

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

HAYSTACK OBSERVATORY

WESTFORD, MASSACHUSETTS 01886

Telephone: 978-692-4764

Fax: 781-981-0590

24 June 2002

TO: Distribution
FROM: Alan R. Whitney
SUBJECT: 24 June 2002 e-VLBI telecon summary

Attendees:

Lee Foster, Pat Gary, Chuck Kodak, Kevin Kranacs – GSFC
Steve Bernstein, Lorraine Prior, Peter Schultz – Lincoln Laboratory
Tom Lehman – ISI-E
Richard Crowley, 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.

Status Reports

The attached figures of the e-VLBI path have been updated to reflect current status and are pretty much self-explanatory; critical status items are indicated in red. In addition, the following comments are relevant:

- Tom and Peter reported that there is still a problem with the OC-48 Bossnet service. It has temporarily been changed to GigE, which seems to work properly. A service person will be dispatched to try to diagnose and fix the problem in the next few days; the problem appears to be in an optical amplifier in the Newark, NJ area.
- Routers at G10, H3 and H7 need configuration updates to support the e-VLBI path. Pat and Tom will consult with Jerry Sobieski and/or Dan Magorian to accomplish this. Bill Fink can assist with this task if Jerry/Dan are not able to do it. **Goal is to have this work done by the end of this week.**
- Pat reported that, as a result of the creation of several VLAN's for e-VLBI purposes, workstation L6 (pluto at GGAO) has had an IP change to 206.196.178.53.
- Pat reported that another Summit 5i (designated K4A) has been added between K4 (Bldg 28) and L2 (GGAO). Additionally, a 'one-armed' Cisco GSR 12000/16 router is attached to K4A to connect the GGAO and Bldg 28 nets. Pat does not believe this additional equipment should affect net performance. All equipment in the e-VLBI path should support 9KB jumbo frames.

- G7B IP address has been changed to 140.173.174.22.

Performance Testing

After the conversion of Bossnet to GigE, Tom achieved >900 Mbps single stream TCP in both directions.

Kevin D. conducted four 30-minute tests, achieving ~965 Mbps average from ISI to Haystack, and ~940 Mbps average from Haystack to ISI, based on 1-sec averaging using iperf. Kevin's plots are attached (top two plots of each test are transmitter performance; bottom two plots are receiver performance). The bandwidth was measured using iperf-1.1.1 with 1 sec averaging. The cpu idle time was measured using vmstat with 1 sec averaging. No information on packet loss rates or re-transmissions. The tests were done with the following parameters:

```
mtu = 4470 Bytes
mss = 4418 Bytes
buf = 3976200 Bytes
```

Quick summary of the results:

- 1] test 1: ISI(kame) -> Haystack(evlbihay)
avg. bandwidth = 965991626 Mb/s,
tx cpu idle time = 40%
rx cpu idle time = 37%
- 2] test 2: Haystack(evlbihay) -> ISI(kame)
avg. bandwidth = 934996557 Mb/s
tx cpu idle time = 12%
rx cpu idle time = 40%
- 3] test 3: ISI(kame) -> Haystack(evlbihay)
avg. bandwidth = 969819409 Mb/s
tx cpu idle time = 37%
rx cpu idle time = 41%
- 4] test 4: Haystack(evlbihay) -> ISI(kame)
avg. bandwidth = 951017228 Mb/s
tx cpu idle time = 13%
rx cpu idle time = 40%

Kevin D. reported that application performance with two Mark 5 systems back-to-back is currently limited to ~450 Mbps due to an apparent bottleneck from memory to/from disk. He plans to further investigate, perhaps trying another motherboard with a faster CPU (current CPU is 1GHz P3) and PCI bus.

Kevin D. reported that he had difficulty measuring round-trip ping time from ISI to Haystack and back to ISI; varies from 4msec (impossible) to ~14msec. Round-trip ping time from Haystack to ISI, however, is consistent at ~14.5msec. Reason for this inconsistency is unknown.

Pat reported that Bill F. has done testing between GGAO (L6) and GSFC Bldg 28 (K6), achieving ~992 Mbps TCP single stream (likely in both directions) using nuttcp. Connection seems to be very solid.

Action Items

Alan: Distribute updated workstation configuration information to group.

Steve: Keep group updated on Bossnet status.

Pat/Tom/Bill F.: Work with Jerry Sobieski/Dan Magorian to properly configure routers at G10, H3 and H7. To be done by end of the week (28 June 2002).

Bill F.: Distribute information on nuttcp routine.

