Kokee Park Geophysical Observatory

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Abstract

This report summarizes the technical parameters and the technical staff of the VLBI system located on the Island of Kauai. Included is an overview of the VLBI activities from March, 1999 through the end of December 2000.

1. KPGO

Kokee Park Geophysical Observatory first participated in VLBI operations as part of the GAPE experiments in 1984. At that time the station was part of the STDN (Satellite Tracking Data Network). The 9-m system was modified by installing a focal point receiver, hydrogen maser, data acquisition terminal, tape drive and computer system. This was operational for the summer of 1984. The system was removed after the GAPE '84 experiments and reinstalled again for summer of 1985. It wasn't until 1986 that we became a continuous participant in VLBI operations.

In October 1989 NASA phased out the STDN operation on Kauai and the station was transferred to the Crustal Dynamics Project at Goddard Space Flight Center. The station started weekly operation for the U.S. Naval Observatory as part of the NAVNET network.

Early in 1992 construction of USNO's present 20-meter antenna was started. The foundation work was completed in August 1992 and the structure was started in September just as Hurricane "Iniki" struck on September 11, 1992. Installation was completed in 1993 and first light was in June 1993. Later the use of the 9-meter system was discontinued.

A Mark IV system was planned to be installed during 1999. However delays have the installation date into the year 2001.

In July 2000 Kokee Park started daily (Monday through Friday) participation in the Intensive sessions for NEOS.

Figure 1. Kokee Park Geophysical Observatory 20m antenna.

Table 1. Location and Addresses of Kokee Park Geophysical Observatory

Longitude	159.665° W
Latitude	22.126° N
Kokee Park Geophysical Observatory P.O. Box 538 Waimea, Hawaii 96796 USA	

2. Technical Parameters of the VLBI System at KPGO

The receiver is of NRAO (Green Bank) design (dual polarization feed using cooled 15 K HEMT amplifiers). The DAR rack and tape drive were supplied through Green Bank. The antenna is of the same design and manufacture as ones at Green Bank and Ny Ålesund.

The technical parameters of the radio telescope are summarized in Table 2.

3. Technical Staff of the VLBI system at KPGO

The staff at Kokee Park consists of six people who are employed by Honeywell-TSI under contract to NASA for the operations and maintenance of the Observatory.

4. Status of KPGO

Kokee Park has participated in many VLBI experiments since 1984. We started observing with GAPE and are continuing until now with NEOS and CORE. We also participate in the RDV experiments.

We averaged 1.5 experiments per week during calendar year 2000 and are increasing to an average of 2 weekly experiments of 24 hours with daily Intensive experiments during year 2001.

Kokee Park also hosts other geodetic measurement systems, including PRARE, a DORIS beacon, and a Turbo-Rogue GPS receiver. Kokee Park is an IGS station. These three systems are shown in Figure 2.

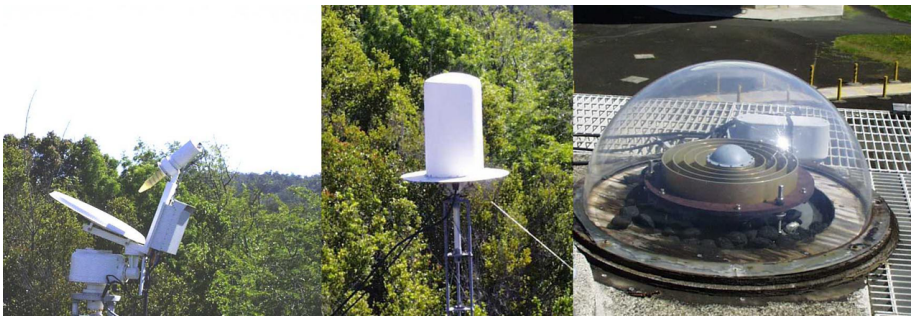

Figure 2. Kokee Park also hosts other systems; PRARE, DORIS Beacon, and IGS (Turbo-Rogue).

Table 2. Technical parameters of the radio telescope at KPGO.

Parameter	Kokee Park
owner and operating agency	USNO-NASA
year of construction	1993
radio telescope system	Az-El
receiving feed	primary focus
diameter of main reflector d	$20m$
focal length f	$8.58m$
f/d	0.43
surface contour of reflector	$0.020 inches rms$
azimuth range	$0 \ldots 540^\circ$
azimuth velocity	$2^\circ/s$
azimuth acceleration	$1^\circ/s^2$
elevation range	$0 \ldots 90^\circ$
elevation velocity	$2^\circ/s$
elevation acceleration	$1^\circ/s^2$
X-band	$8.1 - 8.9\,GHz$
(reference $\nu = 8.4GHz, \lambda = 0.0357m$)	
T_{sys}	$40\,K$
$S_{SEFD}(CASA)$	$900\,Jy$
G/T	$45.05\,dB/K$
η	0.406
S-band	$2.2 - 2.4GHz$
(reference $\nu = 2.3GHz, \lambda = 0.1304m$)	
T_{sys}	$40\,K$
$S_{SEFD}(CASA)$	$665\,Jy$
G/T	$35.15\,dB/K$
η	0.539
VLBI terminal type	VLBA
recording media	thin-tape only
Field System version	9.4.18

5. Outlook

Mark IV equipment is expected to be installed during the first part of this calendar year. Increased operations are expected with the coming of CORE.