

EOS Science Networks Performance Report

This is a summary of EOS QA SCF performance testing for the 1st quarter of 2011 -- 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:

- Mostly stable performance.
 - **ALL Nodes rated at least Good (mostly Excellent!)**
 - **GPA 3.91 (New record!)** (was 3.86 last quarter)
 - Performance to nodes at Universities is lower (and experiences diurnal variation) when classes are in session.
 - EROS upgraded the tail circuit to Chicago from OC-12 (622 mbps) to OC-48 (2.5 gbps) in March
 - Added reporting to CCRS (Ottawa, Canada) and University of Auckland, NZ. No requirements are stated yet, but there are Terra SCFs there.
- 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: ↑

Miami: **Good** → **Excellent**

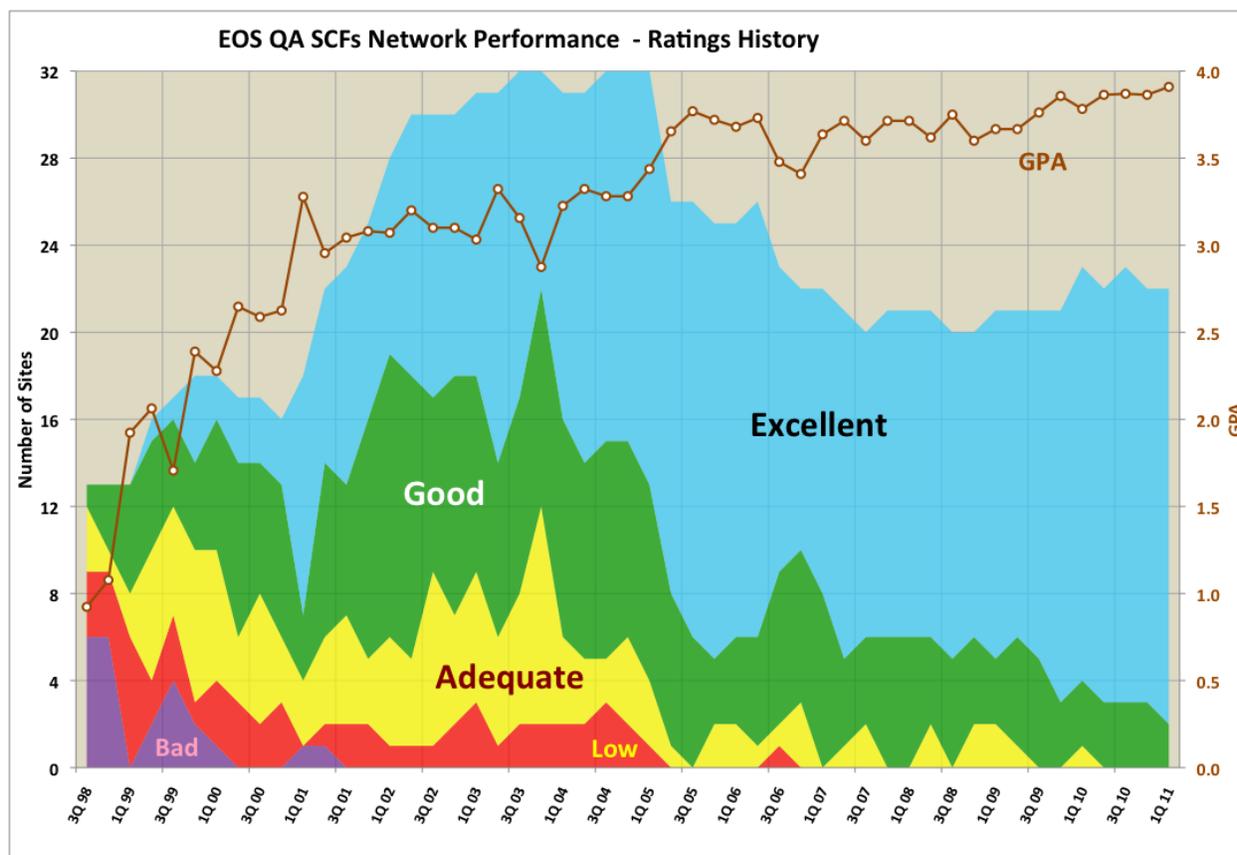
Texas: **Good** → **Excellent**

Downgrade: ↓

GHRC: **Excellent** → **Good**

Ratings History:

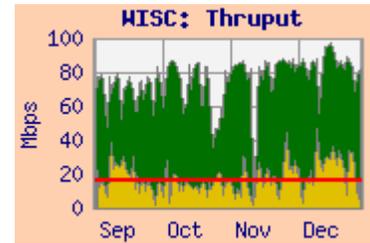
The chart below shows the number of sites in each classification since the testing started in 1998. Note that these ratings do NOT relate to absolute performance -- they are relative to the EOS requirements. The GPA is calculated based on Excellent: 4, Good: 3, Adequate: 2, Low: 1, Bad: 0



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

- Moving the reporting for 6 SIPS sites to the “EOS Production Sites” Network Performance Report (2Q05).
- Testing discontinued to SAGE III Nodes (2Q06)
- Testing discontinued to NOAA and UMD (3Q06)
- Testing discontinued to U Washington (2Q07) and UIUC (4Q06)
- Testing to BADC (RAL) 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.
- UIUC added [back] in 3Q10.
- Testing to MIT discontinued August 2010

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.