Bill F.: Set up reverse mapping so GGAO test workstation can be managed from Bldg 28.

Next telecon

Next telecon will be **Thursday, 11 July 2002** at 2 pm.

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

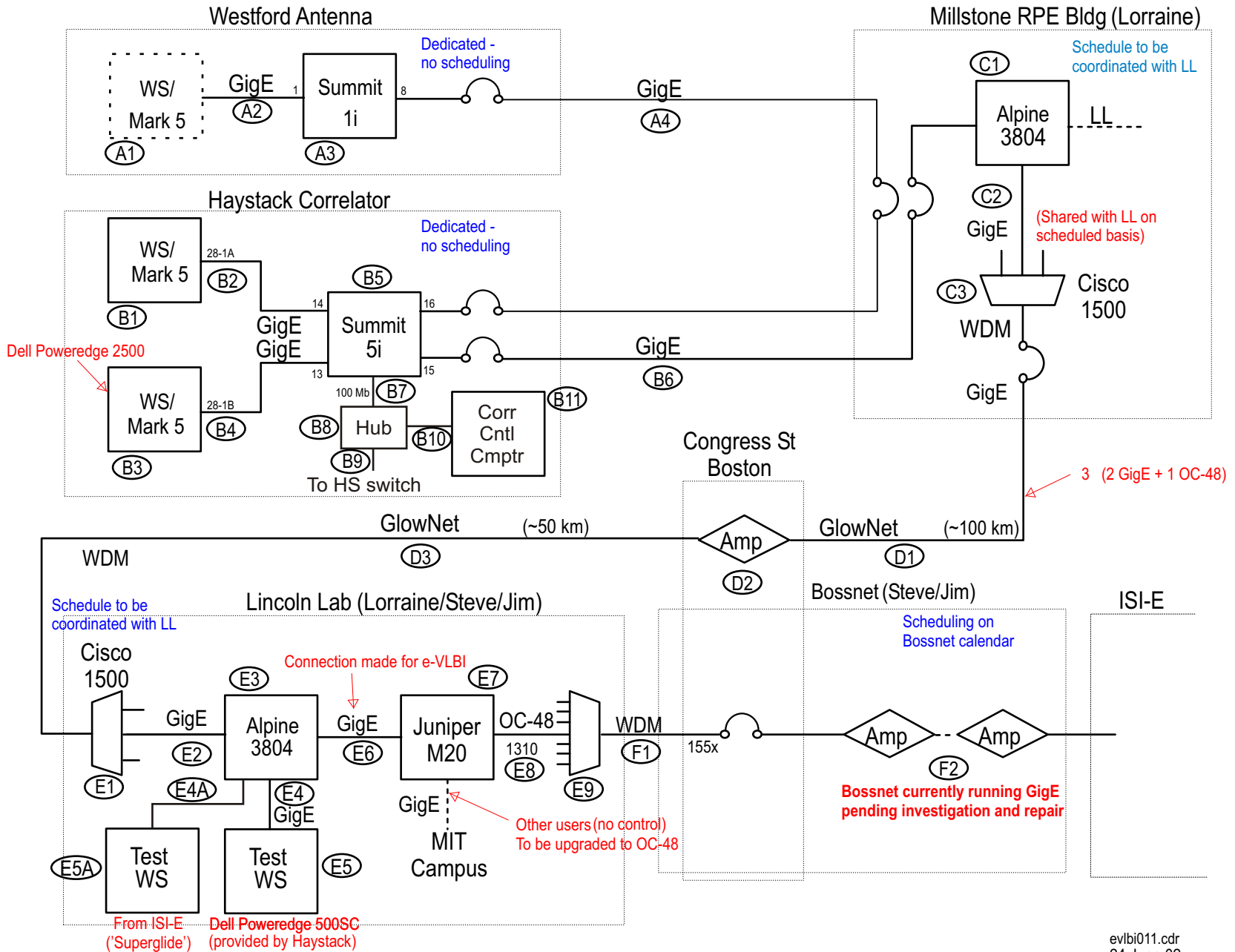


