NOAA GOES Data Collection System – Program Status

Spring TWG 2023

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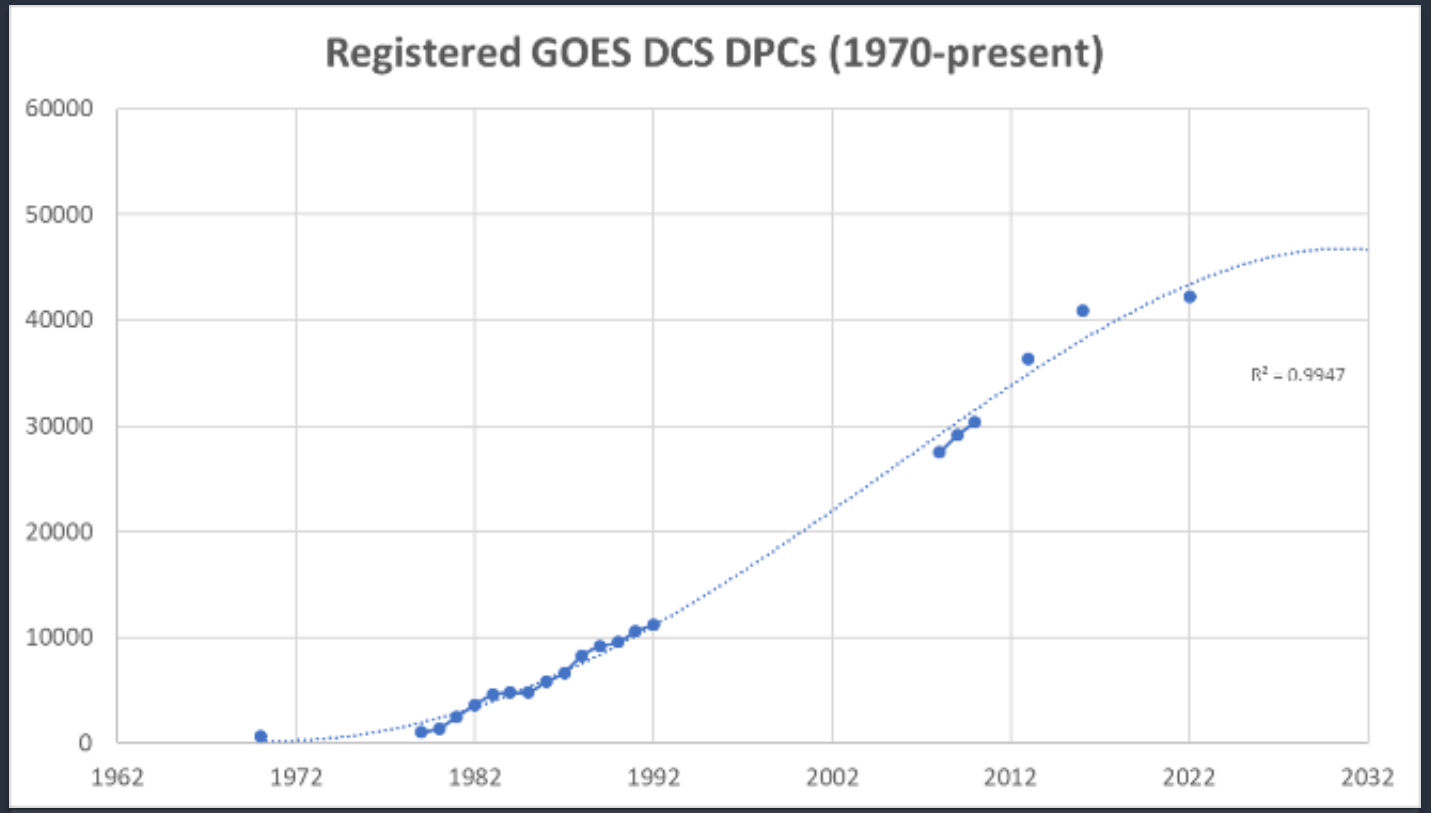
DCS Program Updates

