



TransLight / StarLight

NSF Cooperative Agreement SCI-0441094

www.startap.net/translight

QUARTERLY REPORT May 1 – July 31, 2005

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Table of Contents

1. Participants	3
1.A. Primary Personnel	3
1.B. Other Senior Personnel (Excluding PI and Co-PI)	3
1.C. Other Organizations That Have Been Involved as Partners	3
1.D. Other Collaborators or Contacts	3
2. Activities and Findings	5
2.A. Research Activities	5
2.A.1. Milestones and Accomplishments	5
2.A.2. Usage Summary and Performance	7
2.A.3. Security Event Reporting	7
2.A.4. Project Governance/Management and Oversight – Meeting and Conference Participation	8
2.B. Research Findings	9
2.B.1. Research Findings for Current Quarter	9
2.B.2. Plans for the Coming Quarter (Quarterly Reports Only)	9
2.C. Research Training	10
2.D. Education/Outreach	10
3. Publications and Products	11
3.A. Journals/Papers	11
3.B. Books/Publications	11
3.C. Internet Dissemination	11
3.D. Other Specific Products	11
4. Contributions	12
4.A. Contributions within Discipline	12
4.B. Contributions to Other Disciplines	12
4.C. Contributions to Human Resource Development	12
4.D. Contributions to Resources for Research and Education	12
4.E. Contributions Beyond Science and Engineering	12
5. Special Requirements	13
5.A. Objectives and Scope	13
5.B. Special Reporting Requirements	13
5.C. Unobligated Funds	13
5.D. Animals, Biohazards, Human Subjects	13

6. Program Plan (Annual Reports Only)	14
7. TransLight/StarLight Budget (Annual Reports Only)	14
7.A. FY 2006 Budget	14
7.B. FY 2006 Budget Justification	14

1. Participants

1.A. Primary Personnel

Participant's Name(s)	Project Role(s)	>160 Hours/Yr
Thomas A. DeFanti	Principal Investigator	Yes
Maxine Brown	Co-Principal Investigator	Yes

1.B. Other Senior Personnel (Excluding PI and Co-PI)

Additional people who contributed greatly to the project, and received a salary, wage, stipend or other support from this grant:

Participant's Name(s)	Project Role(s)	>160 Hours/Yr
Alan Verlo	Professional staff	Yes
Laura Wolf	Professional staff	Yes
Linda Winkler+	Professional staff	Yes

+ Linda Winkler, while not compensated by the University of Illinois at Chicago, serves as part-time StarLight engineer with Alan Verlo of EVL/UIC, and assists with TransLight/StarLight.

1.C. Other Organizations That Have Been Involved as Partners

SURFnet

SURFnet, the national network for research and education in the Netherlands <www.surfnet.nl>, is a TransLight/StarLight "key institutional partner," responsible for negotiating, procuring and implementing the TransLight OC-192 circuit(s) between Open Exchanges in the USA and in Europe, which UIC pays for upon receipt of an invoice from SURFnet, as has been our practice with our previous NSF HPIIS Euro-Link award.

Mathematics and Computer Science Division, Argonne National Laboratory

Argonne National Laboratory <www.mcs.anl.gov> has been, and continues to be, a strong supporter of US international networking activities. Linda Winkler has facilitated STAR TAP/StarLight engineering since its inception, and is the lead engineer today; her salary comes from ANL.

International Center for Advanced Internet Research (iCAIR), Northwestern University

Joe Mambretti, director of iCAIR <www.icair.org>, also runs the StarLight facility <www.startap.net/starlight>, and is assisting with connectivity issues, not only at StarLight, but also at MAN LAN.

1.D. Other Collaborators or Contacts

ESnet

The Energy Sciences Network, (ESnet) <www.es.net> is funded by the DOE Office of Science to provide network and collaboration services in support of the agency's research missions, serving thousands of Department of Energy scientists and collaborators worldwide. ESnet provides direct connections to all major DOE sites with high-performance speeds, as well as fast interconnections to more than 100 other networks. TransLight/StarLight funding makes a 10Gb link available to Internet2, DOE and DANTE, to connect Abilene and ESnet with the pan-European backbone, GÉANT (and subsequently GÉANT2).

