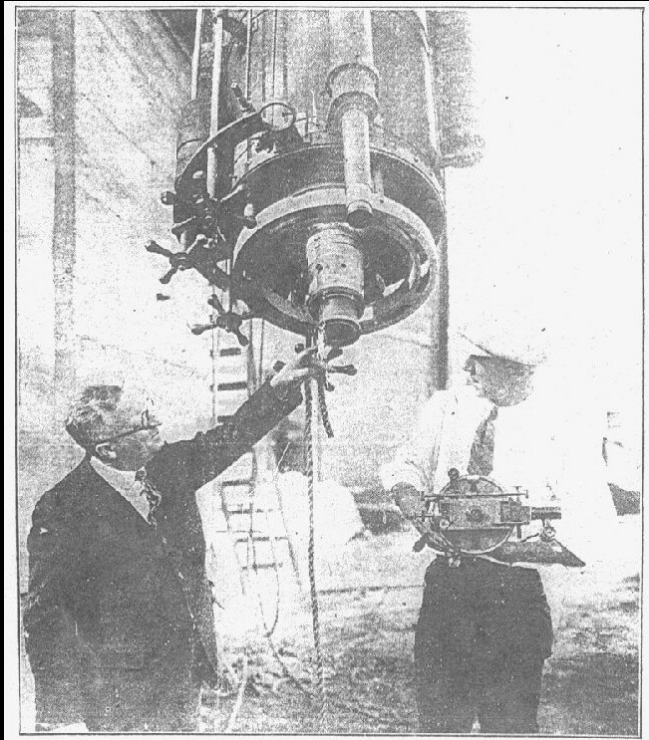




The New Amateur Astronomer



Astronomy During the 20th Century



Lamont-Hussey 27
inch in Ann Arbor



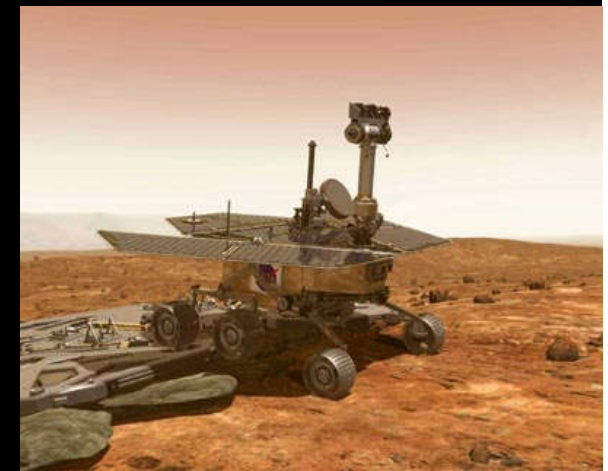
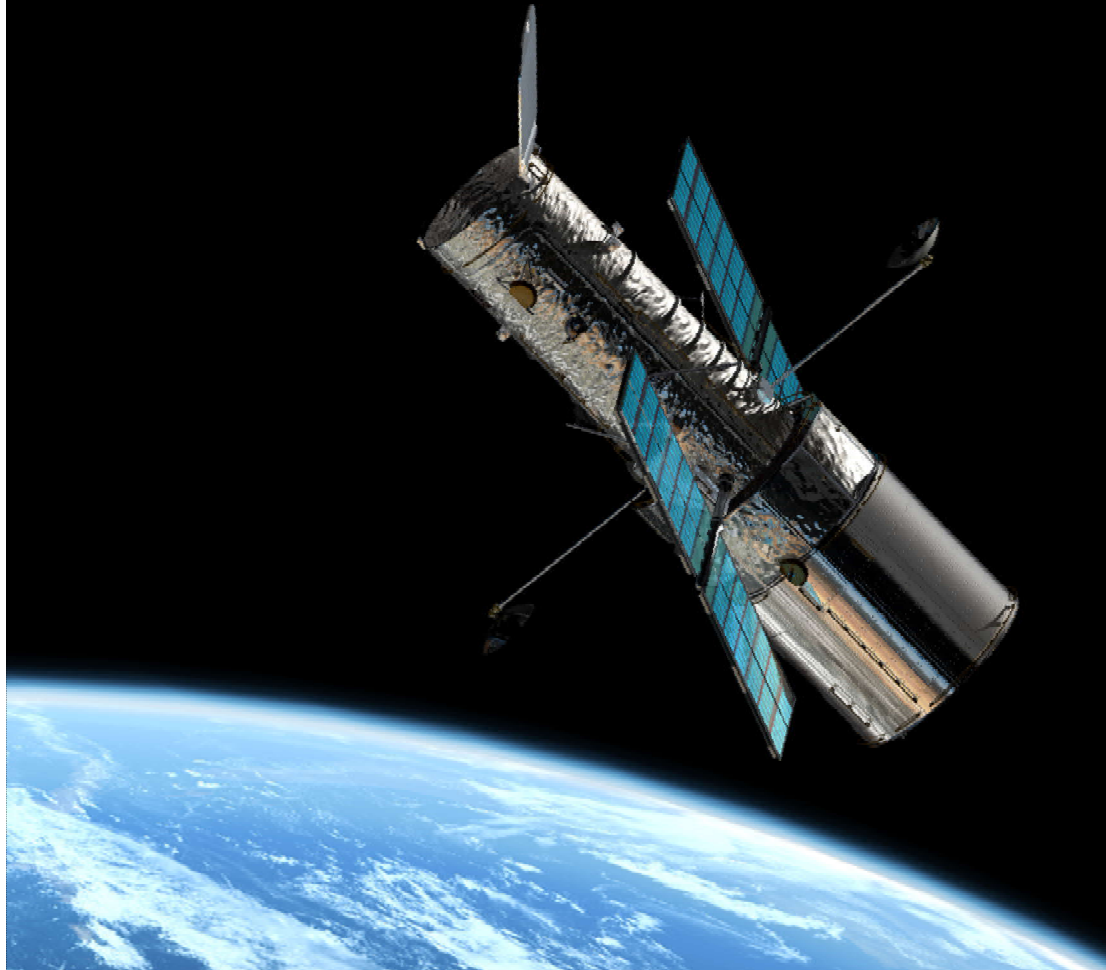
10 inch Metcalf at Boyden Observatory

