

EOS Science Networks Performance Report

This is a summary of EOS QA SCF performance testing for the 1st 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:

- **Reduced congestion on the EBnet GigE**
 - **Affected daily worst performance from MODIS, GSFC-PTH, ISIPS, OMISIPS, others**
 - Compare with better performance from 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.
- Otherwise, mostly stable performance.
 - **ALL Nodes rated at least Adequate** (only one below **Good**)
 - **GPA 3.78** (was 3.86 last quarter)
- The Nov '07 requirements are used as the basis for the ratings
 - Requirements update is 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:

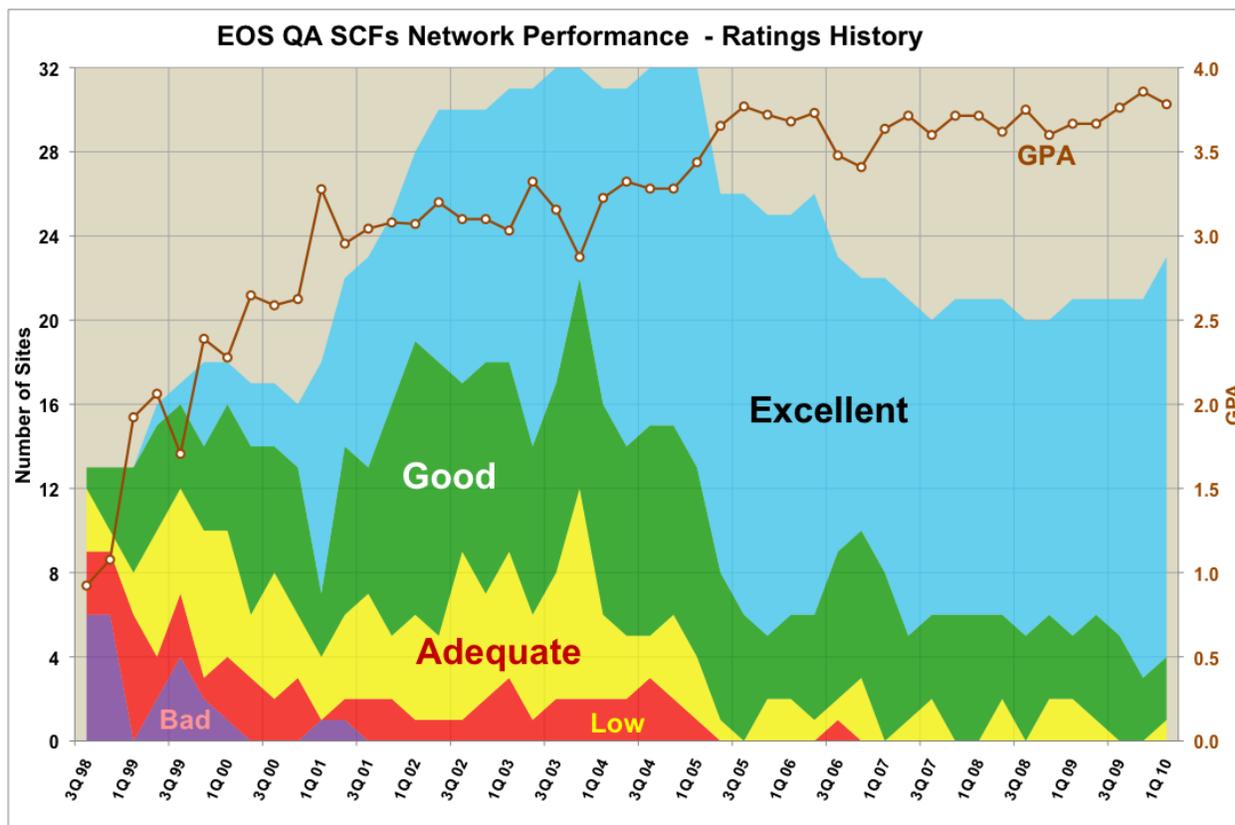
Upgrades: ↑: None

Downgrades: ↓ ICESAT → Texas: Good → Adequate
ICESAT → Ohio State: Excellent → Good

Testing Added: Oxford Univ: Some tests run in March: Excellent
Buffalo: Transferring ICESAT functions from Ohio State: Excellent

Ratings History:

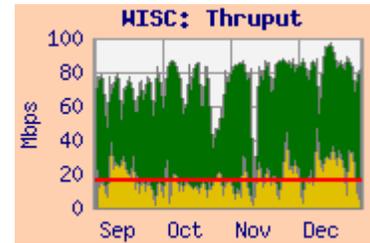
The chart below shows the number of sites in each classification since the testing started in 1998. Note that these ratings do NOT relate to absolute performance -- they are relative to the EOS requirements. The GPA is calculated based on Excellent: 4, Good: 3, Adequate: 2, Low: 1, Bad: 0



Notes: There are fewer sites included in this chart 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 SIPS sites to the “EOS Production Sites” Network Performance Report (2Q05).
- BADC was added in 2009.
- Testing to Oxford was restored in March, 2010.
- 1Q10: It was recognized that the ICESAT functions of Ohio State were being transferred to Buffalo. So for this report, results to Buffalo are added, based on the same requirements as Ohio State. Results to Ohio State are included in this report but will be omitted in future reports.

