THE IGS GLOBAL DATA CENTER AT THE CDDIS — AN UPDATE

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OVERVIEW OF IGS SUPPORT

- CDDIS has served as a global data center for the International GPS Service for Geodynamics (IGS) since its start in June 1992

- Operational and regional data centers deposit data to individual accounts on CDDIS host computer

- Approximately 1 Mbyte/site/day of GPS data (daily files consisting of RINEX, compact RINEX, met, nav, and teqc summary) in compressed format are archived each day from a network of over 160 sites

- CDDIS makes RINEX observation data available with Hatanaka compression (yyd.Z files) and without (yyo.Z files)

- UNAVCO's teqc s/w run on all incoming data

- Metadata is extracted from GPS data and an on-line data base inventory is maintained to keep track of all data received

- Daily status files are generated with information extracted from RINEX header (e.g., receiver and antenna type, antenna height) as well as hour delay in delivery

- On average, 36% of all data are available to the IGS analysis centers and GPS user community within one hour of the end of the observation day; 60% are available within three hours and 70% are available within six hours

RECENT DEVELOPMENTS

- ◆ **Compaq/DEC AlphaServer 4000 running UNIX is operational system**

- ◆ **On-line GPS daily data archive consists of data from 1998 through present**

- ◆ **Began archive of hourly 30-second data in 1998**

- ◆ **All IGS products (since June 1992) are on-line**

- ◆ **Started migration of GPS data archive from magneto-optical disks to CD-ROM**

- ◆ **Data from 1995 through 1997 have been written to CD-ROM and will be accessible via anonymous ftp in near future**

- ◆ **VAX computer (cddis.gsfc.nasa.gov) utilized for tape migration, email, etc.**

CDDIS COMPUTER CONFIGURATION

- ◆ **Components**
  - **DEC AlphaServer 4000**
  - **512 Mbytes memory**
  - **~330 Gbytes on-line magnetic disk space**
    - ✦ **~120 Gbytes for GPS data and products**
    - ✦ **~ 25 Gbytes for GLONASS data and products**
    - ✦ **~ 30 Gbytes for VLBI data and products**
    - ✦ **~ 10 Gbytes for laser data and products**
    - ✦ **~ 5 Gbytes for DORIS data and products**
  - **Digital UNIX**
  - **ORACLE RDBMS**
  - **600 slot CD-ROM JVC jukebox**
- ◆ **Host name cddisa.gsfc.nasa.gov (128.183.102.102)**
- ◆ **Host name cddis.gsfc.nasa.gov (128.183.102.101) used for email and migration/archive of data from/on optical disk and 4mm tapes**

