

**Turbulence  
Joint Safety Implementation Team**

**Detailed Implementation Plan  
For  
Improve the Quality of Turbulence Information**

**DRAFT**

**Statement of Work:** Improve the quality and quantity of turbulence information used to support strategic flight planning and in-flight routing in order to efficiently avoid turbulence. Included are programs to increase the number and quality of turbulence observations to pinpoint the current location and severity of turbulence, initiatives to improve the accuracy of turbulence forecasts, and plans to develop consistent turbulence standards and metrics.

**Lead Organization for Overall Project Coordination (LOOPC):** FAA/ARS-1

**SAFETY ENHANCEMENT 66:** Additional Observations – Manual PIREPs and Automated EDRs.

**Score (InjuryRdx%):** 2007: 0.14    2020: 0.18    Full: 0.18    ‘07 Imp: 75%

**Total Resources Required:**

	Government		Manufacturers		Operators		Total
	FTE	\$M	FTE	\$M	FTE	\$M	FTE/\$M
<b>2007</b>	3.4	1.647	0.1	0.04	1.55	1.05	5.05/2.737
<b>2020</b>	0.2	0.213			0.95	0.5	1.15/0.713
<b>Totals</b>	3.6	1.86	0.1	0.04	2.50	1.55	6.2/3.45

**Completion Date:** Completed 36 months after CAST approval of Safety Enhancement.

**Output 1:** Increase quantity and quality of manual PIREPs through aircrew training and improved distribution within airlines and to FAA/NWS.

**Resources:** ATA Meteorological Committee (LOOC), FAA, RAA, NAATS, NATCA, NWS, NCAR, ARINC, Pilot Unions.

**Timeline:** Completed 36 months after CAST approval of Safety Enhancement.

**Actions:**

- **Airlines/NWS** -- Develop and implement a program to distribute in-house manual pilot reports to NWS/FAA.
- **Airlines** -- Train crews to follow established “PIREP” reporting procedures and encourage use of Flight Watch for PIREP input.
- **FAA/Airlines/Pilot Unions** -- Institute a PIREP awareness campaign.

**Output 2:** Implement National Air Space (NAS)-wide automated turbulence reporting based on Eddy Dissipation Rate (EDR).

**Resources:** FAA/AUA-400 (LOOC), NCAR, NASA, ATA, RAA

**Timeline:** Completed 36 months after CAST approval of Safety Enhancement.

**Actions:**

- **FAA/NCAR/Airlines** -- Install EDR and supporting weather downlink software at all ACARS equipped airlines.
- **FAA/ATA/RAA** -- Assess the utility to pilots, in terms of human factors and cost-effectiveness, of real-time cross linking (from one aircraft to another) of EDR reports.
- **FAA/ATA/RAA/ARINC** -- Ensure that future data link systems (post-ACARS) accommodate EDR reporting.

**Performance Goals & Indicators for Safety Enhancement/Outputs:**

- **Goal:** Improved knowledge about the current state and distribution of atmospheric turbulence.
  - **Indicator:** Starting 12 months after project initiation, and at 12-month intervals thereafter, FSL will issue a report summarizing the volume of manual, automated, and EDR aircraft reports. The report will include the number of reports for the 12 month period prior to project initiation, compared to the corresponding number of reports for each 12 month period subsequent to initiation, with the following goals:
    - Year 1 goal to increase reports by: 10% (manual), 5% (automated), 10% (EDR).
    - Year 2 goal to increase reports by: 5% (manual), 10% (automated), 50% (EDR).
    - Year 3 goal to increase reports by: 5% (manual), 10% (automated), 50% (EDR).
  - Within 12 months, ATA to develop baseline report on the status of data distribution at each airline, with subsequent reports at 24 and 36 months. The report will include details on each airline’s efforts to complete automated PIREP/forecast distribution, in-house PIREP delivery to NWS/FAA, and “forced” uplink of critical turbulence data.
  - Within 12 months, and subsequent 12 month intervals, the FAA will issue a report on the status of:

3/12/03

- PIREP data distribution between the FAA, the NWS, and the airlines.
- PIREP data distribution within the FAA.

