

Adapted from a diary post:

Once a season, whether we need it or not

(Sat Dec 10, 2016 at 07:39:23 AM MST)

Another anomaly

"It's been a quiet week," John's wife told him, just yesterday morning. He's the new guy; been working here just about a year. His first year has been a trial by fire.

Stop me if you've heard this one... The group leader is on the other side of the earth someplace (Germany, this time. At least they have good cell phone and wifi coverage, unlike India). John is on call. It's Friday. Two of the other group members were planning to take the day off. Which leaves me, as backup. At least he does this in the daytime.

There was a communications pass with the deep space network (DSN) a bit after 8am. The carpool comes for me at 8:30. All the status bits were ones, which can't happen if we're actually talking to the onboard computer. Aaaand voltages and currents were ringing alarms about being out of spec low.

Recently the group leader put together a little training program of roughly quarterly presentations on some aspect of the hardware or procedures or something. Two pages from the latest one on anomalies we've actually experienced in flight, were thought to be so useful that we expanded them into a set of "anomaly pages" with useful info like, here's how you diagnose it. Here's when it happened last time, and what we wrote up about it. Here's who you call and what you do. Link to the procedure we wrote last time. It's not complete, but it's pretty good, and in minutes we were on the Slack chat widget going, "yeah, looks like a textbook case of a DPA shutdown". The Digital Processing Assembly is the box containing the main on-board computer for the instrument.

So we followed the procedures; got the ops folks to shake loose a precious extra 15 min of DSN time for the scheduled 5:25pm comm pass, wrote up a cover procedure (we want to run these 5 things in this order), got it approved, printed out the procedures for all of those 5 things, and went across town to the control center. Retrieved my password, since they change more often than I actually go there. Got the ops guy to set up our headsets for us, and we were in place ready to go half an hour before the comm. I hadn't ever really messed around with the EGSE (electrical ground support equipment), which is two identical Linux workstations running custom software to pick apart the data in real time when they come in. The person who does had a concert later in the evening, so she was out for the day, but available, when not actually singing, on slack or by phone. She told me where to look for dumped datafiles, and I found the directory.

So we came up on comm, they do 10 min of health and safety checks, and we're ready. So we turn on the offending piece of equipment. From time to time a cosmic ray hit seems to make the power supply think it has spurious commands to turn various things off, and this looks like another event of that kind. Wait for it... And there's the computer doing its "hello world, I'm running software version 11" routine. Which rings alarms when the ground monitoring software sees it, since we're now up to version 53. It's alive, that much is good. Next, uplink all the flight software patches, which is multiple kilobytes of data uplinked without a checksum (eek), with the risk of getting the command buffer stuck (eek), but it all worked. The procedure then dumps the patch memory for comparison to the ground image of same.

Except I never saw the dump appear in the magickal directory. We did painstakingly verify the command echoes for every single packet of the uplink, ticking them off as they came in on our printed copies of the procedure. The wisdom on the slack channel said to proceed. So we rebooted.

We sit and we wait, eyes glued to the screen, for the longest two minutes of our lives, while somewhere out there in space, our little computer is booting because we told it to.

And it came up in version 53, and started ticking along. Hooray. All that remained is to set the thermostat setpoint, and we were done with time to spare. I'm not sure if the ops guys got in their routine dump of the solid state recorder or not, but there was another comm pass at 11pm, so no harm done. We were happy to have that as contingency time in case things ran over (see above under eek). Catherine would have been done with her concert by then.

I think it was in the car on the way over to the control center that I told John, "We have to stop doing this together."

"Yeah, really," he said.