AEROTECH RESEARCH (U.S.A.), INC.

Advances in Turbulence Detection and Avoidance for Commercial Aviation

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AeroTech Research (USA), Inc.

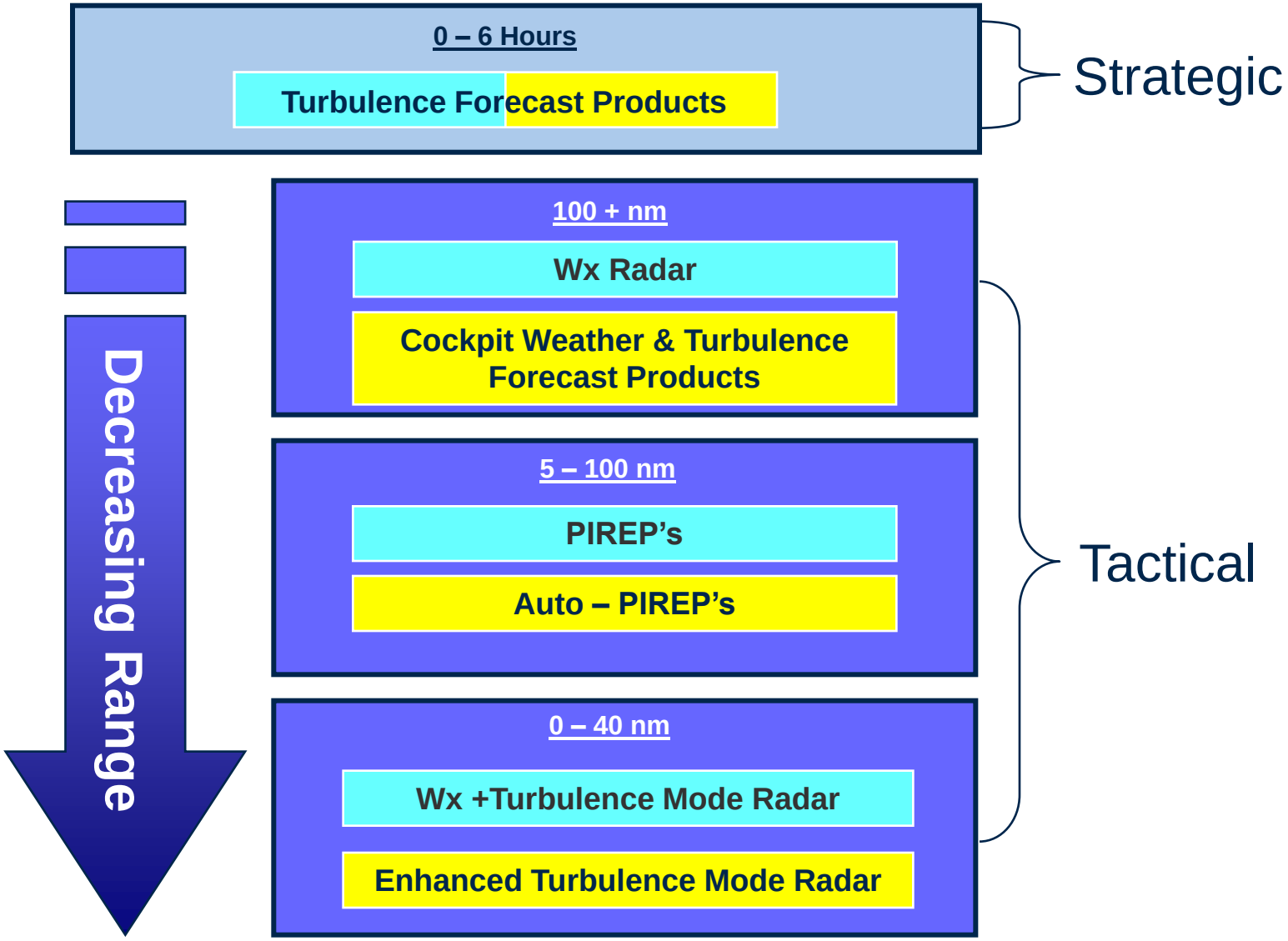
59th Annual International Air Safety Seminar

October 25th, 2006

Presentation Outline

- Overall turbulence products concept.
- Description of Enhanced turbulence detection radar – “E-Turb”.
- Description of TAPS.
- Vision of the applications for the technologies.

Hierarchy of Turbulence Products



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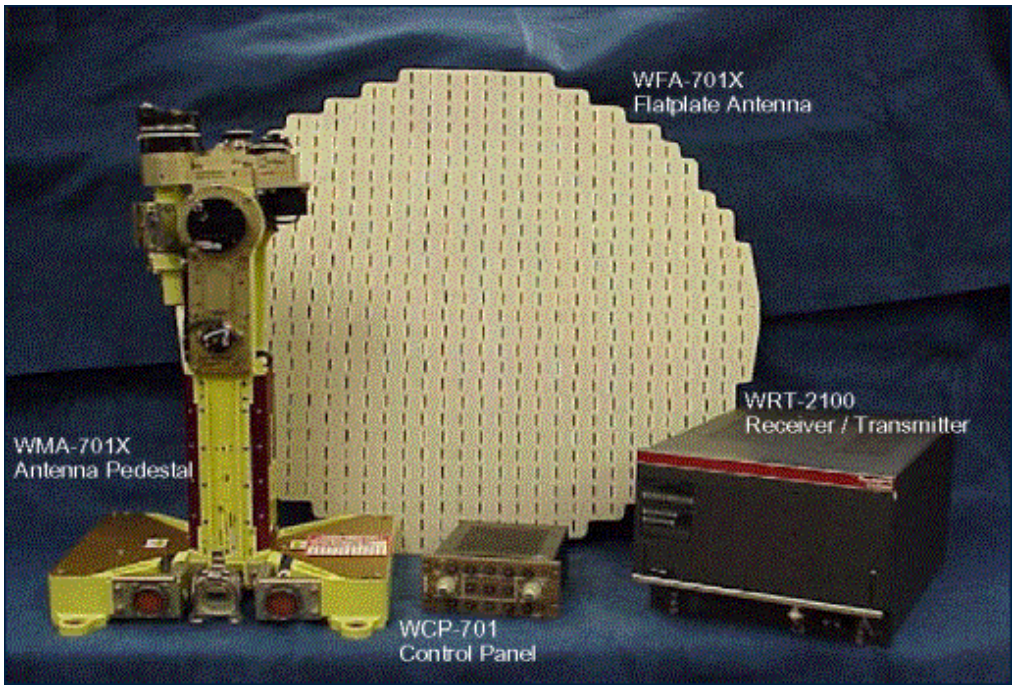
Enhanced Turbulence Mode Airborne Radar

"E-TURB"