DANTE

Owned by European NRENs, DANTE <www.dante.net> is an organization that plans, builds and operates pan-European networks for research and education. The GÉANT and GÉANT2 projects are a collaboration between 26 National Research & Education Networks representing 30 countries across Europe, the European Commission, and DANTE. Its principal purpose has been to develop the GÉANT/GÉANT2 network -- a multi-gigabit pan-European data communications network for research and education; see <www.geant.net> and <www.geant2.net>.

TransLight/StarLight funding makes a 10Gb link available to Internet2, DOE and DANTE, to connect Abilene and

ESnet with the pan-European backbone, GÉANT (and subsequently GÉANT2).

Internet2

Internet2 <www.internet2.edu> is a consortium of leading US research universities working in partnership with industry and government to develop and deploy advanced network applications and technologies. Abilene <<http://abilene.internet2.edu>> is an Internet2 high-performance backbone network that enables the development of advanced Internet applications and the deployment of leading-edge network services to Internet2 universities and research labs across the country. TransLight/StarLight funding makes a 10Gb link available to Internet2, DOE and DANTE, to connect Abilene and ESnet with the pan-European backbone, GÉANT (and subsequently GÉANT2).

National LambdaRail (NLR)

NLR <www.nlr.net> is a major initiative of US research universities and private sector technology companies to provide a national-scale infrastructure for research and experimentation in networking technologies and applications. TransLight/StarLight considers itself, in part, to be the international extension of NLR, and wants to encourage data-intensive e-science drivers needing gigabits of bandwidth to use NLR and international links for schedulable production services not available with “best effort” networks.

