

---

# EOC LAN Design

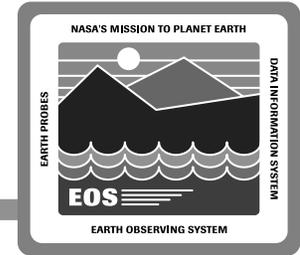
## Dean Moore

---

13 December 1994

# EOC LAN Preliminary Design

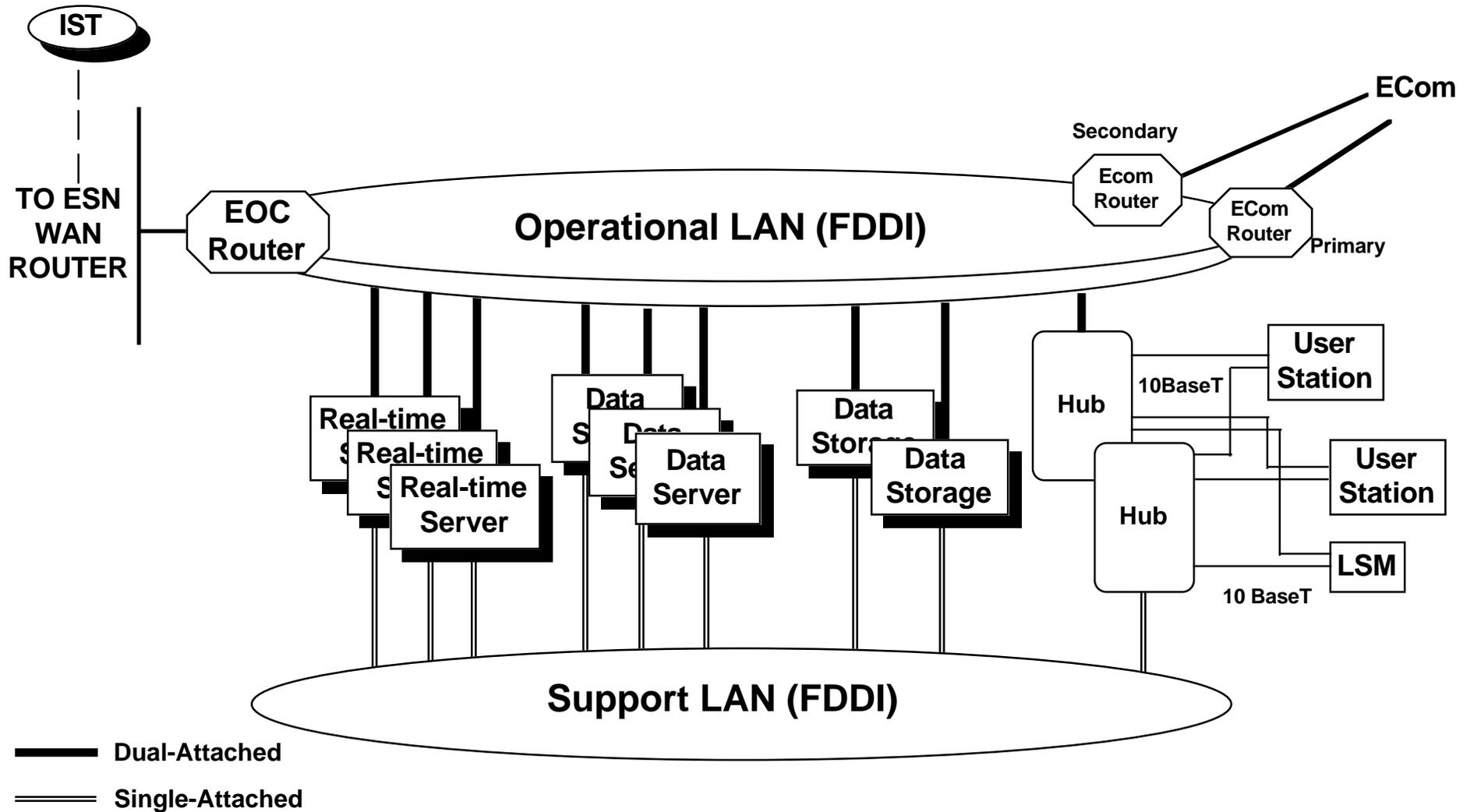
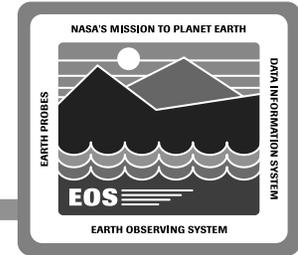
---



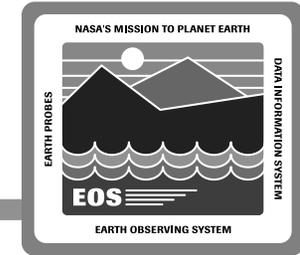
**Design Utilizes Separate FDDI LANs for the Operational and Support Nets.**