E-Turb Radar System Components



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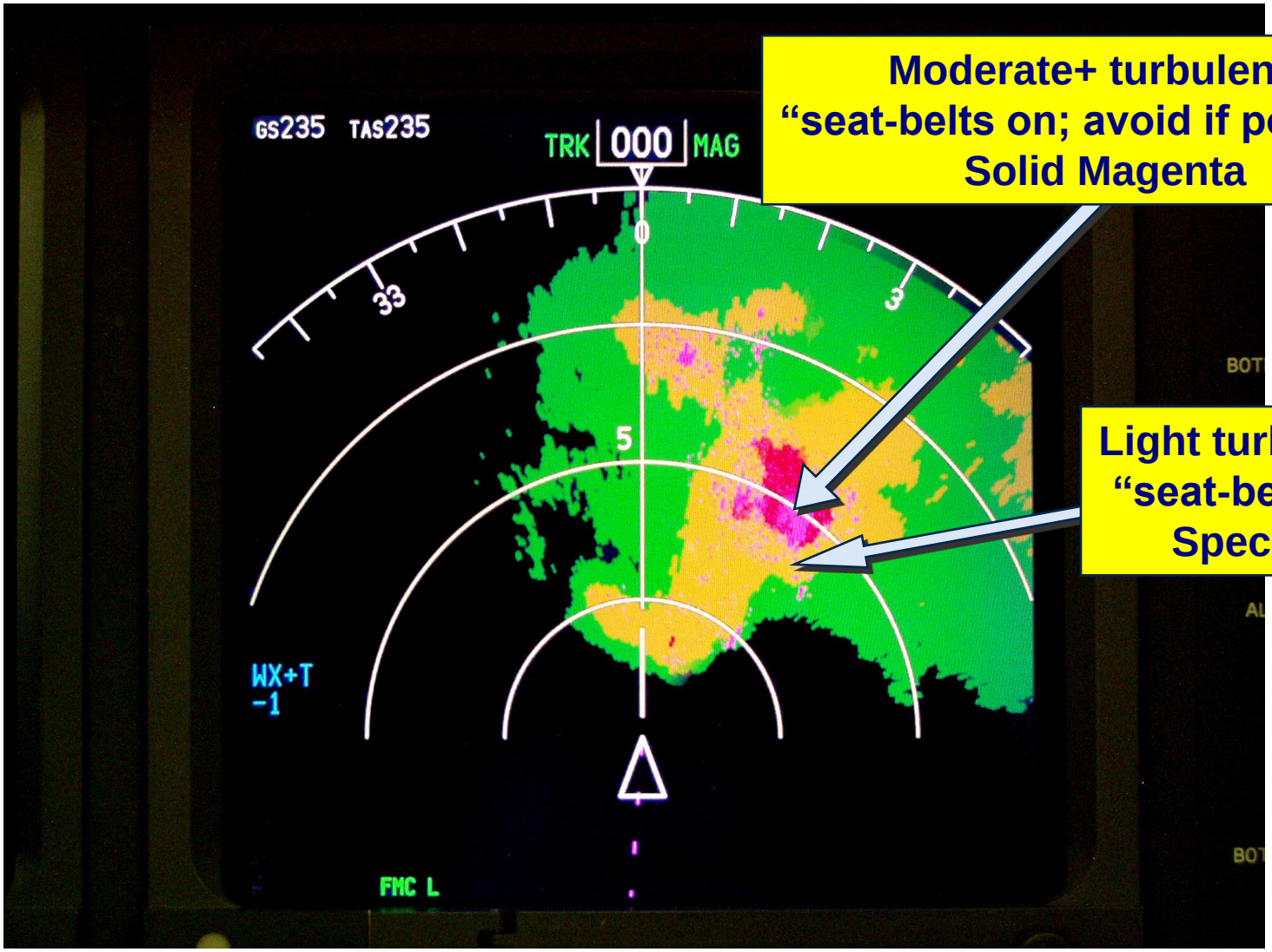
“E-Turb” Radar Display Presentation



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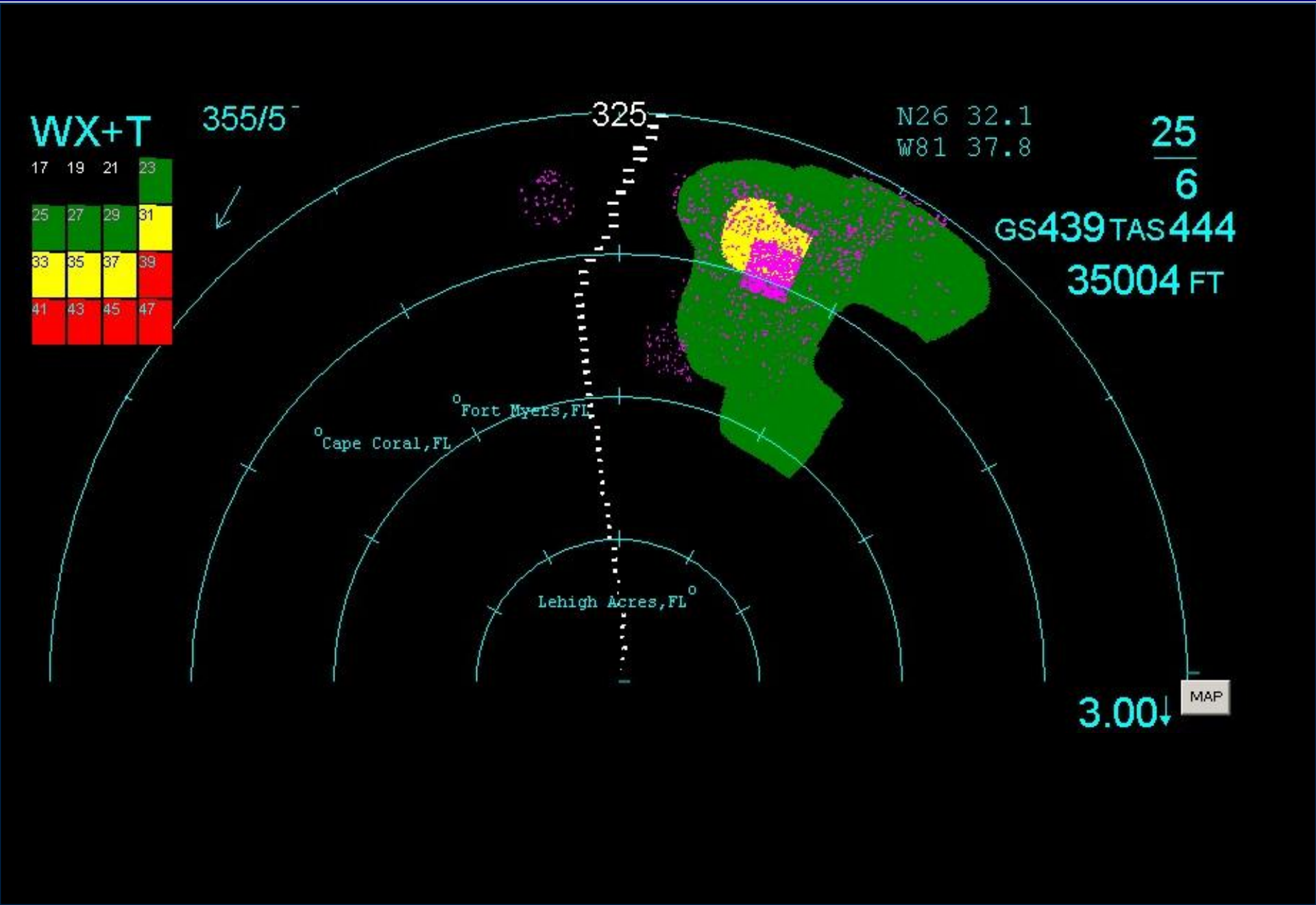
“E-Turb” Radar Display: Example I



“E-Turb” Radar Display: Example II

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Turbulence Auto-PIREP System

TAPS

The Turbulence Encounter Reporting Problem

Current turbulence encounters are <u>GROSSLY</u> under reported.

Those PIREPS that <u>are</u> made are:

- **Late**
- **Subjective**
- **Not distributed to all users**

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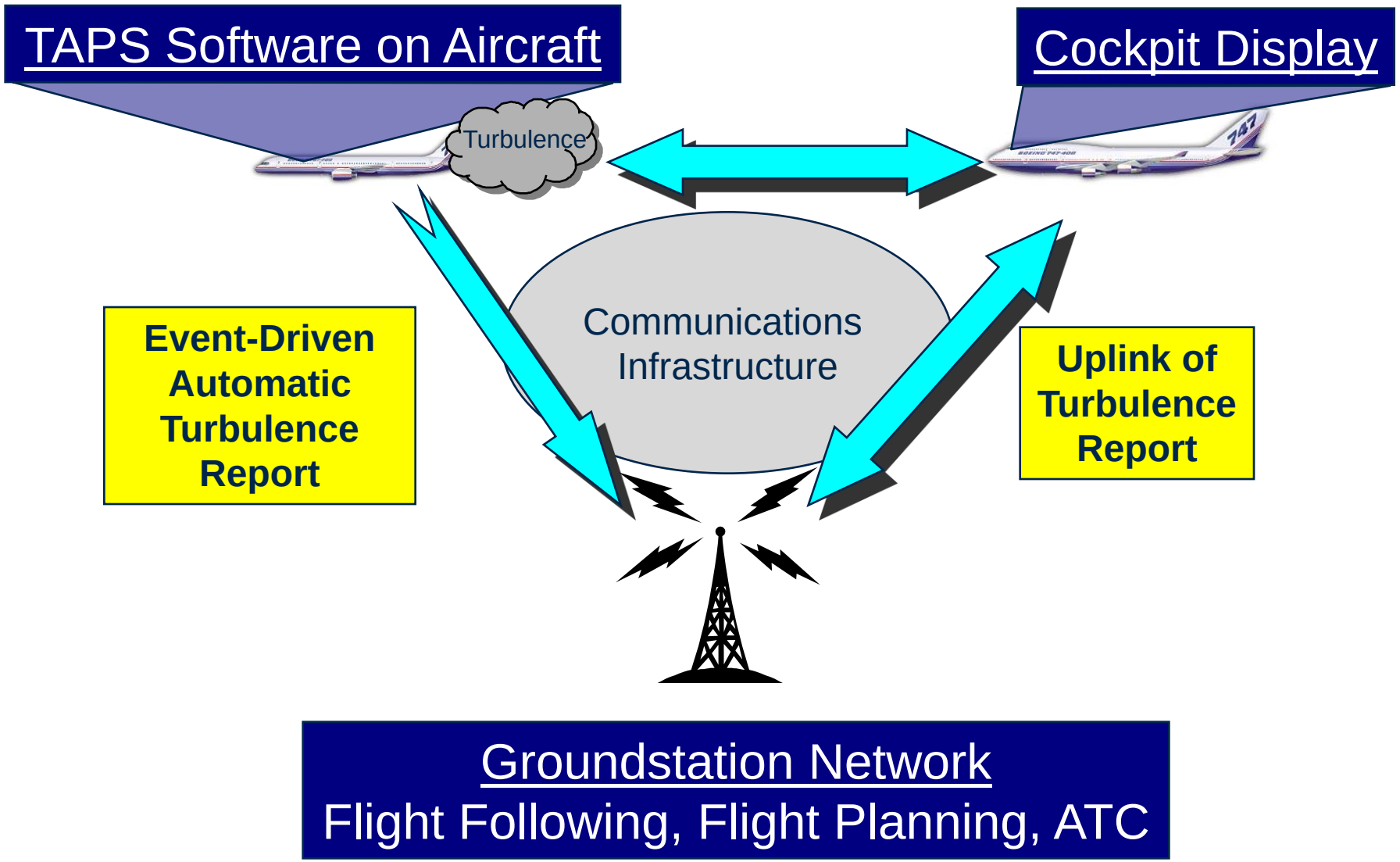
TAPS Architecture



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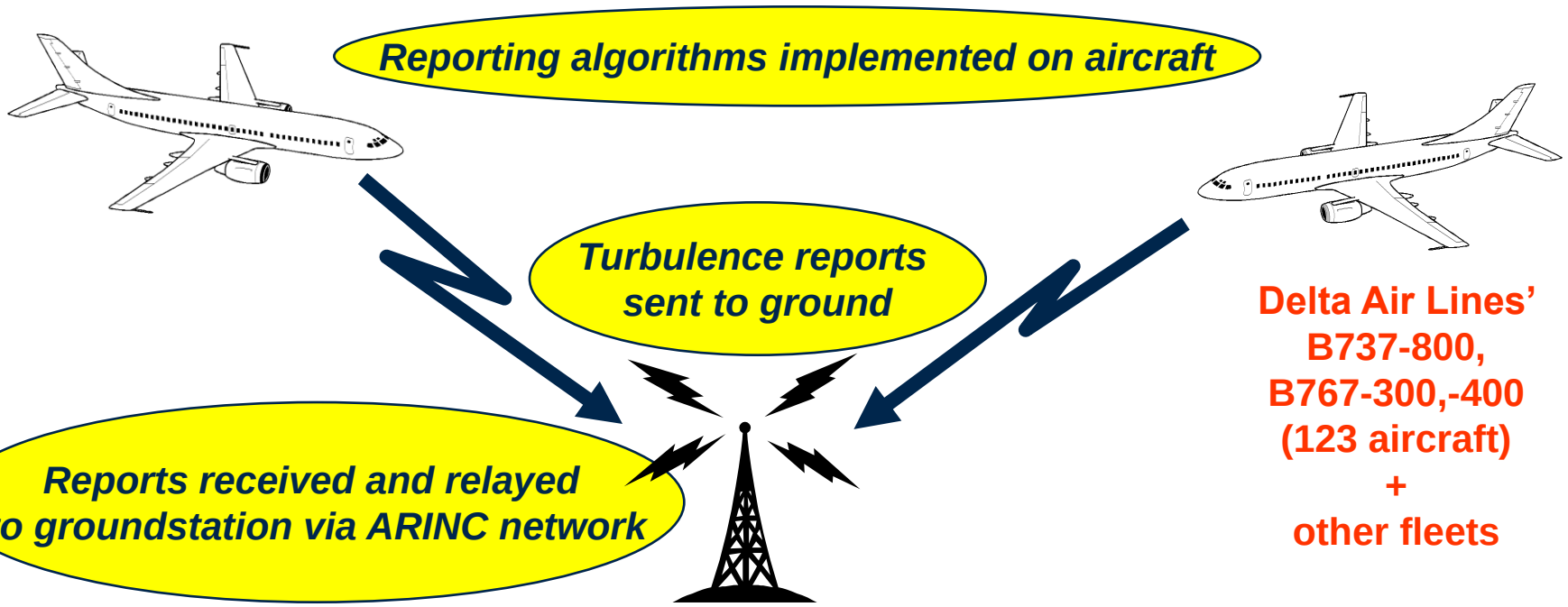
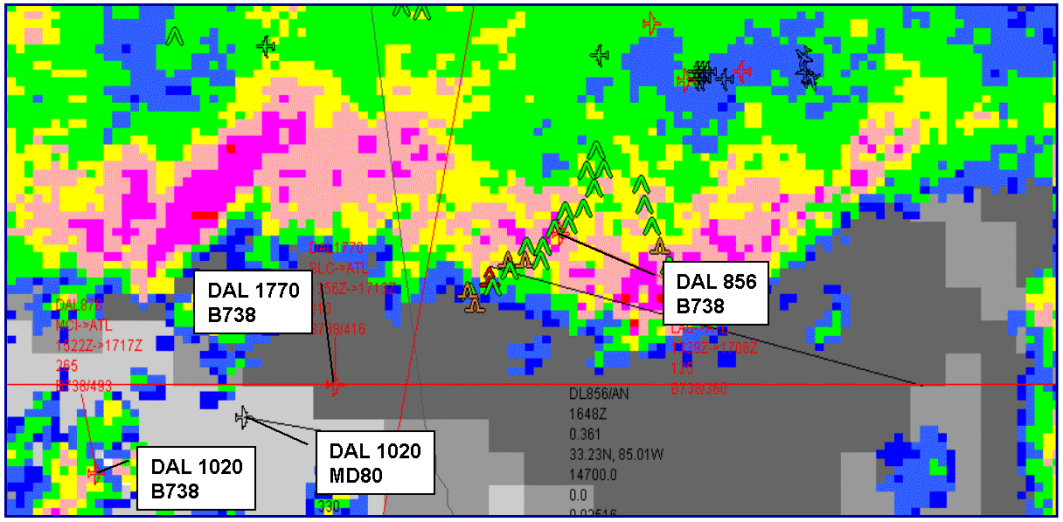
Current TAPS Groundstation Implementation