**SAFETY ENHANCEMENT 67:** Additional Observations – Semi-automate manual PIREP entry.

**Score (InjuryRdx%):** 2007: 0.13 2020: 0.13 Full: 0.13 '07 Imp: 100%

**Total Resources Required:**

	Government		Manufacturers		Operators		Total
	FTE	\$M	FTE	\$M	FTE	\$M	FTE/\$M
2007	4.9	5.1				0.3	4.9/5.4
2020							
Totals	4.9	5.1				0.3	4.9/5.4

**Completion Date:** Completed 48 months after CAST approval of Safety Enhancement.

**Output 1:** Semi-Automate ARTCC/terminal controllers' entry of manual PIREP's.

**Resources:** FAA/ARS-100 (LOOC), ATA, RAA, NAATS, NATCA, NWS, NCAR

**Timeline:** Completed 48 months after CAST approval of Safety Enhancement.

**Actions:**

- FAA -- Semi-Automate ARTCC/terminal controllers' entry of manual PIREP's.

**Performance Goals & Indicators for Safety Enhancement/Outputs:**

- **Goal:** Improved knowledge about the current state and distribution of atmospheric turbulence.
  - **Indicator:** Automated input of manual PIREPS in FAA facilities.

**SAFETY ENHANCEMENT 68:** Improved turbulence forecast accuracy.

**Score (InjuryRdx%):** 2007: 0.11 2020: 0.14 Full: 0.14 '07 Imp: 80%

**Total Resources Required:**

	Government		Manufacturers		Operators		Total
	FTE	\$M	FTE	\$M	FTE	\$M	FTE/\$M
2007	25.4	7.8					25.4/7.8
2020	12	4.8					12/4.8

<b>Totals</b>	<b>37.4</b>	<b>12.6</b>					<b>37.4/12.6</b>
---------------	-------------	-------------	--	--	--	--	------------------

**Completion Date:** Completed 60 months after CAST approval of Safety Enhancement.

**Output 1:** Develop/implement improved forecasts based on multiple data sources.

**Resources:** FAA/AUA-400 (LOOC), NCAR, NWS, FSL, ATA, NASA

**Timeline:** Complete 60 months after CAST approval of Safety Enhancement.

**Actions:**

- **NCAR** -- Develop automated turbulence forecast algorithms (e.g., the Integrated Turbulence Forecast Algorithm, ITFA), utilizing all turbulence information including EDR reports, to be used to improve manual forecasts and eventually replace manually produced AIRMETS and SIGMETS.
- **NWS (AWC)/Airlines** -- Utilizing automated forecasting techniques from the action above, implement improved manual/automated turbulence forecasts.

**Output 2:** Develop/implement turbulence forecast verification system.

**Resources:** FAA/AUA-400 (LOOC), NOAA, FSL, NWS

**Timeline:** Completed 60 months after CAST approval of Safety Enhancement.

**Actions:**

- **NOAA /FSL/NWS** -- Develop/implement turbulence forecast verification system.

**Performance Goals & Indicators for Safety Enhancement/Outputs:**

- **Goals:** Government and industry to improve forecast accuracy of verifiable moderate and severe turbulence events to performance metrics of 80% Probability of Detection “yes” (PODy) and 85% Probability of Detection “no” (PODn), resulting in a non-convective injury rate reduction of 56%.
  - **Indicators:**
    - NCAR/FSL will develop a baseline turbulence forecast verification system for ITFA and NWS High Level Significant Weather Prog (HLSW) (domestic coverage only) developed within 12 months.
    - At 24, 36, 48, and 60-month intervals, compare verification results of ITFA, HLSW, and any other new turbulence forecast products to the stated goals (80% PODy and 85% PODn).
    - Beginning 12 months after project initiation, and at 12-month intervals thereafter, the FAA will issue a report summarizing NTSB turbulence statistics. Each report will include both the non-convective and convective injury rate for the 12-month period prior to project

initiation, compared to the corresponding injury rate for each 12-month period subsequent to initiation.

- Beginning 12 months after project initiation, and at 12-month intervals thereafter, the ATA will issue a report summarizing airline flight attendant loss of time statistics. Each report will include loss of time data for the 12-month period prior to project initiation, compared to the corresponding loss of time data for each 12-month period subsequent to initiation.
- Beginning 12 months after project initiation, and at 12-month intervals thereafter, the ATA will issue a report summarizing the frequency of turbulence related passenger claims. Each report will include the number of claims for the 12-month period prior to project initiation, compared to the corresponding number of claims for each 12-month period subsequent to initiation.