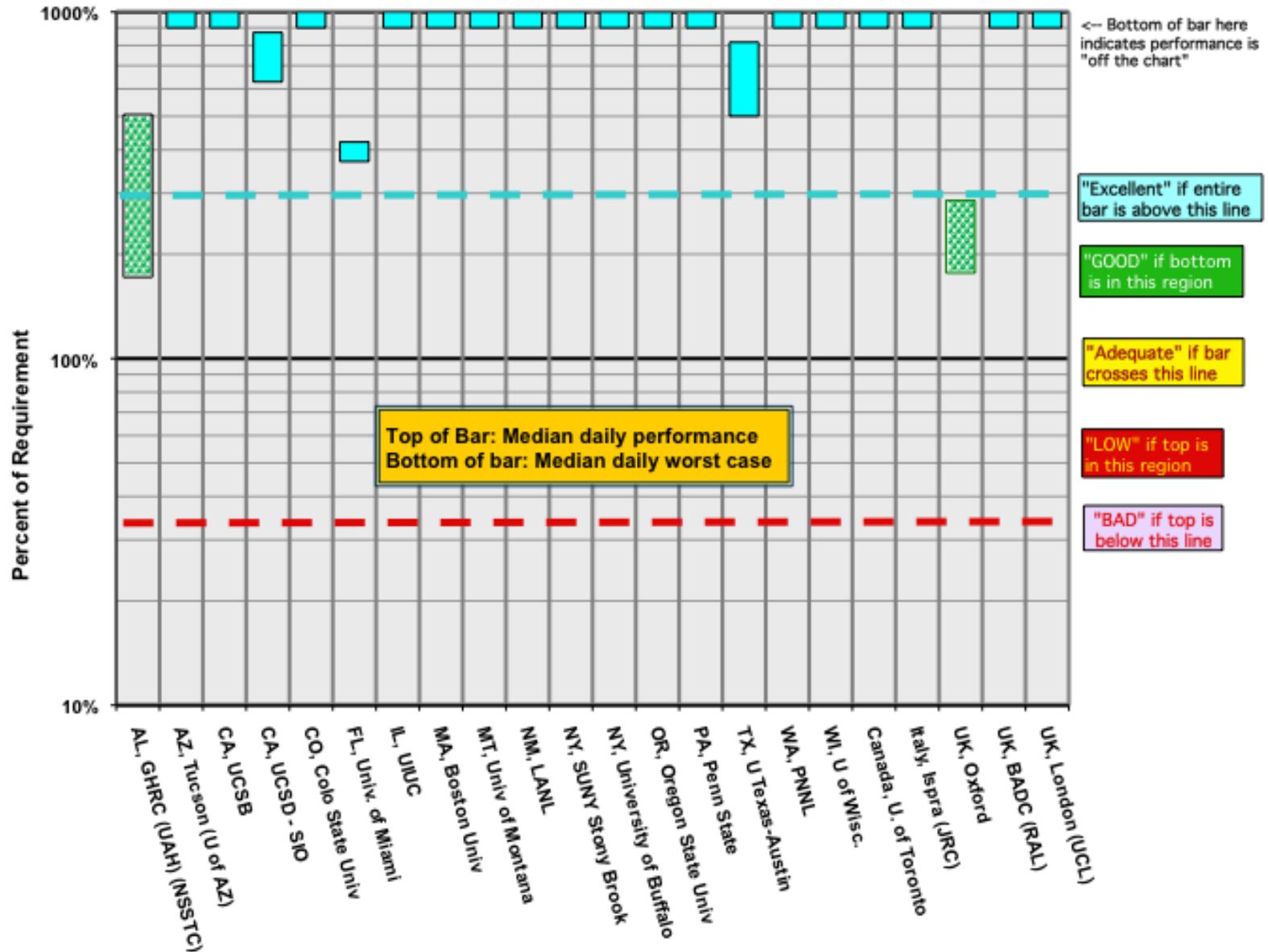
Note: User flow data is has not been available from LaRC since March 2007, so sites with primary requirements from LaRC will not include integrated graphs.

