

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

HAYSTACK OBSERVATORY

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3 October 2002

TO: Distribution
FROM: Alan R. Whitney
SUBJECT: 2 October 2002 e-VLBI telecon summary

Attendees:

Bill Fink, Lee Foster, Pat Gary, Chuck Kodak, Kevin Kranacs – GSFC

Steve Bernstein, Lorraine Prior, Peter Schultz – MIT Lincoln Labs

Kevin Dudevoir, Hans Hinteregger, Arthur Niell, Mike Titus, Alan Whitney – Haystack Observatory

This telecon is one of an ongoing series of telecons to prepare for gigabit/sec e-VLBI demonstrations between NASA GSFC and MIT Haystack Observatory using a combination of network facilities including all or part of Glownet, Bossnet, ISI-E, SuperNet, Max and GSFC/HECN.

ACTION ITEMS ARE HIGHLIGHTED IN RED.

Status Reports

The attached figures of the e-VLBI path have been updated to reflect current status and are pretty much self-explanatory. The following status updates were reported:

- Peter reported that Bossnet has been operational for last couple of weeks, though it is still operating GigE. OC-48 was tried, but error rates were high and GigE was re-enabled. Tom reported that current link from ISI-E to Eckington is from Verizon, but will go away sometime in the next few weeks and be replaced by a higher quality fiber from Qwest that will go directly from ISI-E to Eckington and connect to Bossnet (expected to be in place by end of October). This new fiber should allow Bossnet to return to OC-48 and support proposed 10GigE tests.
- On Tuesday, 9 Oct, Haystack will attempt an e-VLBI experiment with Kashima, Japan. Data will be transmitted via Abilene and GEMnet (across Pacific Ocean) at ~20 Mbps. This is believed to be the first attempt at intercontinental e-VLBI.
- Tom reported a bad fiber was found connecting College Park (MAX) to ISI-E. This has been fixed and will be tested with help from Bill Fink.
- Tom also reported that, as part of infrastructure upgrade, a dedicated OC-48 connection from Bossnet to Abilene will be put in place for e-VLBI work.

- Alan reported that two Mark 5 systems are now in place at both Westford and GGAO. A first attempt at e-VLBI was made a few days ago, but an apparent problem in one of the Mark 5 systems at GGAO prevented success. That Mark 5 system has now been replaced and a new attempt is planned shortly. Using two Mark 5 systems, we expect to achieve a data transfer rate of ~800 Mbps. **We will keep everyone posted on the status of these tests.**
- Pat suggested that future planning needs to be done to continue to expand e-VLBI after the current demonstrations are concluded. Alan indicated that a recent grant from NSF will allow Haystack Observatory to continue to develop e-VLBI and that the ultimate goal is to create a global e-VLBI network. Within NASA, Bill Wildes is very interested in promoting e-VLBI and is a natural contact point and ally. Also, Dr. John LaBrecque at NASA HQ, manager of the NASA Solid Earth and Natural Hazards Program, is also very interested in pursuing e-VLBI. Current annual global geodetic VLBI observations are typically ~150 24-hr sessions with 6-8 antennas each. There is desire to expand these observations and e-VLBI may help to lower costs and increase usefulness. GGAO would be a good test platform for continuing e-VLBI development efforts. **We will pursue this topic further when Bill Wildes returns from vacation.**
- Alan reported that that USNO plans to lease a dark fiber from GWU to USNO. USNO will then connect to the GigaPOP at GWU. This will allow e-VLBI data to be transmitted to USNO for correlation on their Mark 4 correlator system.
- Pat asked about the work to create an e-VLBI demonstration connection to Hawaii. Alan reported that Bill Wildes is taking the lead in this effort, with participation by Kokee Observatory and Pacific Missile Range Facility (PMRF) on Kauai, and well as U. of Hawaii on Oahu and Haystack Observatory. Tentative plan is to bring data through DREN network to MAX, then Bossnet to Haystack. Goal is late 2002/early 2003 for demonstration. Alan will distribute a preliminary diagram of the path prepared by Hans Hinteregger. Pat has created a path diagram similar to the diagrams we have created for this project showing how this path can come into the H7 router on Figure 2; Pat and Alan will distribute this material to the project group (Pat has already done so). It is suggested that Pat be included in the continuing preparations for this test since GGAO may be a good partner antenna for early tests of the Kokee link.

Security

Responding to questions by Kevin D., a lengthy discussion regarding security concerns arose involving multi-homed computers that connect to Bossnet (140.x.x.x). Lorraine made it clear that Haystack's use of the 140 network requires that no machine be connected to both the '140' network and any other non-secure network (e.g. Haystack's internal network, in particular) at the same time. In order for the e-VLBI experiments to move forward, however, it is necessary for the Mark 5 data systems to be connected to Haystack's internal network during data-taking and data processing; however, they will not be connected to the 140 network during this time. They will only be connected to the 140 network during data transfer activities, during which time they will be disconnected from the local Haystack network. Haystack will abide by these rules.

Alan will update network diagrams to show local-LAN-connected computers that must be connected to the Mark 5 systems during data acquisition and correlation.