**SAFETY ENHANCEMENT 69:** Standardize terminology and make turbulence forecasts/warnings aircraft-category specific.

**Score (InjuryRdx%):** 2007: 0.10 2020: 0.13 Full: 0.13 '07 Imp: 80%

**Total Resources Required:**

	Government		Manufacturers		Operators		Total
	FTE	\$M	FTE	\$M	FTE	\$M	FTE/\$M
<b>2007</b>	4.2	2.85			1.1	0.85	5.3/3.7
<b>2020</b>							
<b>Totals</b>	4.2	2.85			1.1	0.85	5.3/3.7

**Completion Date:** Complete 60 months after CAST approval of Safety Enhancement.

**Output 1:** Deploy EDR ride report.

**Resources:** FAA/AUA-400 (LOOC), ATA, RAA, NCAR, NWS, FSL, NASA

**Timeline:** Complete 60 months after CAST approval of Safety Enhancement.

**Actions:**

- **FAA/NWS/NCAR/NASA/Airlines** -- Adopt EDR as the industry-wide, aircraft independent metric for measuring and reporting atmospheric turbulence.
- **FAA/NCAR/NASA/NWS/Airlines** -- Develop an industry “ride report” standard that is aircraft category specific, and that is calibrated to an objective in situ measure of turbulence (EDR).

**Output 2:** Develop/implement Concept of Operations (ConOps) for air-ground, air-air communication of EDR and derived products.

**Resources:** FAA/AUA-400 (LOOC), NCAR/Airlines/NWS.

**Timeline:** Completed 24 months after CAST approval of Safety Enhancement.

**Actions:**

- **FAA/NCAR/Airlines/NASA/NWS** -- Develop an industry ConUse that defines how both the objective measure of turbulence (EDR) and ride report information is communicated and used by flight crews, dispatch functions, weather information services, and air traffic control. Include a definition of where in the infrastructure the conversion to/from EDR and ride report is accomplished.

**Output 3:** Develop an industry standard that defines how turbulence warning and forecast products are generated to be both aircraft category specific and still meet the needs of pilots, dispatchers, weather information service providers, and air traffic controllers.

**Resources:** FAA/AUA-400 (LOOC), NCAR, FSL, NASA, NWS, Airlines

**Timeline:** Completed 24 months after CAST approval of Safety Enhancement.

**Actions:**

- **FAA's Turbulence Product Development Team (PDT)** – Develop an industry standard that defines how turbulence warning and forecast products are generated to be both aircraft category specific, and still meet the needs of pilots, dispatchers, weather information service providers, and controllers .

**Output 4:** Develop/implement training for pilots, dispatchers, air traffic controllers, and weather service providers.

**Resources:** NWS (LOOC), FAA/NCAR/NASA/Airlines

**Timeline:** Completed 24 months after CAST approval of Safety Enhancement.

**Actions:**

- **FAA/NWS** -- Develop training materials.
- **Airlines, FAA, NWS** -- Implement training for pilots, dispatchers, air traffic controllers, and weather service providers.

**Performance Goals & Indicators for Safety Enhancement/Outputs:**

- **Goals:** Standardize turbulence terminology and developing aircraft category specific products.
  - **Indicators:**
    - NCAR, at 12 month intervals, will survey the FAA, NWS, NASA, and the airlines, and report on the level of EDR implementation, and progress in developing an industry “ride report” standard (aircraft category specific and calibrated to EDR).
    - Within 24 months, under the leadership of the FAA's Turbulence PDT, a NAS “concept of operations” plan will be completed that defines how both EDR and ride report information is communicated and used by flight crews, dispatch functions, weather information services, and air traffic control. "Concept of operations" plan will include a definition of where in the infrastructure the conversion to/from EDR and ride report is accomplished. Industry-wide operational implementation of the "concept of operations" to be completed within 24-60 months under FAA leadership.
    - Within 24 months, under the leadership of the FAA's Turbulence PDT, an industry standard will be developed that defines how turbulence warning and forecast products are generated to be both aircraft category specific, and still meet the needs of dispatchers, weather information services, and air traffic control. Industry standard for turbulence warning and forecast products to be implemented within 24-60 months, in conjunction with the “concept of operations”.