- Current Status
- System Changes and Improvements
  - Batch Processing
  - Field Test / Data Users
  - Communication Protocols
  - DCP Latitude / Longitude Reporting
  - Two-Way Communication / Forward Link
- Spectrum Pipeline Reallocation Engineering Study Follow-on (SPRES)

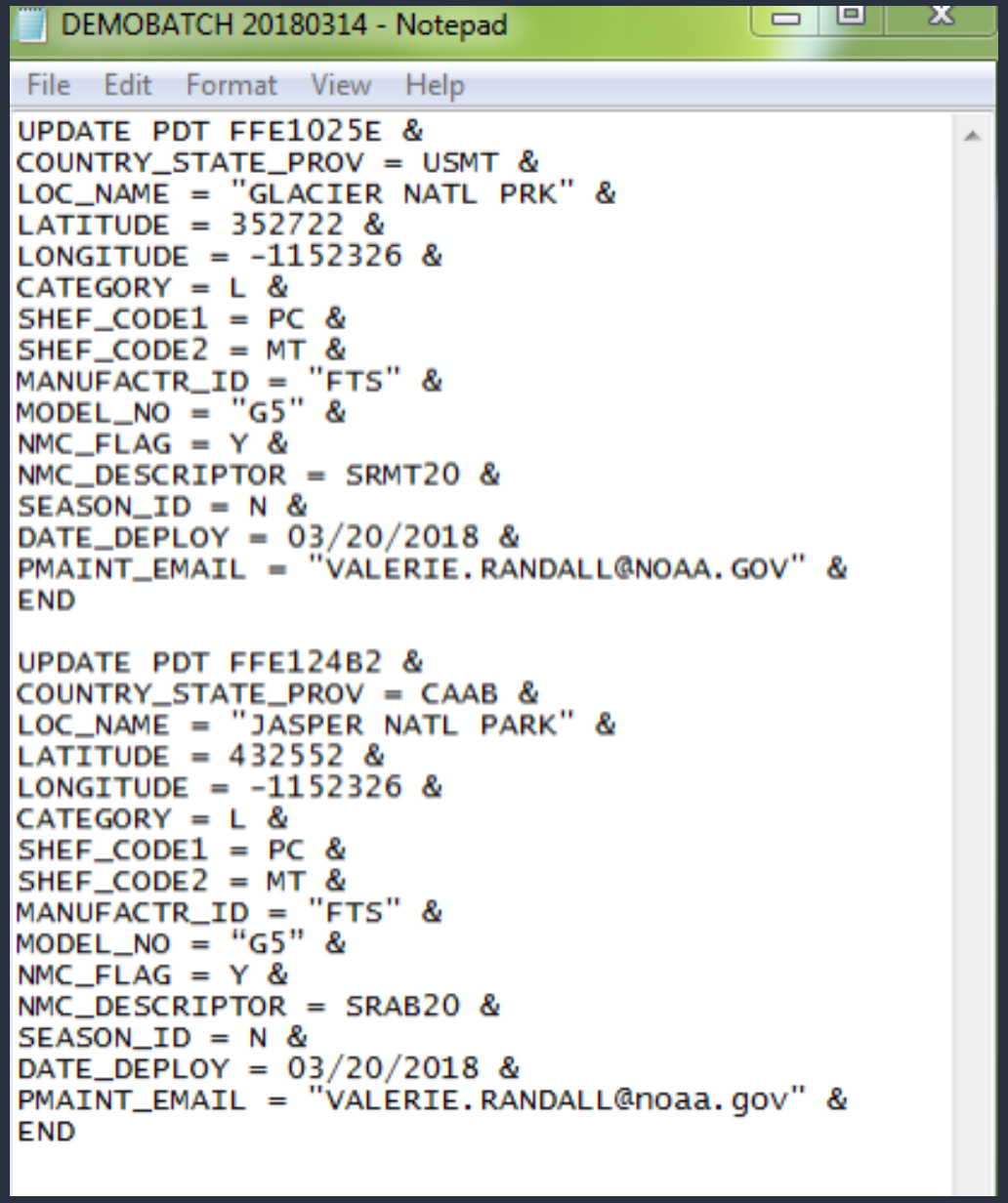
DCS Program Updates - Current Status

- 42,000+ Registered / 33,000+ Active Platforms
- 61 Countries
- ~960,000 messages per day
- User Accounts 3714 Users (1083 Field Test)
- System is operating at high reliability but RFI is an issue



