



**Approved by the NextGen Advisory
Committee September 2013**
NextGen Prioritization

*A Report of the NextGen Advisory Committee in Response to Tasking from
The Federal Aviation Administration*

September 2013

MESSAGE FROM THE NAC CHAIRMAN

Tough Times Call for Tough Choices

By Bill Ayer, Chairman, Alaska Group and Chair of the NextGen Advisory Committee

September 2013

Just two months after receiving the request from the FAA, the NAC is pleased to deliver recommendations on the top priorities for NextGen that document a very meaningful and significant accord among many diverse and competing aviation system stakeholders. While the latest round of potential budget cuts further threatens the NextGen program, it is the consensus of the NAC that, regardless of fiscal realities, it is always good business practice to drive investment decisions based on a set of priorities. As Deputy Administrator Mike Whitaker stated at the September 19th NAC meeting in Washington, this prioritization was not a budget exercise – the FAA simply needs to know industry’s priorities. We all recognize that unlike previous air traffic management modernization programs, NextGen requires significant investment not only on the part of the government, but also of those who operate in the system.

First, I want to thank the FAA Administrator, Michael Huerta, and Deputy Administrator, Mike Whitaker, for entrusting the NAC with the task of coalescing the industry’s point of view on NextGen priorities. The NAC appreciates the FAA’s acknowledgement that NextGen is a partnership, as is manifested in their continued collaboration with industry on NextGen decisions. I also want to thank the committee members, especially the NAC Subcommittee members who deliberated tirelessly to achieve this consensus. Prioritization is simply the most important task we have undertaken and the most important set of recommendations we have delivered to the FAA since our inception. Actions taken on these recommendations could shape the future of NextGen and ensure its long term viability.

While the report stands on its own, several key points merit emphasis:

1. The priorities were forged based on the shared assumptions documented in the report.
2. All eleven capabilities included in Tier 1 are equally important and implementing the full set is essential to maintaining the consensus of the NAC.
3. Included as part of the recommendations are an important set the principles the NAC believes should guide the implementation of NextGen. Most notably among them is the NAC’s strong contention that to succeed in implementing Tier 1, the FAA must be given the flexibility to ensure all necessary resources are applied to implement the eleven capabilities, throughout their lifecycle and regardless of budget levels or certainty.

To forge consensus on these recommendations, the members of the NAC and the NAC Subcommittee displayed a level of collaboration and unanimity of purpose that transcended their individual agenda. The resulting recommendations are intended to lead to improvements in overall air traffic system performance. We stand ready to assist the FAA in the next steps, and look forward to sitting down with key FAA officials to answer any questions you have about this report.

NextGen Prioritization

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NextGen Priorities in a Budget Constrained Environment

Background/Introduction

In July 2013, the FAA requested the NextGen Advisory Committee (NAC) to develop recommendations related to the Agency's NextGen investments.¹ According to the FAA request, "the Taskings, NextGen Activity and Prioritization and Revised Prioritized List of NextGen Integrated Capabilities and Locations, are in response to the uncertainty around funding for NextGen projects."

In light of budget pressures and possible sequestration impacts, the NAC was requested to review current FAA plans and activities that have an effect on the implementation of NextGen² and develop a prioritized list of Tier 1 (consensus on activities that should continue no matter what) and Tier 2 (consensus on activities that should continue, resources permitting) recommendations. The NAC was requested to complete this work and present the report at the September 19, 2013 NAC meeting.

This task included the following activities:

1. NextGen Activity Prioritization

In light of budget pressures and possible sequestration impacts, review current FAA plans and activities that have an effect on the implementation of NextGen and develop a prioritized list of Tier 1 (consensus on activities that should continue no matter what) and Tier 2 (consensus on activities that should continue, resources permitting) recommendations. This task would include the following activities:

- a. Identify relevant activities within FAA that have an impact on NextGen implementation
 - i. Review the NextGen Implementation Plan (NGIP) as well as previous NAC recommendations for integrated capabilities and non-technical barriers to NextGen and other relevant information
- b. Establish criteria for prioritizing activities into Tiers 1 and 2
 - i. Criteria to consider benefits, costs and risks, ripple effects/interrelationships along programs and activities
- c. Apply criteria to list of relevant activities and complete prioritization
- d. Produce Tier 1 and Tier 2 list

2. Revised Prioritized List of NextGen Integrated Capabilities and Locations

¹ Letter from Michael P. Huerta (FAA Administrator) to Margaret Jenny (RTCA President) dated July 12, 2013.

² The scope of the NAC prioritization efforts is limited to areas associated with NextGen implementation. The budget expenses could encompass Facilities and Equipment, Operations and Maintenance or Research and Development.

- a. Starting from previous NAC integrated capabilities recommendations (May 2012 NAC) and taking into account reduced budgets and current FAA NGIP, develop a shorter (i.e., 3-5) list of locations for deployment of selected capabilities in the near-term.
- b. Selection criteria to include, among others: (1) risk assessments, (2) costs, (3) benefits, (4) network/system-wide effects.

Executive Summary

The NAC followed a process that incorporated an analytic, transparent, repeatable, defensible approach to prioritizing NextGen capabilities and related activities. This approach entailed applying a ranked list of weighted criteria against a candidate list of capabilities and activities. Based on the FAA request, the work of the NAC was conducted in as agile, and comprehensive a manner as the accelerated timelines allowed. The Committee also specified a set of underlying assumptions to guide its work and a set of guiding principles to inform the FAA as it considers these recommendations and sets its priorities for NextGen investments³.

The NAC used the following criteria and weightings to carry out its prioritization task⁴. (Numbers following each criterion represent the relative weights assigned to that criterion.):

- Benefits (Monetizable) – 46%
- Benefits (non-Monetizable) – 13%
- Implementation Readiness – 28%
- Other Considerations – 13%
 - Global Harmonization
 - Confidence Building
 - Foundational Critical Infrastructure

The overall results of applying these rankings against a list of 36 NextGen capabilities derived from FAA planning documents yielded an outcome very consistent with previous recommendations from the NAC, as well as those made by Task Force 5 (TF5) (see Appendix D for this comparison).

The Committee was presented a sensitivity analyses to determine the effects of changing the relative rankings and determined that the top five or six were consistent. To ensure that the recommendations were not too heavily weighted toward those things that are low risk and high benefit (the so called “low hanging fruit”) at the expense of some potentially high benefit capabilities that ranked low in implementation readiness, the group looked at those capabilities that were high in benefits and medium or low in implementation readiness. To accomplish this and provide additional fidelity to the recommendation, the capabilities were broken down by tiers, recommending items that are deemed:

³ If necessary, the FAA should seek reprogramming authority to carry out the prioritization recommendations.

⁴ The scope of the prioritization recommendation did not include the FAA costs of the programs.

- High in benefit and readiness (Tier 1A)
- High in benefit and low or medium readiness (Tier 1B)
- Medium benefit and high readiness (Tier 2)
- All other capabilities

Methodology

To begin this initiative, the NAC established a set of assumptions to guide its prioritization work and guiding principles as input for the FAA in its prioritization efforts. Next, to ensure a transparent and defensible outcome, the NAC first reached consensus on the criteria it would use to prioritize among the list of candidate initiatives and then weighted the criteria. Following this, the Committee reached consensus on the list of candidate capabilities that were considered within scope of this task, namely those things that are related to the implementation of NextGen. To facilitate the work of the NAC, NACSC and meet the tight time frame for completing the work, RTCA employed a decision support model.⁵ An important element of this process was the ability to vote on the criteria as well as the candidate capabilities.

The capabilities originated from the FAA's 2013 NextGen Implementation Plan (NGIP) and the NextGen Segment Implementation Plan (NSIP) documents but were aggregated to a level that made the size of the list more manageable while maintaining enough fidelity to produce meaningful recommendations. The items on the candidate list are traceable back to those documents. The NACSC played an important role in the process by applying its expertise in the details associated with the specific capabilities to evaluate these against the list of ranked and weighted criteria.

Throughout the project, the FAA provided relevant subject matter experts to inform the Committee on its constraints and to help identify those activities considered to be in scope for consideration, but they did not participate in the deliberations and final decisions regarding the recommendations.

Assumptions

The NAC made the following assumptions as a basis for its work:

- Sequestration will affect budgets for the foreseeable future.
- Providing a prioritized list of capabilities can inform the FAA no matter which financial option occurs.
- Community consensus on NextGen investments necessary for NextGen is critical.
- The implementation of NextGen capabilities should have a business case with a positive ROI regardless of budget circumstances.
- Aircraft operators continue to invest in updated aircraft/equipage based on a positive ROI and anticipate the removal of barriers to gain their return on investment in these new capabilities.

⁵ Additional information is available at <http://www.decisionlens.com/products/software/>

- NextGen should leverage forward fit (purchase of new generation aircraft) and equipage modernization underway by aircraft operators and expedite delivery of relevant capabilities accordingly.
- Mixed equipage will remain for many capabilities – it is an on-going process and a reality that must continually be addressed.
- Expanding the use of PBN is foundational and will become the norm for aircraft operations.
- Scope of this prioritization task is limited to NextGen capabilities. It is assumed that the FAA will decommission unused or obsolete infrastructure or consolidate existing facilities as required to achieve maximum fiscal benefit without degrading system safety or access.
- Subject matter experts will transfer the lessons learned from one NextGen implementation experience to subsequent ones, most notably from one Metroplex implementation to the next.

