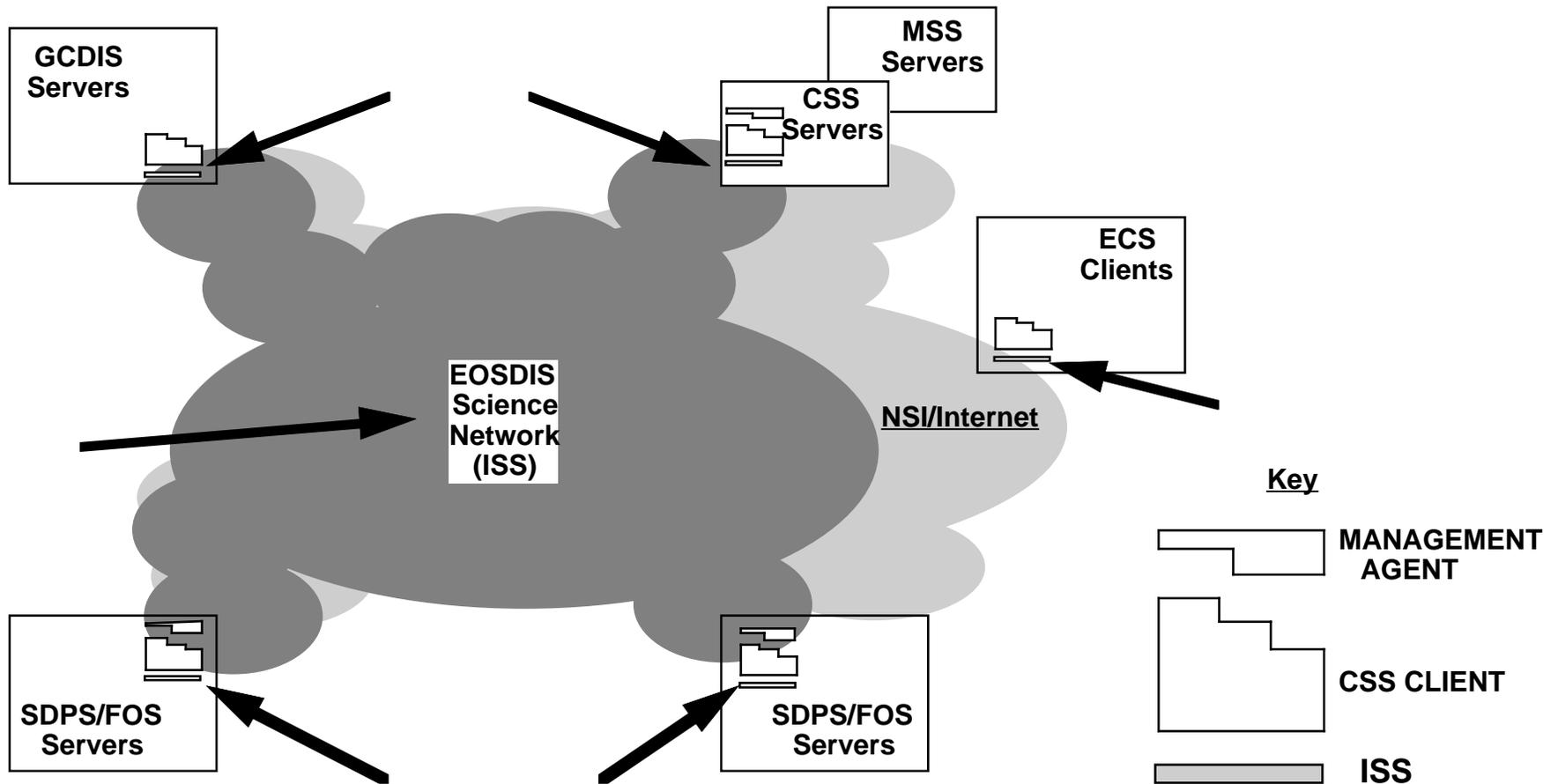
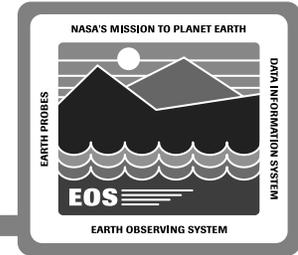


