



LunarSS: Inspiring the Future

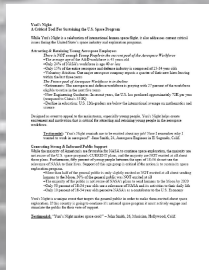
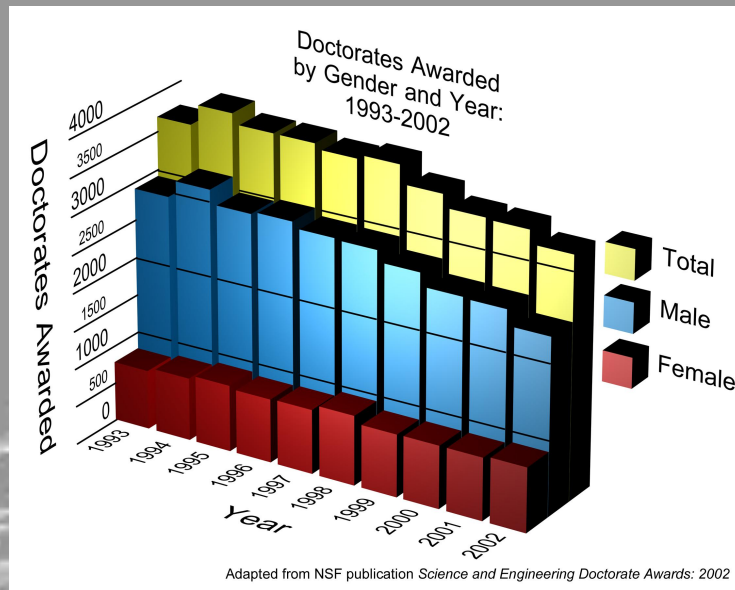


Dana Pugh
ASTE 527

December 15, 2008



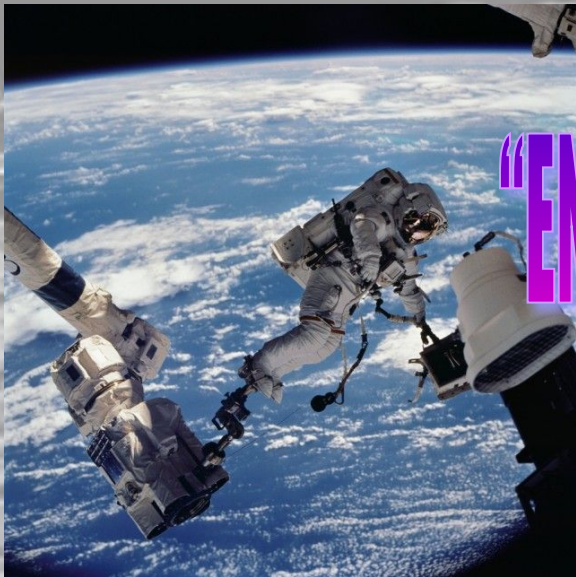
Lack of Science and Engineering Interest



- Where have all the engineers gone?
 - “Between 1986 and 2006, there was a 3 percent decrease in engineering graduates.”
- 5...4...3...2...Yawwwwn
 - “... 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

