WSR-88D Technical Advisory Committee Meeting
March 1, 2012

Pending Beam Blanking/ Blocking Issue For WSR-88D At Melbourne, FL

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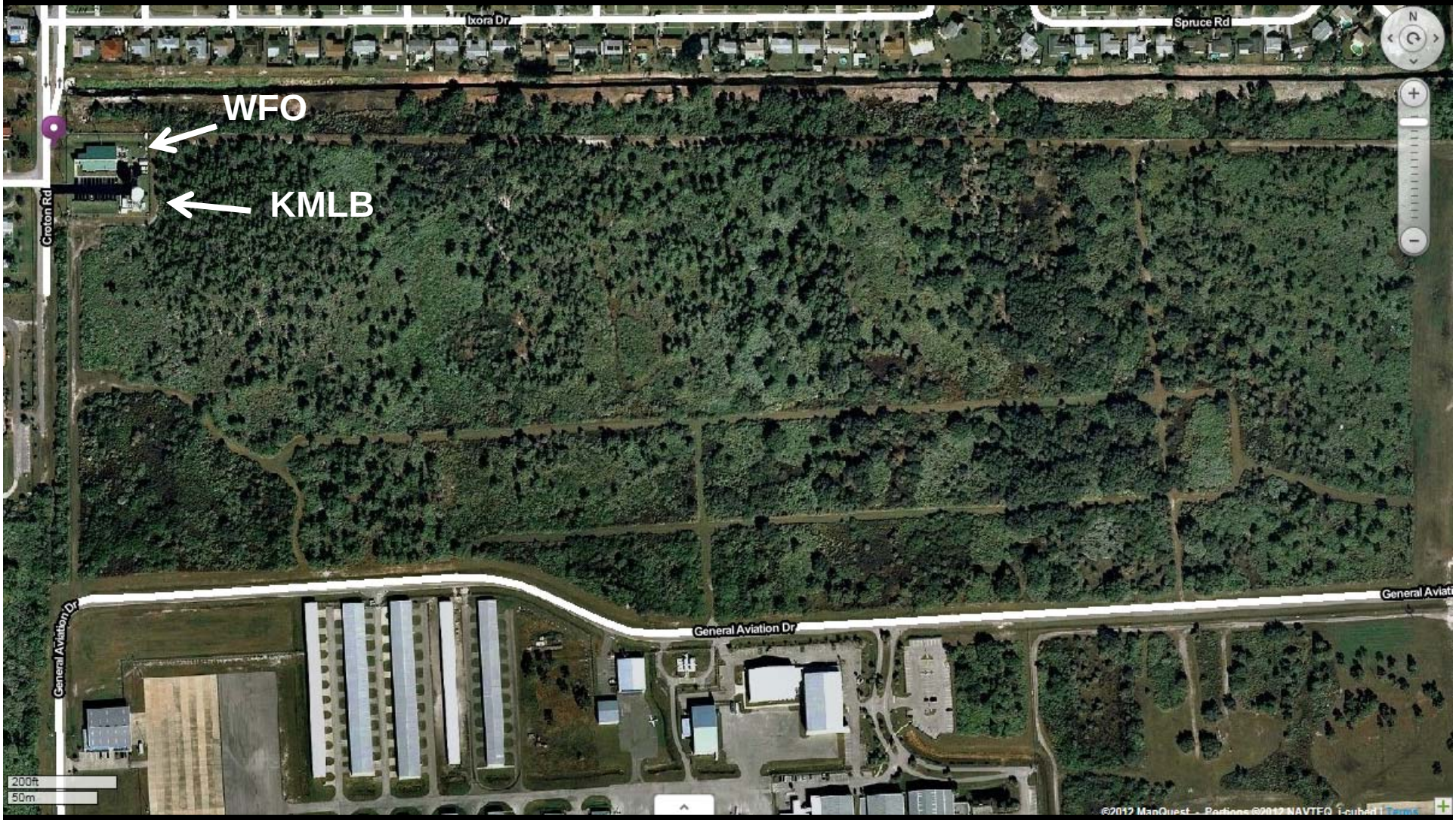
Science & Operations Officer
NOAA/National Weather Service
Melbourne, FL

Information Compilation From:
- WSR-88D Radar Operations Center, Engineering Branch
- NWS Southern Region Headquarters
- NWS Melbourne Forecast Office

Northwest Corner of Airport



Melbourne International Airport

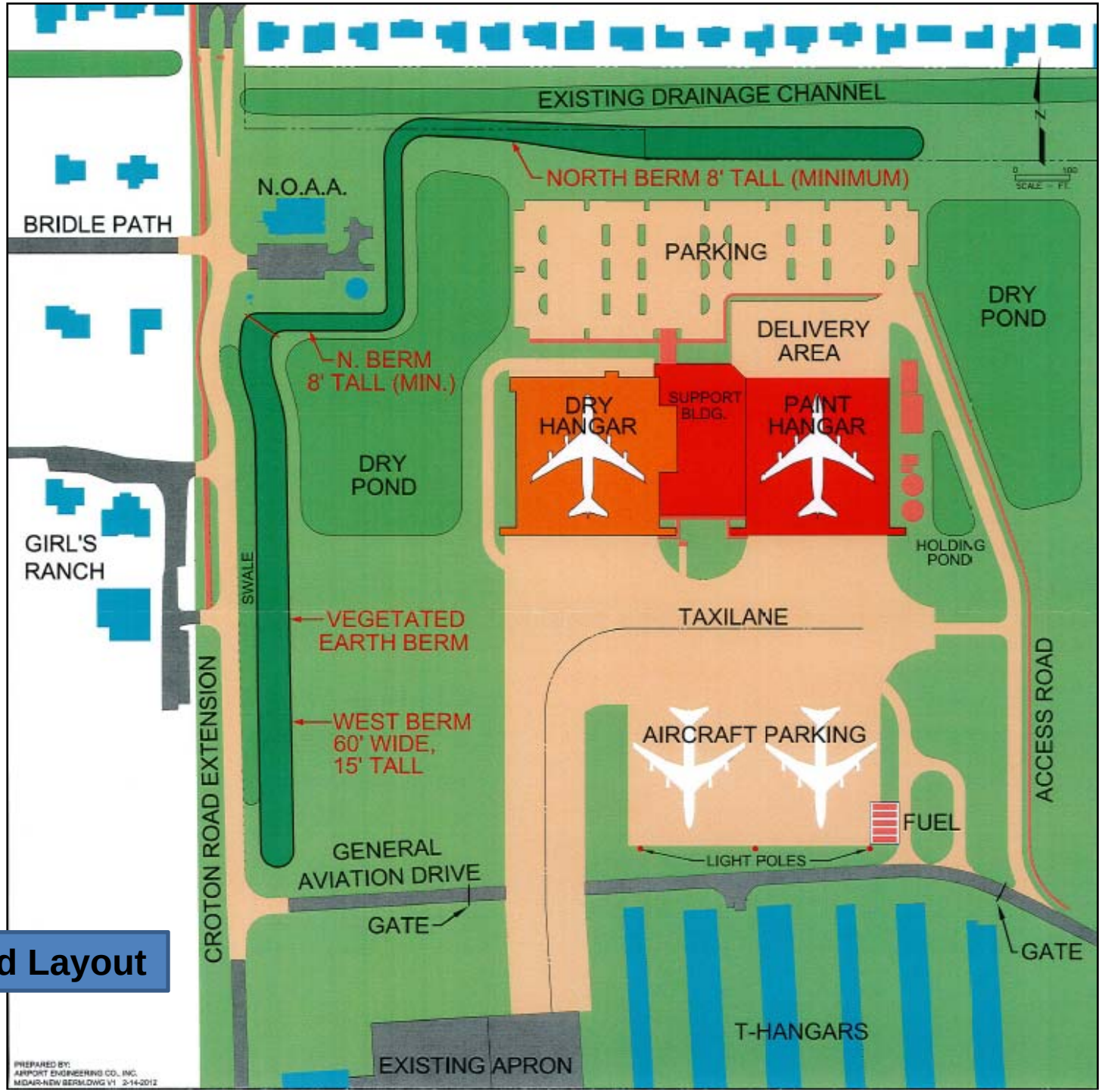
KMLB Tower View to South

(January 2012)

Proposed Hangar Complex

(Hangar Design)

Note: Hangar location and orientation has recently changed.