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 thruptut 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.



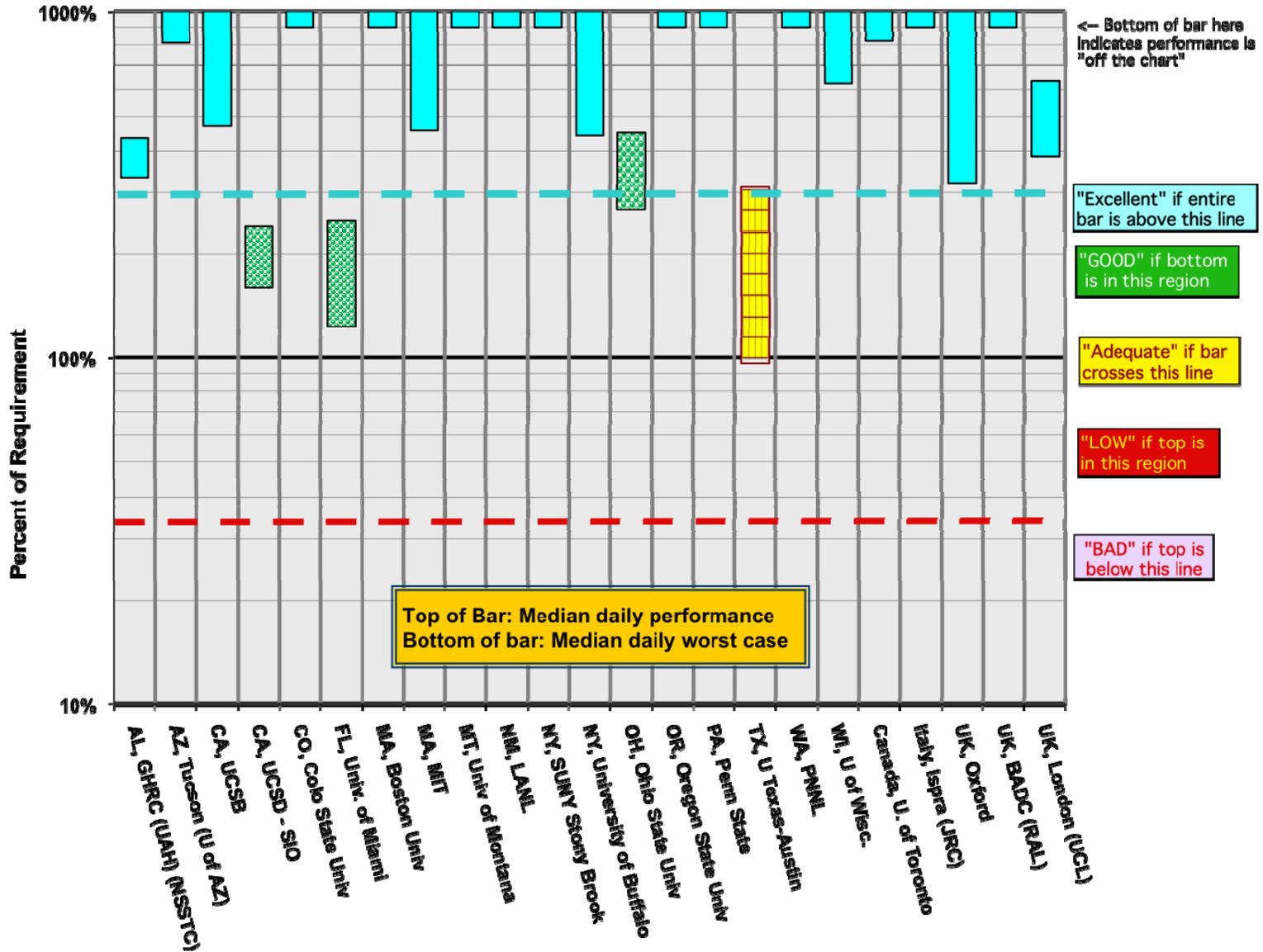
Note: User flow data is has not been available from LaRC since March 2007, so sites with primary requirements from LaRC will not include integrated graphs.