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

1 st Quarter 2011			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 2011	4Q10	
AL, GHRC (UAH) (NSSTC)	CERES, ASTER, LIS	6.9	LaRC PTH	35.1	11.9		Good	Ex	NISN / MAX / Internet2 / SOX / UAH
AZ, Tucson (U of AZ)	MODIS	2.6	EROS LPDAAC	50.4	26.8	1.7	Excellent	Ex	StarLight (Chicago) / Internet2 / CENIC
CA, UCSB	MODIS	3.1	GSFC-MODIS	64.9	32.6	0.3	Excellent	Ex	MAX / Internet2 / CENIC
CA, UCSD - SIO	ICESAT, CERES	7.1	GSFC-ICESAT	62.0	44.7	0.3	Excellent	Ex	NISN / MAX / Internet2 / CENIC
CO, Colo State Univ	CERES	2.1	LaTIS	159.7	138.4		Excellent	Ex	NISN / MAX / Internet2 / FRGP
FL, Univ. of Miami	MODIS, MISR	18.8	GSFC-NISN-PTH	79.3	69.7	0.07	Excellent	Good	MAX / Internet2 / SOX
IL, UIUC	MISR	1.1	LaRC PTH	102.2	28.2		Excellent	Ex	Internet2 via NISN / MAX
MA, Boston Univ	MODIS, MISR	3.0	EROS LPDAAC	153.5	55.4	0.7	Excellent	Ex	StarLight (Chicago) / Internet2 / NOX
MT, Univ of Montana	MODIS	0.8	EROS LPDAAC	108.2	47.4	6.4	Excellent	Ex	StarLight (Chicago) / Internet2 / PNW
NM, LANL	MISR	1.0	LaRC DAAC	77.8	54.1		Excellent	Ex	NISN / MAX / Internet2
NY, SUNY Stony Brook	CERES	0.6	LaTIS	36.6	20.1		Excellent	Ex	NISN / MAX / Internet2 / NYSERnet
NY, University of Buffalo	ICESAT	6.3	GSFC-ICESAT	86.1	75.4		Excellent	Ex	NISN / MAX / Internet2 / NYSERnet
OR, Oregon State Univ	CERES, MODIS	7.6	LaTIS	115.0	113.0		Excellent	Ex	NISN / MAX / Internet2 / PNW
PA, Penn State	MISR	2.6	LaRC DAAC	157.6	114.9		Excellent	Ex	NISN / MAX / 3ROX
TX, U Texas-Austin	ICESAT	11.1	GSFC-ICESAT	90.4	55.4	0.51	Excellent	Good	NISN / MAX / Internet2 / TX-learn
WA, PNNL	MISR	1.4	LaRC PTH	179.2	57.9		Excellent	Ex	NISN / MAX / ESNNet
WI, U of Wisc.	MODIS, CERES, AIRS, NPP	16.5	GES DISC	243.7	184.4	65.8	Excellent	Ex	MAX / Internet2 / MREN
Canada, U. of Toronto	MOPITT	0.6	LaRC DAAC	53.1	13.6		Excellent	Ex	NISN / StarLight (Chicago) / CA*net4
Canada, CCRS: Ottawa	CEOS, MODIS		GSFC-MODIS	51.2	40.5				MAX / Internet2 / CA*net4
Italy, Ispra (JRC)	MISR	0.5	LaRC DAAC	19.4	15.8		Excellent	Ex	NISN / MAX / Géant (DC) / GARR
New Zealand, U Auckland	MISR		LaRC PTH	15.4	3.6				NISN / StarLight (Chicago) / PNW / PacWave
UK, Oxford	HIRDLS	0.5	GSFC-ENPL-PTH	1.46	0.90	0.45	Good	Good	Internet2 / Géant (DC) / JAnet
UK, BADC (RAL)	HIRDLS	0.2	GSFC-ESDIS-PTH	31.3	18.1		Excellent	Ex	Internet2 / Géant (DC) / JAnet
UK, London (UCL)	MISR, MODIS	1.0	LaRC PTH	31.4	27.1		Excellent	Ex	NISN / MAX / Géant (DC) / JAnet
							Summary		
								Current:	Prev
							Rating	1 Q 2011	Report
Excellent	Median Daily Worst >= 3 * Requirement					Excellent	20	19	
Good	Median Daily Worst >= Requirement					Good	2	3	
Adequate	Median Daily Worst < Requirement <= Median Daily Median					Adequate	0	0	
LOW	Median Daily Median < Requirement					LOW	0	0	
BAD	Median Daily Median < Requirement / 3					BAD	0	0	
							Total	22	22
							GPA	3.91	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

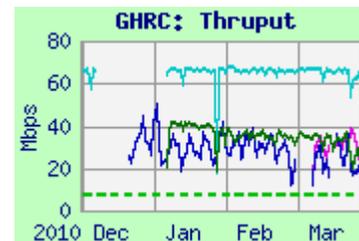
Web Page: <http://ensight.eos.nasa.gov/Missions/terra/NSSTC.shtml>

Rating: ▼ **Excellent** → **Good**

Domain: nsstc.uah.edu

Test Results:

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
LaRC-PTH	41.1	35.1	11.9	NISN / MAX / I2 / SOX
GSFC-CNE	67.2	66.2	28.8	
GSFC-EDOS	48.9	30.1	7.3	MAX / I2 / SOX



Requirements:

Source Node	FY	Mbps	Rating
LaRC ANGe	'06 – '09	7.0	Good

Comments: Testing from **GSFC-CNE** and **LaRC** was suspended in October '10 when the old **GHRC** test node was retired. Testing using **nuttcp** was initiated to the new test node later in October with improved performance (testing resumed from **LaRC** in January). Median daily worst thruput from **LaRC-PTH** is now below 3x the requirement, so the rating drops to **Good**.

Testing was initiated in December from **GSFC-EDOS** for LANCE flows; an additional LANCE test was initiated in March with similar results.

