

EOS Production Sites

Network Performance Report: October 2012

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 ↑ 3.68** (was 3.66 last month).
- **Requirements:** use the Network Requirements Database
 - Previously used Handbook 1.4.3 (May '09 – May '12)
- **All EBnet Outflows: EBnet Firewall replaced in September – with major improvements!** (additional improvements shortly thereafter with retuning) (High packet loss and reduced thruput had started in February '11.)
- **LaRC ASDC Outflow:** No change: very high congestion continued to reduce performance on most outflows. (Not observed from LaRC ANGe or LaRC-PTH)
- **2 flows below Good:**
 - GSFC MODAPS-PDR → EROS (“**Adequate**”)
 - LaRC ASDC → JPL (“**Adequate**”)

Ratings Changes:

Upgrade: ↑

- GSFC MODAPS-PDR → EROS : **Almost Adequate** → **Adequate**

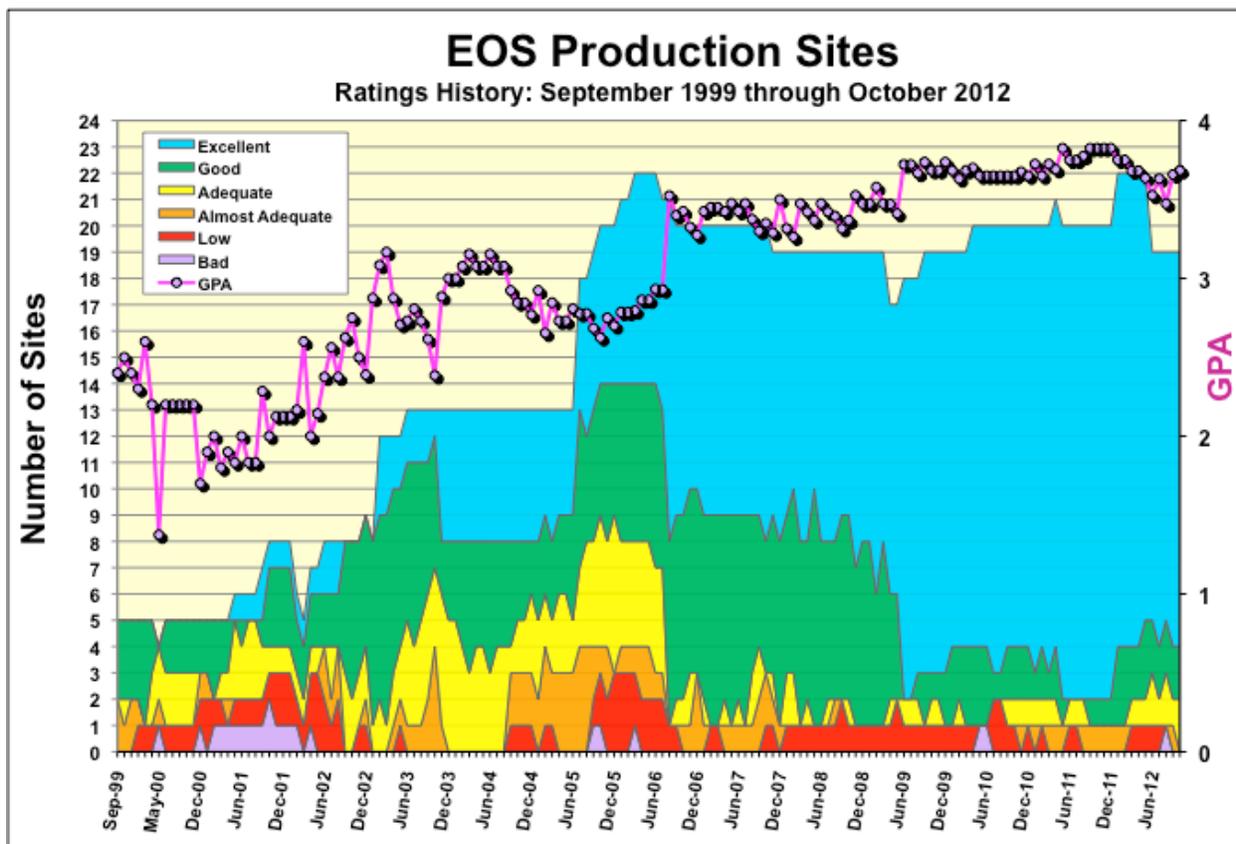
Downgrades: ↓ None

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 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.

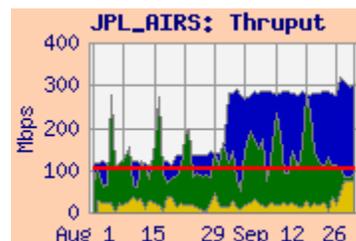
Previously, the requirements were based on the EOS Networks Requirements Handbook, Version 1.4.3 (from which the original database requirements were derived). Prior to that, the requirements were derived from version 1.4.2.

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.

