



Weather Post-Analysis Capability for ATM (WX-PAC)

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AvMet Applications, Inc.

**Friends and Partners in Aviation
Weather (FPAW) Summer Meeting
August 2015**

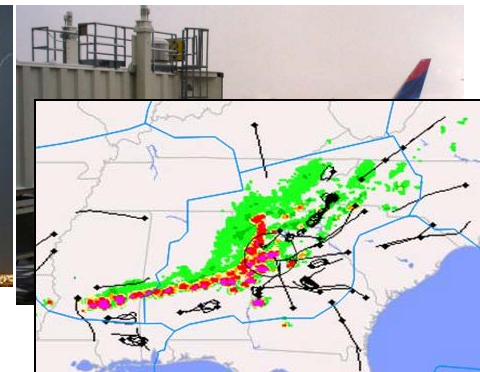
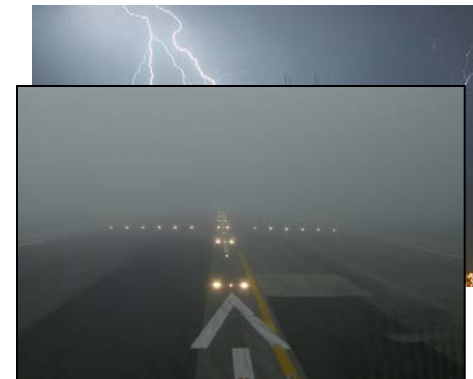
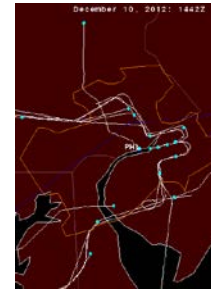
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Consider This....

- In the absence of irregular operations, the **NAS performs pretty well**
- It is **during irregular operations** when NAS goes “nonlinear”....impacts soar and both inefficiencies and opportunities abound....
- By far, most significant cause of irregular operations is **adverse aviation weather**
- Despite continued and heightened use and development of NAS post-event metrics, **dedicated, weather-aware post event analysis of weather-induced irregular operations continues to be challenging and relatively elusive**



NAS Operation – Weather-ATM Post Event Analysis

Some Key Needs

“Those who cannot remember the past are condemned to repeat it.”

“Fool me once, shame on you. Fool me twice shame on me.”



Objective, Analytical WX-ATM
Data / Metrics



Intelligent Event Grouping
& Scenario Taxonomy



“What-If” Analytical Capabilities



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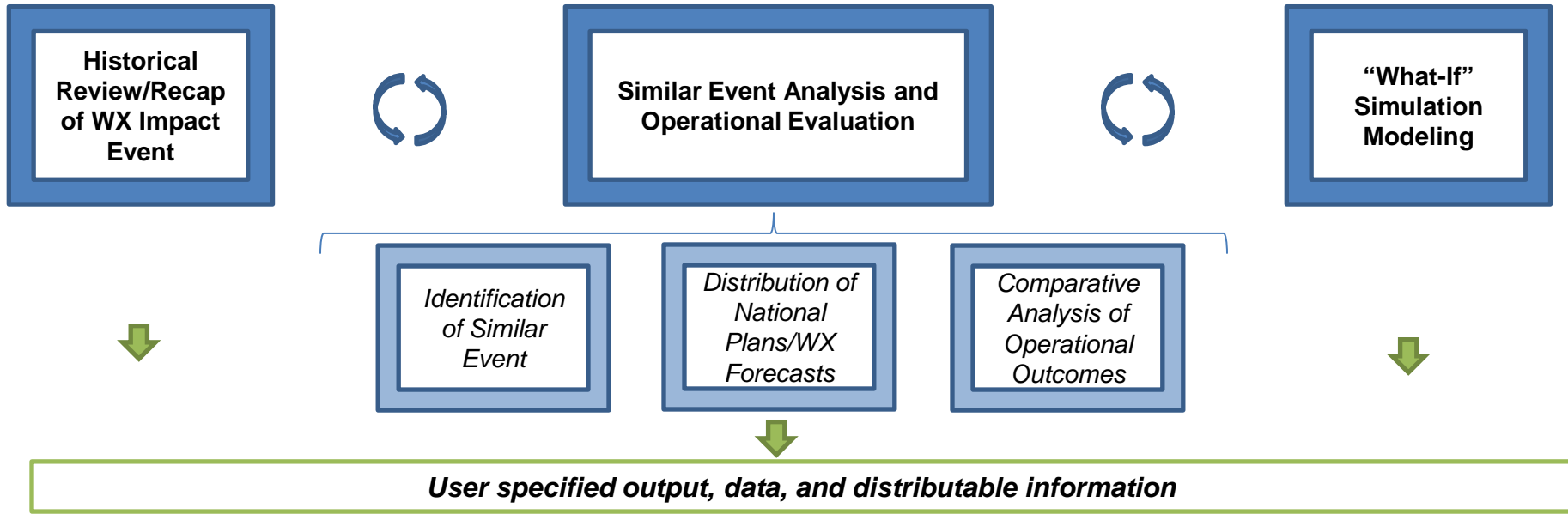




