

## EOS Production Sites Network Performance Report: May 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 3.64** (was 3.68 last month).
- **Requirements:** updated to Handbook 1.4.3 in May '09 (was 1.4.2 previously)
  - Many Requirements dropped significantly (under review)
- **All EBnet Outflows:** Continued high packet loss and reduced thruput started 29 February. Partial improvement observed in May.
- **LaRC ASDC Outflow:** very high congestion reduced performance on most outflows. (Not observed from LaRC ANGe or LaRC-PTH)
- **Only 2 flows below "Good":**
  - GSFC MODAPS-PDR → EROS ("Low")
  - LaRC ASDC → JPL ("Adequate")

### Ratings Changes:

**Upgrade:** ↑ GSFC → JPL: Adequate → Good

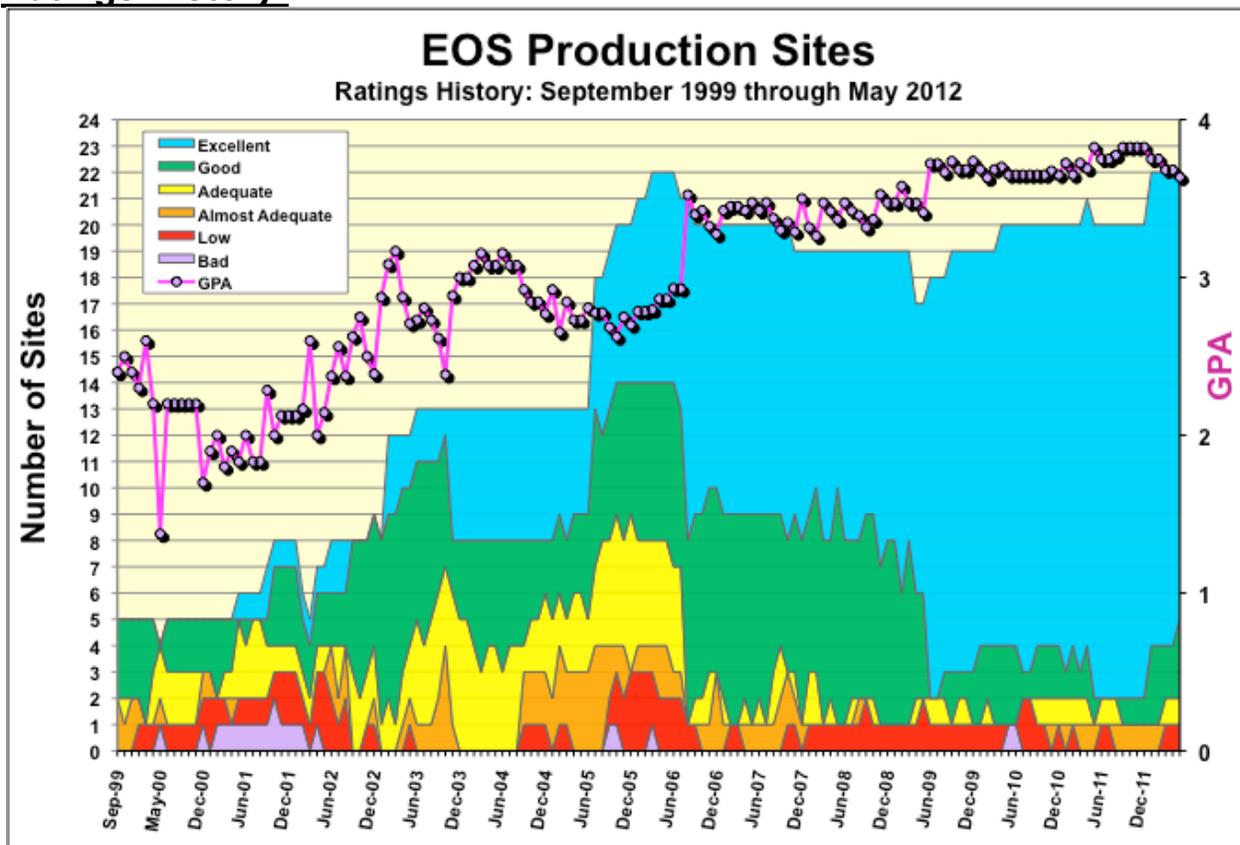
**Downgrades:** ↓ LaRC ASDC → JPL: Excellent → Adequate

### 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: NOAA → GSFC-SD3E  
GSFC-SD3E → Wisconsin

### **Requirements Basis:**

While the long-term plan is to use the requirements from the EOSDIS network requirements database, the database does not appear ready to be used for that purpose at this time. ESDIS is in process of reviewing its network ICD's with each instrument team. When these ICDs are completed, the database will be updated with the ICD values, and those values will be used here as well.

Until then, the requirements are based on the EOS Networks Requirements Handbook, Version 1.4.3 (from which the original database requirements were derived). Previously, the requirements were derived from version 1.4.2.

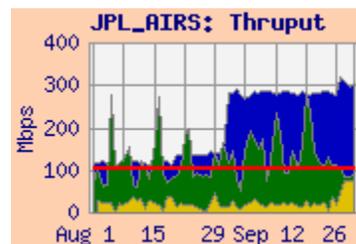
One main difference between Handbooks 1.4.2 and 1.4.3 is that most flows which occur less than once per day were averaged over their production period. These flows were typically monthly Level 3 data transfers, which were specified to be sent in just a few hours. However, they could easily be accommodated 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.

However, it seems likely that there are some flows which have been omitted from version 1.4.3. For example, the GES DISC to KNMI requirement for Level 1+ data (without contingency) was 1.4 mbps in version 1.4.2, but only 22 kbps in version 1.4.3. The user flow has been averaging about 1.4 mbps, suggesting that version 1.4.2 was correct, and that version 1.4.3 has omitted something.

