

CURRENT STATUS of and BACKUP PLANS for FLOW of IGS DATA and PRODUCTS

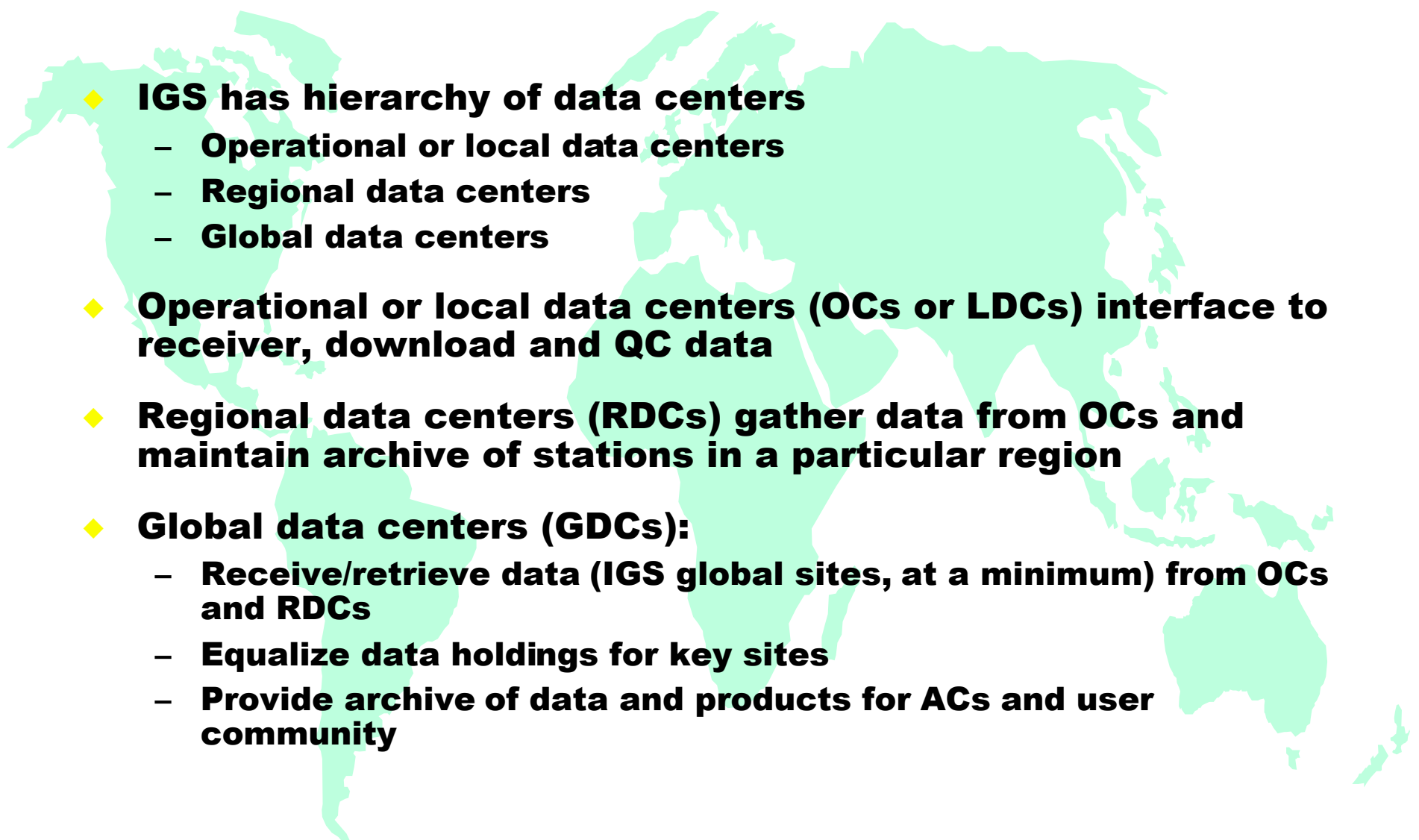
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Greenbelt, MD USA**

**IGS Network Workshop
July 12-14, 2000
Soria Moria, Oslo, Norway**

OVERVIEW

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- ◆ **Background**
 - Data centers
 - Types of data and products
 - ◆ **Current Status of Data Centers**
 - Data flow
 - Data and product holdings
 - Timeliness of data deliveries
 - ◆ **Backup Strategies**
 - ◆ **Recommendations**