Internetworking Subsystem

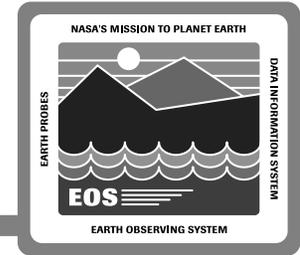
Mary Armstrong

System Design Review - 29 June 1994

ISS Context

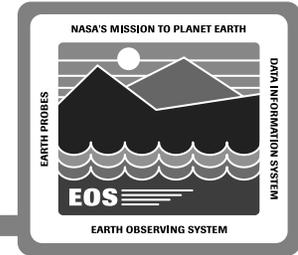


ISS Roadmap



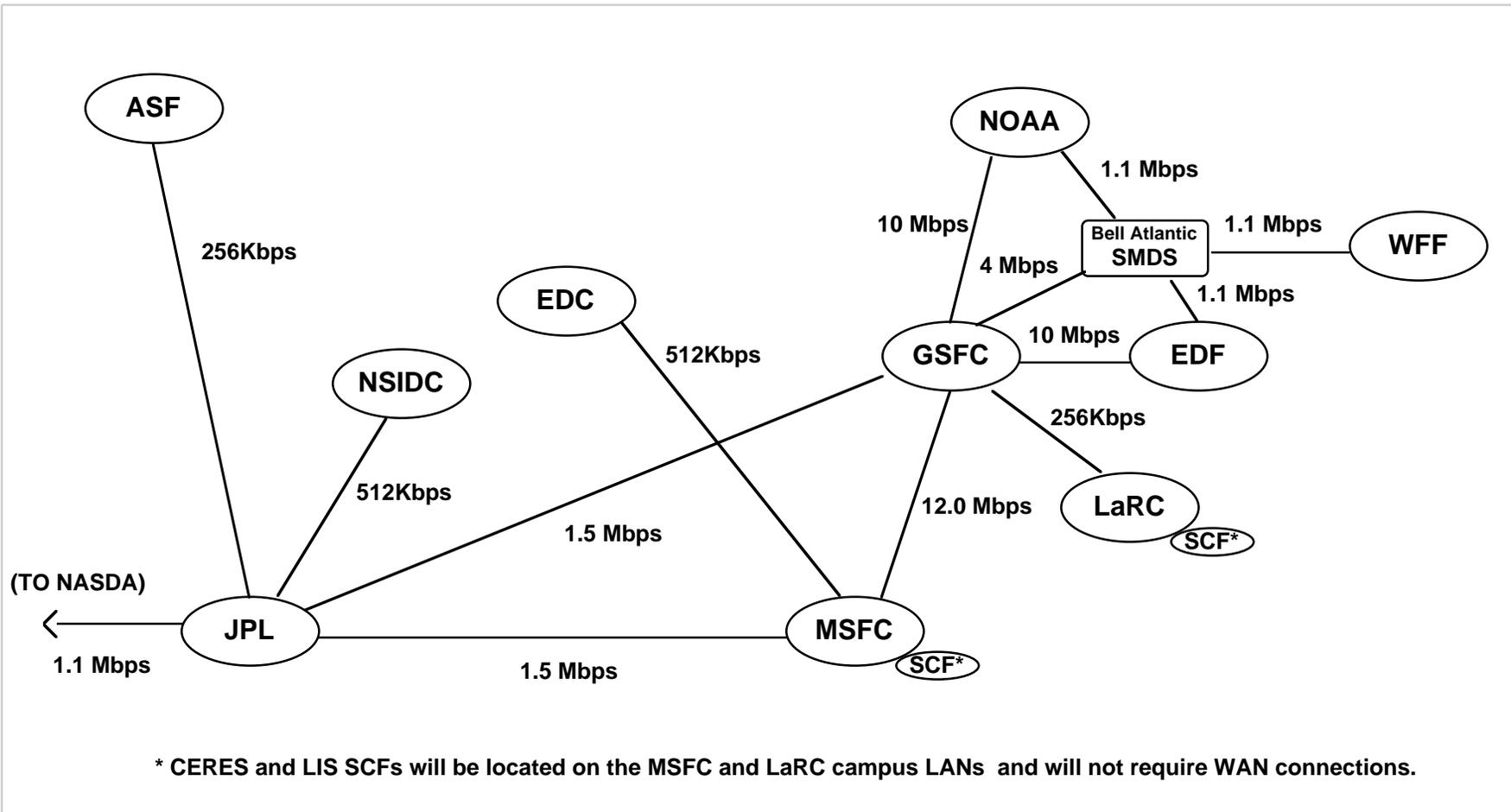
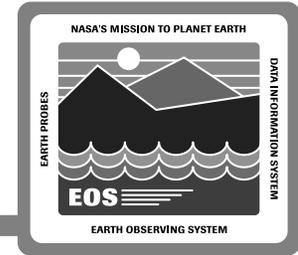
- **ESN WAN Development and V0 -> V1 Transition**
- **ECS LANs / External Interfaces**
- **Summary of ISS Services**
- **CSMS Security Services**