### **Integrated Charts:**

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

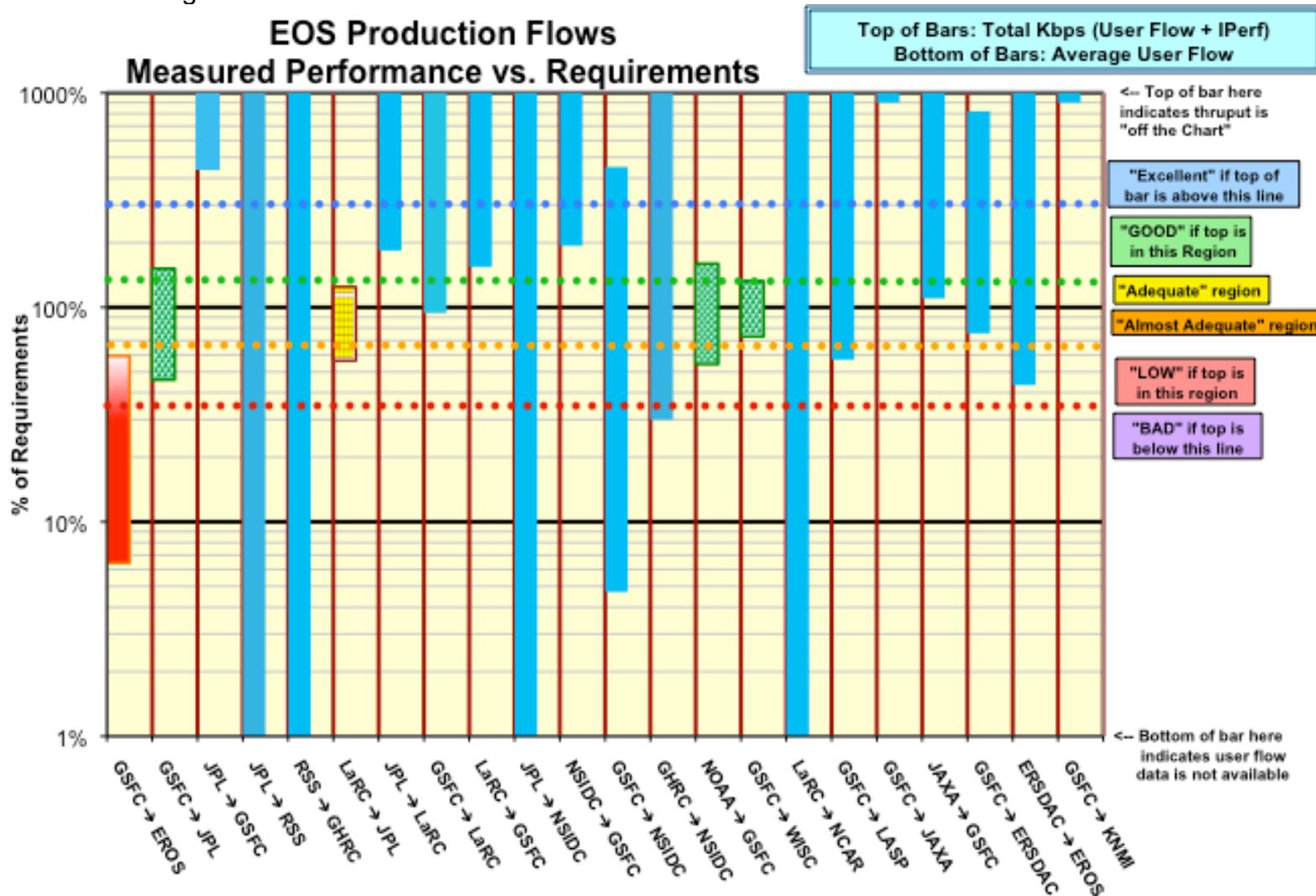


Network Requirements vs. Measured Performance

May 2012		Requirements (mbps)		Testing				Ratings	
Source → Destination	Instrument (s)	Current	Old	Source → Dest Nodes	Average User Flow mbps	iperf Median mbps	Integrated mbps	Ratings re HB 1.4.3+ Requirements	
		HB 1.4.3+	HB 1.4.2					This Month	Last Month
GSFC → EROS	MODIS, LandSat	342.9	345.9	MODAPS-PDR → EROS LPDAAC	22.1	199.8	203.5	Low	Low
GSFC → JPL	AIRS, MLS, NPP, ISTs	116.7	43.6	GSFC GES DISC → JPL-AIRS	53.6	159.9	176.8	Good	Ad
JPL → GSFC	MLS	0.6	7.4	JPL-PODAAC → GSFC GES DISC	2.4	78.2	78.6	Excellent	Ex
JPL → RSS	AMSR-E	0.5	2.5	JPL-PODAAC → RSS (Comcast)		13.3		Excellent	Ex
RSS → GHRC	AMSR-E	0.3		RSS (Comcast) → GHRC		5.3		Excellent	Ex
LaRC → JPL	TES, MISR	69.3	43.7	LARC-ASDC → JPL-TES	39.1	86.2		Adequate	Ex
JPL → LaRC	TES	1.5	4.4	JPL-TES → LARC-PTH	2.7	203.5		Excellent	Ex
GSFC → LaRC	CERES, MISR, MOPITT	30.8	60.5	GES DISC → LaRC ASDC	29.0	559.1	559.4	Excellent	Ex
LaRC → GSFC	CERES, MODIS, TES	0.4	0.2	LARC-ASDC → GES DISC	0.56	461.4	461.4	Excellent	Ex
JPL → NSIDC	AMSR-E	0.2	1.3	JPL-PODAAC → NSIDC		303.9		Excellent	Ex
NSIDC → GSFC	MODIS, ICESAT, QuikScat	0.6	0.5	NSIDC DAAC → GES DISC	1.10	274.5	274.5	Excellent	Ex
GSFC → NSIDC	MODIS, ICESAT, QuikScat	27.6	34.5	GES DISC → NSIDC-DAAC	1.30	124.4	124.4	Excellent	Ex
GHRC → NSIDC	AMSR-E	0.5	7.5	GHRC → NSIDC DAAC (ftp)	0.14	10.9		Excellent	Ex
NOAA → GSFC	NPP	615.6	n/a	NOAA-PTH → GSFC NPP-SD3E OPS1	334.4	917.5	982.9	Good	Good
GSFC → WISC	NPP	253.7	n/a	GSFC NPP-SD3E OPS1 → WISC	185.7	286.9	335.6	Good	Good
LaRC → NCAR	MOPITT	0.1	5.4	LaRC-PTH → NCAR		155.1		Excellent	Ex
GSFC → LASP	ICESat, QuikScat	0.4	0.4	GES DISC → LASP (blue)	0.059	6.56		Excellent	Ex
GSFC → JAXA	QuikScat, TRMM, AMSR	0.1	2.0	GSFC → JAXA	3.6	Testing discontinued:		Excellent	Ex
JAXA → GSFC	AMSR-E	0.1	1.3	JAXA → GSFC	0.11	31 March 2009		Excellent	Ex
GSFC → ERSDAC	ASTER	5.4	12.5	GSFC-EDOS → ERSDAC	4.1	44.1	44.1	Excellent	Ex
ERSDAC → EROS	ASTER	8.3	26.8	ERSDAC → EROS PTH	3.6	94.0	94.0	Excellent	Ex
GSFC → KNMI	OMI	0.03	3.3	GSFC-OMISIPS → KNMI ODPS	4.3	35.6	36.2	Excellent	Ex
				Significant change from v 1.4.2 (5/09) to v 1.4.3				Ratings Summary	
				Value used for ratings				HB 1.4.3+ Req	
								Score	Prev
*Criteria:	Excellent	Total Kbps > Requirement * 3			Excellent		17	18	
	Good	1.3 * Requirement <= Total Kbps < Requirement * 3			Good		3	2	
	Adequate	Requirement < Total Kbps < Requirement * 1.3			Adequate		1	1	
	Almost Adequate	Requirement / 1.5 < Total Kbps < Requirement			Almost Adequate		0	0	
	Low	Requirement / 3 < Total Kbps < Requirement / 1.5			Low		1	1	
	Bad	Total Kbps < Requirement / 3			Bad		0	0	
						Total Sites		22	22
Notes:	Flow Requirements include: TRMM, Terra, Aqua, Aura, ICESAT, QuikScat, GEOS, NPP					GPA		3.64	3.68



