Weather Information Modernization and Transition (WIMAT)

Friends and Partners of Aviation Weather
October 24, 2019

WIMAT

- FAA led – Kevin Johnston
- Close coordination National Weather Service User and user community
  - Steering Committee
  - Whole WIMAT Committee
- Improve FAA decision-making by
  - 1) Enhancing consistency among weather products
  - 2) Reducing conflicting information
  - 3) Exploiting higher resolution information
- By examining a wide range of aviation weather information that is used and/or supported by the FAA and FAA-supported activities (e.g., FSS-Leidos, FIS-B)
- For FPAW illustration we will look at **convective products** used by aviation
  - Show how they differ
  - What WIMAT might do to reduce the number of products used and/or supported by the FAA?

WIMAT Process

- Identify the information that could be used as the ***principle*** source within FAA-supported activities
  - From which users can create displays for their unique decision making purpose
  - To remove conflicting information from FAA use
  - To help identify products that can be retired
- Determine impacts on users of “to be retired” products
- Identify mitigation strategies to reduce impacts
- Identify and assist implementation strategies based on mitigation strategies
- Identify products no longer required by FAA or FAA-sponsored activities
- Help retire these products, if necessary.

WIMAT Current Efforts

- Reduce number of duplicative aviation weather products
  - Retire Text Area Forecasts for Caribbean and Gulf of Mexico. Replaced by GFA grids.
  - Text AIRMETs, rely on the G-AIRMET only.
- Impacts on those that
  - Graphically display text AIRMETs
  - Use text from Text AIRMET
- Mitigation
  - Graphically – From AWC site to complex display integration
  - Textually – From recreating text AIRMET to designing text specific to user need.

Convective Analysis Products (CONUS)

Product	Tactical
Leidos Base Reflectivity	Analysis
Leidos Radar Summary Chart	Analysis
Leidos Radar Summary Chart (Echo Tops)	Analysis
Lightning Observed	Analysis
MRMS Base Analysis	Analysis
MRMS Comp Ref Analysis	Analysis
MRMS Echo Tops Analysis	Analysis
MRMS VIL Analysis	Analysis
CIWS/CoSPA (NWP) Base Refl Analysis	Analysis
CIWS/CoSPA (NWP) Comp Refl Analysis	Analysis
CIWS/CoSPA (NWP) Echo Tops (18dBZ) analysis	Analysis
CIWS/CoSPA (NWP) VIL Analysis	Analysis
Turb -- Current Turbulence Grids GTG -- CIT	Analysis

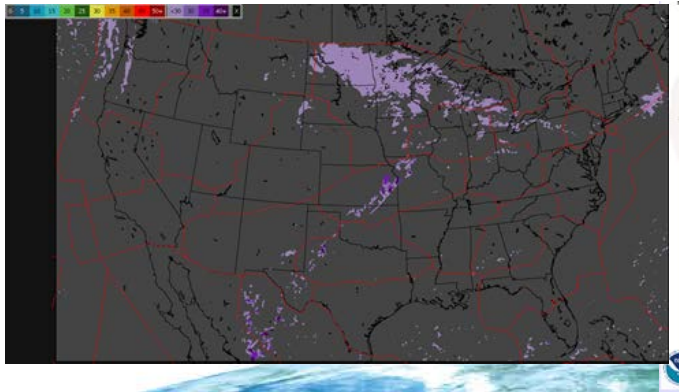
Convective Forecast Products (CONUS only)

