# Robledo Station Report

## EVN TOG Meeting January 2011
## JIVE, The Netherlands

### 1. Hardware and Software status.

As a result of a power plant failure last summer 2010 (see picture) several components of the DSS-63 70m antenna K-band receiver failed. The communication with the K-band system was lost and it was necessary to replace the GPIB-lan gateway and the IO-tech unit. Currently there is still no control over the noise diode and the post-downconverter attenuators. These variable attenuators have been replaced by fix attenuators of appropriate value to obtain best possible system temperature and linearity at each polarization. Troubleshooting is still in progress.
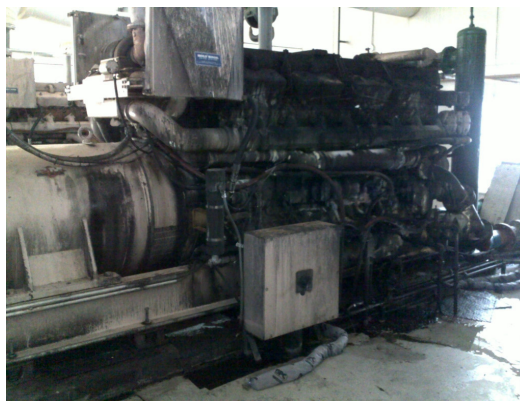

Power plant diesel generator #3 after the fire

The third converter for commercial power was installed and tested during the summer 2010 and is fully operational. Diesel generators are used in backup mode.

Recently during a JPL Reference Frame Calibration experiment was found that MarkIV DAT VC11 tpzero level was too high (above 2000 counts). Both potentiometers (LSB and USB) were adjusted and tpzero value is currently below 1000 counts.

The DSN supports EVN, Global and SGP observations using the Field System version FS-9.9.0 and the Mark5A recorders. Our current Mark5 s/w version is the following:

```
DTS_id? 0 : Mark5A : 2005y147d17h : 1 : Mark560a : 1 : 1 : 2.7x : 0xb8 : 0x19 ;
mk5/!OS_rev1? 0 : "Linux version 2.4.20-8 (bhcompile@porky.devel.redhat.com) (gc" ;
mk5/!OS_rev2? 0 : " version 3.2.2 20030222 (Red Hat Linux 3.2.2-5)) #1 Thu Mar 13 17:54:28 EST 2003" ;
mk5/!SS_rev1? 0 : "BoardType PCI-816VXF2, SerialNum 8270, ApiVersion 5.21, ApiDateCode Apr  7 2005" ;
mk5/!SS_rev2? 0 : "FirmwareVersion 10.84, FirmDateCode Apr 06 2005, MonitorVersion 6.02, XbarVersion
3.18, AtaVersion 1.05, UAtaVersion 0.00, DriverVersion 623" ;
form/m,16,1:2,off,,3,pass,41,0x44,okay
```

Robledo will try to install FS-9.10.4 and latest Mark5A software as R&D versions to support next EVN observing session in which we participate.

## 2. Calibration.

a. **K-band calibration.** Due to K-band receiver control problems currently is not possible to fire the noise diode and control the post-downconverter attenuators. To calibrate the K-band EVN observations from observing session#3 the ambient load was used for each preob and its temperature was continuously logged in the Field System log. System temperature for each preob and tpi measurement was calculated using *minical* JPL software and translated into antabfs format with a custom built script.

b. **K-band pointing.** K-band pointing was checked and improved before our participation in the EVN observing session #3 2010.

c. **GPS data.** We will be able to provide continuous gps-fmout values during the observations from now on.

## 3. Future Plans.

DSS-63 Robledo 70 m antenna will be stopped from April 1$^{st}$ until May 8$^{th}$ 2011 for *depot level* maintenance tasks.

The DSN K-band broadband receiver (18-26.5GHz, with only 70MHz baseband bandwidth per polarization) is currently being upgraded from three to four IF channels with a goal of 10 GHz instantaneous usable bandwidth at each polarization (17-27GHz), and beam switching capability for single dish spectroscopy. The actual downconverter (MMS) will be replaced by a design from the EE Department at Caltech that will down convert the IF channels into either into 1GHz wide USB and LSB, or into 2 GHz wide in-phase/quadrature-phase analog data channels. It will also allow selecting linear or circular polarization. Phase I of the receiver (only 8 channels for 21-23GHz frequency range) is currently being installed at Canberra 70 m antenna (DSS-43). Goldstone and Madrid receivers will be upgraded in a timely manner.



Tom Kuiper (JPL) and Dave Jauncey (CSIRO) working on the new K-band receiver

The DSN is upgrading the MARKIV DATs with a digital backend that supports Mark5C recording over 10GE interfaces. The digital backend is being developed at JPL and is based on the Wide band VLBI Science Receiver (WVSR) currently used to support spacecraft navigation for JPL projects. The upgrade includes removing the PCFS hardware and software, but Field System compatible log and calibration data will be provided to the correlators and users. A Mark5C recorder and a DSN digital backend prototype will be ready for summer 2011; first fringe tests will be conducted between Goldstone and Robledo.

Robledo e-VLBI plans: actual connection from Robledo to the Spanish Research and Educational Network (RedIRIS) is 100Mbps. Current plan is to upgrade de connection to 1Gbps at the end of 2011.

## 4.  Robledo support to EVN observations.

For EVN session#3 2010 Robledo participated in following observations:

ER025A (Kdual-band; DSS-63 70 m antenna): successful 512 Mbps Mark5 recording; both polarizations were calibrated using the ambient load as there was no control of the noise diode; antabfs file was derived using *minical* JPL application and sent to the EVN archive with the observing log including flagr information, and the uvflag file.

ER025B (Kdual-band; DSS-63 70 m antenna): successful 512 Mbps Mark5 recording; both polarizations were calibrated using the ambient load as there was no control of the noise diode; antabfs file was derived using *minical* JPL application and sent to the EVN archive with the observing log including flagr information, and the uvflag file.

Best regards,

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