United States Block 0 Status Summary Table

Module	Elements	Need Analysis				Implementation Status (if Element is needed)			
		Not Started	In Progress	Need	N/A	Planning	Developing	Partially Implemented	Implemented
Performance Improvement Area 1: Airport Operations									
ACDM	1. Interconnection between aircraft operator & ANSP systems to share surface operations information								√
	2. Interconnection between aircraft operator & airport operator systems to share surface operations information							√	
	3. Interconnection between airport operator & ANSP systems to share surface operations information								√
	4. Interconnection between airport operator, aircraft operator & ANSP systems to share surface operations information								√
	5. Collaborative departure queue management								√
APTA	1. PBN approach procedures with vertical guidance to LNAV/VNAV minima								√
	2. PBN approach procedures with vertical guidance to LPV minima								√
	3. PBN approach procedures without vertical guidance to LNAV minima								√
	4. GBAS Landing System (GLS) procedures to CAT I minima								√
RSEQ	1. AMAN via controlled time of arrival to a reference fix								√
	2. Departure management							√	
	3. Departure flow management						√		
	4. Point merge				√				
SURF	1. A-SMGCS with at least one cooperative surface surveillance system								√
	2. ADS-B APT								√
	3. A-SMGCS alerting with flight identification information								√
	4. EVS for taxi operations				√				
	5. Airport vehicles equipped with transponders								√
WAKE	1. New PANS-ATM wake turbulence categories and separation minima				√				
	2. Dependent diagonal paired approach procedures for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart								√
	3. Wake independent departure and arrival operations (WIDAO) for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart							√	
	4. Wake turbulence mitigation for departures (WTMD) procedures for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart based on observed crosswinds								√
	5. 6 wake turbulence categories and separation minima								√
Performance Improvement Area 2: Globally Interoperable Systems and Data									
AMET	1. WAFS								√
	2. IAVW								√
	3. TCAC forecasts								√
	4. Aerodrome warnings								√
	5. Wind shear warnings and alerts								√
	6. SIGMET								√
	7. Other OPMET information (METAR, SPECI and/or TAF)								√
	8. QMS for MET								√
DATM	1. Standardized Aeronautical Information Exchange Model (AIXM)								√

Module	Elements	Need Analysis				Implementation Status (if Element is needed)			
		Not Started	In Progress	Need	N/A	Planning	Developing	Partially Implemented	Implemented
	2. eAIP								√
	3. Digital NOTAM								√
	4. eTOD								√
	5. WGS-84								√
	6. QMS for AIM								√
FICE	1. AIDC to provide initial flight data to adjacent ATSUs								√
	2. AIDC to update previously coordinated flight data								√
	3. AIDC for control transfer								√
	4. AIDC to transfer CPDLC logon information to the Next Data Authority					√			
Performance Improvement Area 3: Optimum Capacity and Flexible Flights									
ACAS	1. ACAS II (TCAS version 7.1)				√				
	2. APFD function				√				
	3. TCAP function				√				
ASEP	1. ATSA-AIRB								√
	2. ATSA-VSA								√
ASUR	1. ADS-B								√
	2. Multilateration (MLAT)								√
FRTO	1. CDM incorporated into airspace planning								√
	2. Flexible Use of Airspace (FUA)								√
	3. Flexible routing								√
	4: CPDLC used to request and receive re-route clearances								√
NOPS	1. Sharing prediction of traffic load for next day								√
	2. Proposing alternative routings to avoid or minimize ATFM delays								√
OPFL	1. ITP using ADS-B								√
SNET	1. Short Term Conflict Alert implementation (STCA)								√
	2. Area Proximity Warning (APW)								√
	3. Minimum Safe Altitude Warning (MSAW)								√
	4. Medium Term Conflict Alert (MTCA)								√
Performance Improvement Area 4: Efficient Flight Paths									
CCO	1. Procedure changes to facilitate CCO								√
	2. Airspace changes to facilitate CCO								√
	3. PBN SIDs								√
CDO	1. Procedure changes to facilitate CDO								√
	2. Airspace changes to facilitate CDO								√
	3. PBN STARs								√
TBO	1. ADS-C over oceanic and remote areas								√
	2. CPDLC over continental areas					√			
	3. CPDLC over oceanic and remote areas								√
	Total	**0**	**0**	**0**	**6**	**2**	**1**	**2**	**68**

United States ASBU Air Navigation Reporting Form (ANRF)					
PIA	1	**Block - Module**	B0 - ACDM	**Date**	April 17, 2017

Module Description: To implement collaborative applications that will allow the sharing of surface operations data among the different stakeholders on the airport. This will improve surface traffic management reducing delays on movement and manoeuvring areas and enhance safety, efficiency and situational awareness.

