On-Orbit Engineering and Vehicle Integration

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Mission Evaluation Room (MER) Console

Abstract

One of the duties of the MER Managers is getting the consoles to review and sign Electronic Flight Notes (EFN) and Mission Action Requests (Chit) before they are due. Chits and EFNs and are accessible through the Mission Control Center – Houston (MCC-H) Gateway. Chits are the official means of documenting questions and answers, technical direction, real-time changes to Flight Rules (FR) and procedures, request for analysis, etc. between various consoles concerning on-orbit operations. EFNs are documents used by the Flight Control Team (FCT) to communicate precise details between console positions and manage real time changes to FR and Systems Operation Data File (SODF) procedures.

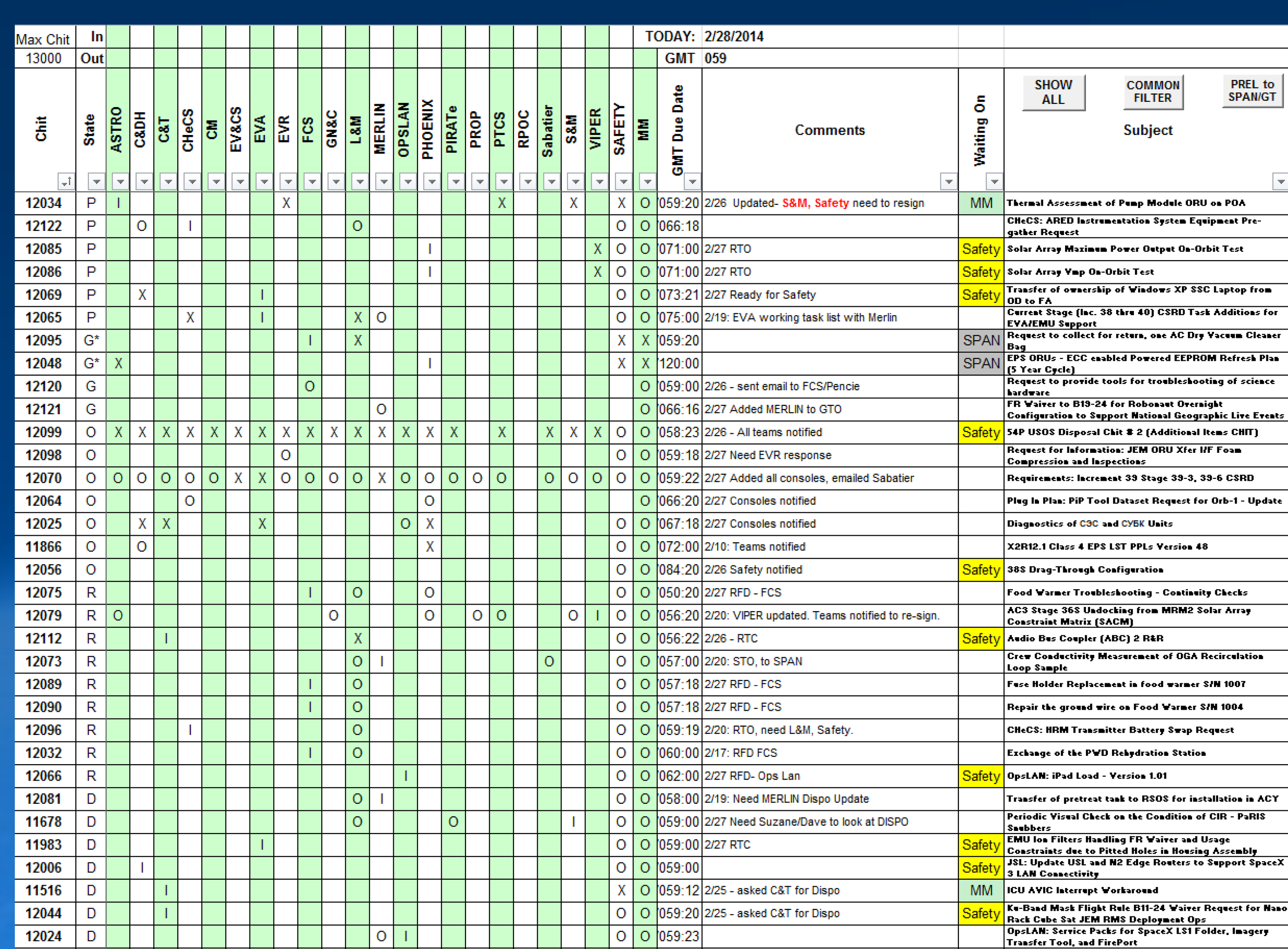

Figure 1: List of Chits automated using the Auto-George form

Contributions

I assisted the MER Manager on console by running an Auto-George form for the Chits and EFNs. An Auto-George form is a form that takes input from the MCC-H Gateway regarding Chits and EFNs and organizes it in an Excel form. The form tracks who initiated the Chit/EFN, who has signed, who needs to sign, the due date, any comments on the status, and the current state it is in. When the Auto-George form was completed, I looked over the Chits/EFNs that were overdue, or close to being due, and contacted the consoles that needed to sign. Once a Chit was ready to be moved to a different state, I contacted Spacecraft Analysis (SPAN) and informed them of the progress.

Columbus Interface Heat Exchanger Close Call Investigation

Abstract

On GMT 2013/345 the External Active Thermal Control System (EATCS) on the Columbus (COL) Moderate Temperature Loop (MTL) Interface Heat Exchanger (IFHX) shut down due to low temperatures. Over the next couple of days, the core temperature of COL MT IFHX dropped due to the failure of the Flow Control Valve (FCV). After the temperature drop was discovered, heaters were turned on to bring the temperatures back to nominal. After the incident occurred, a possible freeze threat was discovered that could have ruptured the heat exchanger. The COL MT IFHX rupturing would be considered a catastrophic failure and potentially result in a loss of the vehicle and/or the lives of the International Space Station (ISS) crew members.