Guiding Principles

The NAC established the following principles to provide the FAA with consensus on key drivers in their prioritization of the NextGen investments:

- NextGen investments enhance safety.
- Delivering tangible, measurable benefits is crucial to encouraging NextGen investments.
- It is better to fund capabilities at a level required to deliver benefits and drive to 100% completion of a single capability than to cut x% from everything and/or delay everything. Funding must include all necessary resources including personnel, training, etc.
- It is imperative that all high priority initiatives are not only fully funded, but also have all the necessary resources allocated, including participation of the key stakeholders, especially air traffic controllers.
- Those initiatives with a validated operational concept and a positive business case that are in a critical stage of implementation should be considered for continued investment.
- Timing matters – Operator’s business case for investment in NextGen capabilities are predicated on commitment on the part of the FAA to deliver capabilities by defined dates.
- Right size the investments – deploy NextGen capabilities at locations where measurable benefits can be achieved.
- It is important to have “scalability” of capabilities across the NAS (capabilities deployed in one location could then be deployed across the National Airspace System).

- Metrics is an overarching issue and it is critical to define goals associated with the key NextGen metrics, establish baseline measures, and continue to track and report progress on these metrics in a public forum.

Criteria

To ensure a transparent and defensible outcome, the NAC reached consensus on the following criteria, associated definitions, weightings and rating scales. These were developed based on work conducted by TF5 and previous NAC recommendations.

1. Monetizable Benefits
2. Non-Monetizable Benefits
3. Implementation Readiness (including risk mitigation)
4. Other: (Enhance Global Harmonization, Increase Confidence, Is a Critical Infrastructure Element of NextGen)

Benefits (Monetizable)

Weighting: 46.2%

Sub Criteria	Definition
Operator	
Capacity	<p>This criterion will be used to assess how much the capability will increase capacity.</p> <p><i>SAMPLE MEASURES</i> Airport and Metroplex throughput Airspace capacity in weather events Deconflict airports</p>
Efficiency	<p>This criterion will be used to assess whether the investment increases efficiency.</p> <p><i>SAMPLE MEASURES</i> Fuel use, blocked time lengths, terminal and flight time, airport and airspace. Reduction in passenger delays Reduction in delay minutes Increased predictability Deviation from scheduled block time Scheduled block time Deviation from flight plans and flight time</p>
Societal	
ATC System Productivity	<p>This criterion will be used to assess improvements in the ATC System Productivity.</p> <p><i>SAMPLE MEASURE</i> ATC cost per hour</p>

Environmental	<p>This criterion will be used to assess the impact on the environment by the ATC.</p> <p><i>SAMPLE MEASURES</i> Reduction of emissions Reduction in noise</p>
Rating Monetizable Benefits	Scale Definition
High	The capability delivers significant benefit to stakeholder groups in all categories (Capacity, ATC System Productivity, Environmental).
Medium	The capability delivers significant benefit to stakeholder groups in 3 or more categories AND has no perceived negative impact on any of the other categories.
Low	The capability delivers significant benefit to stakeholder groups in 3 or fewer categories and may have a perceived negative impact on one of the other categories.
N/A	The operational capability has a minor negative impact on stakeholders and delivers little or no significant benefit.
Showstopper	The negative effects of the operational capability are a show stopper.

Benefits (Non-Monetizable)

Weighting: 12.8%

Sub Criteria	Definition
Access	<p>This criterion will be used to assess the operator’s access to resources that are essential to meeting the objectives of an operation, including airspace, airports and services.</p> <p><i>SAMPLE MEASURES</i> Civilian use of Special Activity Airspace Airports with all-weather approaches or options Ability to operate UAS in airspace for civilian and public aircraft DoD access to airspace Access to Metroplex environment Ability to operate commercial space flights</p>
Flexibility	<p>This criterion will be used to assess the operator’s ability to plan, carry out and adjust their operations and/or schedules, especially during irregular operations due to things such as adverse weather.</p> <p><i>SAMPLE MEASURES</i> Flight plans approved Number of TFM restrictions</p>
Safety	<p>This criterion will be used to assess whether the capability delivers improvements in situational awareness for pilots and controllers and/or improves operational decision making.</p>

	<p><i>SAMPLE MEASURES</i></p> <p>Number of operational errors Reduce rates of accidents Reduce rates of incidents Reduce unstabalized approaches Reduce pilot-controller communication errors</p>
Security	This criterion will be used to assess whether the capability would stimulate improvements in physical and cyber security.
Rating non-Monetizable Benefits	Scale Definition
High	The capability delivers significant benefit to stakeholder groups in all categories (Access, Flexibility, Safety, Security).
Medium	The capability delivers significant benefit to stakeholder groups in 2 or more categories AND has no perceived negative impact on any of the other categories.
Low	The capability delivers significant benefit to stakeholder groups in 3 or fewer categories and may have a perceived negative impact on one of the other categories.
N/A	The operational capability has a minor negative impact on stakeholders and delivers little or no significant benefit.
Showstopper	The negative results of the operational capability are a show stopper.

Implementation Readiness

Weighting: 28.3%

Sub Criteria	Definition
Standards and Approvals	<p>This criterion will assess the extent to which Standards, Approvals, Certifications and Regulatory Guidance as well as Equipage are in place.</p> <p><i>SAMPLE MEASURE</i> Need for rule making</p>
Policy/Ops	This criterion will be used to assess the extent to which Training, valid Concept of Operations (ConOps) and Procedures are in place. It also takes into account Site Readiness including the degree of acceptance by local stakeholders.
Systems	This criterion will be used to assess whether aircraft and ground infrastructure, automation and decision support tools are ready (ex. ERAM). This criterion also addresses the level of integration among systems that is required to achieve operational benefits. It also takes into account the extent to which there are a lot of elements already in place.

Institutional	<p>This criterion will be used to assess the extent to which the required institutional, cultural changes, or new policies or political considerations have been mitigated.</p> <p><i>SAMPLE MEASURES</i> Scope of the change Extent of stakeholder alignment around the change The extent of institutional/organizational change required to implement</p>
Roles & Operational Complexity	<p>This criterion will be used to assess the extent to which the changes in the role of the pilots, controllers or dispatchers have been made to enable the capability. The complexity of implementing the capability includes changes to airspace, equipage, traffic flow management, requirements and the need for integrated decision support tools.</p>
Community Perceived Noise and Emission Impact	<p>This criterion will be used to assess whether the mitigations are in place to counter noise or emissions impacts.</p> <p><i>SAMPLE MEASURE</i> The potential for a community to perceive a negative impact on noise</p>
Time to Completion	<p>This criterion will be used to assess the amount of time required to derive the intended benefit from the capability.</p> <p><i>SAMPLE MEASURES</i> Incremental Transition Decisions/ Plans (ground systems, interim aircraft capabilities etc)</p>
Rating Implementation Readiness	Scale Definition
Highly Ready	Needed elements are already in place to achieve the operational capability.
Moderate Readiness	Elements are achievable with nominal lead times for the needed timeframe (2018). Low risk to complete.
Low Readiness	Significant intervention is required to ensure the elements are in place in the needed timeframe (2018).
Showstopper	Required elements cannot be available in the needed timeframe (2018).
Not Applicable	Elements are not required to achieve the operational capability.
Don't Know	No information is known

Other Considerations

Weighting: 12.7%

Sub Criteria	Definition
Global Harmonization	This criterion will be used to assess whether the capability will enhance global harmonization. It will also take into account the

	degree of interoperability of procedures needed.
Rating Global Harmonization	Scale Definition
High Impact	It is a capability called out in an ICAO Aviation System Block Upgrade (ASBU) and helps maintain US leadership in aviation.
No Impact	The capability does not require harmonization.
Negative Impact	Implementation of this capability would be contradictory to the direction of the rest of the global aviation community.
Confidence Building	This criterion will be used to assess whether the capability increases the aviation stakeholders' confidence in industry and FAA's ability to deliver on commitments (early delivery of benefits) leading to higher probability of positive business case for equipage.
Rating Confidence Building	Scale Definition
Strong Positive Impact	Will greatly increase likelihood of a positive return on investment related to this or subsequent related capabilities.
Moderate Positive Impact	Will modestly increase likelihood of a positive return on investment related to this or subsequent related capabilities.
Minimal Positive Impact	Will only minimally increase likelihood of a positive return on investment related to this or subsequent related capabilities.
Neutral / No Impact	Will not increase likelihood of a positive return on investment related to this or subsequent related capabilities.
Negative Impact	Will be perceived as having a negative return on investment related to this or subsequent related capabilities.
Foundational Critical Infrastructure	This criterion will be used to assess the degree to which this capability provides a foundational critical infrastructure component of NextGen or is required to be compliant with mandates.
Rating Foundational Critical Infrastructure	Scale Definition
Essential	To future benefits-yielding NextGen capabilities or to cost-cutting measures.
Very Important	To future benefits-yielding capabilities or to cost-cutting measures.
Moderately Important	To future benefits-yielding capabilities or to cost-cutting measures.
Marginally Important	To future benefits-yielding capabilities or to cost-cutting measures.
No Impact on NextGen	Or considered not essential to ability to deliver NextGen benefits at reasonable cost or to cost cutting measures.