Updated Layout

Legend

City Boundary

CU-2011-17_SP-11-09_Midair_(2)

Title: PED_View
Department: City of Melbourne Planning & Economic Development Department
Prepared By: City of Melbourne GIS Team
Last Updated: 12/21/2011 12:46:41 PM
Map Location: G:\PZ\P&ZBOARD2012\Maps\CU-2011-17 SP-11-09 Midair USA Maintenance Building.mxd
Illustrative purposes only.
No warranties, expressed or implied, are provided for the property records and mapping data herein, or for their use or interpretation by the User. The City of Melbourne assumes no liability for any damages, losses, costs or expenses, including but not limited to attorney's fees, arising from any User's use or misuse of the property records or mapping data provided herein.

Radar Spec vs. Hangar Specs

• WSR-88D Tower Base	35 ft MSL
• WSR-88D Tower Height	65.62 ft AGL; 100.62 ft MSL
• WSR-88D Beam Center	79.62 ft AGL; 114.62 ft MSL ***
• Hangar Base	~33.0 ft MSL
• Hangar Ridge (High)	~92.0 ft AGL; 123.5 ft MSL ***
• Hangar Ridge (Low)	~69 ft AGL; 102 .5 ft MSL
• Closest Tower-Hangar Distance	~350 ft ***
• Boeing 747 Tail Height	63 ft 8 in AGL; 97 ft 2 in MSL
• Construction Crane Height	180 ft AGL; 223.5 ft MSL
• WSR-88D Frequency	2865 MHz
• WSR-88D Transmit Power	750 KW (peak)

*** *"of particular note"*

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Radar Performance Impacts

- Hangar complex will be within 600 ft *"safety zone."*
- Radar beam blockage is certain; blanking likely required.
- An appreciable reduction/degradation in base data/quality will occur to the southeast of the KMLB radar.
- It will be a greater challenge for radar operators to assess weather phenomena forming within, or moving through, this area.
- Limiting effect on algorithm performance.
- Unique concerns also exist during the construction phase; a 180 ft crane will be used (e.g., coordinated down time).

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Blanked Zones

- Four Different Zones
  - 107 to 131 degrees azimuth
    - Blank everything below 2.3 degrees elevation
  - 131 to 140 degrees azimuth
    - Blank everything below 4.0 degrees elevation
  - 140 to 144 degrees azimuth
    - Blank everything below 3.0 degrees elevation
  - 144 to 150 degrees azimuth
    - Blank everything below 2.3 degrees elevation

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Blocked Zone

- Partial Beam Blockage
  - 100 to 107 degrees azimuth
    - Radar transmitter will radiate, but half of the energy will be blocked by hangars (e.g., reduced sensitivity)

Note: Once the hangars are in place, damage to the WSR-88D receiver components is not likely due to employed blanking and that whatever energy strikes the hangar will be reflected away.

Note: The WSR-88D site guidelines state that within 1200 ft of the radar, no structure should block the beam.

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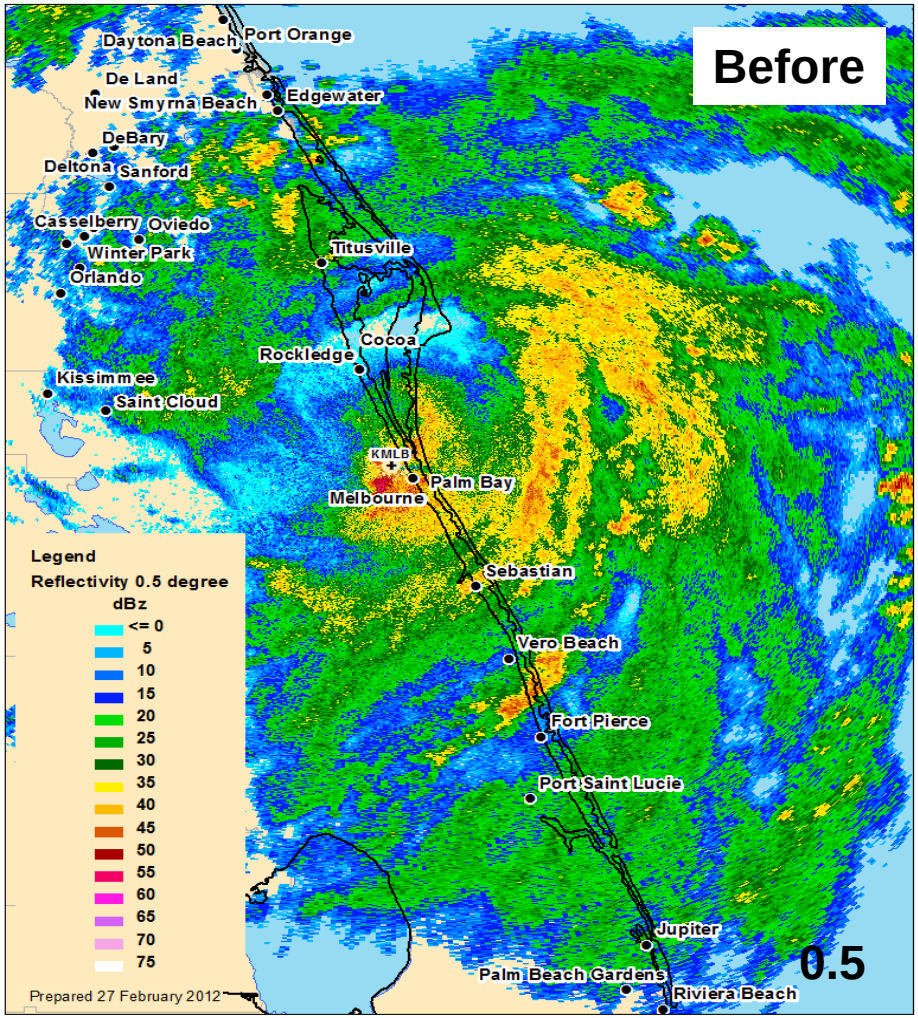
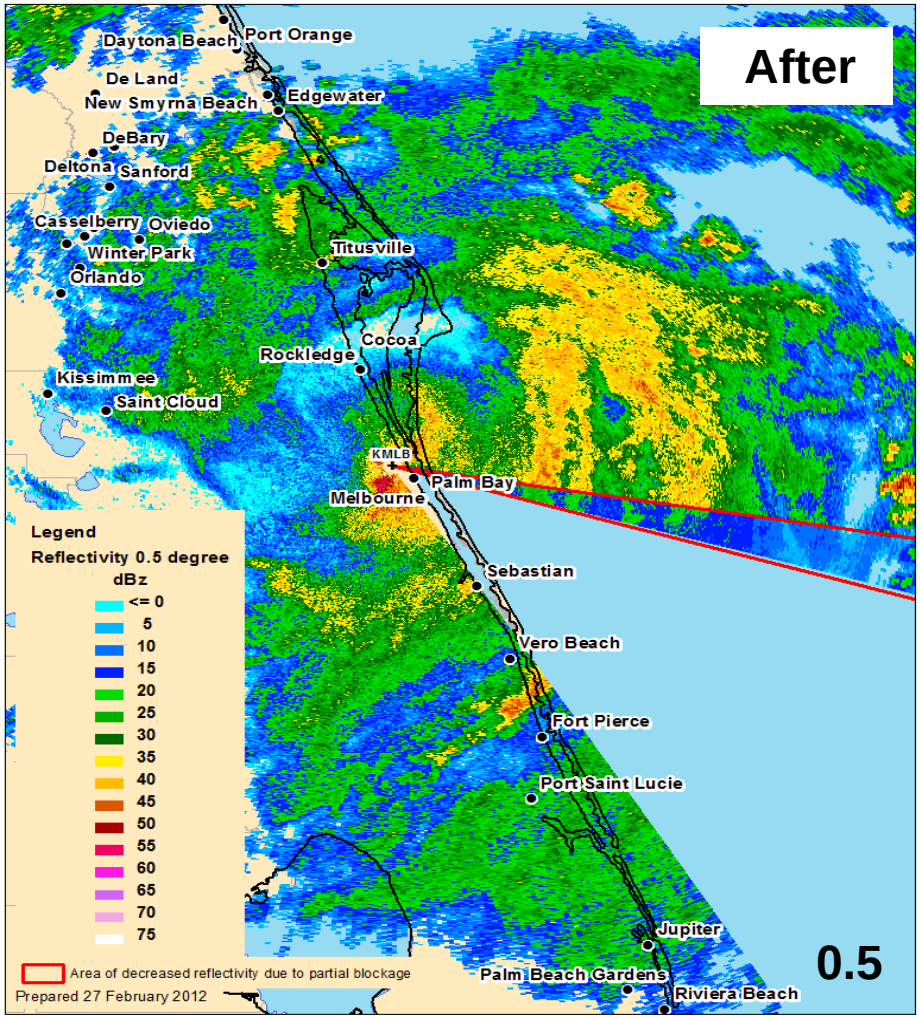
Tropical Storm Fay (2008)