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

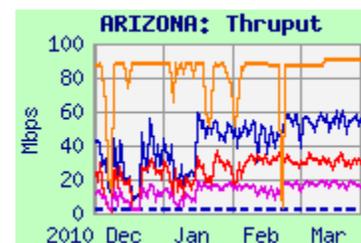
Web Page: <http://ensight.eos.nasa.gov/Missions/terra/ARIZONA.shtml>

Rating: Continued **Excellent**

Domain: arizona.edu

Test Results:

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
EROS LPDAAC	59.5	50.4	26.8	StarLight / I2 / CENIC
EROS PTH SCP	41.2	29.6	9.4	
GSFC ENPL	88.2	87.3	73.1	MAX / I2 / CENIC



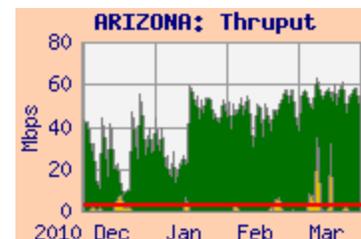
Requirements:

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

Comments: Thruput from **EROS LPDAAC** stabilized and improved in January. The median daily worst was way above 3 x the requirement, so the rating remains "**Excellent**".

From **GSFC-ENPL**, thruput is even better and very stable.

The average user flow from **EROS** was about 1.7 mbps, consistent with the requirement (without contingency).



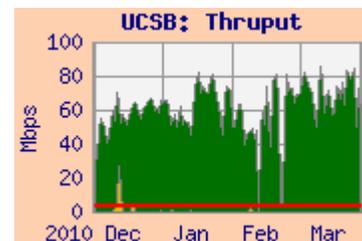
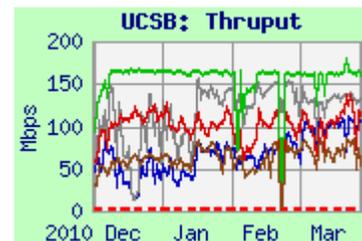
3) CA, UCSB :

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	87.4	64.9	32.6	MAX / I2 / CENIC
GSFC-GES DISC	130.5	101.2	50.0	
GSFC-ENPL	165.9	161.8	113.9	
EROS-LPDAAC	101.3	71.3	36.4	StarLight / I2 / CENIC
EROS-PTH	151.8	132.3	73.0	



Requirements:

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

Comments: The requirements are split between EROS and GSFC. **Thruput from all sites became less noisy.** The rating remains “**Excellent**” from both EROS and **GSFC-MODIS**. The user flow from GSFC averaged only 0.2 mbps this period, well below typical and the requirement.

4) CA, UCSD (SIO):

Teams: CERES, ICESAT
 Domain: ucsd.edu
 Web Page: <http://ensight.eos.nasa.gov/Missions/terra/UCSD.shtml>

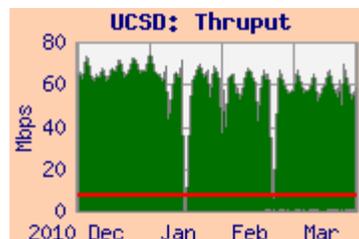
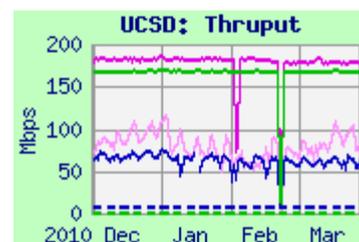
Ratings: ICESAT: Continued **Excellent**
 ANGe: Continued **Excellent**

Test Results:

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
GSFC-ICESAT	73.4	62.0	44.7	NISN SIP / MAX / I2 / CENIC
LaRC ANGe (LaTIS)	168.2	167.6	166.5	
GSFC-ESDIS-PTH	104.2	74.2	48.3	MAX / I2 / CENIC
GSFC-ENPL	185.7	180.5	171.6	

Requirements:

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



Comments: Performance from all sources was quite stable. The daily minimum thruput from ICESAT is above 3 x the requirement, so the rating remains “**Excellent**”

Performance from **GSFC-ENPL** is better and very steady. **GSFC-ESDIS-PTH** replaced GSFC-EBnet-PTH in March '10 – performance was steady but lower than from GSFC-EBnet-PTH, **apparently due to 0.03% packet loss inside EBnet.** User flow from GSFC averaged only 325 kbps during this 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

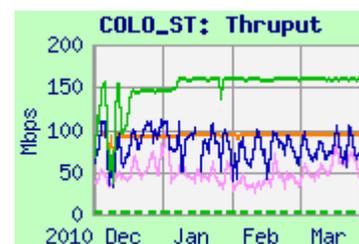
Test Results:

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
LaRC ANGe (LaTIS)	161.5	159.7	138.4	NISN SIP / MAX / I2 / FRGP
GSFC-ICESAT	73.4	62.0	44.7	
GSFC-ESDIS-PTH	80.8	45.4	23.9	MAX / I2 / FRGP
GSFC-ENPL	93.2	93.1	92.7	

Requirements:

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

Comments: Thruput from all sources was less noisy, with smaller best:worst ratios. Performance from LaRC ANGe remained well above 3 x the requirement, so the rating remains “**Excellent**”. Testing from GSFC-ENPL is very stable, outside most GSFC campus firewalls, limited by its 100 mbps ethernet connection.