NextGen-Related Activities

Working with the FAA, the NAC identified the following NextGen-related initiatives as the candidate list to prioritize. The list was derived from the NGIP and the NSIP that were also evaluated against

capabilities identified by TF5 and previous recommendations from the NAC. The list (contained in Appendix C) is aggregated from the much longer list of Operational Improvements (OIs) in the FAA documents, and all are traceable back to those OIs. The aggregation was carried out to enable the following outcomes: (1) produce a more manageable number of capabilities to prioritize while (2) ensuring an appropriate level of fidelity to ensure meaningful recommendations, and (3) produce a prioritized list that the FAA can more easily digest back into its planning processes.

NGIP/NSIP PORTFOLIO		Consolidated CAPABILITY / ACTIVITY	Description
Surface Ops	1.	Data Sharing	Share data on movement of traffic on surface
	2.	Situational Awareness – ADS-B	Display target for ground equipment on ATC display and aircraft displays TIS-B for ground equip and aircraft on surface
	3.	Revised PDC via DataComm	Deliver revised PDC to pilot pre-flight via DataComm
Surface/Terminal	4.	Surface/Terminal Alerting (ADS-B In)	Automated Terminal Proximity Alert (ATPA) provides situational awareness and alerts to controllers ADS-B In Traffic Situational Awareness on the Airport Surface
Low Vis Approaches	5.	GLS I	GLS I – precision approaches
	6.	GLS II/III	GLS II-III – precision approaches
	7.	EFVS	Enable use of enhanced flight vision systems to conduct approach and landing in low visibility conditions
	8.	Advanced EFVS	Using EFVS for Lower Than Standard Approach Minima Operations and Takeoff
Multiple Runway Ops	9.	Sep standards reduced (CSPO)	Reduced lateral separation for runways closer than 4300 ‘ and 2500’ SATNAV or ILS for parallel runway ops
PBN	10.	OAPM	Expedite OAPM, leverage categorical exclusions (based on RTCA priorities), increase emphasis on OAPM
	11.	PBN	PBN/RNAV, RNP AR Large scale airspace redesign
	12.	Advance PBN	New function – upload dynamic PBN procedures (Advanced RNP)

NGIP/NSIP PORTFOLIO		Consolidated CAPABILITY / ACTIVITY	Description
TBFM	13.	Metering/Merging/Spacing (Enroute and Terminal) (Ground-based)	Ground automation-based time-based metering, merging and spacing
	14.	Interval Management (IM) (ADS-B)	IM in cruise phase of flight Terminal IM, single stream of aircraft
	15.	Advanced Flight deck Interval Management (FIM)	Terminal IM for multiple streams of aircraft
CATM	16.	Flight Planning Feedback	Ability for operators to get feedback on NAS constrains during fight planning process Collaborative Trajectory/Flight Planning
	17.	Airborne Rerouting -TFM	Traffic Manager ability to propose reroutes and amend for weather or other constraints
	18.	Modeling, improved predictions	Enhanced modeling for better demand/capacity balance predictions
	19.	CDM	Collaborative Arrival, Departure, Enroute Planning
	20.	Separation Services (reduced separation) (ADS-B Out)	Expanded use of 3-nm separation standards Reduce aircraft separation standards Increased access to low altitude, non-radar airspace
Separation Management	21.	Terminal Controller Proximity Alerting	Alerts controllers when compression between subsequent aircraft is likely to result in unsafe separation
	22.	In Trail Procedures (ITP) (ADS-B)	Enable aircraft equipped with ADS-B and appropriate on-board automation to climb and descend through altitudes where current non-ADS-B separation standards would prevent desired altitude changes
	23.	Oceanic DataComm (ATN Services)	Extend Data Communications services beyond satellite and FANS 1/A to aircraft having the ATN baseline 1 application package
	24.	Advanced ATOP Applications	Numerous enhancement to the ATOP system
	25.	Enhanced Conflict Detection	Enhanced conflict probe for

NGIP/NSIP PORTFOLIO		Consolidated CAPABILITY / ACTIVITY	Description
			Enroute controller (a/c to a/c and a/c to airspace)
	26.	CPDLC, Weather Reroute (DataComm, FANS 1/A)	Basic CPDLC and reroutes around weather for DataComm-equipped aircraft (FAN 1/A, VDL 2)
	27.	DataComm ATN B2 Services	DataComm ATN B2 services (CPDLC, 4D TRAD, FIS)
	28.	New DataComm Applications	New DataComm Applications with ATN B2 (Advanced PBN, Advanced FIM, ATC Winds)
	29.	Enroute PBN	Automation will then reduce conformance bounds used in conflict detection algorithms for aircraft with RNAV/RNP based on performance criteria adapted for the route and aircraft capabilities, allowing the system to take advantage of the reduced separation of the routes while maintaining safe operations
	30.	Wake Re-Categorization & Wake Separation	Improve throughput at capacity constrained airports maintaining or improving wake safety Revised separation based on wake information
	31.	Oceanic User Requests	Enable aircraft to stay closer to preferred route
On-Demand NAS Info	32.	NAS information to stakeholders (Near-Term)	Provide information to stakeholders on status of NAS resources.
	33.	NAS information to stakeholders (Far-Term)	Provide more sophisticated and more real-time NAS status information
Weather	34.	Common Weather Info DB	Access to common aviation weather picture, using global and open standards
Core Infrastructure	35.	SWIM Ground	Provides policies and standards to support NAS data management, secure its integrity and control its access and use.
	36.	SWIM Air	Airborne Access to SWIM (AAtS) enables in-flight aircraft access to information available through SWIM. AAtS extends

NGIP/NSIP PORTFOLIO		Consolidated CAPABILITY / ACTIVITY	Description
			these capabilities to the cockpit through third party communication vendors, providing Internet access on the flight deck, for example on an EFB. Although AATS aircraft guidance is complete, AATS implementation is still in development.

Recommendations

The following overall ranking was derived by a previously described decision support tool process which involved voting on the application of the four criteria to the list of 36 candidate consolidated capabilities. The outcome reflects the results of the voting.

Alternative Name	Candidate #	Score
PBN	11	0.815
Multiple Runway Ops - Sep standards reduced (CSPO)	9	0.749
Surface Ops - Data Sharing	1	0.711
TBFM -Metering/Merging/Spacing (Enroute and Terminal) (Ground-based)	13	0.706
Separation Management - Wake Re-Categorization & Wake Separation	30	0.673
PBN - OAPM	10	0.648
Separation Management (reduced separation) (ADS-B Out)	20	0.633
CATM - Flight Planning Feedback	16	0.633
On Demand NAS Info- Near Term	32	0.628
Separation Management - CPDLC, Weather Reroute (DataComm, FANS 1/A)	26	0.628
CATM-CDM	19	0.626
Surface/Ops - Revised PDC via DataComm	3	0.621
Core Infrastructure - SWIM Ground Based	35	0.618
Separation Management - Enroute PBN	29	0.608
Separation Management - Terminal Controller Proximity Alerting	21	0.601
CATM - Airborne Rerouting -TFM	17	0.600
Separation Management - In Trail Procedures (ITP) (ADS-B)	22	0.597
Low Vis Approaches - GLS I	5	0.571
Separation Management - Oceanic User Requests	31	0.562
Separation Management - Enhanced Conflict Detection	25	0.561
Weather - Common Weather Info DB	34	0.551
On Demand NAS Info - Far Term	33	0.543
Separation Management - DataComm ATN B2 Services	27	0.534
TBFM - Interval Management (IM) (ADS-B)	14	0.530

TBFM - Advanced Flight deck Interval Management (FIM)	15	0.517
Surface Ops - Situational Awareness ADS-B	2	0.512
Low Vis Approaches - GLS II and III	6	0.510
Separation Management - Advanced ATOP	24	0.510
Separation Management - New DataComm Applications	28	0.503
CATM - Modeling, improved predictions	18	0.503
Core Infrastructure - SWIM Airborne Based	36	0.496
Low Vis Approaches - EFVS	7	0.495
Separation Management - Oceanic DataComm (ATN Services)	23	0.489
PBN - Advanced PBN	12	0.478
Low Vis Approaches Advanced EFVS	8	0.457
Surface/Terminal - Surface/Terminal Alerting (ADS-B In)	4	0.439

The Committee was presented a sensitivity analyses to determine the effects of changing the relative rankings and determined that the top five or six were consistent. To ensure that the recommendations were not too heavily weighted toward those things that are low risk and high benefit (the so called “low hanging fruit”) at the expense of some potentially high benefit capabilities that ranked low in implementation readiness, the group looked at those capabilities that were high in benefits and medium or low in implementation readiness. Based on that analysis, the group determined that there are a set of capabilities that are potentially high benefit but not scored as high in implementation readiness, i.e., more work needs to be done to implement and deploy but it would be worth accelerating that work. As the result of examination of the prioritization done by the Committee, the Committee recommends that the candidate capabilities be categorized into four tiers:

Tier One Prioritized Capabilities

To be considered for the Tier 1 list (consensus on activities that should continue regardless of budget constraints) an initiative must have scored high when compared to other potential investments (based on the criteria).

The Committee outlined the following principles important to Tier 1 consensus:

- No scope creep
- No schedule creep – given full resources
- Only capabilities with a validated concept of operation, with the assumption that it is based on solid business case analysis
- Many of these capabilities have enablers (ie. revision of controller handbook, policies, etc.) that need to be addressed in order to achieve the intended benefit

Tier 1A: Capabilities that are deemed to be high benefit and high readiness. These should be considered highest priority, and be given full resources to achieve or IOC dates or accelerate those dates. Budget cuts should not affect these capabilities. It is important to note that several of these are interdependent and lead to service improvements. For example, PBN will not achieve the projected benefit in congested terminal airspace without the merging and spacing tools or CSPO work being completed.

