

**ARM Cloud Properties  
Working Group Meeting  
MMCR/WACR Status**

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**Instrument Mentors**

**November 2006**

# Happy 10th Birthday SGP MMCR!

- “born” 11/8/1996
- Over 300 GB of moments data delivered



# Outline

- Current MMCR Status
- MMCR Upgrade Plans
- MMCR Calibration Discussion
- MMCR Antenna Refit
- Current WACR Status
- Spectra Compression

# SGP MMCR Status

- 200 watt TWTA
- Running C40 DSP
- Collocated with WACR
- No problems!

# Barrow MMCR Status

- Coherent Up/Down Converter failure
- Underreporting reflectivity by ~20 dBZ
- Replaced in October
- TWT has low power ~ 12 watts, should be 100 watts
- PIRAQ upgrade this winter, replace TWTA at same time with 200 watt TWTA

# Manus MMCR Status

- PIRAQ upgrade in June '06
- Sensitivity problems
- Possible RF circulator switch cause, replaced October
- TWT at half power (~ 48 watts)

# Nauru MMCR Status

- PIRAQ Upgrade in September '06
- TWTA failure, to be replaced late November/early December with 200 watt TWTA

# Darwin MMCR Status

- PIRAQ Upgrade November 2005
- Discovered in 7/06 LNA was damaged during lightning strike in 11/05.
- Receiver failure on 9/20/06
- Troubleshooting postponed to remove RF switches for troubleshooting Manus MMCR