Product	Tactical (0-8 hours)	Strategic (8+ hours)
CIWS/CoSPA (NWP) Echo Tops (18dBZ) Forecast ≤ 8 hours	5-120 mins, 5 mins 2-8 hours, 15 mins	
CIWS/CoSPA (NWP) VIL Forecast ≤ 8 hours	5-120 mins, 5 mins 2-8 hours, 15 mins	
Center Weather Advisory	0-2 hours	
SIGMET -- Convective	0-2 hours	
Aviation Watch Notification (SAW)	0-6 hours	
Extended Convective Forecast Product	0-6 hours, 6-12 hours	12-18, 18-24,24-30, 30-36… 72-76
GFA Surface -- surface weather type	Each hour 1-8	Each hour 9-30 3-hourly 33+
GFA Surface -- static image weather type	3,6	9,12
Meteorologica Impact Statement	0-8 hours	8-48
SPC Convective Outlook	24 hours	8-72
Leidos Base Reflectivity Forecast ≤ 6 hours	1,2,3,4,5,6	
Gate Forecast	Each hour 1-8	
Lamp Convective Probability	Each hour 1-8	Each hour 9-24
Convective Outlook (2-6 hr portion of Convective SIGMET)	2-6 hours	
TCF - (Alphanumeric Code)	4,6,8	
TCF - (Static Image)	4,6,8	
TCF Extended		10,12,14,15,18,20,22,24,26,28,30
SPC Thunderstorm Outlook (4-8 hours)	4-8	
MRMS Echo Tops Forecast	?	
MRMS VIL Forecast	?	
Leidos Hi Level Sig Wx Charts 12/24 hours		12,24
Significant Weather Charts (12/24 Hr) - IFR/MVFR (web version)		12,24
WPC Thunderstorm Probability (12/24 Hr)	6	12.19.24.36.49
TAF	Variable time period	Variable time period

WIMAT Convective Tasks

- **Evaluate current and future operational aviation weather information to serve as the *principle* information**
  - ***Principle Information*** will best serve as the source information for FAA operations and FAA-supported activities within Next Generation Air Transportation System (NextGen) and System Wide Information Management (SWIM).
  - Which of these information sources could serve as <u>the</u> answer for FAA planning and services over the CONUS 8 hours into the future?

