

SUG Minutes – 30 Aug 2016

In attendance

Jim B, Whit, Wes, Jim T, Shing, Tom, Andy, Chuck, Dick, Dave

Station Reports – New Info in RED

Tom – Beset with monsoons and lightning.

Dick – RSS not serving; also, can't remotely access the PC via VNC. A trip to Kaneohe is in the offing.

Whit – Traveling to Coho this week to take down the damaged LPDA and inspect it to see what parts need to be ordered..

Nathan – Will be receiving a RASDR-2 SDR from Bogdan soon. Intent is to get the unit working for HF-band observation and write any code that is necessary to extract data from the instrument.

Jim B – Station presently offline for 2 to 3 weeks as remodeling takes place. New floor will be installed along with a couple 19" racks and panels for same. The test and eval of different arm angles for the LWA antennas will proceed when instrumentation comes back online. A support structure has been designed to quickly change the angle of the dangle in three steps from 45° (max droop) to 90° (horizontal). Similarly, the DDRR test and eval will finish up after instrumentation comes back online. All indications so far are that this antenna is "less than optimal." Jim and Dick will write up the results to disabuse anyone from ever considering this antenna design for Jupiter work.

Wes – Currently doing minimal operations. About 75% of the time there is strong line noise. Also typical afternoon thunderstorms. A bolt struck a pine tree about 30' from the TFD array last week; but, all instruments were unplugged. Dave suggested checking the TFD elements one-by-one for a signal to make sure the wee SMD balun transformers were not damaged. Wes informed Dave later that all four baluns are just fine.

Chuck – Will do a new site survey with the dairy farm's electric fence turned on. Several observers requested a spectrogram of what the electric fence RFI looks like. Chuck will also investigate whether the fence must always be turned on or might be turned off for observations.

Francisco –

Andy – Lots of thunderstorms. Considering a 4 or 8 element TFD array for the future.

Dave – No new hardware or software; getting some relatively good Jupiter lately considering the present Jovian elongation of about 23°.

Discussion – New Info in RED

HAARP

Whit recently visited the HAARP facility open house. In August 2015, University of Alaska bought the facility from the USAF for \$1 (or something like that). They have spent the last year getting the facility back online and are trying to involve the public as much as possible. The facility is not yet operational. Shing mentioned that the HAARP facility is represented at the HEC meeting currently happening at GSFC and indications are that the HAARP data will be made as open to the public as possible.

HEC grant general news

Shing, Chuck, Jim T, and Len are digesting the station upgrades and station capabilities documents that Dick and Dave provided. Chuck asked if he could use data from the Florida cluster in his presentation to the AGU; Francisco, Wes, and Dave all agreed. Francisco and Wes requested to be notified ahead of time so they can be sure to have their equipment running during the desired time. Francisco hopes to have RHO up and running in time for the next apparition. If that doesn't work, Chuck may fall back on using a data comparison from early 2016 from several more SUG stations, not just the Florida group.

Jim T, Shing, and Len are meeting with many people at the HEC meeting at GSFC; this is getting Radio Jove out to a wider audience. Jim T mentioned the Space Weather Action Center, and education group at Goddard, would like to corroborate and possibly use Radio Jove data to supplement their own. Shing mentioned that a group at MSFC (Marshall) using Inspire VLF receivers is interested in the Radio Jove data. Shing also mentioned the HamSci group (ham radio science) is using QSO parties to monitor ionospheric conditions and may be interested in collaborating with Radio Jove.

eCALLISTO

Shing reiterated his desire for an instrument with a wider observing bandwidth, if possible, and if cost effective. Dick reminded us that the FSX is fixed at 15 to 30 MHz for technical design reasons and suggested that the eCALLISTO telescope may work. Whit offered that with the “normal” setup, the eCALLISTO telescope has a 250 ms time resolution. The receiver can sweep from 45 to 870 MHz. The sweep rate is 800 channels per second. Typical configuration is 200 channels, from 215 to 415 MHz. Each channel's passband is 280 kHz wide. Dave asked Shing if this instrument's capabilities would be suitable; Shing said the time and freq resolution would work fine.

Calibration

Dave asked Shing what is needed in the way of amplitude calibration. Shing replied that cross-calibration (each station calibrated in absolute terms) is definitely required if we are to compare data from different stations. We must be able to know and account for instrumental and data processing effects so that we can measure variations in source

signal. These variations will ideally be due only to ionospheric scintillation and variation in the emission source itself. Dick mentioned that we also need to be able to back out the differences in antenna gain at each station for each station's AZ/EL to Jupiter. Dave and Dick discussed briefly the idea of creating an automatic calibrator that would run once a day. The device would calibrate the RCP and LCP channels at the same time, the calibration plane being located at the inputs to the telescope's hybrid ring. Chuck mentioned that at UF, calibrations usually took place at the start and end of an observing run and immediately after a particularly strong emission event. Dave mentioned that Nancay calibrations run every 4 hours (which is wrong, it's once every hour). Dick and Dave will research the design of an automatic calibrator for SUG stations (cost, dynamic range, number of steps, timing, etcetera).

Radio Jove Cubesat

Kazu described his proposed satellite, a fixed-frequency 20.1 MHz receiver aboard a 2U Cubesat (4 x 4 x 8 inches). Antenna would be a 15 meter dipole that would unspool from the Cubesat chassis. Receiver would have a prox 5 kHz bandwidth. Proposed system will use a Raspberry-Pi Zero to digitize and record the detected signal at 10 kilosamples per second. A GPS receiver with 1 PPS output will be used as a timing source. The data will first be stored, then only small portions transmitted to the ground. Downlink will be in the 70 cm ham band. Uplink will be in the 2 meter ham band. Downlink will operate at 9600 bits per second. Goal is to look at Jovian S burst timing and correlate with ground-based observations. The next proposal phase is for launch of the instrument from the ISS. If approved, launch would take place in two or three years.

JUNO

Chuck is making a several ground-based observations using the LWA-1.

Archiving

Jim Sky has released an updated program that will automatically copy the user's RSS data directory to a PDS hard drive and format the directory structure on the PDS hard drive the way the PDS wants if formatted. The updated version creates a manifest in the user's RSS data directory. This will aid the user in knowing what data was provided to the PDS and when. Chuck's students used the original version of the program and will try the new version. Dave will try the new version as well.

2017 Solar Eclipse

Chuck mostly done with a guide for participation in observing the 2017 eclipse with a Radio Jove receiver and one or two dipoles.

**Next SUG Telecon Tues, 13 Sep 2016 at 5:00 pm EDT (2100 UTC)
(844) 467-6272, 352297#**