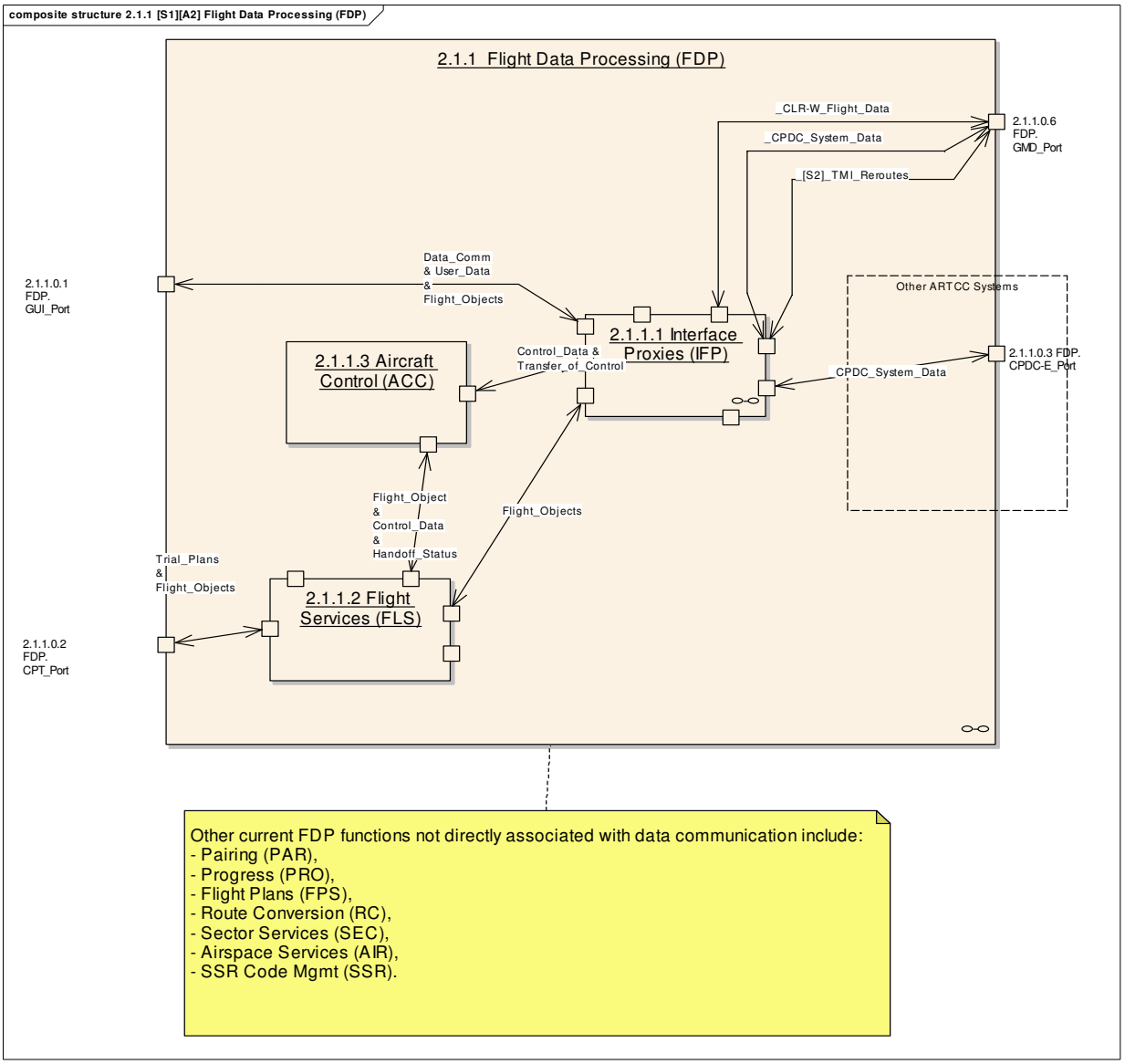
CompositeStructure diagram: 2.1.1 [S2][A1] Flight Data Processing (FDP)



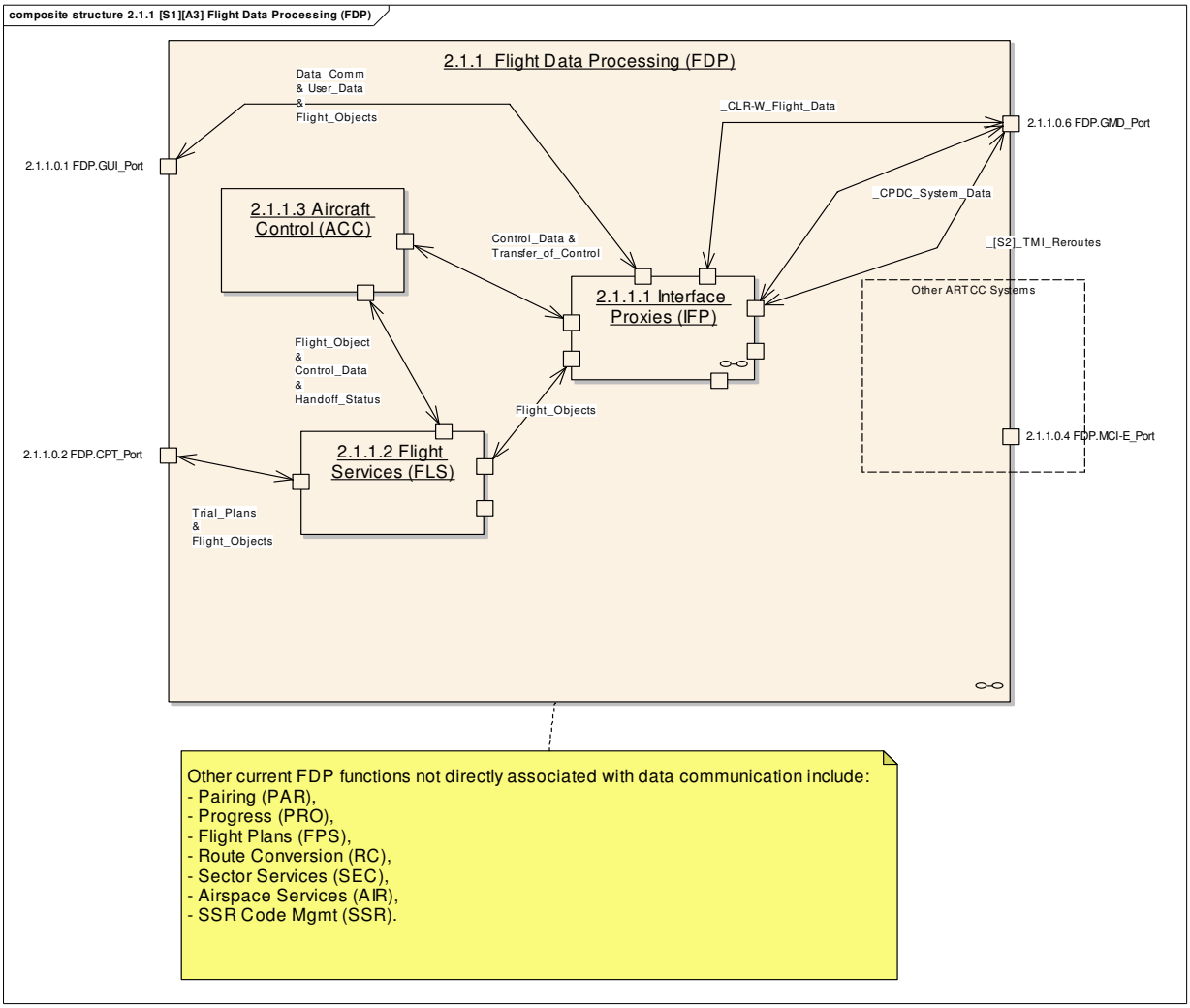
CompositeStructure diagram: 2.1.1 [S1][A1] Flight Data Processing (FDP)



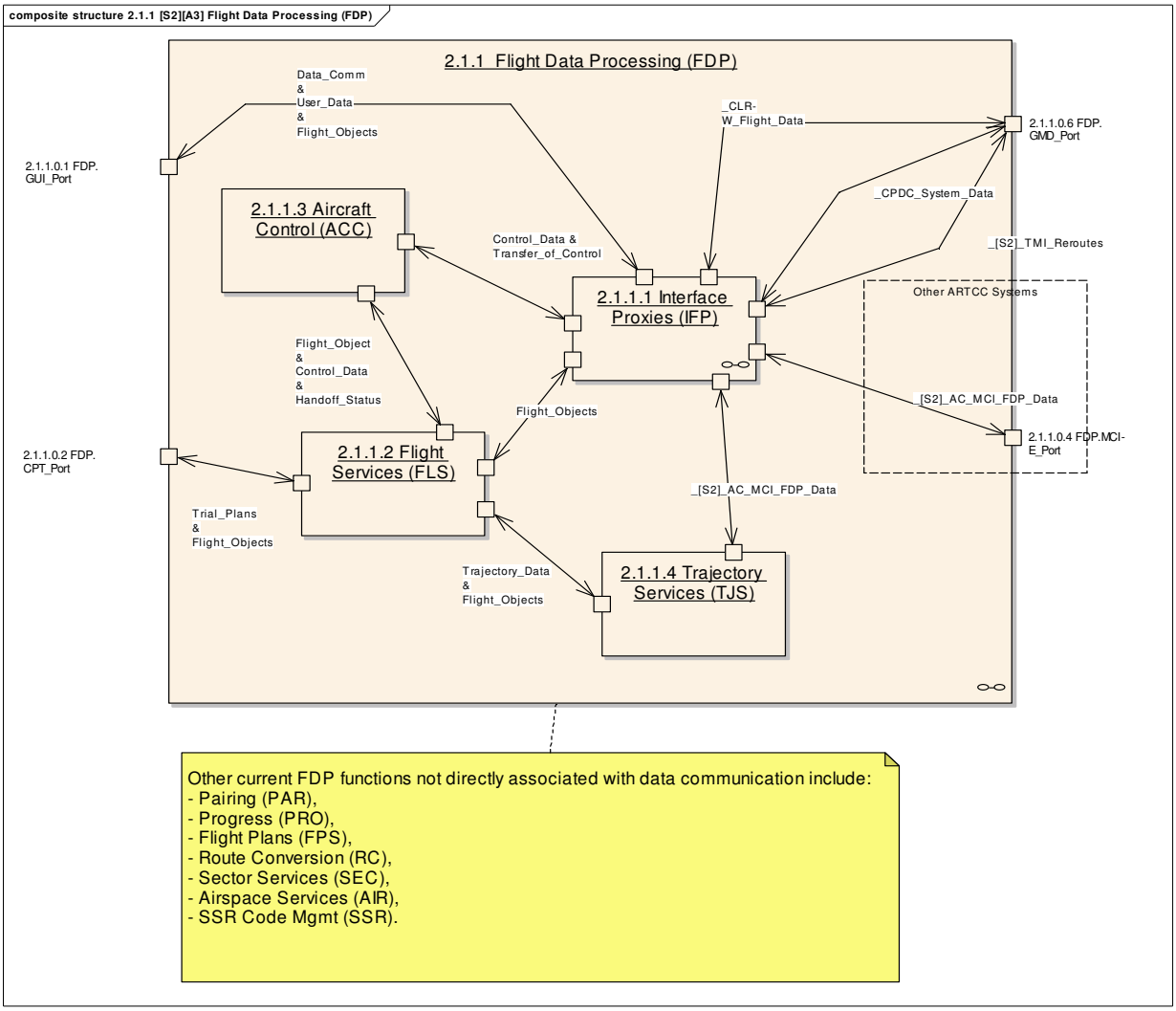
CompositeStructure diagram: 2.1.1 [S1][A2] Flight Data Processing (FDP)



CompositeStructure diagram: 2.1.1 [S1][A3] Flight Data Processing (FDP)



CompositeStructure diagram: 2.1.1 [S2][A3] Flight Data Processing (FDP)



2.1.1.3 Aircraft Control (ACC)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/10/2006. *Last modified on*.11/29/2006.
GUID: {C545A6EE-1828-4ae7-99AE-B32C463FAD06}

The Aircraft Control (ACC) function determines the controlling facility/sector for a flight. ACC provides handoff status to Flight Services for retention in the Flight Object. ACC provides automatic handoff initiation. [from ERAM SADD, Section 4.2.2].

Note: This FDP function assigns/manages controller eligibility.

[AA][SA]: The ACC/Flight Object needs to be enhanced to address the notion of data authority. Data authority is tied to the instance of a CPDC function. The flight object will need to be updated to support transfer of data authority, e.g., when an aircraft transfers center boundaries and another CPDC function exists in the downstream center.

[SA][AA]: The ACC/Flight Object will need to be updated to manage which controller has data communication eligibility. This is who has COMMUNICATION access and NOT necessarily who has CONTROL. Note that while communication and control are similar they are NOT the same. Controller A may have 'control', but Controller B may retain voice channel communication, e.g. on point-outs. The data communication access should mirror that available to today's voice, so Controller B would retain voice and data communication, while Controller A has 'control'.

[SA][AA]: The ACC/Flight Object needs to be enhanced to handle Tower/TRACON controller communications eligibility and handoffs (assuming Tower/TRACON facilities do not have their own FDP).

Embedded Elements

Element	Detail	Notes
Port 2.1.1.3.0.1 ACC.IFP_Port	1.0	
Port 2.1.1.3.0.2 ACC.FLS_Port	1.0	

2.1.1.2 Flight Services (FLS)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/10/2006. *Last modified on*.11/29/2006.
GUID: {D0323AE5-50A6-4f45-9C42-B3DFEB90B0B0}

The FLS function creates, updates, deletes, and distributes Flight Objects. Flight Objects consist of a flight plan, converted route, trajectory, and status information about a flight. Status information includes control eligibility and conformance/adherence status. Requests to FLS are previously syntactically checked; semantic validation is performed by FLS in the process of creating and updating the Flight Object by invoking FPS for the flight plan and RTC for the route.
[from ERAM SADD, Section 4.2.2]

[S1][AA]: The FLS flight object will need to be updated to include the following information:

- a field indicating that the aircraft is data link capable (may also need to include information about type, version of datalink information - from flight plan??).
- data authority information,
- communications eligibility (note this is different from control eligibility).

[S2][AA]: Additions to the FLS flight object may include:
- FMS Trajectory information

Note: FMS Trajectory information may need to be a new trajectory stored in flight object. The FMS trajectory might be DIFFERENT from both the Flight Plan Trajectory (ERAM) and the Aircraft Trajectory (ERAM). The Aircraft Trajectory contains stuff like letters of agreement data that might alter the trajectory that the aircraft is unaware of.

Note: The filed flight plan may need to be more detailed to indicate data link type (e.g. ATN, FANS).

Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.1.1.2 Flight Services (FLS) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.2.8 [S2] Conformance Management Element.Type= Requirement	

Embedded Elements

Element	Detail	Notes
Port 2.1.1.2.0.2 FLS.CPT_Port	1.0	
Port 2.1.1.2.0.3 FLS.ACC_Port	1.0	

Element	Detail	Notes
Port 2.1.1.2.0.1 FLS.IFP_Port	1.0	
Port 2.1.1.2.0.5 [A1] FLS.CPDC_Port	1.0	
Port 2.1.1.2.0.4 FLS.TJS_Port	1.0	

2.1.1.4 Trajectory Services (TJS)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/10/2006. *Last modified on*.11/29/2006.
GUID: {FED77204-BDD2-4e9c-8A61-7825BFE2A81C}

The TJS function provides clients with the capability to model trajectories. Services are also provided for deriving the predicted location and time that an aircraft will cross an adapted airspace boundary (e.g. sector, facility) based on the trajectory. Trajectory modeling is
performed for the entire route of flight that is within U.S. domestic airspace. [from ERAM SADD, Section 4.2.2]

[S1]: No changes are anticipated.

[S2]: The TJS will be modified to accept aircraft provided wind vector information, state data, and intent data in order to enhance trajectory prediction. In addition, the TJS will accept FMS Trajectory information to improve trajectory prediction. The TJS will 'also' control aircraft subscriptions (data subset selection and update rate).

[S3]: The TJS will be modified to extend prediction accuracy from current 30 minutes to future 2 hours.

Note: In [S3], the time horizon for a given prediction accuracy for the TJS must be extended from 30 minutes to 2 hours. Additional airborne environmental data (state data) may need to be provided to TJS and/or WDP.

Embedded Elements

Element	Detail	Notes

Element	Detail	Notes
Port 2.1.1.4.0.2 TJS.IFP_Port	1.0	
Port 2.1.1.4.0.1 TJS.FLS_Port	1.0	

2.1.1.1 Interface Proxies (IFP)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/10/2006. *Last modified on*.11/29/2006.
GUID: {A089ED4E-32B5-4315-B286-1EE238668AD3}

The IFP function provides separate proxies to handle inputs and outputs for each external facility. Each proxy determines what, when, and the message format that is sent for each interface. Input messages are validated syntactically prior to calling on other functions to complete the request (e.g., when a flight plan is amended, IFP checks the existence of the flight and the presence of the required fields for the specific amendments and the adherence to the prescribed field's ranges then FLS is called to amend the flight). [from ERAM SADD, Section 4.2.2]

[S1][A2][A3]: The IFP will be modified to support data exchange with external CPDC function. The following types of data is needed by the CPDC:
- User Eligibility Information
- Current/Next Data Authority Information
- Flight Object Data (needed to perform aircraft-to-flight plan correlation at CPDC aircraft dialog start)

Note: There are actually two (2) IFPs: IFP-A (talks to non-ERAM world) and IFP-B (talks to ERAM components)

Connections

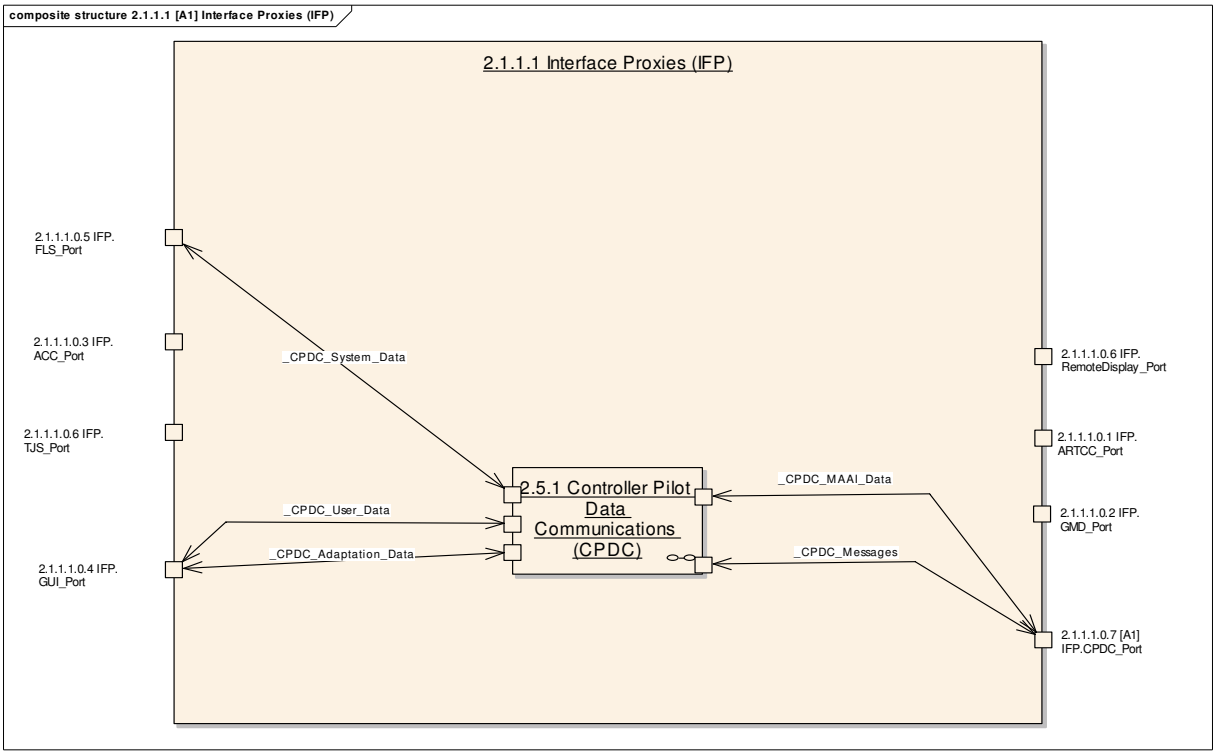
Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote	ConnTarget.Scope= Public ConnTarget.Role=	

Connector	Source	Target	Notes
	Element.Name= 2.1.1.1 Interface Proxies (IFP) Element.Type= Object	ConnTarget.RoleNote= Element.Name= PPR.3.1.2.4 [S2] Decision Support Tools Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.1.1.1 Interface Proxies (IFP) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= PPR.3.1.2.7 [S2] Aircraft Decision Support Tools Element.Type= Requirement	

Embedded Elements

Element	Detail	Notes
Port 2.1.1.1.0.4 IFP.GUI_Port	1.0	
Port 2.1.1.1.0.2 IFP.GMD_Port	1.0	
Port 2.1.1.1.0.3 IFP.ACC_Port	1.0	
Port 2.1.1.1.0.6 IFP.TJS_Port	1.0	
Port 2.1.1.1.0.6 IFP.RemoteDisplay_Port	1.0	
Port 2.1.1.1.0.5 IFP.FLS_Port	1.0	
Port 2.1.1.1.0.7 [A1] IFP.CPDC_Port	1.0	
Port 2.1.1.1.0.1 IFP.ARTCC_Port	1.0	

CompositeStructure diagram: 2.1.1.1 [A1] Interface Proxies (IFP)



2.1.4 [S3] Conflict Probe Tools (CPT)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/10/2006. *Last modified on*.11/28/2006.
GUID: {E2D5C832-D75B-4852-92DC-152DBD176472}

This function provides flight plan related decision support services. The CPT function uses flight data objects generated by the FDP function and provides services that include strategic conflict probe and trial planning. The controller can enter amendments for trial planning and probing by the system. The trial plan can be submitted as an amendment to the active flight plan. [from ERAM SADD]

[S3]: The CPT is augmented to reduce the tolerances/separation down to wake turbulance distances.

Note: To be consistent with current automation functions, the CPT function will remain as an 'very internal' function with interfaces only to the GUI, FDP, and system operations, i.e., there are no direct connections to data communication functions (e.g., CPDC or MCI).

Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.1.4 [S3] Conflict Probe Tools (CPT) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0002A: CPT does not directly interact with DCS. Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.1.4 [S3] Conflict Probe Tools (CPT) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00037: [DONE] CP/FDP ATW Functionality Element.Type= Requirement	

Embedded Elements

Element	Detail	Notes
Port 2.1.4.0.1 [S3] CPT.GUI_Port	1.0	
Port 2.1.4.0.2 [S3] CPT.FDP_Port	1.0	

2.1.3 [S2] Surveillance Data Processing (SDP)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*

Detail: *Created on* 5/10/2006. *Last modified on*.11/28/2006.
GUID: {14FADBEB-0404-4292-A467-347CB86DA5B1}

This function performs real time quality control assessment of radar surveillance interfaces, uses the target reports in a multi-sensor fusion tracker, provides the target and track information for display, and uses the multi–sensor fusion tracks to generate aircraft-to-aircraft, aircraft-to-terrain and aircraft-to-airspace alerts. This function also processes long range radar weather messages. [from ERAM SADD, Section 4.2]

[S2]: SDP is enhanced to control the type and periodicity of AC provided MCI data updates (_[S2]_AC_MCI_Mgmt).

[S2]: SDP uses _[S2]_AC_State_Data to enhance tracking prediction/position.

[S2]: SDP updates controller displays with _[S2]_AC_State_Data.

Connections

Connector	Source	Target	Notes
NoteLink Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= Note Element.Type= Note	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 2.1.3 [S2] Surveillance Data Processing (SDP) Element.Type= Object	

Embedded Elements

Element	Detail	Notes
Port 2.1.3.0.1 [S2] SDP.GUI_Port	1.0	
Port 2.1.3.0.2 [S2] SDP.MCI-E_Port	1.0	

2.2 Tower Ground Data Processing (GDP-W)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/8/2006. *Last modified on*.2/3/2007.
GUID: {6CF9B924-9EC6-4b26-987F-77744D886E2B}

Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.2 Tower Ground Data Processing (GDP-W) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0001A: CPDC as separate GDP function Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.2 Tower Ground Data Processing (GDP-W) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0021A: DCL does not support appended D-TAXI Element.Type= Requirement	

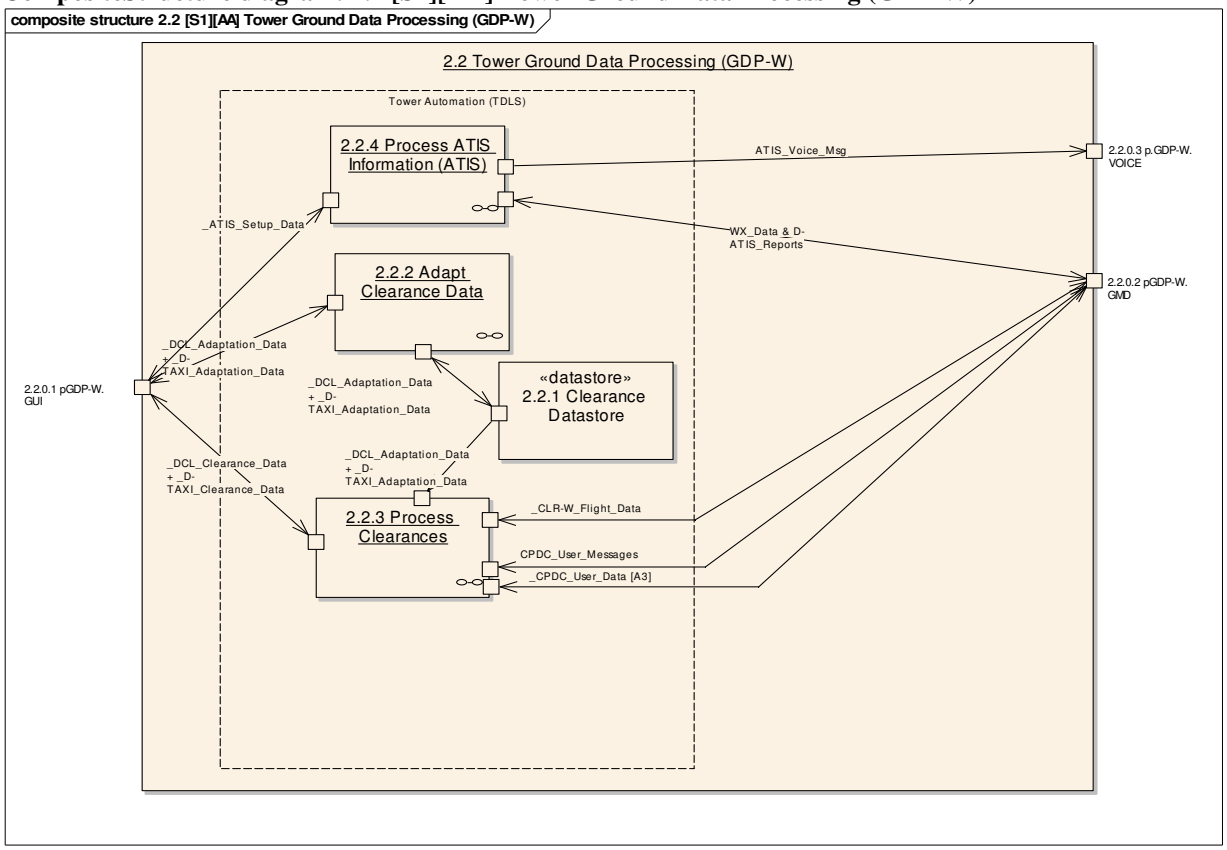
Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.2 Tower Ground Data Processing (GDP-W) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00045: D-SIG Report Creation/Modification Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.2 Tower Ground Data Processing (GDP-W) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0008A: Tower retains all automation functions Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.2 Tower Ground Data Processing (GDP-W) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00052: Add applicable Tower Segment 2 flows Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.2 Tower Ground Data Processing (GDP-W) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00053: Tower Alternative "Variant" Selection Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.2 Tower Ground Data Processing (GDP-W)	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00054: FDP	

Connector	Source	Target	Notes
	Element.Type= Object	Function Split Up for Terminal Element.Type= Requirement	

Embedded Elements

Element	Detail	Notes
Port 2.2.0.1 pGDP-W.GUI	1.0	
Port 2.2.0.2 pGDP-W.GMD	1.0	
Port 2.2.0.3 p.GDP-W.VOICE	1.0	

CompositeStructure diagram: 2.2 [S1][AA] Tower Ground Data Processing (GDP-W)



2.2.1 Clearance Datastore

Type: **DataStoreNode**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/13/2006. *Last modified on*.6/19/2007.

GUID: {7C0F3CF1-355C-4860-8681-868EE6FA1100}

This database includes DCL and D-TAXI adaptation data.

DCL Data
=========
- DCL Appended Data Profiles - a series of local Tower DCL data elements that are grouped as a profile which can be appended to the DCL before transmission. Tower DCL data elements include:
  - active runway
  - voice frequqnecy information
  - initial reporting/contacting requirements
  - SIDS
- rules for proposing a DCL Appended Data Profile based on flight plan data (e.g., destination airport)

D-TAXI Data
==========
- available coded and non-coded taxi routes for the airport (with corresponding detailed routes)
- rules for proposing a taxi route based on flight plan data (e.g. destination airport)

AIRCRAFT PARCIPATION DATA
==========
- data on which aircraft/users are participating in departure clearance program and D-TAXI. Specifically for POA and 623.

Embedded Elements

Element	Detail	Notes
Port 2.2.1.0.1 pADAPT-W.DB	1.0	

2.2.2 Adapt Clearance Data

Type: **Object**

Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/12/2006. *Last modified on*.2/1/2007.
GUID: {C3DFF73D-BBB6-46a3-84A2-E5815BA73782}

This function handles DCL adaption parameters, a.k.a. DCL element profiles.

