CONCEPT OF OPERATIONS

SWIM SERVICE LEVEL MANAGEMENT (SSLM)

Version 1.0.0

U.S. FEDERAL AVIATION ADMINISTRATION

SYSTEM WIDE INFORMATION MANAGEMENT (SWIM)

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Preface

The rapid evolution of SWIM is leading to the emergence of new services, new technological solutions for service provisioning, and new interaction and collaboration models. An increasing number of FAA and non-FAA organizations are building their systems and business processes by relying on SWIM services. This new generation of SWIM-consuming systems requires strong guarantees of availability and quality, which cannot be provided by best-effort services.

The SWIM Service Level Management (SSLM) framework presented in this document addresses these challenges and introduces a solution for establishing and maintaining dependable and sustainable relationships between SWIM service providers and consumers.

Implementing SSLM will allow SWIM to better control service provisioning, increase service effectiveness, identify potential areas for improvement, reduce the risk of negatively impacting consumer processes, and enhance the SWIM program's reputation.

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1 Scope

1.1 Identification

This document is identified as “Concept of Operations (ConOps) for SWIM Service Level Management (SSLM).”

1.2 Purpose

This document provides an overview of a proposed process and framework for conducting Service Level Management (SLM) in the context of System Wide Information Management (SWIM). It presents a common methodology for helping SWIM stakeholders understand the purpose of all the activities and relationships involved in SLM.

The purpose of this document is to:

- Provide a clear vision of the intended use and benefits of SLM.
- Achieve consensus among potential SLM stakeholders.
- Lay a foundation for defining the requirements and architecture for the future implementation of SLM in SWIM.

The format of this document is consistent with the outline of a concept of operations document defined in the Institute of Electrical and Electronics Engineers (IEEE) Std 1362-1998 [1].

This document contains the following sections:

Section 1 - Provides an overview of this document and describes the general nature and concept of SLM.

Section 2 - Lists the references to information resources mentioned in this document.

Section 3 - Describes the current situation and the issues that led to the proposed SSLM framework.

Section 4 - Justifies the proposed framework based on the most current information available.

Section 5 - Describes and discusses the concepts of the proposed framework.

Section 6 - Summarizes operational, organizational, and other impacts of implementing the proposed framework.

Appendixes - Provides a non-normative example of a Service Level Agreement template.

1.3 Overview

SWIM is a technological framework that aims to facilitate interoperable, effective, and secure exchanges of Air Traffic Management (ATM) information.

The Federal Aviation Administration (FAA) has established the SWIM program as being responsible for developing, provisioning, and managing a set of highly-distributed, loosely-coupled, and platform-independent services. These services (commonly known as *information services*) make available a wide range of aeronautical, flight planning, meteorological, and other aviation-related information that is vital for ATM decision-makers and operators.

SWIM also enables access to information services through multiple communications middleware technologies. To this end, SWIM provisions a number of services (referred to as *core services*) that provide the capabilities for service discovery, security, mediation, routing, and reliable message exchange.

To ensure consistency of use and interoperability, the SWIM program has established a SWIM Governance component with responsibilities for enabling a set of enforceable policies, rules, and mechanisms for developing, using, and evolving SWIM-based services.

SWIM services and consuming applications and software agents, as well as service provider and consumer organizational entities, together form a complex ecosystem with many levels and interdependencies.

SWIM services are increasingly used by the FAA, private companies and airlines, and international partners. The inability of a service to deliver adequate performance can adversely affect dependent services, ultimately compromising the products delivered to their consumers.

A common solution to the problems of specifying and monitoring services performance is typically found in the notion of Service Level Management (SLM), together with its most recognized instrument, the Service Level Agreement (SLA).

This ConOps is intended to evaluate issues relating to performance levels by SWIM and SWIM-affiliated services, and to discuss the implementation of a Service Level Management framework within SWIM.

2 Referenced Documents

[1] IEEE Std 1362-1998: IEEE Guide for Information Technology System Definition Concept of Operations (ConOps) Document; Software Engineering Standards Committee of the IEEE Computer Society; Approved 19 March 1998

[2] ISO 20000-1 2011; Information technology - Service management - Part 10: Concepts and vocabulary; 2018-09

[3] ISO/IEC 18384-1; Information technology — Reference Architecture for Service Oriented Architecture (SOA RA); 2016

[4] FAA-STD-065 Rev. B, Preparation of Web Service Description Documents, 15 July 2019

[5] WP-10, SWIM Service Category Taxonomy; The Fourth Meeting of System Wide Information Management Task Force (SWIM TF/4); November 2020

[6] IT Infrastructure Library (ITIL) Foundation, 4 Edition; AXELOS Limited; 2019

[7] OASIS Reference Model for Service Oriented Architecture 1.0, 12 October 2006

3 Current Situation

Rapid development of SWIM services within and outside the FAA has prompted the emergence of new collaborating and interacting models and improved approaches to service management. More and more organizations are increasingly relying on SWIM services to support their business processes.

Organizations that consume the services establish expectations regarding operations and performance of the services based on information made available by organizations responsible for provisioning the services, as shown in Figure 1. Subsequently, service consumers use this information to develop consumer software agents or applications to support their everyday operations and decision-making.

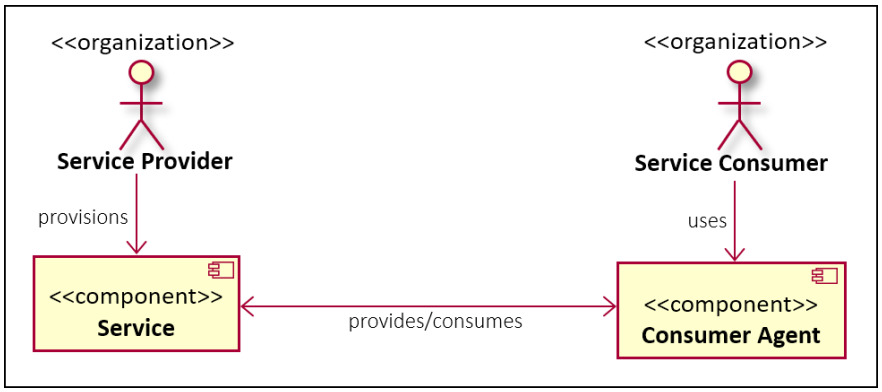

Figure 1 Service-centric ecosystem (core scenario)

The information about service levels can be divided into two categories: *specified* and *observed*. The former is typically provided by a service provider and is derived from service requirements and verification processes. The latter is obtained from user experience or as a result of monitoring service performance and behavior during the service operations.

Issues arise when the service consumer builds systems and processes based on expectations that do not match what is delivered by the provider.

In SWIM, a service's direct interactions with a consumer agent are currently quite rare. The most common scenario is one in which a service relies on intermediary ("core") services of some kind to receive or deliver messages (Figure 2). The subsequent service levels experienced by a consumer are almost always affected by the performance of participating core services.

