Mission Control Center

Today and Tomorrow

Heather Rarick
Johnson Space Center/Flight Operations
Assistant Director for Commercial Crew
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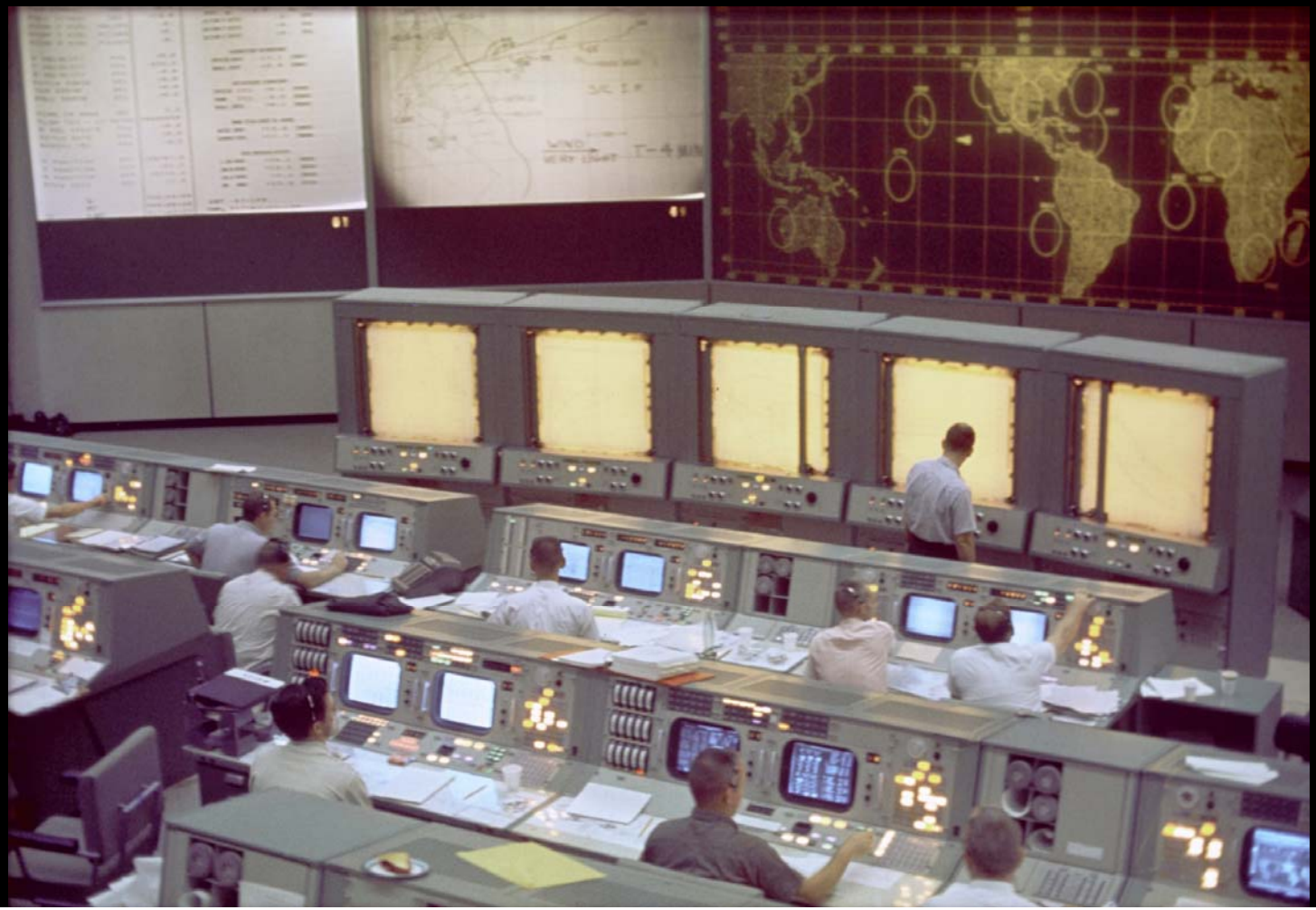
Mission Control Center: Houston 50 Years!

https://www.youtube.com/watch?feature=player_embedded&v=wJAiKZmunPQ&list=UUPLAYER_ReelNASA



