

**NSF/FIU AMPATH Workshop, August 2001**  
**Discuss the Infrastructure Enabling Potential Areas of  
Collaboration Between the International Space Station  
and the Americas**



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# What I'm Going to Tell You About Space Based Payload Operations at a High Level

## (See How AMPATH Can Fit In)

1. What's Needed to Conduct Space Based Science Operations
2. How We Did Business in the Space Lab (Olden) Days
3. How We Are Going to Do Business in the Space Station Era
4. Describe the Concept That Will Allow This New Way
5. And, What This Means to You, Capability to Collaborate  
In Space Based Payload Operations and Science  
In Payload/Experiment Development  
And, Remove Several Major Obstacles to Collaboration

Bob Bradford  
Chart 2



## Capabilities You Need to Conduct Space Based Payload Operations

1. Receive and Process Your Telemetry
2. Talk with the Ground Cadre and ISS On Board Crew
3. Receive Video of On Board Activities and Science
4. Commanding of Your Payload/Experiment
5. Payload Planning and Training Activities with Cadre and Crew

Bob Bradford  
Chart 3



# The Old Way of Conducting Space Based Payload Operations

Bob Bradford  
Chart 4



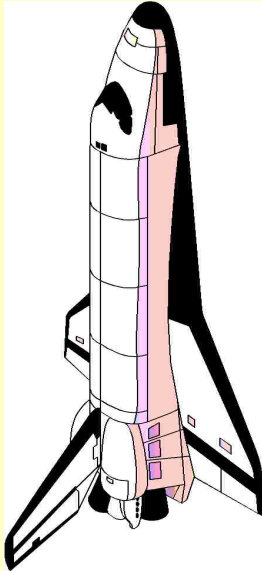
**You Conducted Your Payload Ops from Marshall Space  
Flight Center (MSFC)**

**Which Meant You Traveled Back and Forth from Home  
to Huntsville Alabama for a Year or More**

**Bob Bradford  
Chart 5**

# HOW DID WE DO IT?

Shuttle/Spacelab



NASA Video



One Video Feed

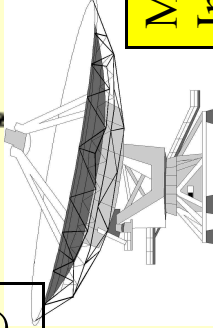
White Sands, NM



JSC

Dedicated Circuits

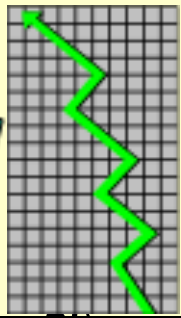
MSFC



Many Users  
In Huntsville



POCCC  
Telemetry  
Voice/Video  
Commanding  
Planning



Conduct  
Science

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Chart 6



# The New Way of Conducting Payload Operations for the International Space Station (ISS)

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Chart 7



# You Stay Home

Bob Bradford  
Chart 8



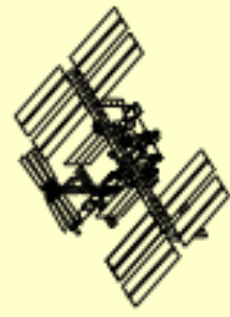


## Questions?

1. How would you get your data?
2. Who is going to provide you the services needed at both ends to conduct space based payload operations?
3. And, what is it going to look like on your PC?

Bob Bradford  
Chart 9

Space Station



White Sands, NM



JSC

MSFC  
POIC  
Ground  
Systems  
Telemetry  
Mission Voice  
DL Video  
Planning  
Commanding

STAR TAP,  
Abilene\*,  
AMPATH,  
and  
Other  
Research  
And  
Education  
Networks

User's  
"Last Mile"