Lorraine and Steve will review the current security situation and consider alternate connections and schemes that might be adopted in the future to ease or eliminate some or all of these constraints. Anne Gorczyca needs to be kept in the loop in these discussions.

Report Outline

A draft outline for a proposed project report was distributed by Alan (see minutes of 16 Sep 02 telecon). After some discussion, the outline was modified as follows:

- Executive Summary - Alan
- Introduction - Alan
- What is VLBI? - Alan
- Why e-VLBI? - Alan
- Goals of the 1-Gbps e-VLBI Demonstration - Alan
- Elements of the 1-Gbps Demonstration
 - Mark 5 VLBI Data System - Alan
 - Glownet/Bossnet – Steve/Lorraine/Peter
 - ISI-E/Max – Tom/Jerry
 - GSFC Networks – Pat/Bill F./Paul/Kevin K./Dan
 - Haystack/GGAO – Kevin D./Alan/Bill W.
- Testing and Performance – Tom/Bill F./Kevin K./Kevin D.
- Results of e-VLBI Demonstration – Alan
- Recommendations for further work/Future Directions in e-VLBI - All
- Summary - Alan

Goal is to have first draft by end Nov 2002 and final report ready to submit for publication by end Dec 2002. To be included as well: network diagrams, performance graphs, and e-VLBI results.

Everyone is asked to distribute draft material for comment; Alan will act as editor and badgerer. We expect final report will be 10-15 pages in length.

Next telecon

Next telecon is scheduled for **Wed, 23 October 2002** at 2 pm EDT.

xc:	Steve Bernstein, LL	Aruna Muppalla, GSFC
	Jim Calvin, LL	Bill Wildes, GSFC
	Lorraine Prior, LL	Dan Magorian, UMCP
	Leslie Weiner, LL	Tom Lehman, ISI
	Herbert Durbeck, GSFC	Jerry Sobieski, Max
	Bill Fink, GSFC	Richard Crowley, Haystack
	Lee Foster, GSFC	Kevin Dudevoir, Haystack
	Pat Gary, GSFC	Hans Hinteregger, Haystack
	Chuck Kodak, GSFC	Arthur Niell, Haystack
	Kevin Kranacs, GSFC	Joe Salah, Haystack
	Paul Lang, GSFC	

