

EOS Production Sites Network Performance Report: January 2013

This is a monthly summary of EOS network performance testing between production sites -- comparing the measured performance against the requirements. **Significant improvements are noted in Green, Network problems in Red, System problems and Requirements issues in Gold, Issues in Orange, and other comments in Blue.**

Highlights:

- **Mostly stable flows**
 - **GPA ↓ 3.47** (was 3.68 last month).
- **Requirements:** from the Network Requirements Database
- **LaRC ASDC Outflow:** No change: **very high congestion continued to reduce performance on most outflows.** (Not observed from LaRC ANGe or LaRC-PTH)
- **1 flow below Adequate :**
 - LaRC ASDC → JPL (**Low**)

Ratings Changes:

Upgrade: ↑ None

Downgrades: ↓

- GSFC → EROS: **Good** → **Adequate**
- RSS → GHRC: **Excellent** → **Adequate**
- LaRC ASDC → JPL: **Adequate** → **Low**

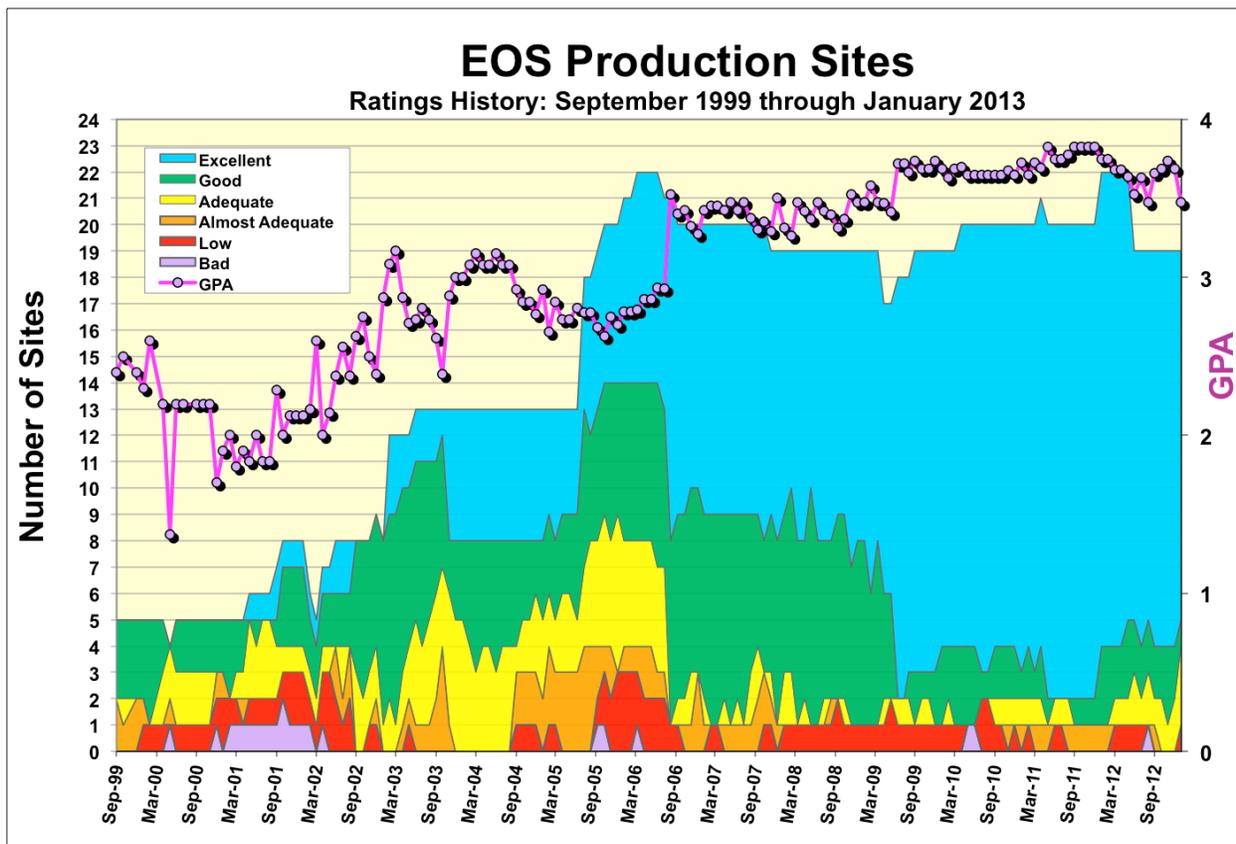
Ratings Categories:

Rating	Value	Criteria
Excellent:	4	Total Kbps > Requirement * 3
Good:	3	1.3 * Requirement <= Total Kbps < Requirement * 3
Adequate:	2	Requirement < Total Kbps < Requirement * 1.3
Almost Adequate:	1.5	Requirement / 1.5 < Total Kbps < Requirement
Low:	1	Requirement / 3 < Total Kbps < Requirement / 1.5
Bad:	0	Total Kbps < Requirement / 3

Where Total Kbps = Average Integrated Kbps (where available), otherwise just iperf

Note that "**Almost Adequate**" implies meeting the requirement excluding the usual 50% contingency factor.

Ratings History:



The chart above shows the number of sites in each rating category since EOS Production Site testing started in September 1999. Note that these ratings do NOT relate to absolute performance – they are relative to the EOS requirements.

Additions and deletions:

- 2011 April: Added RSS to GHRC
- 2011 May: Deleted WSC to ASF for ALOS
- 2012 January: Added NOAA → GSFC-SD3E
Added GSFC-SD3E → Wisconsin
- 2012 June: Deleted GSFC → LASP
Deleted GSFC ← → JAXA

Requirements Basis:

In June 2012, the requirements have been switched, as planned for quite a while, to use the EOSDIS network requirements database. EOSDIS has been reviewing its network ICD's with each of the instrument teams. These ICDs are now essentially completed, and the database has been updated with the ICD values, so those values are now used here.

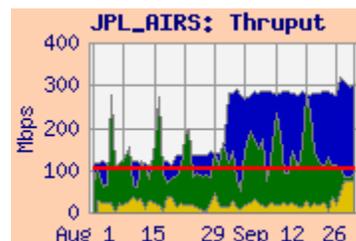
Previously, the requirements were based on the EOS Networks Requirements Handbook, Version 1.4.3 (from which the original database requirements were derived). Prior to that, the requirements were derived from version 1.4.2.

One main difference between Handbooks 1.4.2 and 1.4.3 is that in 1.4.3 most flows which occur less than once per day were averaged over their production period. These flows were typically monthly Level 3 data transfers, which were specified to be sent in just a few hours. However, they could easily be accommodated either between the per-orbit flows, or within the built-in contingency. Previously, these flows were added in linearly to the requirements, making the requirements unrealistically high.

Additionally, the contingency for reprocessing flows greater than 2X reprocessing was reduced. These flows WERE a major component of the contingency, so adding additional contingency on top of these flows was considered excessive.