ISS Role

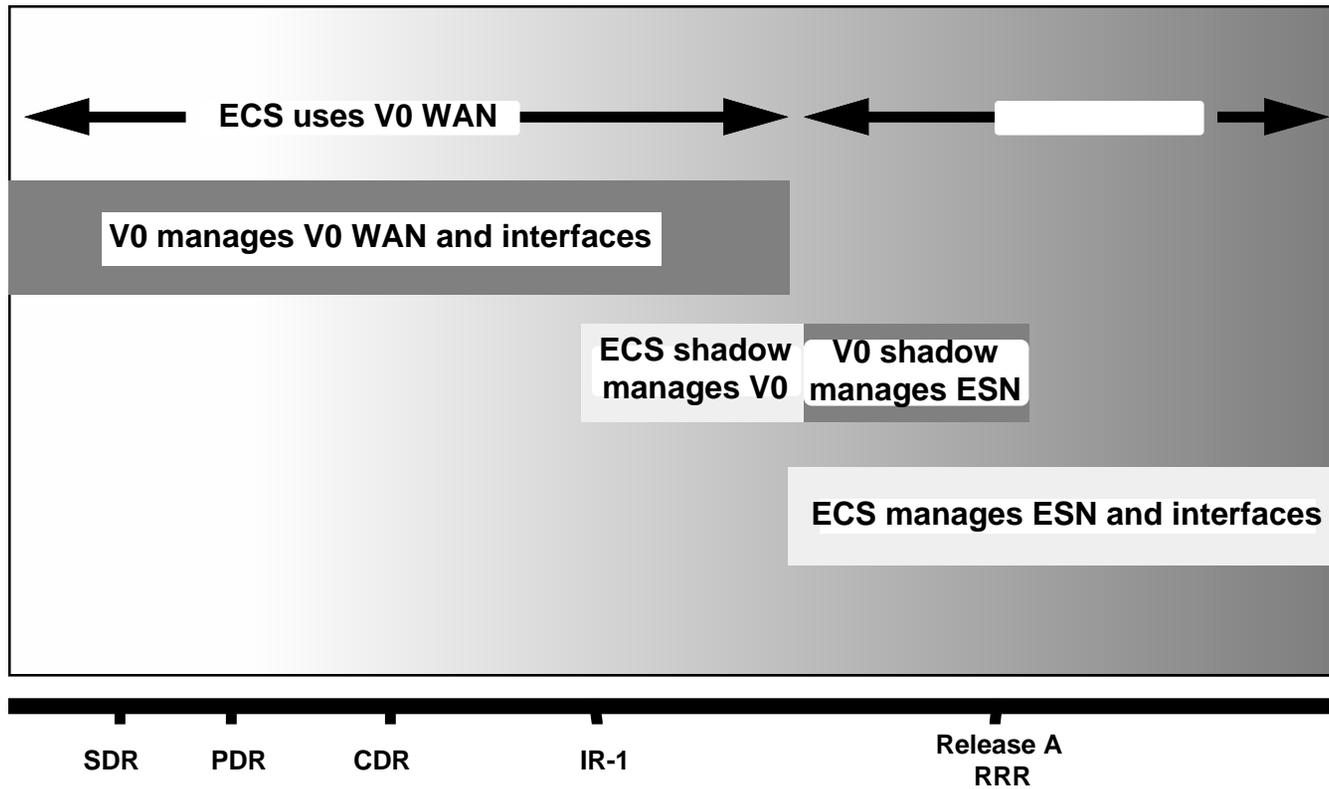
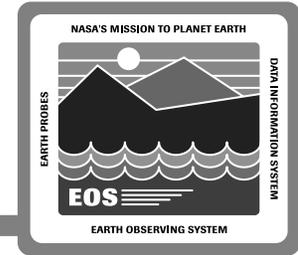


