EOS Production Sites
Network Performance Report: August 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 ↓ 3.47** (was 3.63 last month).
- **Requirements**: use the Network Requirements Database
  - Previously used Handbook 1.4.3 (May '09 – May '12)
- **All EBnet Outflows:** Continued high packet loss and reduced thruput started in February '11. **Firewall replaced in September – with major improvement!**
- **LaRC ASDC Outflow:** very high congestion continued to reduce performance on most outflows. (Not observed from LaRC ANGe or LaRC-PTH)
- **3 flows below "Good":**
  - **GSFC MODAPS-PDR → EROS** ("Bad")
  - **LaRC ASDC → JPL** ("Adequate")
  - **GSFC NPP → Wisconsin** ("Adequate")

Ratings Changes:

Upgrades: ↑ None

Downgrades: ↓

- **GSFC MODAPS-PDR → EROS** ("Bad")
- **GSFC NPP → Wisconsin: Good → Adequate**
- **GSFC → JPL: Excellent → Good**

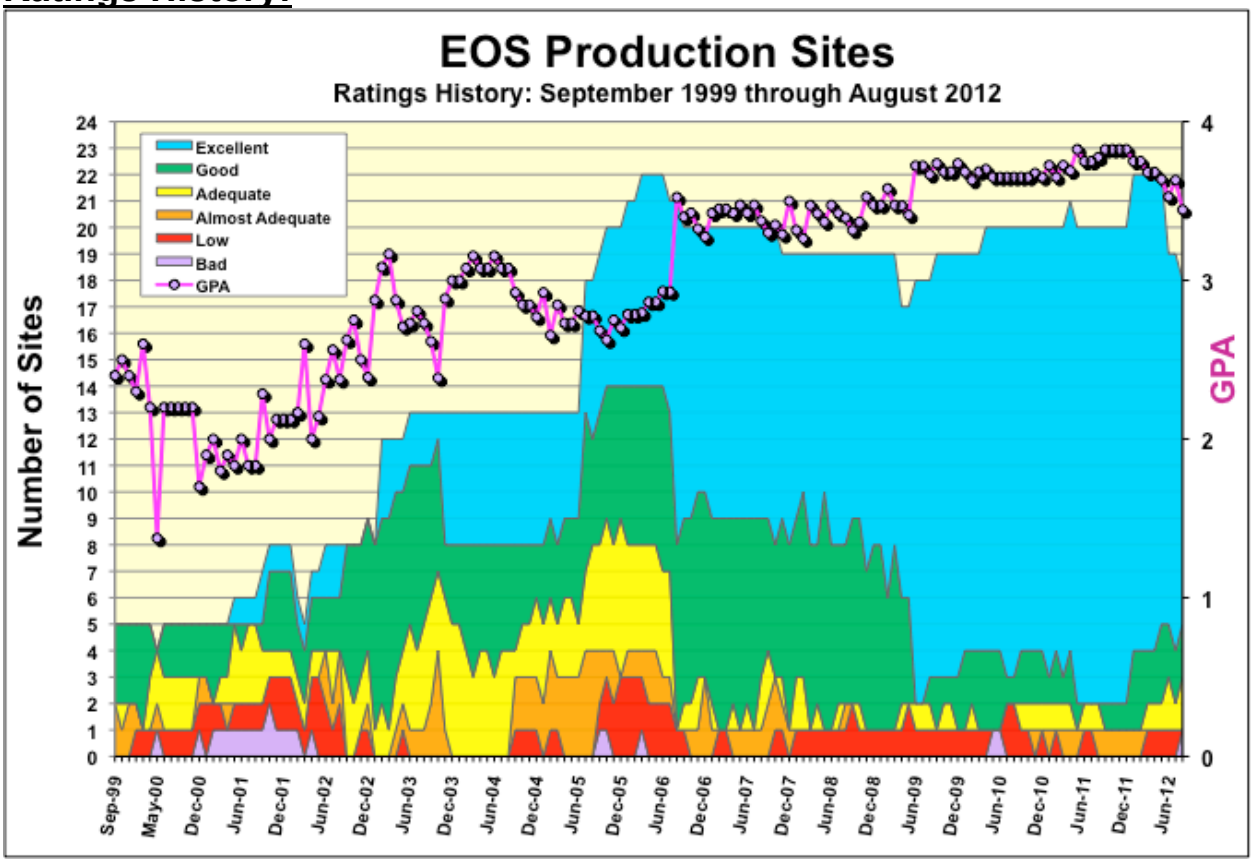
Ratings Categories:

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 except for 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:

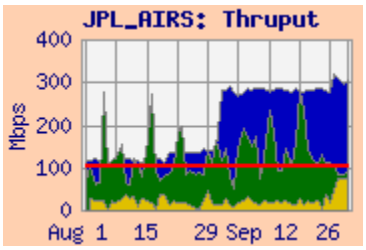
In June 2012, the requirements have been switched, as planned for quite a while, to use the EOSDIS network requirements database. ESDIS has been reviewing its network ICD's with each of the instrument teams. These ICDs are now essentially completed, and the database has been updated with the ICD values,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

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Network Requirements vs. Measured Performance