2. Activities and Findings

2.A. Research Activities

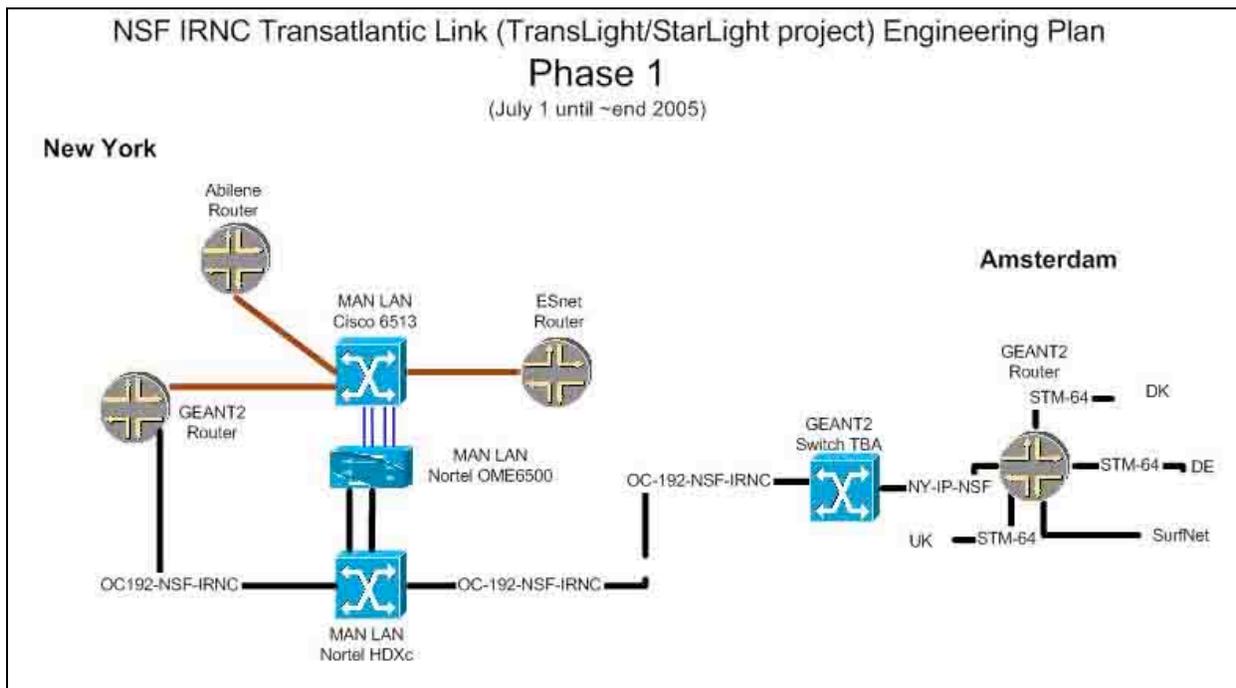
2.A.1. Milestones and Accomplishments

The NSF International Research Network Connections (IRNC) Translight/Starlight award is responsible for providing a minimum of OC-192 connectivity between the US and Europe. In cooperation with US and European national research and education networks, Translight/Starlight is implementing a strategy to best serve established production science, including usage by those scientists, engineers and educators who have ongoing large-flow, real-time, and other advanced application requirements.

IRNC New York/Amsterdam OC-192

TransLight is a L3 connection between GÉANT2 and Abilene and ESnet for both production L3 usage as well as backup usage¹. It is connected between the GÉANT owned-and-operated Juniper M160 routers located at the MAN LAN facility and the NetherLight facility in Amsterdam (operated by SARA). In New York, the router connects to Abilene's HDXc; in Amsterdam, the router connects to SURFnet's HDXc.

Peering is up, but temporarily constrained as GÉANT waits for the 10 Gige interface for their router to connect to the 6513. There are currently two GigeS there and providing the peering.



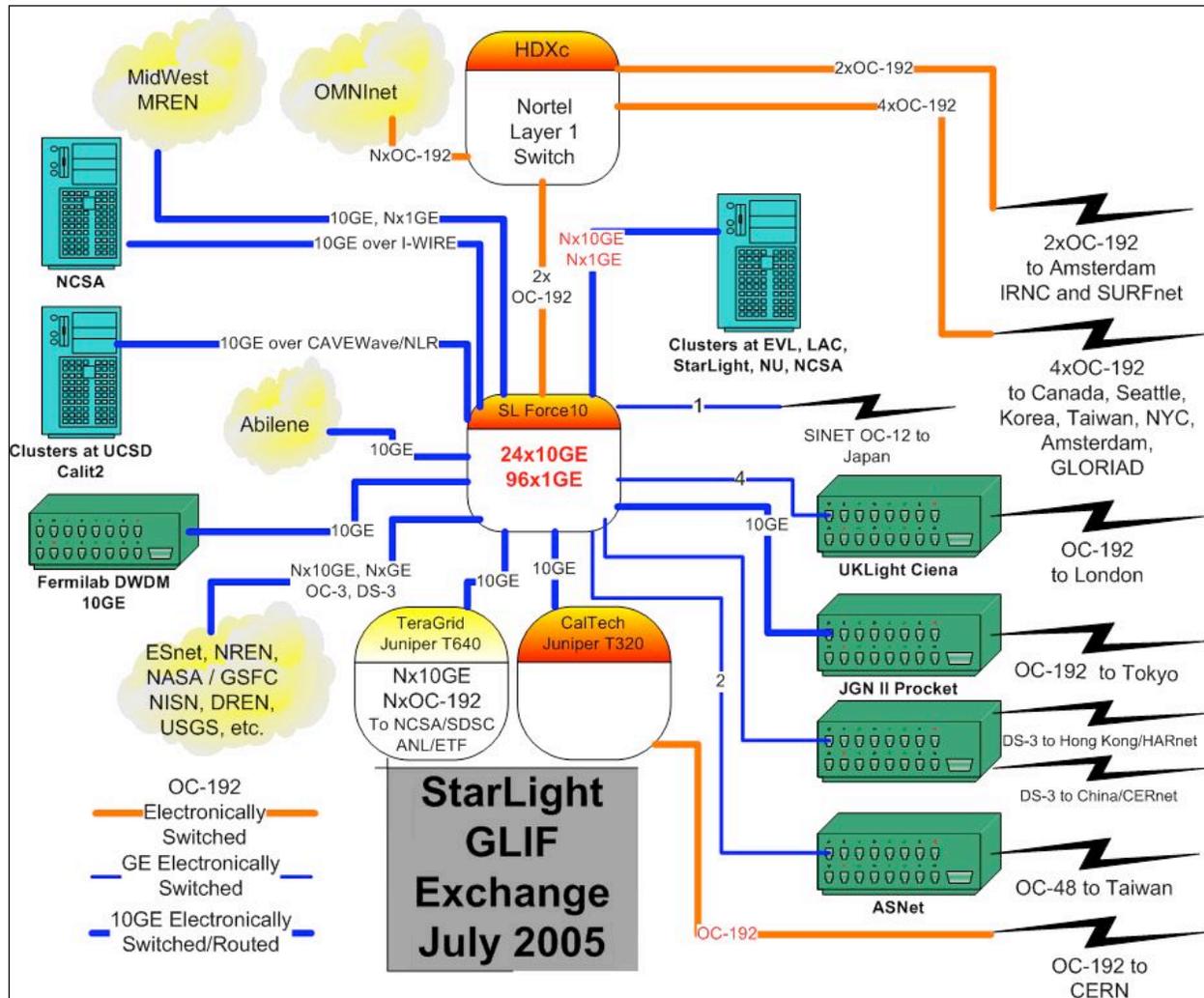
VSNL Global Network (the new owner of Tyco Global Network and our OC-192 provider) delivered the 10Gb NYC/AMS link on June 30. GÉANT was not ready in New York, so testing was postponed until after the July 4th weekend. Subsequently, a problem with cabling at New York's 32 Avenue of the Americas facility was diagnosed and fixed on July 14 by VSNL and SARA engineers. GÉANT requested to wait until after the weekend to make it operational. The link became operational July 20th.