ECS Needs	ISS Capability	ISS Approach
<ul style="list-style-type: none"> • provide local, metropolitan area and/or WAN connectivity between EOS entities (e.g., DAACs, ADCs, SCFs, ISTs) • establish V0 interoperability • minimize schedule and cost risk • high rate data transfer at low costs 	<ul style="list-style-type: none"> • site-unique designs and campus routing practices, use of appropriate technologies for WAN, MAN, LAN (e.g, T1, T3, frame relay, SMDS, FNS) • V0 LAN envelopment • re-use of V0 WAN and interfaces • ATM, alternate protocols 	<ul style="list-style-type: none"> • cooperative engineering with campus providers (for local connections) and PSCN (metro area and wide area access): site visits, DAAC-unique ICDs, PSCN IRD and ICD • site visits, V0 analysis, V0 IRD and ICD, DAAC-unique ICDs • size LANs for Release B • prototype in cooperation with network providers, transition to emerging technologies (e.g., ATM in WAN, TCP HIPER and other alternatives)

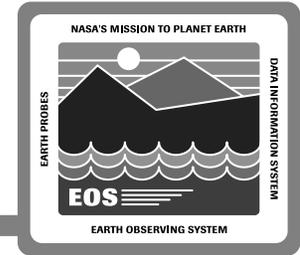
V0 -> V1: ESN at Release A



V0 -> V1 Network Transition

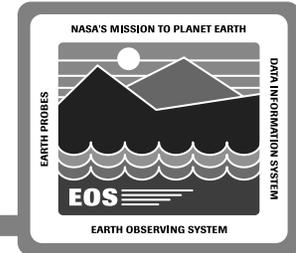


ESN WAN Analysis - SCF Attachment



- **Selection criteria for SCF attachment to ESN will be based on performance requirements: need for timely data exchange**
- **QC SCFs are the primary candidates since their function is considered “in-line” to the production process. However,**
 - **SCF practices vary regarding QC scenarios, but most are *not* “in-line” to production**
 - **QC and science SCFs may be at the same locations, making distinction of functions difficult**
- **Other SCF functions require large data flows on a daily basis as well: algorithm I&T, interdisciplinary science requirements**

ESN WAN: ECS Flows in 1999

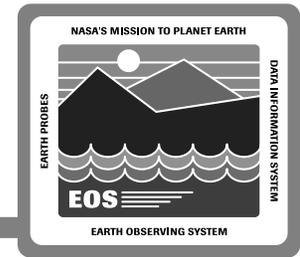


		To (in Mbps)							
		ASF	EDC	GSFC	JPL	LaRC	MSFC	NSIDC	ORNL
From	ASF								
	EDC								
	GSFC		28.648			198.776	4.69	1.152	
	JPL		3						
	LaRC		1.104	28.344					
	MSFC			4.69					
	NSIDC								
	ORNL								

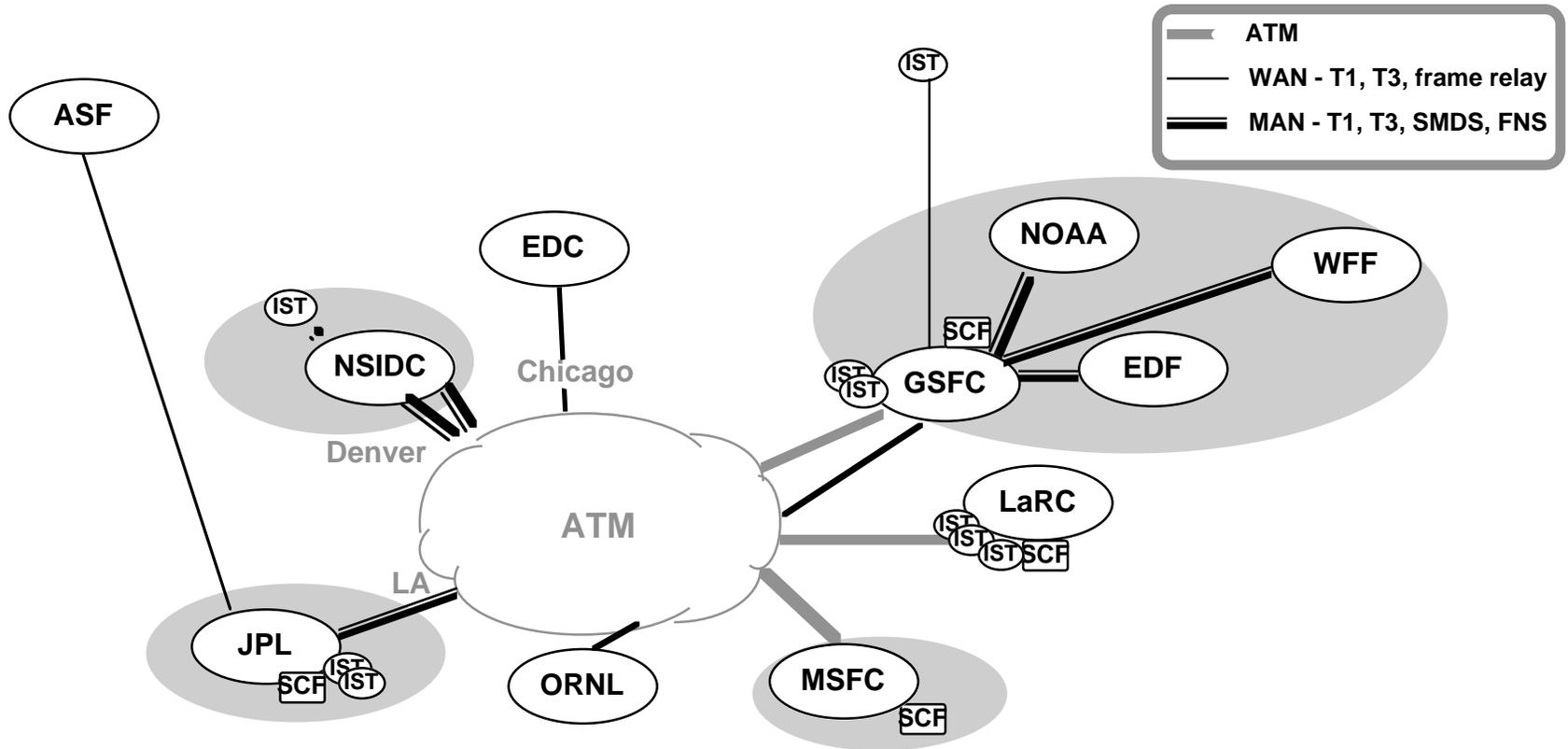
MAJOR ASSUMPTIONS:

1. Includes best estimate of ECS DAAC to DAAC product flow based on “strings” model; V0 flows are not included.
2. Assumes transfer of products, vs. individual parameters
3. Assumes normal processing + 2x reprocessing
4. Timeframe is Release B post-launch (1st quarter 1999)
5. Flows represent 24 hour averages (no peaks or contingency), with no protocol overhead
6. Includes AM-1, ASTER metadata (JPL->EDC), and TRMM (GSFC->MSFC).
7. Does not include any SCF or IST flows.

ESN Connectivity: 1999

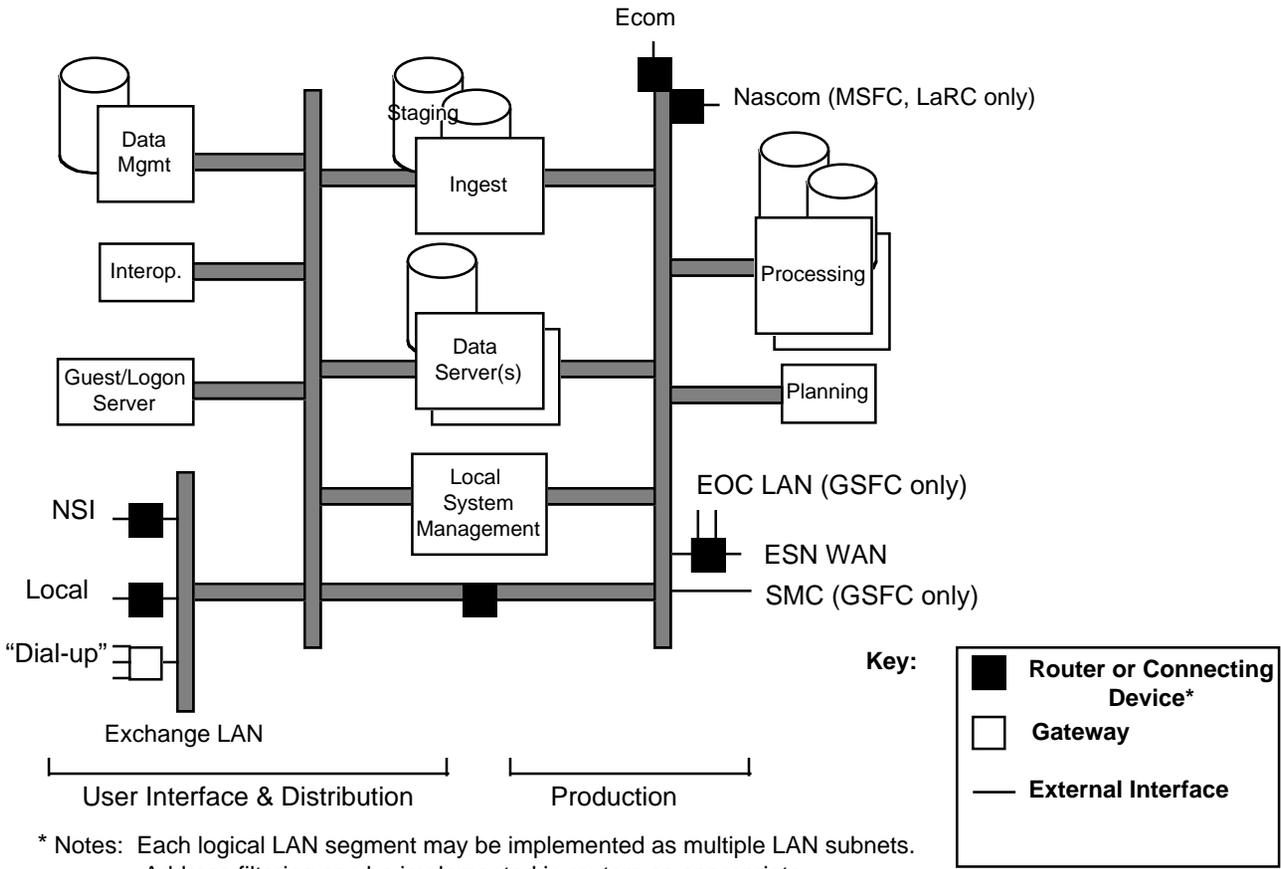
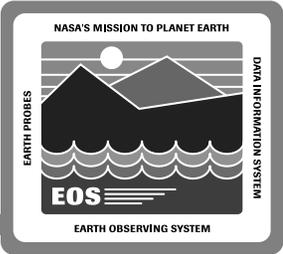