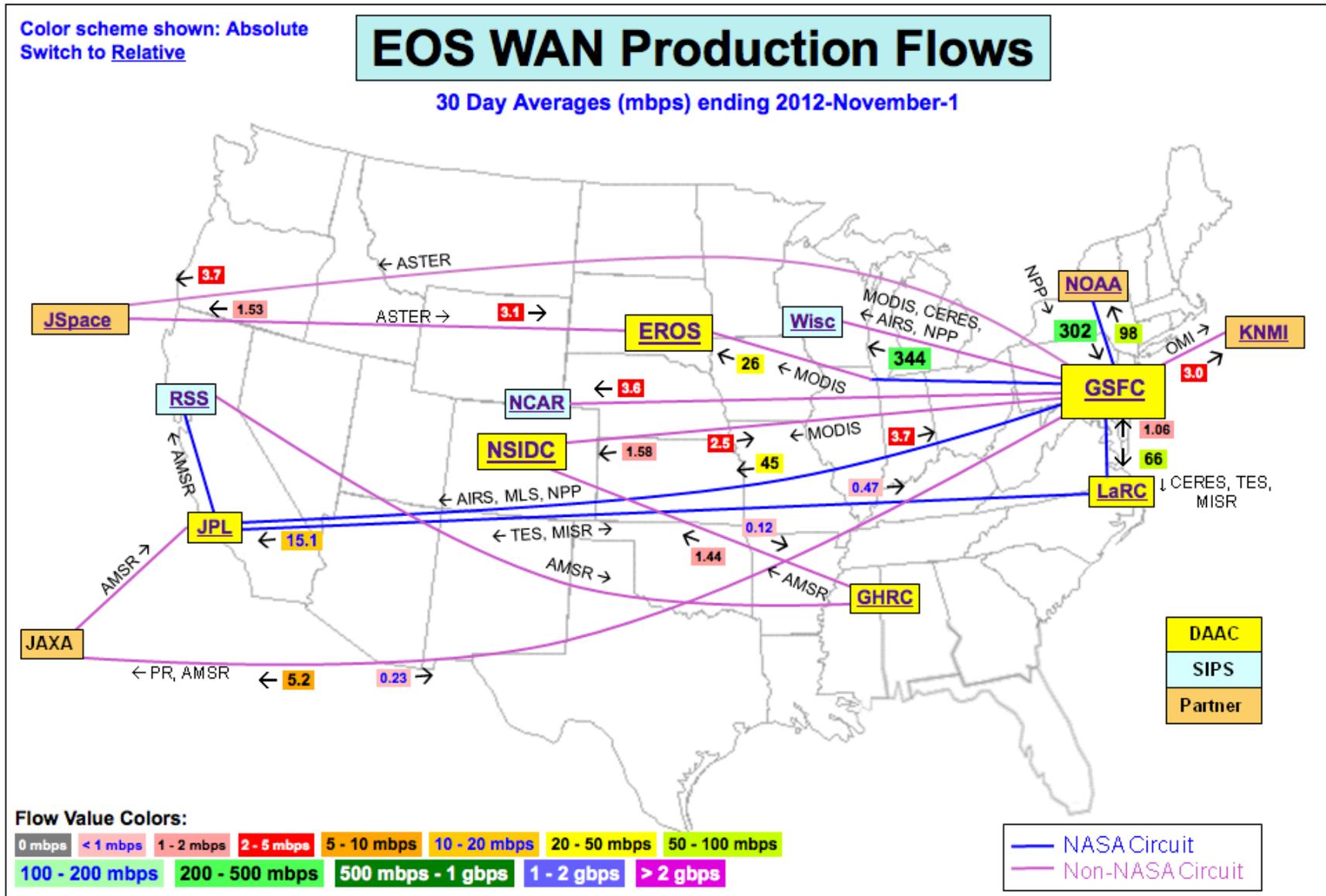
Integrated Charts:

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 throughput 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.



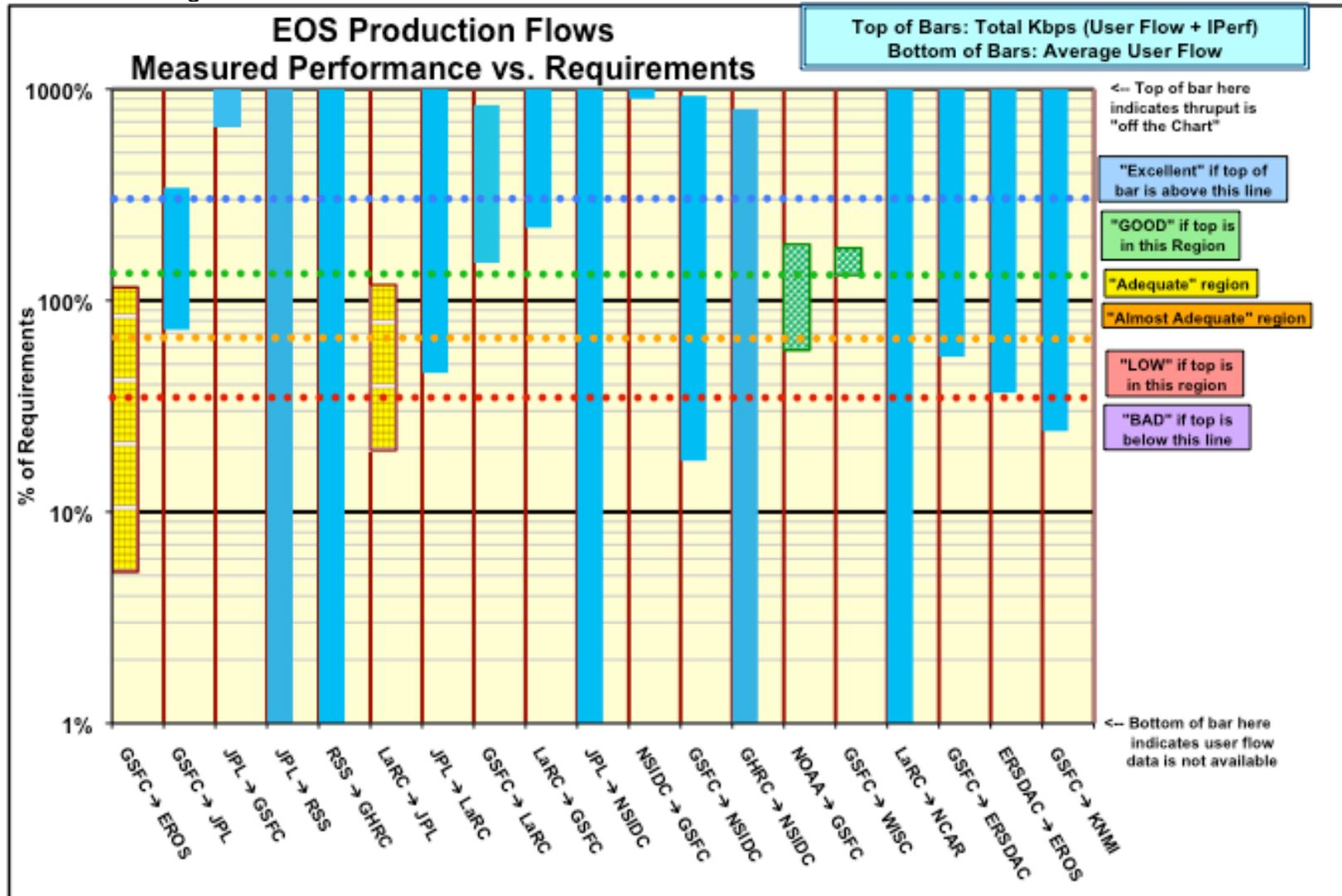
Network Requirements vs. Measured Performance

