To the Moon

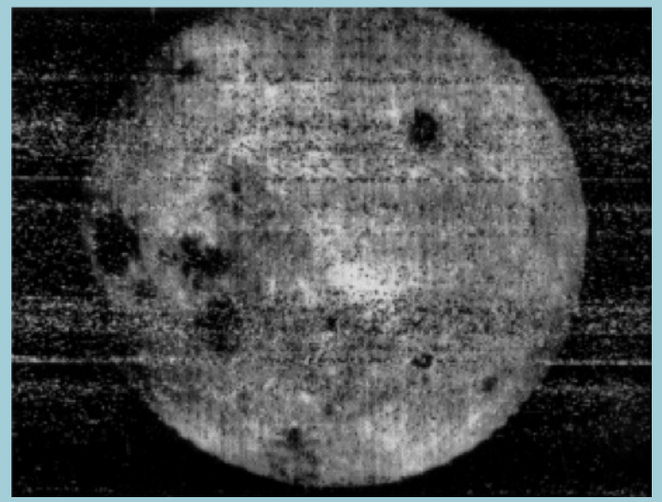
Small steps to giant leaps

Once Just a Dream...

...Became Reality

Soviet Uncrewed Firsts:

- Hard landing 1959
- View of the far side (below) 1959
- Soft landing 1966
- Orbiter 1966



A Challenge to the Nation

"I believe that this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the Moon and returning him safely to Earth."

President John F. Kennedy during a budget speech to Congress in May 1961

“Only those who dare to fail greatly can ever achieve greatly.”
Robert Kennedy

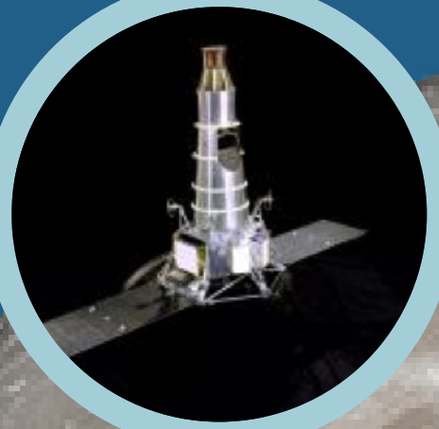
Step 1

Design spacecraft to get to the Moon and back

Step 2

Train humans to safely travel to the Moon and back

Step 1 - Vehicles to the Moon



Ranger
3 of 9 successful

Fly to and impact the Moon
1961 – 1965

Orbiter
All 5 successful

First image of Earth from “deep space”
1966 – 1967

Surveyor
5 of 7 successful

Soft landing on the lunar surface
1966 – 1968

Step 2 - Human Space Flight

Mercury
6 of 7 launched

Launching a human into Earth orbit
1961 – 1963

Gemini
All 10 successful

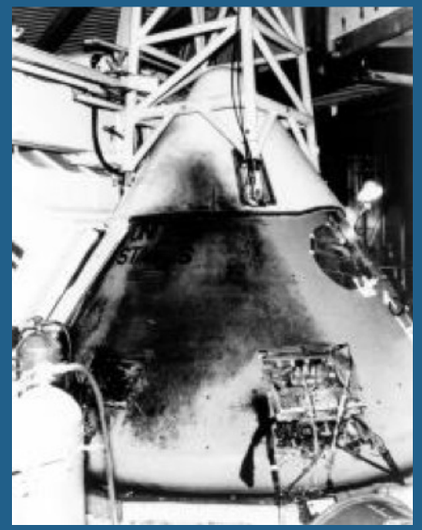
Working for long duration in space
1965 – 1966