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: Continued **Low**  
 ERSDAC→ EROS: Continued **Excellent**

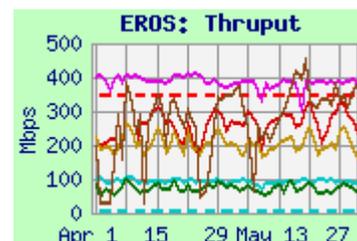
Web Page: <http://ensight.eos.nasa.gov/Organizations/production/EROS.shtml>  
[http://ensight.eos.nasa.gov/Organizations/production/EROS\\_PTH.shtml](http://ensight.eos.nasa.gov/Organizations/production/EROS_PTH.shtml)

**Test Results:**

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
MODAPS-PDR → EROS LPDAAC	261.8	199.8	134.8	22.1	203.5
GSFC-EDOS → EROS LPDAAC	126.0	70.6	23.6		
GES DISC → EROS LPDAAC	333.9	269.1	165.8		
GSFC-ENPL → EROS LPDAAC	401.1	384.3	264.8		
ERSDAC → EROS LPDAAC	123.6	94.0	54.3	3.6	94.0
NSIDC SIDADS → EROS PTH	523.2	331.3	153.9		
GSFC-ENPL → EROS PTH	797.3	701.1	328.4		
GSFC-NISN → EROS PTH	529.0	358.7	187.2		
LaRC PTH → EROS PTH	188.3	150.6	85.6		

**Requirements:**

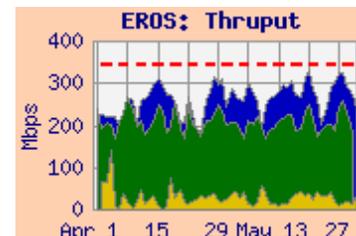
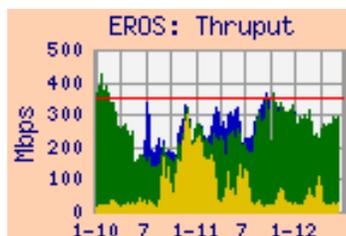
Source → Dest	Date	mbps	Rating
GSFC → EROS	CY '08 -	343	<b>Low</b>
ERSDAC → EROS	FY '06 -	8.3	<b>Excellent</b>



**Comments:**

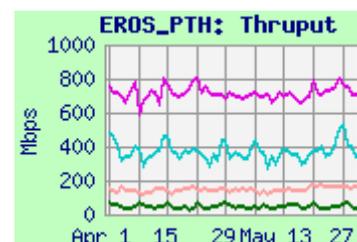
**1.1 GSFC → EROS:** The rating is based on the MODAPS-PDR Server to EROS LP DAAC measurement, since that is the primary flow. The route is via the Doors to NISN SIP, via the NISN 10 gbps backbone to the NISN Chicago CIEF, then via GigE to the StarLight Gigapop, peering there with the EROS OC-48 tail circuit.

The user flow dropped off in July '11, after about 8 months of high user flow, reportedly based on a science user at EROS acquiring MODIS data. This month it remained close to normal, and averaged only about 6.4% of the nominal requirement (the requirement includes MODIS reprocessing).



Due to packet loss on all flows leaving EBnet, the median integrated thrupt from MODAPS-PDR to LPDAAC is again below the requirement, even without the 50 % contingency factor, so the rating remains **Low**. From GES DISC (also on EBnet) to LPDAAC, the thrupt is better, and would be rated "**Almost Adequate**".

Iperf testing for comparison is performed from GSFC-ENPL to LPDAAC 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 about 700 mbps, and shows the capacity of the network is well in excess of the requirement -- 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 ERSDAC → EROS:** **Excellent**. See section 9 (ERSDAC) for further discussion.

**1.3 NSIDC → EROS-PTH:** Performance is very noisy, with a best:worst ratio over 10:1.

**1.4 LaRC → EROS:** The thrupt 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/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/Organizations/production/ESDIS_PTH.shtml)
- [http://ensight.eos.nasa.gov/Missions/icesat/GSFC\\_ISIPS.shtml](http://ensight.eos.nasa.gov/Missions/icesat/GSFC_ISIPS.shtml)

**Test Results:**

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
NOAA-PTH → NPP-SD3E-OPS1	937.2	917.5	764.3	334.4	982.9
EROS LPDAAC → GES DISC	220.6	193.6	124.3		
EROS PTH → GSFC-ESDIS PTH	395.9	278.9	184.6		
JPL-PTH → GSFC-ESDIS PTH	87.9	85.4	74.9	2.7	
JPL-TES → GSFC-NISN	564.9	172.0	34.0		
LaRC ASDC → GES DISC	551.7	461.4	81.0	0.56	
LARC-ANGe → GSFC-ESDIS PTH	500.9	426.6	342.3		
NSIDC DAAC → GES DISC	318.6	274.5	175.1	1.6	
NSIDC DAAC → GSFC-ISIPS (scp)	73.6	63.2	24.9		

**Requirements:**

Source → Dest	Date	Mbps	Rating
NSIDC → GSFC	CY '06 –	0.6	Excellent
LaRC ASDC → GES DISC	FY '07 –	0.4	Excellent
JPL → GSFC combined	CY '06 –	3.2	Excellent
NOAA → NPP SD3E	CY '06 –	615.6	Good

