

EOS Production Sites Network Performance Report: August 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: 3.68** (was 3.74 last month).
- **Requirements:** from the Network Requirements Database
- **LaRC ASDC Outflow:** Pretty much improved: reduced congestion – only infrequently reducing performance
- **2 flows below Good:**
 - **GSFC → EROS:** **Almost Adequate**
 - **LaRC ASDC → JPL:** **Almost Adequate**

Ratings Changes:

Upgrade: ↑: None

Downgrade: ↓:

- **GSFC → EROS:** **Adequate** → **Almost Adequate**
- **LaRC ASDC → JPL:** **Adequate** → **Almost Adequate**
- (The above changed only a little, but are close to the edge.)

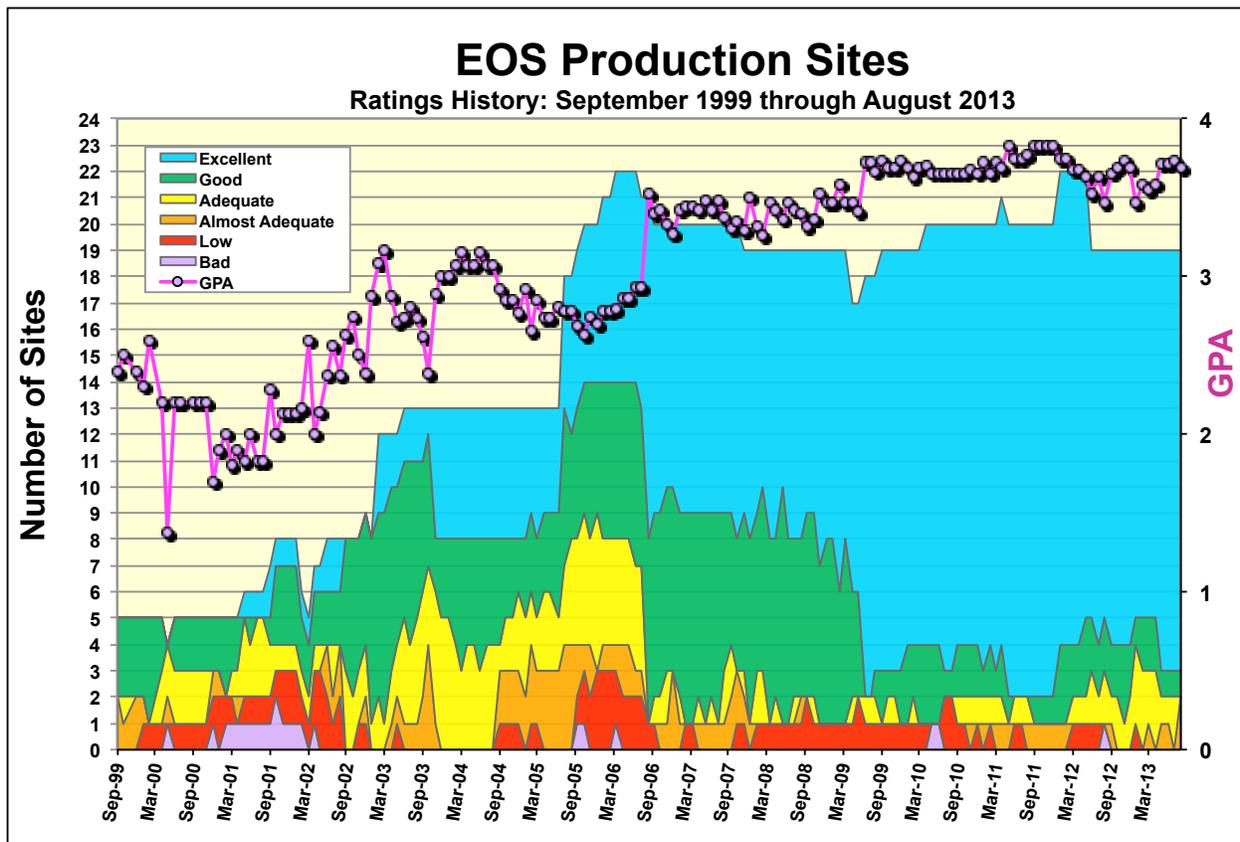
Ratings Categories:

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.

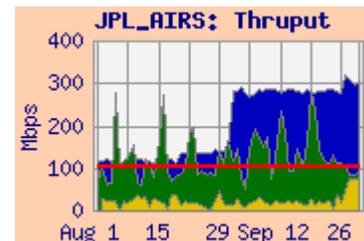
Previously, the requirements were based on the EOS Networks Requirements Handbook, Version 1.4.3 (from which the original database requirements were derived). Prior to that, the requirements were derived from version 1.4.2.

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.

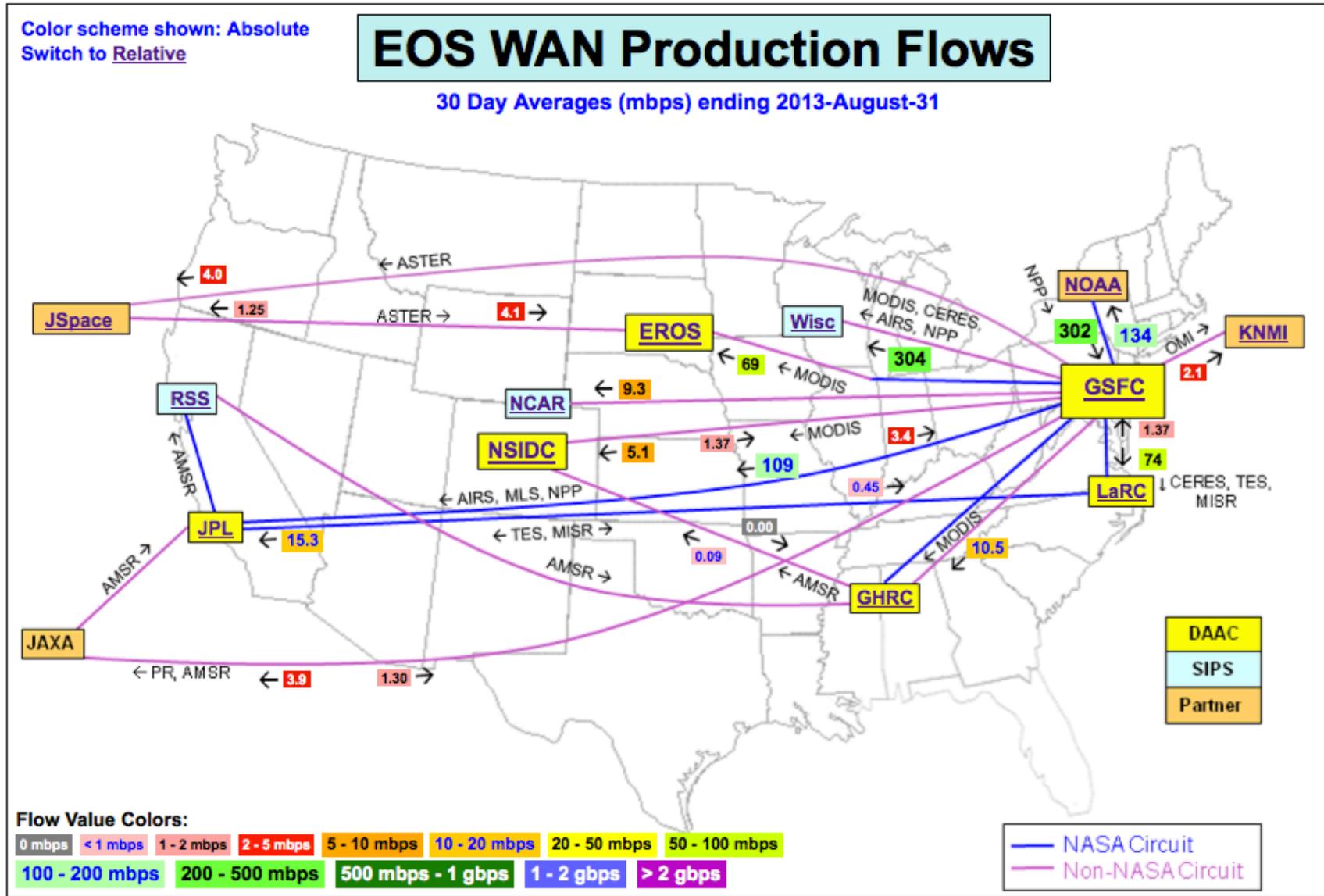
Integrated Charts:

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 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.



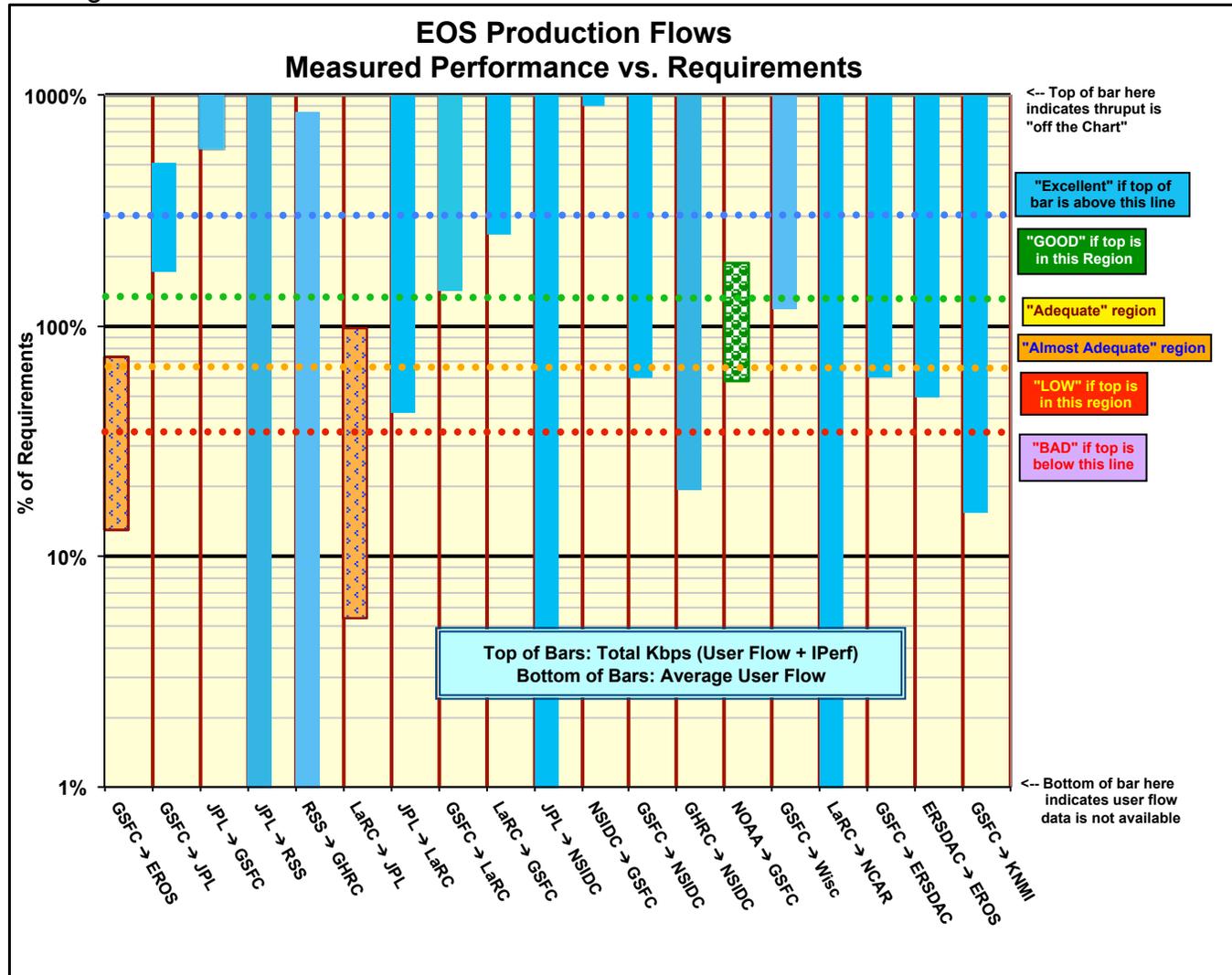
Network Requirements vs. Measured Performance