(~28 inches of rain – Brevard County)

Original Melbourne, FL 0.5 degree WSR-88D Image of Tropical Storm Fay, 20 Aug 2008 0800Z



Melbourne, FL 0.5 degree WSR-88D Image of Tropical Storm Fay, 20 Aug 2008 0800Z with Simulated Hangar Blockage & Blanking



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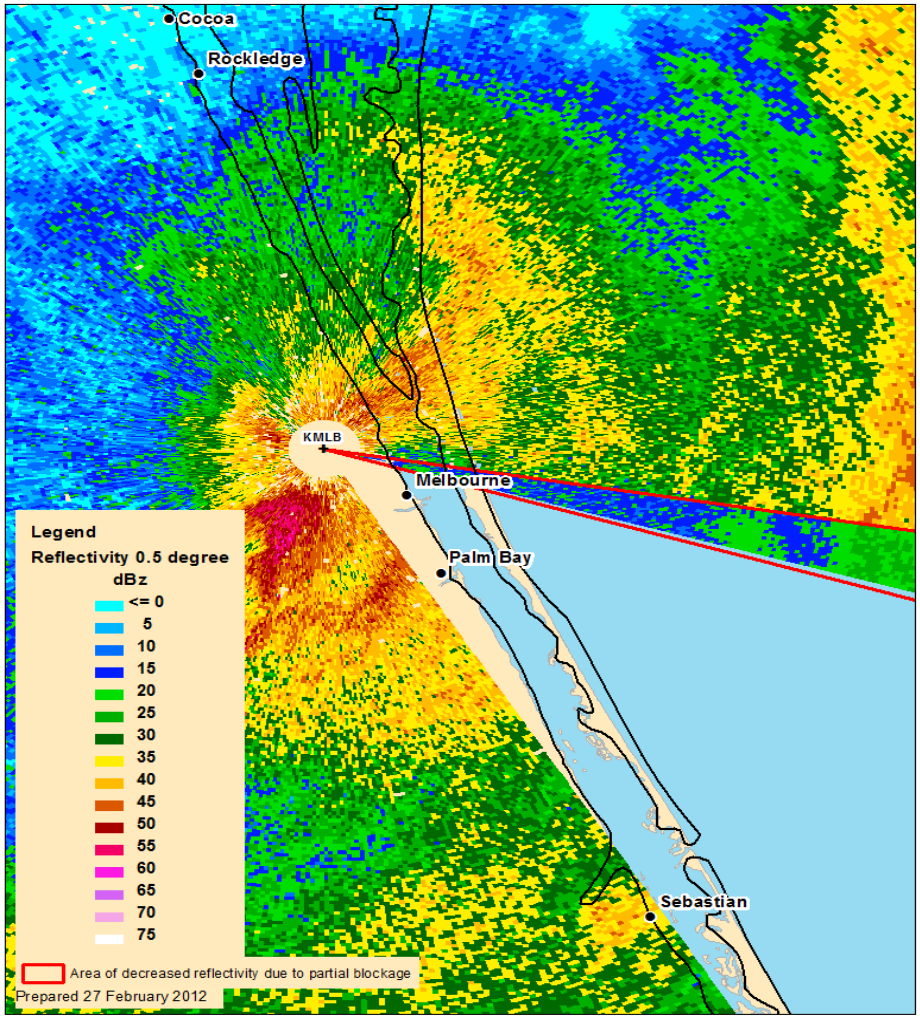

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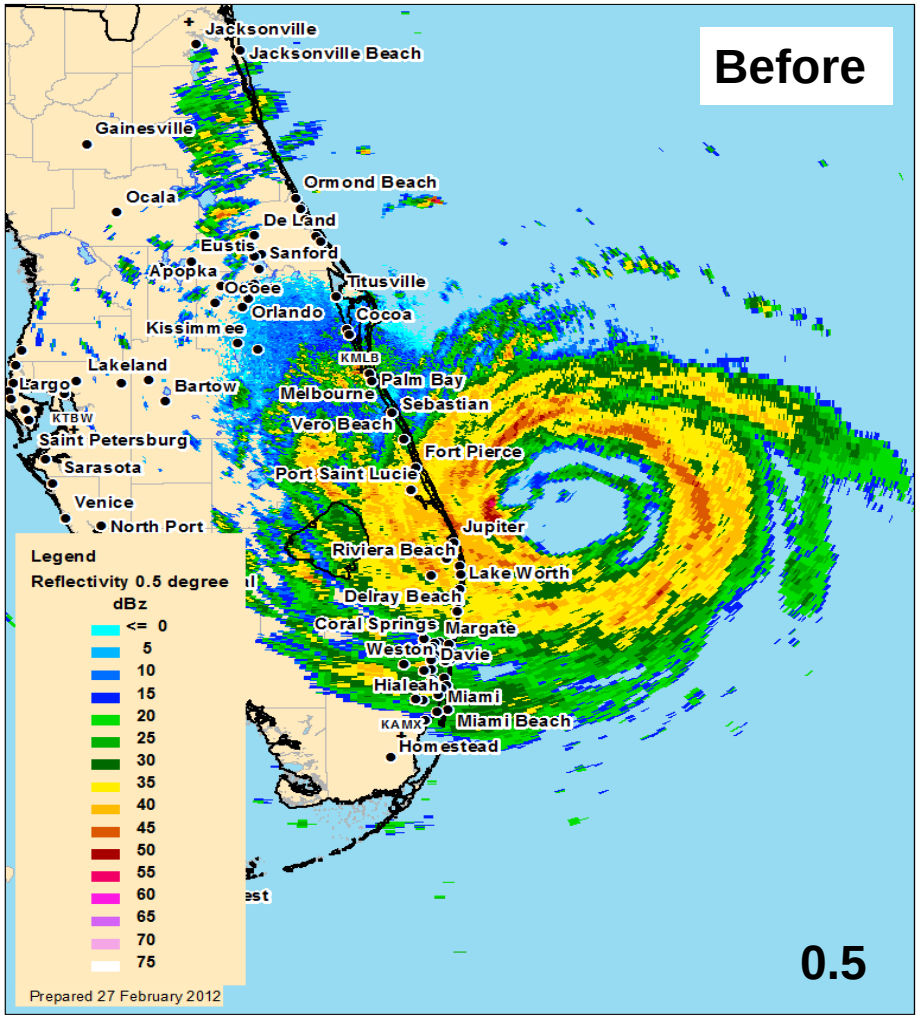
Major Hurricane Jeanne (2004)

(~100 knot winds)

Original Melbourne, FL 0.5 degree WSR-88D Image of Hurricane Jeanne, 26 Sep 2004 0010Z



