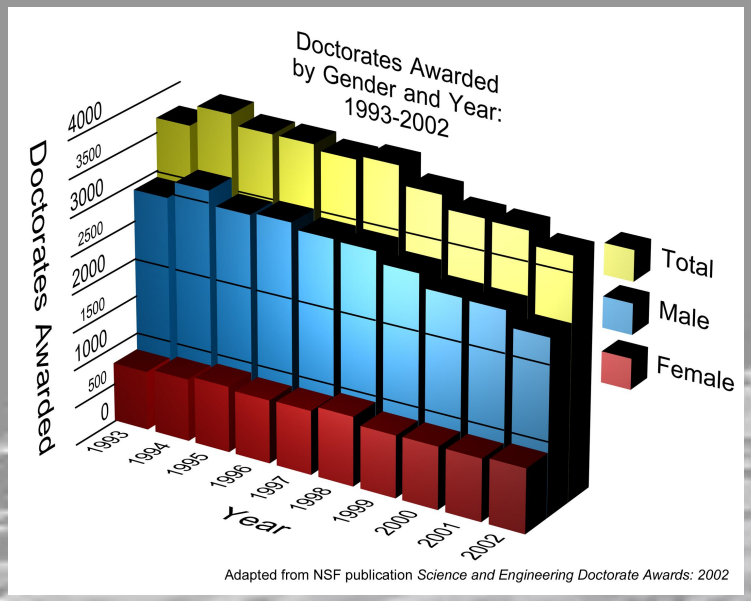
LunarSS:
Inspiring the Future

Dana Pugh

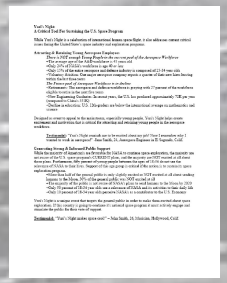
ASTE 527

December 15, 2008

Lack of Science and Engineering Interest



Adapted from NSF publication *Science and Engineering Doctorate Awards: 2002*



- **Where have all the engineers gone?**
  - "Between 1986 and 2006, there was a 3 percent decrease in engineering graduates."
- **5...4...3...2...Yawwwwwn**
  - "… but it is hard for most Americans to care much about the space program when they are worried about keeping their jobs, making house payments and putting food on the table."
- **Yuri's Night Rationale Document (embedded)**
  - New Engineering Graduates: In recent years, the U.S. has produced approximately 72K per year (compared to China's 351K)
  - Decline in education: U.S. 12th-graders are below the international average on mathematics and science

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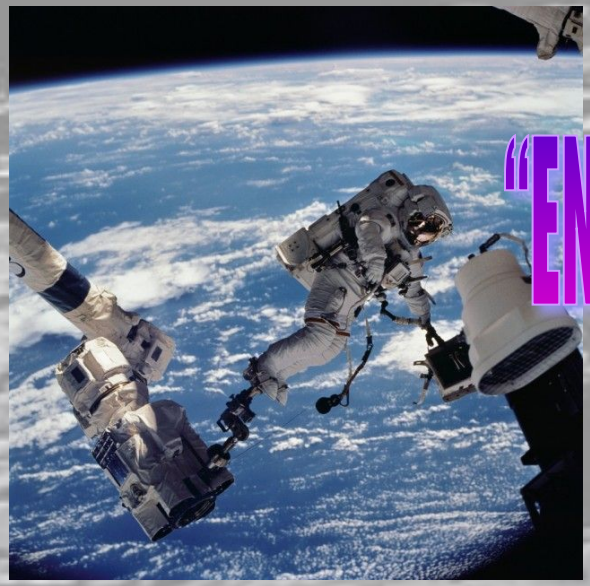
Inspiring the Next Generation



"ENGAGE KIDS MORE!!!!"

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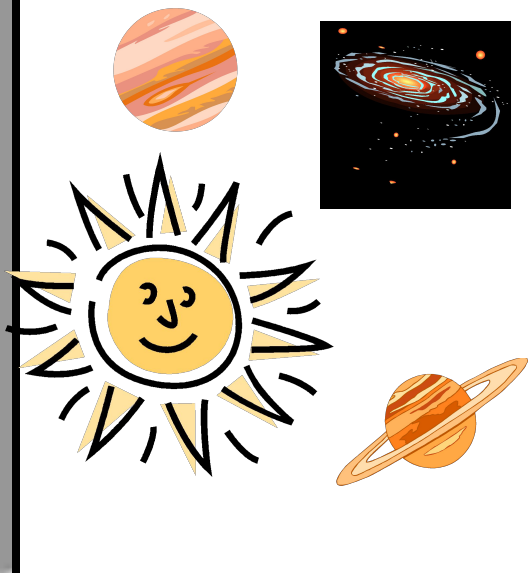
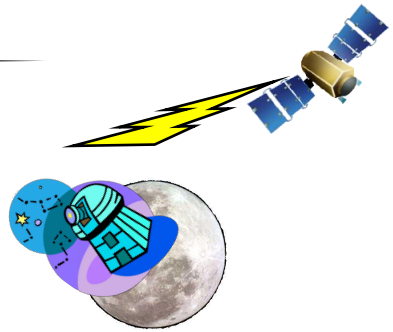
Lunar Space Scope Architecture





