

# **EVN TOG Meeting 2004 Robledo Report**

## **1. Hardware upgrades.**

Radio Astronomy computers all over the DSN network have been connected to the same Science LAN. Old Network Encryption Units (NEU) have been removed.

K-band Spectroscopy: after several problems experienced with our old SDS spectrometer during 2003 it finally failed and has been substituted by the SPB500 spectrometer initially installed in Goldstone. This implies a frequency resolution improvement from 256 to 348 channels. Besides SPB500 spectrometer has been sent to Microtec SRL (Romania) to increase its resolution to 1024 channels.

S2 recorders and LBA\_DAS unit have been sent to Canberra DSN Complex to be used for their ongoing VSOP Co-observing Program. SCHED station catalog file entries for Robledo should be updated.

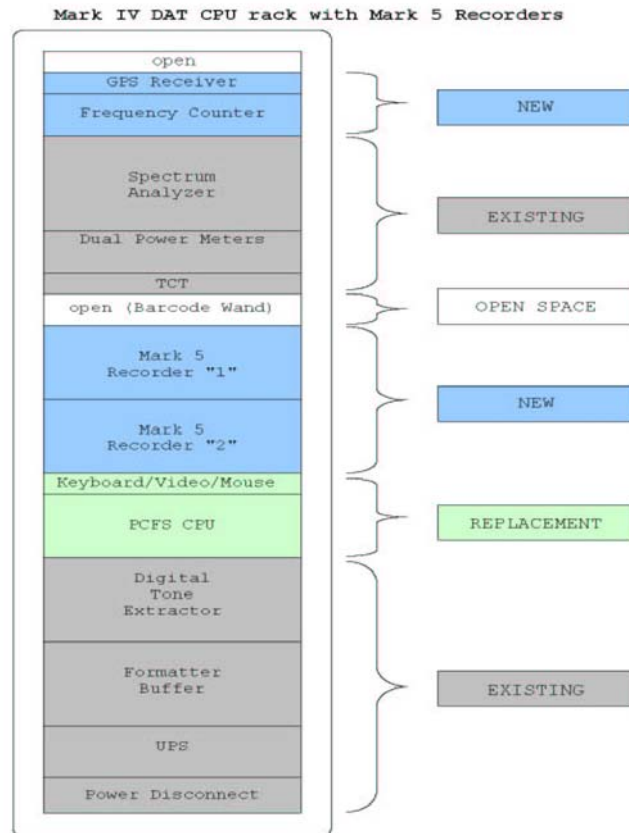
## **2. Future hardware upgrades.**

The Equipment Activity Controller (EAC) will be upgraded from a Sun UltraSPARC 1 to a Sun Blade 2000 workstation.

Mark5 Upgrade Plan at DSN. Modifications will start next June 2004 and the Mark5 will be operational in the DSN by January 2005.

This plan includes following upgrades (see Figure 1):

- a. PC Field System computer (PCFS) will be upgraded from 90 MHz pentium PC to 1.5 GHz PC. The screen will be replaced by a slide-out drawer containing the keyboard, LCD video and mouse.
- b. Installation of the GPS receiver.
- c. Installation of two Mk5A units. These units will be later replaced by Mk5B units.



**Figure 1. Future DSN MarkV configuration.**

Robledo e-VLBI plans. Robledo has recently joined the Spanish Research and Educational Network (RedIRIS) as an affiliated member. RedIRIS provides 10 Gbps cost free connection to Geant/Dante. We are currently studying different possibilities for the *last mile* Gbps coverage from Robledo to RedIRIS, as well as the necessary Gbps electronics (switch, firewall, etc).

### **3. Software upgrades.**

A new software release for the PCFS and EAC was installed and tested last August 2003. This release solved a “Dual Antenna Support” problem and a communication problem between the EAC and the antenna that accidentally caused the non-execution of moving commands.

PCFS software currently in use contains Station Software version st-13.2.5 and Field System version 9.4.17.

#### 4. Future software upgrades.

Included in the Mark5 Upgrade Plan a new PCFS software release will be delivered. Field System software will be upgraded to at least 9.6.0 version.

First transition phase to turn the EAC into a MON-2 compliant subsystem is planned for May 2004 on a best-effort basis (refer to paragraph 6.b for details).

#### 5. Plans for new receivers.

a. C-band (6 cm). EVN proposal for C-band installation at Rob70 is still under negotiation.

b. Q-band (7 mm). The Q-band receiver installation at one of our beam wave guided antennas was delayed due to the increase of workload during winter 2003-2004. It will be operative by 2005.

#### 6. Calibration issues at DSN.

**a. Sub-reflector configuration.** At DSN there are two possible ways to configure the sub-reflector:

a.1 Sub-reflector fixed for best focus at 45 deg elevation. This mode lets signal gain to vary but keeps phase constant while the antenna moves.

a.2 Sub-reflector tracking or in autofocus mode. In this mode the SRC is sent to its best focus position for each elevation. This mode keeps the signal gain as high as possible and allows the phase to change.

DSN recommendation: Fix sub-reflector for best focus at 45 degrees antenna elevation if *astrometric* results are primary data type (for phase-referencing or any other accurate bandwidth synthesis BWS VLBI technique). Just in case the results depend heavily on gain set the sub-reflector in autofocus mode. But ultimately the PI must take this decision.

Sub-reflector configuration for recent EVN and GLOBAL observations in which Robledo has participated is summarized in Table 1. The rule to fix the sub-reflector for all EVN observations is not fulfilled for GLOBAL observations that usually are correlated at Socorro. Therefore JIVE correlator feedback on GLOBAL observation GM052A (EVN session#1 2004) will be very valuable to decide whether the sub-reflector should be also fixed for these type of observations.