(Potential configuration assuming future use of ATM)

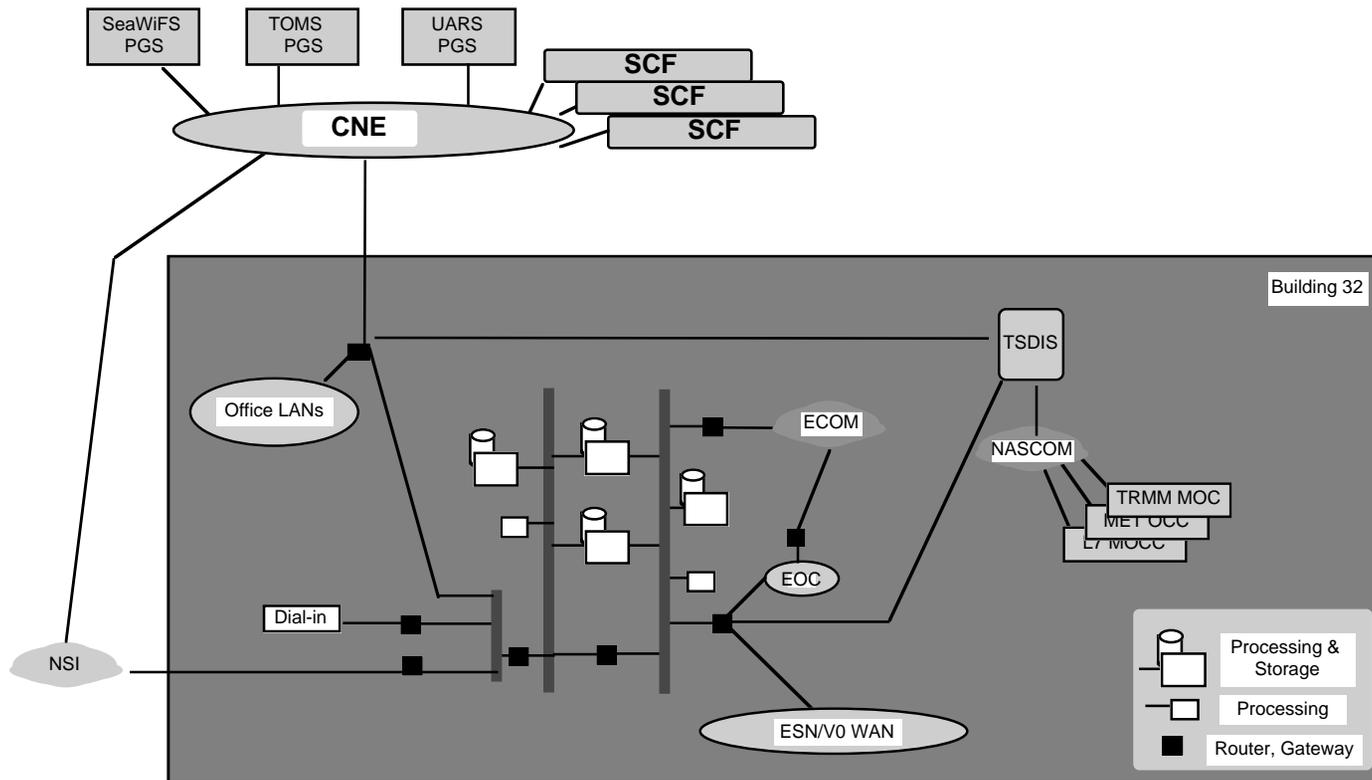
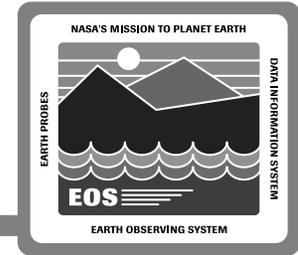