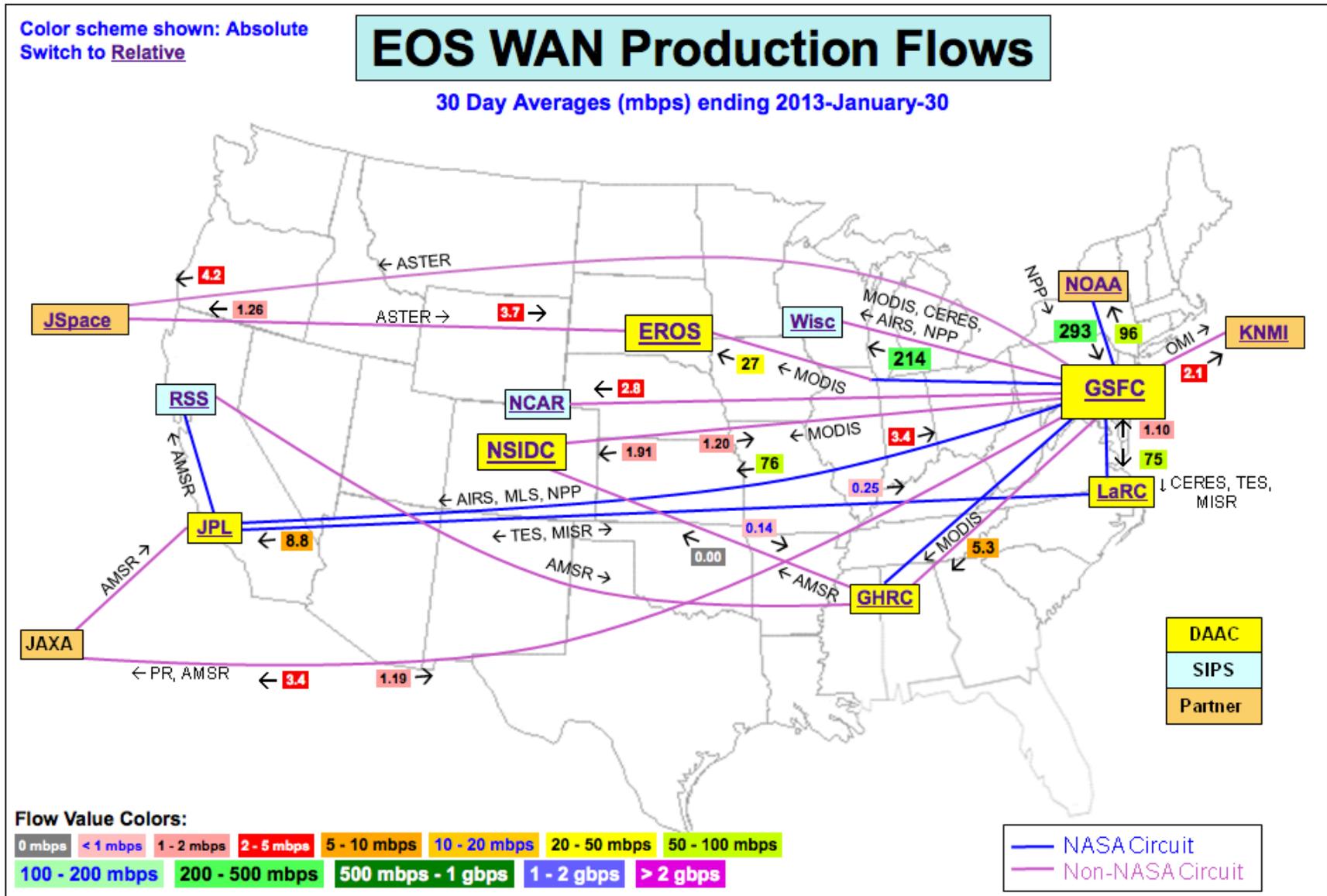
Integrated Charts:

Integrated charts are included with site details, where available. These charts are "Area" charts, with a "salmon" background. A sample Integrated chart is shown here. The yellow area at the bottom represents the daily average of the user flow from the source facility (e.g., GSFC, in this example) to the destination facility (JPL, in this example) obtained from routers via "netflow". The green area is stacked on top of the user flow, and represents the "adjusted" daily average iperf thrupt between the source-destination pair most closely corresponding to the requirement. This iperf measurement essentially shows the circuit capacity remaining with the user flows active. Adjustments are made to compensate for various systematic effects, and are best considered as an approximation. The red line is the requirement for the flow from the source to destination facilities. On some charts a blue area is also present – usually "behind" the green area – representing adjusted iperf measurements from a second source node at the same facility.



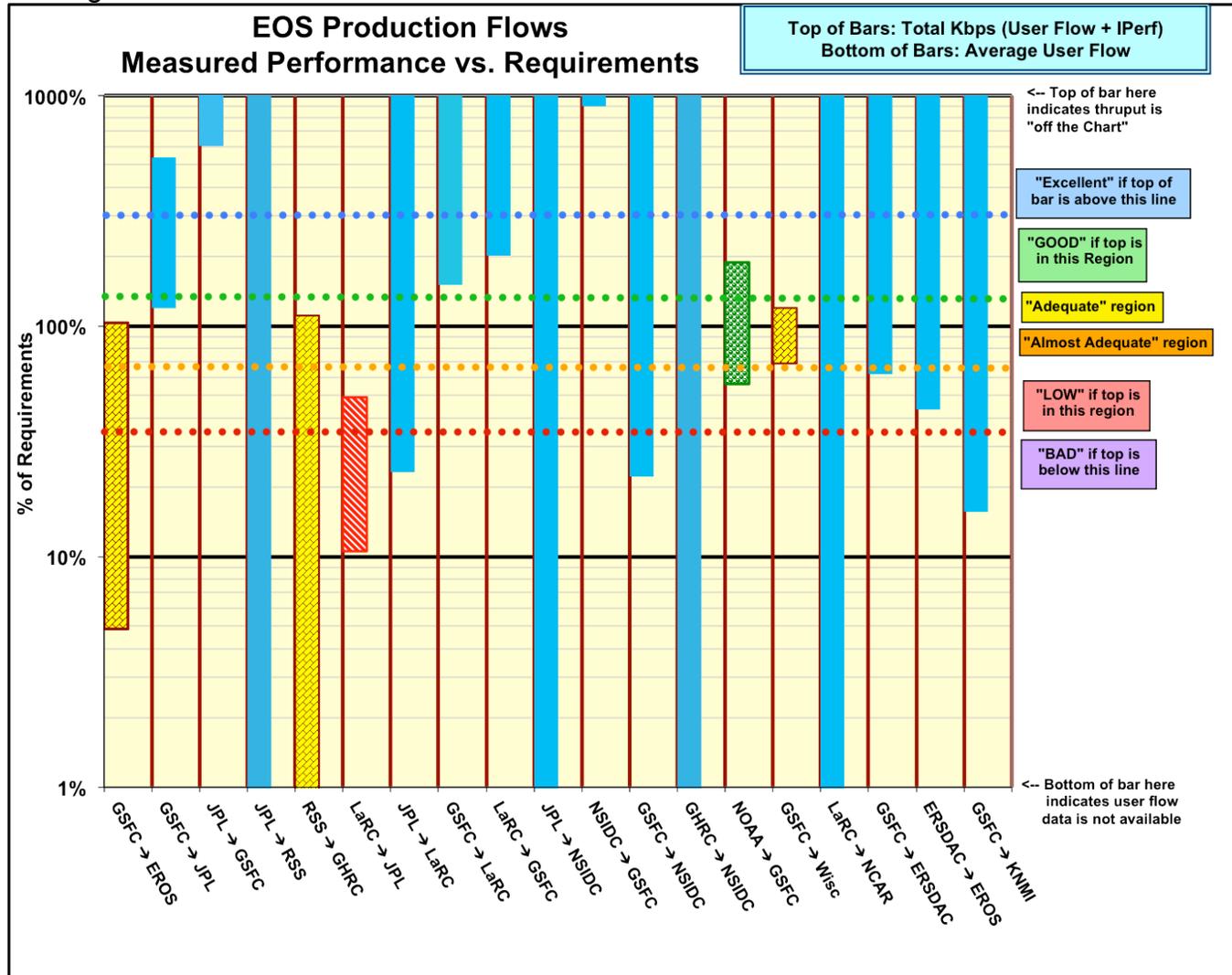
Network Requirements vs. Measured Performance