System Changes & Improvements – Batch Processing

- Platform Data Tables
  - 40,000+ Platforms
  - Biggest user has 12,000 platforms
  - Manual update can be tedious or impractical
- Registration dialogue chances for Secure Transfer File Protocol (SFTP) - Complete
- Internal testing to verify - In Progress



System Changes & Improvements - Field Test & Data-only User

- Field Test
  - Originally intended for field users to test a DCP without an account
  - Security requirements drove change for users to establish accounts
  - Field Test Users now number >1000, **likely for data-access** not field test
- Problems
  - IT Security: User account review requirements not being met
    - Accounts need to be reviewed annually
  - DADDS accounts currently require a System Use Agreement that pertains to deploying DCPs (U.S. 15 CFR 911). No real "data-only" account option.
- Solutions
  - DADDS functionality will be implemented to provide system managers tools to address account review
    - Users who have not accessed the system in time requirements will be notified of account suspension
  - NOAA is considering DADDS functionality that allows Data-only users more targeted access

System Changes & Improvements - Communication Protocols

- Compacting ASCii offers up to 50% message size reduction
- Compacting Pseudobinary offers up to 20% message size reduction
- Open Binary
- Draft protocol to be discussed **tomorrow**

Carrier 0.5s 0.25s	Clock 1-0-1 1=180	FSS 15-Bits	GOES ID 32-Bits	Flag Word								Packet Length 14-Bits	BCH 10-Bits	Data	CRC 16-Bits	Encoder Flush 16-Bits
				P	1	0	0	0	0	X	0					

