

## EOS Production Sites

### Network Performance Report: October 2010

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 with reduced congestion at GSFC**
  - **GPA 3.65** (same as last month)
- **Requirements:** updated to Handbook 1.4.3 in May '09 (was 1.4.2 previously)
  - Many Requirements dropped significantly (under review)
- **Only 1 flow below "Adequate":**
  - **GSFC MODAPS-PDR to EROS** ("Low")
    - MODIS Congestion fixed in July
    - Problem now is packet loss due to removal of Portis Firewall at EROS
- **Bottlenecks:**
  - **GSFC:** EBnet: 10 Gig upgrade substantially complete.
    - User flow averages 1.1 gbps – was only 700 mbps before upgrade
    - Remaining systems to be upgraded individually

#### Ratings Changes:

**Upgrades:** ↑ None

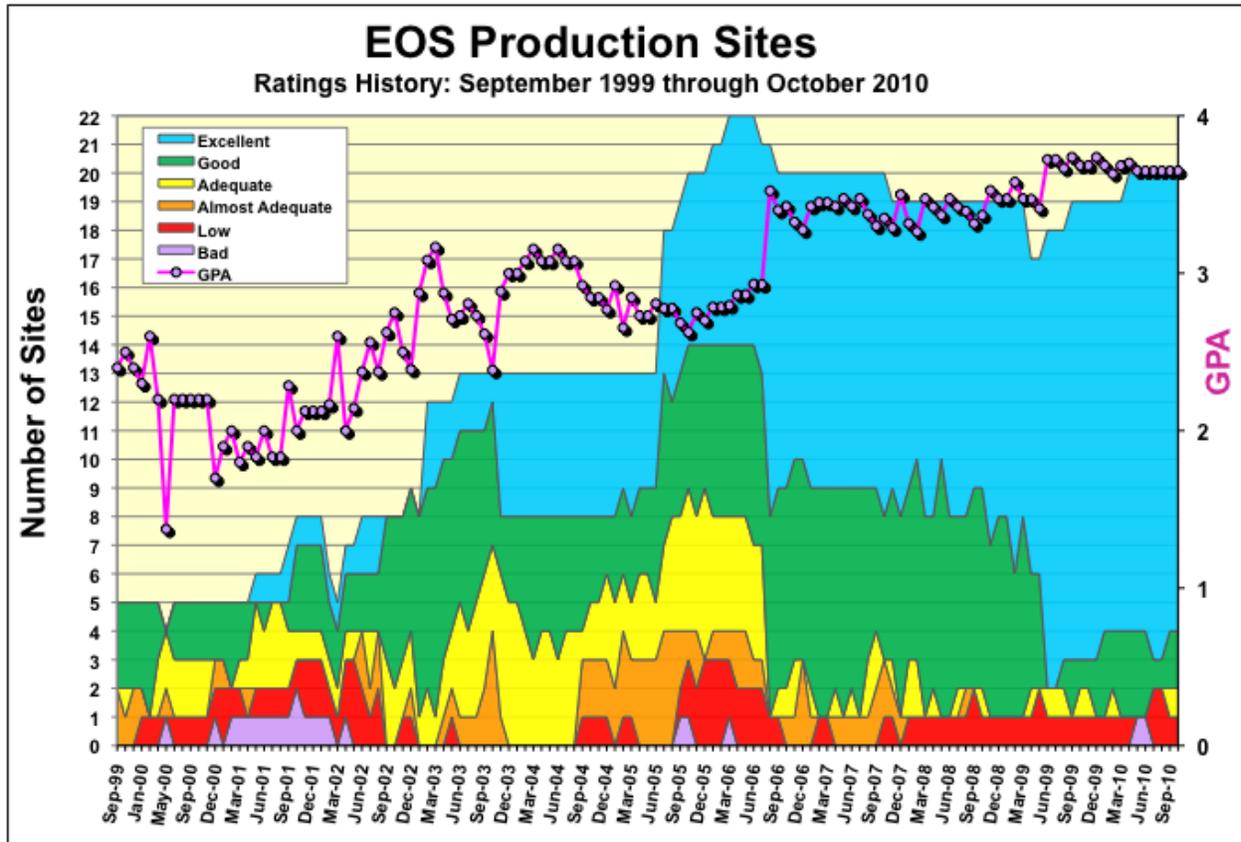
**Downgrades:** ↓ None

#### Ratings Categories:

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

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

**Ratings History:**



The chart above shows the number of sites in each classification 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.

### **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. Some mission flows have not been included yet (e.g., TRMM), and the network requirements based on rapid reprocessing (e.g., MODIS 27X, AIRS 20X) have not been resolved.

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

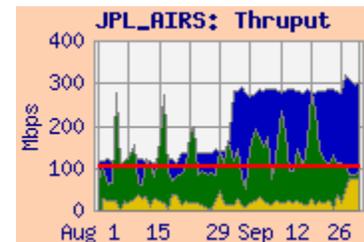
One main difference between Handbooks 1.4.2 and 1.4.3 is that most flows which occur less than once per day were averaged over their production period. These flows were typically monthly Level 3 data transfers, which were specified to be sent in just a few hours. However, they could easily be accommodated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