August 2012		Requirements (mbps)		Testing				Ratings	
Source → Destination	Instrument (s)	Current Database	Old HB 1.4.3+	Source → Dest Nodes	Average User Flow mbps	iperf Median mbps	Integrated mbps	Ratings re Database Requirements: This Month	Ratings re Database Requirements: Last Month
GSFC → EROS	MODIS, LandSat	548.4	342.9	MODAPS-PDR → EROS LPDAAC	39.8	171.2	178.3	Bad	Low
GSFC → JPL	AIRS, MLS, NPP, ISTs	63	116.7	GSFC GES DISC → JPL-AIRS	81.8	131.1	160.6	Good	Ex
JPL → GSFC	MLS	0.57	0.6	JPL-PODAAC → GSFC GES DISC	3.0	94.5	94.6	Excellent	Ex
JPL → RSS	AMSR-E	0.16	0.5	JPL-PODAAC → RSS (Comcast)		13.4		Excellent	Ex
RSS → GHRC	AMSR-E	0.32	0.3	RSS (Comcast) → GHRC		4.1		Excellent	Ex
LaRC → JPL	TES, MISR	83.5	69.3	LARC-ASDC → JPL-TES	15.2	98.0		Adequate	Adq
JPL → LaRC	TES	1.1	1.5	JPL-TES → LARC-PTH	1.7	175.6		Excellent	Ex
GSFC → LaRC	CERES, MISR, MOPITT, TES, MODIS	52.2	31.3	GES DISC → LaRC ASDC	28.9	557.5	572.8	Excellent	Ex
LaRC → GSFC	MISR	0.6	0.4	LARC-ASDC → GES DISC	0.58	568.1	568.1	Excellent	Ex
JPL → NSIDC	AMSR-E	0.16	0.2	JPL-PODAAC → NSIDC		43.5		Excellent	Ex
NSIDC → GSFC	AMSR-E, MODIS, ICESAT	0.017	0.6	NSIDC DAAC → GES DISC	4.2	233.2	233.2	Excellent	Ex
GSFC → NSIDC	AMSR-E, MODIS, ICESAT	8.42	27.6	MODAPS PDR → NSIDC-DAAC	1.37	25.2	25.3	Excellent	Ex
GHRC → NSIDC	AMSR-E	0.46	0.5	GHRC → NSIDC DAAC (ftp)	0.184	1.5		Excellent	Ex
NOAA → GSFC	NPP	522.3	615.6	NOAA-PTH → GSFC NPP-SD3E OPS1	311.8	923.7	948.5	Good	Good
GSFC → WISC	NPP	259.1	253.7	GSFC NPP-SD3E OPS1 → WISC	216.7	226.3	293.8	Adequate	Good
LaRC → NCAR	MOPITT	0.044	0.1	LaRC-PTH → NCAR		161.4		Excellent	Ex
GSFC → JAXA	TRMM, AMSR-E, MODIS	3.51	0.1	GSFC → JAXA	4.06	Testing discontinued:		n/a	n/a
JAXA → GSFC	AMSR-E	0.16	0.1	JAXA → GSFC	0.15	31 March 2009		n/a	n/a
GSFC → ERSDAC	ASTER	6.75	5.4	GSFC-EDOS → ERSDAC	3.7	39.2	39.8	Excellent	Ex
ERSDAC → EROS	ASTER	8.3	8.3	ERSDAC → EROS PTH	3.5	83.4	83.8	Excellent	Ex
GSFC → KNMI	OMI	13.4	0.03	GSFC-OMISIPS → KNMI ODPS	2.4	43.4	44.1	Excellent	Ex

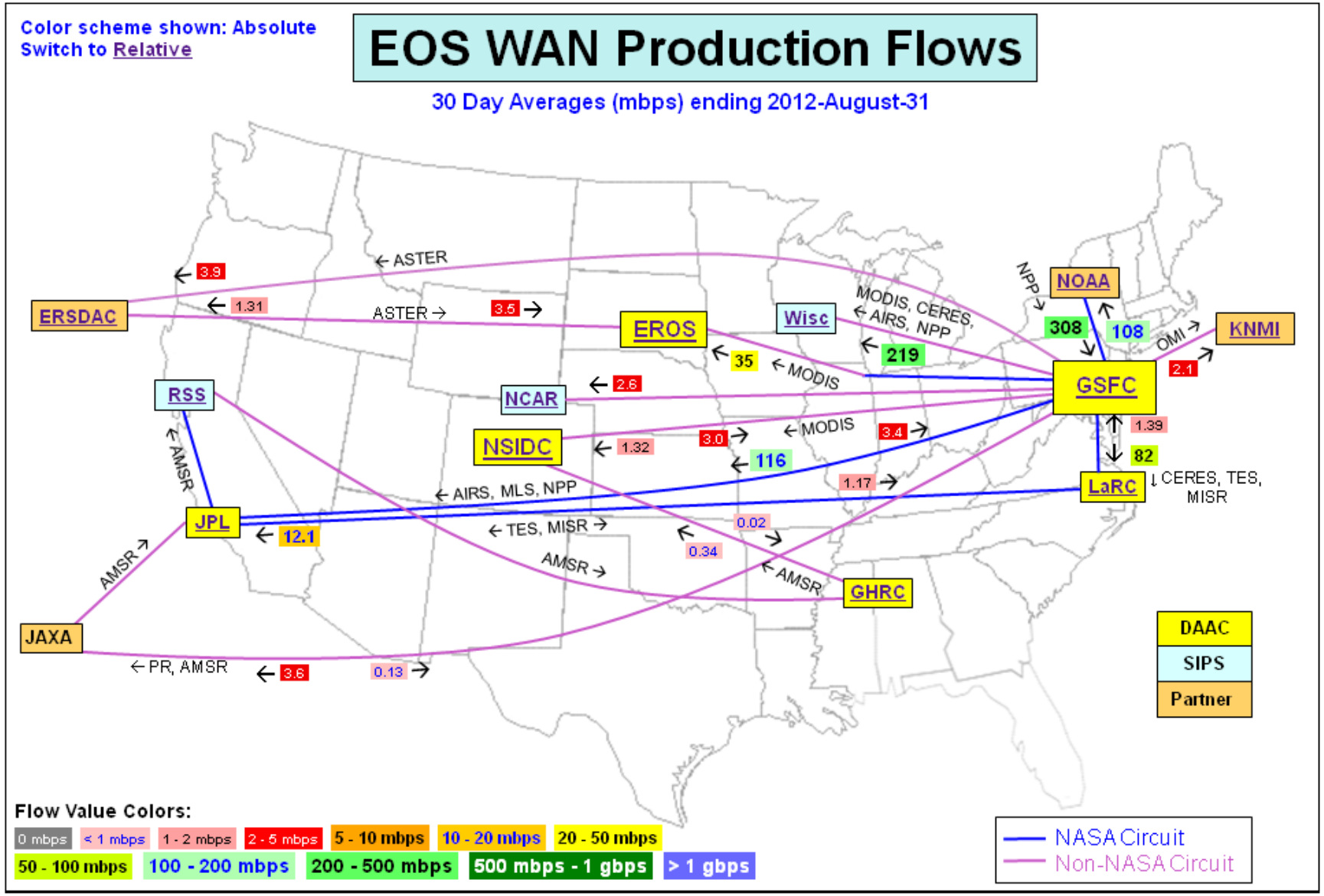
Significant change from HB v1.4.3 to Requirements Database

Value used for ratings

*Criteria:		
	Excellent	**Total Kbps** > Requirement * 3
	Good	1.3 * Requirement <= **Total Kbps** < Requirement * 3
	Adequate	Requirement < **Total Kbps** < Requirement * 1.3
	Almost Adequate	Requirement / 1.5 < **Total Kbps** < Requirement
	Low	Requirement / 3 < **Total Kbps** < Requirement / 1.5
	Bad	**Total Kbps** < Requirement / 3