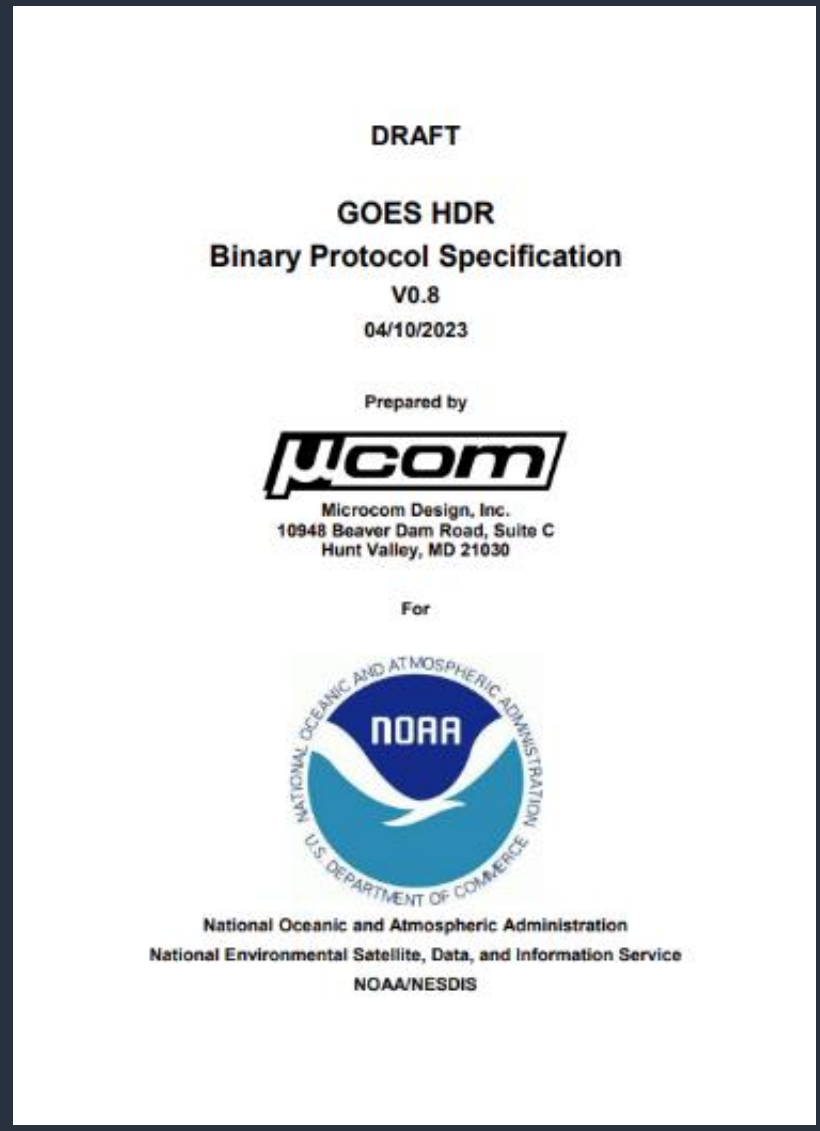
Figure 6: Open Binary Message Structure

Carrier 0.5s 0.25s	Clock 1-0-1 1=180	FSS 15-Bits	GOES ID 32-Bits	Flag Word								Packet Length 14-Bits	BCH 10-Bits	Data	CRC 16-Bits	Encoder Flush 16-Bits
				P	1	0	0	0	1	X	0					

Figure 12: Compact Pseudo Binary Message Structure

Carrier 0.5s 0.25s	Clock 1-0-1 1=180	FSS 15-Bits	GOES ID 32-Bits	Flag Word								Packet Length 14-Bits	BCH 10-Bits	Data	CRC 16-Bits	Encoder Flush 16-Bits
				P	1	0	0	1	0	X	0					

Figure 13: Compact Numeric ASCII Message Structure



DRAFT

GOES HDR
Binary Protocol Specification
V0.8
04/10/2023

Prepared by

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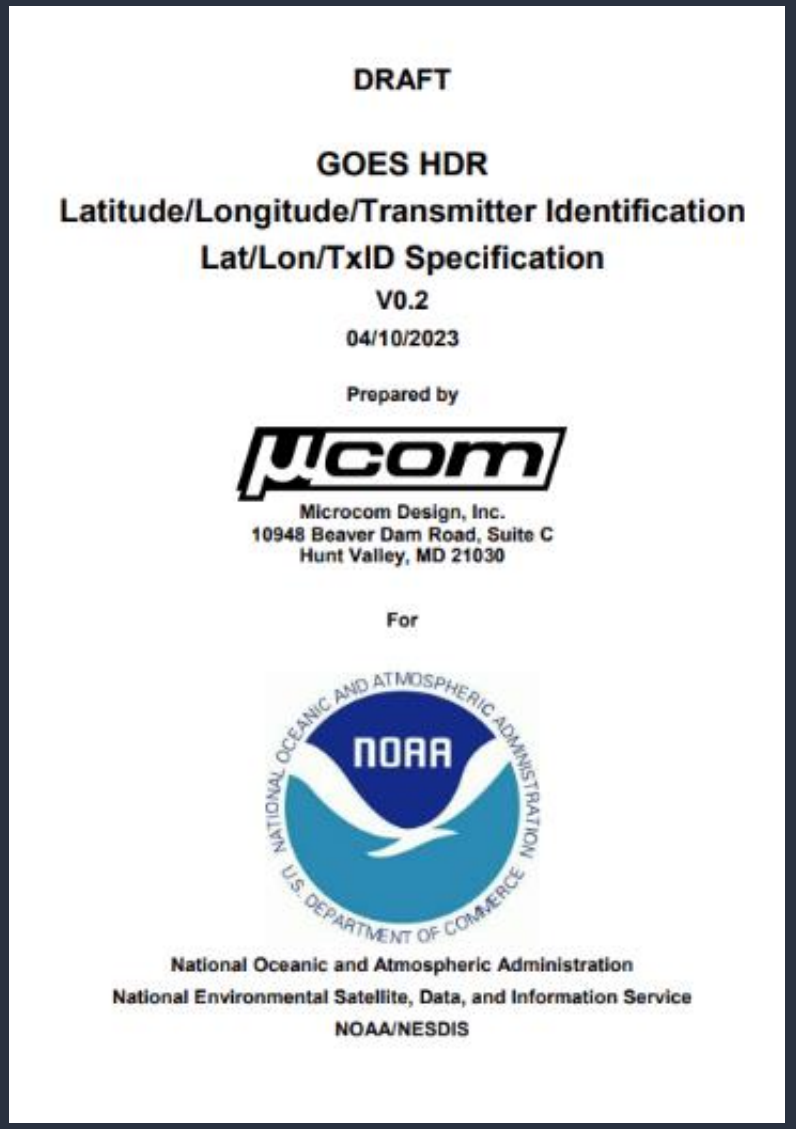
For