October 2012		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	28.6	630.8	632.6	Adequate	AA
GSFC → JPL	AIRS, MLS, NPP, ISTs	63	116.7	GSFC GES DISC → JPL-AIRS	45.8	189.1	215.1	Excellent	Ex
JPL → GSFC	MLS	0.57	0.6	JPL-PODAAC → GSFC GES DISC	3.7	58.2	58.3	Excellent	Ex
JPL → RSS	AMSR-E	0.16	0.5	JPL-PODAAC → RSS (Comcast)		4.4		Excellent	Ex
RSS → GHRC	AMSR-E	0.32	0.3	RSS (Comcast) → GHRC		3.8		Excellent	Ex
LaRC → JPL	TES, MISR	83.5	69.3	LARC-ASDC → JPL-TES	16.3	99.1		Adequate	Adq
JPL → LaRC	TES	1.1	1.5	JPL-TES → LARC-PTH	0.5	202.2		Excellent	Ex
GSFC → LaRC	CERES, MISR, MOPITT, TES, MODIS	52.2	31.3	GES DISC → LaRC ASDC	78.5	431.8	438.2	Excellent	Ex
LaRC → GSFC	MISR	0.6	0.4	LARC-ASDC → GES DISC	1.23	376.6	376.6	Excellent	Ex
JPL → NSIDC	AMSR-E	0.16	0.2	JPL-PODAAC → NSIDC		46.7		Excellent	Ex
NSIDC → GSFC	AMSR-E, MODIS, ICESAT	0.017	0.6	NSIDC DAAC → GES DISC	2.6	199.4	199.4	Excellent	Ex
GSFC → NSIDC	AMSR-E, MODIS, ICESAT	8.42	27.6	MODAPS PDR → NSIDC-DAAC	1.47	77.9	78.3	Excellent	Ex
GHRC → NSIDC	AMSR-E	0.46	0.5	GHRC → NSIDC DAAC		3.7		Excellent	Ex
NOAA → GSFC	NPP	522.3	615.6	NOAA-PTH → GSFC NPP-SD3E OPS1	304.2	923.7	959.4	Good	Good
GSFC → WISC	NPP	259.1	253.7	GSFC NPP-SD3E OPS1 → WISC	342.1	340.7	457.6	Good	Good
LaRC → NCAR	MOPITT	0.044	0.1	LaRC-PTH → NCAR		124.8		Excellent	Ex
GSFC → JAXA	TRMM, AMSR-E, MODIS	3.51	0.1	GSFC → JAXA	4.7	Testing discontinued: 31 March 2009		n/a	n/a
JAXA → GSFC	AMSR-E	0.16	0.1	JAXA → GSFC	0.23			n/a	n/a
GSFC → ERSDAC	ASTER	6.75	5.4	GSFC-EDOS → ERSDAC	3.7	94.7	94.7	Excellent	Ex
ERSDAC → EROS	ASTER	8.3	8.3	ERSDAC → EROS PTH	3.0	162.5	163.9	Excellent	Ex
GSFC → KNMI	OMI	13.4	0.03	GSFC-OMISIPS → KNMI ODPS	3.2	232.0	232.5	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		15	15
	Good	1.3 * Requirement <= Total Kbps < Requirement * 3				Good		2	2
	Adequate	Requirement < Total Kbps < Requirement * 1.3				Adequate		2	1
	Almost Adequate	Requirement / 1.5 < Total Kbps < Requirement				Almost Adequate		0	1
	Low	Requirement / 3 < Total Kbps < Requirement / 1.5				Low		0	0
	Bad	Total Kbps < Requirement / 3				Bad		0	0
						Total Sites		19	19
Notes:	Flow Requirements include: TRMM, Terra, Aqua, Aura, ICESAT, QuikScat, GEOS, NPP				GPA		3.68	3.66	



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: **↑ Almost Adequate** → **Adequate**
 ERSDAC → EROS: Continued **Excellent**

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

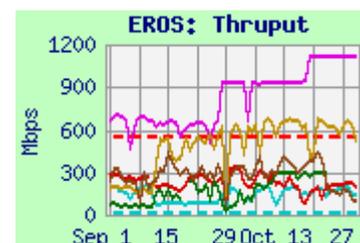
http://ensight.eos.nasa.gov/Organizations/production/EROS_PTH.shtml

Test Results:

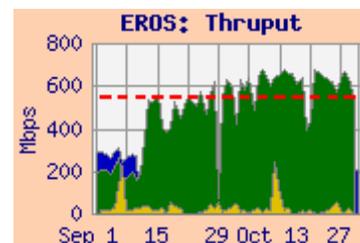
Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
MODAPS-PDR → EROS LPDAAC	677.4	630.8	339.0	28.6	632.6
GSFC-EDOS → EROS LPDAAC	297.4	280.5	54.2		
GES DISC → EROS LPDAAC	296.9	215.8	92.2		
GSFC-ENPL → EROS LPDAAC	939.5	938.6	911.3		
ERSDAC → EROS LPDAAC	207.1	162.5	54.5	3.1	163.6
NSIDC SIDADS → EROS PTH	502.1	309.8	111.0		
GSFC-ENPL → EROS PTH	819.2	746.9	578.0		
GSFC-NISN → EROS PTH	511.3	318.6	152.0		
LaRC PTH → EROS PTH	188.7	171.9	101.4		

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:**

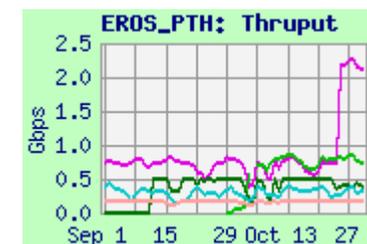
1.1 GSFC → EROS: The rating is based on the MODAPS-PDR Server to EROS LP DAAC measurement, since that is the primary flow. The requirement was switched in June, from using the Handbook v1.4.3 to now use the requirements database. This resulted in a 60% increase in the requirement, based primarily on increased MODIS reprocessing. As MODIS is not conducting reprocessing at present, the user flow this month is only about 5.2% of the new requirement.