IRNC Chicago/Amsterdam OC-192

Our second TransLight/StarLight IRNC link is a continuation of the Euro-Link setup provided by Global Crossing. Its configuration of one OC-48 (for Abilene peering) and 6x1GE (2 x 1GE for CA*net4 peering) was kept in place until the NYC/AMS link became operational on July 20th. The link currently is connected between Force10s over

¹ Tom DeFanti told Bill Johnston (ESnet) to negotiate with Kevin Thompson regarding the appropriate percentage of production usage and how much that could be exceeded for (presumably short-term backup purposes).

ONS 15454s at StarLight and NetherLight. It is matched by a SURFnet-paid OC-192 connecting into the same equipment. Global Crossing is the carrier for both, although separate fiber routes have been procured for the two circuits. The links are currently up and operating, although we are waiting for the HDXc installation to be completed before any production traffic is attempted.



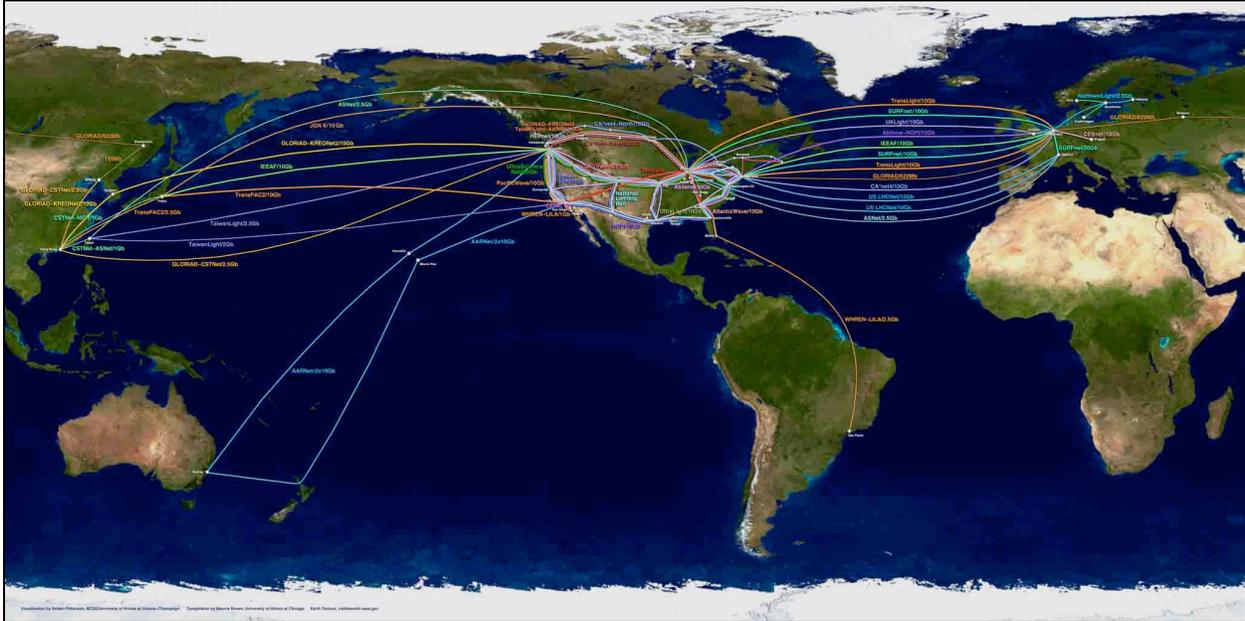
In August, the link will be moved to operate as a 10Gb lambda between the CANARIE-owned HDXc at StarLight and the SURFnet-owned HDXc at NetherLight.

