
NORTHROP GRUMMAN
Space Technology
Raytheon

# Svalbard Initial Mission Recovery Collaborative Efforts

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# Agenda:

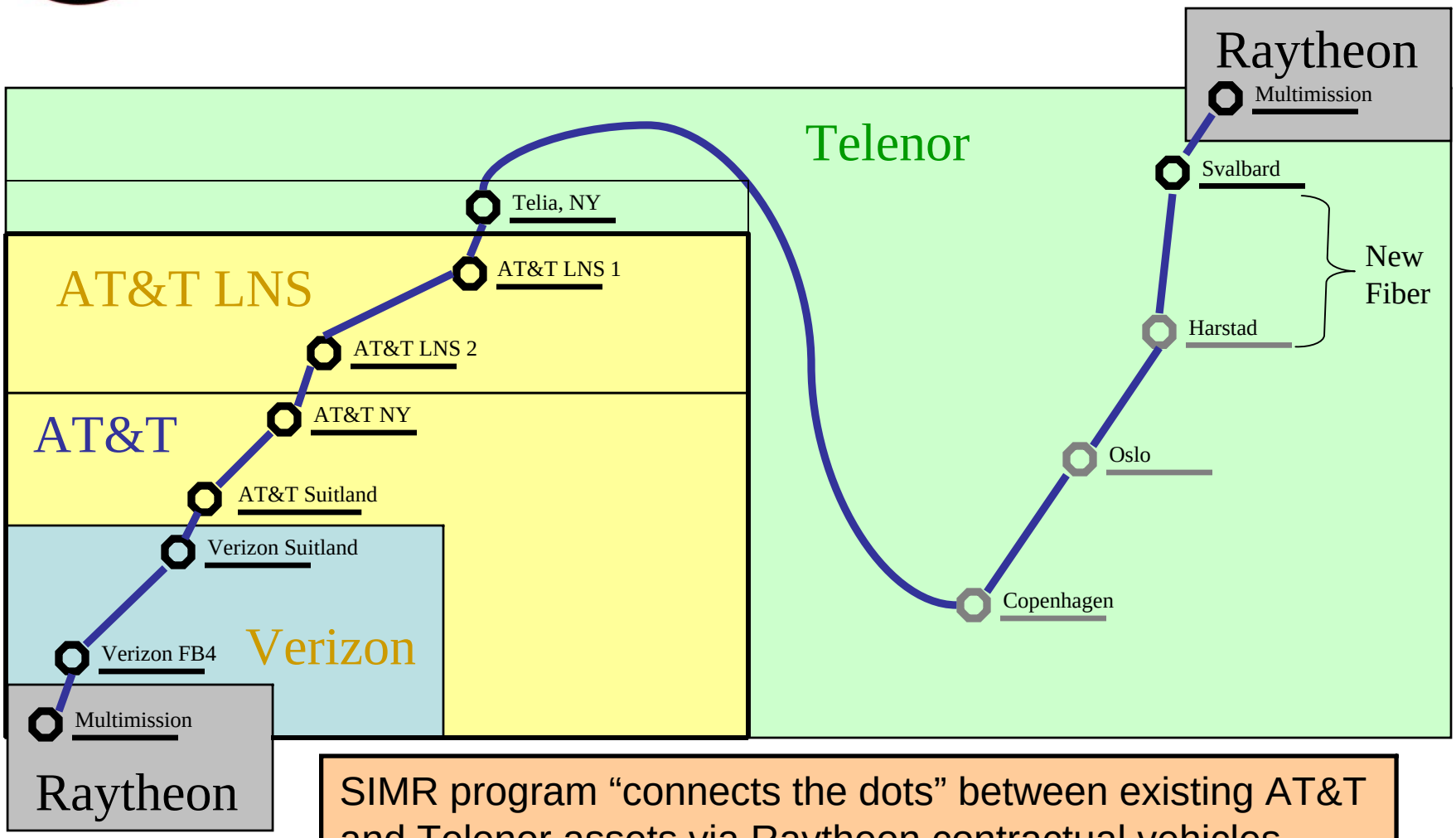
- Overview
  - What is SIMR?
- Key Players
- What was the Problem?
- Why Collaborate?
- How was it done?
- Was it Successful?
- What Helped?
- What Didn't?
- What's Next?
- Acronyms

# What is Svalbard Initial Mission Recovery (SIMR)?

- The Integrated Program Office (IPO), together with NASA and the Norwegian Space Centre, installed an undersea fiber-optic cable to provide high bandwidth terrestrial connectivity between Svalbard and mainland Norway.
  - Fiber to be utilized by current NASA missions, the WindSat-Coriolis mission, and in the future, the NPOESS Preparatory Project (NPP) and NPOESS. NASA and the IPO will share the use of a 155 Mbps communications circuit on the fiber through 2030 (a 25-year period).