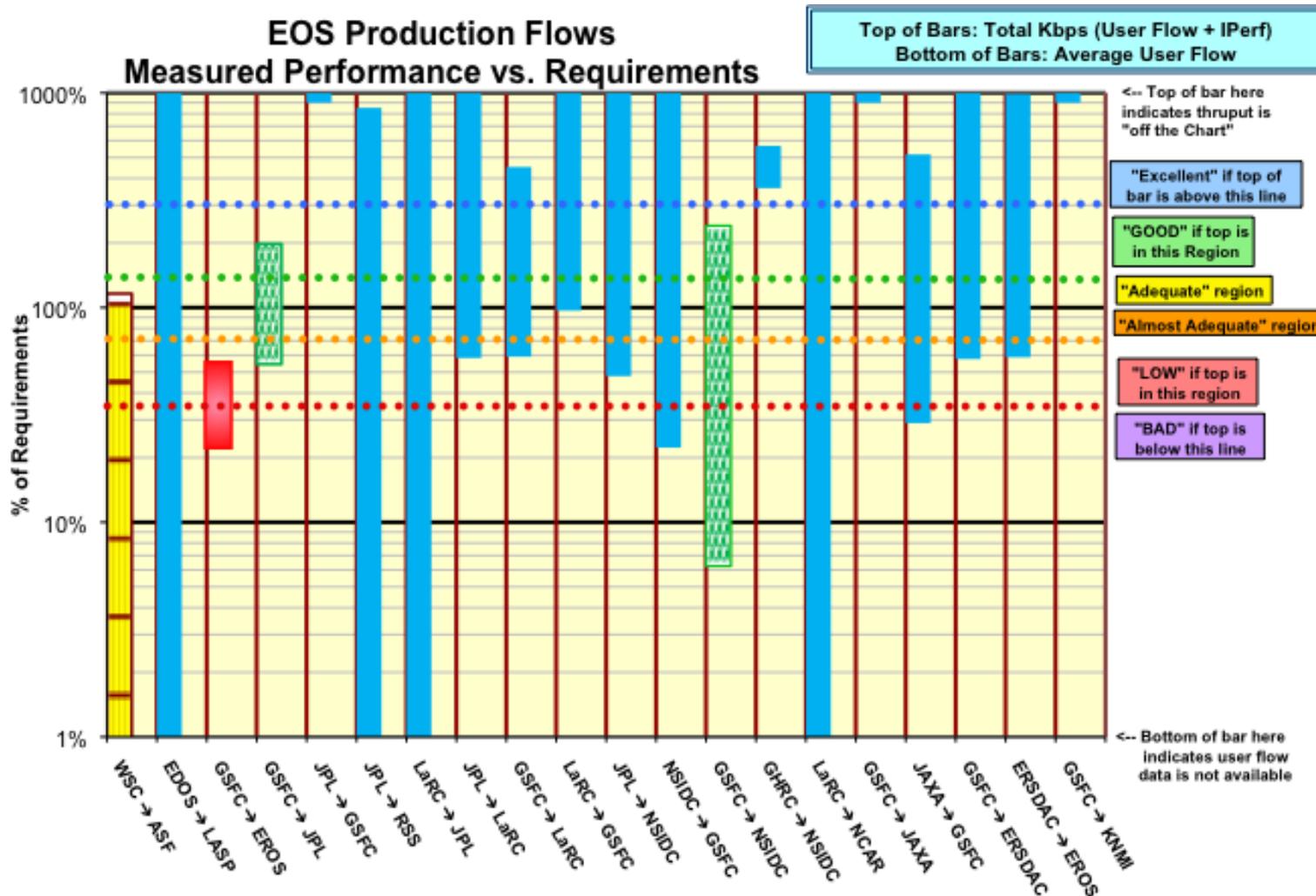
Integrated charts are included with site details, where available. These charts are “Area” charts, with a “salmon” background. A sample Integrated chart is shown here. The yellow area at the bottom represents the daily average of the user flow from the source facility (e.g., GSFC, in this example) to 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

October 2010		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
WSC → ASF	ALOS	96.0	n/a	WSC → ASF		111.4		Adequate	A
EDOS → LASP	ICESat, QuikScat	0.4	0.4	GSFC-EDOS → LASP (blue)	0.00008	19.6		Excellent	E
GSFC → EROS	MODIS, LandSat	342.9	345.9	MODAPS-PDR → EROS LPDAAC	75.7	159.6	188.3	Low	L
GSFC → JPL	AIRS, MLS, ISTs	101.7	43.6	GES DISC → JPL-AIRS	55.4	176.9	201.4	Good	G
JPL → GSFC	MLS	0.6	7.4	JPL-PTH → GSFC-ESDIS-PTH	5.8	89.1	89.4	Excellent	E
JPL → RSS	AMSR-E	0.5	2.5	JPL-PODAAC → RSS		4.1		Excellent	E
LaRC → JPL	TES, MISR	23.0	43.7	LARC-DAAC → JPL-TES	0.06	327.3		Excellent	E
JPL → LaRC	TES	1.5	4.4	JPL-PTH → LARC-PTH	0.85	76.6		Excellent	E
GSFC → LaRC	CERES, MISR, MOPITT	31.3	60.5	GSFC-EDOS → LDAAC	18.5	138.6	141.6	Excellent	E
LaRC → GSFC	CERES, MODIS, TES	0.4	0.2	LDAAC → GES DISC	0.35	379.4	379.4	Excellent	E
JPL → NSIDC	AMSR-E	0.2	1.3	JPL-PODAAC → NSIDC	0.08	22.3		Excellent	E
NSIDC → GSFC	MODIS, ICESAT, QuikScat	0.6	0.5	NSIDC DAAC → GES DISC	0.13	283.2	283.2	Excellent	E
GSFC → NSIDC	MODIS, ICESAT, QuikScat	27.6	34.5	MODAPS-PDR → NSIDC-DAAC	1.7	66.2	66.3	Good	G
GHRC → NSIDC	AMSR-E	0.5	7.5	GHRC → NSIDC DAAC (ftp)	1.7	2.1	2.7	Excellent	E
LaRC → NCAR	MOPITT	0.1	5.4	LDAAC → NCAR		271.3		Excellent	E
GSFC → JAXA	QuikScat, TRMM, AMSR	0.1	2.0	GSFC → JAXA	1.62	Testing discontinued: 31 March 2009		Excellent	E
JAXA → GSFC	AMSR-E	0.5	1.3	JAXA → GSFC	2.5			Excellent	E
GSFC → ERSDAC	ASTER	5.4	12.5	GSFC-EDOS → ERSDAC	3.1	79.0	79.2	Excellent	E
ERSDAC → EROS	ASTER	8.3	26.8	ERSDAC → EROS PTH	4.9	81.5	81.6	Excellent	E
GSFC → KNMI	OMI	0.03	3.3	GSFC-OMISIPS → KNMI ODPS	2.5	186.4	186.4	Excellent	E
				Significant change from v 1.4.2 (5/09) to v 1.4.3					
				Value used for ratings					
				<b>Ratings Summary</b>				<b>HB 1.4.3 Req</b>	
								<b>Score</b>	<b>Prev</b>
<b>*Criteria:</b>	<b>Excellent</b>	<b>Total Kbps &gt; Requirement * 3</b>		<b>Excellent</b>				16	16
	<b>Good</b>	<b>1.3 * Requirement &lt;= Total Kbps &lt; Requirement * 3</b>		<b>Good</b>				2	2
	<b>Adequate</b>	<b>Requirement &lt; Total Kbps &lt; Requirement * 1.3</b>		<b>Adequate</b>				1	1
	<b>Almost Adequate</b>	<b>Requirement / 1.3 &lt; Total Kbps &lt; Requirement</b>		<b>Almost Adequate</b>				0	0
	<b>Low</b>	<b>Requirement / 3 &lt; Total Kbps &lt; Requirement / 1.3</b>		<b>Low</b>				1	1
	<b>Bad</b>	<b>Total Kbps &lt; Requirement / 3</b>		<b>Bad</b>				0	0
				<b>Total Sites</b>				20	20
<b>Notes:</b>	Flow Requirements include: TRMM, Terra, Aqua, Aura, ICESAT, QuikScat, GEOS			<b>GPA</b>				3.65	3.65