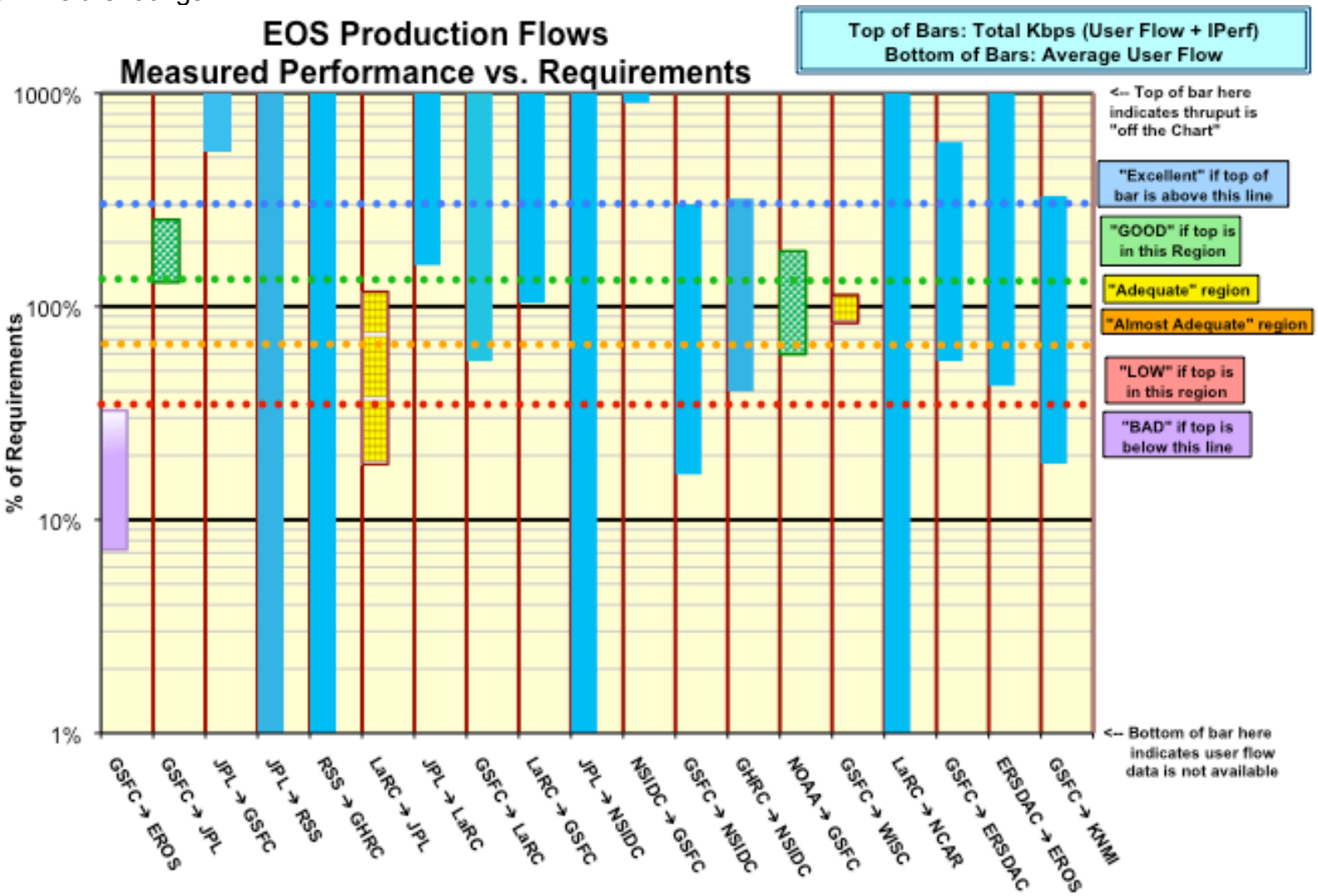
Ratings Summary	Database Req Score	Database Req Prev
Excellent	14	15
Good	2	2
Adequate	2	1
Almost Adequate	0	0
Low	0	1
Bad	1	0
Total Sites	19	19
GPA	3.47	3.63

Notes: Flow Requirements include:
TRMM, Terra, Aqua, Aura, ICESAT, QuikScat, GEOS, NPP



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.



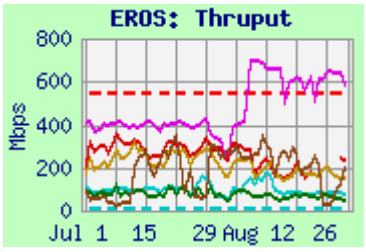
1) EROS:

Ratings: GSFC→ EROS: ↓ Low → Bad
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)				
	Best	Median	Worst	User Flow	Integrated
MODAPS-PDR→ EROS LPDAAC	236.9	171.2	119.2	39.8	178.3
GSFC-EDOS → EROS LPDAAC	111.6	66.1	26.1		
GES DISC → EROS LPDAAC	291.5	222.2	112.6		
GSFC-ENPL → EROS LPDAAC	662.1	612.7	375.5		
ERSDAC→ EROS LPDAAC	111.7	83.4	49.7	3.5	83.8
NSIDC SIDADS→ EROS PTH	392.9	247.8	43.5		
GSFC-ENPL → EROS PTH	789.5	710.8	571.5		
GSFC-NISN → EROS PTH	532.6	349.7	169.6		
LaRC PTH→ EROS PTH	189.1	172.2	108.9		

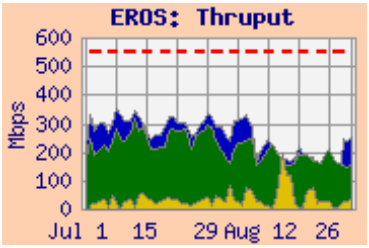


Requirements:

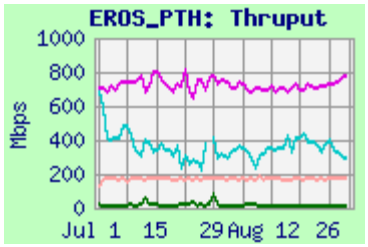
Source → Dest	Date	mbps	prev	Rating
GSFC → EROS	CY '12 -	548.4	343	Bad
ERSDAC → EROS	FY '06 –	8.33	8.3	Excellent

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 7.3% 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.



Due to packet loss on all flows leaving EBnet **(FIXED IN SEPTEMBER !)**, the median integrated thruput from MODAPS-PDR to LPDAAC is now slightly below 1/3 of the requirement, so the rating drops to **Bad**. From GES DISC (also on EBnet) to LPDAAC, the thruput is better, and would be rated **Low** vs. the increased requirement.

Iperf testing for comparison is performed from GSFC-ENPL to both LPDAAC (retuned in August) and to EROS-PTH. 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 typically gets over 700 mbps, and shows the capacity of the network is in excess of the requirement – it would be rated **Good**. Also, GSFC-ENPL to EROS LPDAAC is the best to LPDAAC, and would be rated "**Adequate**". The difference in performance from GSFC-ENPL to EROS-PTH vs LPDAAC is attributable to the extra firewalls at EROS.