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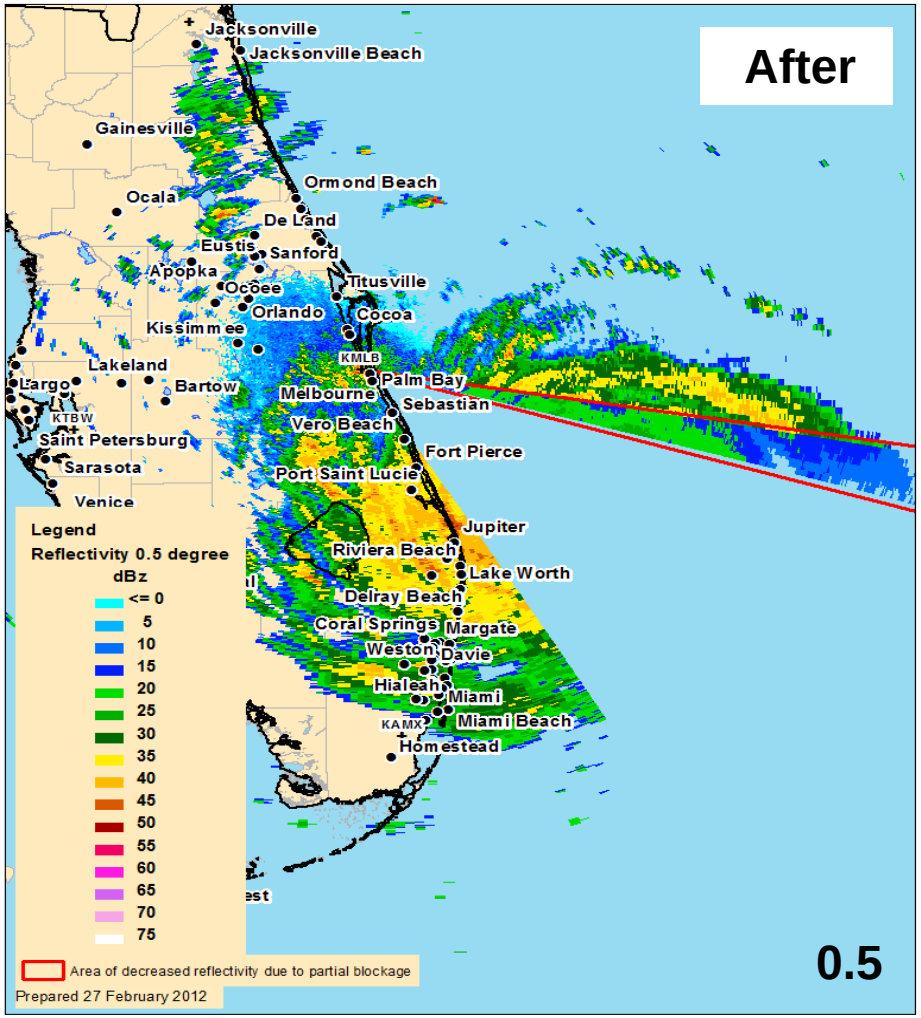

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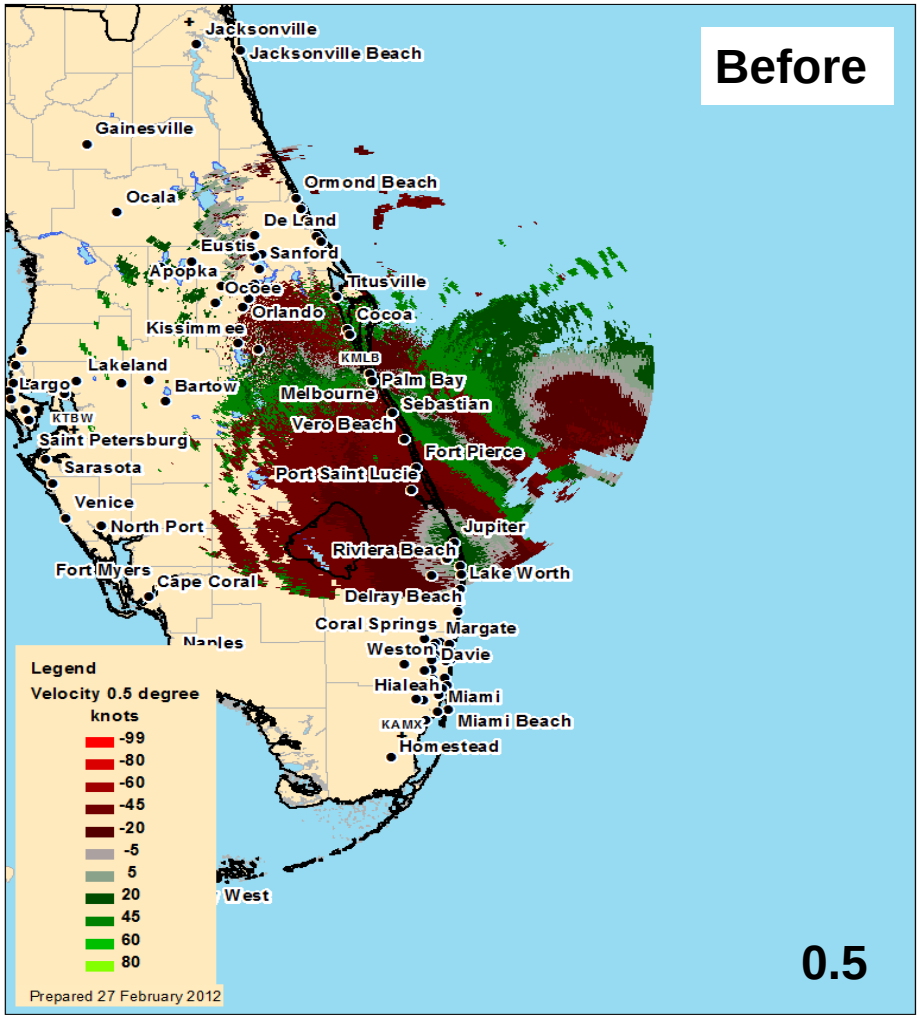

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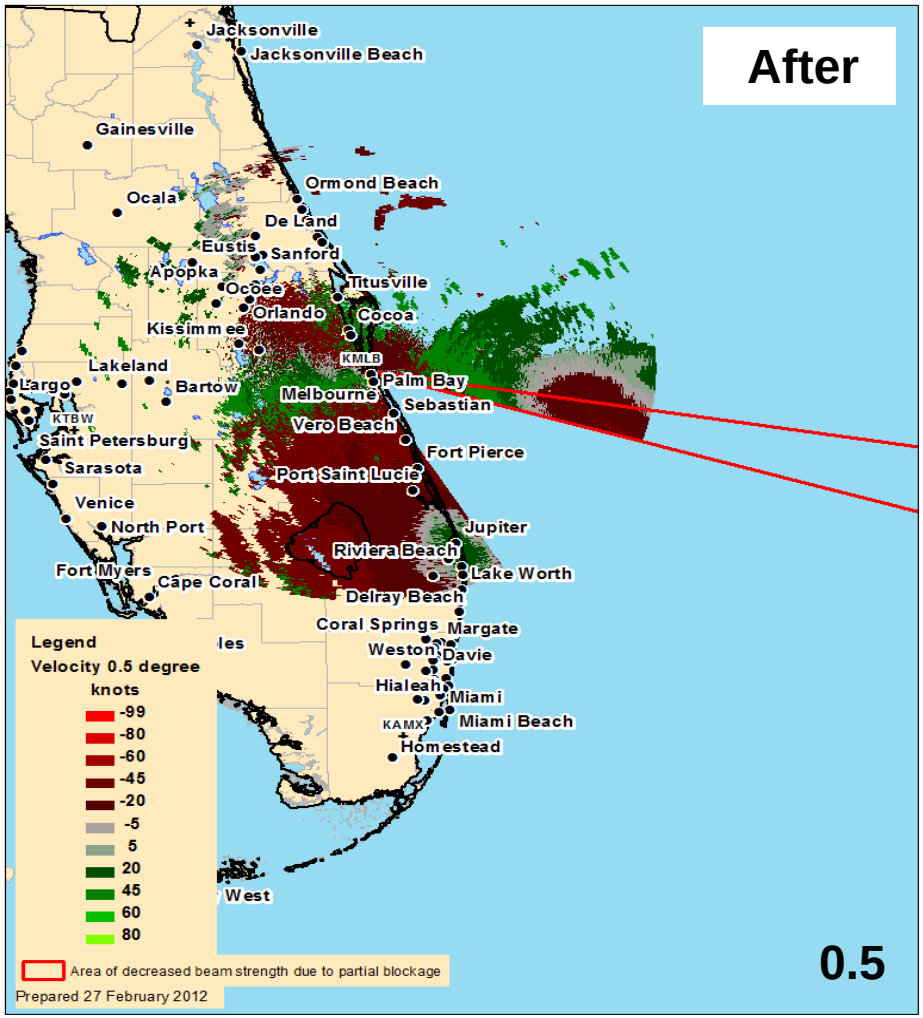