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

1 st 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					1 Q 2010	4Q09	
AL, GHRC (UAH) (NSSTC)	CERES, ASTER	6.9	LaTIS	30.2	23.2		Excellent	E	NISN / MAX / Internet2 / SOX / UAH
AZ, Tucson (U of AZ)	MODIS	2.6	EROS LPDAAC	33.1	20.8	2.5	Excellent	E	StarLight (Chicago) / Internet2 / CENIC
CA, UCSB	MODIS	3.1	GSFC-MODIS	33.8	14.7	0.6	Excellent	E	MAX / Internet2 / CENIC
CA, UCSD - SIO	ICESAT, CERES	7.1	GSFC-ICESAT	17.0	11.3	0.2	GOOD	G	NISN / MAX / Internet2 / CENIC
CO, Colo State Univ	CERES	2.1	LaTIS	67.4	20.5		Excellent	E	NISN / MAX / Internet2 / FRGP
FL, Univ. of Miami	MODIS, MISR	18.8	GSFC-MODIS	46.7	23.3	0.2	GOOD	G	MAX / Internet2 / SOX
MA, Boston Univ	MODIS, MISR	3.0	EROS LPDAAC	121.6	91.3	2.4	Excellent	E	StarLight (Chicago) / Internet2 / NOX
MA, MIT	ICESAT	7.0	GSFC-ICESAT	73.4	32.1	0.3	Excellent	E	NISN / MAX / Internet2 / NOX
MT, Univ of Montana	MODIS	0.8	EROS LPDAAC	39.8	31.9	1.2	Excellent	E	StarLight (Chicago) / Internet2 / PNW
NM, LANL	MISR	1.0	LaRC DAAC	55.7	20.8		Excellent	E	NISN / MAX / Internet2
NY, SUNY Stony Brook	CERES	0.6	LaTIS	36.6	24.3		Excellent	E	NISN / MAX / Internet2 / NYSERnet
NY, University of Buffalo	ICESAT	6.3	GSFC-ICESAT	69.8	27.9		Excellent	n/a	NISN / MAX / Internet2 / NYSERnet
OH, Ohio State Univ	ICESAT	6.3	GSFC-ICESAT	28.5	16.8		GOOD	E	NISN / MAX / Internet2 / OARnet
OR, Oregon State Univ	CERES, MODIS	7.6	LaTIS	102.8	100.6		Excellent	E	NISN / MAX / Internet2 / PNW
PA, Penn State	MISR	2.6	LaRC DAAC	46.1	27.2		Excellent	E	NISN / MAX / 3ROX
TX, U Texas-Austin	ICESAT	11.1	GSFC-ICESAT	34.4	10.6	0.6	Adequate	G	NISN / MAX / Internet2 / TX-learn
WA, PNNL	MISR	1.4	LaRC PTH	62.9	36.0		Excellent	E	NISN / MAX / ESNet
WI, U of Wisc.	MODIS, CERES, AIRS, NPP	16.5	GES DAAC	177.9	102.7	107.3	Excellent	E	MAX / Internet2 / MREN
Canada, U. of Toronto	MOPITT	0.6	LaRC DAAC	40.9	5.0		Excellent	E	NISN / StarLight (Chicago) / CA*net4
Italy, Ispra (JRC)	MISR	0.5	LaRC DAAC	16.6	15.5		Excellent	E	NISN / MAX / Géant (DC) / GARR
UK, Oxford	HIRDLS	0.5	GSFC-PTH	12.9	1.7		Excellent	n/a	Internet2 / Géant (DC) / JAnet
UK, BADC (RAL)	HIRDLS	0.2	GSFC-PTH	31.5	17.5		Excellent	E	Internet2 / Géant (DC) / JAnet
UK, London (UCL)	MISR, MODIS	1.0	LaRC PTH	6.6	4.0		Excellent	E	NISN / MAX / Géant (DC) / JAnet
*Rating Criteria:				Summary			Current:	Prev	
							1 Q 2010	Report	
Excellent	Median Daily Worst >= 3 * Requirement						19	18	
GOOD	Median Daily Worst >= Requirement						3	3	
Adequate	Median Daily Worst < Requirement <= Median Daily Median						1	0	
LOW	Median Daily Median < Requirement						0	0	
BAD	Median Daily Median < Requirement / 3						0	0	
							Total	23	21
							GPA	3.78	3.86

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 LaTIS	33.0	30.2	23.2	NISN / MAX / I2 / SOX
GSFC-CNE	44.4	41.0	33.1	MAX / I2 / SOX



Requirements:

Source Node	FY	Mbps	Rating
LaRC LaTIS	'06 – '09	7.0	Excellent

Comments: Performance from both sources was mostly 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

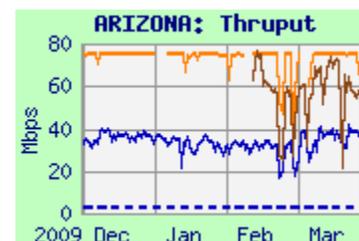
Web Page: <http://ensight.eos.nasa.gov/Missions/terra/ARIZONA.shtml>

Rating: Continued **Excellent**

Domain: arizona.edu

Test Results:

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
EROS LPDAAC	45.4	33.1	20.8	StarLight / I2 / CENIC
GSFC ENPL	75.2	75.0	71.2	MAX / I2 / CENIC