Delta Air Lines' B737-800, B767-300,-400 (123 aircraft) + other fleets



ARINC's WebASD℠ real-time display

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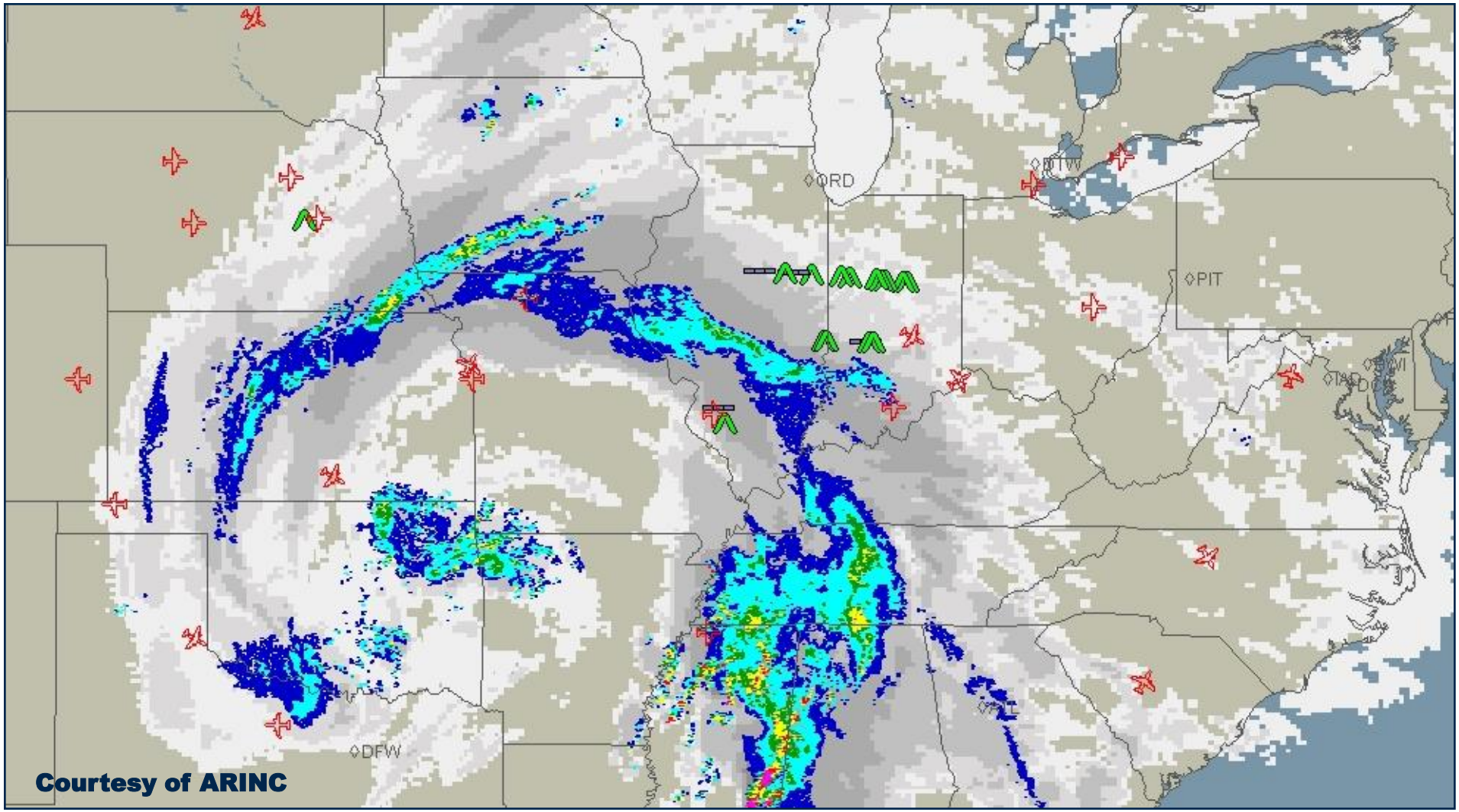
Dispatchers' TAPS WebASD℠ Display



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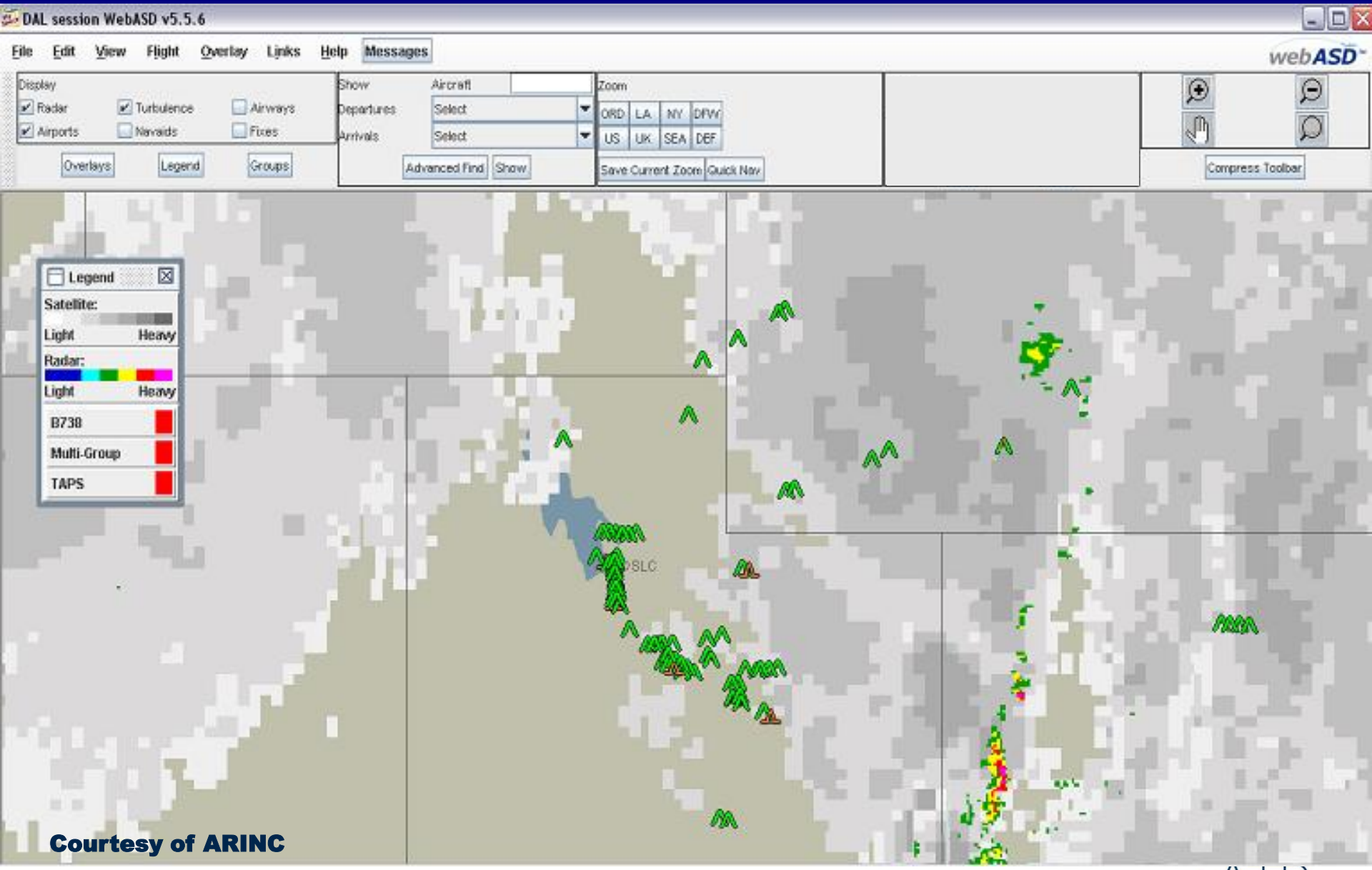
Dispatchers' TAPS WebASD℠ Display



