

EOS Science Networks Performance Report

This is a summary of EOS QA SCF performance testing for the 2nd quarter of 2010 -- comparing the performance against the requirements, including Terra, TRMM, QuikScat, Aqua, Aura, ICESat, and GEOS requirements

Current results can be found on the EOS network performance web site (ENSIGHT): http://ensight.eos.nasa.gov/active_net_measure.html. Or click on any of the site links below.

Highlights:

- **GSFC:** EBnet: 10 Gig upgrade “mostly” complete.
 - **MAX:** 10 Gig upgrade completed on 29 June
 - Nodes moved to 10 Gig backbone
 - GSFC-GES DISC: June '09 – 1 Gig connection.
 - Closed EBnet (EDOS): October '09 – 1 Gig connection.
 - MODIS: February '10 – 1 Gig connection.
 - MODIS GigE remained congested, but congestion was reduced to several other nodes.
 - 10 gig MODIS connection in July
- EROS Proxy firewall removed in May – outgoing performance improved
- “ESDIS-PTH” replaced “EBnet-PTH” as test source at GSFC in March
 - ESDIS-PTH is 1 gig connected to 10 gig EBnet backbone
 - EBnet-PTH was on the congested 1 Gig EBnet backbone
- Multiple parallel streams enabled from ICESAT test source
 - Thruput improvements observed.
- Otherwise, mostly stable performance.
 - **ALL Nodes rated at least Good**
 - **GPA 3.86** (was 3.78 last quarter)
- The Nov '07 requirements are used as the basis for the ratings
 - Requirements update is [still] in progress

Ratings:

Rating Categories:

Excellent: median of daily worst cases > 3 x requirement

Good: median of daily worst cases > requirement

Adequate: median of daily worst cases < requirement
and
median of daily medians > requirement

Low: median of daily medians < requirement.

Bad: median of daily medians < 1/3 of the requirement.

Ratings Changes:

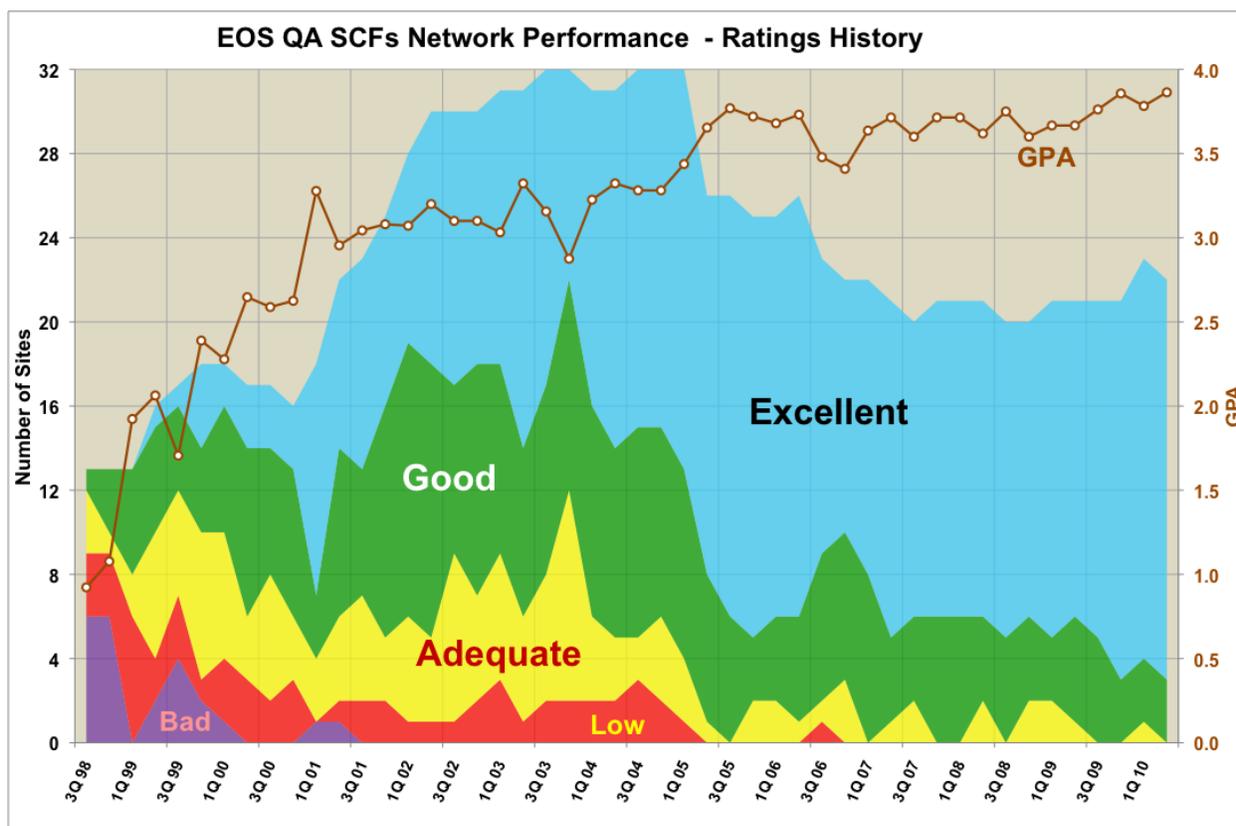
Upgrades: ↑ ICESAT → Texas: Adequate → **Good**
UCSD: Good → **Excellent**

Downgrades: ↓ Oxford Univ: Excellent → **Good**

Testing Discontinued: Ohio State: ICESAT functions transferred to **Buffalo**

Ratings History:

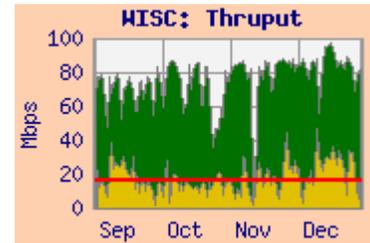
The chart below shows the number of sites in each classification since the testing started in 1998. Note that these ratings do NOT relate to absolute performance -- they are relative to the EOS requirements. The GPA is calculated based on Excellent: 4, Good: 3, Adequate: 2, Low: 1, Bad: 0



Notes: The number of sites included in this chart has changed since 1Q'05 due to:

- Discontinuation of tests to U Washington (5/07) and UIUC (4Q06)
- Discontinuation of tests to NOAA and UMD (3Q06)
- Discontinuation of tests to SAGE III Nodes (2Q06)
- Moving the reporting for 6 SIPS sites to the “EOS Production Sites” Network Performance Report (2Q05).
- BADC added in 2009.
- Testing to Oxford was restored in March, 2010.
- ICESAT functions of Ohio State were transferred to Buffalo. Testing to Buffalo added 1Q10; Ohio State dropped 2Q10.