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. Other tests to and from NSIDC dropped at the same time, so the problem is believed not to be related to EROS.

1.4 LaRC → EROS: The thruput from LaRC-PTH to EROS-PTH was 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:

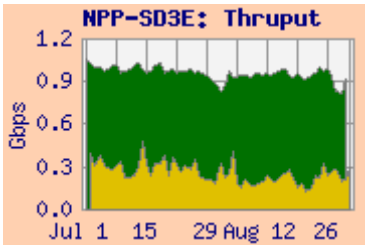
http://ensight.eos.nasa.gov/Missions/NPP/GSFC_SD3E.shtml
http://ensight.eos.nasa.gov/Organizations/production/GDAAC.shtml
http://ensight.eos.nasa.gov/Organizations/production/ESDIS_PTH.shtml
http://ensight.eos.nasa.gov/Missions/icesat/GSFC_ISIPS.shtml

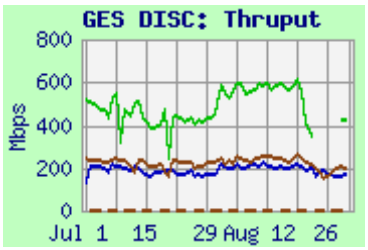
Test Results:

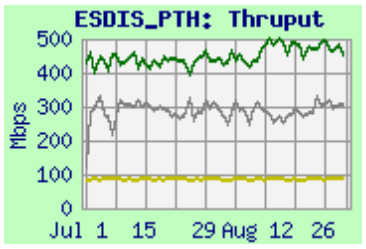
Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	User Flow	Integrated
NOAA-PTH → NPP-SD3E-OPS1	938.7	923.7	839.4	311.8	948.5
EROS LPDAAC → GES DISC	227.4	200.1	125.9		
EROS PTH→ GSFC-ESDIS PTH	422.3	286.5	185.7		
JPL-PTH→ GSFC-ESDIS PTH	87.5	85.6	79.8	2.5	
JPL-TES→ GSFC-NISN	537.1	158.3	41.6		
LaRC ASDC → GES DISC	620.3	568.1	290.8	0.58	
LARC-ANGe → GSFC-ESDIS PTH	540.6	470.5	379.5		
NSIDC DAAC → GES DISC	255.8	233.2	165.1	1.4	
NSIDC DAAC → GSFC-ISIPS (scp)	57.3	42.5	11.8		

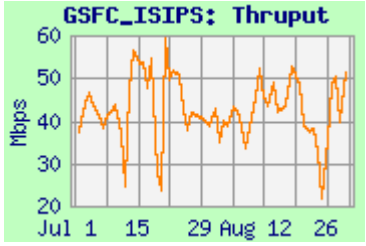
Requirements:

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

JPL → GSFC: Thruput 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 closer 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. Thruput from LaRC ANGe to ESDIS-PTH was much more stable. Both results remained way above 3 x the modest requirement, so the rating continues as "**Excellent**". The user flow this month was close to the requirement.

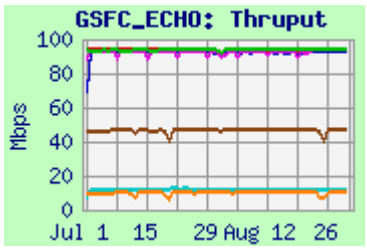
NSIDC → GSFC: Performance from NSIDC to GES DISC was steady, and way above the requirement; the rating remains **Excellent.** The user flow was again above the old requirement, and well above the new lower requirement. Testing to GSFC-ISIPS was restored in May by using SCP (iperf testing still down after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

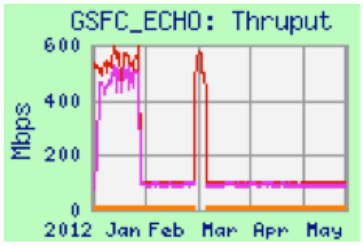
2.2 GSFC-ECHO: EOS Metadata Clearinghouse

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

Test Results:

Source	Medians of daily tests (mbps)		
	Best	**Median**	**Worst**
EROS LPDAAC	93.2	92.6	82.8
EROS LPDAAC ftp	12.1	12.1	9.1
GES DISC	93.8	93.6	91.0
GES DISC ftp	93.0	92.5	54.6
LaRC ASDC DAAC	93.7	93.6	86.3
LaRC ASDC DAAC ftp	n/a	n/a	n/a
NSIDC DAAC	46.6	46.5	46.0
NSIDC DAAC ftp	10.9	10.7	4.1





Comments:

The echo 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 (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 the first week in March: iperf from GES DISC was back over 500 mbps. Then, by March 7, the 100 mbps limitation was back.

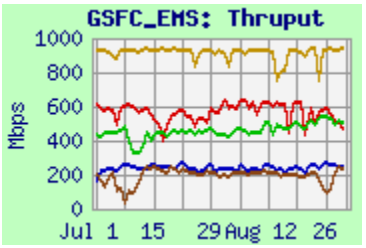
Performance was stable from EROS and NSIDC. FTP performance is mostly limited by TCP window size – especially from sites with long RTT.

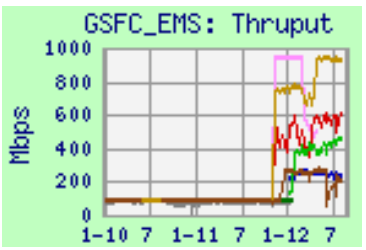
2.3 GSFC-EMS: EOS Metrics System

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	269.8	239.3	143.5
GES DISC	633.1	593.4	199.7
LARC ASDC	525.5	485.9	373.0
MODAPS-PDR	936.7	932.5	616.3
NSIDC-SIDADS	251.5	209.4	125.7





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:

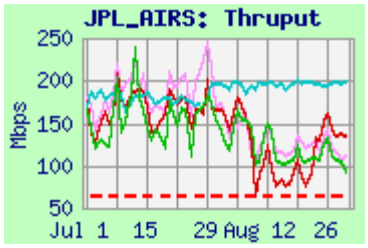
3.1) GSFC → JPL:

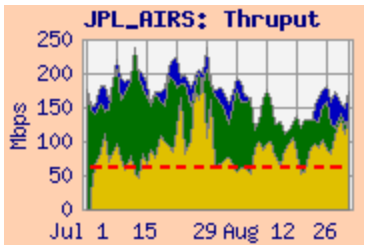
Ratings: GSFC → JPL: ↓ **Excellent** → **Good**