Multiple element profiles can be stored. :
- active runway
- voice frequency information
- initial reporting/contacting requirements
- SIDS??

This function also allows editing of rule sets for automatically proposing a candidate DCL element profile to use to the User. For example, flights with an LAX destination would be proposed the west gate set of DCL element profiles.

fragment <which are used by the CPDC-W function to pre-fill fields for DCL message proposals presented to the Controlelr. >

Connections

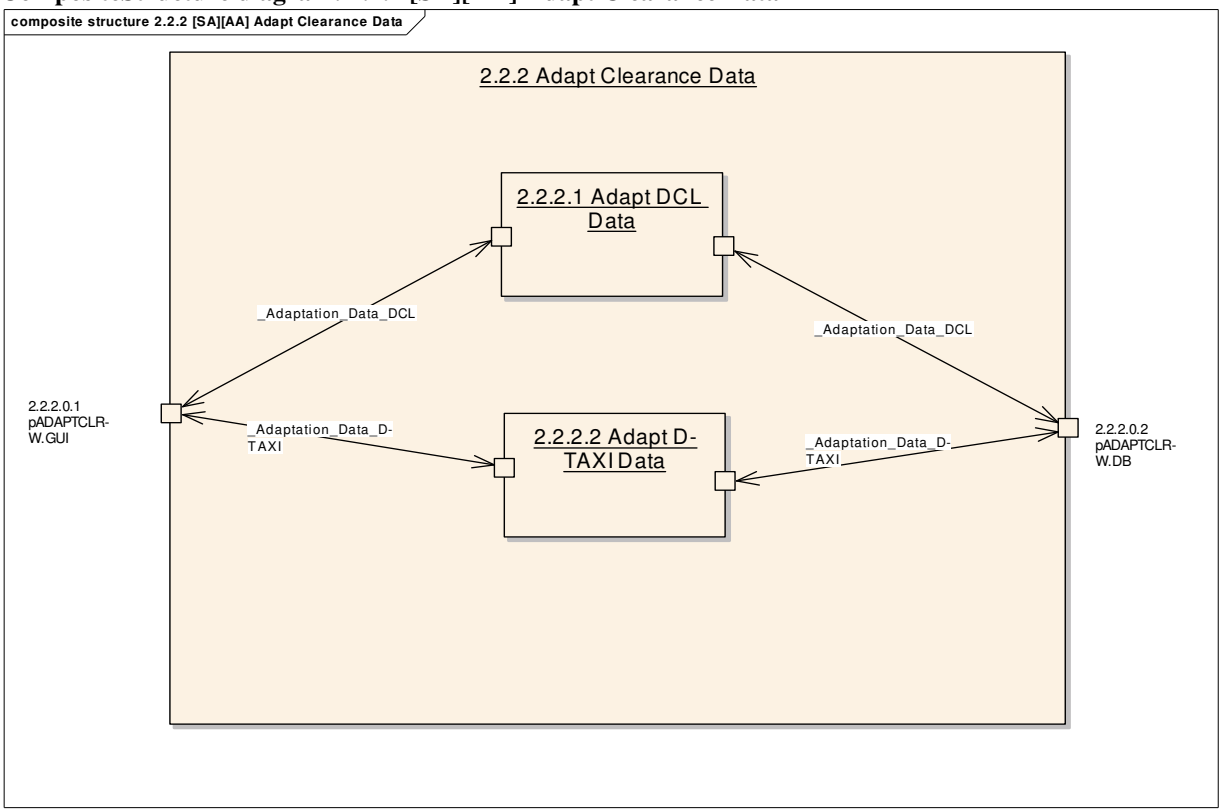
Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.2.2 Adapt Clearance Data Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00040: Aircraft DCL capabilities on an Airport Specific basis Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role	ConnTarget.Scope= Public ConnTarget.Role=	

Connector	Source	Target	Notes
	ConnSource.RoleNote Element.Name= 2.2.2 Adapt Clearance Data Element.Type= Object	ConnTarget.RoleNote= Element.Name= TODO-00020: [DONE] Multiple Simultaneous DCL Adaption Profiles Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.2.2 Adapt Clearance Data Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0007A: DCL function only does adaptation Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.2.2 Adapt Clearance Data Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0021A: DCL does not support appended D-TAXI Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.2.2 Adapt Clearance Data Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00042: Reconsider need for D-TAXI adaptation Element.Type= Requirement	

Embedded Elements

Element	Detail	Notes
Port 2.2.2.0.1 pADAPTCLR-W.GUI	1.0	
Port 2.2.2.0.2 pADAPTCLR-W.DB	1.0	

CompositeStructure diagram: 2.2.2 [SA][AA] Adapt Clearance Data



2.2.2.1 Adapt DCL Data

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/13/2006. *Last modified on*.2/2/2007.
GUID: {BA25B012-845C-446d-911F-A86C0BF3F439}

This function supports the creation, edit, and deletion of DCL Data Profiles and DCL data rules. It rule checks data profiles (e.g. insures data fits within the confines that the system can handle), support communication/entry of data into the database.

Embedded Elements

Element	Detail	Notes
Port 2.2.2.1.0.1 pADAPTDCL-W.GUI	1.0	
Port 2.2.2.3.0.2 pADAPTDCL-W.DB	1.0	

2.2.2.2 Adapt D-TAXI Data

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/12/2006. *Last modified on*.2/2/2007.
GUID: {DF24DF96-311B-414a-BA87-697A1210DC67}

This function handles D-TAXI adaption parameters, e.g. creates/storage of coded taxi routes or full routes. It also handles the creation and editting of rulesets for proposing taxi routes based on flight plan data.

Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.2.2.2 Adapt D-TAXI	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name=	

Connector	Source	Target	Notes
	Data Element.Type= Object	TODO-00021: Appending D-TAXI info to DCL messages. Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.2.2.2 Adapt D-TAXI Data Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00014: [DONE] Create D-TAXI sub-function diagram Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.2.2.2 Adapt D-TAXI Data Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00036: D-TAXI and FIS 'obstruction' data Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.2.2.2 Adapt D-TAXI Data Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00042: Reconsider need for D-TAXI adaptation Element.Type= Requirement	

Embedded Elements

Element	Detail	Notes
Port 2.2.3.0.1 pADAPTDTAXI-W.GUI	1.0	
Port 2.2.3.0.2 pADAPTDTAXI-W.DB	1.0	

2.2.3 Process Clearances

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 2/2/2007. *Last modified on*.2/2/2007.
GUID: {7FB87A4C-1989-4601-843E-5D272269C598}

This function processes Tower Clearances including DCL and D-TAXI. It interacts with the Controller and supports clearance creation/modification and provides clearance proposals (with information from the adaptation database).

Connections

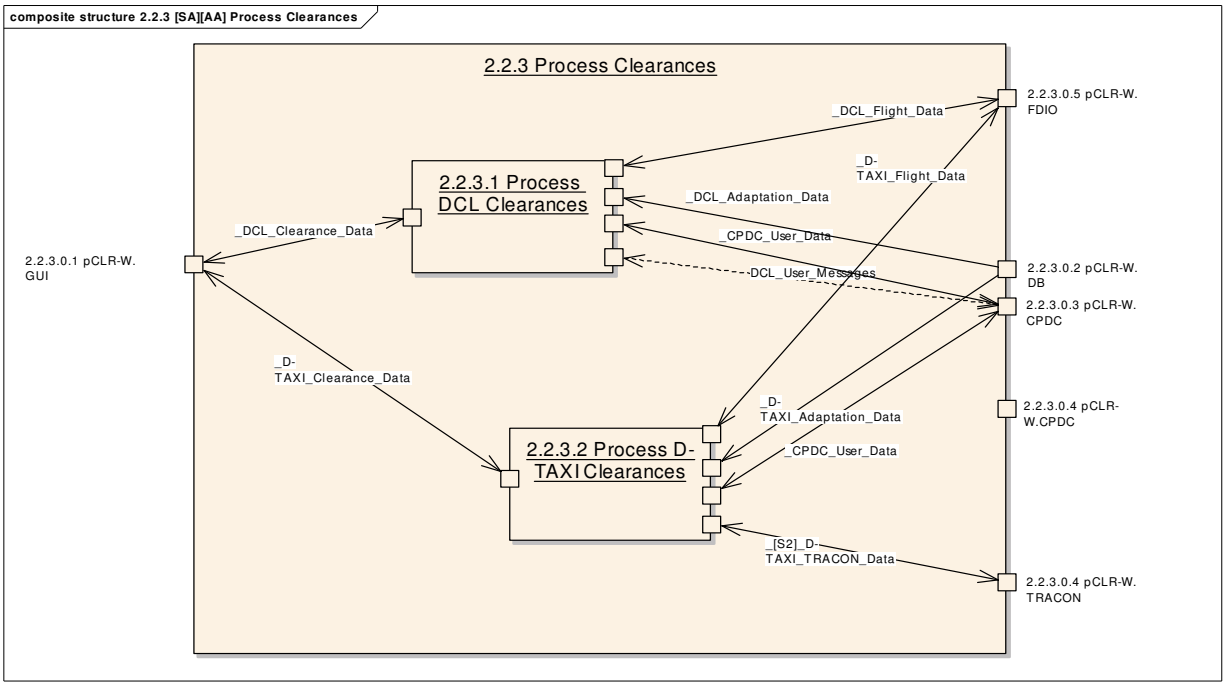
Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.2.3 Process Clearances Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00050: PDC in/out of CPDC-C Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.2.3 Process Clearances Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00048: Confirm [S2] D-TAXI_TRACON_Data Connection -- Segment 2 Element.Type= Requirement	

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.2.3 Process Clearances Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00049: PDC Messages (to S-CAOSS or FOC?) Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.2.3 Process Clearances Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00036: D-TAXI and FIS 'obstruction' data Element.Type= Requirement	

Embedded Elements

Element	Detail	Notes
Port 2.2.3.0.4 pCLR-W.TRACON	1.0	
Port 2.2.3.0.1 pCLR-W.GUI	1.0	
Port 2.2.3.0.5 pCLR-W.FDIO	1.0	
Port 2.2.3.0.3 pCLR-W.CPDC	1.0	
Port 2.2.3.0.4 pCLR-W.CPDC	1.0	
Port 2.2.3.0.2 pCLR-W.DB	1.0	

CompositeStructure diagram: 2.2.3 [SA][AA] Process Clearances



2.2.3.1 Process DCL Clearances

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 1/29/2007. *Last modified on*.2/2/2007.
GUID: {A630E075-713B-4278-9E0F-944BB9E09EA2}

Process DCL functions:
==========
- communicating with GUI in appropriate message format to exchange data elements
- maintainance of various 'tagged' versions of DCL message
- gets route/flight_plan information from FDP and TFM
- supports addition of local airport information (e.g. runway, voice freqs) (via adaptation and direct communications with Tower GUI).
- proposes DCL instructions to controller for approval/editting.
- routes/formats GUI provided clearance data to either CPDC function or PDC data receiver based on equippage/service capabilities located in flight object.

Embedded Elements

Element	Detail	Notes
Port 2.2.3.1.0.3 pDCL.CPDC	1.0	
Port 2.2.3.1.0.4 pDCL.PDC	1.0	
Port 2.2.3.1.0.1 pDCL.DB	1.0	
Port 2.2.3.1.0.2 pDCL.GUI	1.0	
Port 2.2.3.1.0.5 pPDC.FDIO	1.0	

2.2.3.2 Process D-TAXI Clearances

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 1/29/2007. *Last modified on*.2/2/2007.
GUID: {D7D90AAB-3C0C-4a31-90A1-93EB638EECD4}

D-TAXI message functions:
==========
- communicating with GUI in appropriate message format to exchange data elements
- maintainance of various tagged' versions of D-TAXI messages (tags include candidate, proposed, activated)
- supports addition of local airport information (e.g. coded taxi routes in Segment #1) (via adaptation and direct communications with Tower GUI).

D-TAXI storage functions:
==========
- stores system generated proposed, and activated versions of the clearance.

Embedded Elements

Element	Detail	Notes
Port 2.2.3.2.0.1 pDTAXI.DB	1.0	
Port 2.2.3.2.0.2 pDTAXI.GUI	1.0	
Port 2.2.3.2.0.3 pDTAXI.CPDC	1.0	
Port 2.2.3.2.0.4 pDTAXI.FDIO	1.0	
Port 2.2.3.2.0.5 [S2] pDTAXI.TRACON	1.0	

2.2.4 Process ATIS Information (ATIS)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/12/2006. *Last modified on*.2/3/2007.
GUID: {47FF4CAC-50D2-44f6-8BD8-47001F69AF44}

This function supports the creation, review, and posting of D-ATIS reports to the national FIS datastore.

Connections

Connector	Source	Target	Notes
Realisation	ConnSource.Scope=	ConnTarget.Scope=	

Connector	Source	Target	Notes
Source -> Destination	Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.2.4 Process ATIS Information (ATIS) Element.Type= Object	Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00045: D-SIG Report Creation/Modification Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.2.4 Process ATIS Information (ATIS) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00034: TechOpp: ATIS RVR & Preload of other data Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.2.4 Process ATIS Information (ATIS) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00033: ATIS report identicality (FIS, ACARS, Voice) Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.2.4 Process ATIS Information (ATIS) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00032: ATIS WX Sources Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.2.4 Process ATIS Information (ATIS) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00031: ATIS Manual Voice Recording	

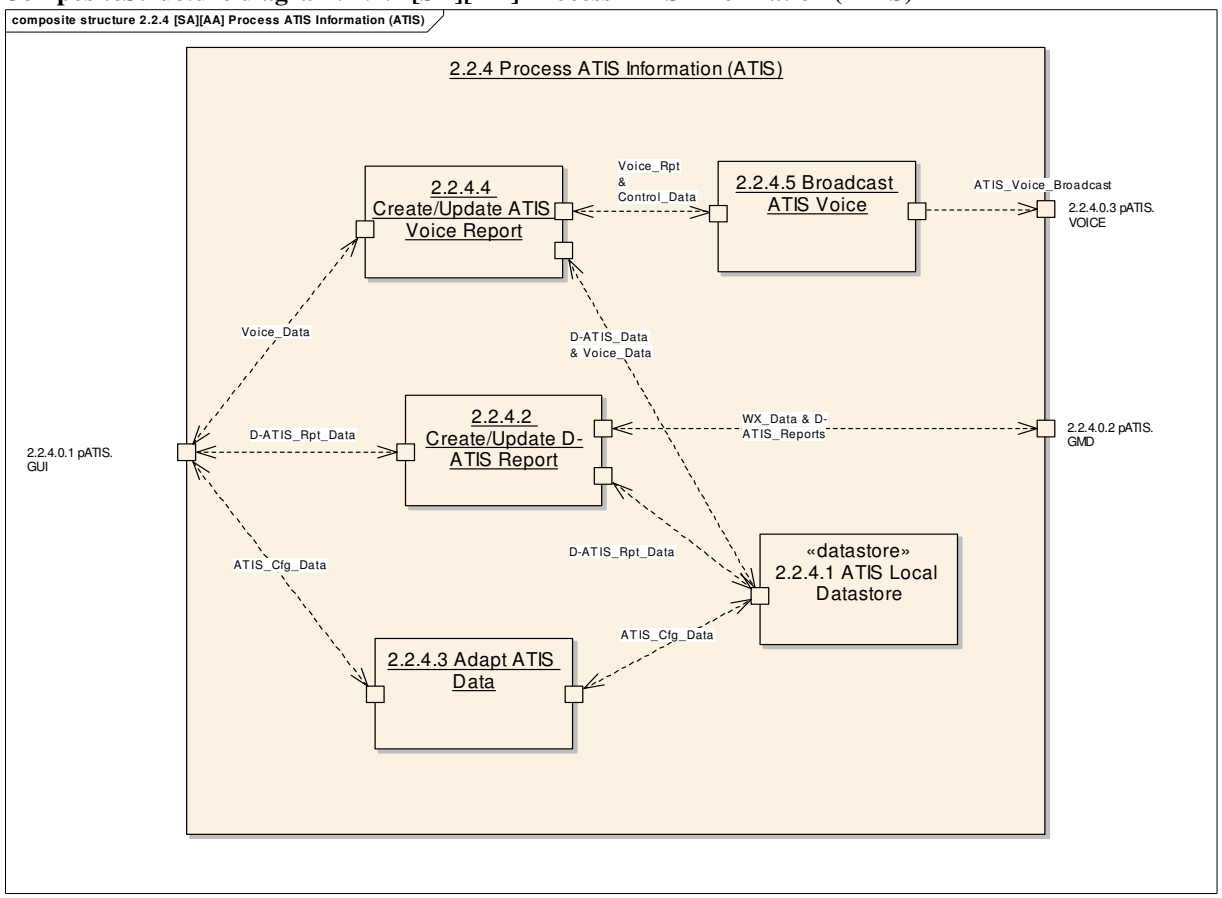
Connector	Source	Target	Notes
		Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.2.4 Process ATIS Information (ATIS) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0026A: D-SIG works just like D-ATIS Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.2.4 Process ATIS Information (ATIS) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0018A: ATIS primary weather source is WARP via GMD Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.2.4 Process ATIS Information (ATIS) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0017A: ATIS GUI supports sound file play/record Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.2.4 Process ATIS Information (ATIS) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0015A: ATIS voice synthesis & play loop supported by DCS Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name=	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote=	

Connector	Source	Target	Notes
	2.2.4 Process ATIS Information (ATIS) Element.Type= Object	Element.Name= ASUM-0016A: ATIS Voice reports are only available locally Element.Type= Requirement	

Embedded Elements

Element	Detail	Notes
Port 2.2.4.0.1 pATIS.GUI	1.0	
Port 2.2.4.0.2 pATIS.GMD	1.0	
Port 2.2.4.0.3 pATIS.VOICE	1.0	

CompositeStructure diagram: 2.2.4 [SA][AA] Process ATIS Information (ATIS)



2.2.4.1 ATIS Local Datastore

Type: **DataStoreNode**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/12/2006. *Last modified on*.5/12/2006.
GUID: {04D10D43-CCA7-4a2d-AD7D-BD5CB6E661C8}

D-ATIS Configuration Data includes:
- Magnetic Deviation (used to convert true wind to magnetic wind).
- Rules about converting METAR data (e.g. winds less than 2 knots are converted to calm).
- Active Runways

D-ATIS Reports include:
- Temporary files which can be reviewed before uploading a new report to the D-ATIS central database.

ATIS Digital Voice Files

ATIS Voice Dictionary (used to translate D-ATIS tokens into appropriate words/phrases).

Embedded Elements

Element	Detail	Notes
Port 2.2.4.1.0.1 pATIS.DB	1.0	

2.2.4.2 Create/Update D-ATIS Report

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/12/2006. *Last modified on*.5/12/2006.
GUID: {C2EC6A75-DA58-4047-865C-074293CB6C5A}

The DCS must:
- notify AT Data Specialist when new surface weather report is available
- must verify/validate input weather data (i.e., message well formed)

- support METAR and SPECI formats
- pre-format proposed new D-ATIS message using current data & merging in new data
- allow the AT Data Specialist to enter additional information and edit current information
- support the creation of arrival, departure, and combined reports.
- enable AT Data Specialist ro review & approve D-ATIS report
- perform data translation as required (e.g., convert true wind to magnetic wind, replace winds at < 2knots with 'calm', etc).
- this function should insure the necessary data elements for all types of FIS users are included so that FIS function can effectively service all customer types - note this is a should and not a must because the FIS function has a rule check in it and will return an error to D-ATIS update if the D-ATIS function doesn't get things rights.

Embedded Elements

Element	Detail	Notes
Port 2.2.4.2.0.2 pATIS.DRPT.DB	1.0	
Port 2.2.4.2.0.1 pATIS.DRPT.GUI	1.0	
Port 2.2.4.2.0.3 pATIS.DRPT.GMD	1.0	

2.2.4.3 Adapt ATIS Data

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/12/2006. *Last modified on*.2/2/2007.
GUID: {1AA10DC4-6E46-4ae2-BA2F-D61BE8F6D6EA}

This function sets up D-ATIS adaptation data used to help automate the D-ATIS generation process, including:
- supported WXSYSTEMS
- Airport Code
- Active Runways
- Magnetic Deviation (used to convert true wind to mag win provided in METAR-ASOS reports)

Embedded Elements

Element	Detail	Notes
Port 2.2.4.3.0.2 pATIS.ADAPT.GUI	1.0	
Port 2.2.4.3.0.1 pATIS.ADAPT.DB	1.0	

2.2.4.4 Create/Update ATIS Voice Report

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/12/2006. *Last modified on*.5/12/2006.
GUID: {E0A8160E-75BB-43f2-89F2-DB0832E9258E}

This function:
- retrieves currently active D-ATIS report from local database
- synthesizes digital voice waveform based on dictionary
- supports transmission of generated digital voice file to GUI for review
- transfers file to voice broadcast system (as directed by user)

Embedded Elements

Element	Detail	Notes
Port 2.2.4.4.0.3 pATIS.VRPT.D-VOICE	1.0	
Port 2.2.4.4.0.1 pATIS.VRPT.GUI	1.0	
Port 2.2.4.4.0.2 pATIS.VRPT.DB	1.0	

2.2.4.5 Broadcast ATIS Voice

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/12/2006. *Last modified on*.5/12/2006.
GUID: {B2F53F52-2583-4f95-B60E-8C77CDA6148C}

This function:
- provides voice report in a format compatible with voice network (e.g. analog audio signal) which can be transmitted and broadcast from a remote ATIS VHF Voice Radio.
- supports play loops for continual and repeated broadcast of voice report

Embedded Elements

Element	Detail	Notes
Port 2.2.4.5.0.2 pATIS.VBC.VOICE	1.0	
Port 2.2.4.5.0.1 pATIS.VBC.VRPT	1.0	

2.3 National Ground Data Processing (GDP-N)

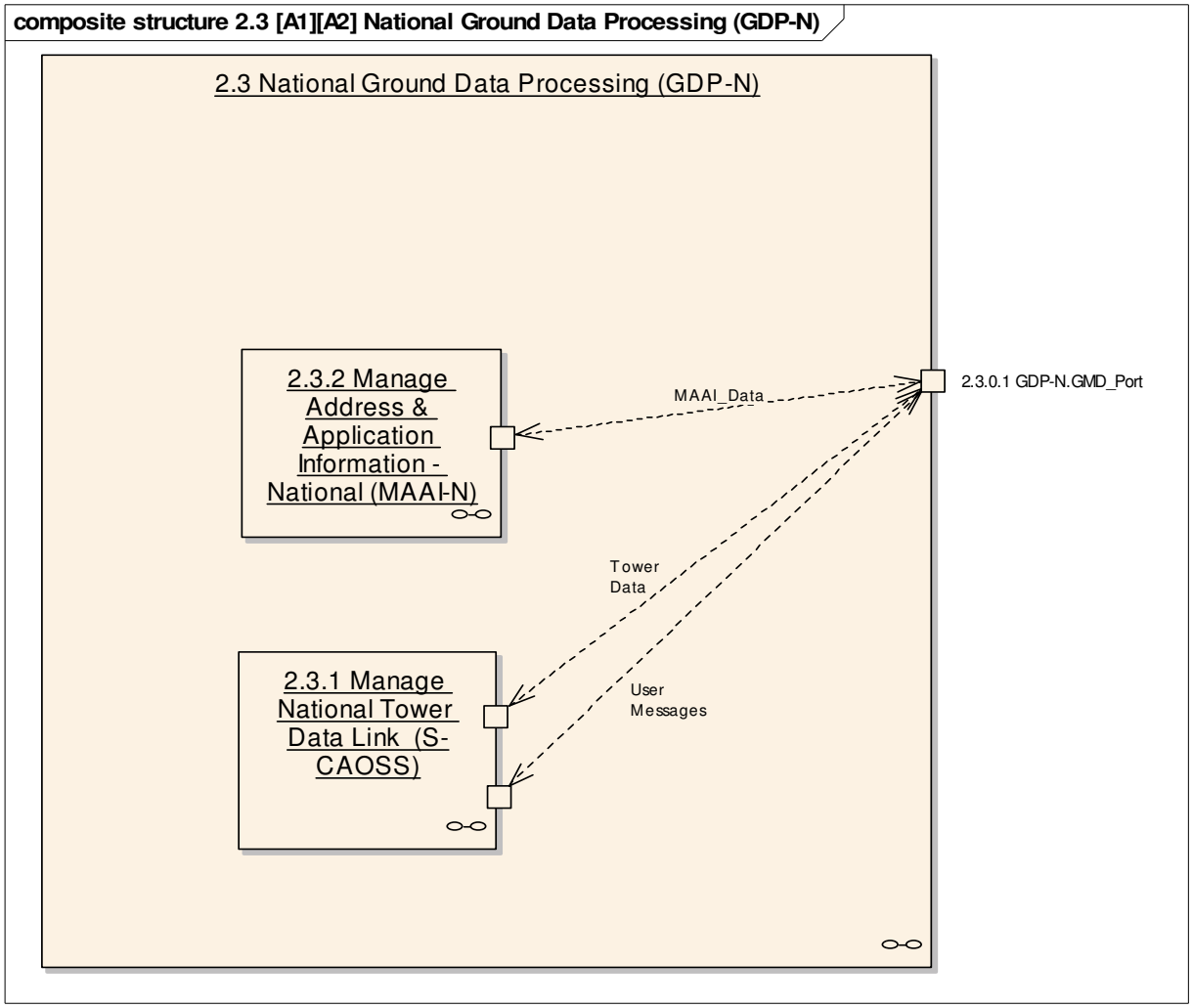
Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/8/2006. *Last modified on*.11/25/2006.
GUID: {77A905B1-24F9-430f-B273-84FDC86023E2}

This function performs ground data processing on a national-basis. There is one instance of this function for the entire NAS (except for backup/redundant instance). For example, there may be a single NAS-wide database to store D-ATIS information.

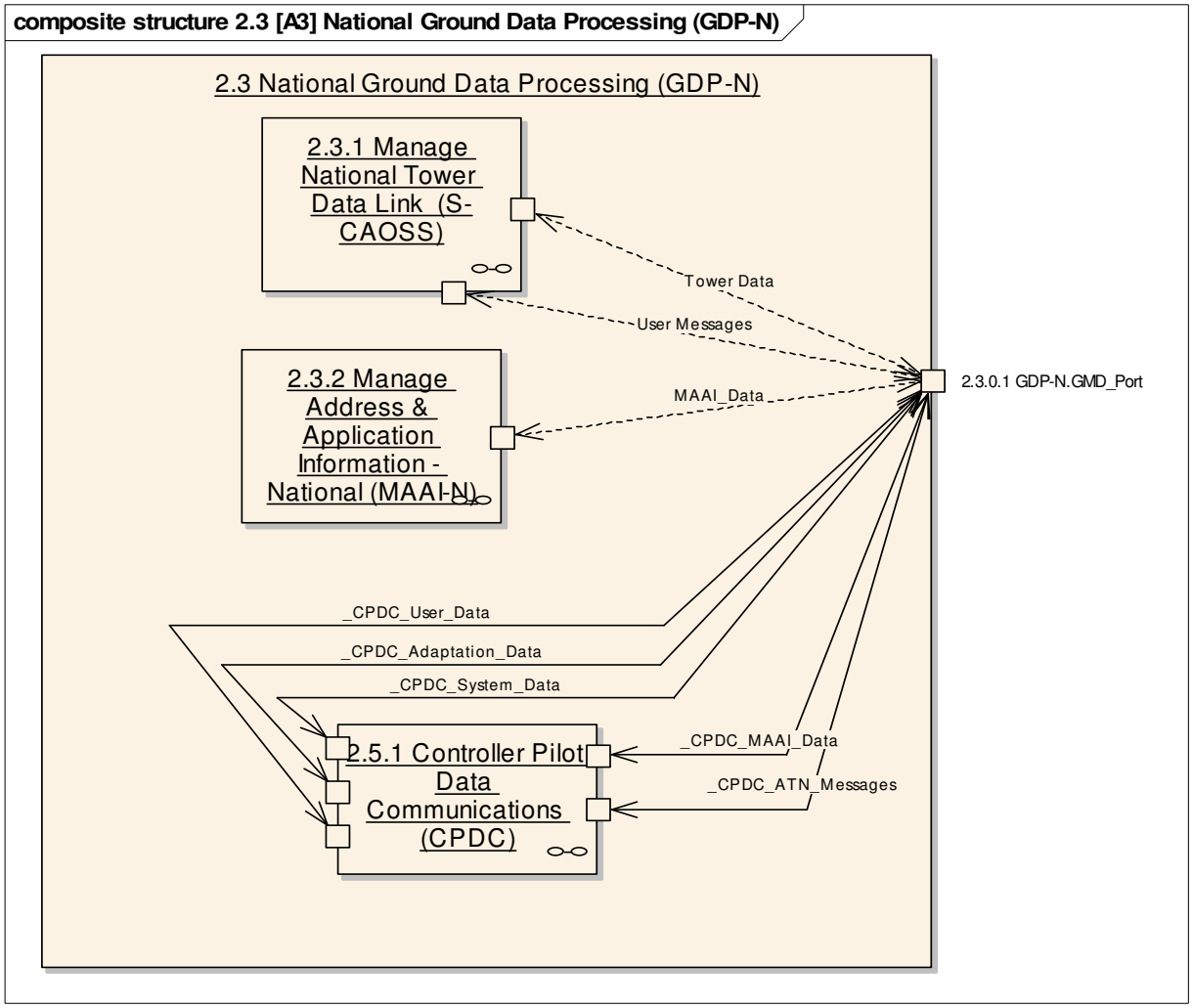
Embedded Elements

Element	Detail	Notes
Port 2.3.0.1 GDP-N.GMD_Port	1.0	

CompositeStructure diagram: 2.3 [A1][A2] National Ground Data Processing (GDP-N)



CompositeStructure diagram: 2.3 [A3] National Ground Data Processing (GDP-N)



2.3.2 Manage Address & Application Information - National (MAAI-N)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/10/2006. *Last modified on*.5/13/2006.
GUID: {16BDA34E-3F8E-418e-9386-938959C26D6F}

This function is associated with air-ground data communication services . It manages aircraft/ground identifiers, addresses, and application capability profiles necessary to initiate and maintain data communication services.

Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.3.2 Manage Address & Application Information - National (MAAI-N) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0006A: MAAI supports Ground Facility registration Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.3.2 Manage Address & Application Information - National (MAAI-N) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0005A: MAAI function holds DCL registration Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.3.2 Manage Address & Application Information - National (MAAI-N) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00013: [DONE] Handling mulitple network types (ATN, FANS) Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.3.2 Manage Address	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name=	

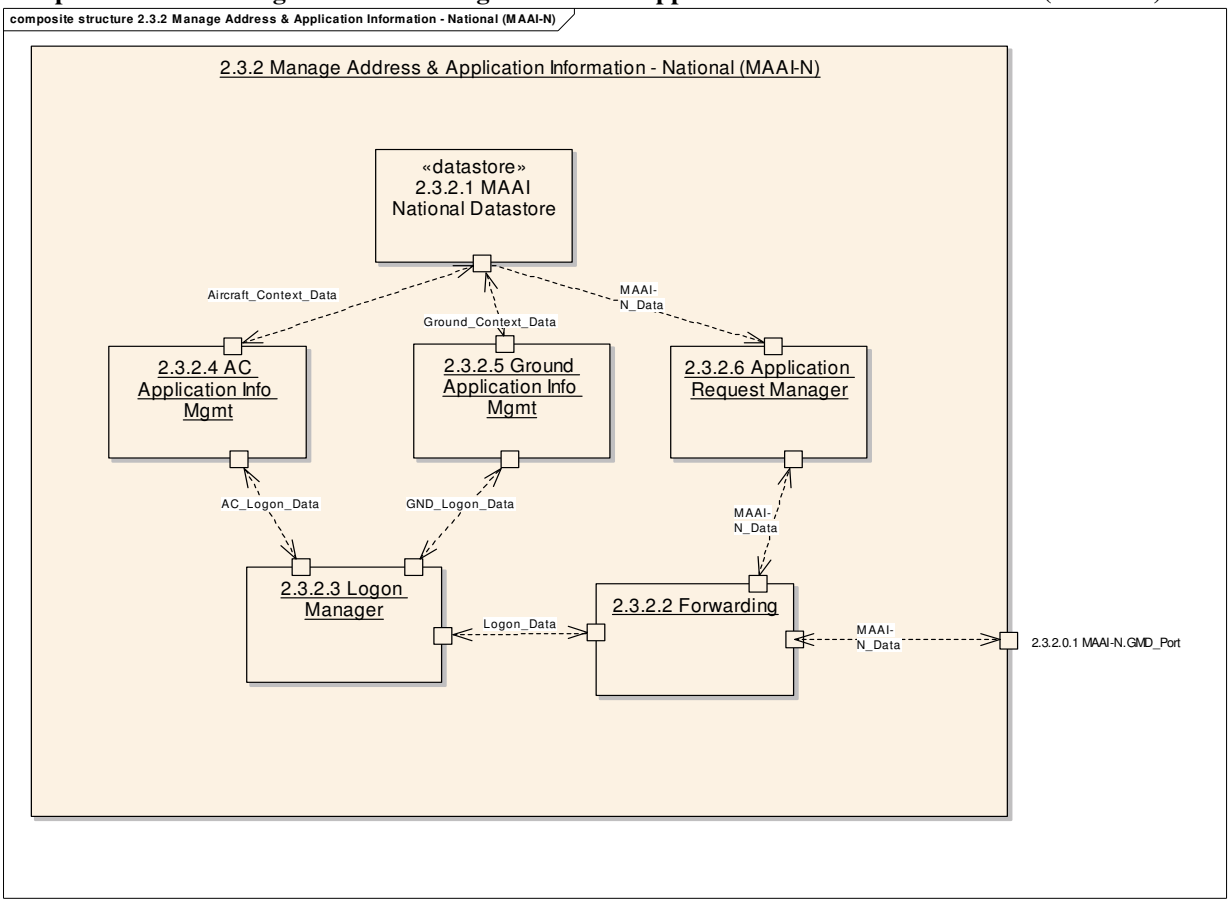
Connector	Source	Target	Notes
	& Application Information - National (MAAI-N) Element.Type= Object	TODO-00041: Application Version compatibility Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.3.2 Manage Address & Application Information - National (MAAI-N) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00025: Eligibility Questions Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.3.2 Manage Address & Application Information - National (MAAI-N) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0003A: FOC interacts DCS for DCL configuration Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.3.2 Manage Address & Application Information - National (MAAI-N) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00008: AC-FP Correlation Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.3.2 Manage Address & Application Information - National (MAAI-N) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00024: Equippage from FP vs MAAI logon Element.Type= Requirement	
Realisation	ConnSource.Scope=	ConnTarget.Scope=	

Connector	Source	Target	Notes
Source -> Destination	Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.3.2 Manage Address & Application Information - National (MAAI-N) Element.Type= Object	Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0004A: MAAI is Nationally-based function Element.Type= Requirement	

Embedded Elements

Element	Detail	Notes
Port 2.3.2.0.1 MAAI-N.GMD_Port	1.0	

CompositeStructure diagram: 2.3.2 Manage Address & Application Information - National (MAAI-N)



2.3.2.6 Application Request Manager

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/13/2006. *Last modified on*.5/13/2006.
GUID: {4162A521-26D1-442f-9FE2-A197E1BC6065}

This function:
- decodes and processes application requests
- composes and encodes replies based on a set of rules
- performs intra-message structure & content validation,
- monitors/captures performance information.
- performs transaction management

Embedded Elements

Element	Detail	Notes
Port 2.3.2.6.0.2 MAAI_RQST.FWD_Port	1.0	
Port 2.3.2.6.0.1 RQST.DS_Port	1.0	

2.3.2.2 Forwarding

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/13/2006. *Last modified on*.5/13/2006.
GUID: {AB0AB4E5-C152-4678-9EC6-B50FEC44C3D3}

This function handles the connection to the ground network (e.g. transport layer support).

Connections

Connector	Source	Target	Notes
Dependency MAAI-N_Data Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.3.2.2 Forwarding Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 2.3.2.0.1 MAAI-N.GMD_Port Element.Type= Port	This functional data flow includes: - CPDC context data/requests - MCI context data/requests [S2] - FIS context data/requests - MAAI-A logon exchanges - FOC Ground Registration/Logon Requests

Embedded Elements

Element	Detail	Notes
Port 2.3.2.2.0.3 MAAI_FWD.LGN_Port	1.0	
Port 2.3.2.2.0.2 MAAI_FWD.RQST_Port	1.0	
Port 2.3.2.2.0.1 MAAI_FWD.GMD_Port	1.0	

2.3.2.1 MAAI National Datastore

Type: **DataStoreNode**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/13/2006. *Last modified on*.5/13/2006.
GUID: {B60B8362-0216-4036-A847-6A1908174235}

This datastore includes:
- Aircraft capability information (applications, versions, 24-bit ICAO address, network_types[ATN,FANS,ACARS]).
- Aircraft-to-Flight_Plan/Flight_ID association information
- Ground facility capability information (applications, versions, address)
- Aircraft 'registration' info (ACARS capabilities, voice only, DCL ability)

Embedded Elements

Element	Detail	Notes
Port 2.3.2.1 MAAI_DS.Data_Port	 1.0	

2.3.2.5 Ground Application Info Mgmt

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/13/2006. *Last modified on*.5/13/2006.
GUID: {71AB9444-CC28-4b87-B935-A8649E582471}

This function supports the 'registration' of capabilities for each ground facility (i.e. applications supported, addresses, and version status). It manages ground related MAAI data in the MAAI datastore.

Embedded Elements

Element	Detail	Notes
Port 2.3.2.5.0.2 MAAI_GDATA.LGN_Port	1.0	
Port 2.3.2.5.0.1 GDATA.DS_Port	1.0	

2.3.2.4 AC Application Info Mgmt

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/13/2006. *Last modified on*.5/13/2006.
GUID: {F9E9A4BC-CC3D-47ef-B030-4C49A65BD8DD}

This function performs aircraft correlation during initiation of AC log activity (i.e., correlates aircraft information with flight plan data). It deletes expired aircraft information from the MAAI data store. It performs rule checking for logon requests (e.g. checks for duplicate entries in aircraft table), as applicable, and stores aircraft logon information in the MAAI datastore.

This function also handles ACARS registration/capability requests.

Embedded Elements

Element	Detail	Notes
Port 2.3.2.4.0.1 ADATA.DS_Port	1.0	
Port 2.3.2.4.0.2 MAAI_ADATA.LGN_Port	1.0	

2.3.2.3 Logon Manager

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/13/2006. *Last modified on*.5/13/2006.
GUID: {4DE7DFD1-8FF6-4cbc-8E2C-D934B167EF4A}

This function:
- decodes and processes logon requests
- composes and encodes replies based on a set of rules
- performs intra-message structure & content validation,
- monitors/captures performance information.
- routes the 'good' messages to either the AC Application Info Mgmt or Ground Application Info Mgmt functions
- performs transaction management

Embedded Elements

Element	Detail	Notes
Port 2.3.2.3.0.1 MAAI_LGN.FWD_Port	1.0	
Port 2.3.2.3.0.2 MAAI_LGN.AC_Port	1.0	
Port 2.3.2.3.0.3 MAAI_LGN.GND_Port	1.0	

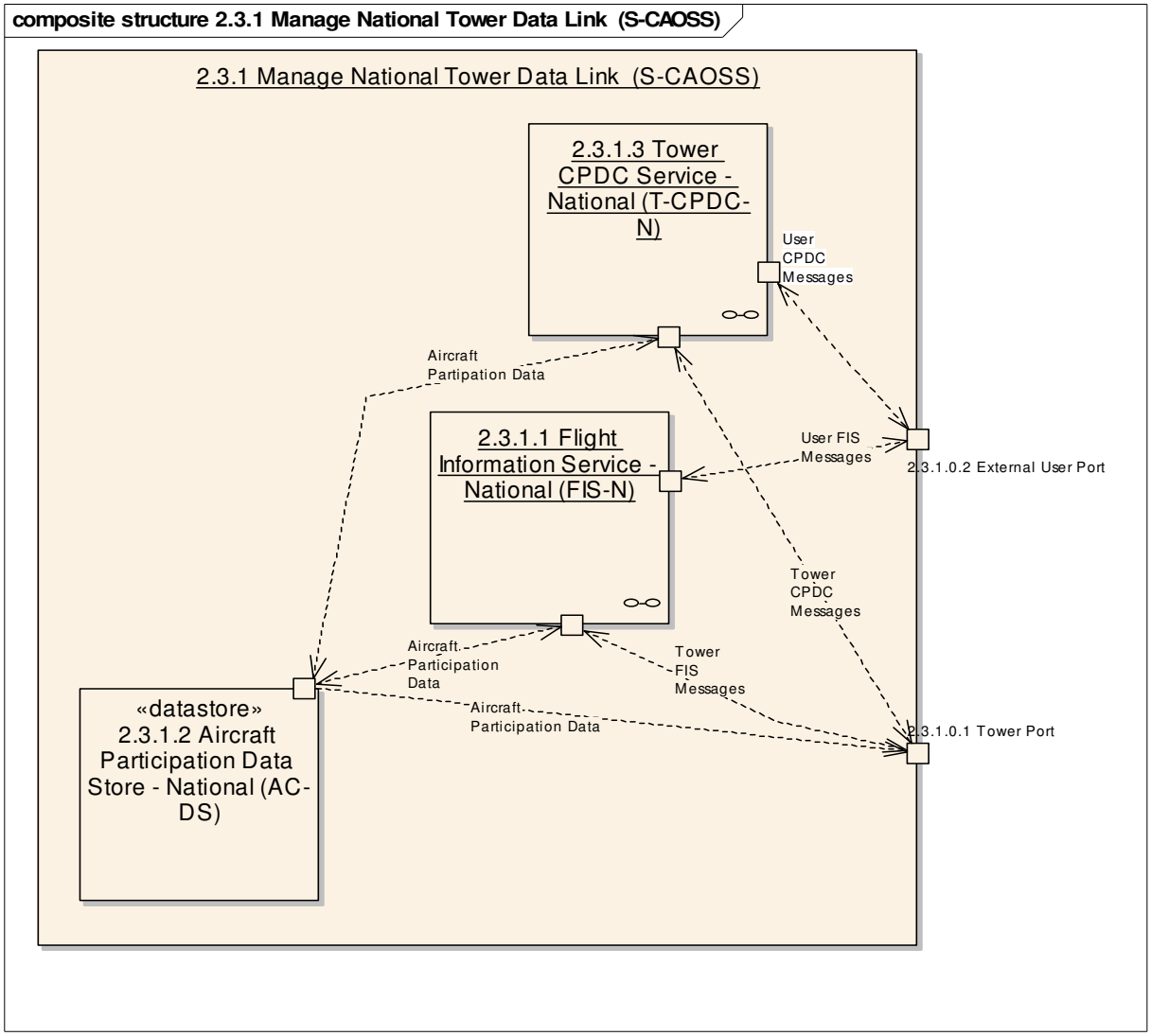
2.3.1 Manage National Tower Data Link (S-CAOSS)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 6/12/2007. *Last modified on*.6/12/2007.
GUID: {A7B8AB89-E07B-4571-A239-0B44A712E9B4}

Embedded Elements

Element	Detail	Notes
Port 2.3.1.0.1 Tower Port	1.0	
Port 2.3.1.0.2 External User Port	1.0	

CompositeStructure diagram: 2.3.1 Manage National Tower Data Link (S-CAOSS)



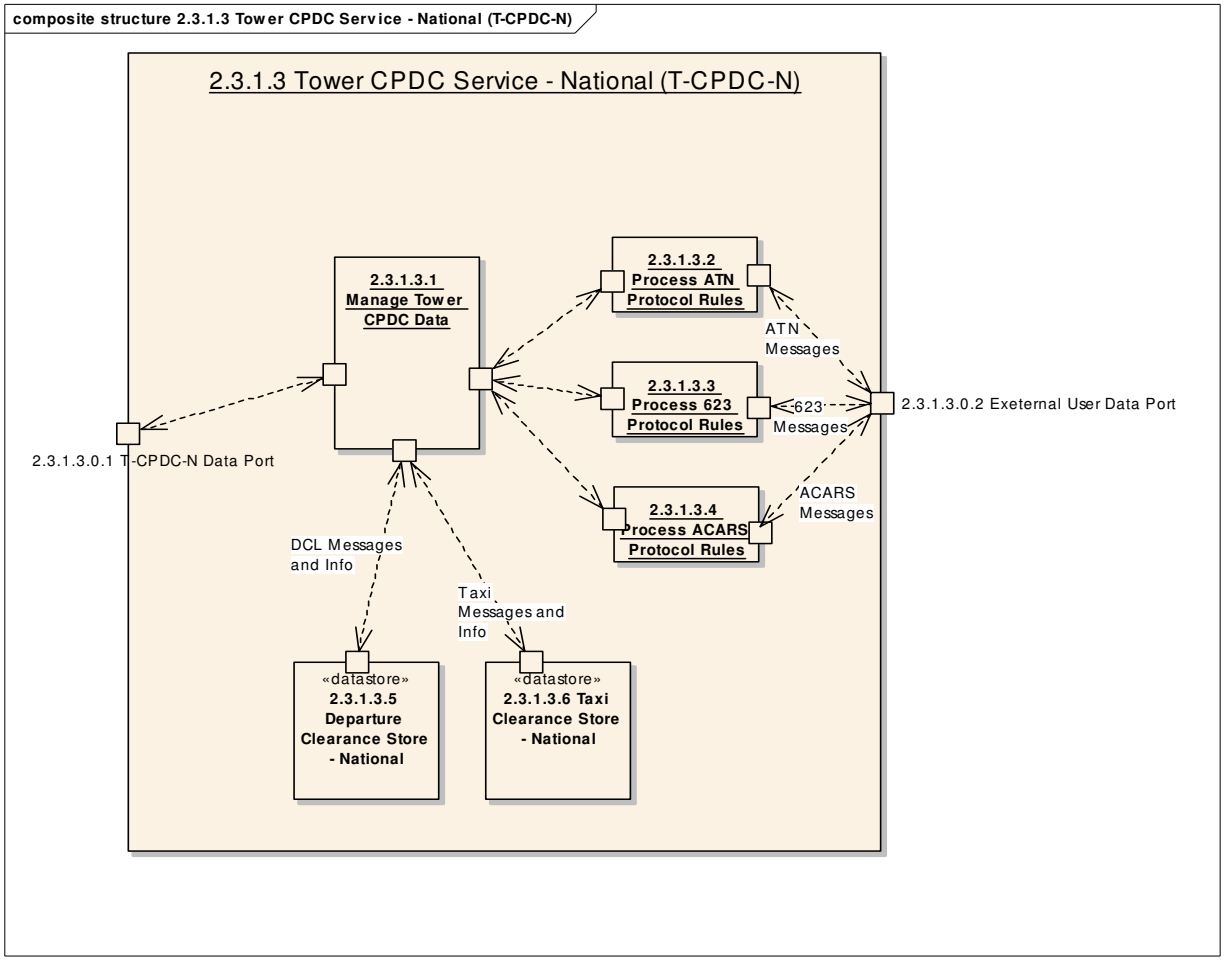
2.3.1.3 Tower CPDC Service - National (T-CPDC-N)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 6/12/2007. *Last modified on*.6/12/2007.
GUID: {FB8DCF04-F2CA-42de-BE1F-3871822B144C}

Embedded Elements

Element	Detail	Notes
Port 2.3.1.3.0.1 T-CPDC-N Data Port	1.0	
Port 2.3.1.3.0.2 Exeternal User Data Port	1.0	

CompositeStructure diagram: 2.3.1.3 Tower CPDC Service - National (T-CPDC-N)



2.3.1.3.6 Taxi Clearance Store - National

Type: **DataStoreNode**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 6/12/2007. *Last modified on*.6/12/2007.
GUID: {B32E35F1-40A7-4960-A31F-5735B79598D4}

Embedded Elements

Element	Detail	Notes
Port 2.3.1.3.6.0.1 Taxi Data Store Port	1.0	

2.3.1.3.4 Process ACARS Protocol Rules

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 6/12/2007. *Last modified on*.6/12/2007.
GUID: {61E0A905-3946-4016-B1FB-C2B15C701E80}

Connections

Connector	Source	Target	Notes
Dependency ACARS Messages Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.3.1.3.4 Process ACARS Protocol Rules Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 2.3.1.3.0.2 Exeternal User Data Port Element.Type= Port	

Embedded Elements

Element	Detail	Notes
Port 2.3.1.3.4.0.2 Proposed ACARS Messages	1.0	
Port 2.3.1.3.4.0.1 ACARS Port	1.0	

2.3.1.3.1 Manage Tower CPDC Data

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 6/12/2007. *Last modified on*.6/12/2007.
GUID: {B9689155-7182-4010-BE59-FDDCE097EA46}

Embedded Elements

Element	Detail	Notes
Port 2.3.1.3.1.0.1 Tower Data Port	1.0	
Port 2.3.1.3.1.0.3 External Protocol Data Port	1.0	
Port 2.3.1.3.1.0.2 Data Store Port	1.0	

2.3.1.3.3 Process 623 Protocol Rules

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 6/12/2007. *Last modified on*.6/12/2007.
GUID: {459DA044-5EB6-4dca-A90A-AFE871112BD7}

Embedded Elements

Element	Detail	Notes
Port 2.3.1.3.3.0.1 623 Port	1.0	
Port 2.3.1.3.3.0.2 Proposed 623 Messages	1.0	

2.3.1.3.2 Process ATN Protocol Rules

Type: **Object**

Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 6/12/2007. *Last modified on*.6/12/2007.
GUID: {EF64E4AF-E33E-4bbe-BCA6-18F36DAF6537}

Embedded Elements

Element	Detail	Notes
Port 2.3.1.3.2.0.2 Proposed ATN Messages	1.0	
Port 2.3.1.3.2.0.1 ATN Data Port	1.0	

2.3.1.3.5 Departure Clearance Store - National

Type: **DataStoreNode**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 6/12/2007. *Last modified on*.6/12/2007.
GUID: {585F4F3E-1BDD-442e-AFFE-E36FB8FD86E3}

Embedded Elements

Element	Detail	Notes
Port 2.3.1.3.5.0.1 Dep Clearance Port	1.0	

2.3.1.1 Flight Information Service - National (FIS-N)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/10/2006. *Last modified on*.6/12/2007.
GUID: {2A24093E-0655-4866-A539-EE7592956EA1}

This function provides the capability for ground users/systems and flight crews to request/retrieve flight information including terminal status information (weather, active runways, delays, notices-to-airmen).

Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.3.1.1 Flight Information Service -	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00006: SWIM	

Connector	Source	Target	Notes
	National (FIS-N) Element.Type= Object	Questions Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.3.1.1 Flight Information Service - National (FIS-N) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0025A: Segment 3 Service Binning Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.3.1.1 Flight Information Service - National (FIS-N) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0020A: FIS Report access & datastore updates have different addresses Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.3.1.1 Flight Information Service - National (FIS-N) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0019A: FIS function supports Ground User report access Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.3.1.1 Flight Information Service - National (FIS-N) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0024A: Segment 2 Service Binning Element.Type= Requirement	
Realisation	ConnSource.Scope=	ConnTarget.Scope=	

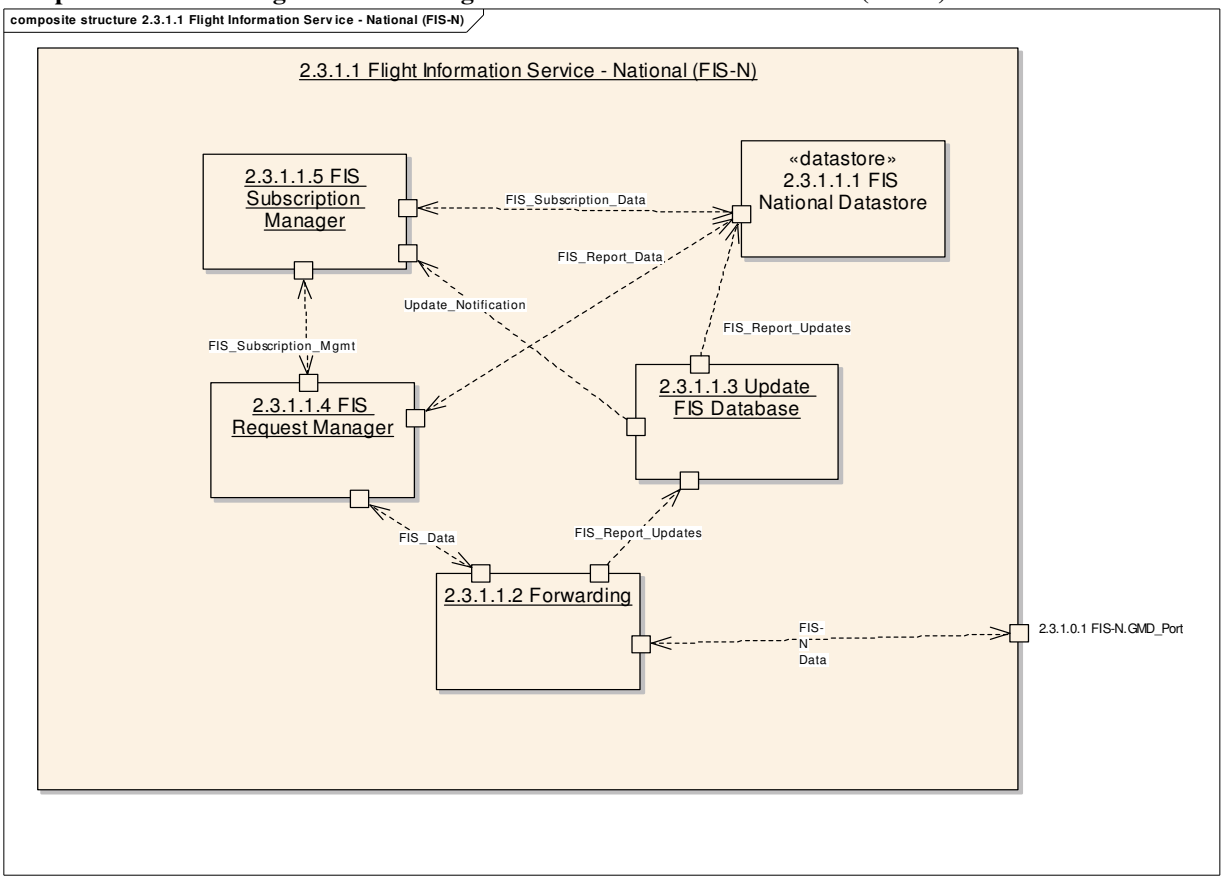
Connector	Source	Target	Notes
Source -> Destination	Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.3.1.1 Flight Information Service - National (FIS-N) Element.Type= Object	Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00015: [DONE] Triggering a D-ATIS Update Report Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.3.1.1 Flight Information Service - National (FIS-N) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00013: [DONE] Handling mulitple network types (ATN, FANS) Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.3.1.1 Flight Information Service - National (FIS-N) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0014A: FIS National Database is centralized Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.3.1.1 Flight Information Service - National (FIS-N) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0013A: Nationally-based FIS function Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.3.1.1 Flight Information Service -	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00019: S-	

Connector	Source	Target	Notes
	National (FIS-N) Element.Type= Object	CAOSS, SWIM and DCS - who has the data? Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.3.1.1 Flight Information Service - National (FIS-N) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00043: Subscription Support Requirements (e.g., FIS, ADS) Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.3.1.1 Flight Information Service - National (FIS-N) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00036: D-TAXI and FIS 'obstruction' data Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.3.1.1 Flight Information Service - National (FIS-N) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00023: FIS Report 'Push' Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.3.1.1 Flight Information Service - National (FIS-N) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00022: FIS Subscription Cancellation Issues Element.Type= Requirement	

Embedded Elements

Element	Detail	Notes
Port 2.3.1.1.0.2 FIS External User Port	1.0	
Port 2.3.1.0.1 FIS-N.GMD_Port	1.0	

CompositeStructure diagram: 2.3.1.1 Flight Information Service - National (FIS-N)



2.3.1.1.4 FIS Request Manager

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/13/2006. *Last modified on*.6/12/2007.
GUID: {053F3B0F-B3DC-4d6f-ADF8-7EBD5690D0D8}

This function manages:
- manages requests and associated replies for FIS information from aircraft and/or ground facilities.
- forwards subscription requests to the subscription handler.
- self-handles demand reports for information
- monitors database updates (via update message) and generates reports
- encodes/decodes messages using appropriate protocol structure for associated user.

- insures stale data is not sent to users (possibly deletes from database & notifies M&C?)

This function handles necessary protocol structure for AC (e.g. ATN, FANS) and ground facility communications (e.g., IP).

Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.3.1.1.4 FIS Request Manager Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0013A: Nationally-based FIS function Element.Type= Requirement	

Embedded Elements

Element	Detail	Notes
Port 2.3.1.4.0.3 FIS_RQT.FIS_QRY_Port	1.0	
Port 2.3.1.4.0.2 FIS_RQT.DS_Port	1.0	
Port 2.3.1.4.0.1 FIS_RQT.FIS_SUB_Port	1.0	

2.3.1.1.2 Forwarding

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/13/2006. *Last modified on*.6/12/2007.
GUID: {2E57970C-58C0-4be5-A5D7-087E9718A251}

This function handles the connection to the ground network (e.g. transport layer support).

Embedded Elements

Element	Detail	Notes
Port 2.3.1.2.0.3 FIS_FWD.FIS_RQT_Port	1.0	
Port 2.3.1.2.0.1 FIS_FWD.GMD_Port	1.0	
Port 2.3.1.2.0.2 FIS_FWD.FIS_UPD_Port	1.0	

2.3.1.1.5 FIS Subscription Manager

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/13/2006. *Last modified on*.6/12/2007.
GUID: {133A6CA7-0166-4308-8C4D-71960926AF0D}

This function:
- processes all subscription initiation, update, and cancellation requests.
- instructs the FIS Request Manager to send an initial FIS report immediately after successful initiation request
- receives report update notices from the Update FIS Database function and instructs the FIS Request Manager to send an updated FIS report to the appropriate list of subscribed users.

Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.3.1.1.5 FIS Subscription Manager Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00022: FIS Subscription Cancellation Issues Element.Type= Requirement	

Embedded Elements

Element	Detail	Notes
Port 2.3.1.5.0.1 FIS_SUB.DS_Port	1.0	
Port 2.3.1.5.0.3 FIS_SUB.FIS_RQT_Port	1.0	
Port 2.3.1.5.0.2 FIS_SUB.FIS_UPD_Port	1.0	

2.3.1.1.1 FIS National Datastore

Type: **DataStoreNode**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/13/2006. *Last modified on*.6/12/2007.
GUID: {9668DAD0-74F9-48fa-B0D8-1DCBC3C87D07}

This nationally-based datastore contains subscription information. It includes the following types of information:
- D-ATIS Reports
- D-SIG Reports (Segment 2 and later)
- Subscription Information

Embedded Elements

Element	Detail	Notes
Port 2.3.1.1.0.1 FIS_DS.Data_Port	 1.0	

2.3.1.1.3 Update FIS Database

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/13/2006. *Last modified on*.6/12/2007.
GUID: {7D5D4FBF-6286-4ea8-B3D8-C0FFDA820848}

This function manages "supply" side of FIS. (e.g. FIS reports generated by air traffic control towers). This function allows/supports updates to the database. As such, it may have more restrictive mechanisms involved to insure only 'authorized' users update related datastore information. Also, this function should do rule checking on ATIS contents to insure required elements/fields for FIS-user communication are included.

Embedded Elements

Element	Detail	Notes
Port 2.3.1.3.0.1 FIS_UPD.DS_Port	1.0	
Port 2.3.1.3.0.3 FIS_UPD.FIS_SUB_Port	1.0	
Port 2.3.1.3.0.2 FIS_UPD.FWD_Port	1.0	

2.3.1.2 Aircraft Participation Data Store - National (AC-DS)

Type: **DataStoreNode**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 6/12/2007. *Last modified on*.6/12/2007.
GUID: {6BC53E0F-1B45-4a04-9BB7-1F748E229BEF}

Embedded Elements

Element	Detail	Notes
Port 2.3.1.2.0.1 AC-DS Data Port	1.0	

2.4 [S2] TRACON Ground Data Processing (GDP-T)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/8/2006. *Last modified on*.2/11/2007.

