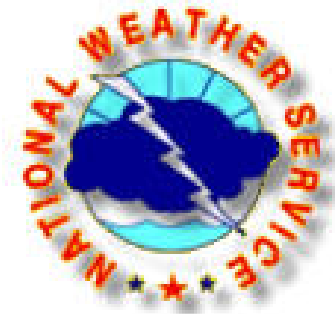


# NEXRAD Product Improvement Program Update

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OS&T/PPD

MARCH 2006



# TOPICS

## ORDA

- Dual Polarization
- Super-Resolution
  - Recommendation to proceed
- FAA Radar Data Ingest
- CASA

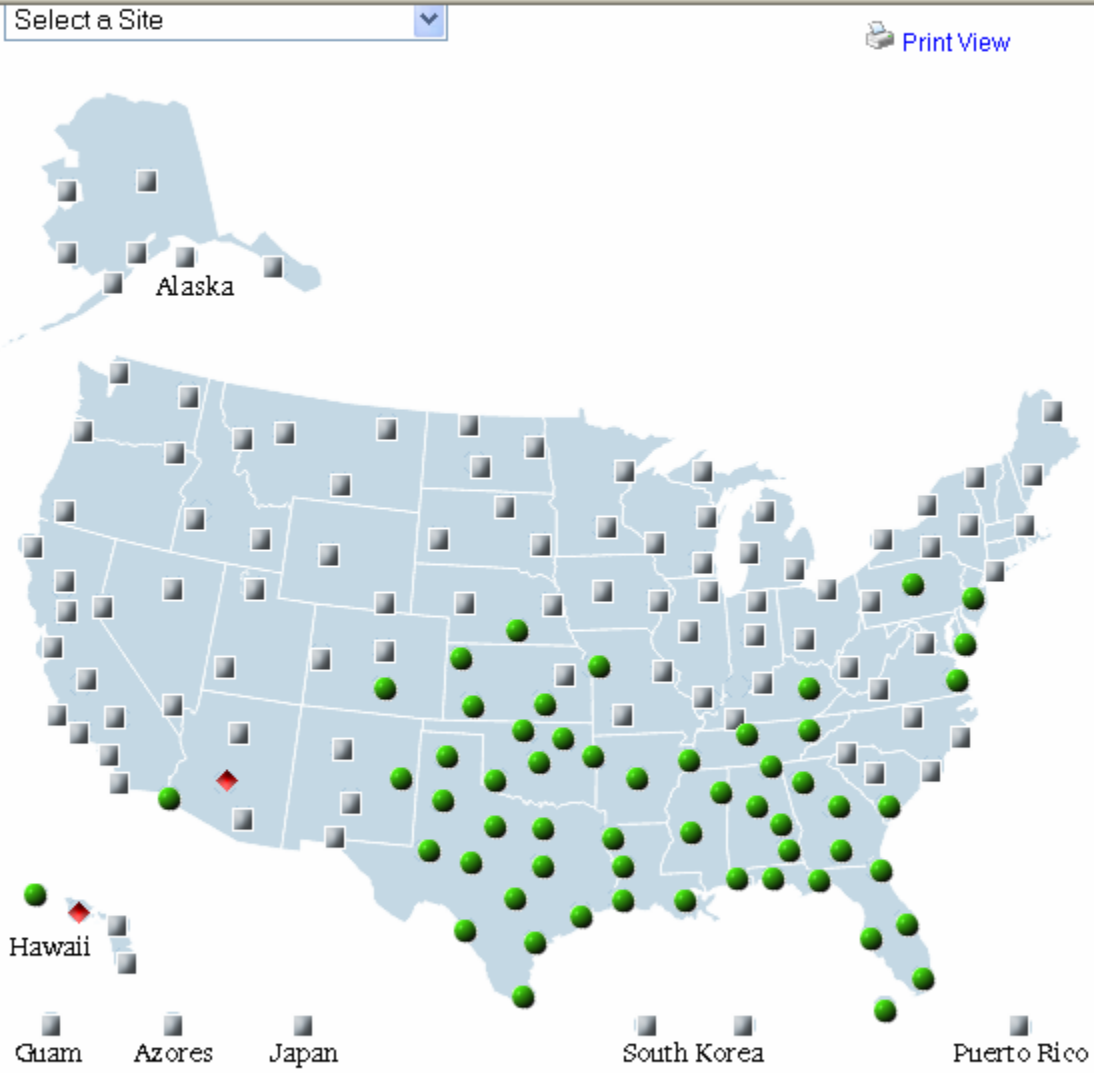
# ORDA

- ORDA subsystem replaces the current WSR-88D Radar Data Acquisition subsystem to improve:
  - Receiver and signal processing hardware
  - User interface
  - Signal processing and diagnostic software
  - Reliability, maintainability and availability
- ORDA improvements critical to meeting strategic goals for severe weather

