



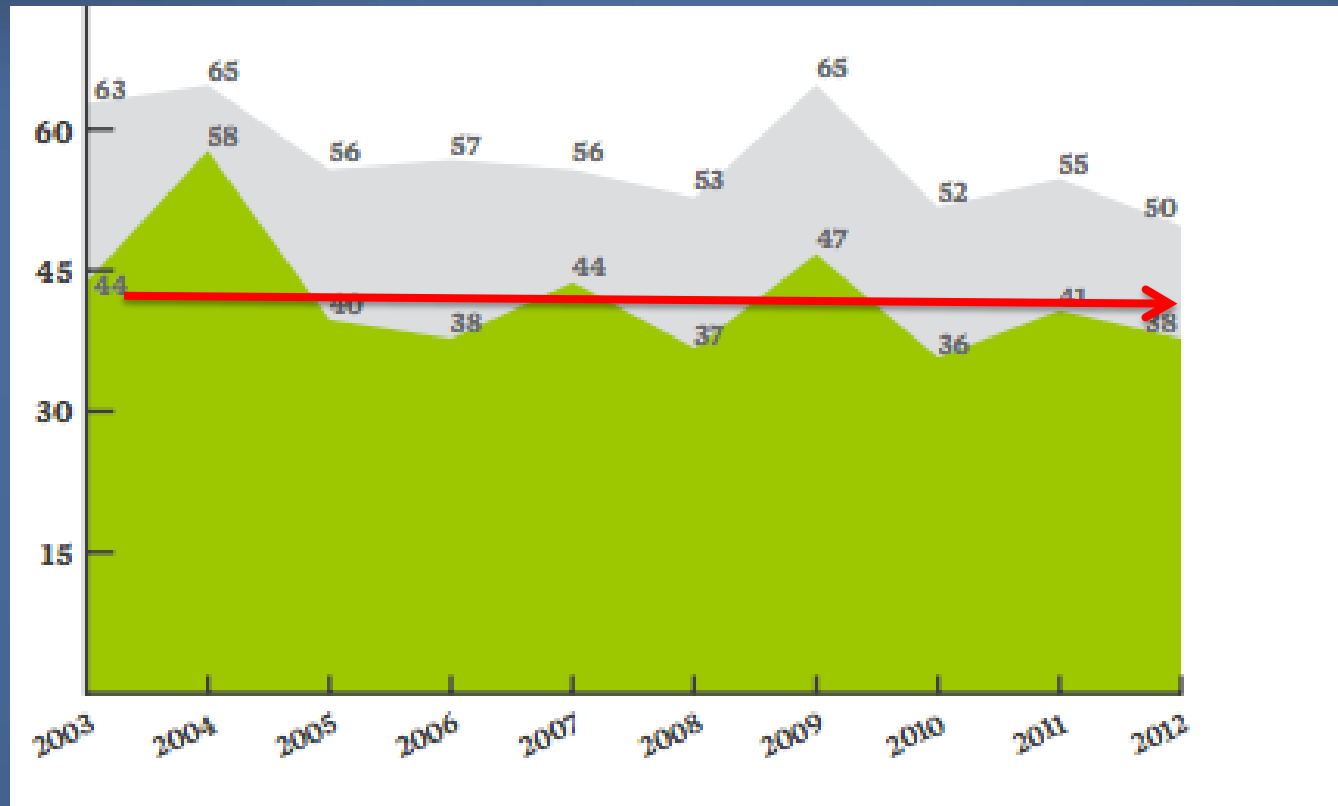
**National
Transportation
Safety Board**

Recap of the NTSB PIREP Forum: Optimizing Safety Benefits for Pilots, ATC, and Meteorologists