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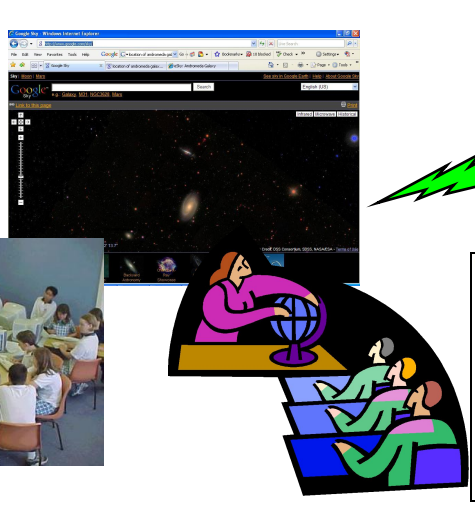

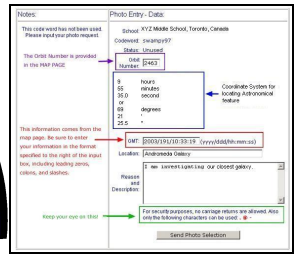

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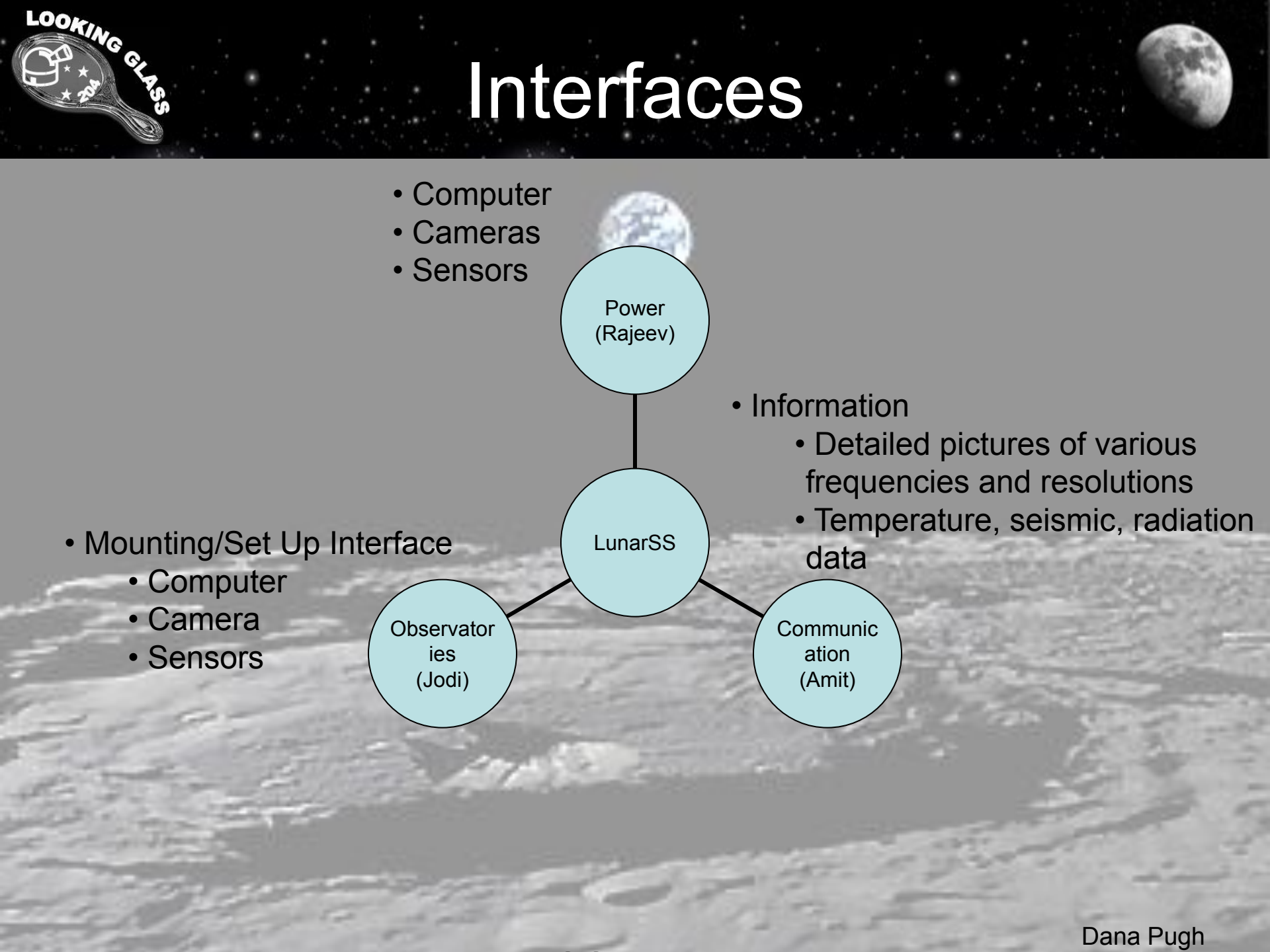
Interfaces