Figure 1: e-VLBI Path - Haystack to ISI-E

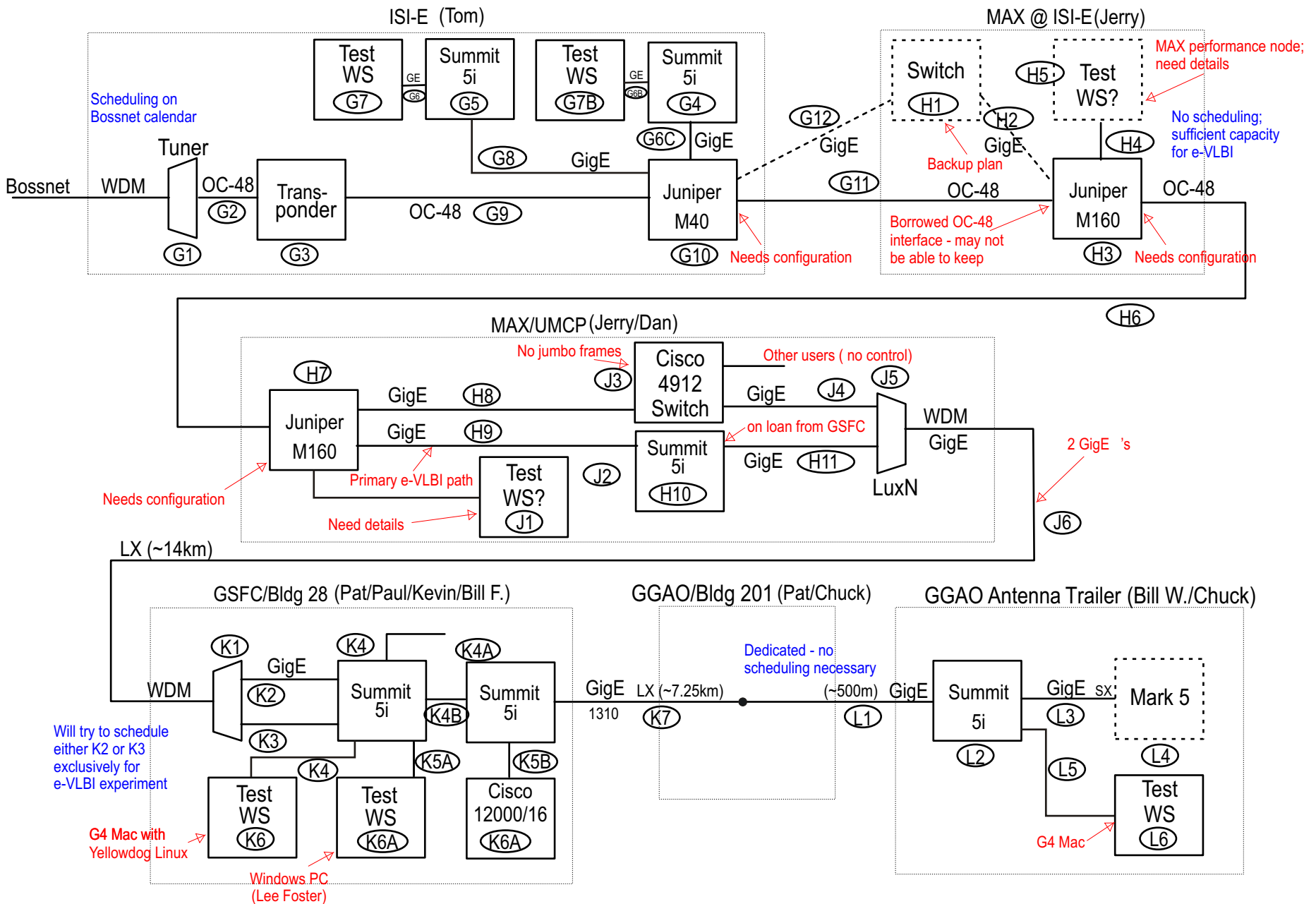
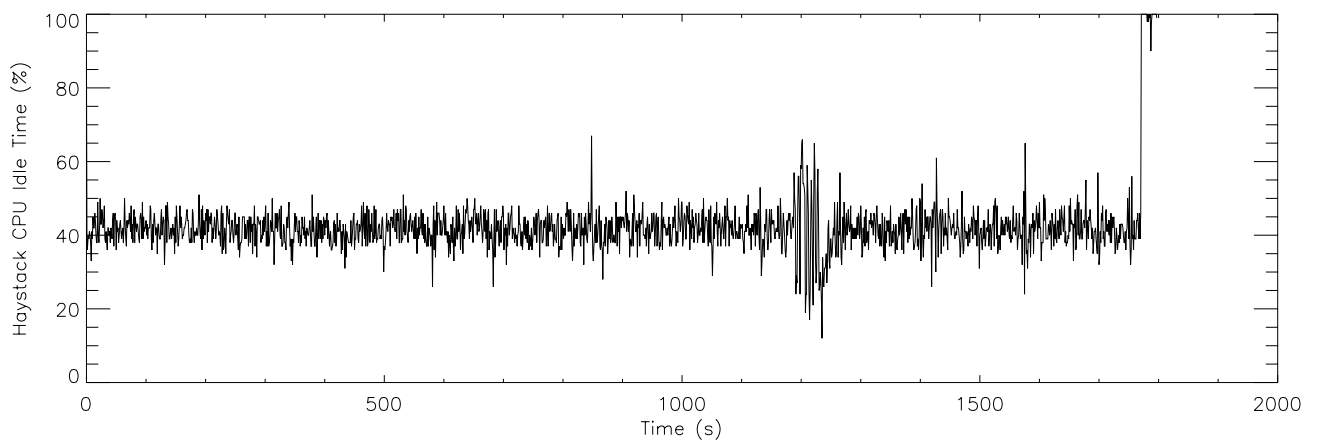
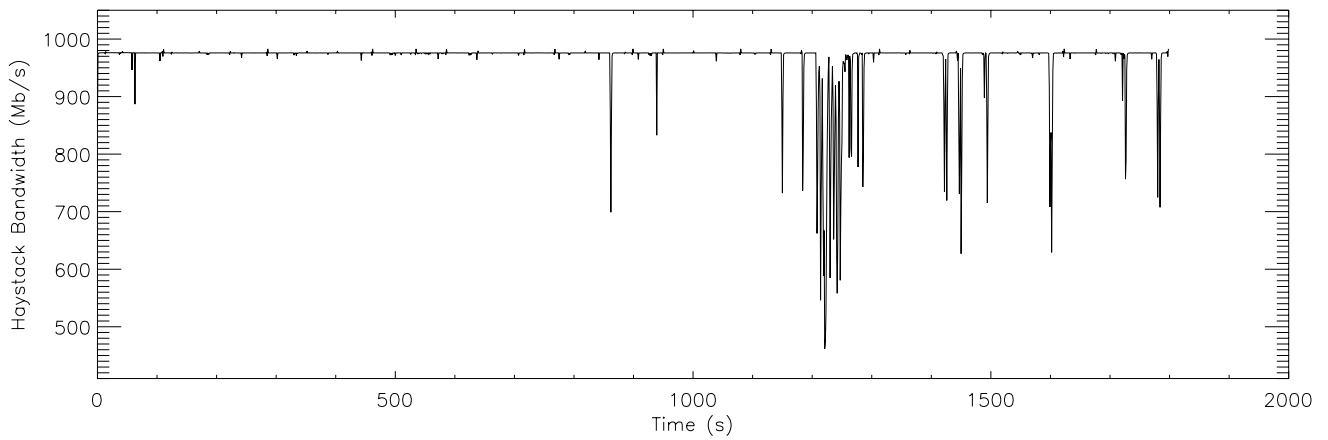