- PBN - PBN
- Multiple Runway Ops – Sep standards reduced (CSPO)
- Surface Ops - Data Sharing
- TBFM - Metering/Merging/Spacing (Enroute and Terminal) (Ground-based)
- Separation Management - Wake Re-Categorization & Wake Separation
- PBN – OAPM⁶

Tier 1B: Capabilities that are deemed to be high benefit and low or medium readiness. These capabilities should also be given full resources to achieve or IOC dates or accelerate those date. In the case of Tier 1B, attention should be given to address and resolve all technical and non-technical issues, and the capabilities should be accelerated if possible. Budget cuts should not affect these capabilities.

- CATM - Flight Planning Feedback
- CATM - CDM
- Separation Management (reduced separation) (ADS-B Out)
- Separation Management - CPDLC, Weather Reroute (DataComm, FANS 1/A)
- Separation Management - Enroute PBN

Tier Two Capabilities

Tier 2: Capabilities that are deemed to be of medium benefit and high readiness. These capabilities should remain on track budget permitting, but if budget cuts dictate, they could be delayed. To be considered for the Tier 2 list (consensus on things that should continue, resources permitting), an initiative must have scored relatively high, but below the cutoff point defined by the Committee.

- Surface/Ops - Revised PDC via DataComm
- CATM - Airborne Rerouting - TFM
- Separation Management - Terminal Controller Proximity Alerting
- Separation Management - In Trail Procedures (ITP) (ADS-B)
- Separation Management - Enhanced Conflict Detection
- Separation Management - Oceanic User Requests
- On Demand NAS Info - Near Term
- Core Infrastructure - SWIM Ground Based

Other Capabilities

All other candidate capabilities.

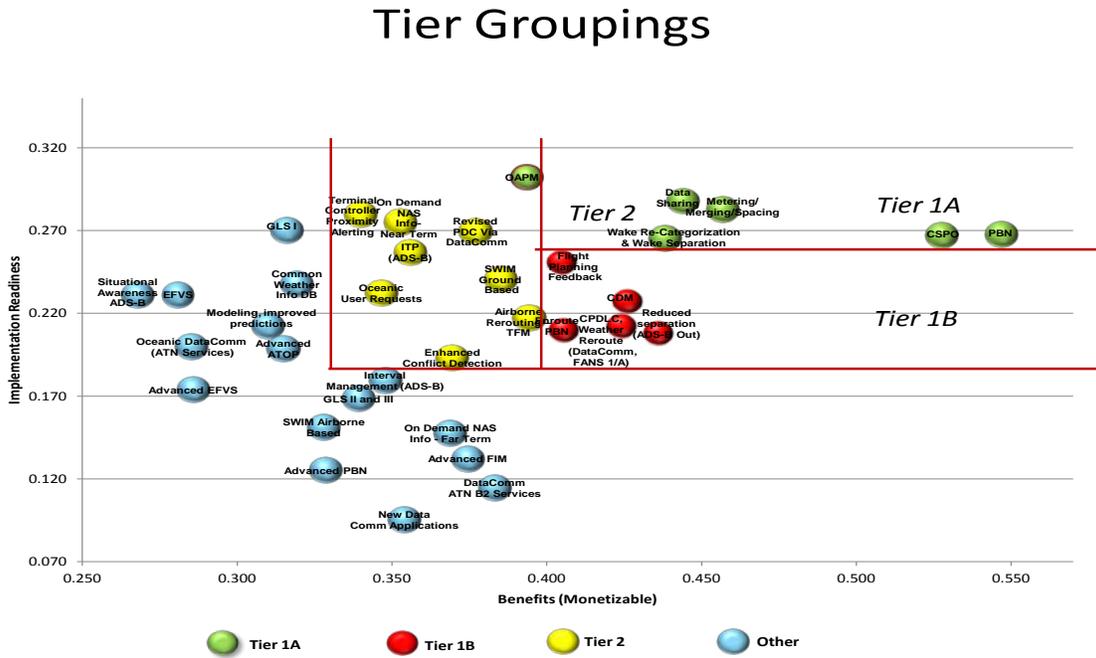
- Surface Ops - Situational Awareness ADS-B
- Surface/Terminal - Surface/Terminal Alerting (ADS-B In)
- Low Vis Approaches - GLS I
- Low Vis Approaches - GLS II and III
- Low Vis Approaches - EFVS

⁶ The aviation community has been actively involved and supportive of OAPM as indicated by the overall rating. In consideration of the importance of this initiative, it was placed in the Tier 1A list even though it was determined to be a Tier 2 capability.

- Low Vis Approaches Advanced EFVS
- PBN - Advanced PBN
- TBFM - Interval Management (IM) (ADS-B)
- TBFM - Advanced Flight deck Interval Management (FIM)
- CATM - Modeling, improved predictions
- Separation Management - Oceanic DataComm (ATN Services)
- Separation Management - Advanced ATOP
- Separation Management - DataComm ATN B2 Services
- Separation Management - New DataComm Applications
- On Demand NAS Info - Far Term
- Weather - Common Weather Info DB
- Core Infrastructure - SWIM Airborne Based

The scatter diagram below shows the results of that analysis and resulting suggestion for capabilities in Tiers 1A, 1B, 2, and Other.

Figure 1: Monetizable Benefits vs. Implementation Readiness - Tier Groupings



It should be noted that the only capability that falls outside the natural line demarcations is Capability 10: PBN-OAPM. The Committee included OAPM in Tier 1A because of its high readiness score. Though others were deemed to have higher benefit, the Committee believes that the FAA is well on the way to completing these initiatives, and the community will benefit from their completion.

Appendix A: NextGen Capabilities Task Group - Members of the NAC & Associated Organizations

Members of the NextGen Advisory Committee

Bill Ayer, Alaska Airlines, NAC Chair	Rob Maruster, JetBlue Airways
Ed Bolen, NBAA	Allan McArtor, Airbus Americas, Inc.
Frank Brenner, EUROCONTROL	Lee Moak, ALPA
Sherry Carbary, The Boeing Company	Arlene Mulder, O'Hare Noise Compatibility Commission
Mario Diaz, Houston Airport System	Julie Oettinger, FAA
Carl Esposito, Honeywell International, Inc.	Mike Perrone, Professional Aviation Safety Specialists
Christa Fornarotto, FAA	Jim Rankin, Air Wisconsin
Craig Fuller, AOPA	Paul Rinaldi, NATCA
Bob Gray, ABX Air	Lillian Ryals, The MITRE Corporation
David Grizzle, FAA	Mike Whitaker, FAA, DFO
John Harris, Raytheon Systems Company	Pamela Whitley, FAA
John Hickey, FAA	Andy Cebula, RTCA, Inc., NAC Secretary
Stephanie Hill, Lockheed Martin Corporation	
Margaret Jenny, RTCA, Inc.	
James Jones, USAF	
Patrick Ky, SESAR	

NAC organization representatives and leaders of NACSC, Business Case Performance Metrics Workgroup and Operational Capabilities Work Group

Steve Alterman, CAA	Fran Hill, Lockheed Martin Corporation
Merrill Armstrong, USAF	Craig Hoskins, Airbus Americas
Chris Baum, ALPA	Charles Keegan, Raytheon Systems Company
Monte Belger, Metron Aviation, Inc.	Debbie Kirkman, The MITRE Corporation
Joseph Bertapelle, JetBlue Airways	Ed Lohr, Delta Air Lines, Inc.
Tom Bock, Port Authority of NY & NJ	Paul McGraw, ATA
Steve Brown, NBAA	Gisele Mohler, FAA
Bruce DeCleene, FAA	Juan Narvid, USAF
Jana Denning, Lockheed Martin Corporation	Melissa Rudinger, AOPA
Steve Dickson, Delta Air Lines, Inc.	Sandy Samuel, Lockheed Martin Corporation
Dan Elwell, A4A	Heidi Williams, AOPA
Keith Hagy, ALPA	Dale Wright, NATCA

Appendix B: Members of the NACSC

Frank Bartonek, Cessna Aircraft Company
David Batchelor, SESAR JU
Gary Beck, Alaska Airlines
Ali Bahrami, Aerospace Industries Association
Monte Belger, Metron Aviation, Inc.
Christopher Benich, Honeywell International
Joe Bertapelle, JetBlue Airways
Tom Bock, Port Authority of NY & NJ
Steve Brown, NBAA
Ed Bular, US Airways
Randy Burdette, NASAO
Sean Cassidy, ALPA
Peter Cerda, IATA
Peter Challan, Harris Corporation
Jim Crites, Dallas/Fort Worth International
Airport
Ben DeLeon, FAA
Bruce DeCleene, FAA
Steve Dickson, Delta Air Lines, Inc., NACSC Co-
Chair (A4A)
Todd Donovan, Thales
William Dunlay, LeighFisher
Ken Elliott, Jetcraft Avionics LLC
Steve Fulton, GE Aviation
Michael Gonzales, Professional Aviation Safety
Specialists
Ron Hawkins, ARINC, Inc.
Cole Hedden, ACSS
Jens Hennig, GAMA
Urmila Hiremath, The MITRE Corporation
Craig Hoskins, Airbus Americas, Inc.
Jennifer Iversen, RTCA, Inc., NACSC Secretary
Nancy Kalinowski, FAA
Ken Kaminski, Saab-Sensis Corporation
Charles Keegan, Raytheon Systems Company
John Kefaliotis, ITT Corporation
George Ligler, Project Management Enterprises,
Inc.
Ed Lohr, Delta Air Lines, Inc.