Courtesy of ARINC

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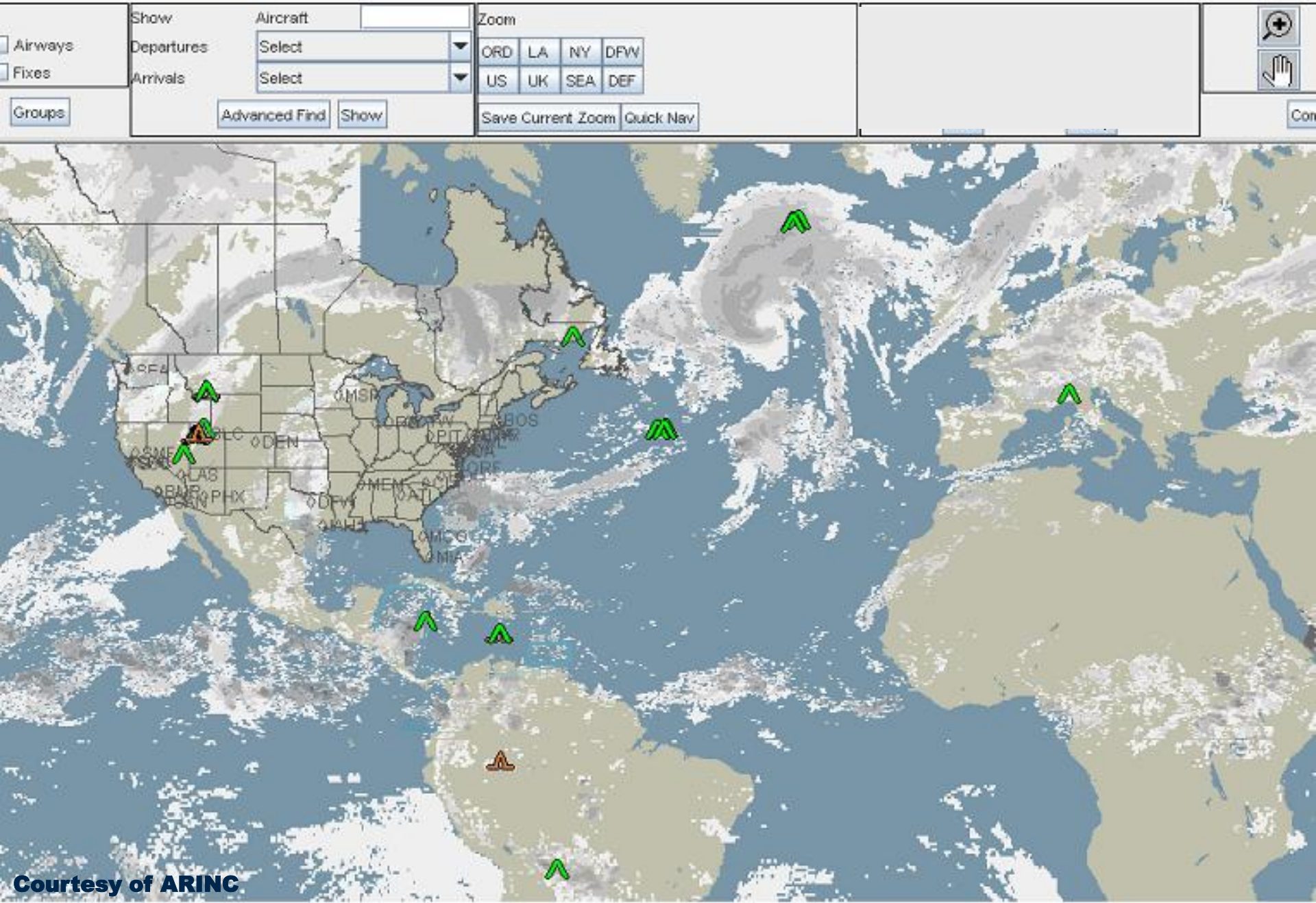
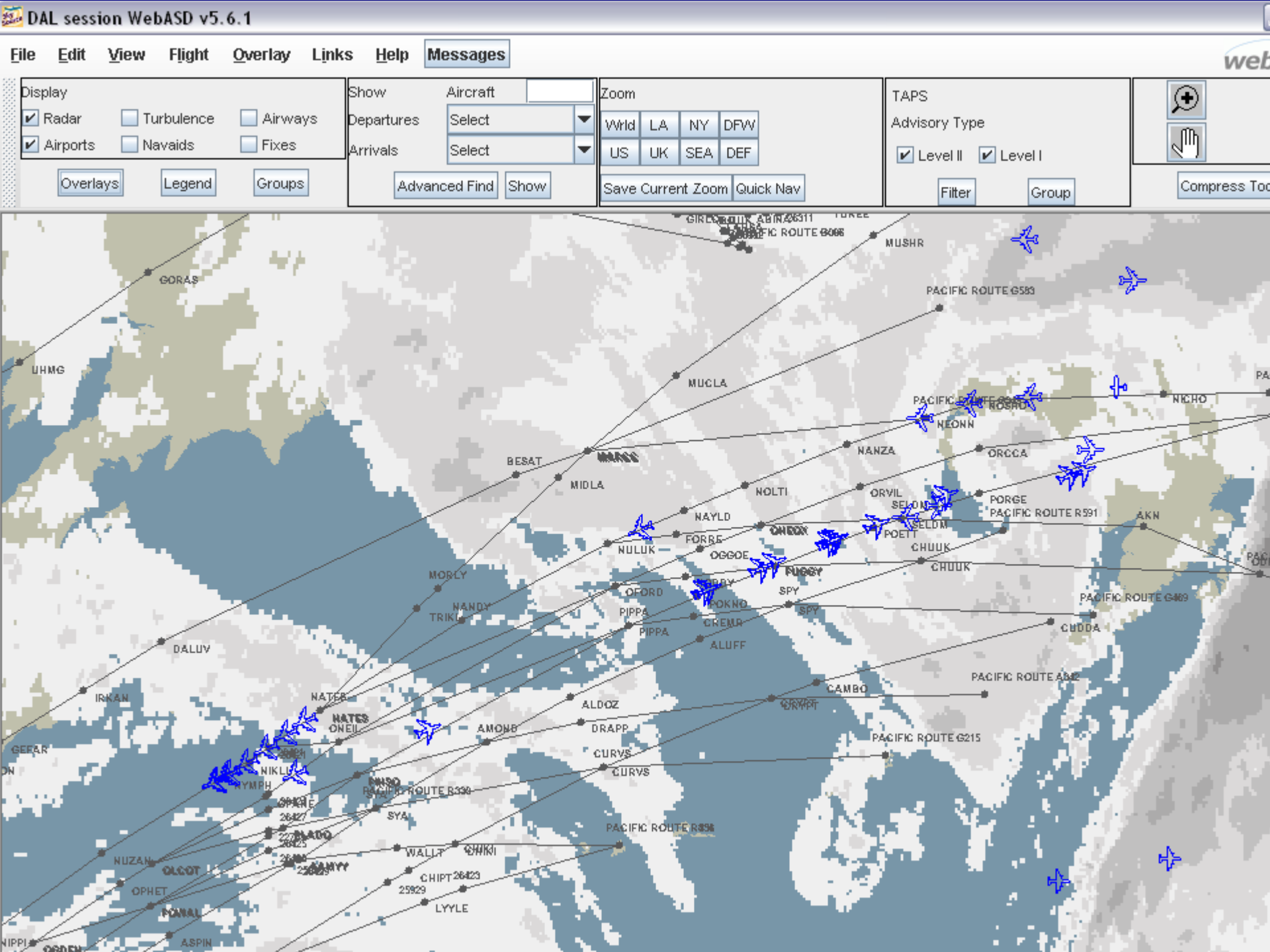
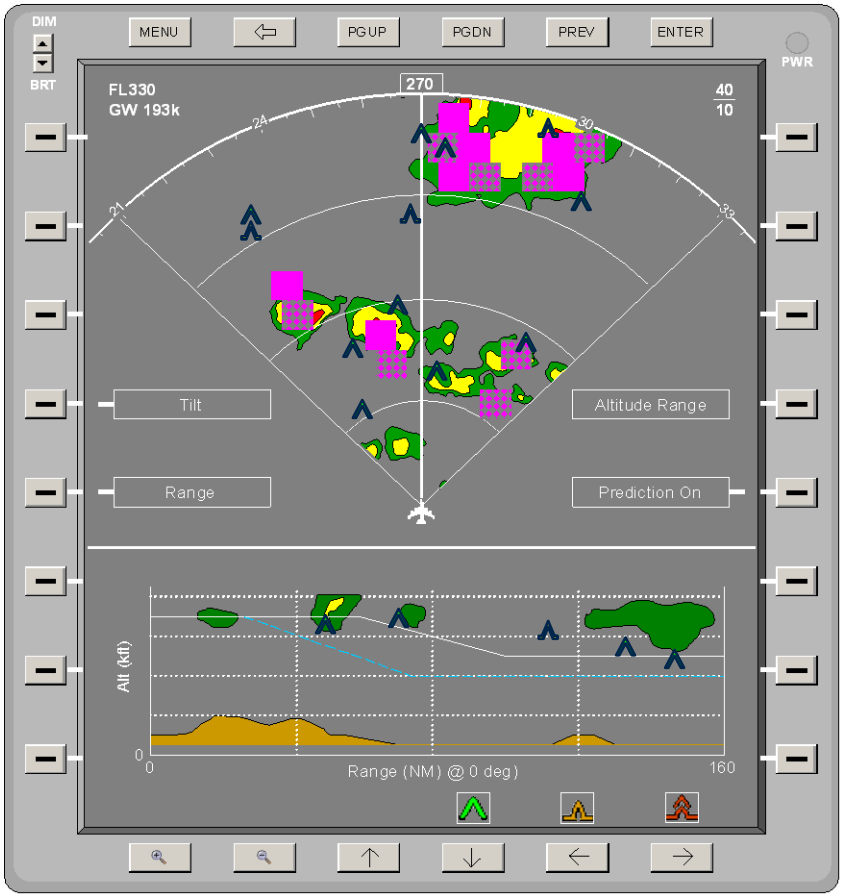
Dispatchers' TAPS WebASD℠ Display