Instruments had many limitations and required high maintenance

Information sharing were slow and difficult

Amateur astronomers played a major role in data recording

Beyond 2000 - A New Era In Astronomy



NASA

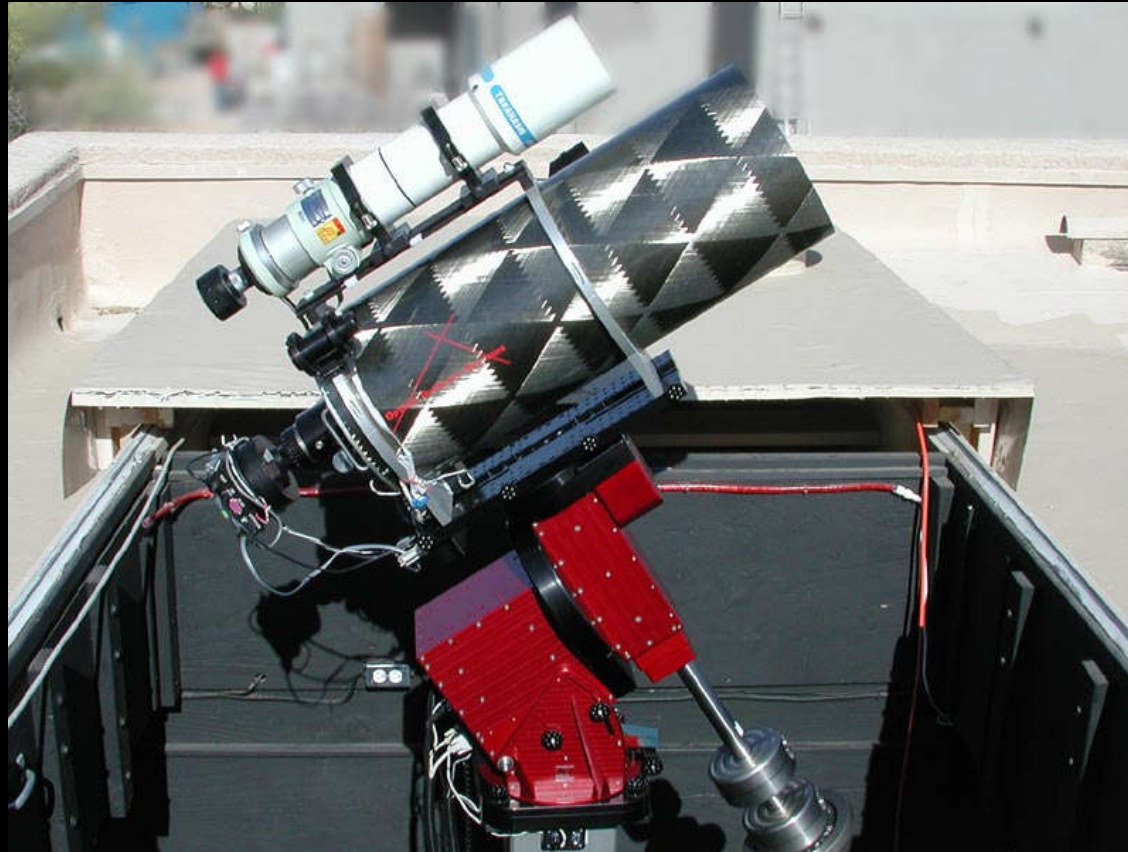
From Humble Optics to Space Age Technology