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)				
	Best	**Median**	**Worst**	**User Flow**	**Integrated**
GSFC-GES DISC→ JPL-AIRS	157.9	131.1	71.3	81.7	160.6
NPP-SD3E-OPS2→ JPL-AIRS	152.1	108.9	80.2		
GSFC-NISN → JPL-AIRS	203.5	196.4	170.1		
ESDIS-PTH → JPL-AIRS	167.1	125.7	92.1		
NPP IDPS-Mini → JPL-Sounder	82.6	54.6	37.1		
GSFC-NISN → JPL-MLS	498.4	328.7	162.1		
ESDIS-PTH → JPL-MLS	131.8	92.3	59.3		
ESDIS-PTH → JPL-PODAAC	99.9	79.1	55.9		
GSFC-NISN → JPL- PODAAC	104.0	77.0	34.0		
MODAPS-PDR → JPL-PODAAC	58.9	40.6	26.4		
GSFC-NISN → JPL-QSCAT	74.1	70.9	60.8		
ESDIS-PS → JPL-QSCAT	41.5	26.3	19.1		





Requirements:

Source → Dest	Date	Mbps	Prev	Rating
GSFC → JPL Combined	CY '12-	**63**	**116.7**	**Good**
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**

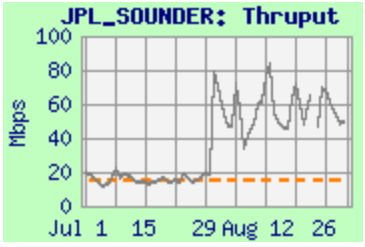
Comments: Due to EBnet outgoing packet loss, thruput from all EBnet sources (GES DISC, NPP-SD3E, ESDIS-PS, and ESDIS-PTH) dropped significantly on 29 February, compared with GSFC-NISN, which was stable. Thruput from EBnet sources dropped further in August, but increased greatly in September with the EBnet firewall upgrade!

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.

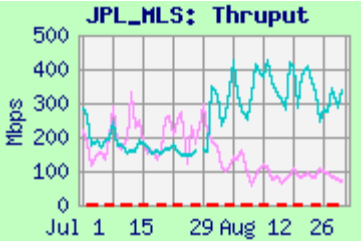
The AIRS Integrated thruput from GES DISC was lower, but remains above 3 x the reduced AIRS requirement, so the AIRS rating remains **Excellent**.

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 dropped below 3 x this requirement, so the overall rating also remains **Good**. **Note that the actual user flow was below the old requirement, but above the new one.**

NPP to JPL Sounder: Testing from NPP IDPS-Mini was initiated to the JPL Sounder PEATE server in late June. The tests initially used reverse nuttcp, which only could employ a single stream, due to firewall limitations. The tests were switched to forward iperf in late July (after firewall rules were implemented), with improved results based on multiple streams, improving the rating to **Excellent**.



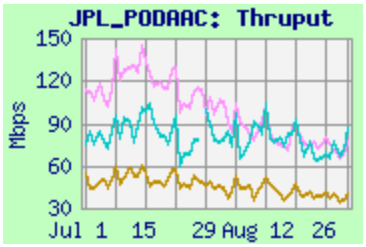
3.1) GSFC → JPL: continued

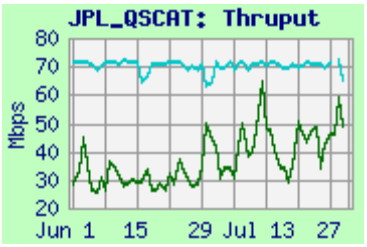


MLS: Thruput from ESDIS-PTH dropped due to EBnet packet loss. Thruput from GSFC-NISN improved with retuning. Both were way above the modest requirement, so the rating remains "**Excellent**".

PODAAC: There is no longer a requirement from GSFC to JPL PODAAC in the database. But thruput to PODAAC 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 is noisy due to EBnet packet loss. (unlike from GSFC-NISN, which was higher and more stable). It remains well above the modest previous 0.6 mbps requirement.





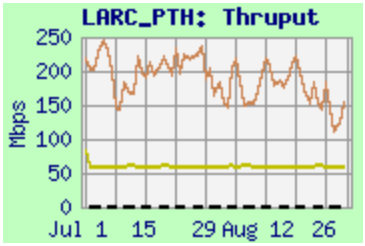
3.2) JPL → LaRC

Rating: Continued Excellent

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

Test Results:

Source → Dest	Medians of daily tests (mbps)			
	Best	Median	Worst	User Flow
JPL-PTH → LaRC PTH	63.0	59.6	57.4	1.7
JPL-TES → LaRC PTH	270.8	175.6	78.9	



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 remained much higher than the requirement; the rating remains "**Excellent**". The user flow this month was close to the usual, and above the requirement.

Thruput from JPL-PTH to LaRC-PTH was again mostly at the lower of its two common states – 63 and 85 mbps, limited by a Fast–E interface on JPL-PTH.

3.3) LaRC → JPL

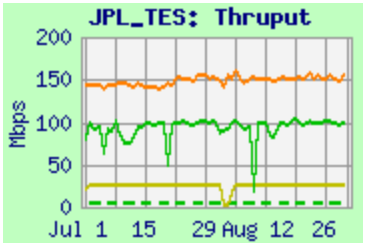
Rating: Continued **Adequate**

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

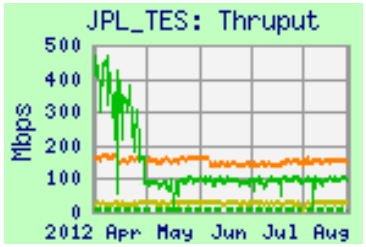
Test Results:

Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	User Flow	Integrated
LaRC DAAC → JPL-MISR	67.4	62.2	24.1	1.8	62.7
LaRC PTH → JPL-MISR	71.0	67.0	37.2		
LaRC DAAC → JPL-TES	102.5	98.0	73.5	0.10	
LaRC PTH → JPL-TES	167.0	151.0	128.1		
LaRC PTH → JPL-TES sftp	26.5	25.8	12.4		
LaRC ANGE → JPL-PTH	77.9	75.2	70.7	15.2	

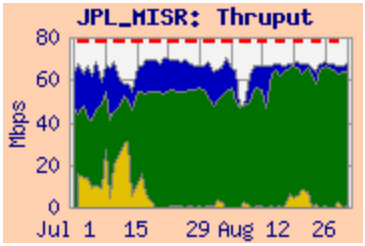


Requirements:

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



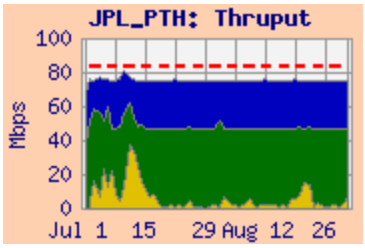
Note: Performance from LaRC ASDC to JPL was very variable (typically on a 3 hour cycle), beginning at the end of April, apparently due to congestion at ASDC. After mid July the 3 hour cycle disappeared, but the thruput stayed low. Performance from LaRC ANGe and LaRC PTH to JPL was stable and did not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



LaRC → JPL (MISR): There was a significant user flow to MISR through the first half of July (but only about 20% of the requirement). But the user flow dropped; and the iperf thruput showed a corresponding increase. The thruput is limited by the Fast-E connection to the MISR node, and the ASDC congestion. The median integrated thruput is now only 80% 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, beginningat the end of April, due to the congestion above. It remains over 3 x the TES requirement, so the TES rating remains "**Excellent**". But is now only 16% 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 thruput, which is not subject to the ASDC congestion (but is limited to 200 mbps by NISN). It would be rated **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 capability.