GPS DATA SETS

◆ **Daily GPS data**
  – **30 second sampling**
  – **~165 stations per day**
  – **Average 2 hour delay**
  – **Data from 98001 through present currently on-line**
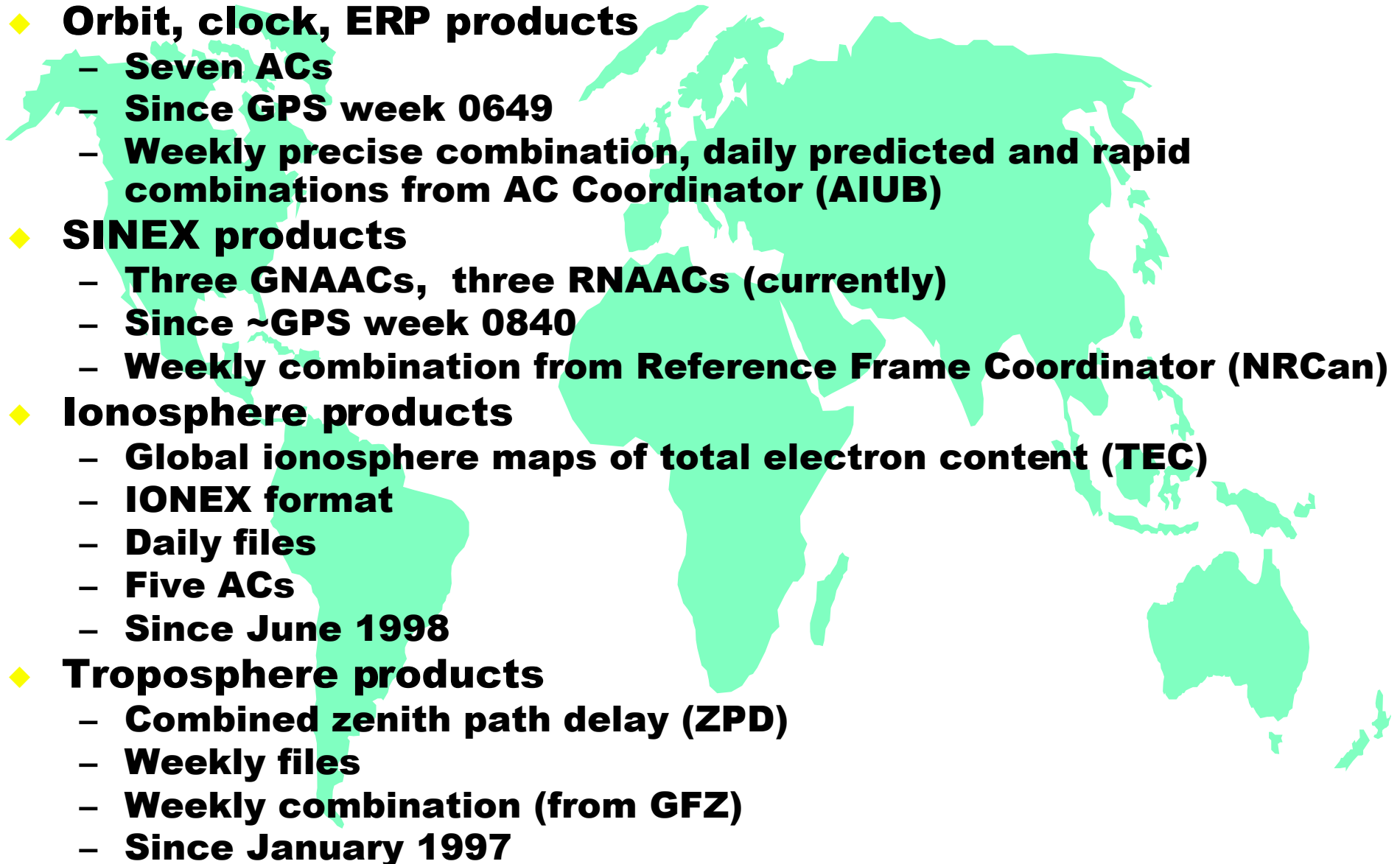 – **Directories:**
    ✦ **Daily status file**