Paul McGraw, A4A
Joe Miceli, Airline Dispatchers Federation
Gisele Mohler, FAA
Juan Narvid, USAF
Chris Oswald, ACI-NA
Neil Planzer, The Boeing Company
John Plowman, Flight Dispatchers,
Meteorologists & Operation Specialists
Union
Bo Redeborn, EUROCONTROL
David Rhodes, CSC
Martin Rolfe, NATS, Ltd.
Melissa Rudinger, AOPA, NACSC Co-Chair
Van Ruggles, Garmin
Sandy Samuel, Lockheed Martin Corporation
Nan Shellabarger, FAA
Steve Vail, Mosaic ATM, Inc.
Bryan Vester, Rockwell Collins, Inc.
Brian Will, American Airlines
Chris Williams, UPS
Heidi Williams, AOPA
Dale Wright, NATCA

Appendix C: Capabilities Ranked by NextGen Advisory Committee Subcommittee

Capabilities Ranked by Relative Priority

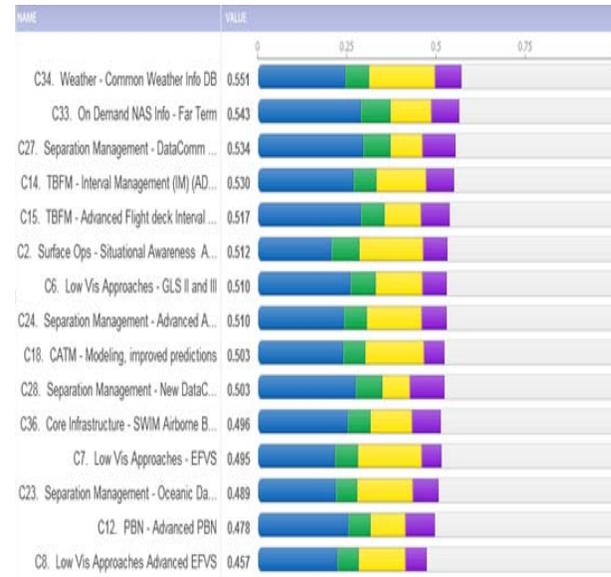
Ranked 1-6



Ranked 7-20

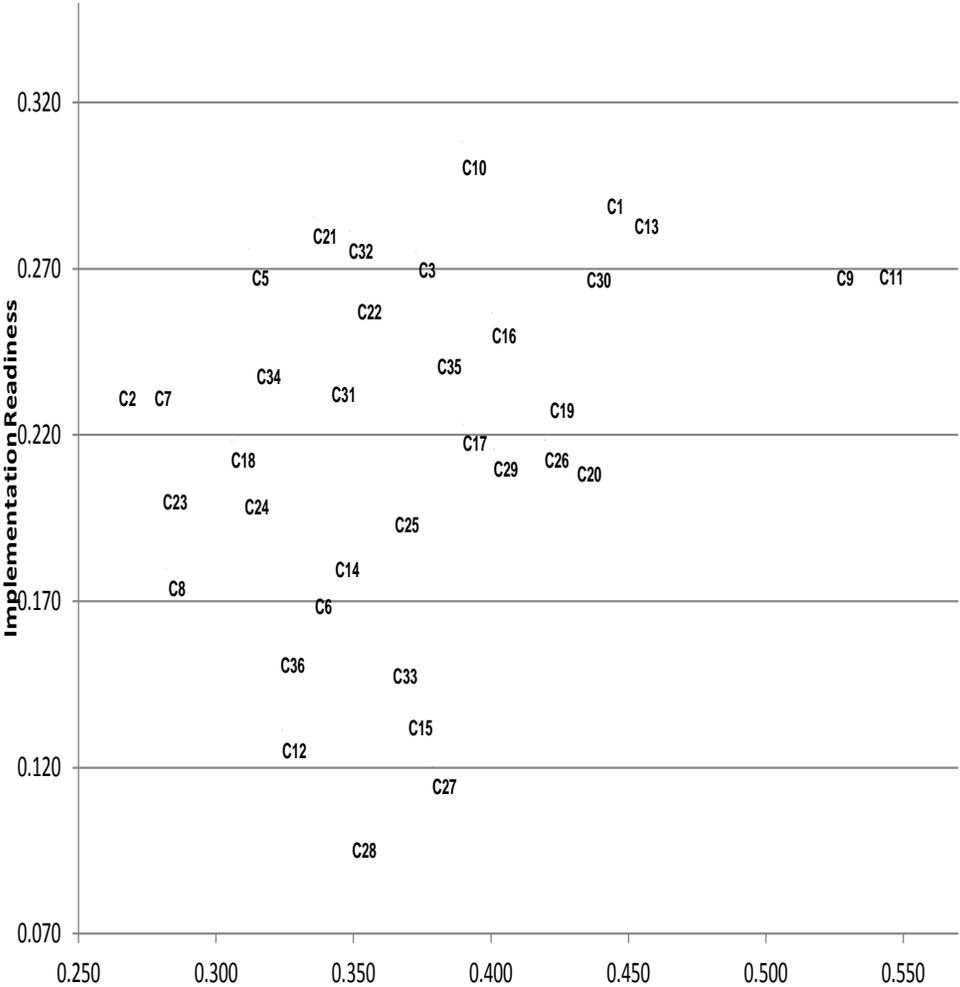


Ranked 21-36



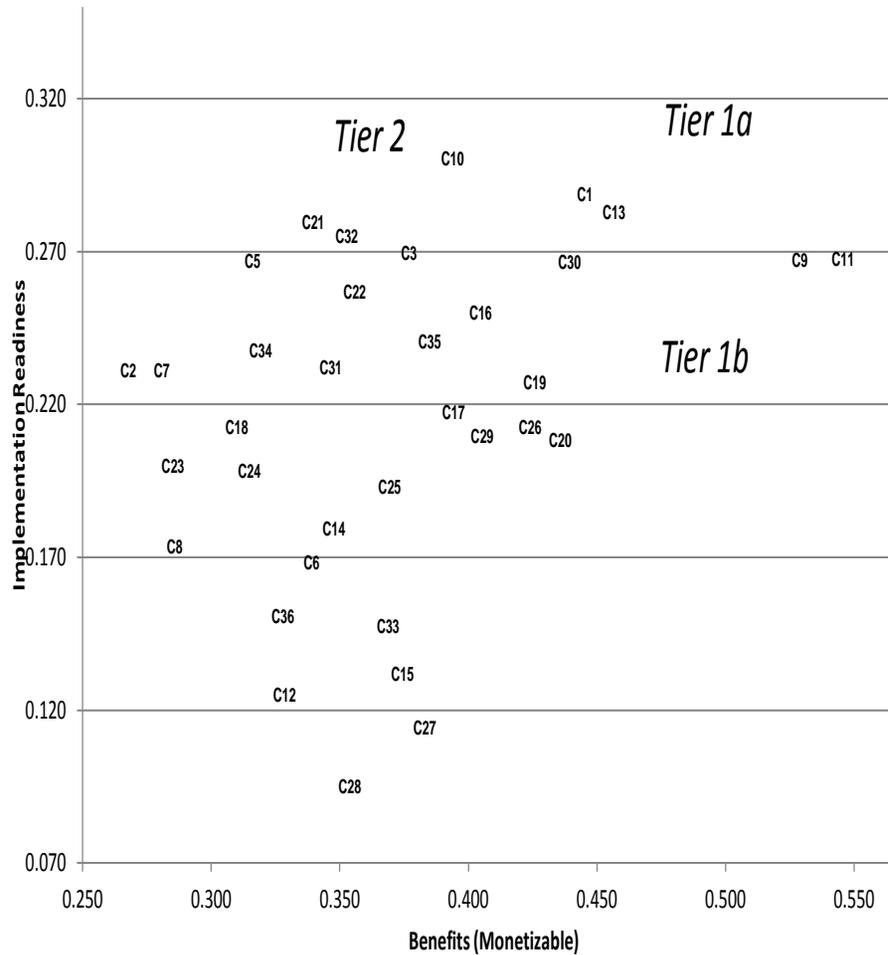
Tier Groupings

- C1 - Surface Ops - Data Sharing
- C2 - Surface Ops - Situational Awareness ADS-B
- C3 - Surface/Ops - Revised PDC via DataComm
- C4 - Surface/Terminal - Surface/Terminal Alerting (ADS-B In)
- C5 - Low Vis Approaches - GLS I
- C6 - Low Vis Approaches - GLS II and III
- C7 - Low Vis Approaches - EFVS
- C8 - Low Vis Approaches Advanced EFVS
- C9 - Multiple Runway Ops - Sep standards reduced (CSPO)
- C10 - PBN - OAPM
- C11 - PBN - PBN
- C12 - PBN - Advanced PBN
- C13 - TBFM - Metering/Merging/Spacing (Enroute and Terminal) (Ground-based)
- C14 - TBFM - Interval Management (IM) (ADS-B)
- C15 - TBFM - Advanced Flight deck Interval Management (FIM)
- C16 - CATM - Flight Planning Feedback
- C17 - CATM - Airborne Rerouting -TFM
- C18 - CATM - Modeling, improved predictions
- C19 - CATM-CDM
- C20 - Separation Management (reduced separation) (ADS-B Out)
- C21 - Separation Management - Terminal Controller Proximity Alerting
- C22 - Separation Management - In Trail Procedures (ITP) (ADS-B)
- C23 - Separation Management - Oceanic DataComm (ATN Services)
- C24 - Separation Management - Advanced ATOP
- C25 - Separation Management - Enhanced Conflict Detection
- C26 - Separation Management - CPDLC, Weather Reroute (DataComm, FANS 1/A)
- C27 - Separation Management - DataComm ATN B2 Services
- C28 - Separation Management - New DataComm Applications
- C29 - Separation Management - Enroute PBN
- C30 - Separation Management - Wake Re-Categorization & Wake Separation
- C31 - Separation Management - Oceanic User Requests