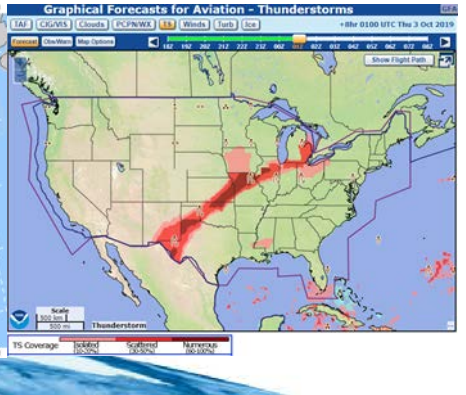
8 hr CoSPA



8 hr LAMP

8 hr TCF

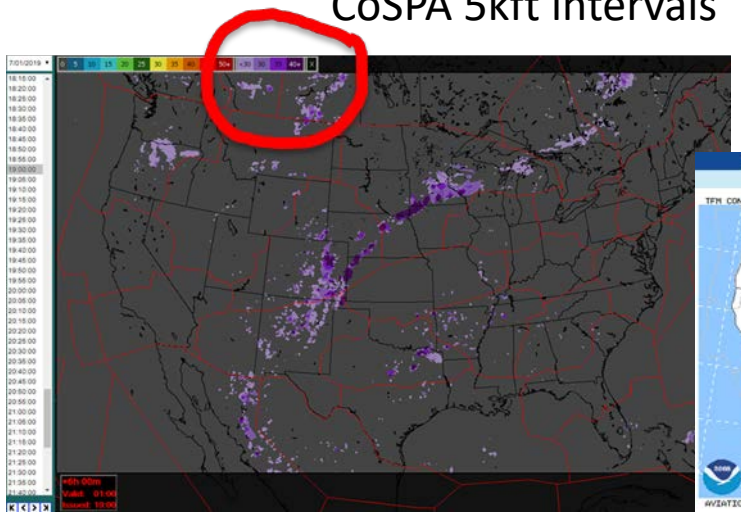
05Z NDFD

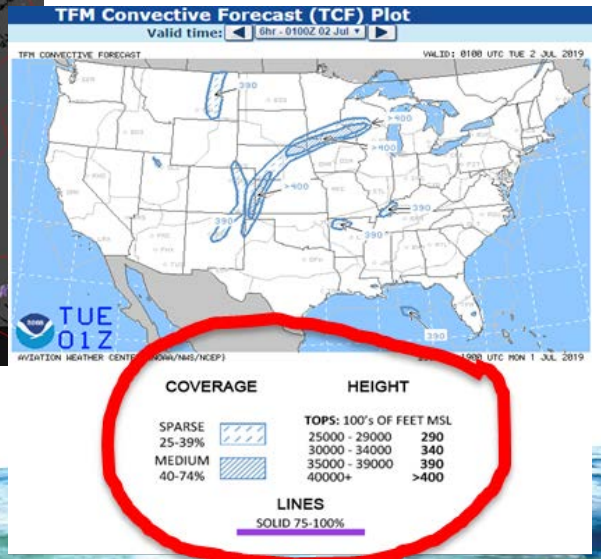


WIMAT Convective Tasks

- Users will display Principle Information that best meets their needs
  - *A guiding principle in the WIMAT process is it is the weather provider's task to produce weather information content that allows individual users the ability to display and utilize weather information that meets specific user needs.*

CoSPA 5kft intervals





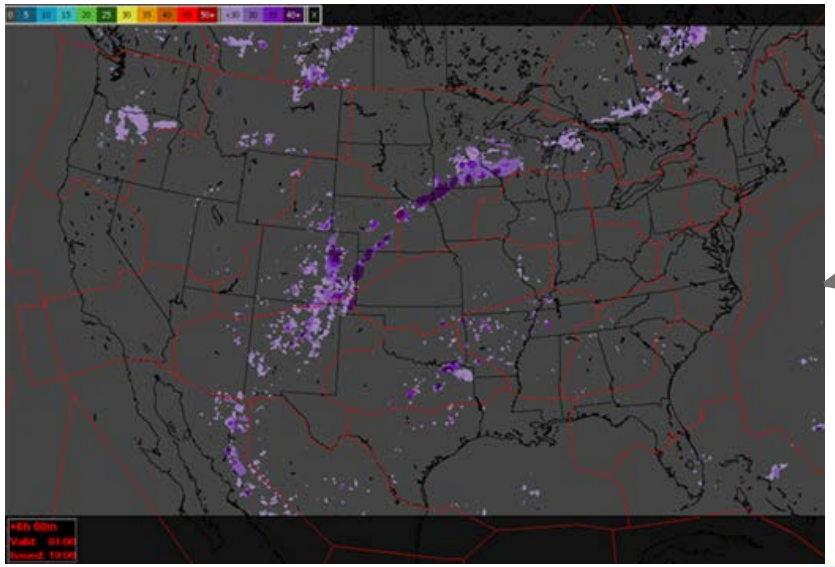
But Severe Weather Group at ATCSCC needs ≥ FL320!!

Can one information source meet all user needs?

From the same information, we can display weather according to user needs?

Information

CIWS/CoSPA (NWP) information is at 72 levels of echo top (1kft resolution)