4) GSFC → LaRC:

Rating: Continued Excellent

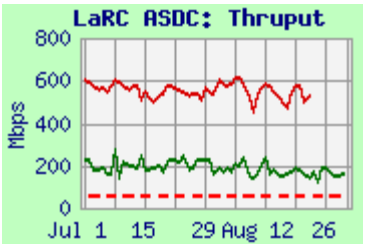
Web Pages : http ://ensight.eos.nasa.gov/Organizations/production/LARC.shtml
http://ensight.eos.nasa.gov/Organizations/production/LARC_ANGe.shtml
http://ensight.eos.nasa.gov/Organizations/production/LARC_PTH.shtml

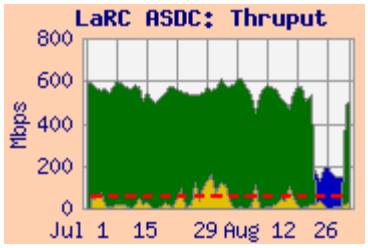
Test Results:

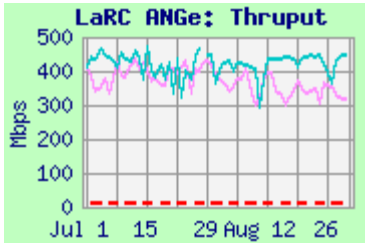
Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	User Flow	Integrated
GES DISC → LaRC ASDC	605.4	557.5	394.1	28.9	572.8
GSFC-EDOS → LaRC ASDC	291.7	169.1	62.7		
ESDIS-PTH → LaRC-ANGe	406.8	342.5	271.7		
GSFC-NISN → LaTIS	467.3	432.2	207.8		

Requirements:

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







Comments: Due to EBnet outgoing packet loss, thruput from all EBnet sources (GES DISC, EDOS, and ESDIS-PTH) dropped significantly on 29 February, compared with GSFC-NISN, which was stable. Thruput from GES DISC mostly recovered in May, and ESDIS-PTH in July. 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 was much lower than from GES DISC.

As seen on the integrated graph, there were periods of high user flow exceeding the requirement in both July and August.

ANGe (LaTIS): Testing to ANGe (Bob) from ESDIS-PTH and LaTIS (Darrin) from GSFC-NISN was consistent.

5) Boulder CO sites:

5.1) NSIDC:

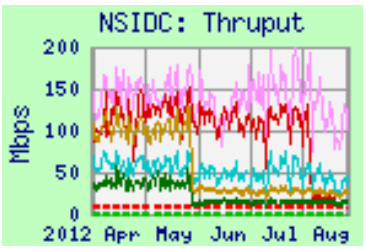
Ratings: GSFC → NSIDC: Continued **Excellent**
JPL → NSIDC: Continued **Excellent**
GHRC → NSIDC: Continued **Excellent**

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.

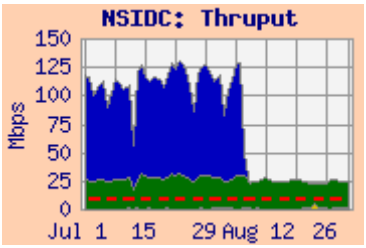
Test Results: **NSIDC S4PA**

Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	User Flow	Integrated
MODAPS-PDR → NSIDC DAAC	28.9	25.2	20.5	1.4	25.3
GES-DISC → NSIDC DAAC	23.3	19.8	15.3		
GSFC-EDOS → NSIDC DAAC	16.4	14.3	9.5		
ESDIS-PTH → NSIDC DAAC	156.5	116.3	66.1		
GSFC-ISIPS → NSIDC (iperf)	55.7	41.1	19.5		
JPL PODAAC → NSIDC DAAC	47.9	43.5	25.3		
GHRC → NSIDC DAAC (nuttcp)	6.0	4.1	3.0		
GHRC → NSIDC DAAC (ftp pull)	2.0	1.5	1.3		



Requirements:

	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**

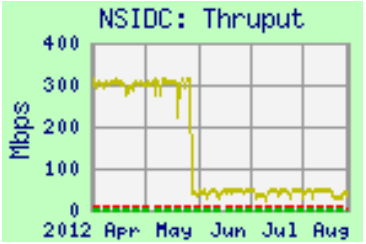


Comments: GSFC → NSIDC S4PA: Thruput dropped from GSFC-EDOS and MODAPS-PDR at the end of May, but remained stable from GES DISC, ESDIS-PTH and GSFC-ISIPS. Note that all these nodes are on EBnet at GSFC. Thruput from GES DISC dropped in August, corresponding with an address change for GES DISC. This supports 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 1.4 mbps average user flow was typical, and was only 17% of the newly reduced requirement (which includes reprocessing).

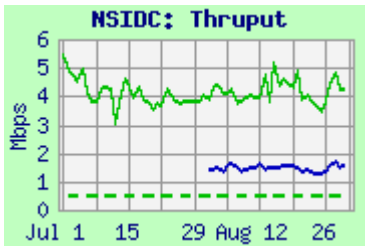
JPL PODAAC → NSIDC S4PA: The requirement was reduced from 1.34 mbps in May '09. Thruput from PODAAC to NSIDC dropped in May from over 300 mbps previously; it had been mostly stable since testing was moved to use Internet2 in September '09; the rating remains "**Excellent**".



5) Boulder CO sites (Continued):

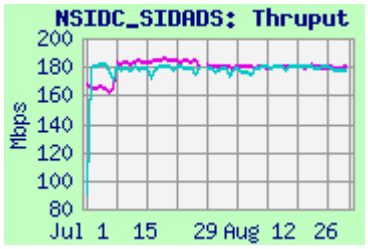
5.1) NSIDC: (Continued):

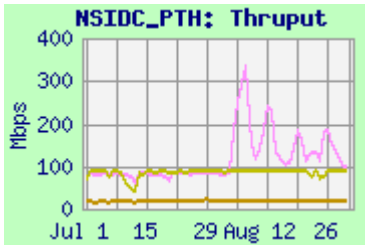
GHRC, GHRC-ftp → NSIDC S4PA: GHRC (NSSTC, UAH, Huntsville, AL) sends AMSR-E data to NSIDC via NLR / Internet2. Thruput from GHRC experienced a drop (similar to the other drops above) at the end of May. The rating is based on reverse nuttcp testing. The median nuttcp thruput remained more than 3x the 0.46 mbps requirement, so the rating remains "**Excellent**". User flow averaged only 43 kbps this month, way below the requirement. FTP testing was restored in August.