- SIMR provides the network services and mission data recovery for the US Navy's WindSat-Coriolis mission. It also provides network services for all of NASA's Svalbard missions (Terra, Aqua, Aura, EO-1, ICESat, etc.)
  - Network designed and built by Raytheon
  - Operated and maintained jointly by IPO and Raytheon

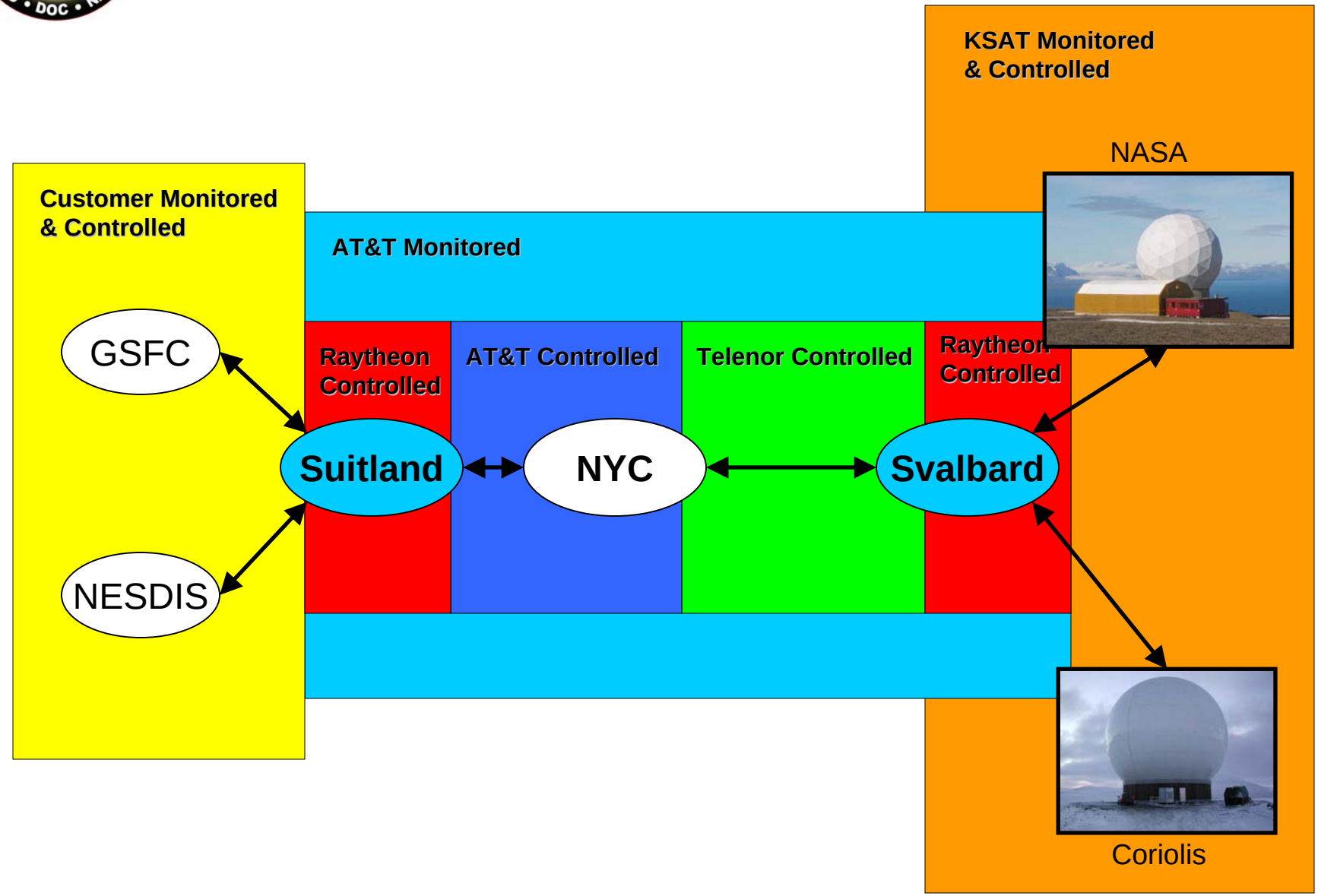
# SIMR Fiber Circuit




SIMR program "connects the dots" between existing AT&T and Telenor assets via Raytheon contractual vehicles

Note: This is a simplified diagram showing the major links provided by each telecom service provider.

