NWS-FAA Radar Projects - Update 2013

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Radar Improvement Drivers

- **Improve severe weather warning services performance**
  - **Tornado warning performance has been stagnant at 14-min average lead time, with only ~50% detection with positive lead time, and stubborn 75% false alarm rate**
  - **NWS stretch goals are probabilistic high-resolution tornado warnings with 60-min lead time, and greatly reduced deterministic false alarm rate (50%)**

- **Address meso-scale, including storm scale, observation gaps**
  - **Geographical coverage in inter-mountain west and costal areas**
  - **Boundary layer coverage (<2km from ground level) and adequate spatial resolution**
  - **Improved temporal resolution to capture the rapid evolution of strong convective storms**
  - **Data for assimilation into NWP models for warn-on-forecast**

- **Address need for better weather information to support safer, more efficient aviation operations, especially as aviation traffic increases in the future**

NWS-FAA Radar History

Long history of NWS & FAA collaboration on weather radar projects

- **Next Generation Weather Radar (Weather Surveillance Radar – 1988 Doppler: WSR-88D)**
  - **Partnership with DoD/USAF**
  - **Joint development of operational and system requirements**
  - **Joint acquisition program**
  - **Joint network operations, overseen by NEXRAD Program Management Committee**
  - **Joint program to improve WSR-88D capabilities (NEXRAD Product Improvement)**

- **FAA Terminal Doppler Weather Radar (TDWR)**
  - **Collaboration with NWS for NWS ingest of TDWR data from all 45 TDWR sites**
  - **NWS development of Supplemental Product Generator to produce WSR-88D format products from TDWR data for use by NWS forecast offices**
  - **FAA enhancements to TDWR; will also add value for NWS operations**
  - **Significant enhancement of radar information for tornado warnings & other severe weather operations**

- **DoD En-Route (ARSR-4, operated by FAA) and FAA Terminal (ASR-11) Radars**
  - **Ongoing collaboration with NWS for NWS experimental ingest of data**
  - **ARSR-4 data ingest from Watford City, ND; Makah, WA; Guantanamo, Cuba**
  - **ASR-11 data ingest from Erie, PA**
  - **Proven capability, but no program funding for expansion to operational status**

NOAA-NWS Radar Requirements

- **NOAA Consolidated Observing Requirements List (CORL)**
  - **Based on physical and temporal attributes of observable weather elements**
  - **Addresses needs for current analysis as well as current & potential usage in numerical modeling over the next 5 to 10 years**
  - **Includes storm-scale as well as larger scale attributes**
  - **Is independent of any particular observing system**
  - **Available at: https://www.nosc.noaa.gov/tpio/main/pords.html**

NOAA-NWS Radar Requirements

- **NOAA-NWS Radar Functional Requirements (RFR)**
  - **… develop an official NOAA/NWS document for functional radar requirements that will satisfy current and future multiple mission needs and will be the basis for agency planning associated with next generation surveillance at NOAA**
  - **Builds on:**
    - **CORL, particularly the storm-scale elements**
    - **Current WSR-88D (NEXRAD) sensing capabilities (including Dual Polarization) and the existing base of science applications and external users**
    - **Agency Strategic Plans & 'Stretch Goals' (e.g., 45 – 60 min tornado warning lead times)**
    - **Anticipated completion in 2013; future revisions anticipated to reflect mission requirements changes and advances in weather radar technology and science**
  - **Collaboration with FAA to ensure NWS support to evolving FAA weather information requirements is addressed**