GUID: {06E18AAA-74FC-4a45-8EC0-5AB1D63D8559}

This function performs ground data processing on a terminal/TRACON basis. There would be one instance of this function for each Terminal Facility.

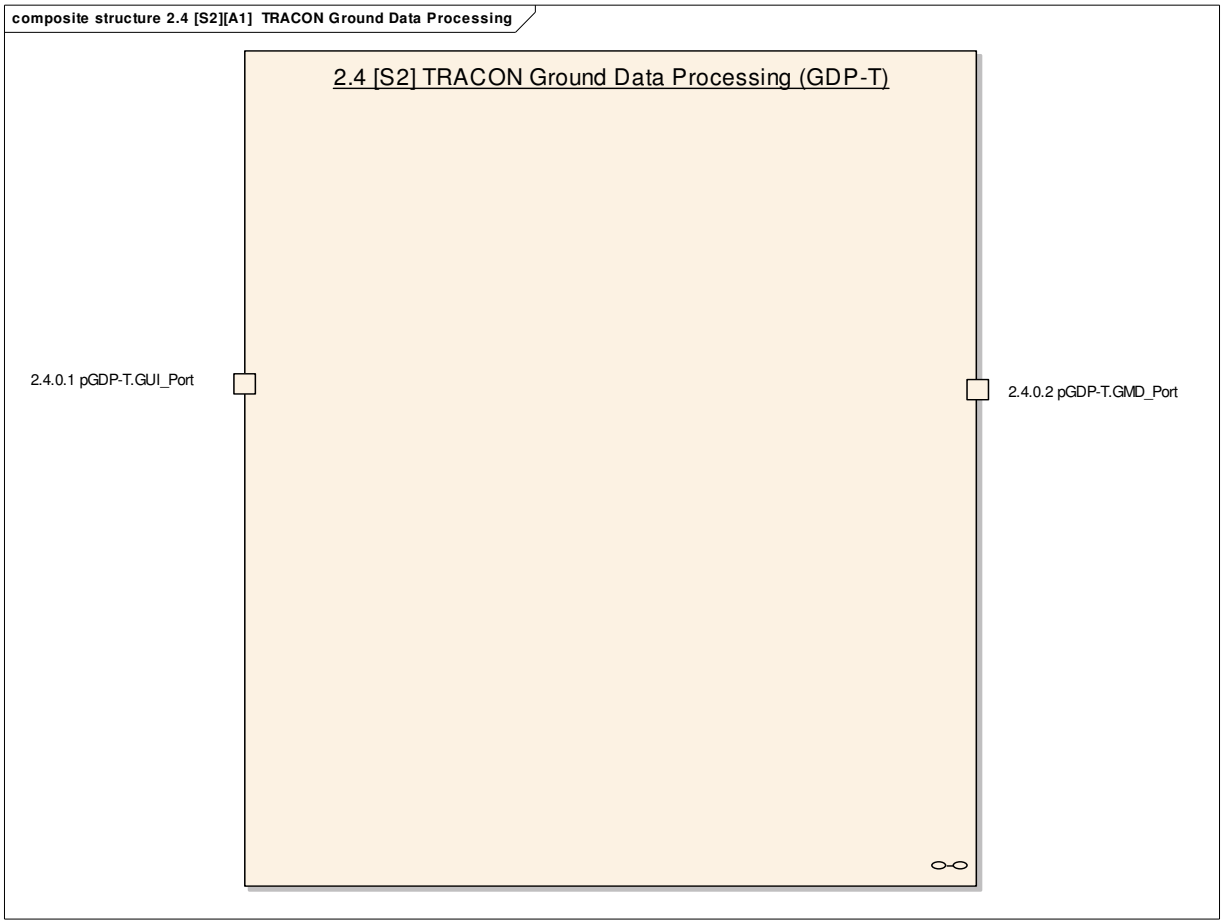
Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.4 [S2] TRACON Ground Data Processing (GDP-T) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0001A: CPDC as separate GDP function Element.Type= Requirement	

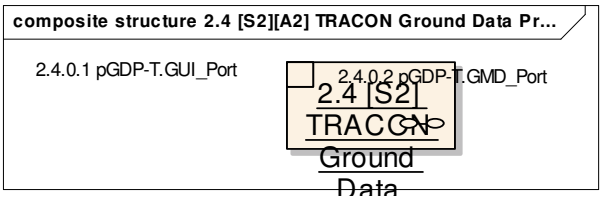
Embedded Elements

Element	Detail	Notes
Port 2.4.0.1 pGDP-T.GUI_Port	1.0	
Port 2.4.0.2 pGDP-T.GMD_Port	1.0	

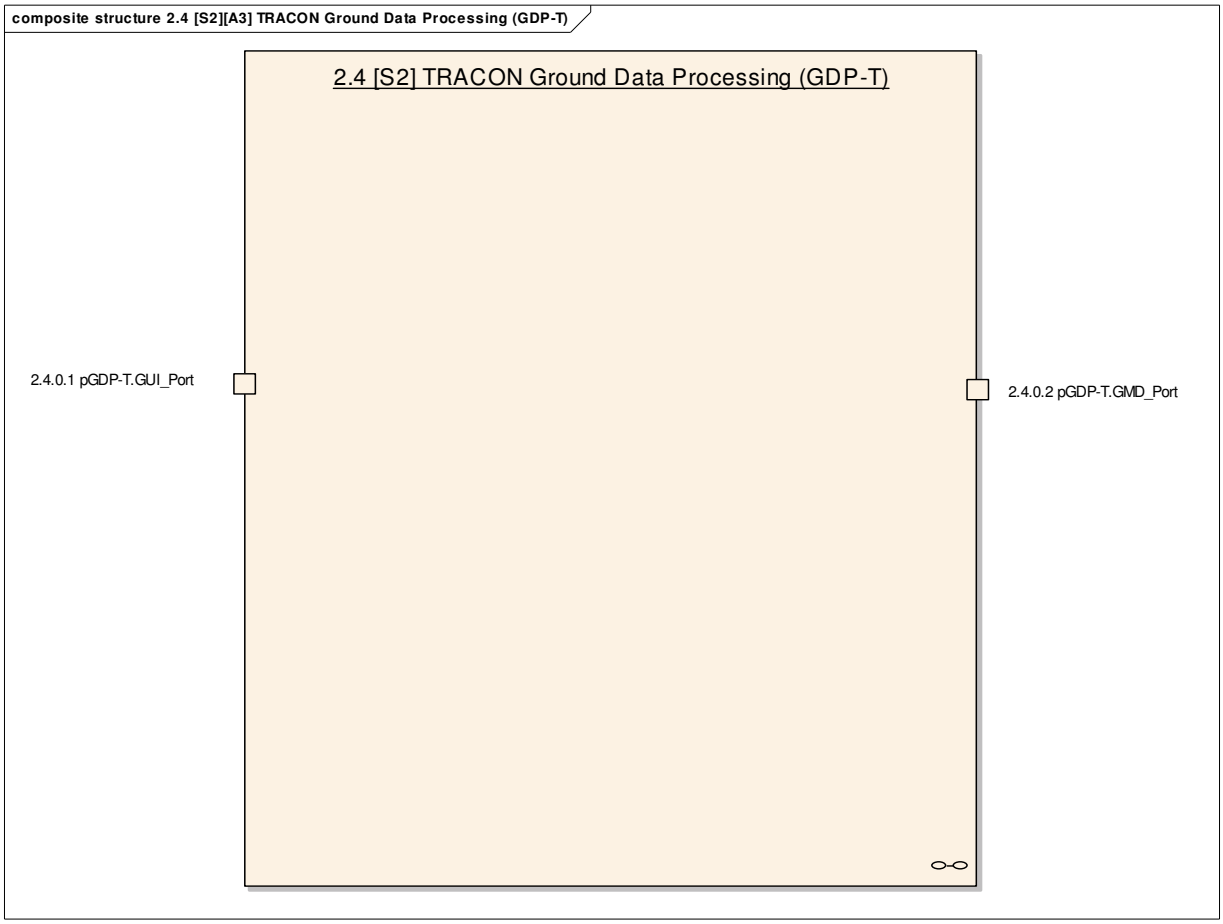
CompositeStructure diagram: 2.4 [S2][A1] TRACON Ground Data Processing



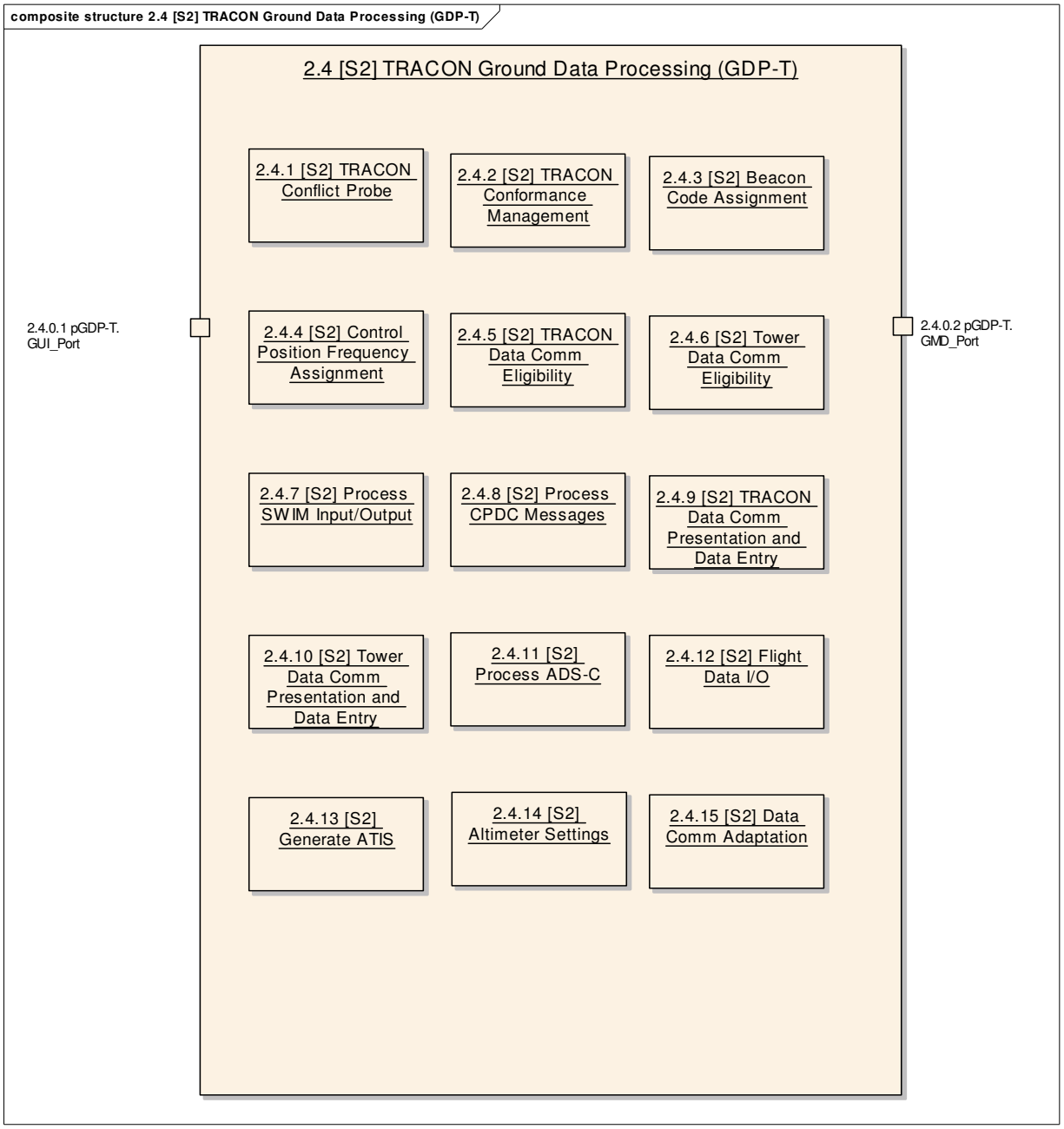
CompositeStructure diagram: 2.4 [S2][A2] TRACON Ground Data Processing



CompositeStructure diagram: 2.4 [S2][A3] TRACON Ground Data Processing (GDP-T)



CompositeStructure diagram: 2.4 [S2] TRACON Ground Data Processing (GDP-T)



2.4.6 [S2] Tower Data Comm Eligibility

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/30/2007. *Last modified on*.6/1/2007.
GUID: {90C5D2BD-5A44-4870-AB58-0635DE849AE8}

Identifies when the Tower is responsible for the aircraft either from accepting handoff from TRACON or when the flight strip is available in the Tower. Should also identify when the Tower has transferred the control to the

TRACON on departures. Includes determining default position.

2.4.3 [S2] Beacon Code Assignment

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/30/2007. *Last modified on*.6/1/2007.
GUID: {EBCD2F4F-3447-48a6-893A-68EE01D32172}

Assigns beacon codes to flights either automatically or through controller input. Provides to Departure Clearance and Taxi functions.

2.4.13 [S2] Generate ATIS

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.

Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/30/2007. *Last modified on*.6/1/2007.
GUID: {56EB4429-08E1-4b3f-947B-BB5E0C618300}

a) Create D-ATIS Reports for local airport/airspace, Manage adaptation information (altimeter settings, runway, frequencies) for inclusion in D-ATIS report. Allow specialist to review and edit D-ATIS reports.

b) Provides interface between ATIS voice radio and D-ATIS creation. Provides voice synthesis and review of voice synthesis to ensure accuracy and "hearability" of information

c) Establishes connection with National Data Comm Function, which delivers the D-ATIS report.

c) Establishes connection with other systems that provide the airport or airspace status input data, e.g., ASOS, weather, altimeter settings, as needed.

2.4.8 [S2] Process CPDC Messages

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/30/2007. *Last modified on*.6/1/2007.
GUID: {36E37754-C8B4-45b0-BC6B-B9CA206101C2}

The Controller Pilot Data Communications (CPDC) is the overall CPDC message generation function It formats messages based on protocol structures supported by ground users and aircraft avionics and enforces inter-process rules.

This function manages data comm connections for Eligible Users. Eligible users are ground users can be eligible users and only a SINGLE user is granted eligible access at a time. Communication Eligibility is used to send clearances and instructions to aircraft. Eligibility verification is handled by identifying/confirming the 'eligible' user with the correct FDP.

This function may also process inter-message rules and ensure that eligible controller can only send messages that have been authorized to that position and meet other requirements for DO-280 and the ATN SARPS.

2.4.9 [S2] TRACON Data Comm Presentation and Data Entry

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/30/2007. *Last modified on*.6/1/2007.
GUID: {5CB95D4D-B659-4830-9AF8-615F3D93668A}

Provides and receives information to the appropriate TRACON GUI for CPDC messages and ADS-C messages.

2.4.5 [S2] TRACON Data Comm Eligibility

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/30/2007. *Last modified on*.6/1/2007.

GUID: {3FDE6F3D-AB0F-417e-AF7A-C586F6B11C16}

Interfaces with TRACON automation (ARTS/STARS) to identify which control position has "track control" of an aircraft. Normally, this person also has voice contact with the aircraft. This info is used to determine which control position has eligibility to send data comm messages.

2.4.2 [S2] TRACON Conformance Management

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/30/2007. *Last modified on*.6/1/2007.
GUID: {B4C872D0-96BA-4e1f-BE1D-9585000D1A75}

Confirms that a flight is on its predicted flight path.

2.4.11 [S2] Process ADS-C

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/30/2007. *Last modified on*.6/1/2007.
GUID: {E85F781A-4DCF-497f-A7CC-DBD6A2D47318}

Interfaces with ADS-C information provider (national or En Route depending on the architecture) and provides information to the appropriate GUI and to TRACON automation. Also processes controller requests for additional ADS-C information and routes request to appropriate provider (may be request to aircraft for a "demand" contract or to the ADS-C information provider. May also provide updated parameters for periodic and event contracts.

2.4.15 [S2] Data Comm Adaptation

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/30/2007. *Last modified on*.6/1/2007.
GUID: {7CBB292F-BD62-4c81-9C28-3749A7CA8576}

New or modified adaptation data that specifically supports Data Comm, such as pre-defined local message options.

2.4.12 [S2] Flight Data I/O

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/30/2007. *Last modified on*.6/1/2007.
GUID: {8BF55B1A-8926-400c-B58F-57FC27FA0F11}

Interface with ERAM for flight data and flight strips, as well as any other Flight Object data that is needed to support sending revisions via data link.

2.4.1 [S2] TRACON Conflict Probe

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/30/2007. *Last modified on*.6/1/2007.
GUID: {68EB2418-EF2C-4942-B269-CF20A8D81C5B}

Probes flights for conflicts with other flights or airspace restrictions

2.4.7 [S2] Process SWIM Input/Output

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/30/2007. *Last modified on*.6/1/2007.
GUID: {4D2B8F04-93B9-4600-A9F3-32F32948CDD1}

Provides data exchange with TFM automation via SWIM. Primarily for TFM control times and TFM advisory messages that are not embedded in the flight plan

2.4.10 [S2] Tower Data Comm Presentation and Data Entry

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/30/2007. *Last modified on*.6/1/2007.
GUID: {DAF61C8E-2A3B-4d00-A325-5342D095AD7F}

Provides and receives information to the appropriate TRACON GUI for CPDC messages and ADS-C messages. Provides and receives information to the appropriate Tower GUI for CPDC messages and ADS-C messages.

2.4.4 [S2] Control Position Frequency Assignment

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/30/2007. *Last modified on*.6/1/2007.
GUID: {93A6D5FA-2A93-4437-9F94-42E98A1EB7B5}

Provides current voice frequency for each control position.

2.4.14 [S2] Altimeter Settings

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 5/30/2007. *Last modified on*.6/1/2007.
GUID: {90D098E9-AD47-4eb2-92C7-5FEFE6C4EF8C}

Interfaces with appropriate sources of altimeter data for use by Data Comm functions.

2.5 Common Ground Data Processing (GDP-C)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 11/25/2006. *Last modified on*.11/25/2006.
GUID: {054D7962-9C24-4dc3-9BD9-9E3AC15C524B}

2.5.1 Controller Pilot Data Communications (CPDC)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 11/24/2006. *Last modified on*.2/3/2007.
GUID: {D725AB0E-540C-499f-B2FA-5D27EB21E0ED}

The Controller Pilot Data Communications (CPDC) function manages the connection between the aircraft and one

or more ground users. It formats messages based on protocol structures supported by ground users and aircraft avionics and enforces inter-message (and possibly inter-process) rules.

This function manages/uses three types of user access categories:

(1) Eligible Users: Only ground users can be eligible users and only a SINGLE user is granted eligible access at a time. Communication Eligibility is used to send clearances and instructions to aircraft. Eligibility verification is handled by identifying/confirming the 'eligible' user with the correct FDP.

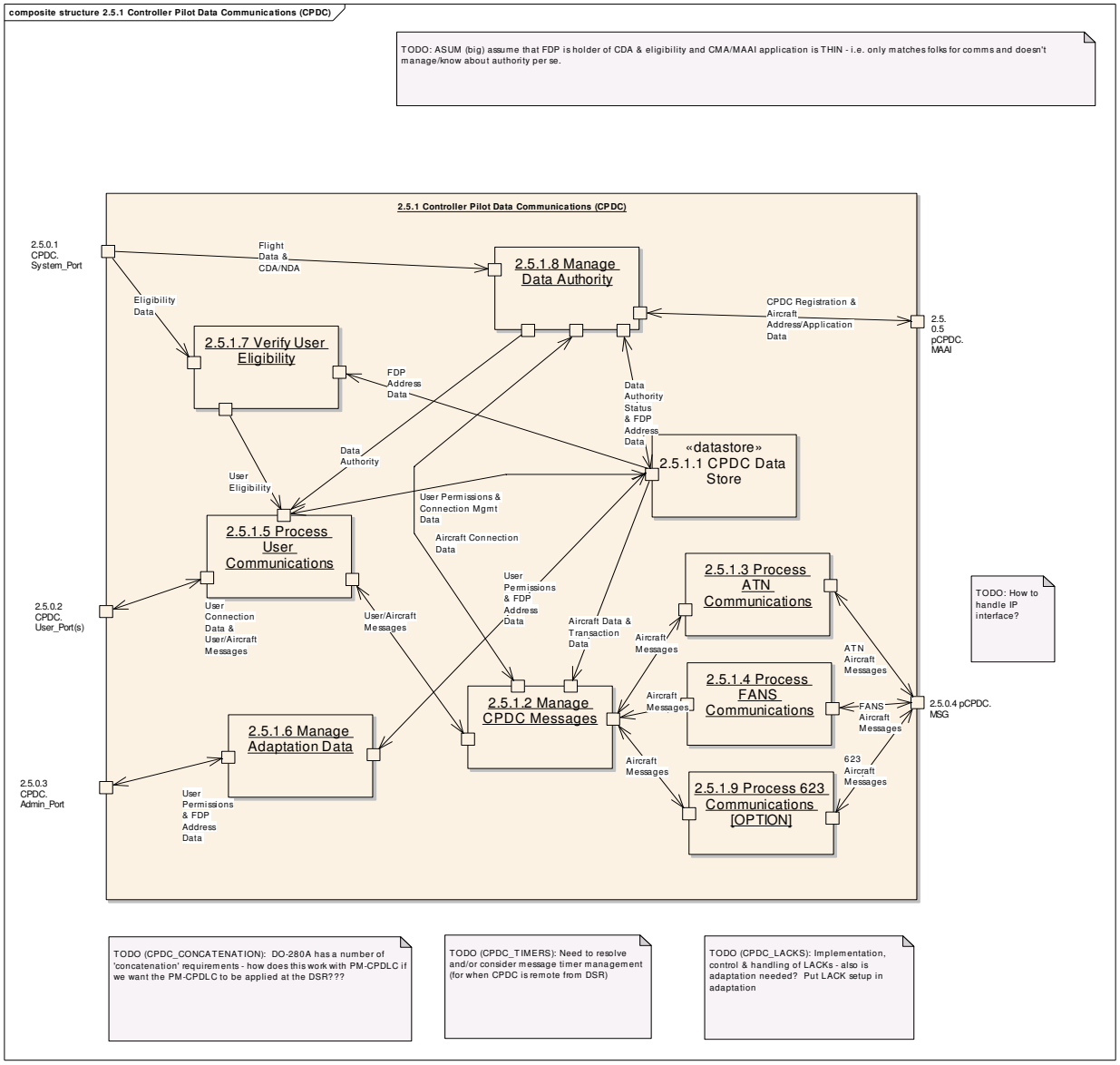
(2) Permitted Users: Only ground users can be permitted users and one or more users can be granted access to the same aircraft. Non-clearance related types of messages are permitted, e.g., expects, notifications, advisories. Permitted verification is handled by adaptation data entry.

(3) Authorized Users: Only aircraft users can be 'authorized' users. Authorized access management is the same thing as managing the 'data authorities' as described in CPDLC communications. It insures that only one ground entity can communicate with the aircraft at one time. Note that while data authorities are described as being facility-based in CPDLC documentation, it is interpretted herein as being CPDC-function based. Thus, transfer of data authority happens between instances of the CPDC function (e.g. domain-based, facility-based, sector-based, etc).

Embedded Elements

Element	Detail	Notes
Port 2.5.0.4 pCPDC.MSG	1.0	
Port 2.5.0.5 pCPDC.MAAI	1.0	
Port 2.5.0.2 CPDC.User_Port(s)	1.0	Connection port for users that which to send A/G CPDC communication. Multiple users can each set up a port to talk to an aircraft.
Port 2.5.0.1 CPDC.System_Port	1.0	
Port 2.5.0.3 CPDC.Admin_Port	1.0	This port is used to: - setup permitted user list

CompositeStructure diagram: 2.5.1 Controller Pilot Data Communications (CPDC)



2.5.1.2 Manage CPDC Messages

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 11/24/2006. *Last modified on*.11/24/2006.
GUID: {DD408CD0-3746-4e73-87CC-78E2AC129B5C}

Transaction management functions:
==========
These sub-functions include:
- Inter-message rule checking
- maintains active message status (manages message expiration timers)

- message thread management (ties requests to replies, clearances to acknowledgements, etc).
- maintains message lists for controllers (for displays 'outstanding' messages that have not been acked, or replied to) (This should be a display function - maybe - since it is likely that message status needs to be provided on display anyway.)
- enforces inter-transaction type rules (eg. insures that a 2nd ACL message for altitude is not sent until the 1st altitude message transaction is closed).

Embedded Elements

Element	Detail	Notes
Port 2.5.1.2.0.1 User Port	1.0	
Port 2.5.1.2.0.3 Datastore Port	1.0	
Port 2.5.1.2.0.2 Aircraft Port	1.0	
Port 2.5.1.2.0.4 Msg.Authority_Port	1.0	

2.5.1.9 Process 623 Communications [OPTION]

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 2/2/2007. *Last modified on*.2/2/2007.
GUID: {CA1F1715-E1D1-47e8-BC97-9C6C1FA9BBC6}

The Process 623 Communications functions formats/encapsulates CPDC messages within 623 message structure and implements/manages any 623 specific rules processing. This function manages the ground side of the 623 connection. This module is REQUIRED ONLY for CPDC instantiations that serve the Tower domain.

Embedded Elements

Element	Detail	Notes
Port 2.5.1.9.0.1 p623.CPDC	1.0	
Port 2.5.1.9.0.2 p623.GMD	1.0	

2.5.1.6 Manage Adaptation Data

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 11/24/2006. *Last modified on*.11/24/2006.
GUID: {CDE02E23-2A61-487d-8BD6-A39B86BAAA3A}

For FDP/System Resource Data:
- allows setup of FDP address(es)

For User Permissions:
- supports adaptation entry/read
- validates permitted user communications (for non-clearance related communication)

Embedded Elements

Element	Detail	Notes
Port 2.5.1.6.0.1 Administration Port	1.0	
Port 2.5.1.6.0.2 Database Port	1.0	

2.5.1.5 Process User Communications

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 11/24/2006. *Last modified on*.11/24/2006.
GUID: {486977D3-565E-47ac-AB90-B386840736D2}

Accepts connects with one or more users on a per aircraft basis. Provides user interface protocol/message translation.
Validates that users are permitted to communicate with aircraft (this is done once at connection setup).

Users that which to conduct 'eligible' communications must connect with that type of request. This function first that this application instance is the current data authority for the requested aircraft, it verifies they are 'permitted' and then verifies they are 'eligible'.

This function is a gate-keeper of sorts. If a message passes through this gate, it means that user is allowed to conduct that aircraft data communication.

Embedded Elements

Element	Detail	Notes
Port 2.5.1.5.0.1 User Port	1.0	
Port 2.5.1.5.0.3 User Validation Port	1.0	
Port 2.5.1.5.0.2 Message Port	1.0	

2.5.1.1 CPDC Data Store

Type: **DataStoreNode**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 11/24/2006. *Last modified on*.11/24/2006.
GUID: {D4714C14-F791-4c8b-A7C2-E27F0B20E164}

This datastore includes the following information:
- network protocol capabilities (e.g. ATN, FANS, etc) - local copy after querying MAAI datastore upon CPDC dialog start.
- Eligibility information
- Transaction state information
- Permitted User list information (User ID, User Address, User Capabilities)

Embedded Elements

Element	Detail	Notes
Port 2.5.1.1.0.1 CPDC Datastore Port	1.0	

2.5.1.7 Verify User Eligibility

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 11/24/2006. *Last modified on*.11/24/2006.
GUID: {D55FFE16-D1C5-4dcc-A09A-03927A945FD6}

Notes:
- Communications with FDP to determine if user is eligible.

Embedded Elements

Element	Detail	Notes
Port 2.5.1.7.0.3 Request Port	1.0	
Port 2.5.1.7.0.1 System Resource Port	1.0	
Port 2.5.1.7.0.2 Datastore Port	1.0	

2.5.1.3 Process ATN Communications

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 11/24/2006. *Last modified on*.11/24/2006.
GUID: {FDDF67ED-8D3C-475d-850E-FE97EA87DF3B}

The Process ATN Communications functions formats/encapsulate CPDC messages within ATN message structure and implements/manages any ATN specific rules processing. This function manages the ground side of the ATN connection. This function supports a single connection per aircraft, but supports multiple aircraft.

Embedded Elements

Element	Detail	Notes
Port 2.5.1.3.0.2 CPDC Port	1.0	
Port 2.5.1.3.0.1 ATN Port	1.0	

2.5.1.8 Manage Data Authority

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 11/24/2006. *Last modified on*.11/28/2006.
GUID: {99FF2CA2-126E-45b6-9447-2DB29F467529}

This function subscribes to the FDP flight object to get data authority information. This function is not the 'truth' holder, but communicates with the FDP as needed to get data authority status. It also updates the remote MAAI function so that that function can assign the right CPDC application address during aircraft logon.

Notes:
- Registers CDPC application with MAAI function (ground log-on)
- Handles CPDC startup up with aircraft users (dialog start)
- Handles aircraft-flight plan correlation (during dialog start) using Flight Data - as needed
- Handles CDA/NDA status for other CPDC functions.

Note: There does not need to be a ground-ground exchange between Manage Data Authority sub-functions in nearby CPDC functions. This is because the FDP will hold 'the truth' and will manage data authority handoffs as it now manages control handoffs. Also note that data authority handoffs are envisioned to happen in tandem with communication handoffs.

TODO: With thinner MAAI function (no longer managing data authority - only status), will FDP be doing AC-FP Correlation?

Embedded Elements

Element	Detail	Notes
Port 2.5.1.8.0.1 DAuth.MAAI_Port	1.0	
Port 2.5.1.8.0.2 DAuth.User_Port	1.0	
Port 2.5.1.1.0.3 DAuth.Datastore_Port	1.0	
Port 2.5.1.8.0.4 DAuth.System_Port	1.0	
Port 2.5.1.8.0.5 DAuth.ATN Port	1.0	

2.5.1.4 Process FANS Communications

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 11/24/2006. *Last modified on*.11/24/2006.
GUID: {FA0D59F0-F6DB-4831-B87C-75869341010E}

The Process FANS Communications functions formats/encapsulates CPDC messages within FANS message structure and implements/manages any FANS specific rules processing. This function manages the ground side of the FANS connection.

