



The Space Grant Internet Telescope Network

Dr. Paul S. Hardersen

North Dakota Space Grant

National Space Grant Meeting

Washington, D.C.

March 3, 2007



The concept

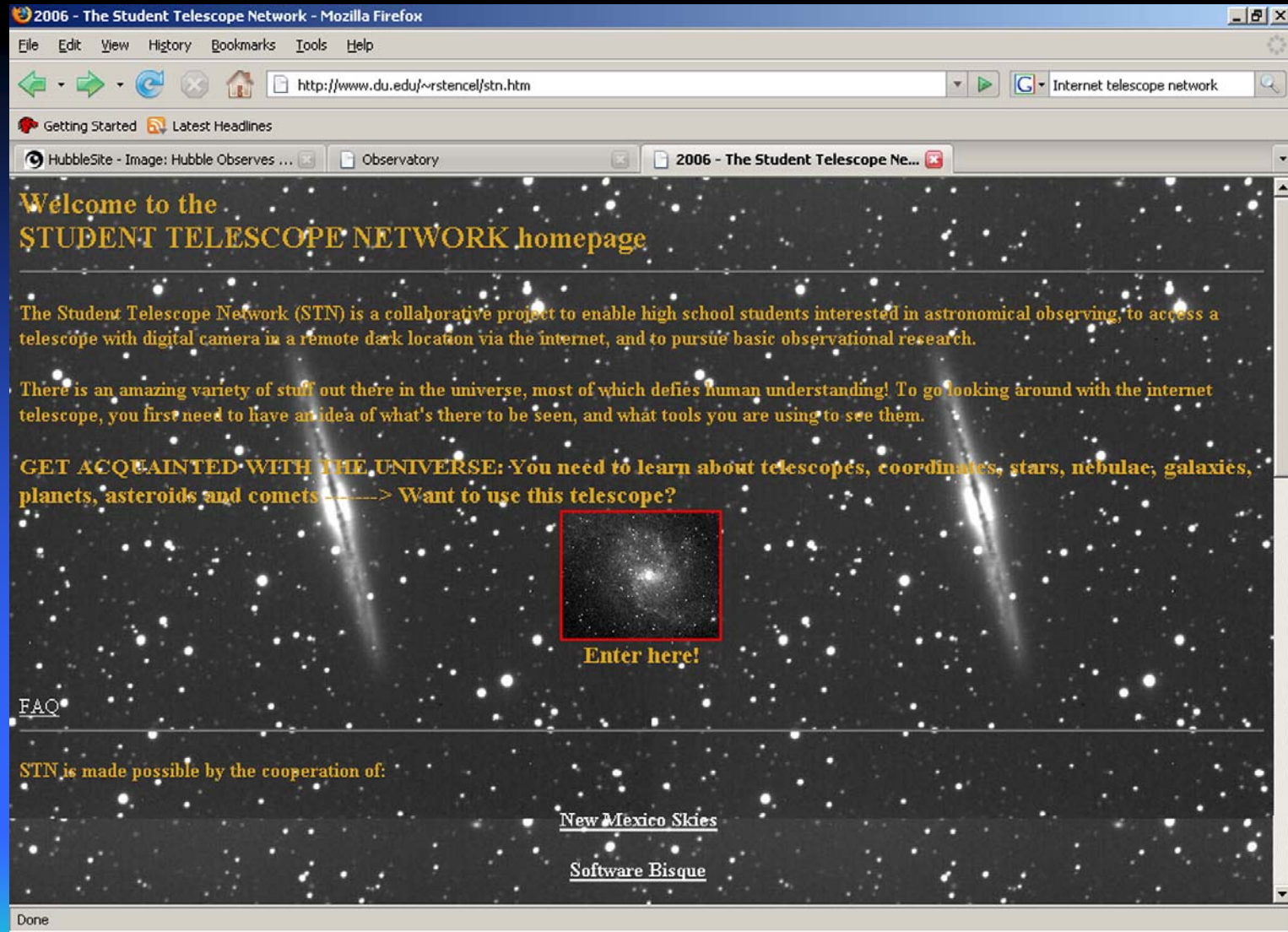
- What? → Establish a national network of Internet astronomical observatories for non-astro and under-served colleges and universities.
- Why? → To facilitate graduate and undergraduate student research and education projects.
- When? → Initial network to begin operations ~ May 1.
- Who? → Space Grant consortia, including affiliates, and all potential users at those institutions.