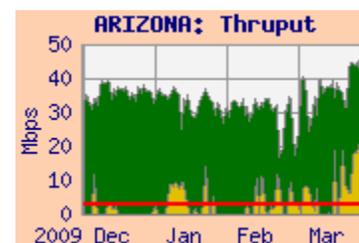


Requirements:

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

Comments: The ratings are based on the MODIS flow from EROS. Performance was stable from both sources -- 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 2.5 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:**

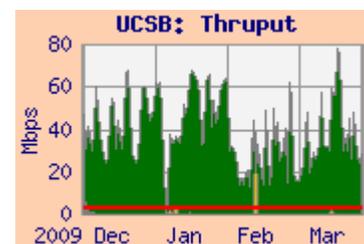
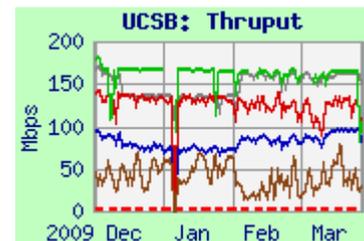
Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
GSFC-MODIS	67.4	33.8	14.7	MAX / I2 / CENIC
GSFC-GES DISC	143.3	127.8	67.8	MAX / I2 / CENIC
GSFC-ENPL	167.8	164.4	127.1	MAX / I2 / CENIC
EROS-LPDAAC	95.9	80.7	52.2	StarLight / I2 / CENIC
EROS-PTH	162.6	154.4	117.8	StarLight / I2 / CENIC

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 Gig-E**, while performance from ENPL and GES DISC (on the 10 gig EBnet backbone since June) is much less noisy. EROS LPDAAC has been stable since 2005, while EROS-PTH (outside the ECS firewall) has lower packet loss and higher thruput. The rating remains "Excellent" from both EROS and GSFC-MODIS.

The user flow from GSFC averaged only 540 kbps this period, much lower than the requirement. The user flow from GSFC averaged only 540 kbps this period, much lower 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: Continued **Good**
LaTIS: Continued **Excellent****Test Results:**

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
GSFC-ICESAT	17.2	17.0	11.3	NISN SIP / MAX / I2 / CENIC
LaTIS	167.9	166.2	155.0	NISN SIP / MAX / I2 / CENIC
GSFC-EBnet-PTH	182.5	141.7	49.0	MAX / I2 / CENIC
GSFC-ENPL	185.3	185.1	184.3	MAX / I2 / CENIC

Requirements:

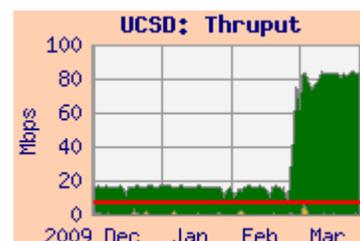
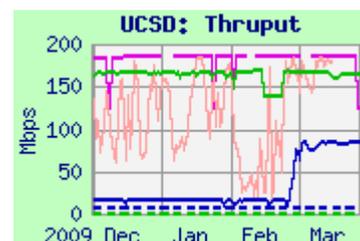
Source Node	FY	mbps	Rating
GSFC-ICESAT	'05 - '09	7.0	Good
LaTIS	'02 - '09	0.26	Excellent

Comments: Performance from ICESAT was lower than other sources, due to its inability to send multiple concurrent streams (**fixed in February '10**).

The daily minimum thruput from GSFC-ICESAT remained below 3 x the requirement, so the rating continues "Good". Using multiple streams, the performance in March would rate "Excellent"

Peak performance from GSFC-EBnet-PTH is better, **but was also very noisy until MODIS was moved off the 1 gig EBnet backbone in February, reducing congestion**. GSFC-ENPL avoids the MODIS congestion, and gets very steady thruput. User flow from GSFC averaged only 240 kbps during the test period, **much lower than the requirement**.

Performance from LaTIS was also very stable. The LaTIS 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

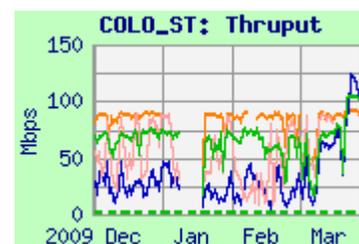
Test Results:

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
LaTIS	79.7	67.4	20.5	NISN SIP / MAX / I2 / FRGP
GSFC-ICESAT	45.8	26.0	5.9	NISN SIP / MAX / I2 / FRGP
GSFC-EBnet-PTH	88.8	49.2	14.6	MAX / I2 / FRGP
GSFC-ENPL	90.9	87.4	48.1	MAX / I2 / FRGP

Requirements:

Source Node	FY	mbps	Rating
LaTIS	'04 - '09	2.15	Excellent

Comments: Performance from LaTIS was mostly stable, and remained well above 3 x the requirement, so the rating remains “Excellent”. Thruput from GSFC-PTH stabilized in February with reduced congestion from MODIS. Thruput from GSFC-ICESAT improved in March due to the use of multiple streams. Testing from GSFC-ENPL is outside most campus firewalls, and shows that the true capacity of the WAN is higher than seen from either the CNE or EBnet nodes.