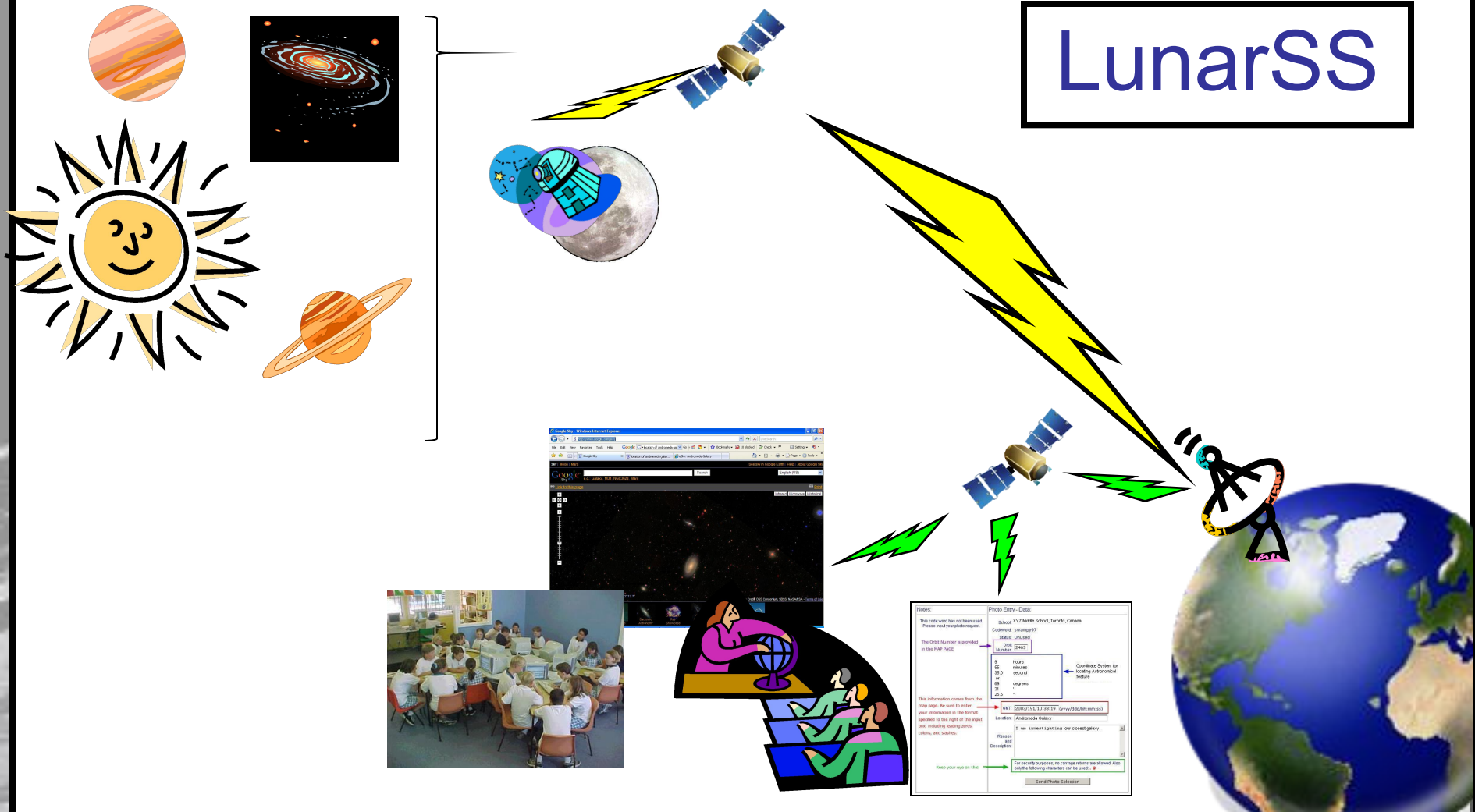


Inspiring the Next Generation



"ENGAGE KIDS MORE!!!!"



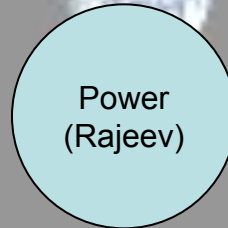




Interfaces



- Computer
- Cameras
- Sensors



- Mounting/Set Up Interface
 - Computer
 - Camera
 - Sensors

- Information
 - Detailed pictures of various frequencies and resolutions
 - Temperature, seismic, radiation data



Operational Architecture



LunarSS

Observatory
Operations

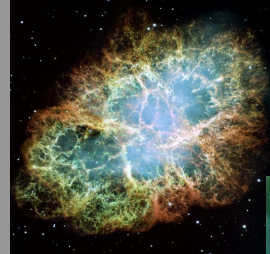
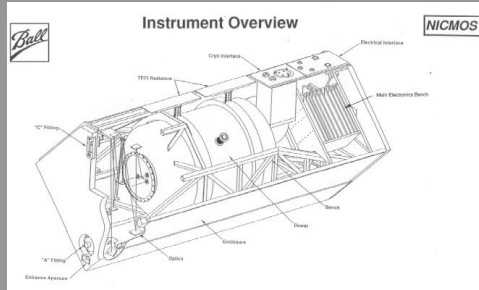
School/Education

