

# Goddard Geophysical and Astronomical Observatory

*Jay Redmond, Charles Kodak*

## Abstract

This report summarizes the technical parameters and the technical staff of the VLBI system at the fundamental station GGAO. It also gives an overview about the VLBI activities during the previous year. The outlook lists the outstanding tasks to improve the performance of GGAO.

## 1. GGAO at Goddard

The Goddard Geophysical and Astronomical Observatory consists of a radio telescope for VLBI, SLR site to include MOBILAS-7, SLR-2000 (development system), a 48" telescope for developmental two color Satellite Ranging, a GPS timing and development lab, meteorological sensors and a H-maser. In addition, we are a fiducial IGS site with several IGS / IGSX receivers.

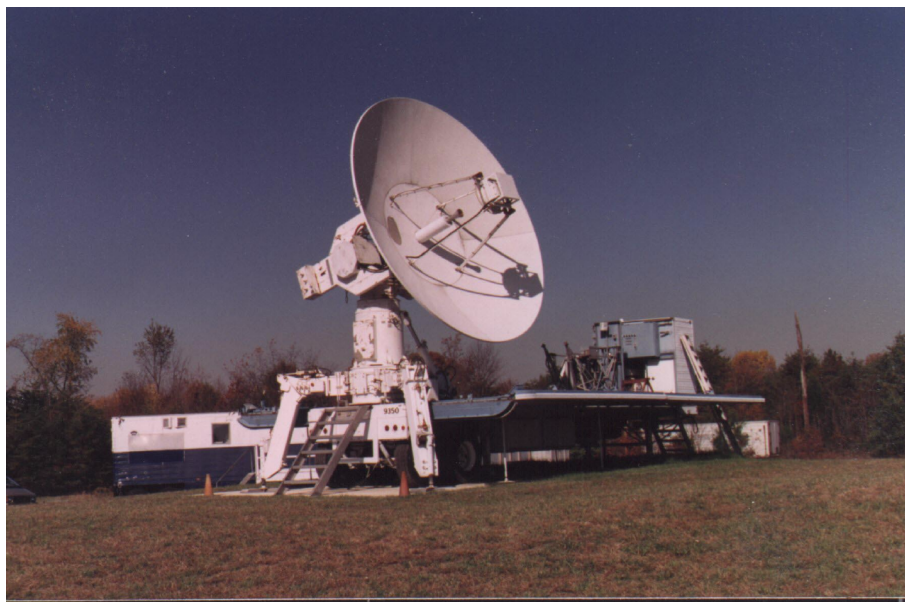


Figure 1. MV-3 VLBI antenna at GGAO.

GGAO is located on the east coast of the United States in Maryland. It is about 15 miles NNE of Washington D.C. in Greenbelt, Maryland.

## 2. Technical Parameters of the VLBI Antenna at GGAO

The radio telescope for VLBI at GGAO (MV3) was originally built as a mobile or transportable station. It was previously known as Orion and was part of the original CDP. It is now being used as a fixed site having been moved to Goddard and semi-permanently installed here since the spring of 1991. The design criteria were:

- transportability on two tractor trailers utilizing a 5 meter dish sized to maximize receive and mobility considerations,
- setup of the radio telescope within eight hours (although it has been used as a fixed site since the spring of 1991)

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

Table 1. Location and addresses of GGAO at Goddard.

Longitude	76.8265° W
Latitude	39.0219° N
MV3 Code 299.0 Goddard Space Flight Center, (GSFC) Greenbelt, Maryland 20771	
<a href="http://www.gsfc.nasa.gov">http://www.gsfc.nasa.gov</a>	

Table 2. Technical parameters of the radio telescope of GGAO for geodetic VLBI.

Parameter	GGAO-VLBI
owner and operating agency	NASA
year of construction	1982
diameter of main reflector $d$	5m
azimuth range	0 ... 540°
azimuth velocity	3°/s
azimuth acceleration	1°/s <sup>2</sup>
elevation range	0 ... 90°
elevation velocity	3°/s
elevation acceleration	1°/s <sup>2</sup>
X-band	8.18 – 8.98 GHz
<i>receivingfeed</i>	<i>Cassegrainfocus</i>
$T_{sys}$	24 K
<i>Bandwidth</i>	800MHz, -2dB
$G/T$	32.1 dB/K
S-band	2.21 – 2.45GHz
<i>receivingfeed</i>	<i>primaryfocus</i>
$T_{sys}$	19 K
<i>Bandwidth</i>	240MHz, -2dB
$G/T$	21.2 dB/K
VLBI terminal type	MK4
recording media	thin-tape only
Field System version	9.5.3 (9.5 BETA)

### 3. Technical Staff of the VLBI Facility at GGAO

The GGAO VLBI facility gains from the experiences of the staff from the Research and Development VLBI support staff. GGAO is a NASA R&D and data collection facility, operated under contract by Honeywell Technology Solutions Incorporated (HTSI). Table 3 lists the GGAO station staff that are involved in VLBI operations.

Table 3. Staff working at the MV3 VLBI station at GGAO.

Name	Background	Dedication	Agency
Jay Redmond	engineering technician	100%	HTSI
TBD	engineering technician	20%	HTSI

### 4. Status of MV3 at GGAO

GGAO participated in several VLBI experiments which are listed in table 4. In addition to the scheduled experiments listed in this table, MV3 has participated in several unscheduled experiments for VLBI developmental purposes and various other developmental activities.

Table 4. Participation of GGAO in VLBI Experiments from April 9 2001 thru January 16 2002.

Date	Experiment
2001-04-09	RDV28
2001-07-05	RDV29
2001-10-29	RDV30
2002-01-16	RDV31

### 5. Outlook

GGAO will continue to support both scheduled experiments and developmental activities. The plan for 2002 consists of:

1. Continue testing of pre-release versions of PC-FS and new Linux kernel releases.
2. Continually striving to improve the performance of the entire MK4 data collection and station specific equipment.
3. MV-3 will install the MK5 EVLBI hardware in February 2002 and will be testing on the MK5 system soon after.