Integrated Charts: Integrated charts are now included for selected sites with the site details. These charts are “Area” charts, with a pink 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 (e.g., Wisconsin, in this example) obtained from routers via “netflow”. The green area is stacked on top of the user flow, and represents the “adjusted” daily average iperf thruput between the source-destination pair most closely corresponding to the requirement. This iperf measurement essentially shows the circuit capacity remaining with the user flows active. The 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.



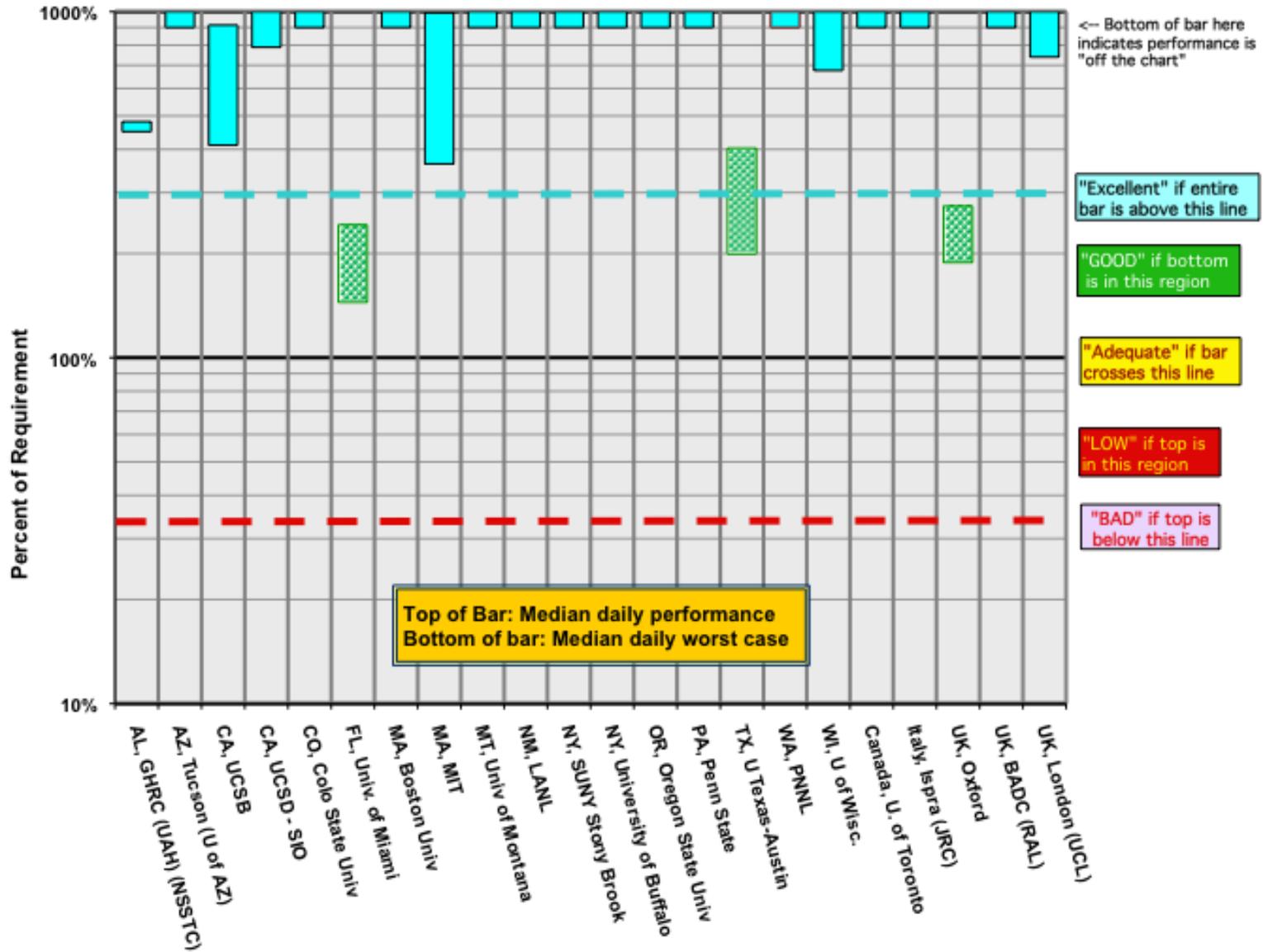
Note: User flow data is has not been available from LaRC since March 2007, so sites with primary requirements from LaRC will not include integrated graphs.