Website





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



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





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!***



Dana Pugh



Sky.google.com



Google Sky - Windows Internet Explorer

http://www.google.com/sky/

File Edit View Favorites Tools Help Google location of andromeda gal. Go 10 blocked Check Settings

Google Sky location of andromeda galax... eSky: Andromeda Galaxy

Sky | Moon | Mars See sky in Google Earth | Help | About Google Sky

Google Sky Search English (US)

e.g.: Galaxy, M31, NGC3628, Mars

Link to this page Print

Infrared Microwave Historical

Andromeda Galaxy

9h 55m 35.0s 69° 2' 13.7"

Image Credit: DSS Consortium, SDSS, NASA/ESA - Terms of Use

Solar System Constellations Hubble Showcase Backyard Astronomy Chandra X-Ray Showcase GALEX Ultraviolet Showcase Spitzer Infrared Showcase Earth & Sky Podcasts



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.

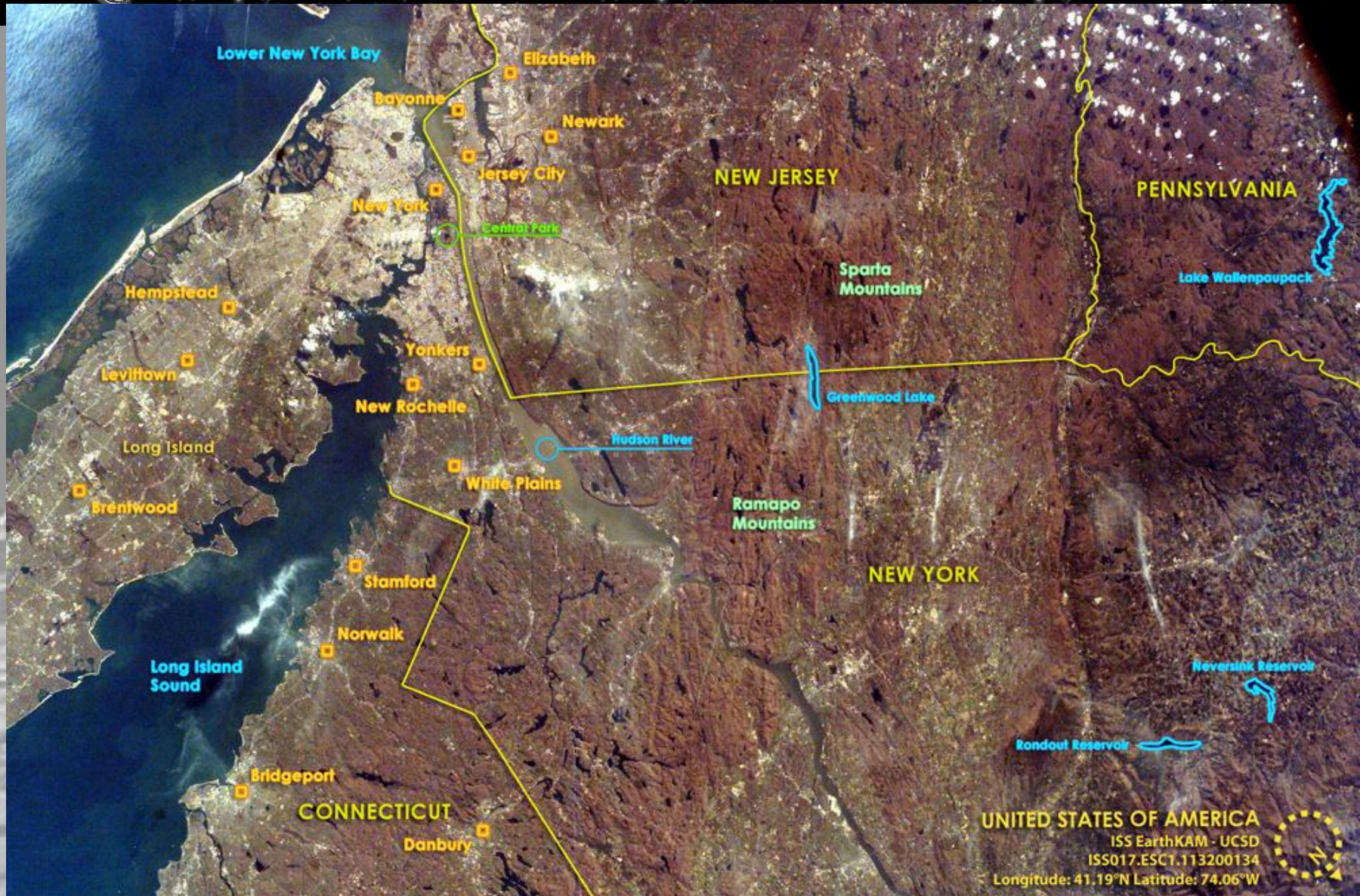
For security purposes, no carriage returns are allowed. Also
only the following characters can be used: . @ -

