Appendix B: Program/Project–Initiatives Matrix

Appendix B: Program/Project-Initiatives Matching Matrix

Service Area (1): Ceiling and Visibility

Initiative	Description	FAA	NASA	NOAA	DOD	IND/UNIV
1	Develop and implement ceiling and visibility **products** that are applicable for use by ATC service providers, airline operations centers, and pilots. i i i i	FAA-4 FAA-43 FAA-44		NOAA-3 NOAA-14		
2	Develop and implement ground to air (Flight Information Service) capabilities to **disseminate** observations within 5 minutes of availability and ceiling and visibility analyses/ forecasts within 15 minutes of product generation to pilots, airline operations centers, and ATC service providers. i i i i	FAA-15 FAA-49	NASA-11			IND-10 IND-14
3	Increase the types and number of aircraft with the capability for **automatic reporting** of humidity and temperature. i i i i	FAA-14 FAA-17				
4	Develop and implement **training packages** that focus on rapidly changing ceiling/visibility scenarios for tactical use by ATC service providers, airline operations centers, and pilots. i i i i			NOAA-21 NOAA-15		IND-18 ASSOC-1
5	Improve the **observing and reporting** of widespread low ceiling and visibility affecting en route operations. i i i i			NOAA-3	DOD-1 DOD-2 DOD-3 DOD-26	
6	Develop and implement a color cockpit multifunctional **display** that includes ceiling and visibility along with terrain, and other traffic hazards. i i i i		NASA-6/E			IND-6 IND-7
7	Improve the resolution and accuracy of ceiling and visibility **observations** affecting terminal operations. i i i i	FAA-50 FAA-31		NOAA-2	DOD-2 DOD-3 DOD-32 DOD-26	
8	Develop and implement **forecasting (for up to one hour) and modeling** techniques that will improve ceiling and visibility products, including resolution and accuracy in time and space, affecting **terminal operations**. i i i	FAA-19		NOAA-10		UNIV-4 UNIV-5

9	Improve current **ground-based communications** systems to readily **disseminate** observations, pilot reports, analyses, and forecasts of ceiling and visibility to pilots, airline operations centers, and ATC service providers. i i	FAA-21 FAA-22 FAA-23 FAA-35			DOD-8 DOD-46	
10	Develop and implement **forecast (for up to one hour) and modeling** techniques that will improve ceiling and visibility products, including resolution and accuracy in time and space, affecting **en route operations**. i i			NOAA-10	DOD-23	
11	Develop and implement **forecasting (for one hour or greater) and modeling** techniques that will improve ceiling/visibility products, including resolution and accuracy in time and space, affecting **terminal operations**. i i	FAA-11 FAA-33		NOAA-10	DOD-38	UNIV-4 UNIV-5
12	Implement the reporting, in compliance with ICAO requirements, of **runway visual range (RVR)** at all U.S. airports having New Generation RVR equipment. i i	FAA-42				
13	Develop and implement **forecasting (for one hour or greater) and modeling** techniques that will improve ceiling/visibility products, including resolution and accuracy in time and space, affecting **en route operations.** i i	FAA-33		NOAA-10	DOD-38	
14	Develop and implement capabilities for **terminal operations** in zero-ceiling/zero-visibility meteorological conditions. i		NASA-8			
	Ceiling and Visibility	FAA	NASA	NOAA	DOD	IND/UNIV

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Service Area (2): <u>Convective Hazards</u>