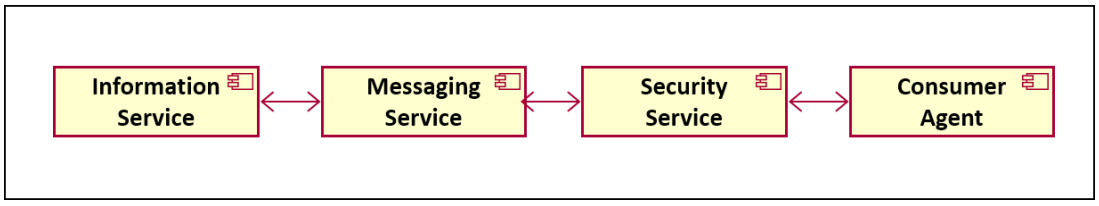

Figure 2 Example (informative) of a service provisioning chain

A similar situation occurs where multiple services are parts of a service composition model and thus collectively deliver a fused product to a consumer (Figure 3). As a result, the service level experienced by the consumer represents an aggregate of service levels of all composite services.

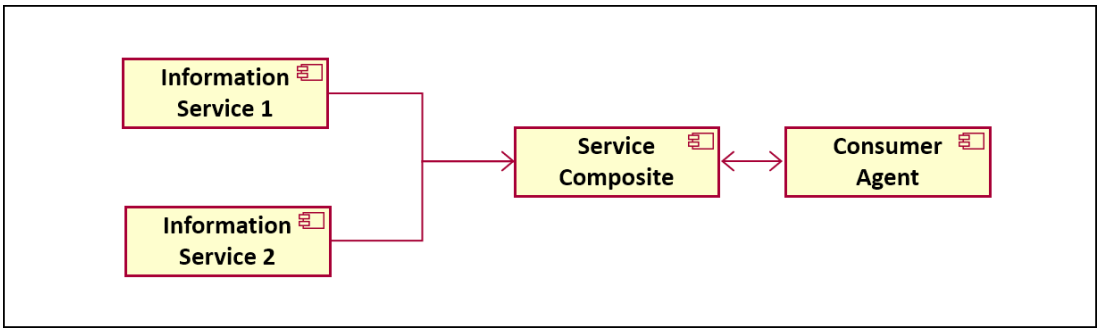

Figure 3 Example (informative) of a service composition

The Cloud solution, which is becoming widespread within SWIM, presents opportunities for integrating multiple service-based solutions and also creates additional challenges in the area of service management.

A common issue presented in all multi-service models described above is having separate providers who are jointly responsible for the product received by a service consumer. Those providers usually have different duties regarding service provisioning and may be connected by different organizational and business relationships.

For example, a SWIM flight information service provider may rely on another SWIM service to support secure data exchange managed by another organization. The same service provider may contract a vendor organization to support messaging capabilities. It is also conceivable for SWIM to function as the integrator in this multi-service solution ecosystem (see Figure 4).

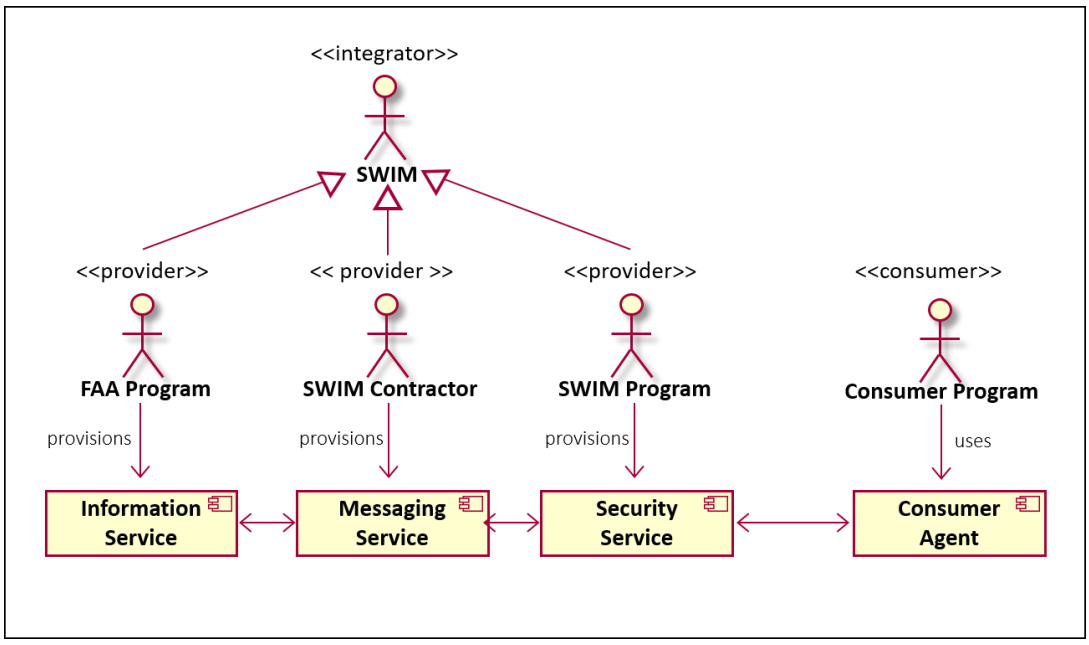

Figure 4 Example (informative) of multi-provider SWIM environment

And even though an environment like this offers many well-known SOA benefits (e.g., reusable, composable, self-contained, loosely coupled), it also poses significant challenges to service consumers who wish to maintain a single set of service expectations, as well as a single point of accountability from the service provider.

Service Level Management (SLM) is recognized as a solution for:

- Setting and maintaining service consumers' expectations and experiences.
- Enabling efficient collaboration between interacting entities (e.g., service providers, consumers, third parties).
- Improving the efficiency of services through constant monitoring, measurement, reporting, and review.

4 Justification for and Nature of Changes

There are some major risks and challenges to be resolved in order for the SWIM program to provide appropriate levels of service, ensure reliable and sustainable interactions between SWIM service providers and consumers, and meet the business objectives of both consumers and providers.

Factors that could negatively affect the current state of SWIM interactions with service consumers from the perspective of service level management include:

1) ***A mismatch between service consumer expectations and actual service offering can occur.***

This issue stems from the consumers not having a clear understanding of service level parameters and the conditions under which the service performs.

For service consumers, the only source of information about service characteristics and parameters is almost always a service description document of some kind. The document is typically made available by a service provider before the service enters the operational stage. It may be prepared as a stand-alone human-readable document, presented as a service registry entry, or rendered in a machine-processable format.

However, relying exclusively on the service description document may lead to some pitfalls for a service consumer, as described in the following examples:

a) As a rule, service descriptions are developed from a service provider's perspective and may not contain information needed by a service consumer.
b) A service description is more likely a derivation of service requirements and may not represent an actual operational or hosting environment.
c) A service description is ordinarily produced by a service provider after completing the service's development and typically reflects service quality on the provider side rather than the consumer side.
d) Every service description describes a single service, one that the consumer wants to use. However, in the case of a service provisioning chain or a service composition, the service level received by the consumer is the aggregate of the service levels offered by all participating services, and it is not provided in the service description(s).