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.

Packet loss on all flows leaving EBnet was FIXED ON 11 SEPTEMBER! EBnet to EROS measurements improved dramatically! The median integrated throughput from MODAPS-PDR to LPDAAC is now above the requirement, with contingency! **So the rating improves further to --**

Adequate. Thruput also improved from other EBnet nodes: GES DISC and GSFC-EDOS.



Iperf testing for comparison is performed from GSFC-ENPL to both LPDAAC (switched in late September from the internal "EIL" node to the "FTL" node outside the EROS firewall, and returned in mid-October) and to EROS-PTH (switched to a 10 gig host at EROS in late October). 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 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 **Good** for the whole month of October, and **Excellent** for the last part after the node switch. Thruput from GSFC-ENPL to EROS LPDAAC would also be rated **Good**.

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

1.3 NSIDC → EROS-PTH: Performance dropped substantially in early June, but improved again in mid July, and was noisy but stable in September and October (Other tests to and from NSIDC had dropped at the same time, so the problem is believed not to be related to EROS).

1.4 LaRC → EROS: The throughput 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.

2) to GSFC

Ratings: NOAA → NPP SD3E: **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	938.4	923.7	824.7	304.2	959.4
EROS LPDAAC → GES DISC	196.8	153.9	71.8		
EROS PTH → GSFC-ESDIS PTH	435.3	298.1	170.5		
JPL-PTH → GSFC-ESDIS PTH	88.1	85.9	82.3	3.7	
JPL-TES → GSFC-NISN	539.9	148.6	44.0		
LaRC ASDC → GES DISC	478.0	376.6	214.7	1.2	
LARC-ANGe → GSFC-ESDIS PTH	538.3	533.2	509.6		
NSIDC DAAC → GES DISC	228.4	199.4	139.5	2.6	
NSIDC DAAC → GSFC-ISIPS (scp)	65.6	59.2	15.0		

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.

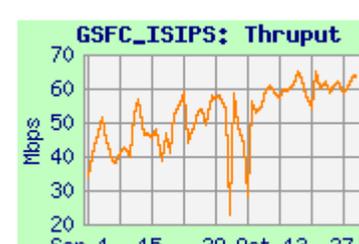
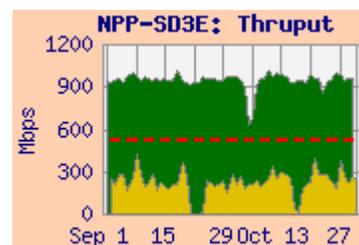
NOAA → NPP-SD3E: Performance from NOAA-PTH to GSFC NPP-SD3E-OPS1 was very steady at over 900 mbps, limited by the gig-E interfaces on the test machines (the circuits are all 10 gbps). User flow was similar to last month, and close to the requirements (without contingency).

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.

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 above the requirement.

NSIDC → GSFC: Performance from NSIDC to GES DISC was steady, and way above the 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

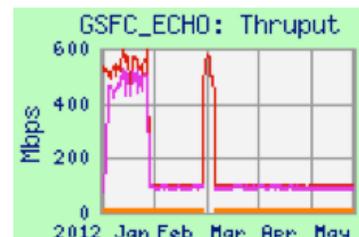
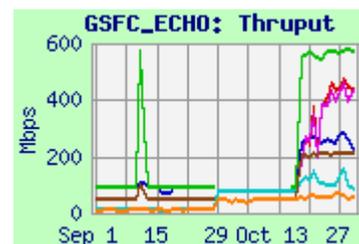
Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
EROS LPDAAC	284.7	255.2	178.8
EROS LPDAAC ftp	88.2	77.5	41.8
GES DISC	484.8	412.3	212.7
GES DISC ftp	501.6	383.2	168.8
LaRC ASDC DAAC	582.8	567.7	379.9
LaRC ASDC DAAC ftp	n/a	n/a	n/a
NSIDC DAAC	215.1	208.5	177.0
NSIDC DAAC ftp	48.9	47.1	22.5

Comments:

The ECHO test node was moved at the end of September '11. Most ftp tests continued working (except from LaRC ASDC), but iperf tests needed new firewall rules before resumption of testing – this was fixed in June '12 (Iperf testing resumed from GES DISC in November '11).

In late January, however, thruput from GES DISC to ECHO dropped to just under 100 mbps, suggesting that a fast-E interface was in use. Performance returned to the higher state for occasional short periods until early October, when the ECHO firewall was replaced, and stable gigabit level performance returned. Performance improved dramatically from all sources at that time. 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

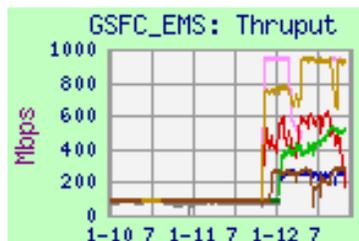
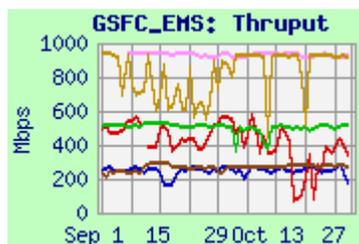
Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
EROS LPDAAC	281.7	248.3	116.0
ESDIS-PTH	937.3	933.7	760.5
GES DISC	535.0	390.4	80.2
LARC ASDC	517.6	503.2	338.1
MODAPS-PDR	935.4	930.1	315.1
NSIDC-SIDADS	283.2	274.8	238.0

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:

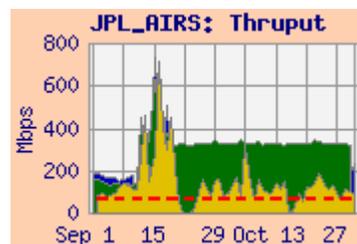
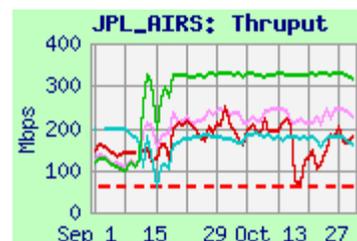
3.1) GSFC → JPL:

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	250.3	189.1	94.9	45.8	215.1
NPP-SD3E-OPS2 → JPL-AIRS	333.5	326.7	295.2		
GSFC-NISN → JPL-AIRS	194.4	177.6	147.9		
ESDIS-PTH → JPL-AIRS	251.0	232.5	185.7		
NPP IDPS-Mini → JPL-Sounder	148.5	96.6	58.6		
GSFC-NISN → JPL-MLS	242.0	170.5	116.1		
ESDIS-PTH → JPL-MLS	272.4	259.0	205.4		
ESDIS-PTH → JPL-PODAAC	119.3	96.7	73.1		
GSFC-NISN → JPL-PODAAC	100.4	75.7	33.5		
MODAPS-PDR → JPL-PODAAC	75.7	55.2	31.9		
GSFC-NISN → JPL-QSCAT	74.3	70.8	59.8		
ESDIS-PS → JPL-QSCAT	82.8	79.7	62.7		



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 on 11 September with the EBnet firewall upgrade (due to EBnet reduced outgoing packet loss), compared with GSFC-NISN, which was stable.

AIRS , Overall: The requirements were switched in June 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 slightly higher than last month, due to a full month of better EBnet performance (but lower user flow), and remains above 3 x the reduced AIRS requirement, so the AIRS rating remains **Excellent**.

The **JPL overall rating** is based on the GES DISC 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 user flow this month was closer to the requirement, and much lower than last month's exceptionally high flow.

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



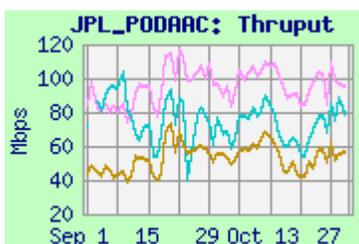
3.1) GSFC → JPL: continued

MLS: Thruput from ESDIS-PTH improved in September due to reduced EBnet packet loss. Thruput from GSFC-NISN dropped at the same time 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.



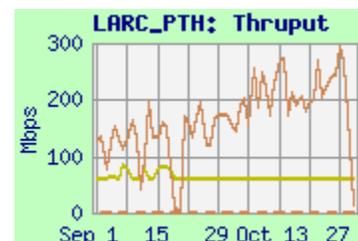
3.2) JPL → LaRC

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	83.1	59.5	56.4	0.50
JPL-TES → LaRC PTH	339.0	202.2	82.1	



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 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 was again mostly at the lower of its two common states – 60 and 85 mbps, limited by a Fast-E interface on JPL-PTH.

3.3) LaRC → JPL

Rating: Continued **Adequate**

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 DAAC → JPL-MISR	69.2	64.6	26.9	1.9	64.6
LaRC PTH → JPL-MISR	79.1	70.7	39.9		
LaRC DAAC → JPL-TES	102.4	99.1	41.2	0.13	
LaRC PTH → JPL-TES	171.6	157.8	130.6		
LaRC PTH → JPL-TES sftp	26.5	25.8	14.7		
LaRC ANGE → JPL-PTH	78.0	75.1	70.1	16.3	

Requirements:

Source → Dest	Date	Mbps	Prev	Rating
	CY '12 –	83.5	69.3	Adequate
LaRC DAAC → JPL-MISR	CY '12 –	78.1	62.3	Almost Adq.
LaRC DAAC → JPL-TES	CY '12 –	5.5	7.0	Excellent

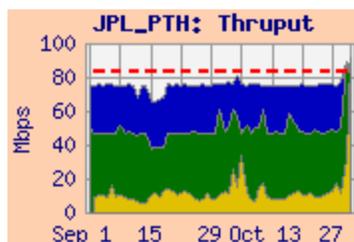
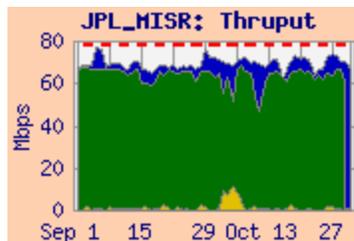
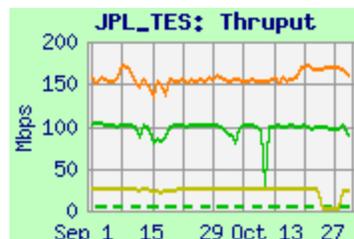
Note: Performance from LaRC ASDC to JPL (also from LaRC ASDC to most other destinations) was very variable (typically on a 3 hour cycle), beginning at the end of April, apparently due to congestion at ASDC. After mid July, the 3 hour cycle disappeared, but the thrupt from LaRC ASDC stayed low. Performance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

LaRC → JPL (MISR): There was a reduction in user flow to MISR after mid July (allowing the iperf results to improve). The thrupt is limited by the Fast-E connection to the MISR node, and the ASDC congestion. The median integrated thrupt is now only 77% of the requirement, so the rating remains **Almost Adequate**.

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. Thrupt remained over 3 x the TES requirement, so the TES rating remains **Excellent**. But is now only 19% above the increased combined requirements, so the Overall rating remains **Adequate**. 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**.

Note: Even though the LaRC → MISR rating is **Almost Adequate**, the overall LaRC → JPL rating remains **Adequate**, since the MISR performance is limited by MISR's Fast-E interface. Its performance is therefore not representative of the overall LaRC → JPL network capability.



