About the Occultation

- S69 Rev 151 Saturn atmospheric occultation
  - Ingress and Egress
  - Telemetry OFF, 1-way mode
  - Covered by Canberra

- From Essam Marouf:

  The S69/Rev151 Radio Science Saturn atmospheric occultation is the first occultation in the Cassini Solstice Mission and the only occultation of any type throughout 2011. It's an ingress-egress occultation that probes Saturn's mid northern latitude range. This latitude range was sparsely sampled during the Nominal and Extended Missions. Measured near the top of the troposphere, the ingress and egress latitudes are 51.1 and 42.7 degrees, respectively. Simultaneous measurement of the S-, X-, and Ka-band signals amplitude, frequency, and phase provide information about the large- and small-scale structure of the atmosphere, the temperature/pressure profile, abundance of microwave absorbing species, and the electron number density profile of the ionosphere. When compared with results from previous occultations, the measurements provide information about profile variability with latitude and solar zenith angle. The information is relevant to characterization of ongoing physical and dynamical atmospheric processes

DSN Antennas

- DSN Coverage

	Pre	BOT	EOT	Post						
11 213	0030	0200	0815	0830	DSS-34 CAS	T/P	RS151-OCCUL	5052	N750	1A1
11 213	0100	0200	0815	0830	DSS-43 CAS	T/P	RS151-OCCUL	5052	1639	1A1

- Receivers scheduled
  - 2 closed-loop receivers per antenna
  - Open-loop receivers (RSRs, WVSRs, VSRs)
  - Open-loop data are prime. Closed-loop data are backup

- Antennas Band and Polarization Capabilities

	DSS-34*	DSS-43
	X-RCP	X-RCP X-LCP
*Either KLCP (switch 43 in B position) or monopulse (switch 43 in A position)	K-RCP K-LCP	S-RCP S-LCP

  - LCP data are enhancement. Prime are RCP
  - Record RCP only DSS-34

RSR/VSR/WVSR Assignment

Aseel: VOCA
Don: Ops Room Displays

DSS	Operator	Station	Open-loop Receiver	RSR Assignment
34	Elias	rsops1	RSR1	RSR1A -> XRCP RSR1B -> KRCP
43	Don	rsops2	RSR2	RSR2A -> XRCP RSR2B -> SRCP
43	Don	rsops2	WVSR1	WVSR1A -> XLCP WVSR1B -> SLCP

RSSG will be in Ops Room at 5 pm on Sunday, July 31st (213/0000)

ORTs

ORT on DOY 191 (July 10) over DSS-34, X- and Ka-band
11 191 0130 0300 1200 1215 DSS-34 CAS RS150-OCCORT2 MC 5030 0681 1A1

- DSS-34 prime pass
- Windy, but DSS-34 uses LQG servo coefficinets
- Problems with monopulse. No pointing data acquired
  - Bad Tau value
  - Software anomaly
    - Monopulse parameters not updating
    - Can't clear monopulse offsets
      - Log and display showed offsets are cleared, but they weren't
      - "We must make sure that we do not clear monopulse offsets after performing a MONO D command or we could finish up in the same state as occurred on DOY 191"

ORT on DOY 192 (July 11) over DSS-43, X- and S-band
11 192 0200 0300 1200 1215 DSS-43 CAS TP RS150-OCCORT1 5031 1637 1A1

- DSS-43 prime pass
- Nominal support. X- and S-band signals verified, RCP and LCP

ORTs cont'd

ORT on DOY 196 (July 15) over DSS-34, X- and Ka-band

11 196 0115 0245 1145 1200 DSS-34 CAS RS150-OCCORT3 MC 5035 N750 1A1

- DSS-34 prime pass
- Multiple on-point phase cals performed
- Pointing data acquired
  - Showed a MRE of 6.8 mdeg -> model needs updating
- Tau stability problem discovered
  - Tau was changing about 2 degrees per hour
  - If same value is used on DOY 213, it will drive antenna off-point

GSEs surrounding Occultation (all will be scripted)