Send Photo Selection



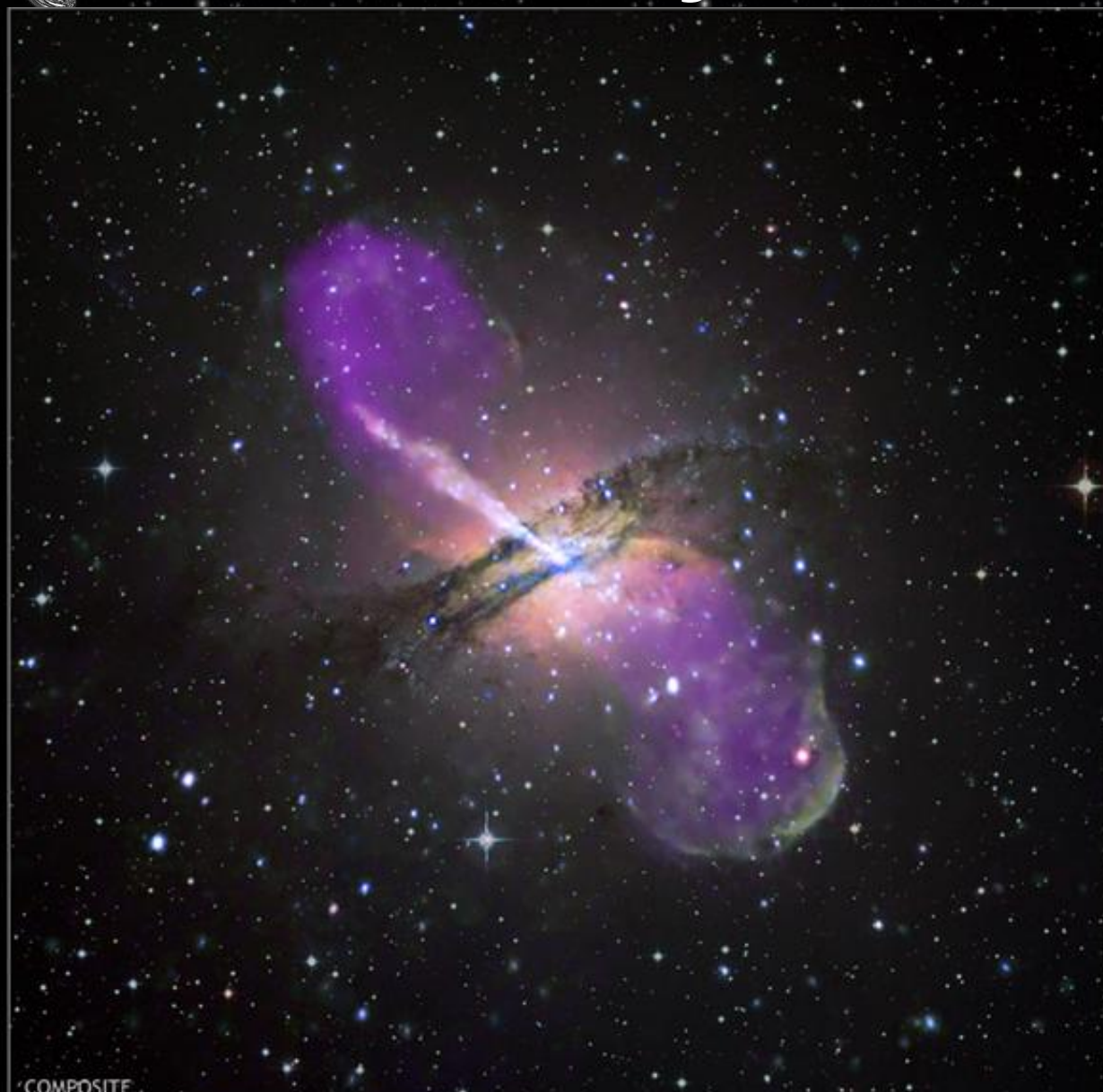


Example Project





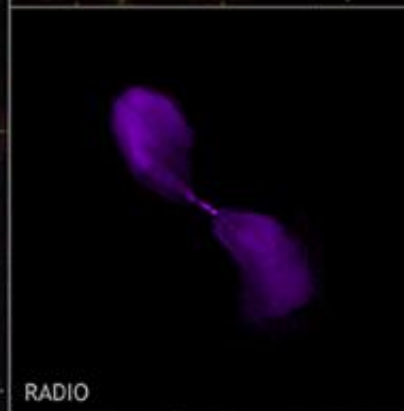
Active Galaxy Centaurus A



COMPOSITE



X-RAY



RADIO



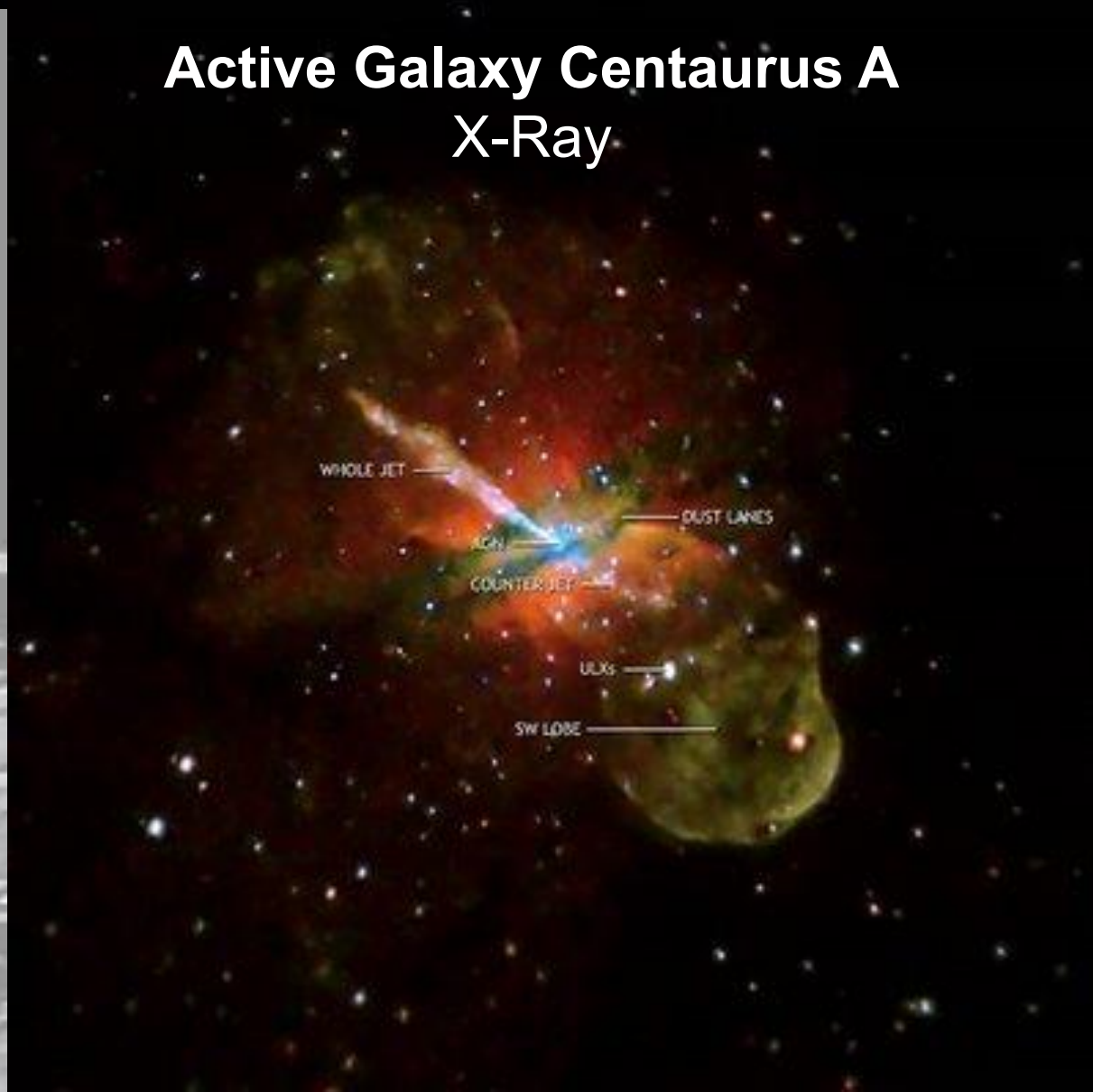
OPTICAL

Band 1.5gh



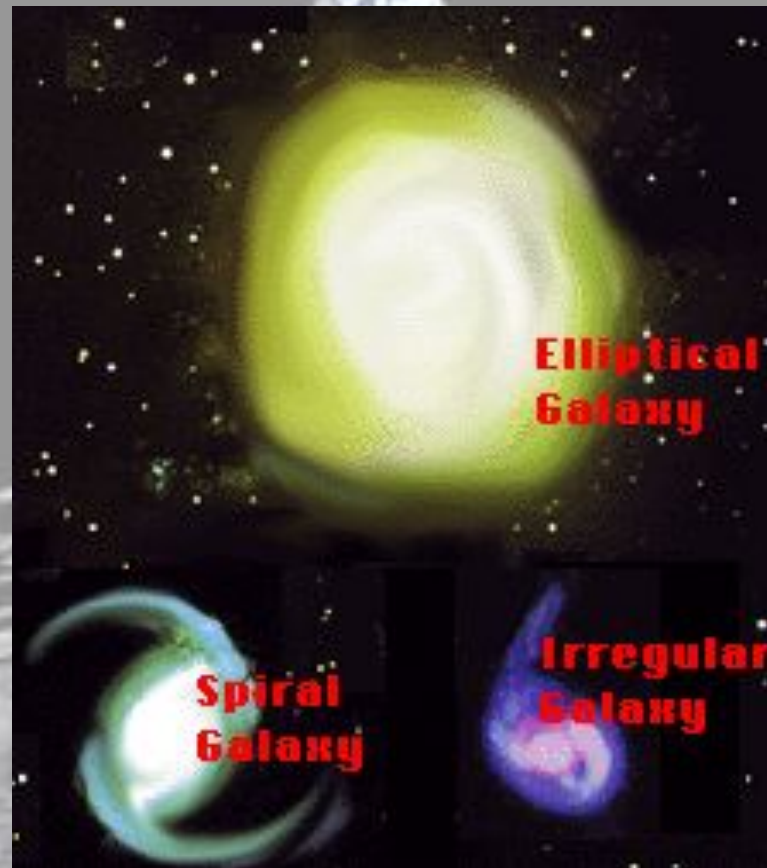
Example Project

Active Galaxy Centaurus A X-Ray