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

Teams: MODIS, MISR

Domain: rsmas.miami.edu

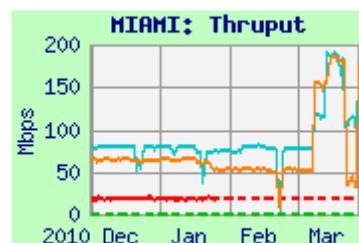
Web page: <http://ensight.eos.nasa.gov/Missions/terra/MIAMI.shtml>Rating: GSFC: ↑ **Good** → **Excellent**LaRC: Continued **Excellent****Test Results:**

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
GSFC-NISN	81.6	79.3	69.7	MAX / I2 / SOX
GSFC-MODIS-SCP	25.5	17.9	10.9	
LaRC PTH	64.4	53.9	46.2	NISN / MAX / I2 / SOX

Requirements:

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

Comments: In March thuput improved from all sources, but became bimodal (mostly stabilized at the higher level in late April). Thuput from GSFC-NISN was steady before that, and well above the requirement. The average daily worst was now above 3x the requirement, so the rating improves to “**Excellent**”.



SCP testing from GSFC-MODIS was discontinued in January. Thuput also mostly steady, although lower than iperf, as usual. Iperf testing from MODIS resumed in May.

Thuput was also steady until March from LaRC PTH. The rating from LaRC remains “**Excellent**”, due to the much lower requirement.

7) IL, UIUC:

Teams: MISR

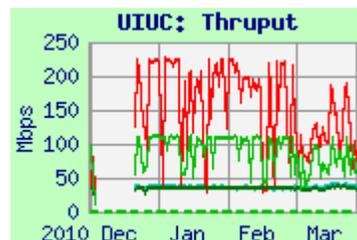
Web page: <http://ensight.eos.nasa.gov/Missions/terra/UIUC.shtml>

Rating: LaRC: **Excellent**

Domain: uiuc.edu

Test Results:

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
LaRC PTH-SCP	111.6	102.2	28.2	NISN / StarLight / I2
LaRC PTH	38.2	34.6	30.9	
GSFC-NISN-SCP	228.6	175.3	20.0	MAX / I2
GSFC-NISN	42.2	36.7	30.4	



Requirements:

Source Node	FY	mbps	Rating
LaRC ASDC	'04 -	1.1	Excellent

Comments: Testing was added to UIUC in August '10. Initially, SCP testing was initiated from GSFC and LaRC, sending files to UIUC. SCP thrupt is noisy from both sources, somewhat bimodal, but well above the requirement; so the rating remains **Excellent**.

In October nuttcp testing was added, initiated by UIUC, receiving from GSFC and LaRC. Thrupt on these tests is steadier than SCP, but much lower, apparently due to significant incoming packet loss (which is causing the noisiness on the SCPs as well).

8) MA, Boston Univ:

Teams: MODIS, MISR

Domain: bu.edu

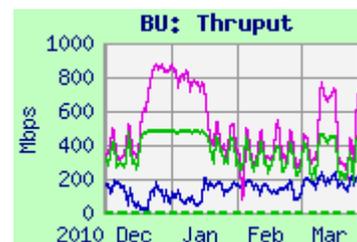
Web Page: <http://ensight.eos.nasa.gov/Missions/terra/BU.shtml>

Ratings: EROS: Continued **Excellent**

LaRC: Continued **Excellent**

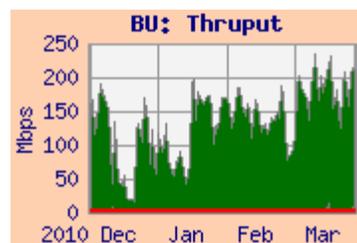
Test Results:

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
EROS LPDAAC	197.5	153.5	55.4	StarLight / I2 / NOX
GSFC ENPL	830.1	436.9	238.5	MAX / I2 / NOX
LaRC ASDC	480.1	367.8	127.7	NISN / MAX / I2 / NOX



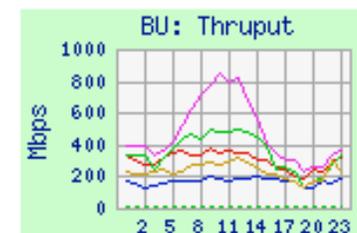
Requirements:

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



Comments: BU is well connected, with peaks close to 1 gbps. When students are present, there is a major diurnal variation in thrupt from all sources.

Thrupt from all sources was much better than the requirements, rating "**Excellent**". From EROS LPDAAC, the user flow averaged about 0.7 mbps for this period (lower than the requirement without contingency). Thrupt from GSFC and LaRC ASDC DAAC greatly exceeded the requirements. User flow from GSFC was an average of 3.4 mbps.



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

Teams: MODIS

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

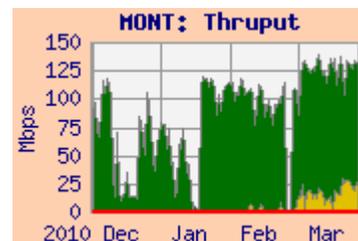
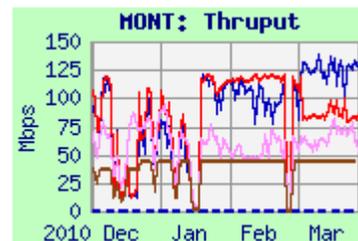
Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
EROS LPDAAC	124.3	108.2	47.4	StarLight / I2 / PNW
EROS PTH	121.2	100.6	71.1	
GSFC-ESDIS	79.9	60.8	41.8	MAX / I2 / PNW
NSIDC	44.3	44.2	42.8	CU / FRGP / I2 / PNW

Requirement:

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

Comments: Performance from all sources improved in January due to an upgrade at Montana, and again in March with the upgrade at EROS. With the very low requirement, the rating remains "**Excellent**". The average user flow from EROS increased in March, to an average of 6.5 mbps for the 3 month period – well above the requirement.