BACKGROUND

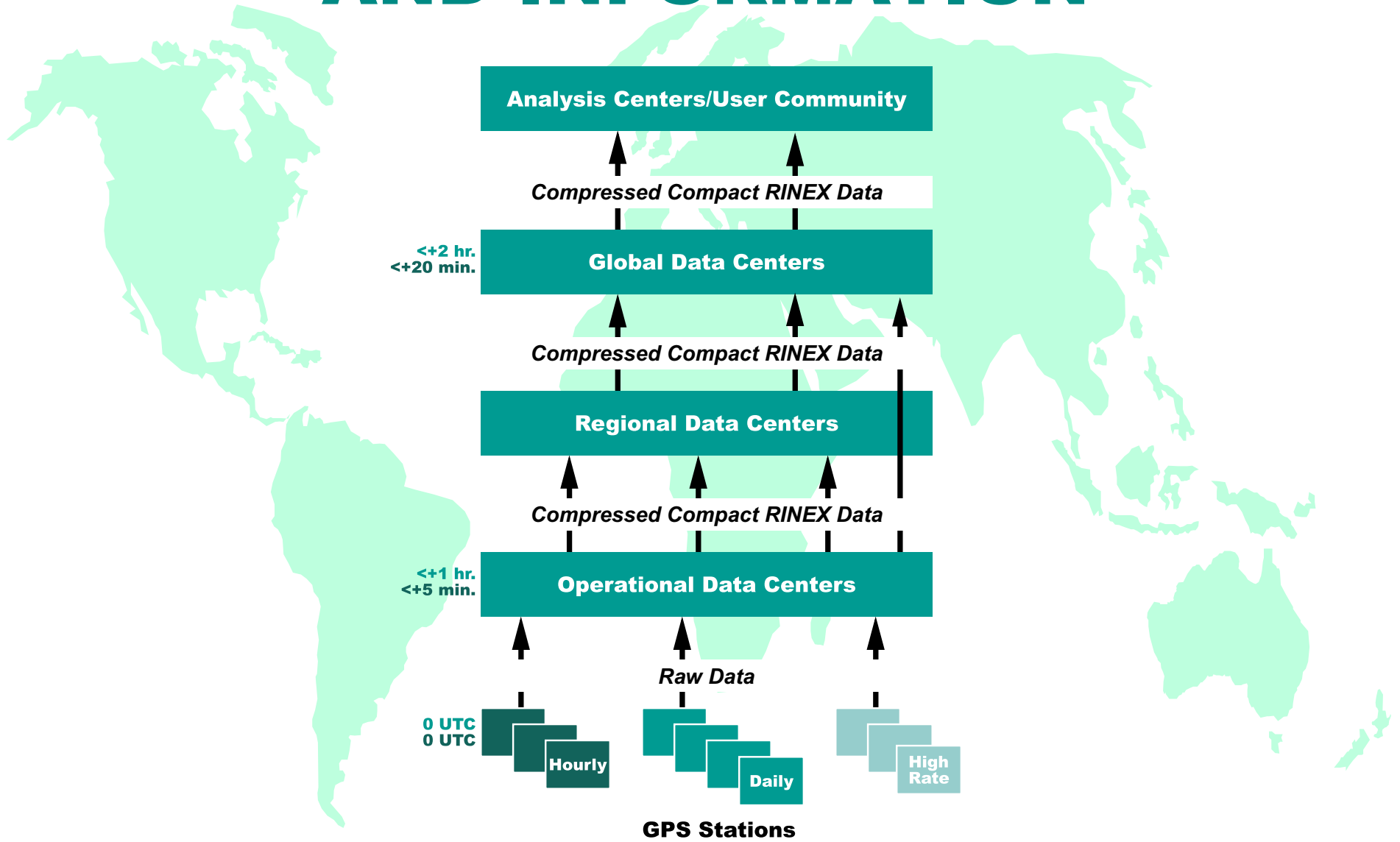
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- ◆ **IGS has hierarchy of data centers**
 - **Operational or local data centers**
 - **Regional data centers**
 - **Global data centers**

 - ◆ **Operational or local data centers (OCs or LDCs) interface to receiver, download and QC data**

 - ◆ **Regional data centers (RDCs) gather data from OCs and maintain archive of stations in a particular region**

 - ◆ **Global data centers (GDCs):**
 - **Receive/retrieve data (IGS global sites, at a minimum) from OCs and RDCs**
 - **Equalize data holdings for key sites**
 - **Provide archive of data and products for ACs and user community**

FLOW OF IGS DATA, PRODUCTS, AND INFORMATION



IGS DATA CENTERS

◆ Operational Data Centers

- ASI*	Italian Space Agency
- AUSLIG	Australian Surveying and Land Information Group
- AWI	Alfred Wegener Institute for Polar and Marine Research, Germany
- CASM	Chinese Academy of Surveying & Mapping
- CNES	Centre National d'Etudes Spatiales, France
- DGFI	Deutsches Geodätisches Forschungsinstitut, Germany
- DUT	Delft University of Technology, The Netherlands
- ESOC*	European Space Agency (ESA) Space Operations Center, Germany
- GFZ*†	GeoForschungsZentrum Germany
- GSI	Geographical Survey Institute, Japan
- INEGI	Instituto Nacional de Estadística, Geografía e Informática, Mexico
- ISR	Institute for Space Research, Austria
- JPL*†	Jet Propulsion Laboratory, USA
- KAO	Korean Astronomical Observatory
- NCASM	National Coordination Agency for Surveys and Mapping, Indonesia
- NGI	National Geography Institute, Korea
- NIMA	National Image and Mapping Agency (formerly DMA), USA
- NMA*	Norwegian Mapping Authority
- NOAA*	National Oceanic and Atmospheric Administration, USA
- NRCan*	Natural Resources Canada
- PGC*	Pacific Geoscience Center, Canada
- RDAAC	Regional GPS Data Acquisition and Analysis Center on Northern Eurasia, Russia
- RJGC	Royal Jordanian Geographic Centre
- SIO	Scripps Institution of Oceanography, USA
- TAU	Tel Aviv University, Israel
- UNAVCO	University NAVSTAR Consortium, USA
- USGS	United States Geological Survey
- WTZR*	Bundesamt für Kartographie und Geodäsie (Wetzell), Germany