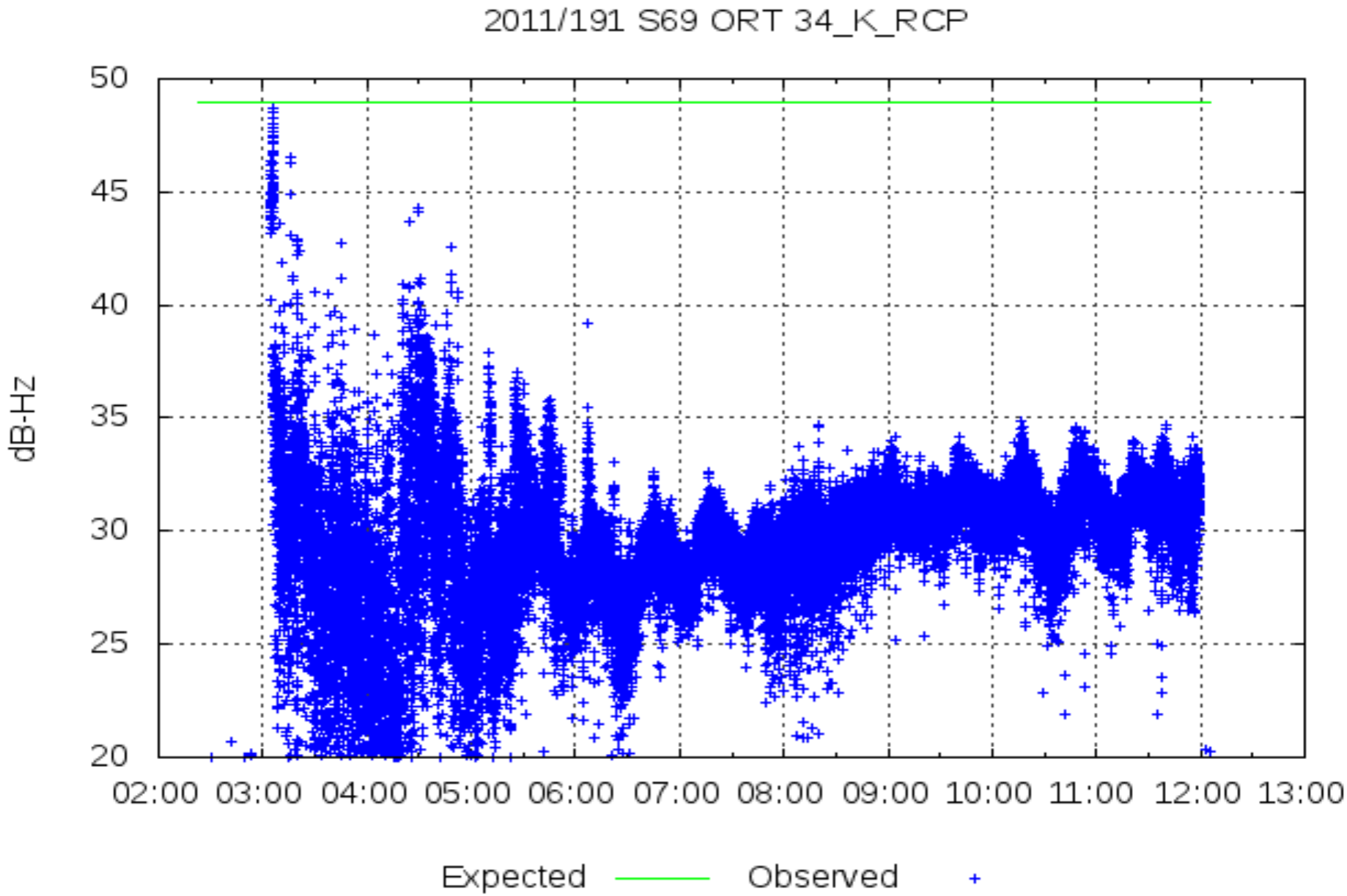
11 212 1800 1930 0430 0445 DSS-25 CAS T/P RS151-KADWN1 5051 N748 1A1