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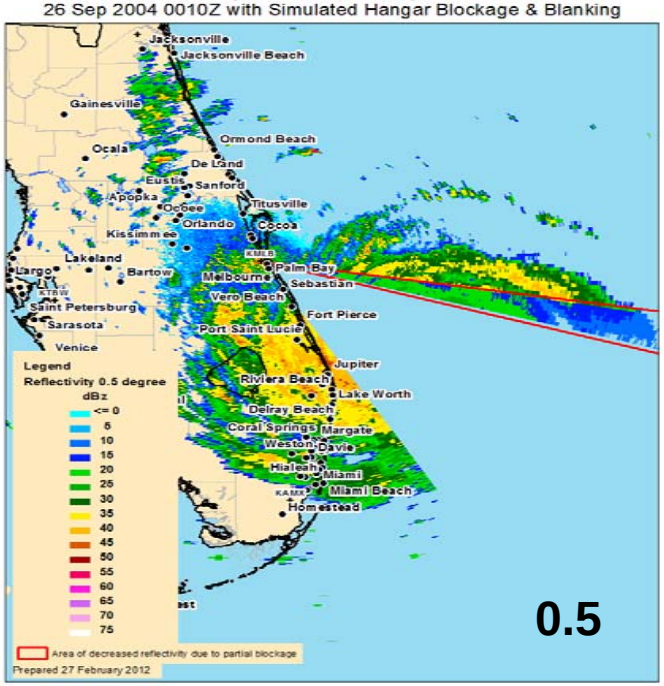

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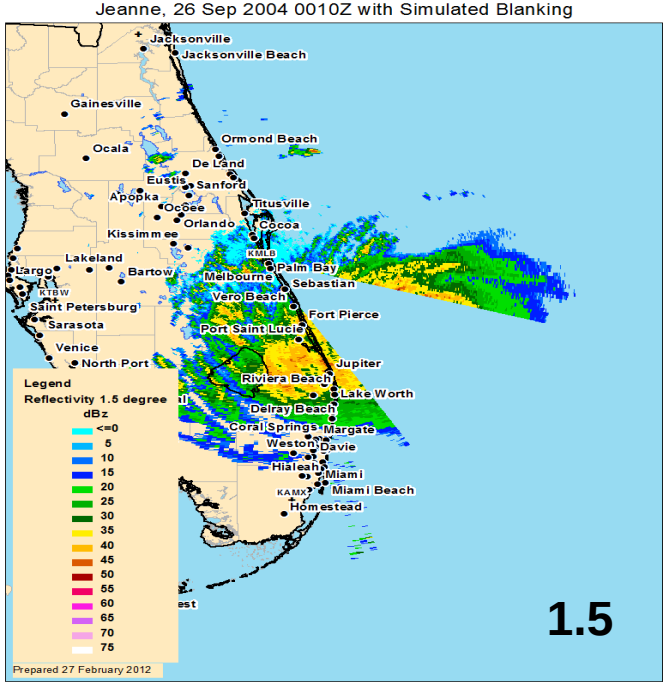
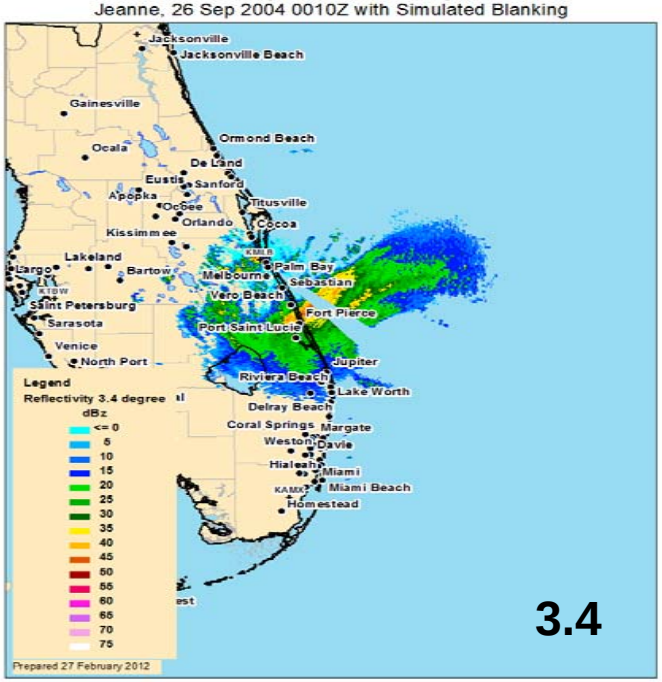
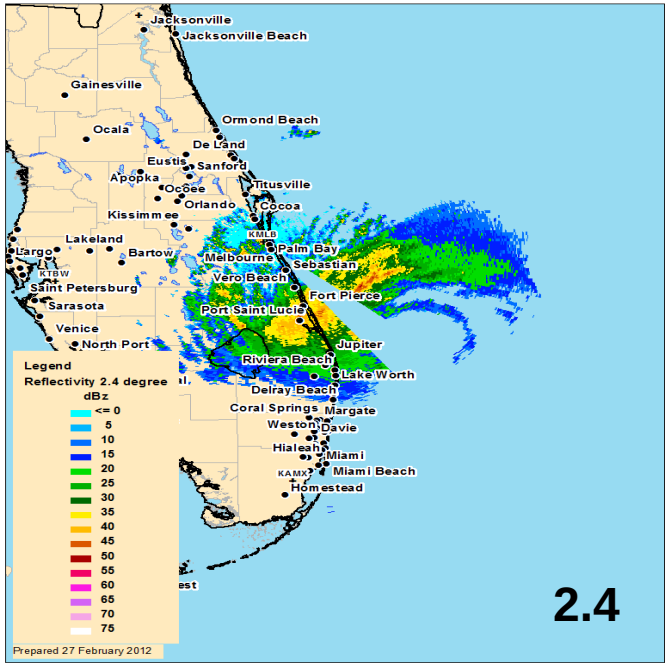


Melbourne, FL 3.4 degree WSR-88D Image of Hurricane Jeanne, 26 Sep 2004 0010Z with Simulated Blanking



Melbourne, FL 2.4 degree WSR-88D Image of Hurricane Jeanne, 26 Sep 2004 0010Z with Simulated Blanking



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Mitigation Strategies

- Airport/MidAir
  - Shorten the hangar height
    - Unlikely since business intent is to work on 747 aircraft
  - Move the hangars farther away; preferably beyond 1810 ft
    - Will disrupt development plans for the rest of airport
  - A combination of the two aforementioned
    - A design challenge

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Mitigation Strategies

- NWS/NEXRAD
  - Raise the KMLB tower
    - Raise tower to 30 meters
      - Cost $0.87M; 7 weeks down time
    - Build new tower next to existing one
      - Cost $1.25M; 4 weeks down time
  - Move the KMLB radar
    - Relocate radar to new site
      - Cost $1.66M to $2.11M; 6 weeks down time
  - Employ supplemental radar data
    - WSR-88D multi-radar/multi-sensor approach (manual; automated?)
    - Exploit nearby TDWRs
    - Secure data from nearby USAF/PAFB/45WS Dual Pol (DWR)
      - Base data line; cost $129K with recurring line costs
      - SMG image relay (*.tif)