    ✦ **O (RINEX observation data)**
    ✦ **D (RINEX observation data, Hatanaka compression)**
    ✦ **M (RINEX meteorological data)**
    ✦ **N (RINEX broadcast ephemeris data)**
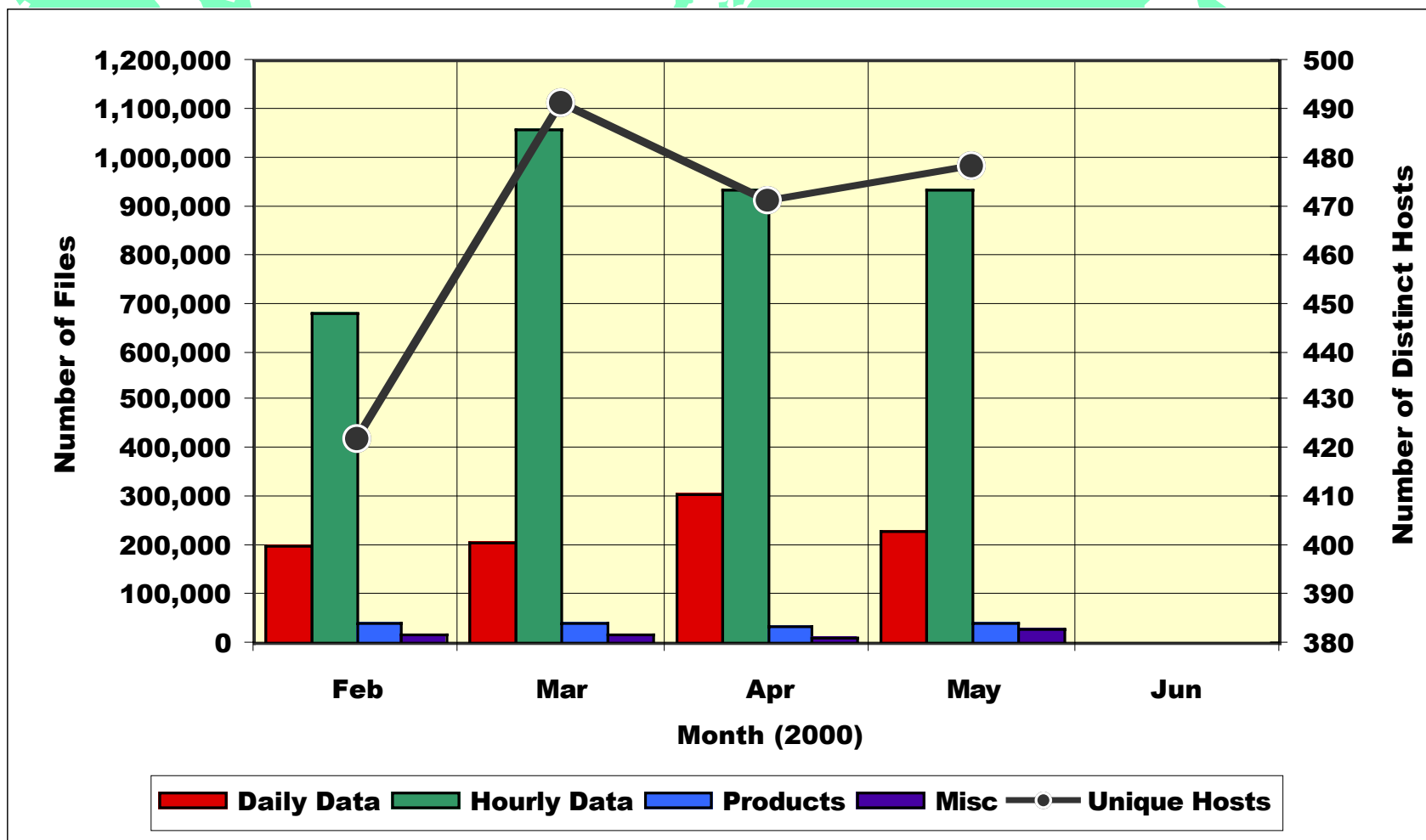   ✦ **S (output from teqc)**