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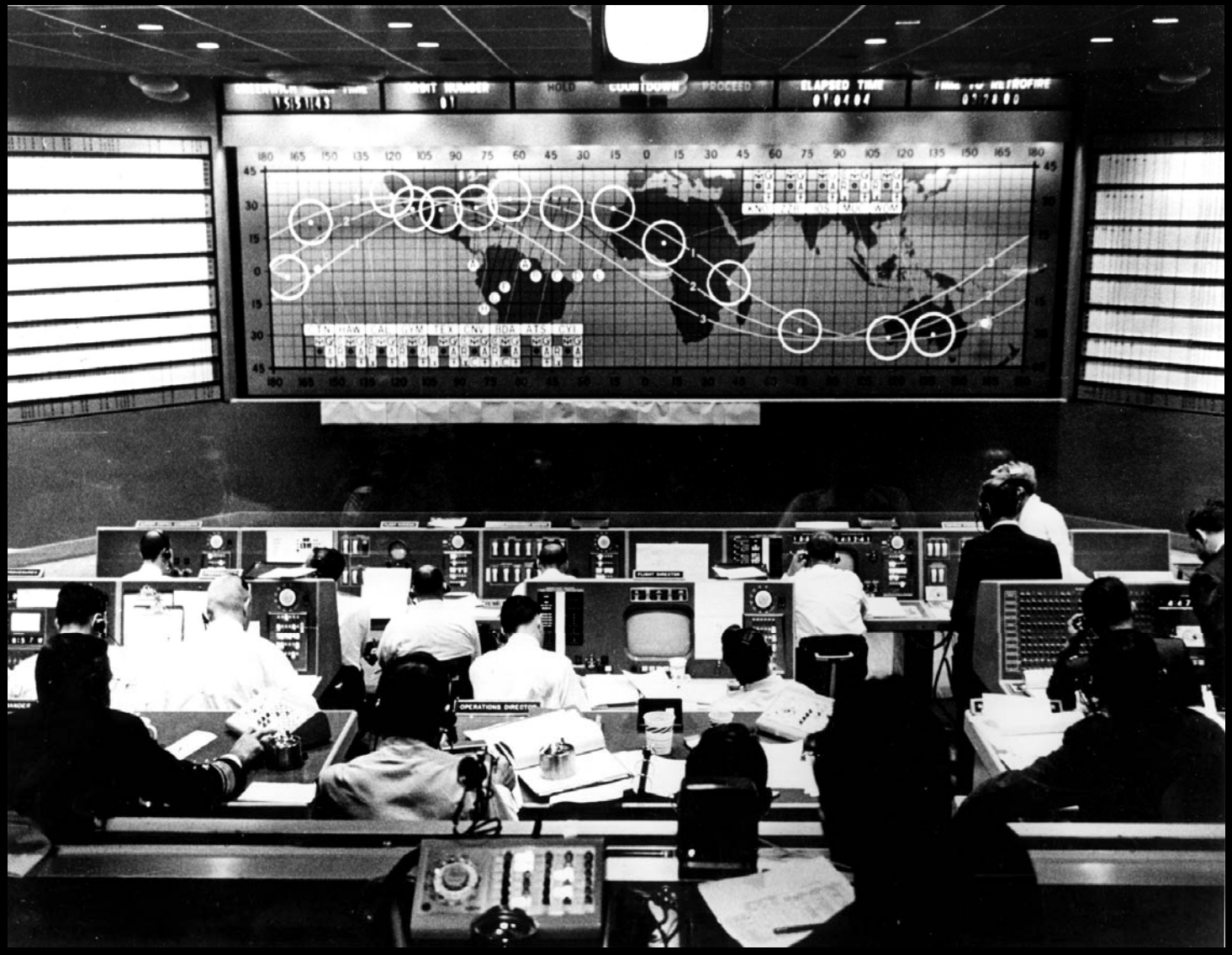


MCC initially used a world-wide network of ground stations which were eventually replaced with geo-synch satellite and ground networks.

- Russian Space Agency still uses ground stations to support International Space Station.
- Communications are limited between MCC-Moscow and ISS to 20 minutes per orbit for about 7 orbits per day.