Test Results: NSIDC SIDADS, NSIDC-PTH

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
GSFC-ENPL → NSIDC-SIDADS	186.2	180.0	156.6
GSFC-NISN → NSIDC-SIDADS	181.0	179.3	156.1
ESDIS-PTH → NSIDC-PTH	253.9	134.1	77.4
MODAPS-PDR → NSIDC-PTH	19.8	17.1	15.8
JPL PTH → NSIDC-PTH	88.8	88.7	76.7





GSFC → NSIDC-SIDADS: The performance to SIDADS via NISN and Internet2 was very stable this month – **no drop was observed.**

NSIDC-PTH: Thruput to NSIDC-PTH 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 from ESDIS-PTH.

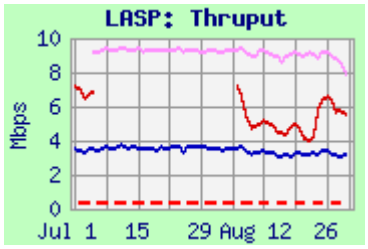
5.2) LASP:

Ratings: LASP → GSFC: n/a → **Excellent**

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

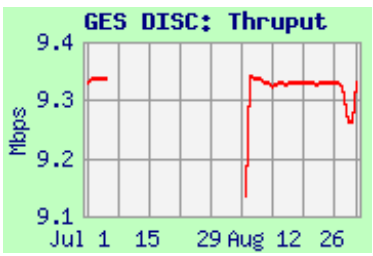
Test Results:

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
ESDIS-PTH → LASP blue (scp)	3.7	3.3	2.6
ESDIS-PTH → LASP blue (iperf)	9.4	9.1	7.8
GES DISC → LASP blue (iperf)	5.8	5.0	3.8
LASP → GES DISC	9.3	9.3	8.2



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 this month, when the nuttcp server at LASP was started. Iperf and SCP testing from GES DISC and ESDIS-PTH was very stable, and consistent with the circuit limitation.

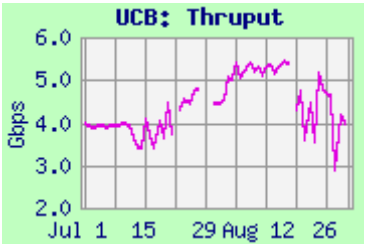
5) Boulder CO sites (Continued):

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	5.8	5.1	3.2



Comments: Testing was added in April 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.

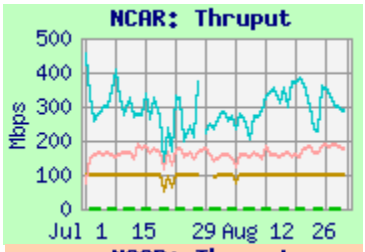
5.4) NCAR:

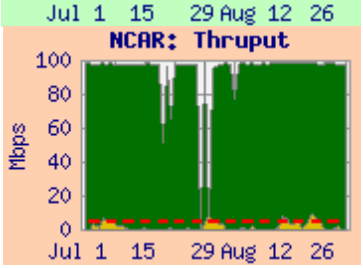
Ratings: LaRC → NCAR: Continued **Excellent**
GSFC → NCAR: Continued **Excellent**

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

Test Results:

Source	Medians of daily tests (mbps)		
	Best	**Median**	**Worst**
LaRC PTH	188.1	161.4	129.7
GSFC-ENPL-10G	5945.4	4471.5	2038.5
GSFC-ENPL-FE	98.8	98.2	95.1
GSFC-NISN	483.4	294.7	136.1



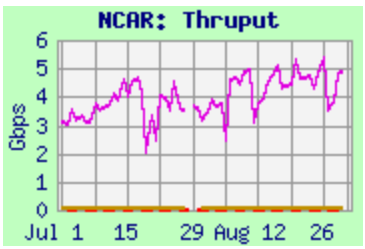


Requirement:

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 2.2 mbps, a bit above the typical value of recent months, with peaks about equal to the requirement.

From GSFC-ENPL-10G, with a 10 Gig-E interface, and a 10 gig connection to MAX, performance to NCAR's 10 Gig PerfSonar node gets over 5 gbps on peaks! Significant diurnal variation is no longer observed.

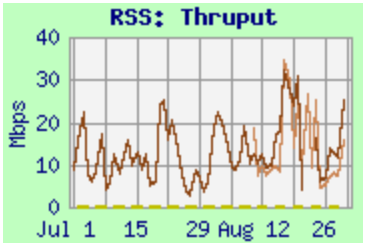
6) Remote Sensing Systems (RSS):

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

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

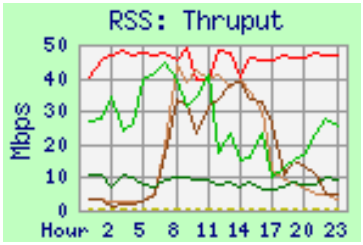
Test Results:

Source → Dest	Medians of daily tests (mbps)		
	Best	**Median**	**Worst**
JPL PODAAC → RSS (Comcast)	39.0	13.4	1.2
JPL TES → RSS (Comcast)	45.8	9.6	2.0
RSS (Comcast) → GHRC (UAH)	5.25	4.14	2.57
RSS (Comcast) → GHRC (NISN)	3.79	3.66	2.21



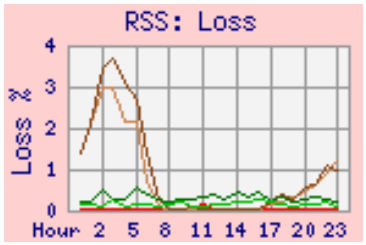
Requirements:

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).

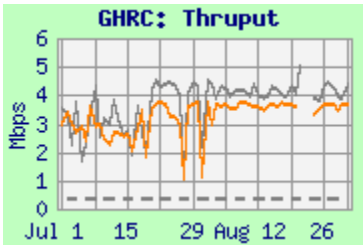
At the end of March '12, RSS switched its production node from the NISN SIP circuit (4 x T1s to NASA ARC -- total 6 mbps) to the Comcast circuit, rated at 50 mbps incoming, and 12 mbps outgoing (installed in April 2011). Testing via the NISN circuit to RSS was discontinued at that time. Testing from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



On May 14, testing was switched from a linux test server at RSS (which was outside the firewall), to the windows production server inside the RSS 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 significant (30:1) 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 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), but stabilized in August.