Element Implementation Status

1	**Element Description:** Interconnection between aircraft operator and ANSP systems to share surface operations information	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details **TFMS**: The Traffic Flow Management System (TFMS) supports the Flight Schedule Monitor (FSM), which creates a common situational awareness among all users and service providers by displaying the Aggregate Demand List (ADL) information for both airport and airspace data elements for its users. TFMS also supports Airport Demand Chart (ADC), which is a web-based, graphical display of airport arrival and departure information, which allows the user to view demand/capacity at multiple airports on one screen. **TFDM**: Starting in 2020, Terminal Flow Data Manger (TFDM) will provide improved schedule data exchange between airport stakeholders (e.g. Earliest Off-Block Time, Target Movement Area Time) and departure queue management through departure metering. **ASDE-X**: ASDE-X is a surface surveillance system that was implemented at 35 aerodromes that show aircraft movement on the airport surface. This data is made available to flight operators via the SWIM network. **SWIM:** Above data are shared via SWIM.		
2	**Element Description:** Interconnection between aircraft operator and airport operator systems to share surface operations information	**Date Planned/Implemented** December 2013	**Status** Partially Implemented
	Status Details AJR-E (the Airport Surface Efficiency Office) under the ATCSCC leads the collaboration efforts with the airlines to ensure buy-in and agreement on future system plans and requirements. This work includes support to Collaborative Stakeholder Group, creation of agreements, and negotiation of commitments between the airlines and the FAA. This group also does operational procedures work and ConOps coordination for incoming systems that lays the groundwork for system development and training. ATCSCC also leads the Planning Teleconference several times a day to coordinate the traffic flow management issues including the airport situation.		
3	**Element Description:** Interconnection between airport operator and ANSP systems to share surface operations information	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details Refer to B0-ACDM Element 1 response.		

4	**Element Description:** Interconnection between airport operator, aircraft operator and ANSP systems to share surface operations information	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details Refer to B0-ACDM Element 1 response.		
5	**Element Description:** Collaborative departure queue management	**Date Planned/Implemented** 2020	**Status** Developing
	Status Details The TFDM system will provide departure queue management (departure metering) at 27 airports by recommending optimal times for departing aircraft to enter the movement area (taxiway and/or runway) for takeoff during high volume, high congestion periods, resulting in significantly shorter lines for takeoff and easier rescheduling and a significant reduction in fuel burn.		
Achieved Benefits			
Access and Equity			
Capacity			
Efficiency			
Environment			
Safety			
Implementation Challenges			
Ground system Implementation			
Avionics Implementation			
Procedures Availability			
Operational Approvals			
Notes			

United States ASBU Air Navigation Reporting Form (ANRF)					
PIA	1	**Block - Module**	B0 - APTA	**Date**	April 17, 2017

Module Description: The use of Performance-based Navigation (PBN) and ground-based augmentation system (GBAS) landing system (GLS) procedures will enhance the reliability and predictability of approaches to runways, thus increasing safety, accessibility and efficiency. This is possible through the application of basic global navigation satellite system (GNSS), Baro-vertical navigation (VNAV), satellite-based augmentation system (SBAS) and GLS. The flexibility inherent in PBN approach design can be exploited to increase runway capacity.

Element Implementation Status

1	**Element Description:** PBN approach procedures with vertical guidance to LNAV/VNAV minima	**Date Planned/Implemented** December 2013	**Status** Implemented

Status Details

PBN approach procedures with vertical guidance published by FAA (as of August 20, 2015):

- RNAV(VNAV): 3,442

2	**Element Description:** PBN approach procedures with vertical guidance to LPV minima	**Date Planned/Implemented** December 2013	**Status** Implemented

Status Details

PBN approach procedures with vertical guidance published by FAA (as of August 20, 2015):

- RNAV(LPV): 3,567

Additionally, the following 720 RNAV(RNP, Public) procedures are vertically guided (as of August 20, 2015):

NM	Count	NM	Count	NM	Count
0.10	53	0.20	38	0.30	399
0.11	59	0.21	5		
0.12	14	0.22	5		
0.13	8	0.23	6		
0.14	9	0.24	3		
0.15	66	0.25	5		
0.16	12	0.26	4		
0.17	14	0.27	2		
0.18	10	0.28	1		
0.19	4	0.29	3		

3	**Element Description:** PBN approach procedures without vertical guidance to LNAV minima	**Date Planned/Implemented** December 2013	**Status** Implemented

Status Details

PBN approach procedures without vertical guidance published by FAA (as of August 20, 2015):

- RNAV(VNAV): 5,984
- RNAV(LP): 594

4	**Element Description:** GBAS Landing System (GLS) procedures to CAT I minima	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details GLS procedures approach procedures published by FAA (as of August 20, 2015): • GLS: 11		

Achieved Benefits

Access and Equity

Element 1*:* Increased access to airports, especially at night and in low visibility operating conditions. Across GA airports with LPVs for which we collect operational and weather data, demand decreased by 1.3% on average after implementation advanced procedures. While the occurrence of IMC and marginal VMC decreased by 4 and 12.9%, respectively, the number of arrivals increased by 22 and 10.9 % in each condition. These changes include sizable increases during night conditions, and contrast with the reductions observed under VMC in both day and night operations.

Capacity

Element 1*:* Increased runway capacity at locations where new procedures are published with lower minima (compared to procedures that were available in the past).

Efficiency

Element 1*:* Reduced fuel burn due to lowering minima for landing that result in fewer diversions, cancellations, and/or delays.

Environment

Element 1*:* Reduced emissions due to reduced fuel burn.

Safety

Element 1*:* Increased safety through more stabilized approaches.

Implementation Challenges

Ground system Implementation

Avionics Implementation

Procedures Availability

Operational Approvals

Notes

United States ASBU Air Navigation Reporting Form (ANRF)					
PIA	1	**Block - Module**	B0 - RSEQ	**Date**	April 17, 2017

Module Description: To manage arrivals and departures (including time-based metering) to and from a multi-runway aerodrome or locations with multiple dependent runways at closely proximate aerodromes, to efficiently utilize the inherent runway capacity.