**Comments:**

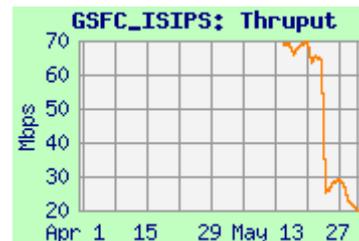
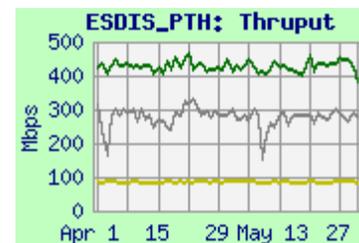
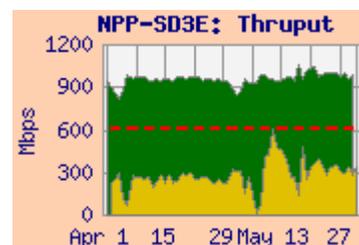
**NOAA → NPP-SD3E:** Performance from NOAA-PTH to GSFC NPP-SD3E-OPS1 was very steady at over 900 mbps, limited by the gig-E interfaces on the test machines (the circuits are all 10 gbps). User flow was 17% higher than the 287 mbps last month, and close to expectations soon after NPP launch.

**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 above the 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 very 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 low 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 meets the requirement.



## 2.2 GSFC-ECHO: EOS Metadata Clearinghouse

Web Page: [http://ensight.eos.nasa.gov/Organizations/gsfc/GSFC\\_ECHO.shtml](http://ensight.eos.nasa.gov/Organizations/gsfc/GSFC_ECHO.shtml)

### Test Results:

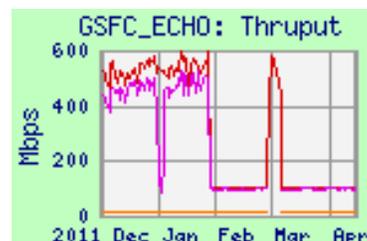
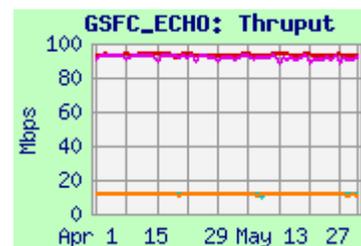
Source	Medians of daily tests (mbps)		
	Best	Median	Worst
EROS LPDAAC	n/a	n/a	n/a
EROS LPDAAC ftp	11.8	11.8	10.5
GES DISC	93.7	93.4	91.1
GES DISC ftp	92.5	91.4	82.9
LaRC ASDC DAAC	n/a	n/a	n/a
LaRC ASDC DAAC ftp	n/a	n/a	n/a
MODIS-LADSWEB	n/a	n/a	n/a
NSIDC DAAC	n/a	n/a	n/a
NSIDC DAAC ftp	11.4	11.3	10.5

### Comments:

The echo node was moved at the end of September '11. Most ftp tests continued working (except from LaRC ASDC), but iperf tests need new firewall rules before resumption of testing (fixed in June). Iperf testing resumed from GES DISC in November, with excellent thruput.

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, but the ftp stopped working during that period. Then, by March 7, the 100 mbps limitation was back – but the ftp tests from EROS and NSIDC started working again.

Ftp 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

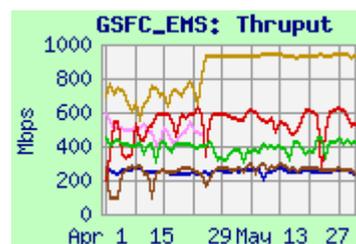
Web Page: [http://ensight.eos.nasa.gov/Organizations/gsfc/GSFC\\_EMS.shtml](http://ensight.eos.nasa.gov/Organizations/gsfc/GSFC_EMS.shtml)

### Test Results:

	Medians of daily tests (mbps)		
	Best	Median	Worst
EROS LPDAAC	272.5	252.5	200.0
GES DISC	621.5	559.0	175.3
LARC ASDC	466.7	386.0	81.8
MODAPS-PDR	936.8	934.6	650.6
NSIDC-SIDADS	292.8	266.2	199.8

### Comments:

Testing is performed to GSFC-EMS from the above nodes, iperf only. The EMS testing from GES DISC, and MODAPS-PDR was transitioned to the new test node (FS1) in November '11, with much improved thruput. NSIDC-SIDADS was transitioned in December, also with improved thruput. Testing from LaRC ASDC and EROS LPDAAC transitioned in January. The performance limitation to the old server was its 100 mbps Fast-E connection; the new server is gigabit connected. Thruput from MODAPS-PDR improved in late April due to MODAPS reconfiguration.



## 3) JPL:

## 3.1) GSFC → JPL:

Ratings: GSFC → JPL: ↑ Adequate → **Good**

Web Pages: [http://ensight.eos.nasa.gov/Missions/aqua/JPL\\_AIRS.shtml](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/aura/JPL_MLS.shtml)  
[http://ensight.eos.nasa.gov/Organizations/production/JPL\\_QSCAT.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/production/JPL_PODAAC.shtml)

## Test Results:

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
GSFC-GES DISC → JPL-AIRS	193.2	159.9	105.3	53.6	176.8
NPP-SD3E-OPS2 → JPL-AIRS	167.4	125.2	84.6		
GSFC-NISN → JPL-AIRS	190.7	171.4	142.0		
ESDIS-PTH → JPL-AIRS	215.7	162.9	107.8		
ESDIS-PTH → JPL-PODAAC	142.8	101.9	67.9		
GSFC-NISN → JPL-PODAAC	117.9	83.3	44.7		
MODAPS-PDR → JPL-PODAAC	62.7	46.5	29.5		
GSFC-NISN → JPL-QSCAT	74.4	70.5	60.0		
ESDIS-PS → JPL-QSCAT	46.1	33.7	21.1		
GSFC-NISN → JPL-MLS	209.5	156.8	88.9		
ESDIS-PTH → JPL-MLS	254.9	151.9	83.7		

## Requirements:

Source → Dest	Date	Mbps	Rating
GSFC → JPL Combined	FY '08-	116.7	Good
GSFC → JPL AIRS	FY '08-	98	Good
GSFC NPP → JPL Sounder	FY '12 -	15	Excellent
GSFC → JPL PODAAC	FY '08-	1.5	Excellent
GSFC → JPL QSCAT	FY '08-	0.6	Excellent
GSFC → JPL MLS	FY '08-	2.1	Excellent

**Comments:** Due to EBnet outgoing packet loss, thrupt 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. Thrupt from GES DISC and ESDIS-PTH mostly improved in late April.

