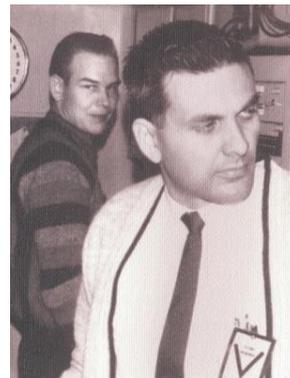MICROCOM
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Microcom Introduction & DCS History

- Founded in 1975 by Harry E. Betsill and William M. Pulford
  - Formerly of Bendix Satellite Communications Division
- Brett H. Betsill, President and Craig M. Pulford, Vice-President

- Experience with GOES Data Collection System (DCS) since the early 1980's - Assumed Lead DCS Ground Station Role in 2000's.
  - Sutron 100 bps DCP TX Design: 1980-1987 (Model 8004, aka the Yellow Brick)
  - Vitel/NOAA HDR Analog Demod: 1993-2000
  - Microcom *DigiTrak* DRGS Design & 1ST Delivery: 2002
  - DAMS-NT Development & Production: 2003 – Install at WCDA November 2003
  - Microcom GTX-1.0 Certification: July 2004 (GTX-1.0DA - August 2003)
  - DADDS Development and Deployment: 2006-2008
  - EDDN Buildout and Commissioning: 2007/2008
  - Microcom GTX-2.0 Certification: December 2012

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Microcom *DigiTrak* Receivers

- DAMS-NT *DigiTrak* Direct Readout Ground System
  - Direct Reception from the GOES Satellite
  - Lowest latency, highest reliability
  - Nearly 50 systems delivered and deployed since 2003
- Rack (200+ Channels) and Desktop (4-16 Channels) Versions
- Some Recent Installation News
  - 2020-2023: Upgraded all USACE Sites: Sacramento, Omaha, Vicksburg, Saint Louis, Cincinnati, Rock Island, and Columbus MS (summer 2023)
  - 2020: NOAA NERRS at University of South Carolina
  - 2020: NTIA's Table Mountain site in Boulder, Colorado
  - 2018-2023 Five Desktop DAMS-NT system sold to Ott Hydromet

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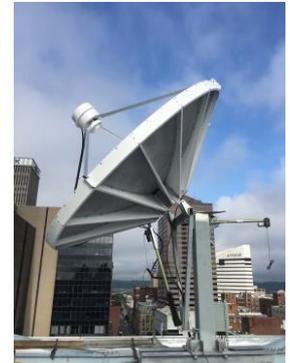
DigiRIT HRIT Receive System

- System Characteristics:
    - Easy installation with 2 people - Multiple mounting options for various site configurations
    - Does not require a dedicated computer - transfers data via an Ethernet connection
    - GOES rebroadcast with complete DCS channel coverage and low latency
    - East and West satellites provide opportunity for redundancy and backup
- Utilization Summary:
    - Over 50 *DigiRIT* systems have been delivered and deployed since 2012
    - USACE alone has nearly 30 *DigiRIT* systems deployed
    - Other users include USGS, NIFC, BOR, BC Hydro, Alberta Environmental
    - Next Install: USGS HIF2 in Tuscaloosa later this year

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DAMS-NT Software

Data Acquisition and Monitoring System Software

- DAMS-NT Server Application
    - Interface for the DAMS-NT *DigiTrak* DRGS systems.
    - DCS message ingest and dissemination to connected TCP/IP clients
    - System monitoring and fault indications
    - Remote Control and Monitoring via the DAMS-NT Client Application
- DAMS-NT Client Application
    - Similar interface to Server application
    - Data Ingest Options: DAMS-NT DRGS, *DigiRIT* Receiver, DDS/LRGS
        - DCS Data Service (DDS) - Internet based protocol to receive DCS messages from major DRGS installations (WCDA, NSOF, EDDN).
    - Optional Message Parser, Decoder, and Data Presentation
    - SQL Database Option – Storage of message parameters, signal quality statistics, and message data (raw and decoded) stored in user provided database.