Element Implementation Status

1	**Element Description:** AMAN via controlled time of arrival to a reference fix	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details Arrival management using Time Based Flow Management (TBFM) is operationally available at Core 30 airports (December 2013 data).		
2	**Element Description:** Departure management	**Date Planned/Implemented** December 2013	**Status** Partially Implemented
	Status Details Ground Management System is partially implemented at JFK that is operated by the Port Authority of New York/New Jersey. Research and development activities are in progress to support departure queue management with connections to TBFM system.		
3	**Element Description:** Departure flow management	**Date Planned/Implemented** 2020	**Status** Developing
	Status Details Starting in 2020, TBFM will provide TFDM with arrival demand information to feed into its scheduling tool in order to manage departure scheduling. Scheduling information will also be shared TBFM through TFDM and will increase the efficient use of time-based flow management slots in the departure stream.		
4	**Element Description:** Point merge	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details No plan to implement this Element. The FAA uses time-based metering with the TBFM system to merge traffic to the arrival fix.		

Achieved Benefits
Access and Equity
Capacity
Efficiency
Environment
Safety
Implementation Challenges
Ground system Implementation
Avionics Implementation
Procedures Availability
Operational Approvals

Notes

United States ASBU Air Navigation Reporting Form (ANRF)					
PIA	1	**Block - Module**	B0 - SURF	**Date**	April 17, 2017

Module Description: First levels of advanced-surface movement guidance and control systems (A-SMGCS) provides surveillance and alerting of movements of both aircraft and vehicles at the aerodrome, thus improving runway/aerodrome safety.

Automatic dependent surveillance-broadcast (ADS-B) information is used when available (ADS-B APT). Enhanced vision systems (EVS) is used for low-visibility operations.

Element Implementation Status

1	**Element Description:** A-SMGCS with at least one cooperative surface surveillance system	**Date Planned/Implemented** December 2013	**Status** Implemented

Status Details

The FAA has implemented Secondary Surveillance Radar (Mode S) at airports throughout the entire US. There are several versions of secondary radars. There are 113 Mode Select (Mode S) Secondary Surveillance Radars supporting 107 airports. 6 airports are supported by 2 Mode S SSRs. Air Traffic Control Beacon Interrogator Model 5 (ATCBI-5) supports 26 airports and the ASR 11/MSSR (Monopulse Secondary Surveillance Radar) supports 68 airports. Overall, the US has 207 Secondary Surveillance Radars at 201 airports (as of Dec 2013.)

The FAA has implemented ADS-B and surface multilateration called ASDE-X at 35 aerodromes. The list of 35 aerodromes are below:

KATL	KDCA	KFLL	KJFK	KMDW	KORD	KSDF
KBDL	KDEN	KHNL	KLAS	KMEM	KPHL	KSEA
KBOS	KDFW	KHOU	KLAX	KMIA	KPHX	KSJC
KBWI	KDTW	KIAD	KLGA	KMKE	KPVD	KSNA
KCLT	KEWR	KIAH	KMCO	KMSP	KSAN	KSTL

2	**Element Description:** ADS-B APT	**Date Planned/Implemented** December 2014	**Status** Implemented

Status Details

The FAA has integrated ADS-B into the existing 35 ASDE-X sites as of the end of September 2014. The integration includes the use of ADS-B as part of a fused display of surveillance information which includes SMR surface radar, surface multilateration as well as ADS-B information for aircraft on the surface as well as on the approaches to the surface.

In addition, ADS-B data, is now included as part of the integrated fused surveillance data in all alerting logic at the 35 airports ASDE-X airports.

3	**Element Description:** A-SMGCS alerting with flight identification information	**Date Planned/Implemented** December 2013	**Status** Implemented

Status Details

Alerting logic is part of the ASDE-X baseline and is implemented at every ASDE-X location. Alerting is provided for intersecting runways, traffic on closed runways and for occupied runway scenarios on arrivals and departures.

4	**Element Description:** EVS for taxi operations	**Date Planned/Implemented** N/A	**Status** N/A

	Status Details EVS from the FAA perspective does not relate to ATM. This is only about aircraft equipage with no related ATM procedures.		
5	**Element Description:** Airport vehicles equipped with transponders	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details The FAA has implemented cooperative transponder systems for airport vehicles. The FAA developed a product specification and guidance material for the airport to procure and install these devices. This capability is operational at BOS, STL, MKE, and DEN.		
Achieved Benefits			
Access and Equity			
Capacity			
Efficiency			
Environment			
Safety			
Implementation Challenges			
Ground system Implementation			
Avionics Implementation			
Procedures Availability			
Operational Approvals			
Notes			

United States ASBU Air Navigation Reporting Form (ANRF)					
PIA	1	**Block - Module**	B0 - WAKE	**Date**	April 17, 2017

Module Description: Improved throughput on departure and arrival runways through optimized wake turbulence separation minima, revised aircraft wake turbulence categories and procedures.