**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	60.4	46.7	23.3	MAX / I2 / SOX
GSFC-ENPL	30.4	30.3	27.9	MAX / I2 / SOX
LaRC DAAC	14.3	11.9	9.8	NISN / MAX / I2 / SOX

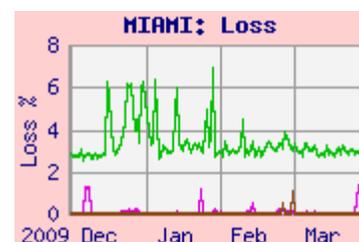
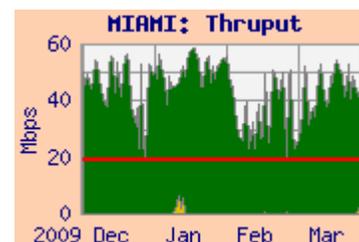
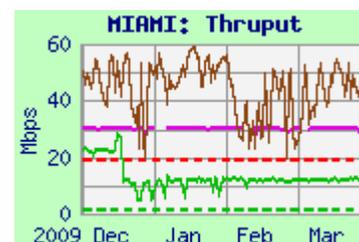
Requirements:

Source Node	FY	mbps	Rating
GSFC	'04 - '09	18.8	Good
LaRC DAAC	'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. The integrated daily worst from MODIS remained above the requirement, so the rating remains “Good”. The rating remains “Excellent” from LaRC, due to the much lower requirement.

The integrated graph shows the user flow from GSFC averaged only 240 kbps, about 1.3% 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

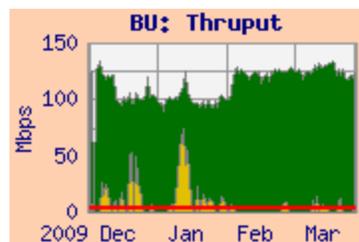
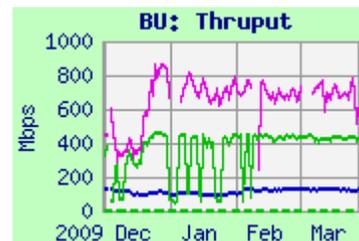
Web Page: <http://ensight.eos.nasa.gov/Missions/terra/BU.shtml>Ratings: EROS: Continued **Excellent**
LaRC: Continued **Excellent****Test Results:**

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
EROS DAAC	134.4	121.6	91.3	StarLight / I2 / NOX
GSFC ENPL	854.2	693.3	548.5	MAX / I2 / NOX
LaRC DAAC	449.4	428.0	261.0	NISN / MAX / I2 / NOX

Requirements:

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

Comments: From EROS, thrupt was limited by packet loss at EROS, while the user flow averaged about 2.4 mbps for this period (close to the requirement). Thrupt from GSFC and LaRC greatly exceeded the requirements, and user flow from GSFC was an average of 1.8 mbps. 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	83.1	73.4	32.1	NISN / MAX / I2 / NOX
GSFC-EBnet-PTH	90.9	77.9	29.8	MAX / I2 / NOX
GSFC-ENPL	93.5	93.5	83.2	MAX / I2 / NOX

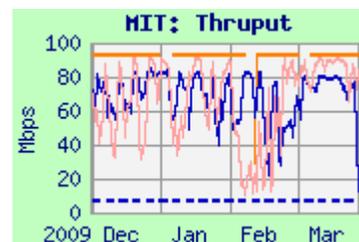
Requirements:

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 well above the requirement, so the rating remains "Excellent".

Thrupt from GSFC-EBnet-PTH stabilized with the MODIS move in late February. Performance from GSFC-ENPL is very stable.

The daily average user flow from ICESAT was only 250 kbps – only about 3.6% of the requirement.



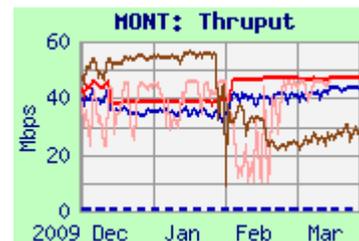
9) MT, Univ of Montana:Rating: Continued **Excellent**

Teams: MODIS

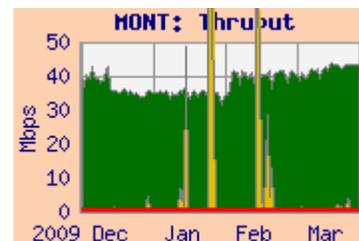
Domain: ntsg.umt.edu

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

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
EROS LPDAAC	43.3	39.8	31.9	StarLight / I2 / PNW
EROS PTH	46.7	46.6	46.1	StarLight / I2 / PNW
GSFC-EB-PTH	46.3	42.2	19.0	MAX / I2 / PNW
NSIDC	40.6	31.1	19.4	CU / FRGP / I2 / PNW

**Requirement:**

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



Comments: Performance was relatively stable this period. With the very low requirement, the rating remains "Excellent". The average user flow from EROS was about 1.2 mbps – above the requirement (!), mostly in occasional bursts far above the requirement.