**b. Calibration signal.** At the beginning of 2003 as part of the Network Simplification Project (NSP) implementation, the old Block V receiver was replaced by the Downlink Tracking and Telemetry assembly (DTT). As a result current EAC software is not able to control the calibration signal (noise diodes) during the observations and no system temperature monitoring is being provided for the observations. The problem affected to 2003 EVN sessions and to EVN session#1 2004 (just partially).

In order to solve the EAC software compatibility problem it was decided to turn the EAC into a MON-2 compliant subsystem. This new software release will solve the DTT interface problem and the EAC will again recover the capability of controlling the calibration signal during the observations. Additionally the EAC will be able to interface with the Antenna Pointing Controller (APC) that will replace the Antenna Pointing Assembly (APA) on DSS63 (Rob70) and DSS65 (Rob34) antennas.

PROJ	ARRAY	CORR	OBS NAME	YEAR	DOY	BAND	SRC STATUS	REMARKS
Global	VLBA+VLA+EVN+RO+GO	Socorro	GB036	2001	54	L-LCP	AUTO	Supernova remnant SN1979C in M100
Global	VLBA+VLA+EVN+RO+GO	Socorro	GM038	2001	54	L-LCP	AUTO	Supernova remnant in M82 with high resolution
EVN	EVN+RO	JIVE	N01L1	2001	54	L-LCP	FIX	Antenna calibration
EVN	EVN+RO	JIVE	N01X2	2001	153	X-RCP	FIX	Antenna calibration
Global	VLBA+VLA+EVN+RO+GO	Socorro	GB042B	2001	329	L-LCP	AUTO	Study of expanding shell of supernova SN1993J
EVN	EVN+RO	JIVE	EP040	2002	48	L-LCP	FIX	Study of ZW35 (phase referencing)
EVN	EVN+RO	JIVE	EP042A	2002	48	L-LCP	FIX	OH spectrum line absorption data of starburst SZW049.057
Global	VLBA+VLA+EVN+RO+GO	Socorro	GP030B	2002	56	L-LCP	FIX	High resolution and very high sensitivity spectral study of grav. lens 2016+112
Global	VLBA+VLA+EVN+RO+GO	Socorro	GM048B	2002	321	L-LCP	AUTO	SN1993J
Global	VLBA+EVN+RO+ARECIBO	Socorro	GM047	2002	322	L-LCP	AUTO	SN1979C
Global	VLBA+EVN+RO	Socorro	GP034	2003	39	K-LCP	AUTO	Water megamasers in circumnuclear accretion disks
EVN	EVN+RO	JIVE	EI005A	2003	40	K	FIX	Kinematics of circumprotostellar gas disk of IRAS 0338+6312
Global	VLBA+VLA+EFF+RO+GO	Socorro	BG134B	2003	136	K	AUTO	Water megamasers to map sub-pc accretion disks of supermassive BH
EVN	EVN+RO	JIVE	EF009C	2003	145	L-LCP	FIX	AGN in nearby galaxies
EVN	EVN+RO	JIVE	EB022C	2003	144	L-LCP	FIX	ARP220 OH-megamaser
EVN	EVN+RO	BONN	EL029C	2003	145	L-LCP	FIX	3C75 (phase referencing)
Global	VLBA+VLA+EVN+RO+GO	JIVE	GM052A	2004	43	X-RCP	AUTO	Helical structure in B1524-136 jets
EVN	EVN+RO	JIVE	EB027B	2004	50	L-LCP	FIX	MKN 273 (phase referencing)

**Table 1. Sub-reflector configuration for EVN and GLOBAL observations during pass years.**

**c. Pointing and Efficiency.** The Pointing and efficiency tool (PET) developed at Robledo is being integrated as part of a more complex Performance Tool that will be used in all DSN complexes.

During February 2004 the DSS63 (70m) S/X and X-dual pointing models have been improved using PET (pointing error improved from 10mdeg to 2mdeg in both axes). There are plans to improve also the L-band pointing model as well as to optimize the sub-reflector position for that same band before incoming EVN session#2 2004.

Future EAC architecture (FY 05) will include several PET functionalities to improve their calibration capabilities.

## 7. About Robledo support to EVN observations.

Robledo did not participate in EVN session#3 2003.

For EVN session#1 2004 Robledo participated in two observations:

- a. GM052A (X-RCP): for this observation an extra effort was done to provide System Temperature monitoring; for this purpose the calibration signal was configured and controlled manually (at preob) from the DTT Maintenance Terminal (DMT). Sub-reflector was configured in Autofocus mode.

- b. EB027B (L-LCP): first 2-head recording observation in which Robledo has participated. It was not possible to provide System Temperature monitoring this time. The strong L-band RFI (1660-1670 MHz) still persists and has completely degraded VC05 output (1666.49 MHz).

## 8. Other DSN News.

JPL Block II Correlator has been moved to a new location. The new address is:

Operator Correlator: Masis Markosyan (626) 305-6354 [mmarkosyan@jftl.jpl.nasa.gov](mailto:mmarkosyan@jftl.jpl.nasa.gov)  
1400 S. Shamrock St.  
Mail Stop B1400  
Monrovia Ca 91016

There are plans to decommission the JPL Block II Correlator; it will be replaced by a Software Correlator still under development.

## 9. DSN points of contact.

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NASA/ JPL/ DSN:

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Best regards,

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