**SAFETY ENHANCEMENT 70:** Standardize vertica and horizontal clearance distance from thunderstorms

**Score (InjuryRdx%):** 2007: 0.10 2020: 0.10 Full: 0.10 ‘07 Imp: 100%

**Total Resources Required:**

	<b>Government</b>		<b>Manufacturers</b>		<b>Operators</b>		<b>Total</b>
	<b>FTE</b>	<b>\$M</b>	<b>FTE</b>	<b>\$M</b>	<b>FTE</b>	<b>\$M</b>	<b>FTE/\$M</b>
<b>2007</b>	<b>1.5</b>	<b>2.5</b>			<b>1.2</b>	<b>1.5</b>	<b>2.7/4.0</b>
<b>2020</b>							
<b>Totals</b>	<b>1.5</b>	<b>2.5</b>			<b>1.2</b>	<b>1.5</b>	<b>2.7/4.0</b>

**Completion Date:** Completed 36 months after CAST approval of Safety Enhancement.

**Output 1:** Review current airline thunderstorm clearance procedures, develop scientifically valid standards for horizontal and vertical clearance between aircraft and convective activity, and train aircrews to new standards.

**Resources:** FAA/AUA-400 (LOOC), ATA, RAA, NCAR, NWS, NASA

**Timeline:** Completed 36 months after CAST approval of Safety Enhancement.

**Actions:**

- **Airlines/FAA/NCAR/NASA** -- Review current industry clearance standards between aircraft and thunderstorms.
- **NCAR/NASA** -- Complete research to determine scientifically valid standards.
- **Airlines/FAA** -- Train flight crews to new standards.

**Performance Goals & Indicators for Safety Enhancement/Outputs:**

- **Goal:** Government and industry to develop scientifically valid thunderstorm clearance standards, resulting in a convective injury rate reduction of 50% and a commensurate reduction in flight attendant injuries and liability claims.
  - **Indicators:**
    - ATA to complete a review of current airline thunderstorm clearance standards and issue a report within 6 months.
    - NCAR/NASA will complete any required in situ research of aircraft and thunderstorm clearance standards and issue a report within 12-36 months.
    - ATA, starting at 36 months, and annually thereafter will report on operational implementation of new standards at each airline.
    - Beginning 12 months after project initiation, and at 12-month intervals thereafter, the FAA will issue a report summarizing NTSB turbulence statistics. Each report will include both the non-convective and convective injury rate for the 12-month period prior to project initiation, compared to the corresponding injury rate for each 12-month period subsequent to initiation.
    - Beginning 12 months after project initiation, and at 12-month intervals thereafter, the ATA will issue a report summarizing airline flight attendant loss of time statistics. Each report will include loss of time data for the 12-month period prior to project initiation, compared to the corresponding loss of time data for each 12-month period subsequent to initiation.
    - Beginning 12 months after project initiation, and at 12-month intervals thereafter, the ATA will issue a report summarizing the frequency of turbulence-related passenger claims. Each report will include the number of claims for the 12-month period prior to project initiation, compared to the corresponding number of claims for each 12-month period subsequent to initiation.

**Relationship to Current Aviation Community Initiatives**

- Varying levels of dissemination and reporting of PIREP information:
  - Meteorological Data Collection and Reporting System (MDCRS)



- FSL/ACARS Website
- Airline direct input to NWS
- Aviation Digital Data Service (ADDS)
- The following automation systems are being developed to assist input and dissemination of information in the Air Traffic arena:
  - Enroute Automation Modernization (ERAM)
  - ASOS Controller Equipment - Information Display System (ACE-IDS)
  - Enroute Information Display System (ERIDS)
- One airline has adopted its own in-house collection and distribution system; however, it does not capitalize upon PIREPs from other airlines and therefore limits the geographical scope and usefulness as a universal system.
- Six airlines are currently providing automated ACARS weather reports.
- One airline is currently downlinking EDR data. Expansion is planned to other domestic and international carriers within the next 18 months.
- FAA funded NWS/FSL/NCAR Turbulence Product Development Team (PDT) is currently testing and transferring to operations an automated turbulence forecast model.
- The ADDS integrates turbulence forecasts and PIREPs into a single user display.