January 2013		Requirements (mbps)		Testing				Ratings			
Source → Destination	Instrument (s)	Current	Old	Source → Dest Nodes	Average User Flow mbps	iperf Median mbps	Integrated mbps	Ratings re Database Requirements			
		Database	HB 1.4.3+					This Month	Last Month		
GSFC → EROS	MODIS, LandSat	548.4	342.9	MODAPS-PDR → EROS LPDAAC	26.7	566.4	566.4	Adequate	Good		
GSFC → JPL	AIRS, MLS, NPP, ISTs	63	116.7	NPP SD3E OPS2 → JPL-AIRS	75.4	330.0	339.0	Excellent	Ex		
JPL → GSFC	MLS	0.57	0.6	JPL-PODAAC → GSFC GES DISC	3.4	56.2	56.4	Excellent	Ex		
JPL → RSS	AMSR-E	0.16	0.5	JPL-PODAAC → RSS (Comcast)		9.1		Excellent	Ex		
RSS → GHRC	AMSR-E	0.32	0.3	RSS (Comcast) → GHRC		0.35		Adequate	Ex		
LaRC → JPL	TES, MISR	83.5	69.3	LARC-ASDC → JPL-TES	8.8	41.0		Low	Adq		
JPL → LaRC	TES	1.1	1.5	JPL-TES → LARC-PTH	0.26	180.9		Excellent	Ex		
GSFC → LaRC	CERES, MISR, MOPITT, TES, MODIS	52.2	31.3	GES EDOS → LaRC ASDC	78.7	702.2	722.0	Excellent	Ex		
LaRC → GSFC	MISR	0.6	0.4	LARC-ASDC → GES DISC	1.12	266.8	266.8	Excellent	Ex		
JPL → NSIDC	AMSR-E	0.16	0.2	JPL-PODAAC → NSIDC		229.5		Excellent	Ex		
NSIDC → GSFC	AMSR-E, MODIS, ICESAT	0.017	0.6	NSIDC DAAC → GES DISC	1.20	192.7	192.8	Excellent	Ex		
GSFC → NSIDC	AMSR-E, MODIS, ICESAT	8.42	27.6	MODAPS PDR → NSIDC-DAAC	1.87	614.3	614.3	Excellent	Ex		
GHRC → NSIDC	AMSR-E	0.46	0.5	GHRC → NSIDC DAAC	0.0027	10.5		Excellent	Ex		
NOAA → GSFC	NPP	522.3	615.6	NOAA-PTH → GSFC NPP-SD3E OPS1	293.3	927.5	985.7	Good	Good		
GSFC → Wisc	NPP	259.1	253.7	GSFC NPP-SD3E OPS1 → WISC	178.4	304.4	310.3	Adequate	Adq		
LaRC → NCAR	MOPITT	0.044	0.1	LaRC-PTH → NCAR		133.5		Excellent	Ex		
GSFC → JAXA	TRMM, AMSR-E, MODIS	3.51	0.1	GSFC → JAXA	3.36	Testing discontinued: 31 March 2009		n/a	n/a		
JAXA → GSFC	AMSR-E	0.16	0.1	JAXA → GSFC	1.31			n/a	n/a		
GSFC → ERSDAC	ASTER	6.75	5.4	GSFC-EDOS → ERSDAC	4.2	94.8	94.8	Excellent	Ex		
ERSDAC → EROS	ASTER	8.3	8.3	ERSDAC → EROS PTH	3.6	132.2	133.2	Excellent	Ex		
GSFC → KNMI	OMI	13.4	0.03	GSFC-OMISIPS → KNMI ODPS	2.1	358.9	360.5	Excellent	Ex		
Significant change from HB v1.4.3 to Requirements Database				Value used for ratings				Ratings Summary		Database Req	
										Score	Prev
*Criteria:	Excellent	Total Kbps > Requirement * 3			Excellent				14	15	
	Good	1.3 * Requirement <= Total Kbps < Requirement * 3			Good				1	2	
	Adequate	Requirement < Total Kbps < Requirement * 1.3			Adequate				3	2	
	Almost Adequate	Requirement / 1.5 < Total Kbps < Requirement			Almost Adequate				0	0	
	Low	Requirement / 3 < Total Kbps < Requirement / 1.5			Low				1	0	
	Bad	Total Kbps < Requirement / 3			Bad				0	0	
Notes:		Flow Requirements include: TRMM, Terra, Aqua, Aura, ICESAT, QuikScat, GEOS, NPP			Total Sites				19	19	
					GPA				3.47	3.68	



This chart shows the averages for the main EOS production flows for the current month. Up to date flow information can be found at http://ensight.eos.nasa.gov/Weather/web/hourly/Production_Flows-A.shtml

This graph shows a bar for each source-destination pair – relating the measurements to the requirements for that pair. The bottom of each bar represents the average measured user flow from the source site to the destination site (as a percent of the requirement) – it indicates the relationship between the requirements and actual flows. Note that the requirements generally include a 50% contingency factor above what was specified by the projects, so a value of 67% (dotted orange line) would indicate that the project is flowing as much data as requested. The top of each bar similarly represents the integrated measurement, combining the user flow with Iperf measurements – this value is used to determine the ratings.



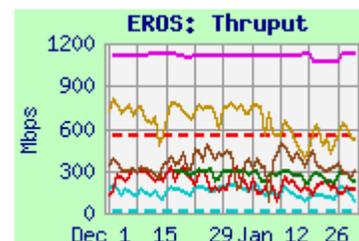
1) EROS:

Ratings: GSFC → EROS: ↓ **Good** → **Adequate**
 ERSDAC → EROS: Continued **Excellent**

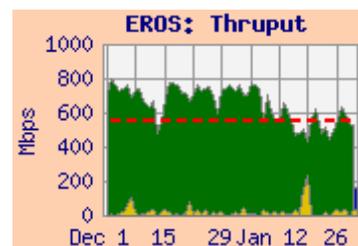
Web Page: <http://ensight.eos.nasa.gov/Organizations/production/EROS.shtml>
http://ensight.eos.nasa.gov/Organizations/production/EROS_PTH.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
MODAPS-PDR → EROS LPDAAC	726.5	566.4	246.4	26.7	566.4
GSFC-EDOS → EROS LPDAAC	305.4	273.0	42.0		
GES DISC → EROS LPDAAC	275.1	178.7	75.4		
GSFC-ENPL → EROS LPDAAC	1116.3	1114.8	1069.2		
ERSDAC → EROS LPDAAC	203.4	132.2	36.8	3.6	133.2
NSIDC SIDADS → EROS PTH	527.7	329.7	112.7		
GSFC-ENPL → EROS PTH	2323.2	2288.8	2008.0		
GSFC-ENPL → EROS PTH (IPv6)	760.4	673.1	590.3		
GSFC-NISN → EROS PTH	819.0	736.4	482.6		
ESDIS-PS → EROS PTH	763.9	559.2	295.6		
ESDIS-PS → EROS PTH (IPv6)	451.4	436.3	380.1		
LaRC PTH → EROS PTH	179.3	159.7	116.7		

**Requirements:**

Source → Dest	Date	mbps	prev	Rating
GSFC → EROS	CY '12 -	548.4	343	Adequate
ERSDAC → EROS	FY '06 -	8.33	8.3	Excellent

**Comments:**

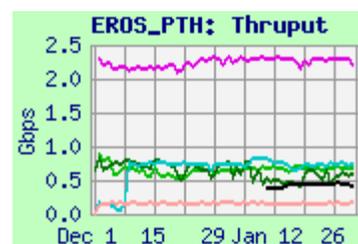
1.1 GSFC → EROS: The rating is based on the MODAPS-PDR Server to EROS LP DAAC measurement, since that is the primary flow. The requirement was increased 60% in June '12, switching to the requirements database, based primarily on increased MODIS reprocessing. As MODIS is not conducting reprocessing at present, the user flow this month is only about 4.8% of the new requirement (a bit more than the 3.2% last month).

The route from MODAPS-PDR is via EBnet to the Doors to NISN SIP, via the NISN 10 gbps backbone to the NISN Chicago CIEF, then via GigE to the StarLight Gigapop, peering there with the EROS OC-48 tail circuit.

The median integrated thrupt from MODAPS-PDR to LPDAAC remains above the requirement, with contingency, but by less than 30%, so the rating drops to **Adequate**. Thrupt also dropped from GES DISC (also on EBnet).

Tests from ESDIS-PS (on EBnet) to EROS-PTH using both IPv4 and IPv6 were added in January – they appear limited below 1 gbps.

Iperf testing for comparison is performed from GSFC-ENPL to both LPDAAC (now to the “FTL” node outside the EROS firewall) and to EROS-PTH (a 10 gig host) using both IPv4 and IPv6. The GSFC-ENPL host has a direct 10 gig connection to the MAX; its route is via MAX to Internet2 to StarLight in Chicago. GSFC-ENPL to EROS-PTH (IPv4) now typically gets over 2 gbps. This result shows that the capacity of the network is in excess of the requirement – it would be rated **Excellent**. IPv6 tests appear limited below 1 gbps.



1.2 ERSD → EROS: **Excellent**. See section 9 (ERSD) for further discussion.

1.3 NSIDC → EROS-PTH: Performance has been noisy but stable since September.

1.4 LaRC → EROS: The thrupt from LaRC-PTH to EROS-PTH was very stable. The route is via NISN SIP to the Chicago CIEF to StarLight – similar to EBnet sources. Note that LaRC-PTH outflow is limited to 200 mbps by NISN at LaRC.