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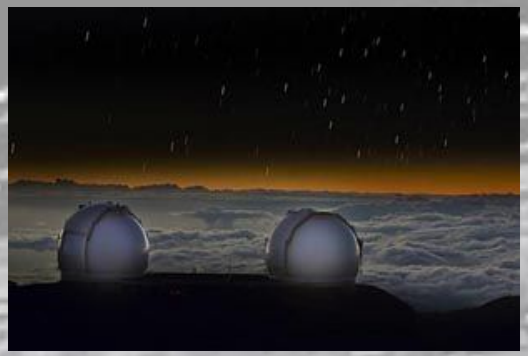
Operational Architecture

LunarSS

Observatory Operations

School/Education

Website



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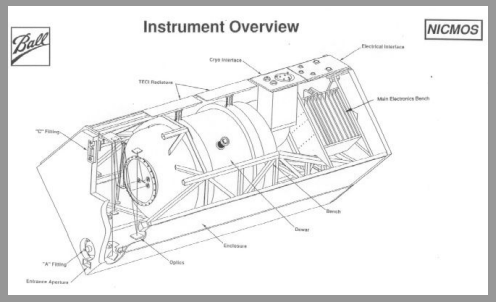
Sensory Systems



- Camera:
  - Advanced versions of Hubble imaging systems
    - Wide Field and Planetary Camera 2 (WFPC2)
    - Near Infrared Camera and Multi-object Spectrometer (NICMOS)
    - Space Telescope Imaging Spectrograph (STIS)
- Temperature Monitoring Systems
- Seismic Activities Monitors – study meteor hits
- Radiation Detectors

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Power/Communication/ Integration

- Power
  - Power needed for each sensory system
  - 60W to run laptop
- Communication
  - Images & Sensor information sent in “bursts”
- Interchangeable sensor/camera system
  - Allows technology to be top of the line

Technology rate is fast!

Subaru’s primary near-IR camera & Spectrograph

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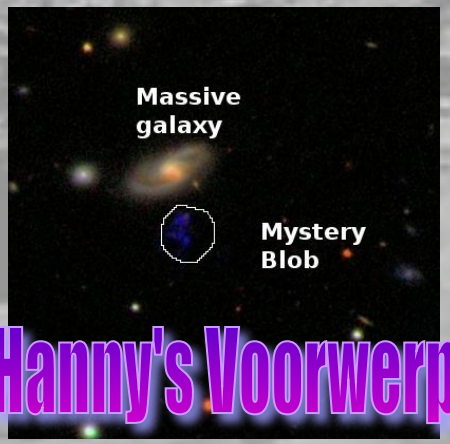
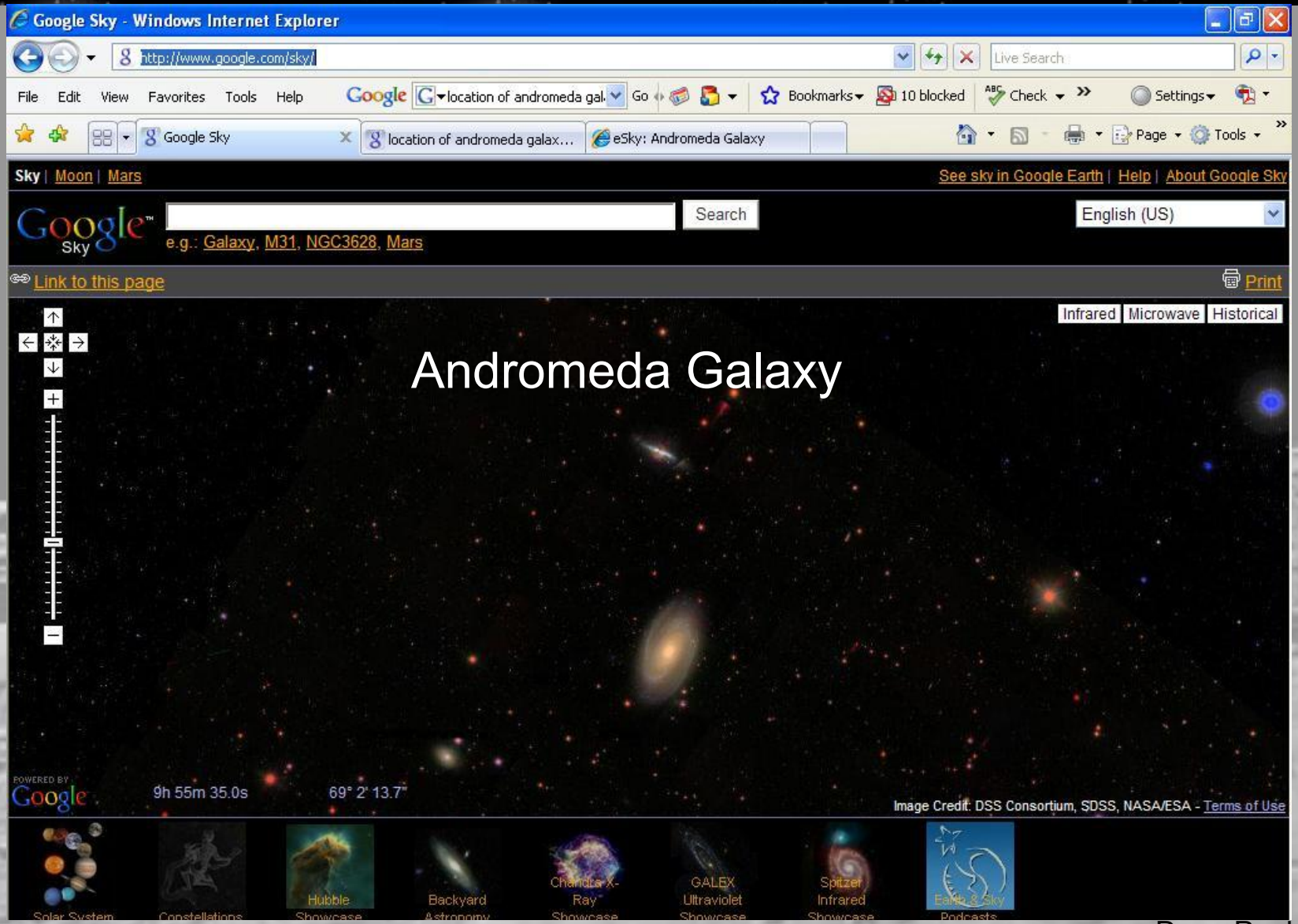
How are Kids involved