Element Implementation Status

1	**Element Description:** New PANS-ATM wake turbulence categories and separation minima	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details N/A (As of Dec 2013, New PANS-ATM wake turbulence categories and separation minima is not published. US/FAA optioned to implement 6 wake turbulence categories and separation minima described as Block 0 WAKE Element 5 in this ANRF.)		
2	**Element Description:** Dependent diagonal paired approach procedures for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details US offered FAA Order 7110.308 as an example wording for ICAO PANS. Dependent diagonal staggered approach procedures is implemented.		
3	**Element Description:** Wake independent departure and arrival operations (WIDAO) for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart	**Date Planned/Implemented** July 2015	**Status** Partially Implemented
	Status Details US offered FAA Order 7110.316 as an example wording for ICAO PANS for independent departure operations. This solution has been implemented in the US. US is working on an independent (or paired) arrival procedure, with an eye on implementation in 2018.		
4	**Element Description:** Wake turbulence mitigation for departures (WTMD) procedures for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart based on observed crosswinds	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details US offered FAA Order 7110.316 as an example wording for ICAO PANS for independent departure operations. This solution has been implemented in the US.		
5	**Element Description:** 6 wake turbulence categories and separation minima	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details On Nov 1, 2012 RECAT Phase I was implemented at Memphis (KMEM). In Sep 2013, it was implemented at Louisville (KSDF), and in Mar 2014 at Cincinnati (KCVG). Also implemented at ATL (June 2014 ATL), IAH (Dec 2014), NY (Mar 2015), CLT (Mar 2015), and ORD (June 2015). As of July 2015, this capability is implemented at 8 TRACONS.		

Achieved Benefits

Access and Equity
Capacity **Element 5**: At KMEM, we observed no increase in hourly capacity initially, but an increase in frequency of setting high-end ADRs and AARs. About four to six months after deployment of the WAKE RECAT, we started observing increases in departure rates as well (ADRs increased from 80 to 100, and overall airport rate from 179 to 199). During peak periods at KMEM, departure throughput increased about 3 departures and arrival throughput one arrivals per quarter hour (12% and 3% increase, respectively).
Efficiency **Element 5**: After RECAT implementation at KMEM, taxi-out times decreased by 1 minute and 47 seconds on average (12% decrease). Arrivals to MEM now fly almost 1 minute shorter time and just under 3 nm shorter distances in the terminal area on average, with high-end savings of almost 3 minutes and 10 nm, respectively. To date, FedEx is reporting saving of as much as $1.8M per month due to RECAT. On September 16, RECAT Phase I was implemented on SDF. To date, UPS is reporting that since RECAT has been operational, they are realizing 52,000 lbs of fuel saving per night for arrival operations.
Environment
Safety
Implementation Challenges
Ground system Implementation
Avionics Implementation
Procedures Availability
Operational Approvals
Notes

United States ASBU Air Navigation Reporting Form (ANRF)					
PIA	2	**Block - Module**	B0 - AMET	**Date**	April 17, 2017

Module Description: Global, regional and local meteorological information:

a) forecasts provided by world area forecast centres (WAFC), volcanic ash advisory centres (VAAC) and tropical cyclone advisory centres (TCAC);

b) aerodrome warnings to give concise information of meteorological conditions that could adversely affect all aircraft at an aerodrome including wind shear; and

c) SIGMETs to provide information on occurrence or expected occurrence of specific enroute weather phenomena which may affect the safety of aircraft operations and other operational meteorological (OPMET) information, including METAR/SPECI and TAF, to provide routine and special observations and forecasts of meteorological conditions occurring or expected to occur at the aerodrome.

This information supports flexible airspace management, improved situational awareness and collaborative decision making, and dynamically optimized flight trajectory planning.

This module includes elements which should be viewed as a subset of all available meteorological information that can be used to support enhanced operational efficiency and safety.

Element Implementation Status

1	**Element Description:** WAFS	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details The US Washington World Area Forecast Center (WAFC), a component of WAFS, is operational and continues as one of two ICAO designated WAFCs providing aeronautical meteorological en-route forecasts as prescribed in ICAO Annex 3. The US also continues as a provider State for the WAFC Internet File Service (WIFS). Through WIFS, authorized users are able to access the WFAC products as well as: advisories for volcanic ash (Element 2) and tropical cyclones (Element 3); and SIGMETs and other operational meteorological (OPMET) information (Element 6). The US WIFS also provides backup to the companion Satellite Distribution System (SADIS) provided by the United Kingdom.		
2	**Element Description:** IAVW	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details The US continues to support the IAVW and participates as a provider State for the Anchorage and Washington Volcanic Ash Advisory Centers (VAACs).		
3	**Element Description:** TCAC forecasts	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details The US continues to provide tropical cyclone watch support as a provider State for the Miami and Honolulu Tropical Cyclone Advisory Centers (TCACs).		
4	**Element Description:** Aerodrome warnings	**Date Planned/Implemented** December 2013	**Status** Implemented

	Status Details Airport weather warnings are issued for US civil airports by the National Weather Service (NWS) Weather Forecast Offices (WFOs) based on agreed airport warning criteria and dissemination procedures.		
5	**Element Description:** Wind shear warnings and alerts	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details Wind shear warnings and alerts are provided for major civil airports. Over 120 US airports have ground-based wind shear detecting systems installed. These systems included the Low Level Wind Shear System (LLWS) and the Terminal Doppler Weather Radar (TDWR) as an input component of the Integrated Terminal Weather System (ITWS).		
6	**Element Description:** SIGMET	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details The NWS provides SIGMETs for all US controlled airspace in compliance with ICAO Annex 3 with filed State exceptions as well as supporting NWS, FAA or DoD publications.		
7	**Element Description:** Other OPMET information (METAR, SPECI and/or TAF)	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details The NWS issues TAFS for all major civil airports and METAR/SPECI reports are provided at all major airports by the NWS, FAA, Department of Defense (DoD), or other local or state authorities. The TAFS and METAR/SPECI reports are provided in compliance with ICAO Annex 3 with filed State exceptions.		
8	**Element Description:** QMS for MET	**Date Planned/Implemented** March 2010	**Status** Implemented
	Status Details FAA, in coordination with the National Weather Service, has implemented a Quality Management System (QMS) based on ISO 9001-2008 requirements as specified in ICAO Annex 3.		
Achieved Benefits			
Access and Equity			
Capacity			
Efficiency			
Environment			
Safety			
Implementation Challenges			
Ground system Implementation			
Avionics Implementation			
Procedures Availability			
Operational Approvals			
Notes			