EOS QA SCF Sites Summary: Network Requirements vs. Measured Performance

2 nd Quarter 2010		Testing							
Destination	Team (s)	Requirement	Source Node	Median mbps	Median Daily Worst	Average User Flow	Rating re Current Requirements		Route Tested
		Nov-07					2 Q 2010	1Q10	
AL, GHRC (UAH) (NSSTC)	CERES, ASTER	6.9	LaTIS	33.4	31.3		Excellent	E	NISN / MAX / Internet2 / SOX / UAH
AZ, Tucson (U of AZ)	MODIS	2.6	EROS LPDAAC	39.4	25.6	2.4	Excellent	E	StarLight (Chicago) / Internet2 / CENIC
CA, UCSB	MODIS	3.1	GSFC-MODIS	28.6	12.9	5.8	Excellent	E	MAX / Internet2 / CENIC
CA, UCSD - SIO	ICESAT, CERES	7.1	GSFC-ICESAT	71.2	56.1	0.2	Excellent	G	NISN / MAX / Internet2 / CENIC
CO, Colo State Univ	CERES	2.1	LaTIS	103.1	77.1		Excellent	E	NISN / MAX / Internet2 / FRGP
FL, Univ. of Miami	MODIS, MISR	18.8	GSFC-MODIS	45.5	27.2	2.6	GOOD	G	MAX / Internet2 / SOX
MA, Boston Univ	MODIS, MISR	3.0	EROS LPDAAC	118.4	87.6	0.9	Excellent	E	StarLight (Chicago) / Internet2 / NOX
MA, MIT	ICESAT	7.0	GSFC-ICESAT	69.5	25.5	0.3	Excellent	E	NISN / MAX / Internet2 / NOX
MT, Univ of Montana	MODIS	0.8	EROS LPDAAC	42.0	34.5	1.9	Excellent	E	StarLight (Chicago) / Internet2 / PNW
NM, LANL	MISR	1.0	LaRC DAAC	57.2	41.7		Excellent	E	NISN / MAX / Internet2
NY, SUNY Stony Brook	CERES	0.6	LaTIS	36.8	19.6		Excellent	E	NISN / MAX / Internet2 / NYSERnet
NY, University of Buffalo	ICESAT	6.3	GSFC-ICESAT	104.7	76.4		Excellent	E	NISN / MAX / Internet2 / NYSERnet
OR, Oregon State Univ	CERES, MODIS	7.6	LaTIS	101.8	97.8		Excellent	E	NISN / MAX / Internet2 / PNW
PA, Penn State	MISR	2.6	LaRC DAAC	69.3	47.5		Excellent	E	NISN / MAX / 3ROX
TX, U Texas-Austin	ICESAT	11.1	GSFC-ICESAT	44.6	22.0	0.5	GOOD	A	NISN / MAX / Internet2 / TX-learn
WA, PNNL	MISR	1.4	LaRC PTH	60.7	43.5		Excellent	E	NISN / MAX / ESNet
WI, U of Wisc.	MODIS, CERES, AIRS, NPP	16.5	GES DISC	179.1	111.3	35.6	Excellent	E	MAX / Internet2 / MREN
Canada, U. of Toronto	MOPITT	0.6	LaRC DAAC	52.3	30.4		Excellent	E	NISN / StarLight (Chicago) / CA*net4
Italy, Ispra (JRC)	MISR	0.5	LaRC DAAC	27.3	21.0		Excellent	E	NISN / MAX / Géant (DC) / GARR
UK, Oxford	HIRDLS	0.5	GSFC-ENPL-PTH	1.4	1.0	0.2	GOOD	E	Internet2 / Géant (DC) / JAnet
UK, BADC (RAL)	HIRDLS	0.2	GSFC-ESDIS-PTH	30.7	21.2		Excellent	E	Internet2 / Géant (DC) / JAnet
UK, London (UCL)	MISR, MODIS	1.0	LaRC PTH	10.9	7.6		Excellent	E	NISN / MAX / Géant (DC) / JAnet
						Summary			
*Rating Criteria:							Current:	Prev	
							2 Q 2010	Report	
Excellent	Median Daily Worst >= 3 * Requirement					Excellent	19	19	
GOOD	Median Daily Worst >= Requirement					GOOD	3	2	
Adequate	Median Daily Worst < Requirement <= Median Daily Median					Adequate	0	1	
LOW	Median Daily Median < Requirement					LOW	0	0	
BAD	Median Daily Median < Requirement / 3					BAD	0	0	
						Total	22	22	
						GPA	3.86	3.82	

EOS QA SCF Sites

Daily Median and Worst Performance as a percent of Requirements



Details on individual sites:

Each site listed below is the DESTINATION for all the results reported in that section. The first test listed is the one on which the rating is based -- it is from the source most relevant to the driving requirement. Other tests are also listed. The three values listed are derived from [nominally] 24 tests per day. For each day, a daily best, worst, and median is obtained. The values shown below are the medians of those values over the test period.

1) AL, GHRC (UAH) (aka NSSTC)

Teams: CERES, AMSR

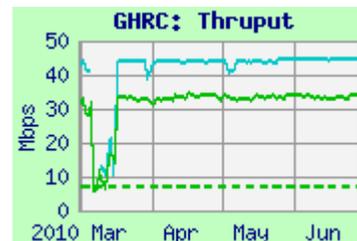
Web Page: <http://ensight.eos.nasa.gov/Missions/terra/NSSTC.shtml>

Rating: Continued **Excellent**

Domain: nsstc.uah.edu

Test Results:

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
LaRC ANGe	34.6	33.4	31.3	NISN / MAX / I2 / SOX
GSFC-CNE	44.3	44.0	43.3	MAX / I2 / SOX



Requirements:

Source Node	FY	Mbps	Rating
LaRC ANGe	'06 - '09	7.0	Excellent

Comments: Performance from both sources was very steady; median daily worst thruput remains above 3x the requirement, so the rating remains "Excellent".

Note: Testing between GHRC and NSIDC for AMSR-E (AQUA) is included in the "Production Sites" report.

2) AZ, Tucson (U of AZ):

Team: MODIS

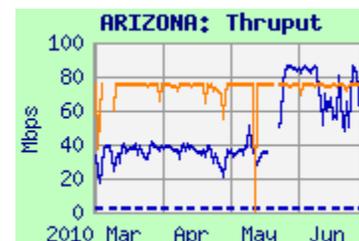
Web Page: <http://ensight.eos.nasa.gov/Missions/terra/ARIZONA.shtml>

Rating: Continued **Excellent**

Domain: arizona.edu

Test Results:

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
EROS LPDAAC	52.1	39.4	25.6	StarLight / I2 / CENIC
GSFC ENPL	75.2	74.9	62.0	MAX / I2 / CENIC

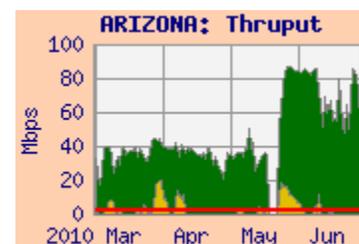


Requirements:

Source Node	FY	Mbps	Rating
EROS LPDAAC	'03 - '09	2.6	Excellent

Comments: The ratings are based on the MODIS flow from EROS. Performance from EROS improved with the removal of the EROS proxy firewall in May. Thruput was stable from GSFC. The median daily worst from EROS remained way above 3 x the requirement, so the rating remains "Excellent".

The average user flow from EROS was 2.4 mbps – very close to the stated requirement.