WX-PAC Core Components

Build context around weather day of interest
(More than just the Weather)

“Control” Analysis for Similar Historical Events

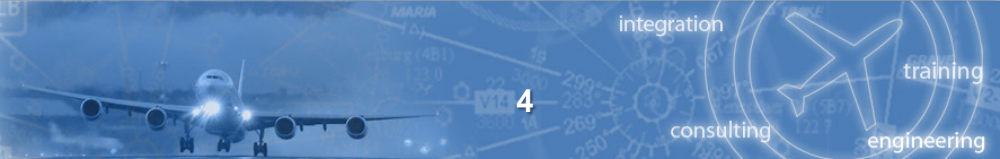
Assess / Demonstrate Value of Alternative ATM Strategies & Outcomes



 Iterative Process
 Output



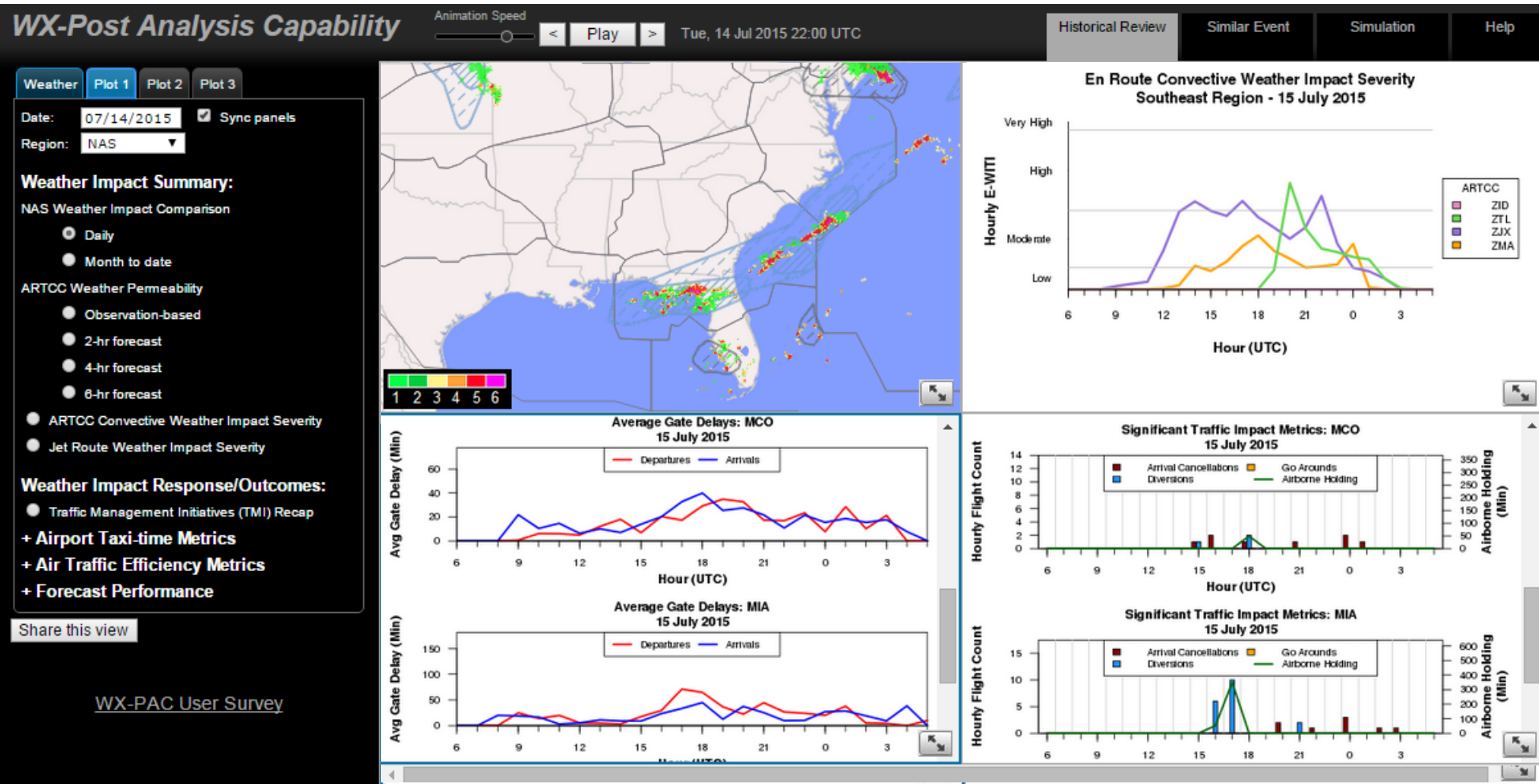
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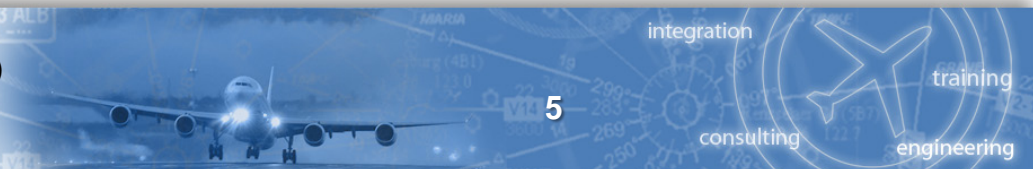
WX-PAC Demonstration (SWAP 2014-2015)