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	530.9	431.8	272.6	78.5	438.2
GSFC-EDOS → LaRC ASDC	852.4	716.4	225.0		
ESDIS-PTH → LaRC-ANGe	476.9	475.0	448.9		
GSFC-NISN → LaRC-ANGe	511.3	453.0	332.6		

Requirements:

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

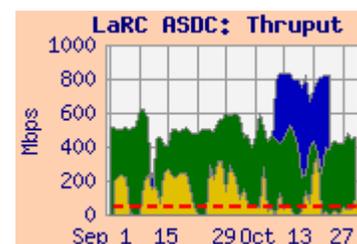
Comments: Thruput from all EBnet sources (GES DISC, EDOS, and ESDIS-PTH) improved in September due to reduced EBnet packet loss, compared with GSFC-NISN, which was stable. Note that packet loss does not have much effect on thruput for these flows – TCP recovers quickly due to the short RTT.

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 improved more than from GES DISC, and improved further in October with retuning. Testing from GSFC-EDOS stopped in mid October while the node is being moved to Open EBnet, and firewall rules are being installed for the new address.

As seen on the integrated graph, the user flow was back closer (but still above) to the requirement this month, after being much higher than normal last month, substantially exceeding the requirement.

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

The node “Darrin” has being retired – all tests formerly to or from Darrin have been switched to use “Bob” instead.



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.)

Test Results: NSIDC S4PA

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
MODAPS-PDR → NSIDC DAAC	81.2	77.9	53.5	1.5	78.3
GES-DISC → NSIDC DAAC	185.3	133.6	64.0		
GSFC-EDOS → NSIDC DAAC	20.1	19.2	12.7		
ESDIS-PTH → NSIDC DAAC	300.4	292.9	226.0		
GSFC-ISIPS → NSIDC (iperf)	99.1	96.2	63.5		
JPL PODAAC → NSIDC DAAC	49.9	46.7	29.8		
GHRC → NSIDC DAAC (nuttcp)	5.7	3.7	3.0		
GHRC → NSIDC DAAC (ftp pull)	1.7	1.3	1.3		

Requirements:

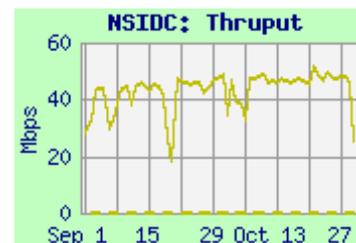
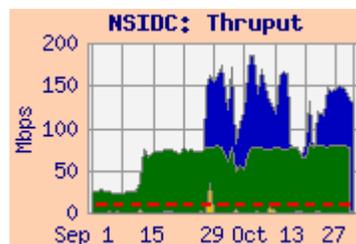
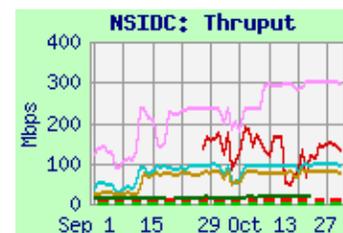
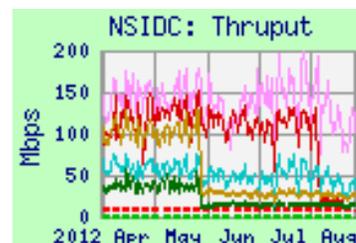
Source → Dest	Date	Mbps	Prev	Rating
GSFC → NSIDC	CY '12 –	8.42	27.6	Excellent
JPL → NSIDC	CY '12 –	0.16	0.2	Excellent
GHRC → NSIDC	CY '12 –	0.46	0.5	Excellent

Comments: **GSFC → NSIDC S4PA:** Thruput from all EBnet sources (MODAPS-PDR, GES DISC, GSFC-EDOS, ESDIS-PTH, and GSFCISIPS) 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 relates 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 1.5 mbps average user flow was typical, and was only 18% of the reduced requirement (which includes reprocessing).

Testing from GSFC-EDOS stopped in mid October while the EDOS node is being moved to Open EBnet.

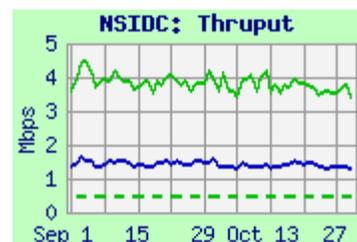
JPL PODAAC → NSIDC S4PA: The requirement was reduced from 1.34 mbps in May '09. Thruput from PODAAC to NSIDC dropped in May from over 300 mbps previously; it had been mostly stable since testing was moved to use Internet2 in September '09; the rating remains **Excellent**.



5) Boulder CO sites (Continued):

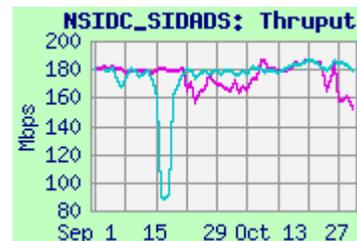
5.1) NSIDC: (Continued):

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.** The rating is based on reverse ntttcp testing. The median ntttcp thruput remained more than 3x the 0.46 mbps requirement, so the rating remains **Excellent**. **User flow averaged 1.5 mbps this month, about 3 x the requirement.**



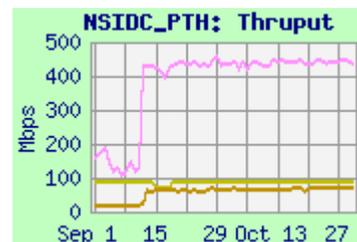
Test Results: NSIDC SIDADS, NSIDC-PTH

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
GSFC-ENPL → NSIDC-SIDADS	189.8	178.3	154.4
GSFC-NISN → NSIDC-SIDADS	185.2	180.3	156.6
ESDIS-PTH → NSIDC-PTH	478.9	440.9	383.5
MODAPS-PDR → NSIDC-PTH	70.4	67.3	54.2
JPL PTH → NSIDC-PTH	88.8	88.7	75.9



GSFC → NSIDC-SIDADS: The performance to SIDADS via NISN and Internet2 was very stable this month.

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.** NSIDC-PTH was upgraded from its Fast-E to a Gig-E interface in early August; performance improved at that time.