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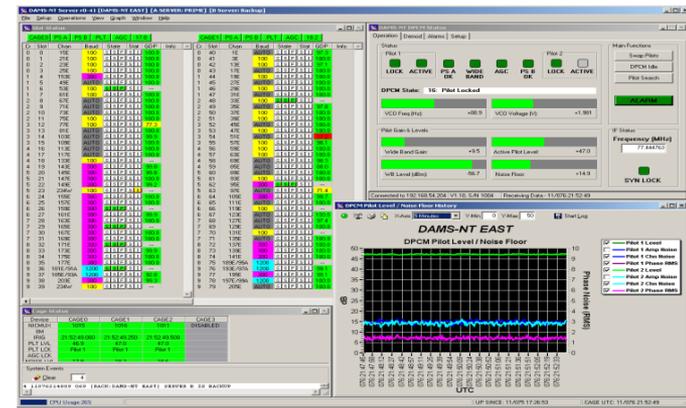
The XPress

- Fully integrated GOES DCS Data Collection Platform

  - GTX-2.0 Satellite Data Transmitter & Logger

  - UB6 Satellite Transmit Antenna

  - 5 Watt Solar Panel

  - GPS Antenna

  - Internal Battery Pack

  - Solar Regulator

- Lightweight

- IP66 Enclosure

- Extremely cost-effective

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GPS Antenna
- Ensure Accurate Transmission Time
- Calibrate the Onboard 10MHz VCXO

UV Resistant ABS Plastic Shell
- Neoprene Gasket Seal
- IP66

UB6 Transmit Antenna
- 6 dB Gain
- 3 dB Beam Width of 78°
- Right hand circular polarized
- Transmits Data at 402MHz

12V 4.5aH Battery Pack
- Absorbed Glass Mat Construction

GTX-2.0 Satellite Data Transmitter & Logger
- Certified for GOES, EUMETSAT, INSAT, and Himawari
- Sample up to 64 total sensors parameters
- Log up to 250,000 entries
- -40˚ to 60˚C operating temperature
- 1.3mA quiescent current

External Connections
- Solar Panel
- RS-232
- 2 SDI-12/TB

Solar Regulator/Battery Charger
- Monitors battery temperature
- Contains a Microcontroller that calculates the charge goal based on temperature
- Automatically stops charging when that goal is reached
- 30 microampere quiescent current

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Configuring the XPress

- The XPress has 4 external connectors
  - Solar Power, RS-232, & 2 SDI-12/Tipping Bucket connectors
- The XPress can be configured using the provided RS-232 cable and GTX Utility software
  - The GTX Utility is provided with all units and can be downloaded on the GTX webpage
  - Tutorials on using the GTX Utility can be found on Microcom Environmental's YouTube Page

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Deployment Options

- Long-Term
  - Quick and easy set-up
  - Cost-effective and versatile mounting options for various applications
- Seasonal
  - Monitor rivers impacted by snow melt in spring and early summer
  - Change sensors and monitor drought and fire conditions in summer and fall


- Rapid
  - Additional sensing in advance of extreme weather
  - Post-flooding and post-wildfire monitoring
  - Temporary replacement for destroyed DCPs
- Extreme Applications
  - Monitor rivers impacted by snow melt in spring and early summer
  - Change sensors and monitor drought and fire conditions in summer and fall

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Example XPress Deployments

- The De Beers Mining Company has units installed in Yellowknife, Canada (Latitude 62° North)
  - In winter months units operate in temperatures ranging from -10°C to -40°C, heavy snow, and limited sunlight