Initiative	Description	FAA	NASA	NOAA	DOD	IND/UNIV
1	Develop and implement convective **products** covering phenomena such as hail, turbulence, tornadoes, lightning, and heavy precipitation, in a single display product which requires little or no interpretation or analysis and is applicable for use by ATC service providers, airline operations centers, and in the cockpit. i i i i	FAA-4 FAA-24 FAA-25 FAA-40		NOAA-14 NOAA-19		
2	Develop and implement ground to air (Flight Information Service) capabilities to readily **disseminate** convective storm observations within 5 minutes of availability and forecast products within 15 minutes of product generation in order to facilitate convective hazard avoidance. i i i i	FAA-15 FAA-49	NASA-11			IND-2 IND-8 IND-10
3	Develop and implement a multifunctional, color cockpit **display** that includes convective storm attributes, such as hail, turbulence, tornadoes, lightning, and heavy precipitation along with terrain and other traffic hazards. i i i i		NASA-6/E			IND-6 IND-7
4	Increase the types and number of aircraft capable of **automatic reporting** of winds, temperatures, humidity, turbulence, and icing. i i i i	FAA-7 FAA-14 FAA-17				
5	Improve the resolution, accuracy, and the update rate of **observations** of hail, turbulence, tornadoes, lightning, and heavy precipitation associated with convective storms affecting **terminal operations.** i i i i	FAA-1 FAA-3 FAA-46 FAA-47 FAA-50		NOAA-2 NOAA-5	DOD-2 DOD-3 DOD-4 DOD-26 DOD-27 DOD-40 DOD-41	IND-5
6	Establish a quantitative **ICAO standard** for characterizing hail, turbulence, lightning, and heavy precipitation associated with convective storms. i i i					

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7	Develop and implement **0-1 hour forecast** and **modeling** techniques that will improve hail, turbulence, tornado, lightning, and heavy precipitation products, including resolution and accuracy in time and space, associated with convective storms affecting **terminal operations**. iii	FAA-12 FAA-19		NOAA-10		
8	Improve current **ground-based communications** systems to readily **disseminate** convective storm observations, pilot reports and forecast products to pilots, airline operations centers, and ATC service providers. ii	FAA-21 FAA-22 FAA-23			DOD-8 DOD-46	
9	Improve the resolution, accuracy, and the update rate of **observations** of hail, turbulence, tornadoes, lightning, and heavy precipitation associated with convective storms affecting **en route operations**. ii		NASA-6F	NOAA-5	DOD-4 DOD-27 DOD-40 DOD-41	IND-5 IND-17
10	Develop and implement **0-1 hour forecast and modeling** techniques that will improve hail, turbulence, tornado, lightning, and heavy precipitation products, including resolution and accuracy in time and space, associated with convective storms affecting **en route operations**. ii	FAA-10 FAA-26		NOAA-10		
11	Develop and implement **1-hour and greater forecast and modeling** techniques that will improve hail, turbulence, tornado, lightning, and heavy precipitation products, including resolution and accuracy in time and space, associated with convective storms affecting **en route operations**. i	FAA-10 FAA-33		NOAA-10	DOD-38	
12	Develop and implement **1-hour and greater forecast and modeling** techniques that will improve hail, turbulence, tornado, lightning, and heavy precipitation products, including resolution and accuracy in time and space, associated with convective storms affecting **terminal operations**. i	FAA-12 FAA-33		NOAA-10	DOD-38	IND-1
	Convective Hazards	FAA	NASA	NOAA	DOD	IND/UNIV

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Service Area (3): <u>En Route Winds and Temperatures</u>

Initiative	Description	FAA	NASA	NOAA	DOD	IND/UNIV
1	Develop and implement en route wind and temperature **products** that are applicable for use by pilots, ATC service providers, airline operations centers, and others. i i i i	FAA-4	NASA-6			
2	Increase the types and number of aircraft with the capability for **automatic reporting** of winds and temperatures and ensure the widest dissemination possible to the National Weather Service and airline operations center's using established ground-based communication systems. i i i i	FAA-17	NASA-6A			
3	Develop and implement ground to air (Flight Information Service) capabilities to readily **disseminate** en route wind forecast products within 15 minutes of product generation for strategic route planning. i i i i	FAA-15 FAA-49	NASA-11			IND-2 IND-10
4	Develop and implement a multifunctional color cockpit **display** that includes en route wind and temperature information along with terrain and traffic hazards. i i i i		NASA-6/E			IND-6 IND-7
5	Expand the **collection of data** for winds and temperature aloft to include flight levels above FL390 and below 3,000 feet above ground level. i i	FAA-17	NASA-6A		DOD-45	
6	Improve the resolution and accuracy of wind and temperature aloft **observations**. i i	FAA-17	NASA-6A/F NASA-7		DOD-45	
7	Develop and implement **forecasting and modeling** techniques that will improve en route wind and temperature products, including resolution and accuracy in space and time, affecting **en route operations**. i i	FAA-33		NOAA-10	DOD-38	