National Oceanic and Atmospheric Administration
National Environmental Satellite, Data, and Information Service
NOAA/NESDIS

System Changes & Improvements - DCP Position Reporting

- 9000+ blank DCP position entries in DADDS
- GOES DCS Program is **considering** a future requirement that all DCPs shall automatically report a position on deployment/re-deployment
  - This could include more than position…
  - DCP system setting parameters
- Draft protocol to be discussed…TOMORROW



DRAFT

GOES HDR
Latitude/Longitude/Transmitter Identification
Lat/Lon/TxID Specification
V0.2
04/10/2023

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System Changes & Improvements - Two-way Communications / Commanding

- GOES DCS remains committed to restoring “two-way communication using a forward link for DCP Commanding using GOES”
- Explore feasibility of other options (e.g. commercial) primarily focused on DCPs in cooperation with Coordination Group for Meteorological Satellites (CGMS) Enhanced DCP Standard (EDCP)
- Restoration of GOES DCS Two-way commanding is underway…
  - Previously developed Two-way Modulator is connected to the DADDS Development Rail
  - Test and Monitoring software is being updated
  - Preliminary “command” table developed in DADDS
  - Testing/debugging in progress
  - Next step: TCP/IP Interface Documentation and IF Interface connection
- GOES DCS Program is coordinating with GOES-R/GeoXO Program
- GOAL: in 2025 have sufficient information to support a two-way transponder decision on GeoXO (for or against)

Spectrum Pipeline Reallocation Engineering Study Follow-on (SPRES)

- In 2016, the Federal Communications Commission (FCC) issued a Notice of Proposed Rulemaking to consider sharing of the 1675-1680 MHz band between new commercial mobile operators and incumbent NOAA satellite operations.

- In January 2018, NOAA received funding to address the potential impact of spectrum sharing on its operations and awarded contracts to perform the Spectrum Pipeline Reallocation Engineering Study (SPRES).

- The May 2021 SPRES report finds that…
  - ….sharing presents low risk of causing impacts to HRIT given the frequency separation.
  - ….the GRB signal is also at some risk of RFI at the ground stations, more so from commercial base station operations (downlinks) than from commercial user devices (“uplinks”)
  - …**DCS, the report finds that, if the commercial operations are limited to uplinks, sharing would be manageable with modest protection zones**.

Spectrum Pipeline Reallocation Engineering Study Follow-on (SPRES)

- The May 2021 SPRES report recommends
  - Task #1. Reach a conclusion on the feasibility…required to establish appropriate redundant facilities for the DCS at key sites…. to insure that the DCS data can be received and further distributed without interruption, high reliability, and low latency in the event that any one of these facilities experiences harmful RFI.
  - Task #2. Reach a conclusion on the feasibility… to provide a robust, high reliability and low-latency alternative means of near real-time distribution of the DCS data from the key sites to both federal and non-federal users -- one possible alternative is disseminating the data by streaming it from one or more of the key DCS facilities.

