

THE DORIS DATA CENTER AT THE CDDIS

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ABSTRACT - *The Crustal Dynamics Data Information System (CDDIS) has proposed to serve as a global data center for the DORIS Pilot Experiment providing a data archive and distribution service to the experiment. The CDDIS has archived DORIS data since the launch of the TOPEX/Poseidon mission in 1992. Since that time, the CDDIS has archived DORIS data from the TOPEX, SPOT-2, -3, and -4 missions. This paper will present information about the archive and data holdings. More general information about the CDDIS and its support of other international space geodesy services (the IGS, ILRS, and IVS) will also be discussed.*

1 - INTRODUCTION

The Crustal Dynamics Data Information System (CDDIS) has supported the archive and distribution of DORIS data since the launch of the TOPEX/Poseidon mission in 1992. This report summarizes the current and future plans of the CDDIS with respect to the DORIS Pilot Experiment. Included here are background information about the CDDIS, its computer architecture, staffing, and archive contents, as well as future plans for the system within the DPE.

2 - BACKGROUND

The CDDIS has been operational since September 1982, serving the international space geodesy and geodynamics community. This data archive was initially conceived to support NASA's Crustal Dynamics Project; since the end of this successful program in 1991, the CDDIS has continued to support the science community through NASA's Space Geodesy Program (SGP) and the Solid Earth and Natural Hazards (SENH) activity. The main objectives of the CDDIS are to store all geodetic data products acquired by NASA programs in a central data bank, to maintain information about the archival of these data, and to disseminate these data and information in a timely manner to authorized investigators and cooperating institutions. Furthermore, science support groups analyzing these data submit their resulting data sets to the CDDIS on a regular basis. Thus, the CDDIS is a central facility providing users access to raw and analyzed data to facilitate scientific investigation. A large portion of the CDDIS holdings of GPS, GLONASS, laser ranging, VLBI, and DORIS data are stored on-line for remote access. Information about the system is available via the world wide web at URL http://cddisa.gsfc.nasa.gov/cddis_welcome.html.

The CDDIS currently supports many international programs and services as an archive and distribution center. The system has been an active participant in the International GPS Service (IGS), the International Laser Ranging Service (ILRS), and the International VLBI Service for Geodesy and Astrometry (IVS) since their respective inceptions. Furthermore, the CDDIS has supported the International Earth Rotation Service (IERS) as a data center for both DORIS and GPS data.

The CDDIS responded to the 1999 Call for Participation in the DORIS Pilot Experiment (DPE). This response stated that the CDDIS would support data center activities by providing access to an archive of DORIS data, products derived from these data, and information about the data and products.

3 - SYSTEM DESCRIPTION

The CDDIS archive of DORIS data, information, and products, as well as other data sets, are accessible to the public via anonymous ftp and the WWW at address *ftp://cddisa.gsfc.nasa.gov/pub/doris*.

3.1 - Computer Architecture

The CDDIS is operational on a dedicated Compaq/Digital Equipment Corporation (DEC) AlphaServer 4000 running the UNIX operating system. This facility currently has over 300 Gbytes of on-line magnetic disk storage; approximately ten Gbytes will be devoted to DORIS activities. The CDDIS is located at NASA's Goddard Space Flight Center (GSFC) in Greenbelt Maryland and is accessible to users 24 hours per day, seven days per week.

3.2 - Staffing

Currently, a staff consisting of one NASA civil service employee and three contractor employees with Raytheon Information Technology and Scientific Services (RITSS) supports all CDDIS activities:

Ms. Carey Noll, CDDIS Manager

Dr. Maurice Dube, Head, CDDIS contractor staff and senior programmer

Ms. Ruth Kennard, request coordinator

Ms. Laurie Batchelor, data technician

4 - ARCHIVE CONTENT

4.1 - DORIS Data

The data flow from DORIS station to user is shown in Figure 1. As illustrated in this figure, the Doppler shift on radiofrequency signals emitted by the ground tracking network of DORIS beacons are received on board the satellite and then downloaded to the CNES processing center located in Toulouse France. CNES then merges these data into files by satellite and transmits these files to the DORIS data centers located at the CDDIS and the Institut Géographique National (IGN) where they are archived and made available to the user community.

The CDDIS currently receives DORIS data from three satellites, TOPEX and SPOT-2 and -4, through electronic transmission by CNES every ten days, approximately ten to fifteen days after the end of the last observation day. This ten-day cycle method of data transmission was established for the generation of the precise orbit product of the TOPEX mission, which follows a ten-day ground-track, repeat cycle. CNES continued to follow this ten-day file format as new DORIS missions were added to the archive. All data files are stored in UNIX compressed format. A typical ten-day compressed file of TOPEX DORIS data is approximately two Mbytes in size; a file for the SPOT satellites is approximately 1.5 Mbytes in size.

