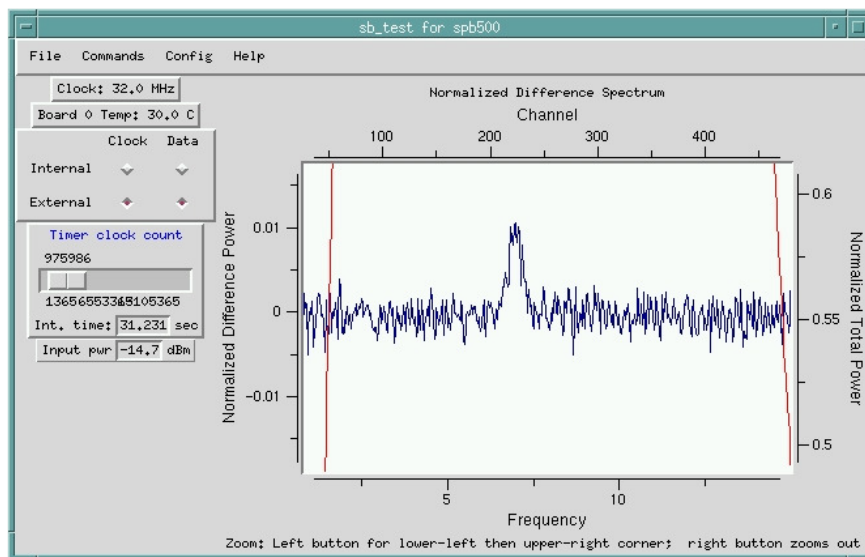


# Robledo Station Report

## EVN TOG Meeting Sep. 2008 Bologna, Italy

### 1. Hardware and Software issues.

Installation of a 38-49 GHz Q-band (7 mm) receiver at the DSS-54 34m beam waveguide antenna during May 2008. The first test spectrum of SiO at 43 GHz was obtained on July 11<sup>th</sup> (see below). First science light was obtained on July 15<sup>th</sup> with spectra of methanol at 44 GHz and CS at 49 GHz.



Spectrum of the oxygen rich evolved star R Leo at 43.122GHz (SiO  $\nu=1$  J=1-0), for a 30 seconds position switching integration. Power scale is not calibrated. Please ignore the red lines that represent each individual on/off spectra.

The Q-band receiver has not yet achieved full sensitivity because the post-amplifiers provided are insufficient to overcome the loss of the long hard-lines between the first and second stage down-converters. Once this problem has been solved, our goal is the participation in 7mm EVN observations, if possible next winter.

The MDSCC commercial power installation was successfully completed by end of July 2008. Previous mode of energy generation used diesel generators. For emergencies or critical activities, there are still generators available and a set of batteries. In the transition process, several power failures occurred and affected to part of the radio astronomy equipment, mostly to the MarkIV recorders (recorder#2 is operational; recorder#1 has died and has been dismantled for pieces to fix recorder#1).

Installed a patch on the Field System station dependent s/w to solve a crash problem when using the Digital Tone Extractor (DTE) during observations longer than 20 hours. This problem affected to observation EC025B (6% of sources lost), performed on EVN session#3 2007. Currently 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/IOS_rev1? 0 : "Linux version 2.4.20-8 (bhcompile@porky.devel.redhat.com) (gc" ;
mk5/IOS_rev2? 0 : " version 3.2.2 20030222 (Red Hat Linux 3.2.2-5)) #1 Thu Mar 13 17:54:28 EST 2003" ;
mk5/ISS_rev1? 0 : "BoardType PCI-816VXF2, SerialNum 8270, ApiVersion 5.21, ApiDateCode Apr 7 2005" ;
mk5/ISS_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
```

The JPL VLBI Mark5 software Correlator (JVC) is currently in soak. We will continue recording in piggyback mode for a short period of time, with Mark5A as prime recorder. Tapes will be finally removed in early 2009. This correlator is supporting JPL Reference Frame Calibration projects as Catalog Maintenance & Enhancement (CatM&E) and Clock Synchronizations (TEMPO).

## 2. Calibration issues at DSN.

**a. Calibration signal.** The status of the calibration signal control continues as last year. The EAC software automatically controls the calibration signal (noise diode) during the observations in order to provide system temperature monitoring, at only one frequency band or polarization (in case of dual observations), except for K-band observations that Tsys for both polarizations is provided.

**b. Pointing and Efficiency.** Derived new K-band pointing models for encoder and precision modes to solve a tracking problem experienced for high elevation sources. This problem affected to observation GM064, performed on EVN session#2 2008. Robledo gain curves already provided are free of opacity corrections.

**c. GPS data.** The status is the same as last year. Although a GPS receiver and a frequency counter were installed in the MarkIV DAT we only provide gps-fmout values at start and end of observations. A station dependent software problem prevents us to provide gps-fmout data continuously during experiments.

## 3. Future Plans.

DSS-63 70 m antenna will be stopped again next May-July 2009, for *life extension* maintenance tasks, including the replacement of the four provisional elevation bearings and depot level maintenance. During this downtime period, DSS-63 will not be able to participate in 2009 EVN/Global session #2.

The DSN will upgrade the MARKIV DATs with hardware similar to the Wide band VLBI Science Receiver (WVSR). The WVSR is a digital front-end developed at JPL, currently used to support spacecraft navigation at the DSN and for Radio Science JPL projects. It will likely use the same digitizing front end as the WVSR and different candidates for the digital backend are currently being investigated. All the choices are being targeted to support Mark5C recording over 10GE interfaces. Some working prototypes in the lab could be ready within a year from now.

The different possibilities to upgrade our Mark5A recorders are being currently considered. Some R&D tests have been already performed to put Mark-5B data into the JPL software correlator. Solutions that do not imply an irreversible modification and can coexist with the Mark5A recorder seems to be preferable (Mark5C instead and Mark5B).

The Mark5 OS kernel will be upgraded, as well as the motherboard. Last version available of Mark5 software will be installed.

Within the next year the JPL Mark5 software correlator should be able to support Mark5A at 1Gbps.

Robledo e-VLBI plans: *last mile* Gbps coverage problem from Robledo to the Spanish Research and Educational Network (RedIRIS) not yet solved, but connection to RedIRIS has recently being improved from 1.5 to 40Mbps, with possibility of using a maximum of 100Mbps. Throughput tests between Robledo and the JPL correlator are currently being arranged.

#### **4. Robledo support to EVN observations.**

For EVN session#1 2008 Robledo participated in one observation:

GC030 (S/X-RCP): successful 512 Mbps Mark5 recording; system temperature file was derived using the *antabfs* application and sent to the EVN archive.

For EVN session#2 2008 Robledo participated in one observation:

GM064 (K-band-dual): successful 512 Mbps Mark5 recording; experienced pointing problems for high elevation sources due to a problem with the precision pointing models; experienced signal instability on all K-LCP channels, that were caused by a faulty pre-amplifier at the downconverter (Modular Measurement System –MMS#1-). System temperature file was derived using the *antabfs* application and sent to the EVN archive.

Best regards,

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