Optical designs results in greater efficiency

Space age material reduce the effects of temperature variations



Precision Mounts – The Base for Advanced Astronomy

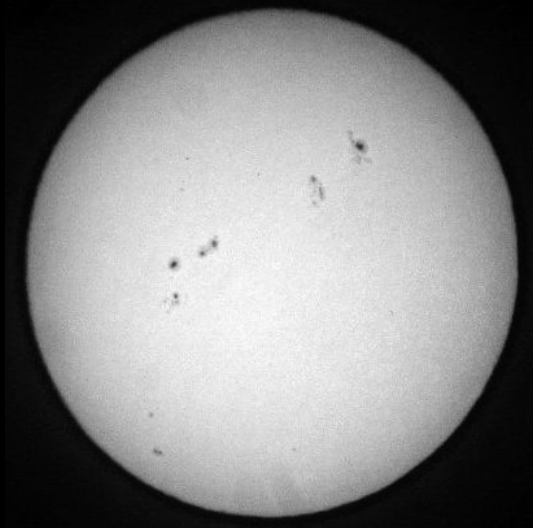


New mounts provide superb tracking

Enables astronomers to remotely control telescopes

Pre programmed instructions via PC ensure greater productivity

Digital Cameras and Video Recorders



Total Solar Eclipse
of
1994 November 3

taped at
La Lava, Bolivia
by
Fred Espenak



Planetary Imaging Equipment

High speed digital cameras with built in stacking software enable amateur astronomers to produce high quality images of planets



Cooled CCD Imaging Equipment

Extremely sensitive light capturing capabilities

Cooled electronics provide low noise levels

Enabling amateur astronomers to observe very faint objects





M51

By Tony Hallas

Well known for his wonderful astrophotos taken with film, but this image of M51 represents his first attempt at LRGB color imaging with a CCD camera! This incredible image was taken with an ST-10XE camera and CFW8A color filter wheel through a 14.5" Newtonian scope at F/8.



Rho Ophiuchi

By Loke Tan

This classic portrait of the nebulous region surrounding the star Rho Ophiuchi was taken with a new STL-11000M camera with built-in filter wheel through a 300mm lens at F/5.6 and a 106mm F/5 refractor.

Image processing software

Astrometry

A technique of measuring star and comet positions by reference to known stars in an image

Automated Dark-Frame and Flat-Fielding

Software routines offer the option to program cameras to routinely close the shutter for taking a dark-frame and to call up a flat field from memory

Auto focusing

CCD images downloaded from the camera is checked for sharpness and a motorized focuser is controlled to minimize the star images

Blink Comparison

Software blinks 2 images taken minutes apart to improve the observation of faint fast moving objects like asteroids

Filters

Faint regions in photographs can be enhanced, bright regions suppressed and star images tightened with little increase in noise

New age amateur astronomers patrolling the night sky

Supernova Discoverers

Photographing of distant galaxies, software flags any suspicious remnants

Cataclysmic-Variable Observers and Gamma Ray Burst Hunters

Observation and estimation of CV outbursts and amateurs can confirm the optical counterpart of GRB's

Armchair Comet Hunters

Images of satellites like SOHO are posted to the internet and amateur astronomers have the ability to discover comets from these images

Near-Earth Object Chasers

With quality equipment and appropriate software amateur astronomers can determine precise measurement of asteroids relative to background stars. There is an increasing need to keep track of objects classified as NEO

Exoplanet Discoverers

Amateur astronomers can help with the discovery of exoplanets by observing planet bearing stars for transits.