- **Servers and Data Storage are attached to FDDI**
- **User Stations are attached to dedicated Ethernet segments**
- **All hosts attached to both Operational Net and Support Net**

# EOC LAN Design: Logical Connectivity



# EOC LAN Primary Design Requirements



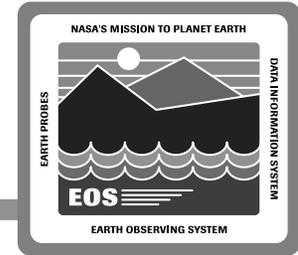
**The EOC Operational Net backbone shall be able to support a peak aggregate traffic rate of 20 Mb/s.**

**The EOC LAN shall include a separate network for support functions that will not interfere with the operational network.**

**The Support Net architecture shall be identical in function and performance to that of the Operational Net.**

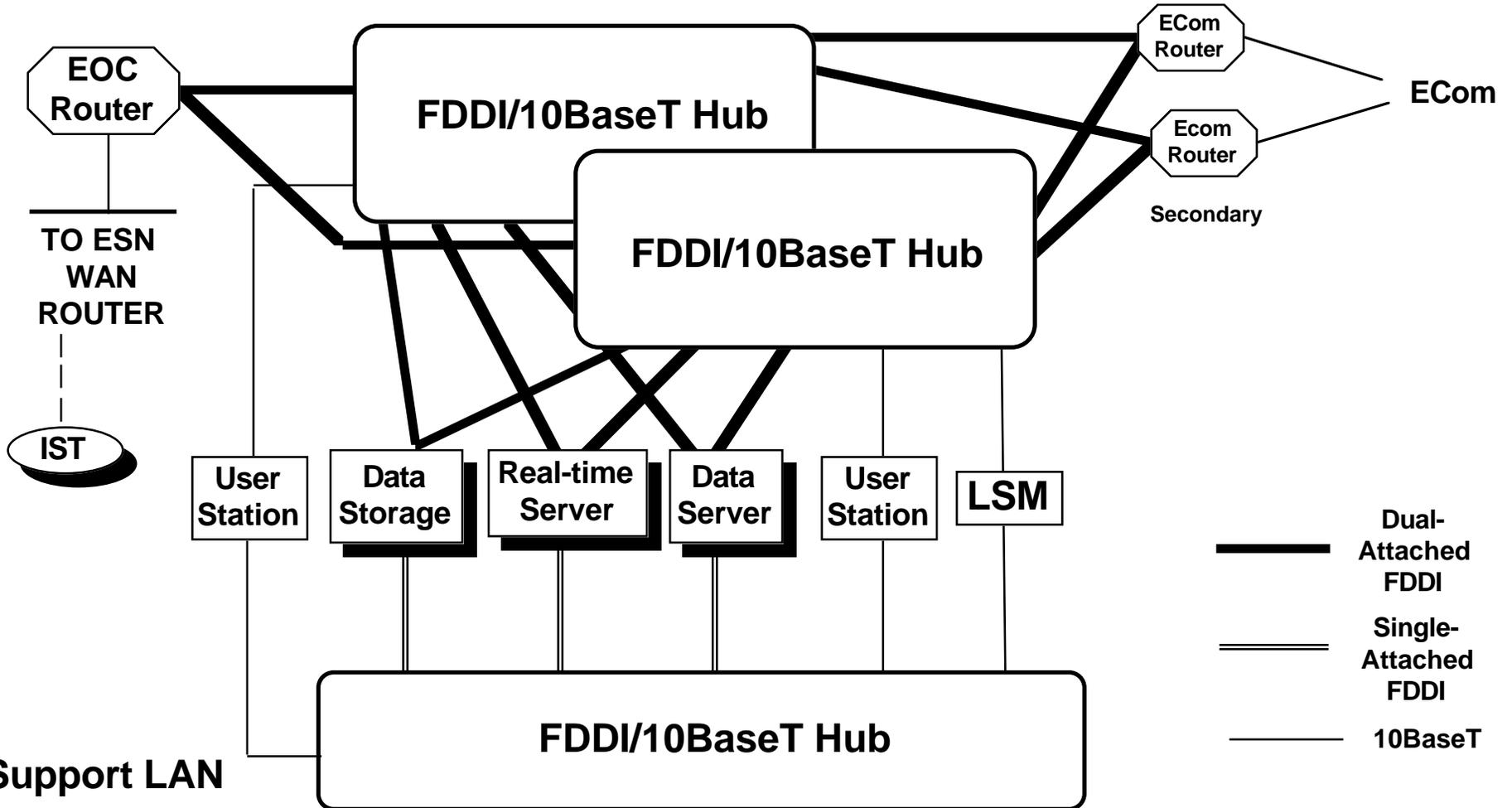
**The EOC LAN must not inhibit the reconfiguration of FOS devices.**