United States ASBU Air Navigation Reporting Form (ANRF)					
PIA	2	**Block - Module**	B0 - DATM	**Date**	April 17, 2017

Module Description: The initial introduction of digital processing and management of information, from origination to publication, through aeronautical information service (AIS)/aeronautical information management (AIM) implementation, use of aeronautical exchange model (AIXM), migration to electronic aeronautical information publication (AIP) and better quality and availability of data.

Element Implementation Status

1	**Element Description:** Aeronautical Information Exchange Model (AIXM)	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details The introduction of digital processing and digital management of information using the aeronautical information exchange model (AIXM) has been initiated, but not complete. The FAA currently provides a subset of Aeronautical Information in AIXM including digital NOTAM in AIXM 5.1.		
2	**Element Description:** eAIP	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details Implementation of eAIP has been initiated, but not completed. The effort is ongoing.		
3	**Element Description:** Digital NOTAM	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details Digital NOTAM has been implemented. More than 400 airports are capable of producing Digital NOTAM.		
4	**Element Description:** eTOD	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details Currently providing point data in NAD83/NAVD88. Plans in place to provide AIXM 5.1 obstacle point data in WGS-84.		
5	**Element Description:** WGS-84	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details Currently a subset of Aeronautical Information and specific aeronautical products are disseminated in WGS-84. Plans in place to disseminate all aeronautical information in AIXM 5.1 WGS-84.		
6	**Element Description:** QMS for AIM	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details FAA has implemented ISO 9001:2008 quality management system (QMS) within AIM to aid in standardizing processes for the verification of aeronautical data to allow any data anomalies or errors to be detected by root cause, corrected and communicated. These processes, along with quarterly QMS training for all AIM staff, are documented and stored on the Knowledge Services Network (KSN) website which serves as the central information point for the AIM QMS.		

Achieved Benefits
Access and Equity
Capacity
Efficiency
Environment
Safety
Implementation Challenges
Ground system Implementation
Avionics Implementation
Procedures Availability
Operational Approval
Notes

United States ASBU Air Navigation Reporting Form (ANRF)					
PIA	2	**Block - Module**	B0 - FICE	**Date**	April 17, 2017

Module Description: To improve coordination between air traffic service units (ATSUs) by using ATS interfacility data communication (AIDC) defined by ICAO's Manual of Air Traffic Services Data Link Applications (Doc 9694). An additional benefit is the improved efficiency of the transfer of communication in a data link environment.

Element Implementation Status

1	**Element Description:** AIDC to provide initial flight data to adjacent ATSUs	**Date Planned/Implemented** March 2006	**Status** Implemented
	Status Details The United States supports the notification, coordination and the transfer of communications and control phases in their AIDC interfaces with adjacent Flight Information Regions (FIR). In a key component of AIDC functionality, the United States exchanges initial flight data in the notification phase of their automated interfaces.		
2	**Element Description:** AIDC to update previously coordinated flight data	**Date Planned/Implemented** March 2006	**Status** Implemented
	Status Details Updating of data is performed in the AIDC coordination functionality. The United States updates AIDC flight data within system messaging in all of their interfaces with adjacent FIRs. This falls within the coordination phase of AIDC.		
3	**Element Description:** AIDC for control transfer	**Date Planned/Implemented** March 2006	**Status** Implemented
	Status Details AIDC protocols as implemented within the United States ATOP system supports the notification, coordination and specifically the transfer of communications and control phases as defined in bilateral agreements between the United States and interfaced ATSUs.		
4	**Element Description:** AIDC to transfer CPDLC logon information to the Next Data Authority	**Date Planned/Implemented** Projected 2020	**Status** Planning
	Status Details The United States is not scheduled to support CPDLC logon information to the Next Data Authority until 2020 when AIDC Version 3.0 is projected for implementation.		

Achieved Benefits

Access and Equity

Capacity

Efficiency

Environment

Safety

Implementation Challenges

Ground system Implementation

Avionics Implementation

Procedures Availability

Operational Approvals

Notes

United States ASBU Air Navigation Reporting Form (ANRF)					
PIA	3	**Block - Module**	B0 - ACAS	**Date**	April 17, 2017

Module Description: To provide short-term improvements to existing airborne collision avoidance systems (ACAS) to reduce nuisance alerts while maintaining existing levels of safety. This will reduce trajectory deviations and increase safety in cases where there is a breakdown of separation.

Element Implementation Status

1	**Element Description:** ACAS II (TCAS version 7.1)	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details The FAA initially mandated TCAS II V6.04a. Effective May 1, 2003 TCAS II V7.0 is required when installing TCAS II for the first time. If operating in RVSM airspace and equipped with TCAS II, V7.0 must be installed. The FAA has no plans to mandate TCAS II V7.1 at this time.		
2	**Element Description:** AP/FD function	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details FAA has no plans to implement Auto Pilot/Flight Director (AP/FD) TCAS.		
3	**Element Description:** TCAP function	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details FAA has no plans to implement TCAS Alert Prevention (TCAP).		