2) to GSFC

Ratings: NOAA → NPP SD3E: Continued **Good**
 NSIDC → GES DISC: Continued **Excellent**
 LDAAC → GES DISC: Continued **Excellent**
 JPL → GSFC: Continued **Excellent**

Web Pages:

http://ensight.eos.nasa.gov/Missions/NPP/GSFC_SD3E.shtml
<http://ensight.eos.nasa.gov/Organizations/production/GDAAC.shtml>
http://ensight.eos.nasa.gov/Organizations/production/ESDIS_PTH.shtml
http://ensight.eos.nasa.gov/Missions/icesat/GSFC_ISIPS.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
NOAA-PTH → NPP-SD3E-OPS1	938.9	927.5	876.3	293.3	985.7
EROS LPDAAC → GES DISC	200.9	146.7	49.6		
EROS PTH → GSFC-ESDIS PTH	652.1	554.6	275.3		
JPL-PTH → GSFC-ESDIS PTH	88.3	85.8	82.6	2.7	
JPL-TES → GSFC-NISN	531.0	320.4	148.8		
LaRC ASDC → GES DISC	427.2	266.8	87.1	1.1	
LARC-ANGe → GSFC-ESDIS PTH	542.5	539.5	533.1		
NSIDC DAAC → GES DISC	271.0	192.7	90.2	1.2	
NSIDC DAAC → GSFC-ISIPS (scp)	74.6	73.0	52.6		

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
NSIDC → GSFC	CY '12 –	0.017	0.6	Excellent
LaRC ASDC → GES DISC	CY '12 –	0.6	0.4	Excellent
JPL → GSFC combined	CY '12 –	0.57	3.2	Excellent
NOAA → NPP SD3E	CY '12 –	522.3	615.6	Good

Comments: Note: all requirements were updated in June...see above.

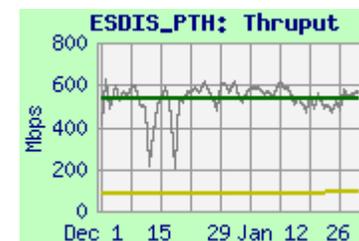
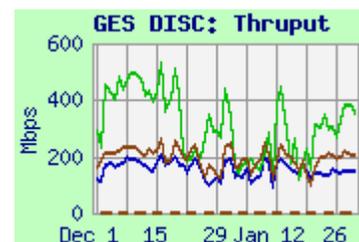
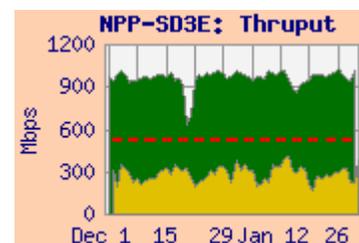
NOAA → NPP-SD3E: Performance from NOAA-PTH to GSFC NPP-SD3E-OPS1 was very steady at over 900 mbps, limited by the gig-E interfaces on the test machines (the circuits are all 10 gbps). User flow was similar to last month, and close to the requirements (without contingency).

EROS LPDAAC, EROS-PTH → GSFC: The thrupt for tests from EROS and EROS-PTH to GES DISC and ESDIS-PTH were mostly stable.

JPL → GSFC: Thrupt from JPL-PTH was again very stable this month, limited by the Fast-E interface on JPL-PTH. With the modest requirement the rating remains **Excellent**. The actual user flow is close to the old requirement, but well above the new reduced requirement. Testing from JPL-TES to GSFC-NISN (not graphed) more clearly shows the capability of the network. Note that some JPL → GSFC flows take Internet2 instead of NISN, based on JPL routing policies.

LaRC → GSFC: Performance from LaRC ASDC to GES DISC was again variable, apparently due to congestion at ASDC. Thrupt from LaRC ANGe to ESDIS-PTH was much more stable. Both results remained way above 3 x the modest requirement, so the rating continues as **Excellent**. The user flow this month was close to the requirement.

NSIDC → GSFC: Performance from NSIDC to GES DISC was steady, and way above the tiny requirement; the rating remains **Excellent**. The user flow was again above the old requirement, and well above the new lower requirement. Thrupt to GSFC-ISIPS using SCP (iperf testing still down after reconfiguration due to firewall blocking) is lower than iperf previously, as expected, but is well above the requirement.



2.2 GSFC-ECHO: EOS Metadata Clearinghouse

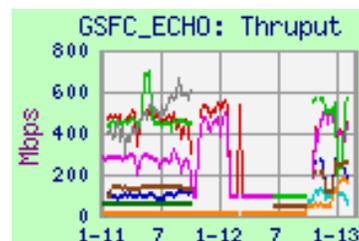
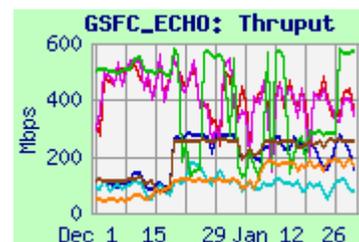
Web Page: http://ensight.eos.nasa.gov/Organizations/gsf/GSFC_ECHO.shtml

Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
EROS LPDAAC	285.8	233.5	101.7
EROS LPDAAC ftp	175.2	100.9	26.7
GES DISC	509.2	390.9	136.3
GES DISC ftp	516.1	391.7	140.4
LaRC ASDC DAAC	577.4	280.9	96.3
LaRC ASDC DAAC ftp	n/a	n/a	n/a
NSIDC DAAC	260.7	251.9	198.9
NSIDC DAAC ftp	215.1	169.5	71.6

Comments:

Performance improved dramatically from all sources in mid October, when the ECHO firewall was replaced. Performance improved again from EROS and NSIDC in mid-December with retuning. FTP performance is mostly limited by TCP window size – especially from sites with long RTT.



2.3 GSFC-EMS: EOS Metrics System

Web Page: http://ensight.eos.nasa.gov/Organizations/gsf/GSFC_EMS.shtml

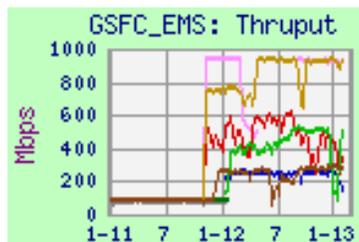
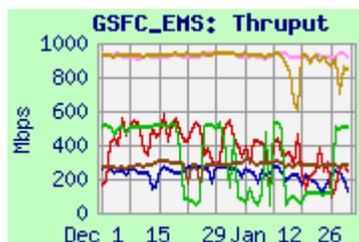
Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
EROS LPDAAC	276.2	221.2	78.4
ESDIS-PTH	937.3	920.0	747.7
GES DISC	490.2	335.0	58.7
LARC ASDC	515.6	118.5	38.6
MODAPS-PDR	936.7	923.3	399.0
NSIDC-SIDADS	285.6	282.2	244.2

Comments:

Testing is performed to GSFC-EMS from the above nodes, iperf only. The testing was transitioned to the new EMS test node (FS1) between November '11, and January '12 with much improved thruput. The performance limitation to the old server was its 100 mbps Fast-E connection; the new server is gigabit connected.

Thruput from all sources was pretty stable this month.



3) JPL:

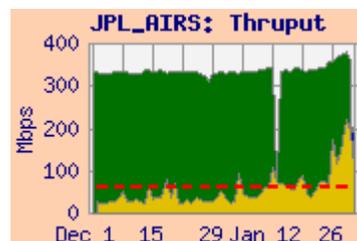
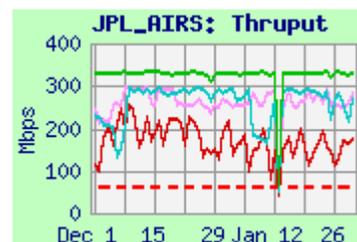
3.1) GSFC → JPL:

Ratings: GSFC → JPL: Continued **Excellent**

Web Pages: http://ensight.eos.nasa.gov/Missions/aqua/JPL_AIRS.shtml
http://ensight.eos.nasa.gov/Missions/aura/JPL_MLS.shtml
http://ensight.eos.nasa.gov/Missions/NPP/JPL_SOUNDER.shtml
http://ensight.eos.nasa.gov/Organizations/production/JPL_QSCAT.shtml
http://ensight.eos.nasa.gov/Organizations/production/JPL_PODAAC.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
GSFC-GES DISC → JPL-AIRS	219.0	157.2	60.7	76.5	176.1
NPP-SD3E-OPS2 → JPL-AIRS	336.3	330.0	280.0		
GSFC-NISN → JPL-AIRS	297.4	275.2	142.0		
ESDIS-PTH → JPL-AIRS	300.7	257.0	211.8		
NPP IDPS-Mini → JPL-Sounder	167.6	128.4	53.4		
GSFC-NISN → JPL-MLS	373.7	311.0	131.8		
ESDIS-PTH → JPL-MLS	272.5	259.3	186.8		
ESDIS-PTH → JPL-PODAAC	115.7	94.9	73.0		
GSFC-NISN → JPL-PODAAC	150.9	119.4	54.1		
MODAPS-PDR → JPL-PODAAC	80.7	56.8	34.7		
GSFC-NISN → JPL-QSCAT	88.4	86.8	56.0		
ESDIS-PS → JPL-QSCAT	83.4	80.6	68.1		



Requirements:

Source → Dest	Date	Mbps	Prev	Rating
GSFC → JPL Combined	CY '12-	63	116.7	Excellent
GSFC → JPL AIRS	CY '12-	40	98	Excellent
GSFC NPP → JPL Sounder	CY '12-	15	15	Excellent
GSFC → JPL MLS	CY '12-	1.0	2.1	Excellent

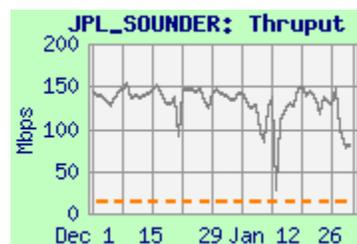
Comments: Thruput from EBnet sources (GES DISC, NPP-SD3E, ESDIS-PS, and ESDIS-PTH) increased greatly in September '12, with the EBnet firewall upgrade (due to EBnet reduced outgoing packet loss), compared with GSFC-NISN, which was more stable. Thruput from GSFC-NISN improved to JPL destinations in early December.

