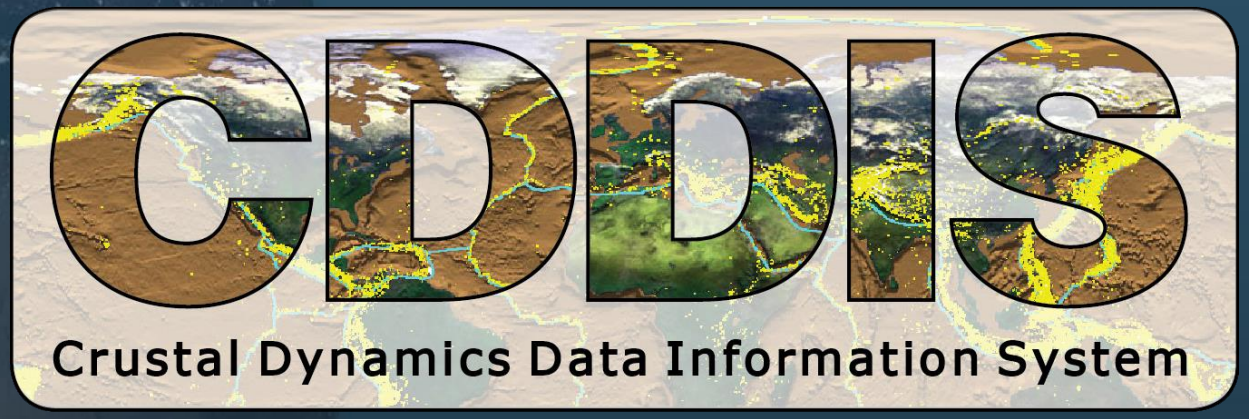
2023 Status Update



Taylor Yates – Software Engineer, Lead for DORIS/VLBI/CMR/Metrics

November 28, 2023

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It’s Been a Busy Year: Improvements

- Guardian Products
  - Added JPL’s Ring of Fire early warning system to our archive
- GNSS Real-Time Upgrade
  - Upgraded the underlying hardware to a new production cluster
- Cloud Migration
  - In development now, production launch planned for Fiscal Year 2025
- Integration into ESDIS’ Ingest & Archive Team
  - Incorporated our Development team into the ESDIS system

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Guardian Products

- JPL's GNSS Upper Atmospheric Real-time Disaster Information & Alert Network (GUARDIAN)
  - Updated files arrive every minute
  - Ingest & Archive latencies range from ~10 seconds to ~0.5 seconds, depending on size of file
  - Meeting these load and latency requirements required a significant refactor of our ingest software
  - The new software was built with multithreading in mind
    - Currently running in production without issue, responds well to horizontal scaling
    - This will be very useful when DORIS datasets move to AWS

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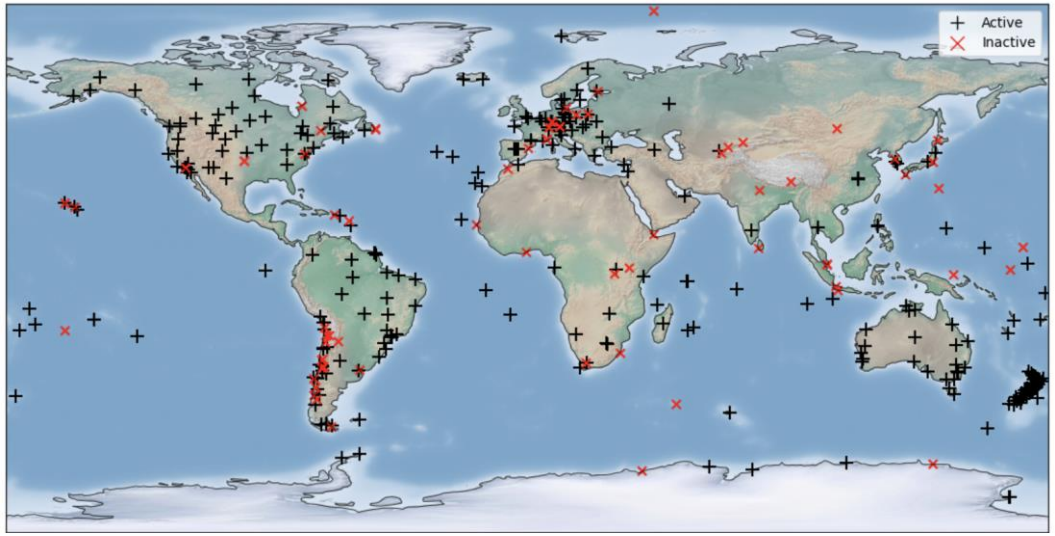
GNSS Real-Time Upgrade

- GNSS real-time system
  - New production cluster opened to the public
  - >400 active streams
  - Average latency is < 1 second
  - 20-30K simultaneous client connections – surges to 100K
  - Users increasing by 20-25% per month
  - Stream status & latency maps
  - New box plots of latency distribution for each stream



Status	Country	Identifier	Closest City	System	Network	Longitude	Latitude	Format	Latency (seconds)
+	NZL	240600NZL0	C KAIAPO TLP	GPS+GLONASS	GeoNet	175.99	-38.69	RTCM 3	0.47
+	MDG	ABPO00MDG0	Antananarivo	GPS	JPL	47.23	-19.02	RTCM 3	2.29
+	USA	AC2300USA0	AC23_RTCM3	GPS+GLO	UNAVCO	-150.88	60.48	RTCM 3.1	0.56
+	USA	AC2400USA0	AC24_RTCM3	GPS+GLO	UNAVCO	-156.65	58.68	RTCM 3.1	0.65

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Cloud Migration (AWS)

- Why Migrate?
  - Easy to keep using CDDIS same as before
    - Directory structure and access via FTP-SSL / HTTPS will remain available
  - Better integration with data discovery tools
    - CMR and EarthData Search
  - If you have the expertise and desire to do so, you can access data directly
    - Saves bandwidth & hard drive spaces, while also ensuring you have up to date copies
- Possible Hurdles
  - There is a learning curve for taking advantage of new capabilities
    - Accessing data directly, calling CMR's API, etc.
  - EarthData dependencies external to CDDIS
    - This can be great when the tool works, but can be frustrating when issues arise

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Ingest & Archive Team

- Agile Scrum – Standardized system for planning improvements
  - System is focused on software and uses 3 month intervals
    - Helps the entire Development team see the big picture
  - Integrated with the other DAACs at NASA
    - This allows us to work together, sharing software packages and ideas
  - Force multiplier for moving to Cloud
    - Other DAACs have already migrated, we're using their best practices and lessons learned

It’s Been a Busy Year: Issues

- Staffing
  - Manager out for Fiscal Year 2024
  - 2nd Civil Servant Position unfilled
  - Lead Contractor Position filled late 2023
  - Several challenges during the fall (medical, hiring, school)
  - Additional FTE for GNSS real-time & RINEX file replacement technology
- Cloud Migration Delays
  - On-prem archive activities take precedence
  - Possible issues with dependencies, still investigating this

What about 2024?

- Cloud Migration (continued)
  - DORIS has been identified as first to go to cloud, followed by VLBI's SWIN
- Web Unification with NASA's EarthData
  - Dynamic landing pages for each dataset is a priority here
- CORS Network
  - Discussion about CDDIS being their archive. Huge datasets
- GNSS & ILRS products & coordinator position
  - CDDIS has been asked by the IGS to assume this
- GNSS Version 4 Ingest System
  - Data Definition Files (DDFs)