Paul Suffern

NTSB Meteorologist

Wx Accident Trend

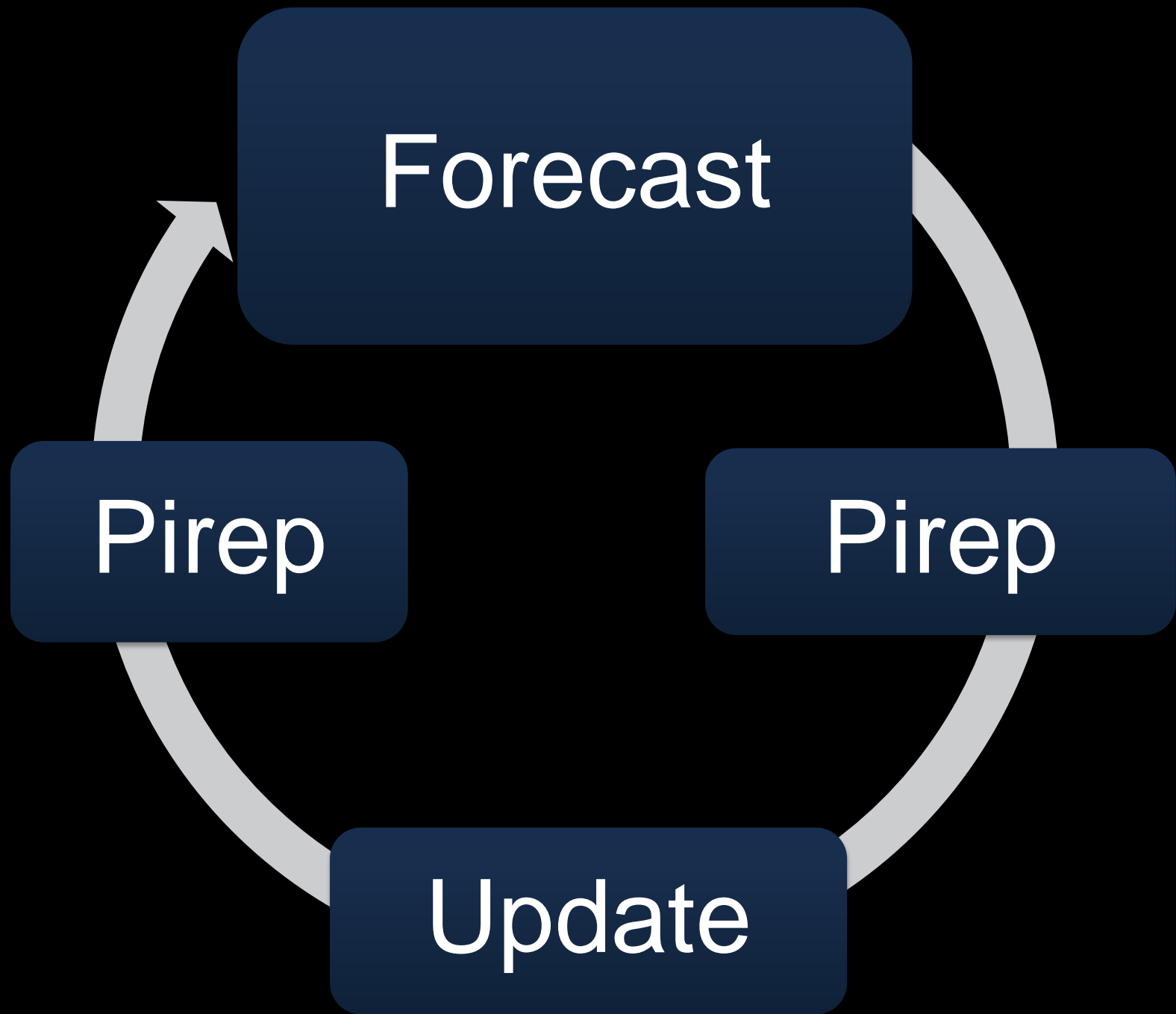


Preflight Planning

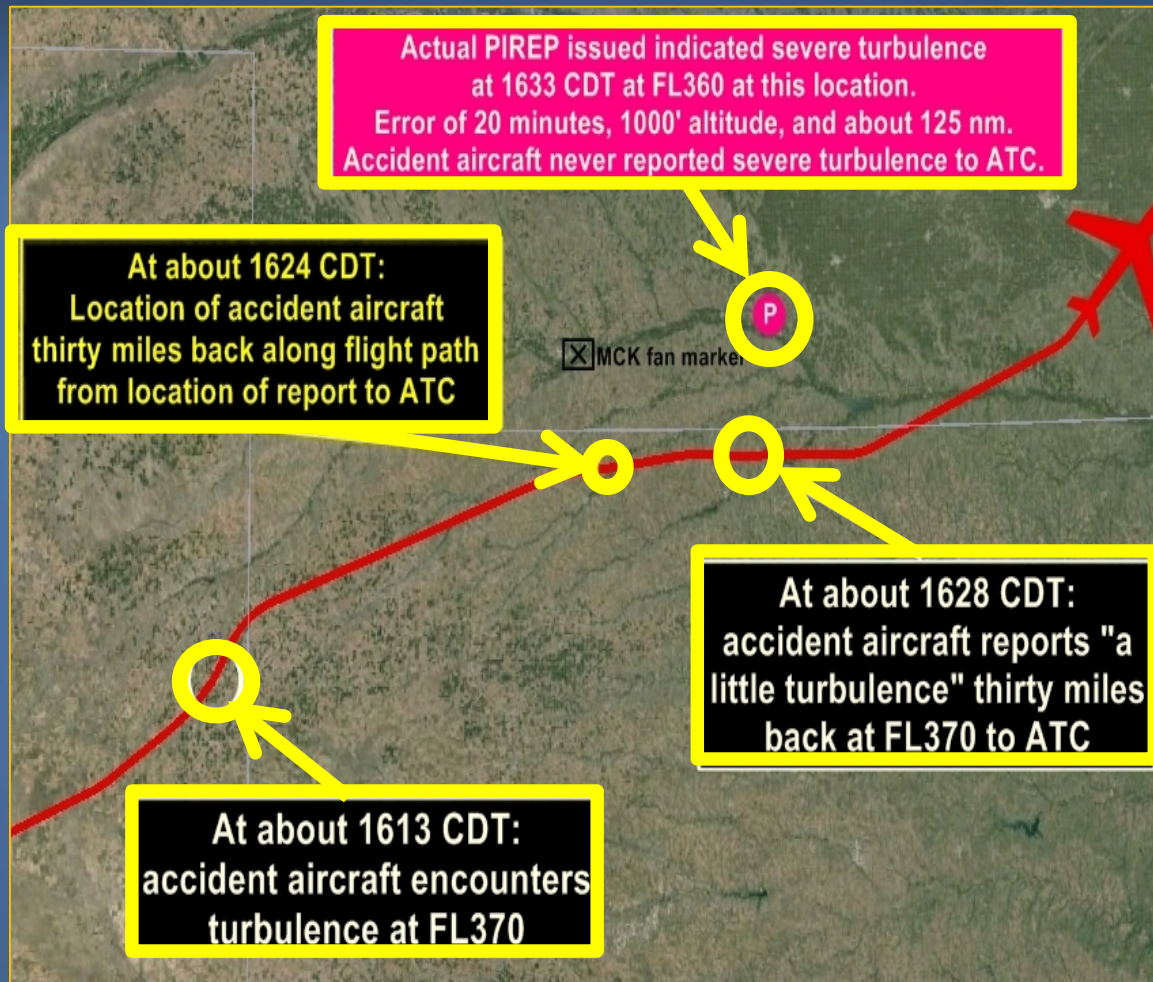
TABLE 1
Pilots' Usage of 15 Aviation Weather Products for Three Different Types of Flight