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). Thus the bottom of each bar 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 66% (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	260.0	159.6	91.0	75.7	188.3
GSFC-EDOS → EROS LPDAAC	209.3	139.9	65.1		
GES DISC → EROS LPDAAC	186.7	134.6	66.2		
ERSDAC → EROS LPDAAC	87.9	81.5	31.1	4.9	81.6
NSIDC SIDADS → EROS PTH	68.1	29.5	12.6		
GSFC-ENPL → EROS PTH	443.2	375.7	208.2		
GSFC-NISN → EROS PTH	433.5	343.7	169.6		
GSFC-NISN → EROS PTH – F/W	304.7	166.1	56.1		
LaRC PTH → EROS PTH	148.2	91.6	21.8		

**Requirements:**

Source → Dest	Date	mbps	Rating
GSFC → EROS	CY '08-11	343	Low
ERSDAC → EROS	FY '06 - '10	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 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 with the EROS OC-12 (622 mbps).

The user flow this month remains far below the nominal requirement (which includes MODIS reprocessing).

In May 2010, the EROS LPDAAC Portus proxy firewall removed – the EROS campus Juniper firewall is used instead. At that time, incoming packet retransmission to the EROS LPDAAC increased, and thrupt dropped from all sources.

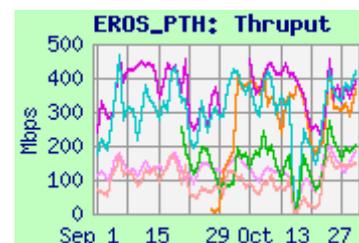
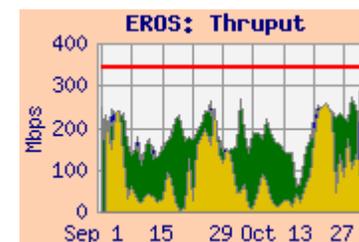
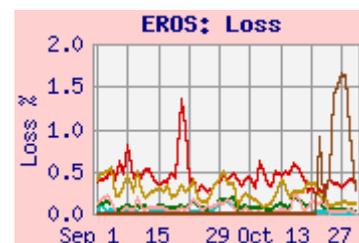
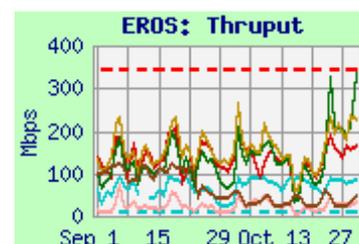
In September, the EROS-PTH node was configured to have 2 interfaces, one inside, and one outside the EROS firewall. Testing was initiated from GSFC-NISN to both interfaces (Outside, Inside). The large difference in performance shows that the firewall is a major factor in this performance problem. Performance from GSFC-NISN to EROS-PTH (outside the firewall) would be rated "Adequate", while performance to the inside interface is similar to MODAPS.

The GSFC-ENPL host has a direct connection to the MAX; its route is via MAX to Internet2 to StarLight in Chicago. Performance is similar to the GSFC-NISN source. Both are mainly limited by the OC-12 to EROS.

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

**1.3 NSIDC → EROS:** Thrupt improved in June, due to reduced RTT via Internet2 from KC (was SLC) to Chicago, but dropped back in September due to apparent congestion in Boulder.

**1.4 LaRC → EROS:** The thrupt from LaRC-PTH to EROS-PTH was stable. The route is via NISN to the Chicago CIEF.



**2) to GSFC**

Ratings: NSIDC → GES DISC: Continued **Excellent**  
 LDAAC → GES DISC: Continued **Excellent**  
 JPL → GES DISC: Continued **Excellent**

Web Pages:

<http://ensight.eos.nasa.gov/Organizations/production/GDAAC.shtml>

[http://ensight.eos.nasa.gov/Organizations/production/GSFC\\_PTH.shtml](http://ensight.eos.nasa.gov/Organizations/production/GSFC_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
	Best	Median	Worst	
EROS LPDAAC → GES DISC	218.0	160.9	31.5	
EROS PTH → GSFC-ESDIS PTH	392.7	308.2	164.5	
JPL-PTH → GSFC-ESDIS PTH	91.6	89.1	85.1	5.8
LDAAC → GES DISC	487.9	379.4	253.1	0.35
LARC-ANGe → GSFC-ESDIS PTH	485.7	349.2	286.7	
NSIDC DAAC → GES DISC	383.7	283.2	153.1	0.13
NSIDC DAAC → GSFC-ISIPS	145.9	129.7	89.2	

**Requirements:**

Source → Dest	Date	Mbps	Rating
NSIDC → GSFC	CY '06 – '10	0.6	<b>Excellent</b>
LDAAC → GES DISC	FY '07 – '10	0.4	<b>Excellent</b>
JPL → GSFC combined	CY '06 - 10	3.2	<b>Excellent</b>

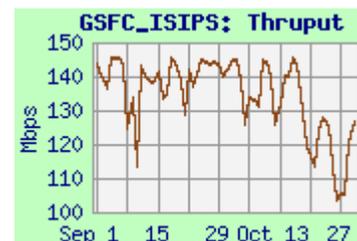
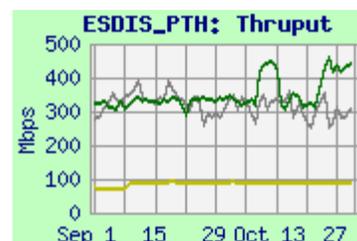
**Comments:**

**EROS, EROS-PTH → GSFC:** The thrupt for tests from EROS PTH to ESDIS-PTH were stable this month. Testing from EROS LPDAAC to GES DISC improved in June with the removal of the EROS proxy firewall.