Online observatories

- Internet-controllable and robotic observatories are now common.
- Internet-controllable – User controls telescope and instruments via a web browser. Wide access!
- Robotic telescopes – User uploads observing plan; telescope operates independently.
- Telescope networks exist, but their user-base and utilization is often variable and/or limited.

Examples



The screenshot shows a Mozilla Firefox browser window displaying the homepage of the Student Telescope Network (STN). The browser's address bar shows the URL <http://www.du.edu/~vrstencil/stn.htm>. The page features a dark background with a starry sky and two bright, glowing nebulae. The main heading reads "Welcome to the STUDENT TELESCOPE NETWORK homepage". Below this, a paragraph explains that the STN is a collaborative project for high school students to access a telescope with a digital camera via the internet. Another paragraph encourages users to explore the universe and provides a link to learn more. A central image of a galaxy is highlighted with a red box and labeled "Enter here!". At the bottom, the page lists the organizations that support the STN: New Mexico Skies and Software Bisque. The browser's status bar at the bottom indicates "Done".

2006 - The Student Telescope Network - Mozilla Firefox

File Edit View History Bookmarks Tools Help

[http://www.du.edu/~vrstencil/stn.htm](#) Internet telescope network

Getting Started Latest Headlines

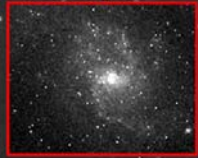
HubbleSite - Image: Hubble Observes ... Observatory 2006 - The Student Telescope Ne...

Welcome to the STUDENT TELESCOPE NETWORK homepage

The Student Telescope Network (STN) is a collaborative project to enable high school students interested in astronomical observing, to access a telescope with digital camera in a remote dark location via the internet, and to pursue basic observational research.

There is an amazing variety of stuff out there in the universe, most of which defies human understanding! To go looking around with the internet telescope, you first need to have an idea of what's there to be seen, and what tools you are using to see them.

GET ACQUAINTED WITH THE UNIVERSE: You need to learn about telescopes, coordinates, stars, nebulae, galaxies, planets, asteroids and comets -----> Want to use this telescope?



Enter here!

[FAQ](#)

STN is made possible by the cooperation of:

[New Mexico Skies](#)

[Software Bisque](#)

Done

Examples

The screenshot shows a Mozilla Firefox browser window displaying the website for the Bradford Robotic Telescope. The browser's address bar shows the URL <http://www.telescope.org/index.php>. The website header features the logo "BRADFORD ROBOTIC TELESCOPE" and "BRT" in a stylized font, along with the date "Monday 26 February 2005". A navigation menu includes links for "MAIN PAGE", "SYSTEM STATUS", "USE THE TELESCOPE", "WEATHER REPORTS", "WEB CAMS", "FORUMS", "PROJECT NEWS", "CONTACT US", "TELESCOPE STATISTICS", "IMAGE GALLERY", "PHOTO GALLERIES", "EDUCATIONAL MATERIAL", "REGISTER FOR AN ACCOUNT", "INFORMATION", and "FUNDS".

The main content area is divided into three columns:

- Login:** A form with fields for "Username" and "Password", a "Login" button, and links for "Forgotten your details? Click here" and "Click here to register for a new account".
- Welcome to the Bradford Robotic Telescope:** A text block stating: "The Bradford Robotic Telescope is unique. If you want to wonder at the grandeur and beauty of your star sign it will take a colour image for you covering all the stars in your constellation. It will show you the majesty of the sky seen by our grandparents before the age of light pollution. Look at our image gallery!" accompanied by a small image of a star field.
- Image from the Gallery:** A larger image of a galaxy labeled "NGC 1365 | Avg. rating 6.0".