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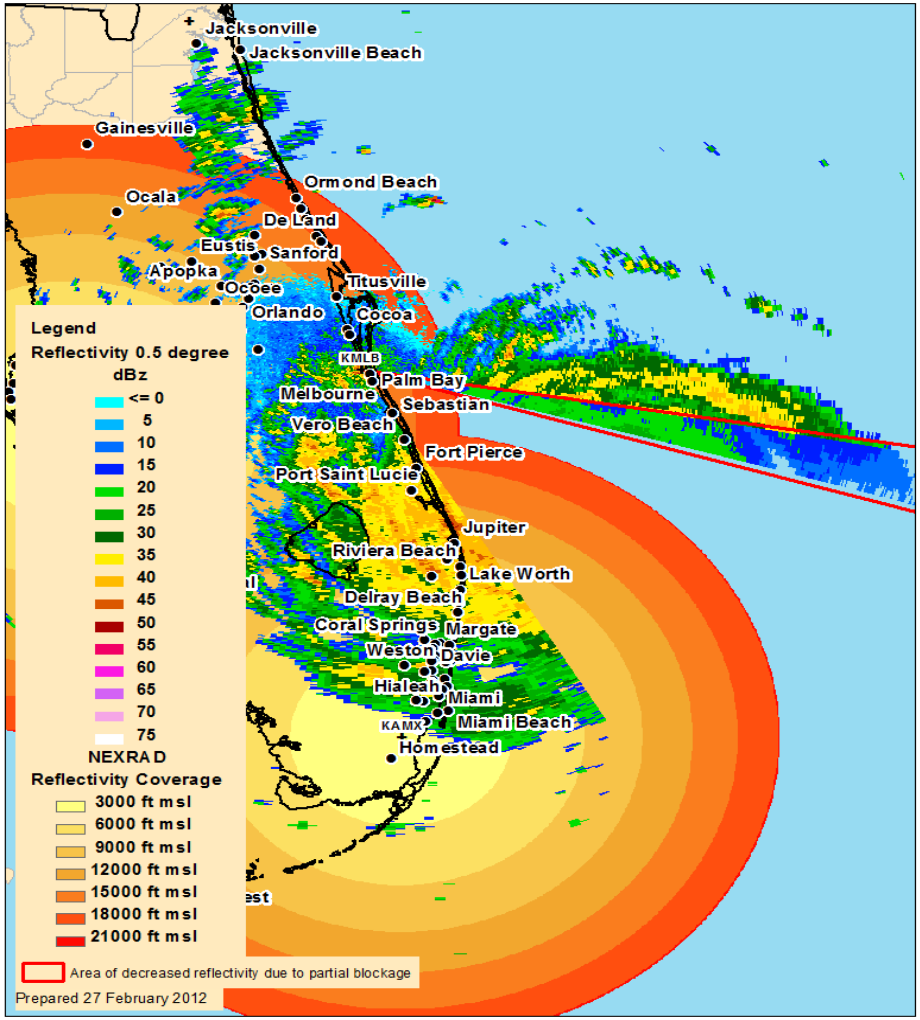
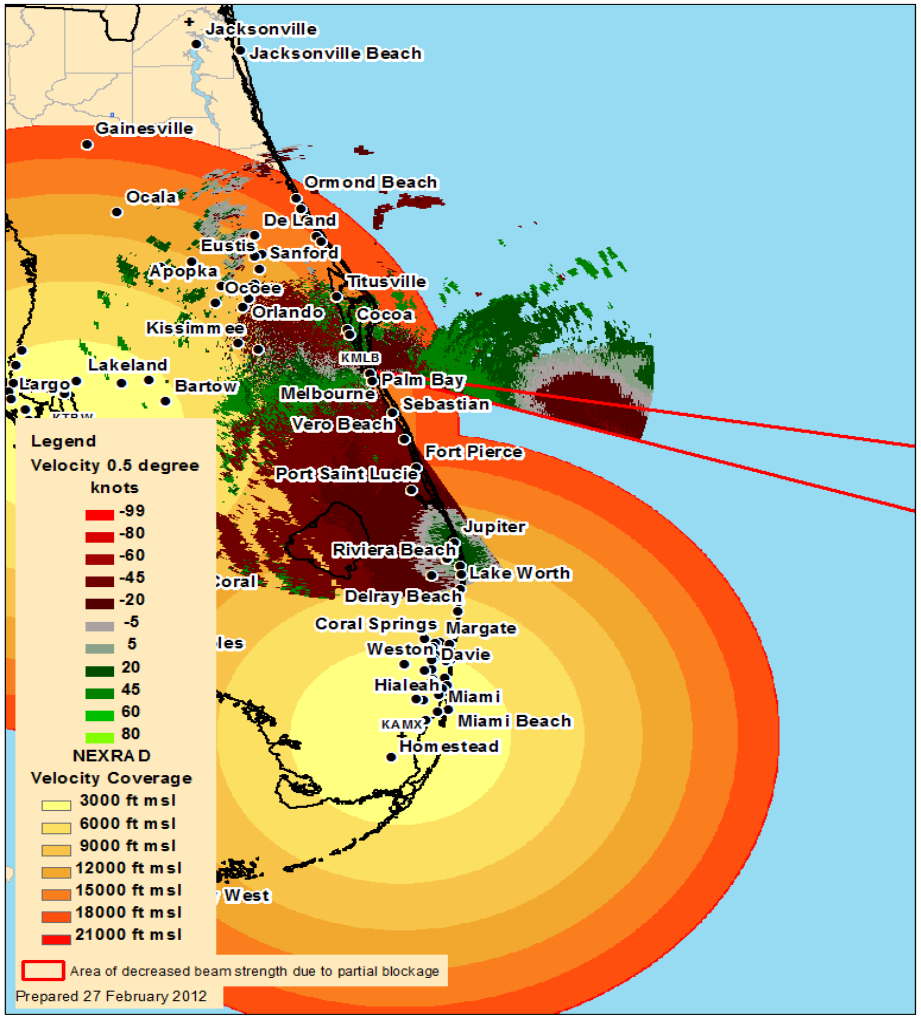
Network Gap Coverage

(WSR-88D KAMX & KTBW)

Melbourne, FL WSR-88D Image of Hurricane Jeanne, 26 Sep 2004 0010Z
with Simulated Hangar Blockage & Blanking with NEXRAD Coverage