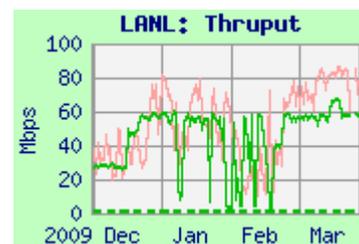
10) NM, LANLRating: Continued **Excellent**

Teams: MISR

Domain: lanl.gov

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

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
LaRC DAAC	60.8	55.7	20.8	NISN / MAX / I2
GSFC-EBnet-PTH	84.7	63.3	16.6	MAX / ESnet

**Requirements:**

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

Comments: Performance from LaRC was relatively stable – returned in December '09. With the low requirement, the rating remains "Excellent". From GSFC performance was noisier due to EBnet congestion, which was reduced with the MODIS move in late Feb.

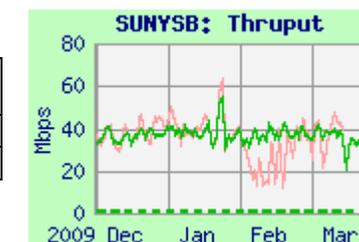
11) NY, SUNY-SB:Rating: Continued **Excellent**

Teams: CERES, MODIS

Domain: sunysb.edu

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

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
LaTIS	53.7	36.6	24.3	NISN / MAX / I2 / NYSERnet
GSFC	58.4	36.0	18.9	MAX / I2 / NYSERnet

**Requirements:**

Source Node	FY	mbps	Rating
LaTIS	'02-'09	0.57	Excellent

Comments: Performance from LaTIS has been stable since March '07. Due to the very low requirement, the rating remains "Excellent". Performance from GSFC was noisier due to EBnet congestion, which was reduced with the MODIS move in late Feb.

12) NY, University of Buffalo:

Team: ICESAT

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

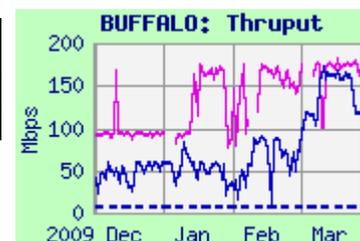
Domain: buffalo.edu

Test Results:

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
GSFC-ICESAT	88.3	69.8	27.9	NISN / MAX / I2 / NYSERnet
GSFC-ENPL	182.2	162.5	96.9	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 with the use of multiple streams in March. Testing was returned from ENPL in January, also with improved thruput. The new rating is "Excellent".

13) OH, Ohio State Univ:

Teams: ICESAT

Web Page: http://ensight.eos.nasa.gov/Missions/icesat/OHIO_STATE.shtmlRating: ↓ Excellent → **Good**

Domain: ohio-state.edu

Test Results:

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
GSFC-ICESAT	31.8	28.5	16.8	NISN / MAX / I2 / OARnet
GSFC-EBnet-PTH	40.0	33.8	15.5	MAX / I2 / OARnet

Requirements:

Source Node	FY	mbps	Rating
GSFC-ICESAT	'05-'09	6.3	Good



Comments: Performance from both sources dropped in late December, then dropped further in January (due to an ethernet duplex mismatch). That was fixed in February, and performance was back as in early December. Testing was discontinued in March, since the ICESAT functions have been transferred to Buffalo. (Ohio State will be removed from the next issue of this report). For now, however, the median daily worst thruput from ICESAT dropped below 3 x the requirement; the rating therefore drops to "Good". Performance from GSFC-EBnet-PTH was noisier due to EBnet congestion at GSFC.

14) OR, Oregon State Univ:

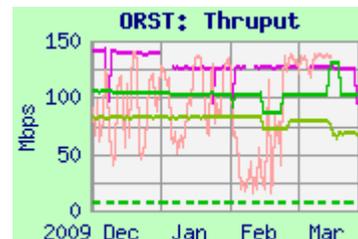
Teams: CERES, MODIS Domain: oce.orst.edu

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

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
LaTIS	103.2	102.8	100.6	NISN / MAX / I2 / PNW
JPL-PTH	82.5	81.6	78.9	CENIC / I2 / PNW
GSFC-EBnet-PTH	138.2	112.7	41.2	MAX / I2 / PNW
GSFC-ENPL	127.6	126.1	124.6	MAX / I2 / PNW

Requirements:

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



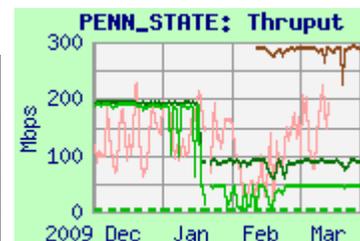
Comments: Thruput from LaTIS was very stable for this period, well above the requirement. Thruput from GSFC-EBnet-PTH is noisy due to EBnet to Doors congestion (but note the improvement and increased stability after MODIS was moved off the congested GigE in late February). Testing from GSFC-ENPL is not 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".