### **Programmatic Approach**

#### *Organizational Strategy*

The FAA Act of 1958 established the inherent obligation of any air carrier certificate holder to maintain the highest level of safety in the public interest. Besides its regulatory and enforcement functions, the FAA also leads an aviation weather research and development effort in collaboration with other government agencies and private industry. PDTs have been formed by the FAA's Aviation Weather Research Program (AWRP) to address all known aviation weather hazards. In particular, the Turbulence PDT is currently researching the physical processes associated with all forms of turbulence with the goal of introducing operational versions of advanced diagnoses, nowcasts, and forecasts in the near term. We propose to use this organizational strategy to oversee the integration of outputs described in this plan with the current research activities sponsored by the FAA. The PDT brings together the best the research community has to offer in terms of expertise in the fields that have direct application to the turbulence problem. These organizations include the National Weather Service (NWS), the National Center for Atmospheric Research (NCAR), the National Aeronautics and Space Administration (NASA), and the National Oceanic and Atmospheric Administration's Forecast Systems Laboratory (FSL). The PDT maintains a strong linkage to the user community through the airlines, Air Transport Association (ATA), air traffic management/control, the Regional Airline Association (RAA), the NWS and airline pilot unions.

The Lead Organization for Overall Project Coordination (LOOPC) is ARS-1, a member of the CAST and a designee of ATS-1, the Associate FAA Administrator responsible for Air Traffic Services. The Lead Organizations for Output Coordination (LOOC) are

identified in each Output of this Implementation Plan. Included are FAA organizations with responsibilities associated with the outcomes. Also included is the ATA, with a role of coordinating industry participation in the dissemination of improved turbulence information. The roles and responsibilities of the LOOPC and LOOC are described in the CAST approved JSIT Process Document.

### *Implementation Activities*

The research community, FAA, ATA/RAA, and other industry participants will collaborate to accomplish the following activities (outputs).

### **Key Products and Milestones**

<b>Safety Enhancement 66:</b> Additional Observations – Manual PIREPs and Automated EDRs.		
<b>Output 1:</b> Increase quantity and quality of manual PIREPs through aircrew training and improved distribution within airlines and to FAA/NWS.		
<b>Action</b>	<b>Responsible Party</b>	<b>Completion Date</b>
Develop and implement a program to distribute in-house manual pilot reports to NWS/FAA.	<b>Airlines/NWS</b>	<b>36 months after CAST approval</b>
Train crews to follow established “PIREP” reporting procedures and encourage use of Flight Watch for PIREP input.	<b>Airlines</b>	<b>36 months after CAST approval</b>
Institute a PIREP awareness campaign.	<b>FAA/Airlines/ Pilot Unions</b>	<b>18 months after CAST approval</b>
<b>Output 2:</b> Implement National Air Space (NAS)-wide automated turbulence reporting based on Eddy Dissipation Rate (EDR).		
<b>Action</b>	<b>Responsible Party</b>	<b>Completion Date</b>

Install Eddy Dissipation Rate (EDR) and supporting weather downlink software at all ACARS equipped airlines.	<b>FAA/NCAR/ Airlines</b>	<b>36 months after CAST approval</b>
Assess the utility to pilots, in terms of human factors and cost-effectiveness, of real-time cross-linking (from one aircraft to another) of EDR reports.	<b>FAA/ATA/RAA</b>	<b>36 months after CAST approval</b>
Ensure that future data link systems (post-ACARS) accommodate EDR reporting.	<b>FAA/ATA/RAA/ ARINC</b>	<b>ongoing CAST oversight</b>

<b>Safety Enhancement 67: Additional Observations – Semi-Automate manual PIREP entry.</b>		
<b>Output:</b> Semi-automate ARTCC/terminal controller’s entry of manual PIREPs		
<b>Action</b>	<b>Responsible Party</b>	<b>Completion Date</b>
Semi-Automate ARTCC/Terminal entry of manual PIREPs	<b>FAA/NATCA/</b>	<b>48 months after CAST approval</b>

<b>Safety Enhancement 68: Improved turbulence forecast accuracy.</b>		
<b>Output 1:</b> Develop/implement improved forecasts based on multiple data sources		
<b>Action</b>	<b>Responsible Party</b>	<b>Completion Date</b>
Develop automated turbulence forecast algorithms (e.g., the Integrated Turbulence Forecast Algorithm, ITFA), utilizing all turbulence information including EDR reports, to be used to improve manual forecasts and eventually replace manually produced AIRMETS and SIGMETS.	<b>NCAR</b>	<b>60 months after CAST approval</b>
Utilizing automated forecasting techniques from the above action, implement improved manual/automated turbulence forecast.	<b>NWS (AWC)/ Airlines</b>	<b>60 months after CAST approval</b>