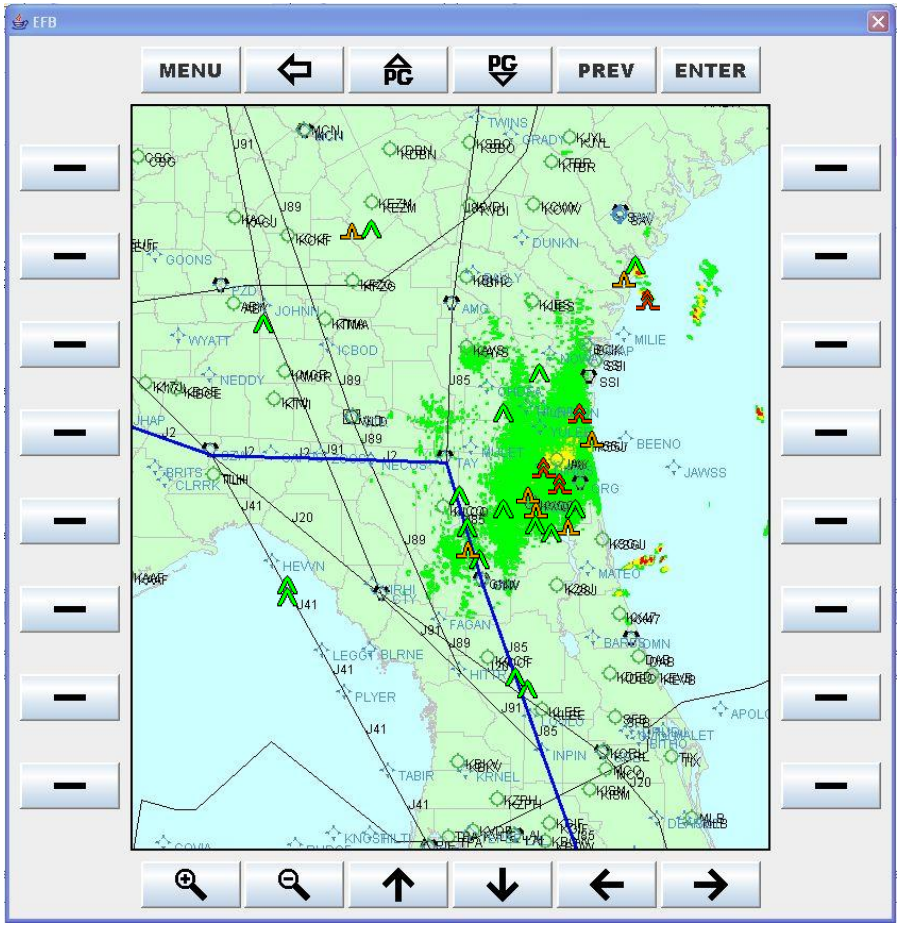

DAL session WebASD v5.6.1
File
Edit
View
Flight
Overlay
Links
Help
Messages
Display
Radar
Turbulence
Airways
Airports
Navaids
Fixes
Overlays
Legend
Groups
Show
Aircraft
Departures
Select
Arrivals
Select
Advanced Find
Show
Zoom
Wrld
LA
NY
DFW
US
UK
SEA
DEF
Save Current Zoom
Quick Nav
TAPS
Advisory Type
Level II
Level I
Filter
Group
Compress Too
GORAS
UHMG
MUSHR
PACIFIC ROUTE G583
MUCLA
NICHO
NEONN
NANZA
ORCCA
BESAT
MIDLA
NOLTI
ORVIL
PORGE
PACIFIC ROUTE R591
AKN
NAYLD
FORRE
NULUK
OGGOE
POETT
CHUUK
MORLY
OFORD
PIPPA
SPY
POKNO
CREMR
ALUFF
PACIFIC ROUTE G469
CHDDA
DALUV
IRKAN
NATES
ONEIL
ALDOZ
AMONB
DRAPP
CAMBO
PACIFIC ROUTE A582
CURVS
PACIFIC ROUTE G215
NIKLI
PACIFIC ROUTE R339
SYA
PACIFIC ROUTE R336
WALLP
CHIPT
26423
25929
LYYLE
NUZAN
OLCOT
OPHET
ASPIN

Prototype Cockpit Displays

TAPS + E-Turb Sector PPI with VPD (Nav display)



Overhead Map (Class II EFB)



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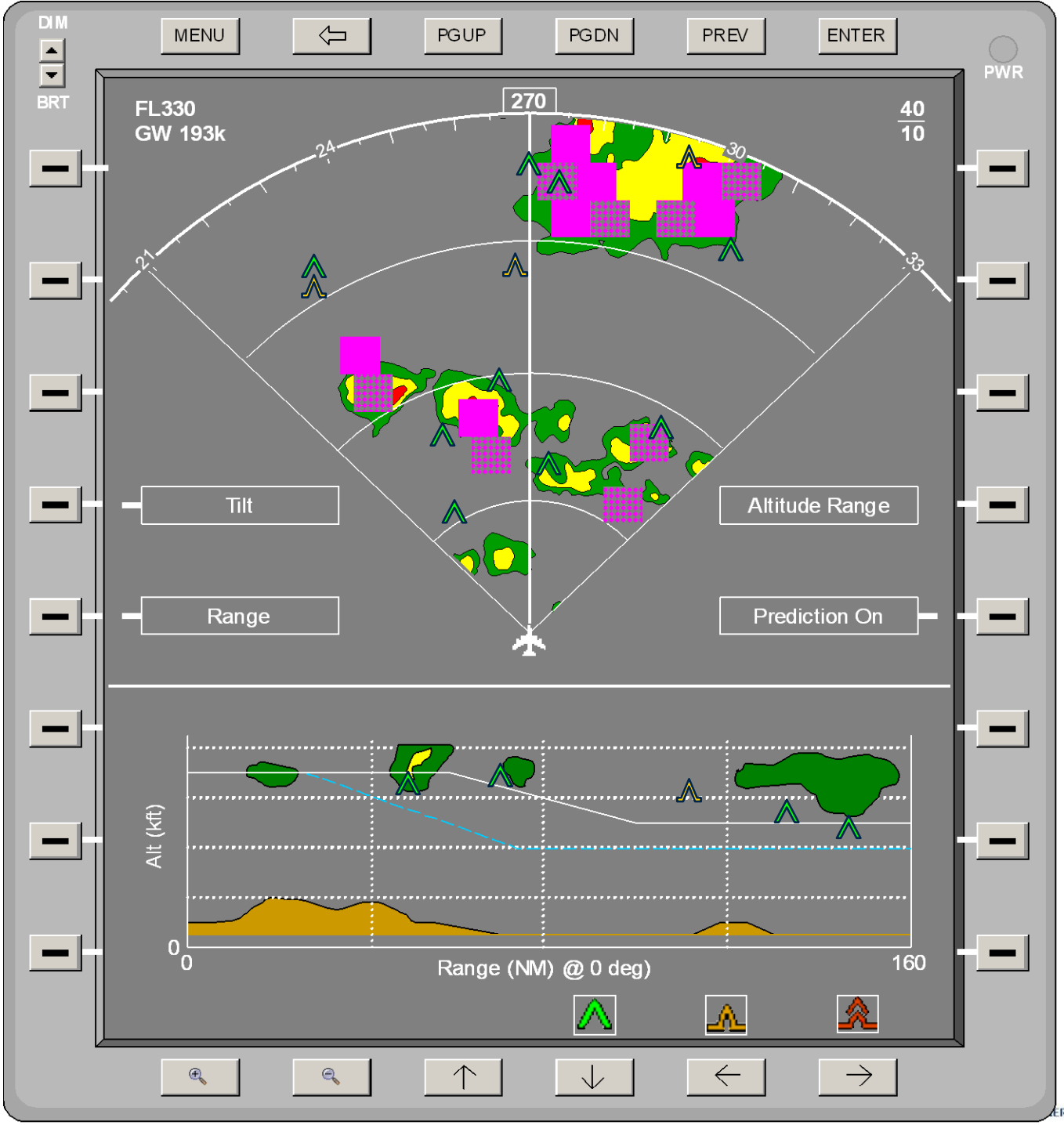