- Request the picture on the website interface
  - Observatory will be pointing to what area
    - Models
    - Simulations
    - Communication closely with LunarSS Observatory Operations
  - Associate the work with the class project
    - Label the different kinds of galaxies
    - Label the names of the stars
    - Astrology
- Something New – ***You name it!***



Sky.google.com



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Request Webpage Example

Notes:

This code word has not been used. Please input your photo request.

The Orbit Number is provided in the MAP PAGE

This information comes from the map page. Be sure to enter your information in the format specified to the right of the input box, including leading zeros, colons, and slashes.

Keep your eye on this!

Photo Entry - Data:

School: XYZ Middle School, Toronto, Canada

Codeword: swampy97

Status: Unused

Orbit Number: 2463

9	hours
55	minutes
35.0	second
or	
69	degrees
21	'
25.5	"

Coordinate System for locating Astronomical feature

GMT: 2003/191/10:33:19 (yyyy/ddd/hh:mm:ss)

Location: Andromeda Galaxy

Reason and Description: I am investigating our closest galaxy.

For security purposes, no carriage returns are allowed. Also only the following characters can be used: . @ -

Send Photo Selection

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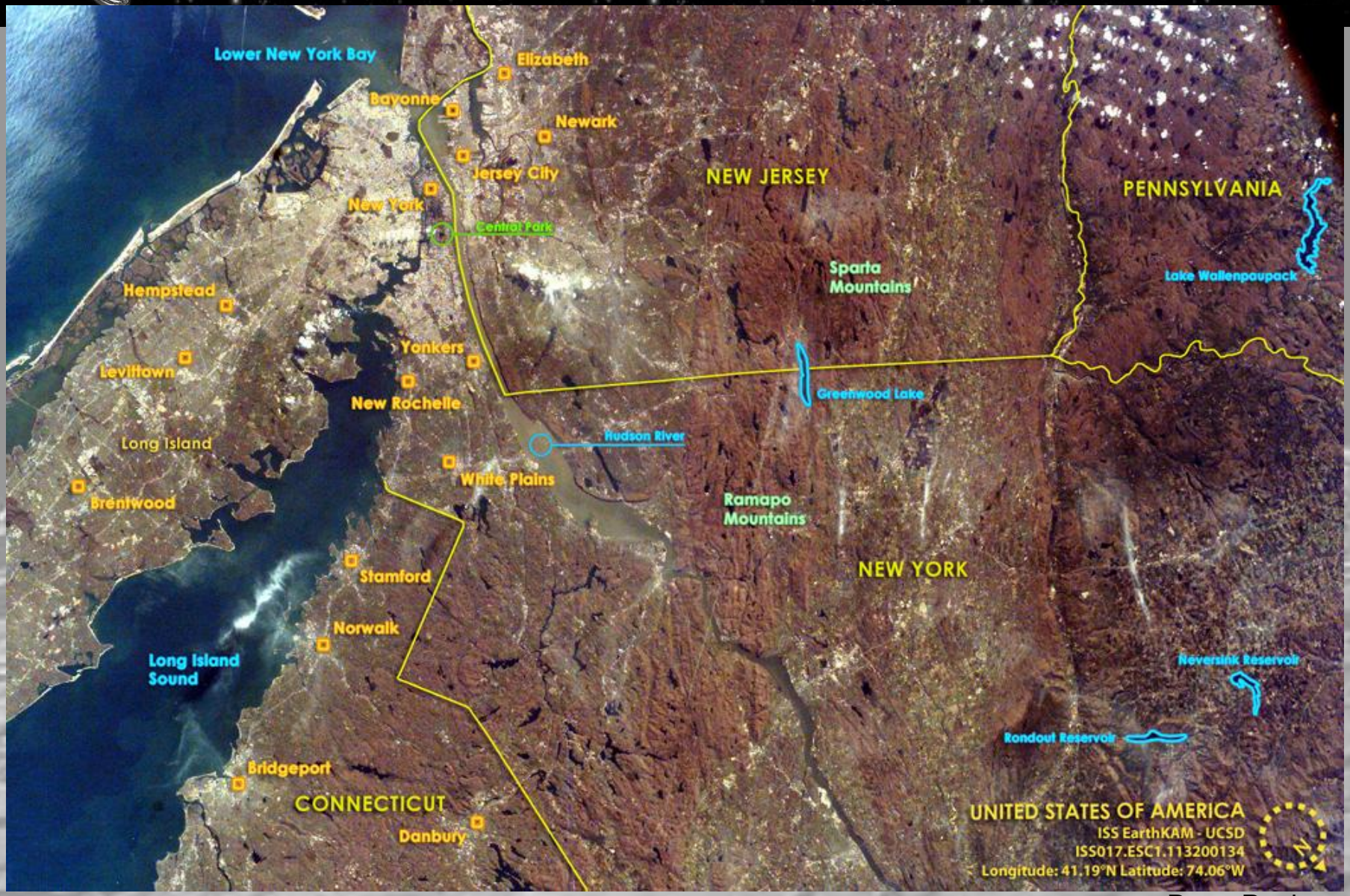
Example Project