Achieved Benefits

Access and Equity

Capacity

Efficiency

Environment

Safety

Implementation Challenges

Ground system Implementation

Avionics Implementation

Procedures Availability

Operational Approvals

Notes

United States ASBU Air Navigation Reporting Form (ANRF)					
PIA	3	**Block - Module**	B0 - ASEP	**Date**	April 17, 2017

Module Description: Two air traffic situational awareness (ATSA) applications which will enhance safety and efficiency by providing pilots with the means to enhance traffic situational awareness and achieve quicker visual acquisition of targets:
a) AIRB (basic airborne situational awareness during flight operations).
b) VSA (visual separation on approach).

Element Implementation Status

1	**Element Description:** ATSA-AIRB	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details The FAA has implemented Traffic Information Service Broadcast (TIS-B) and Flight Information Service-Broadcast (FIS-B). TIS-B service provides traffic information to equipped aircraft and surface vehicles based on the conventional radar returns received for non-equipped aircraft. FIS-B service provides weather and NAS Status information to equipped aircraft.		
2	**Element Description:** ATSA-VSA	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details The FAA has implemented the Visual Separation on Approach (VSA) application that enhances successive approaches for aircraft cleared to maintain visual separation from another aircraft on the approach. The pilot uses ADS-B and TIS-B targets on his/her display to give him/her visual queues when looking out the cockpit window.		

Achieved Benefits

Access and Equity

Capacity

Efficiency

Environment

Safety

Implementation Challenges

Ground system Implementation

Avionics Implementation

Procedures Availability

Operational Approvals

Notes

United States ASBU Air Navigation Reporting Form (ANRF)					
PIA	3	**Block - Module**	B0 - ASUR	**Date**	April 17, 2017
Module Description: To provide initial capability for lower cost ground surveillance supported by new technologies such as ADS-B OUT and wide area multilateration (MLAT) systems. This capability will be expressed in various ATM services, e.g. traffic information, search and rescue and separation provision.					
Element Implementation Status					
1	**Element Description:** ADS-B		**Date Planned/Implemented** December 2013		**Status** Implemented
	Status Details The ADS-B surveillance coverage for the continental United States will be completed in 2014.				
2	**Element Description:** MLAT		**Date Planned/Implemented** December 2013		**Status** Implemented
	Status Details The FAA has implemented of Wide Area Multilateration (WAM) in Juneau (JNU) in Alaska and Telluride, Montrose, Gunnison, Durango, Rifle and Hayden in Colorado.				
Achieved Benefits					
Access and Equity					
Capacity					
Efficiency					
Environment					
Safety					
Implementation Challenges					
Ground system Implementation					
Avionics Implementation					
Procedures Availability					
Operational Approvals					
Notes					

United States ASBU Air Navigation Reporting Form (ANRF)					
PIA	3	**Block - Module**	B0 - FRTO	**Date**	April 17, 2017

Module Description: To allow the use of airspace which would otherwise be segregated (i.e. special use airspace) along with flexible routing adjusted for specific traffic patterns. This will allow greater routing possibilities, reducing potential congestion on trunk routes and busy crossing points, resulting in reduced flight lengths and fuel burn.

Element Implementation Status

1	**Element Description:** CDM incorporated into airspace planning	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details The FAA uses air space planning capabilities such as Flow Evaluation Area/Flow Constraint Area (FEA/FCA), ReRoute Impact Assessment (RRIA), ReRoute Monitor, and Monitor Alert, to evaluate the current constraints, plan the strategy, model the impact, and make plans.		
2	**Element Description:** Flexible Use of Airspace (FUA)	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details The Special Use Airspace Management System (SAMS) is used by the military to schedule Special Use Airspaces (SUAs) and other tracked areas. The FAA automation system obtains such information from SAMS and reviews and approves military SUA schedule requests. In the fall of 2014, FAA's Traffic Flow Management System (TFMS) will ingest this information via SWIM and display active military airspace on Traffic Situation Display (TSD).		
3	**Element Description:** Flexible route	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details The FAA manages the Route Management Tool (RMT) in which playbook routes and Coded Departure Routes (CDR) are maintained. In the situation such as adverse weather, the FAA and its customers use the playbook/CDR routes to maneuver the situation. Currently, track generation, track advisory, and traffic monitoring functions are provided by the Dynamic Ocean Track System Plus (DOTS+). The track generation functionality generates minimum time navigational tracks built from temperature, winds aloft, and a basic aircraft performance model. The DOTS+ is used in the Pacific Region with flexible tracks and reduced horizontal separation to 30MN using RNP 4 and ADS and controller pilot data link communications. CTOP which will be deployed in 2014, will allow the Air Traffic Control System Command Center (ATCSCC) to define a set of constrains or mandatory routes and allow NAS customers to submit their preferences.		
4	**Element Description:** CPDLC used to request and receive re-route clearances	**Date Planned/Implemented** March 2013	**Status** Implemented

	Status Details The FAA supports the use of Controller Pilot Data Link Communication (CPDLC) to enable the Dynamic Airborne Reroute Airborne Procedure (DARP) which is available in the Anchorage, Oakland, and New York Flight Information Regions (FIRs) since 2013. DARP is a planned airborne re-route that occurs when a new forecast is issued after departure indicating that significant time and/or fuel savings can be made. The Aircraft Operations Centre (AOC) will plan the re-route and uplink the route to the aircraft. The flight crew will load the re-route into the flight management computer (FMC) then downlink the route request to the ATSU utilizing CPDLC. The ATSU uplinks the route clearance using CPDLC.
Achieved Benefits	
Access and Equity	
Capacity	
Efficiency	
Environment	
Safety	
Implementation Challenges	
Ground system Implementation	
Avionics Implementation	
Procedures Availability	
Operational Approvals	
Notes	

