



Decision Making During Contingencies

Beyond Earth Orbit
Or
It Ain't Your Grandpa's Explorer I Anymore

Don't forget tonight's Pickering Lecture!!



One Way Light Time & Other Annoyances

- OWLT:
 - Cassini – 1.5 hr,
 - Mars – 5–20 min,
 - Voyager 1 – 14 hr 40 min
- Occultation & Solar Conjunction
- Lack of tracking stations
 - LEO
 - Everyone's in the same part of the sky
- Launch
- Human Involvement (STS)

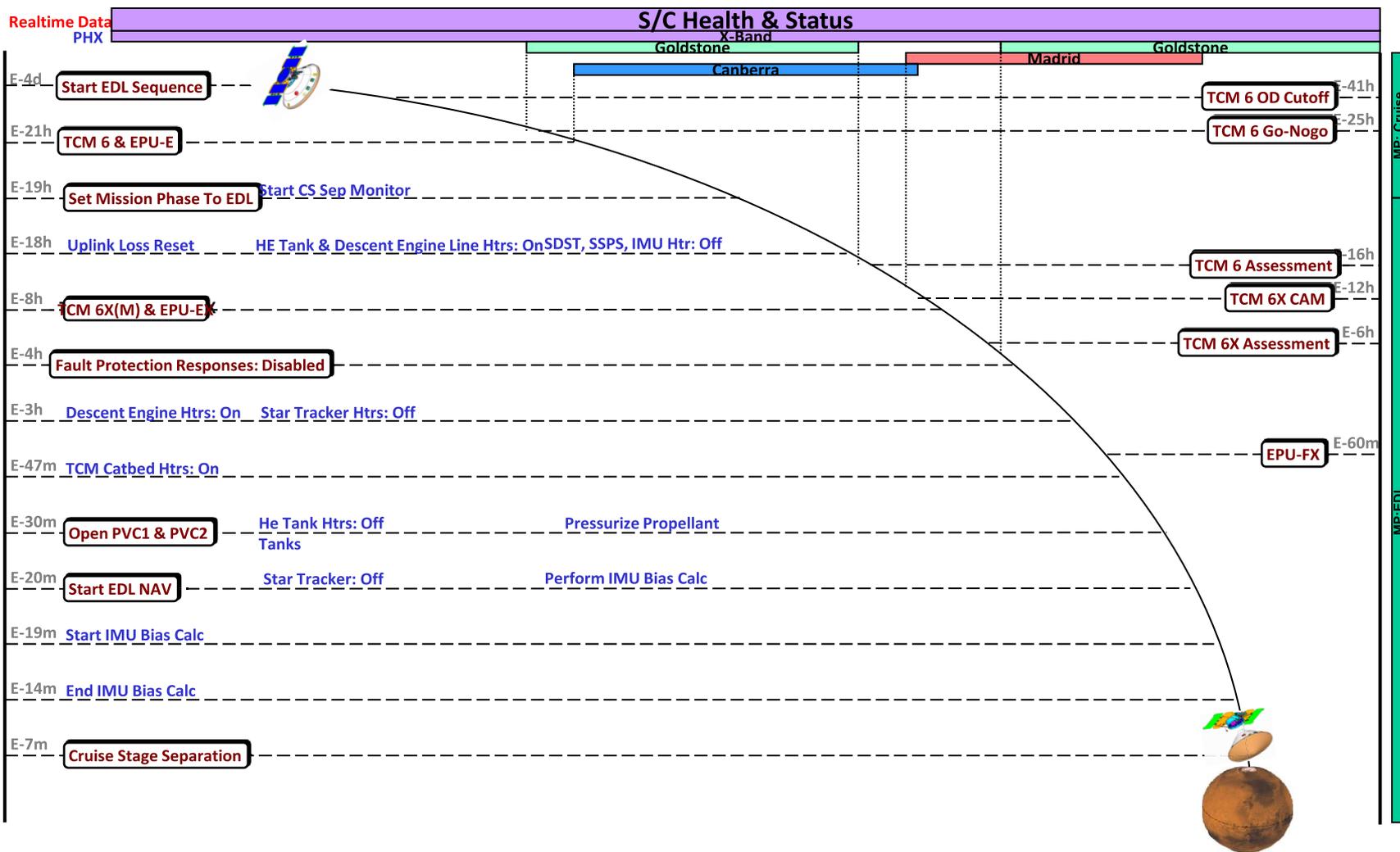


Autonomy

- Do you know what the spacecraft will do?
- If you try to fix it, what might you interrupt that will make it worse?
- To a certain extent, they must take care of themselves
 - Avoid driving off a cliff
 - Safe Mode
 - When can fault protection no longer protect you?
 - You can't always talk to your spacecraft