Either result yields a rating of "**Excellent**" re the 0.32 mbps requirement.

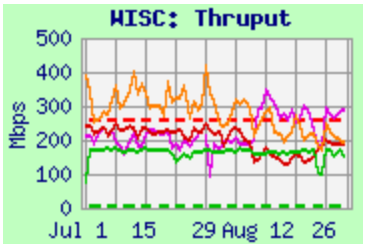
7) Wisconsin:

Rating: ↓ **Good** → **Adequate**

Web Pages http://ensight.eos.nasa.gov/Missions/NPP/WISC.shtml

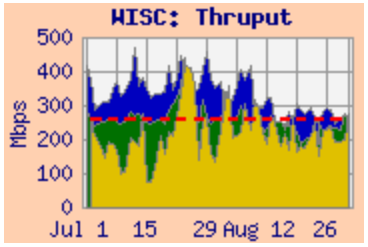
Test Results:

Source Node	Medians of daily tests (mbps)				
	Best	Median	Worst	User Flow	Integrated
NPP-SD3E	314.7	226.3	154.0	216.7	293.8
GSFC DISC	210.7	174.5	116.4		
GSFC ENPL	346.1	263.0	114.4		
LaRC ANGe	175.7	163.4	101.3		



Requirements:

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



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

GSFC: Thruput dropped from all EBnet sources (NPP-SD3E, GES DISC) on 29 February due to EBnet outgoing packet loss, improved from NPP-SD3E in July, and all EBnet sources dropped a bit in August. The integrated thruput was above both the NPP and GSFC combined requirements, but by less than 30%, so the rating drops to **Adequate**. From ENPL thruput was similar, and unaffected by the EBnet packet loss. User flow is consistent with the requirement (less contingency). The route from EBnet at GSFC is via MAX to Internet2, peering with MREN in Chicago.

LaRC: Thruput from LaRC ANGe is very steady and well above the requirement, rating "**Excellent**". The route from LaRC is via NISN, peering with MREN in Chicago.

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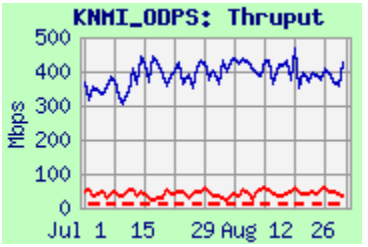
8) KNMI:

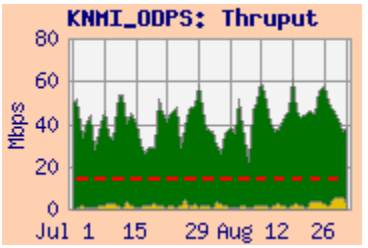
Rating: Continued **Excellent**

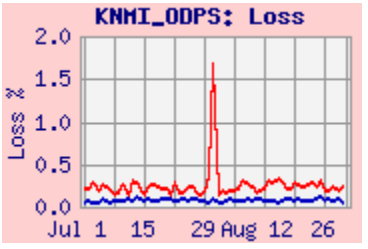
Web Pages http://ensight.eos.nasa.gov/Missions/aura/KNMI_ODPS.shtml

Test Results:

Source → Dest	Medians of daily tests (mbps)			
	Best	Median	Worst	Reqmt
OMISIPS → KNMI-ODPS	65.2	43.4	28.8	13.4
GSFC-ENPL → KNMI-ODPS	680.0	405.1	265.0	







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. The median thruput was steady this month, and remains more than 3 x the increased requirement, so the rating remains **Excellent**. Thruput was much higher from GSFC-ENPL (outside of EBnet), due to much lower packet loss.

The user flow, however, averaged only 2.5 mbps this month, a little higher than last month (and below the more typical 4 mbps).

9) JSpace - ERSD:

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

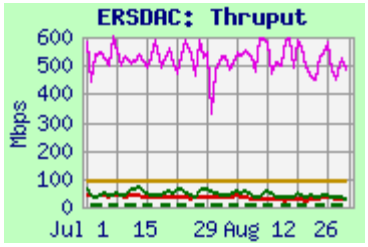
Web Page: http://ensight.eos.nasa.gov/Organizations/production/ERSDAC.shtml

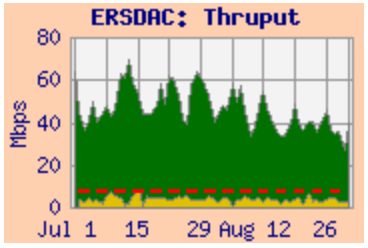
US ←→ JSpace - ERSD Test Results

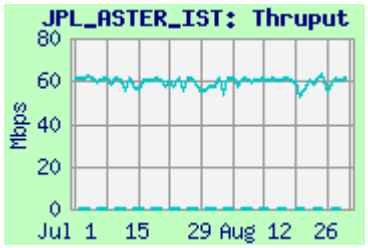
Source → Dest	Medians of daily tests (mbps)				
	Best	Median	Worst	User Flow	Integrated
GSFC-EDOS → ERSD	64.4	39.2	12.7	3.7	39.8
GES DISC → ERSD	36.0	29.6	18.5		
GSFC ENPL (FE) → ERSD	93.4	92.7	90.9		
GSFC ENPL (GE) → ERSD	616.1	526.0	282.9		
ERSD → EROS	111.7	83.4	49.7	3.5	83.8
ERSD → JPL-ASTER IST	68.0	60.6	47.7		

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:

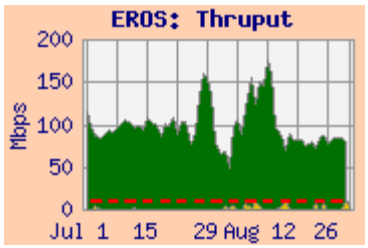
GSFC → ERSD: As of approximately 1 September '11, the ERSDAC test node is connected at 1 gbps – formerly was 100 mbps. The median thruput from most nodes improved. Thruput from GSFC ENPL was over 500 mbps. However, some nodes have been using QoS (HTB) to reduce loss previously seen in the 1 gig to 100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

Thruput dropped from all EBnet sources (GSFC-EDOS, GES DISC) on 29 February, and dropped further in August, due to EBnet outgoing packet loss. But 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 thruput.

ERSD → JPL-ASTER-IST: The thruput 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 thruput 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 thruput is more than 3 x the reduced requirement, so the rating remains "**Excellent**".

10) US ←→ 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 4.06 mbps from GSFC to JAXA, and 152 kbps from JAXA to GSFC.

These values are consistent with the new (database) requirements of 3.5 mbps to JAXA, and 0.16 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.