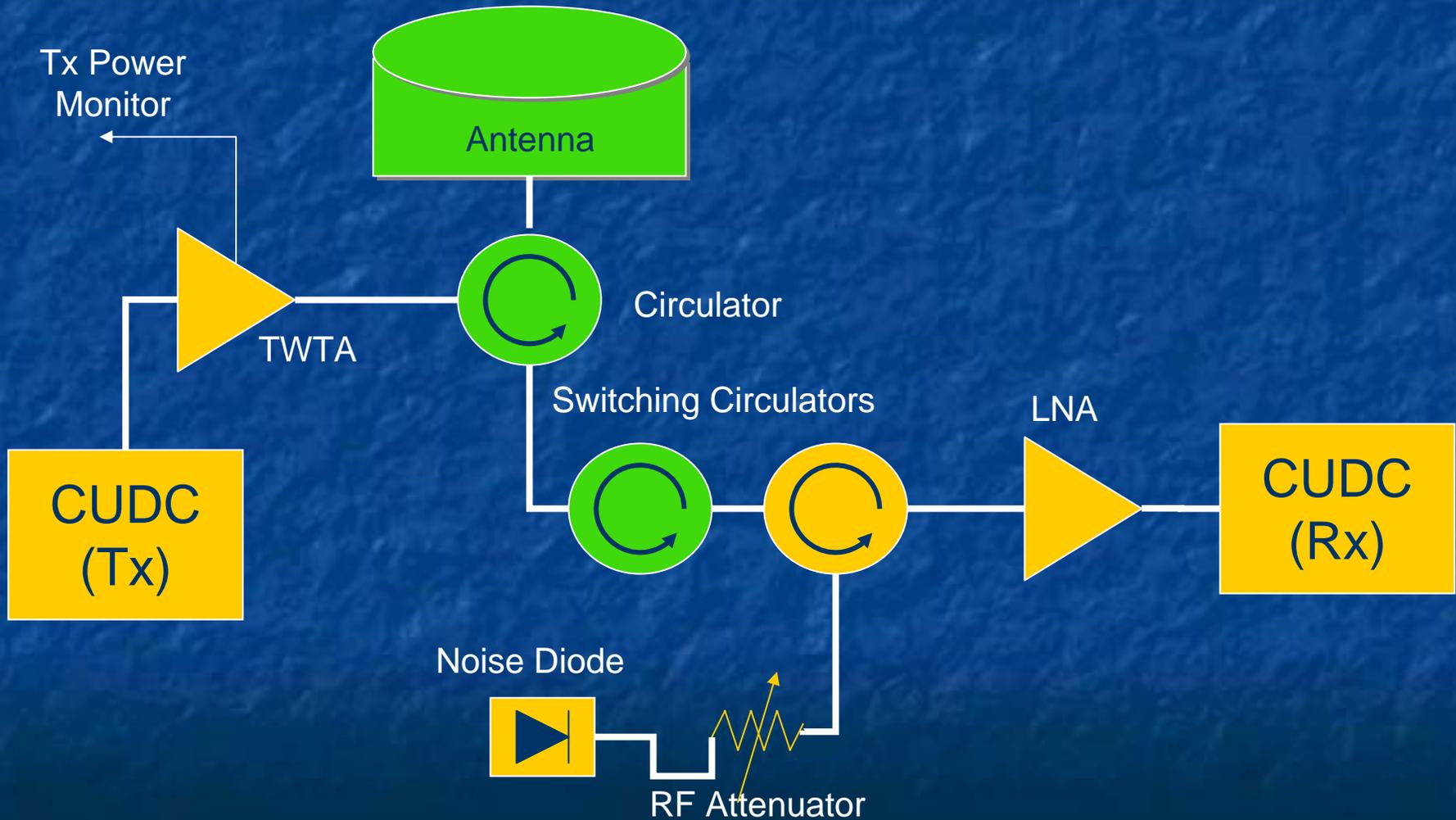
# MMCR Upgrade Plans

- PIRAQ for Barrow
- LAP-XM Upgrade for PIRAQ to reduce spectral image
  - Already completed at Darwin, Manus, and Nauru
  - New digital filter coefficients
  - Pavlos Kollias/Ken Moran confirm positive results

# MMCR NEXGEN III

- Specify in FY '07
- Completely digital transceiver
- Increased sensitivity with reduced range sidelobes
- 1st delivery late FY '08 or early '09