AIRS , Overall: The requirements were switched in June '12 to use the requirements database, instead of the Handbook v1.4.3 previously. This resulted in a 46% decrease in the overall requirement.

The AIRS Integrated thruput from **GES DISC** was lower than last month (was 192 mbps), but with much higher user flow in the last half of January (averaged 33 mbps in December); it remains above 3 x the reduced AIRS requirement, so the AIRS rating remains **Excellent**.

The **JPL overall rating** is based on the **NPP-SD3E-OPS2** to JPL AIRS thruput, compared with the sum of all the GSFC to JPL requirements. The median thruput remained above 3 x this requirement, so the overall rating remains **Excellent**. Note that the average user flow this month was above the requirement (including contingency).

NPP to JPL Sounder: Thruput from NPP IDPS-Mini to the JPL Sounder PEATE was mostly stable after improving in September due to reduced EBnet packet loss. The rating remains **Excellent**.

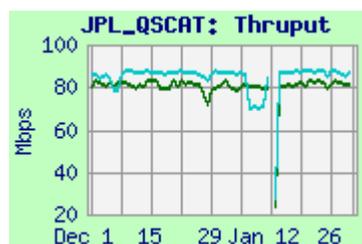
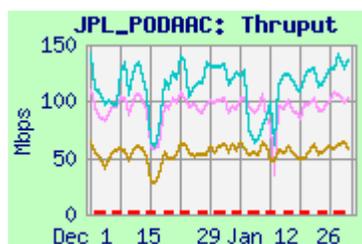
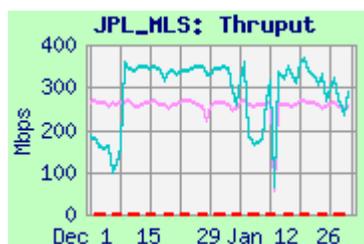


3.1) GSFC → JPL: continued

MLS: Thruput from ESDIS-PTH improved in September due to reduced EBnet packet loss. Thruput from GSFC-NISN dropped at the same time, but improved back to previous levels in December. Both were way above the modest requirement, so the rating remains **Excellent**.

PODAAC: There is no longer a requirement from GSFC to JPL PODAAC in the database. But performance to PODAAC improved in September due to reduced EBnet packet loss – thruput was way above the previous 1.5 mbps PODAAC requirement.

QSCAT: There is no longer a requirement from GSFC to JPL QSCAT in the database. Thuput from ESDIS-PS to QSCAT also improved in September due to reduced EBnet packet loss (unlike from GSFC-NISN, which was stable). It remains well above the modest previous 0.6 mbps requirement.



3.2) JPL → LaRC

Rating: Continued **Excellent**

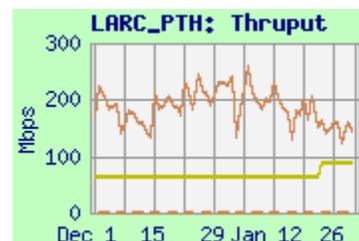
Web Page: http://ensight.eos.nasa.gov/Organizations/production/LARC_PTH.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow
	Best	Median	Worst	
JPL-PTH → LaRC PTH	87.1	63.1	62.9	0.26
JPL-TES → LaRC PTH	314.3	180.9	80.3	

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
JPL → LaRC	CY '12 –	1.1	1.5	Excellent



Comment: This requirement is primarily for TES products produced at the TES SIPS at JPL, being returned to LaRC for archiving. This month the thruput from JPL-TES was again noisy but remained much higher than the requirement; the rating remains **Excellent**. The user flow this month was below the usual and the requirement.

Thruput from JPL-PTH to LaRC-PTH switched from the lower of its two common states – 60 and 85 mbps to the higher state, in mid January. It is limited by a Fast-E interface on JPL-PTH.

3.3) LaRC → JPL

Rating: ↓ **Adequate** → **Low**

Web Pages:

- http://ensight.eos.nasa.gov/Organizations/production/JPL_TES.shtml
- http://ensight.eos.nasa.gov/Missions/terra/JPL_MISR.shtml
- http://ensight.eos.nasa.gov/Organizations/production/JPL_PTH.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
LaRC ASDC → JPL-MISR	81.9	27.1	17.0	1.9	27.1
LaRC PTH → JPL-MISR	79.0	75.8	54.5		
LaRC ASDC → JPL-TES	100.7	41.0	11.3	0.02	
LaRC PTH → JPL-TES	176.3	168.5	145.4		
LaRC PTH → JPL-TES sftp	26.5	25.8	15.7		
LaRC ANGE → JPL-PTH	90.9	88.7	78.9	8.8	

Requirements:

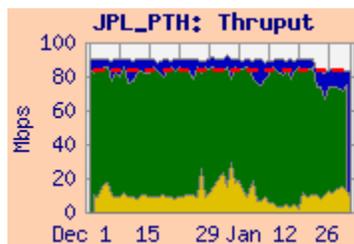
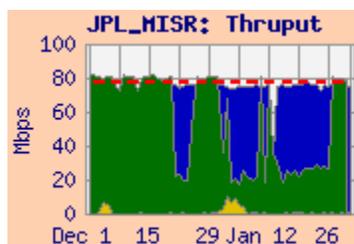
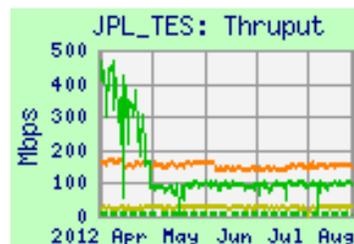
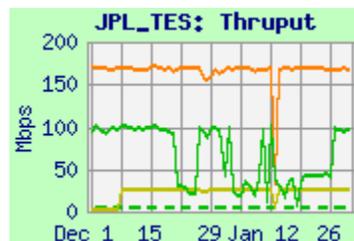
Source → Dest	Date	Mbps	Prev	Rating
LaRC → JPL-Combined	CY '12 –	83.5	69.3	Low
LaRC ASDC → JPL-MISR	CY '12 –	78.1	62.3	Adequate
LaRC ASDC → JPL-TES	CY '12 –	5.5	7.0	Excellent

Note: Performance from **LaRC ASDC** to JPL (also from **LaRC ASDC** to most other destinations) was very variable (typically on a 3 hour cycle), beginning at the end of April, apparently due to congestion at ASDC. After mid July, the 3 hour cycle disappeared, but the thrupt from **LaRC ASDC** stayed low and noisy. Performance from **LaRC ANGe** and **LaRC PTH** to JPL was stable and did not exhibit this characteristic.

LaRC → JPL (MISR): The **LaRC ASDC** to JPL MISR testing was retuned in November, with slightly increased thrupt. User flow was much lower than the requirement. The thrupt is limited by the Fast-E connection to the MISR node, and the ASDC congestion. The median integrated thrupt is now well below the MISR requirement, so the MISR rating drops to **Low**.

LaRC → JPL (Overall, TES): Median performance from **LaRC ASDC DAAC** to JPL-TES dropped way down at the end of April, due to the congestion above. The median thrupt remained well over 3 x the TES requirement, so the TES rating remains **Excellent**. But it is now less than 2/3 of the increased combined requirements, so the Overall rating drops to **Low**. User flow to TES is very low.

The JPL-PTH integrated graph shows the overall LaRC to JPL user flow (vs. the overall requirement). The true capacity of the network is better seen with the **LaRC PTH → JPL-TES** thrupt, which is not subject to the ASDC congestion (but is limited to 200 mbps by NISN). The Overall rating based on this test would be **Good**.