Apollo
6 lunar landings

Reach the Moon with life support
1967 – 1972

Milestones

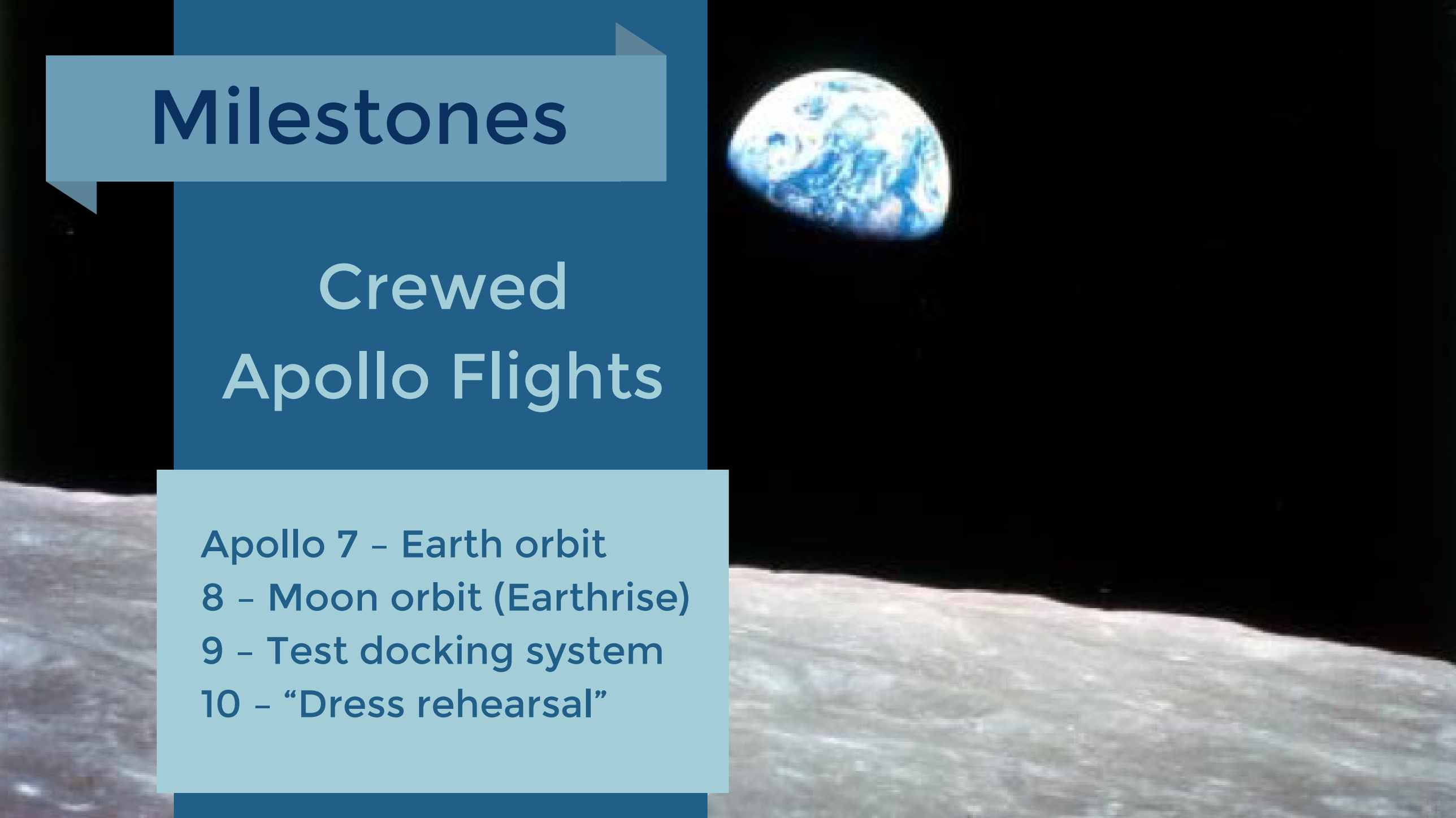
The Apollo program began with tragedy. January 27, 1967



Milestones

Crewed Apollo Flights

Apollo 7 – Earth orbit
8 – Moon orbit (Earthrise)
9 – Test docking system
10 – “Dress rehearsal”



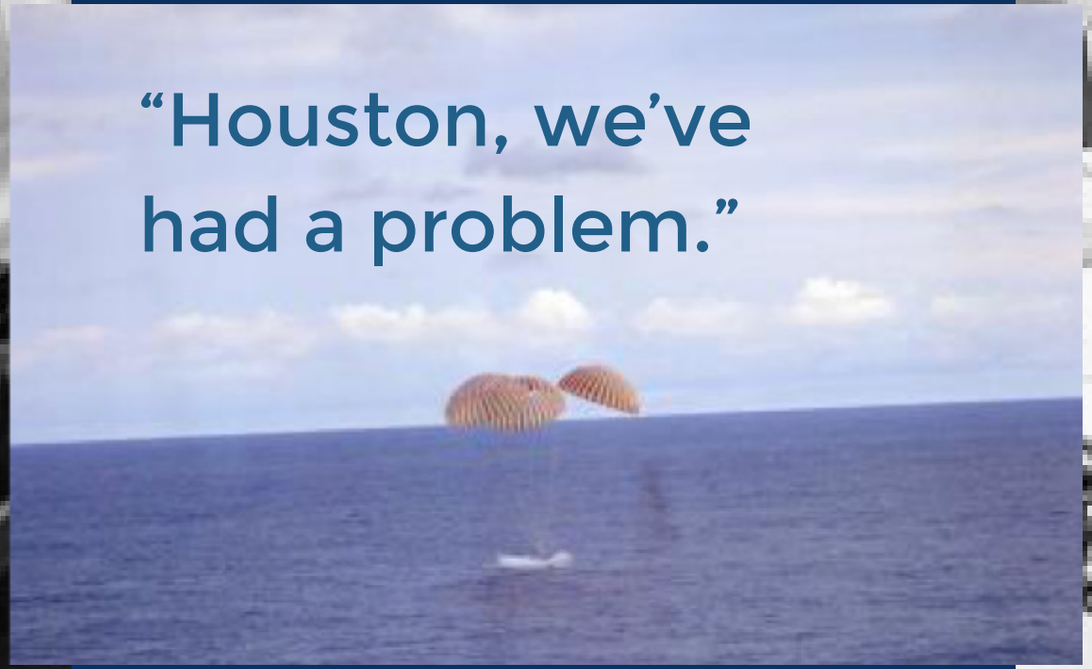
Milestones

First Footsteps

"That's one small step for a man, one giant leap for mankind."
Neil Armstrong,
July 20, 1969

