



# IGS Data Center Operations and Issues Overview

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- Recent developments
- Issues to be addressed
- Future items





# IGS Global Data Centers

- **CDDIS:** Crustal Dynamics Data Information System, NASA GSFC, Greenbelt, MD USA
  - Contact: Carey Noll
- **IGN:** Institut Géographique National, Marne-la-Vallée, France
  - Contact: Bruno Garayt
- **KASI:** Korean Astronomy and Space Science Institute, Daejeon, Korea
  - Contact: Sungki Cho
- **SOPAC:** Scripps Orbit and Permanent Array Center, IGPP/SIO/UCSD, La Jolla, CA USA
  - Contact: Paul Jamason



# Data Center Summary

- GDCs must archive data from IGS reference frame stations (at a minimum)
- Various GDC holdings reflect other requirements in addition to IGS

Type	Then (When)	Now				
	CDDIS	CDDIS	IGN	SOPAC	KASI	IGS
Daily	80 (1994)	330	330	1,700	330	390 (128*)
Hourly	170 (2004)	220	220	600	220	247
High-rate	50 (2001)	120	120	60 (raw)	120	115

*\*Number of IGS reference frame sites*



# Recent Data Center Developments (1/3)

- Transition ACC activities from GFZ to NOAA/NGS
  - Required enhancement of AC->ACC->GDC flow paths
  - AC products flow to DCs and thus independent of ACC
  - IGS GDCs and the IGSCB are THE official sources of IGS ACC products

**Flow of AC and ACC Product Files**

Who	What	Where First (put)	Where Else (get)
ACs	Ultra-Rapid files	CDDIS+BKG	Non-public
ACs	Rapid files	CDDIS+BKG	Non-public
ACs	Final files	CDDIS+IGN	SIO+KASI
ACC	Ultra-Rapid combination files	CDDIS+IGN+SIO+KASI	IGSCB
ACC	Rapid combination files	CDDIS+IGN+SIO+KASI	IGSCB
ACCs	Final combination files	CDDIS+IGN+SIO+KASI	IGSCB
ACs	Reprocessed files	CDDIS	IGN+SIO+KASI
ACCs	Reprocessed combination	CDDIS	IGN+SIO+KASI+IGSCB



# Recent Data Center Developments (2/3)

- RINEX V2.11
  - Accommodates L2C observable
  - Archived in DC operational directories as of 01-Sep-2007
  - Older L2C test data sets converted to RINEX V2.11
  - ~25 sites supply L2C data (not all IGS sites)
- RINEX V3
  - Test data (hourly) available (1 site now)
- New troposphere product
- AC reprocessing activity



# Recent Data Center Developments (3/3)

- Daily data from National Geospatial-Intelligence Agency (NGA)
  - 11 GPS monitor sites
  - Spanning 1999-present
  - New 4-char site naming convention recently adopted
  - Requires update of archives with files using new names
  - CDDIS has now updated archive
  - Site logs to IGS CB (RSN)
  - See (near) future IGSMail message for more details



# GDC Support of IGS Reprocessing Campaign (1/3)

- Reprocessing campaign 1: GPS Weeks <TBD>-1459
- Weekly reprocessed files archived in separate subdirectory within existing GDC directory structure
  - */gps/products/WWWW/repro1*
  - */gps/products/repro1/WWWW*
- Includes AC files (from ESA, GFZ, MIT, NOAA, PDR, SIO) and combination files (from GFZ and NRCan)
- Same filenames convention but AC codes reflect campaign number
  - Current (AC files): *CCCWWWWD.typ.Z*
  - Current (ACC files): *igsWWWWD.typ.Z*, *igsYYPWWWW.typ.Z*, *IGSYYPWW.typ.Z*
  - Reprocessing campaign 1 (AC files): *CC1WWWWD.typ.Z*
  - Reprocessing campaign 1 (ACC files): *ig1WWWWD.typ.Z*, *ig1YYPWWWW.typ.Z*, *IG1YYPWW.typ.Z*



# GDC Support of IGS Reprocessing Campaign (2/3)

- Current GDC holdings for IGS reprocessing campaign:

Source	Time Span	Number of Weeks
ESA (es1)	1408-1459	52
GFZ (gf1)	1410-1459	43
MIT (mi1)	1408-1459	52
NOAA/NGS (ng1)	1448-1459	12
PDR (pd1)	1408-1459	52
SIO (si1)	1408-1459	50
SINEX combination	1408-1459	52
Orbit/Clock combination	1430-1459	30





# GDC Support of IGS Reprocessing Campaign (3/3)

- After end of reprocessing campaign, GDCs will:
  - Move current operational AC and ACC files to */gps/products/WWW/orig*
  - Symbolically link results from reprocessing campaign
    - */gps/products/WWW/repro1/CC1WWWWD.typ.Z* linked to */gps/products/WWW/CCCWWWWD.typ.Z*
- Current operational files for weeks 1460 onward will remain unchanged and should be consistent with these reprocessed products for weeks TBD to 1459
- Users will download consistent products from standard directories



A historical map of the world, likely from the 17th or 18th century, showing continents, oceans, and various geographical features. The map is centered on the Atlantic Ocean and includes labels for various regions and cities. The title "BRDC Files at CDDIS" is overlaid in large white text.