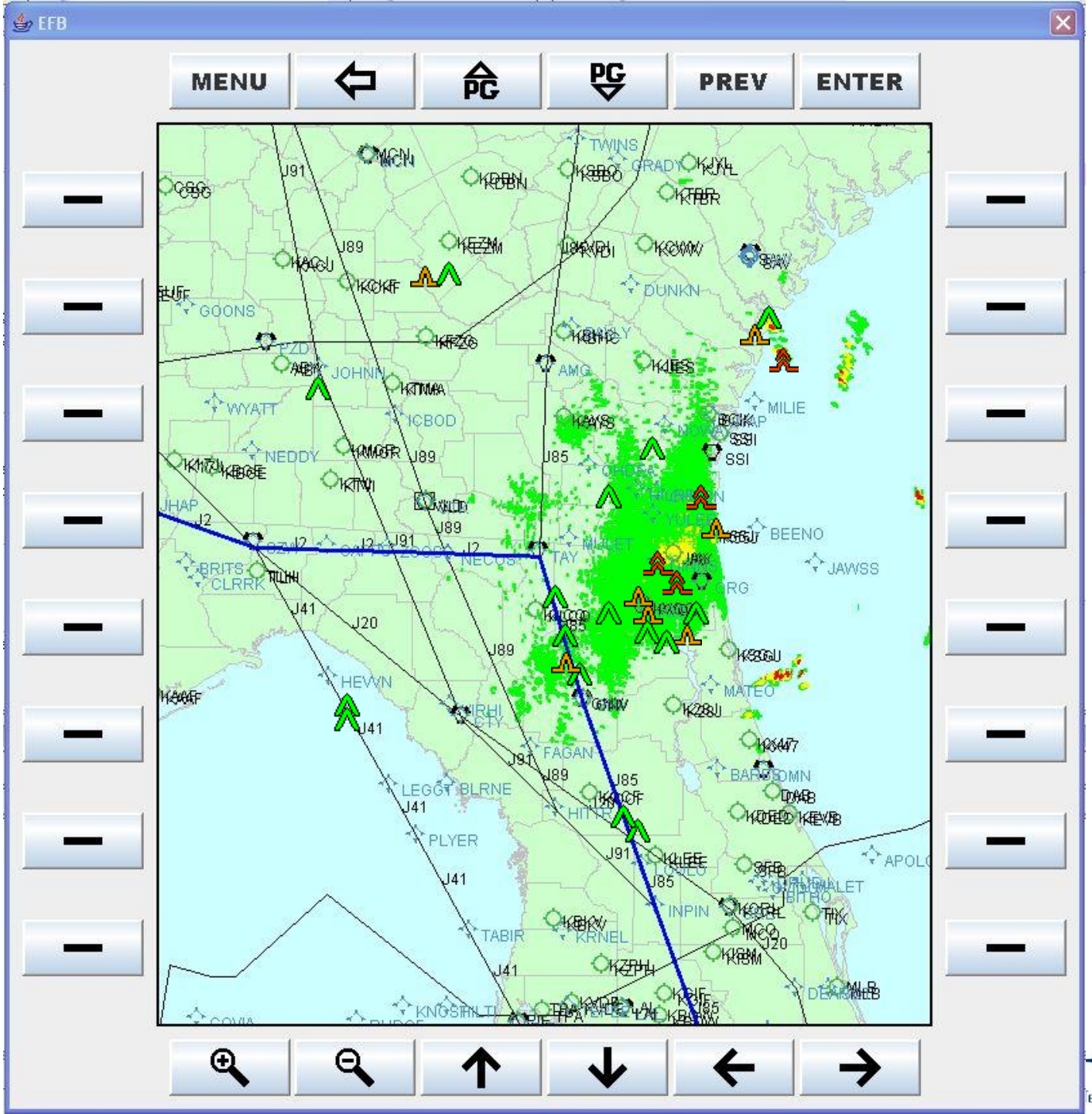
EFB
MENU
PG
PG
PREV
ENTER
TWINS
GRADY
DUNKN
GOONS
JOHNN
WYATT
NEDDY
MILIE
BEENO
JAWSS
BRITS
CLRRK
NECOS
TAY
HEVVN
LEGGT
BLRNE
PLYER
FAGAN
MATEO
INPIN
TABIR
KRNEL
J91
J89
J85
J41
J20
J2

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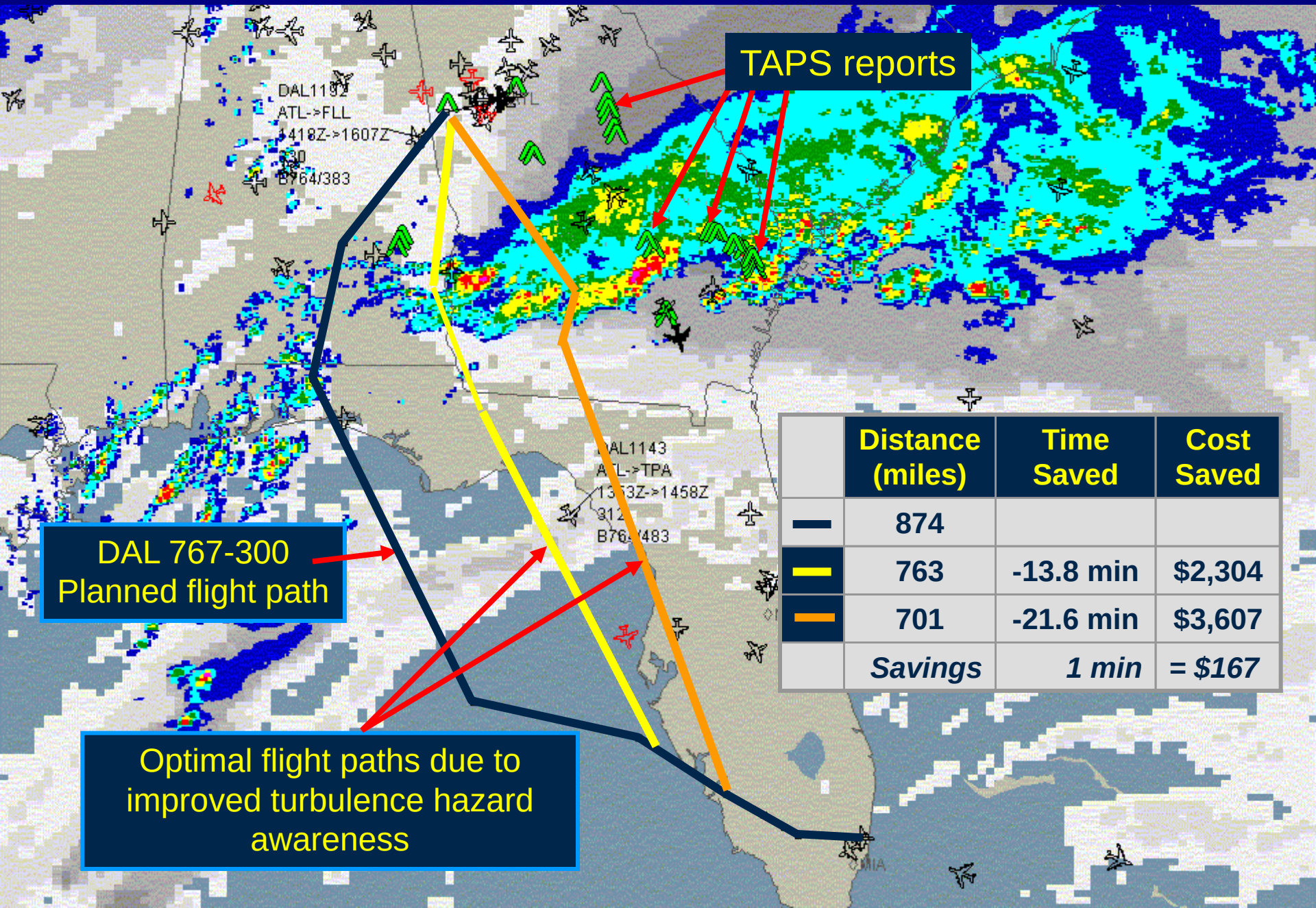
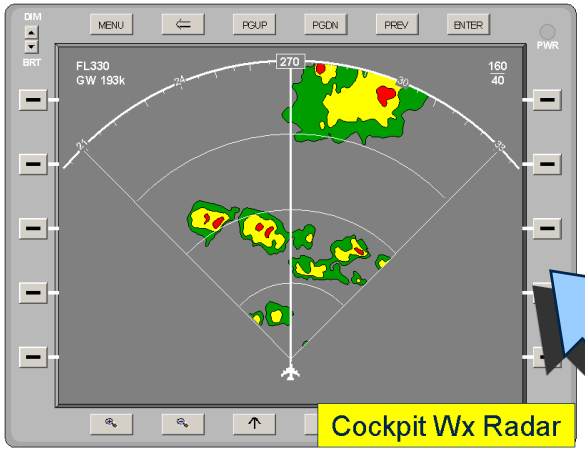
Other TAPS/E-Turb Applications