Display

TCF desired echo top categories

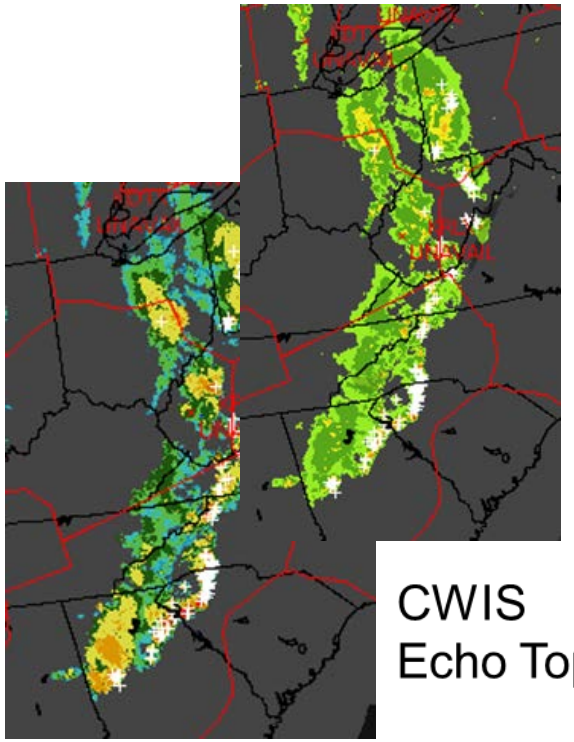
CIWS/CoSPA desired echo top categories

ATCSCC echo top categories

Any user-determined echo top categories

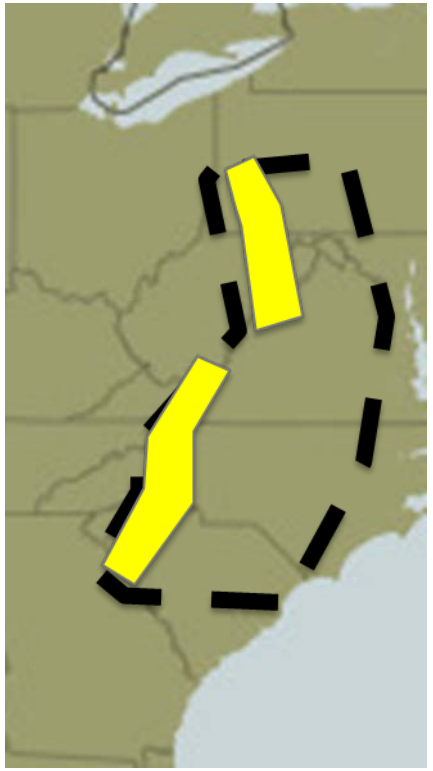
WIMAT Challenge --- Ensuring consistency of convective forecast information by reducing conflicting sources

- Can Convective SIGMETs and outlooks be generated from CIWS/CoSPA (NWP) forecasts?