2) There is no documented agreement that defines the service level targets and responsibilities for consumers and providers.

Even if the information furnished by a service provider is complete and accurate, it only describes what the provider intends to deliver and offers no guarantees regarding delivery. A document that describes service provider obligations regarding stated service levels currently does not exist in the SWIM ecosystem.

Presently, service description documents solely focus on describing technical aspects of interoperability between systems (e.g., between services and consumer agents) without addressing mutual responsibility between provider and consumer organizations and their respective roles and obligations.

3) ***A lack of a standard methodology for measuring service levels produces inconsistent results.***

There is no standard set forth by the IT industry or the FAA to define service level metrics or a methodology for their measurement. It is difficult to diagnose and resolve performance issues when service providers and consumers use different methodologies for measuring service levels.

Presently, no document identifies a party responsible for collecting service metrics and how they are collected (this information is not a part of any service description).

4) The monitoring of service performance is limited or insufficient.

In the current SWIM environment, there are few systems designed to monitor service performance. Typically, these systems only report service outages and are not able to calculate service availability against service level targets.

No systems are used to measure and monitor service parameters that may be critical from the consumer's perspective, such as latency, error rate, etc.

4.1 Description of Desired Changes

To address the risks and concerns outlined above, this ConOps asserts a need to take the following steps:

a) Establish a shared understanding of service provisioning, with a focus on clearly defined service levels and targets.
b) Establish a documented agreement between a service provider(s) and consumer(s) that includes clearly defined roles and responsibilities of all participating parties.
c) Verify that SWIM providers meet the defined service levels through the collection, analysis, storage, and reporting of the relevant metrics.
d) Perform service reviews to ensure that the services continue to meet the needs of the organization and its customers.
e) Capture and report service issues, including performance against defined service levels.

4.2 Changes Considered but Not Included

This ConOps considered but did not address the notion of SLM in a Cloud setting. The business and operational model for Cloud adoption and deployment is still an emerging topic in the SWIM environment. And while some successful prototyping has taken place, a detailed description of this subject is deferred to future SLM SWIM documentation.

5 Concepts for the Proposed Framework

5.1 Key Concepts

5.1.1 Agreement

This section describes the types of agreements between organizations involved in providing and consuming SWIM services.

5.1.1.1 Service Level Agreement (SLA)

The most widely used kind of agreement between a service provider and consumer is the Service Level Agreement (SLA).

Service Level Agreement (SLA) – a documented agreement between a service provider and consumer that identifies services and their agreed-upon performance [2].

According to [3], an SLA may specify:

- The set of services the service provider will deliver.
- A sufficient, specific definition of each service.
- The responsibilities of the service provider and the service consumer, and the set of metrics to determine whether the service provider is delivering the service as promised.
- An auditing mechanism to monitor the service.
- The remedies available to the service consumer and service provider if the terms of the SLA are not met.
- How the SLA will change over time.

Figure 5 presents the most "basic" model of the SLA ecosystem, where a single provider is entirely responsible for provisioning a service to a service consumer.

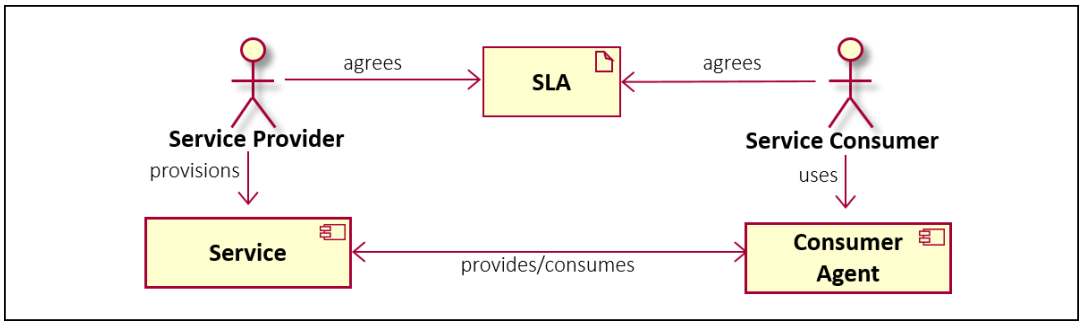

Figure 5 Basic SLA ecosystem

However, as discussed in Section 3, a service provider in the SWIM environment often provides – and accordingly is responsible for – only a portion of a provisioned service. At the same time, a SWIM service consumer desires to have a single point of accountability for received performance.

To manage this situation in the context of an SLA, the service provider should be represented by a single organization that will take responsibility for aggregating and managing service levels across all participating services. Such an organization could be either a SWIM program entity acting as a service integrator, or a provider of a service (commonly an information service, e.g., flight data or NOTAMs) that the consumer seeks to consume.

Figure 6 depicts a notional multi-provider SWIM environment in which SLAs might be established either between the consumer and a service integrator, or an information service the consumer wishes to use (but not both).