3) CA, UCSB :

Teams: MODIS

Domain: ucsb.edu

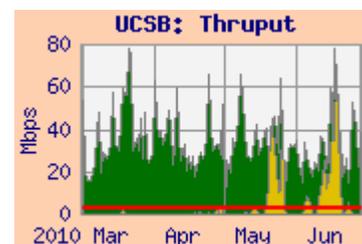
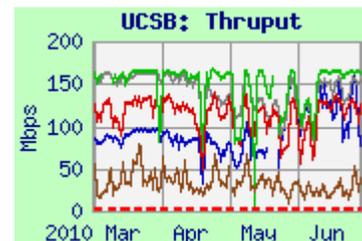
Web page: <http://ensight.eos.nasa.gov/Missions/terra/UCSB.shtml>Ratings: GSFC: Continued **Excellent**
EROS: Continued **Excellent****Test Results:**

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
GSFC-MODIS	59.6	28.6	12.9	MAX / I2 / CENIC
GSFC-GES DISC	142.7	118.0	54.5	MAX / I2 / CENIC
GSFC-ENPL	166.9	160.5	93.2	MAX / I2 / CENIC
EROS-LPDAAC	121.6	86.6	46.9	StarLight / I2 / CENIC
EROS-PTH	157.6	135.7	83.8	StarLight / I2 / CENIC

Requirements:

Source Node	FY	mbps	Rating
GSFC-MODIS	'04 - '09	3.1	Excellent
EROS-LPDAAC	'04 - '09	2.2	Excellent

Comments: The requirements are split between EROS and GSFC. Thruput from MODIS at GSFC remains noisy due to the congested EBnet MODIS GigE, while performance from ENPL and GES DISC (on the 10 gig EBnet backbone since June '09) is much less noisy. Thruput from EROS LPDAAC improved with the removal of the EROS proxy firewall in May, and is now similar to EROS-PTH (outside the ECS firewall. The rating remains "Excellent" from both EROS and GSFC-MODIS. The user flow from GSFC averaged only 5.7 mbps this period, higher than the requirement.

**4) CA, UCSD (SIO):**

Teams: CERES, ICESAT

Domain: ucsd.edu

Web Page: <http://ensight.eos.nasa.gov/Missions/terra/UCSD.shtml>Ratings: ICESAT: ↑ Good → **Excellent**
ANGe: Continued **Excellent****Test Results:**

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
GSFC-ICESAT	79.5	71.2	56.1	NISN SIP / MAX / I2 / CENIC
LaRC ANGe (LaTIS)	165.3	163.5	149.8	NISN SIP / MAX / I2 / CENIC
GSFC-ESDIS-PTH	119.0	112.1	86.5	MAX / I2 / CENIC
GSFC-ENPL	184.9	184.7	183.3	MAX / I2 / CENIC

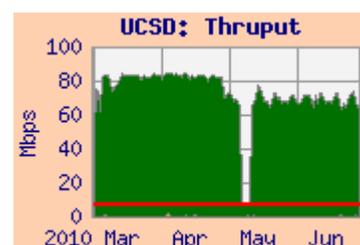
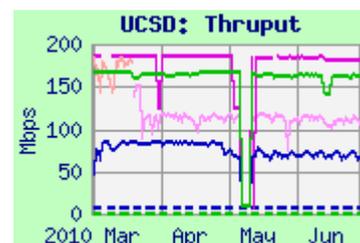
Requirements:

Source Node	FY	mbps	Rating
GSFC-ICESAT	'05 - '09	7.0	Good
ANGe	'02 - '09	0.26	Excellent

Comments: Performance from ICESAT improved in February '10, due to adding the capability to send multiple concurrent streams. The daily minimum thruput from ICESAT is now above 3 x the requirement, so the rating improves to "Excellent"

Peak performance from GSFC-ENPL is better and very steady. GSFC-ESDIS-PTH replaced GSFC-EBnet-PTH in March – performance was steady but lower than from GSFC-EBnet-PTH, perhaps due to it's "advanced" Auto tuning of TCP parameters. User flow from GSFC averaged only 170 kbps during the test period, much lower than the requirement.

Performance from ANGe (LaTIS) was very stable. The ANGe rating continues as "Excellent".



5) CO, Colo State Univ.:

Teams: CERES, ICESAT

Web page: http://ensight.eos.nasa.gov/Missions/terra/COLO_ST.shtmlRating: Continued **Excellent**

Domain: colostate.edu

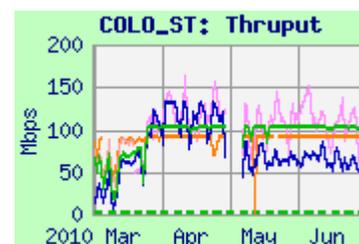
Test Results:

Source Node	Medians of daily tests (mbps)			Route
		Median	Worst	
LaRC ANGe (LaTIS)	103.5	103.1	77.1	NISN SIP / MAX / I2 / FRGP
GSFC-ICESAT	104.4	69.7	32.6	NISN SIP / MAX / I2 / FRGP
GSFC-ESDIS-PTH	155.0	112.5	51.2	MAX / I2 / FRGP
GSFC-ENPL	92.6	92.5	90.6	MAX / I2 / FRGP

Requirements:

Source Node	FY	mbps	Rating
LaRC ANGe (LaTIS)	'04 - '09	2.15	Excellent

Comments: Performance from LaRC ANGe was stable, and remained well above 3 x the requirement, so the rating remains “Excellent”. Thruput from GSFC-ESDIS-PTH (replacing GSFC-PTH) was higher but somewhat noisy. Thruput from GSFC-ICESAT improved in March due to the use of multiple streams. Testing from GSFC-ENPL is very stable, outside most GSFC campus firewalls.