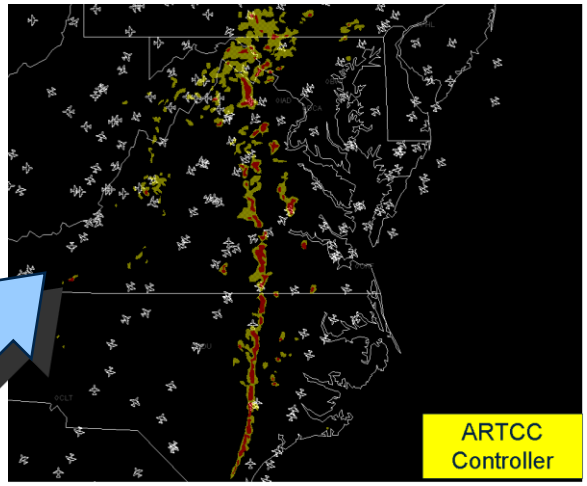
Potential Time/Distance/Cost Savings



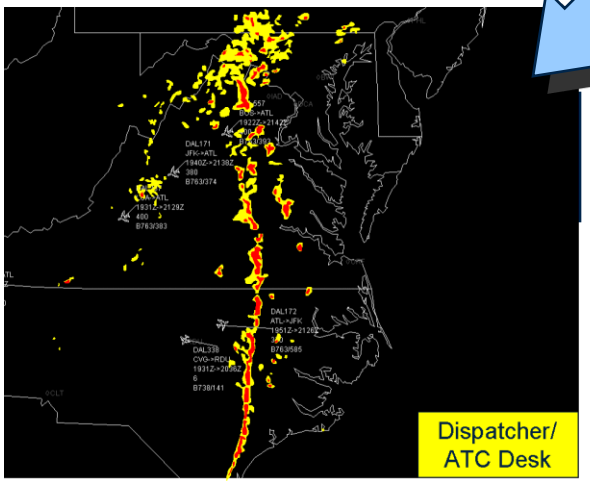
	Distance (miles)	Time Saved	Cost Saved
	874		
	763	-13.8 min	$2,304
	701	-21.6 min	$3,607
	Savings	*1 min*	*= $167*

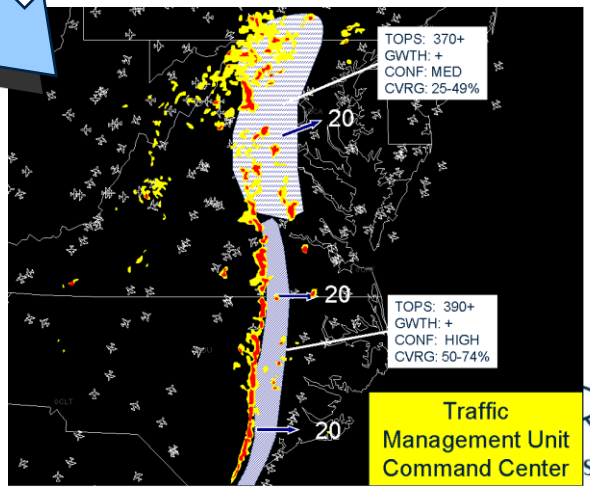
Turbulence Information Flow - Present



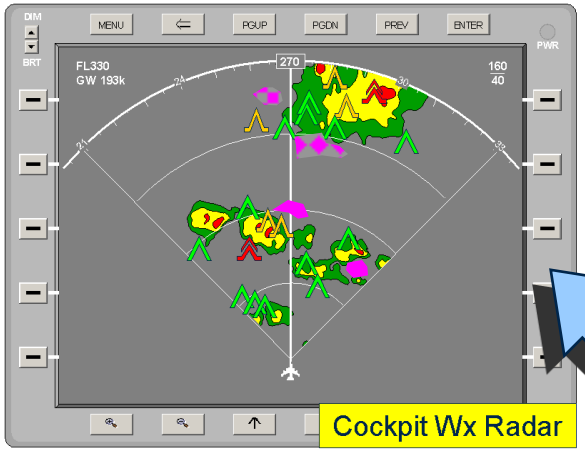


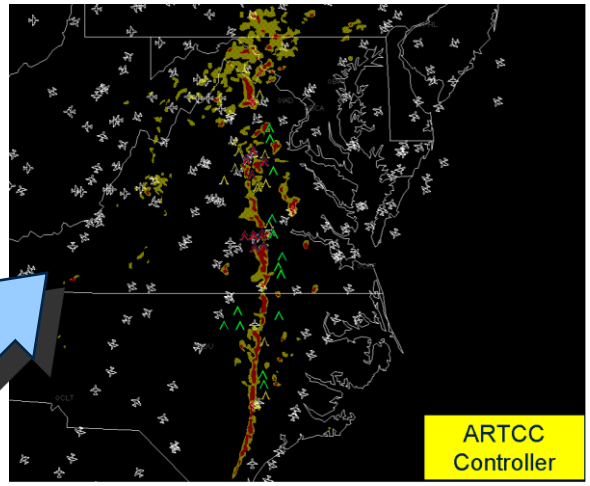
Where is the hazard?



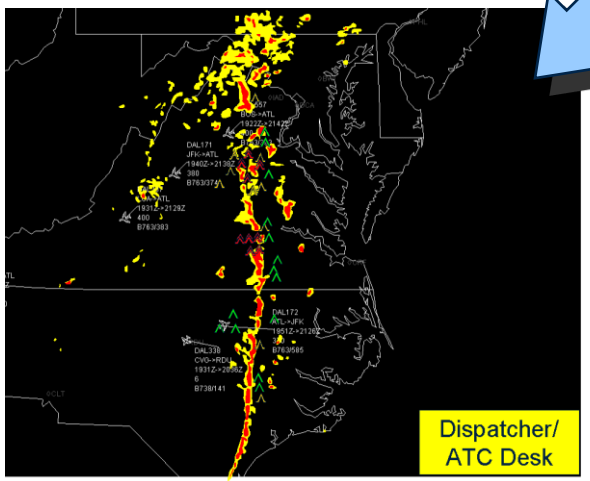


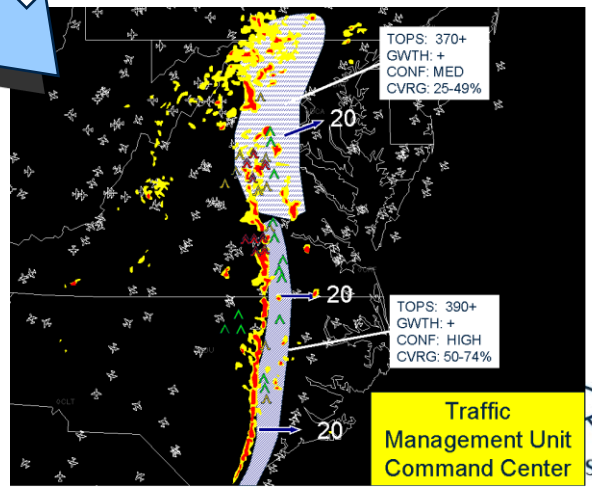
Turbulence Information Flow - Future





TAPS & other products





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