# EOC LAN Design: Physical Connectivity



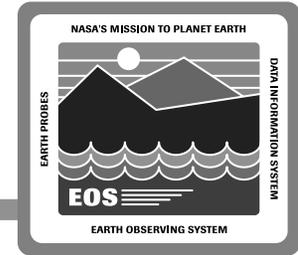
## Operational LAN

Primary



## Support LAN

# EOC LAN RMA Requirements



The EOC Operational LAN shall be configured to support the following RMA requirements:

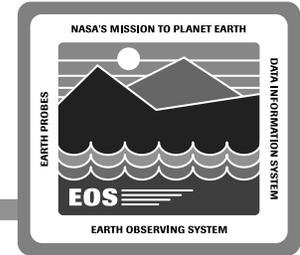
**Critical Real-time data:            Availability = 0.9998 ; MDT < 1 minute**

**Non-Critical Real-time data:    Availability = 0.99925 ; MDT < 5 minute**

The EOC Operational LAN shall have no single-point of failure for critical real-time functions.

The EOC Support LAN shall have an operational availability of at least 0.96 and shall have a MDT of no greater than 4 hours.

# Scalability and Evolvability Requirements



**The EOC Operational Net and Support Net shall be able to support 230 network devices without redesign.**

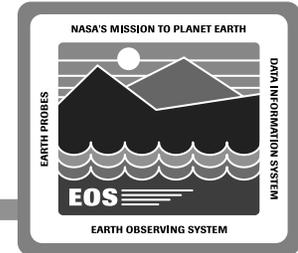
**The EOC Operational Net backbone shall be able to support peak data rates of up to 40 Mb/s without redesign.**

**The EOC LAN architecture shall support evolution to new technologies.**

## **Security:**

**The EOC LAN shall be able to perform filtering based on network address, TCP socket number, and protocol to control access from external and internal interfaces. (Allows control of IST access)**

# Other Designs Considered



## Switched 100baseT/10baseT for Operational and Support LANs

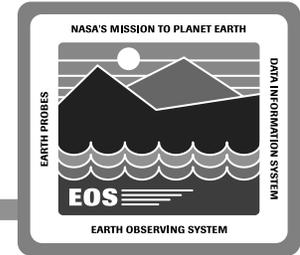
- Provides adequate bandwidth, but
- Technology not completely standardized
- Concerns with vendor support, particularly among router vendors
- 100baseT does not have built-in redundancy like FDDI

## FDDI Operational LAN with Switched 10baseT Support LAN

- May not provide adequate bandwidth to support simulation and test activities, but
- Will be reevaluated after clarification and development of Support LAN requirements (Future Analysis)

# Design Benefits

---



**100 Mbps FDDI backbone provides plenty of bandwidth to handle future growth.**

**Switched Ethernet provides each User Station with its own dedicated bandwidth not shared by other User Stations**

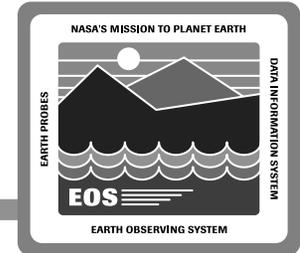
**Separate Operational and Support LANs provide efficient network utilization by segregating traffic.**

**FDDI and Ethernet are “low risk” technologies.**

**Attaching devices to both the Operational and Support LANs allows devices to switch function without reconfiguration of hardware (switch-over accomplished totally in software).**

# More Design Benefits

---

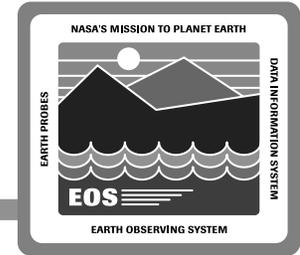


**Flexible topology allows evolution of ops concept and data flows without necessitating network hardware modifications**

## **Advantages of Hub Implementation:**

- **Allows hosts to be added without disrupting network operation**
- **Provides central monitoring and troubleshooting point**
- **Hubs “chained” together to allow expansion**

# IST Network Connectivity



## Generic Solution for ISTs Co-Located with DAACs

- **ISTs will utilize the ESN WAN bandwidth from EOC to DAAC site**
- **ISTs will use the site campus network from ESN point-of-presence to the IST desktop**
- **If all ISTs in same location, providing dedicated network to IST desktop will be considered**