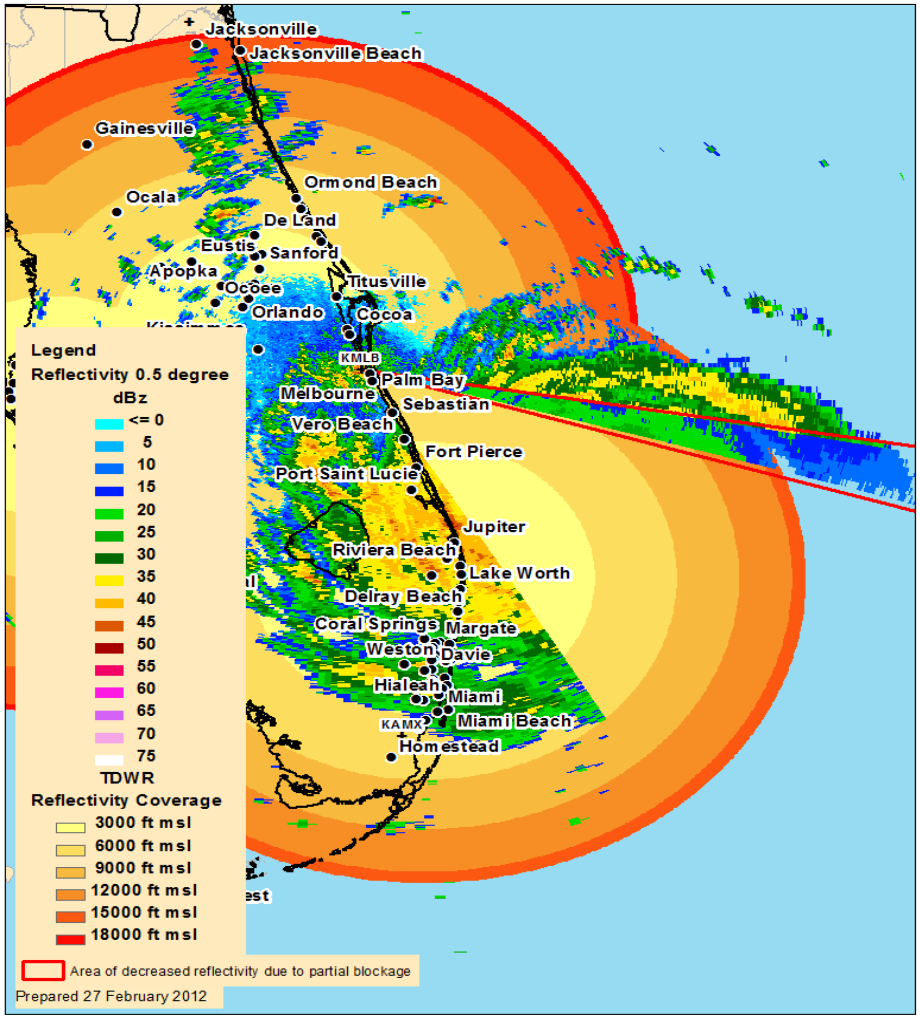
Melbourne, FL WSR-88D Image of Hurricane Jeanne, 26 Sep 2004 0010Z
with Simulated Hangar Blockage & Blanking with NEXRAD Coverage



TDWR Gap Coverage

(TPBI & TMCO)

Melbourne, FL WSR-88D Image of Hurricane Jeanne, 26 Sep 2004 0010Z
with Simulated Hangar Blockage & Blanking with TDWR Coverage



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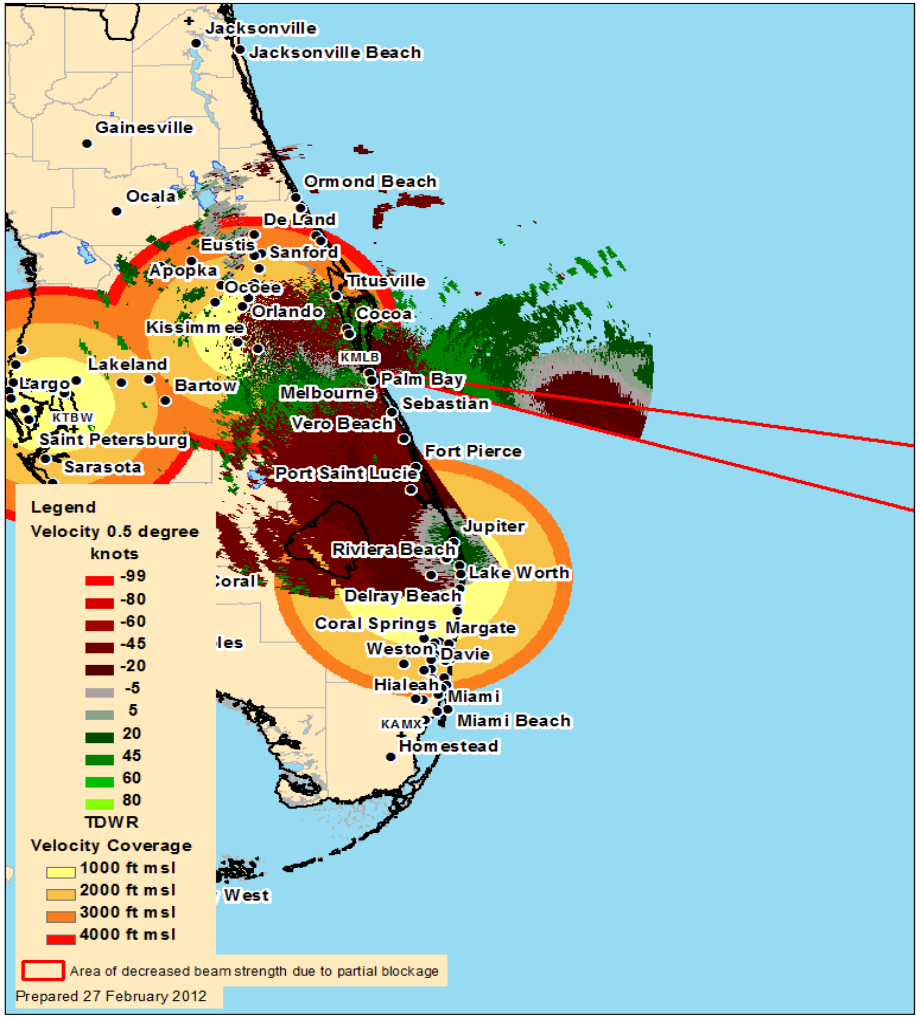
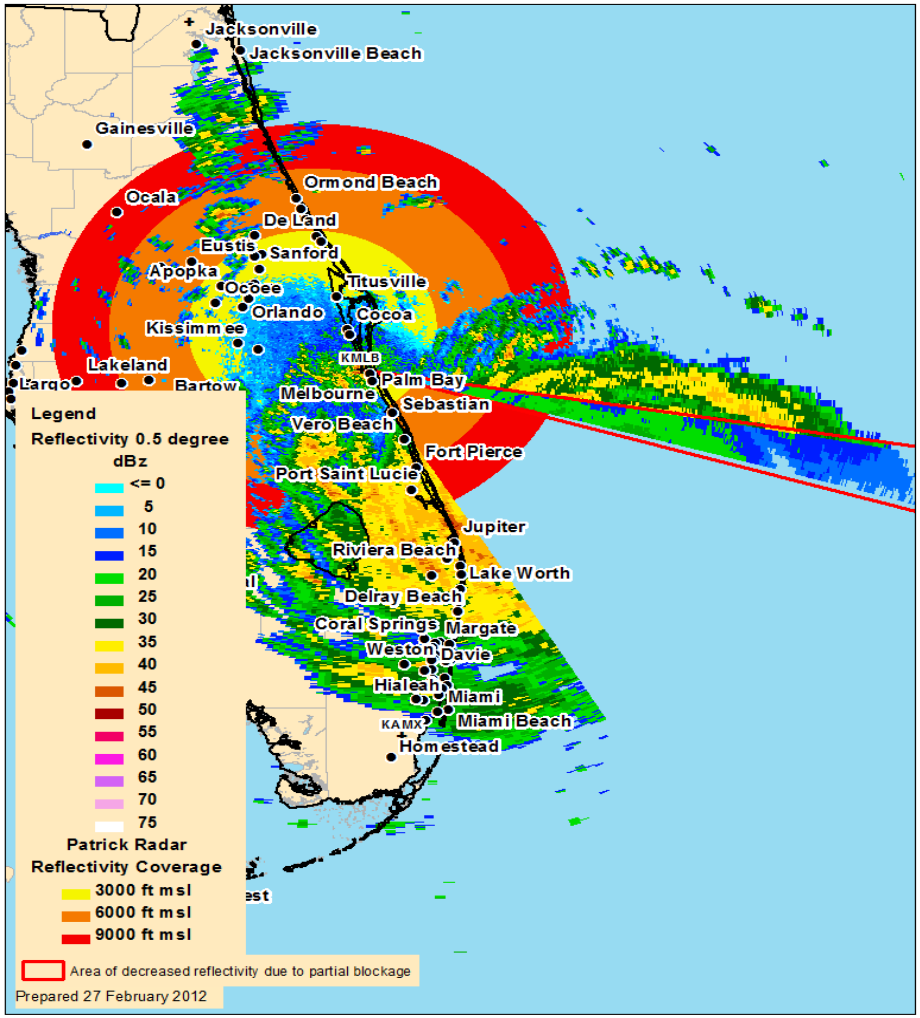


USAF/45WS Gap Coverage

(Patrick AFB Dual Pol Radar)