◆ Regional Data Centers

- AUSLIG†	Australian Land Information Group
- BKG*	Bundesamt für Kartographie und Geodäsie, Germany
- JPL*†	Jet Propulsion Laboratory, USA
- NOAA	National Oceanic and Atmospheric Administration, USA
- NRCan	Natural Resources Canada
- RDAAC	Regional GPS Data Acquisition and Analysis Center on Northern Eurasia, Russia

◆ Global Data Centers

- CDDIS*†	Crustal Dynamics Data Information System, NASA GSFC, USA
- IGN*	Institut Géographique National, France
- SIO	Scripps Institution of Oceanography, USA

* indicates data center currently transmitting and/or archiving hourly, 30-second GPS data from selected sites

† indicates data center proposing to transmit and/or archive hourly, high-rate GPS data for LEO activities

GPS DATA SETS

◆ Daily GPS data

- 30 second sampling
- ~240 stations at CBIS
- Average 2 hour delay
- File types:
 - ◆ 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
- ~70 regularly submitting
- Average 5-15 minute delay
- Retained for three days
- Since mid 1998

◆ Hourly high-rate GPS data (future)

- ~10 second sampling (TBD)
- >30 stations planned
- Late 2000

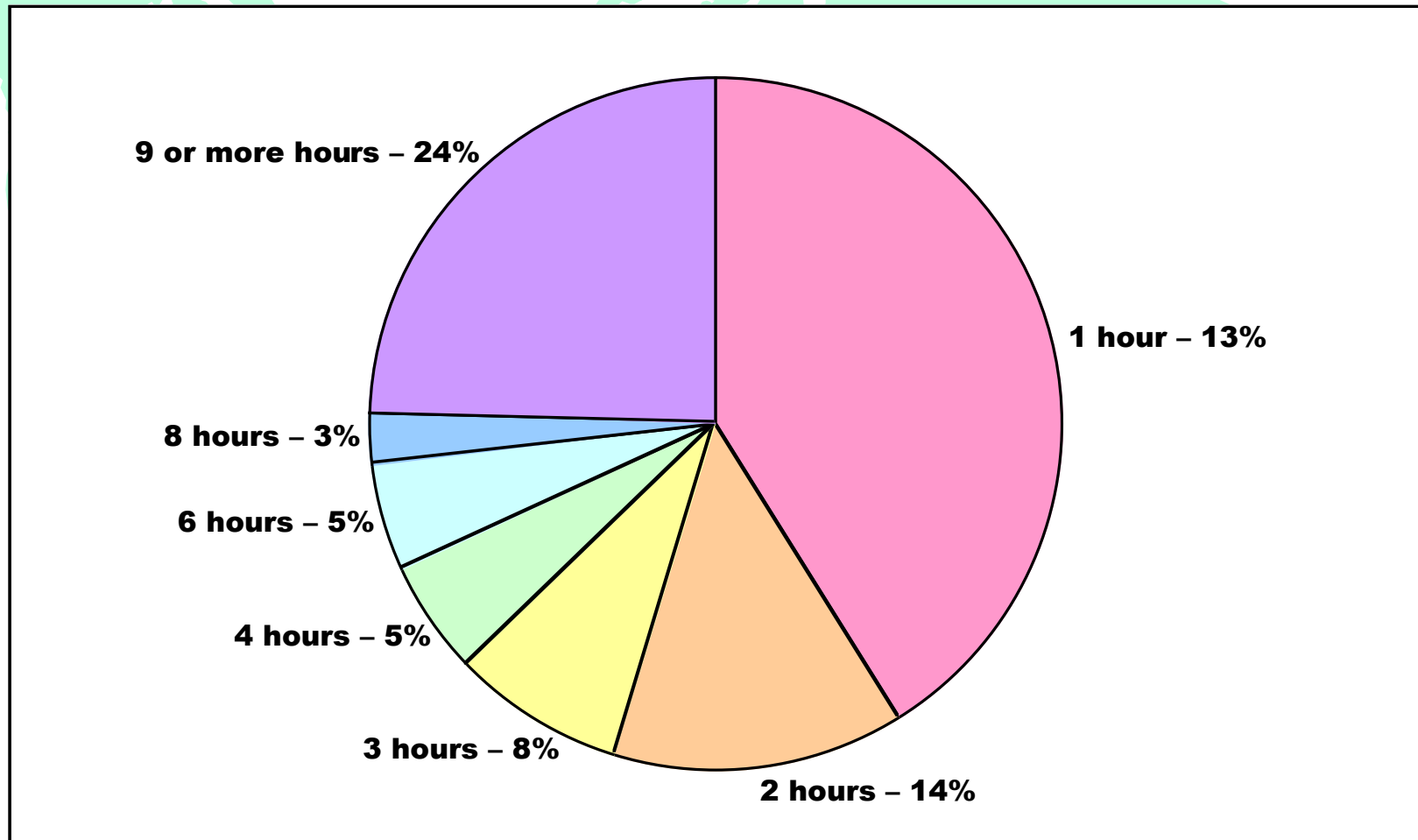
IGS PRODUCTS

- ◆ **Orbit, clock, ERP products**
 - **Seven ACs**
 - **Since GPS week 0649**
 - **Weekly precise combination, daily predicted and rapid combinations from AC Coordinator (AIUB)**
- ◆ **SINEX products (station positions)**
 - **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 AACs**
 - **Since June 1998**
- ◆ **Troposphere products (combined zenith path delay, ZPD)**
 - **Seven AACs**
 - **Weekly files**
 - **Weekly combination (from GFZ)**
 - **Since January 1997**

