

The Apollo moon missions pervade popular culture, even today:

- MTV's logo; the first few minutes of MTV on the air were the famous image of Buzz Aldrin on the surface of the moon
- Slogans on jeans and elsewhere ("For all mankind")
- Etc.

Whole project took about 8 years, whereas now we're waiting until 2020 to go back to the moon. We'll look at why.

What was special about this project?

- there was a really unique geopolitical environment at the time
- atmosphere of "science is in the service of the country"
- interaction of humans and complex systems with danger

Seeing the Earth from a distance ("Earthrise" photograph) helped boost the environmental movement.

There are people here at MIT who worked on the Apollo project.

Overview of some issues with the project and the technology:

- how did they manage such a huge project? How did they get all the engineers working on the same thing/same wavelength?
- What was the political system in place that made this possible?
 - o "Why we went to the moon" has little or nothing to do with scientific curiosity – we went to prove that we were better than the Soviets
 - Apollo is kind of like "engineering performance art."
- what else was going on, politically/socially? Did Apollo have anything to do with these things?
 - o Vietnam, civil rights, etc.

This class won't be a chronological description of the Apollo project; students will be responsible on our own for understanding *how* the project worked. This class will focus on different *levels* of understanding.

Looking at some of the famous Apollo images: what do we see? What can we learn from them?

(image on slide) Buzz Aldrin

- sun angle: Apollo missions were all timed by sun angle (between 8-18* above the horizons), because too high = too bright and they wouldn't be able to see anything; too low = too dark
- can see the foot pad of lander with landing probe in this photo; you can tell they landed with some lateral velocity

(image) Meeting of team of engineers at Cape Canaveral, ~1963, with Kennedy and head of NASA:

- virtually all of them worked for GE or Bell, because that's what electrical engineers did in the '50s

(image) Saturn launcher

- 1st and 2nd stage (kerosene) would get you up into orbit; 3rd stage (liquid H) gets you out of orbit and on your way toward the moon

(image) Close-up of launcher

(image) Spacecraft above the moon's surface

(image) Control room at NASA as the astronauts stepped out onto the moon

(image) Astronaut piloting spacecraft via star navigation

- Apollo 8: this was the last mission on which they did this; later, they got so much better at uploading correct vectors from the ground that it was better to do that than to navigate the craft internally

(image) Comics illustrating the need for balance between not enough automation and too much

(image) Lunar lander

(image) Astronaut bringing exploration gear out onto the moon

- who made the scientific contributions, on these missions? The astronauts, scientists – both, neither? Complicated issues here, will discuss later.

(image) Woman creating a memory “chip” for the craft, by sewing thread through a disk

Short film: power descent initiation