<i>VFR Local</i>			<i>VFR Cross-Country</i>			<i>IFR</i>		
<i>Product</i>	<i>Usually or Always</i>		<i>Product</i>	<i>Usually or Always</i>		<i>Product</i>	<i>Usually or Always</i>	
	<i>Self</i>	<i>All</i>		<i>Self</i>	<i>All</i>		<i>Self</i>	<i>All</i>
METAR	72%	78%	RADAR	87%	82%	RADAR	83%	85%
RADAR	72%	70%	TAF	81%	81%	TAF	83%	81%
TAF	70%	71%	METAR	72%	80%	METAR	77%	82%
Surf anl chart	45%	41%	Winds aloft	72%	77%	Winds aloft	70%	79%
Satellite	43%	45%	Surf anl chart	68%	61%	Surf anl chart	70%	69%
PIREP	43%	38%	Satellite	55%	60%	PIREP	66%	65%
Winds aloft	43%	45%	PIREP	53%	46%	Satellite	62%	67%
Area forecast	34%	36%	Area forecast	51%	58%	AIR/SIGMET	58%	64%
AIR/SIGMET	34%	43%	AIR/SIGMET	47%	57%	Area forecast	55%	62%
Conv. outlook	25%	20%	Winds aloft-Gr.	41%	41%	Sig. weather chart	51%	56%
Winds aloft-Gr.	22%	22%	Conv. outlook	38%	39%	Current icing	51%	57%
Sig. weather chart	21%	26%	Sig. weather chart	33%	44%	Winds aloft-Gr.	50%	50%
NCWF	17%	17%	Current icing	32%	25%	Conv. outlook	43%	51%
Current icing	11%	11%	NCWF	23%	30%	NCWF	38%	38%
Frz level graphic	6%	7%	Frz level graphic	21%	18%	Frz level graphic	30%	40%

Note. VFR = visual flight rules; IFR = instrument flight rules; PIREP = Pilot Weather Report; NCWF = National Convective Weather Forecast.



Inaccurate Pilot Reporting, ATC Coding



Learjet Severe Icing Encounter



- Severe icing right before touchdown
- Crew lost all forward visibility
- Veered, struck berm
- ATC did not tell crew of severe icing PIREP

Commander 690C Accident

Loss of control, fatal accident

- Difficulty maintaining heading, altitude in IMC
- Airframe icing
- Loss of engine power

NTSB PIREP Forum

- Since 2012 more than 20 accident/incident investigations revealed PIREP and/or weather dissemination issues
- Held PIREP Forum at end of June 2016
- Numerous stakeholders
 - FAA
 - NWS / FSS
 - Operators and pilot organizations
 - Labor unions
 - Department of Defense
 - Tech industry, equipment and service providers

NTSB PIREP Forum 4 Main Discussion Topics

- Use and Significance of PIREPs
- Submission, Solicitation, and Dissemination
- Training, Education, and Operations
- Future Improvements

PIREPs: Importance, Uses

Fairly universal awareness:

- Valuable source of in-situ info about actual weather conditions
- Strategic and tactical uses in NAS
 - Pilots, dispatchers: route planning
 - ATC: traffic routing, free up airspace

PIREPs: Importance, Uses

Less awareness among pilots, operators, ATC personnel:

- **Impact on weather products**
 - Essential for forecast verification
 - Critical for accuracy of global forecast models, add value to icing and turbulence product algorithms
 - Both adverse and fair weather PIREPs

PIREPs: Importance, Uses

- Forecasting skill past 10-20 years
 - Improved due to surface observations
 - No such dense observation network aloft (why more/better PIREPs needed)
- One PIREP can result in drastic change to forecast, AIRMET, SIGMET, other advisories



Local Forecast

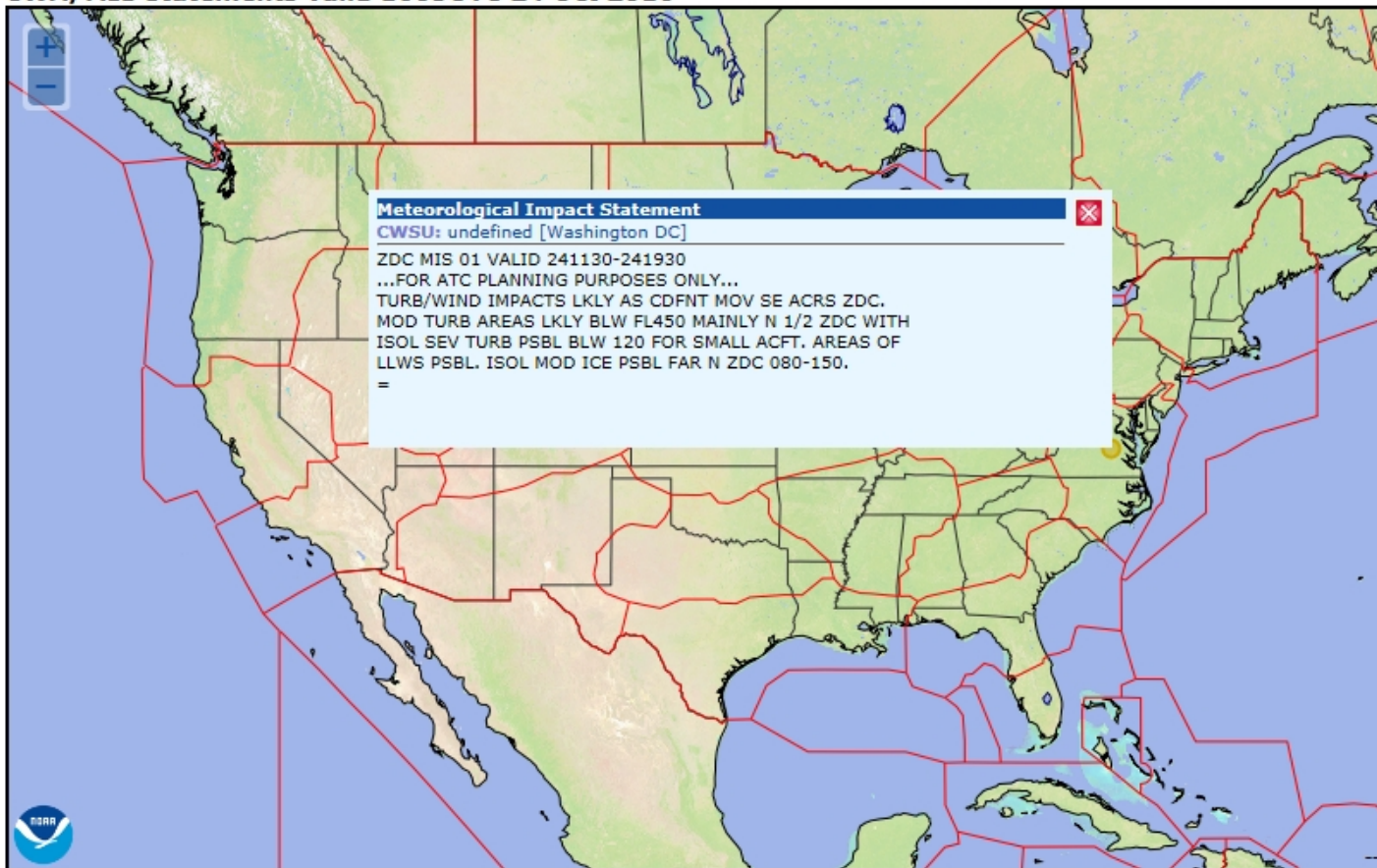
Go

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CWSU Advisories

[INFO](#)