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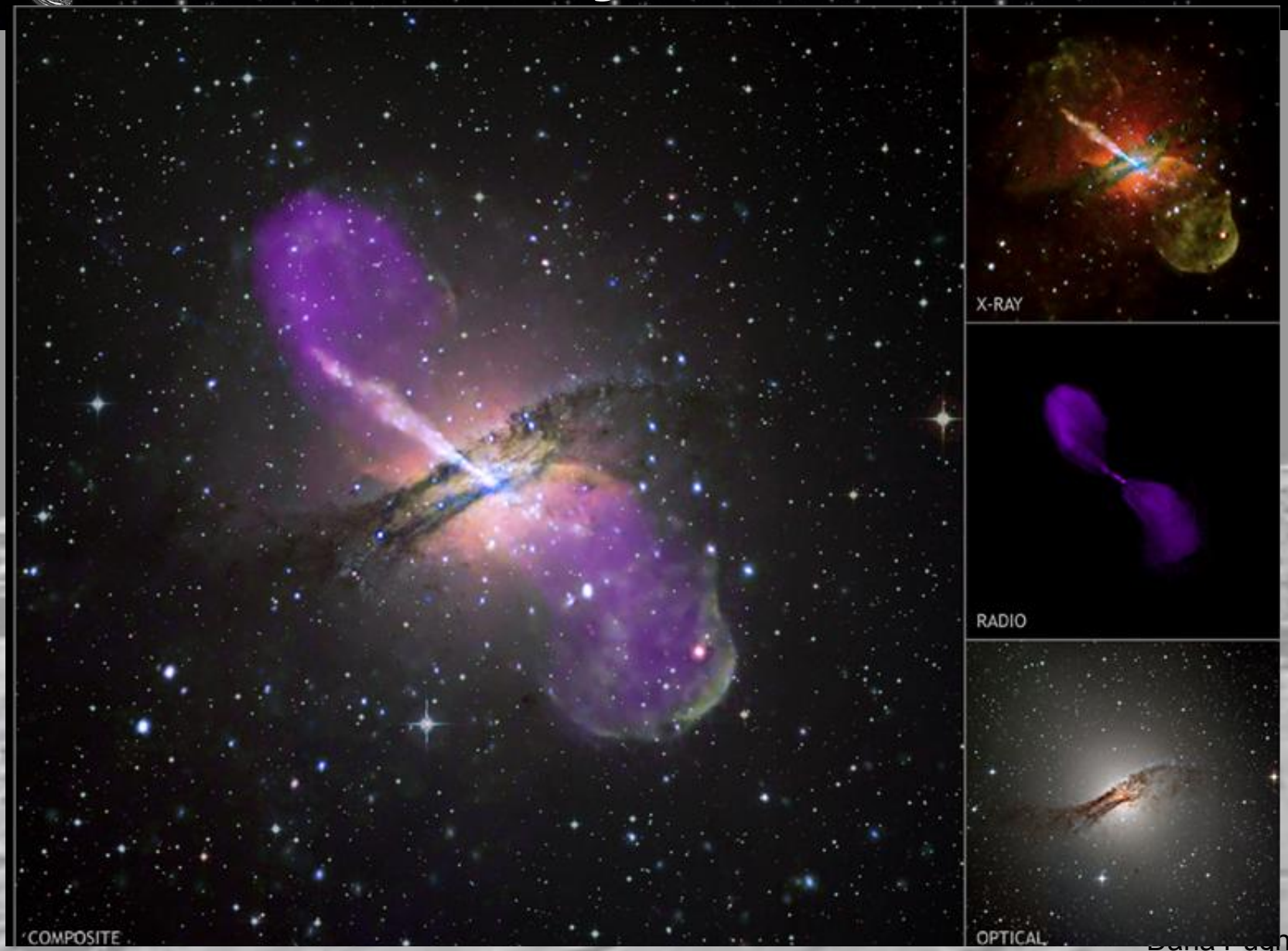
Active Galaxy Centaurus A