- Over 80 XPress units are deployed throughout Florida for the Florida Department of Transportation to monitor wind speed/direction and other sight specific parameters
  - 26 units are deployed along US1 in the Florida Keys
    - during Hurricane Irma units recorded wind gusts as high as 140 mph.
  - 50 units are deployed throughout the Florida Panhandle
    - during Hurricane Michael Recorded wind gusts of up to 208 mph

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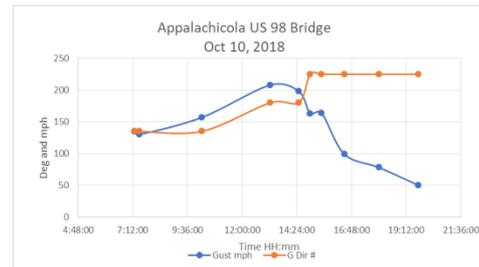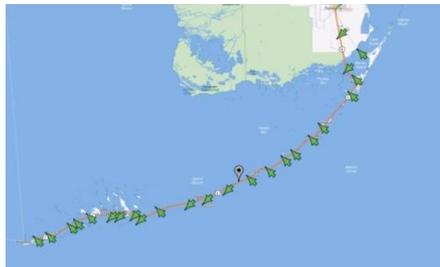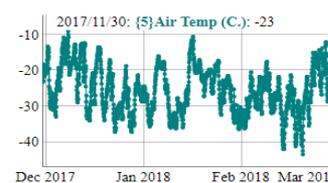
GTX-2.0 and GTXO-2.0

- GTX-2.0 Satellite Transmitter and Datalogger
  - Successor to Microcom's original DCP workhorse, the GTX-1.0
  - Certified for and used on GOES, EUMETSAT, Himawari, ARGOS/SCD and INSAT satellite systems.
  - Integral SDI-12 and Tipping Bucket inputs.
  - Built-in statistical processing and custom equation execution

- GTXO-2.0 Satellite Transmitter Only – *Coming Soon!*
  - Same proven transmitter technology and design as the GTX-2.0
  - Designed for users who want to add DCS satellite capability to existing dataloggers
  - Independent RS-232 port and USB interface
  - External failsafe connector for extending manual failsafe reset outside of environmental enclosure
  - All connections and visual indications on common/top surface

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SDI-12 Interfaces and Sensors

- Microcom manufactures and sells a wide variety of SDI-12 interfaces
    - Measuring wind speed and direction, temperature, barometric pressure, solar radiation, water level pressure transducers,
    - SDI-12 Interfaces are packaged in NEMA IP66 enclosures

- MagShaft – Absolute Magnetic Shaft Encoder
    - uses magnetic sensing to accurately measure the rotational position of its input shaft
    - no gears or other mechanical connections to the input shaft results in extremely low torque and rotating inertia
    - SDI-12 Interface and Optional Display Readout
    - Does not lose position or ability to sense rotation when SDI-12 is disconnected or powered down.

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Microcom DCS Solutions

Data Collection to Data Presentation
Designed and Built in the USA
Questions?

Data Collection Platforms & Sensors

Data Reception Systems

Data Presentation Tools

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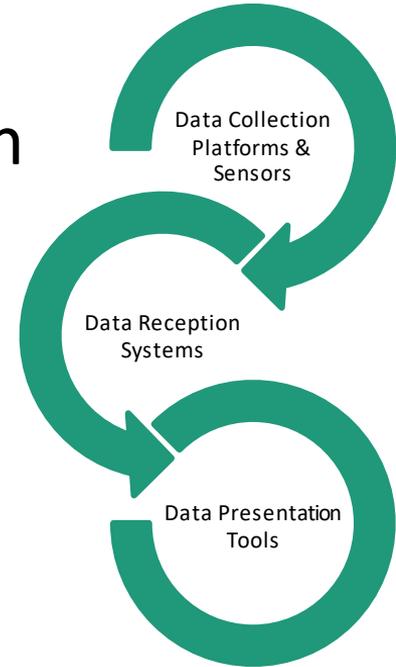
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