# Key Players
# Service Provider Demarcations



# Key Players

- NPOESS Integrated Program Office – Silver Spring, MD
  - Joint agency composed of Dept of Defense, Dept of Commerce (NOAA), NASA, and contractor support
- Northrop Grumman (NGST) – Redondo Beach, CA
  - NPOESS Prime contractor
- Raytheon – Aurora, CO
  - NGST Teammate for NPOESS
- AT&T – New York, NY
- Kongsberg Satellite Services (KSAT) - Norway

# What is the Problem?

- Managing and operating the SIMR network to strict customer standards.
  - 20-minute response to customer call drove the need to find a way to cost effectively provide 24 hour a day on call support
- Aggravating factors
  - No one entity oversees the entire network
  - Multiple organizations involved with operations

# Why Collaborate?

- Both the government and contractor have complementary capabilities

- IPO Watch Officer
  - 24x7 position already in place for DMSP issues
  - Rotating responsibility for 3 Air Force Officers
  - Checklist disciplined and familiar with troubleshooting ops related problems
  - Not a technical position

- Northrop Grumman / Raytheon Team
  - Technical expertise
  - Familiar with Svalbard and SIMR project
  - Not cost effective to establish dedicated 24x7 on-call position

# How was it done?

- IPO chose not to exercise option in NPOESS SIMR contract to provide operations support because 24x7 capability already existed within the IPO
  - IPO took the responsibility internally utilizing existing IPO Watch Officer personnel
- IPO and Raytheon worked together to identify roles and responsibilities of key players and development flow charts for troubleshooting
- Raytheon provided first draft of Anomaly Resolution Checklist and training material
- IPO revised checklist to match format the IPO Watch Officer is familiar with
- Customers and users reviewed checklist for accuracy
- IPO and Raytheon trained IPO Watch Officer on SIMR and went step by step through the checklist
- Raytheon established dial-up connection to routers at Suitland and Svalbard to enable troubleshooting from Aurora, CO
- IPO, KSAT and Raytheon conduct weekly telecons to discuss technical/management issues

# Was it Successful?

YES…

- The day after training the IPO Watch Officer was contacted about an anomaly
  - Ran checklist in order to determine cause of anomaly for NASA
  - Turned reins over to Raytheon for final anomaly resolution
  - Raytheon and the IPO Watch Officer stayed in contact through out the process

- Raytheon identified a weakness in communications link between KSAT/Telenor and NASA/SIMR customers
  - Worked with KSAT/Telenor to ensure this problem does not persist

- KSAT/Telenor now contacts all users, IPO Watch Officer, and Raytheon to advise of planned down times

***Initial feedback from customers is positive***

# What helped?

- Working Relationship – Excellent support history between Contractors and IPO on the NPOESS program
- Tapping Strengths - Exploiting existing area of expertise in satellite operations anomaly by utilizing the IPO Watch Officer
- Strong Preparation – High quality training materials provided to the IPO by Raytheon and strong feedback process as the procedures were updated by the IPO
- Utilization of Technology - Cell phones and pagers allowed technical experts and IPO Watch Officer to be contacted regardless of location and time. Use of email enhanced communication between IPO, Raytheon and KSAT

# What Didn't Help?

- Culture - The different operating cultures of the groups involved and in some cases a language barrier caused breakdowns in communications during the recovery phase of system outages. Raytheon worked to minimize this problem.
  - All maintenance requests are scheduled through KSAT
  - KSAT utilizes an email distribution list to provide information pertaining to outages or maintenance
  - KSAT has provided a single-point of contact for all network related correspondence
    - Liaison between KSAT and Telenor
- Lack of familiarity with SIMR - Prior to the training the IPO Watch Officers had no background or knowledge in the SIMR program. Thorough training helped to overcome this issue.

# What Didn't Help?

- Geography – Most organizations are in different time zones making human contact and adequate communication a challenge. The use of technology improved this area.

# What's Next?

- The IPO Watch Officer will continue to work SIMR related issues until NPP launch in FY07

- IPO Watch Officer will play a vital role in the NPP/NPOESS timeframe in the event of a satellite anomaly or reduced satellite capability which causes NPOESS data not to meet the war fighter's requirements.
  - Will require familiarity with Raytheon operated equipment
  - Anticipate process for developing training materials and administering will be similar to this process just illustrated

# Acronyms

AT&T LNS – AT&T Local Network Services

DMSP – Defense Meteorological Satellite Program

GSFC – Goddard Space Flight Center

IPO – Integrated Program Office

NASA – National Aeronautics and Space Administration

NESDIS – NOAA's Environmental Satellite Data and Information Service

NOAA – National Oceanic and Atmospheric Administration

NPOESS – National Polar-orbiting Operational Environmental Satellite System

NPP – NPOESS Preparatory Project

NYC – New York City

SIMR – Svalbard Initial Mission Recovery