CWIS
VIL

CWIS
Echo Tops

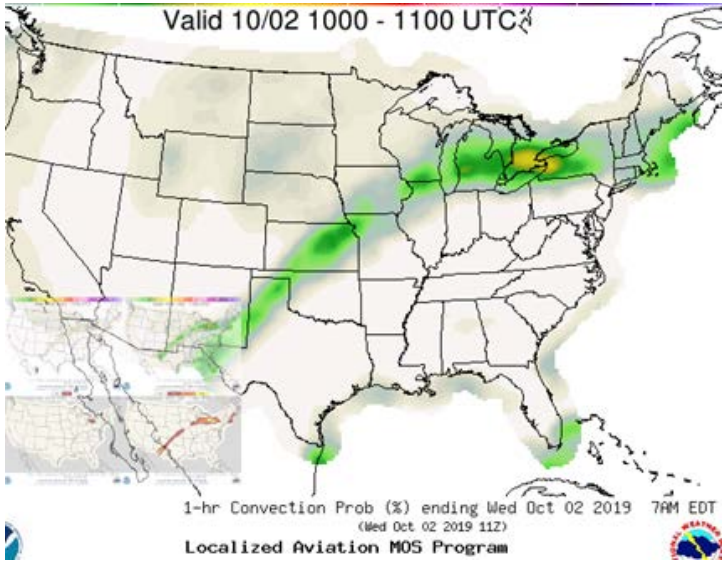


Convective
SIGMETs &
Outlooks

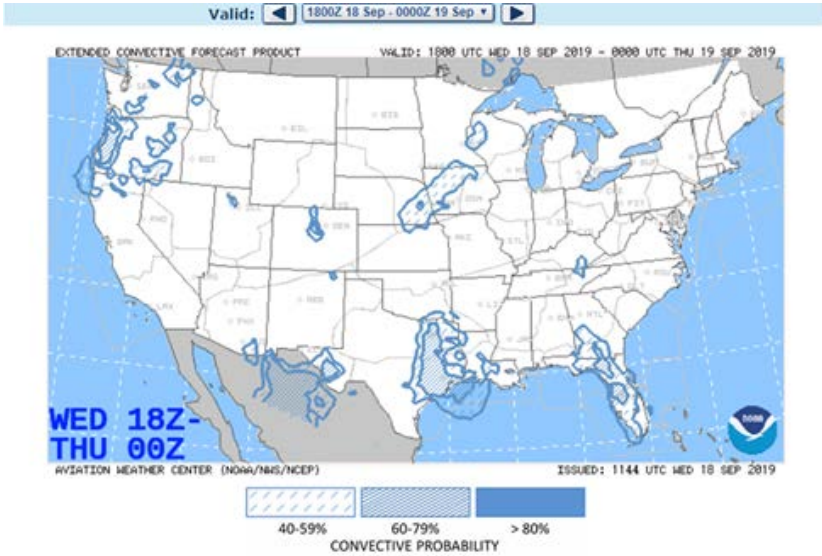
WIMAT Challenge --- Ensuring consistency of convective forecast information by reducing conflicting sources

- Which information source should represent convective forecasts from 30-72 hours?