# 1. How Would You Get Your Data?

\*Abilene cannot be used to access a NASA network from another network

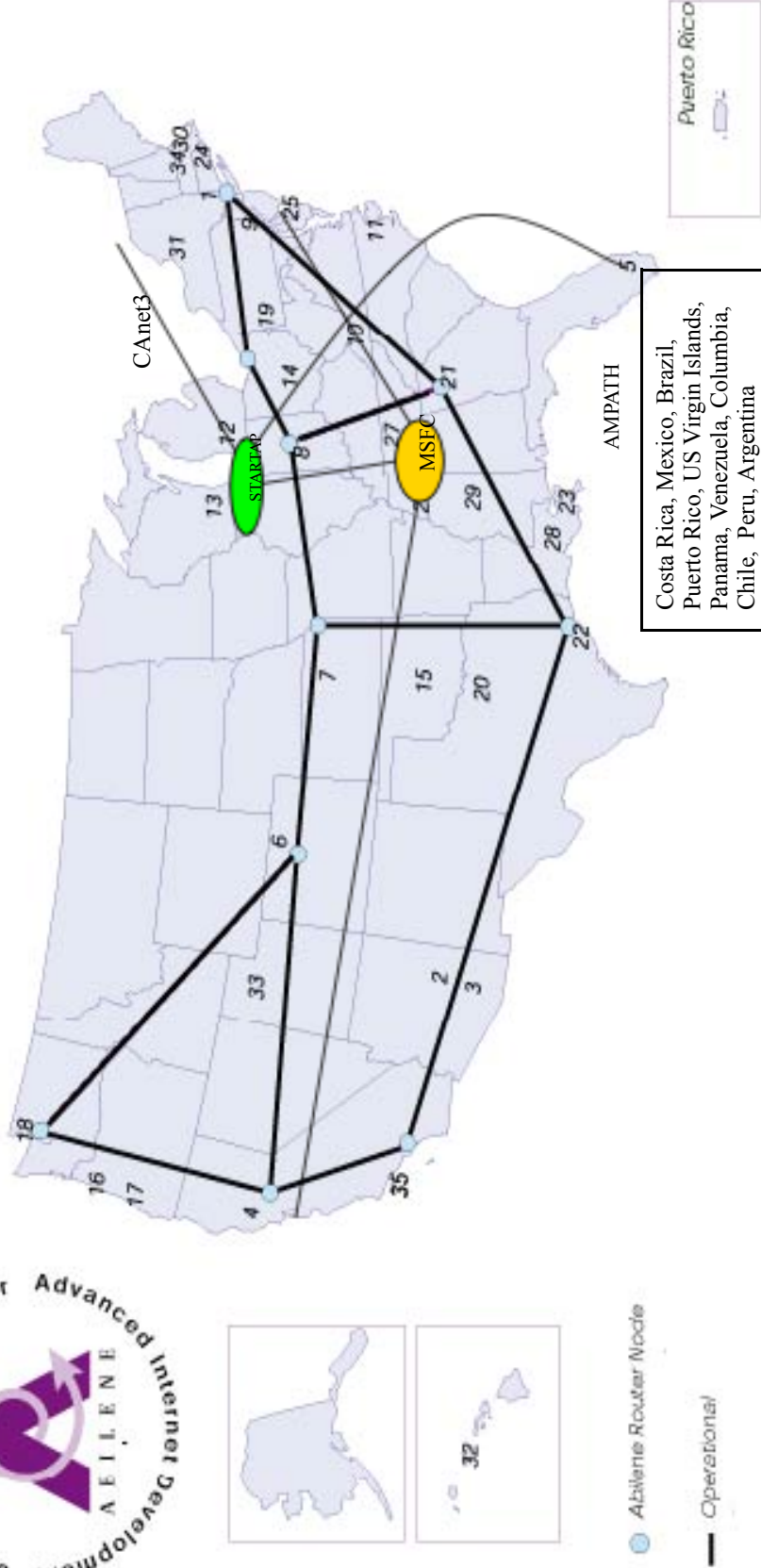






# Abilene Network Connectors

March 2000



## Completed Direct Connections

- 2. Arizona GigaPoP
- 3. Arizona State University
- 4. CalREN-1 North
- 35. CalREN-2 South
- 6. Front Range
- 7. Great Plains Network
- 8. Indiana University
- 28. LaNet
- 10. MAX
- 11. MCNC
- 12. Merit
- 13. MREN/Ameritech
- 30. NOX
- 31. NYSENet
- 14. OarNet
- 19. Pitsburg Supercomputing Center
- 16. Oregon GigaPoP (Denver)
- 17. Oregon GigaPoP (Sacramento)
- 18. Pacific Northwest
- 20. Southern Methodist University
- 21. SoX
- 22. Texas GigaPoP
- 25. University of Delaware
- 32. University of Hawaii
- 27. Vanderbilt University
- 5. Florida International University
- 9. MAGPI
- 29. Mississippi State University
- 15. OneNet
- 24. University of Connecticut