Example Project

Active Galaxy Centaurus A

X-Ray

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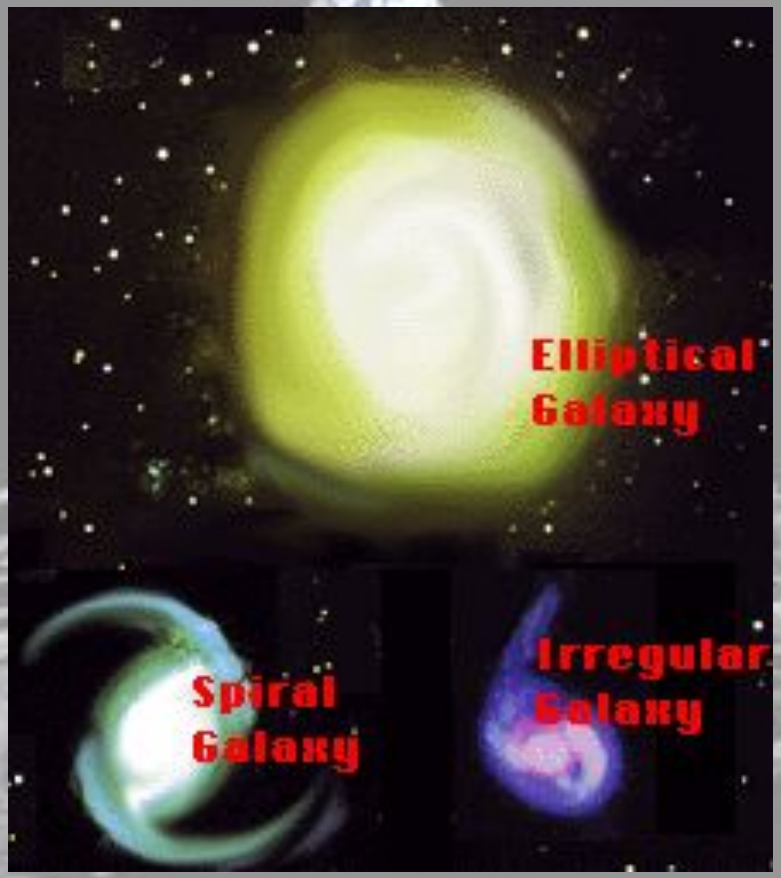
Example Project



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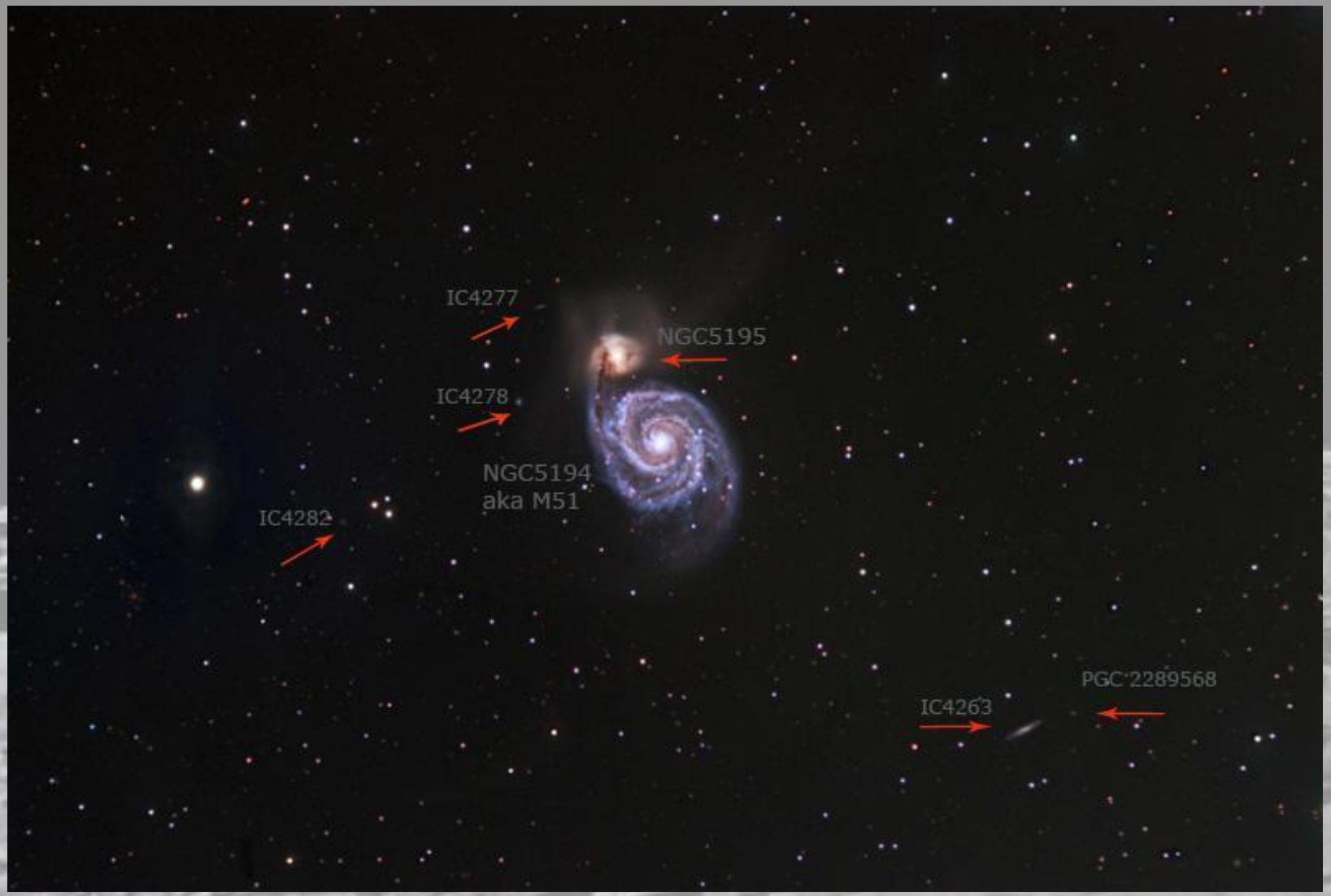
Example Project