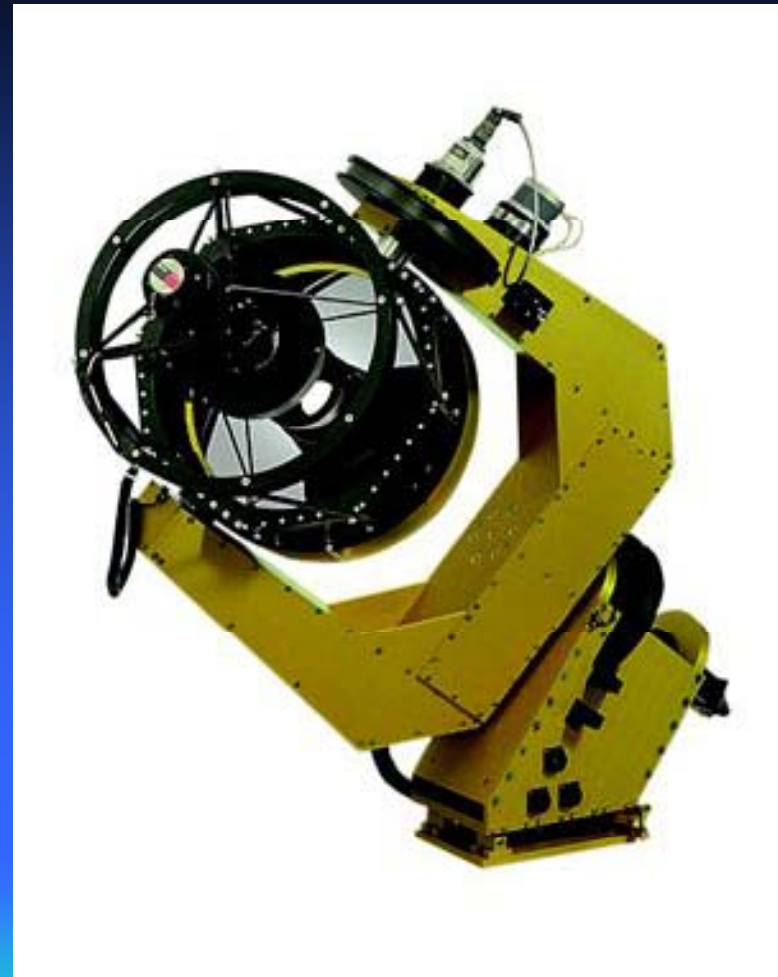
At the bottom, there are three sections: "Educational Material" with a link to schools.telescope.org; "Teachers" with a link to "Getting Started: help and"; and "General Interest" with a link to "Information".

At the very bottom of the browser window, a status bar reads "Transferring data from www.telescope.org..."



Iowa Robotic Telescope Facilities

- The Rigel Telescope is used by undergraduate and graduate students at the University of Iowa.
- 14.5-inch aperture telescope operated in southern Arizona.
- Used for education and research.



Rent-a-scope

The screenshot shows a web browser window with the URL <http://www.global-rent-a-scope.com/>. The page features a dark background with a starry sky theme. At the top, the text reads "Global Rent-a-Scope 'Where the Sun Never Rises'" in red and white, followed by "Powered by Software Bisque, SBIG" and "New Mexico Skies and Astrodon". To the right, it says "Only made possible through the genius of our suppliers!" and displays the "SBIG ASTRONOMICAL INSTRUMENTS" logo. A navigation menu includes links for Home, Buy Time, CCD Imaging, Research, Why Go Remote, Demonstration, Portal Login, Live Images, How It Works, Image Gallery, FAQ, Our Suppliers, Links, and Contact Us. The main content area is divided into three columns. The left column has a "Featured Images" section with a red-tinted image of a nebula and the caption "M16 AREO8 Marcos Mataratzis Vivek Hira". The middle column has a "Research News" section with three entries: "11 Aug 06 - Carl Kirby Honored" (RASO members cook Mean Stew), "17 July 06 - AREO6" (Obtained MPC Designated Observatory E26), and "7 July 06 - RAS Observatory, New Director Appointed" (Dr. Edward Wiley named new RASO director). The right column has a "Global Telescope Network" section listing five observatories: AREO1 (TAK MEWLON 300, FLI IMG 1024 DM, NEW MEXICO, USA), AREO2 (TAK MEWLON 300, SBIG ST-8E, NEW MEXICO, USA), AREO3 (TAK TQA-150, SBIG STL-11000, NEW MEXICO, USA), AREO4 (TAK EPSLION 250, SBIG ST-8XE, NEW MEXICO, USA), and AREO5 (TAK EPSLION 250, SBIG ST-8XE, NEW MEXICO, USA).