# BRDC Files at CDDIS

- Daily broadcast ephemeris file (BRDC) contains all unique messages for a given day
  - <ftp://cddis.gsfc.nasa.gov/pub/gps/data/daily/YYYY/brdc>
- Hourly file for current day contains messages from previous hour and accumulates from 01:00 UTC
- Hourly file becomes daily file at UTC 00:00 the next day; daily file re-processed from site-specific daily navigation files approximately UTC 02:00 the following day
- Recent identified problems (e.g., bad messages) have been corrected by procedure modification
- CDDIS also testing alternate method for creating daily BRDC file:
  - <ftp://cddis.gsfc.nasa.gov/pub/gps/data/daily/YYYY/brd2>



# Issues Still to be Addressed (1/2)

- Support of network validation/QC
  - Provide statistics covering data availability, data latency, completeness of data files and the consistency of the records in the RINEX header and the site logs
- CDDIS daily data summary information
  - Generated each day and updated throughout the day as new data arrive
  - Derived from teqc output
  - Could be enhanced to show discrepancies between IGS site log and RINEX header
  - Allows data to be flagged, but not removed from archive

IGS Tracking Network Status for 29-May-08 080529 08150      GPS Week 1481 Day 5      As of date: Jun 2 2008 18:25:25

Site	Dly (H)	No. Exp.	No. Obs.	Pts. Del.	Avg. %	Avg. MP1	Avg. MP2	Pos. Diff	No. Slps	No. V	Receiver Type	Ant. Antenna Type	Height	Marker Name	Number	
abpo	1	26658	25914	0	97	0.40	0.37	0.07	23	1	ASHTECH UZ-12	ASH701945G_M	SCIT	0.008	ABPO	33302M001
adis																
aira	1	25234	23157	738	91	0.37	0.49	0.03	35	1	TRIMBLE 5700	TRM29659.00	DOME	0.000	AIRA	21742S001
ajac																
albh	1	25135	24689	138	98	0.17	0.20	0.11	8	1	AOA BENCHMARK ACT	AOAD/M_T	SCIS	0.100	albh WCDA-ACP	927 40129M003
algo	1	24911	24605	28	98	0.23	0.20	0.03	2	1	AOA BENCHMARK ACT	AOAD/M_T	NONE	0.100	ALGO CACS-ACP	8831 40104M002
alic	8	25652	25649	1	99	0.26	0.20	0.21	5	1	LEICA GRX1200GGPRO	AOAD/M_T	NONE	0.007	ALIC	50137M001
alrt	2	29994	28464	8	94	0.11	0.14	0.13	5	1	ASHTECH UZ-12	ASH701945C_M	NONE	0.100	ALRT	40162M001
amc2	1	24666	24352	0	98	0.34	0.35	0.07	6	1	ASHTECH Z-XII3T	AOAD/M_T	NONE	0.000	AMC2	40472S004
amu2	2	58145	57148	7	98	0.36	0.43	0.00	30	1	TRIMBLE NETRS	ASH700936D_M	SCIS	0.000	AMU2	66040M002
ankr	5	24679	24679	0	100	0.31	0.35	0.04	0	1	TPS E_GGD	TPSCR3_GGD	CONE	0.070	ANKR	20805M002
Antc																

⋮



# Issues Still to be Addressed (2/2)

- Synchronization/equalization/validation of GDC archives
  - Data files must be consistent between data centers
  - Data revisions must populate to all archiving data centers
  - Users must be aware of data revisions
- Accumulation and archive of observation and product files from real-time data files
- New data formats (e.g., RINEX V3)
  - No TEQC?
  - QC/validation at DCs





# Future Items

- Data discovery
  - See talk and demonstration by Jamason, et. al
- GGOS developments:
  - Planning recommendations for IAG services in regard to metadata standards
  - IGS data and products will need to incorporate these standards for interface to GGOS portal
  - GGOS will interface to other international systems and will thus provide visibility to the IGS, etc. to a broader user community
  - See metadata presentation at GGOS Unified Analysis Workshop (<http://www.iers.org/> under Meetings/Workshops)



# IGS Data Center Overview

- Questions/Comments???