Using TDRS satellites, MCC-Houston and ISS has communications ~90% / day.

MCC provides

- Communications with astronauts & spacecraft
- Additional computing power not available on early spacecraft
  - Critical for trajectory and flight dynamics
- Additional technical expertise
  - Trajectory and System specialists
  - Design and test engineers
  - Science and research specialists
  - Medical and psychological support
  - Mission-specific needs
  - Coordination of return
- Ability to off-load astronauts from spacecraft tasks

MCC sends

- Commands
- Voice
- Files – including video, photos, email, software, procedures, timelines

MCC receives

- Telemetry - Real-time and recorded data
- Voice
- Files – tons of video and photos, email, procedure status and data feedback, timeline status and feedback

Today, International Space Station uses a world-wide network of control centers.

- MCC-Houston, JSC
- Payload Ops Center, MSFC
- MCC-Moscow, Roscosmos/Russia (includes Soyuz and Progress vehicles)
- Columbus Control Center, ESA/Germany
- Japanese Experiment Module (JEM) Control Center, JAXA/Japan*
- MCC-X, Space-X – Dragon cargo vehicle (California)
- MCC-D, Orbital Sciences Corp – Cygnus cargo vehicle (Virginia)
- * Includes H-II Transfer Vehicle (HTV) – cargo vehicle
- Previously included cargo vehicle – Automated Transfer Vehicle (ATV) Control Center, ESA/France

Why is MCC needed today?

Allows astronauts to spend as much time as possible on microgravity science and experiments.

Reduces astronaut training, pre-flight.

Provides work environment similar to Earth.

Where do we go from here?

Mission Control for Mars?

Using Near Earth Network and Deep Space Network, opportunities for communications will be reduced.

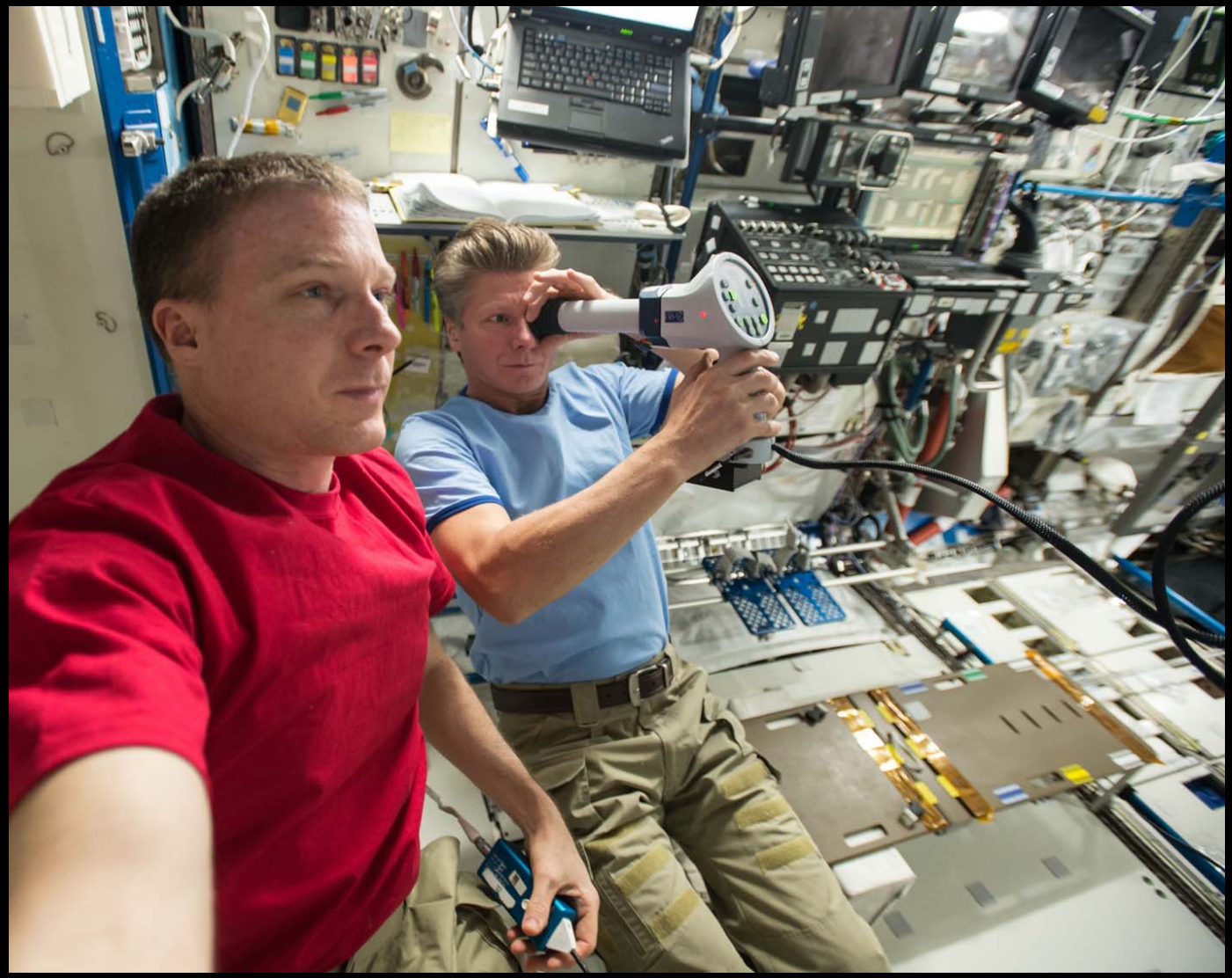
Astronauts will have “free” time during long duration spaceflight.