Example Project



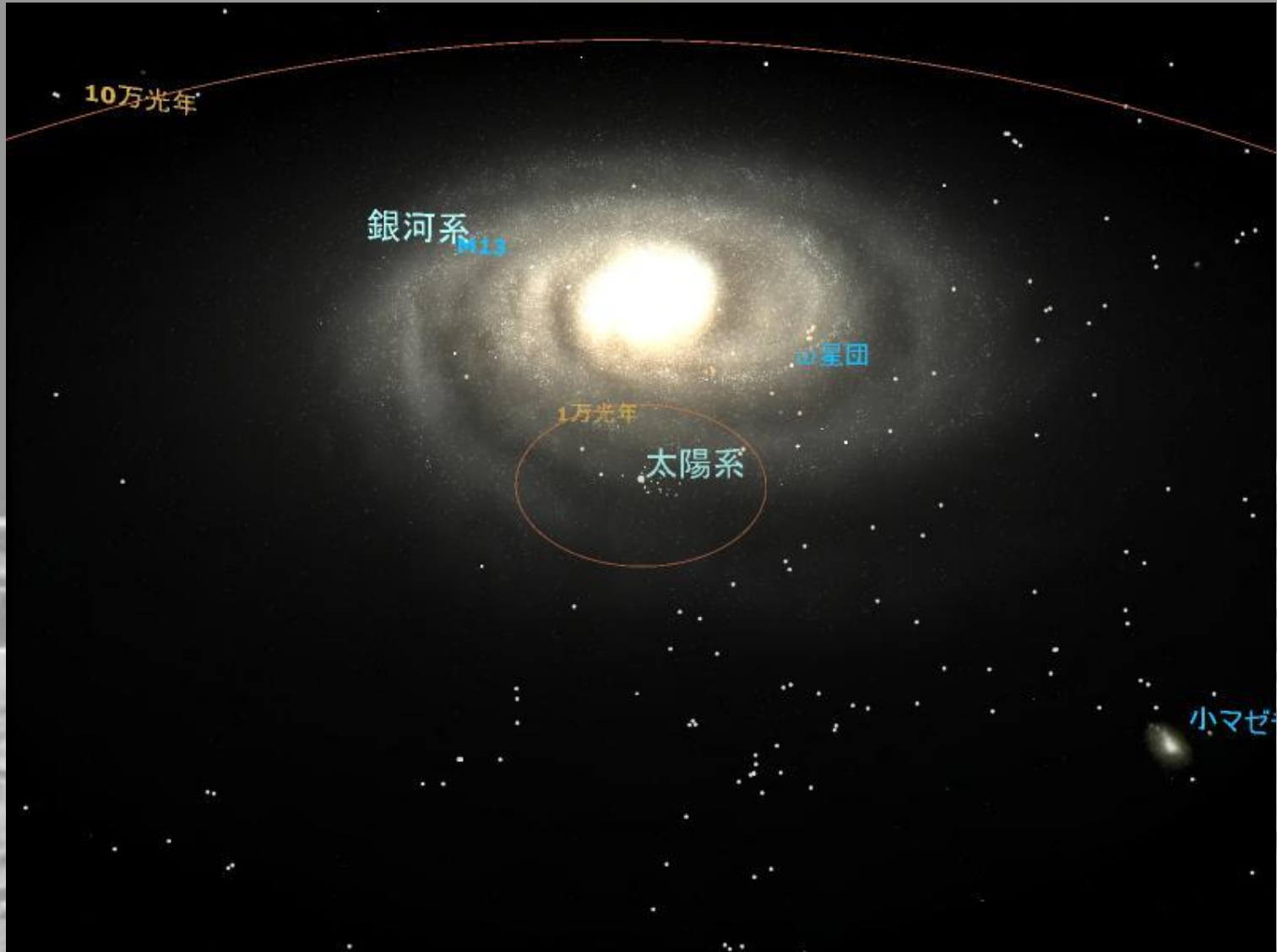


Example Project





Example Project





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



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>
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 - <http://abcnews.go.com/Technology/Space/Story?id=6358924&page=1>
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- Observatory Picture
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- NASA ISS EarthKAM Example Project
 - http://www.earthkam.ucsd.edu/public/images/graphics/annotated/NewYork_andLongIsland_LARGE.jpg
- Hubble Telescope Information
 - <http://science.howstuffworks.com/hubble3.htm>
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 - <http://antwrp.gsfc.nasa.gov/apod/ap080110.html>
- Camera and sensors
 - <http://www.spaceaholic.com/wfpccameras.jpg>
 - http://www.nasa.gov/centers/goddard/images/content/204997main_MIRI_Verif_Iq.jpg
 - 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