15) PA: Penn State Univ:

Team: MISR

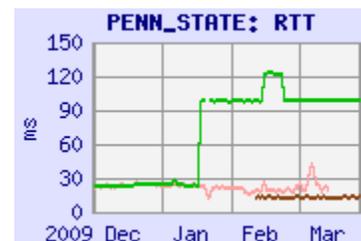
Web Page: http://ensight.eos.nasa.gov/Missions/terra/PENN_STATE.shtmlRating: Continued **Excellent**
Domain: psu.edu**Test Results:**

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
LaRC DAAC	46.7	46.1	27.2	NISN / MAX / I2 / 3ROX
LaRC-PTH	92.5	89.5	42.8	NISN / MAX / I2 / 3ROX
GSFC-EBnet-PTH	205.4	126.5	47.4	MAX / I2 / 3ROX
GSFC-ESTO	292.8	287.7	228.3	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, corresponding to an increase in RTT. The forward route did not change, but apparently the return route is now via peering with NISN in Chicago! Due to the low requirement, however, the rating remains "Excellent". Thruput from GSFC-EBnet-PTH is noisy due to EBnet congestion.



A new test was added in February from "GSFC-ESTO", which is on SEN at GSFC, not EBnet. Its thrupt is much higher than other sources, and quite steady.

16) TX: Univ. of Texas - Austin:

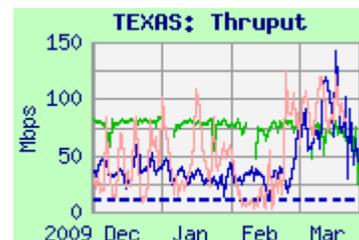
Team: ICESAT

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

Domain: utexas.edu

Test Results:

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
GSFC-ICESAT	68.9	34.4	10.6	NISN / MAX / I2 / TX
GSFC-ENPL	89.7	75.6	42.3	MAX / I2/ TX
GSFC-EBnet-PTH	135.2	49.9	9.7	MAX / I2/ TX

**Requirements:**

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

Comments: Performance from ICESAT was noisy – similar to last quarter. However, the daily worst thruput is now slightly below the requirement, so the rating drops to “Adequate”. In late February, testing from ICESAT was enhanced to use multiple TCP streams – thruput increased at that time (but not early enough to affect the rating this period).

Testing from GSFC-EBnet-PTH was also very noisy until late February, due to EBnet congestion.

But GSFC-ENPL is outside most of the congested GSFC campus infrastructure – so it is much less noisy – would be rated “Excellent”.

The average user flow this period was only 630 kbps, only about 6% of the requirement.

17) WA, PNNL:

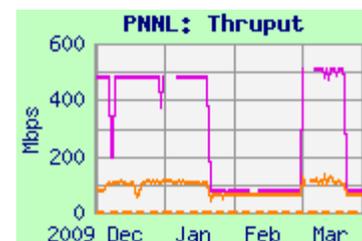
Team: MISR

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

Domain: pnnl.gov

Test Results:

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
LaRC-PTH	63.0	62.9	36.0	NISN / MAX / ESnet
GSFC-ENPL	77.6	77.3	77.0	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 – one of the modes is **OUTSTANDING!**

18) 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-DAAC	312.3	200.0	141.7	MAX / I2 / MREN
LaTIS	93.3	93.1	92.4	NISN / MAX / I2 / MREN
GSFC-ENPL	214.7	214.4	212.9	MAX / I2 / MREN

Requirements:

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

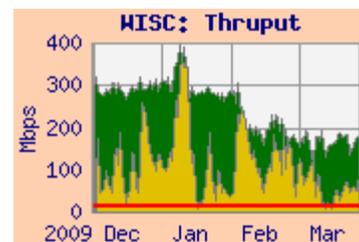
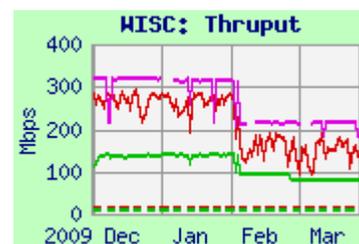
Comments: Performance from all nodes dropped from all sources in early February – apparently due to reconfiguration at Wisconsin. Thruput from GDAAC had improved in June '09 with GDAAC's move to the 10 gig EBnet, and was no longer noisy due to EBnet congestion at GSFC .

The user flow from GSFC increased in November '09, and averaged 107 mbps this period (vs 75 mbps last period, and 30 mbps in 3Q09), now over 6 x **above** the requirement. Due to this high user flow, the rating is based on the integrated results from GSFC, shown above.