CWA/MIS statements valid 1605UTC 24 Oct 2016



Map:

- ☒ Light
☐ Dark
☐ Simple

Plot Options:

- ☒ CWA ☒ MIS ☐ Hover

Overlays:

- ☐ Highways
☐ Top Jetroutes
☒ ARTCC/FIR Bounds

CWA

TS

Turb

Ice

IFR

MIS



Links to Individual CWSU Web Sites

ZAB -

ZFW - Fort Worth ZMA - Miami

Request CWA/MIS data

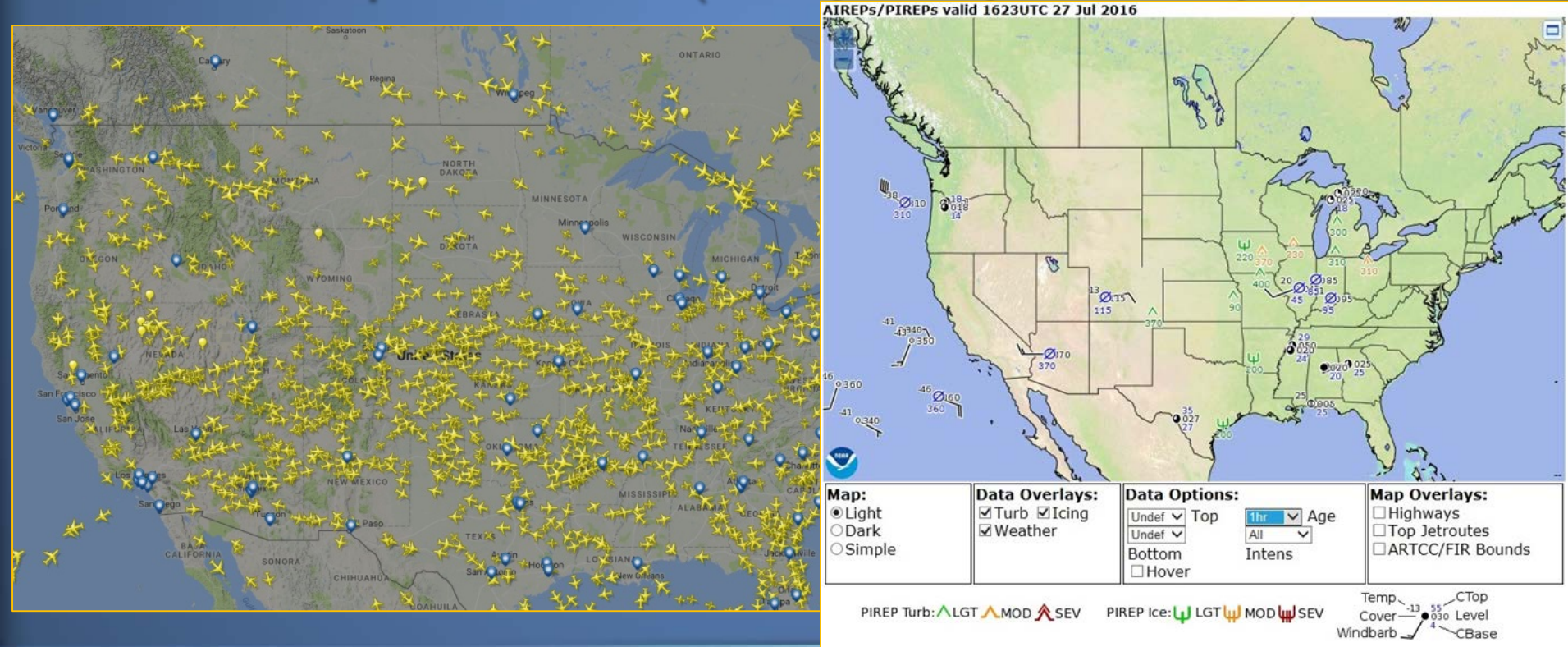
ZAB - Albuquerque



Get CWA/MIS data

PIREPs: Importance, Uses

Data potential (wx perspective)









PIREPs: Submission, Solicitation, and Dissemination

- Need better quality, quantity, variety submitted from pilots, operators
- Need effective dissemination by ATC, FSS, dispatchers
- Specific time limit requirements prohibitive?
- What ways can technology aid ATC/pilots?

PIREPs: Training, Education, and Operations

13. In what region of the country do you fly the most?

#	Answer	Bar	Response	%
1	Northeast		133	19%
2	South		118	17%
3	Midwest		117	17%
4	Southwest		170	25%
5	Pacific Northwest		73	11%
6	Alaska		75	11%
7	Hawaii		2	0%
	Total		688	

- Rarely/sometimes (75%) of pilots would provide unsolicited PIREP
- Never/Rarely (80%) has ATC requested PIREP

PIREPs: Training, Education, and Operations

- AOPA PIREP Survey
 - “Weather as forecast” would not likely submit a PIREP (10% would)
 - “Below 5,000 feet not much PIREP information...”
 - Most often receive PIREP information via FSS, NWS website, or ATC
 - Pilots more likely to provide PIREP to ATC (80%) than FSS (55%) if requested (excludes Alaska...)
 - Enforcement action only concern for ~15% of pilots
 - Only 38% (9% “always”) believed their PIREPs would make into NAS if provided...