**6) FL, Univ. of Miami:**

Teams: MODIS, MISR

Domain: rsmas.miami.edu

Web page: <http://ensight.eos.nasa.gov/Missions/terra/MIAMI.shtml>Rating: GSFC: Continued **Good**LaRC: Continued **Excellent****Test Results:**

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
GSFC-MODIS	58.9	45.5	27.2	MAX / I2 / SOX
GSFC-ENPL	30.4	30.3	28.1	MAX / I2 / SOX
LaRC ASDC	14.1	11.9	10.4	NISN / MAX / I2 / SOX

Requirements:

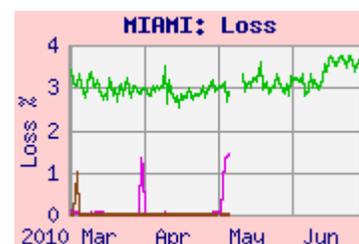
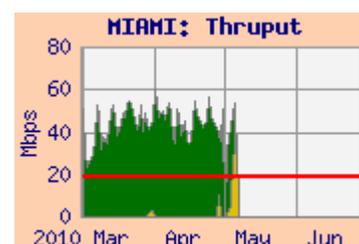
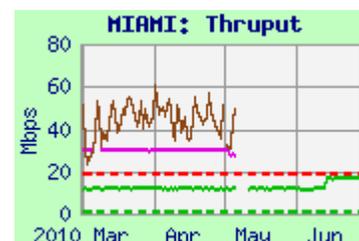
Source Node	FY	mbps	Rating
GSFC	'04 - '09	18.8	Good
LaRC ASDC	'04 - '09	1.1	Excellent

Comments: Thruput from GSFC-MODIS was noisy but mostly stable. Since MODIS dominated the former EBnet Gig, it did not benefit much from moving its 1 gig connection to the 10 gig backbone (Further improvement observed in July). The integrated daily worst from MODIS remained above the requirement, so the rating remains “Good”. Testing from MODIS and ENPL became blocked after configuration changes at Miami in May. Testing has resumed from ENPL in July.

Thruput improved in June from LaRC ASDC DAAC, due to retuning. The rating remains “Excellent”, due to the much lower requirement.

The integrated graph shows the user flow from GSFC averaged only 2.6 mbps, about 14 % of the requirement.

Note: Thruput was about 133 mbps from GSFC and 38 mbps from LaRC until Aug '05. An increase in packet loss was observed at that time. Since this loss is observed from all sources, and began from all sources at the same time, the problem appears to be in or near Miami.



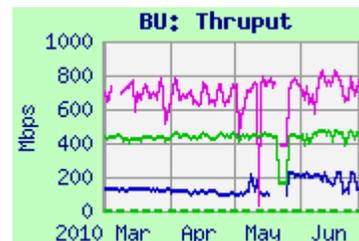
7) MA, Boston Univ:

Teams: MODIS, MISR

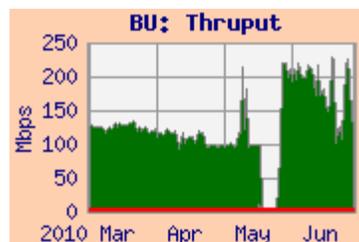
Domain: bu.edu

Web Page: <http://ensight.eos.nasa.gov/Missions/terra/BU.shtml>Ratings: EROS: Continued **Excellent**
LaRC: Continued **Excellent****Test Results:**

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
EROS LPDAAC	175.3	118.4	87.6	StarLight / I2 / NOX
GSFC ENPL	833.6	704.4	504.2	MAX / I2 / NOX
LaRC ASDC	458.6	442.0	310.9	NISN / MAX / I2 / NOX

**Requirements:**

Source Node	FY	mbps	Rating
EROS LPDAAC	'04 - '09	3.0	Excellent
LaRC ASDC DAAC	'04 - '09	1.2	Excellent



Comments: From **EROS LPDAAC**, thrupt was limited by packet loss at **EROS**, until the proxy firewall was removed in May. The user flow averaged about 0.9 mbps for this period (well below the requirement). Thrupt from **GSFC** and **LaRC ASDC DAAC** greatly exceeded the requirements, and user flow from GSFC was an average of 5.3 mbps, also above the stated requirement. The rating from both sources remains "Excellent".

8) MA, MIT:

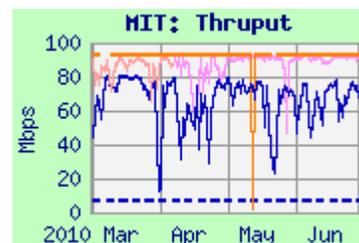
Teams: ICESAT

Web Page: <http://ensight.eos.nasa.gov/Missions/icesat/MIT.shtml>Rating: Continued **Excellent**
Domain: mit.edu**Test Results:**

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
GSFC-ICESAT	79.2	69.5	25.5	NISN / MAX / I2 / NOX
GSFC-ESDIS-PTH	92.8	90.4	59.6	MAX / I2 / NOX
GSFC-ENPL	93.5	93.5	83.6	MAX / I2 / NOX

Requirements:

Source Node	FY	mbps	Rating
GSFC	'05 - '09	7.0	Excellent



Comments: Performance from **GSFC ICESAT** to MIT is noisy but stable; the median daily worst remained above 3 x the requirement, so the rating remains "Excellent".

Thrupt from **GSFC-ESDIS-PTH** (replacing GSFC-EBnet-PTH) and **GSFC-ENPL** was very stable.

The daily average user flow from GSFC was only 310 kbps – only about 4.4% of the requirement.

9) MT, Univ of Montana:

Teams: MODIS

Web Page: <http://ensight.eos.nasa.gov/Missions/terra/MONT.shtml>Rating: Continued **Excellent**

Domain: ntsg.umt.edu

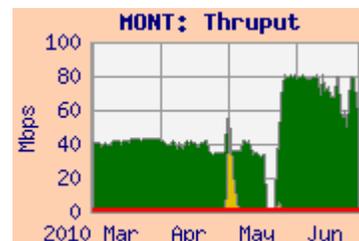
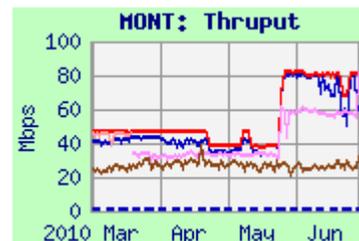
Test Results:

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
EROS LPDAAC	44.7	42.0	34.5	StarLight / I2 / PNW
EROS PTH	47.2	47.2	46.9	StarLight / I2 / PNW
GSFC-ESDIS	36.7	34.0	30.0	MAX / I2 / PNW
NSIDC	35.8	26.9	18.3	CU / FRGP / I2 / PNW

Requirement:

Source Node	FY	mbps	Rating
EROS LPDAAC	'04 - '09	0.82	Excellent

Comments: Performance from most sources improved in May due to an upgrade at Montana. With the very low requirement, the rating remains "Excellent". The average user flow from EROS was about 1.9 mbps – above the requirement (!), mostly in occasional bursts far above the requirement.