**AIRS, Overall:** Integrated thrupt from GES DISC remained above the AIRS requirement by more than 30%, so the AIRS rating remains **Good**.

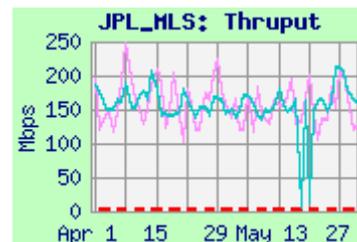
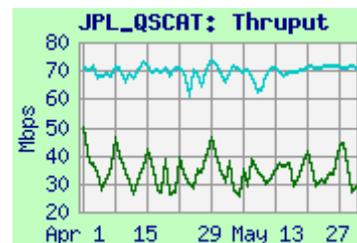
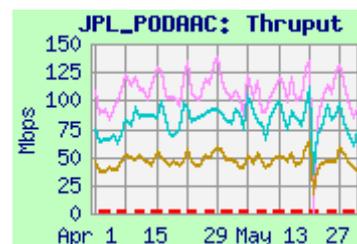
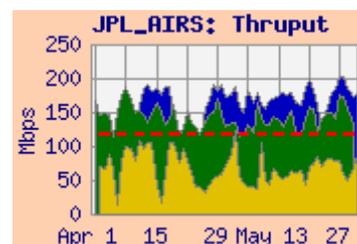
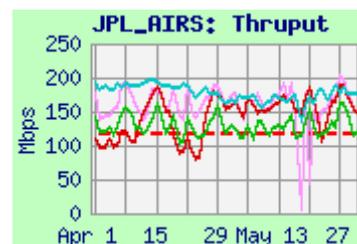
The **JPL overall rating** is based on this test compared with the sum of all the GSFC to JPL requirements – the thrupt improved to now be above 1.3 x this requirement, so the overall rating improved to **Good**. As the AIRS integrated graph shows, total user flow from GSFC to JPL was relatively steady.

**NPP:** Testing from SD3E-OPS2 is also to JPL-AIRS, as a proxy for JPL-Sounder PEATE. Thrupt was comparable to other EBnet sources, well in excess of the requirement.

**PODAAC:** Performance to PODAAC is way above the 1.5 mbps PODAAC requirement, rating **Excellent**.

**QSCAT:** Thrupt from ESDIS-PS to QSCAT is noisy due to EBnet packet loss. (unlike from GSFC-NISN, which was more stable). It remains well above the modest requirement, rating **Excellent**.

**MLS:** Thrupt from ESDIS-PTH is low due to EBnet packet loss. Thrupt from GSFC-NISN was stable. Both were way above the modest requirement, so the rating remains **Excellent**.



**3.2) LaRC → JPL**

Rating: **↓ Excellent → Adequate**

Web Pages:

- [http://ensight.eos.nasa.gov/Organizations/production/JPL\\_TES.shtml](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/Missions/terra/JPL_MISR.shtml)
- [http://ensight.eos.nasa.gov/Organizations/production/JPL\\_PTH.shtml](http://ensight.eos.nasa.gov/Organizations/production/JPL_PTH.shtml)

**Test Results:**

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
LaRC DAAC → JPL-TES	98.4	86.2	6.8	0.06	
LaRC PTH → JPL-TES	172.0	154.3	127.4		
LaRC PTH → JPL-TES sftp	26.5	25.8	14.1		
LaRC ANGE → JPL-PTH	79.1	75.1	70.2	39.1	
LaRC DAAC → JPL-MISR	49.1	28.3	6.0	24.9	44.1
LaRC PTH → JPL-MISR	70.7	41.9	25.4		

**Requirements:**

Source → Dest	Date	Mbps	Rating
LaRC DAAC → JPL-TES	FY '07 –	7.0	Excellent
LaRC DAAC → JPL-MISR	FY '07 –	62.3	Almost Adequate
LaRC → JPL-Combined	FY '07 –	69.3	Adequate

**Note:** The overall LaRC → JPL flow (39.1 mbps) was much higher than recent months; 63% of that flow this month was for MISR. The JPL-PTH integrated graph shows the overall LaRC to JPL user flow (vs. the overall requirement).

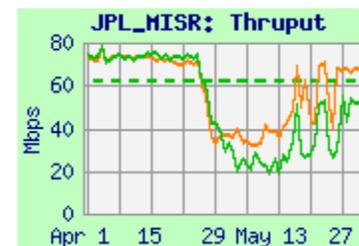
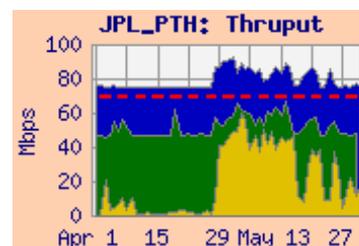
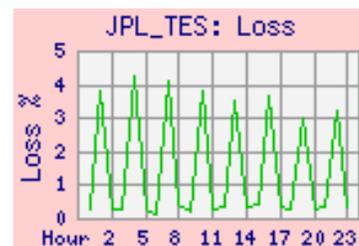
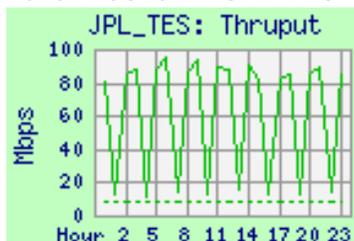
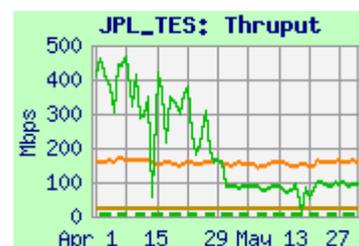
Performance from LaRC ASDC to JPL was very variable (typically on a 3 hour cycle), beginning at the end of April, apparently due to congestion at ASDC.

Thruput from LaRC ANGe and LaRC PTH to JPL was much more stable.

**LaRC → JPL (Overall, TES):** Median performance from LaRC ASDC DAAC to JPL-TES dropped way down as a result of the above congestion. It remains over 3 x the TES requirement, so the TES rating remains “Excellent”. But is now only 24% above the combined requirements, so the Overall rating drops to **Adequate**. User flow to TES is very low.

**LaRC → JPL (MISR):** There was an increase in user flow to MISR of about 40 mbps during the first part of May – the iperf thrupt showed a corresponding decrease. The integrated thrupt is limited by the Fast-E connection to the MISR node, and the ASDC congestion, and the median is now only 71% of the requirement, so the rating drops to **Almost Adequate**.