August 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	71.6	385.3	403.5	AA	Adq
GSFC → JPL	AIRS, MLS, NPP, ISTs	63	116.7	NPP SD3E OPS1 → JPL-AIRS	108.7	322.5		Excellent	Ex
JPL → GSFC	MLS	0.57	0.6	JPL-PODAAC → GSFC GES DISC	3.4	231.4	231.5	Excellent	Ex
JPL → RSS	AMSR-E	0.16	0.5	JPL-PODAAC → RSS (Comcast)		27.1		Excellent	Ex
RSS → GHRC	AMSR-E	0.32	0.34	RSS (Comcast) → GHRC (UAH)		2.70		Excellent	Ex
LaRC → JPL	TES, MISR	83.5	69.3	LARC-ASDC → JPL-TES	4.5	81.8		AA	Adq
JPL → LaRC	TES	1.1	1.5	JPL-TES → LARC-PTH	0.46	153.2		Excellent	Ex
GSFC → LaRC	CERES, MISR, MOPITT, TES, MODIS	52.2	31.3	GSFC EDOS → LaRC ASDC	74.5	818.1	823.0	Excellent	Ex
LaRC → GSFC	MISR	0.6	0.4	LARC-ASDC → GES DISC	1.39	877.2	877.2	Excellent	Ex
JPL → NSIDC	AMSR-E	0.16	0.2	JPL-PODAAC → NSIDC		254.2		Excellent	Ex
NSIDC → GSFC	AMSR-E, MODIS, ICESAT	0.017	0.6	NSIDC DAAC → GES DISC	1.37	394.5	394.5	Excellent	Ex
GSFC → NSIDC	AMSR-E, MODIS, ICESAT	8.42	27.6	MODAPS PDR → NSIDC-DAAC	5.04	591.5	591.5	Excellent	Ex
GHRC → NSIDC	AMSR-E	0.46	0.5	GHRC → NSIDC DAAC	0.09	10.5	10.5	Excellent	Ex
NOAA → GSFC	NPP	522.3	615.6	NOAA-PTH → GSFC NPP-SD3E OPS1	302.0	929.2	981.3	Good	Good
GSFC → Wisc	NPP, MODIS, CERES, AIRS	259.1	253.7	GSFC NPP-SD3E OPS1 → WISC	306.7	2638.9	2667.7	Excellent	Ex
LaRC → NCAR	MOPITT	0.044	0.1	LaRC-PTH → NCAR		163.4		Excellent	Ex
GSFC → JAXA	TRMM, AMSR-E, MODIS	3.51	0.1	GSFC → JAXA	4.00	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	4.0	177.8	177.8	Excellent	Ex
ERSDAC → EROS	ASTER	8.3	8.3	ERSDAC → EROS PTH	4.1	92.7	92.7	Excellent	Ex
GSFC → KNMI	OMI	13.4	0.03	GSFC-OMISIPS → KNMI ODPS	2.1	254.7	254.7	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			16	16
	Good	1.3 * Requirement <= Total Kbps < Requirement * 3			Good			1	1
	Adequate	Requirement < Total Kbps < Requirement * 1.3			Adequate			0	2
	Almost Adequate	Requirement / 1.5 < Total Kbps < Requirement			Almost Adequate			2	0
	Low	Requirement / 3 < Total Kbps < Requirement / 1.5			Low			0	0
	Bad	Total Kbps < Requirement / 3			Bad			0	0
								Total Sites	
Notes: Flow Requirements include:								19	
TRMM, Terra, Aqua, Aura, ICESAT, QuikScat, GEOS, NPP								GPA	
								3.68	
								3.74	



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 lperf measurements – this value is used to determine the ratings.



1) EROS:

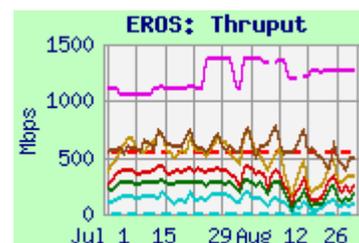
Ratings: GSFC → EROS: ↓ **Adequate** → **Almost Adequate**
 ERSDAC → EROS: Continued **Excellent**

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

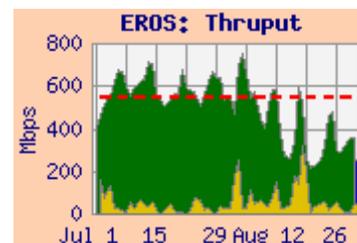
http://ensight.eos.nasa.gov/Organizations/production/EROS_PTH.shtml

Test Results:

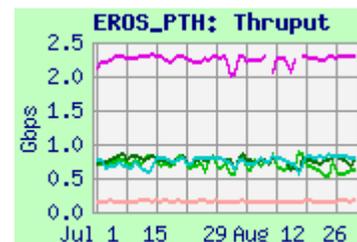
Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
MODAPS-PDR → EROS LPDAAC	598.4	385.3	171.7	71.6	403.5
GSFC-EDOS → EROS LPDAAC	285.1	183.0	56.7		
GES DISC → EROS LPDAAC	394.7	248.7	85.4		
GSFC-ENPL → EROS LPDAAC	1291.9	1268.1	1146.2		
ERSDAC → EROS LPDAAC	155.0	92.7	25.2	4.09	92.7
NSIDC SIDADS → EROS PTH	699.8	553.8	101.5		
GSFC-ENPL → EROS PTH	2326.0	2255.8	2018.6		
GSFC-ENPL → EROS PTH (IPv6)	787.0	643.1	452.0		
GSFC-NISN → EROS PTH	858.8	795.2	456.6		
ESDIS-PS → EROS PTH	848.4	761.1	385.2		
ESDIS-PS → EROS PTH (IPv6)	n/a	n/a	n/a		
LaRC PTH → EROS PTH	179.9	159.9	115.7		

**Requirements:**

Source → Dest	Date	mbps	prev	Rating
GSFC → EROS	CY '12 -	548.4	343	Almost 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. The average user flow this month is only about 13% of the new requirement (more than to typical). The median integrated thrupt from **MODAPS-PDR** to LPDAAC decreased, and is now below the requirement (but above the requirement without contingency), so the rating drops to **Almost Adequate**. Thrupt from **GSFC-EDOS** and **GES DISC** (also on EBnet) remained noisy but stable.



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

Iperf testing for comparison is performed from **GSFC-ENPL** to both LPDAAC (the "FTL" node, outside the EROS firewall) and to EROS-PTH (both 10 gig hosts) using both IPv4 and IPv6. The route from **GSFC-ENPL** to EROS is via a direct 10 gig connection to the MAX, to Internet2 to StarLight in Chicago. **GSFC-ENPL** (IPv4) to EROS-PTH now typically gets over 2 gbps. This shows that the capacity of the network is well 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 2012.

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**2.1) to NPP, GES DISC, etc.**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.shtmlhttp://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	939.2	929.2	884.6	302.0	981.3
EROS LPDAAC → GES DISC	465.8	209.8	49.5		
EROS PTH → GSFC-ESDIS PTH	620.4	470.4	173.6		
JPL-PTH → GSFC-ESDIS PTH	92.2	92.2	92.0	3.36	
JPL-TES → GSFC-NISN	505.6	258.8	62.4		
LaRC ASDC → GES DISC	917.2	877.2	643.3	1.39	
LARC-ANGe → GSFC-ESDIS PTH	936.7	935.3	918.9		
NSIDC DAAC → GES DISC	413.1	394.5	279.2	1.37	
NSIDC DAAC → GSFC-ISIPS (scp)	74.3	72.2	52.9		

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:

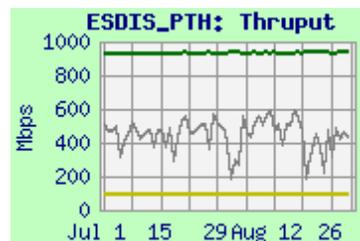
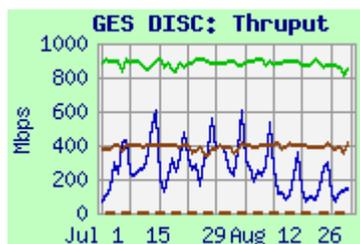
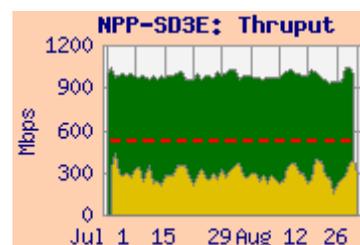
NOAA → NPP-SD3E: Performance from **NOAA-PTH** to GSFC NPP-SD3E-OPS1 was very steady at over 900 mbps, limited by the gig-E interface on the NOAA side test machine (the circuits are all 10 gbps). User flow was steady, and close to the requirement (without contingency).