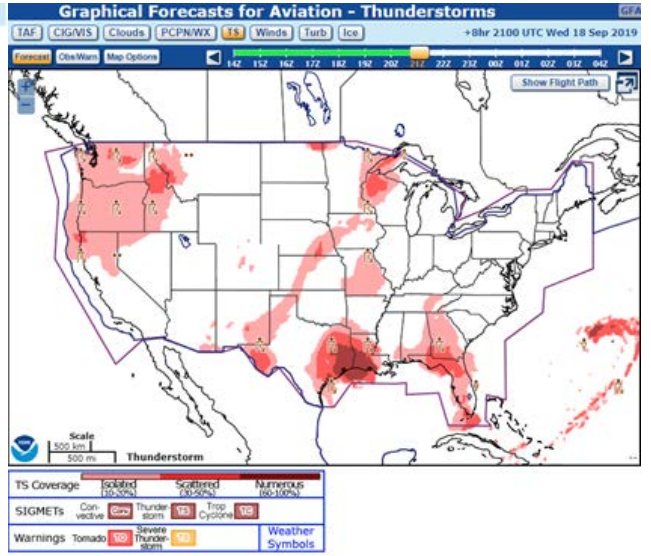
LAMP



ECFP

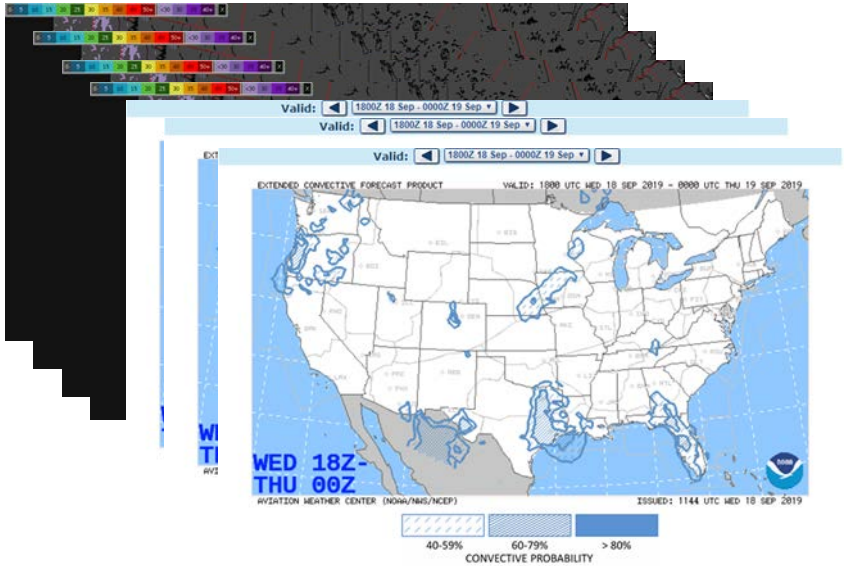


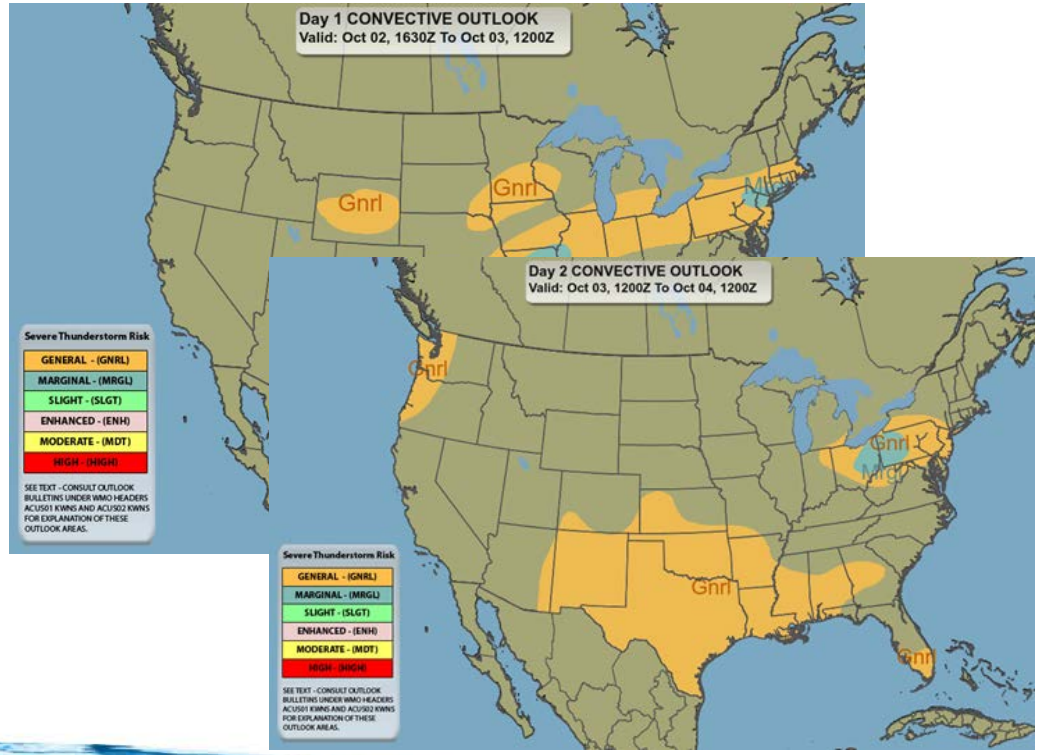
NDFD



WIMAT Challenge --- Ensuring consistency of convective forecast information by reducing conflicting sources

- Should FAA functions use CIWS/CoSPA (NWP) and ECFP (or NDFD) data through 48 hours?
  - Replace SPC Day 1 Convective Outlook
  - Replace SPC Day 2 Convective Outlook





Determine which convective information should be used as principle information

- Determine which convective information should be used as ***principle source*** *for various locations and time horizons*?
- Which information source has:
  - Highest update rates -- To incorporate latest observations into updated forecasts
  - Highest temporal resolution --To address need at user-specified time or time period
  - Highest scale resolution -- To address user-specified intensity, altitude criteria
  - Highest spatial resolution -- To address need for user-defined point, area, route
  - Of acceptable accuracy -- Balance between needed attribute resolution and source accuracy that is “good enough”

From one source – many displays

- Can the same Principle Information (CIWS/CoSPA for example) be used to create displays tailored to user needs or advisory products?
  - Convective SIGMETs
  - CWSU Gate Forecasts
  - Capacity Forecasts?
  - Convective displays for GA on FSS Leidos, FSS OASIS, and 1800wxbrief.com?

WIMAT Challenges

- Identifying Needed Infrastructure Changes
  - Production systems
  - Communication systems
  - User systems
  - User Training and Documentation
- Ensuring most, if not all change impacts are identified
  - WIMAT Steering Group
  - WIMAT Committee
  - Federal Register(?)
- Developing workable mitigation strategies that balance timeline and cost
- Getting across-the-board user buy-in to changes
- Developing workable implementation strategies among those affected
- Getting users off legacy products

DISCUSSION