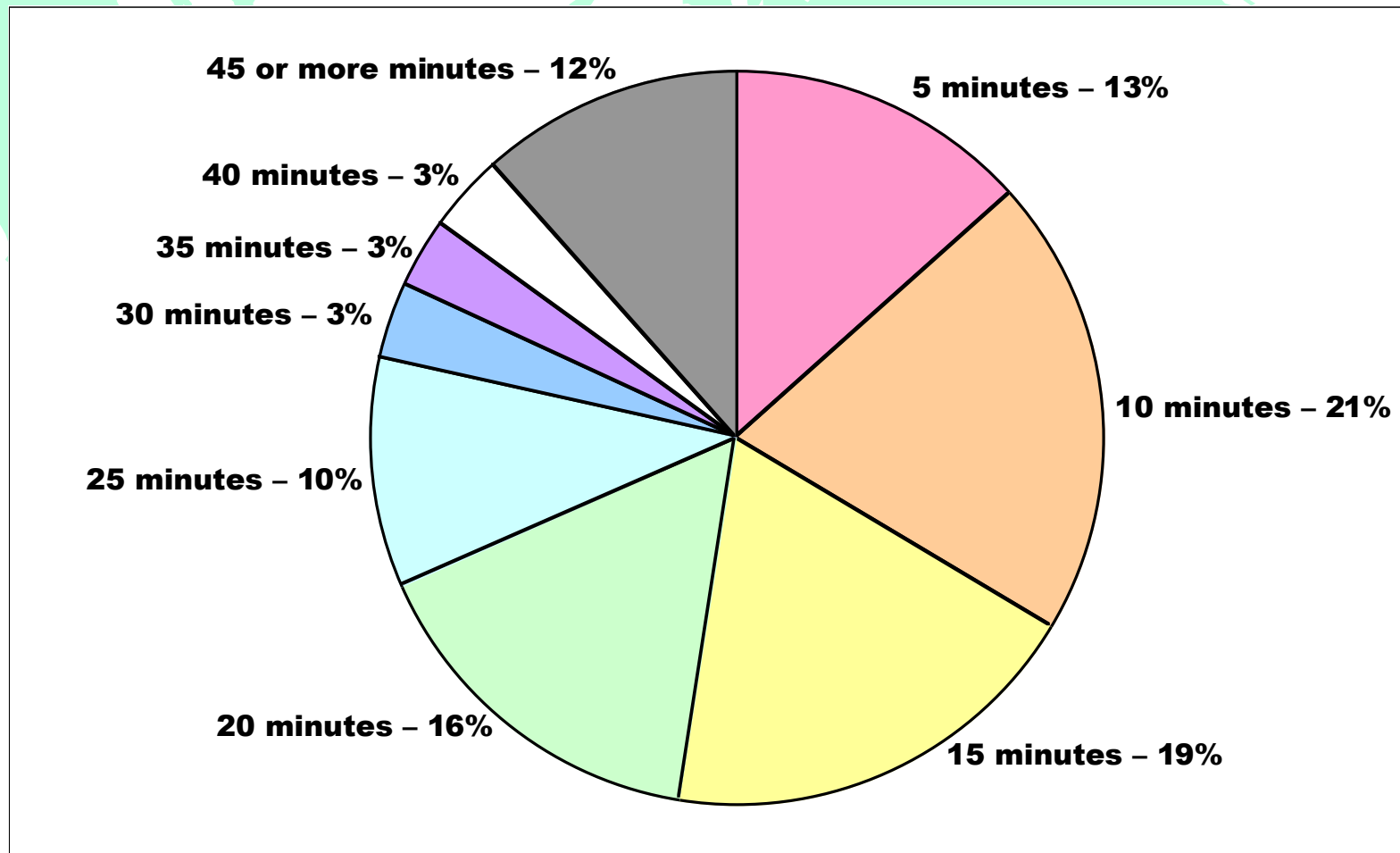
IGS GLOBAL DATA CENTER HOLDINGS

Data Type	CDDIS	IGN	SIO
Data			
GPS daily (D format)	X	X	
GPS daily (O format)	X		X
GPS hourly (30-second)	X	X	
GPS hourly (high-rate)	Future		
GLONASS daily (D format)	X	X	
GLONASS daily (O format)	X		
Products			
Orbits, etc.	X	X	X
SINEX	X	X	X
Troposphere	X	X	X
IONEX	X	X	

LATENCY OF DAILY DATA (at CDDIS)