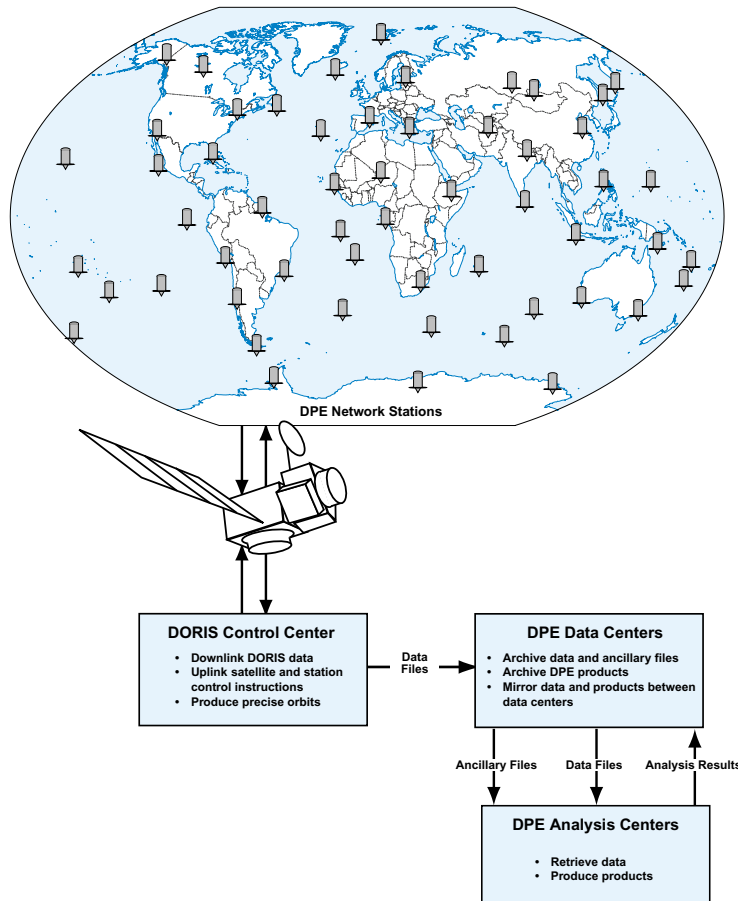


Fig. 1: Flow of DORIS data, products, and information.

The CDDIS staff has created automated routines that peruse the CNES data delivery area several times per day. These routines copy any new files to the public archive, summarize the files to ensure data quality, and load this summary information into an Oracle data base. These summaries detail observing stations, date and time, and total observations per pass. The directory structure and file naming conventions for DORIS data are illustrated in Table 1.

4.2 - Supporting Information

The CDDIS anonymous ftp archive and web site provides access to ancillary data used by DORIS analysts. This information includes satellite maneuver files, station lists and maps, format documents, DORIS data reports (quantity and quality), and historic DORISMail messages. These files are updated as new information is received via email, ftp, etc. from the global DORIS community.

Tab. 1: CDDIS Directory Structure for DORIS Data and Information

Directory	File Name	Description
Data Directories		
/doris/satname	satcodedata###.dat.Z satname.files	DORIS data for satellite <i>satcode</i> and 10-day cycle number ### File containing cycle filenames versus time span
/data/satname/sum	satcodedata###.sum	Summary of contents of DORIS data file for satellite <i>satcode</i> and 10-day cycle number ###
Other Directories		
/doris/dorismail	dorismail.#####	DORISMail message number #####
/doris/general		General DORIS information such as satellite maneuver files

5 - FUTURE PLANS

The CDDIS and the IGN have both proposed to serve as data centers supporting the DORIS Pilot Experiment (DPE). These data centers will institute procedures to compare data holdings on a regular basis, thus ensuring consistent, reliable archiving of DORIS data and products. A data flow coordinator for the experiment (Carey Noll, manager of the CDDIS) has been established to define procedures for the exchange of data and information between the control centers and data centers as well as between the analysis centers and data centers. A Data and Products Formats Working Group, chaired by John Ries, will determine the type and format of products to be initially considered for the DPE. This group will also study the existing DORIS data formats and determine their usability with second generation receivers. Furthermore, this group will look into extending the GPS RINEX format for DORIS measurements.

Currently, the CDDIS archives DORIS data by cycle number, an artificial file boundary initially created to coincide with TOPEX data processing efforts. The CDDIS will develop new procedures to create daily and/or monthly files by satellite; these programs will be executed within the current data quality/summary routines.

As the DORIS Pilot Experiment commences, analysis centers will begin generating products derived from the data available through the data centers. The DORIS data centers, including the CDDIS, will archive these products.

6 - CONTACT INFORMATION

To obtain more information about the CDDIS archive supporting the DORIS Pilot Experiment, contact:

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