

Kokee Park Geophysical Observatory

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Abstract

This report summarises the technical parameters and the technical staff of the VLBI System at Kokee Park on the Island of Kauai. Included is an overview of the VLBI activities for the year 2001.

1. KPGO

Kokee Park Geophysical Observatory is located on the Island of Kauai in the Hawaiian Islands, Kauai is the most northwestern (inhabited) Island. The site is in a State Park (Kokee State Park) hence its name. It is located at an elevation of 1100 meters near the Waimea Canyon, which is often referred to as the Grand Canyon of the Pacific.

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 NASA's 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 the summer of 1985. It was not 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 the 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 in 1993 the use of the 9-meter system was discontinued.

Starting in July 2000 Kokee Park started daily (Monday through Friday) participation in the Intensive Schedule for USNO.

An S-2 Recorder system was installed in 2000.

A Mark IV System was planned to be installed during 1999. However delays caused the installation to slip well into 2001. Included with this installation is a second VLBA4 Recorder.

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	



Figure 1. Kokee Park Geophysical Observatory 20m Antenna.

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 those used at Green Bank and Ny-Ålesund.

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

Timing and Frequency is provided by a Sigma Tau Maser with a NASA NR Maser providing backup. Monitoring of the station frequency standards performance is provided by a CNS (GPS) Receiver/Computer system. The Sigma Tau performance is also monitored via the IGS Network.

3. Technical Staff of the VLBI System at KPGO

The staff at Kokee Park consists of six people who are employed by Honeywell under contract to NASA for the operations and maintenance of the Observatory. VLBI operations are conducted by K. Kim, M. Harms, and D. Mitchell.

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 increased to an average of 2 experiments of 24 hours each week 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.

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	0.020inchesrms
azimuth range	0...540°
azimuth velocity	2°/s
azimuth acceleration	1°/s ²
elevation range	0...90°
elevation velocity	2°/s
elevation acceleration	1°/s ²
X-band (reference $\nu = 8.4GHz$, $\lambda = 0.0357m$)	8.1 – 8.9 GHz
T_{sys}	40 K
$S_{SEFD}(CASA)$	900 Jy
G/T	45.05 dB/K
η	0.406
S-band (reference $\nu = 2.3GHz$, $\lambda = 0.1304m$)	2.2 – 2.4 GHz
T_{sys}	40 K
$S_{SEFD}(CASA)$	665 Jy
G/T	35.15 dB/K
η	0.539
VLBI terminal type	VLBA/VLBA4
recording media	thin-tape only
Field System version	9.5.3



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

5. Outlook

Mark V Data System is expected this coming year along with a DAS System for the S-2 Recorders.