# RDA Status

- Began production deployment November 2005
  - Five Contractor install teams
  - Technical Support by RSIS Engineering and ROC
  - Five Installs/Week
- 57 of 158 sites installed
- Target completion date – September 2006
- Maintenance Training ongoing
- Focus on Transition to O&M

- Deployment
- Schedule Map
- Lessons Learned
- Hardware
- Components
- Networks
- RDA HCI
- Single
- Redundant
- Redundant
- System
- Star Presentation
- ORDA
- Misc
- Announcements
- Contact Webmaster



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[View INCO Schedule](#)

# ORDA Website

<http://www.orda.roc.noaa.gov/>

# Dual Polarization

# Acquisition Strategy Outline

- Develop Performance Requirements
  - Leverage NSSL Experience
  - Include ROC and Agency Stakeholders
- Continue Emphasis on Commercial Solutions
- ORDA SIGMET Supports Dual Pol Modification
- Performance-based acquisition
  - Development
  - Production
  - Deployment
- Utilize NSSL work in Dual Pol Algorithm Development
- Align with Current NEXRAD Maintenance Concept
- Administer in OS&T/NPI



# Dual Pol Program Activities

- Issue
  - Contracting Officer is key member of Acquisition Team
  - NOAA Contracts support is constrained by limited resources
  - Alternative Contracting Services organization identified
    - FAA RESULTS Acquisition Group
    - Located at Mike Monroney Aeronautical Center in Oklahoma City

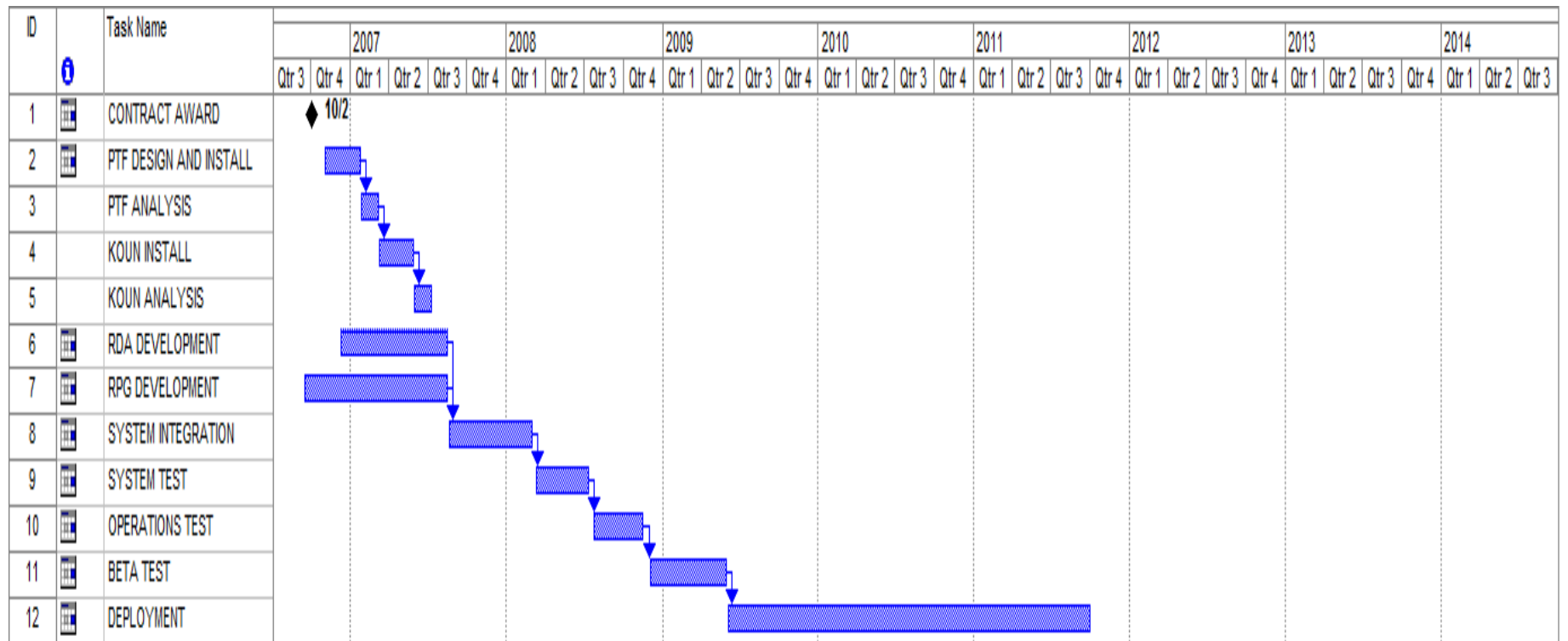
# Dual Pol Program Activities (cont.)

