

# CDDIS Data Center Summary for the IVS 2012 Annual Report

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## Abstract

This report summarizes activities during 2012 and future plans of the Crustal Dynamics Data Information System (CDDIS) with respect to the International VLBI Service for Geodesy and Astrometry (IVS). Included in this report are background information about the CDDIS, the computer architecture, staff supporting the system, archive contents, and future plans for the CDDIS within the IVS.

## 1. Introduction

The Crustal Dynamics Data Information System (CDDIS) has supported the archiving and distribution of Very Long Baseline Interferometry (VLBI) data since its inception in 1982. The CDDIS is a central facility providing users access to data and derived products to facilitate scientific investigation. The CDDIS archive of GNSS (GPS, GLONASS, etc.), laser ranging, VLBI, and DORIS data are stored on-line for remote access. Information about the system is available via the Web at the URL <http://cddis.gsfc.nasa.gov>. In addition to the IVS, the CDDIS actively supports other IAG services including the International GNSS Service (IGS), the International Laser Ranging Service (ILRS), the International DORIS Service (IDS), the International Earth Rotation and Reference Frame Service (IERS), and the Global Geodetic Observing System (GGOS) of the IAG. The current and future plans for the system's support of the IVS are discussed below.

## 2. System Description

The CDDIS archive of VLBI data and products is accessible to the public through anonymous ftp.

### 2.1. Computer Architecture

The CDDIS is operational on a dedicated server, [cddis.gsfc.nasa.gov](http://cddis.gsfc.nasa.gov). The system has over 32 Tbytes of on-line disk storage; at this time, over 150 Gbytes are devoted to VLBI activities. The CDDIS is located at NASA GSFC and is accessible to users 24 hours per day, seven days per week.

In 2011, the CDDIS staff procured new server hardware to further enhance the capabilities of the system and ensure a robust archive environment. The new configuration is fully redundant with the primary and secondary/failover systems located in different buildings on the GSFC campus. Each system utilizes a distributed functionality (incoming, outgoing, processing, database, and map servers) and is configured with a local backup system as well as a full backup system located in a third building at GSFC. The archive is equipped with a 32 Tbyte RAID storage system and is scaled to accommodate future growth. Users and suppliers of data and product files did not need to update their software or procedures to access the new systems. The structure of the VLBI data and product archive remained unchanged in this new system configuration. The new server configuration became operational in May 2012.

## 2.2. Staffing

Currently, a staff consisting of one NASA civil service employee and four (one full-time, three part-time) contractor employees supports all CDDIS activities (see Table 1 below).

Table 1. CDDIS Staff.

Name	Position
Ms. Carey Noll	CDDIS Manager
Dr. Patrick Michael	System Engineer (part-time)
Dr. Maurice Dube	Senior programmer
Mr. Nathan Pollack	Programmer (part-time)
Ms. Lori Tyahla	Programmer (part-time)

## 3. Archive Content

The CDDIS has supported GSFC VLBI coordination and analysis activities for the past several years through an on-line archive of schedule files, experiment logs, and data bases in several formats. This archive has been expanded for the IVS archiving requirements.

The IVS Data Center content and structure is shown in Table 2. (A figure illustrating the flow of information, data, and products between the various IVS components was presented in the CDDIS submission to the IVS 2000 Annual Report.) In brief, dedicated ftp-only accounts have been established on the CDDIS incoming computer, `cddisin.gsfc.nasa.gov`. Using specified file names, operation and analysis centers deposit data files and analyzed results to appropriate directories within their ftp-only accounts. Automated archiving routines, developed by GSFC VLBI staff, peruse the directories and move any new data to the appropriate public disk area. These routines migrate the data based on the file name to the appropriate directory as described in Table 2. Index files in the main sub-directories under `ftp://cddis.gsfc.nasa.gov/pub/vlbi` are updated to reflect data archived in the filesystem. Furthermore, mirroring software has been installed on the CDDIS host computer, as well as all other IVS data centers, to facilitate equalization of data and product holdings among these data centers. At this time, mirroring is performed between the IVS data centers located at the CDDIS, the Bundesamt für Kartographie und Geodäsie in Leipzig, and the Observatoire de Paris.

The public filesystem in Table 2 on the CDDIS computer, accessible via anonymous ftp, consists of a data area, which includes auxiliary files (e.g., experiment schedule information, session logs, etc.) and VLBI data (in both database and NGS card image formats). A products disk area has also been established to house analysis products from the individual IVS analysis centers as well as the official combined IVS products. A documents disk area contains format, software, and other descriptive files.

## 4. Data Access

During 2012, over 1,300 distinct hosts accessed the CDDIS on a regular basis to retrieve VLBI related files. These users, which include other IVS data centers, successfully downloaded over 2.3

Table 2. IVS Data and Product Directory Structure.

Directory	Description
Data Directories	
vlbi/ivsdata/db/ <i>yyyy</i>	VLBI database files for year <i>yyyy</i>
vlbi/ivsdata/ngs/ <i>yyyy</i>	VLBI data files in NGS card image format for year <i>yyyy</i>
vlbi/ivsdata/aux/ <i>yyyy/sssss</i>	Auxiliary files for year <i>yyyy</i> and session <i>sssss</i> ; these files include: log files, wx files, cable files, schedule files, correlator notes
vlbi/raw	Raw VLBI data
Product Directories	
vlbi/ivsproducts/crf	CRF solutions
vlbi/ivsproducts/eopi	EOP-I solutions
vlbi/ivsproducts/eops	EOP-S solutions
vlbi/ivsproducts/daily_sinex	Daily SINEX solutions
vlbi/ivsproducts/int_sinex	Intensive SINEX solutions
vlbi/ivsproducts/trf	TRF solutions
vlbi/ivsproducts/trop	Troposphere solutions
Project Directories	
vlbi/ivs-iers	IVS contributions to the IERS
vlbi/ivs-pilotbl	IVS Analysis Center pilot project (baseline)
Other Directories	
vlbi/ivscontrol	IVS control files (master schedule, etc.)
vlbi/ivsdocuments	IVS document files (solution descriptions, etc.)
vlbi/dserver	Dserver software and incoming files

Tbytes of data and products (2.5M files) from the CDDIS VLBI archive last year.

## 5. Future Plans

The CDDIS staff will continue to work closely with the IVS Coordinating Center staff to ensure that our system is an active and successful participant in the IVS archiving effort.