Embedded Elements

Element	Detail	Notes
Port 2.5.1.4.0.1 CPDC Port	1.0	
Port 2.5.1.4.0.2 FANS Port	1.0	

2.2 [S1][AA] Tower Ground Data Processing (GDP-W)

Type: **UMLDiagram**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 6/19/2007. *Last modified on*.6/19/2007.
GUID: {F7560B9E-AD0F-406e-B966-A958966C94F0}

2.3.1 Manage National Tower Data Link (S-CAOSS)

Type: **UMLDiagram**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 2.0 Ground Data Processing (GDP) *Keywords:*
Detail: *Created on* 6/19/2007. *Last modified on*.6/19/2007.
GUID: {C3516EAE-488E-4bda-A9A0-FFB61ADB6492}

3.0 Ground Message Delivery (GMD)

Type: **Package**
Status: Proposed. Version . Phase 1.0.
Package: Functional Model
Detail: *Created on* 9/28/2006 4:49:31 PM. *Last modified on* 9/28/2006 4:49:31 PM
GUID: {624C7375-41EA-4f72-A5AC-76211CE41777}

3.0 Ground Message Delivery (GMD) - *(CompositeStructure diagram)*
Created By: on 5/9/2006
Last Modified: 11/28/2006
Version: 1.0. False
GUID: {790982C1-E07B-4192-9E85-5CF95A0663E5}

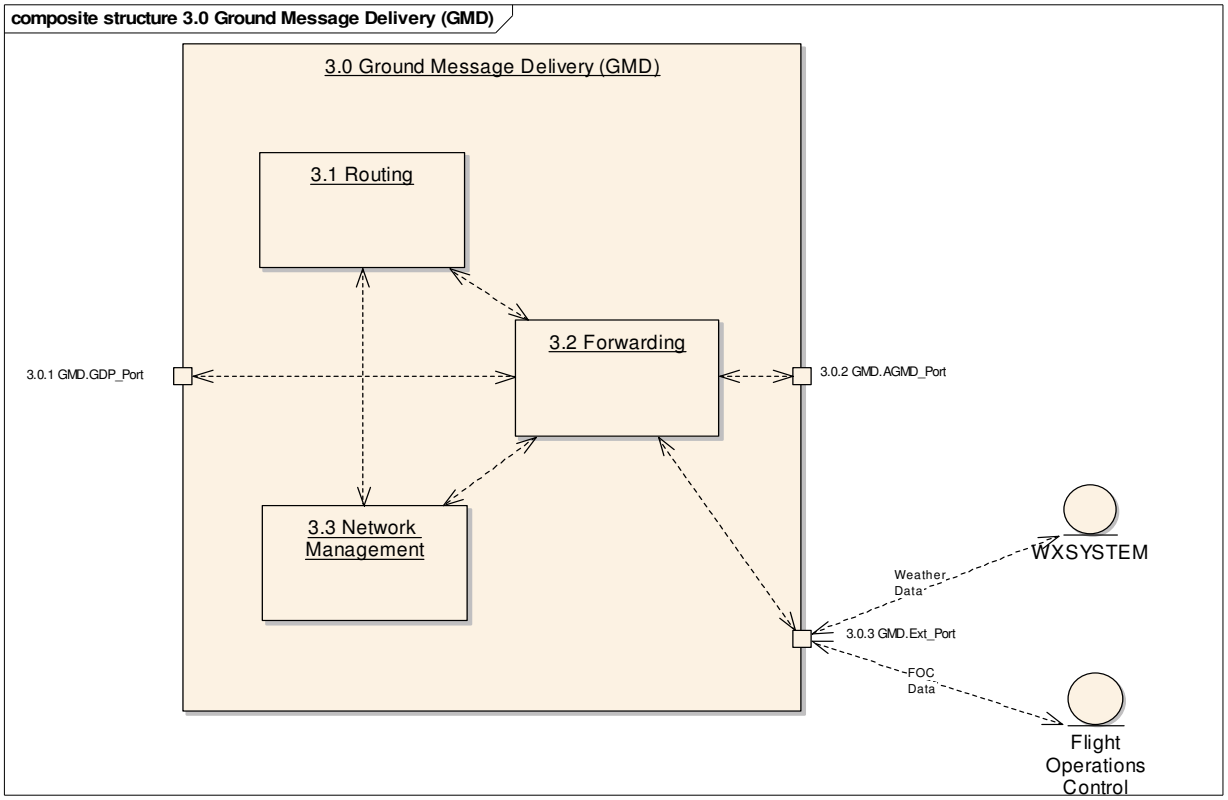


Figure: 3

3.0 Ground Message Delivery (GMD)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 3.0 Ground Message Delivery (GMD) *Keywords:*
Detail: *Created on* 5/4/2006. *Last modified on*.9/28/2006.
GUID: {C5573A05-1CD8-4b83-8C25-CAB26C2B981B}

This function provides:
- ground/ground routing
- ground/ground forwarding, and
- ground network management.

Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 3.0 Ground Message Delivery (GMD) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00044: Need Consistent use of 'Forwarding' function Element.Type= Requirement	
Sequence ACL Msg Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 3.0 Ground Message Delivery (GMD) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 4.0 Air-Ground Message Delivery (AGMD) Element.Type= Object	
Sequence Wilco Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 4.0 Air-Ground	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name=	

Connector	Source	Target	Notes
	Message Delivery (AGMD) Element.Type= Object	3.0 Ground Message Delivery (GMD) Element.Type= Object	
Sequence Wilco Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 3.0 Ground Message Delivery (GMD) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 2.1.2 LEGACY Controller-Pilot Data Communication - Enroute (CPDC-E) Element.Type= Object	

Embedded Elements

Element	Detail	Notes
Port 3.0.1 GMD.GDP_Port	1.0	
Port 3.0.2 GMD.AGMD_Port	1.0	
Port 3.0.3 GMD.Ext_Port	1.0	

3.1 Routing

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 3.0 Ground Message Delivery (GMD) *Keywords:*
Detail: *Created on* 5/9/2006. *Last modified on*.5/9/2006.
GUID: {E846552D-91BE-44d6-8709-3A3F4294D21E}

This function includes:
- Maintain routing information
- Provide policy-based routing

Connections

Connector	Source	Target	Notes
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 3.2 Forwarding Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 3.1 Routing Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 3.1 Routing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 3.3 Network Management Element.Type= Object	

3.2 Forwarding

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 3.0 Ground Message Delivery (GMD) *Keywords:*
Detail: *Created on* 5/9/2006. *Last modified on*.5/9/2006.
GUID: {CFC49B0B-5E6C-4e2d-9DDE-53C9B22394A9}

This function includes:
- forwarding A/G messages
- forwarding G/G messages
- forwarding routing messages
- providing health & status information

Connections

Connector	Source	Target	Notes
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 3.2 Forwarding Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 3.1 Routing Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 3.2 Forwarding Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 3.0.3 GMD.Ext_Port Element.Type= Port	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 3.2 Forwarding Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 3.0.2 GMD.AGMD_Port Element.Type= Port	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 3.2 Forwarding Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 3.3 Network Management Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role	ConnTarget.Scope= Public ConnTarget.Role=	

Connector	Source	Target	Notes
	ConnSource.RoleNote Element.Name= 3.0.1 GMD.GDP_Port Element.Type= Port	ConnTarget.RoleNote= Element.Name= 3.2 Forwarding Element.Type= Object	

3.3 Network Management

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 3.0 Ground Message Delivery (GMD) *Keywords:*
Detail: *Created on* 5/9/2006. *Last modified on*.5/9/2006.
GUID: {AE7E6904-3B30-41fd-91F1-030CDE4C02B7}

This function includes:
- Provide policy-based routing setup
- Provide Heath & Status
- Manage interfaces
- Manage Connectivity Rules - Domain Policies

Connections

Connector	Source	Target	Notes
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 3.1 Routing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 3.3 Network Management Element.Type= Object	

Connector	Source	Target	Notes
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 3.2 Forwarding Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 3.3 Network Management Element.Type= Object	

4.0 Air-Ground Message Delivery (AGMD)

Type: **Package**
Status: Proposed. Version . Phase 1.0.
Package: Functional Model
Detail: *Created on* 9/28/2006 4:49:57 PM. *Last modified on* 9/28/2006 4:49:57 PM
GUID: {79A00B64-BE3E-4dfe-A058-4144E98B149A}

4.0 Air-Ground Message Delivery (AGMD) - *(CompositeStructure diagram)*
Created By: on 5/9/2006
Last Modified: 5/9/2006
Version: 1.0. False
GUID: {EDF94E79-E5B9-4ce0-A05E-AC804B873AFA}

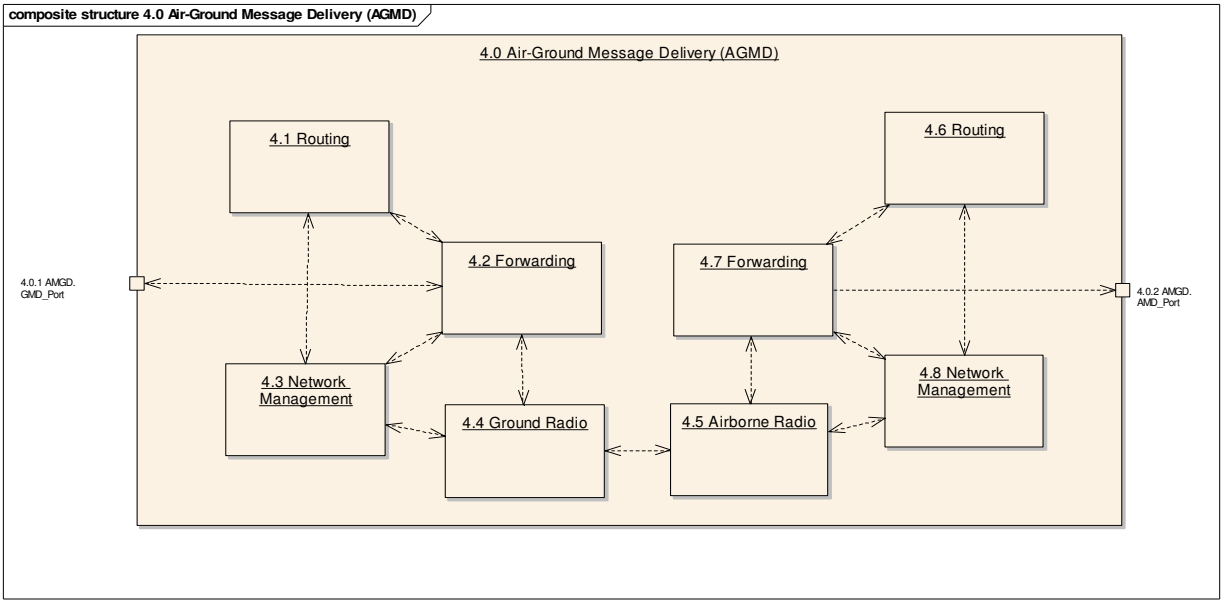


Figure: 4

4.0 Air-Ground Message Delivery (AGMD)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 4.0 Air-Ground Message Delivery (AGMD) *Keywords:*
Detail: *Created on* 5/4/2006. *Last modified on*.9/28/2006.
GUID: {B5FEF880-3810-40fb-AEB2-888D5247F256}

This function includes the entire air-ground communication function (i.e. both the ground and airborne portions)..

Note: This is only the subnetwork functionality. This is the SNDCF.

Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 4.0 Air-Ground Message Delivery (AGMD) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00027: Authorizing use of A/G network Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 4.0 Air-Ground Message Delivery (AGMD) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00044: Need Consistent use of 'Forwarding' function Element.Type= Requirement	

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 4.0 Air-Ground Message Delivery (AGMD) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00028: Compare model AGMD function with SSLS Diagram Element.Type= Requirement	
Sequence ACL Msg Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 3.0 Ground Message Delivery (GMD) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 4.0 Air-Ground Message Delivery (AGMD) Element.Type= Object	
Sequence ACL Msg Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 4.0 Air-Ground Message Delivery (AGMD) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 5.0 Airborne Message Delivery (AMD) Element.Type= Object	
Sequence Wilco Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 5.0 Airborne Message Delivery (AMD) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 4.0 Air-Ground Message Delivery (AGMD) Element.Type= Object	
Sequence Wilco Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 4.0 Air-Ground Message Delivery	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 3.0 Ground Message	

Connector	Source	Target	Notes
	(AGMD) Element.Type= Object	Delivery (GMD) Element.Type= Object	

Embedded Elements

Element	Detail	Notes
Port 4.0.1 AMGD.GMD_Port	1.0	
Port 4.0.2 AMGD.AMD_Port	1.0	

4.8 Network Management

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 4.0 Air-Ground Message Delivery (AGMD) *Keywords:*
Detail: *Created on* 5/9/2006. *Last modified on*.5/9/2006.
GUID: {95C6FEAF-BEFF-4a3b-8F13-73026B9A3A1C}

This function includes:
- Provide policy-based routing setup
- Provide Heath & Status
- Manage interfaces
- Manage Connectivity Rules - Domain Policies

Connections

Connector	Source	Target	Notes
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 4.6 Routing	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name=	

Connector	Source	Target	Notes
	Element.Type= Object	4.8 Network Management Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 4.7 Forwarding Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 4.8 Network Management Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 4.5 Airborne Radio Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 4.8 Network Management Element.Type= Object	

4.7 Forwarding

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 4.0 Air-Ground Message Delivery (AGMD) *Keywords:*
Detail: *Created on* 5/9/2006. *Last modified on*.5/9/2006.
GUID: {BAEE7135-A666-4674-8505-9483B721D16F}

This function includes:
- forwarding A/G messages
- forwarding routing messages
- providing health & status information

Connections

Connector	Source	Target	Notes
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 4.6 Routing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 4.7 Forwarding Element.Type= Object	
Dependency Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 4.7 Forwarding Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 4.0.2 AMGD.AMD_Port Element.Type= Port	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 4.7 Forwarding Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 4.8 Network Management Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 4.7 Forwarding Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 4.5 Airborne Radio Element.Type= Object	

4.4 Ground Radio

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 4.0 Air-Ground Message Delivery (AGMD) *Keywords:*
Detail: *Created on* 5/9/2006. *Last modified on*.5/9/2006.
GUID: {D879B567-FC68-46c2-A4A0-7362FF039485}

This function includes the ground radio portion of the A/G radio subnetwork. It translates wireline communication into RF communication. It also manages subnetwork join events (connection management) .

Connections

Connector	Source	Target	Notes
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 4.3 Network Management Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 4.4 Ground Radio Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 4.2 Forwarding Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 4.4 Ground Radio Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 4.4 Ground Radio Element.Type=	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 4.5 Airborne Radio	

Connector	Source	Target	Notes
	Object	Element.Type= Object	

4.2 Forwarding

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 4.0 Air-Ground Message Delivery (AGMD) *Keywords:*
Detail: *Created on* 5/9/2006. *Last modified on*.5/9/2006.
GUID: {BD94053E-ECCF-4afd-8632-A340C38201BB}

This function includes:
- forwarding A/G messages
- forwarding routing messages
- providing health & status information

Connections

Connector	Source	Target	Notes
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 4.1 Routing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 4.2 Forwarding Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name=	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote=	

Connector	Source	Target	Notes
	4.0.1 AMGD.GMD_Port Element.Type= Port	Element.Name= 4.2 Forwarding Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 4.2 Forwarding Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 4.4 Ground Radio Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 4.3 Network Management Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 4.2 Forwarding Element.Type= Object	

4.5 Airborne Radio

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 4.0 Air-Ground Message Delivery (AGMD) *Keywords:*
Detail: *Created on* 5/9/2006. *Last modified on*.5/9/2006.
GUID: {131A7DB1-1E27-4118-A350-07CC666BD22C}

This function includes the airborne radio portion of the A/G radio subnetwork. It translates wireline communication into RF communication. It also manages subnetwork join events (connection management) .

Connections

Connector	Source	Target	Notes
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 4.5 Airborne Radio Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 4.8 Network Management Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 4.7 Forwarding Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 4.5 Airborne Radio Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 4.4 Ground Radio Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 4.5 Airborne Radio Element.Type= Object	

4.1 Routing

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 4.0 Air-Ground Message Delivery (AGMD) *Keywords:*
Detail: *Created on* 5/9/2006. *Last modified on*.5/9/2006.
GUID: {E9769C1B-0526-4cd1-9AB4-E9DB8AD2DA58}

This function includes:
- Maintain routing information
- Maintain subnetwork info
- Provide policy-based routing

Note: This is equivalent to the A/G router function. This function includes mobility in it (but there is also mobility functions in 3.0 & 5.0).

Connections

Connector	Source	Target	Notes
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 4.1 Routing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 4.2 Forwarding Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 4.1 Routing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 4.3 Network Management Element.Type= Object	

4.6 Routing

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 4.0 Air-Ground Message Delivery (AGMD) *Keywords:*
Detail: *Created on* 5/9/2006. *Last modified on*.5/9/2006.
GUID: {180C3503-C636-458d-82AF-A1AD62A16FE4}

This function includes:

- Maintain routing information
- Maintain subnetwork info
- Provide policy-based routing

Connections

Connector	Source	Target	Notes
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 4.6 Routing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 4.7 Forwarding Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 4.6 Routing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 4.8 Network Management Element.Type= Object	

4.3 Network Management

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 4.0 Air-Ground Message Delivery (AGMD) *Keywords:*

Detail: *Created on* 5/9/2006. *Last modified on*.5/9/2006.
GUID: {C2AF917F-8F6D-40b5-8AA4-C4A35AC1FCBD}

This function includes:
- Provide policy-based routing setup
- Provide Heath & Status
- Manage interfaces
- Manage Connectivity Rules - Domain Policies

Connections

Connector	Source	Target	Notes
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 4.1 Routing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 4.3 Network Management Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 4.3 Network Management Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 4.4 Ground Radio Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 4.3 Network	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name=	

Connector	Source	Target	Notes
	Management Element.Type= Object	4.2 Forwarding Element.Type= Object	

5.0 Airborne Message Delivery (AMD)

Type: **Package**
Status: Proposed. Version . Phase 1.0.
Package: Functional Model
Detail: *Created on* 9/28/2006 4:50:43 PM. *Last modified on* 9/28/2006 4:50:43 PM
GUID: {CE48B206-2C84-48a0-BEE3-CB42CB465F14}

5.0 Airborne Message Delivery (AMD) - *(CompositeStructure diagram)*
Created By: on 5/9/2006
Last Modified: 5/9/2006
Version: 1.0. False
GUID: {9AAD0958-A4E9-4389-A832-CA6C14C953DF}

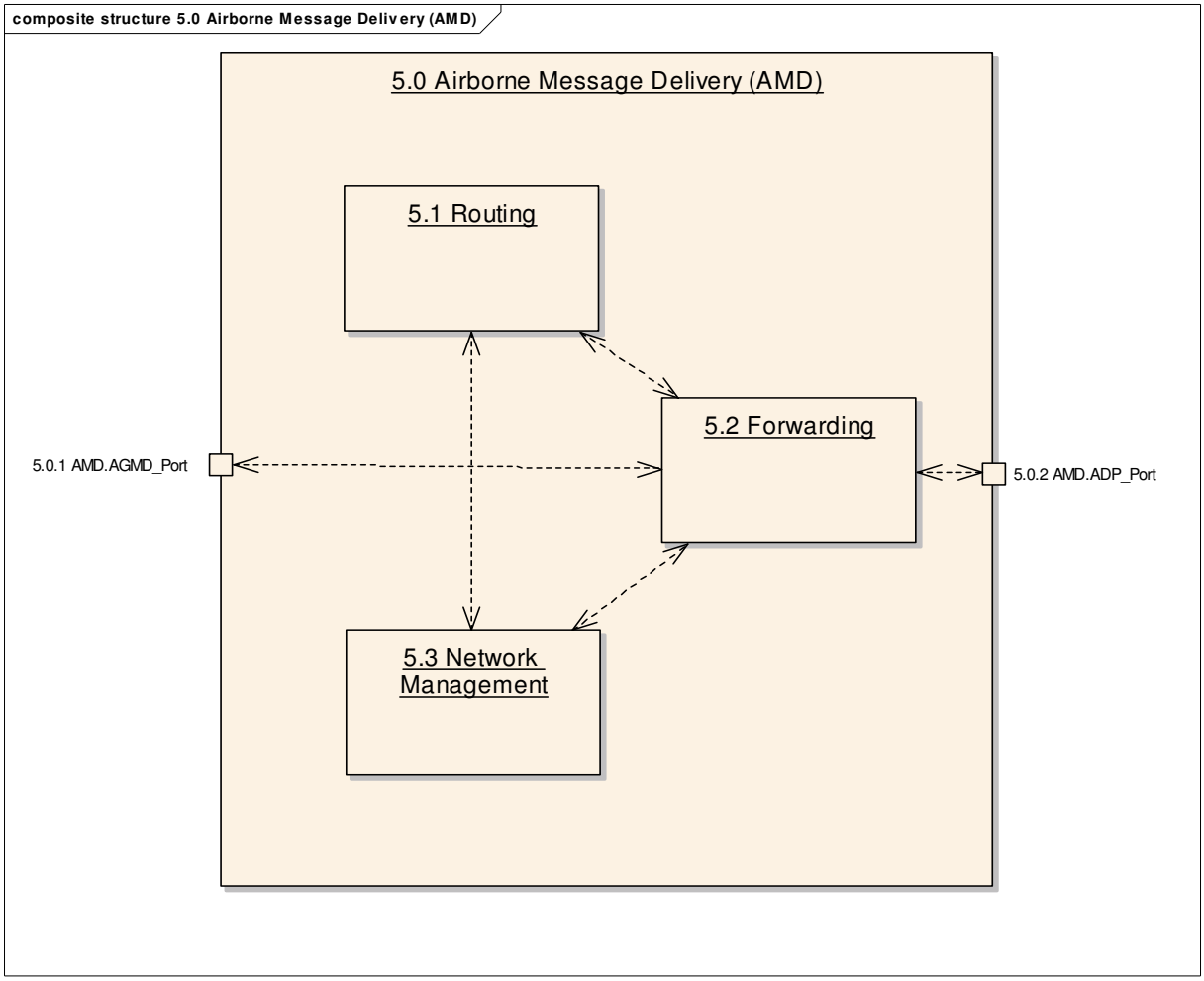


Figure: 5

5.0 Airborne Message Delivery (AMD)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 5.0 Airborne Message Delivery (AMD) *Keywords:*
Detail: *Created on* 5/4/2006. *Last modified on*.9/28/2006.
GUID: {2F687404-E69C-43a7-B08E-B9B3F1422FE6}

The function handles the communication functions between all high-level airborne processing functions as well as air-ground processing functions.

Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 5.0 Airborne Message Delivery (AMD) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00044: Need Consistent use of 'Forwarding' function Element.Type= Requirement	
Sequence ACL Msg Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 4.0 Air-Ground Message Delivery (AGMD) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 5.0 Airborne Message Delivery (AMD) Element.Type= Object	
Sequence ACL Msg Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 5.0 Airborne Message Delivery (AMD) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 6.1.2 Controller-Pilot Data Communications - Airborne (CPDC-A) Element.Type= Object	
Sequence Wilco Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 6.1.2 Controller-Pilot Data Communications - Airborne (CPDC-A) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 5.0 Airborne Message Delivery (AMD) Element.Type= Object	

Connector	Source	Target	Notes
Sequence Wilco Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 5.0 Airborne Message Delivery (AMD) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 4.0 Air-Ground Message Delivery (AGMD) Element.Type= Object	

Embedded Elements

Element	Detail	Notes
Port 5.0.1 AMD.AGMD_Port	1.0	
Port 5.0.2 AMD.ADP_Port	1.0	

5.3 Network Management

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 5.0 Airborne Message Delivery (AMD) *Keywords:*
Detail: *Created on* 5/9/2006. *Last modified on*.5/9/2006.
GUID: {59AC0C02-D0DB-4d6e-8DA6-9DEA5BA18EAE}

This function includes:
- Provide policy-based routing setup
- Provide Heath & Status
- Manage interfaces
- Manage Connectivity Rules - Domain Policies

Connections

Connector	Source	Target	Notes
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 5.3 Network Management Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 5.2 Forwarding Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 5.1 Routing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 5.3 Network Management Element.Type= Object	

5.1 Routing

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 5.0 Airborne Message Delivery (AMD) *Keywords:*
Detail: *Created on* 5/9/2006. *Last modified on*.5/9/2006.
GUID: {A80600B2-DAB3-471e-B645-E89646D0072E}

This function includes:
- Maintain routing information
- Provide policy-based routing

Connections

Connector	Source	Target	Notes
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 5.1 Routing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 5.3 Network Management Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 5.1 Routing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 5.2 Forwarding Element.Type= Object	

5.2 Forwarding

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 5.0 Airborne Message Delivery (AMD) *Keywords:*
Detail: *Created on* 5/9/2006. *Last modified on*.5/9/2006.
GUID: {689FA2F0-10A9-4cfa-9751-061C13FCFD7E}

This function includes:
- forwarding A/G messages
- forwarding routing messages
- providing health & status information

Connections

Connector	Source	Target	Notes
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 5.3 Network Management Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 5.2 Forwarding Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 5.2 Forwarding Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 5.0.2 AMD.ADP_Port Element.Type= Port	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 5.0.1 AMD.AGMD_Port Element.Type= Port	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 5.2 Forwarding Element.Type= Object	
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 5.1 Routing Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 5.2 Forwarding Element.Type= Object	

6.0 Airborne Data Processing (ADP)

Type: **Package**
Status: Proposed. Version . Phase 1.0.
Package: Functional Model
Detail: *Created on* 9/28/2006 4:51:12 PM. *Last modified on* 9/28/2006 4:51:12 PM

GUID: {47EB70FA-78AF-4e98-8A3F-5A070370CC46}

6.0 Airborne Data Processing (ADP) - *(CompositeStructure diagram)*
Created By: on 5/9/2006
Last Modified: 10/10/2006
Version: 1.0. False
GUID: {89C93C51-1EBA-4e46-829C-8181561E6E16}

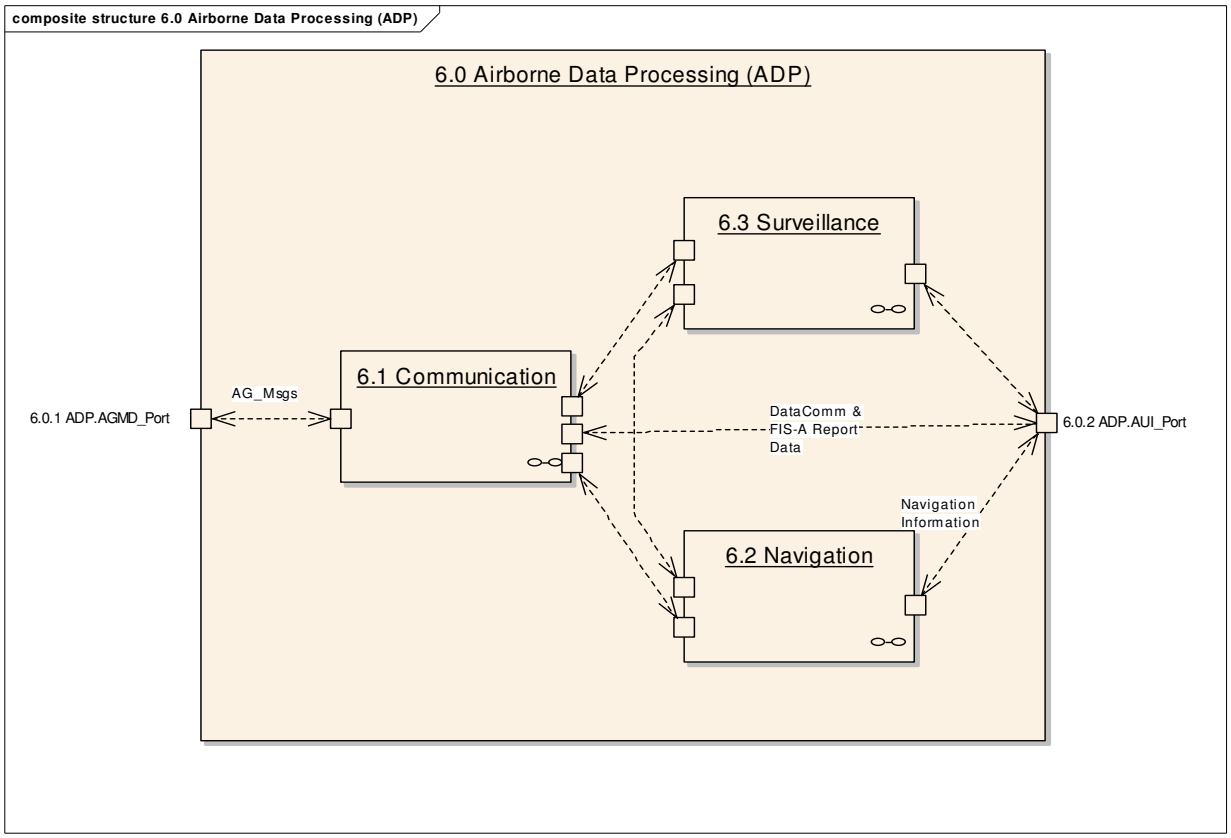


Figure: 6

6.0 Airborne Data Processing (ADP)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 6.0 Airborne Data Processing (ADP) *Keywords:*
Detail: *Created on* 5/4/2006. *Last modified on*.9/28/2006.
GUID: {F533EC4E-F5A3-4b35-933B-E5FF28E8AC84}

This function performs airborne processing activities needed to support the DCS Concept of Operations.

Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 6.0 Airborne Data Processing (ADP) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00044: Need Consistent use of 'Forwarding' function Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 6.0 Airborne Data Processing (ADP) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00030: Compare model ADP with AEEC arch Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 6.0 Airborne Data Processing (ADP) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00029: Constraint: DO-280A air-initiated services Element.Type= Requirement	

Embedded Elements

Element	Detail	Notes
Port 6.0.1 ADP.AGMD_Port	1.0	

Element	Detail	Notes
Port 6.0.2 ADP.AUI_Port	1.0	

6.2 Navigation

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 6.0 Airborne Data Processing (ADP) *Keywords:*
Detail: *Created on* 5/9/2006. *Last modified on*.5/9/2006.
GUID: {C1862A4F-69EA-47ea-97B5-278171D73804}

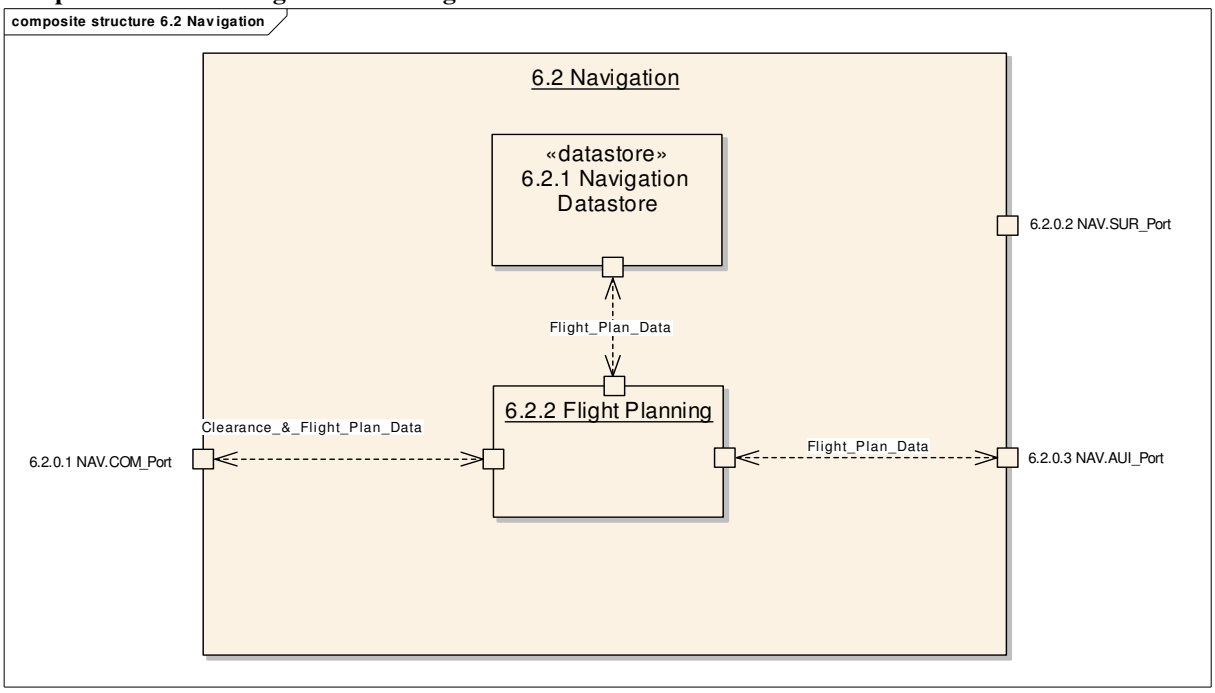
For the purpose of this document, navigation topics include:
Position, Velocity and Time determination (PVT)
Flight Plan Definition
Lateral Guidance (LNAV)
Navigation Control and Display

In general, these elements correspond to the two dimensional (2D) RNAV functions implemented in most commercial aircraft. The Advanced Flight Management System (FMS) defined in ARINC Characteristic 702A includes expanded navigation
functions such as flight plan performance predictions, vertical (VNAV or 3D) guidance, speed control/autothrottle, required time of arrival (RTA or 4D) guidance,
navigation data base processing and electronic map generation. Simplified geometric vertical (3D) guidance may be provided by systems that do not have the
performance prediction function implemented or activated. [ARINC REPORT 660A]

Embedded Elements

Element	Detail	Notes
Port 6.2.0.1 NAV.COM_Port	1.0	
Port 6.2.0.2 NAV.SUR_Port	1.0	
Port 6.2.0.3 NAV.AUI_Port	1.0	

CompositeStructure diagram: 6.2 Navigation



6.2.1 Navigation Datastore

Type: **DataStoreNode**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 6.0 Airborne Data Processing (ADP) *Keywords:*
Detail: *Created on* 5/9/2006. *Last modified on*.5/9/2006.
GUID: {A41E1CF5-7C4B-4685-AD5B-F9E11BF002F8}

Stores all Navigation information to include flight plans, NOTAMs, SID's, STARS, RTA constraints.

Embedded Elements

Element	Detail	Notes
Port 6.2.1.0.1 NDATA.IF_Port	1.0	

6.2.2 Flight Planning

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 6.0 Airborne Data Processing (ADP) *Keywords:*
Detail: *Created on* 5/9/2006. *Last modified on*.5/9/2006.
GUID: {5770B82F-A61B-4546-8DB1-B1AF68585B94}

A flight planning function should be provided that allows for the assembly of a flight plan by means of crew entries and/or data link from either the ATS ground system or airline dispatch, using the following elements and those included in RTCA Document DO- 241. [ARINC REPORT 660A]

NOTE: Includes active flight plan & trial flight plan info.

Embedded Elements

Element	Detail	Notes
Port 6.2.2.0.3 FPLAN.AUI_Port	1.0	
Port 6.2.2.0.2 FPLAN.NDATA_Port	1.0	
Port 6.2.2.0.1 FPLAN.COM_Port	1.0	

6.1 Communication

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.

Package: 6.0 Airborne Data Processing (ADP) *Keywords:*
Detail: *Created on* 5/9/2006. *Last modified on*.5/9/2006.
GUID: {6154220F-D492-4249-8CA6-D986CCA4D62E}

This function includes communications management functions, ATN end systems and communication protocol conversion functions.

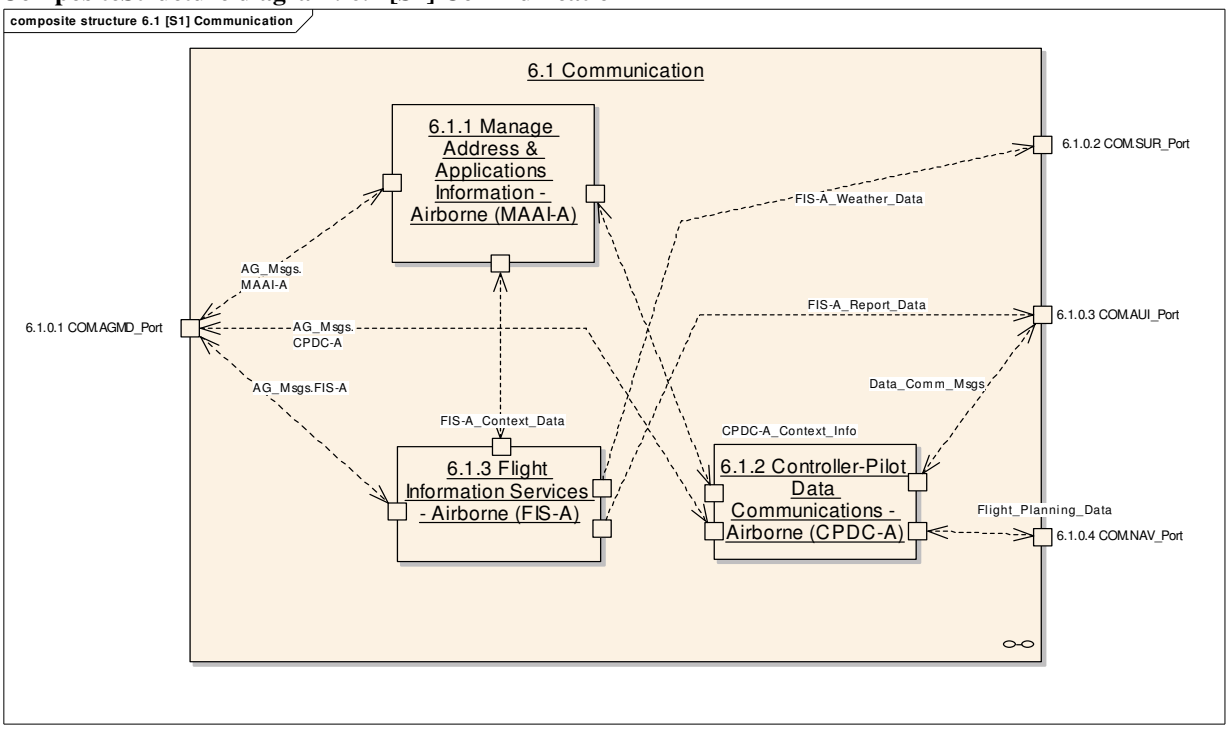
Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 6.1 Communication Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00013: [DONE] Handling mulitple network types (ATN, FANS) Element.Type= Requirement	

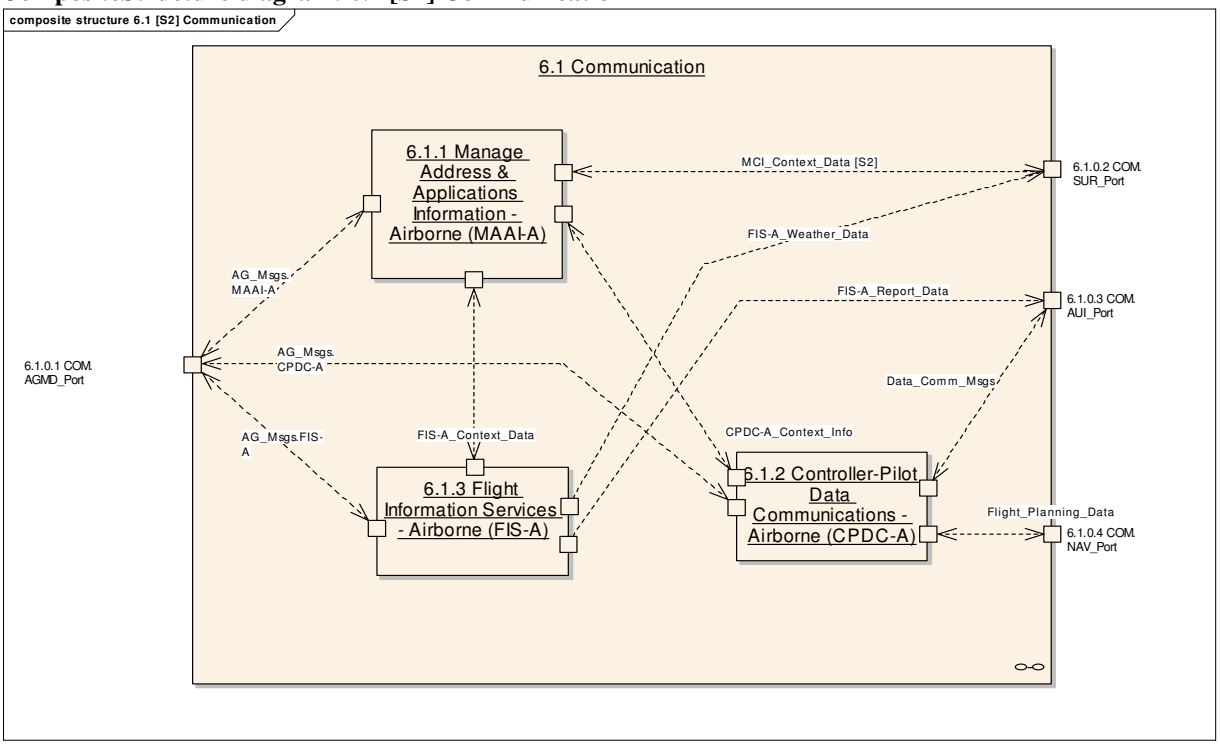
Embedded Elements

Element	Detail	Notes
Port 6.1.0.1 COM.AGMD_Port	1.0	
Port 6.1.0.2 COM.SUR_Port	1.0	
Port 6.1.0.3 COM.AUI_Port	1.0	
Port 6.1.0.4 COM.NAV_Port	1.0	

CompositeStructure diagram: 6.1 [S1] Communication



CompositeStructure diagram: 6.1 [S2] Communication



6.1.1 Manage Address & Applications Information - Airborne (MAAI-A)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 6.0 Airborne Data Processing (ADP) *Keywords:*
Detail: *Created on* 5/9/2006. *Last modified on*.5/9/2006.
GUID: {98B7F8FE-CCBC-41c6-9FCA-743D8FEEDF7D}

This function is associated with air-ground data communication services . It manages aircraft/ground identifiers, addresses, and application capability profiles necessary to initiate and maintain data communication services.

Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 6.1.1 Manage Address & Applications Information - Airborne (MAAI-A) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00041: Application Version compatibility Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 6.1.1 Manage Address & Applications Information - Airborne (MAAI-A) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00010: Create MAAI-A functional diagram. Element.Type= Requirement	

Embedded Elements

Element	Detail	Notes
Port 6.1.1.0.3 MAAI-A.CPDC-A_Port	1.0	
Port 6.1.1.0.2 MAAI-A.SUR_Port	1.0	
Port 6.1.1.0.4 MAAI-A.FIS-A_Port	1.0	
Port 6.1.1.0.1 MAAI-A.AGMD_Port	1.0	

6.1.3 Flight Information Services - Airborne (FIS-A)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 6.0 Airborne Data Processing (ADP) *Keywords:*
Detail: *Created on* 5/9/2006. *Last modified on*.5/9/2006.
GUID: {96848D53-4C68-449a-9BAE-0C6AD3FDFFBD}

The FIS function allows a pilot to request and receive FIS services from ground FIS systems. The FIS function is designed to enable FIS services to be provided to a pilot via the exchange of messages between aircraft avionics and ground FIS systems.

Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 6.1.3 Flight Information Services - Airborne (FIS-A)	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0025A: Segment 3 Service	

Connector	Source	Target	Notes
	Element.Type= Object	Binning Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 6.1.3 Flight Information Services - Airborne (FIS-A) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0024A: Segment 2 Service Binning Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 6.1.3 Flight Information Services - Airborne (FIS-A) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00012: Create FIS-A functional diagram. Element.Type= Requirement	

Embedded Elements

Element	Detail	Notes
Port 6.1.3.0.3 FIS-A.SUR_Port	1.0	
Port 6.1.3.0.1 FIS-A.AGMD_Port	1.0	
Port 6.1.3.0.4 FIS-A.AUI_Port	1.0	
Port FIS-A.MAAI-A_Port	1.0	

6.1.2 Controller-Pilot Data Communications - Airborne (CPDC-A)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 6.0 Airborne Data Processing (ADP) *Keywords:*
Detail: *Created on* 5/9/2006. *Last modified on*.5/9/2006.
GUID: {5772E0CF-1361-4185-B163-A3E0438F697D}

The CPDC function allows data link communication between controllers and pilots.

The CPDC functionprovides the capability to establish, manage, and terminate CPDC dialogues between ATS

ground and aircraft system peers. Once a dialogue is established, CPDC provides for controller/pilot message exchange.

Support for automation-to-automation communications (and other variants of human/machine interaction) are also possible.

Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 6.1.2 Controller-Pilot Data Communications - Airborne (CPDC-A) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0025A: Segment 3 Service Binning Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 6.1.2 Controller-Pilot Data Communications - Airborne (CPDC-A) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0024A: Segment 2 Service Binning Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name=	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote=	

Connector	Source	Target	Notes
	6.1.2 Controller-Pilot Data Communications - Airborne (CPDC-A) Element.Type= Object	Element.Name= TODO-00011: Create CPDC-A functional diagram. Element.Type= Requirement	
Sequence ACL Msg Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 5.0 Airborne Message Delivery (AMD) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 6.1.2 Controller-Pilot Data Communications - Airborne (CPDC-A) Element.Type= Object	
Sequence Decoded ACL Msg Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 6.1.2 Controller-Pilot Data Communications - Airborne (CPDC-A) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 7.0 Airborne User Interface (AUI) Element.Type= Object	
Sequence Wilco Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 7.0 Airborne User Interface (AUI) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 6.1.2 Controller-Pilot Data Communications - Airborne (CPDC-A) Element.Type= Object	
Sequence Wilco Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 6.1.2 Controller-Pilot Data Communications - Airborne (CPDC-A) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 5.0 Airborne Message Delivery (AMD) Element.Type= Object	

Embedded Elements

Element	Detail	Notes
Port 6.1.2.0.2 CPDC-A.MAAI-A_Port	1.0	
Port 6.1.2.0.1 CPDC-A.AGMD_Port	1.0	
Port 6.1.2.0.4 CPDC-A.NAV_Port	1.0	
Port 6.1.2.0.3 CPDC-A.AUI_Port	1.0	

6.3 Surveillance

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 6.0 Airborne Data Processing (ADP) *Keywords:*
Detail: *Created on* 5/9/2006. *Last modified on*.10/10/2006.
GUID: {3B60A497-4F46-4b5d-9687-5CC4B40AB536}

For the purpose of this document, Surveillance functions include:
- Data Link Waypoint Reports (WPR)
- Automatic Dependent Surveillance (ADS)
- Elementary Surveillance
- TIS/TIS-B
- ADS-Broadcast (ADS-B)
- Cockpit Display of Traffic Information (CDTI)
- Obstacle and Terrain Data

[from AEEC 660A]

Connections

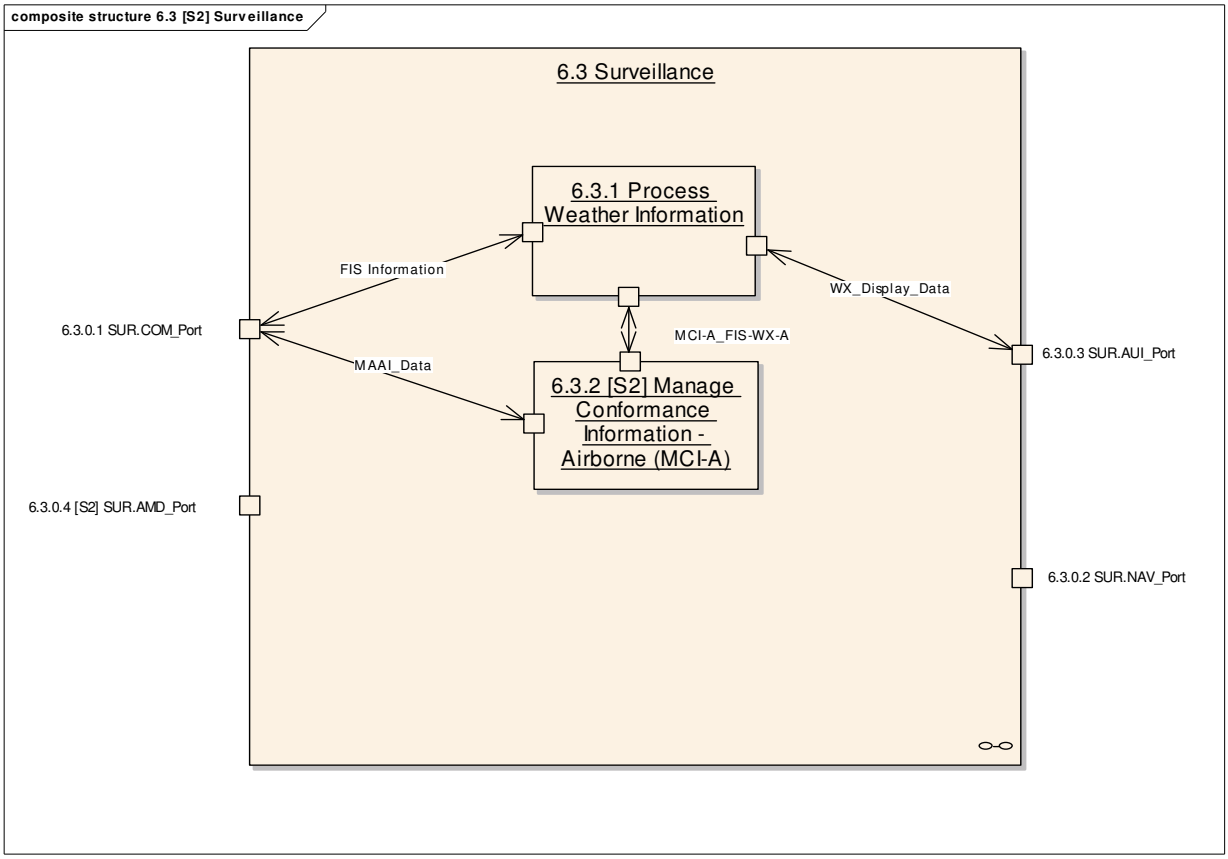
Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote	ConnTarget.Scope= Public ConnTarget.Role=	

Connector	Source	Target	Notes
	Element.Name= 6.3 Surveillance Element.Type= Object	ConnTarget.RoleNote= Element.Name= ASUM-0023A: Air-Air Application Version Info is available in National MAAI data store Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 6.3 Surveillance Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0022A: Air to Air Separation is an Airborne Surveillance Function Element.Type= Requirement	

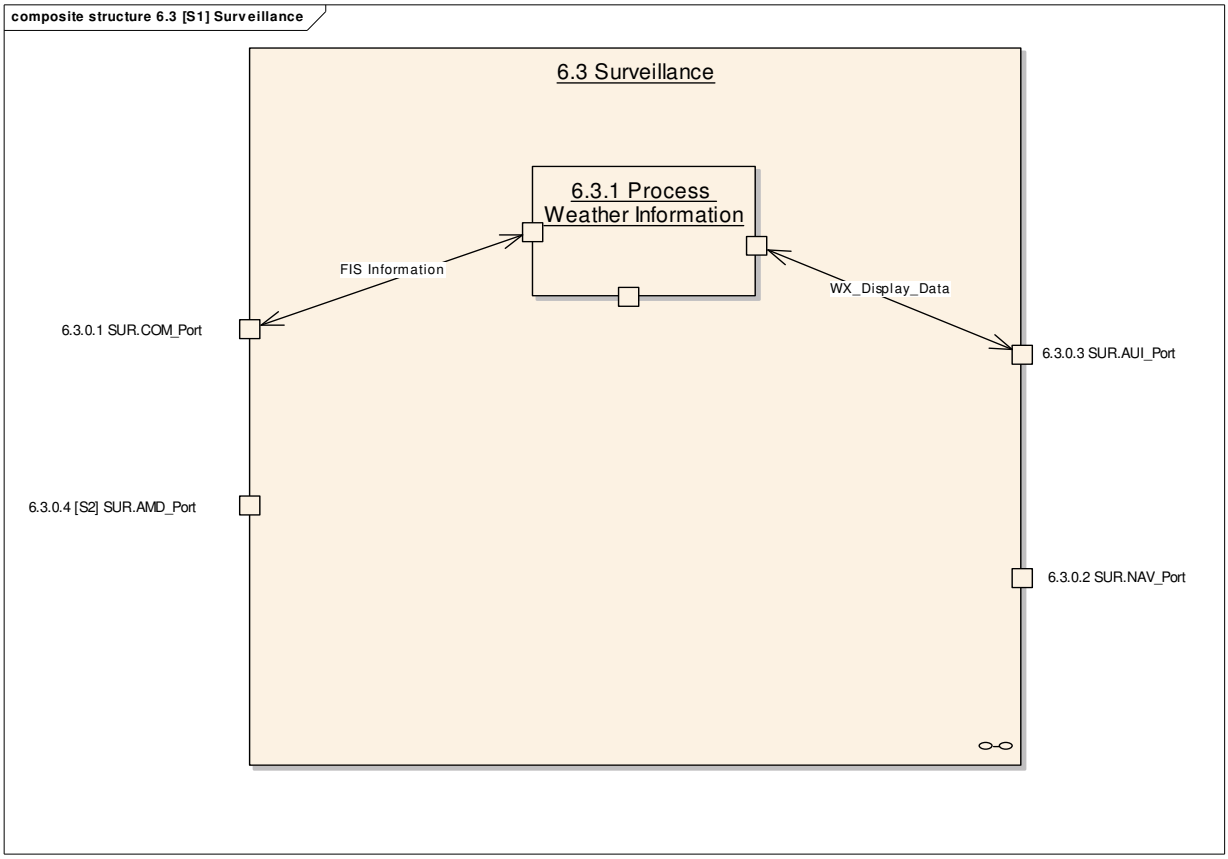
Embedded Elements

Element	Detail	Notes
Port 6.3.0.4 [S2] SUR.AMD_Port	1.0	
Port 6.3.0.2 SUR.NAV_Port	1.0	
Port 6.3.0.1 SUR.COM_Port	1.0	
Port 6.3.0.3 SUR.AUI_Port	1.0	

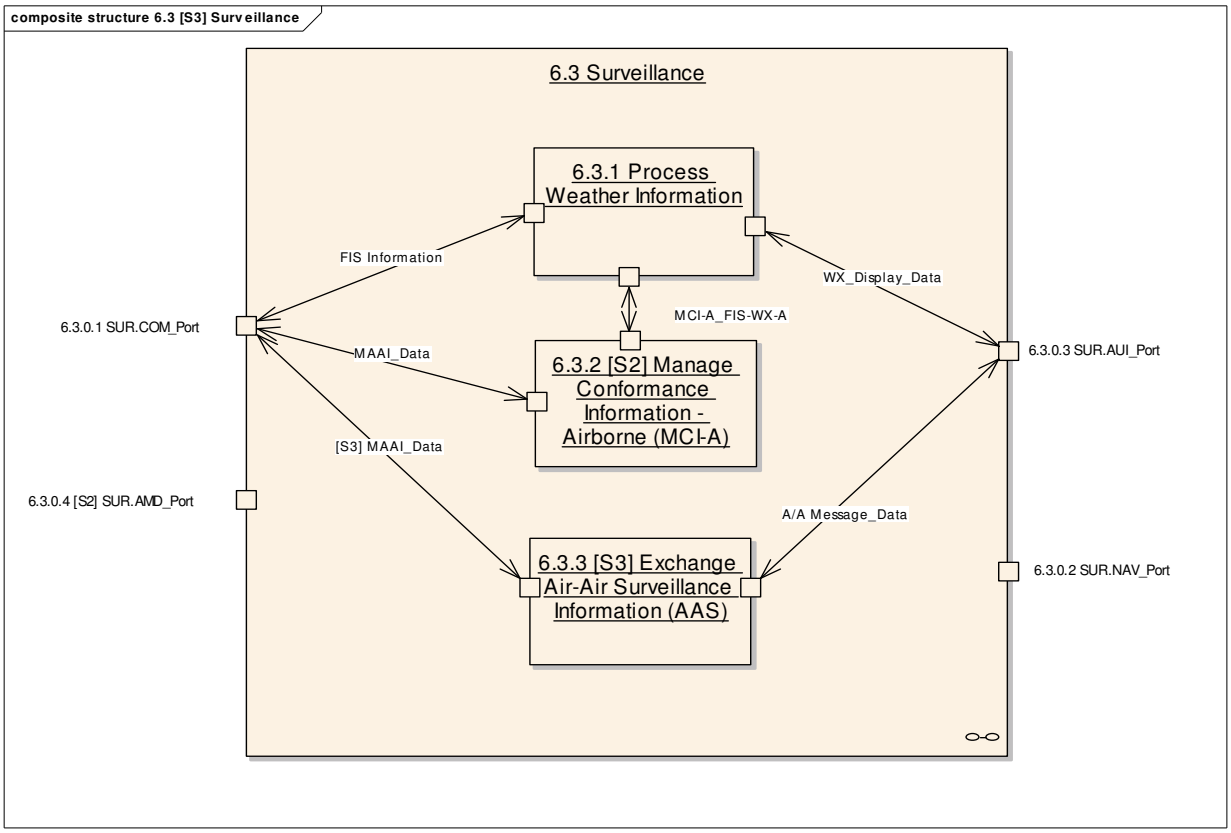
CompositeStructure diagram: 6.3 [S2] Surveillance



CompositeStructure diagram: 6.3 [S1] Surveillance



CompositeStructure diagram: 6.3 [S3] Surveillance



TBD: I copied this diagram from the Version 1.0 version and changed actitivies to Objects, but the original diagram doesn't make much sense. Need to revisit this diagram.

6.3.1 Process Weather Information

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 6.0 Airborne Data Processing (ADP) *Keywords:*
Detail: *Created on* 5/9/2006. *Last modified on*.10/10/2006.
GUID: {B7948225-4C06-4d18-A2AA-BFC7834D2DF9}

In addition to traffic, obstacle and terrain data, it is desirable to display various forms of weather data in the cockpit, both in strategic and tactical formats.

Weather products may include:
Cloud density (satellite imagery)
Convective activity (Doppler radar measurements)
Favorable or unfavorable winds aloft (LIDAR or information from other aircraft)
Fog/smoke (local measurements)
High surface winds (local measurements)
Icing conditions (downlinked data and/or infrared measurements)

Embedded Elements

Element	Detail	Notes
Port 6.3.1.0.2 PWI.AUI_Port	1.0	
Port 6.3.1.0.1 PWI.COM_Port	1.0	
Port 6.3.1.0.3 PWI.MCI_Port	1.0	

6.3.3 [S3] Exchange Air-Air Surveillance Information (AAS)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 6.0 Airborne Data Processing (ADP) *Keywords:*
Detail: *Created on* 5/9/2006. *Last modified on*.10/10/2006.
GUID: {68CAB47D-E040-49fd-9366-DD83E4C0D2BB}

This function provides for the exchange of necessary information with other aircraft to support segment 3 services such as paired approach (PAIRAPP) and wake vortex separation (WAKE).

Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 6.3.3 [S3] Exchange Air-Air Surveillance Information (AAS) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0022A: Air to Air Separation is an Airborne Surveillance Function Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 6.3.3 [S3] Exchange Air-Air Surveillance Information (AAS) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0023A: Air-Air Application Version Info is available in National MAAI data store Element.Type= Requirement	

Embedded Elements

Element	Detail	Notes
Port 6.3.3.0.1 AAS.MAAI_Port	1.0	
Port 6.3.3.0.2 AAS.AUI_Port	1.0	

6.3.2 [S2] Manage Conformance Information - Airborne (MCI-A)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 6.0 Airborne Data Processing (ADP) *Keywords:*
Detail: *Created on* 5/9/2006. *Last modified on*.10/10/2006.
GUID: {8C92EFC6-87A3-4fe1-A10B-890DB9B8613F}

The Manage Conformance Information (MCI) function allows the ground to request aircraft state and parametric information (e.g., position, winds, speed, flight intent, etc) on a demand or subscription basis.

Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 6.3.2 [S2] Manage Conformance Information - Airborne (MCI-A) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0024A: Segment 2 Service Binning Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 6.3.2 [S2] Manage Conformance Information - Airborne (MCI-A) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ASUM-0025A: Segment 3 Service Binning Element.Type= Requirement	

Embedded Elements

Element	Detail	Notes
Port 3.3.2.0.1 MCI-A.MAAI-A_Port	1.0	
Port 6.3.2.0.2 MCI-A.PWI_Port	1.0	

7.0 Airborne User Interface (AUI)

Type: **Package**

Status: Proposed. Version . Phase 1.0.
Package: Functional Model
Detail: *Created on* 9/28/2006 4:51:41 PM. *Last modified on* 9/28/2006 4:51:41 PM
GUID: {0FE820D2-A27C-4c14-B48C-C0818C935FA5}

7.0 Airborne User Interface (AUI) - *(CompositeStructure diagram)*
Created By: on 5/9/2006
Last Modified: 5/10/2006
Version: 1.0. False
GUID: {AE2FD93A-2C38-480a-A27C-ED1D15B45C9F}

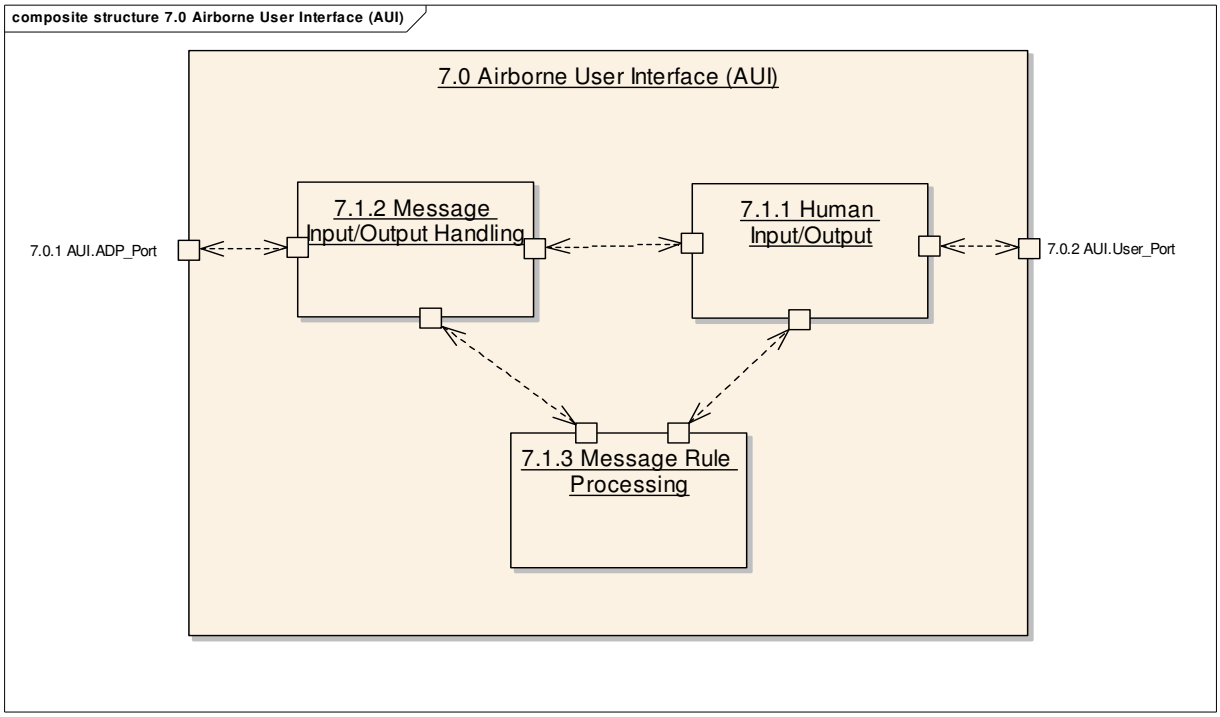


Figure: 7

7.0 Airborne User Interface (AUI)

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 7.0 Airborne User Interface (AUI) *Keywords:*
Detail: *Created on* 5/4/2006. *Last modified on*.9/28/2006.
GUID: {96280E0E-6C37-4fe6-87D0-4F2FA7D8D010}

This function performs user workstation functions for the Flight crew. It includes human input/output functions, system interface functions, and message rule processing.

Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 7.0 Airborne User Interface (AUI) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00030: Compare model ADP with AEEC arch Element.Type= Requirement	
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 7.0 Airborne User Interface (AUI) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00044: Need Consistent use of 'Forwarding' function Element.Type= Requirement	
Sequence Decoded ACL Msg Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 6.1.2 Controller-Pilot Data Communications - Airborne (CPDC-A) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 7.0 Airborne User Interface (AUI) Element.Type= Object	
Sequence Display Clearance Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 7.0 Airborne User Interface (AUI) Element.Type=	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= Flight Crew Element.Type=	

Connector	Source	Target	Notes
	Object	Actor	
Sequence Wilco Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= Flight Crew Element.Type= Actor	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 7.0 Airborne User Interface (AUI) Element.Type= Object	
Sequence Wilco Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 7.0 Airborne User Interface (AUI) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 6.1.2 Controller-Pilot Data Communications - Airborne (CPDC-A) Element.Type= Object	

Embedded Elements

Element	Detail	Notes
Port 7.0.1 AUI.ADP_Port	1.0	
Port 7.0.2 AUI.User_Port	1.0	

7.1.2 Message Input/Output Handling

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 7.0 Airborne User Interface (AUI) *Keywords:*
Detail: *Created on* 5/9/2006. *Last modified on*.5/10/2006.
GUID: {3FB3DCD0-3F8F-4834-A33B-9BACA85FB457}

Translates human input/output data and/or messages into format compatible with ADP functions (e.g., communication protocols and message formats). This function should be able to be replaced/updated to account for changes in message format changes or protocol changes.

Embedded Elements

Element	Detail	Notes
Port 7.1.2.0.1 MIOH.ADP_Port	1.0	
Port 7.1.2.0.3 MIOH.MRP_Port	1.0	
Port 7.1.2.0.2 MIOH.HIO_Port	1.0	

7.1.3 Message Rule Processing

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 7.0 Airborne User Interface (AUI) *Keywords:*
Detail: *Created on* 5/9/2006. *Last modified on*.5/10/2006.
GUID: {207FBECC-03D6-46a3-B72B-D8C57307F422}

This function may include rule processing beyond that which can be captured in a standard user interface, i.e. the Human Input/Output function (e.g., maybe CPDC rules or application specific rules).

Embedded Elements

Element	Detail	Notes

Element	Detail	Notes
Port 7.1.3.0.1 MRP.HIO_Port	1.0	
Port 7.1.3.0.2 MRP.MIOH_Port	1.0	

7.1.1 Human Input/Output

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 7.0 Airborne User Interface (AUI) *Keywords:*
Detail: *Created on* 5/9/2006. *Last modified on*.5/10/2006.
GUID: {ADC73CB6-7AE1-4f40-8C96-22D09F70AD2D}

Includes:
- keyboard (some aircraft have simple keypad interface - others have bona-fide keyboards)
- display
- audible devices (This function produce audible alerts or annunciations, e.g., to indicate when a message has arrived for consideration).
- forward field of view display
- trackball
- joystick
- mice

Embedded Elements

Element	Detail	Notes
Port 7.1.1.0.2 HIO.MIOH_Port	1.0	
Port 7.1.1.0.3 HIO.MRP_Port	1.0	
Port 7.1.1.0.1 HIO.User_Port	1.0	

8.0 Support Functions

Type: **Package**
Status: Proposed. Version . Phase 1.0.
Package: Functional Model
Detail: *Created on* 9/28/2006 4:52:53 PM. *Last modified on* 2/28/2007 12:34:05 PM
GUID: {78161EC4-EE1A-4800-B26B-AC0587616BCA}

8.0 Support Functions - *(CompositeStructure diagram)*
Created By: Jim Simpkins on 5/10/2006
Last Modified: 2/28/2007
Version: 1.0. False
GUID: {42D9BA9D-6EDB-44c0-AC01-14DFC214F383}

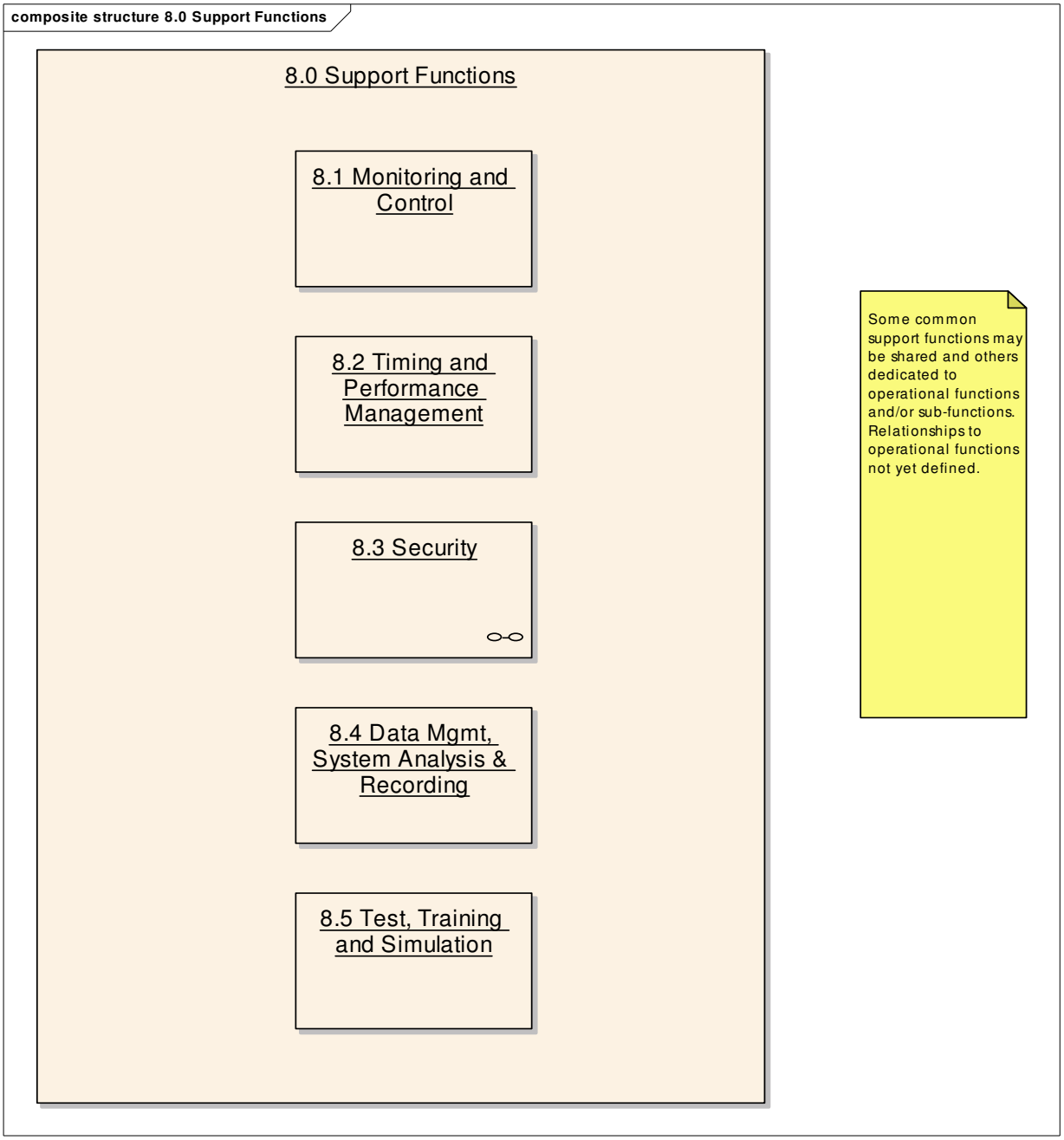


Figure: 8

8.0 Support Functions

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 8.0 Support Functions *Keywords:*
Detail: *Created on* 5/4/2006. *Last modified on*.9/28/2006.
GUID: {FC6C1787-6397-46c9-8D4C-69BC1AA660EE}

This function provides the necessary DCS operational and system support capabilities including:
- Monitoring and Control

- Timing and Performance Management
- Security
- Data Mgmt, system Analysis & Recording
- Test, Training and Simulation.

NOTE: Some common support functions may be shared and others dedicated to operational functions and/or sub-functions. Relationships to operational functions not yet defined.

Connections

Connector	Source	Target	Notes
Realisation Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 8.0 Support Functions Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= TODO-00039: Support Functions require additional research/allocation Element.Type= Requirement	
Dependency Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= TO Technician Element.Type= Actor	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 8.0 Support Functions Element.Type= Object	
NoteLink Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name=	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote=	

Connector	Source	Target	Notes
	<anonymous> Element.Type= Note	Element.Name= 8.0 Support Functions Element.Type= Object	
Dependency Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= NIM System Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 8.0 Support Functions Element.Type= Object	

8.5 Test, Training and Simulation

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 8.0 Support Functions *Keywords:*
Detail: *Created on* 5/10/2006. *Last modified on*.2/28/2007.
GUID: {5ABC1D8D-9724-4f3e-B8E7-54A3FBEAAFC6}

The Test, Training and Simulation (TTS) function provides the capability to monitor the support system hardware that includes the Operational Replica from a single position by the Support M&C Operator. The operator is provided status information on a continuous basis. On the Support and TTS simulation resources, the M&C Operator has the ability to execute diagnostic commands and control commands to isolate problems. The Operational Replica uses the M&C position within it to execute diagnostic and control commands for problem determination.

Note: The Operational Environment provides the capabilities that directly support air traffic control and the system management of the associated resources. This addresses the key requirements, functional architecture, security, system design and transition for the Operational Environment. The Operational Environment is also instantiated, with some hardware configuration differences, in the Test and Training Environment. This instantiation is termed the Operational Replica.

8.2 Timing and Performance Management

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 8.0 Support Functions *Keywords:*
Detail: *Created on* 5/10/2006. *Last modified on*.5/10/2006.
GUID: {5E9BB1F0-AFE8-4cde-89CA-8AADB40D0CF3}

This function provides for system performance complicance as well as distributes UTC timing information (i.e. Time Synchroniztion).

8.3 Security

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 8.0 Support Functions *Keywords:*
Detail: *Created on* 5/10/2006. *Last modified on*.4/23/2007.
GUID: {68E9E22F-DE80-4858-9E6A-9AECCC9981E3}

The National Institute of Standards and Technology (NIST) identifies 17 security control families in NIST Federal Information Processing Standard (FIPS) Publication 200, "Minimum Security Requirements for Federal Information and Information Systems." The 17 security control families are organized into management controls, operational controls, and technical controls. Each security control family can be modeled as a functional element in the functional architecture; however, only technical controls are modeled here.

There are 4 purely technical controls -- Access Control (AC), Audit and Accountability (AU), Identification and Authentication (IA), and System and Communications Protection (SC). The System and Information Integrity (SI) operational control contains some technical components. For the purposes of this functional architecture, relevant security controls in the SI security control family are treated as technical controls.

The technical security controls are largely provided by the COTS components that are used to host the data communications functionality. A significant portion of these controls may be provided by the appropriate

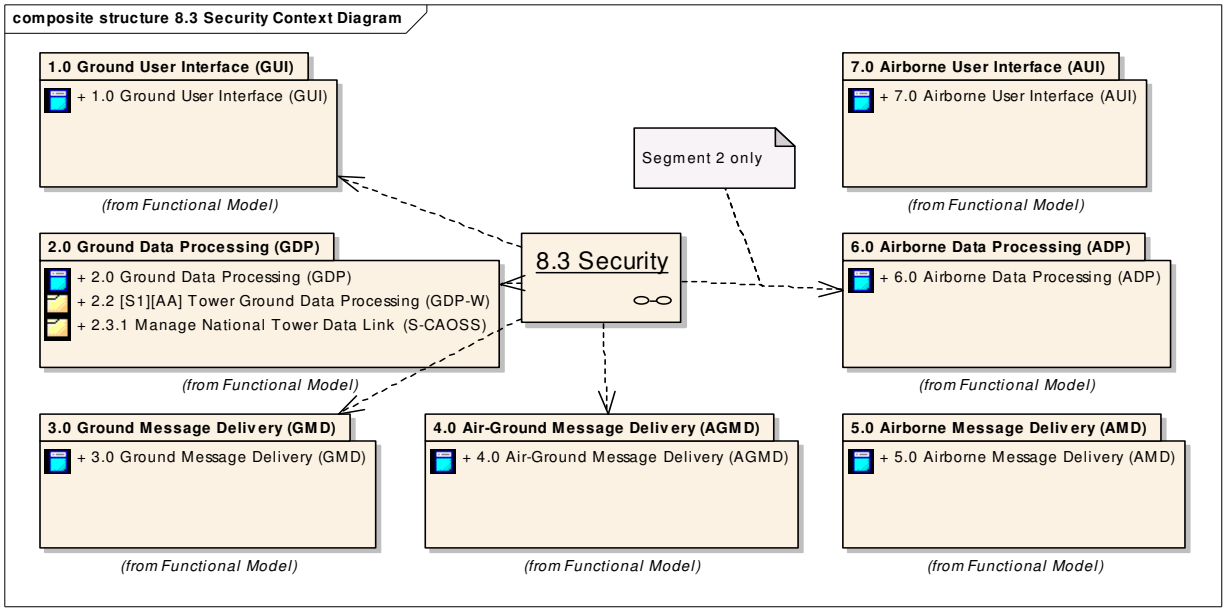
configuration of the supporting operating system. Additional controls, such as anti-virus protections and file system integrity protections, may be provided by third-party applications.

Connections

Connector	Source	Target	Notes
Dependency Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 8.3 Security Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.0 Ground User Interface (GUI) Element.Type= Package	
Dependency Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 8.3 Security Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 3.0 Ground Message Delivery (GMD) Element.Type= Package	
Dependency Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 8.3 Security Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 4.0 Air-Ground Message Delivery (AGMD) Element.Type= Package	

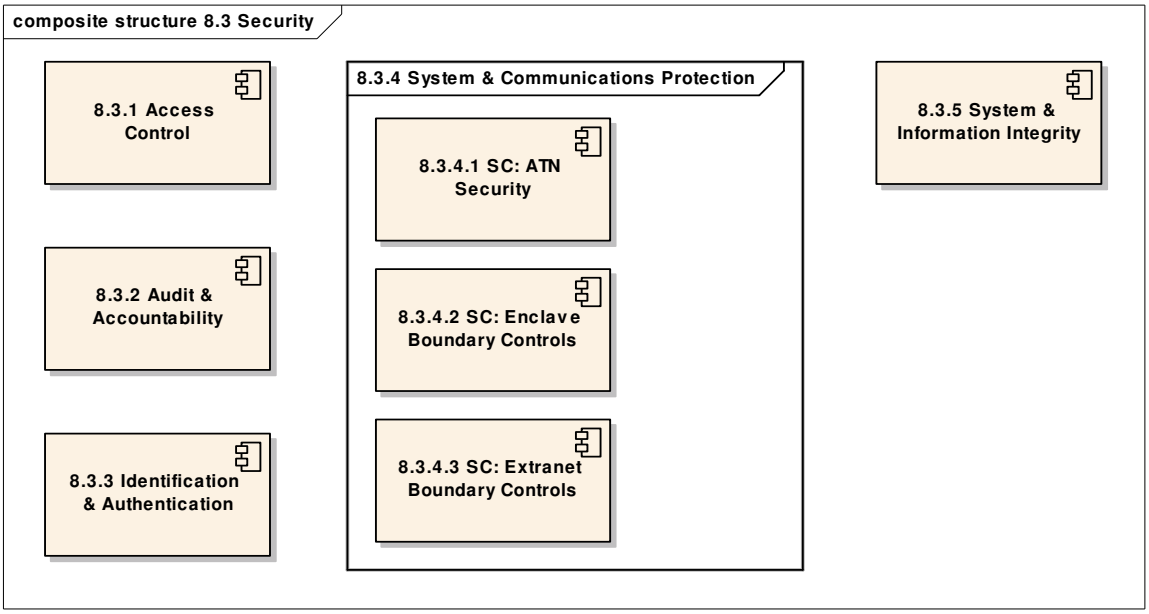
Connector	Source	Target	Notes
Dependency Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 8.3 Security Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 2.0 Ground Data Processing (GDP) Element.Type= Package	
Dependency Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 8.3 Security Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 6.0 Airborne Data Processing (ADP) Element.Type= Package	System and Communications Protection security controls are applied to air-ground messages in Segment 2 only.

CompositeStructure diagram: 8.3 Security Context Diagram



This diagram shows how the security controls identified in 8.3 are allocated to the rest of the functional architecture. Segment 1 functionality implements most of the security controls required for Segment 2 also. The main difference between Segment 1 and Segment 2 is the allocation of System and Communications Protection security controls to air-ground messages. These controls are allocated to 2.0 Ground Data Processing and 6.0 Airborne Data Processing.

CompositeStructure diagram: 8.3 Security



8.3.2 Audit & Accountability

Type: **Component**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 8.0 Support Functions *Keywords:*
Detail: *Created on* 2/28/2007. *Last modified on*.2/28/2007.
GUID: {00878F86-5A87-4130-81BC-9CF72A41D642}

The Audit and Accountability security control family ensures that all activity on the information system is audited (i.e., logged and reviewed) and that users are accountable for their actions.

Audit and Accountability addresses the following functional areas:
1. Auditable events;
2. Content of audit records;
3. Audit reduction and report generation;
4. Protection of audit information; and
5. Audit retention.

Typical implementations of the Audit and Accountability security family include:
1. Syslog (provided by the operating system); and
2. Application security events.

8.3.5 System & Information Integrity

Type: **Component**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 8.0 Support Functions *Keywords:*
Detail: *Created on* 2/28/2007. *Last modified on*.2/28/2007.
GUID: {8DC40BCF-4A51-498b-8EC3-A2D6CC980ACD}

The System and Information Integrity security control family ensures that the information system and the information it processes are protected from unauthorized changes, whether malicious or unintentional.

System and Information Integrity addresses the following functional areas:
1. Malicious code protection;
2. Intrusion detection;
3. Security functionality verification; and
4. Software and information integrity;

Typical implementations of the System and Information Integrity security family include:
1. Checksums;
2. File system integrity tools (e.g., Tripwire); and
3. Anti-virus and anti-spam tools.

Note that intrusion detection is addressed with the System and Communications Protection security family for the purposes of this functional architecture.

8.3.4 System & Communications Protection

Type: **Component**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 8.0 Support Functions *Keywords:*
Detail: *Created on* 2/28/2007. *Last modified on*.2/28/2007.
GUID: {2842DE8B-526F-4c5e-BB26-1A64D23DF061}

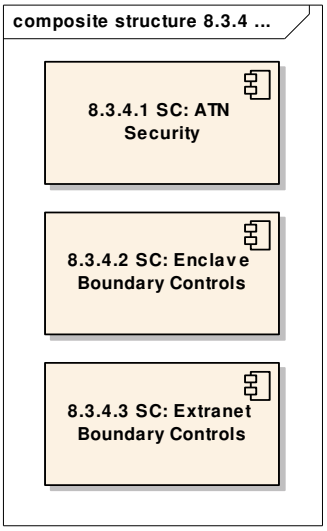
The System and Communications Protection security control family ensures that the information system and the information it processes are protected at external and key internal boundaries.

System and Communications Protection addresses the following functional areas:
1. Application partitioning;
2. Security function isolation;
3. Denial of service protection;
4. Resource priority;
5. Boundary protection;
6. Transmission integrity and confidentiality; and
7. Key management;

For the purposes of this functional architecture, the System and Communications Protection security control family is separated into two main components: protectionof information exchanges and boundary controls. Intrusion detection is addressed with boundary controls.

Security enclaves are created by the placement of boundary controls. These boundary controls can be organized into 2 sets:
1. Enclave boundary controls that provide protections for internal security enclaves that have no direct connection to the outside world; and
2. Extranet boundary controls that provide protections from all external entities.

CompositeStructure diagram: 8.3.4 System & Communications Protection



8.3.4.2 SC: Enclave Boundary Controls

Type: **Component**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 8.0 Support Functions *Keywords:*
Detail: *Created on* 2/28/2007. *Last modified on*.2/28/2007.
GUID: {3B16009B-5AB8-4788-91F0-CB3231B13250}

The SC: Enclave Boundary Controls security control provides boundary protections for internal security enclaves.

SC: Enclave Boundary Controls addresses the following functional areas:
1. Cryptographic operations;
2. Public Key Infrastructure;
3. Key management;
4. Peer entity authentication;
5. Data origin authentication;
6. Replay protection;
7. Denial of service protection;
8. Message integrity;
9. Intrusion detection/prevention.

Typical implementations of the SC: Enclave Boundary Controls security control include:
1. Virtual Private Networks (VPNs);
2. Authentication, Authorization, and Accountability (AAA) servers;
3. Stateful packet inspection (up to OSI Layer 4);
4. Stateful deep packet inspection (up to OSI Layer 7);
5. Access Control Lists.

8.3.4.1 SC: ATN Security

Type: **Component**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 8.0 Support Functions *Keywords:*
Detail: *Created on* 2/28/2007. *Last modified on*.2/28/2007.
GUID: {56A30FE8-23F5-4b4f-AFC6-590F584FEBD9}

The SC: ATN Security control provides protections for air-ground information exchanges between ground automation systems and airborne automation systems and for ground-ground information exchanges between two ground automation systems. It is specified in ICAO Doc 9705 Edition 3.

SC: ATN Security addresses the following functional areas:
1. Cryptographic operations;
2. Public Key Infrastructure;
3. Key management;
4. Peer entity authentication;
5. Data origin authentication;
6. Replay protection;
7. Message integrity.

8.3.4.3 SC: Extranet Boundary Controls

Type: **Component**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 8.0 Support Functions *Keywords:*
Detail: *Created on* 2/28/2007. *Last modified on*.2/28/2007.
GUID: {0DD7B79C-473F-4aa1-953A-F7FC7B5333FE}

The SC: Extranet Boundary Controls security control provides boundary protections at external boundaries.

SC: Extranet Boundary Controls addresses the following functional areas:
1. Cryptographic operations;
2. Public Key Infrastructure;
3. Key management;
4. Peer entity authentication;
5. Data origin authentication;
6. Replay protection;
7. Denial of service protection;
8. Message integrity;
9. Intrusion detection/prevention.

Typical implementations of the SC: Extranet Boundary Controls security control include:
1. Virtual Private Networks (VPNs);
2. Authentication, Authorization, and Accountability (AAA) servers;
3. Stateful packet inspection (up to OSI Layer 4);
4. Stateful deep packet inspection (up to OSI Layer 7);
5. Application proxies; and
6. Access Control Lists.

The protections provided by the SC: Enclave Boundary Controls and SC: Extranet Boundary Controls are similar. They are applied differently to protect against different threats.

8.3.1 Access Control

Type: **Component**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 8.0 Support Functions *Keywords:*
Detail: *Created on* 2/28/2007. *Last modified on*.2/28/2007.

GUID: {04346AF1-5E6E-4505-AE82-830B0ADF6766}

The Access Control security control family ensures that access to the information system is limited to authorized users, processes, and devices.

Access Control addresses the following functional areas:
1. Account management;
2. Access enforcement;
3. Information flow enforcement;
4. Separation of duties;
5. Least Privilege;
6. Session management; and
7. Supervision and review of user activities.

Typical implementations of the Access Control security family include:
1. Access Control Lists.

8.3.3 Identification & Authentication

Type: **Component**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 8.0 Support Functions *Keywords:*
Detail: *Created on* 2/28/2007. *Last modified on*.2/28/2007.
GUID: {05352BAC-804C-4704-9527-47ABCE15A98F}

The Identification and Authentication security control family ensures that users of the information system are identified and that their identity is verified prior to allowing access.

Identification and Authentication addresses the following functional areas:
1. User identification and authentication;
2. Device identification and authentication; and
3. Cryptographic module authentication.

Typical implementations of the Identification and Authentication security family include:
1. Username and password;
2. Single Sign-On;

3. Authentication, Authorization, and Accountability (AAA) servers (e.g., RADIUS, TACACS+); and
4. Certificate systems used in a Public Key Infrastructure.

8.1 Monitoring and Control

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 8.0 Support Functions *Keywords:*
Detail: *Created on* 5/10/2006. *Last modified on*.5/10/2006.
GUID: {2286C1CD-DABD-4841-A564-E9770A1E0076}

This function is responsible for monitoring (data acquisition, status determination, and data reporting) and controlling the operational system. Control functions include login/logout, startup/restart, shutdown, release cutover, verification for certification, application of radar correction parameters, enabling/disabling system interfaces, enabling/disabling SAR recording gates and classes, and starting/stopping simulation. [from ERAM SADD]

8.4 Data Mgmt, System Analysis & Recording

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 8.0 Support Functions *Keywords:*
Detail: *Created on* 5/10/2006. *Last modified on*.5/10/2006.
GUID: {E82D6BC9-8AB4-4fe8-B4B1-6E1BC4D0A25B}

The following categories of system data are managed, analyzed and recorded:
· System inputs (e.g., input messages from another ARTCC, user commands)
· System outputs (e.g., output messages to another ARTCC)
· System events (e.g., detection of failures)
· System status and configuration data (e.g., configuration of system processors that are being monitored)
· Component status and configuration data (e.g., configuration of individual processors and their status)
· System and component performance (e.g., performance data for system response time)
· System and component resource utilization (e.g., CPU and LAN utilization)
· System Parameters (e.g., channel modes –Backup vs. Active vs. Test)
· Security events (e.g., detection of unauthorized intrusion attempts)
· Initialization and control events (e.g., application address space initialization completed)
· Internal messages (e.g., messages from one ERAM application to another ERAM application within an ARTCC). Due to volume, these messages are not recorded by default unless they are
needed for the generation of canned DR&A reports. They can be selected for recording with an M&C command. The set of SAR data to be recorded is determined by the default SAR gates. Additionally, the M&C operator can enable or disable individual SAR gates or classes of SAR gates.
[from ERAM SADD]

9.0 External Actors and Systems

Type: **Package**
Status: Proposed. Version 1.0. Phase 1.0.
Package: Functional Model
Detail: *Created on* 10/10/2006 7:47:35 AM. *Last modified on* 10/10/2006 7:47:35 AM
GUID: {1DE44FF0-E94A-4b44-9C54-F01732665F82}

AO Dispatcher

Type: **Actor**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 9.0 External Actors and Systems *Keywords:*
Detail: *Created on* 3/26/2006. *Last modified on*.10/10/2006.
GUID: {2907728C-5D47-4376-AFE7-048FAF67C587}

The AO Dispatcher monitors and assists active airline flights.