The integrated daily worst remained well above 3 x the requirement, so the rating remains "Excellent".

Thruput from LaTIS was otherwise very stable; the rating from LaTIS remains "Excellent".

Testing from ENPL also avoids the GSFC congestion and was also very stable other than the February drop.

**19) Canada, Univ of Toronto:**

Team: MOPITT

Domain: utoronto.ca

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

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
LaRC DAAC	61.0	40.9	5.0	NISN / StarLight / CA*net4
LaRC PTH	84.8	68.6	8.3	NISN / StarLight / CA*net4
GSFC-EBnet-PTH	89.8	68.6	13.8	MAX / I2 / NY / CA*net4

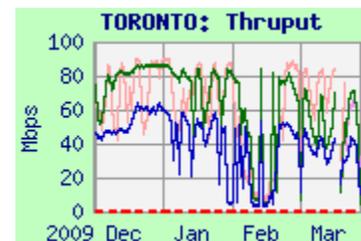
Requirements:

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

Comments: Thruput from all sources to Toronto was noisy, especially in February. Testing from GSFC-EBnet-PTH is also very noisy, due to EBnet congestion (improved in late February).

The ratings from both sources remain "Excellent", due to the low requirements.

User flow from GSFC averaged only 1.2 kbps this period.



20) Italy, EC - JRC:

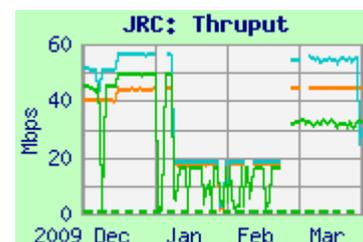
Team: MISR

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

Domain: jrc.it

Test Results:

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
LaRC DAAC	16.7	16.6	15.5	NISN / MAX / Géant / Garr
GSFC-NISN	18.4	18.3	18.2	NISN / MAX / Géant / Garr
GSFC-ENPL	16.7	16.6	15.5	MAX / I2 / Géant / Garr

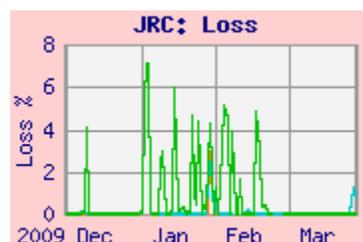
**Requirements:**

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. However, the median daily worst thruput from LaRC remained well above 3 x the requirement, so the rating remains "Excellent".

Performance is similar from both GSFC nodes. LaRC now take a similar routes as the GSFC nodes.

**21) UK, London: (University College)**

Teams: MODIS, MISR

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

Domain: ucl.ac.uk

Test Results:

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
LaRC PTH	6.6	6.6	4.0	NISN / MAX / Géant / JAnet
GSFC-EBnet-PTH	4.4	3.9	2.2	MAX / I2 / Géant (DC) / JAnet
EROS-PTH	5.8	5.5	3.1	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 thruput was 9.5 mbps from LaRC and 32 mbps from GSFC.

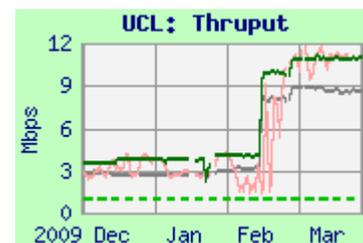
NISN began peering with Géant in September '09, with improved thruput.

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

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

From GSFC the route (peering with Géant at MAX) is optimum. The thruput is noisy due EBnet congestion at GSFC (improved in late February).

Thruput from EROS is similar to the other sites.



22) UK, Oxford:

Team: HIRDLS

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

Domain: ox.ac.uk

Test Results:

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
GSFC-ENPL	18.1	12.9	1.7	MAX / I2 / Géant (DC) / JAnet

Requirements: (IST Only)

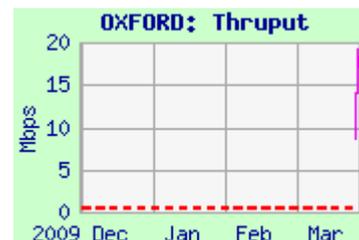
Source Node	FY	kbps	Rating
GSFC	'03 – '09	512	Excellent

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 this 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.

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

**22A) Rutherford Appleton Laboratory (BADC)**

Team: HIRDLS

Web Page: http://ensight.eos.nasa.gov/Missions/aura/UK_RAL.shtmlRating: Continued **Excellent**

Domain: rl.ac.uk

Test Results:

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
GSFC-ENPL	36.7	35.4	30.3	MAX / I2 / Géant (DC) / JAnet
GSFC-EBnet-PTH	35.3	31.5	17.5	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, but noisier. from GSFC-PTH, due to EBnet congestion at GSFC, until the congestion was eliminated in late February. The thruput has consistently been much higher than the requirement, so the rating remains "Excellent".