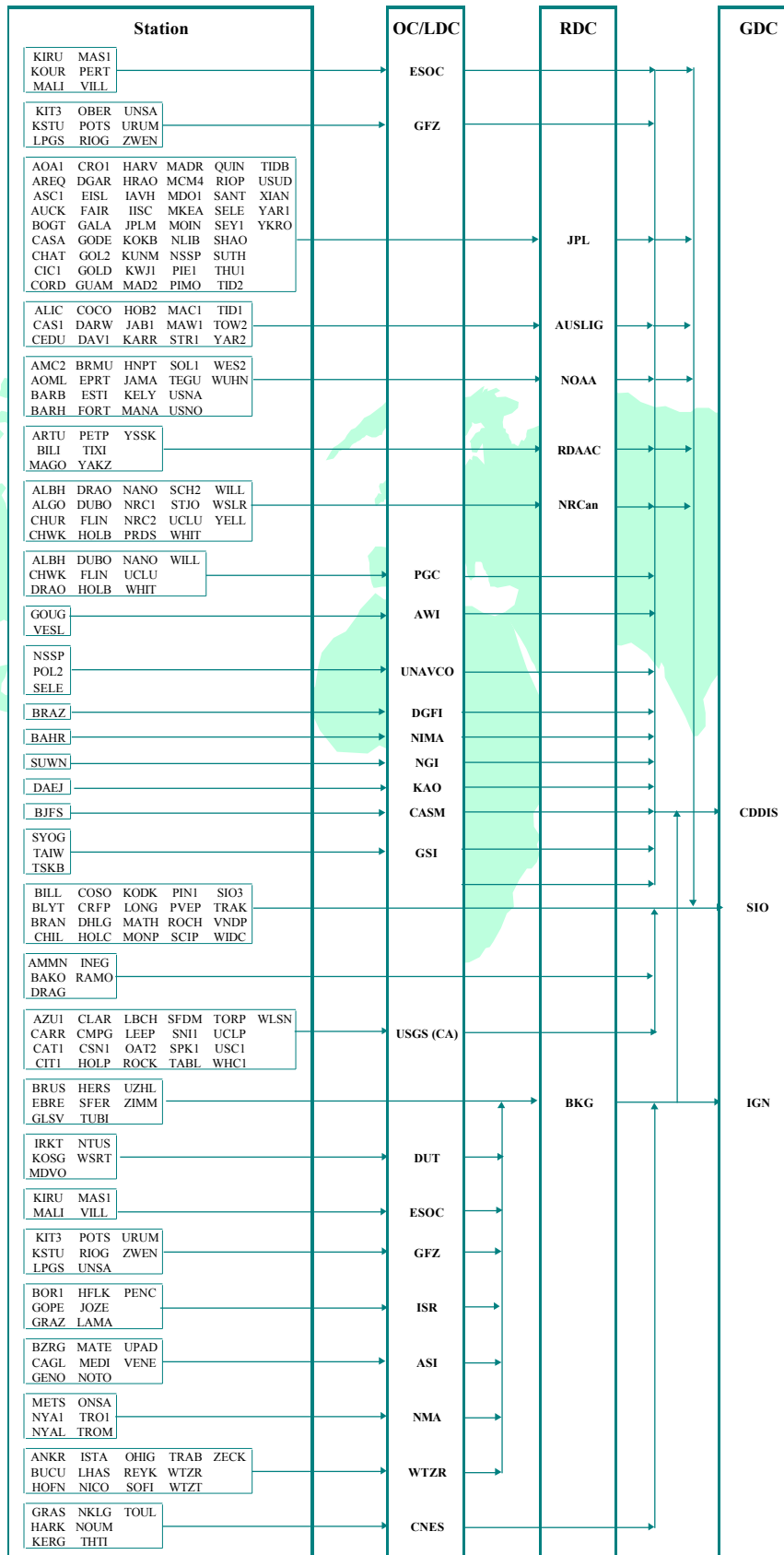


LATENCY OF HOURLY DATA (at the CDDIS)