File Edit View History Bookmarks Tools Help

<http://www.global-rent-a-scope.com/> Rent a Scope

Getting Started Latest Headlines

Global Rent-a-Scope

"Where the Sun Never Rises"

Powered by Software Bisque, SBIG
New Mexico Skies and Astrodon

Only made possible through the genius of our suppliers!


SBIG ASTRONOMICAL INSTRUMENTS

Home Buy Time CCD Imaging Research Why Go Remote Demonstration Portal Login
Live Images How It Works Image Gallery FAQ Our Suppliers Links Contact Us

Global Rent a Scope puts you in command!

Control a network of research grade telescopes over the Internet with your web browser. [View Video Demonstration](#)

Featured Images



M16 AREO8 Marcos Mataratzis Vivek Hira

Research News

11 Aug 06 - Carl Kirby Honored
[RASO members cook Mean Stew](#)

17 July 06 - AREO6
Obtained MPC Designated Observatory E26

7 July 06 - RAS Observatory, New Director Appointed
[Dr. Edward Wiley named new RASO director](#)

Global Telescope Network

AREO1	TAK MEWLON 300 FLI IMG 1024 DM NEW MEXICO, USA
AREO2	TAK MEWLON 300 SBIG ST-8E NEW MEXICO, USA
AREO3	TAK TQA-150 SBIG STL-11000 NEW MEXICO, USA
AREO4	TAK EPSLION 250 SBIG ST-8XE NEW MEXICO, USA
AREO5	TAK EPSLION 250 SBIG ST-8XE NEW MEXICO, USA

Colleges and universities

- Many colleges and universities operate their own online observatories.
- However, many operate their observatories in isolation.
- Advantages of a new network:
 1. Network will provide more observing time.
 2. Unique research projects can be conducted.
 3. Can serve rural and minority populations.
 4. Motivation for advanced STEM degrees/careers.

Critical issues

- What are the big issues for a network:
 1. Users – must have observing experience.
 2. Instrumentation – will define what projects are possible.
 3. Location – multiple, widely-separated observatories will provide the most benefit.
 4. Operations – must be easy to use.

Telescope control software

Red Mountain Simulated Observatory - Welcome Paul S. Hardersen - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://simulator.my-sky.com:9080/index.asp

Getting Started Latest Headlines

(0 unread) Yahoo! Mail Beta, paulhard... Red Mountain Simulated Observatory ... Create a User Account Red Mountain Simulated Observ...

Red Mountain Simulated Observatory

Welcome Paul S. Hardersen

Observing

- Single Object Imaging
 - Single Image
 - Color Series
- Multiple Objects (Plan)
- Cal Frames (Dark/Ebias)
- Automatic Sky Flats
- Special Tasks
 - System Status Disp.
 - Release the Obs.
 - Deep Sky Catalog
 - Obs. Plan Checker

My Documents

- Acquired Images
- Observing Plans
- Run Logs

Shared Files

- Shared File Area
- Downloads

Observatory Info

System Status

[Help](#)

Observatory	Telescope	Imager	Activity
Available	Stopped	Idle	Idle
UTC: 14:47:21	RA: 08:55:22.95	Filter Clear	Target None
LST: 17:43:55	Dec: 12°13'26.7"	Binning 1:1	
Owner Free	Az: 306.7°	Cooler -35 °C/85%	
Weather Clear Wind	Alt: -25.3°	Guider	
Shutter Open	Air: 13.4	Idle	
Dome Slave	<i>RA/Dec local topo</i>	Error Ex: None	
		Er: None	

Hover mouse over links

Last image preview
Click to see larger image

[Show/Hide Run Log and Abort Control](#)