**JPL → GSFC:** Thrupt was very stable this month. With the modest requirement (reduced from 7.4 mbps in May '09), the rating remains "**Excellent**". The actual user flow is above but fairly consistent with the reduced requirement.

**LaRC → GSFC:** Performance from LDAAC → GES DISC and LaRC ANGe to ESDIS-PTH remained way above 3 x the modest requirement, so the rating continues as "**Excellent**". The user flow this month was typical and consistent with the requirement.

**NSIDC → GSFC:** Performance from NSIDC to GSFC (DAAC and ISIPS) improved at the beginning of July, when FRGP's connection to Internet2 was switched from SLC to KC, reducing RTT to the East. The user flow was below the low requirement (reduced from 13.3 mbps in May '09); the rating remains "**Excellent**".

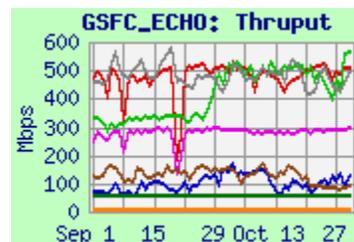


## 2.2 GSFC-ECHO: EOS Metadata Clearinghouse

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	153.7	110.0	36.0
EROS LPDAAC ftp	7.7	7.5	1.9
GES DISC	537.6	495.4	368.1
GES DISC ftp	299.6	286.5	152.4
LaRC ASDC DAAC	620.2	501.7	301.4
LaRC ASDC DAAC ftp	58.4	57.6	37.5
MODIS-LADSWEB	581.4	470.5	397.4
NSIDC DAAC	175.8	125.1	73.0
NSIDC DAAC ftp	9.6	9.3	4.6



### Comments:

Testing was stable from all sources, with improvement from LaRC. Performance is mostly limited by TCP window size – especially on ftp 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:

Source	Medians of daily tests (mbps)		
	Best	Median	Worst
EROS-PTH	76.9	60.5	29.7
ESDIS-PTH	94.2	93.7	44.0
GES DISC	93.8	93.8	47.2
LARC-PTH	94.1	94.0	43.2
MODAPS-PDR	94.1	94.0	54.7
NSIDC-SIDADS	91.9	90.0	52.3



### Comments:

Testing is performed to GSFC-EMS from the above nodes, iperf only. Results are mostly very steady. Performance limitation is from the 100 mbps fast-E connection.

### 3) JPL:

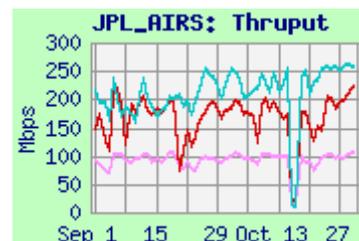
#### 3.1) GSFC → JPL:

Ratings: GSFC → JPL: Continued **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)

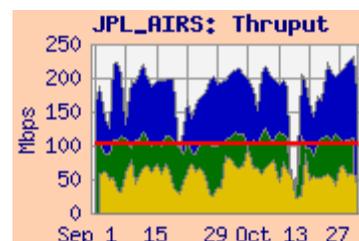
**Test Results:**

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
GSFC-GES DISC → JPL-AIRS	217.8	176.9	95.8	55.4	201.4
GSFC-NISN → JPL-AIRS	272.2	238.5	153.8		
ESDIS-PTH → JPL-AIRS	115.8	98.3	70.9		
GSFC-NISN → JPL-PODAAC	145.1	116.7	80.1		
ESDIS-PTH → JPL-PODAAC	115.5	87.4	48.2		
GSFC-NISN → JPL-QSCAT	88.5	87.3	74.5		
ESDIS-PTH → JPL-QSCAT	59.9	53.7	40.3		
GSFC-NISN → JPL-MLS	371.7	299.5	173.5		
ESDIS-PTH → JPL-MLS	162.5	96.3	43.2		



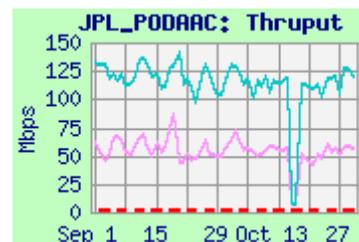
**Requirements:**

Source → Dest	Date	Mbps	Rating
GSFC → JPL Combined	FY '08-'10	101.7	Good
GSFC → JPL AIRS	FY '08-'10	98	Good
GSFC → JPL PODAAC	FY '08-'11	1.5	Excellent
GSFC → JPL QSCAT	FY '08-'11	0.6	Excellent
GSFC → JPL MLS	FY '08-'10	2.1	Excellent

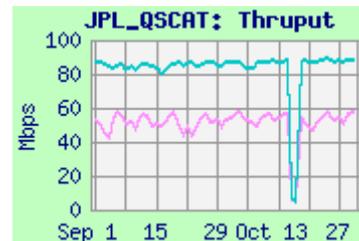


**Comments:** The user flow from GSFC/EOS increased slightly this month (was 50 mbps last month).

**AIRS, Overall:** Thruput from **GES DISC** was about 80 % above the AIRS requirement, 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 thruput is also below 3x this requirement, so the overall rating remains "**Good**".

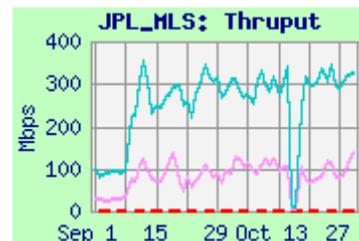


**PODAAC:** **ESDIS-PTH** (connected at 1 gig to the 10 gig EBnet backbone) replaced EBnet-PTH as a test source in April 2010. Performance is lower than previously from EBnet-PTH, but still way above the 1.5 mbps PODAAC requirement (possibly related to tuning), rating "**Excellent**".