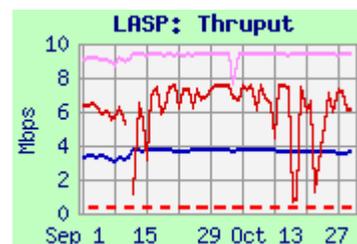
5.2) LASP:

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)	3.7	3.7	3.5
ESDIS-PTH → LASP blue (iperf)	9.4	9.4	8.0
GES DISC → LASP blue (iperf)	7.5	6.8	1.6
LASP → GES DISC	9.3	9.3	6.6

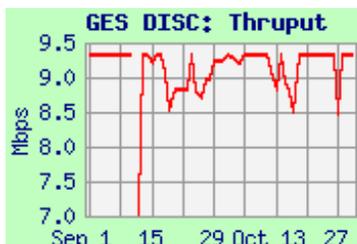


Requirement:

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.

Testing between GES DISC and LASP was restored in August, when the ntttcp server at LASP was restarted. 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**.



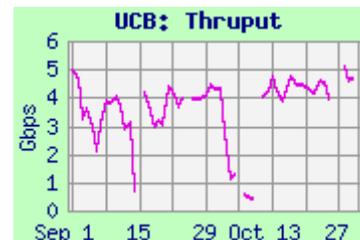
5) Boulder CO sites (Continued):**5.3) UCB:**

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	5.3	4.3	3.1

Comments: Testing is to a 10 gig connected test node at UCB. The route is via Internet2 to FRGP, similar to NCAR, with similar performance, as well. The previously observed diurnal variation is no longer present.

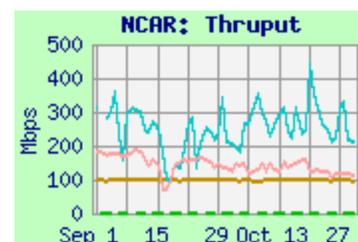
**5.4) NCAR:**

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

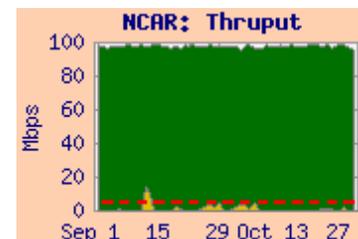
Web Pages <http://ensight.eos.nasa.gov/Missions/terra/NCAR.shtml>

Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
LaRC PTH	172.6	124.8	78.7
GSFC-ENPL-10G	5260.8	2890.1	382.4
GSFC-ENPL-FE	98.8	98.1	86.6
GSFC-NISN	479.2	258.7	82.1

**Requirement:**

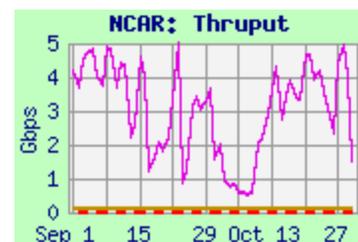
Source	Date	Mbps	Prev	Rating
LaRC	CY '12 -	0.044	0.1	Excellent
GSFC	CY '12 -	0.111	5.0	Excellent



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: Thruput 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). Thruput dropped at the end of May, similar to NSIDC nodes – but recovered in July. It remained well above 3 x the requirement, so the rating remains "**Excellent**". The average user flow from GSFC this month was 0.9 mbps, lower than recent months.

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 5 gbps on peaks. Significant diurnal variation is no longer observed.

6) Remote Sensing Systems (RSS):

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

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)	39.3	4.4	0.5
JPL TES → RSS (Comcast)	45.6	3.7	1.1
GSFC-NISN → RSS (Comcast)	50.0	47.3	30.8
GHRC-UAH → RSS (Comcast)	47.6	22.5	7.3
GHRC-NISN → RSS (Comcast)	13.4	7.9	4.3
RSS (Comcast) → GHRC (UAH)	5.23	3.75	2.16
RSS (Comcast) → GHRC (NISN)	3.75	3.46	1.76

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).

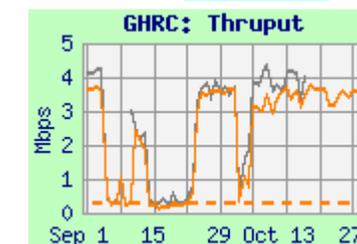
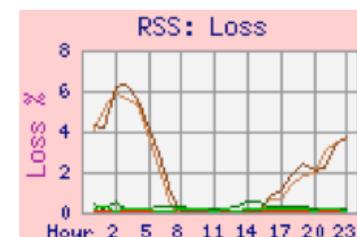
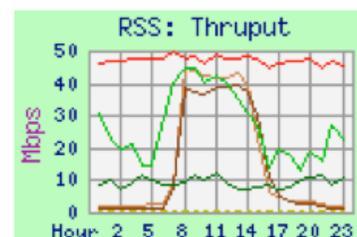
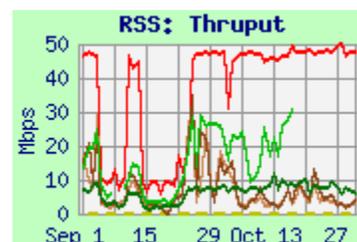
At the end of March '12, RSS switched its production node from the NISN SIP circuit (4 x T1s to NASA ARC -- total 6 mbps) to the Comcast circuit, rated at 50 mbps incoming, and 12 mbps outgoing (installed in April 2011). Testing via the NISN circuit to RSS was discontinued at that time. Testing from JPL PODAAC got much better results using the Comcast circuit than via NISN. The route from JPL is via Los Nettos, CENIC, peering with Comcast in LA.

In May, testing was switched from a linux test server at RSS (which was outside the RSS firewall), to the windows production server inside the firewall. Performance dropped at that time, both from JPL to RSS, and from RSS to GHRC. In addition, the windows server does not provide outgoing packet loss information.