◆ **Hourly near real-time GPS data**
  – **30 second sampling**
  – **~60 stations per hour**
  – **Average 5-15 minute delay**
  – **Retained for three days**
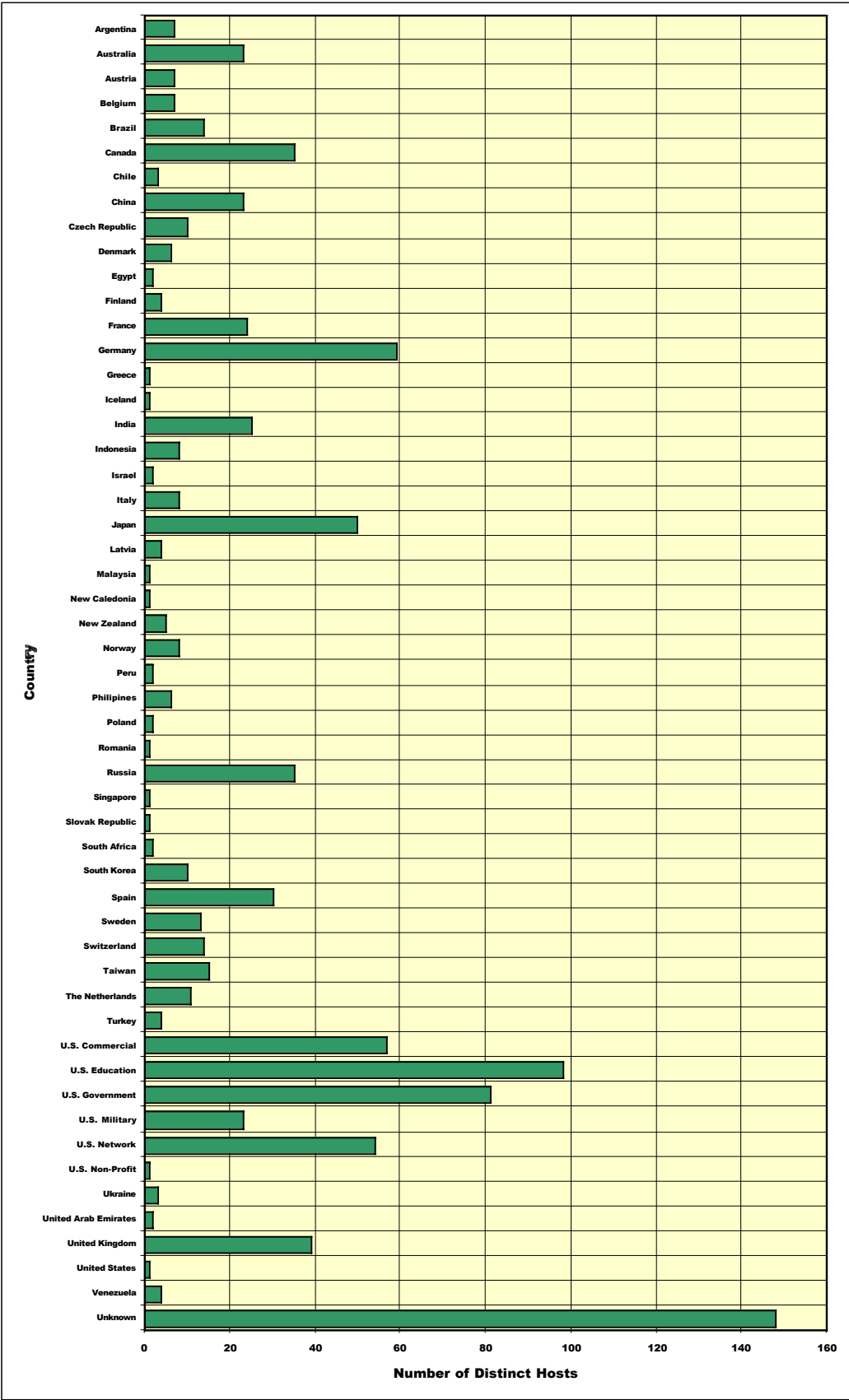 – **Since mid 1998**