Welcome

[Getting Started](#)

search

close all

select theme

font: + = -

options >

Items Categories

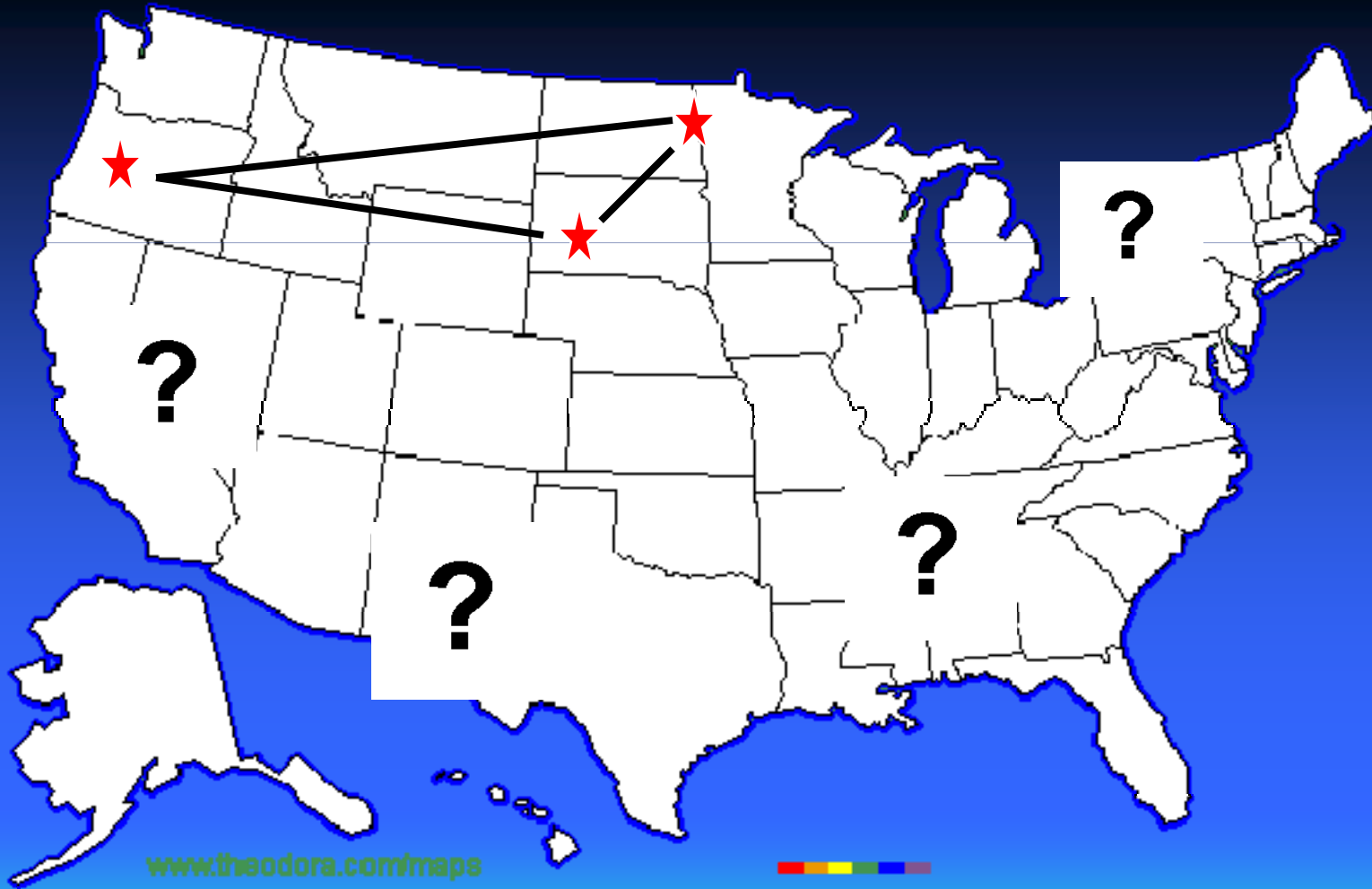
All items in alphabetical order

- Acquire a Single Image
- Acquired Images
- AdvancedOptions
- Authoring Setup
- Automatic Sky Flats
- Browser Compatibility
- Calibration Frames
- Check Observing Plan
- CloudSensor II
- Common Questions
- Deep Sky Catalog Search
- Downloads
- Getting Started
- Instruments & Equipment
- LightBoxTest
- Location
- Log Off
- Making Observing Plans
- Multiple Objects (Plan)
- Observing
- Observing Plans
- Open or Close
- RSS Feed
- Run Logs