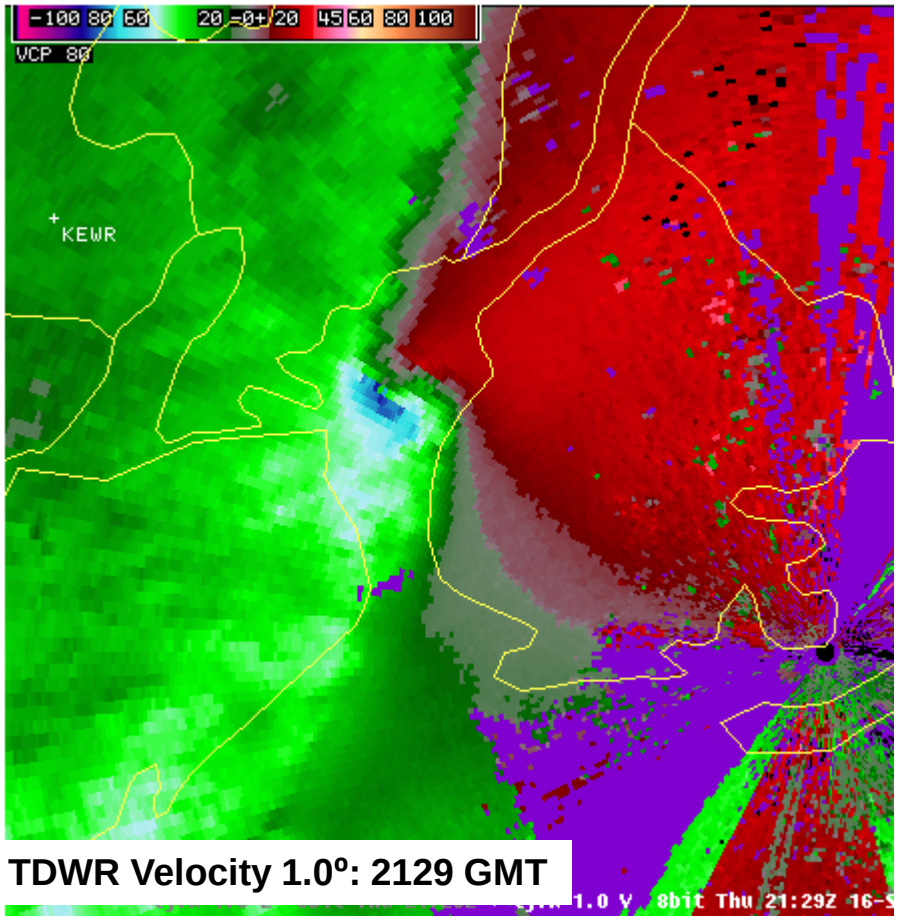
NextGen Surveillance & Weather Radar Capabilities Program (NSWRC)

- **The FAA currently operates four distinct radar systems for terminal aircraft surveillance and airport hazardous weather detection in the nation's terminal airspace**
  - **Airport Surveillance Radar (ASR) models 8, 9, and 11 and Terminal Doppler Weather Radar (TDWR), are nearing the end of their life cycle**
  - **Sustainment and upgrade programs can keep these radars operating in the near to mid-term**
  - **For the long term, the FAA recognizes that replacement of these radars is the best option**

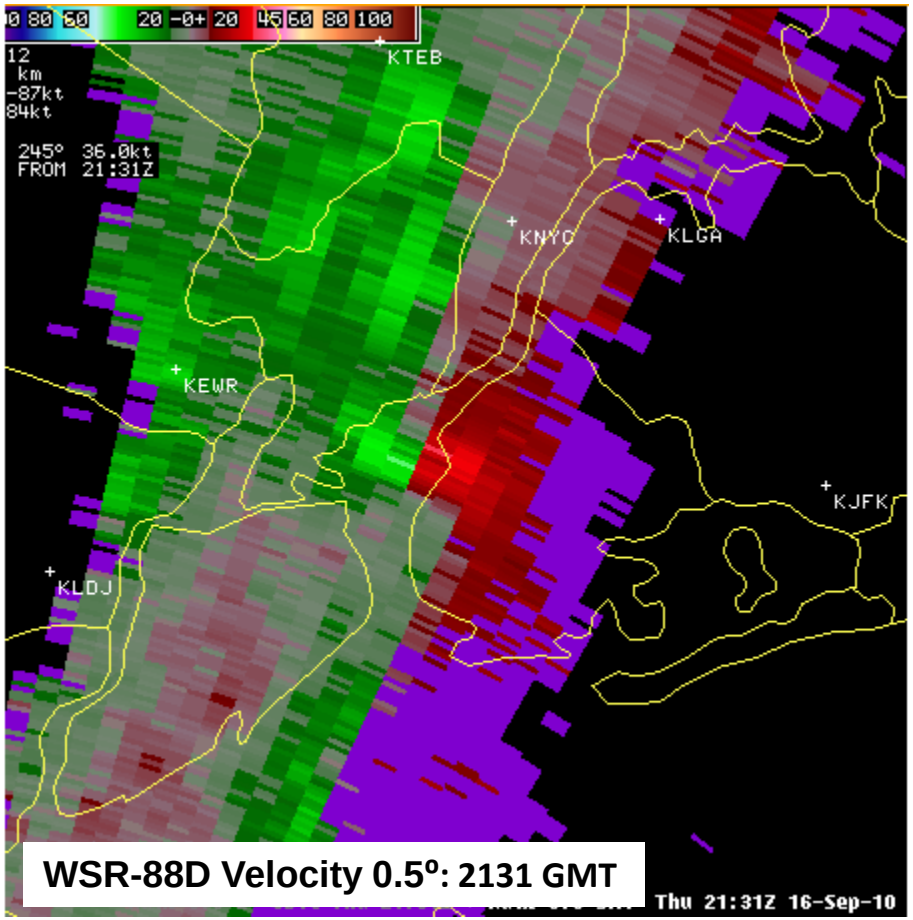
- **NSWRC program initiated for potential procurement of replacement of terminal radars**
  - **Potential for program to include replacement of WSR-88D units**
  - **Potential for program to include DoD long range radars (ARSR units) if DoD desires**
  - **NOAA/NWS collaborating with FAA on planning and technical teams**
  - **Multifunction Phased Array Radar (MPAR)**
    - **Working Group – MPAR: with other agencies under lead of OFCM**
    - **Notional functional requirements for the aircraft and weather surveillance elements currently in place to help drive functional requirements for NSWRC.**
    - **Proof-of-Concept work with phased array radar at NOAA's National Weather Radar Test Bed**