Spectroscopy



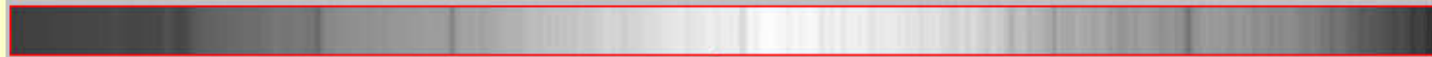
New spectrographs allow amateur astronomers to practice spectroscopy

These spectrographs are user friendly and opens a new field to amateur astronomers

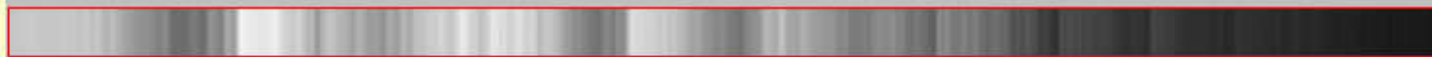
Spectrum of B Class Star



Spectrum of G Class Star



Spectrum of M Class Star



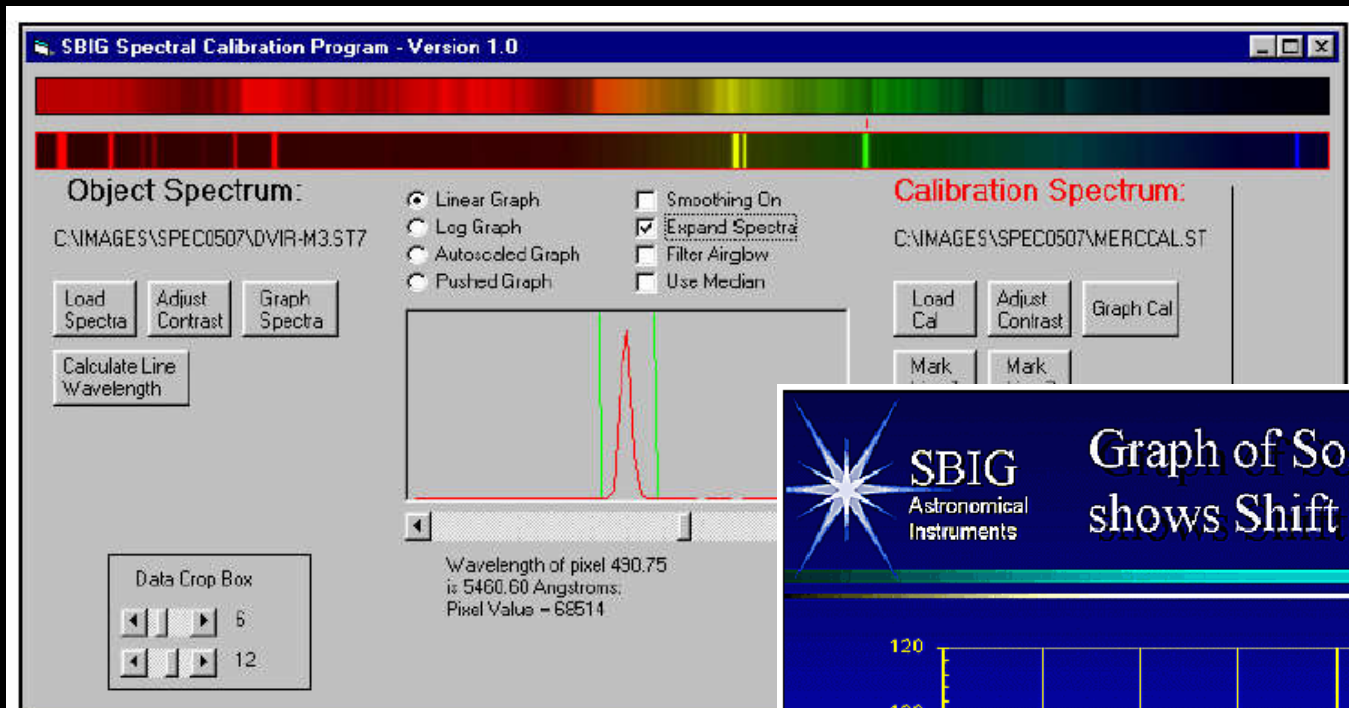


Figure 11
Screen shot of the Spectral Calibration Program

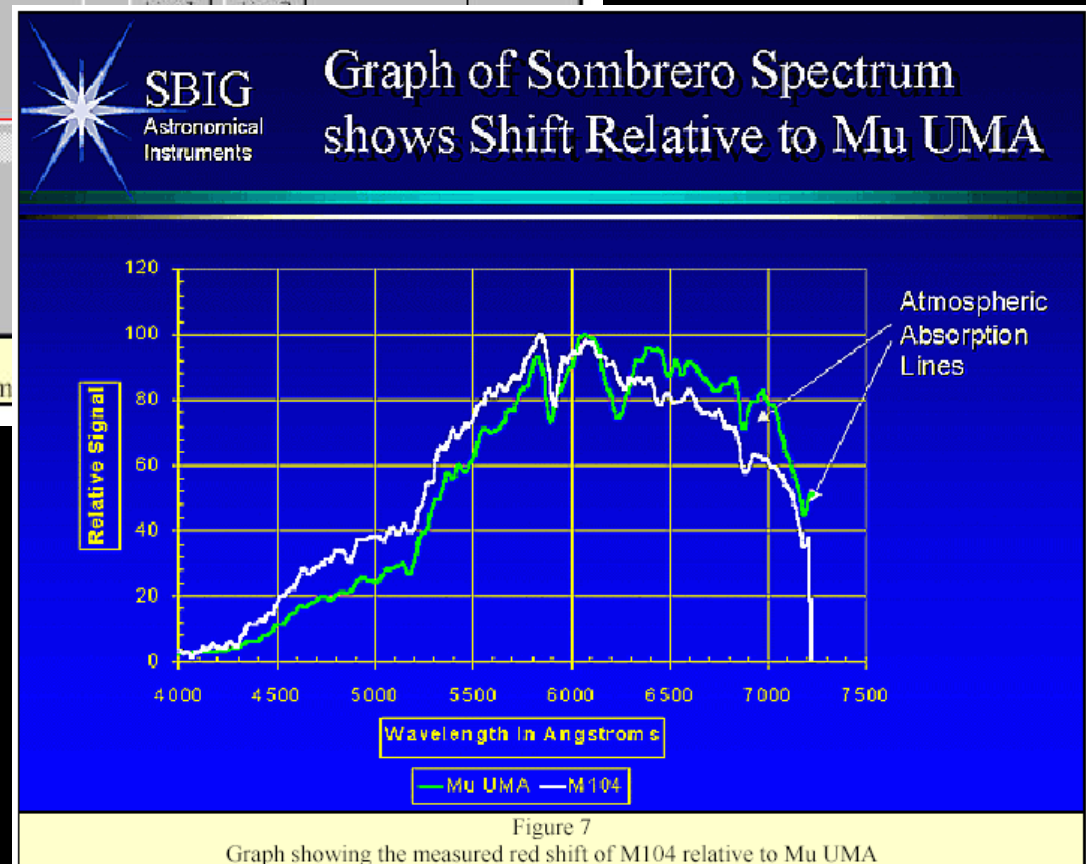
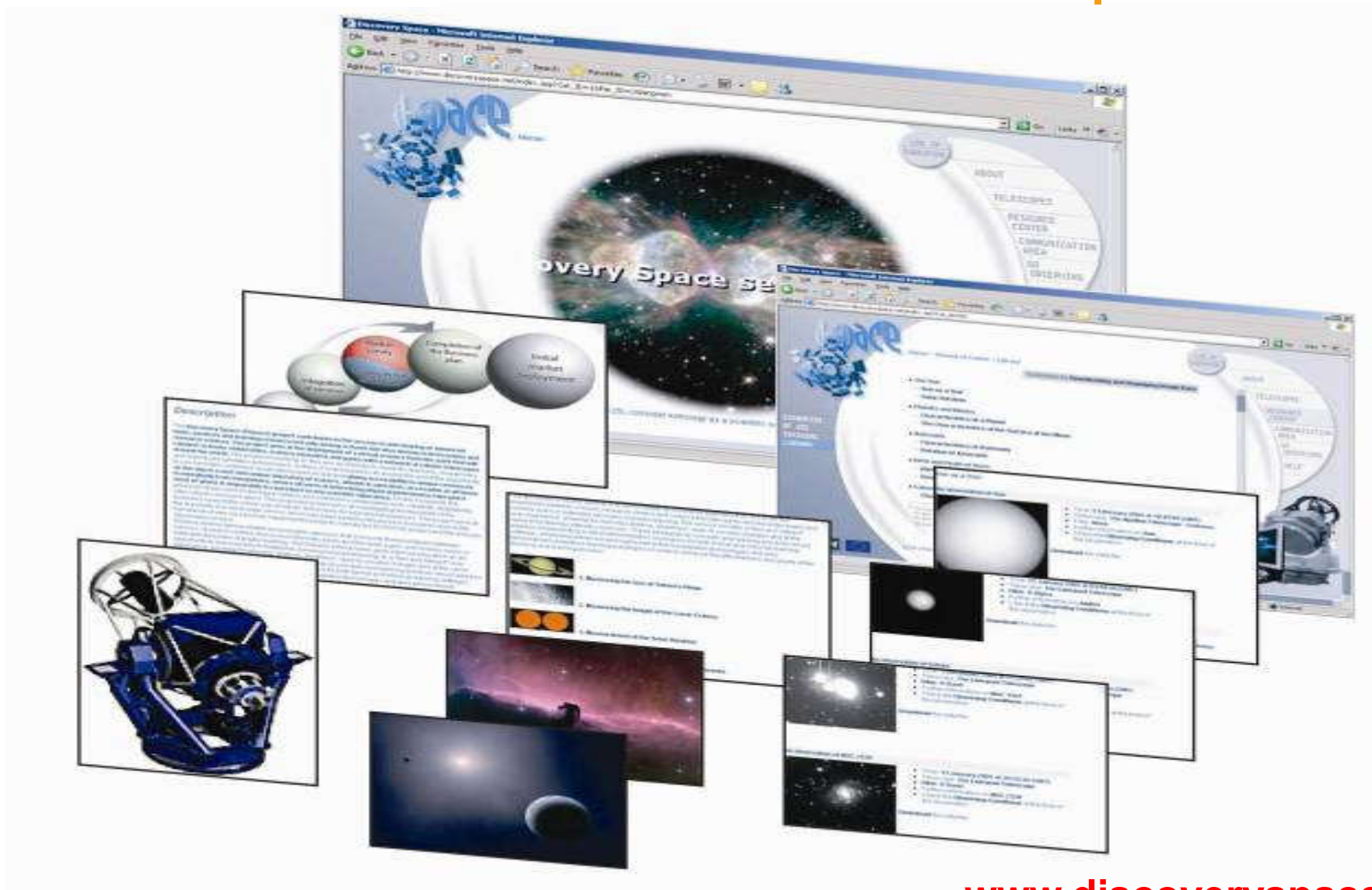