4) GSFC → LaRC:**Rating: Continued Excellent**

Web Pages : <http://ensight.eos.nasa.gov/Organizations/production/LARC.shtml>
http://ensight.eos.nasa.gov/Organizations/production/LARC_ANGe.shtml
http://ensight.eos.nasa.gov/Organizations/production/LARC_PTH.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
GES DISC → LaRC ASDC	511.7	401.0	236.8	78.7	431.5
GSFC-EDOS → LaRC ASDC	853.4	702.2	132.4		
ESDIS-PTH → LaRC-ANGe	476.9	475.2	448.0		
GSFC-NISN → LaRC-ANGe	498.9	495.9	488.5		

Requirements:

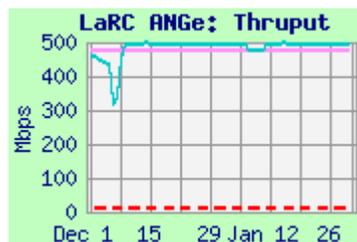
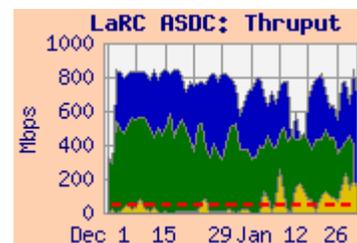
Source → Dest	Date	Mbps	Prev	Rating
GSFC → LARC (Combined)	CY '12 –	52.2	31.3	Excellent

Comments: Thruput from all EBnet sources (GES DISC, EDOS, and ESDIS-PTH) improved in September '12 due to reduced EBnet packet loss. Note that the high packet loss prior to September did not have much effect on thruput for these flows – TCP recovers quickly due to the short RTT.

GSFC → LaRC ASDC: Thruput from GES DISC to LaRC ASDC DAAC remained well above 3 x the increased combined requirement, so the rating remains **Excellent**. Thruput to ASDC from GSFC-EDOS was down in November due to a switch of the EDOS test node to Open EBnet – testing resumed in December. Thruput had improved more than from GES DISC, and improved further in October with retuning.

As seen on the integrated graph, the user flow was above normal and above the requirement this month, after being lower than normal (21 mbps) last month.

ANGe (LaTIS): Testing to ANGe (“Bob”) from ESDIS-PTH improved in September due to reduced EBnet packet loss, and was consistent from GSFC-NISN.



5) Boulder CO sites:

5.1) NSIDC:

Ratings: GSFC → NSIDC: Continued **Excellent**
 JPL → NSIDC: Continued **Excellent**
 GHRC → NSIDC: Continued **Excellent**

Web Pages: <http://ensight.eos.nasa.gov/Organizations/production/NSIDC.shtml>
http://ensight.eos.nasa.gov/Organizations/production/NSIDC_SIDADS.shtml
http://ensight.eos.nasa.gov/Organizations/production/NSIDC_PTH.shtml

Thruput from some (but not all) sources to NSIDC destinations dropped dramatically at the end of May. But no corresponding change in route or packet loss was observed! (It is suspected that the problem might relate to the return route. Whatever the problem was, it was fixed in December. Thruput is now much higher than previous levels!

Test Results: NSIDC S4PA

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
MODAPS-PDR → NSIDC DAAC	627.9	614.3	367.0	1.87	614.3
GES-DISC → NSIDC DAAC	155.6	101.1	37.8		
GSFC-EDOS → NSIDC DAAC	159.0	156.4	26.2		
ESDIS-PTH → NSIDC DAAC	602.0	599.2	561.6		
GSFC-ISIPS → NSIDC (iperf)	136.7	134.5	121.4		
JPL PODAAC → NSIDC DAAC	242.5	229.5	188.6		
GHRC → NSIDC DAAC (nuttcp)	18.8	10.5	5.5		
GHRC → NSIDC DAAC (ftp pull)	n/a	n/a	n/a		

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
GSFC → NSIDC	CY '12 –	8.42	27.6	Excellent
JPL → NSIDC	CY '12 –	0.16	0.2	Excellent
GHRC → NSIDC	CY '12 –	0.46	0.5	Excellent

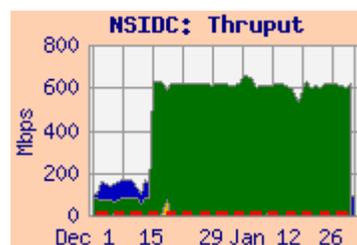
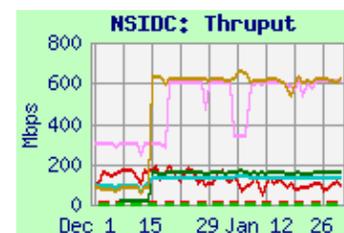
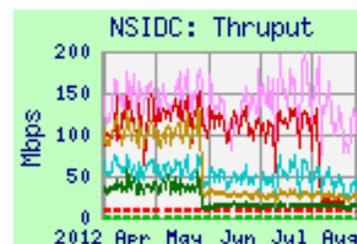
Comments: GSFC → NSIDC S4PA: Thruput from all EBnet sources (MODAPS-PDR, GES DISC, GSFC-EDOS, ESDIS-PTH, and GSFC-ISIPS) improved in September due to reduced EBnet packet loss. Thruput had dropped from GSFC-EDOS and MODAPS-PDR at the end of May, but remained stable at that time from GES DISC, ESDIS-PTH and GSFC-ISIPS. Thruput from GES DISC dropped in August, corresponding with an address change for GES DISC (but recovered in September). This supports the hypothesis that the problem related to the return route.

The rating is based on testing from the MODAPS-PDR server to the NSIDC DAAC. The requirement was reduced in May '09 from 34.5 mbps (and was 64 mbps in April '08). The integrated thruput from MODAPS-PDR remains more than 3 x the requirement, so the rating remains **Excellent**. The 1.87 mbps average user flow was close to typical, and was only about 10% of the reduced requirement (without contingency).

Testing from GSFC-EDOS stopped in mid October while the EDOS node was being moved to Open EBnet – resumed in December.

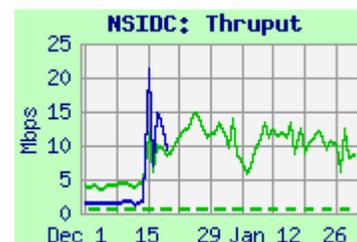
JPL PODAAC → NSIDC S4PA: The requirement was reduced from 1.34 mbps in May '09. Thruput from PODAAC to NSIDC dropped in May '12 from over 300 mbps previously; it had been mostly stable since testing was moved to use Internet2 in September '09.

Performance also improved dramatically in mid December; the rating remains **Excellent**.

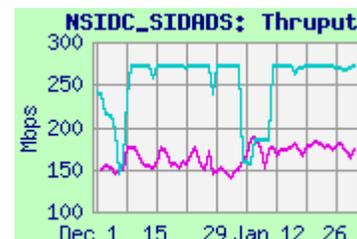


5) Boulder CO sites (Continued):**5.1) NSIDC:** (Continued):

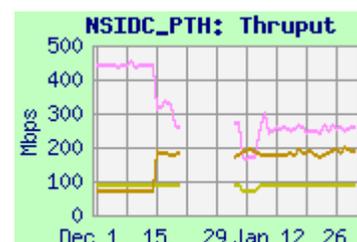
GHRC, GHRC-ftp → NSIDC S4PA: GHRC (NSSTC, UAH, Huntsville, AL) sends AMSR-E data to NSIDC via NLR / Internet2. Thruput from GHRC experienced a drop (similar to the other drops above) at the end of May, but also improved again in mid December. The median thruput remained more than 3x the 0.46 mbps requirement, so the rating remains **Excellent**. User flow averaged only 3 kbps this month, well below the requirement and the typical flow. FTP testing stopped in December due to filename changes; this test resumed in February.

**Test Results: NSIDC SIDADS, NSIDC-PTH**

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
GSFC-ENPL → NSIDC-SIDADS	186.6	173.5	99.0
GSFC-NISN → NSIDC-SIDADS	271.9	270.7	218.3
ESDIS-PTH → NSIDC-PTH	320.3	254.8	189.1
MODAPS-PDR → NSIDC-PTH	251.2	181.9	149.7
JPL PTH → NSIDC-PTH	88.8	88.8	85.3



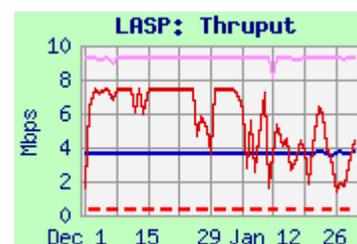
GSFC → NSIDC-SIDADS: The performance to SIDADS via NISN improved last month, and was pretty stable via Internet2 (note expanded scale on graph).