EROS LPDAAC, EROS-PTH → GSFC: The thruput for tests from **EROS** to **GES DISC** and from **EROS-PTH** to **ESDIS-PTH** were noisy but stable this month.

JPL → GSFC: Thruput from **JPL-PTH** is limited by the Fast-E interface on **JPL-PTH**. With the modest requirement the rating remains **Excellent**. The 3.36 mbps average user flow was close to typical and the old requirement, and well above the new [reduced] requirement. Testing from **JPL-TES** to **GSFC-NISN** (not graphed) more clearly shows the capability of the network.

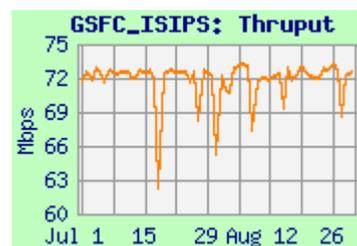
Note that **JPL → EBnet** flows take **Internet2** instead of **NISN**, based on **JPL** routing policies.

LaRC → GSFC: Performance from **LaRC ASDC** to **GES DISC** was less noisy last month, due to reduced congestion at **ASDC**. Thruput from **LaRC ANGe** to **ESDIS-PTH** was more stable. Both results remained way above 3 x the modest requirement, so the rating continues as **Excellent**. The user flow this month was again higher than the requirement.



NSIDC → GSFC: Performance from **NSIDC** to GES DISC was stable, after improving around 1 May, apparently due to I2 route changes. It was 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.

Thruput to GSFC-ISIPS using SCP (iperf testing still down after reconfiguration due to blocking) is lower than iperf previously, as expected, but also improved in early May, and remains well above the requirement.

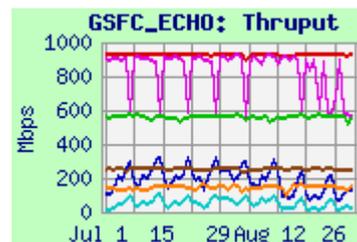


2.2 GSFC-ECHO: EOS Metadata Clearinghouse

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

Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
EROS LPDAAC	291.5	170.0	59.5
EROS LPDAAC ftp	118.8	43.3	6.8
GES DISC	937.2	926.9	882.9
GES DISC ftp	941.2	888.9	519.5
LaRC ASDC DAAC	580.3	562.0	429.4
NSIDC DAAC	263.2	250.5	192.5
NSIDC DAAC ftp	179.4	149.3	68.5



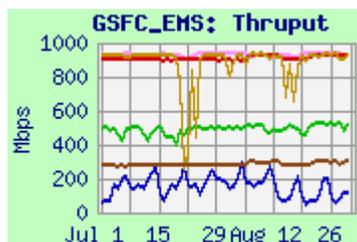
Comments: Performance was mostly stable from all sites. Performance from **LaRC ASDC** was less noisy due to reduced congestion at **LaRC ASDC**. FTP performance is mostly limited by TCP window size – especially from sites with long RTT.

2.3 GSFC-EMS: EOS Metrics System

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

Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
EROS LPDAAC	263.0	155.6	34.4
ESDIS-PTH	938.3	934.4	756.9
GES DISC	935.1	929.1	487.8
LARC ASDC	528.8	509.0	311.7
MODAPS-PDR	937.8	924.1	389.8
NSIDC-SIDADS	304.1	296.5	220.4



Comments: Testing is performed to GSFC-EMS from the above nodes, iperf only. Performance from **LaRC ASDC** was less noisy. Performance was quite stable from other sources.

3) JPL:

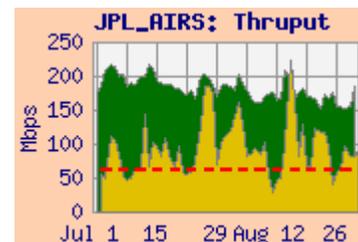
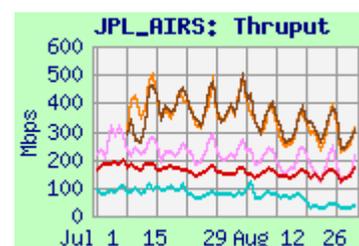
3.1) GSFC → JPL:

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
http://ensight.eos.nasa.gov/Organizations/daac/JPL_SMAP.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
GSFC-GES DISC → JPL-AIRS	181.5	148.8	117.2	108.7	176.8
NPP-SD3E-OPS1 → JPL-AIRS	484.1	322.5	202.8		
ESDIS-PTH → JPL-AIRS	298.2	207.2	117.1		
GSFC-NISN → JPL-AIRS	133.1	66.6	35.8		
NPP IDPS-Mini-inf → JPL-Sounder	143.5	120.3	49.1		
GSFC-NISN → JPL-Sounder	418.6	214.1	65.3		
ESDIS-PTH → JPL-MLS	480.8	393.5	233.4		
GSFC-NISN → JPL-MLS	381.5	268.1	127.9		
ESDIS-PTH → JPL-PODAAC	172.0	121.3	61.6		
GSFC-NISN → JPL-PODAAC	125.6	73.9	35.7		
MODAPS-PDR → JPL-PODAAC	78.9	49.2	23.0		
ESDIS-PS → JPL-QSCAT	92.7	90.4	82.8		
GSFC-NISN → JPL-QSCAT	87.3	81.5	64.3		
EDOS → JPL-SMAP	324.1	157.5	69.0		



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

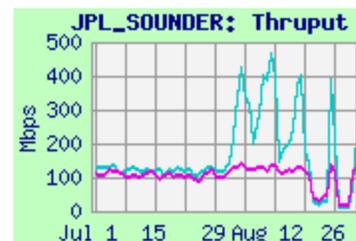
Comments:

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 tlcf node was moved to a new location in mid-June. When testing resumed about 2 weeks later, throughput was significantly lower from all sources. But the integrated throughput from **NPP-SD3E-OPS1** remained above 3 x the reduced AIRS requirement, so the AIRS rating remains **Excellent**.

The **JPL overall rating** is also based on the **NPP-SD3E-OPS1** to JPL AIRS throughput, compared with the sum of all the GSFC to JPL requirements. The median throughput 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), and higher than the 100 mbps last month.

NPP to JPL Sounder: Testing from **NPP IDPS-Mini-inf** to the JPL Sounder PEATE was mostly stable until the end of this month, when diurnal congestion was observed. Performance improved from **GSFC-NISN** – which also experienced diurnal congestion. The rating remains **Excellent**.



