MIT Haystack - Institutional Activities / Plans

Chester Ruszczyk
Haystack-NRAO Technical Meeting
Oct. 26 2006
Advantages of e-VLBI

- Bandwidth growth potential for higher sensitivity
  - Network bandwidth potential growth will far exceed recording capability for e-VLBI
- Rapid processing turnaround
- Increased reliability – remote stations
  - Performance monitoring
  - A control capability in near real-time
- Lower Costs
  - Automate operations
  - Eliminate shipping of storage media
  - Near real-time processing
  - Reduction of recording-media pool (millions of $’s!)
State of Networking Environment

• 10 Gbps currently standard backbone speed
  – Within 2 years 100 Gbps available
• Global VLBI Antenna Network Connections
  – Europe, Australia, Japan moving rapidly ahead (up to 10Gbps)
  – US needs a coherent plan
• Availability of point-to-point optical services
  – Up to 10Gbps
  – On demand connections - reservation based
• e-VLBI is an excellent globally distributed network application.
  – Bandwidth
  – Flexible transport requirements
  – Stresses the latest networking research
Ongoing

• EGAE (Experiment Guided Adaptive Endpoint)
  – Verifying / merging so that it is used in all e-transfers.
    • Integrating Wetzell e-transfers software
  – Testing / Debugging GUI front end
  – Deploy software to BONN

• Transport Protocol Research
  – Proposed follow on to EGAE – NSF, rejected.
  – Working / Evaluating other transport protocols in trials
    NyAlesund – VFER, UDT
Ongoing (cont)

• VSI-E
  – Testing phase
  – Trial with Japan Jan. 07 JGNII Demo.

• BOSSNET Upgrade
  – Completion scheduled for Jan 07 ????

• International Collaboration
  – Univ. of Manchester
  – Onsala
  – Sunet
  – Uninett
  – Creat-net (Italy – initial discussions, collaborations)
Next Steps

• E-transfers
  – Intensives Ny-Alesund (Nov. 2006)
• 1Gbps real time trial – 2007
  – Based on completion of BOSSNET
• GLOWNET Upgrade – 10Gbps ~ 2007
• Continue search for funding opportunities
  – Support of 8Gbps - 2010
Next Steps

• Continue ramp up of actual e-VLBI experiments
  – Real-time transfers at 2 Gbps and higher (Mark5B++)
  – Support of both real time and non-real time efforts
  – Help transition telescopes to e-VLBI capabilities:
    • Recent requests from: China, South America, etc.

• Pursue work on transport protocols
  – Take advantage of dedicated light path characteristics

• Initiate development of coherent US plan in collaboration with other VLBI stake holders.
Conclusions

• e-VLBI has huge potential for new science and significantly improved operational efficiency

• International in nature and requires
  – Cooperation from all interested parties
  – Standardization

• US last-mile connectivity continues to be a challenge