IGS PRODUCTS

◆ **Orbit, clock, ERP products**
- – **Seven ACs**
- – **Since GPS week 0649**
- – **Weekly precise combination, daily predicted and rapid combinations from AC Coordinator (AIUB)**

◆ **SINEX products**
- – **Three GNAACs, three RNAACs (currently)**
- – **Since ~GPS week 0840**
- – **Weekly combination from Reference Frame Coordinator (NRCan)**

◆ **Ionosphere products**
- – **Global ionosphere maps of total electron content (TEC)**
- – **IONEX format**
- – **Daily files**
- – **Five ACs**
- – **Since June 1998**

◆ **Troposphere products**
- – **Combined zenith path delay (ZPD)**
- – **Weekly files**
- – **Weekly combination (from GFZ)**
- – **Since January 1997**

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NUMBER OF GPS-RELATED FILES TRANSFERRED
(2000)

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DISTRIBUTION OF IGS USERS
(2000)

Current Status of and Backup Plans for Flow of IGS Data and Products   **13-Jul-2000**

OTHER DATA SETS ARCHIVED AT THE CDDIS

- **IGLOS-PP – International GLONASS Service - Pilot Project**
  - GLONASS data and products
  - Preceded by IGEX-98 (09/1998-04/1999) and now an IGS Pilot Project
  - CfP issued in early 2000
- **ILRS – International Laser Ranging Service**
  - Global satellite and lunar laser ranging data and products
  - Operational since 11/1998
- **IVS – International VLBI Service for Geodesy and Astrometry**
  - Very long baseline interferometry data and products
  - Operational since early 1999
- **DPE – DORIS Pilot Experiment (future IDS, International DORIS Service)**
  - DORIS data and products
  - CfP issued in early 2000

IGLOS-PP DATA AND PRODUCTS

◆ **GLONASS Data:**

  – **Daily observation files at a 30-second sampling rate in RINEX format**

  – **GPS and GLONASS navigation files**

  – **Currently, nearly 40 stations routinely provide data**

  – **CDDIS GLONASS data archive: since 1998; all data and products currently available on-line**

◆ **IGLOS-PP Products:**

  – **Precise satellite ephemerides**

  – **Site positions and velocities**

  – **Clocks**

  – **Earth rotation parameters**

ILRS DATA AND PRODUCTS

◆ **Laser Data:**

– **Daily files containing on-site normal points, sorted by satellite, in CSTG format**

– **Hourly files containing on-site normal points, containing all satellites, in CSTG format**

– **Daily and monthly full-rate data files from a subset of the global network in MERIT-II format**

– **Currently, 26 satellites and four sites on the moon are tracked on a routine basis by 36 SLR and LLR stations**

– **Approximately 1 Mbyte/day on-site normal point data (uncompressed); 2 Mbytes/day full-rate data (compressed)**

– **CDDIS laser data archive: 1976 through present; approximately 50% of data holdings available on-line**

◆ **ILRS Products (future):**

– **Precise satellite ephemerides**

– **Site positions and velocities**

– **Utilized for maintaining the International Terrestrial Reference Frame (ITRF)**

– **Earth rotation parameters**

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IVS DATA AND PRODUCTS

◆ **VLBI Data:**

- **VLBI data bases in DBH and NGS card formats**
- **Auxillary files (e.g., log, met data, schedule, cable info, correlator notes, etc.)**
- **Currently, nearly 30 antennas participate in the IVS**
- **Approximately 2-3 Mbyte/data base file on-site normal point data (compressed)**
- **CDDIS VLBI data archive: 1979 through present; recent data available on-line**