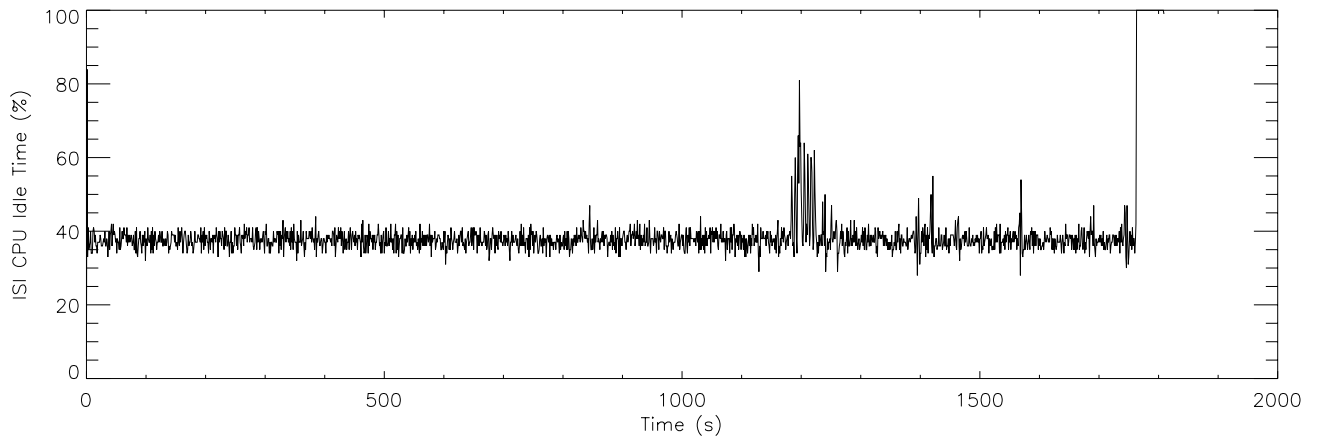
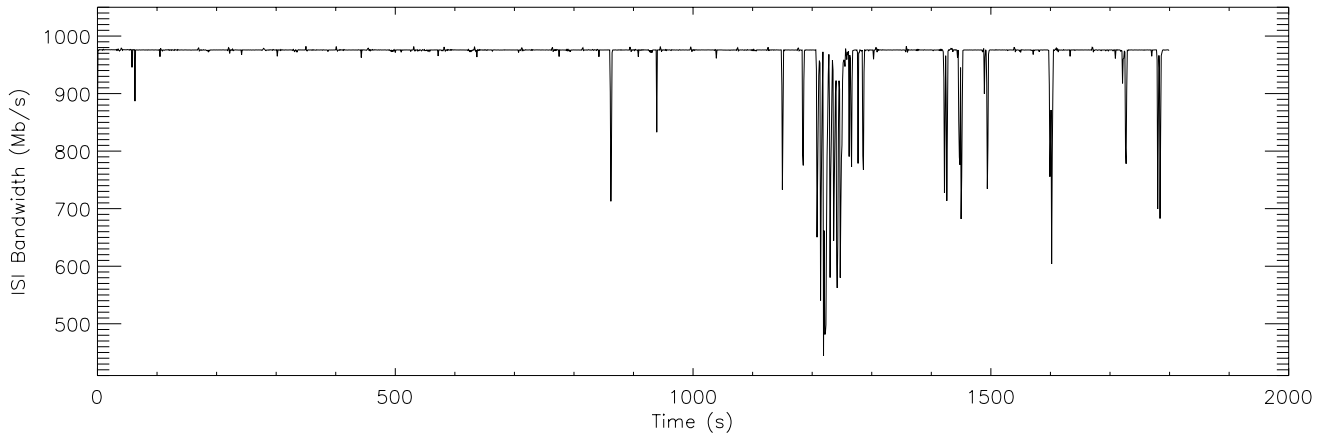
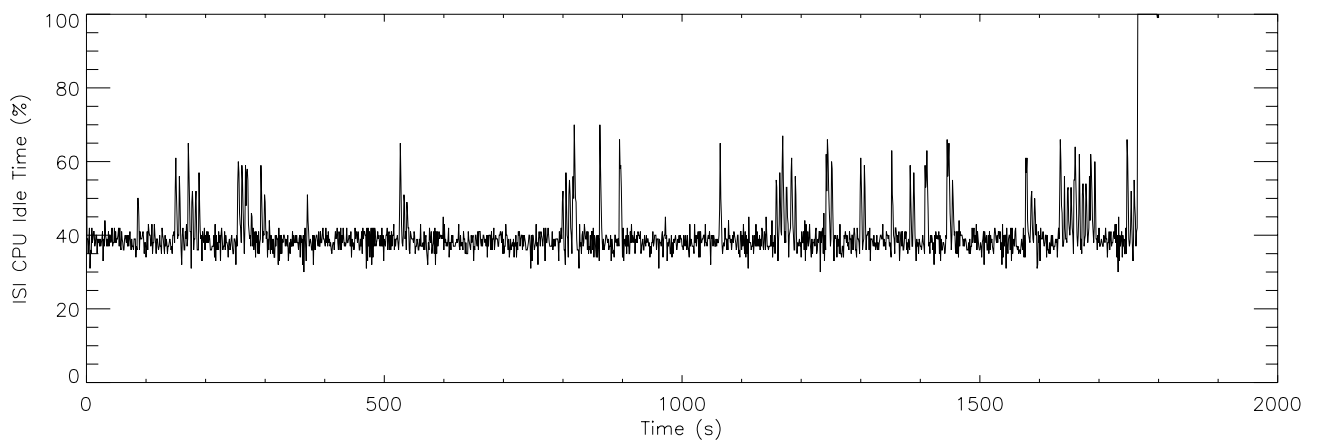
