

Discussion:

Readings for today have one thing in common: they talk about engineering cultures.

What is an engineering culture and what constitutes it? How do you know you're in one?

- communication structures (can be formal or informal)
- priorities
- methodology (how you go about engineering)
- how decisions are made: one person making them vs. communal
- outside vs. inside: what parts of the project are done within the organization, and what's outsourced?
- labor relations
- accountability
- leadership hierarchy / division of responsibility
- background (encompasses training, education, work methodology, etc.)
- geography; local culture
- rewards/blame structure
- size of the organization
- values
- expectations / work hours
- age
- funding sources
- receptivity to new ideas
- who are the role models?

NACA: National Advisory Committee on Aeronautics

Photo of members in slide shows Charles Lindberg, Doolittle, Orville Wright, and others. Founded in 1915 (World War I), as the U.S. was beginning to mobilize its resources for science and technology.

National agencies either build labs or give out money to enable research. The NACA mostly contracted out all their work.

PARD: pilot-less aircraft research division (near Chincoteague): these were, largely, the people who would get involved in the space group.

MIT invented a lot of flight instruments in the 1930's to make aviation more commercial, more uniform, and safer.

NACA high-speed flight base

- X-15: similar in structure to the Bell X1, but its design recognized the importance of the human pilot in re-entry. It was created to study hypersonics, but there was a focus on human control, as well (from space vacuum back into the atmosphere)

Neil Armstrong was one of the test pilots for the X-15; there are a few cases where he kind of loses his focus, similar to what will happen in Apollo 11. He wrote several reports emphasizing the importance of the pilot.

- Werner von Braun spoke against the opinion that pilots should fly rockets off the launch pad.

(Photo on the slide): Iron cross simulator: this was a balance tester for the X-15; it looks similar to the lunar lander simulator.

(Photos on slide of Peenemunde research center in Germany, where von Braun originally worked).

(To clarify, Sato (the author of one of the readings) was a graduate student who wrote a neat dissertation; he didn't end up going into the field, so there's nothing else important about him for our purposes.)

Von Braun was an SS officer, but he only wore his uniform once, to appear before Himler, and his involvement with the Nazis was only so he'd be able to keep doing space research. The Nazis actually jailed him for "not being dedicated enough to the war effort."

- some of von Braun's associates were deported because the VII's were actually manufactured in concentration camps.

(Finished class with a clip from the movie "X-15" with Charles Bronson and Mary Tyler Moore; we watched the scene in which the importance of the human pilot is discussed at a press conference.)