NTSB Learned: Perspectives

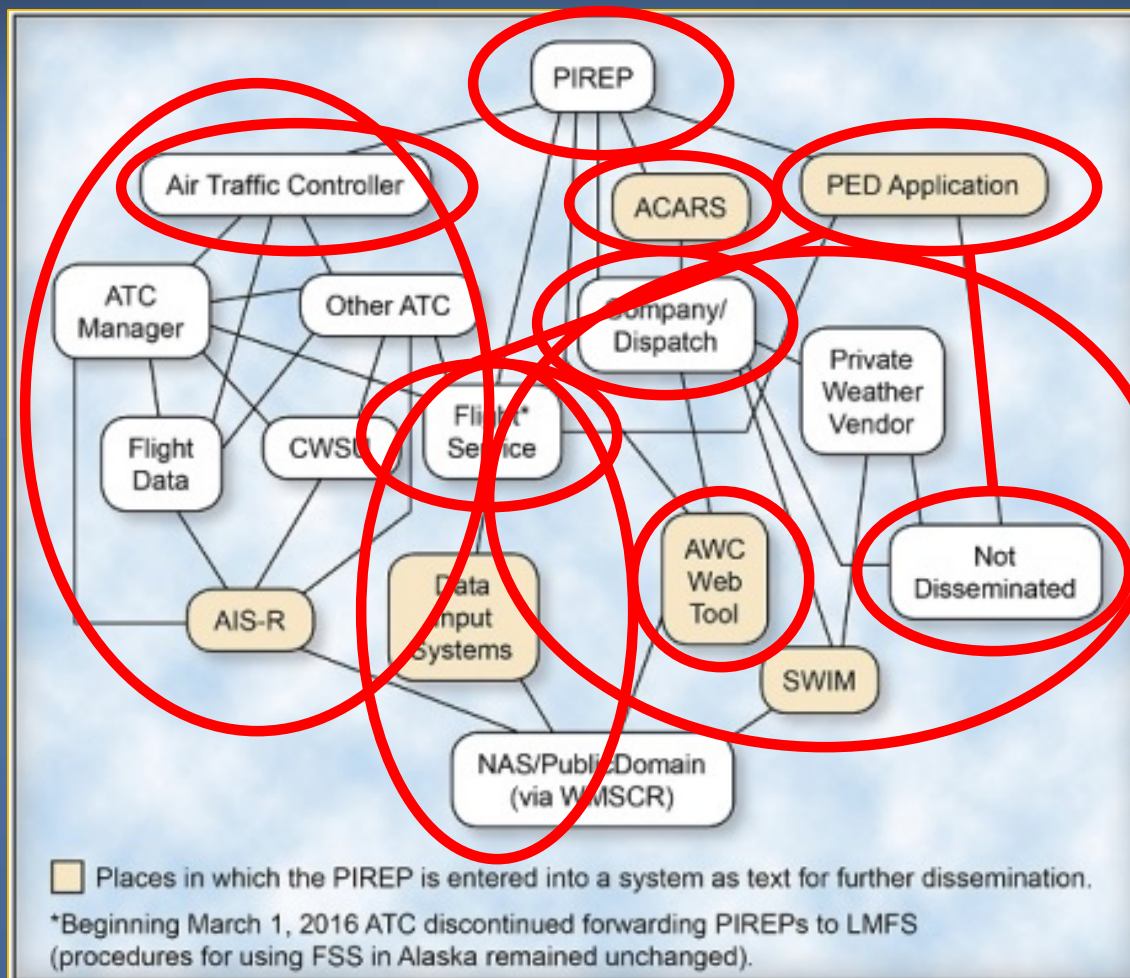
Various PIREP user groups not fully aware of others' needs, priorities, and constraints

- Weather forecasters/researchers
- Pilots/operators/educators
- ATC
- FSS

Considerations Moving Forward

- Short-term improvements within constraints of current system
- Foundation for supporting long-term solutions associated with emerging technologies
- NTSB drafting Special Investigation Report to analyze facts, make safety recommendations

Considerations Moving Forward



AWC ~~Experimental~~ PIREP Submit Form

- Pilots, operators, dispatchers may submit PIREPs electronically
 - Users required to register and each account is validated (based on pilot's license, e-mail address, and/or airline ID number)
- Enables registered users to directly enter pertinent information to increase reports and assist other pilots, dispatchers, and flight planners

PIREP Entry Form		FAQ
Pilot Weather Report → = Space Symbol		
NOTICE: The location lookup tool has been updated to accept 5 character intersection/fix locations. The locations will be verified on the server and the SA and OV computed based on the location. Also, the system will attempt to lookup unknown VORs entered in the OV field as airports and update the entry if a valid airport is found. The PIREP entry form is under continual improvement, please The PIREP entry form is under continual improvement, please let us know if you are experiencing any problems.		
3-Letter SA Identifier <input type="text"/>	Location Lookup Intersection/Fix: <input type="text"/> OR Lat: <input type="text"/> DD <input type="text"/> MM <input type="text"/> N/S DDD MM E/W Lon: <input type="text"/> <input type="text"/> W VOR: <input type="text"/> <input type="button" value="Insert"/> ARPT: <input type="text"/> <input type="button" value="Insert"/>	
Nearest weather reporting station		
1.	<input checked="" type="radio"/> UA (Routine Report) <input type="radio"/> UUA (Urgent Report)	
2. /OV →	Location: <input type="text"/> Site, Bearing/distance from VOR, Route (ex: KTPA, KMCI030025, KOKC-KDFW)	
3. /TM →	Time: <input type="text"/> <input type="button" value="Current Time"/> 4 digits UTC (ex: 0915, 2330)	
4. /FL	Altitude/Flight Level: <input type="text"/> <input type="radio"/> climb <input type="radio"/> descent <input type="button" value="Erase"/> Unknown <input type="button" value="Erase"/> 3 digits for hundreds of feet MSL. (ex: 095, 210) If unknown check box, select 'climb' or 'descent' if applicable	
5. /TP →	Aircraft Type: <input type="text"/> 4 characters max. If unknown, use UNKN (ex: C210, P3, UNKN)	