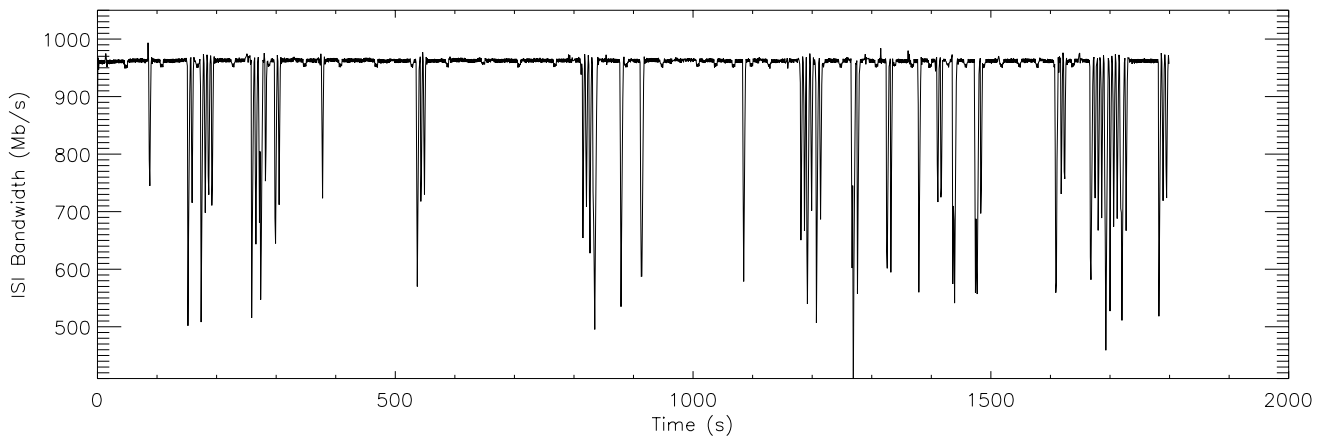
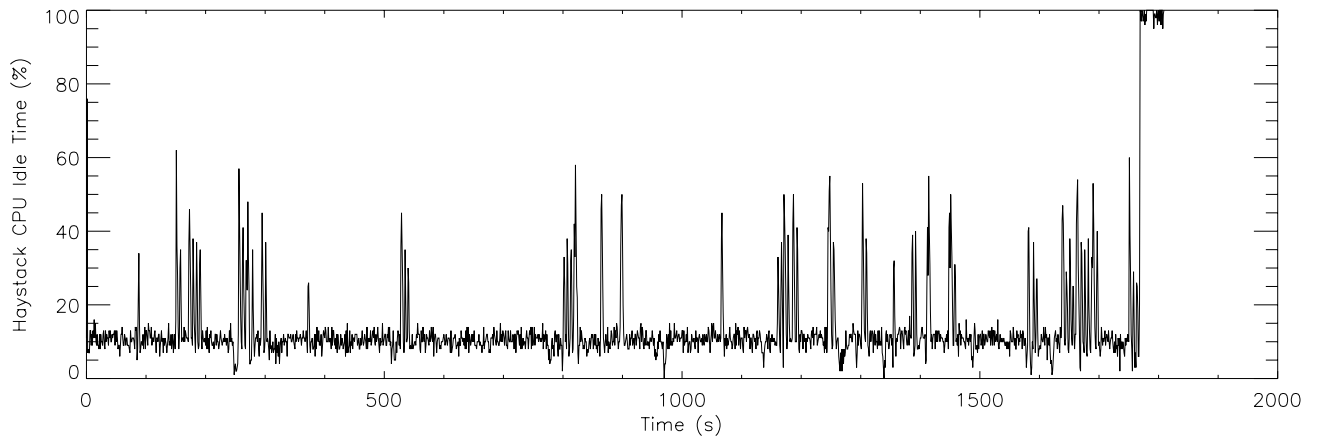
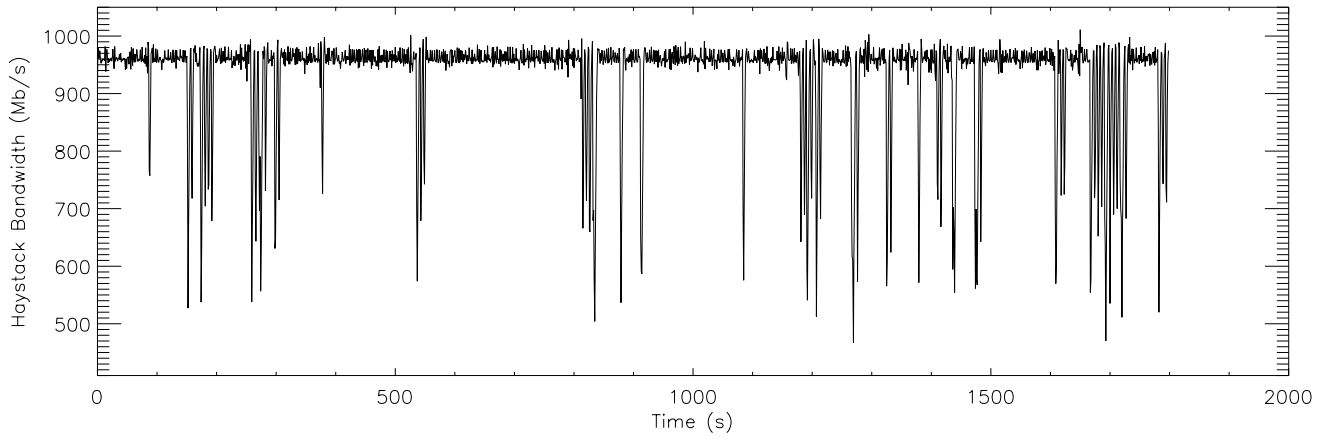