Tier Groupings

- C1 - Surface Ops - Data Sharing
- C2 - Surface Ops - Situational Awareness ADS-B
- C3 - Surface/Ops - Revised PDC via DataComm
- C4 - Surface/Terminal - Surface/Terminal Alerting (ADS-B In)
- C5 - Low Vis Approaches - GLS I
- C6 - Low Vis Approaches - GLS II and III
- C7 - Low Vis Approaches - EFVS
- C8 - Low Vis Approaches Advanced EFVS
- C9 - Multiple Runway Ops - Sep standards reduced (CSPO)
- C10 - PBN - OAPM
- C11 - PBN - PBN
- C12 - PBN - Advanced PBN
- C13 - TBFM - Metering/Merging/Spacing (Enroute and Terminal) (Ground-based)
- C14 - TBFM - Interval Management (IM) (ADS-B)
- C15 - TBFM - Advanced Flight deck Interval Management (FIM)
- C16 - CATM - Flight Planning Feedback
- C17 - CATM - Airborne Rerouting -TFM
- C18 - CATM - Modeling, improved predictions
- C19 - CATM-CDM
- C20 - Separation Management (reduced separation) (ADS-B Out)
- C21 - Separation Management - Terminal Controller Proximity Alerting
- C22 - Separation Management - In Trail Procedures (ITP) (ADS-B)
- C23 - Separation Management - Oceanic DataComm (ATN Services)
- C24 - Separation Management - Advanced ATOP
- C25 - Separation Management - Enhanced Conflict Detection
- C26 - Separation Management - CPDLC, Weather Reroute (DataComm, FANS 1/A)
- C27 - Separation Management - DataComm ATN B2 Services
- C28 - Separation Management - New DataComm Applications
- C29 - Separation Management - Enroute PBN
- C30 - Separation Management - Wake Re-Categorization & Wake Separation
- C31 - Separation Management - Oceanic User Requests
- C32 - On Demand NAS Info- Near Term
- C33 - On Demand NAS Info - Far Term
- C34 - Weather - Common Weather Info DB
- C35 - Core Infrastructure - SWIM Ground Based



Tier 1a Tier 1b Tier 2 Other

Appendix D: High-level Comparison of RTCA Recommendations

The following chart compares the top level recommendations developed by the aviation community (NextGen Advisory Committee and RTCA Task Force 5) highlighting the consistency of many of the recommendations.



RTCA Recommendations at-a-Glance

NAC 09-2013	NAC 2011/2012	TF5 2009
Surface Data Sharing	Surface Traffic Mgt	Surface Data Sharing
CSPO		CSPO
PBN	PBN Terminal	PBN Metroplex
TBFM	TBFM	TBFM
Wake Re-Cat		
		RNAV Enroute
	SAA Use	SAA Use
Separation Services (reduced separation) (ADS-B Out)		Access low alt, non radar a/s
DataComm CPDLC Weather reroute FANS 1/A	DataComm CPDLC Weather reroute FANS 1/A	DataComm CPDLC Weather reroute FANS 1/A

Appendix E: Consolidated Candidate Capabilities List Mapping to NGIP/NSIP

<i>Portfolio</i>	<i>NAC Consolidated Capability #</i>	<i>NAC Consolidated Capability Name</i>	<i>Name</i>	<i>OI ID</i>	<i>IOC</i>	<i>Alpha/Bravo Phase</i>	<i>Status</i>	<i>Enablers</i>
Improved Surface Operations	1	Data Sharing	Data Exchange with operators	104209-17	TBD	Bravo	Planned	TFDM (P), ASDE-X (S)
Improved Surface Operations	1	Data Sharing	Expansion of Surface Surveillance	103207-13	2013-2015	Alpha	In Progress	ASSC(P), ADS-B(S), DDU(S), TIS-B(S), ADS-B Out Services ADS-B for Surface Vehicles
Improved Surface Operations	1	Data Sharing	External Surface Data Release	104209-16	2010-2011	Alpha	In Progress	DEX (P), TDDS (P), ASDE-X(S), ASSC(S), DDU(S)
Improved Surface Operations	1	Data Sharing	External Surface Data Release	104209-16	2010-2011	Alpha	In Progress	DEX (P), TDDS (P), ASDE-X(S), ASSC(S), DDU(S)
Improved Surface Operations	1	Data Sharing	Provide Initial Surface Management System	102406-11	2015	Alpha	In Progress	TFDM(P), ASDE-X(S), ASDI(S), ASSC(S), DDU(S), TDDS(S)

<i>Portfolio</i>	<i>NAC Consolidated Capability #</i>	<i>NAC Consolidated Capability Name</i>	<i>Name</i>	<i>OI ID</i>	<i>IOC</i>	<i>Alpha/Bravo Phase</i>	<i>Status</i>	<i>Enablers</i>
Improved Surface Operations	1	Data Sharing	Stand Up TFDM Scheduler/Sequencer	104209-13	TBD	Bravo	Planned	TFDM(P), TBFM(S)
Improved Surface Operations	2	Situational Awareness, ADS-B	Improve Low-Visibility Taxi (EFVS)	103208-14	TBD	Bravo	Planned	EFVS
Improved Surface Operations	2	Situational Awareness, ADS-B	Situational Awareness and Alerting of Ground Vehicles	104207-11	2011-2012	Alpha	In Progress	ADS-B(P), ASDEX(S), ASSC(S), TIS-B(S) ADS-B for Surface Vehicles
Improved Surface Operations	3	Revised PDC	Revised Departure Clearance via Data Comm	104207-11	2016	Bravo	In Progress	DataComm.(P), ERAM(S), TDLS(S), TDDS(S) FANS 1/A+ (VDL Mode 2)
Surface, Terminal	4	Surface/Terminal Alerting (ADS-B In)	Situational Awareness and Alerting of Ground Vehicles	102406-11	2016-2109			ASSC(P), ADS-B(S), DDU(S), TIS-B(S), ADS-B Out

<i>Portfolio</i>	<i>NAC Consolidated Capability #</i>	<i>NAC Consolidated Capability Name</i>	<i>Name</i>	<i>OI ID</i>	<i>IOC</i>	<i>Alpha/Bravo Phase</i>	<i>Status</i>	<i>Enablers</i>
On-Demand NAS Information	4	Surface/Terminal Alerting (ADS-B In)	Traffic Situational Awareness with Alerts	103206-11	2012-2015	Alpha	In Progress	SBS(P)
Improved Approaches and Low-Visibility Operations	5	GLS I	GBAS Category I Non-Federal System Approval	107107-11	2010-2014	Alpha	In Progress	GPS, GBAS (non-Federal) GLS I
Improved Approaches and Low-Visibility Operations	6	GLS II/III	GBAS Category II/III Standards	107107-21	TBD	Bravo	Planned	GPS, GBAS (non-Federal) GLS III
Improved Approaches and Low-Visibility Operations	7	EFVS	EFVS to 100 Feet	107117-11	2012-2015	Alpha	In Progress	EFVS
Improved Approaches and Low-Visibility Operations	7	EFVS	EFVS to Touchdown	107118-11	2012-2015	Alpha	Planned	Approach Lighting System, Airport Lighting EFVS

<i>Portfolio</i>	<i>NAC Consolidated Capability #</i>	<i>NAC Consolidated Capability Name</i>	<i>Name</i>	<i>OI ID</i>	<i>IOC</i>	<i>Alpha/Bravo Phase</i>	<i>Status</i>	<i>Enablers</i>
Improved Approaches and Low-Visibility Operations	7	EFVS	Enhanced Synthetic Flight Vision Systems	107117-21	2012-2015	Alpha	Planned	Approach Lighting System, Airport Lighting EFVS
Improved Approaches and Low-Visibility Operations	8	<i>Advanced</i> EFVS	Synthetic Vision Systems (SVS) for Lower Than Standard Approach Minima Operations	107117-12	TBD	Bravo	Planned	SVS
Improved Approaches and Low-Visibility Operations	8	<i>Advanced</i> EFVS	Enhanced, Synthetic, and Combined Vision Systems for Low Visibility/Ceiling Landing Operations	107118-21	TBD	Bravo	Planned	Airport Lighting EFVS, SVS

<i>Portfolio</i>	<i>NAC Consolidated Capability #</i>	<i>NAC Consolidated Capability Name</i>	<i>Name</i>	<i>OI ID</i>	<i>IOC</i>	<i>Alpha/Bravo Phase</i>	<i>Status</i>	<i>Enablers</i>
Improved Approaches and Low-Visibility Operations	8	Advanced EFVS	Enhanced Flight Vision System for Takeoff	107115-11	TBD	Bravo	Planned	EFVS
Improved Multiple Runway Operations	9	Parallel runway sep stds	Additional 7110.308 Airports	102141-11	2010-2015	Alpha	In Progress	ILS
Improved Multiple Runway Operations	9	Parallel runway sep stds	Amend Dependent Runway Separation Standards	102140-99	2012-2015	Alpha	Planned	ILS, GPS, SBAS, GBAS ILS, , RNAV, RNP, LPV, GLS I
Improved Multiple Runway Operations	9	Parallel runway sep stds	Amend Independent Runway Separation Standards	102141-13	2010-2015	Alpha	In Progress	ILS STARS, TAMR
Improved Multiple Runway Operations	9	Parallel runway sep stds	Enable Additional Approach Options for New Independent Runway Separation Standards	102141-13a	2012-2015	Alpha	Planned	ILS STARS, TAMR