Stakeholders: ATCSCC QA & System Efficiency; MTO Facilities

Historical Review



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WX-PAC Demonstration (SWAP 2014-2015)

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Similar Event

WX-Post Analysis Capability

Animation Speed < Play > Wed, 15 Jul 2015 15:00 UTC

Historical Review Similar Event Simulation Help

Weather Plot 1 Plot 2

View region:

Animation interval:

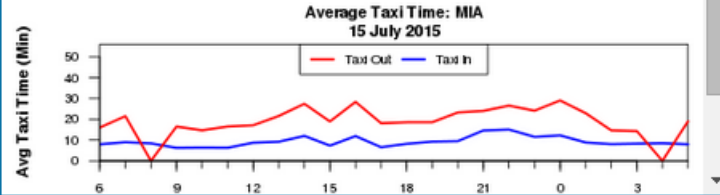
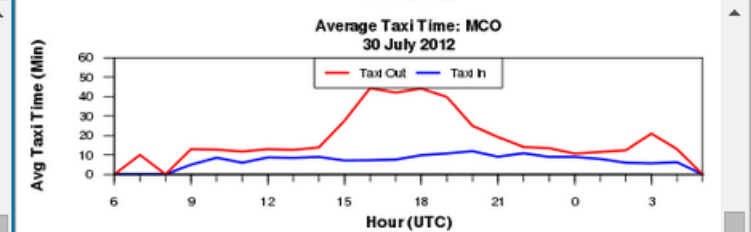
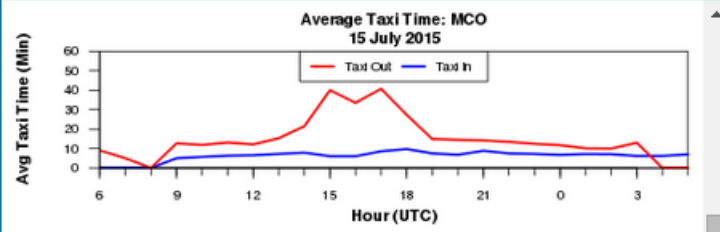
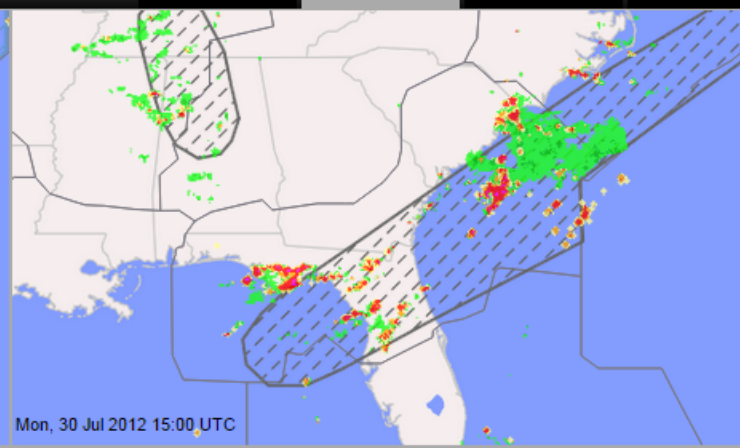
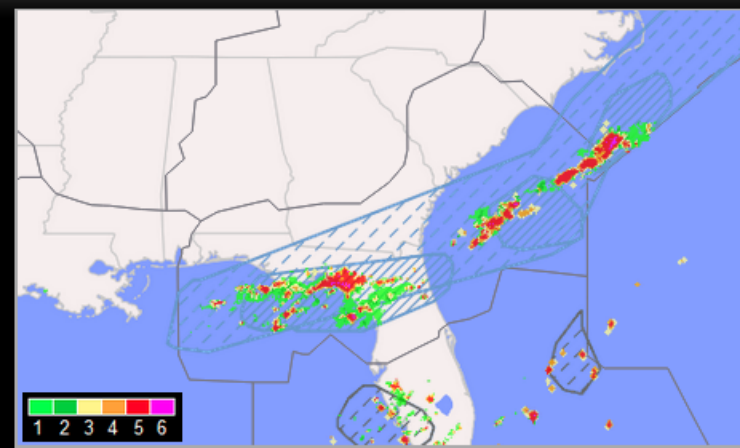
Reference date:

Time of day:

Match region:

Best Matches (max 3 stars):

- + Observed Weather
- + Forecast Products
- + Overlays



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WX-PAC Demonstration (SWAP 2014-2015)

Stakeholders: ATCSCC QA & System Efficiency; MTO Facilities

Simulation

WX-Post Analysis Capability

Historical Review

Similar Event

Simulation

Help

Input Output

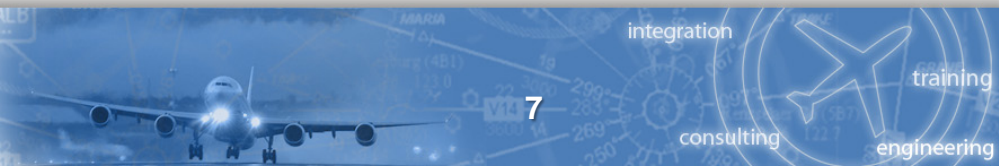
Current Simulation: 07/15/2015 (unsaved)

07/15/2015 Open Saved Simulation Reset Add TMI Unedited Edited Added Simulation History Run Simulation