Backup Slides

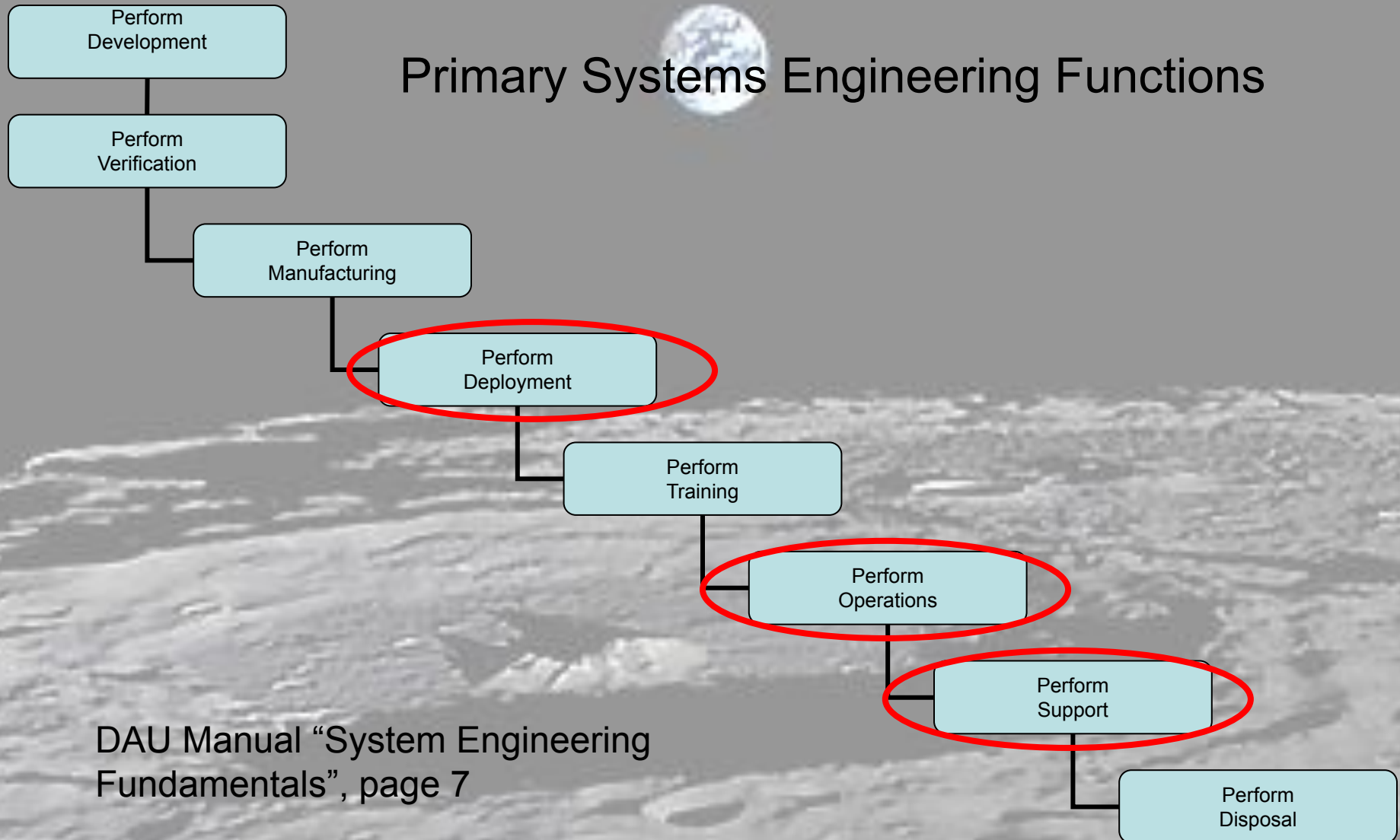




Overall Return to the Moon: Lunar Observatories



Primary Systems Engineering Functions



DAU Manual "System Engineering Fundamentals", page 7

Dana Pugh



Looking Glass 204 Architecture