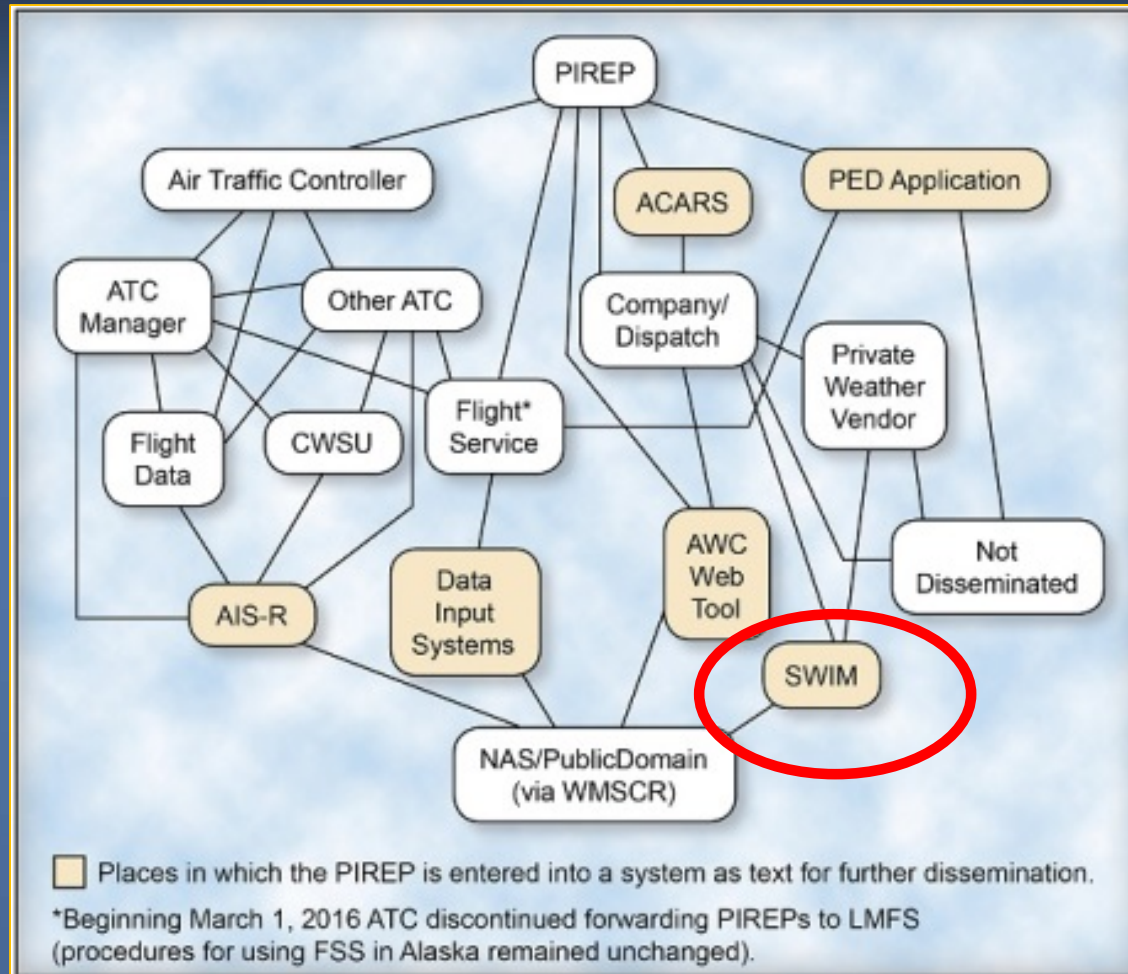
Items 1 through 5 are mandatory for all PIREPs

AWC PIREP Submit Form

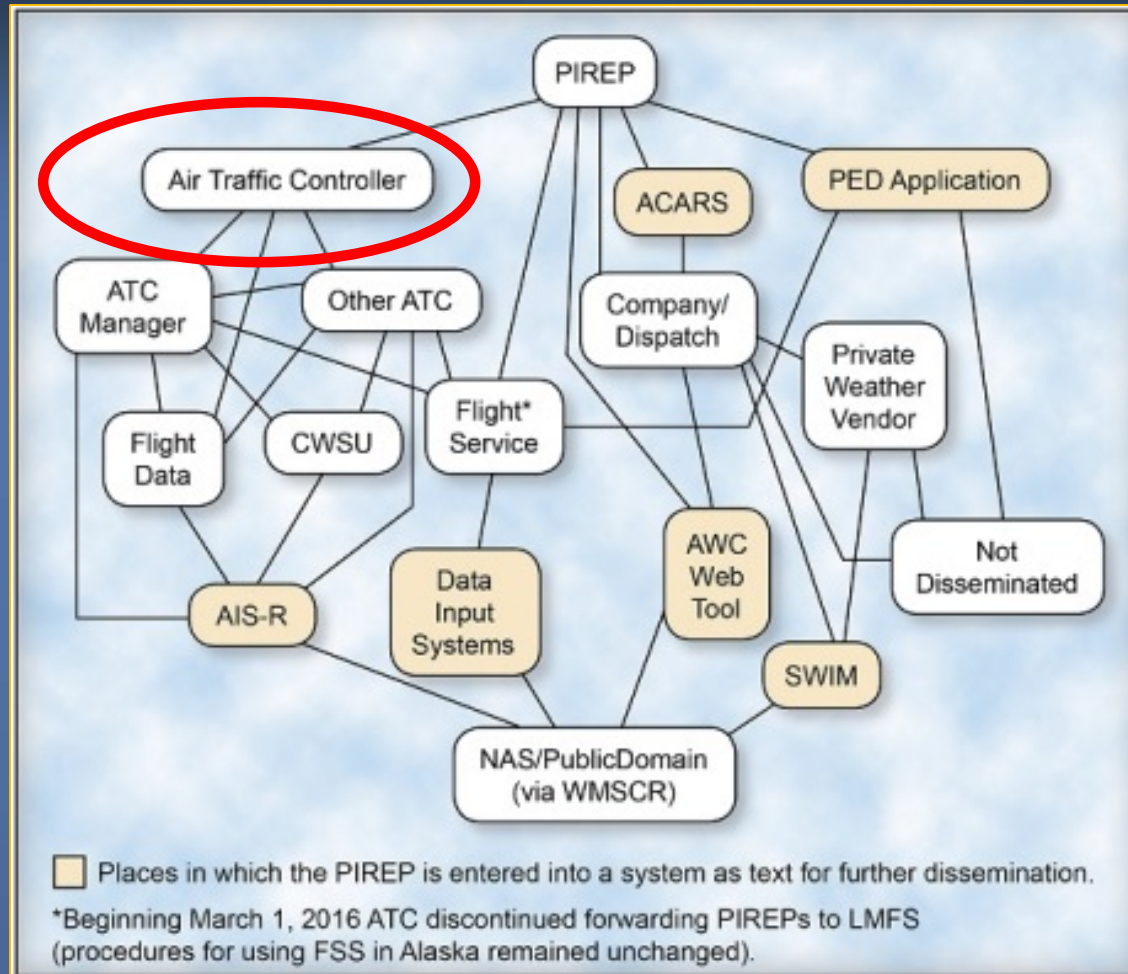
- Pilots, operators, dispatchers may submit PIREPs electronically
 - Just like all PIREPs, these are integrated into the AWC forecast production process
 - Will be automatically formatted, distributed, and displayed graphically on www.AviationWeather.gov