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Service Area (4): Ground De-Icing and Anti-Icing

Initiative	Description	FAA	NASA	NOAA	DOD	IND/UNIV
1	Develop and implement ground de-icing **decision aids** that are applicable for use by, pilots, ATC service providers, airline operations centers, and airport managers. i i i i	FAA-13				IND-4
2	Improve the **detection and measurement** of freezing/frozen precipitation, freezing fog, and frost to support ground de-icing, holdover, and airport operations. i i i	FAA-50		NOAA-2	DOD-2 DOD-26	
3	Develop and implement a **training program** on ground de-icing in order to increase air traffic controller, pilot and ground crew awareness. i i i	FAA-13				ASSOC-1
4	Enhance capabilities to rapidly **disseminate** freezing/frozen precipitation, freezing fog, and frost forecasts to ATC service providers, airport managers and operators, and airline operations centers in order to improve ground de-icing operations. i i i	FAA-13				IND-4
5	Develop/improve **0-2 hour forecasts** of freezing/frozen precipitation, freezing fog, and frost in order to plan ground de-icing activities. i i	FAA-13				IND-4
6	Develop/improve **2-6 hour forecasts** of freezing/frozen precipitation, freezing fog, and frost in order to plan ground de-icing activities. i	FAA-13				IND-4

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Service Area (5): <u>In-Flight Icing</u>

Initiative	Description	FAA	NASA	NOAA	DOD	IND/UNIV
1	Develop and implement icing **products** that are applicable for use by aircrews, ATC service providers, and airline operations centers for tactical and strategic icing avoidance. i i i i	FAA-4 FAA-6/6A	NASA-6	NOAA-1 NOAA-14		
2	Develop and implement ground to air (Flight Information Service) capabilities to readily **disseminate** icing observations, within five minutes of availability, and forecast products, within 15 minutes of product generation, throughout the National Airspace System, i.e., to the cockpit, to airline operations centers, and to ATC providers. i i i i	FAA-15 FAA-49	NASA-11			IND-2 IND-10
3	Develop and implement a multifunctional, color cockpit **display** that includes icing along with terrain and traffic hazards. i i i i		NASA-6/E			IND-6 IND-7
4	Develop the capability and increase the types and number of aircraft with **automatic reporting** of icing related variables. i i i i	FAA-14 FAA-17	NASA-6A			
5	Develop **training packages** for use by operators of all types of aircraft to increase their knowledge of icing hazards and its impact on aircraft safety. i i i i		NASA-4			IND-18 UNIV-2 ASSOC-1
6	Improve the vertical and horizontal resolution and accuracy of **observations** of icing related variables affecting **en route operations**. i i i i	FAA-14 FAA-17 FAA-46	NASA-6A			
7	Improve current **ground-based communications** systems to readily **disseminate** icing products and reports within the National Airspace System, i.e., to the cockpit, to Airline Operations Centers, and to ATC service providers. i i	FAA-21 FAA-22 FAA-23			DOD-8 DOD-46	
8	Develop and implement **forecasting (for less than 1 hour) and modeling** techniques that will improve icing guidance products for **tactical avoidance**. i i	FAA-6A		NOAA-10		