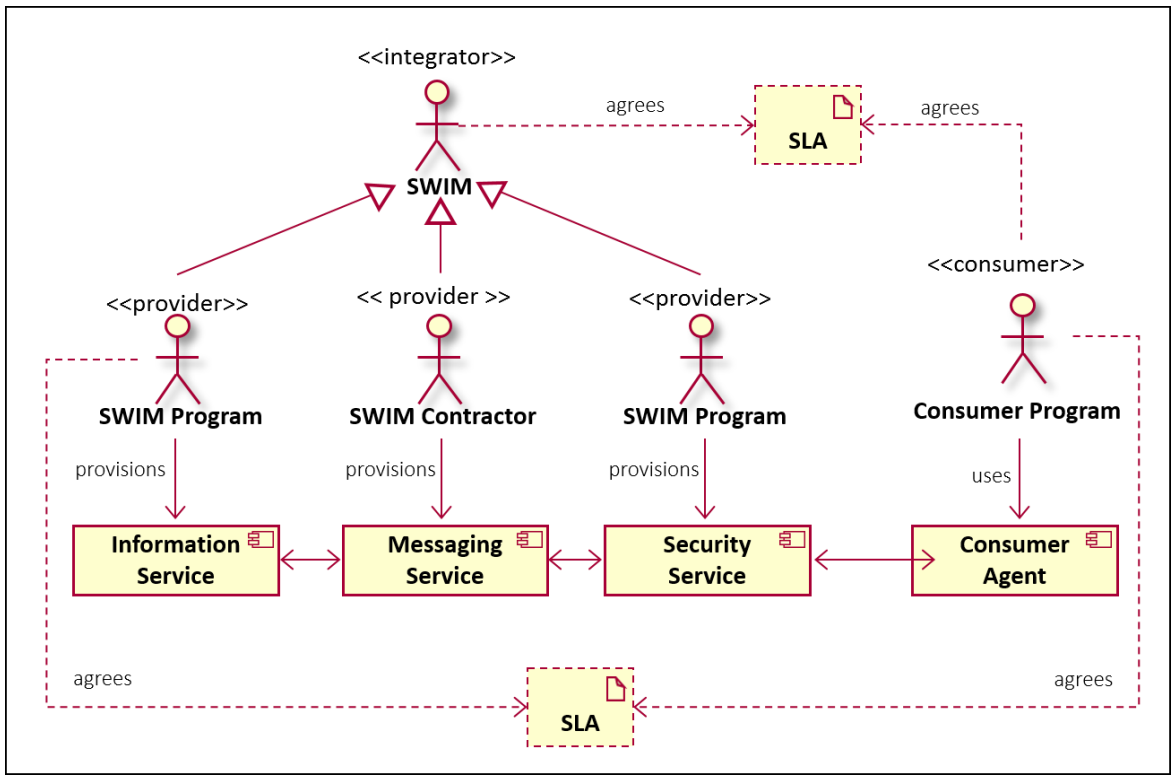

Figure 6 Example of establishing SLA in SWIM multi-provider environment

5.1.1.2 Operational Level Agreement (OLA)

A critical challenge in the provisioning of services involving multiple providers is to aggregate related service levels into a single SLA. For this reason, it might be necessary to establish "back-to-back" agreements that define how different organizations will work together to meet consumer-facing service level agreements. This kind of agreement is known as an Operational Level Agreement (OLA).

Operational Level Agreement (OLA) – a documented agreement between a service provider and another unit of the same organization who both participate in delivering the service specified in the SLA.

From a SWIM perspective, the main difference between an SLA and an OLA is that the former is an agreement between a SWIM service provider and a service consumer, whereas the latter is an agreement between two SWIM programs that are partnering to provide the service to the consumer. Note: This difference is depicted in Figure 7.

The primary function of an OLA is to detail the service levels, responsibilities, actions, processes, and policies required for a consumer-facing service provider to meet a specific SLA. For example, an OLA should include service level targets that may be further aggregated into SLA obligations.

5.1.1.3 Underpinning Contract (UC)

It is common for a SWIM provider or the SWIM program to contract a third party or a vendor, who is external to the SWIM program and/or generally to the FAA, to provide supporting services that enable the service provider to deliver a service to consumers. The third party (contractor) may provide network support, hardware, software management, and other such services. A contract between service providers (or a service integrator) and an external contractor is referred to as an Underpinning Contract (UC) [2].

Underpinning Contract (UC) – a contract between a service provider and a third party. The third party provides supporting services that enable the service provider to deliver a service to a consumer.

Services provided by a contractor frequently affect the performance received by a consumer. Therefore, the role of a UC is to define the service levels and responsibilities that need to be met in order to meet agreed-upon service levels for one or more SLAs.

5.1.1.4 Relationships between Agreements

Three kinds of agreements designed to regulate interactions between various parties engaged in service provisioning have been described in the previous sections. All the agreements share the same objectives and are structurally similar, but their key difference resides in their roles within the SWIM SLM ecosystem.

- An SLA defines an agreement between a SWIM service provider and a consumer, where the provider role may be assumed either by the SWIM organization acting as an integrator or by the SWIM program responsible for developing and managing a specific service. It is common for a consumer to be represented by an organization external to SWIM or to the FAA overall.
- An OLA supports an agreement between two organizations (programs) participating in provisioning a SWIM service to the service consumer. One of these programs may also represent a provider in the consumer-facing SLA.
- A UC is an agreement with an external organization that has a service contract with SWIM or with the FAA. A UC is generally deployed when a service provided by a contractor affects – directly or via a service provisioning chain – service level targets declared in the consumer-facing SLA.

In SWIM, responsibilities for managing agreements may be aligned with the scope and activities typically attributed to a Governance component. However, given the cross-cutting and multifaceted nature of an SLA, experts from other areas such as infrastructure management, security, etc. could be considered for incorporation into SLA management.

Figure 7 illustrates the interdependence of different types of agreements and associated organizations in the SWIM environment.

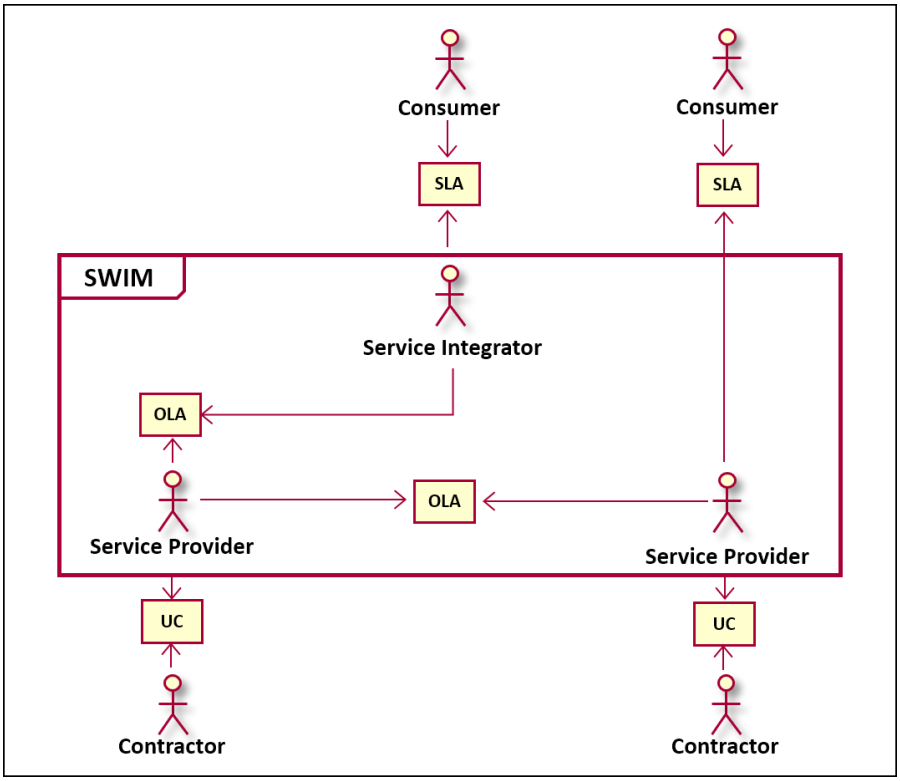

Figure 7 Example of various types of agreements deployed by SWIM-associated organizations

5.1.2 Measurement, Monitoring and Reporting (MMR)

A critical aspect of the implementation of SLM is Measurement, Monitoring and Reporting (MMR).

Measurement, Monitoring and Reporting (MMR) – a set of processes that support continuous measuring, monitoring, reporting, and analyzing service performance metrics to ensure they meet the agreed-upon service level targets.

MMR generally begins after an agreement (see sections 5.1.1.1 through 5.1.1.3) is put in place, with the goal being to ensure that the agreement is not being violated.