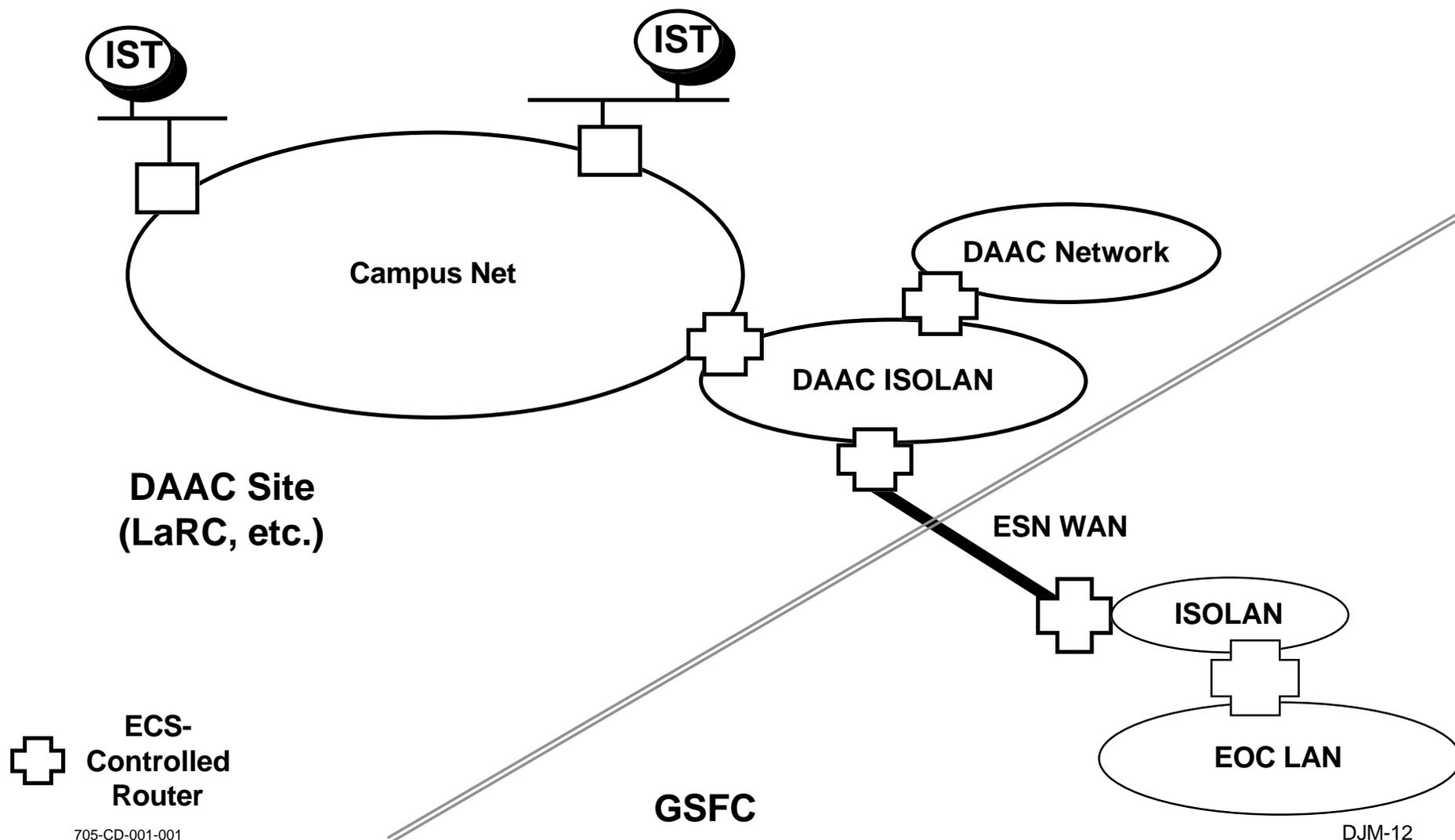
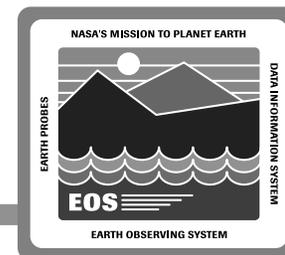
## For ISTs Not Co-Located with DAACs (e.g., Univ. of Toronto)

- **Use NSI or other Internet provider**

## Network level security provided by routers at IST site and at EOC

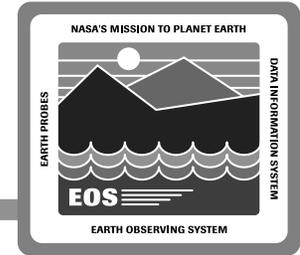
- **Additional security provided by IST software**

# IST Network Connectivity (cont.)



# Future Analysis

---



## Planned Activities:

- **Detailed Implementation Analysis**
- **Detailed RMA Analysis**
- **Evolution and clarification of Support LAN requirements**
- **Consider implementing FDDI over copper media**