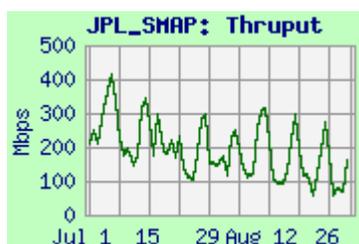
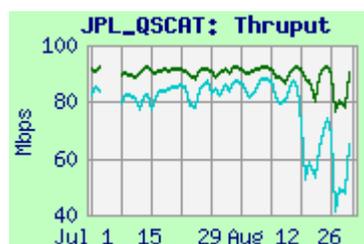
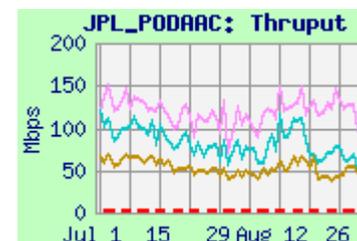
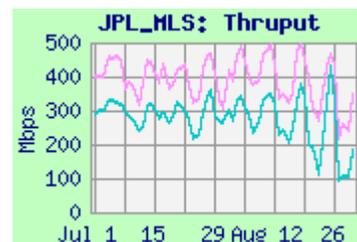
3.1) GSFC → JPL: continued

MLS: Thruput from both **ESDIS-PTH** and **GSFC-NISN** experienced diurnal congestion this month. 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 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** and **GSFC-NISN** to QSCAT remains well above the modest previous 0.6 mbps requirement.

SMAP: There is no requirement from GSFC to JPL SMAP in the database. Thuput from **EDOS** to SMAP was noisy.



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	88.9	88.8	88.5	0.46
JPL-TES → LaRC PTH	308.7	153.2	55.1	

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. The route from JPL to LaRC is via NISN PIP. 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 a bit lower than last month, and about 62% of the requirement without contingency.

Thruput from **JPL-PTH** to LaRC-PTH switched from the lower of its two common states (60 mbps), to the higher state (88 mbps) in mid January 2013. It is limited by a Fast-E interface on **JPL-PTH**.

3.3) LaRC → JPL

Rating: **↓ Adequate → Almost 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 ASDC → JPL-MISR	78.3	58.3	27.1	4.51	59.1
LaRC PTH → JPL-MISR	77.3	54.9	30.7		
LaRC ASDC → JPL-TES	96.0	81.8	55.4		
LaRC ANGE → JPL-TES	348.2	271.9	188.0		
LaRC PTH → JPL-TES	175.9	138.5	82.9		
LaRC PTH → JPL-TES sftp	26.6	24.6	7.7		
LaRC ANGE → JPL-PTH	87.8	85.8	80.8	15.2	

August Requirements:

Source → Dest	Date	Mbps	Prev	Rating
LaRC → JPL-Combined	CY '12 –	83.5	69.3	Almost Adq
LaRC ASDC → JPL-MISR	CY '12 –	78.1	62.3	Almost Adq
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 mostly stable this month (although still well below the level from April 2012). It was previously very variable, beginning at the end of April 2012, apparently due to congestion at ASDC. Performance from LaRC ANGe and LaRC PTH to JPL was stable during this period, and did not exhibit these characteristics.

LaRC → JPL (MISR): LaRC ASDC to JPL MISR thrupt is limited by the Fast-E connection to the MISR node. User flow was higher than usual this month, but still averaged only 5.8% of the requirement. **Thruput to MISR dropped dramatically from all sources in late August**, and apparently recovered in mid-September. The median integrated thrupt remains below the MISR requirement, so the MISR rating remains **Almost Adequate**.

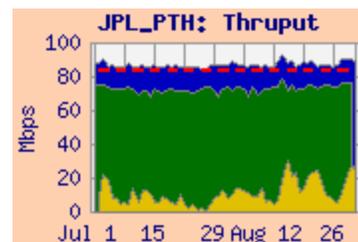
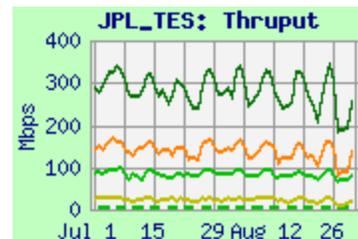
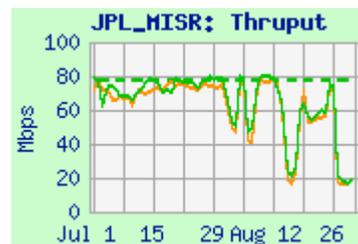
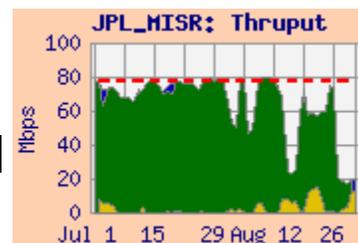
LaRC → JPL (Overall, TES): Thruput from LaRC ASDC to JPL- TES was more stable this month. However, the median dropped very slightly, and is now below the combined requirements, so the Overall rating drops to **Almost Adequate**.

The median thrupt remained well over 3 x the TES requirement, so the TES rating remains **Excellent**. 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 ANGe → JPL- TES thrupt, which is not subject to the ASDC congestion. The Overall rating based on this test would be **Excellent**.

Performance from LaRC PTH to JPL- TES is stable, better than from LaRC ASDC, but is limited to 200 mbps by agreement with CSO / NISN.



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	935.0	916.9	522.5	74.5	918.5
GSFC-EDOS → LaRC ASDC	865.0	818.1	351.1		
ESDIS-PTH → LaRC-ANGe	925.0	904.7	479.7		
GSFC-NISN → LaRC-ANGe	887.0	847.3	703.7		

Requirements:

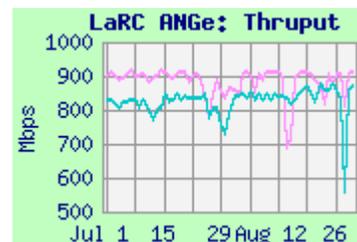
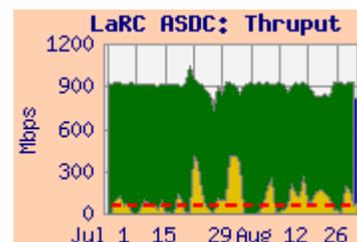
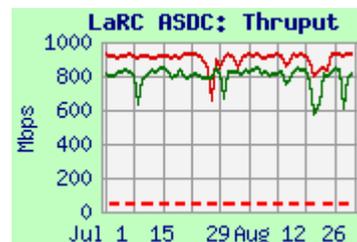
Source → Dest	Date	Mbps	Prev	Rating
GSFC → LARC (Combined)	CY '12 –	52.2	31.3	Excellent

Comments:

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 noisy but stable.

