

# Satellites!

# Types of Satellites

- Communications
- Earth remote sensing
- Weather
- Global Positioning System
- Scientific Research
- Military

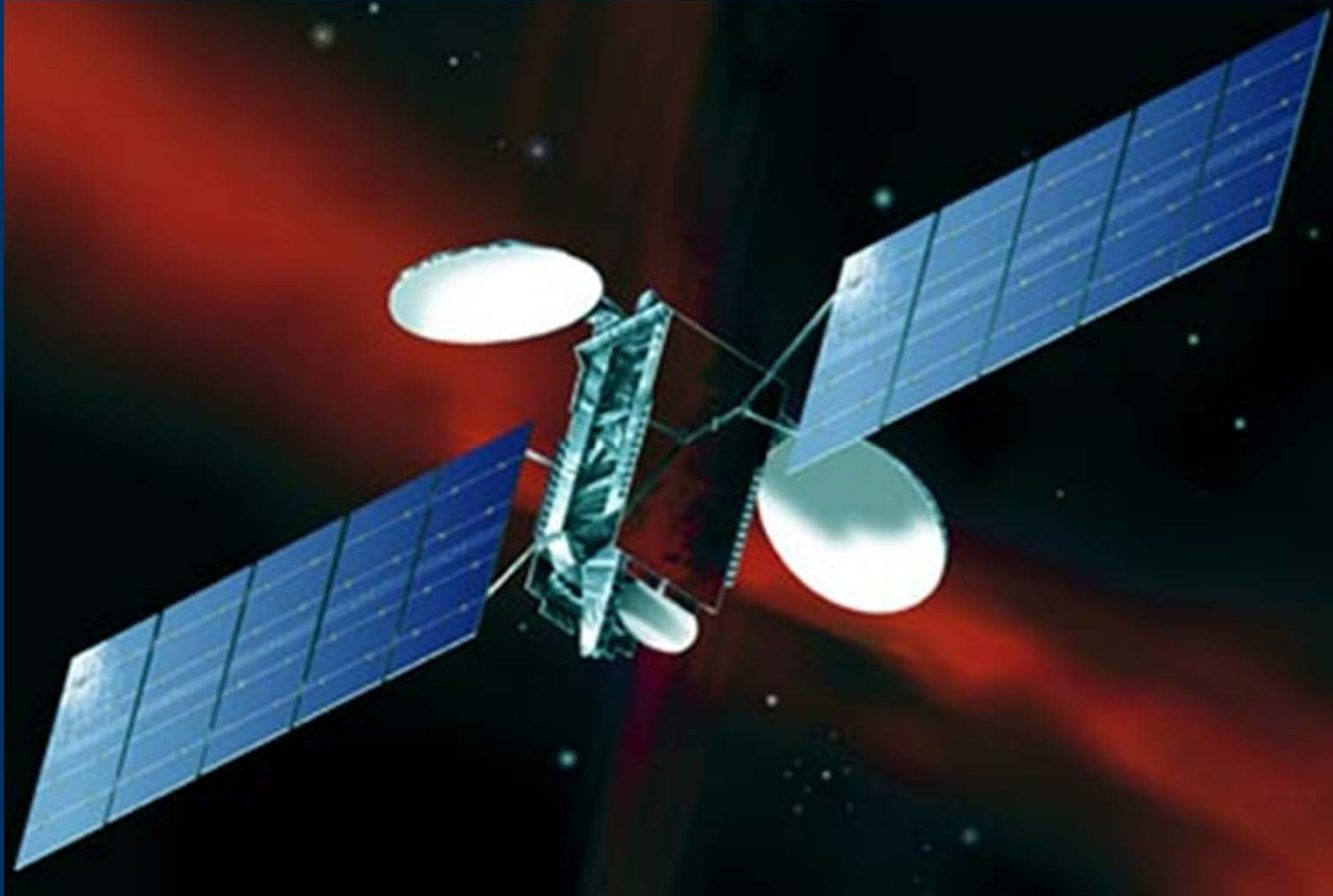
# Sputnik 1 – world's 1<sup>st</sup> artificial satellite