Output 2: Develop/implement turbulence forecast verification system.		
Action	Responsible Party	Completion Date
Develop/implement turbulence forecast verification system.	NOAA/FSL/ NWS	60 months after CAST approval

<b>Safety Enhancement 69: Standardize terminology and make turbulence forecasts/warnings aircraft-category specific.</b>		
Output 1: Deploy EDR ride report.		
Action	Responsible Party	Completion Date
Adopt EDR as the industry-wide, aircraft independent metric for measuring and reporting atmospheric turbulence.	FAA/NWS/ NCAR/NASA/ Airlines	60 months after CAST approval
Develop an industry “ride report” standard that is aircraft category specific, and that is calibrated to an objective in situ measure of turbulence (EDR).	FAA/NCAR/ NASA/NWS/ Airlines	60 months after CAST approval
Output 2: Develop/implement Concept of Operations (ConOps) for air-ground, air-air communication of EDR and derived products.		
Action	Responsible Party	Completion Date
Develop an industry ConOps that defines how both the objective measure of turbulence (EDR) and ride report information is communicated and used by flight crews, dispatch functions, weather information services, and air traffic control. Include a definition of where in the infrastructure the conversion to/from EDR and ride report is accomplished.	FAA/NCAR/ NASA/Airlines/ NWS	24 months after CAST approval
Output 3: Develop an industry standard that defines how turbulence warning and forecast products are generated to be both aircraft category specific and still meet the needs of pilots, dispatchers, weather information service providers, and air traffic controllers.		
Action	Responsible Party	Completion Date
Develop an industry standard that defines how	FAA	24 months after

turbulence warning and forecast products are generated to be both aircraft category specific and still meet the needs of pilots, dispatchers, weather information services providers, and controllers.	<b>Turbulence PDT</b>	<b>CAST approval</b>
<b>Output 4:</b> Develop/implement training for pilots, dispatchers, air traffic controllers, and weather service providers.		
<b>Action</b>	<b>Responsible Party</b>	<b>Completion Date</b>
Develop training materials	FAA/NWS	<b>24 months after CAST approval</b>
Implement training for pilots, dispatchers, controllers and weather service providers.	Airlines/FAA/NWS	<b>24 months after CAST approval</b>

<b><u>Safety Enhancement 70: Standardize vertical and horizontal clearance distance from thunderstorms.</u></b>		
<b>Output:</b> Review current airline thunderstorm clearance procedures, develop scientifically valid standards for horizontal and vertical clearance between aircraft and convective activity, and train aircrews to new standards.		
<b>Action</b>	<b>Responsible Party</b>	<b>Completion Date</b>
Review current industry clearance standards between aircraft and thunderstorms.	FAA/NASA/Airlines/NCAR	<b>24 months after CAST approval</b>
Complete research to determine scientifically valid standards.	NCAR/NASA	<b>36 months after CAST approval</b>
Train flight crews to new standards	Airlines/FAA	<b>36 months after CAST approval</b>

**Risk Description and Risk Mitigation Plan:**

<b>RISK DESCRIPTION</b>	<b>RISK MITIGATION PLAN</b>
R2 – Turbulence is a small-scale dynamic phenomenon. The forecast problem may be more difficult than currently perceived and, as such, the stated goals of 80% PODy/85% PODn may be hard to achieve.	M2 – Monitor scientific discovery, product development, and verification results. Adjust expectations as necessary. NOTE: These activities are already part of the Turbulence PDT direction from AWRP.
R3 – FAA and airline software development/implementation and budget cycles may impact completion dates.	M3 – Implement as part of regularly scheduled P <sup>3</sup> I for airlines and FAA. Monitor budget developments carefully to support future planning.
R4 - Manual PIREP systems will always be subject to higher priority concerns.	M4 – Maintain manual systems until automation gains user confidence.

	Automated systems will reduce workload.
R5 – Increased clearance standards from convective activity may contribute to perception of increased delays.	M5 - Perception of increased delays may be offset by more precise forecast of convective activity and turbulence.

**Impact on Non-FAR Part 121 or International Applications**

There will be a disconnect in terminology with general aviation aircraft and non-US carriers who have not adopted ICAO EDR standards.