Domain: ntsq.umt.edu

**10) NM, LANL**

Teams: MISR

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 ASDC DAAC	82.6	77.8	54.1	NISN / MAX / I2
GSFC-ESDIS-PTH	56.3	45.4	33.9	MAX / ESnet

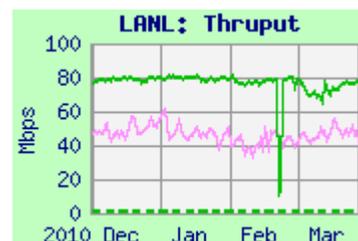
Requirements:

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 performance was lower, due to EBnet packet loss, but also stable.

Rating: Continued **Excellent**

Domain: lanl.gov

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

Teams: CERES, MODIS

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

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
LaRC ANGe	52.9	36.6	20.1	NISN / MAX / I2 / NYSERnet
GSFC-ESDIS	36.5	30.6	21.4	MAX / I2 / NYSERnet

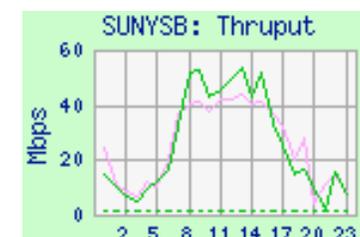
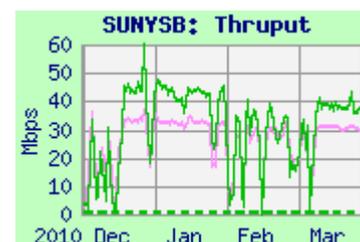
Requirements:

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

Comments: Performance from both sources acquires a significant diurnal component when classes are in session. However, the daily worst for this period is about 5x the previous daily worst, from both sources. Due to the very low requirement, the rating remains "**Excellent**".

Rating: Continued **Excellent**

Domain: sunysb.edu



12) NY, University of Buffalo:

Team: ICESAT

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

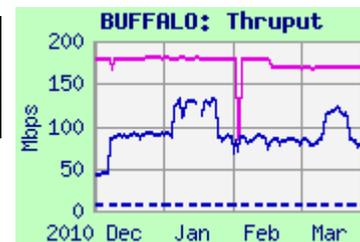
Domain: buffalo.edu

Test Results:

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
GSFC-ICESAT	91.0	86.1	75.4	NISN / MAX / I2 / NYSERnet
GSFC-ENPL	180.0	178.8	161.1	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. The thrupt is mostly stable, well above 3 x the requirement from both sources, so the rating remains "**Excellent**".

13) OR, Oregon State Univ:

Teams: CERES, MODIS

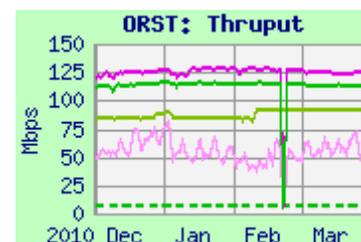
Domain: oce.orst.edu

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

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
LaRC ANGe (LaTIS)	115.4	115.0	113.0	NISN / MAX / I2 / PNW
JPL-PTH	91.2	91.0	83.2	CENIC / I2 / PNW
GSFC-ESDIS-PTH	73.3	52.5	35.5	MAX / I2 / PNW
GSFC-ENPL	127.7	126.5	124.7	

Requirements:

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



Comments: Performance from all sources was very stable for this period, thrupt was well above the requirement. The ratings from both LaTIS and GSFC remain "**Excellent**".

Thruput from **GSFC-ESDIS-PTH** was also stable, but lower than previously from GSFC-EBnet-PTH, **due to EBnet packet loss**. 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.

14) PA: Penn State Univ:

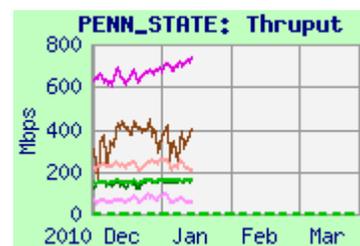
Team: MISR

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	163.0	157.6	114.9	NISN / MAX / I2 / 3ROX
LaRC-PTH	157.8	154.5	132.3	
GSFC-ESDIS-PTH	82.4	63.0	44.7	MAX / I2 / 3ROX
GSFC-ENPL	798.8	702.7	593.3	
GSFC-ESTO	461.7	341.8	209.2	

**Requirements:**

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

Comments: Thruput from LaRC ASDC and LaRC-PTH dropped in mid January '10, corresponding to an increase in RTT. The forward route did not change, but the return route is now peering with NISN in Chicago! Performance improved in June '10 due to retuning. Due to the low requirement, the rating remains **Excellent**.



From GSFC-ESDIS-PTH, thruput is stable and was similar to LaRC. It also sees the long return route, and has EBnet packet loss.

From GSFC-ESTO (on the SEN at GSFC, not EBnet) and from GSFC-ENPL (direct GigE to MAX), the RTT is lower (due to the optimum return route), and they get higher thruput than other sources.