    Task #3. Conduct further technical compatibility analysis to determine specific technical limits on commercial mobile operations to insure protection for the key DCS sites and certain GRB and HRIT sites.
  - Task #4. Determine what DCS, GRB and HRIT sites require protection for NOAA to meet its mission and where those sites are located. Part of that consideration would include review of the availability of online access by GRB users.
- Spectrum Reallocation
  - https://docs.google.com/forms/d/e/1FAIpQLScPHLSzU5UnL0iAKftnNMSRMza91lB0rtEkAVJRtEE_8yAU9g/viewform

GOES DCS Projects – Replacement GOES DCS DADDS

- Follow-on to DADDS Next project - - Three Areas for Improvement or Modernization
  1. Align / Design for NOAA Common Cloud Framework (NCCF)
  2. Preserve, Modernize & Improve upon Administrative and User Functionality
  3. Restore Previous (DAPS) System Capabilities
     - Two-way Communication w/ DCP Commanding via forward link
- STATUS: Projected Contract Award Sept 2023*

*Project is in contracting and details can no longer be shared publicly

Closing Thoughts

GOES DCS continues to be highly reliable, highly relevant, and highly important to dozens of agencies and groups in the western hemisphere

A number of concurrent efforts to improve now (protocols, etc.) and look to the future (DADDS replacement and GeoXO)

User input (Good Stories from the Field) and Site Visits are extremely valuable

Questions, Contacts, and References

- Questions?

- Program Manager - William “Skip” Dronen William.dronen@noaa.gov
- Customer Account Manager – Letecia Reeves letecia.reeves@noaa.gov
- DCS Help Desk **(757) 824-7450**

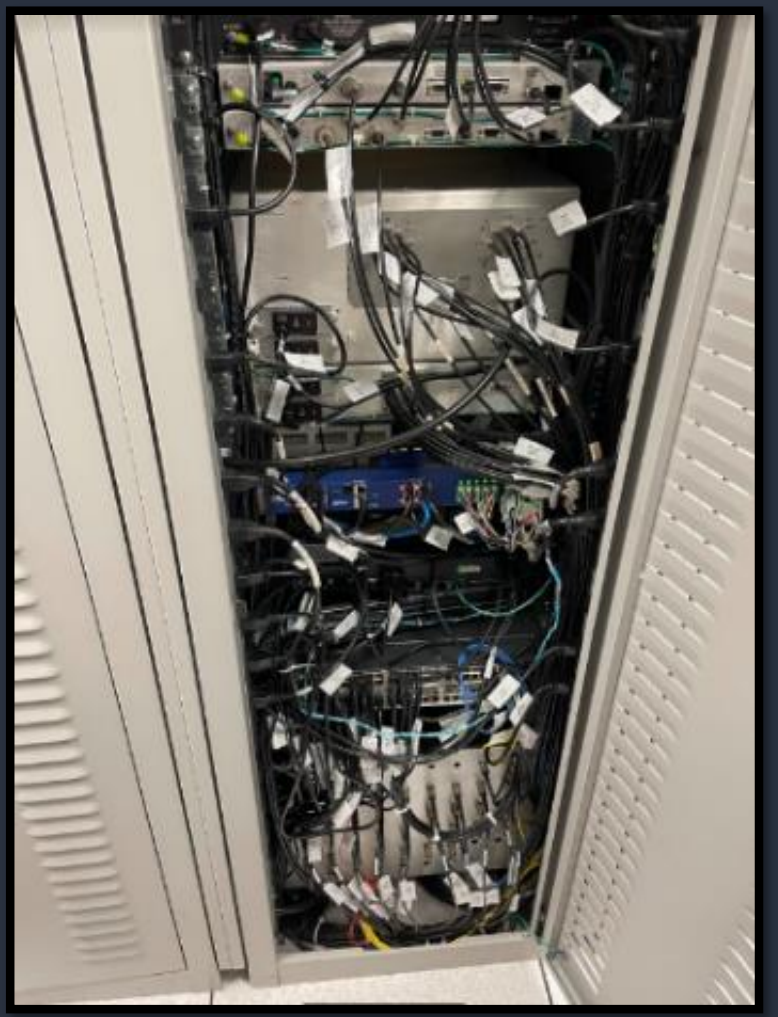
- Program Website
  - https://www.noaasis.noaa.gov/GOES/GOES_DCS/goes_dcs.html
- DADDS
  - https://dcs1.noaa.gov/
- System Diagram
  - https://dcs1.noaa.gov/documents/NOAA%20DCS%20Mar%202020.pdf
- Certified manufacturers
  - https://dcs1.noaa.gov/documents/GOES%20DCS%20Certified%20Venders.pdf