An effective MMR encompasses a wide array of activities, including (but not limited to):

- Establishing the key performance indicators (KPI) for evaluating the performance of the services.

- Monitoring services for compliance with service level targets set forth in appropriate agreements.
- Instituting a mechanism for reporting unplanned interruptions to a service or reductions in the quality of the service.
- Determining the actions to be taken in the event of outages, the corresponding responses, and the expected repair time.

In general, the SWIM program is responsible for implementing MMR; however, some tasks are typically handled by other FAA organizations. Consumers may report service interruptions to the FAA service desk, which then channels the information to identified SWIM components.

5.1.3 Service Level Management (SLM)

This ConOps defines Service Level Management as a top-level, all-encompassing concept. All the processes and artifacts discussed herein are realized as either components or extensions of Service Level Management.

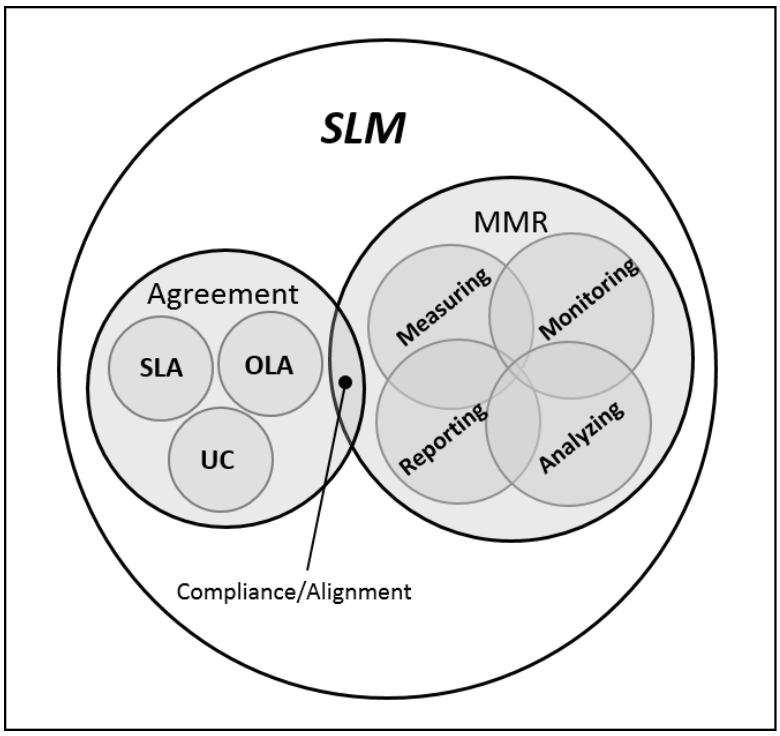

Figure 8 SLM Venn diagram.

The purpose of SLM is to set clear business-based targets for service levels and ensure that service delivery is appropriately assessed, monitored, and managed against these targets. To achieve this, SLM:

- Establishes a shared view of the services and target service levels with customers.
- Ensures that all service and operational level agreements and underpinning contracts are appropriate for the agreed-upon service level targets.

- Identifies metrics and measures that are a truthful reflection of the customer's actual experience.
- Captures data to assess the organization’s compliance with the defined service levels through the collection, analysis, storage, and reporting of the relevant metrics for the identified service.
- Captures and reports on service issues, including performance against defined service levels.
- Performs service reviews to ensure that the current set of services continues to meet the needs of the organization and its customers.

5.2 Use Cases

This section presents a collection of use cases that illustrate how the previously described key concepts can be deployed in the SLM context.

Note: From this point forward, a shorthand notation will be used to denote the actors.

5.2.1 UC01 Establishing SLA

This use case describes establishing an SLA between a single service provider (SP) and a single service consumer (SC).

a. SP develops a draft of the SLA based on the service description and/or other appropriate documents.
b. SP and SC review the draft of the SLA, ensuring that the document accurately represents service level targets and consumer needs.
c. Both SP and SC (or, more precisely, representatives from both organizations) sign the agreement.
d. SP and SC either terminate or update the SLA when it reaches the agreed-upon expiration date.

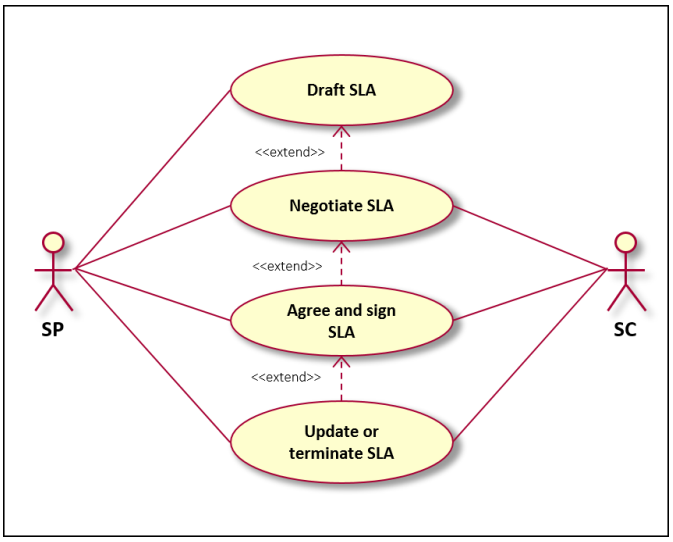

Figure 9 UC01 Establishing an SLA

5.2.2 UC02 Governing SLA

The following use case describes activities supporting the initiation and management of an SLA. This use case is enacted by a new actor, the Service Level Agreement Manager (SLAM).

Service Level Agreement Manager (SLAM) – an individual or organization that manages the creation and use of an SLA between service provider and consumer.

a. SLAM defines an SLA appropriate for the identified SWIM service. This step may include the development of a template (see Appendix A for an example) or a similar mechanism for initiating an SLA.
b. SLAM assists SP in preparation of the SLA to assure consistency with organizational standards and regulations.
c. SLAM assists SP and SC in negotiating the SLA.
d. SLAM regularly verifies the SLA for relevance and sustainability.
e. SLAM stores the SLA to make it available to other organizations that support service level management.