United States ASBU Air Navigation Reporting Form (ANRF)					
PIA	3	**Block - Module**	B0 - NOPS	**Date**	April 17, 2017

Module Description: Air traffic flow management (ATFM) is used to manage the flow of traffic in a way that minimizes delays and maximizes the use of the entire airspace. Collaborative ATFM can regulate traffic flows involving departure slots, smooth flows and manage rates of entry into airspace along traffic axes, manage arrival time at waypoints or flight information region (FIR)/sector boundaries and re-route traffic to avoid saturated areas. ATFM may also be used to address system disruptions including a crisis caused by human or natural phenomena.

Element Implementation Status

1	**Element Description:** Sharing prediction of traffic load for next day	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details The Air Traffic Control System Command Center (ATCSCC) became operational in 1994. The ATCSCC manages the flow of air traffic on a national as well as a local level using advanced automation tools. The ATCSCC coordinates the actions of traffic management units (TMUs) located in ATC facilities across the country. Nationwide, there are 20 Air Route Traffic Control Centers (ARTCCs). Each ARTCC contains a TMU that is responsible for traffic flow within that Center's designated airspace.		
2	**Element Description:** Proposing alternative routings to avoid or minimize ATFM delays	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details Refer to B0-NOPS Element 1 description.		

Achieved Benefits

Access and Equity

Capacity

Efficiency

Environment

Safety

Implementation Challenges

Ground system Implementation

Avionics Implementation

Procedures Availability

Operational Approvals

Notes

United States ASBU Air Navigation Reporting Form (ANRF)					
PIA	3	**Block - Module**	B0 - OPFL	**Date**	April 17, 2017
Module Description: To enable aircraft to reach a more satisfactory flight level for flight efficiency or to avoid turbulence for safety. The main benefit of ITP is fuel/emissions savings and the uplift of greater payloads.					
Element Implementation Status					
1	**Element Description:** ITP using ADS-B			**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details Statistics associated with the ITP (in 2013) is shown below: ● Number of ITP capable flights per month: 240 ● Number of ITP requests per month: 14 Number of ITP maneuvers performed per month: 3				
Achieved Benefits					
Access and Equity					
Capacity					
Efficiency					
Environment					
Safety					
Implementation Challenges					
Ground system Implementation					
Avionics Implementation					
Procedures Availability					
Operational Approvals					
Notes					

United States ASBU Air Navigation Reporting Form (ANRF)					
PIA	3	**Block - Module**	B0 - SNET	**Date**	April 17, 2017

Module Description: To enable monitoring of flights while airborne to provide timely alerts to air traffic controllers of potential risks to flight safety. Alerts from short-term conflict alert (STCA), area proximity warnings (APW) and minimum safe altitude warnings (MSAW) are proposed. Ground-based safety nets make an essential contribution to safety and remain required as long as the operational concept remains human centred.

Element Implementation Status

1	**Element Description:** Short Term Conflict Alert (STCA)	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details 100% of FAA facilities have STCA (MCI) algorithms monitoring the aircraft.		
2	**Element Description:** Area Proximity Warning (APW)	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details 100% of FAA facilities have APM (Approach Path) and GTM (General Terrain) algorithms monitoring the aircraft.		
3	**Element Description:** Minimum Safe Altitude Warning (MSAW)	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details 100% of FAA facilities have short-term conflict alert area proximity warnings and minimum safe altitude warning algorithms.		
4	**Element Description:** Medium Term Conflict Alert (MTCA)	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details 100% of FAA facilities have MTCA (Lateral, Proximity, and Maneuvering) algorithms monitoring the aircraft.		

Achieved Benefits

Access and Equity

Capacity

Efficiency

Environment

Safety

Implementation Challenges

Ground system Implementation

Avionics Implementation

Procedures Availability

Operational Approvals

Notes

United States ASBU Air Navigation Reporting Form (ANRF)					
PIA	4	**Block - Module**	B0 - CCO	**Date**	April 17, 2017

Module Description: To implement continuous climb operations in conjunction with performance-based navigation (PBN) to provide opportunities to optimize throughput, improve flexibility, enable fuel-efficient climb profiles, and increase capacity at congested terminal areas. The application of PBN enhances CCO.

Element Implementation Status

1	**Element Description:** Procedure changes to facilitate CCO	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details The term Continuous Climb Operation (CCO) is not referenced in either the 8260.46E, Departure Procedures or 8260.58, United States Standard for PBN Instrument Procedure Design. CCO is an aircraft operating technique which allows optimization of the performance of the aircraft. RNAV SIDs are developed with altitude and speed restrictions placed only when necessary for ATC. This allows the operator to maximize aircraft performance as desired.		
2	**Element Description:** Route changes to facilitate CCO	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details Route changes are performed parallel with procedure changes during SID development.		
3	**Element Description:** PBN SIDs	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details PBN SIDs are implemented at approximately 219 airports (as of October 2013). 437 RNAV SIDs in the NAS with some of the procedures serving multiple airports (as of October 2013).		

Achieved Benefits

Access and Equity

Element 3: Only at locations where PBN SIDs can be published to deconflict traffic flows with additional/different routing options.