On July 29, SURFnet ended its IP presence at StarLight in Chicago. SURFnet now relies on the GÉANT and Abilene networks for IP peering, rather than a 1GigE on their Amsterdam/Chicago SURFnet link. Rather, SURFnet wishes to support lightpath traffic between StarLight and NetherLight at L1.

We aim to manage the IRNC CHI/AMS and SURFnet circuits as lambdas, tracking GLIF models as they develop. On the IRNC circuit, our express goal is to provide science, engineering, and education production application access to Layer 2 1GE vlans, 10GE vlans, and Layer 1 OC-192 circuits. It being clear that these applications need to be nurtured by our computer scientists and engineers, we are allowed by NSF to encourage the development and testing of new protocols and policies that encourage usage. The challenge, of course, is managing them in a science-friendly, somewhat scalable way. Simply said, the condition of use is that it is a science/engineering/education use and once it fully saturates the OC-192 beyond testing phase, it moves off to its own link. If 10G saturation does not occur (say, only a GE or two are used), we can handle this with vlans. If a dozen of such GE applications emerge, we will be very pleased. We are, of course, working with CANARIE on UCLP and will encourage adoption/evaluation of this technology to achieve GLIF and NSF goals simultaneously on this IRNC link between NL and SL.

New GLIF Map Showcases IRNC Links

Maxine Brown collected data from GLIF participating organizations to create a new release of the GLIF map. Visualization designer Bob Patterson of NCSA/UIUC used various shades of **orange** to indicate the NSF IRNC and IRNC-related links (and the NSF TeraGrid). They are not the *same* shade of **orange** because, in some instances, foreign countries are paying for portions of the links (e.g., Korea, China and Canada are contributing to GLORIAD). So, the color coding is subtle, but something to indicate NSF's contribution to the evolving global LambdaGrid. This map will soon be posted to the GLIF website <www.glif.is>, and ultimately the main IRNC website.



2.A.2. Usage Summary and Performance

Measurements of usage and performance are required for supported links to augment and provide background for the more useful project accountability measures. The awardee will assist in the collection of end-to-end performance data with the permission of the users. The awardee will provide web-based access to measurement and performance data to the NSF program manager. The requirements for this task will be developed jointly between NSF and IRNC awardees.

IRNC New York/Amsterdam OC-192

MRTG traffic statistics of Abilene/GÉANT peering at MAN LAN are available at:
<http://stryper.uits.iu.edu/abilene/summary.cgi?network=nycm-geant-newyork&data=bits>
<http://stryper.uits.iu.edu/manlan/summary.cgi?network=nycm-geant-1&data=bits>
<http://stryper.uits.iu.edu/manlan/summary.cgi?network=nycm-geant-2&data=bits>

Rick Summerhill of Abilene notes that the current path is: Amsterdam HDXc ↔ MAN LAN HDXc ↔ GÉANT Router ↔ MAN LAN 6513. The 6513 end is temporarily constrained by 2x1 GigE, as noted above. The peering with Abilene is to the NYC GÉANT router, so Abilene doesn't see past that router (except at the HDXc, where one only sees circuit-level information).

Roberto Sabatino of GÉANT tells me access to traffic information is restricted to GÉANT1/GÉANT2 project members, but he will arrange to open access to us so we can obtain information on IRNC link utilization.