How automated will the spacecraft be?

How easy will systems be to repair?

What skills will the astronauts need?

How important is access to people on Earth (social)?



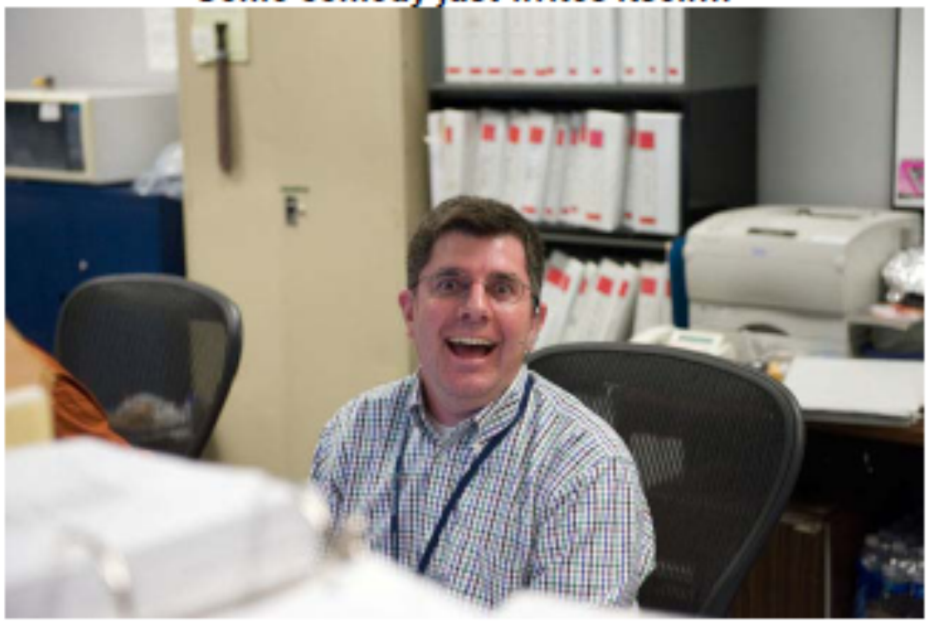
Design of future Control Centers will need to adapt to the type of mission being supported.

Missions must be coordinated from somewhere, unless the mission is earth-independent, even then technology will be needed for coordination and used to monitor the success of the mission.

FLIGHT DIRECTOR

You must see this message safely delivered to them on Alderaan. This is our most desperate hour. Help me, OCA; you're my only hope.

"Some comedy just writes itself..."