- Complete NOAA/FAA Inter-Agency Agreement with RESULTS Input
- Coordinate Acquisition Plan and Inter-Agency Agreement with NOAA Acquisitions
- Brief DOC Acquisition Review Board
- Coordinate with RESULTS on:
  - Pre-Solicitation Activities
  - Evaluation Plan

# Dual Pol Technical Activities

- Tasking to NSSL
  - Hardware Analysis and Prototyping
  - Requirements Development
  - Polarimetric algorithm development (precip and HCA)
  - Support RFI/RFP evaluation.
  - Mitigation of sensitivity loss of 3 dB on KOUN due to dual polarization.
  - Impact of Dual Pol on RV Mitigation, GMAP, AP Mitigation, and Super Resolution
- Tasking to NCAR
  - Analysis and verification of differential reflectivity calibration methods
- No access to ORDA/COMMITTS Resources

# Dual Pol Schedule



# Super-Resolution

- NSSL Tasking in Place
  - Complete researching operational implementation options of Super-Resolution for the WSR-88D.
  - Complete researching operational implementation options of oversampling and whitening for the WSR-88D.
- ORDA Install on KOUN this week (3/20/06)
- COMMITS tasking in place to support install and ORDA SIGMET consulting
- Seek TAC Input on NSSL technical questions
- Watch: Oversampling/Whitening Benefit vs. Infrastructure effect

# Super-Resolution Recommendation

- Recommend: TAC concurrence on proceeding as outlined by NSSL
  - Target Build 10
  - IV&V by ROC Applications

# NWS Utilization of FAA Radar

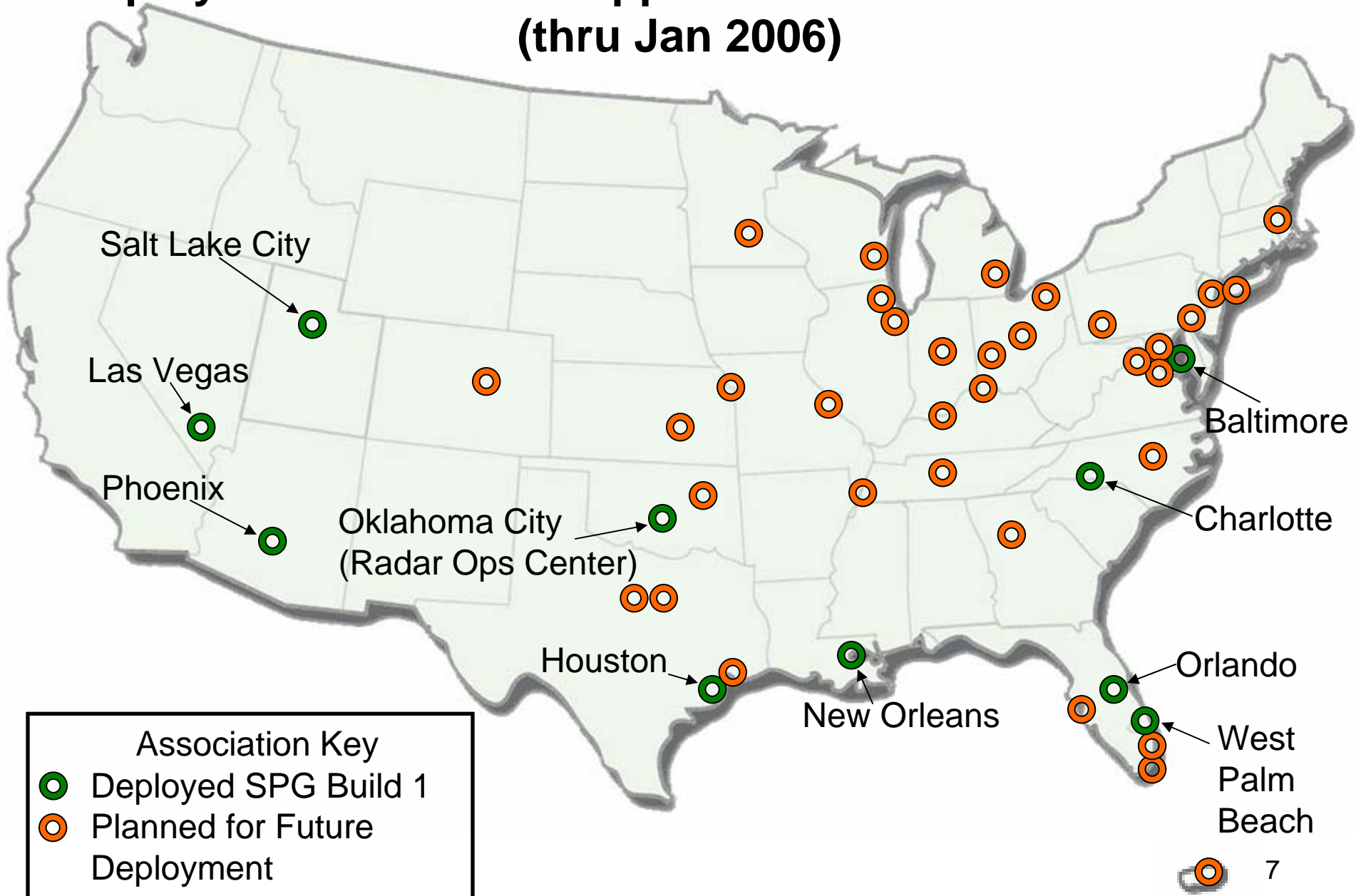
- OS&T Developed and Deployed Prototypes to Ingest and Display Data from FAA Radars
  - ASR-11 (Erie, PA) Lake Effect Snow Assessment
  - ARSR-4 (Watford City, ND) Operational Assessment
  - TDWR (Multiple Sites) Augment NEXRAD Data
- Proof-of-Concept demonstrations conducted using NWS developed Web browsers to access image products from FAA radar data
- NWS developed system to fully integrate TDWR radar data into AWIPS