**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.

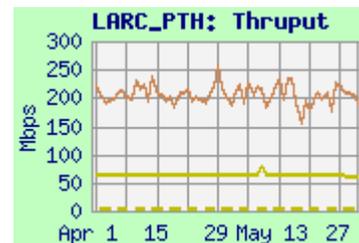


**3.3) JPL → LaRC****Rating: Continued Excellent**Web Page: [http://ensight.eos.nasa.gov/Organizations/production/LARC\\_PTH.shtml](http://ensight.eos.nasa.gov/Organizations/production/LARC_PTH.shtml)**Test Results:**

Source → Dest	Medians of daily tests (mbps)			User Flow
	Best	Median	Worst	
JPL-PTH → LaRC PTH	68.1	63.0	62.9	2.7
JPL-TES → LaRC PTH	311.6	203.5	84.4	

**Requirements:**

Source → Dest	Date	Mbps	Rating
JPL → LaRC	FY '07 –	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 thrupt from JPL-TES was much higher than the requirement; the rating remains “**Excellent**”. The user flow was closer to usual and the requirement this month.

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

**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_ANGe.shtml)  
[http://ensight.eos.nasa.gov/Organizations/production/LARC\\_PTH.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	599.0	559.1	394.8	29.0	559.4
GSFC-EDOS → LaRC ASDC	293.0	157.2	54.2		
ESDIS-PTH → LaRC-ANGe	411.8	357.1	278.5		
GSFC-NISN → LaTIS	495.9	451.2	314.4		

**Requirements:**

Source → Dest	Date	Mbps	Rating
GSFC → LARC (Combined)	CY '09 –	31.3	Excellent

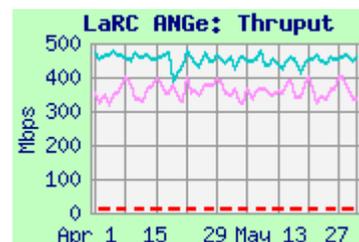
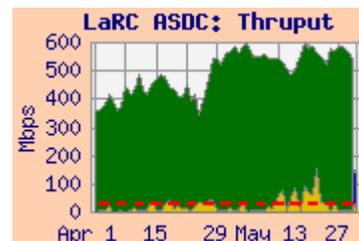
**Comments:** Due to EBnet outgoing packet loss, thrupt from all EBnet sources (GES DISC, EDOS, and ESDIS-PTH) dropped significantly on 29 February, compared with GSFC-NISN, which was stable. Thruput from GES DISC mostly recovered in May. Note that packet loss does not have much effect on thrupt for these flows, due to the short RTT.

**GSFC → LaRC ASDC:** Thruput from GES DISC to LaRC ASDC DAAC remained well above 3 x the combined requirement, so the rating remains “**Excellent**”.

Thruput to ASDC from GSFC-EDOS was lower than from GES DISC.

As seen on the integrated graph, there were periods of high user flow exceeding the requirement in May – not seen last month.

**ANGe (LaTIS):** Testing to ANGe from ESDIS-PTH dropped in March due to EBnet packet loss. Testing to LaTIS (Darrin) from GSFC-NISN was better, with consistent results.



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_SIDADS.shtml)  
[http://ensight.eos.nasa.gov/Organizations/production/NSIDC\\_PTH.shtml](http://ensight.eos.nasa.gov/Organizations/production/NSIDC_PTH.shtml)

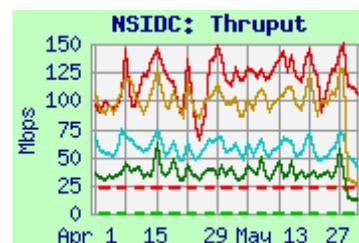
The NSIDC DAAC was disconnected from NISN PIP in December '09 – all flows now go via the UCB campus, usually via FRGP to Internet2 or NLR. Thus the DAAC competes with the students for network capacity, and there was often significant diurnal variation.

Test Results: NSIDC S4PA

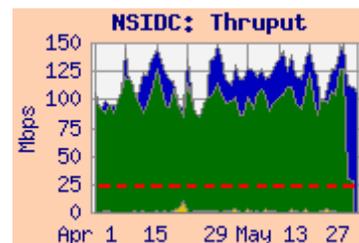
Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
GES-DISC → NSIDC DAAC	147.9	124.4	73.7	1.3	124.4
MODAPS-PDR → NSIDC DAAC	128.9	101.3	76.0		
GSFC-EDOS → NSIDC DAAC	72.5	34.3	14.1		
GSFC-ISIPS → NSIDC (iperf)	82.3	55.8	38.2		
JPL PODAAC → NSIDC DAAC	317.9	303.9	167.2		

Requirements:

Source → Dest	Date	Mbps	Rating
GSFC → NSIDC	CY '07 –	27.6	Excellent
JPL → NSIDC	CY '07 –	0.2	Excellent
GHRC → NSIDC	CY '07 –	0.5	Excellent

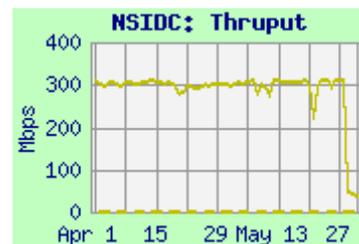


**Comments: GSFC → NSIDC S4PA:** Due to EBnet outgoing packet loss, thrupt from all EBnet sources dropped significantly on 29 February. Thrupt from GES DISC mostly recovered in May.



The rating is based on testing from the GES DISC 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 GES DISC remains above the requirement, by more than 3x, so the rating remains "Excellent". The 1.3 mbps average user flow was below typical, and was only 4.7% of the reduced requirement (which includes reprocessing). Testing from MODAPS-PDR is lower than from GES DISC due to EBnet packet loss. Performance from EDOS, and ISIPS remain lower than GES DISC.



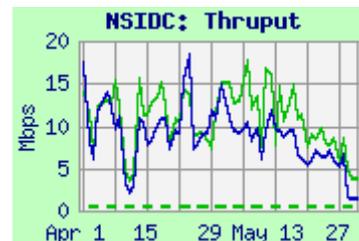
**JPL PODAAC → NSIDC S4PA:** The requirement was reduced from 1.34 mbps in May '09. Thrupt from PODAAC to NSIDC has been mostly stable since testing was moved to use Internet2 in September '09; the rating remains "Excellent".