Phoenix Entry



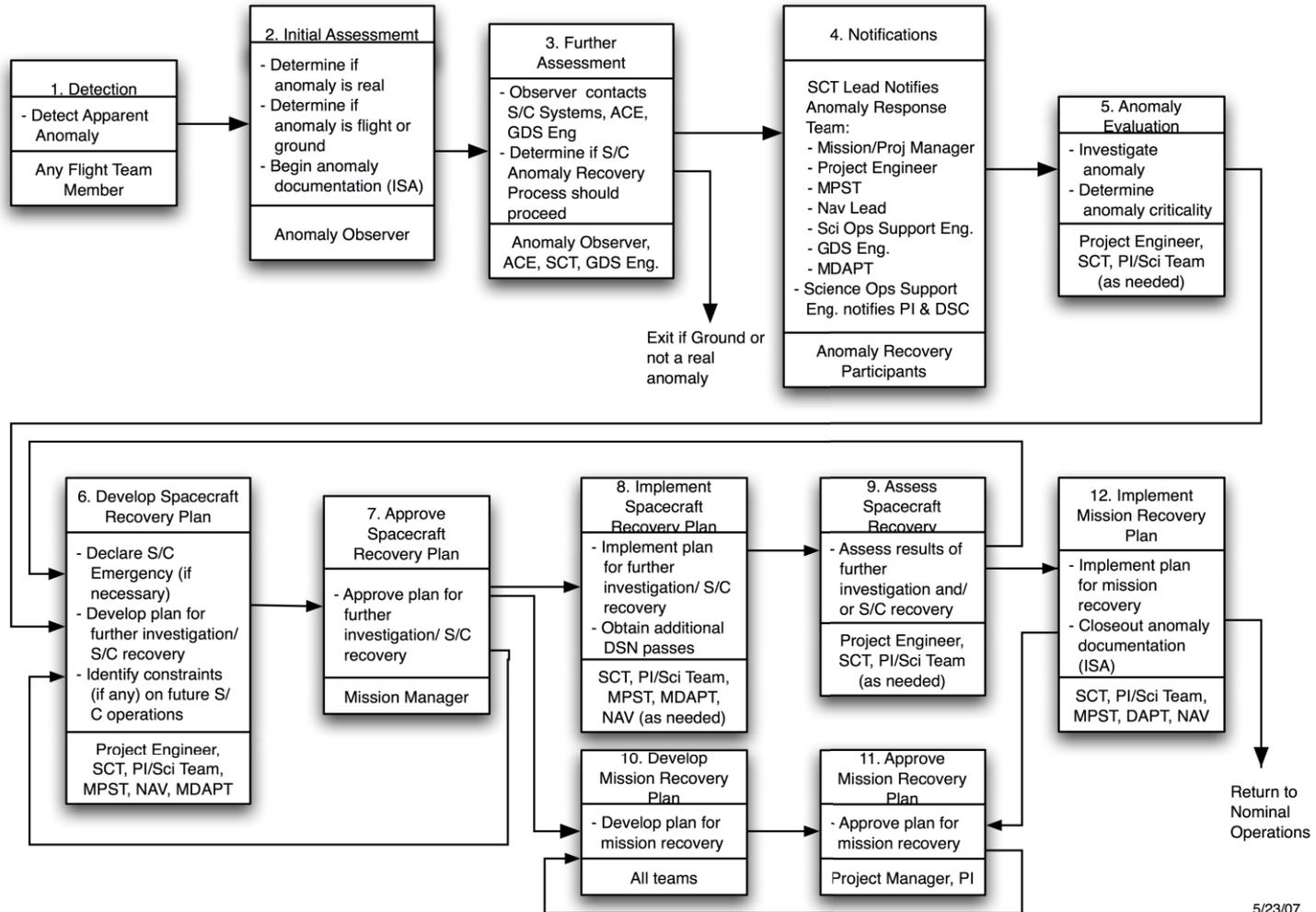


Complexity & No Second Chances

- Interaction between instruments means pre-thinking response
 - On the same spacecraft
 - Robotic Arm – surface composition, difficult target
 - Imaging of samples
 - On different spacecraft
 - Observations to support landing
 - Interactive science
- One shot events – no safe mode or resets
 - Orbit insertion
 - Probe release
 - Landing



The Plan



5/23/07



Summary

- How much time do you really have – it's not always a lot
- How will the spacecraft behave and will it listen to you
- There can be complications and constraints
- Think it through ahead of time – wherever you are flying and
ALWAYS REMEMBER TO CONSIDER THE BIG PICTURE