Melbourne, FL WSR-88D Image of Hurricane Jeanne, 26 Sep 2004 0010Z
with Simulated Hangar Blockage & Blanking with Patrick Coverage



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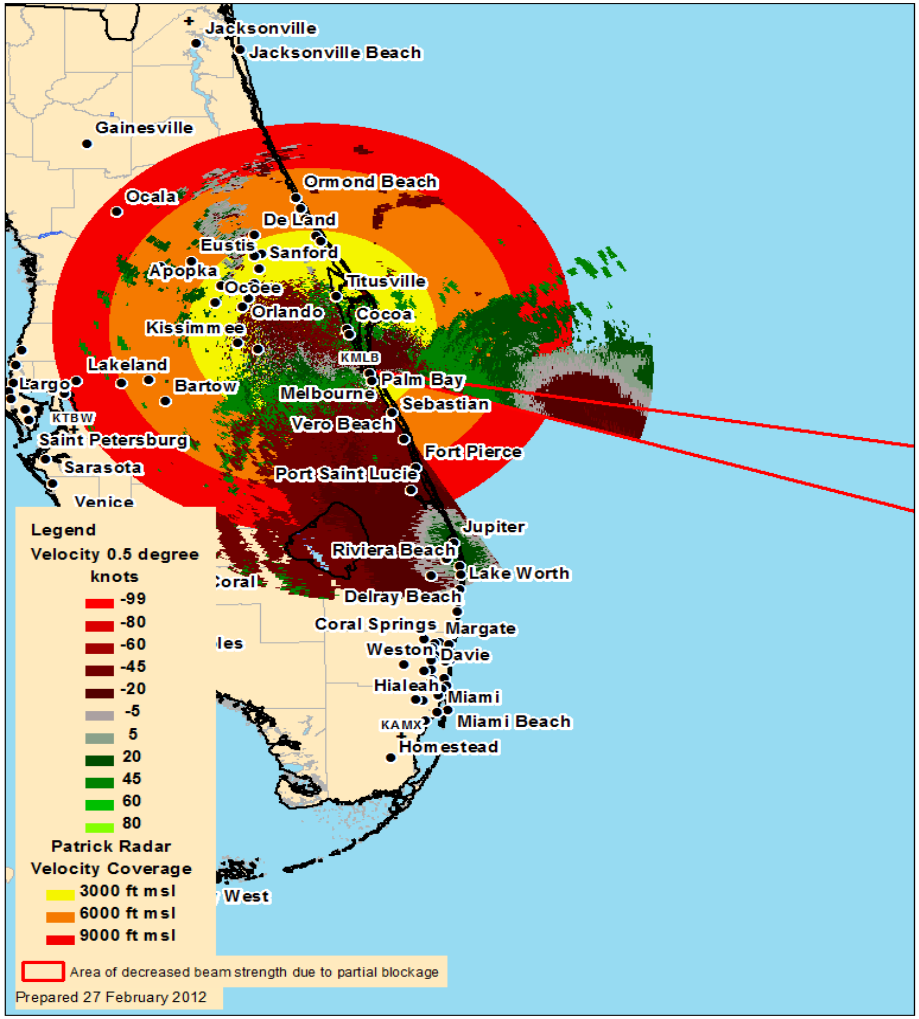
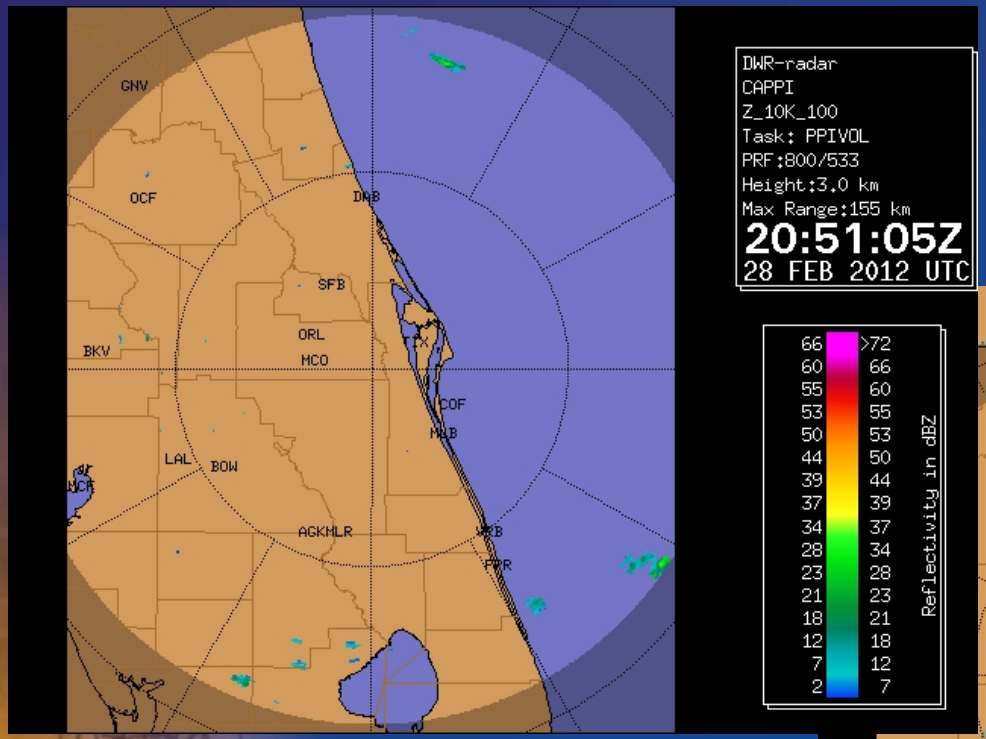
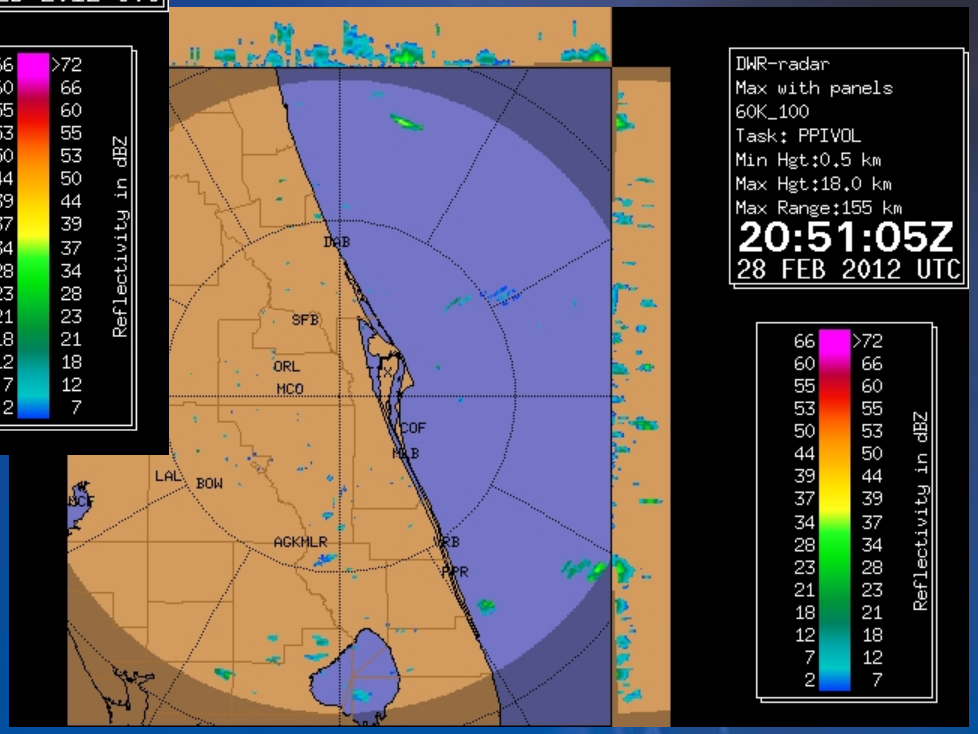


DWR Example Images



- Displayed on PC
- Limited Product Suite
- No Interrogation Functionality



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