Automated submission?



Technology aiding ATC?



More PIREP Thoughts

- Submit more, better PIREPs
 - Time, location accuracy
 - Fair weather reports have value
- Become familiar with options
 - Situation dependent (ATC, FSS, app)
 - Even old PIREPs have value (change requirement?)
- Give braking action/bird/runway condition PIREP when no tower / closed tower
- Enforcement?

PIREPs: *Pay it Forward... Because*



**Weather for
ONE
is Weather for
NONE**

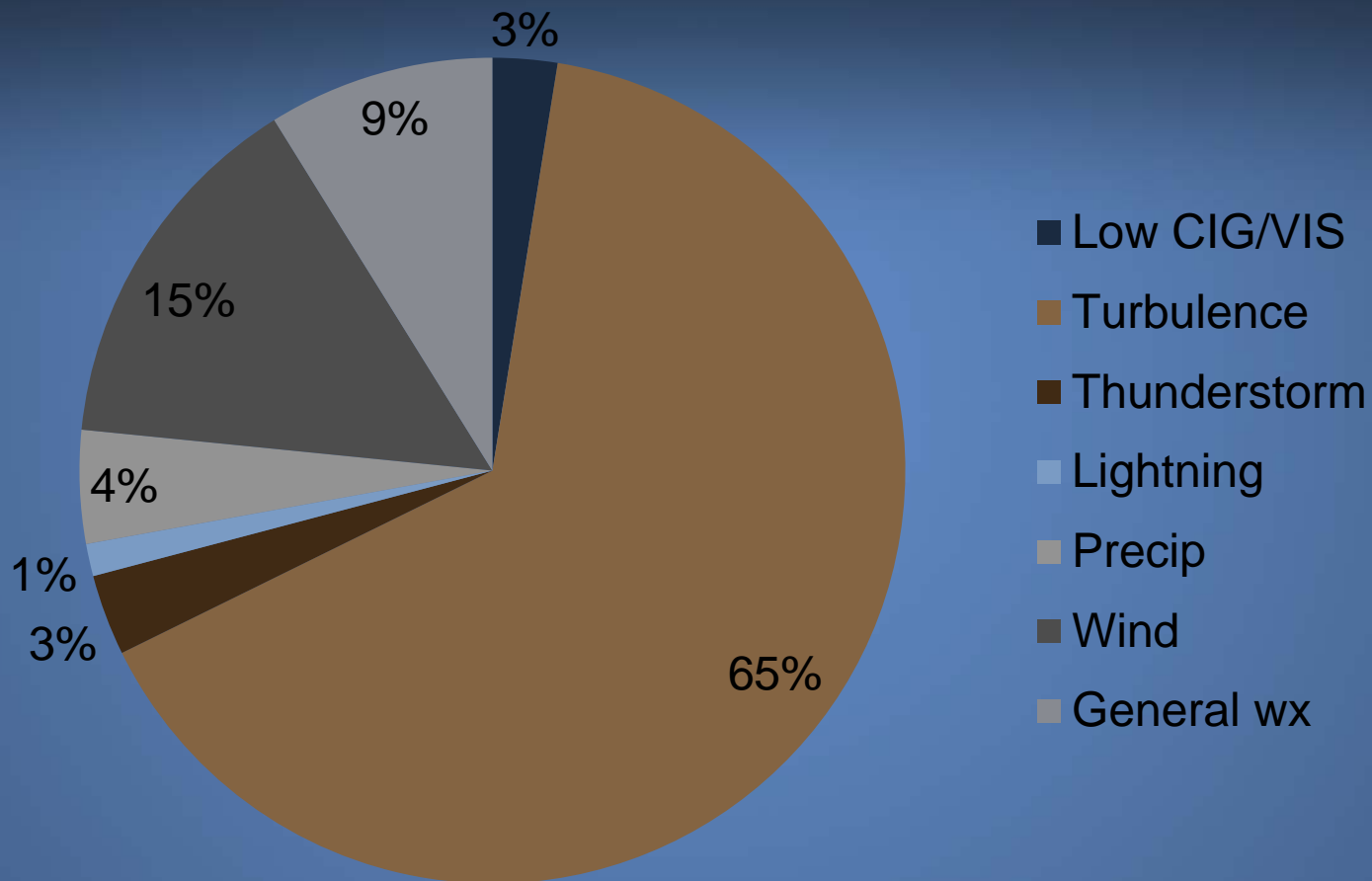
 NATIONAL TRANSPORTATION SAFETY BOARD FORUM

Any Questions?