Thrupt from JPL PODAAC, MODAPS-PDR, and GSFC-EDOS dropped severely at the end of May, while other sources were unaffected. (Under investigation)

5) Boulder CO sites (Continued):

5.1) NSIDC: (Continued): Test Results: GHRC to NSIDC

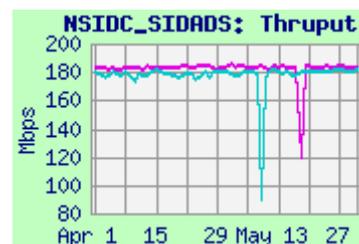
Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
GHRC → NSIDC DAAC (nuttcp)	25.5	10.9	4.3
GHRC → NSIDC DAAC (ftp pull)	25.3	8.2	3.4



**GHRC, GHRC-ftp → NSIDC S4PA:** GHRC (NSSTC, UAH, Huntsville, AL) sends AMSR-E data to NSIDC via NLR / Internet2. The rating is based on reverse nuttcp testing. The median nuttcp thrupt is more than 3x the 0.5 mbps requirement, so the rating remains “**Excellent**”. User flow averaged 140 kbps this month. Thruput from GHRC experienced a drop (similar to the drop to S4PA) at the end of May.

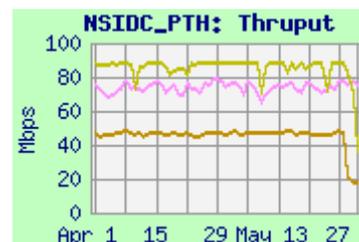
Test Results: NSIDC SIDADS, NSIDC-PTH

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
GSFC-ENPL → NSIDC-SIDADS	189.1	183.5	124.6
GSFC-NISN → NSIDC-SIDADS	181.8	180.1	163.7
ESDIS-PTH → NSIDC-PTH	80.9	74.1	58.1
MODAPS-PDR → NSIDC-PTH	51.2	46.7	42.4
JPL PTH → NSIDC-PTH	88.8	88.2	61.2



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

**NSIDC-PTH:** Thruput to NSIDC-PTH dropped at the end of May (similar to the drop to S4PA) from JPL PTH and MODAPS-PDR, but was very steady from ESDIS-PTH. It has been requested to upgrade NSIDC-PTH from its Fast-E to a Gig-E interface.



5.2) LASP:

Ratings: GSFC ↔ LASP: 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)	3.70	3.45	2.76
GES DISC → LASP blue (iperf)	7.79	6.56	4.76
LASP → GES DISC	9.34	9.34	8.72

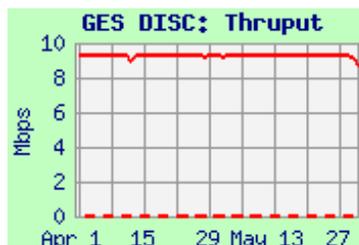


Requirement:

Source → Dest	Date	Mbps	Rating
LASP → GES DISC	CY '10 -	0.016	<b>Excellent</b>

**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.

Thruput from GES DISC to LASP improved in late April with a reduction in EBnet packet loss. SCP testing from ESDIS-PTH was very stable. The average user flow from GSFC to LASP this month was close to normal at 59 kbps.



Thruput from LASP to GES DISC was also very stable, and well over 3x the requirement, so the rating remains “**Excellent**”.

**5) Boulder CO sites (Continued):****5.3) 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)			Requirement
	Best	Median	Worst	
LaRC PTH	188.8	155.1	95.0	0.1
GSFC-ENPL-10G	4208.4	2042.4	469.3	5.0
GSFC-ENPL-FE	98.8	97.9	72.4	
GSFC-NISN	501.7	265.2	123.2	

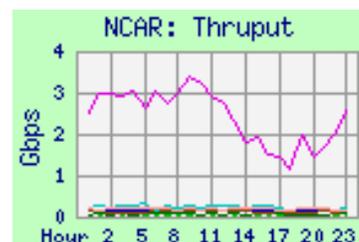
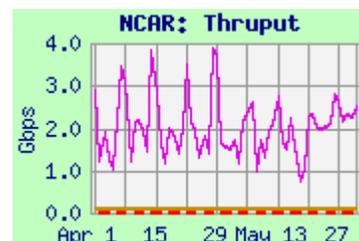
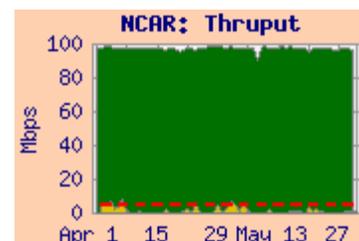
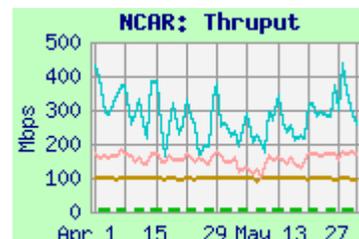
**Comments:** NCAR has a SIPS for MOPITT (Terra, from LaRC), and has MOPITT and HIRDLS (Aura, from GSFC) QA requirements. NCAR is connected to FRGP, but was not affected by the route changes in December '11 (which did affect NSIDC).

Testing was switched to NCAR's PerfSonar server on March 13 – discontinued testing 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**".

**From GSFC:** From GSFC-NISN, the route is via NISN to the MAX (similar route but better performance as from LaRC PTH). Thruput was also well above 3 x the requirement, so the rating remains "**Excellent**". The average user flow from GSFC this month was 1.2 mbps, typical 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 4 gbps on peaks! However, significant diurnal variation is present, varying from a median over 3 gbps at 3 AM (Boulder time) to about 1 gbps at peak usage periods.

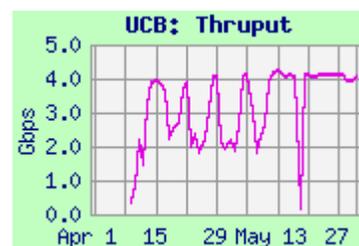
**5.4: UCB:**

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

**Test Results:**

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
GSFC-ENPL-10G	4351.7	4084.4	1144.0

**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 (including the diurnal variation).



## 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)			Req
	Best	Median	Worst	
JPL PODAAC → RSS (Comcast)	50.2	13.3	0.9	0.49
RSS (Comcast) → GHRC (UAH)	5.87	5.30	3.41	0.34
RSS (Comcast) → GHRC (NISN)	5.50	4.50	2.54	



**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, 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 NISN 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.

The JPL → RSS requirement was reduced with handbook 1.4.3 (was 2.5 mbps previously). 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 “3<sup>rd</sup> party testing”, as does the server at GHRC. Testing has therefore been initiated from RSS to GHRC, with initial results around 5 mbps, both to a UAH address and a NISN address at GHRC. Although packet loss is high, either result yields a rating of “**Excellent**” re the 0.34 mbps requirement.