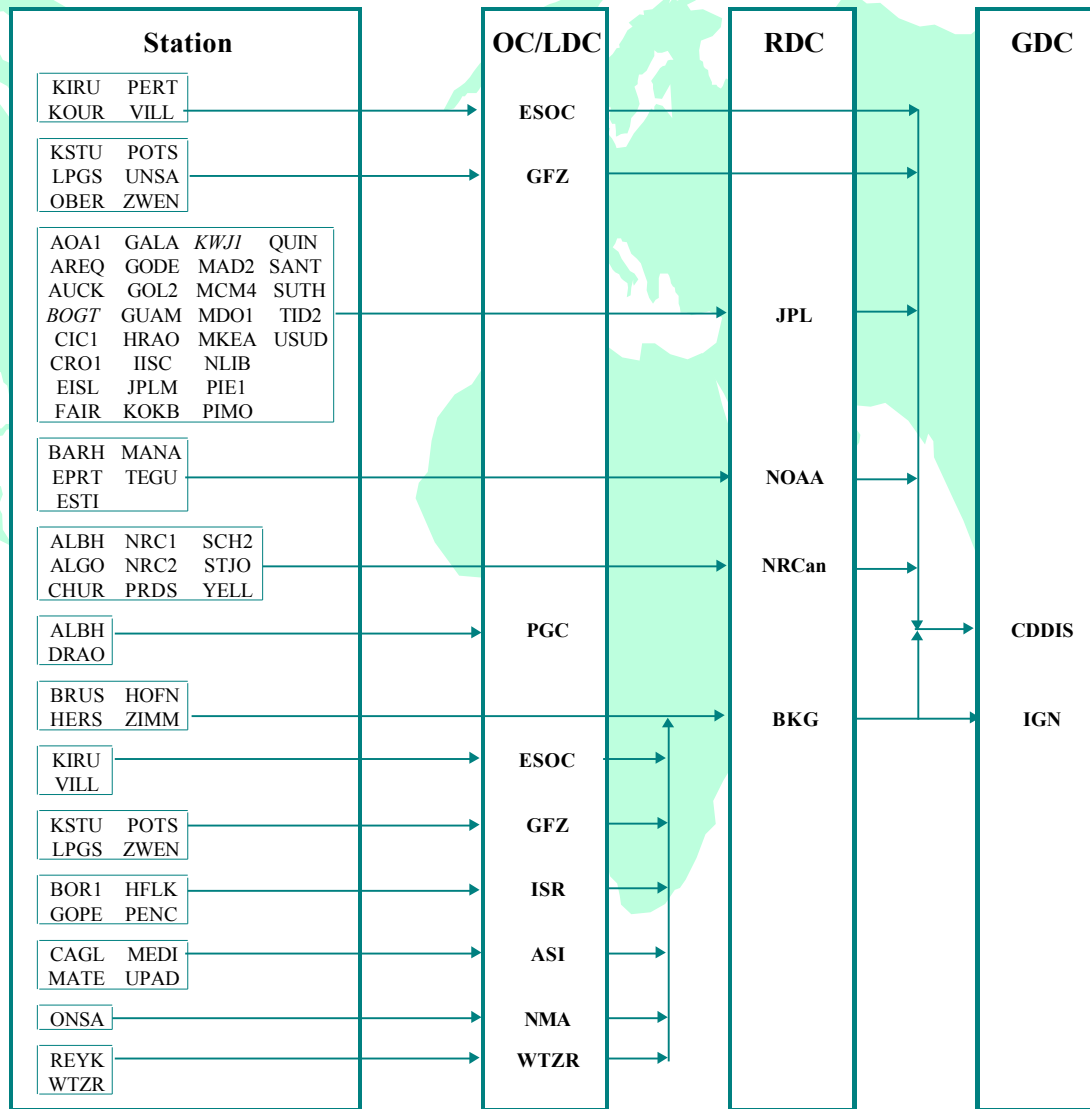
CURRENT IGS DATA FLOW

(Daily Data Files)



CURRENT IGS DATA FLOW

(Hourly Data Files)



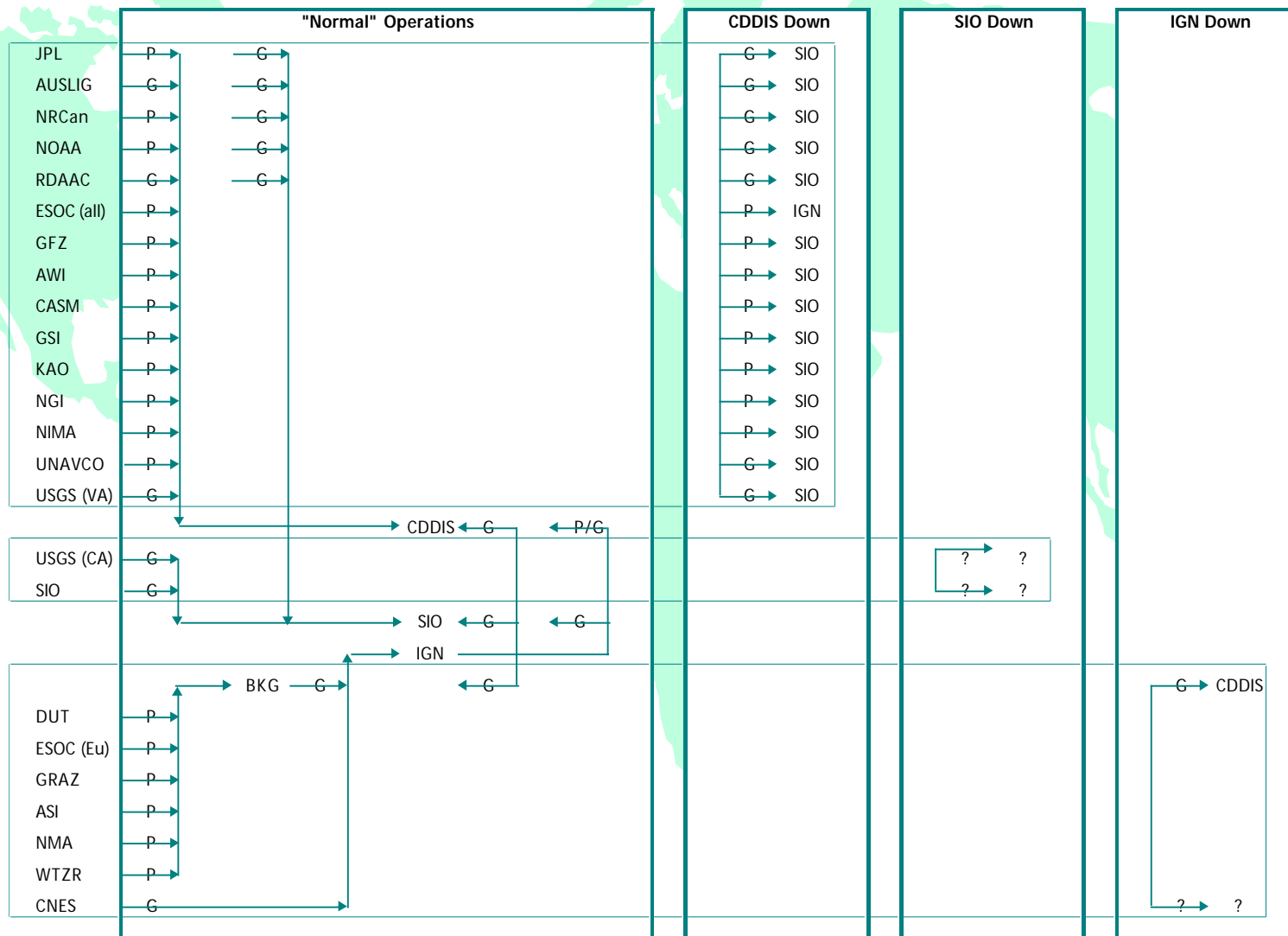
Note: Site in *italics* indicates former hourly site