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9	Establish and institutionalize an **objective, quantitative standard** for characterizing icing without regard to aircraft type. i i		NASA-6A			
10	Develop and implement **forecasting (greater than one hour) and modeling** techniques that will improve icing guidance products for **strategic avoidance**. i i	FAA-6A		NOAA-10		
11	Incorporate new **remote satellite-based and ground-based radar technologies** to warn of impending ice encounters. i i	FAA-6	NASA-3 NASA-6F		DOD-44	
12	Develop and implement icing-related **training packages for ATC service providers** and **require the airlines to implement** similar training packages for their pilots and operations center personnel. i i		NASA-4			
13	Develop and implement procedures that allow aircraft manufacturers to introduce new **technologies**, such as simulation-based design techniques, to streamline the aircraft **certification process** and improve understanding of aircraft performance in icing conditions. i		NASA-2			
14	Develop and incorporate new on-board ice accumulation **detection and removal** technologies. i				DOD-44	
15	Develop and incorporate new **aircraft-mounted, forward-looking technologies** that warn of impending icing encounters. i				DOD-44	
	In-Flight Icing	FAA	NASA	NOAA	DOD	IND/UNIV

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Service Area (6): Terminal Wind and Temperature

Initiative	Description	FAA	NASA	NOAA	DOD	IND/UNIV
1	Develop and implement terminal wind and temperature **products**, such as microburst and low-level wind shear information integrated into a single display which requires little or no interpretation or analysis, that are applicable for use by pilots, ATC service providers, airline operations centers, and other users. i i i i	FAA-19		NOAA-9		
2	Develop and implement ground to air (Flight Information Service) capabilities to **disseminate** terminal wind hazard observations within 1-2 minutes of observation and forecast products within 15 minutes of product generation throughout the National Airspace System; i.e., to the cockpit, to airline operations centers, and to ATC service providers. i i i i	FAA-15 FAA-49	NASA-11			IND-2 IND-3 IND-10 IND-14
3	Develop and implement a multifunctional, color cockpit **display** that includes terminal wind hazards along with terrain and traffic hazards. i i i i		NASA-6/E			IND-6 IND-7
4	Increase the types and number of aircraft capable of **automatic reporting** of terminal wind hazards. i i i i	FAA-17				
5	Improve current **ground-based communications** systems to readily **disseminate** hazardous and operationally significant wind condition reports and products affecting terminal operations. i i i	FAA-21 FAA-22 FAA-23 FAA-35			DOD-8 DOD-46	
6	Develop capabilities for providing terminal wind and temperature hazard information directly to **decision support systems**. i i i	FAA-19 FAA-32 FAA-50		NOAA-2	DOD-2 DOD-3 DOD-9 DOD-26	

7	Develop and implement aircraft-mounted, forward-looking **technologies for detecting** microburst, wind shear, and wake vortex events. ii					
8	Expand the number of **airports** at which microburst and low-level wind shear services are available based on increased operations load and the emergence of more cost-effective **technologies**. ii	FAA-1 FAA-2 FAA-3				
9	Improve the **forecasts** of surface temperature, as well as associated procedures for the calculation of density altitude, for increased awareness of operational ramifications. ii			NOAA-10		
10	Develop and implement **forecasting (for 1 hour or greater) and modeling** techniques that will improve hazardous and operationally significant surface wind condition products (including resolution and accuracy in time and space) affecting **terminal operations**. i	FAA-33		NOAA-10	DOD-38	IND-1
11	Develop and implement **forecasting (for up to 1 hour) and modeling** techniques that will improve hazardous and operationally significant surface wind condition products (including resolution and accuracy in time and space)affecting **terminal operations**. i	FAA-19		NOAA-10		
	Terminal Wind and Temperature	FAA	NASA	NOAA	DOD	IND/UNIV

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Service Area (7): Turbulence