◆ **IVS Products:**

- **Intensive and session Earth orientation parameter series (EOP-I and EOP-S)**
- **Terrestrial Reference System**
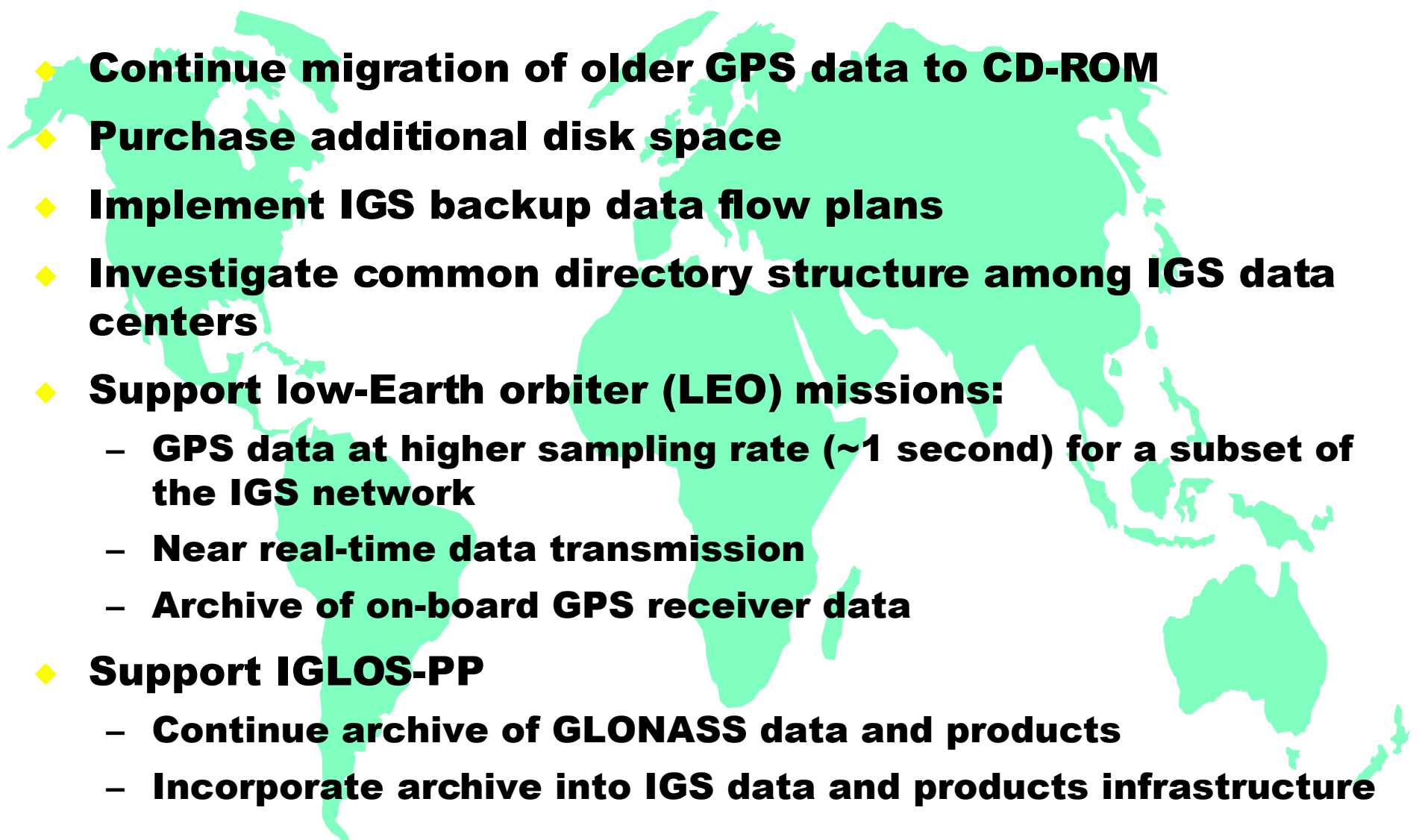- **Celestial Reference System**

IDS DATA AND PRODUCTS

- ◆ **DORIS Data:**
  - – **Ten-day cycle files containing computed range measurements**
  - – **Currently, three satellites have on-board DORIS receivers that receive transmitted signals from a network of over 50 beacons**
  - – **Approximately 5 Mbyte/satellite/cycle (compressed)**
  - – **CDDIS DORIS data archive: 1992 through present; all data available on-line**
- ◆ **IDS Products:**
  - – **Precise satellite ephemerides**
  - – **Site coordinates and velocities; position time series**
  - – **Earth rotation parameters**
  - – **Special products**
    - ✦ **Ionosphere information**
    - ✦ **Time varying geocenter coordinates**
    - ✦ **Static and time-varying coefficients of the Earth's gravity field**

FUTURE PLANS

- ◆ **Continue migration of older GPS data to CD-ROM**

- ◆ **Purchase additional disk space**

- ◆ **Implement IGS backup data flow plans**

- ◆ **Investigate common directory structure among IGS data centers**

- ◆ **Support low-Earth orbiter (LEO) missions:**
  - – **GPS data at higher sampling rate (~1 second) for a subset of the IGS network**
  - – **Near real-time data transmission**
  - – **Archive of on-board GPS receiver data**

- ◆ **Support IGLOS-PP**
  - – **Continue archive of GLONASS data and products**
  - – **Incorporate archive into IGS data and products infrastructure**