IRNC Chicago/Amsterdam OC-192

We intend to help provide measurement as practical and possible on the NL ↔ SL L1/L2 link.

2.A.3. Security Event Reporting

Security of networks as well as user organizations is a critically important function of the network operations.

Security incidents and relevant security issues will be discussed during periodic meetings. Significant security incidents involving NSF-funded circuits shall be reported to the NSF program manager within 24 hours of their occurrence.

Currently there is nothing to report.

2.A.4. Project Governance/Management and Oversight – Meeting and Conference Participation

TransLight/StarLight principals ensure that an efficient and effective project governing structure is in place throughout the award period to support all critical or significant project activities. To date, TransLight/StarLight principals have participated in several meetings and conferences to promote IRNC activities. Major activities are listed here.

July 29, 2005. Tom DeFanti and Maxine Brown participated in an IRNC phone call to discuss status updates.

July 17-20, 2005. Alan Verlo attended the Summer 2005 ESCC/Internet2/CANARIE Joint Techs Workshop co-hosted by BCNET, the University of British Columbia and the British Columbia Institute of Technology, in Burnaby, Canada. He also participated in the JET meeting, held July 18. Tom DeFanti provided Alan and Bill Johnston of ESnet with a set of PPTs on TransLight. <<http://jointtechs.es.net/Vancouver20051.htm>>

June 21, 2005. Alan Verlo and Linda Winkler participated in the monthly JET (Joint Engineering Team) meeting.

June 6, 2005. Tom DeFanti and Maxine Brown participated in an IRNC phone call to discuss status updates.

June 4-5, 2005. The Coordinating Committee for International Research Networks (CCIRN) annual meeting was held in conjunction with the TERENA Networking Conference 2005 in Poznan, Poland. Joe Mambretti, head of the CCIRN Digital Video Working Group (DVWG), could not attend, but Grant Miller offered to give a short presentation in his place; Mambretti provided information on the DVWG as well as StarLight, TransLight, GLIF and iGrid 2005.

May 17, 2005. Alan Verlo and Linda Winkler participated in the monthly JET (Joint Engineering Team) meeting.

May 2, 2005. Joe Mambretti represented TransLight/StarLight at the Internet2 Spring 2005 Member Meeting IRNC panel, held at the International Task Force (ITF) meeting. Presentations are available at <<http://international.internet2.edu/resources/events/2005/2005SMM-itf2.html>>.

2.B. Research Findings

2.B.1. Research Findings for Current Quarter

No findings to report.

2.B.2. Plans for the Coming Quarter (Quarterly Reports Only)

TransLight/StarLight plans for August 1 – October 31, 2005, include:

1. Assist GÉANT and Abilene in any way possible to get 10GigE over the New York/Amsterdam circuit.
2. Reconfigure continuing Global Crossing OC-192 circuit between StarLight and NetherLight to eliminate OC-48 to Abilene in Chicago.
3. Work to identify and develop production applications on both circuits (focusing on the early adopters who use the link for iGrid 2005).

2.C. Research Training

National Research Network (NRN) management and engineers from Internet2, ESnet, DANTE and NLR work closely with IRNC management and engineers at UIC and SURFnet, as well as at MAN LAN, StarLight, and NetherLight, to facilitate connectivity and greater advances in global networking than a single-investigator effort would afford. In addition, numerous researchers, middleware developers, network engineers and international NRNs are involved as users of TransLight. This global, dedicated community has elected to work together, on a persistent basis, to further the goals of international e-science collaboration.

2.D. Education/Outreach

TransLight/StarLight's primary education and outreach activities include web documentation, journal articles, and conference presentations and demonstrations. We also provide PowerPoint presentations, and other teaching materials to collaborators to give presentations at many conferences, government briefings, etc.

Since 1986, EVL has partnered with NCSA, ANL, and more recently NU/iCAIR, in ongoing efforts to develop national/international collaborations at major professional conferences, notably ACM/IEEE Supercomputing (SC), IEEE High Performance Distributed Computing (HPDC), and Internet2 meetings. We have participated in European conferences (e.g., GLIF/LambdaGrid Workshops), NORDUnet annual meetings and a UKERNA seminar on optical networking. Our success has been in the development of teams, tools, hardware, system software, and human interface models on an accelerated schedule to enable multi-site collaborations for complex problem solving.