* SCFs shown will be located on campus / metro area networks and *may* require ESN connections. ISTs located on campus / metro area networks and will require ESN connections. Number of ISTs per instrument is currently under evaluation.

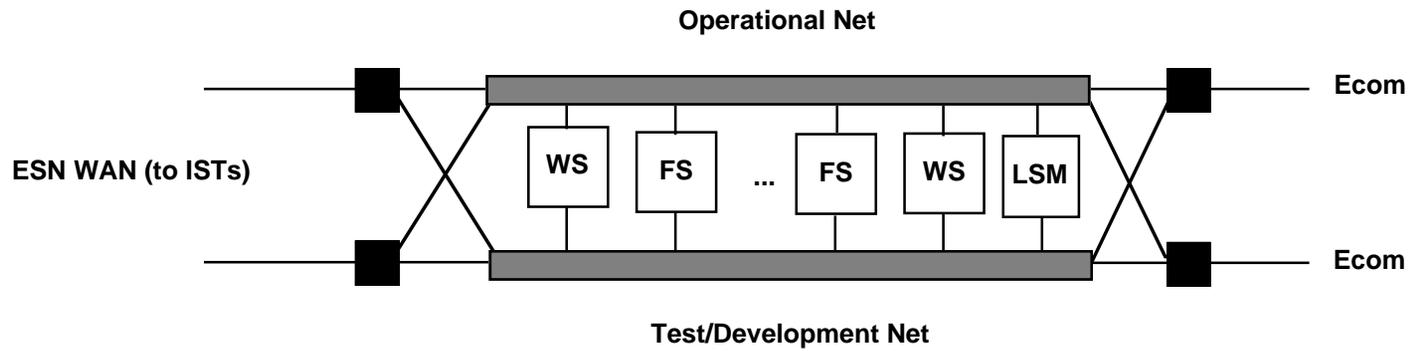
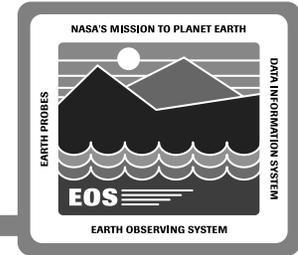
Generic DAAC LAN



GSFC DAAC External Connections



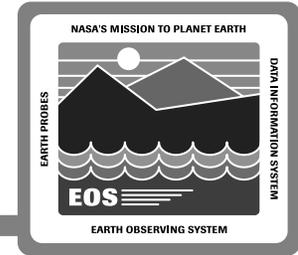
Generic EOC LAN



Key:

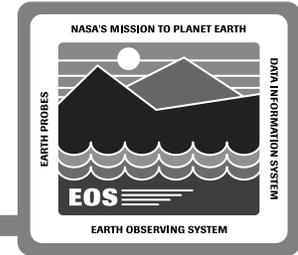
■	Router or Connection Device
WS	Workstation
FS	Fileserver
LSM	Local System Management

* Notes: Address filtering can be implemented in routers as appropriate.