# Integrate TDWR radar data into AWIPS

- *System Concept*
  - Support AWIPS capabilities available with WSR-88D products
  - Separate server (Supplemental Product Generator-SPG) to ingest TDWR base data and provide products following WSR-88D designs
    - Front end translator module creates base data radials and status messages following WSR-88D RDA formats
    - Base data products follow WSR-88D RPG formats but at TDWR spatial and temporal resolution
  - Provide conventional NEXRAD products in future software releases
- *Data Availability*
  - Deploy to WFOs which have TDWR radars within their CWA
  - Support products availability to other users just like WSR-88D
  - Base data distribution in native TDWR format or pseudo-NEXRAD format is possible
- *System Architecture*
  - WSR-88D RPG source code software, tailored to meet the NWS requirements for TDWR data
  - Little-endian PC processor with Linux OS
  - T1 communication from TDWR and LAN interface to AWIPS



# Deployed TDWR NWS Supplemental Product Generators (thru Jan 2006)



# TDWR Impact on NWS Warnings

- 5/8/2003 Oklahoma City Tornado  
**N/A** In study, TVS was identified in TDWR data ~15 min before shown by WSR-88D.
- 7/9/2004 Salt Lake City Severe thunderstorms and downbursts  
**Critical** “WSR-88D overshot area of strong winds.”
- 4/9/2005 Oklahoma City Tornado  
**Heavy** Traveled through cone of silence of 88D.
- 7/7/2005 Charlotte Tornado – Cindy  
**Effective** For the counties involved, Iredell and Alexander:  
With 88D but before TDWR: 6 tornadoes: 3 misses: lead times of 0, 1, 17 min  
With TDWR: 2 tornadoes: 2 hits: lead times of 39 and 8 min
- 10/22/2005 West Palm Beach Tornado – Wilma  
**Critical** “... based entirely on TDWR data.” “... looked like innocuous shower on MIA and  
MLB 88Ds.”
- 11/29/2005 Salt Lake City Winter Storm Warning  
**Heavy** Tracked heavy snow band through Salt Lake & Davis counties. WSR-88D down.
- 2/2/2006 New Orleans Tornado  
**Critical** “The TDWR was invaluable in the operations of this event.”

# FAA Radar Status

- No TDWR Development/Deployment Planned
  - Outyear O&M funding not identified
  - OST/SEC will provide TDWR support until funding is depleted (approx. January 2007)
- Williston Operational Assessment Report nearing completion
- Erie Lake Effect Snow Assessment ongoing
- OS&T/OPS/OCWWS Considering FY09 Budget Initiative to Utilize FAA Radar Data

# CASA: dense networks of low power radars (Collaborative Adaptive Sensing of the Atmosphere)

- ❑ Entering year 3 of a 10 year program
- ❑ Initial 5 year investment \$42 M
  - ❑ (includes \$17M Engineering Research Center grant from US National Science Foundation)
- ❑ \$7 M per year annual budget
- ❑ NPI has contributed nominal amount
  - ❑ Supports participation by NWS