We are currently organizers of the upcoming iGrid 2005 in San Diego in September 2005, and plan to participate in the SC 2005 conference in Seattle in November 2005, to promote the goals of IRNC and TransLight/StarLight.

3. Publications and Products

3.A. Journals/Papers

Tom DeFanti, Maxine Brown, Joe Mambretti, John Silvester, Ron Johnson, “TransLight, a Major US Component of the GLIF” Cyberinfrastructure Technology Watch (CTWatch) Quarterly, Volume 1, Number 2, May 2005, <www.ctwatch.org/quarterly/articles/2005/05/trans-light>

3.B. Books/Publications

None at this time.

3.C. Internet Dissemination

www.startap.net/translight

3.D. Other Specific Products

Other than the information reported here, we have not developed any other specific product of significance.

4. Contributions

4.A. Contributions within Discipline

TransLight/StarLight, by its very nature, is interdisciplinary. There is clearly a fine team of computer scientists, computational scientists and networking engineers involved with TransLight, facilitating greater advances in global networking than single-investigator efforts could produce. TransLight developed its management team in the Chicago area (UIC/EVL), and leveraged the efforts of national networking groups (Internet2, ESnet and NLR) and international NRNs (DANTE and SURFnet) technical and administrative contacts.

4.B. Contributions to Other Disciplines

Within the Computational Science and the Computer Science communities, TransLight/StarLight efforts help lead 21st century discipline science and computer science innovation. TransLight's OC-192 Layer-3 circuit among Abilene, ESnet and GÉANT provides greater connectivity, and the OC-192 Layer-2 circuit between StarLight and NetherLight provides a unique infrastructure to study the effects of long-distance, high-bandwidth networks on advanced applications.

4.C. Contributions to Human Resource Development

We promote TransLight through web documentation, journal articles, demonstrations and presentations at major networking conferences (e.g., Supercomputing, HPDC and Internet2), PowerPoint presentations and other instructional material. We teach the infrastructure, the grid advancements, the technological innovations and the application advancements that global connectivity enables. In fact, thanks to previous NSF funding of STAR TAP, StarLight and Euro-Link, STAR TAP has a mailing list of ~1,000 <stars@startup.net> individuals, from academia, government and industry, interested in information about international advanced networking developments.

4.D. Contributions to Resources for Research and Education

TransLight is a necessary and integral part of application advances and technological innovations for the Computational Science and Computer Science communities, as well as of major interest to network engineers. In particular, the Layer-2 TransLight circuit between StarLight and NetherLight represents a major resource for science and technology.

4.E. Contributions Beyond Science and Engineering

Because of TransLight's interest in advanced applications and light-path provisioning, we often get inquiries from network equipment manufacturers and telecommunication providers about partnering with us to create and showcase a marketplace for wavelength-based network services and products. We look forward to working with these companies and introducing them to the Nation's foremost university and Federal laboratory networking engineers, computer programmers and applications scientists, who are developing and using today's evolving grid technologies. Our users expect us to grow in capacity and sophistication, and we look forward to the engineering challenges ahead.

5. Special Requirements

5.A. Objectives and Scope

A brief summary of the work to be performed during the next year of support if changed from the original proposal.
Our scope of work has not changed.

5.B. Special Reporting Requirements

Do special terms and conditions of your award require you to report any specific information that you have not yet reported?
No.

5.C. Unobligated Funds

Do you anticipate that more than twenty percent of the funds under your NSF award will remain unobligated at the end of the period for which NSF currently is providing support?
No.

5.D. Animals, Biohazards, Human Subjects

Has there been any significant change in animal care and use, biohazards, or use of human subjects from what was originally approved (or approved later)?
No.

6. Program Plan (Annual Reports Only)

The awardee will submit annual reports that detail the plans and milestones for the following year, address community support and satisfaction, address capacity planning and circuit upgrade, and include a revised budget for the following year.

7. TransLight/StarLight Budget (Annual Reports Only)

7.A. FY 2006 Budget

7.B. FY 2006 Budget Justification