Figure 2: e-VLBI Path - ISI-E to GSFC/GGAO

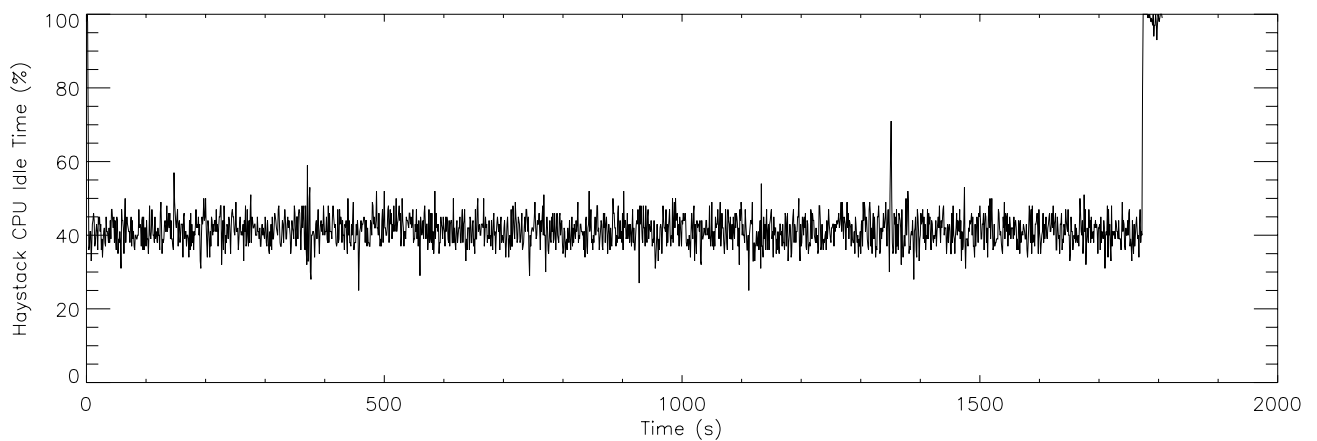
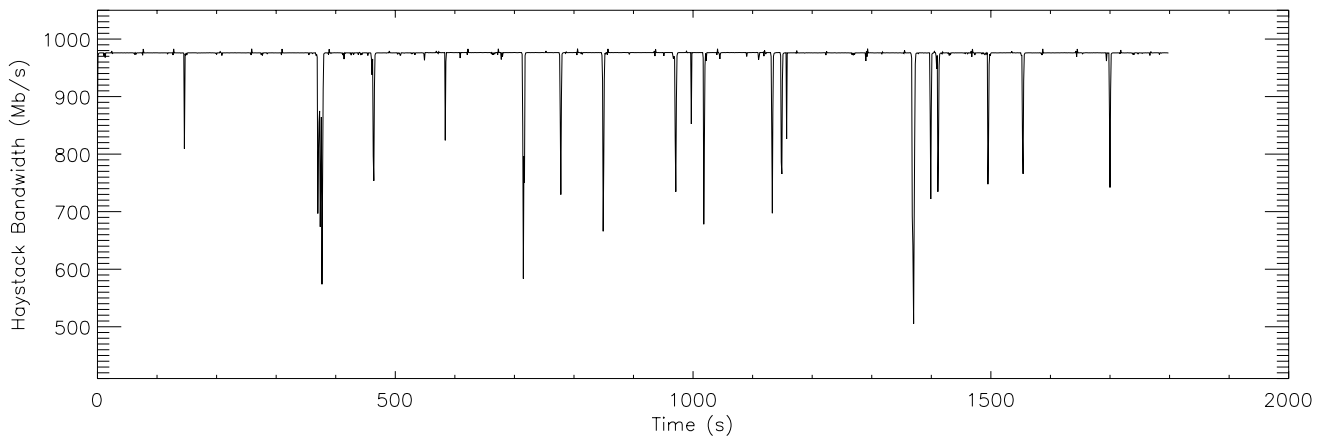
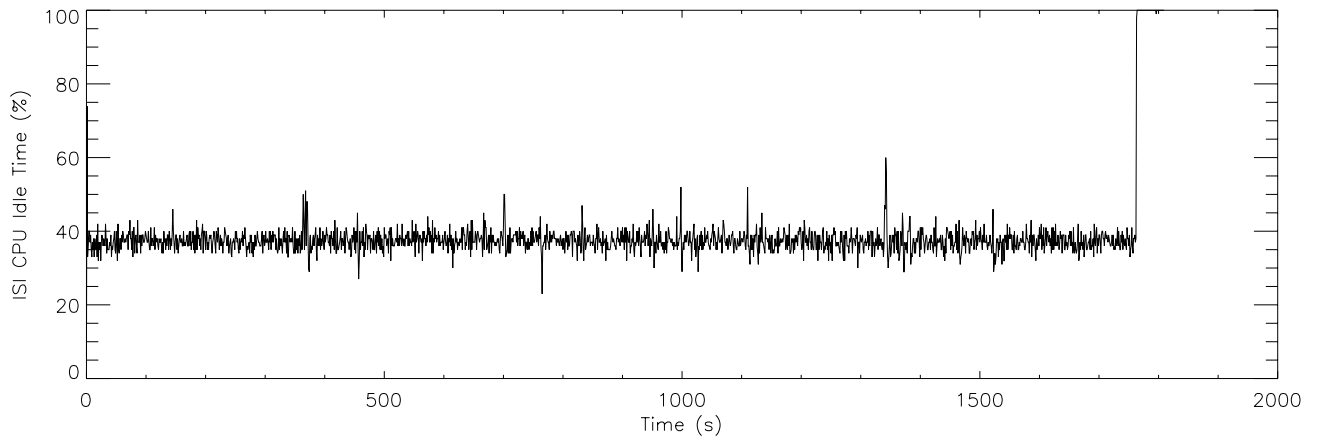
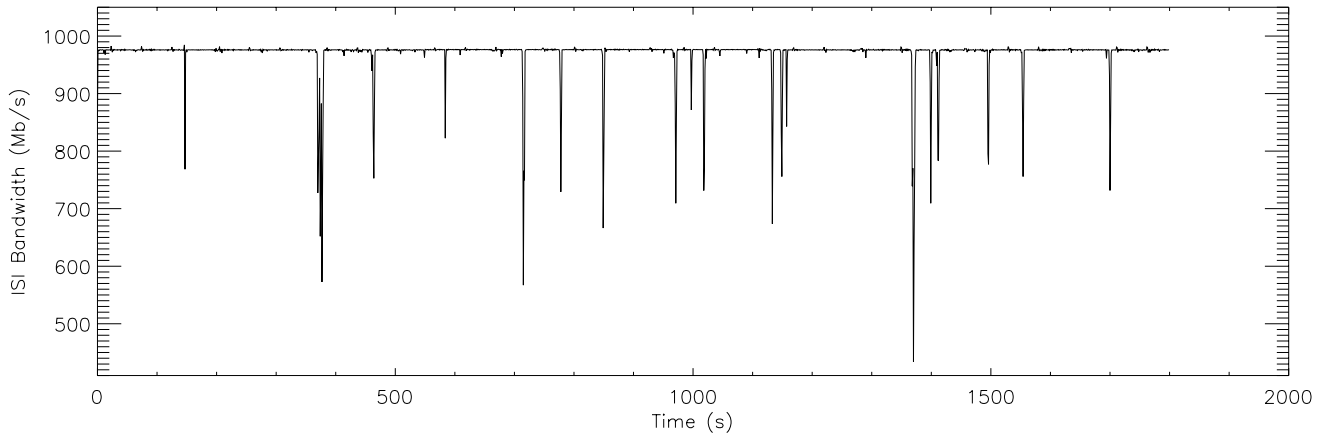
TCP Performance: ISI [kame] to Haystack [evlbihay] (Test 1 on 23 June 2002)



TCP Performance: Haystack [evlbihay] to ISI [kame] (Test 2 on 23 June 2002)



TCP Performance: ISI [kame] to Haystack [evlbihay] (Test 3 on 23 June 2002)



TCP Performance: Haystack [evlbihay] to ISI [kame] (Test 4 on 23 June 2002)