Testing stopped in mid January, when the old test host was retired (testing resumed to the new test host in mid April)

15) TX: Univ. of Texas - Austin:

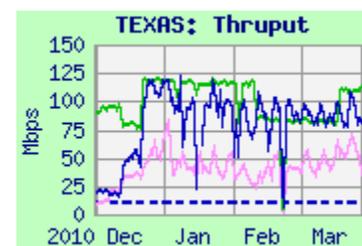
Team: ICESAT

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

Domain: utexas.edu

Test Results:

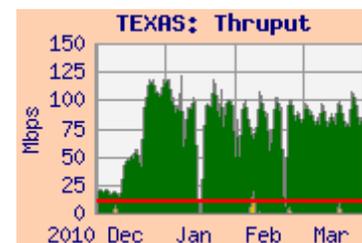
Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
GSFC-ICESAT	125.2	90.4	55.4	NISN / MAX / I2 / TX
GSFC-ENPL-PTH	118.3	108.4	92.2	
GSFC-ESDIS-PTH	67.6	41.5	26.0	MAX / I2 / TX

**Requirements:**

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

Comments: Thruput from all sources improved in December, with a server upgrade. The daily minimum thruput from ICESAT is now above the requirement by more than 3 x, so the rating improves to **Excellent**..

Thruput from GSFC-ESDIS-PTH was also stable, but lower due to EBnet packet loss.



From GSFC-ENPL, outside most of the congested GSFC campus infrastructure, thruput is much less noisy – and higher.

The average user flow this period was only 500 kbps, only about 4.5% of the requirement, but above the 105 kbps last quarter.

16) WA, PNNL:

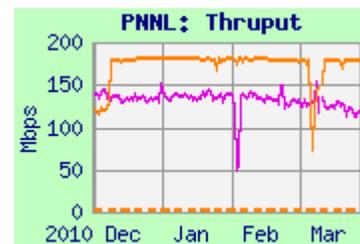
Team: MISR

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	180.3	179.2	57.9	NISN / MAX / ESnet
GSFC-ENPL	151.1	132.3	100.6	MAX / ESnet

**Requirements:**

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

Comments: Thruput from LaRC PTH was mostly stable,; the rating remains "**Excellent**". Performance from GSFC-ENPL was also stable.

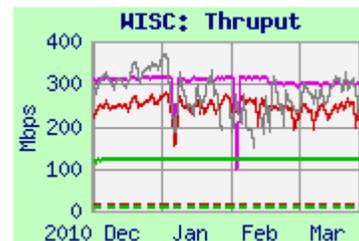
17) WI, Univ. of Wisconsin:

Teams: MODIS, CERES, AIRS, NPP

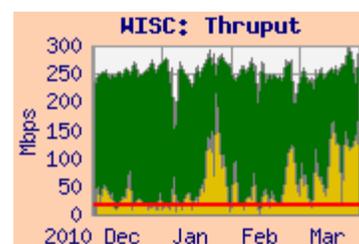
Domain: ssec.wisc.edu

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	305.8	256.5	196.1	MAX / I2 / MREN
Mini IDPS	338.6	260.8	155.0	MAX / I2 / MREN
LaRC ANGe	122.7	122.4	119.7	NISN / MAX / I2 / MREN
GSFC-ENPL	313.4	302.1	289.8	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 was excellent and mostly stable this period.

The user flow from GSFC increased in November '09, and averaged 66 mbps this period (vs 43 mbps in Q4 and 26 mbps in Q3), **well above the current 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 very stable; the rating from ANGe remains "**Excellent**".

Testing from ENPL was also very stable.

Testing was added this period from NPP Mini IDPS at GSFC. Its performance was similar to other GSFC sources.

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	57.1	53.1	13.6	NISN / StarLight / CA*net4
LaRC PTH	76.7	71.1	22.3	
GSFC-ESDIS-PTH	73.9	60.5	28.5	MAX / I2 / NY / CA*net4

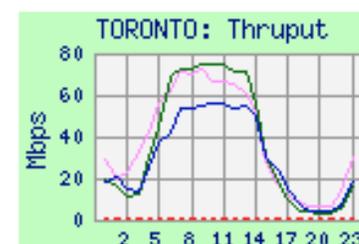
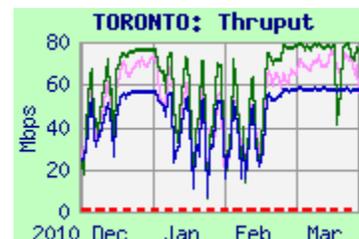
Requirements:

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 noisier again in January (students!), with a major diurnal cycle.

Thruput from **GSFC-ESDIS-PTH** was similar to **LaRC PTH**; **LaRC ASDC DAAC** was a bit lower. The ratings from both sources remain "**Excellent**", due to the low requirements.

User flow from GSFC averaged only 8.5 kbps this period.

**19) Canada: CCRS (Ottawa)**

Teams: MODIS, CEOS

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

Rating: N/A

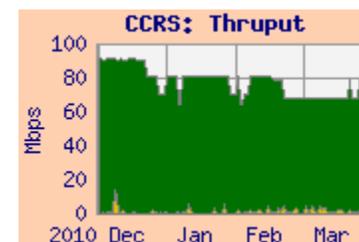
Domain: ccrs.nrcan.gc.ca

Test Results:

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
GSFC-ENPL	81.7	79.0	70.2	MAX / I2 / CA*net4
GSFC-MODAPS	56.8	51.2	40.5	

Testing to CCRS (Canadian Centre for Remote Sensing) has been ongoing for several years for CEOS, but it is now included in this report because of its MODIS SCF.