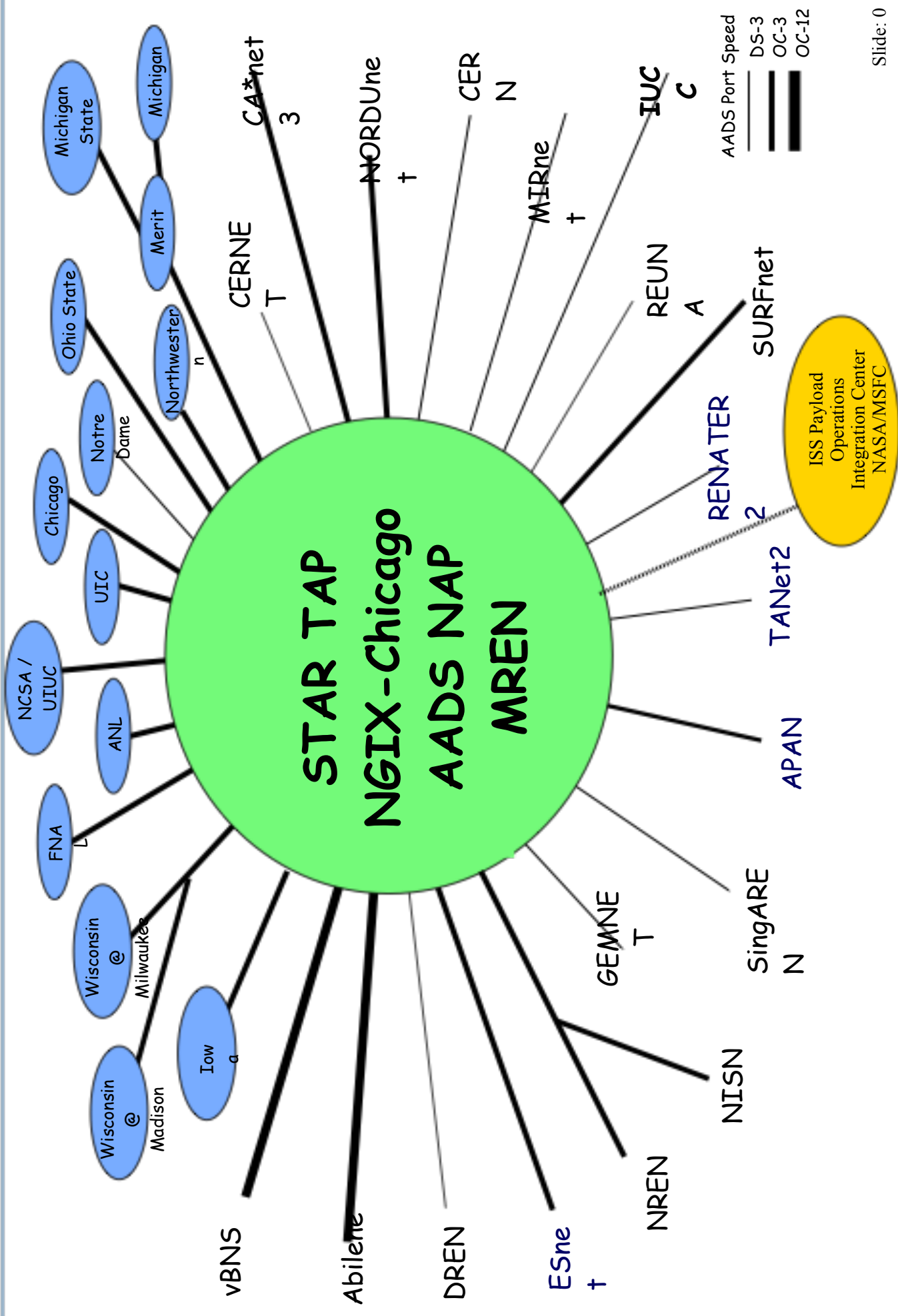
## Connections in Progress(\*)

- 1. Advanced Network Services\*
- 23. Tulane University\*
- 26. University of Memphis\*
- 33. University of Utah\*
- 34. Worcester Polytechnic Institute\*
- 36. OSHEAN\*

Bob Bradford  
Chart 13



# Proposed STAR TAP Connectivity to the Space Station International Science Community





# In Conclusion

With the Tools Provided by the MSFC/POIC i.e. TReK, IVoDS

With the Services Provided by STAR TAP/AMPATH

You Can Collaborate with Fellow Scientists (Using Existing Connectivity) in Development, Operation and/or the Science of Experiments Flying on the ISS from Virtually Any Where

In payload developments.....

In real time operations.....

As a Co-Investigator in post flight analysis.....

And, at a very low cost!

Bob Bradford  
Chart 15