**10) NM, LANL**

Teams: MISR

Web Page: <http://ensight.eos.nasa.gov/Missions/terra/LANL.shtml>Rating: Continued **Excellent**

Domain: lanl.gov

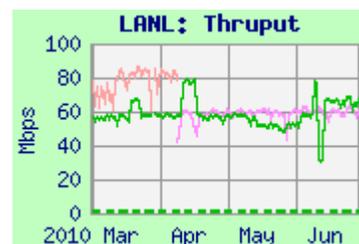
Test Results:

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
LaRC ASDC DAAC	60.5	57.2	41.7	NISN / MAX / I2
GSFC-ESDIS-PTH	65.8	59.2	44.2	MAX / ESnet

Requirements:

Source Node	FY	mbps	Rating
LaRC DAAC	'03-'09	1.03	Excellent

Comments: Performance from LaRC ASDC DAAC was stable. With the low requirement, the rating remains "Excellent". From GSFC-ESDIS-PTH (replacing EBnet-PTH) performance was also stable.

**11) NY, SUNY-SB:**

Teams: CERES, MODIS

Web Page: <http://ensight.eos.nasa.gov/Missions/terra/SUNYSB.shtml>Rating: Continued **Excellent**

Domain: sunysb.edu

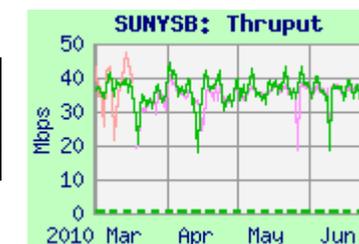
Test Results:

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
LaRC ANGe	51.7	36.8	19.6	NISN / MAX / I2 / NYSERnet
GSFC-ESDIS	42.8	36.1	24.8	MAX / I2 / NYSERnet

Requirements:

Source Node	FY	mbps	Rating
LaRC ANGe	'02-'09	0.57	Excellent

Comments: Performance from LaRC ANGe (LaTIS) has been stable since March '07. Due to the very low requirement, the rating remains "Excellent". From GSFC-ESDIS-PTH (replacing EBnet-PTH) performance was also stable



12) NY, University of Buffalo:

Team: ICESAT

Web Page: <http://ensight.eos.nasa.gov/Missions/icesat/BUFFALO.shtml>Rating: **Excellent**

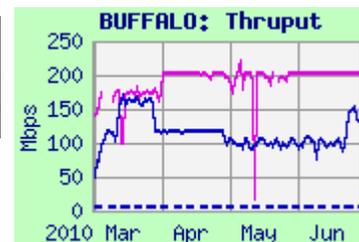
Domain: buffalo.edu

Test Results:

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
GSFC-ICESAT	114.1	104.7	76.4	NISN / MAX / I2 / NYSERnet
GSFC-ENPL	203.6	203.3	182.2	MAX / I2 / NYSERnet

Requirements:

Source Node	FY	mbps	Rating
GSFC-ICESAT	'09-'	6.3	Excellent



Comments: This node replaced Ohio-State for ICESAT, and assumes its requirement. Performance from ICESAT improved in March with the use of multiple streams. Testing was stable from ENPL. The rating remains "Excellent".

13) OR, Oregon State Univ:Ratings: LaRC ANGe: Continued **Excellent**

Teams: CERES, MODIS

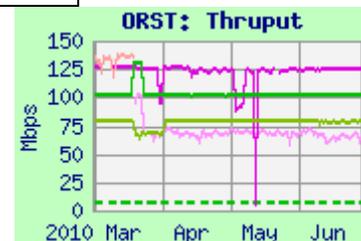
Domain: oce.orst.edu

GSFC: Continued **Excellent**Web Page: <http://ensight.eos.nasa.gov/Missions/terra/ORST.shtml>**Test Results:**

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
LaRC ANGe (LaTIS)	102.1	101.8	97.8	NISN / MAX / I2 / PNW
JPL-PTH	79.6	79.2	77.3	CENIC / I2 / PNW
GSFC-ESDIS-PTH	72.9	67.8	55.4	MAX / I2 / PNW
GSFC-ENPL	126.1	124.7	119.1	MAX / I2 / PNW

Requirements:

Source Node	FY	mbps	Rating
LaTIS	'04 - '09	7.5	Excellent
GES DISC	'02 - '09	0.25	Excellent



Comments: Thruput from LaRC ANGe (LaTIS) was very stable for this period, well above the requirement. Thruput from GSFC-ESDIS-PTH (replacing GSFC-EBnet-PTH) was also stable, but lower than previously from GSFC-EBnet-PTH, apparently due to its use of "autotuning" of TCP parameters. Testing from GSFC-ENPL is not subject to congestion at GSFC – its median and worst performance is higher. Thruput from JPL-PTH is also very stable. The ratings from both LaTIS and GSFC remain "Excellent".

14) PA: Penn State Univ:

Team: MISR

Web Page: http://ensight.eos.nasa.gov/Missions/terra/PENN_STATE.shtmlRating: Continued **Excellent**

Domain: psu.edu

Test Results:

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
LaRC ASDC DAAC	69.9	69.3	47.5	NISN / MAX / I2 / 3ROX
LaRC-PTH	135.3	132.4	49.1	NISN / MAX / I2 / 3ROX
GSFC-ESDIS-PTH	122.1	102.0	51.1	MAX / I2 / 3ROX
GSFC-ENPL	759.0	695.2	508.9	MAX / I2 / 3ROX
GSFC-ESTO	295.8	288.2	212.6	MAX / I2 / 3ROX

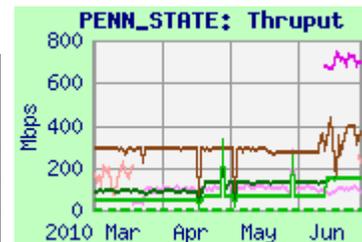
Requirements:

Source Node	FY	mbps	Rating
LaRC DAAC	'03-'09	2.6	Excellent

Comments: Thruput from LaRC dropped dramatically in mid January (had been typically 200 mbps), corresponding to an increase in RTT. The forward route did not change, but the return route is now peering with NISN in Chicago! Due to the low requirement, however, the rating remains "Excellent".

