


Class Agenda

- Introduction
 - Syllabus
- Spacecraft introduction
 - First spacecraft
 - Spacecraft missions

2



Syllabus

- Michael P.J. Benfield, Ph.D.
 - (256) 824-2976
 - pj.benfield@uah.edu
- Textbook
 - Space Mission Analysis and Design
- Class
 - M/W 5:30 - 6:50, TH N155
- Office Hrs.
 - M/W 4:00 - 5:00, SC 156A

3



Syllabus

- Grades
 - 40% Weekly homework
 - 25% Project (20% report, 5% presentation)
 - 15% Midterm
 - 20% Final Exam (Comprehensive)
- Graduate students
 - More in-depth midterm and final
- Schedule
 - January 14 – No Class
 - January 21 – MLK Holiday
 - March 17, 29 – Spring Break
 - April 28th (6:30 – 9:00) – Final Exam

4



Syllabus

- Weekly homework
 - Assigned on Wednesday – due next Wednesday (see schedule)
 - Due within 5 minutes of class starting
 - Late policy
 - 10% off if turned in during class
 - 10% each day after
 - Monday after due – zero (0)
- Project
 - Teams will develop spacecraft design given a payload and mission characteristics

5



Spacecraft Introduction

- WWII
 - German rocket scientists
 - ½ went to U.S., ½ went to USSR
- First spacecraft
 - October 1957
 - 1st launch of spacecraft (USSR)
 - Sputnik I
 - 84 kg
 - 58 cm diameter
 - Battery, transmitter, and whip antenna
- Space race had begun

6

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Spacecraft Introduction

- 1st American spacecraft
 - Explorer I
 - January 31, 1958
 - Discovered Van Allen belt
- Late 1960s
 - Launch capability grew
 - 14 kg to 56,000 kg
- Total of over 4400 spacecraft launches
 - 60% USSR
 - 30% U.S.
 - 10% Others

7

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Spacecraft Missions

8

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Communications

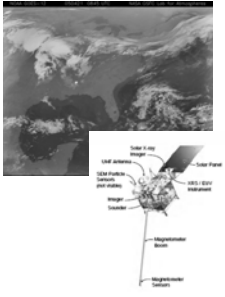
- 1960s
 - Cable calls
- 1990s
 - Near real time over globe
- Current
 - Personal television
 - Voice
 - Internet

9

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Weather

- 19th century
 - Weather reports by mail
- 1891
 - U.S. weather bureau
- 1940s
 - Data needed for aviation
- Today
 - World-wide motion of weather
 - Four times a day




10

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Navigation

- Astrolabe
 - Using astronomy to navigate
- 18th century
 - Sextant, compass, star and sun tables
- 1940s
 - Use of radio signal direction
- Today
 - GPS

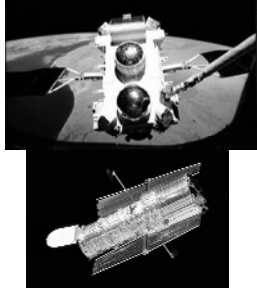


11

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Astronomy

- Avoidance of atmosphere
- Great observatories
 - International Ultraviolet Explorer
 - Hubble Space Telescope
 - Compton Gamma Ray Observatory
 - Chandra X-ray Observatory
 - Hipparchus
 - SOHO

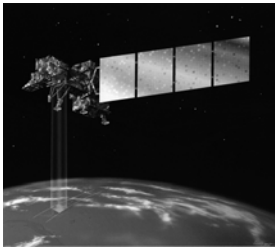


12

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Earth Resources

- 1959
 - 1st photo of Earth from satellite
- Gemini astronauts
- LANDSAT
 - 18 days
 - Looks at vegetation and irrigation
 - Resolution – ¼ acre

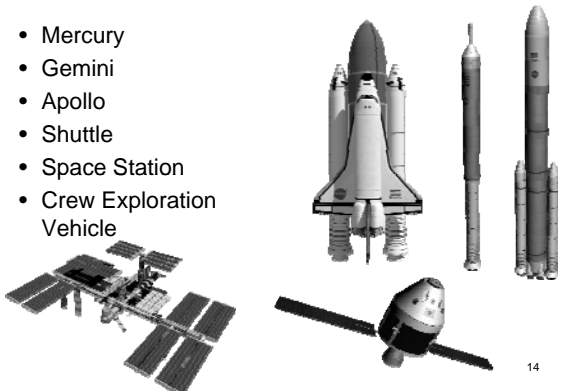


13

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Manned Spacecraft

- Mercury
- Gemini
- Apollo
- Shuttle
- Space Station
- Crew Exploration Vehicle

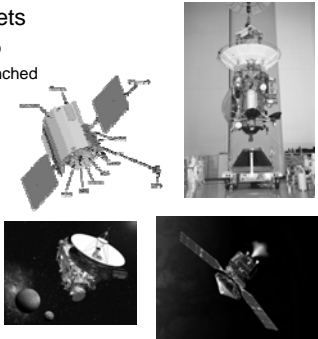


14

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Planetary Spacecraft

- Visited 8 of 9 planets
 - Last planet – Pluto
 - New Horizons launched
- Current missions
 - Cassini (Saturn)
 - MESSENGER (Mercury)
 - MRO (Mars)
 - MER (Mars)
 - Phoenix (Mars)
 - Dawn (Vesta)



15