# Explorer I – America's 1<sup>st</sup> satellite



# EchoStar 3 – example of a communications satellite



# Seasat – example of Earth remote sensing satellite





# Tiros 1 – example of weather satellite



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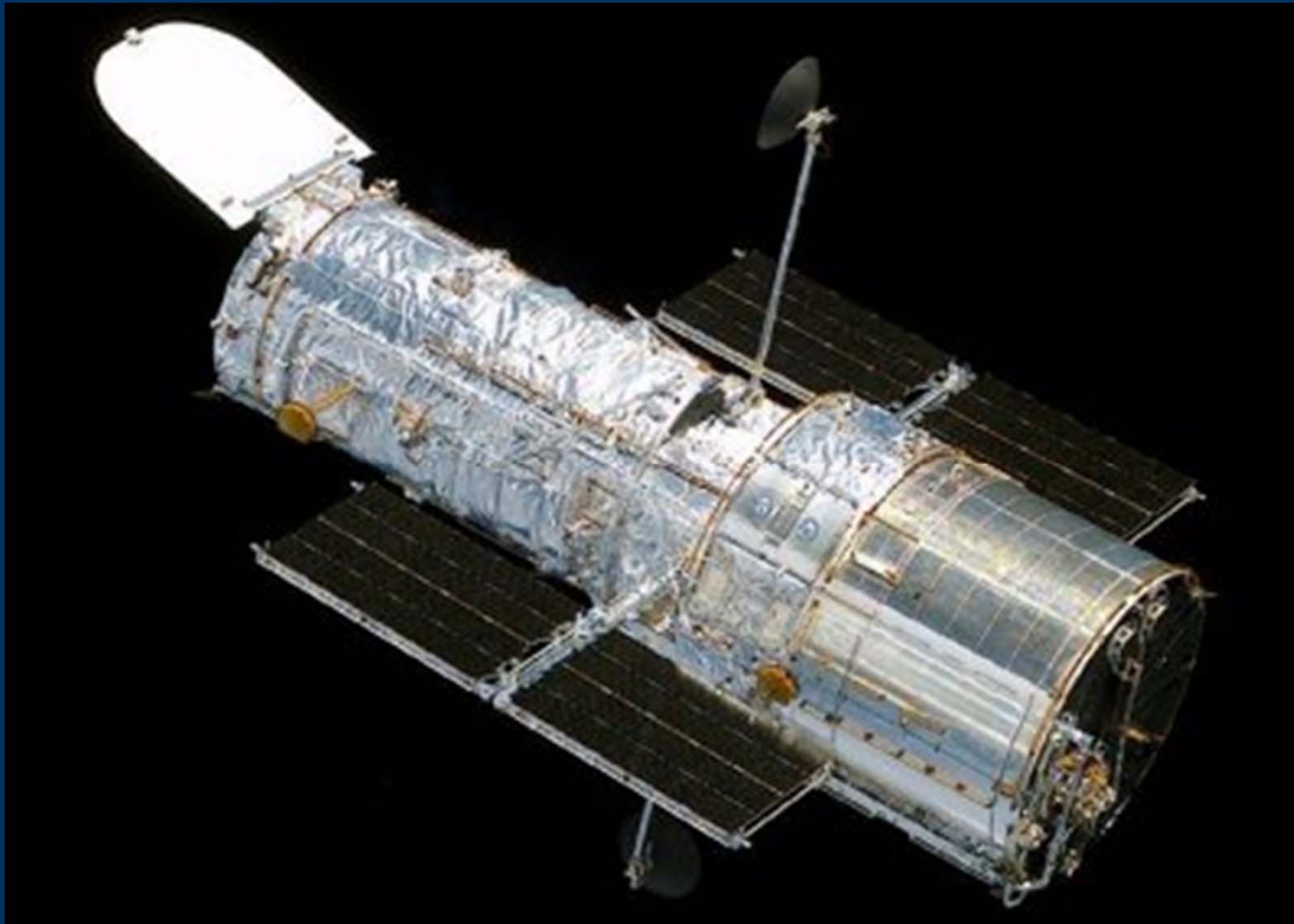
# Navstar 3A – example of GPS satellite



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# Hubble – example of scientific satellite



# DSP – example of military satellite



# Parts of a satellite

- Bus structure
- Power system
- Communications
- Payload
- Thermal control
- Command and data
- Directional control

# Parts of a satellite

- Bus structure
  - the body or framework of the satellite
  - strong but lightweight material

# Parts of a satellite

- Power system
  - solar arrays – capture sunlight and turn it into electricity
  - battery – stores electricity
  - fuel cells – sometimes used
  - nuclear power – on some probes to other planets



# Parts of a satellite

- Communications
  - transmitter/receiver to send messages and data back and forth between Earth and the satellite
  - antennas of various types
  - transponders

# Parts of a satellite

- Payload
  - everything the satellite needs to perform its mission
  - examples:
    - image sensors
    - digital cameras
    - antenna reflectors
    - telescopes

# Parts of a satellite

- Thermal control
  - protects the satellite from the extreme heat and cold in space
  - thermal blanket – thin foil material

# Parts of a satellite

- Command and data
  - flight computer – the brain that controls all activity
  - I/O processor – controls flow of data into and out of the computer

# Types of orbits

- Low earth orbit
- Polar orbit
- Geosynchronous
- Elliptical



# Teacher Resources

- <http://www.nasa.gov/audience/forstudents/k-4/stories/what-is-a-satellite-k4.html>
- <http://www.nasa.gov/audience/forstudents/5-8/features/what-is-a-satellite-58.html>
- <http://www.nro.gov/>
- <http://www.nationalmuseum.af.mil/>