As seen on the integrated graph, the 74.5 mbps average user flow this month was above both normal and the requirement.

ANGe (LaTIS): Testing to ANGe (“Bob”) from both **ESDIS-PTH** and **GSFC-NISN** was very stable, close to the circuit limitation.



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

Test Results: NSIDC S4PA

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
MODAPS-PDR → NSIDC DAAC	605.6	591.5	361.3	5.04	591.5
GES-DISC → NSIDC DAAC	497.1	495.6	474.8		
GSFC-EDOS → NSIDC DAAC	157.8	156.4	146.5		
ESDIS-PTH → NSIDC DAAC	602.5	596.2	531.0		
GSFC-ISIPS → NSIDC (iperf)	135.5	133.4	125.1		
JPL PODAAC → NSIDC DAAC	303.0	254.2	168.0		
GHRC → NSIDC DAAC (nuttcp)	49.4	10.5	3.3	0.09	10.5
GHRC → NSIDC DAAC (ftp pull)	49.0	14.7	2.8		

Requirements:

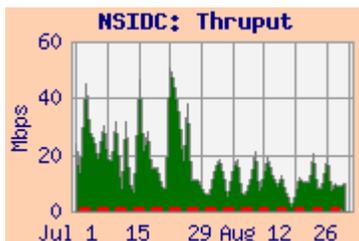
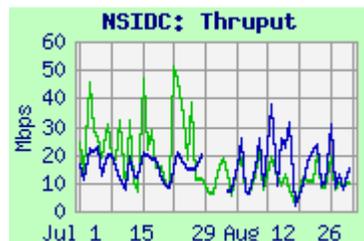
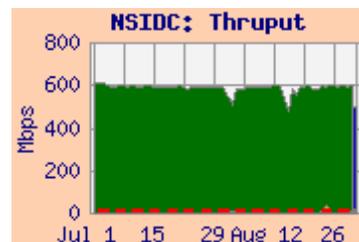
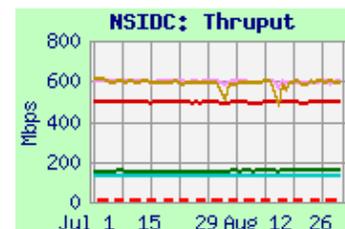
Source → Dest	Date	Mbps	Prev	Rating
GSFC → NSIDC	CY '12 –	8.42	27.6	Excellent
JPL → NSIDC	CY '12 –	0.16	0.2	Excellent
GHRC → NSIDC	CY '12 –	0.46	0.5	Excellent

Comments: **GSFC → NSIDC S4PA**: 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 thrupt from **MODAPS-PDR** remains well above 3 x the requirement, so the rating remains **Excellent**.

The 5.04 mbps average user flow was much higher than typical, and close to the requirement without contingency.

JPL PODAAC → NSIDC S4PA: The requirement was reduced from 1.34 mbps in May '09. Thrupt from **JPL PODAAC** to NSIDC improved in mid August due to an RTT decrease. Before that it was mostly stable since it improved dramatically in mid December 2012, and again in mid May 2013 due to the RTT decrease; the rating remains **Excellent**.

GHRC, GHRC-ftp → NSIDC S4PA: GHRC (NSSTC, UAH, Huntsville, AL) sends AMSR-E data to NSIDC via NLR / Internet2. The median integrated thrupt remained well above 3 x the 0.46 mbps requirement, so the rating remains **Excellent**.

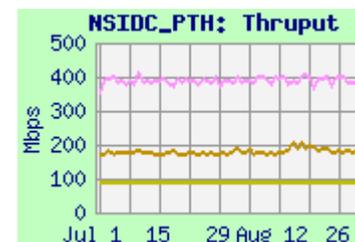
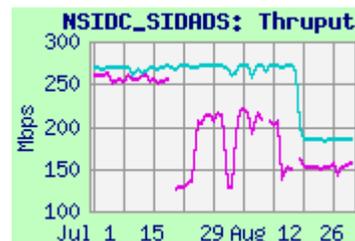


5) Boulder CO sites (Continued):**5.1) NSIDC:** (Continued):**Test Results: NSIDC-SIDADS, NSIDC-PTH**

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
GSFC-ENPL → NSIDC-SIDADS	178.6	155.0	115.7
GSFC-NISN → NSIDC-SIDADS	272.0	259.0	166.1
ESDIS-PTH → NSIDC-PTH	445.5	392.7	284.4
MODAPS-PDR → NSIDC-PTH	265.2	180.6	150.7
JPL-PTH → NSIDC-PTH	89.1	89.0	81.7

GSFC → NSIDC-SIDADS: Performance from GSFC to NSIDC-SIDADS dropped in mid August (there was no change in RTT, but apparently a small increase in packet loss).

NSIDC-PTH: Thruput from ESDIS-PTH dropped about 10% (similar to thrupt to NSIDC DAAC), due to the RTT increase in late April, and recovered in late May. Thruput from MODAPS-PDR and JPL-PTH was very stable (JPL-PTH is limited by its Fast-E connection).

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

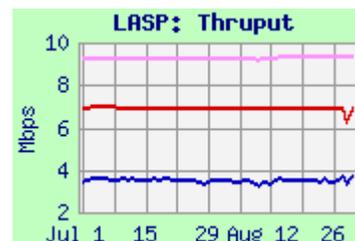
Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
ESDIS-PTH → LASP blue (scp)	3.69	3.49	2.82
ESDIS-PTH → LASP blue (iperf)	9.38	9.37	8.57
GES DISC → LASP blue (iperf)	6.94	6.94	6.15
LASP → GES DISC	9.33	9.32	9.11

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 testing from GES DISC has been stable since mid February 2013, when it improved with the GES DISC firewall upgrade. Iperf and SCP testing from ESDIS-PTH was also very stable, and consistent with the circuit limitation, as was return testing from LASP to GES DISC, rating **Excellent**.

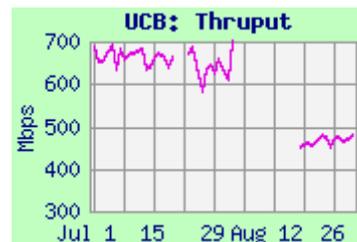


5.3) UCB:

Web Page <http://ensight.eos.nasa.gov/Organizations/daac/UCB.shtml>

Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
GSFC-ENPL	521.6	469.6	277.2



Comments: Testing to the 10 gig connected test node at UCB began failing consistently in mid-May, so testing was switched to a 1 gig test node in mid-June. The route is via Internet2 to FRGP, similar to NCAR. Thruput dropped with the switch to a new ENPL VM, but recovered with retuning in September. Performance is now stable and consistent with the circuit limitation.