fold close close-others refs jump side-bar >

Done

Space Grant Internet Telescope Network

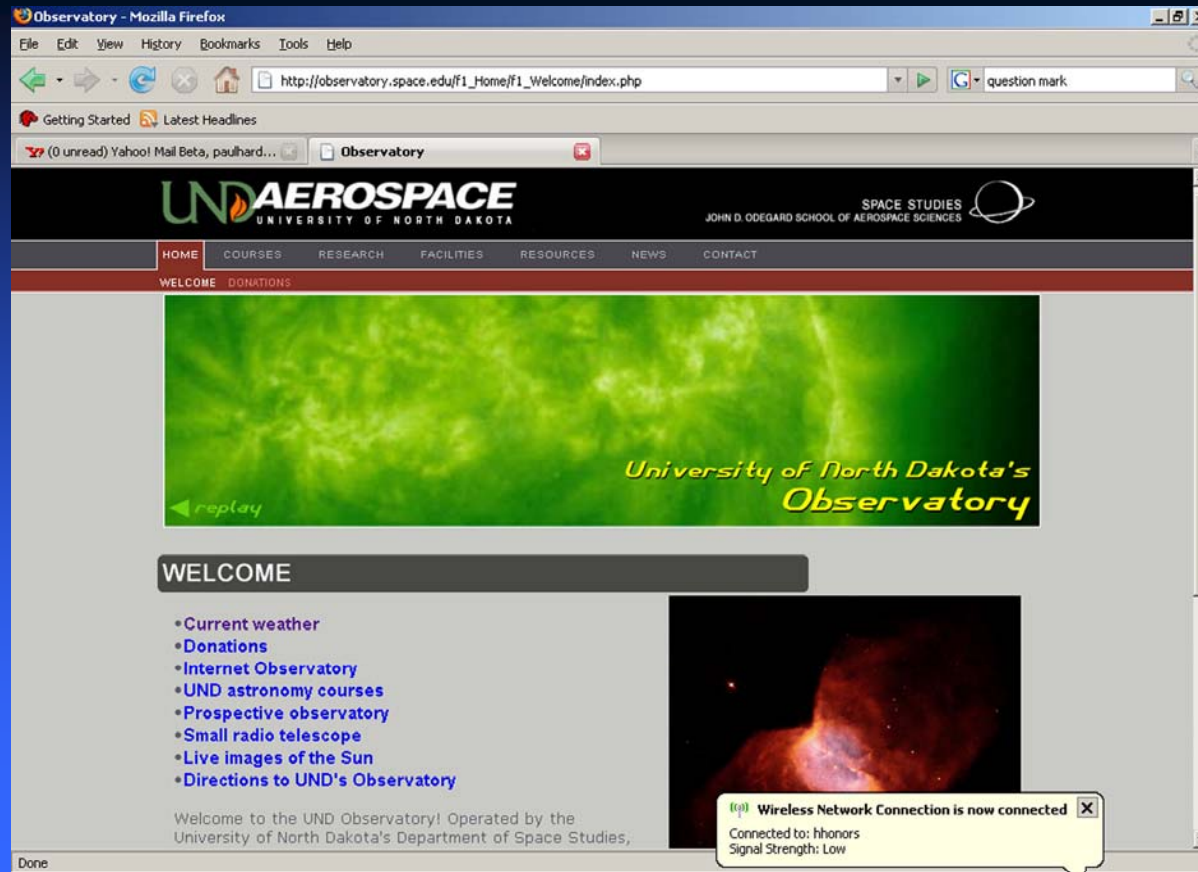




Network members

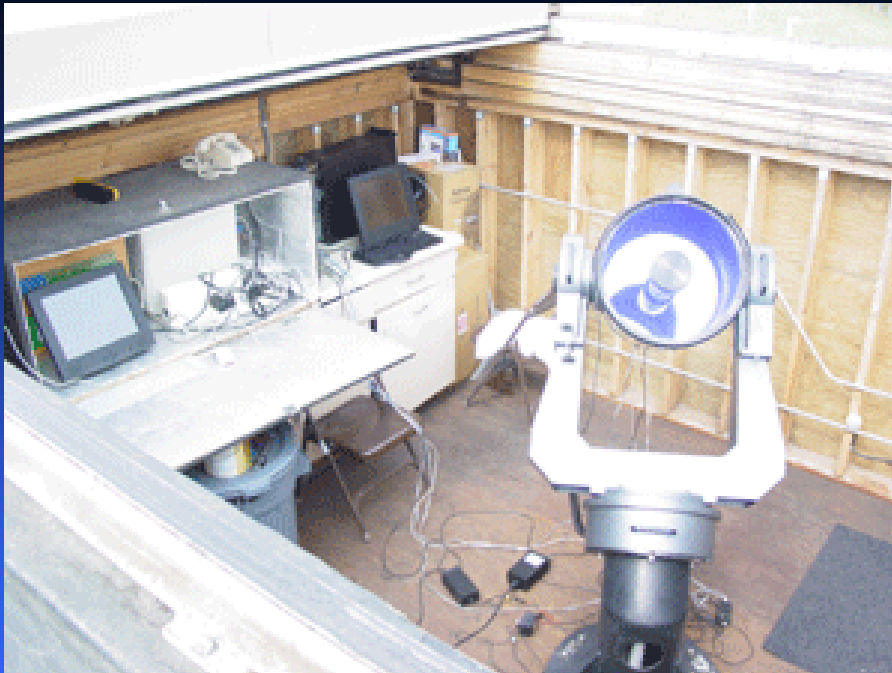
- North Dakota SGC – University of N. Dakota operates a small Internet observatory. Capabilities include:
 - CCD photometry (variable stars, asteroids).
 - Visible- λ stellar spectroscopy (Summer '07).
 - Astrometry of near-Earth and main-belt asteroids.
- Second small observatory will be built Summer '07.

UND Observatory



<http://observatory.space.edu>

UND Internet Observatory



- ~10 miles west of Grand Forks.
 - Meade 16" LX200 SCT.
 - Roll-off roof.
-
- Built in 1996. Renovated in 2004. Supports research and education.
 - Projects: Asteroid light curves, variable star monitoring (T Tauri, G2V, δ Scuti).



Network members

- South Dakota SGC – Badlands Observatory, near Quinn, SD.
- <http://www.sdsmt.edu/space/bo.htm>
- This is a private observatory that include a 26” aperture telescope with CCD camera/filters.
- Research capabilities include: astrometry, photometry.

Badlands Observatory



Since 2001, they have:

1. Discovered 28 MB asteroids.
2. Provided more than 2400 asteroid positions.
3. Confirmed positions for five comets.
4. Conducting a remote educational astronomy program.

Network members

SE View Thu Mar 1 4:08:41 PM 2007



- Oregon SGC – Pine Mountain Observatory, University of Oregon.
- Operates as robotic telescope.
- Extends network coverage > 1000 miles.
- Elevation ~6500 feet.

New members needed!

- To join the Network, any state Space Grant consortium needs:
 1. An institution interested in joining. Must have committed faculty!
 2. An observatory that can be operated remotely -- robotic or online – OR – build a new observatory.
 3. Be willing to commit resources to the effort (\$5000 annually).
 4. Be willing to promote the Network throughout its state.



Network administration

- All users will enter through a common Internet portal maintained by NDSGC.
- Each observatory will be operated by local personnel.
- Network administrator will monitor the overall network and operational status.
- Relatively easy to add new Network members, as they join.



Benefits

- Provide student research opportunities for Space Grant members – faculty and students.
- Promote STEM education and workforce development.
- Encourage students to pursue research careers in astronomy and planetary science.
- Improve and enhance state and national astronomical research infrastructure.

Questions?