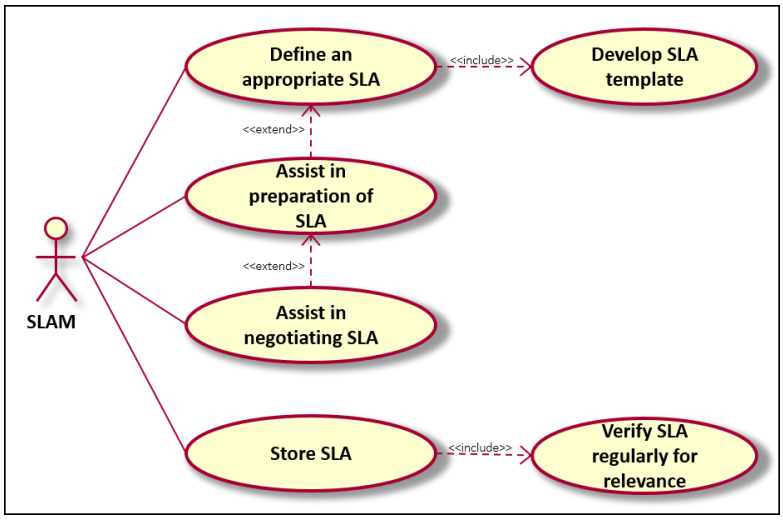

Figure 10 UC02 Governing an SLA

5.2.3 UC03 Maintaining SLA

The following use case is a conjunction of UC01 and UC02. It describes how SP, SC, and SLAM coordinate individual efforts in preparing and sustaining an SLA.

a. SLAM defines an SLA appropriate for identified SWIM service and prepares a suitable SLA template or guidance.
b. SP, with assistance from SLAM, drafts the SLA.
c. SP and SC discuss and negotiate the SLA, while SLAM oversees and assists as needed.
d. SP and SC (representatives from respective organizations) sign the SLA.
e. SLAM regularly verifies SLA for relevance and sustainability. The output of this process is used when SP and SC make a decision about either terminating or updating the SLA.

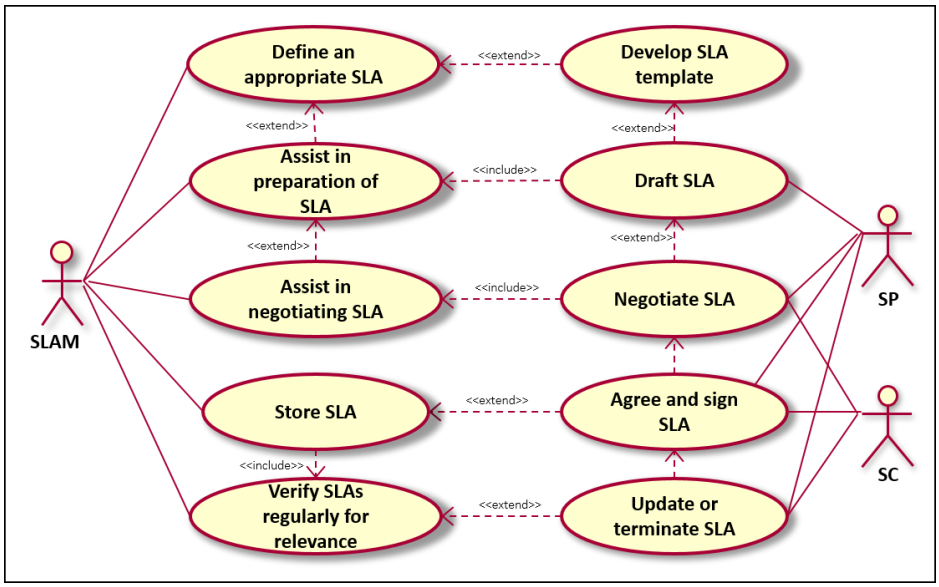

Figure 11 UC03 Conjunction of Establishing and Maintaining SLA

5.2.4 UC04 Implementing MMR

This use case describes Measurement, Monitoring, and Reporting (MMR) activities in the context of SWIM.

The use case requires adding two actors: a Monitoring Manager (MM) and a Service Desk (SD).

Monitoring Manager (MM) – an organizational entity responsible for continuously tracking critical performance indicators using tools and best practices to ensure that the agreed-upon service level targets in an SLA are met.

For example, one organization may be responsible for developing a standard methodology for measuring service levels (e.g., SWIM governance), while another may operate a system that provides a real-time graphical representation of data (e.g., a dashboard). Meanwhile, a third-party vendor may monitor the network infrastructure.

Service Desk (SD) – a person, organization, or software system that acts as a point of communication between service providers and their consumers to support the reporting and resolution of incidents.

Similar to the example of a complex MM structure, the SD in the SWIM environment can be realized through some combination of enterprise-level service desk, helpdesk, and other systems or groups that gather and analyze information about incidents and failures.

a. MM determines which KPIs need to be collected and how they should be calculated.
b. MM continuously monitors the performance of the service and collects relevant data.
c. MM and SP may use a dashboard to monitor the services' performance.
d. In case of failures or incidents, SC notifies SD.

e. SD logs the reported failures and/or incidents and assigns priorities to them.

f. SD escalates information about the failures and/or incidents to more expertise or authority.

g. MM and SD (separately or in coordination) develop a regular review of monitored or reported activities.

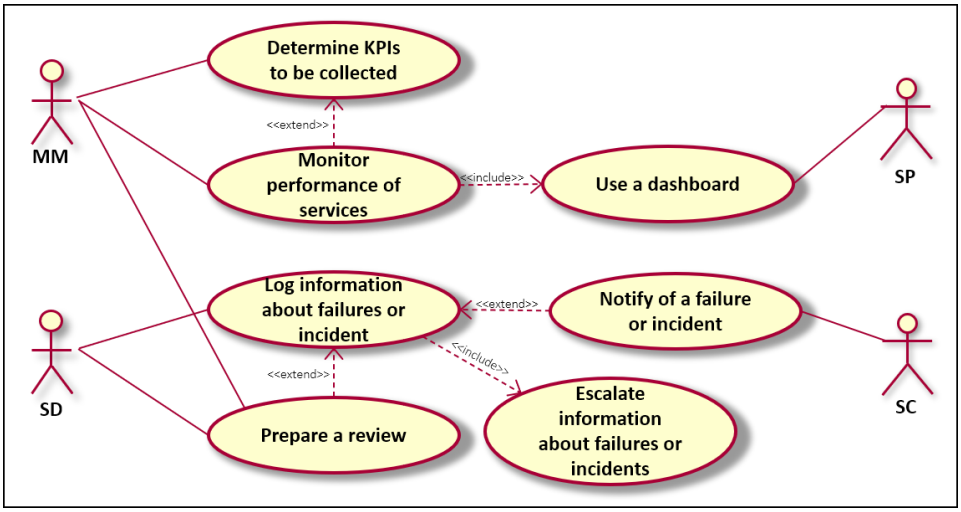

Figure 12 UC04 Implementing MMR

5.2.5 UC05 Implementing SLM in SWIM Context

This use case summarizes all SLM-related activities in the SWIM environment. It encompasses all use cases described in previous use cases (sections 5.2.1 through 5.2.4).

The top-level actor in this use case is the SWIM Program. The SWIM Program does not directly implement any of the said use cases, but delegates SWIM components (e.g., governance, engineering) or external organizations (e.g., enterprise service desk) to enact those use cases.