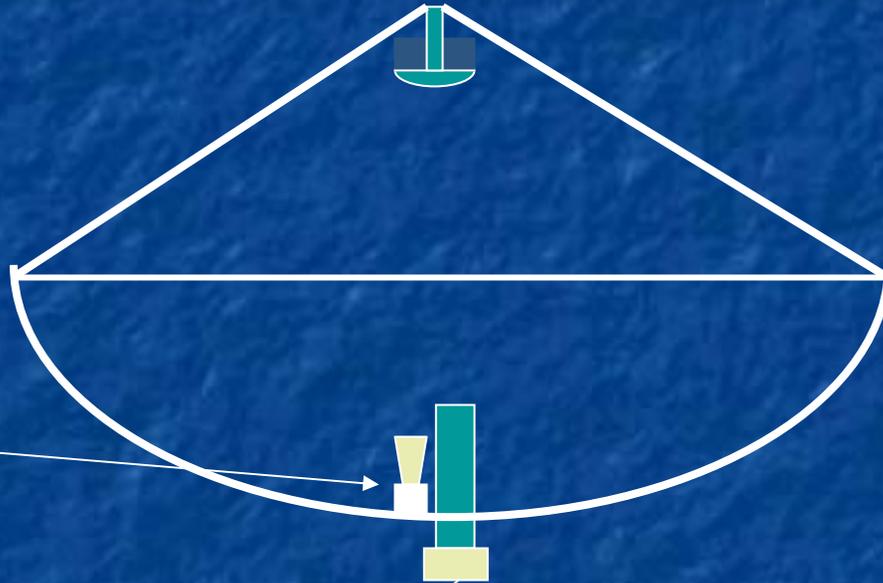
# MMCR Calibration



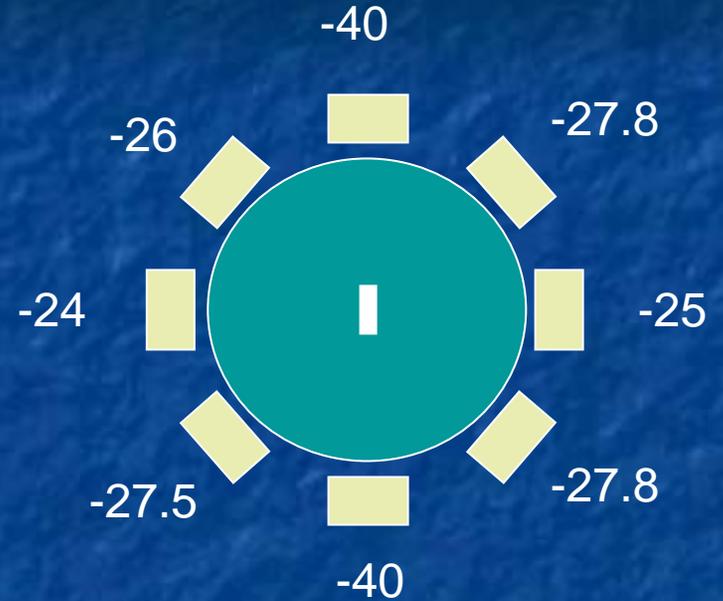
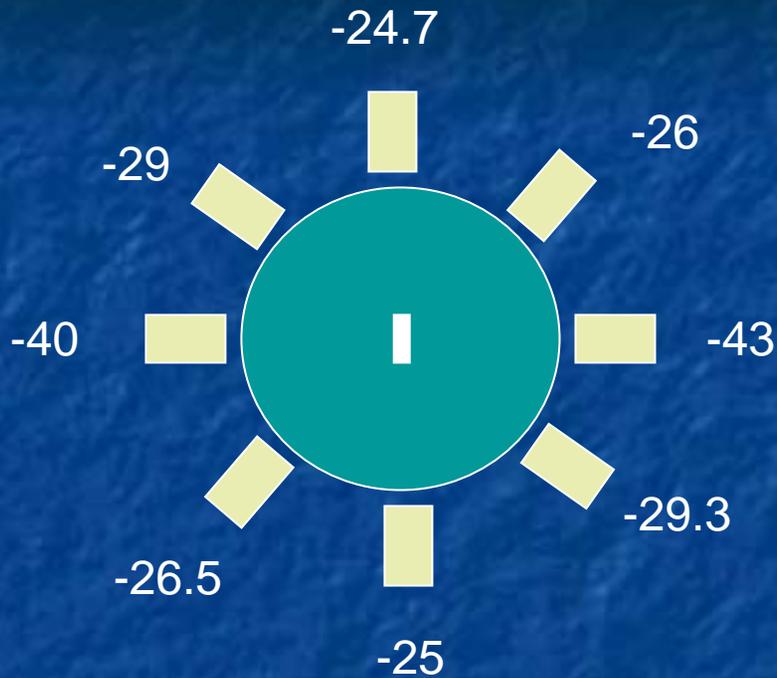
# Signal Injection Technique



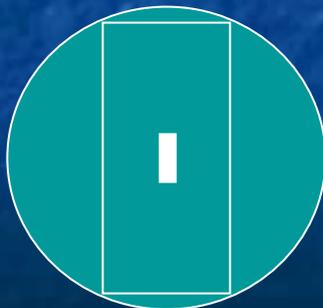
Gunn diode with horn antenna



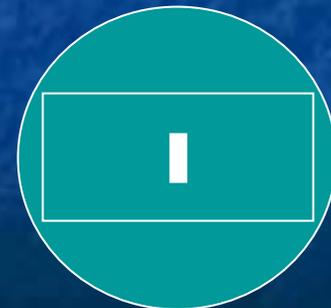
# Power Measurements



Horn directly on antenna feed



+4



-12

all readings in dBm

# MMCR Antenna Refit

- Cycling through a new 2 meter antenna through all of the MMCRs so the antennas can be refit and recalibrated
- New feeds and subreflectors for improved cross-polarization performance

# MMCR Antenna Refit

- Schedule - 6 months each site
- SGP  $\Rightarrow$  Barrow  $\Rightarrow$  Manus  $\Rightarrow$  Nauru  $\Rightarrow$  Darwin
- Note: SGP will go temporarily from 3m to 2m antenna means loss of sensitivity of 3 dB

# Darwin Antenna Example (2006)



# AMF WACR Status

- Running Great!
- Lowered PRF to get higher clouds up to 18 km.
- Spare EIKA/modulator ordered to support both AMF and SGP

# SGP WACR Status

- Has been running great!
- Removed in September, returned to ProSensing for software/firmware modification to facilitate external calibration.
- Reinstalled in October.

# WACR Calibration

- SGP uses splash plate and corner reflector to get absolute calibration.
- Uses hot and cold loads as noise sources for calibration (both SGP and AMF)
- Would like to do a comparison of AMF and SGP WACRs at SGP someday!

# Spectra Compression

- Goal is to have digital transmission of data rather than current disk swapping
- Raw spectra ~ 15 GB per day!
- Extra disks installed at SGP and new computers required
- Data system folks working on the software
- No completion date but promised “soon” in 6-8 weeks