No requirement has been stated (under development), but the thruput seems excellent. User flow from GSFC averaged 1.4 mbps 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 ASDC DAAC	24.6	19.4	15.8	NISN / MAX / Géant / Garr
GSFC-NISN	54.4	52.4	47.8	
GSFC-ENPL	43.6	43.3	37.6	MAX / I2 / Géant / Garr

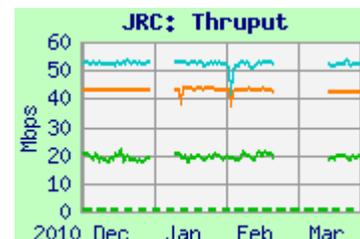
Requirements:

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 was stable from all sources this period. The median daily worst thrupt 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.

**21) University of Auckland, New Zealand**

Teams: MISR

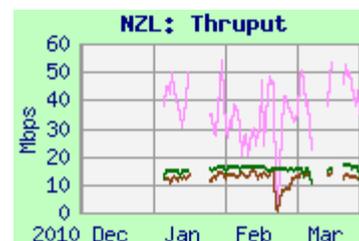
Web Page: <http://ensight.eos.nasa.gov/Missions/terra/NZL.shtml>

Rating: N/A

Domain: auckland.ac.nz

Test Results:

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
GSFC-ESDIS	58.4	37.2	17.7	MAX / I2 / PNW / PacWave
GSFC-ESTO	14.8	12.8	9.1	
LaRC-PTH	15.5	15.4	3.6	NISN / Chicago / I2 / PNW / PacWave



Testing to the University of Auckland, New Zealand is now included in this report because of its MISR SCF.

No requirement has been stated (under development), but the thrupt seems likely to be acceptable for SCF operations..

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

Teams: MODIS, MISR

Domain: ucl.ac.uk

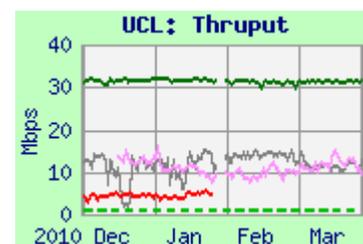
Web Page: <http://ensight.eos.nasa.gov/Missions/terra/UCLSCF.shtml>**Test Results:**

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
LaRC PTH	32.5	31.4	27.1	NISN / MAX / Géant / JAnet
GSFC-ESDIS	15.9	10.6	7.3	MAX / I2 / Géant (DC) / JAnet
GSFC-ESDIS-ftp	5.7	4.4	3.1	
EROS-PTH	17.6	12.7	7.0	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 – using ftp pulls by UCL instead of iperf from GSFC and LaRC. Results were much lower using this method. These were replaced in November and December '10 by nuttcp pulls, with improved results. FTP testing with GSFC was discontinued in January.



NISN began peering with Géant in September '09, with improved thruput from LaRC. Previously, the route from LaRC was via NISN peering with Teleglobe on the US west coast, unnecessarily increasing RTT and reducing thruput.

Thruput improved from all sources due to the improved test protocol; the median daily worst thruput from LaRC remained well above 3 x the requirement, so the rating remains "**Excellent**".

From GSFC-ESDIS, thruput is reduced due to EBnet Packet loss.

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

23) UK, Oxford:Rating: Continued **Good**

Team: HIRDLS

Domain: ox.ac.uk

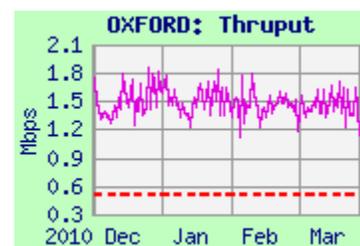
Web Page: <http://ensight.eos.nasa.gov/Missions/aura/OXFORD.shtml>**Test Results:**

Source Node	Medians of daily tests (mbps)			Route
	Best	Median	Worst	
GSFC-ENPL	2.26	1.46	0.90	MAX / I2 / Géant (DC) / JAnet

Requirements: (IST Only)

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

Comments: Testing resumed in April '10, but using "flood pings", which is a poor substitute for iperf, and provides much lower results, now rated "**Good**". User flow from GSFC to Oxford averaged 450 kbps for this period (vs. 270 last period).



(Testing to Oxford had been down since the old Oxford test host was retired in April '08). At that time iperf, performance had been mostly stable at about 25 mbps since October '06 (similar to BADC, below, which is similarly connected to JAnet), rating "**Excellent**".

24) British Atmospheric Data Centre

(Rutherford Appleton Laboratory)

Team: HIRDLS

Rating: Continued **Excellent**

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	35.5	31.3	18.1	MAX / I2 / Géant (DC) / JAnet
GSFC-ESDIS-PTH	21.5	16.5	9.1	

Requirements:

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

Comments: Thruput to RAL declined from both sources in late February (mostly recovered in April), due to apparent congestion.

Thruput from GSFC-ENPL was higher than from GSFC-ESDIS-PTH, due to packet loss on EBnet at GSFC. The thruput has consistently been much higher than the requirement, so the rating remains “**Excellent**”.