"Another day on console, during a holiday, AWESOME!!!"
"Boy I can't wait to taste the TOCA water."
“I’ve just saved a bunch of money on my car insurance.”
"MORE COFFEE MORE COFFEE MORE COFFEE..."
"I knew a thong was a bad choice today."
“Red Bull gives me wings!”
"If I only had a brain, do, do doodle, do do."
“Hey! I’ve been chosen as a UPA test subject!”
"What's a guy gotta do to make the Execute Package cover?"
“No caption required.”

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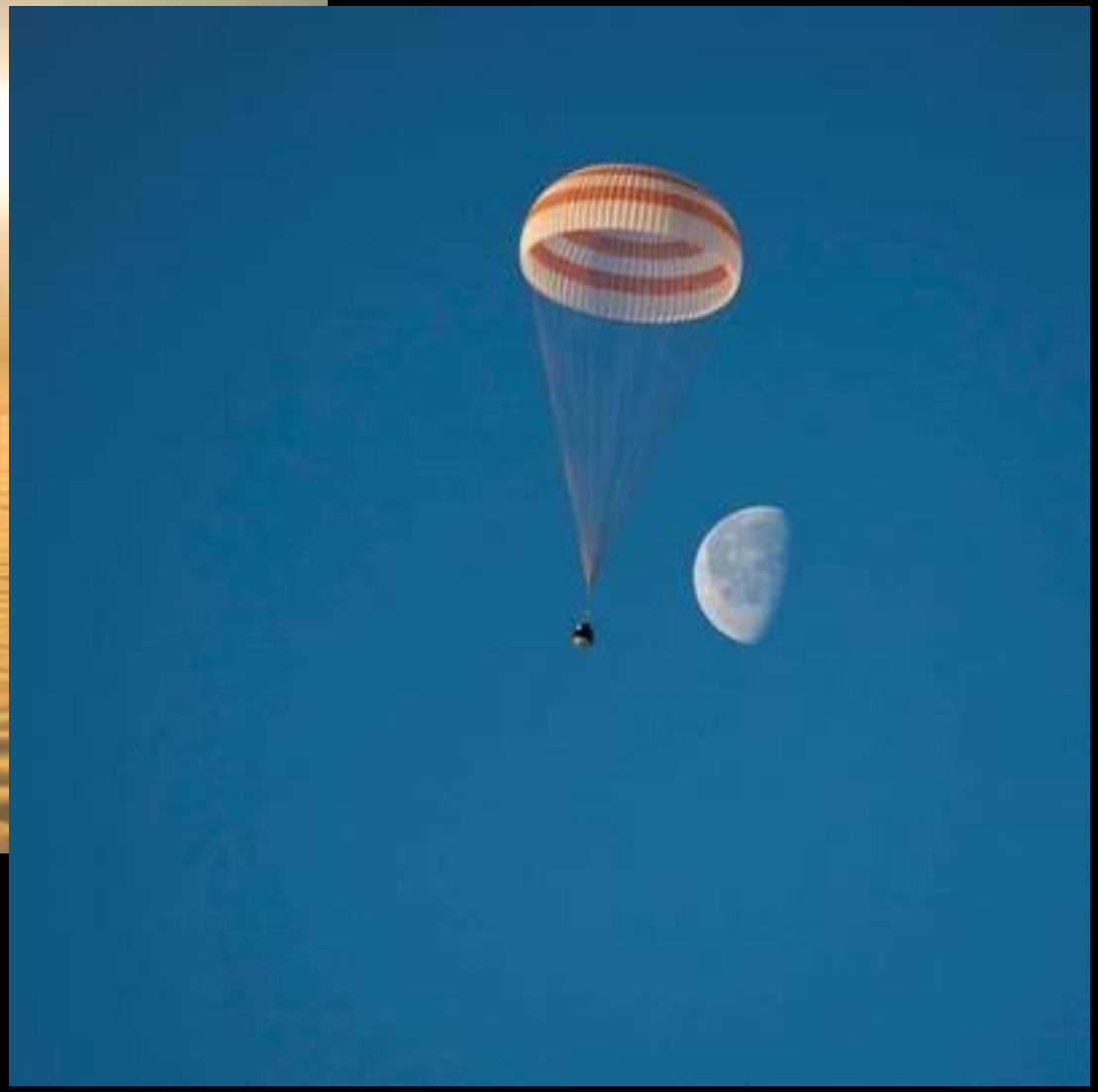
future
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