11 212 1830 1930 0430 0445 DSS-14 CAS TKG PASS 5051 N003 1A1

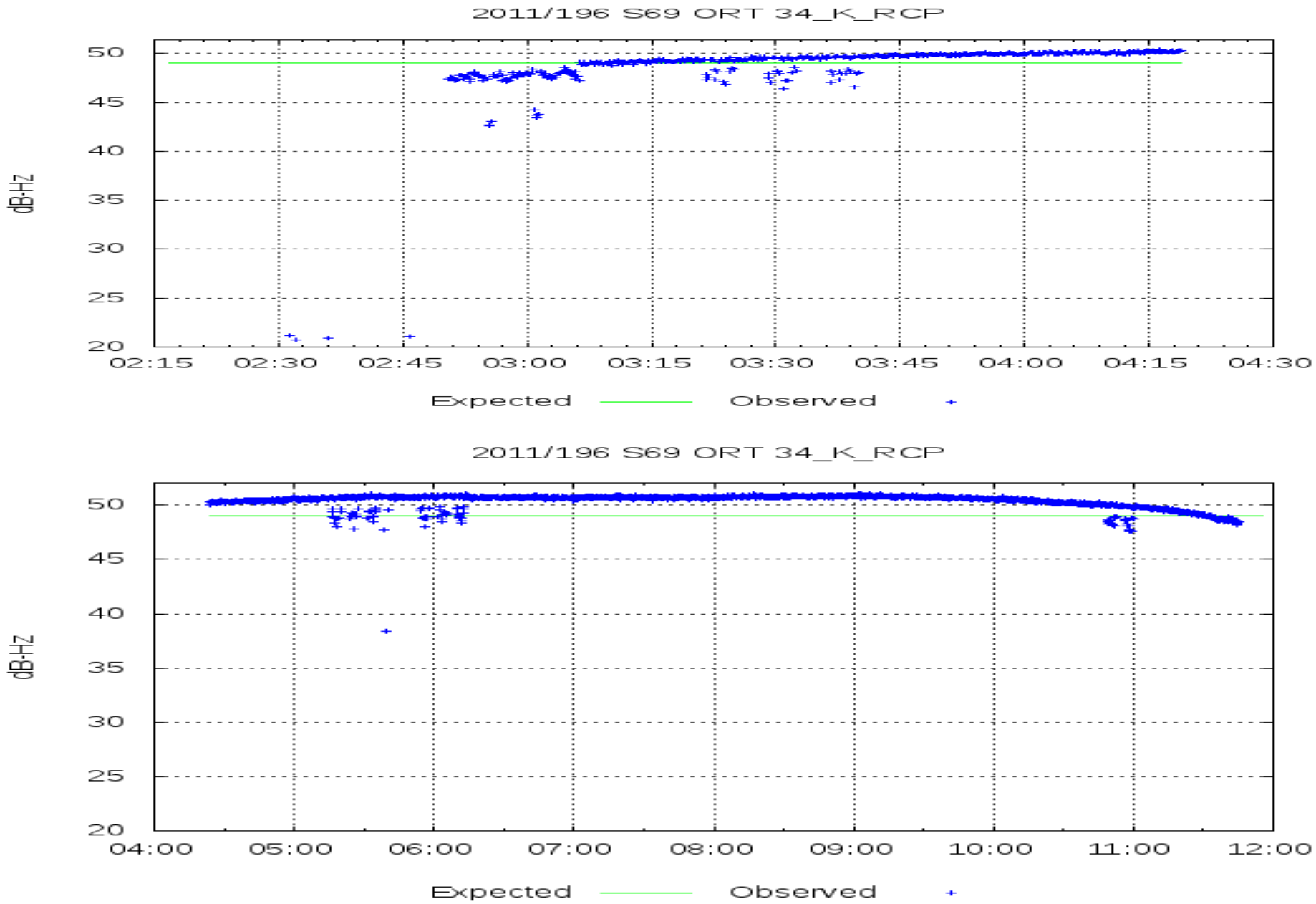
11 214 1745 1915 0415 0430 DSS-25 CAS T/P RS151-KADWN1 5053 N748 1A1

11 214 1815 1915 0415 0430 DSS-14 CAS TKG PASS 5053 N003 1A1

DSS-34 DOY 191 Ka-band Power Plot



DSS-34 DOY 196 Ka-band Power Plot



Misc

Plan for Cassini Specific 4th Order Pointing Models
- Don sent David pointing data from second DSS-34 ORT (no data from 1st ORT)

Equipment Status
- X-HEMT at DSS-34?
  - RTS date?
  - What's impact if not fixed?
- DSS-34 Monopulse issues and software anomaly
  - Do we have time for an on-point phase cal at the beginning of the baseline?
    - Canberra tracks for 2.5 hours in 3-way before start of experiment, and then switches to 1-way at the beginning of the baseline
  - Are monopulse offsets reported correctly?
  - What to do about clearing the offsets

SNT
- Enable X only at DSS-34 throughout
- Conduct SNT measurements

DSS-43 Microwave Configuration
- Configure SRCP low noise to the SP MASER to the 01 output
- Configure SLCP through the diplexer to the SB HEMT to the 02 output

Live update this Friday. Possible update to timeline