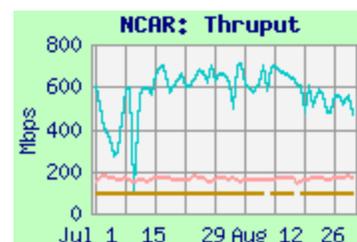
5.4) NCAR:

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

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

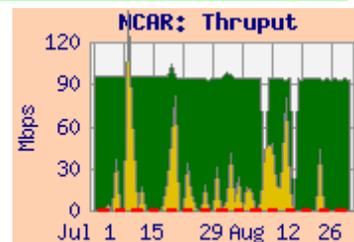
Test Results:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
LaRC PTH	184.4	163.4	131.2
GSFC-ENPL-10G	5435.5	3471.4	1252.9
GSFC-ENPL-FE	94.3	93.9	92.5
GSFC-NISN	784.4	596.9	327.1



Requirement:

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



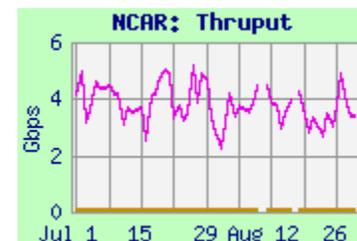
Comments: NCAR has a SIPS for MOPITT (Terra, from LaRC), and has MOPITT and HIRDLS (Aura, from GSFC) QA requirements.

Testing was switched to NCAR's 10 gigabit capable PerfSonar server in March '12 – testing was discontinued from LaRC ASDC at that time; testing from LaRC-PTH continued.

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 remained somewhat noisy this month, but mostly stable, and well above 3 x the requirement, so the rating remains **Excellent**. The average user flow from GSFC this month was 10.6 mbps, well above the usual and the revised 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 is noisy, and gets over 5 gbps on peaks.



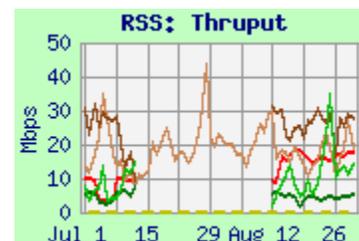
6) Remote Sensing Systems (RSS):

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)	41.2	27.1	7.7
JPL TES → RSS (Comcast)	47.7	18.9	8.5
GSFC-NISN → RSS (Comcast)	18.5	16.5	10.4
GHRC-UAH → RSS (Comcast)	48.0	10.4	1.6
GHRC-NISN → RSS (Comcast)	8.9	4.6	1.3
RSS (Comcast) → GHRC (UAH)	4.61	2.70	1.00
RSS (Comcast) → GHRC (NISN)	3.70	2.61	0.71



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). Note that AMSR-E is not operating at this time, so that data is not flowing. However, AMSR2 is operating on JAXA's GCOM-W1 spacecraft, and sending data to RSS (but this is not an EOS requirement).

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.

In mid July, testing to the "internal" RSS test node began failing, due to the firewall configuration at RSS (fixed in August). During that period, the only testing which continued was from JPL TES to a server outside the RSS firewall. The other averages above are based on only that portion of August during which the tests were working

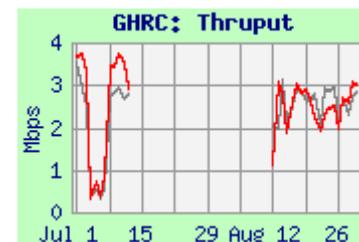
JPL → RSS: The median iperf from JPL PODAAC remained well above 3 x the reduced requirement, so the rating from JPL remains **Excellent**.

GHRC → RSS: Testing from the UAH server at GHRC was noisy but stable, with significant diurnal variation. Testing from the NISN server at GHRC was also noisy and lower than from UAH.

GSFC → RSS: Testing from GSFC-NISN degraded around the beginning of June, indicating a peering problem between NISN and Comcast, but recovered at the end of June.

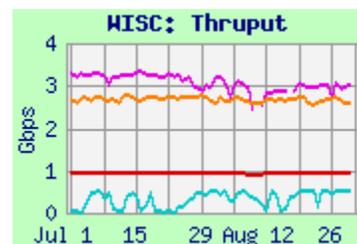
RSS → GHRC: The server at RSS on the Comcast circuit allows "3rd party" testing, as do the servers at GHRC. Testing is therefore performed between RSS and GHRC, both with a UAH address and a NISN address at GHRC.

The results to the two destinations are very similar. The performance from both sources remained well above 3 x the requirement, so the rating remains **Excellent**

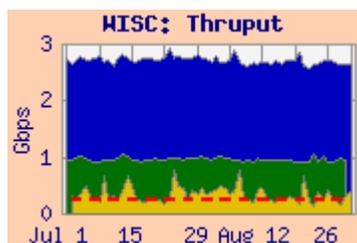


7) Wisconsin:Rating: Continued **Excellent**Web Pages <http://ensight.eos.nasa.gov/Missions/NPP/WISC.shtml>**Test Results:**

Source Node	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
NPP-SD3E	2792.3	2638.9	2075.0	306.7	2667.7
GES DISC	933.4	927.5	853.5		
GSFC ENPL	3118.6	2975.1	1899.3		
LaRC ANGe	558.7	471.3	140.6		

**Requirements:**

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



Comments: The University 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: At the end of March 2013, testing from **GSFC-ENPL** was switched to a new 10 gig server at Wisconsin (SSEC), with throughput now over 3 gbps.

User flow was high, close to but above, the requirement, and similar to last month.

Testing from **NPP-SD3E** was also switched to Wisconsin's 10 gig server, in May, with throughput typically around 2.7 gbps! The integrated throughput from **NPP-SD3E** was above the NPP requirement by more than 3 x, so the NPP rating remains **Excellent**. It was also above the GSFC combined requirement by more than 3 x, so that rating also remains **Excellent**.

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

LaRC: There is no longer a CERES requirement from LaRC to Wisconsin. On 23 April, testing from **LaRC ANGe** was switched to the new SSEC 10 gig server; performance improved at that time. Thruptut from **LaRC ANGe** is very noisy (with a 4:1 average best:worst ratio), but is less noisy than last month, and well above the previous 7.9 mbps requirement; it 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)			User Flow	Integrated
	Best	Median	Worst		
OMISIPS → KNMI-ODPS	459.5	254.7	150.8	2.1	254.7
GSFC-ENPL → KNMI-ODPS	666.7	549.3	378.5		

Requirements:

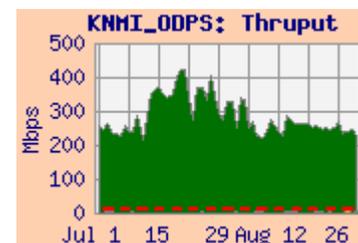
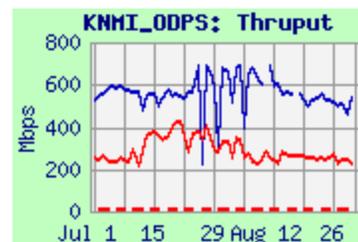
Source Node	Date	mbps	Prev	Rating
OMISIPS	CY'12 -	13.4	0.03	Excellent

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 2+ 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** on EBnet at GSFC to the ODPS primary server at KNMI. Thruput from **OMISIPS** has been noisy but mostly stable. 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 recent months, but only 15% of the revised 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	473.6	177.8	31.7	4.0	177.8
GES DISC → ERSD	63.0	61.0	23.6		
GSFC ENPL (FE) → ERSD	87.9	86.6	52.6		
GSFC ENPL (GE) → ERSD	529.7	346.6	28.1		
ERSD → EROS	155.0	92.7	25.2	4.1	92.7
ERSD → JPL-ASTER IST	n/a	n/a	n/a		
ERSD → JPL-TES	95.0	58.9	33.5		

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 2011, the ERSD test node is connected at 1 gbps – it was previously 100 mbps. The median thrupt from most nodes improved at that time. Peak thrupt from **GSFC ENPL** is often over 400 mbps.