**QSCAT:** Thuput from **ESDIS-PTH** to QSCAT was also lower than from **EBnet-PTH**, but is also well above the modest requirement, rating "**Excellent**". Testing from **GSFC-NISN** has even higher thruput. User flow from GSFC to QSCAT averaged only about 1.2 kbps this month.

**MLS:** Thruput from **ESDIS-PTH** was mostly stable, but thruput was even better from **GSFC-NISN**. The rating remains "**Excellent**".



**3.2) LaRC → JPL**

Rating: Continued **Excellent**

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	424.5	327.3	127.5	0.06	327.3
LaRC PTH → JPL-TES	173.2	135.3	75.5		
LaRC PTH → JPL-TES sftp	13.0	12.3	6.4		
LaRC ANGE → JPL-PTH	77.6	74.6	74.1	3.8	74.7
LaRC PTH → JPL-PTH	65.7	46.6	27.3		
LaRC PTH → JPL-PTH sftp	31.8	31.8	31.7		
LaRC DAAC → JPL-MISR	65.8	54.0	37.8	1.9	54.4
LaRC PTH → JPL-MISR	84.2	82.3	47.1		

**Requirements:**

Source → Dest	Date	Mbps	Rating
LaRC DAAC → JPL-TES	FY '07 – '10	7.0	Excellent
LaRC DAAC → JPL-MISR	FY '07 – '10	32.9	Good
LaRC → JPL-Combined	FY '07 – '10	39.9	Excellent

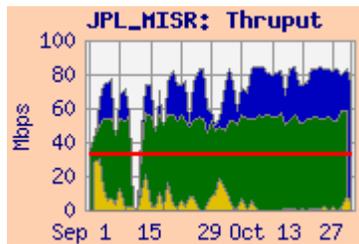
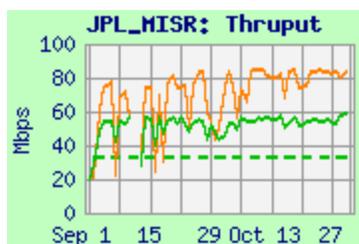
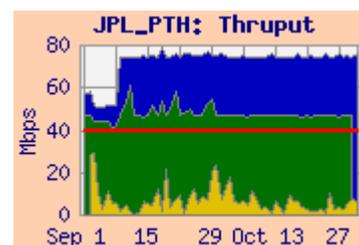
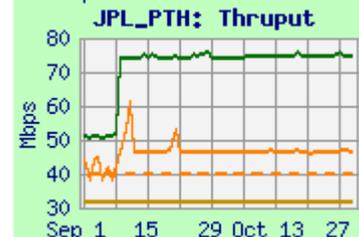
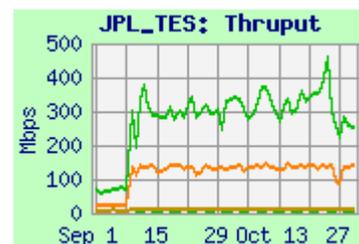
**Note:** About half of the LaRC to JPL flow this month is for MISR.

**LaRC→ JPL (Overall, TES):** A video server was in operation at JPL for about 2 weeks in late August / early September, and reduced thrupt to TES (also MISR) for that period. Median performance from LaRC ASDC DAAC to JPL-TES remains well over 3 x the TES and combined requirements, so the TES and Overall ratings remain "Excellent". User flow to TES is very low.

**Sftp performance** from LaRC-PTH to JPL-TES is quite low, limited by the Sftp application on the TES node. Sftp results are better from LaRC-PTH to JPL-PTH (than to TES) because JPL-PTH uses a larger TCP window size.

**The JPL-PTH integrated graph** shows the overall LaRC to JPL user flow (vs. the overall requirement).

**LARC → JPL (MISR):** the median thrupt is above the requirement, by more than 30%, so the MISR rating remains "Good".



### 3.3) JPL → LaRC

Rating: Continued **Excellent**

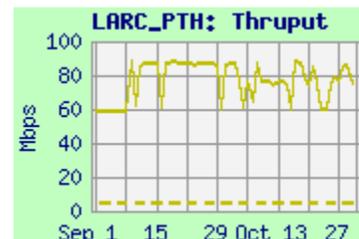
Web Page: [http://ensight.eos.nasa.gov/Organizations/production/LARC\\_PTH.shtml](http://ensight.eos.nasa.gov/Organizations/production/LARC_PTH.shtml)

**Test Results:**

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
JPL-PTH → LaRC PTH	88.5	76.6	59.4	0.9	76.6

**Requirements:**

Source → Dest	Date	Mbps	Rating
JPL-PTH → LaRC PTH	FY '07 – '10	1.5	<b>Excellent</b>



**Comment:** This requirement is primarily for TES products produced at the TES SIPS at JPL, being returned to LaRC for archiving; it was reduced from 4.4 mbps in May '09 (and had been reduced in April '08 from 52.6 mbps). This month the thrupt frequently switched between its two common states -- 60 and 85 mbps. The rating remains "**Excellent**". The user flow is now measured (at JPL); it was small but consistent with the requirement.

### 4) GSFC → LaRC:

Rating: Continued **Excellent**

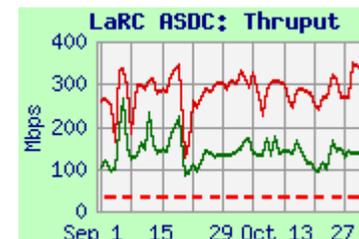
Web Pages: <http://ensight.eos.nasa.gov/Organizations/production/LARC.shtml>  
[http://ensight.eos.nasa.gov/Organizations/production/LARC\\_ANGe.shtml](http://ensight.eos.nasa.gov/Organizations/production/LARC_ANGe.shtml)  
[http://ensight.eos.nasa.gov/Organizations/production/LARC\\_PTH.shtml](http://ensight.eos.nasa.gov/Organizations/production/LARC_PTH.shtml)

**Test Results:**

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
GES DISC → LaRC ASDC	336.0	289.3	174.3	16.8	289.3
GSFC-EDOS → LaRC ASDC	253.7	138.6	67.3		
ESDIS-PTH → LaRC-ANGe	412.7	381.2	295.4		
GSFC-NISN → LaTIS	386.0	369.3	342.4		