AO Technician

Type: **Actor**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 9.0 External Actors and Systems *Keywords:*
Detail: *Created on* 3/26/2006. *Last modified on*.10/10/2006.
GUID: {9A734988-36C1-4a89-8A32-209040BCC3C9}

The Airline Operations (AO) Technician supports aircraft maintenance activities.

Clearance Delivery

Type: **Actor**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 9.0 External Actors and Systems *Keywords:*
Detail: *Created on* 4/20/2006. *Last modified on*.10/10/2006.
GUID: {190FEC85-332B-4490-96BF-11C143E2D38D}

A Clearance Delivery Controller performs the following activities: Operate communications equipment; process and forward flight plan information; issue clearances and ensure accuracy of pilot read back; assist tower cab in meeting situation objectives; operate tower equipment; utilize alphanumerics. [from NAS 5.0]

Connections

Connector	Source	Target	Notes
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= Clearance Delivery Element.Type= Actor	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.0.1 GUI.Human_Port Element.Type= Port	

Flight Data Controller

Type: **Actor**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 9.0 External Actors and Systems *Keywords:*
Detail: *Created on* 4/21/2006. *Last modified on*.10/10/2006.
GUID: {D49CE6BC-19DB-4fb0-A3D0-73C5BAC9A12A}

A Flight Data Controller performs the following activities: Operate interphone; Assist Radar Associate Controller in

managing flight progress strips; Receive/process and distribute flight progress strips; Ensure flight data processing equipment is operational; Request/receive and disseminate weather, NOTAM's, NAS status, traffic management, and Special Use Airspace status messages; Manually prepare flight progress strips when automation systems are not available; Enter flight data into computer; Forward flight data via computer; Assist facility/sector in meeting situation objectives. [from NAS 5.0]

Ground Controller

Type: **Actor**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 9.0 External Actors and Systems *Keywords:*
Detail: *Created on* 4/21/2006. *Last modified on*.10/10/2006.
GUID: {BF5CD843-181D-4f64-B71A-F39887DB4837}

A Ground Controller performs the following activities: Ensure separation; Control vehicles as well as aircraft on movement areas other than active runways Initiate control instructions; Monitor and operate communications equipment; Utilize tower radar display(s); Utilize alphanumerics; Assist the tower associate controller with coordination; Scan tower cab environment; Ensure computer entries and strip marking are completed for instructions or clearances issued or received; Process and forward flight plan information; Perform any functions of the tower team which will assist in meeting situation objectives; Coordinate with local control for safe and efficient use of runways and movement areas. [from NAS 5.0]

Connections

Connector	Source	Target	Notes
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= Ground Controller Element.Type= Actor	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.0.1 GUI.Human_Port Element.Type= Port	

Local Controller

Type: **Actor**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 9.0 External Actors and Systems *Keywords:*
Detail: *Created on* 4/21/2006. *Last modified on*.10/10/2006.
GUID: {6032A893-0A59-4b6a-8D5D-2DFBB108F0C8}

A Local Controller performs the following activities: Ensure separation; Control active runways; Initiate control instructions; Monitor and operate communications equipment; Utilize tower radar display(s); Utilize alphanumerics; Assist the tower associate controller with coordination; Scan tower cab environment; Ensure computer entries and strip marking are completed for instructions or clearances issued or received; Process and forward flight plan information; Perform any functions of the tower team which will assist in meeting situation objectives; Coordinate with ground control for safe and efficient use of runways and movement areas. [from NAS 5.0]

Non-Radar Controller

Type: **Actor**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 9.0 External Actors and Systems *Keywords:*
Detail: *Created on* 4/21/2006. *Last modified on*.10/10/2006.
GUID: {4B20EF9C-FB6C-4324-8F83-3463967B053D}

A Non-Radar Controller performs the following activities: Ensure separation; Initiate control instructions; Monitor and operate radios; Accept and initiate transfer of control, communications, and flight data; Ensure computer entries are completed on instructions or clearances issued or received; Ensure strip marking is completed on instructions or clearances issued or received. [from NAS 5.0]

Planning Controller

Type: **Actor**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 9.0 External Actors and Systems *Keywords:*
Detail: *Created on* 4/21/2006. *Last modified on*.10/10/2006.
GUID: {0855C998-C422-4fce-AF96-A967EA569D30}

A Planning Controller performs the following activities: Ensure separation; Initiate control instructions; Operate interphones; Conduct air/ground communications via data link; Coordinate tactical traffic flows; Scan flight data; Correlate with situation data; Ensure computer entries are completed on instructions issued or received; Enter instructions issued or received by the tactical controller when aware of those instructions. [from NAS 5.0]

Radar Associate Controller

Type: **Actor**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 9.0 External Actors and Systems *Keywords:*
Detail: *Created on* 4/21/2006. *Last modified on*.10/10/2006.
GUID: {B4C3CDC3-DC50-4948-AEDC-532F83B316C0}

A Radar Associate Controller performs the following activities: Ensure separation, initiate control instructions; operate interphones; Accept and initiate non-automated handoffs; and ensure radar controller is made aware of the actions; Assist the radar controller by accepting or initiating automated handoffs/pointouts which are necessary for the continued smooth operation of the sector, and ensure that the radar controller is made immediately aware of any action taken; Coordinate, including pointouts; Monitor radios when not performing higher priority duties; Scan flight progress strips; Correlate with radar data; Manage flight progress strips; Ensure computer entries are completed on instructions issued or received; Enter instructions issued or received by the radar controller when aware of those instructions. [from NAS 5.0]

Radar Controller

Type: **Actor**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 9.0 External Actors and Systems *Keywords:*
Detail: *Created on* 4/21/2006. *Last modified on*.10/10/2006.
GUID: {A57AF240-CAE5-462c-848E-F00417B68E21}

A Radar Controller performs the following activities: Ensure separation; Initiate control instructions; Monitor and operate radios; Accept and initiate automated handoffs; Assist the radar associate controller with non-automated handoff actions when needed; Assist the radar associate controller in coordination when needed; Scan radar display;

Correlate with flight progress strip information; Ensure computer entries are completed on instructions or clearances you issue or receive; Ensure strip marking is completed on instructions or clearances you issue or receive. [from NAS 5.0]

Supervisory Air Traffic Control Specialist

Type: **Actor**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 9.0 External Actors and Systems *Keywords:*
Detail: *Created on* 4/21/2006. *Last modified on*.10/10/2006.
GUID: {31A5B17F-6209-477b-8175-08FDEAE71D49}

The supervisor is responsible for overall facility operations during an assigned shift. Duties include ensuring adequate staffing for the operational situation, monitoring operational positions, and ensuring functions are performed in accordance with directives. [from NAS 5.0]

Note: In earlier versions of the DCS_Model this role was called AT Supervisor.

TO Technician

Type: **Actor**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 9.0 External Actors and Systems *Keywords:*
Detail: *Created on* 3/26/2006. *Last modified on*.10/10/2006.
GUID: {04BC3870-F76A-4735-9EBF-CB1F3C08E1DA}

The Technical Operations (TO) Technician:
- maintains & monitors the ATM infrastructure

Connections

Connector	Source	Target	Notes
Dependency Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= TO Technician Element.Type= Actor	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 8.0 Support Functions Element.Type= Object	

Tower Clearance Data Specialist

Type: **Actor**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 9.0 External Actors and Systems *Keywords:*
Detail: *Created on* 2/1/2007. *Last modified on*.2/1/2007.
GUID: {E6C2B0ED-D546-4ece-A3C3-916B2B0B5A81}

This user enters/configures adaptation data for DCL and D-TAXI clearance services.

Traffic Management Coordinators

Type: **Actor**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 9.0 External Actors and Systems *Keywords:*
Detail: *Created on* 4/21/2006. *Last modified on*.10/10/2006.
GUID: {D54A9370-72F2-495d-BA85-1B5EB1948D04}

Traffic Management Coordinators track and predict traffic flows, analyze ground delays, evaluate alternative routing strategies, and plan local traffic patterns at the local facility (ARTCC, TRACON, or Towers). [from NAS 5.0]

Traffic Management Specialist

Type: **Actor**
Status: Proposed. Version 1.0. Phase 1.0.

Package: 9.0 External Actors and Systems *Keywords:*
Detail: *Created on* 4/21/2006. *Last modified on*.10/10/2006.
GUID: {24F9E4A1-7007-4cde-9BE6-623E0331F15A}

Traffic Management Specialists perform the following activities: Balance air traffic demand with the airspace's capacity to maintain maximum and efficient utilization of the NAS; Coordinate and implement traffic management directives if needed for area of responsibility; Monitor and balance traffic flows within the area of responsibility in accordance with traffic management directives; Evaluate effectiveness of traffic management directives and make necessary adjustments; Document delay information.

ATIS Data Specialist

Type: **Actor**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 9.0 External Actors and Systems *Keywords:*
Detail: *Created on* 4/3/2006. *Last modified on*.10/10/2006.
GUID: {ACCEAD57-043B-4af3-9B0E-15BE2B381703}

Enters operational data for use by system (D-ATIS info).

Receiving Controller

Type: **Actor**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 9.0 External Actors and Systems *Keywords:*
Detail: *Created on* 4/3/2006. *Last modified on*.10/10/2006.
GUID: {9D0DC2B2-04FB-4ed4-887E-03758BF89480}

The receiving controller recieves flights during handoff operations. This is a role that nearly all controllers assume for brief periods of time.

Transferring Controller

Type: **Actor**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 9.0 External Actors and Systems *Keywords:*
Detail: *Created on* 4/3/2006. *Last modified on*.10/10/2006.
GUID: {6CA5913A-B3A6-40a2-BEDA-A24FF414B9BC}

The transferring controller transfers control of an aircraft to a downstream controller (the receiving controller). This is a role that nearly all controllers assume for brief periods of time.

Controller

Type: **Actor**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 9.0 External Actors and Systems *Keywords:*
Detail: *Created on* 3/30/2006. *Last modified on*.10/10/2006.
GUID: {4D6EE222-133F-4079-863C-B6963710B4EC}

The Controller represents a generic controller/control position role. A specific instance of the Controller Team might be any of type of Controller including:
- Local Controller
- Clearance Delivery
- Radar Controller
- Ground Controller
- Flight Data Controller
- Planning Controller
- Non-Radar Controller,
- etc.

Connections

Connector	Source	Target	Notes
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= Controller Element.Type=	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.0.1 GUI.Human_Port	

Connector	Source	Target	Notes
	Actor	Element.Type= Port	
Sequence Compose Clearance Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= Controller Element.Type= Actor	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.1.1 Enroute Controller GUI (GUI-E-CT) Element.Type= Object	
Sequence Display Validated Msg Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1 Enroute Controller GUI (GUI-E-CT) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= Controller Element.Type= Actor	
Sequence Clearance Request Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= Controller Element.Type= Actor	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.1.1 Enroute Controller GUI (GUI-E-CT) Element.Type= Object	Includes: - data elements, ACID, FLID
Sequence TX Cmd Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= Controller Element.Type= Actor	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 1.1.1 Enroute Controller GUI (GUI-E-CT) Element.Type= Object	
Sequence Display Wilco Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name=	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote=	

Connector	Source	Target	Notes
	1.1.1 Enroute Controller GUI (GUI-E-CT) Element.Type= Object	Element.Name= Controller Element.Type= Actor	
Sequence Wilco Latency Okay Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 1.1.1 Enroute Controller GUI (GUI-E-CT) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= Controller Element.Type= Actor	

Flight Crew

Type: **Actor**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 9.0 External Actors and Systems *Keywords:*
Detail: *Created on* 3/30/2006. *Last modified on*.10/10/2006.
GUID: {E0250B21-469A-4b44-9A38-B7E6386D52E6}

The flight crew (e.g pilot) is responsible for the operation and safety of an aircraft during flight and taxi. The pilot responds to and requests heading, altitude, and airspeed instructions given by controllers to maintain separation and achieve traffic synchronization. Pilots with the appropriate category and class rating may act as pilot in command of single-engine airplanes, multiengine airplanes, helicopters, gyroplanes, powered-lift aircraft, gliders, airships, and balloons. (from NAS EA 5.0)

Connections

Connector	Source	Target	Notes

Connector	Source	Target	Notes
Dependency Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 7.0.2 AUI.User_Port Element.Type= Port	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= Flight Crew Element.Type= Actor	
Sequence Display Clearance Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 7.0 Airborne User Interface (AUI) Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= Flight Crew Element.Type= Actor	
Sequence Wilco Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= Flight Crew Element.Type= Actor	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 7.0 Airborne User Interface (AUI) Element.Type= Object	

ASOS

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 9.0 External Actors and Systems *Keywords:*
Detail: *Created on* 4/6/2006. *Last modified on*.10/10/2006.
GUID: {D71A1831-E41A-449c-AB1A-0F7FE6ED65D5}

The Automated Surface Observing System (ASOS) is a surface weather observing system being implemented by the National Weather Service (NWS), the Federal Aviation Administration (FAA), and the Department of Defense (DoD). ASOS is designed to support aviation operations and weather forecasting.

ASOS is the primary, minute-by-minute, 24-hour observation system for the National Weather Service (NWS), the Federal Aviation Administration (FAA) and U.S. Department of Defense (DOD). It provides surface weather observations in "METAR code" (See: METAR (The International Format for reporting surface weather observations) below) for meteorologists, the aviation industry and the media.

ATIS Voice Radio

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 9.0 External Actors and Systems *Keywords:*
Detail: *Created on* 4/18/2006. *Last modified on*.10/10/2006.
GUID: {F0C005E7-7BCB-4185-90B5-E517D1920DB0}

The ATIS voice radio broadcasts ATIS voice radio messages containing the weather, runway conditions, and other notices.

Connections

Connector	Source	Target	Notes
Dependency Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= 2.0.4 GDP.Voice_Port Element.Type= Port	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= ATIS Voice Radio Element.Type=	

Connector	Source	Target	Notes
		Object	

AWOS

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 9.0 External Actors and Systems *Keywords:*
Detail: *Created on* 4/6/2006. *Last modified on*.10/10/2006.
GUID: {944B93D5-B5BA-4fd0-920F-BE20E5620428}

The Automated Weather Observing System (AWOS) is a suite of sensors which measure, collect and disseminate weather data to help meteorologists, pilots and flight dispatchers prepare and monitor weather forecasts, plan flight routes, and provide necessary information for correct take offs and landings. AWOSs provide a minute-to-minute update that is usually provided to pilots by a VHF radio on a frequency between 118 and 136 MHz. AWOSs are categorized as either Federal or NonFederal. Federal AWOSs were purchased and are currently maintained by the FAA. NonFederal AWOSs are purchased and maintained by state, local, and private organizations.

Downstream GDP

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 9.0 External Actors and Systems *Keywords:*
Detail: *Created on* 4/6/2006. *Last modified on*.10/10/2006.
GUID: {4C47F040-CF45-4d08-BE7C-ADDF50022DA3}

The Downstream GDP represents the next facility to receive control of an aircraft.

Flight Operations Control

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 9.0 External Actors and Systems *Keywords:*
Detail: *Created on* 4/6/2006. *Last modified on*.10/10/2006.
GUID: {CAEF1396-388A-44f3-8053-98A8BD4BAD70}

This is an external entity consisting of automation and communication system(s) implemented by AOC.

Connections

Connector	Source	Target	Notes
Dependency FOC Data Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= Flight Operations Control Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 3.0.3 GMD.Ext_Port Element.Type= Port	FOC Data includes: - Aircraft Registration with MAAI function to report ACARS/voice only capabilities and whether DCL can be supported.

NIM System

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 9.0 External Actors and Systems *Keywords:*
Detail: *Created on* 4/6/2006. *Last modified on*.10/10/2006.
GUID: {9ABE994F-3C33-471a-BD75-EA17A0D11E79}

The National Airspace System (NAS) Infrastructure Management System (NIMS) monitors and controls NAS subsystems, equipment and resources. The NIMS provides status information to all NAS users in near real time via the System Wide Information Management (SWIM) system.
[from NAS 5.0]

Connections

Connector	Source	Target	Notes
Dependency Source -> Destination	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= NIM System Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 8.0 Support Functions Element.Type= Object	

SAIDS

Type: **Object**

Status: Proposed. Version 1.0. Phase 1.0.
Package: 9.0 External Actors and Systems *Keywords:*
Detail: *Created on* 4/6/2006. *Last modified on*.10/10/2006.
GUID: {9FA3CC74-7B94-4245-A57D-92712A504842}

A Systems Atlanta Information Display System (SAIDS) enables users to collect and/or input, organize, format, update, disseminate, and display both static and real-time data regarding weather and other rapidly changing critical information to air traffic controllers and Air Traffic Control (ATC) supervisors/Managers. SAIDS is installed at Airport Traffic Control Towers (ATCT), Terminal Radar Approach Control (TRACON) facilities, Air Route Traffic Control Centers (ARTCC), regional offices, and Flight Service Station (FSS) facilities.

TFM System

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 9.0 External Actors and Systems *Keywords:*
Detail: *Created on* 4/19/2006. *Last modified on*.10/10/2006.
GUID: {33D1DE08-F171-484b-ADDF-3A93BE20D538}

The Traffic Flow Management (TFM) system initiates TMI Reroutes. This could be local or national based from DCS standpoint.

General:
This entity provides strategic traffic management services including traffic flow analysis and control. On a national basis, it destributes traffic management initiatives to cope with anticipated congestion or reroutes due to weather phenomenon.

Connections

Connector	Source	Target	Notes
Dependency _[S2]_TMI_Reroute_Data Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= TFM System Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 3.0.3 GMD.Ext_Port Element.Type= Port	See Project Glossary.

Upstream GDP

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 9.0 External Actors and Systems *Keywords:*
Detail: *Created on* 4/6/2006. *Last modified on*.10/10/2006.
GUID: {F5C62759-A09C-4370-93B2-09E1284DEB71}

The Upstream GDP represents transfers control of aircraft to a Downstream GDP.

WXSYSTEM

Type: **Object**
Status: Proposed. Version 1.0. Phase 1.0.
Package: 9.0 External Actors and Systems *Keywords:*
Detail: *Created on* 4/12/2006. *Last modified on*.10/10/2006.
GUID: {4DA9454E-5AD7-4a9f-A1F5-450EA4D7881B}

Minimally, the external DCS weather system is likely to be WARP, but other external weather interfaces may need to supported (e.g. ASOS, AWOS, SAIDS, etc).

Connections

Connector	Source	Target	Notes
Dependency Weather Data Bi-Directional	ConnSource.Scope= Public ConnSource.Role ConnSource.RoleNote Element.Name= WXSYSTEM Element.Type= Object	ConnTarget.Scope= Public ConnTarget.Role= ConnTarget.RoleNote= Element.Name= 3.0.3 GMD.Ext_Port Element.Type= Port	The weather data minimally will include METAR/SPECI reports and may also include other information (e.g. RVR). The primary data flow direction is from the external WX system, but bidrecational flow may be required to support acknowledgements, requests, etc.

A.0 Data Dictionary

Type: **Package**
Status: Proposed. Version 1.0. Phase 1.0.
Package: Functional Model
Detail: *Created on* 2/3/2007 4:21:14 PM. *Last modified on* 2/3/2007 4:21:14 PM
GUID: {09E48828-63DA-45d4-85BE-9A4E68475DFB}

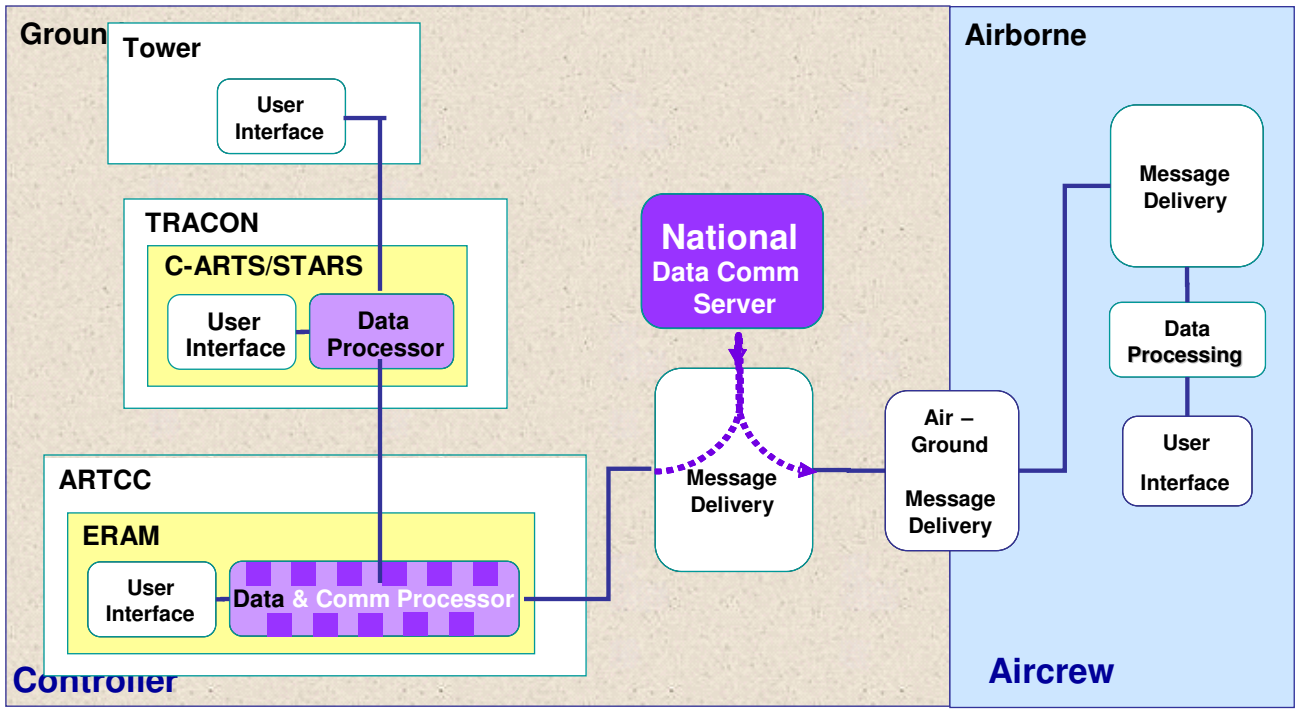
Data Communications Program

Functional Architecture and Alternatives Analysis

Architecture Alternatives

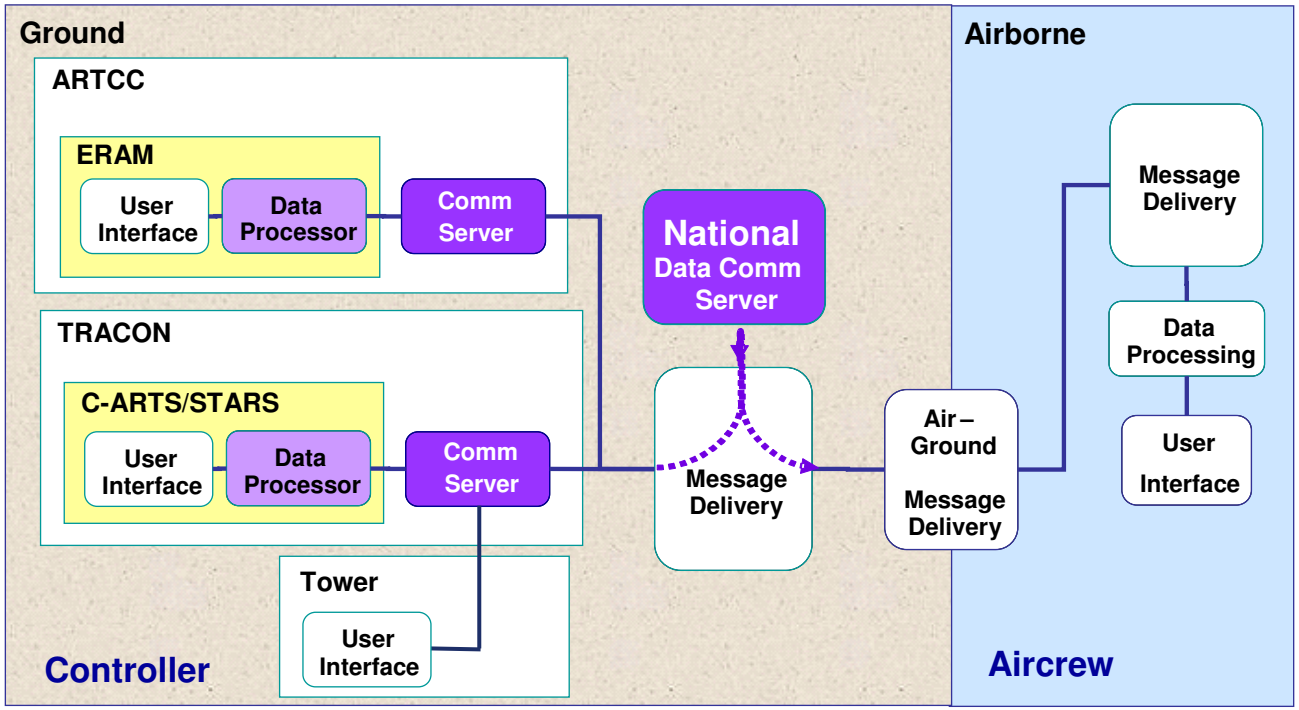
July 24, 2007

Alternative One: Embedded Architecture



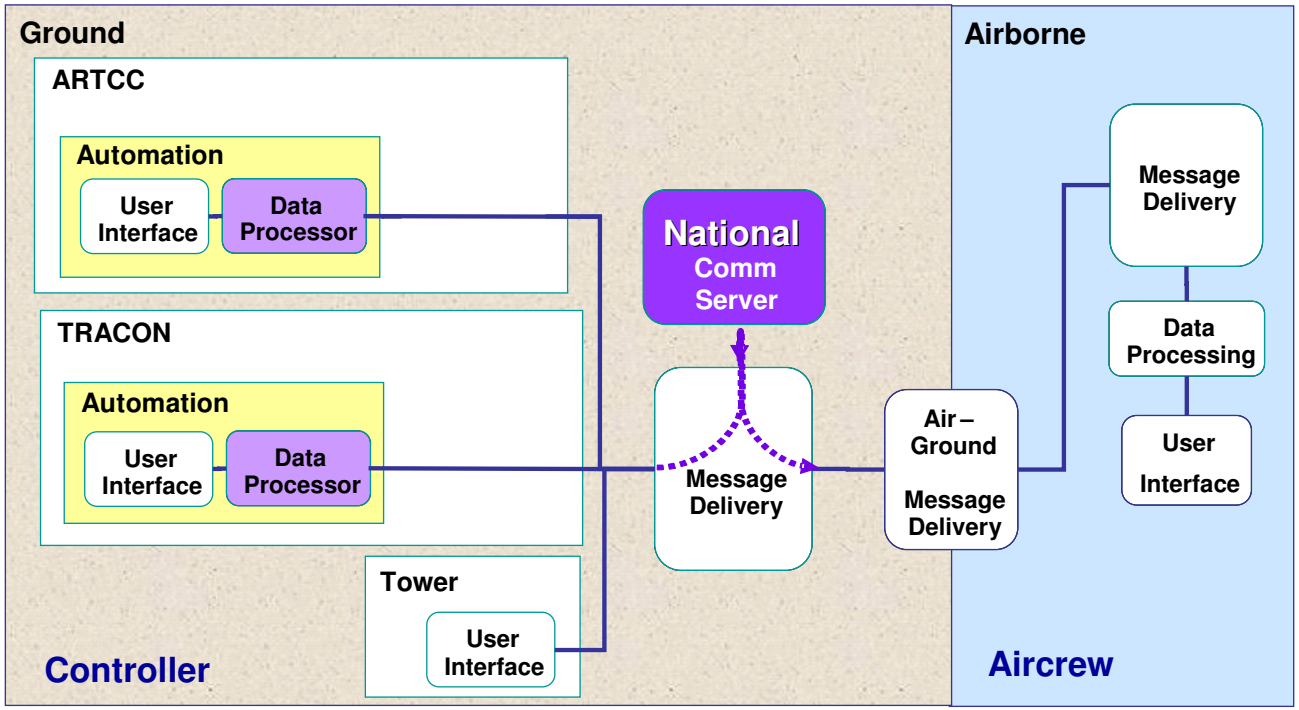
- **Facility-based system**
- **Tightly integrated software**
- **TRACON Data Processor**
  - -- Local Message Processing
  - -- User Interface Processing
- **ATOP-like Architecture**
- **Data Comm Server**
  - – FIS(e.g. D-ATIS)
  - – ADS-C Contract Management
  - – Data Comm "Log-on"
  - – Legacy Pre-Departure Clearance

Alternative Two: Modular Architecture



- **Facility-based system**
- **Outboard HW/SW simplifies development and evolution**
- **Similar to Eurocontrol Architecture**
- **Data Comm Server**
  - FIS (e.g. D-ATIS)
  - ADS-C Contract Management
  - Data Comm "Log-on"
  - Legacy Pre-Departure Clearance

Alternative Three: Networked Architecture



- **Centralized system**
- **Supports transition to co-located and consolidated facilities**
- **Follows Commercial Practices**
- **Data Comm Server**
  - CPDC
  - FIS (e.g. D-ATIS)
  - ADS-C Operational Data Management
  - ADS-C Contract Management
  - Data Comm "Log-on"
  - Departure Clearances (all types)