Figure 7
Graph showing the measured red shift of M104 relative to Mu UMA



Web access to a network of robotic telescopes



www.discoveryspace.net



**A network of robotic
telescopes around the globe**



User Interface

GO OBSERVING

Perform your observations in four simple steps

Select Telescope
First you have to choose the robot telescope for your observation. The system will inform you about the suitability of the specific telescope. In case that the specific telescope is not suitable the system will provide you with some other options.

Select Object
Select the astronomical object you would like to observe. It is important to take into account all the conditions described in the relative form and the sky map of the selected telescope.

CHOOSE TELESCOPE

Blue telescope Yellow telescope Blue telescope

SELECT OBJECT

Select the astronomical object you would like to observe. It is important to take into account all the conditions described in the relative form and the sky map of the selected telescope.

Select the astronomical object you would like to observe from the object list by clicking it.

http://www.dspace.org/.../SELECTOBJECT.as...

Home Planets & Moon Astronomy Stars Galaxies

Moon Jupiter Saturn Mars Venus

[select an object by clicking it]

Internet

SEE WEATHER

Weather in Spain

ENTER OBSERVATION REQUESTS (in order to proceed you have to be a registered user)

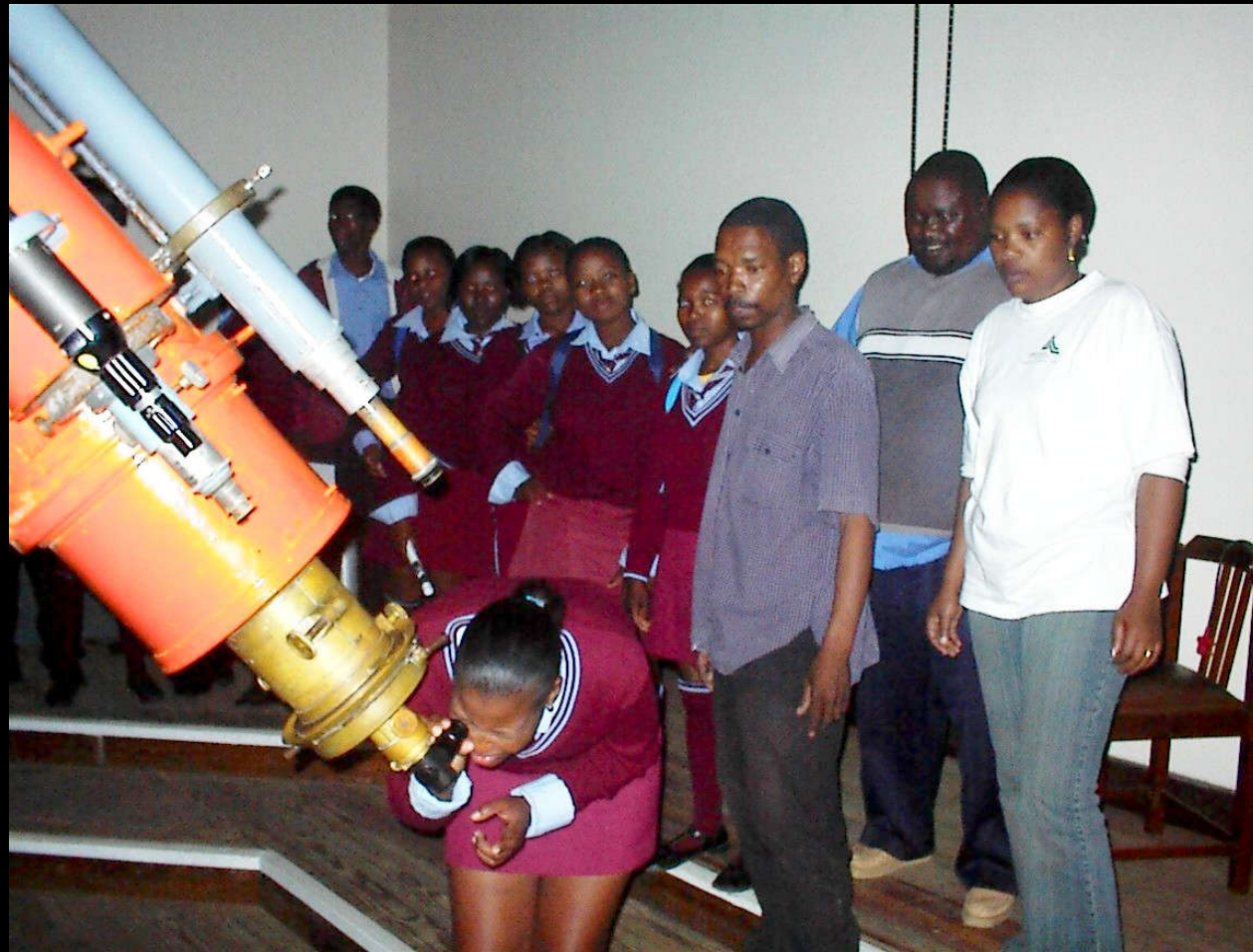
Title:

(Describe the title of your request/object)

Object Name: <input type="text" value="Moon"/>	Filters and Conditions:
Public: <input type="checkbox"/> No	Clear: <input type="checkbox"/> 50
Date: <input type="text"/>	Blue: <input type="checkbox"/> 50
Start Time: <input type="text" value="Local time (UTC)"/>	White: <input type="checkbox"/> 50
Repeat Count: <input type="text" value="1"/>	Red: <input type="checkbox"/> 50
Delay: <input type="text" value="00:30 minutes"/>	Infrared: <input type="checkbox"/> 50
	Ultraviolet: <input type="checkbox"/> 50
	Narrow: <input type="checkbox"/> 50



Education



Amateur astronomers also play a role in the education of students in the field of science and mathematics.

It is possible that an amateur astronomer plants a seed in the mind of a student, that might turn into an Albert Einstein of the future

Conclusion

Amateur astronomers who embrace new technologies and continuously specialize in their individual fields have numerous possibilities to contribute to the professional environment.

In the global race of scientific advancement, Pro-Am collaboration will ensure greater success for everyone in the field of astronomy

Thank You



for your attention