**Requirements:**

Source → Dest	Date	Mbps	Rating
GSFC → LARC (Combined)	CY '09 – '11	31.3	<b>Excellent</b>



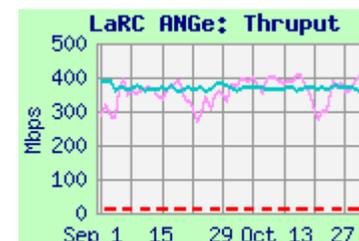
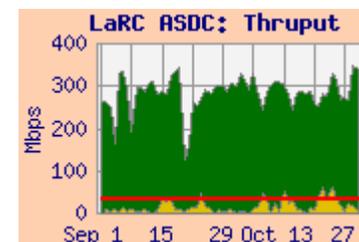
**Comments:**

**GSFC → LaRC ASDC:** The rating is based on the GES DISC to LaRC ASDC DAAC thrupt, compared to the combined requirement. The integrated thrupt remains well above 3 x this requirement, so the rating remains "**Excellent**".

The GES DISC results improved in June '09 when the GES DISC moved to the 10 Gig EBnet LAN, as did results from EDOS with its move to the 10 Gig in October '09.

As seen on the Integrated graph, the average user flow is often much lower than the requirement, except for frequent bursts.

**ANGe (LaTIS):** Testing to ANGe from ESDIS-PTH gets very steady performance. Testing to LaTIS (Darrin) from GSFC-NISN was similar, also with consistent results.



5) Boulder CO sites:

5.1) NSIDC:

Ratings: GSFC → NSIDC: Continued **Good**  
 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 ECS proxy firewall was removed from NSIDC on 25 August. Thruput was generally unaffected, but reverse iperf testing with GHRC remains blocked.

The NSIDC DAAC was disconnected from NISN PIP in December '09 – all flows now go via the UCB campus, usually via FRGP to Internet2.

At the beginning of July 2010, FRGP changed its connection to Internet2 to be at Kansas City (KC) instead of Salt Lake City (SLC). This reduced RTT between sites in the East, and increased it from the West. This resulted in performance changes in some cases.

Test Results: NSIDC S4PA

Source → Dest	Medians of daily tests (mbps)			User Flow	Integrated
	Best	Median	Worst		
MODIS-PDR → NSIDC DAAC	171.0	66.2	26.7	1.7	66.3
GES-DISC → NSIDC DAAC	111.9	76.5	38.0		
GSFC-EDOS → NSIDC DAAC	195.2	46.6	15.0		
GSFC-ISIPS → NSIDC (iperf)	121.2	58.0	17.3		
JPL PODAAC → NSIDC DAAC	71.1	22.3	5.5		

Requirements:

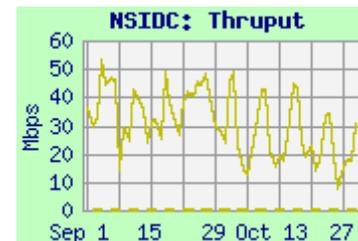
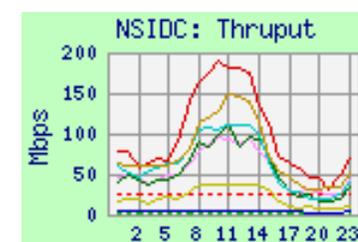
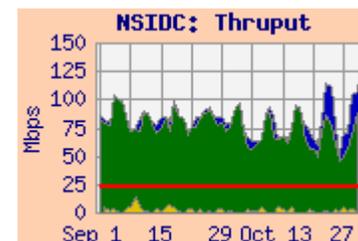
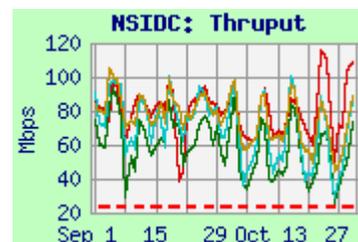
Source → Dest	Date	Mbps	Rating
GSFC → NSIDC	CY '07 – '10	27.6	<b>Good</b>
JPL → NSIDC	CY '07 – '10	0.2	<b>Excellent</b>
GHRC → NSIDC	CY '07 – '10	0.5	<b>Excellent</b>

**Comments: GSFC → NSIDC S4PA:** This rating is based on testing from the MODIS-PDR server to the NSIDC DAAC, since this is the primary production flow. The requirement was reduced in May '09 from 34.5 mbps (and was 64 mbps in April '08). MODIS performance increased at the beginning of July, when MODIS was moved to a 10 gig switch, with separate 1 gig connections for most subsystems.

In late August, probably due to students returning, thrupt to NSIDC had a strong diurnal cycle – for example, the ratio of the median daily max to median daily min from MODIS was 6.4:1 (was only 3.1:1 in August).

The integrated thrupt from MODAPS remains above the requirement, now by slightly less than 3x, so the rating remains "Good". The user flow was steady this month, substantially below the reduced requirement. Testing from other GSFC sources, including GES DISC, EDOS, and ISIPS similar to MODIS.

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



**Test Results: GHRC to NSIDC**

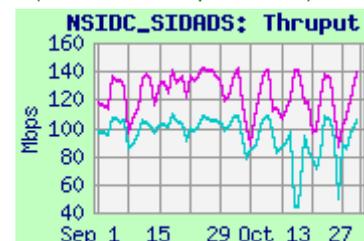
Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
GHRC → NSIDC DAAC (iperf)	n/a	n/a	n/a
GHRC → NSIDC DAAC (ftp pull)	3.69	2.10	1.33



**GHRC, GHRC-ftp → NSIDC S4PA:** GHRC (NSSTC, UAH, Huntsville, AL) sends AMSR-E data to NSIDC via Internet2. Iperf testing from GHRC was performed by reverse testing initiated by NSIDC. With the new NSIDC firewall configuration in August, this testing remains blocked (planning to switch to nuttcp). So the rating is based only on the reverse ftp testing. The median ftp thrupt is more than 3x the 0.5 mbps requirement, so the rating remains “**Excellent**”. The ftp performance is limited by the TCP window size and RTT. User flow averaged about 1.7 mbps this month (above the requirement).