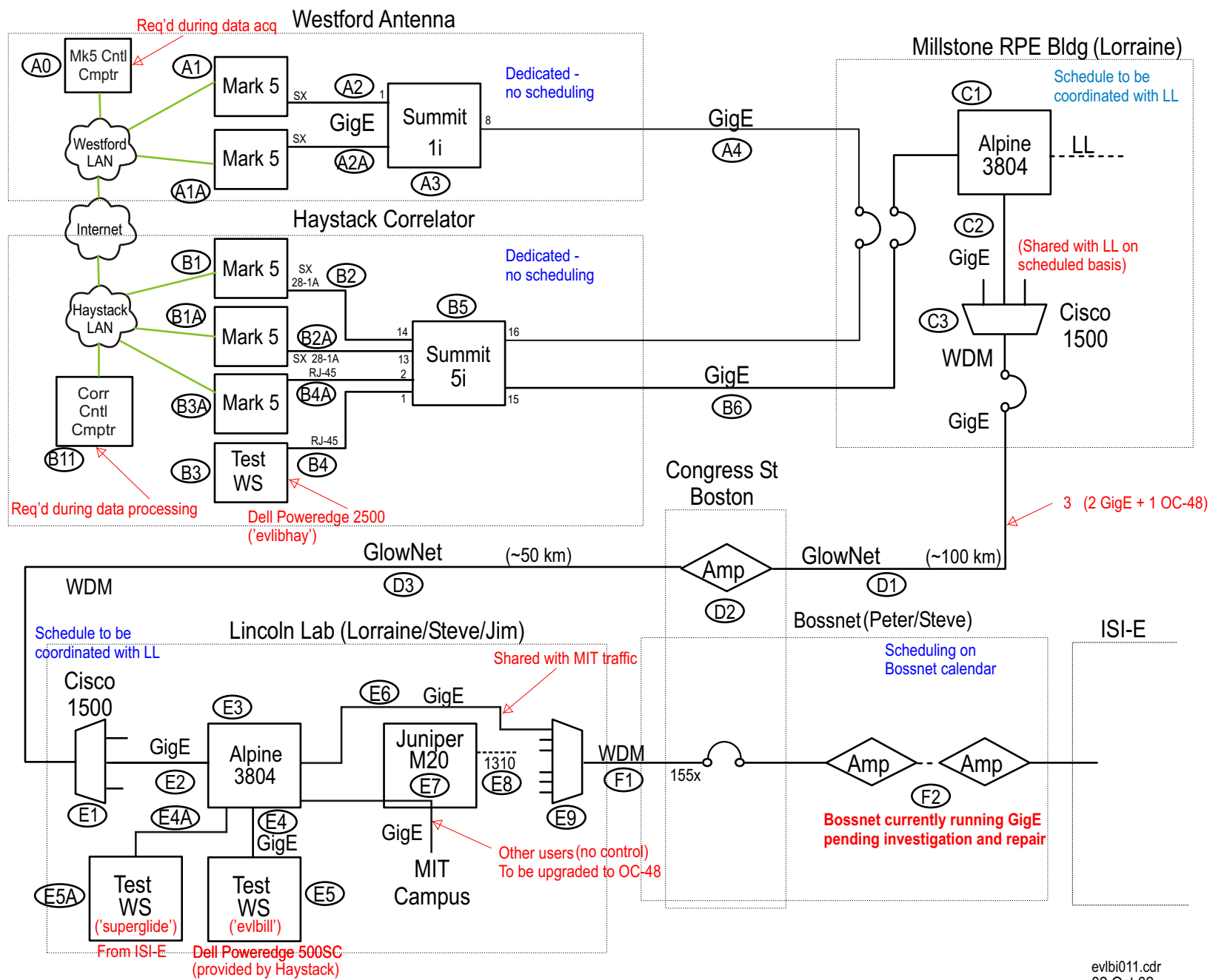


Figure 1: e-VLBI Path - Haystack to ISI-E

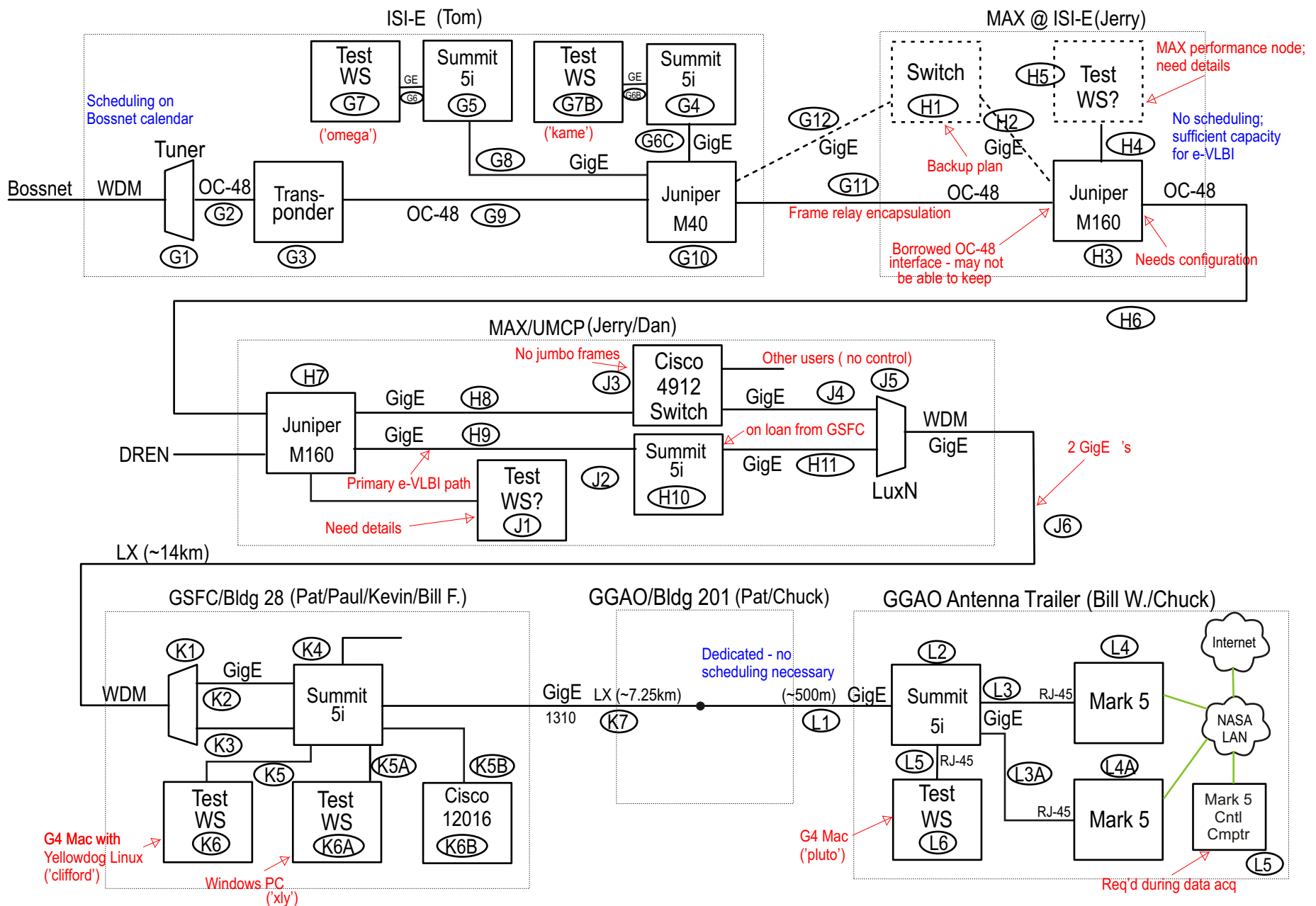


Figure 2: e-VLBI Path - ISI-E to GSFC/GGAO