

## MODULE 6

### SPACECRAFT

#### Chapter 1 - Unmanned Spacecraft

##### Learning Outcomes

After completing this chapter, you should be able to:

- Define a satellite. Describe an orbit. Define apogee and perigee. Identify Sputnik.
- Define a space probe.
- Describe the related parts that make up a satellite system.

#### Chapter 2 - Manned Spacecraft

##### Learning Outcomes

After completing this chapter, you should be able to:

- List the manned space flight projects and their missions. Identify the American and Russian joint manned spacecraft mission.
- Describe the accomplishments of Alan Shepard and Neil Armstrong. State specific facts about the Hubble Space Telescope.

#### Chapter 3 - Living and Working in Space

##### Learning Outcomes

After completing this chapter, you should be able to:

- Describe Space Station Alpha. Explain the differences between Mir and Skylab. Define Spacelab.
- Recall the significance of Salyut 1. Describe the living and working conditions in space. Describe the different space suits.

#### Chapter 1 - Unmanned Spacecraft

- \_\_\_\_\_, the first artificial satellite.
1. In 1957, the Russians launched \_\_\_\_\_
  2. The term \_\_\_\_\_ is used for either a natural or an artificial object in space.
  3. Communication satellites began in 1958 when taped messages were broadcast from orbit on the \_\_\_\_\_ satellite. In 1962, \_\_\_\_\_ became the first commercial satellite.
  4. Intelsat stands for \_\_\_\_\_  
It is made up of 109 nations worldwide that control \_\_\_\_\_ satellites. TDRSS stands for \_\_\_\_\_ and \_\_\_\_\_ provides full-time coverage for the \_\_\_\_\_ It
  6. The Deep Space Network provides continuous communications for planetary spacecraft probing into \_\_\_\_\_.
  7. The first navigational satellite, \_\_\_\_\_, was developed to provide Polaris missile submarines with the ability to fix accurate positions.
  8. GPS is the NAVSTAR \_\_\_\_\_ that offers a precise

9. The Natural Resources Satellites locate \_\_\_\_\_ and monitor other conditions on the Earth's surface. This is the task of the \_\_\_\_\_ series of satellites.
10. In 1960, Tiros 1 became the first \_\_\_\_\_ satellite.
11. GOES stands for \_\_\_\_\_ -GOES provides pictures of the Earth's \_\_\_\_\_, pictures of \_\_\_\_\_ and provides information which helps with \_\_\_\_\_.
12. The \_\_\_\_\_ satellite series discovered the Van Allen radiation belts.
13. Satellite? or spacecraft that either fly by, orbit or land on a celestial body, other than Earth, are called \_\_\_\_\_.
14. The \_\_\_\_\_ took pictures of the Moon in preparation of the Apollo landings. The \_\_\_\_\_ series flew by Venus and Mercury and gave us pictures of Venus' clouds and Mercury's cratered surface.
15. In the 1970s, the \_\_\_\_\_ probes gave us pictures of Jupiter and Saturn. Then in the late 1970s, \_\_\_\_\_ and \_\_\_\_\_ also encountered Jupiter and Saturn.
16. In 1975, the \_\_\_\_\_ series explored the environment of Mars.
17. Satellites as a system are made up of four parts: \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ and a \_\_\_\_\_.
18. Customers define the overall \_\_\_\_\_ and \_\_\_\_\_ for satellites.
19. \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_ are potentially dangerous for satellites.
20. \_\_\_\_\_ and \_\_\_\_\_ can also harm satellites. Some 20,000 tons of \_\_\_\_\_ make it into the Earth's atmosphere every year.
21. Manmade \_\_\_\_\_ or \_\_\_\_\_ is also a threat.
22. The first aspect that ties the sub-systems together is the satellite's \_\_\_\_\_. The first step of the "design of the sub-system is the \_\_\_\_\_.
23. The \_\_\_\_\_ of a satellite is like a building.
24. The \_\_\_\_\_ system provides the boost to get the satellite into orbit.
25. To make minor corrections in direction, the \_\_\_\_\_ system is used.
26. The main source of electricity while the satellite is in orbit is the \_\_\_\_\_.
27. Temperature data is part of the \_\_\_\_\_ sub-system.
28. The \_\_\_\_\_ and \_\_\_\_\_ function of a satellite is a communication system.
29. The sub-system that gets the satellite into orbit is the \_\_\_\_\_.
30. An \_\_\_\_\_ is the movement or path a satellite takes around a celestial body.
31. \_\_\_\_\_'s First Law states that the orbit of each planet is an ellipse, with the sun at the focus.
32. The highest point of an orbit is called the \_\_\_\_\_, and the lowest point is called its \_\_\_\_\_.

