Space Station Control Flight Controller Positions

If name is all capital letters, say each letter separately, i.e. A-C-O versus Oso.

<u>Adco</u>: Attitude Determination and Control Officer -- works with Russian controllers to point and turn the station the right way.
<u>Thor</u>: Thermal control systems Officer -- controls the systems which keep the station's temperature just right.
<u>Phalcon</u>: (Original name derived from the initials of Power, Heating, Articulation, Lighting Control) -- manages the electrical system.
<u>Oso</u>: Operations Support Officer -- person in charge of tools and spare parts.
<u>Eclss</u> (pronounced E-kliss): Environmental Control and Life Support Systems officer -- in charge of the air and water, and crew hygiene equipment.
<u>ACO</u>: Assembly and Checkout Officer -- in charge of testing and adding new space station modules and parts.
<u>EVA</u>: Extravehicular Activity 0fficer -- oversees space walks.
<u>Roso</u>: Robotics Systems Officer -- manages a joint US-Canadian team of robotic experts.
<u>Ops Planner</u>: The Operations Planner -- in charge of crew activities, procedures, and schedules.
<u>Odin</u>: Onboard Data Interfaces and Networks officer -- responsible for the onboard computers.
<u>Flight</u>: Flight Director -- leads the Flight Control team and is responsible for station and crew safety and achieving program goals (along with the Station Commander).
<u>Capcom</u>: Capsule Communicator -- an astronaut who talks with the station crew.
<u>GC</u>: Ground Control -- runs Mission Control's computers and coordinates radio links with international control centers. (Same for space shuttle.)
<u>Cato</u>: Communication and Tracking Officer -- oversees the voice, radio, and TV systems on the station.
<u>Surgeon</u>: Flight Surgeon -- the crew's personal physician. (Same for space shuttle.)
<u>PAO</u>: Public Affairs Officer -- explains station activities to the media and public. (Same for space shuttle.)

The Right Spin on Things

“Flight, CATO,” you hear in your console headset. Everyone has a nick-name in Mission Control. Yours is "Flight." The Communications and Tracking Officer is CATO for short.

“Go ahead, CATO,” you reply. You expect CATO to comment about the new schedule. It usually doesn’t change this much while the crew is asleep. But the robot arm’s camera found weird green ice clinging to the hull a few days ago. The scientists want a sample, so they added a space walk to today's plan.

But CATO says, "Flight, we have lost communications with the station."

You check the ground track map on the big screen at the front of the control room. There should have been radio contact for another ten minutes.

What is wrong? Could some ground equipment be broken? The 300,000 pieces of data pouring down every second from the station are sent to Houston through a base in New Mexico. You call the Ground Controller. "GC, Flight."

"Flight, GC," he answers.

"Any problems with our radio links?"

"We're rechecking the relays, but everything seems okay," GC says.

On Apollo 13, an oxygen tank explosion sent the ship spinning like a balloon with a hole in it. The radio antenna spun also, interrupting communications. Could that be your problem? You call the Environmental Control and Life Support System expert. "ECLSS, how do the oxygen tanks, look?"

"All tank pressures were fine when we lost data," she replies.

What else could make the station spin so the antenna points the wrong way? "ECLSS, could that strange ice have done something?"

"It could have vaporized if the sun heated it," ECLSS replies.

But the station's attitude -- the way it is facing in space -- should have kept the ice in the shade. Gyroscopes and thrusters are used to make sure of that. You call the Attitude Determination and Control Officer. "ADCO, did the ice get exposed to the sun?"

"We're not sure, Flight. But, the station's spin rate was increasing when we lost contact."

This is bad news, though if the spinning pointed the antennas the wrong way, it would explain why you lost communications.

Besides leaking tanks and evaporating ice, what might cause a spin? On a past shuttle flight, the last part of a command got lost in radio static. The computer got confused and ordered thrusters to fire by mistake. Could that have caused a spin?

"Flight, ODIN," you call the Onboard Data Interfaces and Networks expert. "Check your log for any commands that might have been affected by radio noise."

"Roger, Flight," ODIN answers.

Regardless of the reason, if the station spins too fast, the arrays or radiators might rip off, tearing the station apart. The crew could be killed.

You wonder if the crew are even aware of the danger. Could one of them have gotten up early and flipped a wrong switch? You call the controller in charge of the crew schedule. "Ops Planner, are the crew awake?"

"Someone might be up looking out the window," she replies, "but the toilet was quiet and the hot water wasn't heating when we lost data."

So, crew actions probably didn't cause the trouble. Could some automatic function have gone wrong? You have your workstation make a list for you. Every console has one of these powerful little computers. In contrast, the old Mission Control had black and white TV monitors all hooked to one main computer. During the fifth shuttle flight, a fire took out that computer and all the consoles with it. The crew almost had to abort the flight. If yours fails now, you can just slide over one seat to the next console.

The list appears. It shows the robot arm moving to check for ice in other places. You call the Robotic Systems Officer. "ROSO, could the arm movement have caused the station to spin?"

"I don't think so, Flight," ROSO replies. "The arm moves very slowly. If it were hit by a meteor, I suppose it could cause a rotation before the software shut it down. When we get communications, I'll check its position."

"Do that," you order.

You consider a meteor strike. If something hit an antenna, it could knock out communications and also spin the station. There could be a domino effect with one thing breaking off and hitting something else. If that happened, the station's giant wing-like arrays and radiators, the two biggest things on the station, would likely be damaged. Back in 1997, an unmanned rocket slammed into Mir and knocked out an array. Half the power was lost. You call PHALCON, in charge of the power, and THOR, in charge of the thermal radiators.

"PHALCON and THOR, I want you to look at whether we can retract the solar array wings and radiator panels at high spin rates. There might be a debris problem."

"Will do," PHALCON says.

"Roger, Flight," THOR replies.

Next you call the Operations Support Officer in charge of maintenance. "OSO, Flight. If an array is damaged, how long will it take to get a new one to orbit?"

"If Congress approves the money, the factory folks can have one ready in six months," OSO says.

"Oh," you say. Six months with minimal power is a nightmare you hope to avoid.

You nod greetings to the spacewalk specialist and the Flight Surgeon who have just arrived for their shifts.

The Public Affairs Officer also arrives, flashing you a paper that reads, "Alien Ice Invades Station: Makes Crew Take A Walk." You smile. As the "voice of Mission Control," she does a running commentary for the public. Will she be talking about a space walk or an emergency landing today?

You'll know which soon. Mission Control Moscow should have communications in five minutes even if you don't. Their system uses a different set of antennas. You know their flight control team will check the Russian equipment as carefully as your team checks the US and Canadian systems. Experts in Japan, Europe, and Brazil will check their data, too.

You stand to stretch and look around the Flight Control Room, or "ficker" as it is called. The Capcom is busy reviewing emergency procedures in case he has to talk the crew through them. Each member of the team is calling support people, discussing plans, and gathering the information they need. No matter whether the spin problem is easily fixed or requires drastic action, they will be ready.

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