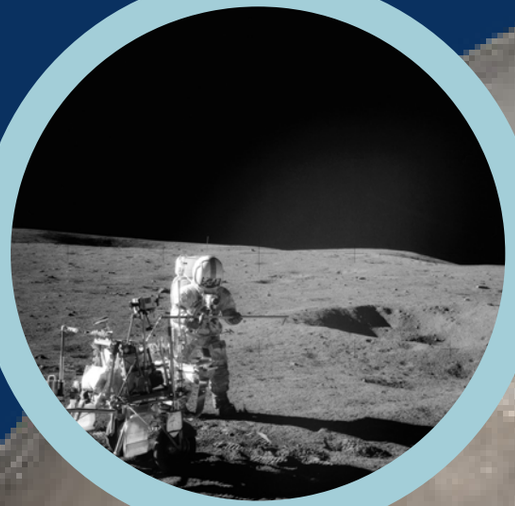
Milestones

Apollo 13



"Houston, we've had a problem."

Science on the Moon



Apollo 14

Landed on Highlands

Apollo 15

First Lunar rover

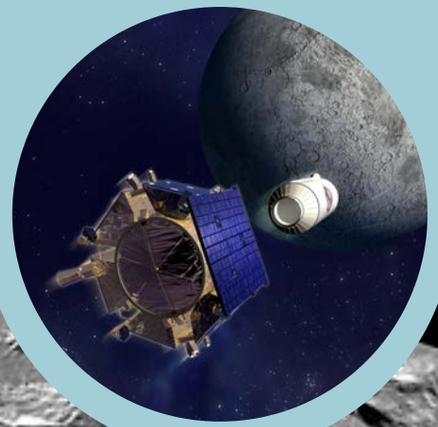
Apollo 16

Gathered the oldest rocks

Apollo 17

First geologist on the Moon

Robotic Exploration

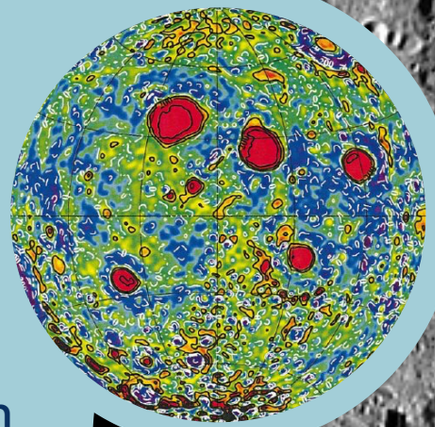


LCROSS sent an impactor and found water ice in polar craters

Ladee observed lunar dust

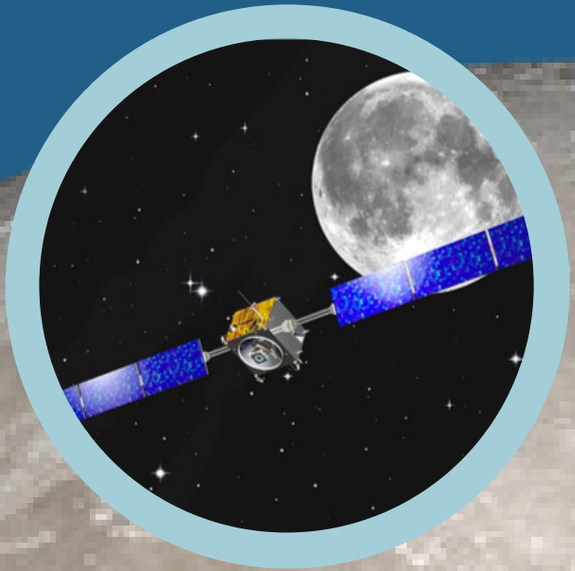
GRAIL explored lunar gravity and interior structure

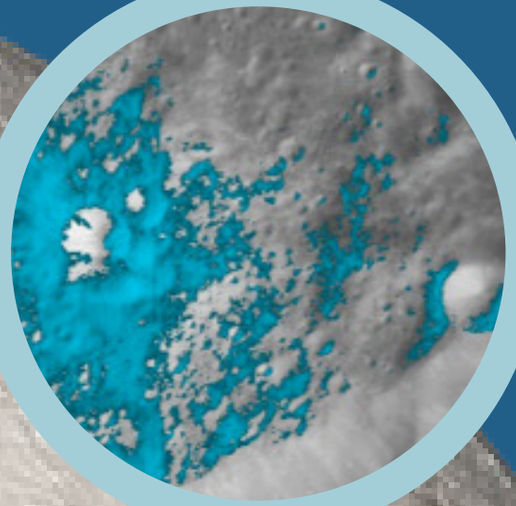
Lunar Prospector mapped surface elements



Clementine mapped the lunar surface in 1994 (right)

Global Endeavor





Japan - JAXA

3rd country to place object in lunar orbit

Europe - ESA

SMART Satellites

China - CNSA

Rovers and first far-side mission

India - ISRO

Orbiters detect water

Next steps