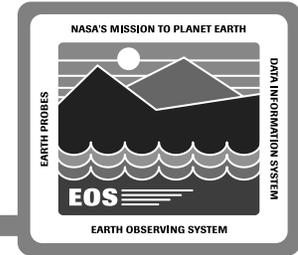
Internetworking Technologies

OSI Layer	Near Term	Mid to Long Term
Transport	TCP UDP	TCP alternatives (Vegas, HIPER, etc...) XTP
Network	IP ICMP ARP/RARP RIP OSPF	IPng BGP IGMP DVMRP

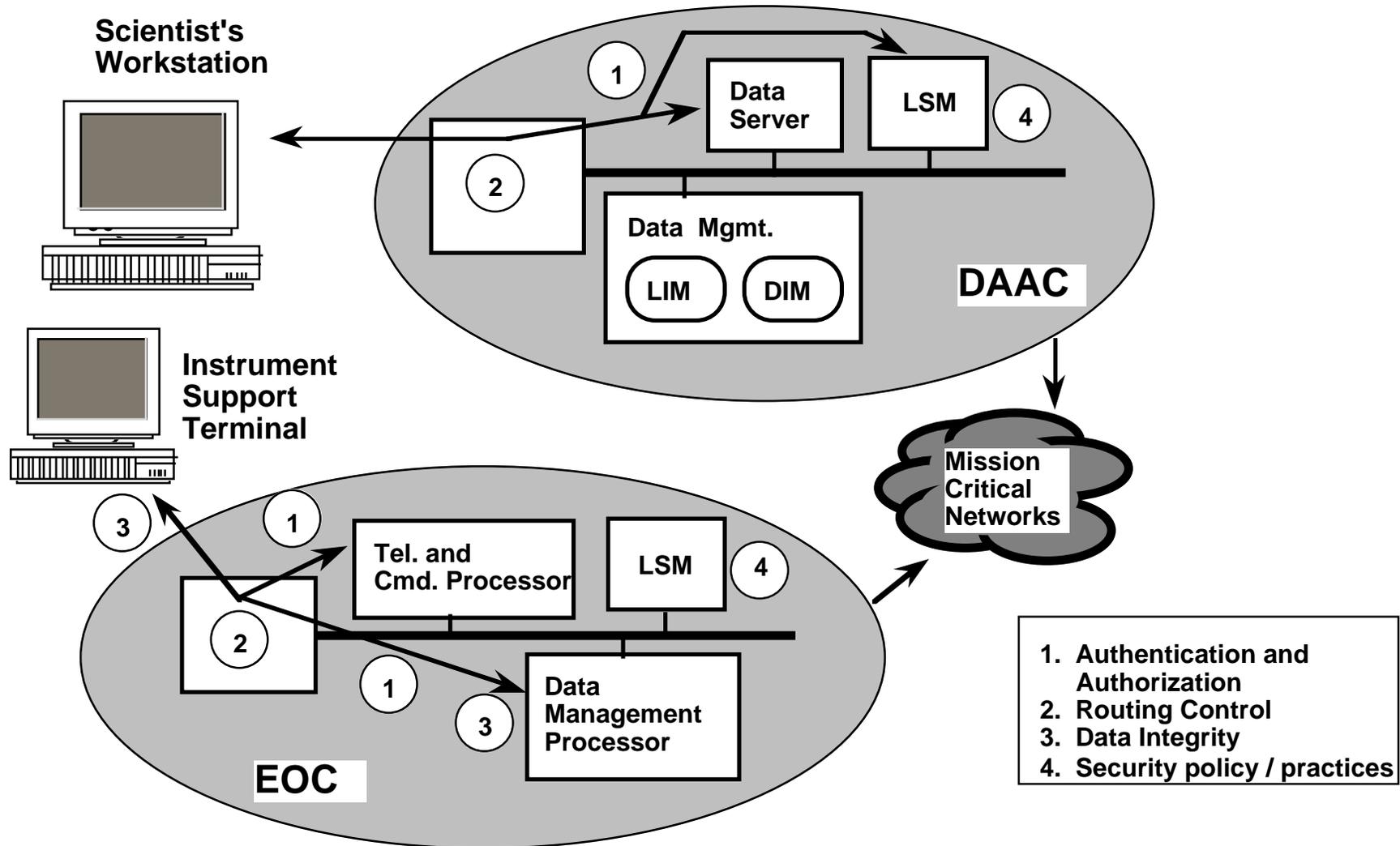


Internetworking Technologies

OSI Layer	Near Term	Mid to Long Term
Data Link	Ethernet FDDI HiPPI SMDS Frame Relay PPP SLIP	ATM New IEEE 802 technologies (such as switched Ethernet and 100VG-anyLan) Fiber Channel
Physical	Twisted Pair Fiber Coax	Sonet WDM



CSMS Security Features



1. Authentication and Authorization
2. Routing Control
3. Data Integrity
4. Security policy / practices

CSMS Security and DAAC User Classes