Email: paul.suffern@ntsb.gov

AOPA PIREP Survey Available

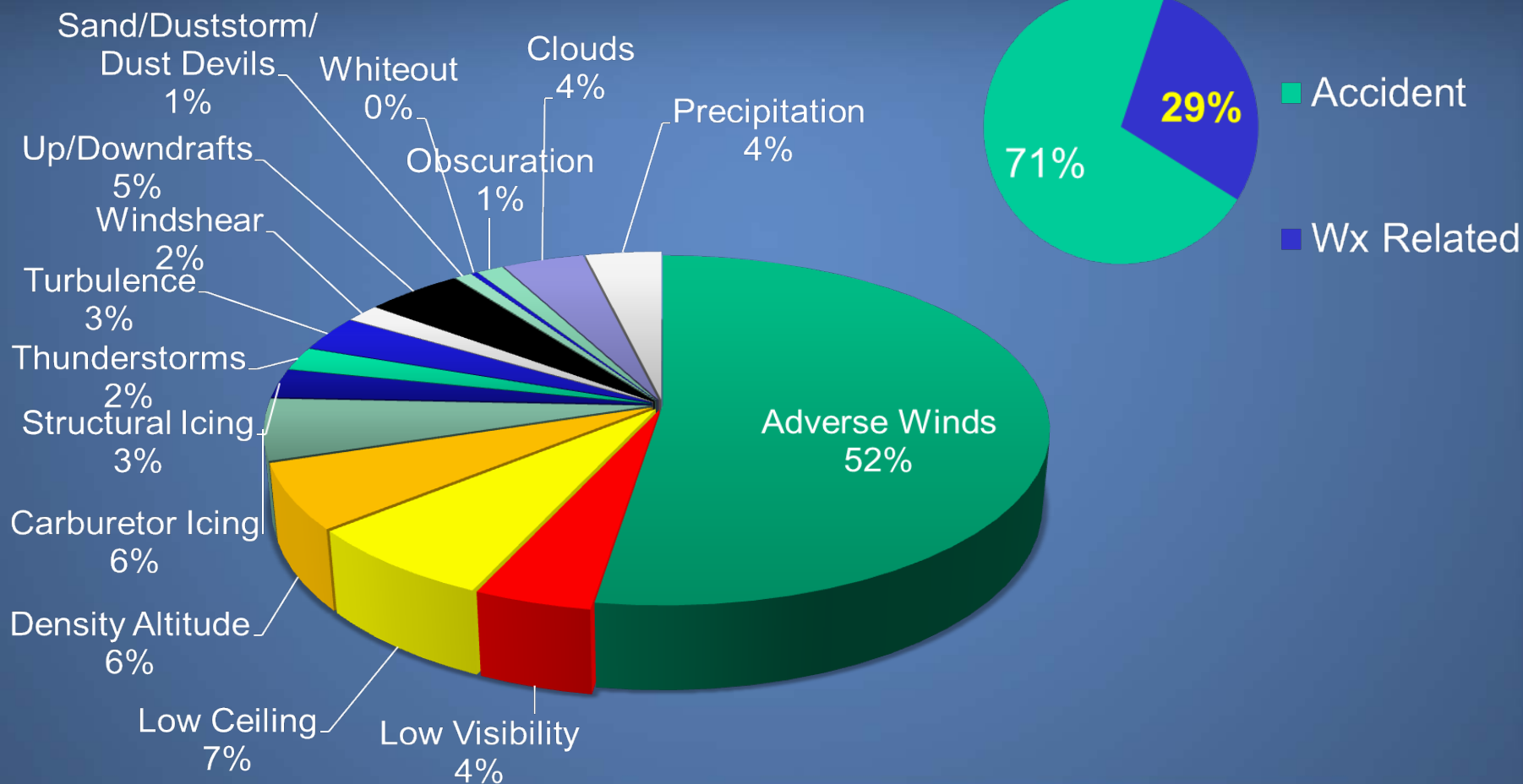
Part 121 Weather Related Accidents 2000-2013



30% of all part 121 accidents from 2000 to 2013 had weather as cause or factor

Part 91 – Weather As Cause/Factor period 2000-2011

19,441 Accidents

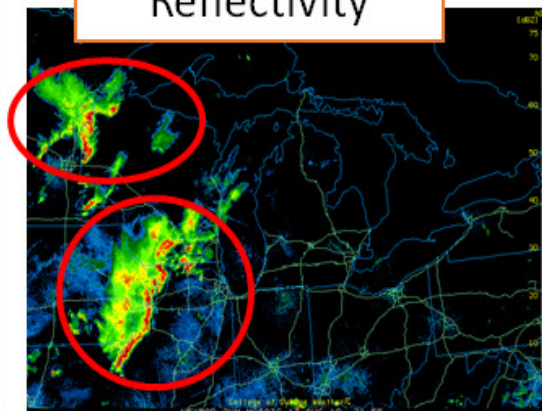


GTG 1hr Fcst

GTG missed
this storm



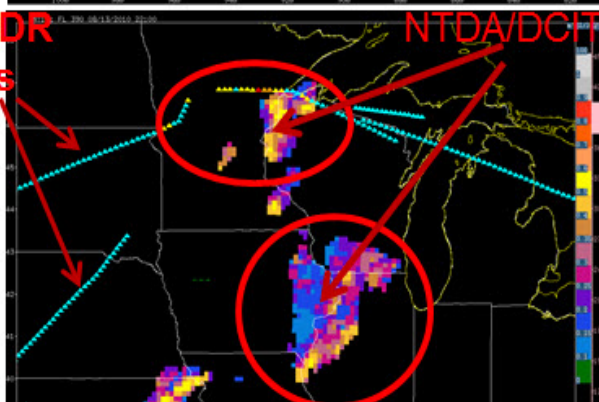
Reflectivity



Components & Output:
20100813 at 22z FL380

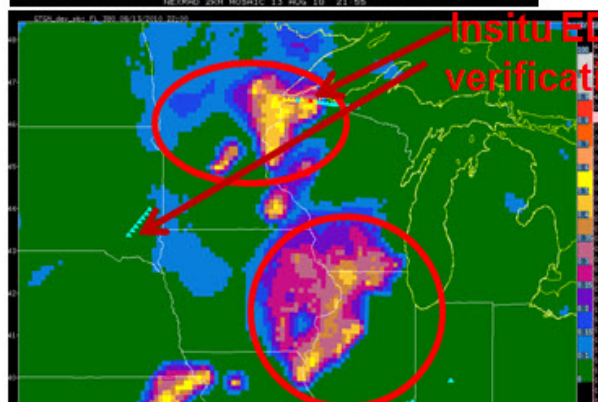
Insitu EDR
tracks

NTDA/DCIT



In situ, Pireps (1 hr prior) & NTD/DCIT

Insitu EDR
verification



GTGN & Next 15min *In situ*