DEVELOPMENT OF BACKUP PLAN FOR IGS DATA FLOW

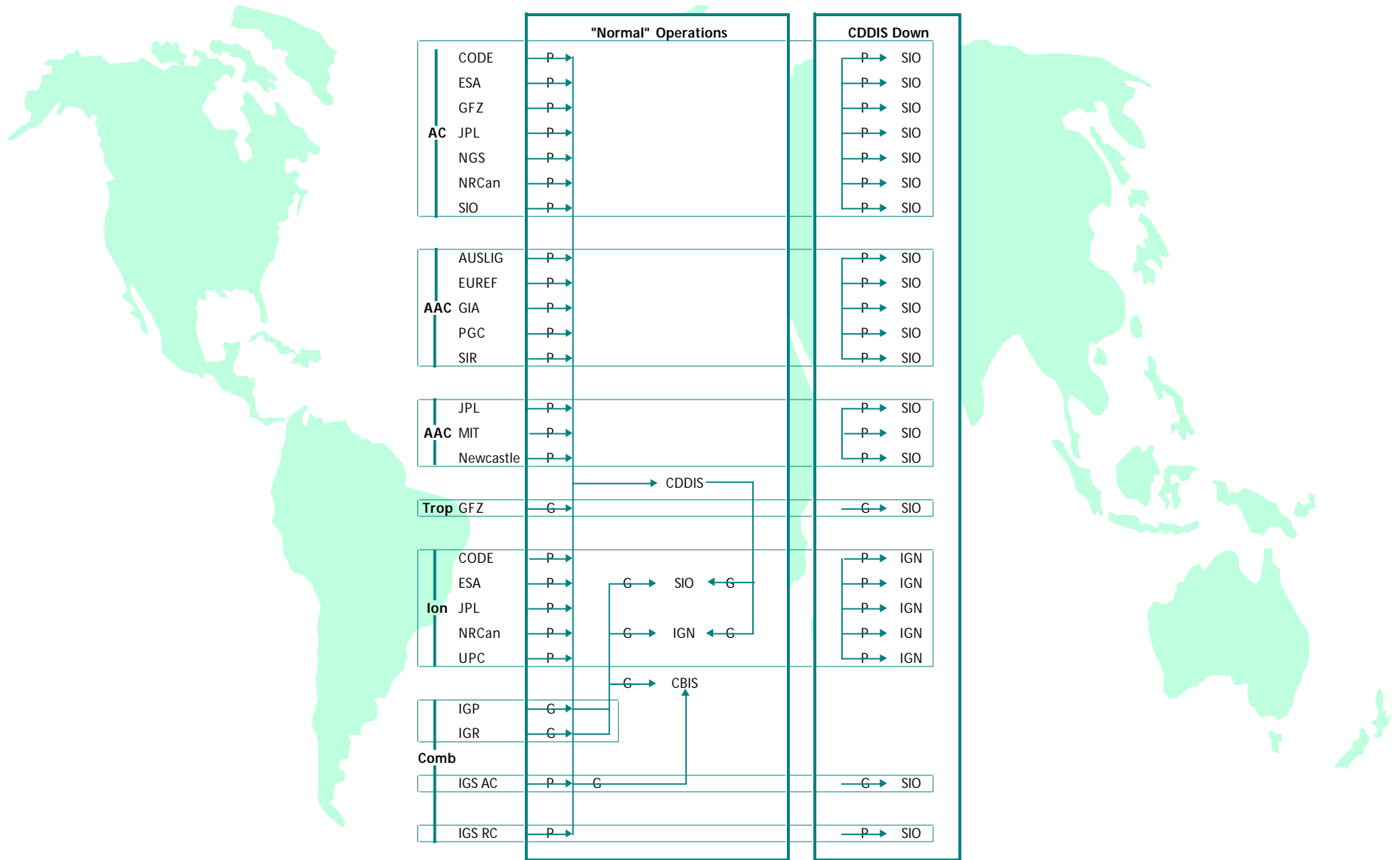
- ◆ **Identify data center contacts**
- ◆ **Identify timelines and protocols for data center outages**
- ◆ **Identify current data flow paths**
 - **All sites with site logs at IGS CB**
- ◆ **Identify alternate paths for data flow**
 - **Initially address backups for GDCs**
 - **Each OC/RDC should have an alternate GDC**
 - **Eventually extend to RDC level**
- ◆ **Develop notification policies**
- ◆ **Minimize special requirements at data centers**
 - **Create anonymous or username/password ftp “put” areas**
 - **Ensure security of incoming data areas**
 - **Develop routines to automatically peruse incoming data areas**
- ◆ **Extend plan**
 - **Hourly data**
 - **Products**
 - **CBIS**
- ◆ **Finalize plan and conduct tests**