New York City TDWR: September 16, 2010

Tornados In NYC



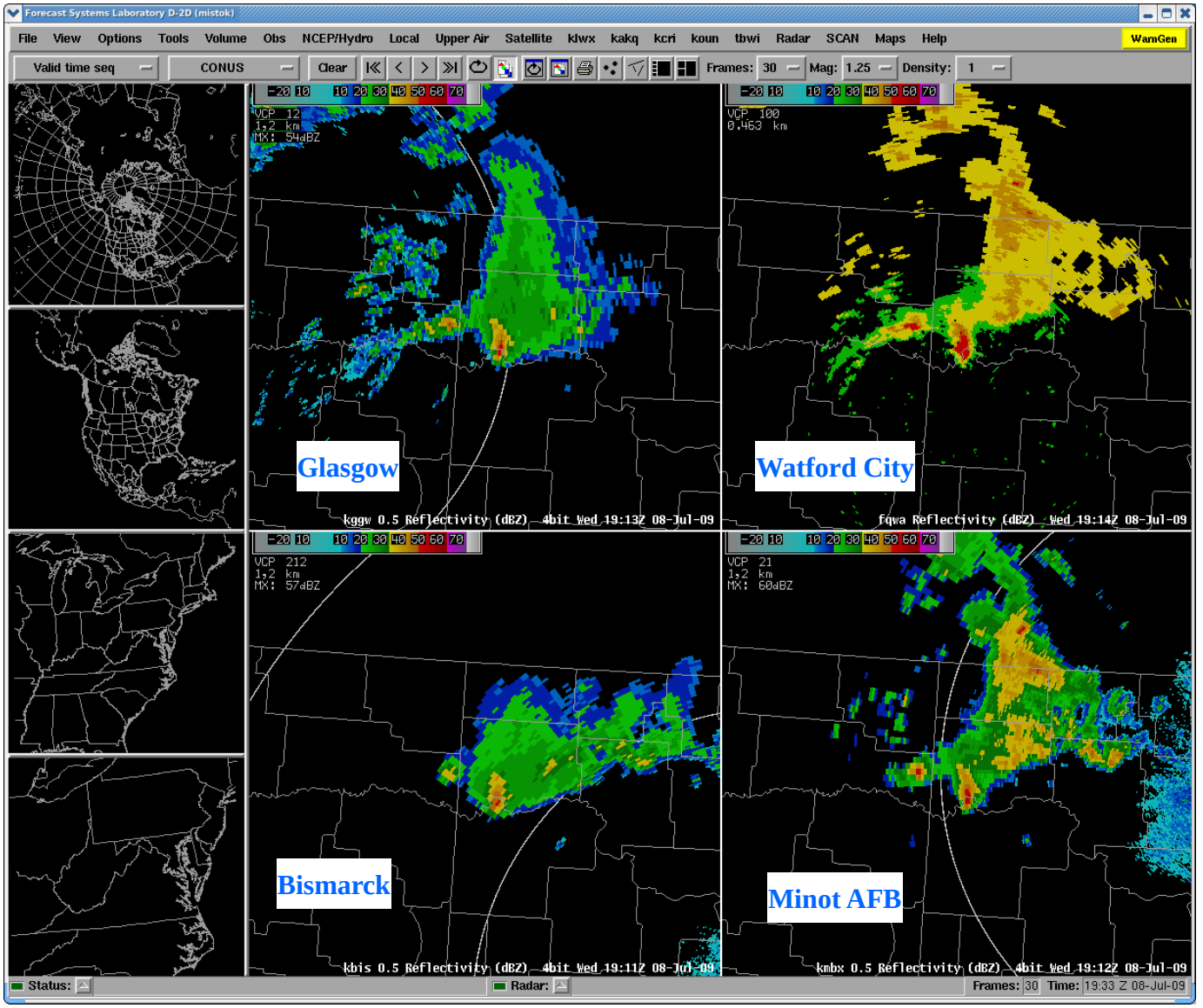
TDWR Velocity 1.0º: 2129 GMT



WSR-88D Velocity 0.5º: 2131 GMT

NWS quote: *TORs issued by OKX yesterday were completely based on the TDWRs.*

Watford City, ND, ARSR-4 & Surrounding WSR-88Ds



Erie ASR-11 Reflectivity