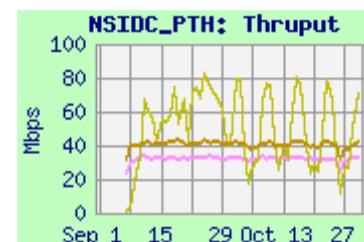
**Test Results: NSIDC SIDADS, PTH**

Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
GSFC-ENPL → NSIDC-SIDADS	144.0	117.8	49.3
GSFC-NISN → NSIDC-SIDADS	111.2	91.4	45.1
ESDIS-PTH → NSIDC-PTH	36.6	32.2	20.1
MODIS-PDR → NSIDC-PTH	46.6	40.7	26.3
JPL PTH → NSIDC-PTH	82.6	39.8	8.9



**GSFC → NSIDC-SIDADS:** Thruput via Internet2 to SIDADS from ENPL and GSFC-NISN showed similar diurnal variation but was otherwise steady.

**NSIDC-PTH:** Testing to NSIDC-PTH resumed in September on the UCB network (had been removed from NISN in mid May). The average thrupt is lower than previously, due to the diurnal variation.



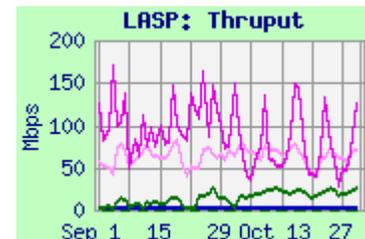
**5.2) LASP:**

Ratings: GSFC → LASP: Continued **Excellent**

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

**Test Results:**

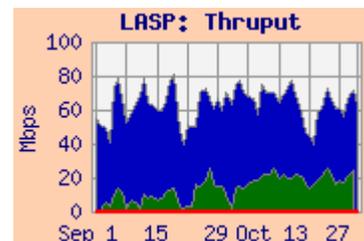
Source → Dest	Medians of daily tests (mbps)		
	Best	Median	Worst
GSFC EDOS → LASP (blue)	33.5	19.6	7.5
ESDIS-PTH → LASP (iperf)	84.3	67.2	43.6
ESDIS-PTH → LASP (scp)	3.2	3.1	2.7
GSFC ENPL → LASP (green)	176.3	65.1	13.8



**Requirement:**

Source → Dest	Date	Mbps	Rating
GSFC-EDOS → LASP (blue)	CY '07 – '10	0.4	<b>Excellent</b>

**Comments:** Thruput from EDOS to the LASP blue network via NISN PIP improved and got much steadier with EDOS' move to the 10 gig backbone, in October '09, became noisier again in August, and stabilized again in October. The median thrupt from EDOS remains well over 3x the requirement, so the rating remains “**Excellent**”. The average user flow this month was below typical at only 1 kbps.



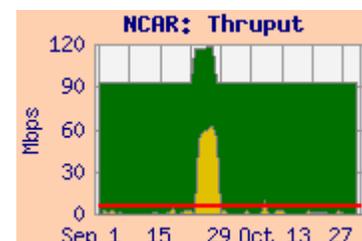
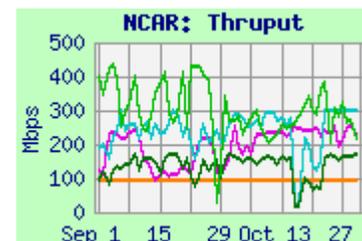
ESDIS-PTH also tests to the test node on LASP's blue network with steady thrupt.

SCP testing was restored in April from ESDIS-PTH to the upgraded LASP test node. When SCP testing was discontinued to the old LASP node in November '09, thrupt was very steady at 0.45 mbps, so the current performance is approximately a 7X improvement.

Performance from GSFC-ENPL to a node on LASP's green network via Internet2 improved in July with the reduced RTT, but is also subject to severe diurnal variation.

**5.3) NCAR:**Ratings: LaRC → NCAR: Continued **Excellent**Web Pages <http://ensight.eos.nasa.gov/Missions/terra/NCAR.shtml>**Test Results:**

Source	Medians of daily tests (mbps)			Requirement	Rating
	Best	Median	Worst		
LaRC ASDC	406.0	271.3	137.5	0.1	
LaRC PTH	181.4	157.1	83.0		
GSFC-ENPL-GE	304.6	234.5	162.8	n/a	
GSFC-ENPL-FE	93.6	93.5	93.3		
GSFC-NISN	302.7	276.2	165.2		



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

Thruput from all of the East coast nodes to NCAR improved at the beginning of July, when FRGP changed its connection to Internet2 to KC instead of SLC, reducing RTT. Thruput from LaRC ASDC was somewhat noisy, but the median remained well above 3 x the reduced requirement, so the rating remains "**Excellent**".

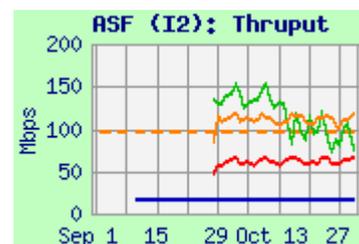
From GSFC-ENPL-GE, with a Gig-E connection to MAX, the median thruput also improved in July. From GSFC-NISN, the route is via NISN to the MAX (similar to the route from LaRC). Performance from all sources is noisy but mostly stable. The average user flow from GSFC this month was back to a normal 1.2 mbps (after a large burst at the end of September).

**6) ASF**Ratings: IOnet: **X** Discontinued  
WSC → ASF: Continued **Adequate**Web Page: <http://ensight.eos.nasa.gov/Organizations/production/ASF2.shtml>**Test Results:**

Source	Medians of daily tests (mbps)			Requirement	Rating
	Best	Median	Worst		
WSC	120.9	111.4	72.3	96	<b>Adequate</b>
WSC-SFTP	66.3	61.4	34.9		
GSFC ENPL	177.2	117.0	48.1		
GSFC-SCP	16.8	16.5	15.4		

**Comments:** IOnet: The ASF IOnet host and firewall was reconfigured in October '07, and all IOnet testing stopped at that time.