NSIDC-PTH: Thruput from EBnet sources (ESDIS-PTH and MODAPS-PDR) improved in September due to reduced EBnet packet loss. Thruput to NSIDC-PTH had dropped at the end of May (similar to the drop to S4PA) from MODAPS-PDR, but was steady from ESDIS-PTH and JPL PTH (limited by its Fast-E connection). Testing went down to NSIDC-PTH in mid December, but recovered in early January.

5.2) LASP:Ratings: LASP → GSFC: Continued **Excellent**Web Page: <http://ensight.eos.nasa.gov/Organizations/production/LASP.shtml>**Test Results:**

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
ESDIS-PTH → LASP blue (scp)	3.71	3.68	3.54
ESDIS-PTH → LASP blue (iperf)	9.29	9.26	7.93
GES DISC → LASP blue (iperf)	7.45	4.03	0.99
LASP → GES DISC	9.33	9.30	4.51

**Requirement:**

Source → Dest	Date	Mbps	Rating
LASP → GES DISC	CY '10 -	0.016	Excellent

Comments: In January '11, LASP's connection to NISN PIP was rerouted: it previously was 100 mbps from CU-ITS via NSIDC; this was changed to a 10 mbps connection to the NISN POP in Denver.

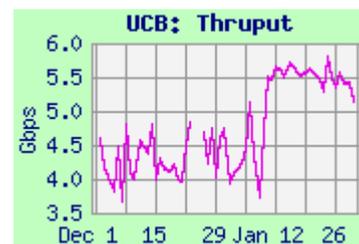
Iperf and SCP testing from GES DISC and ESDIS-PTH was mostly stable, and consistent with the circuit limitation. Return testing from LASP to GES DISC was also stable, rating **Excellent**.



5) Boulder CO sites (Continued):**5.3) UCB:**Web Page <http://ensight.eos.nasa.gov/Organizations/daac/UCB.shtml>**Test Results:**

Source	Medians of daily tests (gbps)		
	Best	Median	Worst
GSFC-ENPL-10G	5.9	5.5	4.0

Comments: Testing is to a 10 gig connected test node at UCB. The route is via Internet2 to FRGP, similar to NCAR. Performance stabilized and improved in January.

**5.4) NCAR:**

Ratings: LaRC → NCAR: Continued **Excellent**
 GSFC → NCAR: Continued **Excellent**

Web Pages <http://ensight.eos.nasa.gov/Missions/terra/NCAR.shtml>**Test Results:**

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
LaRC PTH	178.5	133.5	66.4
GSFC-ENPL-10G	3669.2	1406.5	229.6
GSFC-ENPL-FE	98.9	98.2	91.9
GSFC-NISN	665.6	496.7	226.1

Requirement:

Source	Date	Mbps	Prev	Rating
LaRC	CY '12 -	0.044	0.1	Excellent
GSFC	CY '12 -	0.111	5.0	Excellent

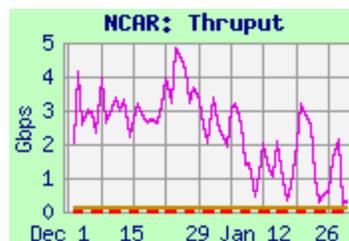
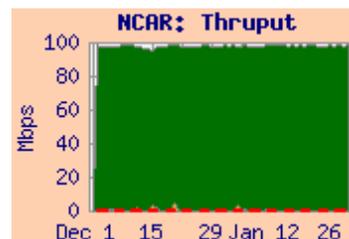
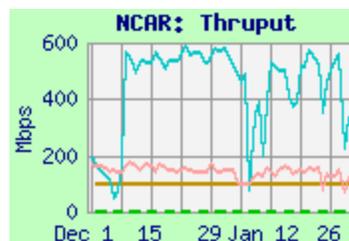
Comments: NCAR has a SIPS for MOPITT (Terra, from LaRC), and has MOPITT and HIRDLS (Aura, from GSFC) QA requirements.

Testing was switched to NCAR's PerfSonar server in March '12 – testing was discontinued from LaRC ASDC at that time; testing from LaRC-PTH continued. This node is 10 gigabit capable. Performance from most nodes was similar to the previous test node, but somewhat noisier.

From LaRC: Thrupt from LaRC-PTH was well above 3 x the modest requirement, so the rating remains **Excellent**. Note that outflow from LaRC-PTH is limited to 200 mbps by NISN.

From GSFC: From GSFC-NISN, the route is via NISN to the MAX (similar route as from LaRC-PTH). Thrupt improved substantially in December. It was well above 3 x the requirement, so the rating remains **Excellent**. The average user flow from GSFC this month was again only 0.5 mbps, which was above the requirement.

From GSFC-ENPL-10G, with a 10 Gig-E interface, and a 10 gig connection to MAX, performance to NCAR's 10 Gig PerfSonar node gets over 3 gbps on peaks.



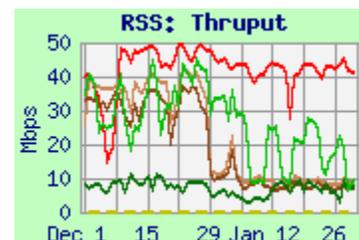
6) Remote Sensing Systems (RSS):

Ratings: JPL → RSS: Continued **Excellent**
 RSS → GHRC: ↓ **Excellent** → **Adequate**

Web Page <http://ensight.eos.nasa.gov/Missions/aqua/RSS.shtml>

Test Results:

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
JPL PODAAC → RSS (Comcast)	10.3	7.5	3.7
JPL TES → RSS (Comcast)	11.8	9.1	3.3
GSFC-NISN → RSS (Comcast)	45.6	42.7	37.2
GHRC-UAH → RSS (Comcast)	30.6	20.7	1.7
GHRC-NISN → RSS (Comcast)	16.5	6.1	1.8
RSS (Comcast) → GHRC (UAH)	0.82	0.35	0.19
RSS (Comcast) → GHRC (NISN)	0.90	0.38	0.22



Requirements:

Source → Dest	Date	Mbps	Prev	Rating
JPL PODAAC → RSS	CY '12 -	0.16	0.49	Excellent
RSS → GHRC	CY '12 -	0.32	0.34	Excellent

Comments: RSS (Santa Rosa, CA) is a SIPS for AMSR-E (Aqua), receiving L1 data from JAXA via JPL, and sending its processed L2 results to GHRC (aka NSSTC) (UAH, Huntsville, AL).

At the end of March '12, RSS switched its production node from the NISN SIP circuit (4 x T1s to NASA ARC -- total 6 mbps) to the Comcast circuit, rated at 50 mbps incoming, and 12 mbps outgoing (installed in April 2011). Testing via the NISN circuit to RSS was discontinued at that time.

It appears that the peering between JPL and Comcast was degraded at the end of December (had improved in late November). The route from JPL is via Los Nettos, CENIC, peering with Comcast in LA.

Testing from the UAH server at GHRC also was degraded; but it remained above the results from GHRC via NISN.

The median iperf from JPL remained well above 3 x the reduced requirement, so the rating from JPL remains **Excellent**.

RSS → GHRC: In addition, the new servers at RSS connected to the Comcast circuit allows "3rd party testing", as does the server at GHRC. Testing is therefore performed between RSS and GHRC, both with a UAH address and a NISN address at GHRC.

The results to the two destinations are very similar; both dropped severely in early January. The performance to the NISN address remains above the requirement, but only slightly, so the rating drops to **Adequate**.



7) Wisconsin:Rating: Continued **Adequate**Web Pages <http://ensight.eos.nasa.gov/Missions/NPP/WISC.shtml>**Test Results:**

Source Node	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
NPP-SD3E	305.5	304.4	297.7	218.0	310.3
GES DISC	248.2	189.3	85.6		
GSFC ENPL	314.6	291.1	237.3		
LaRC ANGe	202.8	179.2	88.9		

Requirements:

Source Node	Date	mbps	Prev	Rating
NPP-SD3E	CY'12 -	237.2	237.2	Good
GSFC MODAPS	CY'12 -	21.9	16.5	Excellent
GSFC Combined	CY'12 -	259.1	253.7	Adequate
LaRC Combined	CY'12 -	n/a	7.9	Excellent

Comments: The Univ of Wisconsin is included in this Production report due to its function as Atmosphere PEATE for NPP. Wisconsin continues to be an SCF on the MODIS, CERES and AIRS teams.