<i>Portfolio</i>	<i>NAC Consolidated Capability #</i>	<i>NAC Consolidated Capability Name</i>	<i>Name</i>	<i>OI ID</i>	<i>IOC</i>	<i>Alpha/Bravo Phase</i>	<i>Status</i>	<i>Enablers</i>
Performance-Based Navigation	11	PBN	expanded DME (close gaps in CONUS)	108209-11	TBD	Bravo	Planned	DME (P)
Performance-Based Navigation	11	PBN	Large-Scale Redesign of Airspace Leveraging PBN	108209-13	2010-2015	Alpha	In Progress	RNAV/RNP
Performance-Based Navigation	11	PBN	Relative Position Indicator (RPI)	108209-15	TBD	Bravo	Planned	TAMR (P)
Performance-Based Navigation	11	PBN	RNAV (GPS) Approaches	107103-12	2010-2015	Alpha	In Progress	RNAV/RNP, GPS, WAAS
Performance-Based Navigation	11	PBN	RNAV SIDs and STARs at Single Sites	108209-19	2010-2015	Alpha	In Progress	RNAV
Performance-Based Navigation	11	PBN	RNP and RNP AR	108209-14	2010-2015	Alpha	In Progress	RNAV/RNP
Performance-Based Navigation	11	PBN	Transition to PBN Routing for Cruise Operations	108209-12	2010-2015	Alpha	In Progress	RNAV
Advanced PBN	12	Advanced PBN	<i>Advanced RNP</i>	108209-20	2013	Alpha	Planned	<i>none</i>

<i>Portfolio</i>	<i>NAC Consolidated Capability #</i>	<i>NAC Consolidated Capability Name</i>	<i>Name</i>	<i>OI ID</i>	<i>IOC</i>	<i>Alpha/Bravo Phase</i>	<i>Status</i>	<i>Enablers</i>
Time-Based Flow Management	13	Metering, Merging & Spacing - Ground Based, En route and Terminal	En Route Path Stretching Capability for Delay Absorption	104120-27	TBD	Bravo	Planned	??
Time-Based Flow Management	13	Metering, Merging & Spacing - Ground Based, En route and Terminal	Extended Metering	104120-11	2014	Alpha	In Progress	TBFM (P), ERAM(S)
Time-Based Flow Management	13	Metering, Merging & Spacing - Ground Based, En route and Terminal	Implement TMA at Additional Airports	104115-12	2014	Alpha	In Progress	TBFM (P) , CIWS(S)
Time-Based Flow Management	13	Metering, Merging & Spacing - Ground Based, En route and Terminal	Implement TMA's ACM Capability at Additional Locations	104115-11	2014	Alpha	In Progress	TBFM (P) , CIWS(S)

<i>Portfolio</i>	<i>NAC Consolidated Capability #</i>	<i>NAC Consolidated Capability Name</i>	<i>Name</i>	<i>OI ID</i>	<i>IOC</i>	<i>Alpha/Bravo Phase</i>	<i>Status</i>	<i>Enablers</i>
Time-Based Flow Management	13	Metering, Merging & Spacing - Ground Based, En route and Terminal	Integrated Departure/Arrival Capability (IDAC)	104117-11	2011-2014	Alpha	In Progress	TBFM (P), TFMS (S) , CIWS(S)
Time-Based Flow Management	13	Metering, Merging & Spacing - Ground Based, En route and Terminal	Metering to Fixes Within Terminals	104120-13	TBD	Bravo	Planned	TBFM (P), TAMR (S)
Time-Based Flow Management	13	Metering, Merging & Spacing - Ground Based, En route and Terminal	Terminal Assessment of Runway Assignment and Sequence for Aircraft	104120-21	TBD	Bravo	Planned	TAMR (P), TBFM (S), TFDM (S)
Time-Based Flow Management	13	Metering, Merging & Spacing - Ground Based, En route and Terminal	Use RNAV Route Data to Calculate Trajectories Used to Conduct TBM Operations	104123-11	2013	Alpha	In Progress	TBFM

<i>Portfolio</i>	<i>NAC Consolidated Capability #</i>	<i>NAC Consolidated Capability Name</i>	<i>Name</i>	<i>OI ID</i>	<i>IOC</i>	<i>Alpha/Bravo Phase</i>	<i>Status</i>	<i>Enablers</i>
Time-Based Flow Management	14	Interval Management	Terminal Display of Runway Assignment and Sequence to Controllers	104120-24	TBD	Bravo	Planned	TAMR (P), TBFM (S), TFDM (S) CDTI/FIM-S
Time-Based Flow Management	14	Interval Mgt	IM-S Arrivals and Approach Phase 1	104120-25	TBD	Bravo	Planned	TAMR, ADS-B, ERAM, TBFM CDTI/FIM-S
Time-Based Flow Management	14	Interval Mgt	IM-S Arrivals and Approach Phase 2	104120-26	TBD	Bravo	Planned	TAMR, ADS-B, ERAM, TBFM CDTI/FIM-S
Time-Based Flow Management	14	Interval Mgt	IM-S Cruise	104120-23	TBD	Bravo	Planned	ADS-B, ERAM, TBFM CDTI/FIM-S
Time-Based Flow Management	15	Advanced FIM	<i>Advanced FIM</i>	<i>No OI in NGIP</i>			Planned	ADS-B In Services; DataComm ATN, ERAM
CATM	16	Flight Planning Feedback	Collaborative Airspace Constraint Resolution	105302-11	2013	Alpha	In Progress	TFMS(P)

<i>Portfolio</i>	<i>NAC Consolidated Capability #</i>	<i>NAC Consolidated Capability Name</i>	<i>Name</i>	<i>OI ID</i>	<i>IOC</i>	<i>Alpha/Bravo Phase</i>	<i>Status</i>	<i>Enablers</i>
Separation Management	24	Advanced ATOP Applications	Advanced Technologies and Oceanic Procedures (ATOP) in Bermuda	104102-32	TBD	Bravo	Planned	ATOP
Separation Management	24	Advanced ATOP Applications	ATOP in Transition Sectors	104102-35	TBD	Bravo	Planned	ATOP
Separation Management	24	Advanced ATOP Applications	Enhanced Conflict Probe for ATOP Surveillance Airspace	104102-34	TBD	Bravo	Planned	ATOP
Separation Management	24	Advanced ATOP Applications	Enhanced Oceanic Controller Training	102114-24	TBD	Bravo	Planned	ATOP
Separation Management	24	Advanced ATOP Applications	Evolution of Offshore Automation System	104102-31	TBD	Bravo	Planned	ATOP
Separation Management	24	Advanced ATOP Applications	Expanded Oceanic International Interfaces	104102-33	TBD	Bravo	Planned	ATOP

<i>Portfolio</i>	<i>NAC Consolidated Capability #</i>	<i>NAC Consolidated Capability Name</i>	<i>Name</i>	<i>OI ID</i>	<i>IOC</i>	<i>Alpha/Bravo Phase</i>	<i>Status</i>	<i>Enablers</i>
Separation Management	25	En route decision Support-conflict detection	Improve Trajectory Modeling Accuracy and Conflict Alert and Probe Algorithms	102137-12	TBD	Bravo	Planned	ERAM
Separation Management	25	En route decision Support-conflict detection	Improved Information Sharing Between En Route Sector Controllers Using Integrated Display Systems	102114-23	TBD	Bravo	Planned	ERAM
Separation Management	25	En route decision Support-conflict detection	Approval of User Requests and Resolving Conflicts with Efficient Maneuvers in En Route Airspace	102137-25	TBD	Bravo	Planned	ERAM

<i>Portfolio</i>	<i>NAC Consolidated Capability #</i>	<i>NAC Consolidated Capability Name</i>	<i>Name</i>	<i>OI ID</i>	<i>IOC</i>	<i>Alpha/Bravo Phase</i>	<i>Status</i>	<i>Enablers</i>
Separation Management	25	En route decision Support-conflict detection	En Route Radar Controller Conflict Probe	102137-22	TBD	Bravo	Planned	ERAM
Separation Management	26	CPDLC/WX Reroutes	Initial En Route Data Communications Services - routine CPDLC, Weather reroutes	104102-25	TBD	Bravo	Planned	ERAM DataComm (FANS-1/A, VDL-2)
Separation Management	26	Oceanic User Requests	Approval of User Requests in Oceanic Airspace	104102-22	TBD	Bravo	Planned	FANS 1/A, Satellite Comm., RNP, RNAV
Separation Management	27	DataComm Applications	DataComm Applications with ATN B2 (CPDLC, 4D TRAD, FIS)	<i>not called out in NGIP</i>			Planned	