From GSFC-ESDIS-PTH (replacing GSFC-EBnet-PTH) thrupt is stable and similar to LaRC. It also sees the long return route.

New tests have been added: from GSFC-ESTO (on the SEN at GSFC, not EBnet) in February, and from GSFC-ENPL in June (direct GigE to MAX). These sources have lower RTT (due to the optimum return route) and higher thrupt than other sources, and are quite steady.

**15) TX: Univ. of Texas - Austin:**

Team: ICESAT

Web Page: <http://ensight.eos.nasa.gov/Missions/icesat/TEXAS.shtml>Rating: ↑ Adequate → **Good**

Domain: utexas.edu

Test Results:

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
GSFC-ICESAT	80.1	44.6	22.0	NISN / MAX / I2 / TX
GSFC-ENPL	90.1	78.7	57.0	MAX / I2 / TX
GSFC-ESDIS	56.2	43.0	20.7	MAX / I2 / TX

Requirements:

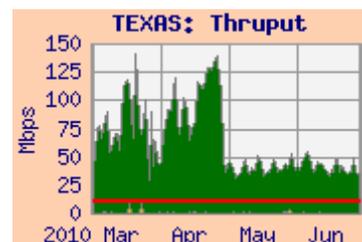
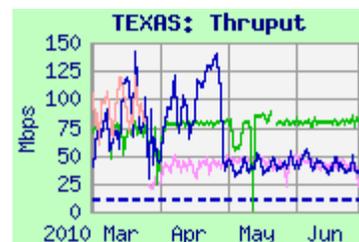
Source Node	FY	mbps	Rating
GSFC-ICESAT	05-'09	11.1	Good

Comments: Performance from ICESAT improved in February '10, due to adding the capability to send multiple concurrent streams. The daily minimum thrupt from ICESAT is now above the requirement, so the rating improves to "Good".

Thruput from GSFC-ESDIS-PTH (replacing GSFC-EBnet-PTH) was also stable, but lower than previously from GSFC-EBnet-PTH, apparently due to its use of "autotuning" of TCP parameters.

From GSFC-ENPL, outside most of the congested GSFC campus infrastructure, so it is much less noisy – thrupt is higher. It would be rated "Excellent".

The average user flow this period was only 540 kbps, only about 5% of the requirement.



16) WA, PNNL:

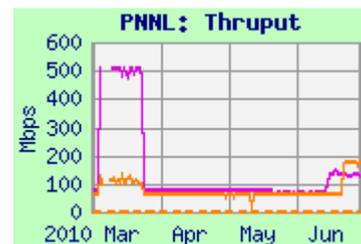
Team: MISR

Web Page: <http://ensight.eos.nasa.gov/Missions/terra/PNNL.shtml>Ratings: Continued **Excellent**

Domain: pnl.gov

Test Results:

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
LaRC-PTH	60.9	60.7	43.5	NISN / MAX / ESnet
GSFC-ENPL	77.3	77.2	73.3	MAX / ESnet

**Requirements:**

Source Node	FY	mbps	Rating
LaRC	'04-'09	1.4	Excellent

Comments: Performance from LaRC PTH has been stable, (but is no longer limited by a 100 mbps Ethernet connection at LaRC); the rating remains "Excellent". Performance from GSFC-ENPL was bimodal – the mode last seen in March was **OUTSTANDING!**

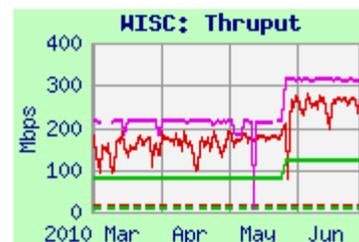
17) WI, Univ. of Wisconsin:

Teams: MODIS, CERES, AIRS, NPP

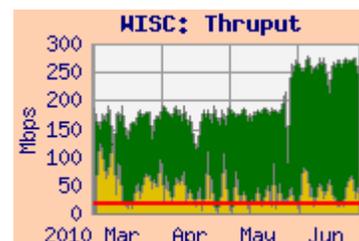
Domain: ssec.wisc.edu

Web Page: <http://ensight.eos.nasa.gov/Missions/terra/WISC.shtml>Ratings: GSFC: Continued **Excellent**LARC: Continued **Excellent****Test Results:**

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
GSFC-DISC	258.5	186.0	118.9	MAX / I2 / MREN
LaRC ANGe	82.0	81.8	81.2	NISN / MAX / I2 / MREN
GSFC-ENPL	214.7	214.4	213.2	MAX / I2 / MREN

**Requirements:**

Source Node	FY	mbps	Rating
GSFC	'04 - '09	16.5	Excellent
LaRC Combined	'05 - '09	7.9	Excellent



Comments: Performance from all sources dropped in early February – apparently due to reconfiguration at Wisconsin, then increased back to previous levels in late May. Thruput from GSFC-DISC had improved in June '09 with GDAAC's move to the 10 gig EBnet, and was no longer noisy due to EBnet congestion at GSFC.

The user flow from GSFC increased in November '09, and averaged 36 mbps this period (vs 107 mbps last period, and 75 mbps in 4Q09), now over 2 x above the requirement. Due to this high user flow, the rating is based on the integrated results from GSFC DISC, shown above. The integrated daily worst remained well above 3 x the requirement, so the rating remains "Excellent".

Thruput from LaRC ANGe (LaTIS) was otherwise very stable; the rating from ANGe remains "Excellent".

Testing from ENPL also avoids the GSFC congestion and was also very stable other than the step changes noted above.