GSFC: Thruput from NPP-SD3E (on EBnet) was stable this month.

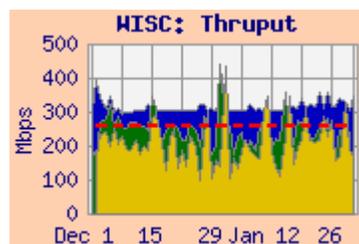
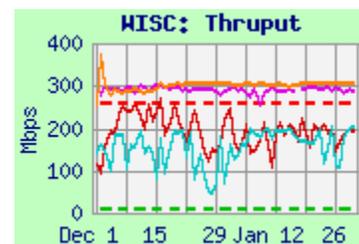
User flow was a bit higher than previously. The integrated thrupt was above the NPP requirement by slightly more than 30%, so the NPP rating is **Good**. It was also above the GSFC combined requirement, but by less than 30%, so that rating remains **Adequate**.

Thruput from GES DISC, however, improved. Thruput from EBnet sources had improved in September 2012 due to the EBnet firewall replacement (Thruput from EBnet previously had dropped in February due to EBnet outgoing packet loss).

The route from EBnet at GSFC is via MAX to Internet2, peering with MREN in Chicago.

From GSFC-ENPL thrupt was similar, and had been unaffected by the EBnet packet loss. In late September, testing from GSFC-ENPL was switched to a PerfSonar node at Wisconsin, with much higher thrupt, but this dropped in October.

LaRC: Although there is no longer a CERES requirement from LaRC to Wisconsin, thrupt from LaRC ANGe is pretty steady and well above the previous 7.9 mbps requirement, and would be rated **Excellent**. The route from LaRC is via NISN, peering with MREN in Chicago. Testing from LaRC was switched in November due to the old test node at LaRC being retired.



8) KNMI:Rating: Continued **Excellent**Web Pages http://ensight.eos.nasa.gov/Missions/aura/KNMI_ODPS.shtml**Test Results:**

Source → Dest	Medians of daily tests (mbps)			
	Best	Median	Worst	Reqmt
OMISIPS → KNMI-ODPS	504.5	358.9	140.4	13.4
GSFC-ENPL → KNMI-ODPS	782.4	689.1	467.1	

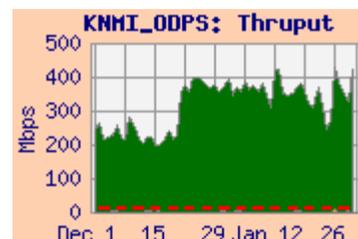
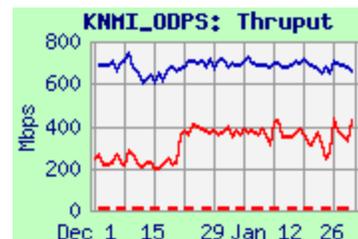
Comments: KNMI (DeBilt, Netherlands) is a SIPS and QA site for OMI (Aura). The route from GSFC is via MAX to Internet2, peering in DC with Géant's 3 x 10 gbps circuit to Frankfurt, then via Surfnet through Amsterdam.

The requirement was increased with the use of the database to 13.4 mbps, a much more realistic value than the previous 0.03 mbps.

The rating is based on the results from OMISIPS at GSFC to the ODPS primary server at KNMI. Thruput from OMISIPS (on EBnet) improved in mid September due to the EBnet firewall replacement!

The median thruput remains much more than 3 x the increased requirement, so the rating remains **Excellent**.

The user flow, however, averaged only 2.1 mbps this month, similar to the last 2 months (and close to the typical 4 mbps), but well below the requirement.



9) JSpace - ERSD:

Ratings: **GSFC → ERSD: Continued Excellent**
ERSD → EROS: Continued Excellent
ERSD → JPL-ASTER-IST: N/A

Web Page: <http://ensight.eos.nasa.gov/Organizations/production/ERSDAC.shtml>

US ↔ JSpace - ERSD Test Results

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
GSFC-EDOS → ERSD	95.0	94.8	26.1	4.2	94.8
GES DISC → ERSD	52.1	39.9	21.7		
GSFC ENPL (FE) → ERSD	93.3	92.7	91.5		
GSFC ENPL (GE) → ERSD	621.1	577.0	273.3		
ERSD → EROS	203.4	132.2	36.8	3.6	133.2
ERSD → JPL-ASTER IST	n/a	n/a	n/a		
ERSD → JPL-TES	164.0	113.6	46.1		

Requirements:

Source → Dest	CY	Mbps	Prev	Rating
GSFC → ERSD	'12 -	6.75	5.4	Excellent
ERSD → JPL-ASTER IST	'12 -	0.31	0.31	Excellent
ERSD → EROS	'12 -	8.33	8.3	Excellent

Comments:

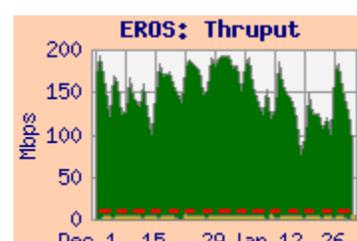
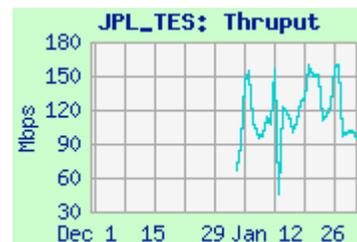
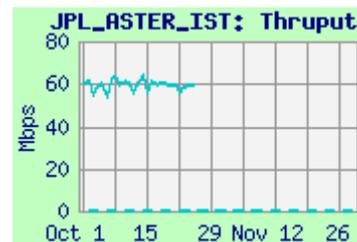
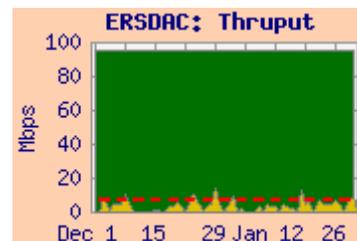
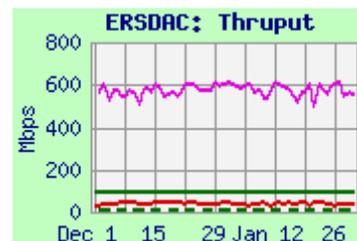
GSFC → ERSD: As of approximately September '11, the ERSD test node is connected at 1 gbps – formerly was 100 mbps. The median thrupt from most nodes improved at that time. Peak thrupt from GSFC ENPL is over 500 mbps. However, some nodes (e.g., EDOS) have been using QoS (HTB) to reduce loss previously seen in the 1 gig to 100 meg switch at Tokyo-XP – those nodes remain limited by their HTB settings, and did not see much improvement.

Thruput from EBnet sources (GSFC-EDOS, GES DISC) improved in mid September due to the EBnet firewall replacement. Thruput remains well above 3 x the reduced requirement, so the rating remains **Excellent**. The integrated chart shows that the user flow is mostly stable, and consistent with the requirement.

The FastE connected GSFC-ENPL-FE node is limited to 100 mbps by its own interface, and gets very steady thrupt.

ERSD → JPL-ASTER-IST: The JPL-ASTER-IST test node was retired in October; a replacement node is being sought. As a substitute, testing was initiated from ERSD to a different node at JPL ("TES"). Results to TES are better than previously to the JPL-ASTER-IST, and would be rated **Excellent**.

ERSD → EROS: The thrupt improved with retuning in October '11, after the ERSDAC Gig-E upgrade; it remains well above the reduced requirement (was 26.8 mbps previously). The user flow was near normal this month. The median thrupt is more than 3 x the reduced requirement, so the rating remains **Excellent**.



10) US ↔ JAXA

Ratings: US → JAXA: N/A
 JAXA → US: N/A

The JAXA test hosts at EOC Hatoyama were retired on March 31, 2009 (the end of the Japanese government's fiscal year). No additional testing is planned for AMSR or TRMM. All testing to JAXA-TKSC for ALOS was terminated at the end of June '09. JAXA has been requested to restore these tests – in preparation for GPM -- but they have declined to participate.

However, the user flow between GSFC and JAXA continues to be measured. As shown below, the user flow this month averaged 3.36 mbps from GSFC to JAXA, and 1.31 mbps from JAXA to GSFC.

These values are consistent with the new (database) requirements of 3.36 mbps to JAXA, and 1.31 mbps back to JPL. However, since no iperf tests are run, the true capability of the network cannot be determined, and therefore no rating is assigned.