<i>Portfolio</i>	<i>NAC Consolidated Capability #</i>	<i>NAC Consolidated Capability Name</i>	<i>Name</i>	<i>OI ID</i>	<i>IOC</i>	<i>Alpha/Bravo Phase</i>	<i>Status</i>	<i>Enablers</i>
Separation Management	28	DataComm Applications	DataComm ATN B2 Services (Advanced PBN, Advanced FIM, ATC Winds)					
Separation Management	29	Enroute PBN	Enroute Performance Monitor for PBN Routes	102114-21	TBD		Planned	ERAM RNP/RNAV
Separation Management	30	Reduce Separation	Wake Re-Categorization Phase 1 - Aircraft Re-Categorization	102154-11	2012-2014	Alpha	In Progress	<i>none</i>
Separation Management	30	Reduce Separation	Wake Re-Categorization Phase 2	102154-21	TBD	Bravo	Planned	TAMP
Separation Management	30	Reduce Separation	Wake Turbulence Alerts for En Route Controllers	102137-13	TBD	Bravo	Planned	TAMR

<i>Portfolio</i>	<i>NAC Consolidated Capability #</i>	<i>NAC Consolidated Capability Name</i>	<i>Name</i>	<i>OI ID</i>	<i>IOC</i>	<i>Alpha/Bravo Phase</i>	<i>Status</i>	<i>Enablers</i>
Separation Management	31	Oceanic User Requests	Approval of User Requests in Oceanic Airspace Phase 2	102137-13	TBD	Bravo	Planned	FANS 1/A, Satellite Comm., RNP, RNAV
Separation Management	31	Oceanic User Requests	Approval of User Requests in Oceanic Airspace Phase 2	104102-26	TBD	Bravo	Planned	FANS 1/A, Satellite Comm., RNP, RNAV
Separation Management	31	Oceanic User Requests	Increased Use of SAAs in Oceanic Airspace	102144-23	TBD	Bravo	Planned	FANS 1/A, Satellite Comm., RNP, RNAV
On-Demand NAS Information	32	NAS Info	Improve SUA-Based Flow Predictions	108212-12	2015	Alpha	Planned	TFMS (P)

<i>Portfolio</i>	<i>NAC Consolidated Capability #</i>	<i>NAC Consolidated Capability Name</i>	<i>Name</i>	<i>OI ID</i>	<i>IOC</i>	<i>Alpha/Bravo Phase</i>	<i>Status</i>	<i>Enablers</i>
On-Demand NAS Information	32	NAS Info	Provide NAS Status via Digital NOTAMs for Flight Operations Centers (FOCs)/Airline Operations Centers (AOCs)	103305-13	2009-2015	Alpha	In Progress	AIM (P), AOC/FOC
On-Demand NAS Information	33	NAS Info	ANSP Real-Time Status for SAAs	108212-11	TBD	Bravo	Planned	AIM(P), ATOP (S), ERAM(S)
On-Demand NAS Information	33	NAS Info	Improve SAA-Based Flow Predictions	108212-21	TBD	Bravo	Planned	AIM(P), TFMS(S)
On-Demand NAS Information	33	NAS Info	Planned Airspace Constraints	103305-22	TBD	Bravo	Planned	AIM(P), TFDM (S),ERAM(S), TFMS(S), TBFM (S)

<i>Portfolio</i>	<i>NAC Consolidated Capability #</i>	<i>NAC Consolidated Capability Name</i>	<i>Name</i>	<i>OI ID</i>	<i>IOC</i>	<i>Alpha/Bravo Phase</i>	<i>Status</i>	<i>Enablers</i>
Core Infrastructure	35	SWIM Ground Applications	SWIM Ground Applications				In Progress	
Core Infrastructure	36	SWIM Air Applications	SWIM Air Applications				Planned	

Appendix F: Task Force 5 Recommendations

TASK FORCE OPERATIONAL CAPABILITY RECOMMENDATIONS ARE:

1. Surface

Improve surface traffic management to reduce tarmac delays and enhance safety, efficiency and situational awareness by defining, standardizing requirements, and implementing the capture and dissemination of surface operations data to pilots, controllers, ramp towers and user operations centers. These actions should be undertaken under the auspices of one consolidated point of responsibility, authority and accountability within the FAA, in accordance with a coordinated execution plan jointly established by industry and government.

To resolve Surface problems, the Task Force recommends that the following operational capabilities be implemented:

- **Surface Situational Awareness Phase 1: Deploy ground infrastructure to capture and integrate surface activities (40)**
- **TFM Common Operational Picture: Define consistent views of operational data for collaborative decision-making (43)**
- **Surface Connectivity & Surface Situational Awareness Phase 2 among FOCs, FAA, Airports (38, 41)**

2. Runway Access

Increase runway access, especially in low visibility, to converging, intersecting and closely-spaced parallel runways. Accomplish this by leveraging potential capacity gains achievable through accurate and predictable flight paths, as well as enhanced surveillance methods. Foundational activities are based on existing ground and aircraft capabilities leading to a determination of needed additional investment.

To resolve Runway Access problems, the Task Force recommends that the following operational capabilities be implemented:

- **Increase capacity and throughput to converging and intersecting runways (9)**
- **Improve parallel runway operations in a phased manner, where near-term commitment and implementation successes dictate the need for mid-term investments (37a, 12, 13, 14)**

3. Metroplex

Relieve congestion and tarmac delays at major metropolitan area airports, inefficiencies at satellite airports, and surrounding airspace by instituting tiger teams that focus on quality of implementation at each location and deconflicting of adjacent airports. Core capabilities to leverage are RNAV, with RNP where needed (e.g., when RF turns are called for); optimized vertical profiles using vertical navigation; use of 3 NM and terminal separation rules in more airspace; integrated approach to airspace design and classification; and ATC, flow and surface traffic management tools.

To resolve Metroplex problems, the Task Force recommends that the following operational capabilities be implemented:

- **Optimize RNAV and RNP operations, institute tiger teams that focus on quality at each location (29, 32a, 32b)**
- **Integrate procedure design to deconflict airports and expand use of terminal separation rules (4, 21a)**

4. Cruise

Improve efficiency of cruise operations by increasing the ability to disseminate real-time airspace status and schedules (particularly with respect to Special Activity Airspace); improving flow management to better utilize time-based metering and flight operator capabilities; and implementing data communications between ATC systems and aircraft to more effectively manage traffic and exchange routing and clearance information.

To resolve Cruise problems, the Task Force recommends that the following operational capabilities be implemented:

- **Special Activity Airspace: Efficient management and use of SAA through real-time data exchange of status and schedules (35)**
- **Improve time-based metering and leverage operator capabilities (24, 25)**
- **Develop Area Navigation-Based En Route System (30)**

5. Access to the NAS:

Improve access to and services provided at non-OEP airports and to low altitude, non-radar airspace by implementing more precision-based approaches and departures, along with the expansion of surveillance services to areas not currently under radar surveillance.

To resolve Access problems, the Task Force recommends that the following operational capabilities be implemented:

- **Low Altitude Non-Radar: Extend radar-like services to low altitude airspace without radar surveillance (28)**
- **Implement LPV procedures for airports without precision approaches (22)**

Cross Cutting Recommendations

In addition, the Task Force submits recommendations in two capability areas that cut across the five domains outlined above:

1. Data Communications

Improve cruise and transition operations by using data communications to enable more efficient use of available or forecast capacity in the NAS. Increase the ability to better adapt to changing conditions through improved dissemination of tactical reroutes around weather forecast and congestion.

To resolve problems due to lack of digital data communications and associated applications, the Task Force recommends that the following operational capabilities be implemented:

- **Digital ATC-Aircraft Communications for Revised Departure Clearances, Weather Reroutes, and Routine Communications (16, 17, 39, 42a, 44)**

2. Integrated Air Traffic Management (I-ATM)

Create an Integrated Air Traffic Management System that leverages new technologies and collaboration with the users, and implements solutions to traffic flow problems that are effectively integrated across time and air traffic control domains, to achieve the efficiency goals of the service provider and the users.

To resolve problems due to lack of an Integrated ATM approach, the Task Force recommends that the following operational capabilities be implemented:

- **Integrated CDM/TFM/ATC Solution to traffic flow problems (47)**

- **Improved Collaborative ATM (C-ATM) Automation: C-ATM automation to negotiate user-preferred routes and alternative trajectories (7b, 8, 46)**

Overarching Recommendations

In addition to the five operational capability recommendations and the two cross-cutting recommendations, the Task Force recommends that the FAA consider the following Overarching Recommendations deemed critical to the success of implementing the recommended operational capabilities:

1. Achieving Existing 3 and 5 Mile Separation Standards

Implement a more collaborative approach to change management and build on relationships by increasing transparency, including robust use of the controller Air Traffic Safety Action Program (ATSAP), creating a program using incentives for operations that perform at most efficient levels and, finally, building metrics that best evaluate the highest performing locations by measuring efficiency and safety in each location's operation.

2. Incentivizing Equipage

Incentivize investments in NextGen capabilities by: 1) providing financial incentives either in the form of low-interest loans, direct subsidies of equipage, or other innovative mechanisms such as other user fees, fuel/excise taxes or income tax credits; 2) providing a timely, unambiguous set of processes (regulations, avionics certifications, operational procedures and approvals, engineering support, etc.) to assure the realization and timelines by NAS users of a sufficient level of operational benefits that justify investments in new avionics or new Flight Operations Centers technologies, i.e., to enable them to make the business case for those investments; and 3) establishing a National Airspace System (NAS) where system users who have aircraft with higher aircraft performance/capability levels get higher levels of service. This is referred to in the FAA's Next Generation Implementation Plan as the Best-Equipped, Best-Served (BEBS) concept.