Initiative	Description	FAA	NASA	NOAA	DOD	IND/UNIV
1	Expand the number and types of **aircraft** capable of automatic **reporting** of aircraft independent turbulence observations. i i i i	FAA-7	NASA-6A			
2	Develop and implement turbulence **products** that are applicable for use by pilots, ATC service providers, and airline operations centers for flight planning and decision making. i i i i	FAA-4	NASA-6	NOAA-14		
3	Develop and implement ground to air (Flight Information Service) capabilities to readily **disseminate** turbulence observations within 5 minutes of availability, and forecast products, within 15 minutes of product generation, to aircraft for turbulence avoidance. i i i i	FAA-15 FAA-49	NASA-11			IND-2 IND-3 IND-10
4	Develop and implement a multifunctional, color cockpit **display** that includes turbulence along with terrain and traffic hazards. i i i i		NASA-6/E			IND-6 IND-7
5	Establish and institutionalize an **objective, quantitative standard** for characterizing turbulence without regard to aircraft type. i i i i	FAA-7				
6	Improve current **ground-based communications** systems, including VHF, to readily **disseminate** turbulence warning products and reports for use by all aircraft. i i i	FAA-21 FAA-22 FAA-23			DOD-8 DOD-46	
7	Investigate the utility of different **procedures** for improving passenger and aircrew safety in turbulent encounters. i i	*	NASA-9			
8	Develop and implement **forecasting (for less than 1 hour) and modeling** techniques that will improve turbulence guidance products for **tactical avoidance**. i i			NOAA-10		

* Objective 4 in FAA's 2004 to 2008 Strategic Plan

9	Develop and implement aircraft-mounted, forward-looking **technologies for detecting** turbulence. i i		NASA-9			IND-13
10	Develop and implement **forecasting (for 1 hour or greater) and modeling** techniques that will improve turbulence guidance products for **strategic avoidance**. i i	FAA-8 FAA-27		NOAA-10	DOD-24	
11	Require **pilot training** in acquiring knowledge about turbulence hazards, their impact on aircraft, and suitable avoidance and recovery techniques. i i					IND-18
12	Develop and implement **remote** (e.g., satellite-based) capabilities for **detecting** turbulence. i	FAA-41	NASA-6F			
	Turbulence	FAA	NASA	NOAA	DOD	IND/UNIV

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Service Area (8): Volcanic Ash and Other Airborne Hazardous Materials

Initiative	Description	FAA	NASA	NOAA	DOD	IND/UNIV
1	Develop and implement analysis **products** for volcanic ash and other hazardous airborne materials that are applicable for use by ATC providers, airline operations centers, and pilots in flight planning, strategic decision-making, and tactical avoidance. i i i i	FAA-28	NASA-6	NOAA-7		
2	Develop and implement ground to air (Flight Information Service) capabilities to readily **disseminate** volcanic ash and other airborne hazardous material initial warning products within 30 minutes of occurrence and updates within 15 minutes of product generation. i i i	FAA-15 FAA-49	NASA-11			IND-2 IND-10
3	Improve current **ground-based communications** systems to readily **disseminate** volcanic ash and other airborne hazardous material initial warning products within 30 minutes of occurrence and updates within 15 minutes of product generation. i i i	FAA-21 FAA-22 FAA-23				
4	Develop and implement a multifunctional, color cockpit **display** that includes volcanic ash clouds, hazardous airborne material clouds along with terrain, and traffic hazards. i i i		NASA-6/E			IND-6 IND-7
5	Improve the resolution and accuracy in time and space of **trajectory forecasts (up to 1 hour)** of volcanic ash clouds and other airborne hazardous material in affected airspace for tactical avoidance. i i			NOAA-17	DOD-15	
6	Improve the resolution and accuracy in time and space of **trajectory forecasts (1 hour or greater)** of volcanic ash clouds and other airborne hazardous material in affected airspace for strategic avoidance. i i			NOAA-17	DOD-15	
7	Improve the **detection** of volcanic eruptions (e.g., using satellite-based techniques) as well as-the resolution and accuracy of **observations** of volcanic ash clouds and other airborne hazardous materials. i i		NASA-6F	NOAA-8		

8	Establish a **quantitative ICAO standard** for describing the composition of volcanic ash clouds and other airborne hazardous materials in terms of proportion of gas, acid content, particle sizes, and density. i					
9	Develop aircraft-mounted forward-looking **technologies for detecting volcanic ash clouds**. i					
	Volcanic Ash	FAA	NASA	NOAA	DOD	IND/UNIV