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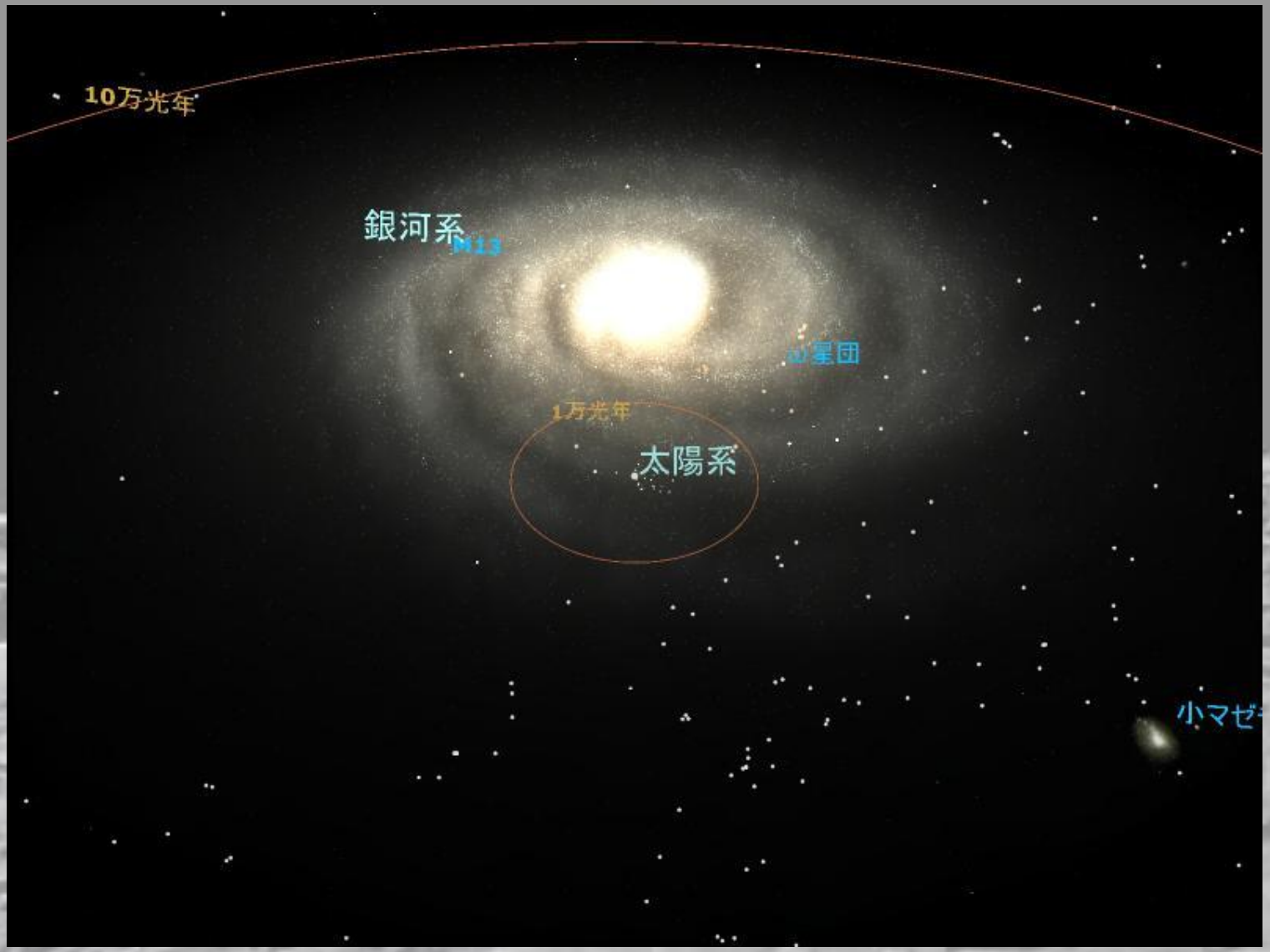
Example Project



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Further Studies

- Program run by students
- Account for Lunar Wobble
- Other interactive programs
  - Telerobotic rovers
    - Samples Moon for kids to analyze
    - Temperature studies
    - Meteorite studies
    - Radiation studies