BACKUP IGS DATA FLOW

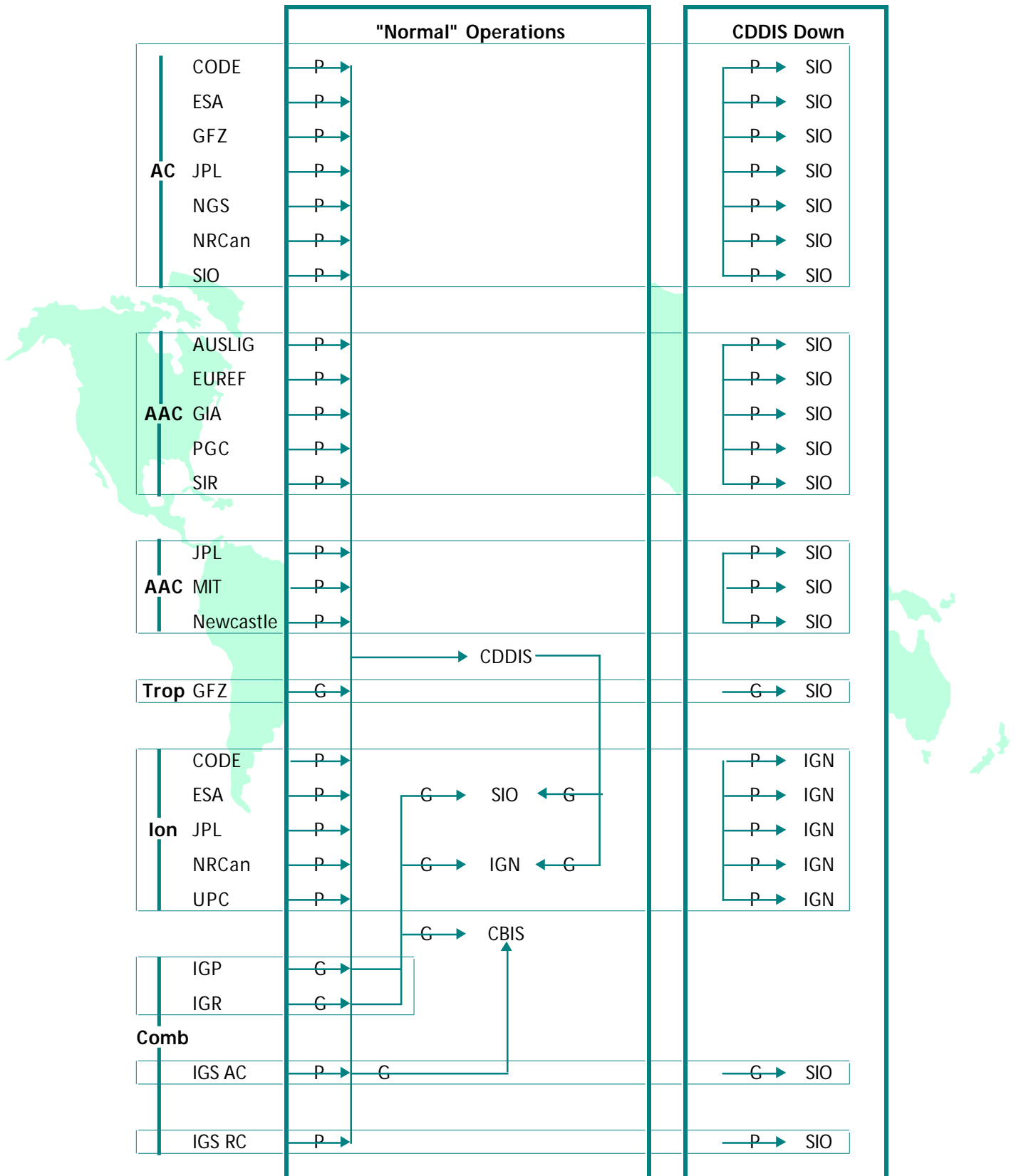
(Daily Data Files)



CURRENT AND BACKUP FLOW OF IGS PRODUCTS



CURRENT AND BACKUP FLOW OF IGS PRODUCTS



RECOMMENDATIONS

- ◆ **Ensure that data center information available through IGS Central Bureau (<ftp://igscb.jpl.nasa.gov/igscb/center/data/>) is complete and current for all IGS participants. Add backup data flow paths to this data center information.**
- ◆ **Establish and maintain email distribution lists for key data center contacts at the IGS Central Bureau. The use of distribution lists could be extended for all components of the IGS as has successfully been implemented within the ILRS (<http://ilrs.gsfc.nasa.gov/pointsof.html>).**
- ◆ **Complete a backup data flow plan for daily and hourly IGS data and IGS products. Ensure all data center (and analysis center) contacts have reviewed the plan and will implement its procedures.**
- ◆ **Data centers should create and monitor ftp put areas (anonymous or username/password) to facilitate flow of data and products in a backup situation.**
- ◆ **Schedule tests of the backup data flow paths on a regular basis to ensure their operational readiness.**
- ◆ **Identify backup facilities for the IGS Central Bureau Information System (CBIS) ftp and web sites. Create a backup system for the various mail exploders maintained by the CBIS, in particular IGSMail.**
- ◆ **Ensure the viability and commitment of all IGS data centers to the routine and backup operations of the service.**