

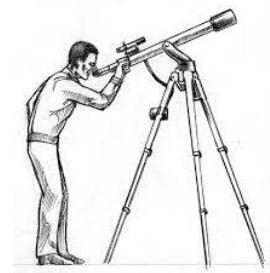
## Space Exploration

### 1. Exploring Space from Earth

- Telescopes - help us see into space

A. 'see' with visible light. Galileo - 1609

B. 'see' with radio waves



### 2. Exploring Space from Space

→ Telescopes in Orbit

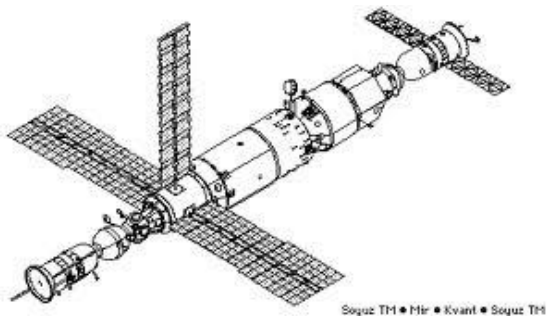
- above our atmosphere the pictures are clearer (no clouds, gases)
- can take light pictures
- can take UV , X-ray & gamma ray pictures

Hubble Space Telescope = HST

- named after Edwin Hubble
- responsible for some of best space pictures launched → April 1990
- orbit altitude → 559 km

→ Humans in Space - Apollo missions to moon

- Space shuttle - reused.
- **ISS = International Space Station**
  - in continual orbit @ 350 km
  - travels at 27,700 km/h
  - orbits earth 15.7 times each day!
- people there since 2000
- 16+ countries



#### **Why?**

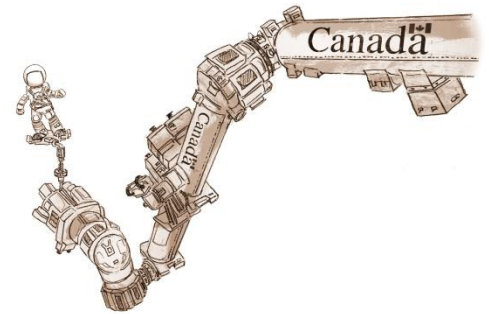
- how humans/machines can work in space
- exploration
  - expand human presence
  - experiments -inside and outside ISS
  - What are effects of space travel on humans?
  - how to make effective equipment
  - effects of microgravity

ISS - Canada helps out!

Canadarm = 15 metre long arm (1981)

= 6 joints

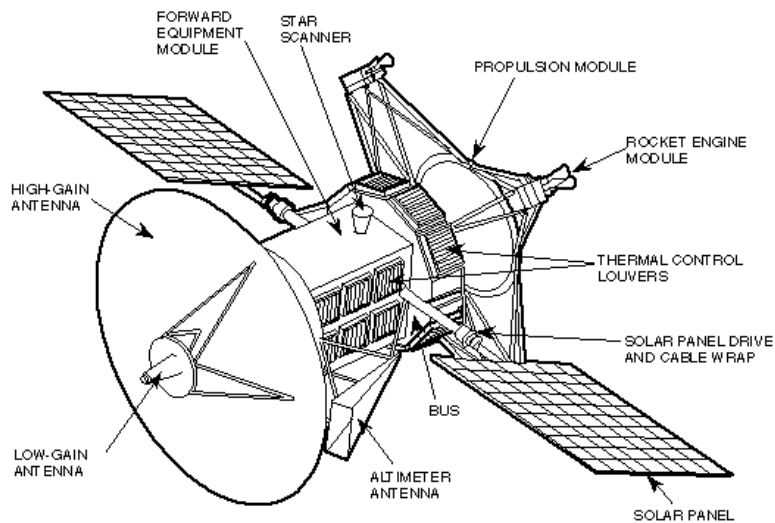
= used to lift parts, assist  
astronauts outside ISS,  
and capture satellites



Canadarm 2 → better (2001)

DEXTRE → a 2 armed dexterous robot (2008)

→ Robots in Space - Mariner and Viking series in 1960's & 1970's explored Mars



- since then, robotic  
probes searching all  
planets in our solar  
system

- expensive and  
sometimes probes are  
lost or malfunction.

- Rover series lands on & explores Mars