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References

- Picture of NASA employee teaching kids
  - http://coop.jsc.nasa.gov/biography/grafx/watsond3.jpg
- Picture of Kid in spacesuit:
  - http://shopping.redorbit.com/images/thumbs/t_16420.jpg
- Astronaut doing a spacewalk
  - http://www.gerhards.net/albums/space/eva_sts112_709_073k.sized.jpg
- Kids love science picture:
  - http://www.ufaparents.com/images/Science.jpg
- World with hands
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  - http://abcnews.go.com/Technology/Space/Story?id=6358924&page=1
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  - http://www.stsci.edu/hst/nicmos/images/GRAPHIC_Instrument_Cutaway.GIF
  - http://creativeclass.typepad.com/thecreativityexchange/images/2007/06/28/motarboard.jpg
  - http://www.publicagenda.org/files/images/pages/2008KansasBoyPC_m.jpg
  - http://images.spaceref.com/news/hand.moon.jpg
  - http://subarutelescope.org/Introduction/instrument/img/IRCS_300.jpg

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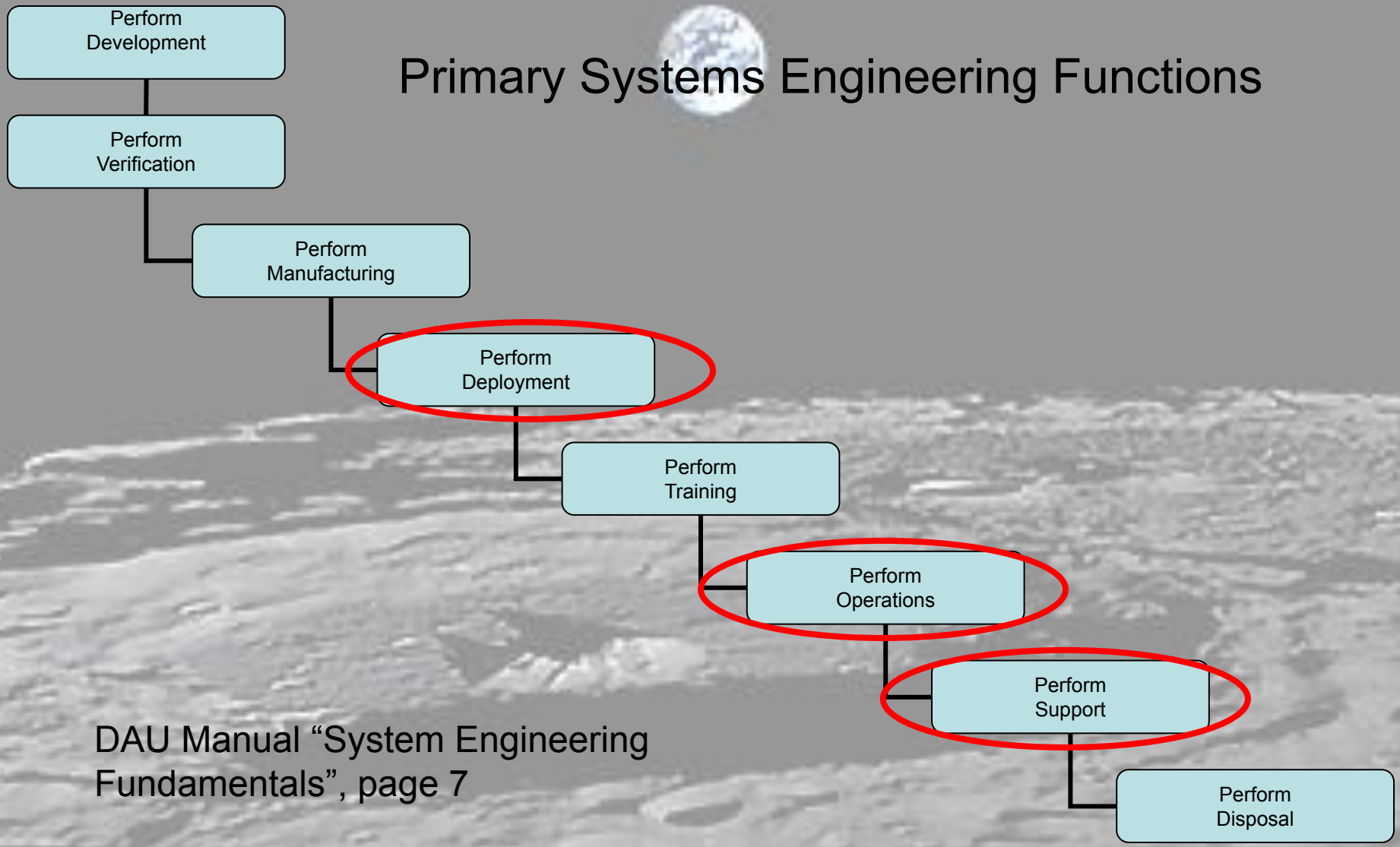
Backup Slides

Overall Return to the Moon: Lunar Observatories

Primary Systems Engineering Functions



DAU Manual “System Engineering Fundamentals”, page 7

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Looking Glass 204 Architecture