Capacity

Efficiency

Element 3: Only at locations where PBN SIDs can be published to shorten typically flown terminal routing options, or to improve flow interaction, or improve vertical profiles.

Reduction in the number of required radio transmissions, and therefore controller and pilot workloads; however, we do not have empirical data to evaluate this particular benefit.

Environment

Element 3: Authorization of operations where noise limitations would otherwise result in operations being curtailed or restricted.

Environmental benefits through reduced emissions (IFSET)

Safety

Implementation Challenges

Ground system Implementation

Avionics Implementation

Procedures Availability
Operational Approvals
Notes

United States ASBU Air Navigation Reporting Form (ANRF)					
PIA	4	**Block - Module**	B0 - CDO	**Date**	April 17, 2017

Module Description: To use performance-based airspace and arrival procedures allowing an aircraft to fly its optimum profile using continuous descent operations. This will optimize throughput, allow fuel efficient descent profiles, and increase capacity in terminal areas. The application of PBN enhances CDO.

Element Implementation Status

1	**Element Description:** Procedure changes to facilitate CDO	**Date Planned/Implemented** Dec 15, 2013	**Status** Implemented
	Status Details Optimized Profile Descent (OPD) is US equivalent to CDO. Most PBN STARs are either being developed or amended as OPD procedures. There are 215 PBN STARs with OPD. These procedures serve 102 airports (as of June 2015).		
2	**Element Description** Route changes to facilitate CDO	**Date Planned/Implemented** Dec 15, 2013	**Status** Implemented
	Status Details Route and associated airspace changes are routinely made as part of PBN procedure design and implementation processes.		
3	**Element Description** PBN STARs	**Date Planned/Implemented** Dec 15, 2013	**Status** Implemented
	Status Details There are 367 total PBN STARs in the NAS with some of the procedures serving multiple airports (as of June 2015). PBN STARs are implemented at 256 airports (as of June 2015).		

Achieved Benefits

Access and Equity

Element 1: Only at locations where PBN STARs can be published to deconflict traffic flows with additional/different routing options. For example, RNAV STARs with OPDs implemented at Dulles and Regan National airports are now laterally separated.

Element 3: Only at locations where PBN STARs can be published to deconflict traffic flows with additional/different routing options.

Capacity

Efficiency

Element 1: Cost savings through reduced fuel burn due to improved vertical profiles.

Reduction in the number of required radio transmissions, and therefore controller and pilot workloads; however, we do not have empirical data to evaluate this particular benefit.

Operational benefits:

— Arrivals exhibited more efficient vertical profiles

— Average time and distance within 250 nm of the airport did not change

		Vertical Profile Performance Outcomes					Additional Efficiency Performance Outcomes	
Weather	Proportion of Flights (%)	Number of Level Segments	Time in Level Flight (min)	Distance in Level Flight (nm)	Time-Weighted Altitude (feet)	Flights Without Level Segments (%)	Time (min)	Distance (nm)
VMC	86	2.0 (-16%)	5.4 (-13%)	31.2 (-12%)	17,300 (6%)	17 (72%)	43.4 (0%)	269.7 (0%)
Non-VMC	14	2.6 (-9%)	8.0 (-6%)	41.6 (-6%)	14,500 (6%)	9 (37%)	47.0 (0%)	280.7 (0%)
All	100	2.1 (-15%)	5.7 (-12%)	32.7 (-11%)	16,800 (6%)	16 (70%)	43.9 (0%)	271.2 (0%)

Element 3:

Only at locations where PBN STARs can be published to shorten typically flown terminal routing options, or to improve flow interaction, or improve vertical profiles.

Environment

Element 1: Reduced emissions as a result of reduced fuel burn (IFSET)

Element 3: Reduced emissions as a result of reduced fuel burn (IFSET)

Safety

Element 1: RNAV STARs facilitate executing stabilized approaches.

Element 3: More consistent flight paths and stabilized approach paths.

Implementation Challenges

Ground system Implementation

Avionics Implementation

Procedures Availability

Operational Approvals

Notes

United States ASBU Air Navigation Reporting Form (ANRF)					
PIA	4	**Block - Module**	B0 - TBO	**Date**	April 17, 2017
Module Description: To implement a set of data link applications supporting surveillance and communications in air traffic services, which will lead to flexible routing, reduced separation and improved safety.					
Element Implementation Status					
1	**Element Description:** ADS-C over oceanic and remote areas		**Date Planned/Implemented** December 2013		**Status** Implemented
	Status Details ADC-C is used for the communication over the Pacific and Atlantic oceans.				
2	**Element Description:** CPDLC over continental areas		**Date Planned/Implemented** 2019		**Status** Planning
	Status Details The FAA plans to expand CPDLC use into En Route in 2019 for routine clearance and communications transfer exchanges.				
3	**Element Description:** CPDLC over oceanic and remote areas		**Date Planned/Implemented** December 2013		**Status** Implemented
	Status Details CPDLC is used for the Oceanic operation and the FAA has implemented Departure Clearances (DCL) trials at MEM and EWR since 1st qtr of 2013 using a stand-alone prototype. Initial implementation in 2016 for DCL at 57 of our busier airports is planned.				
Achieved Benefits					
Access and Equity					
Capacity					
Efficiency					
Environment					
Safety					
Implementation Challenges					
Ground system Implementation					
Avionics Implementation					
Procedures Availability					
Operational Approvals					

Notes