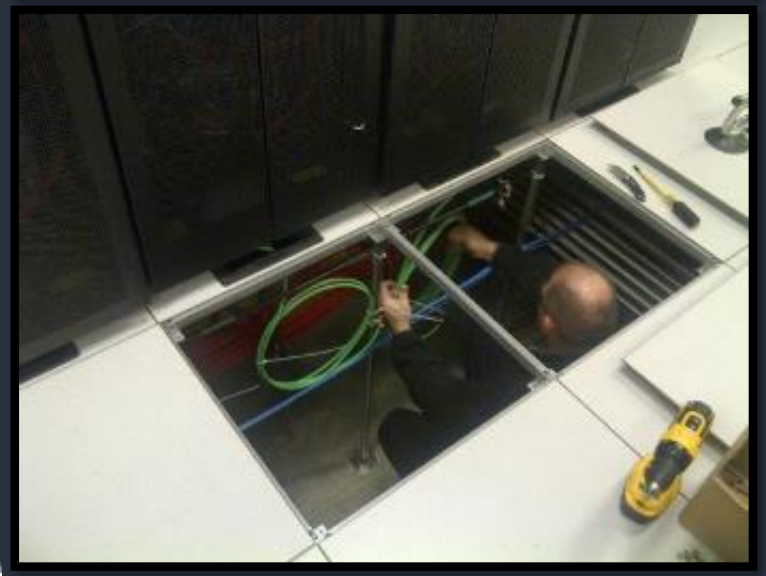
BACKUP SLIDES

Backup Pilot Antenna Project

DCS Backup Pilot System

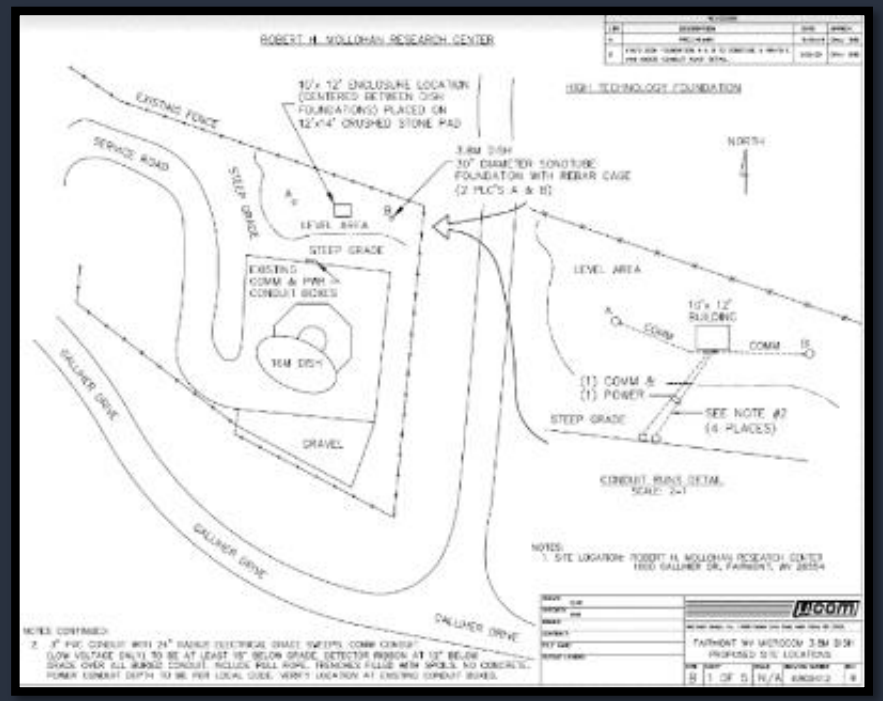
DCS Backup Pilot System





DCS Backup Pilot System

DCS Backup Pilot System



DCS Backup Pilot System