Performance dropped on May 14 due to the server switch at RSS (above)



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

Source Node	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
NPP-SD3E	377.5	286.9	200.4	185.7	335.6
GSFC DISC	255.4	223.4	150.2		
GSFC ENPL	253.4	193.7	110.4		
LaRC ANGe	176.5	170.3	134.0		

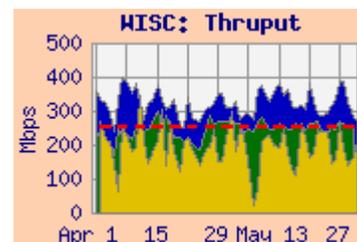
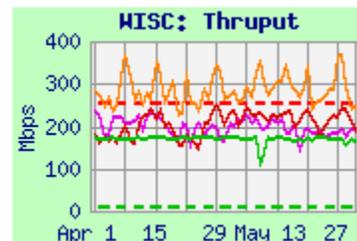
**Requirements:**

Source Node	FY	mbps	Rating
NPP-SD3E	'11 -	237.2	Good
GSFC DISC	'04 -	16.5	Excellent
GSFC Combined	'11 -	253.7	Good
LaRC Combined	'05 -	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. Even so, the integrated thrupt was more than 30% above both the NPP and overall GSFC requirements, rating "Good". The rating from GES DISC was "Excellent", based on its lower requirement. From ENPL thrupt was similar, and unaffected by the EBnet packet loss. User flow increased slightly, and is now consistent with the requirement (less contingency). The route from 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.

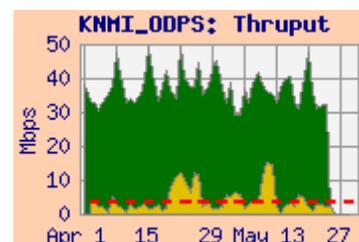
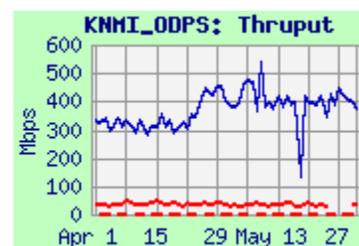
**8) KNMI:** Rating: Continued **Excellent**Web Pages [http://ensight.eos.nasa.gov/Missions/aura/KNMI\\_ODPS.shtml](http://ensight.eos.nasa.gov/Missions/aura/KNMI_ODPS.shtml)**Test Results:**

Source → Dest	Medians of daily tests (mbps)			Reqmt
	Best	Median	Worst	
OMISIPS → KNMI-ODPS	55.5	35.6	21.0	0.03
GSFC-ENPL → KNMI-ODPS	730.8	394.2	263.3	

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

The rating is based on the results from OMISIPS at GSFC to the ODPS primary server at KNMI. Thruput dropped on 29 February due to EBnet outgoing packet loss, but remained much more than the tiny requirement, so the rating remains "Excellent". Thruput was much higher from GSFC-ENPL (outside of EBnet).

The user flow increased, averaging a typical 4.3 mbps this month. This is above the previous 3.3 mbps requirement, and is much more than the current 0.03 mbps requirement (This new requirement remains under review). The rating would still be "Excellent" compared with the old 3.3 mbps requirement.



**9) ERSDAC:**

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

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

**US ↔ ERSDAC Test Results**

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
GSFC-EDOS → ERSDAC	71.7	44.1	10.0	4.1	44.1
GES DISC → ERSDAC	42.4	35.3	24.1		
GSFC ENPL (FE) → ERSDAC	93.2	92.7	91.7		
GSFC ENPL (GE) → ERSDAC	620.1	541.7	349.7		
ERSDAC → EROS	123.6	94.0	54.3	3.6	94.0
ERSDAC → JPL-ASTER IST	68.1	60.9	52.1		

Requirements:

Source → Dest	FY	Mbps	Rating
GSFC → ERSDAC	'05 -	5.4	Excellent
ERSDAC → JPL-ASTER IST	'07-	0.31	Excellent
ERSDAC → EROS	'07-	8.3	Excellent

**Comments:**

**GSFC → ERSDAC:** As of approximately 1 September '11, the ERSDAC test node is connected at 1 gbps – formerly was 100 mbps. The median thrupt from most nodes improved. A new test from GSFC ENPL was able to get average thrupt 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.

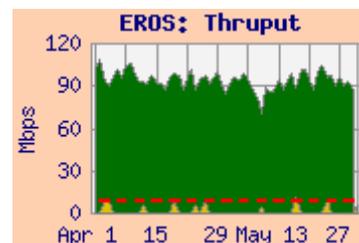
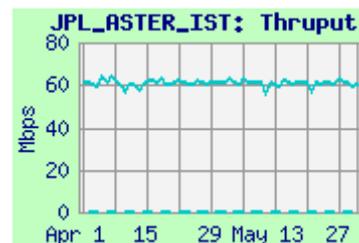
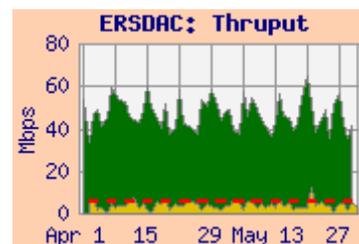
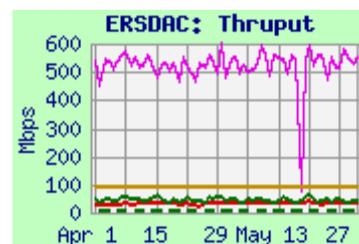
Thruput dropped from all EBnet sources (GSFC-EDOS, GES DISC) on 29 February due to EBnet outgoing packet loss. But thrupt remains well above 3 x the reduced requirement, so the rating remains “Excellent”. The integrated chart shows that the user flow is mostly stable, and consistent with the requirement.

Thruput from GES DISC to ERSDAC did not improve with the Gig-E upgrade at ERSDAC. The GES DISC configuration is planned to be upgraded soon.

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

**ERSDAC → JPL-ASTER-IST:** The thrupt remains very stable with the median well above the [unstated] requirement (IST requirements are generally 311 kbps), so the rating remains “Excellent”.

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



**10) US ↔ JAXA**

Ratings: US → JAXA: Continued **Excellent**  
 JAXA → US: Continued **Excellent**

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 3.6 mbps from GSFC to JAXA (with several peak periods over 5 mbps), and 110 kbps from JAXA to GSFC (with peaks over 500 kbps). Comparing these values to the new requirement of 0.1 mbps produces a rating of “**Excellent**” in both directions. Note that the user flow to JAXA is much more consistent with the old 2.0 mbps GSFC → JAXA requirement.