Performance from JPL PODAAC also began exhibiting very high (> 40:1) diurnal variation at that time (unlike other sources). A test from a second JPL node (JPL-TES) was initiated in August, with very similar results. The tests from GSFC-NISN and GHRC-NISN do not show diurnal variation, but results from GHRC-UAH have variation, but not nearly as much as from JPL (6.5:1). The inference is that there is congestion from JPL peering with Comcast. Even with this diurnal variation, the median iperf remained more than 3 x the reduced requirement, so the rating 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 has therefore been initiated from RSS to GHRC, both to a UAH address and a NISN address at GHRC. Performance dropped on May 14 due to the server switch at RSS (above), stabilized in August, then dropped severely in September; recovering at the end of the month.

The results to the two destinations are very similar, indicating that the congestion is close to RSS. The performance to the UAH address yields a rating of "**Excellent**" vs the 0.32 mbps requirement.



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

Source Node	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
NPP-SD3E	500.1	340.7	199.0	342.0	457.6
GSFC DISC	215.8	118.5	59.9		
GSFC ENPL	314.1	290.7	225.8		
LaRC ANGe	175.8	149.2	70.3		

Requirements:

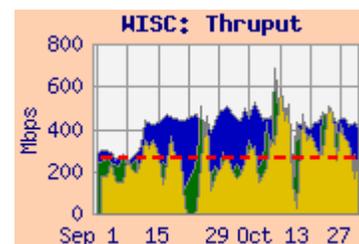
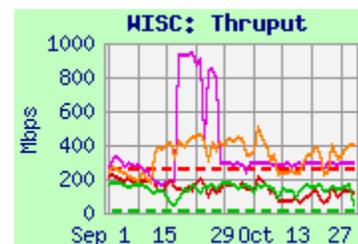
Source Node	Date	mbps	Prev	Rating
NPP-SD3E	CY'12 -	237.2	237.2	Good
GSFC MODAPS	CY'12 -	21.9	16.5	Excellent
GSFC Combined	CY'12 -	259.1	253.7	Good
LaRC Combined	CY'12 -	n/a	7.9	Excellent

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 EBnet sources (NPP-SD3E, GES DISC) improved in September due to firewall replacement! Thruput had dropped from EBnet in February due to EBnet outgoing packet loss. The integrated thrupt was above both the NPP and GSFC combined requirements, by more than 30%, so the rating remains **Good**. User flow is above the requirement (including contingency). The route from GSFC is via MAX to Internet2, peering with MREN in Chicago.

From GSFC-ENPL thrupt was similar, and 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: Thruput from LaRC ANGe is steady and well above the previous requirement, and would be rated **Excellent**. The route from LaRC is via NISN, peering with MREN in Chicago.



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	539.4	232.0	175.4	13.4
GSFC-ENPL → KNMI-ODPS	807.4	704.1	538.3	

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 10 gbps circuit to Frankfurt, then via Surfnet through Amsterdam.

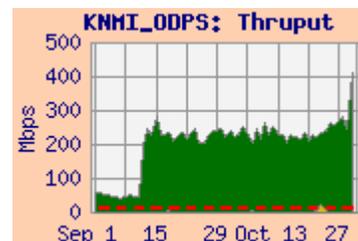
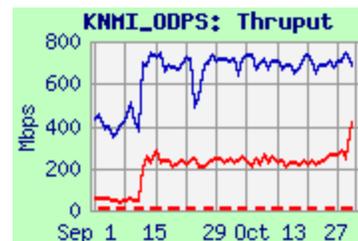
The requirement was increased with the use of the database to 13.4 mbps, a much more realistic value than the previous 0.03 mbps.

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**.

Thruput also improved from GSFC-ENPL in September, due to retuning.

The user flow, however, averaged only 3.2 mbps this month, higher than last month (and close to the typical 4 mbps).



9) JSpace - ERSD:

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

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	95.5	94.7	89.4	3.7	94.7
GES DISC → ERSD	44.7	34.2	20.0		
GSFC ENPL (FE) → ERSD	92.4	92.0	91.4		
GSFC ENPL (GE) → ERSD	614.7	482.6	271.4		
ERSD → EROS	207.1	162.5	54.5	3.1	163.9
ERSD → JPL-ASTER IST	67.7	59.4	41.0		

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 ERSDAC 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 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.

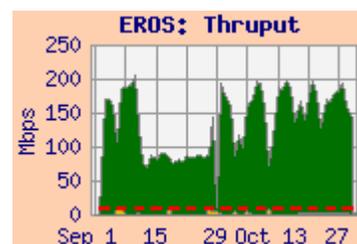
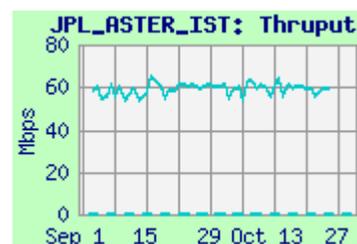
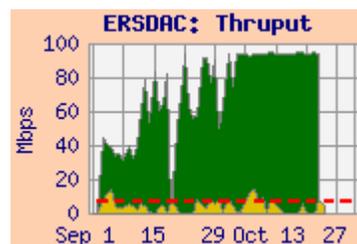
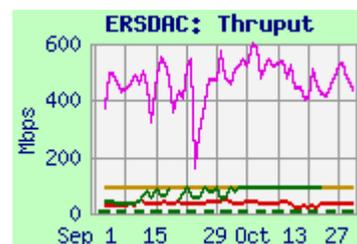
Thruput from EBnet sources (GSFC-EDOS, GES DISC) improved in mid September due to the EBnet firewall replacement. Thruput had dropped from EBnet sources in February, and dropped further in August, due to EBnet outgoing packet loss. Thruput remains well above 3 x the reduced requirement, so the rating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

Thruput from GES DISC to ERSD did not improve with the Gig-E upgrade at ERSDAC. The GES DISC configuration was upgraded in August, with no change observed..

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 thrupt remains very stable with the median well above the [unstated] requirement (IST requirements are generally 311 kbps), so the rating remains **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 \leftrightarrow JAXA

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.](#)

However, the user flow between GSFC and JAXA continues to be measured. As shown below, the user flow this month averaged 4.7 mbps from GSFC to JAXA, and 228 kbps from JAXA to GSFC.

These values are consistent with the new (database) requirements of 3.5 mbps to JAXA, and 0.229 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.