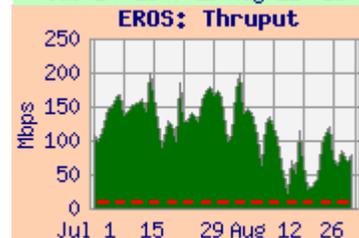
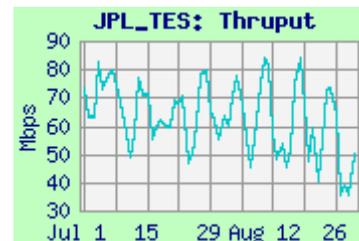
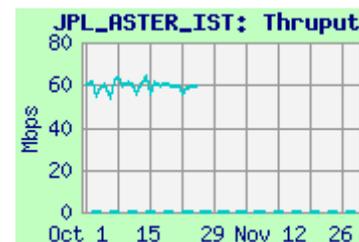
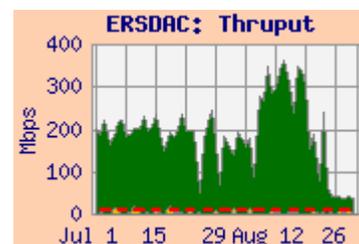
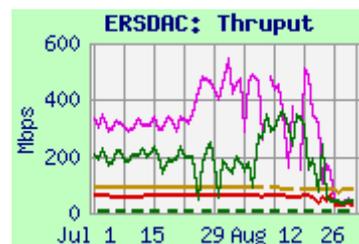
Some nodes, however, (e.g., **EDOS**) had been using QoS (HTB) to reduce loss previously seen in the 1 gig to 100 meg switch at Tokyo-XP – so it initially remained limited by its HTB settings, and did not see much improvement. The **EDOS** HTB settings were raised in February 2013, resulting in much higher average performance, although it was also very noisy.

Thruput to ERSD dropped from all sources and became very noisy in mid August. The POC reports that this was caused by very high levels of ingest (not from GSFC).

However, median thrupt remained well above 3 x the reduced requirement, so the rating remains **Excellent**. The user flow was close to normal from GSFC to ERSD this month, consistent with the requirement.

ERSD → JPL-ASTER-IST: The JPL-ASTER-IST test node was retired in October 2012; a replacement node is being sought. As a substitute, testing was initiated from ERSD to a different node at JPL (“TES”). Results to TES were better than previously to the JPL-ASTER-IST, but are now similar. Either would be rated **Excellent**.

ERSD → EROS: The thrupt improved with retuning in October ‘11, after the ERSDAC Gig-E upgrade. **Performance dropped this month, apparently due to the congestion above.** However, it remains well above the reduced requirement (was 26.8 mbps previously), so the rating remains **Excellent**. The user flow this month was close to normal, and consistent with the requirement.



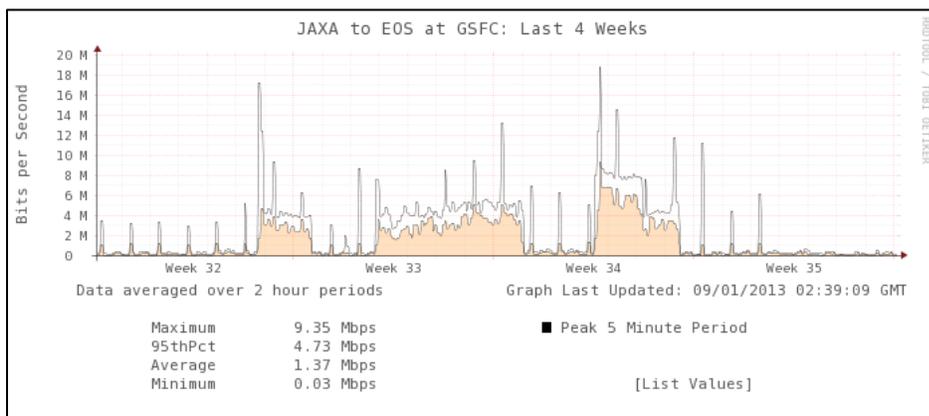
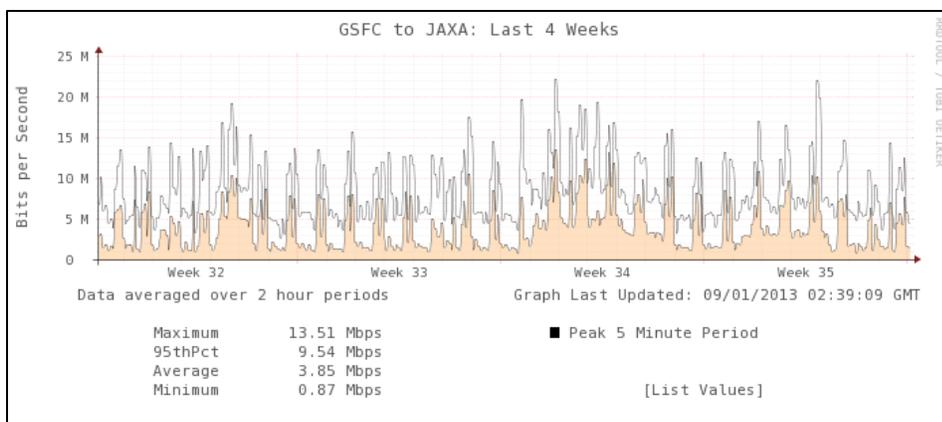
10) US ← → JAXA

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

The JAXA test hosts at EOC Hatoyama were retired on March 31, 2009. 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 has declined to participate.

However, the user flow between GSFC-EBnet and JAXA continues to be measured. As shown below, the user flow this month averaged 3.85 mbps from GSFC-EBnet to JAXA, and 1.37 mbps from JAXA to GSFC-EBnet. GSFC-EBnet to JAXA is very similar to last month, while JAXA to GSFC-EBnet was higher than last month's 0.39 mbps.

These values are mostly 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.



Note that thrupt from GSFC to the Tokyo Exchange Point is well in excess of the JAXA requirements.