NAS Element	Type	Issue Time	Start Time	End Time	Rate for Hour (UTC)																								Scope	E	R					
					06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	00	01	02	03	04	05								
<input checked="" type="checkbox"/> FCAJX1	AFP	1940	1945	2130															75	75	75													(ALL) ZSE ZAB ZLC ZAU ZLA ZDC ZFW ZKC ZME ZHU ZMP ZDV ZBW ZOB ZOA ZJX ZMA ZID ZTL ZNY	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> FCAJX7	AFP	1300	1400	1944										120	90	55	65	65	70														(MANUAL) ZSE ZAB ZLC ZAU ZLA ZDC ZFW ZKC ZME ZHU ZMP ZDV ZBW ZOB ZOA ZJX ZMA ZID ZTL	<input type="checkbox"/>	<input type="checkbox"/>	
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<input checked="" type="checkbox"/> EWR	GS	1044	1034	1145																													(Manual) ZJX ZMA ZTL	<input type="checkbox"/>	<input type="checkbox"/>	
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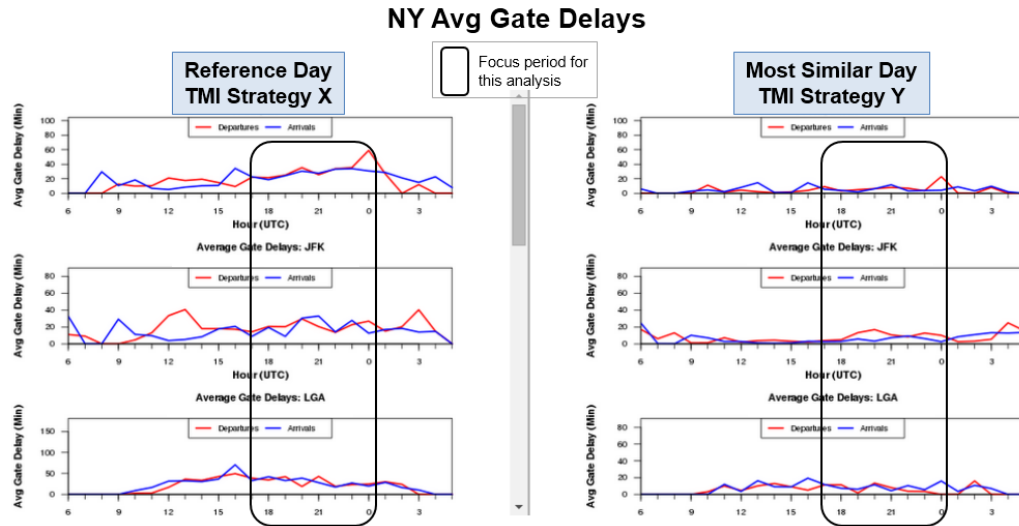


Tactical and Strategic Post-Analysis

Tactical

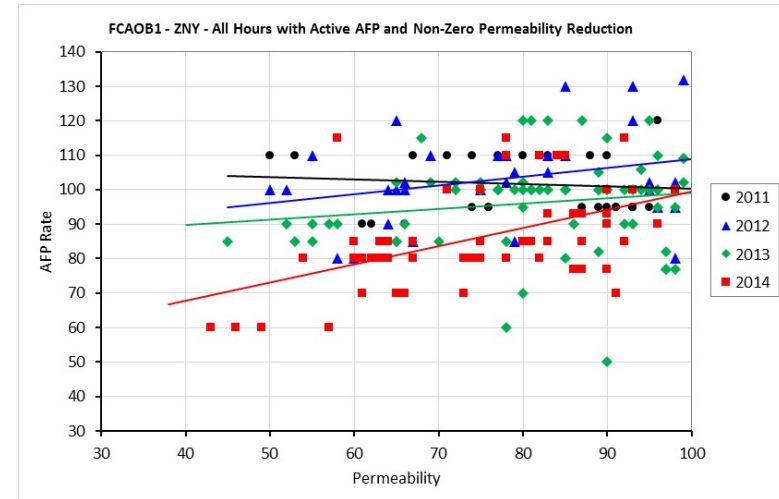
Airport Delay Comparisons

Reference Day vs. Similar WX Day but Different TMI Strategy



Strategic

AFP Hourly Rates vs. Hourly Weather Permeability Reduction, Multi-Year Trends (OB1, ZNY Weather)



Common Objective: Through objective means, aid in identifying, cataloguing, and disseminating ATM 'Best-Practices' and 'Lessons-Learned' when managing adverse weather constraints

Carrying these finding forward as actionable guidance for TFM operations

WX-PAC Can Significantly Enable AWI

- Paradigms break-down and make way for new models and methods when consistent data-driven evidence is applied to the problem
- WX-PAC-derived shortfalls ('lesson-learned') and benefits ('best-practices') may both justify and defend AWI evolution
 - While at the same time honing instances of inhibited / insufficient AWI support:

AWI 'Burn Factor'



AWI 'Controlled Burn'



- WX-PAC can feed training in a multitude of ways and propel consistent indoctrination towards new AWI paradigms – as well as provide valuable data back to AWI community on performance improvement needs, evolution path, etc.