Testing to ASF is for the ALOS mission. The route from WSC is via NISN SIP, peering with Internet2 at one of several possible peering points (usually StarLight in Chicago). Internet2 connects to the "Pacific Northwest Gigapop" (PNW) in Seattle. From there the University of Alaska – Fairbanks (UAF) has a dedicated OC-12 circuit to campus, then via campus LAN to the Alaska Satellite Facility (ASF). In February 2010, policing was installed at the WSC source at 250 mbps. That steadied the thruput significantly.



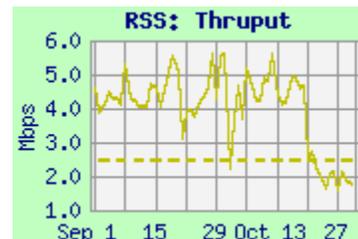
A new ASF iperf server was provided in late September (the old one had gone down in June). The median iperf thruput from WSC is now above requirement, but by less than 30%, so the rating remains "**Adequate**".

From GSFC, SCP thruput is lower, even though the RTT is also lower. This is under investigation.

**7) Remote Sensing Systems (RSS):**Web Page <http://ensight.eos.nasa.gov/Missions/aqua/RSS.shtml>Rating: Continued **Excellent****Test Results:**

Source → Dest	Medians of daily tests (mbps)			Reqmt
	Best	Median	Worst	
JPL → RSS	5.66	4.12	1.19	0.5

**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). This month the thrupt from JPL was noisy, as usual -- periods of low performance are believed to be attributable to correspondingly high user flow (User flow data remains unavailable on this circuit). The requirement was reduced with handbook 1.4.3 (was 2.5 mbps previously). The median iperf was more than 3 x the reduced requirement, so the rating remains "Excellent".



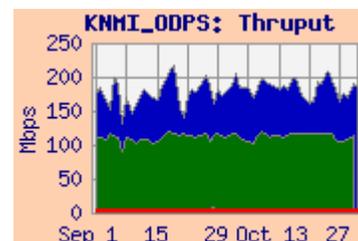
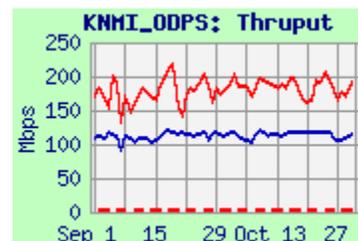
RSS currently is connected to NISN SIP via 4 x T1s to NASA ARC (total 6 mbps). Planning is underway to switch to a higher speed circuit from a commercial ISP in the area.

Note that with the present configuration (passive servers at both RSS and GHRC), the RSS to GHRC performance cannot be tested.

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

Source → Dest	Medians of daily tests (mbps)			Reqmt
	Best	Median	Worst	
OMISIPS → KNMI-ODPS	223.8	186.4	120.0	0.03
GSFC-ENPL → KNMI-ODPS	122.9	115.6	90.8	

**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 Surfnets through Amsterdam. The rating is based on the results from OMISIPS at GSFC to the ODPS primary server, and remains "Excellent". This performance improved dramatically at the end of February with OMI move off of the congested EBnet GigE. The best to worst ratio is now only 1.9:1 (was 12:1 in February). The user flow averaged 2.5 mbps this month, (hard to see on the integrated graph). This is more consistent with the previous 3.3 mbps requirement than the current 0.03 mbps requirement (This new requirement remains under review).



**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	81.9	79.0	59.0	3.1	79.2
GES DISC → ERSDAC	21.5	17.8	13.2		
GSFC ENPL (FE) → ERSDAC	89.5	89.3	86.8		
ERSDAC → EROS	87.9	81.5	31.1	4.9	
ERSDAC → JPL-ASTER IST	89.9	89.7	87.9		

Requirements:

Source → Dest	FY	Mbps	Rating
GSFC → ERSDAC	'05 - '09	5.4	Excellent
ERSDAC → JPL-ASTER IST	'07- '09	0.31	Excellent
ERSDAC → EROS	'07- '09	8.3	Excellent

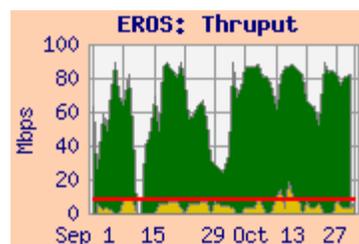
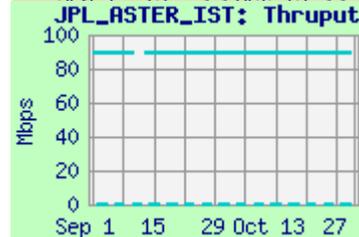
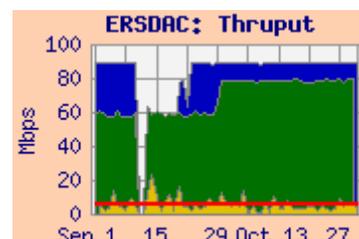
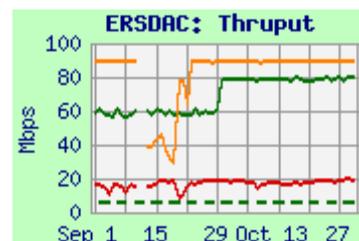
**Comments:**

**GSFC → ERSDAC:** The median thrupt from EDOS improved in late September. It remains well above 3 x the reduced requirement; the rating remains "Excellent". The integrated chart shows that the user flow is stable, and consistent with the new requirement.

Thruput from GES DISC to ERSDAC is limited by packet loss at the GigE to FastE switch at Tokyo-XP. The GES DISC GigE source does not see any bottlenecks until this switch (The Internet2 and APAN backbones are 10 Gbps). It thus exceeds the capacity of the switch's FastE output circuit, causing packet loss. But the FastE connected ENPL node is limited to 100 mbps by its own interface, so does not suffer performance degrading packet loss – and the performance is much higher. EDOS uses QoS (HTB) to limit its burst rate, and thus gets much better thrupt that GES DISC – thrupt similar to ENPL-FE.

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

**ERSDAC → EROS:** The thrupt is mostly stable and remains well above the reduced requirement (was 26.8 mbps previously). The new 8.3 mbps requirement is much closer to the actual 4.9 mbps flow (especially when contingency is added). 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 average user flow this month was 1.62 mbps from GSFC to JAXA (with frequent peaks to about 5 mbps), and 80 kbps from JAXA to GSFC (with regular peaks to 2.5 mbps). 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.