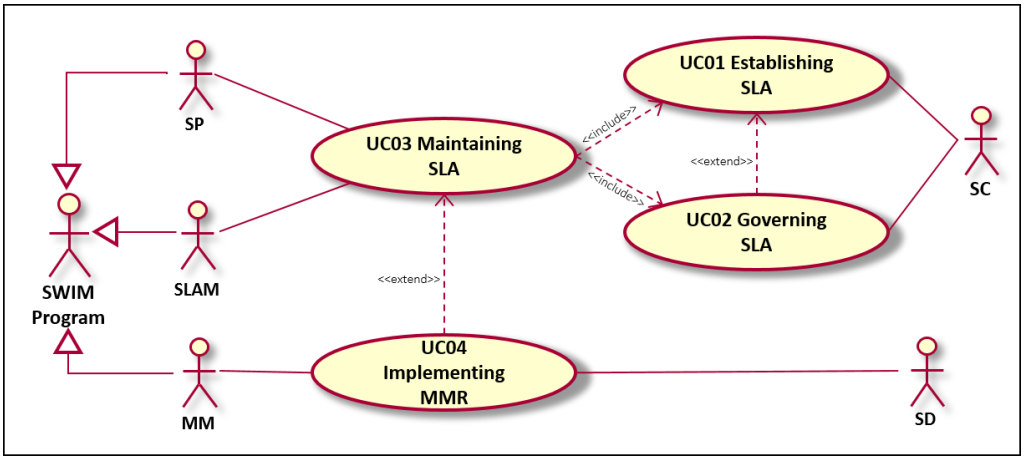

Figure 13 UC05 Implementing SLM in SWIM context

6 Summary of Impacts

In the context of SWIM, the existence of established Service Level Management practices will lead to:

- Setting clear, measurable, and manageable targets for service levels, and assessing, monitoring, and managing service delivery to meet these targets.
- Providing a pragmatic focus on SWIM's aggregated services as a whole, while making each organization in the chain accountable.
- Better aligning SWIM services to the current and future needs of the FAA and its clients, and monitoring customer satisfaction.

7 Glossary

7.1 Definitions

Cloud Services	Infrastructure, platforms, or software that are hosted by third-party providers and made available to users through the internet.
Consumer Agent	A software agent that is designed to interact with a service in order to request that a task be performed on behalf of its owner, the service consumer [4].
Core Service	A service that offers capabilities by which to interconnect, adapt, and facilitate services provided by other parties [5].
Dashboard	A real-time graphical representation of data [6].
Failure	A loss of ability to operate to specification, or to deliver the required output or outcome.
Incident	An unplanned interruption to a service or reduction in the quality of a service [6].
Information Service	A service that offers capabilities for generating, making available, storing, managing, and analyzing information [5].
Key Performance Indicator (KPI)	A metric used to evaluate success in meeting an important objective.
Measurement, Monitoring and Reporting (MMR)	A set of processes that support continuous measuring, monitoring, reporting, and analyzing service performance metrics to ensure they meet the agreed-upon service level targets.
Monitoring Manager (MM)	An organizational entity responsible for continuously tracking critical performance indicators using tools and best practices to ensure that the agreed-upon service level targets in an SLA are met.
Operational Level Agreement (OLA)	A documented agreement between a service provider and another unit of the same organization who both participate in delivering the service specified in the SLA.
Service	A mechanism to enable access to one or more capabilities, where the access is provided using a prescribed interface and is exercised consistent with constraints and policies as specified by the service description [7].
Service Consumer (SC)	An organizational entity that uses the service and maintains a business relationship with the service provider.
Service Desk (SD)	A person, organization, or software system that acts as a point of communication between service providers and their consumers to support the reporting and resolution of incidents.

Service Integrator (SI)	An organizational entity responsible for managing and integrating interdependent services from various internal and external service providers into an end-to-end solution that meets business objectives.
Service Level	One or more metrics that define expected or achieved service quality [6].
Service Level Agreement (SLA)	A documented agreement between a service provider and consumer that identifies services and their agreed-upon performance [2].
Service Level Agreement Manager (SLAM)	An individual or organization that manages the creation and use of an SLA between service provider and consumer.
Service Level Management (SLM)	A framework by which services are defined, service levels required to support business processes are agreed upon, Service Level Agreements (SLAs) and Operational Level Agreements (OLAs) are developed to satisfy the agreements, and costs of services are developed [6].
Service Level Target	A service level that an organization commits to [2].
Service Provider (SP)	An organizational entity responsible for provisioning the service for a service consumer.
Service Provisioning	A set of activities performed by an organization to provide a service. It includes managing the provider's resources, configuring to deliver the service, ensuring access to these resources for users, fulfilling the agreed-upon service actions, service level management, and continual improvement [2].
Service Provisioning Chain	A collection of interconnected services that collectively deliver a product to a service consumer.
Underpinning Contract (UC)	A contract between a service provider and a third party. The third party provides supporting services that enable the service provider to deliver a service to a consumer [2].

7.2 Acronyms

ATM	Air Traffic Management
ConOps	Concept of Operations
FAA	Federal Aviation Administration
IEEE	Institute of Electrical and Electronics Engineers
KPI	Key Performance Indicator
MMR	Measurement, Monitoring and Reporting
OLA	Operational Level Agreement
SC	Service Consumer

SLA	Service Level Agreement
SLAM	Service Level Agreement Manager
SLM	Service Level Management
SOA	Service-Oriented Architecture
SP	Service Provider
SSLM	SWIM Service Level Management
SWIM	System Wide Information Management
UC	(1) Underpinning Contract; (2) Use Case

Appendixes

Appendix A: Example of a Service Level Agreement

The following pages contain a non-normative example of an SLA written for a fictitious "Flight Plan Service (FPS)." The FPS is an imaginary service that has been used in the past for instruction on how to write service requirements and service description documents according to FAA standards and policies. Its full description may be viewed at https://nsrr.faa.gov/services/fps/profile.

The *blue italicized text* that appears in the SLA represents FPS-specific information that would be entered into the template.

It should be emphasized that actual FAA SWIM SLA templates and procedures for SLA usage and governance have not yet been specified.

Service Level Agreement (SLA)

for consumption of *Flight Plan Service (FPS)*

by *Alpha Airline*

Document Identifier: *http://swim.faa.gov/sslm/fps-sla/1.0.0*

Version: *1.0.0*

Effective Date: *October 1, 2022*

1. PURPOSE

This Service Level Agreement (SLA), hereinafter referred to as Agreement, governs the specific terms and conditions in support of the provision and consumption of the *Flight Plan Service (FPS).* It identifies the rights and obligations of the service provider *Federal Aviation Administration (FAA) En Route Services Modernization Group (ESMG)*, hereinafter referred to as Provider, and service consumer *Alpha Airline*, hereinafter referred to as Consumer.

The purpose of this Agreement is to ensure that the proper parameters and obligations necessary to provide consistent service delivery to the Consumer by the Provider are unambiguously stated and agreed upon by all parties involved.

2. TERMS AND CONDITIONS

This Agreement is valid from the Effective Date outlined herein for a maximum period of *5 years*. This Agreement should be reviewed at a minimum once per year; however, in lieu of a review during any period specified, the current Agreement will remain in effect.