## Chapter 2 - Manned Spacecraft

33. America's first manned space flight program was called \_\_\_\_\_.
34. \_\_\_\_\_ was the first American in space.
35. \_\_\_\_\_ was the first American to orbit the Earth. His orbit lasted for \_\_\_\_\_ hours and \_\_\_\_\_ - \_\_\_\_\_ minutes and orbited the Earth \_\_\_\_\_ times.

36. Project Mercury answered the basic questions about \_\_\_\_\_ in \_\_\_\_\_ .
37. \_\_\_\_\_ was the first two-man capsule, and it also achieved the first \_\_\_\_\_ in \_\_\_\_\_ .
38. \_\_\_\_\_ landed on the Moon on July 20, 1969, and \_\_\_\_\_ was the first man to walk on the Moon. After we landed on the Moon, only one of the next six flights \_\_\_\_\_ didn't land on the Moon.
39. \_\_\_\_\_ 's mission was to put a laboratory into space. Scientists were interested in continuing their studies of the effects of \_\_\_\_\_ - \_\_\_\_\_ space flights.
40. The first crew manned Skylab for \_\_\_\_\_ days. The final crew spent \_\_\_\_\_ days in space. 41 . The \_\_\_\_\_ - \_\_\_\_\_ was the linkup in space of an American \_\_\_\_\_ and a Soviet manned spacecraft. 42. In 1981, the Space Transportation System, commonly called the \_\_\_\_\_ , was launched. It provides a system for \_\_\_\_\_ into space and a \_\_\_\_\_ to Earth. The major advantage of this system is that it can be used \_\_\_\_\_ and \_\_\_\_\_
43. The Space Shuttle consists of three main parts: the \_\_\_\_\_ , the \_\_\_\_\_ and the \_\_\_\_\_ . The part that looks like an airplane is called the \_\_\_\_\_
44. In April 1990, the shuttle Discovery deployed the \_\_\_\_\_ . It operates at over \_\_\_\_\_ miles above the Earth and is free of any atmospheric \_\_\_\_\_
45. In 1993, the shuttle carried the European developed \_\_\_\_\_ into orbit.

### Chapter 3 - Living and Working in Space

46. Russian launched the first space station, \_\_\_\_\_ . in April 1971.
47. \_\_\_\_\_ stayed in space for six months then burned up when it reentered the Earth's atmosphere.
48. The next model of Russian space station was called \_\_\_\_\_. It was launched in February 1986.
49. The US' first space station was \_\_\_\_\_. It was launched in 1973. Three different \_\_\_\_\_ crews lived aboard, with the last crew staying the longest, \_\_\_\_\_ days.
50. The European Space Agency also built a space station called \_\_\_\_\_.
51. Zero gravity or \_\_\_\_\_ exists inside the space stations.
52. The air inside the space stations is a mixture of \_\_\_\_\_ and \_\_\_\_\_. This mixture works better than breathing \_\_\_\_\_.
53. For sleeping, the astronauts place sleeping bags \_\_\_\_\_ along the walls.
54. The general term used for going outside the Space Shuttle is \_\_\_\_\_
55. Russian \_\_\_\_\_ accomplished the first space walk in March 1965. Less than three months later, \_\_\_\_\_ was the first American to walk in space.
56. In 1973, \_\_\_\_\_ set the record for the longest EVA with seven hours and one minute.
57. It was during Gemini 7 that space suits were \_\_\_\_\_ inside the spacecraft for the first time.
58. In 1984, astronauts used the \_\_\_\_\_ (\_\_\_\_\_) for the first \_\_\_\_\_

time, allowing them to move around in space without being tied to the spacecraft.

59. In November 1998, the first of several launches to construct \_\_\_\_\_  
\_\_\_\_\_ took place. This is a joint venture between \_\_\_\_\_,  
\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_.
60. The \_\_\_\_\_ will replace the Space Shuttle in the 21<sup>st</sup> century.