18) Canada, Univ of Toronto:Rating: GSFC: Continued **Excellent**
LaRC: Continued **Excellent**

Team: MOPITT

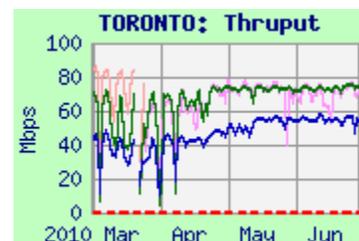
Domain: utoronto.ca

Web Page: <http://ensight.eos.nasa.gov/Missions/terra/TORONTO.shtml>**Test Results:**

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
LaRC ASDC DAAC	56.9	52.3	30.4	NISN / StarLight / CA*net4
LaRC PTH	75.6	72.4	46.8	NISN / StarLight / CA*net4
GSFC-ESDIS-PTH	80.1	71.0	41.9	MAX / I2 / NY / CA*net4

Requirements:

Source Node	FY	kbps	Rating
LaRC DAAC	'02 - '09	100	Excellent
GSFC EOC	'02 - '09	512	Excellent



Comments: Thruput from all sources to Toronto became much less noisy from all sources in late April. Testing from GSFC-ESDIS-PTH replaced GSFC-EBnet-PTH, with results similar to LaRC-PTH. The ratings from both sources remain “Excellent”, due to the low requirements.

User flow from GSFC averaged 190 kbps this period.

19) Italy, EC - JRC:Rating: Continued **Excellent**
Domain: jrc.it

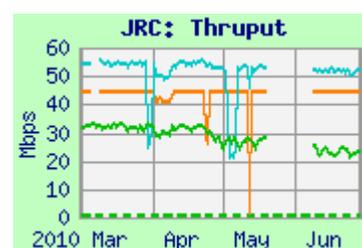
Team: MISR

Web Page: <http://ensight.eos.nasa.gov/Missions/terra/JRC.shtml>**Test Results:**

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
LaRC ASDC DAAC	31.5	27.3	21.0	NISN / MAX / Géant / Garr
GSFC-NISN	55.0	52.5	48.3	NISN / MAX / Géant / Garr
GSFC-ENPL	44.9	44.7	44.4	MAX / I2 / Géant / Garr

Requirements:

Source Node	FY	mbps	Rating
LaRC DAAC	'02 - '09	0.52	Excellent



Comments: JRC was connected to Géant in June '07, with significant performance improvement. NISN began peering with Géant in late September '09. Previously, the route from LDAAC was via NISN to StarLight in Chicago, then Canarie's ITN, peering with Géant in NY (but a high performance route anyway).

Thruput from all sources dropped in early January, apparently due to packet loss, then recovered in late February. The median daily worst thruput from LaRC ASDC DAAC remain well above 3 x the requirement, so the rating remains “Excellent”.

Performance is similar from GSFC-NISN and GSFC-ENPL. LaRC flows now take a similar route as the GSFC nodes.

20) UK, London: (University College)Rating: Continued **Excellent**

Teams: MODIS, MISR

Domain: ucl.ac.uk

Web Page: <http://ensight.eos.nasa.gov/Missions/terra/UCLSCF.shtml>**Test Results:**

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
LaRC PTH	11.1	10.9	7.6	NISN / MAX / Géant / JAnet
GSFC-ESDIS	6.8	5.6	4.1	MAX / I2 / Géant (DC) / JAnet
EROS-PTH	8.5	8.2	7.1	StarLight / I2 / Géant (DC) / JAnet

Requirements

Source Node	FY	mbps	Rating
LaRC DAAC	'02 – '09	1.03	Excellent

Comments: In September '06 the testing was modified due to a new firewall at UCL – now using ftp pulls by UCL instead of iperf from GSFC and LaRC. Results are much lower using this method – previous iperf thrupt was 9.5 mbps from LaRC and 32 mbps from GSFC.

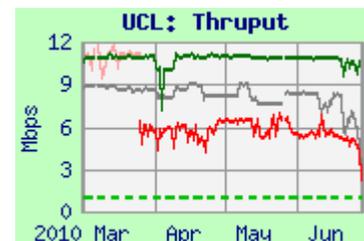
NISN began peering with Géant in September '09, with improved thrupt.

Previously, the route from LaRC was via NISN peering with Teleglobe on the US west coast, unnecessarily increasing RTT and reducing thrupt.

Thrupt improved from all sources in mid February, due to a host upgrade at UCL, which used larger TCP windows. Thrupt was otherwise stable from all sources; the median daily worst thrupt from LaRC remained above 3 x the requirement, so the rating remains “Excellent”

From **GSFC-ESDIS** (replacing GSFC-EBnet-PTH) the route (peering with Géant at MAX) is optimum. The thrupt is stable.

Thrupt from EROS is similar to the other sites, but a bit lower due to a longer RTT.

**21) UK, Oxford:**Rating: ↓ Excellent → **Good**

Team: HIRDLS

Domain: ox.ac.uk

Web Page: <http://ensight.eos.nasa.gov/Missions/aura/OXFORD.shtml>**Test Results:**

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
GSFC-ENPL	1.99	1.40	0.97	MAX / I2 / Géant (DC) / JAnet

Requirements: (IST Only)

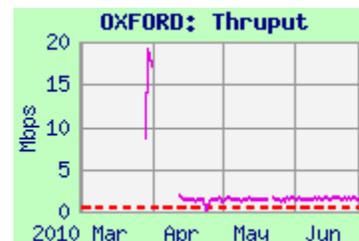
Source Node	FY	kpbs	Rating
GSFC	'03 – '09	512	Good

Comments: Iperf testing to Oxford was restored for a few days at the end of March (after which it was discontinued again by Oxford) (Testing to Oxford had been down since the Oxford test host was retired in April '08).

Performance for that brief period was well in excess of the requirement, rating “Excellent”

Testing resumed in April using “flood pings”, which is a poor substitute for iperf, and provides much lower results, now rated “Good”.

Previously, performance had been mostly stable at about 25 mbps since October '06, rating “Excellent”.



22) Rutherford Appleton Laboratory (BADC)Rating: Continued **Excellent**

Team: HIRDLS

Domain: rl.ac.uk

Web Page: http://ensight.eos.nasa.gov/Missions/aura/UK_RAL.shtml**Test Results:**

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
GSFC-ENPL	34.7	32.9	25.8	MAX / I2 / Géant (DC) / JAnet
GSFC-ESDIS-PTH	34.4	30.7	21.2	MAX / I2 / Géant (DC) / JAnet

Requirements:

Source Node	FY	mbps	Rating
GSFC	'02 – '09	0.19	Excellent

Comments: Thruput to RAL was very stable from **GSFC-ENPL**. It was very similar and also steady from **GSFC-ESDIS-PTH**, replacing GSFC-EBnet-PTH. The thrupt has consistently been much higher than the requirement, so the rating remains "Excellent".