Changes, as necessary, will be made through subsequent agreements or amendments to this document.

3. PARTIES

The following list of organizational entities will be used as the basis of the Agreement and represents the primary stakeholders associated with it:

3.1. SERVICE PROVIDER

Name	*FAA En Route Services Modernization Group (ESMG)*
Description	*A program within the FAA Air Traffic Organization responsible for developing SOA services.*

3.1.1. PROVIDER POINTS OF CONTACT

The following represent individuals or groups of individuals who can be contacted for the purpose of obtaining information and/or technical support from the Provider.

Name	*John D. Doe*
Work Functions	*ATO-X ESMG Manager*
E-mail	*Joe.doe@faa.gov*
Phone Number	*(609) 444-5555*

3.2. SERVICE CONSUMER

Name	*Alpha Airline*
Description	*A United States commercial air carrier headquartered in Atlanta, Georgia. Alpha Airline provides air transport services for passengers and freight.*

3.1.2. CONSUMER POINTS OF CONTACT

The following represent individuals or groups of individuals who can be contacted for the purpose of obtaining information and/or technical support from the Consumer.

Name	*Mary H. Lamb*
Work Functions	*Chief Engineer, Alpha Airline Services*
E-mail	*MHLamb@aal.com*
Phone Number	*(404) 123-4567*

4. SERVICE INFORMATION

The following service is covered by this Agreement:

ID	*http://nsrr.faa.gov/services/fps*
Name	*Flight Plan Service (FPS)*
Version	*1.0.0*
Description	*A service for filing, updating, or canceling an IFR (Instrument Flight Rules) flight plan.*

The *FPS* service referenced in this Agreement is defined by the service description document entitled *Web Service Description Document Flight Plan Service (FPS)*. The service description document is governed by *FAA-STD-065 Rev. B, Preparation of Web Service Description Documents* and is accessible at

https://www.faa.gov/air_traffic/technology/swim/governance/standards/media/FAA-STD-065B%207_15_2019.pdf.

5. OBLIGATIONS

5.1. SERVICE PERFORMANCE

5.1.1. Availability

In the context of this Agreement, *availability* is understood as the probability that the service will be operational during an identified period of time.

Provider agrees to ensure service availability as follows:

a. The service is offered *24 hours a day, 7 days a week, 365 days a year (24x7x365)*.
b. The service has a maintenance window described in section 5.3.
c. Provider agrees to maintain an availability value of *0.999* or greater.

The *availability* value is measured as follows:

Measurement Method	(24 – Total Outage Time in Hours) / 24. Measurements are taken daily and apply to the preceding 24-hour period.
Unit of Measure	Probability expressed to 3 decimal places.

5.1.2. Capacity

In the context of this Agreement, *capacity* is understood as the number of service requests that the service can accommodate within a given time period.

Provider agrees to support *20 requests per minute*. Beyond this capacity, all users may see degraded performance in the return of identification information.

The *capacity* value is measured as follows:

Measurement Method	Simple count.
Unit of Measure	Whole positive number, per period of time.

5.1.3. Response Time

In the context of this Agreement, *response time* is understood as the maximum time required to complete a service request.

Provider agrees not to exceed *3* seconds to return a requested message. This response time is limited by the volume capacity described in section 5.1.2.

The *response time* value is measured as follows:

Measurement Method	Measured from the time the provider agent receives the request to the time the service provider transmits the response.
Unit of Measure	Seconds.

5.1.3. Mean Time to Restore (MTTR)

In the context of this Agreement, *Mean Time to Restore (MTTR)* is understood as the average time required to return the service to a pre-determined (available) state after a failure.

Provider agrees to maintain MTTR value *120* minutes or less.

The *MTTR* value is measured as follows:

Measurement Method	The sum of the times to restore service after failures divided by the number of times the service was restored.
Unit of Measure	Minutes.

5.2. PROBLEM REPORTING

In the event of a service problem or disruption:

Provider agrees to:

a. Send an acknowledgement of receipt of the problem to the Help Desk and the Consumer within 30 minutes.

b. Categorize the problem as *Critical* or *Noncritical*.

- *Critical* problems are defined as disruptions of service where the Consumer no longer has access to the service.
- *Noncritical* problems are all other problems that impede or degrade service delivery but do not result in a service disruption.

c. Generate a problem report with corresponding problem category and resolution parameters and provide it to the Consumer.

Consumer agrees to:

a. Report the problem to the Provider and/or Help Desk at the contact points identified in section 3.1 of this Agreement.

5.3. SERVICE MAINTENANCE

Provider agrees to:

a. Perform planned maintenance during regularly scheduled periods of time (“maintenance windows”). During the following times, the service will be unavailable for normal interactions:

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Begin time						10pm EDT	
End time							6am EDT

b. Notify the Consumer at least *24* hours ahead of time about all non-scheduled and emergency maintenance by using the contact information provided in section 3.2 of this Agreement.

5.4. CHANGE CONTROL

Provider agrees to:

a. Notify the Consumer about planned changes to the service at the beginning of the planning stage or six (6) months prior to the target date on which the new version will become operational, whichever comes first.

b. Maintain an active version of the service for at least twelve (12) months after release of the new version.

Consumer agrees to:

a. Utilize the most recent release within twelve (12) months of general availability.

5.5. VERSIONING

Provider agrees to:

a. Version each release of the service according to the guidance set forth in *SWIM-005, Artifacts Versioning for SWIM-enabled Services*, accessible at *https://www.faa.gov/air_traffic/technology/swim/governance/standards/media/SWIM%20Service%20Versioning%20Spec.pdf*.

b. Maintain each version of the service description in the NAS Services Registry and Repository (NSRR), accessible at https://nsrr.faa.gov/ (login required).

Consumer agrees to:

a. Utilize the most recent release within six months of general availability.

b. Utilize only versions of the service that are actively maintained by the Provider. Consumers using versions no longer maintained by the Provider are subject to loss of access to the service.

5.6. DOCUMENTING

Provider agrees to:

a. Document, maintain, and publish the description of the service and service-related documentation as prescribed by *SWIM Governance Policies Version 3.1*, accessible at

https://www.faa.gov/air_traffic/technology/swim/governance/standards/media/SWIM%20Governance%20Policies%20v3.1_20200206_Final.pdf

5.7. SECURITY

Consumer agrees to:

a. Conform to the following security policies:
FAA Order 1370.121B, FAA Information Security and Privacy: Policy, FAA, 25 April 2022, accessible at
https://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentID/1040976

b. If any action by the Consumer or Consumer agent takes place that adversely impacts the service's ability to operate, e.g., security policy infraction, misuse of service capacity, etc., the Provider has the right to terminate use of the service until the impacting conditions are remedied.

6. SIGNATORIES

FAA En Route Services Modernization Group (ESMG)	*Alpha Airline*
John D. Doe	*Mary H. Lamb*
9/28/2022	9/28/2022