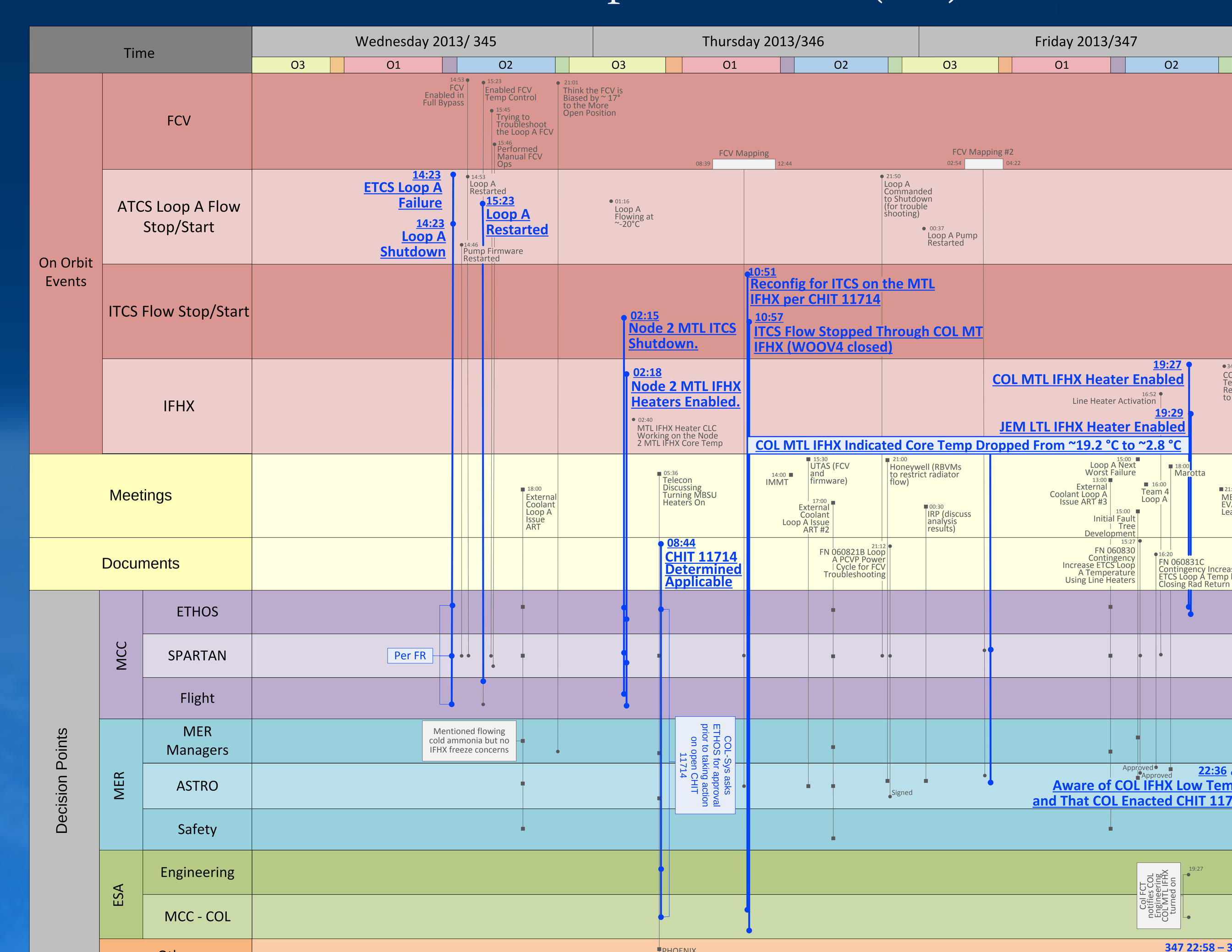

Figure 2: Integrated Timeline

Contributions

To aid the investigation I created an integrated timeline that encompassed the close call as well as the actions taken succeeding the event. A supplementary timeline was created that provides greater detail on the events and actions which occurred during the three day event. The process of construction included collecting information directly from European Space Agency (ESA), Mission Operations Directorate (MOD), and MER, as well as looking thorough the console logs. The timeline was then created using Microsoft Visio. I also added all of the events from the causal tree to closure report forms. The forms included the cause description, explanation of causal thinking, supporting data, and rationale for closure.

Co-op and Intern Tours and Lectures Committee

Abstract

The Tours and Lectures Committee organizes tours of the NASA facilities and lectures by NASA employees (past and present) for the co-ops and interns. Some of the lectures include flight controllers, flight surgeons, astronauts, and many other people who have left their mark at NASA. The tours include the Apollo Mission Operations Control Room (MOCR), Neutral Buoyancy Lab (NBL), Ellington Field, and numerous other locations.

Figure 3: Gene Kranz at Apollo Night

Figure 4: Ellington Field, T-38

Contributions

I was elected the co-chair for the committee and was the point of contact for the tours portion. I also was able to schedule lectures by Mr. Mark Geyer, Daniel Heimerdinger, Ph.D., as well as helping to coordinate Apollo Night. This year, Apollo Night consisted of Mr. Gene Kranz speaking to us in the Apollo MOCR followed by a viewing of movie, *Apollo 13*.

Acknowledgements

I would like to thank my mentor, Chad Rowe, as well as Becky Tures, Brian Derkowski, Liz Bauer, Lynda Gavin, Chris Byrne, Kevin Window, and everyone else in OB/ISS Vehicle Office who helped me. I would also like to thank Missy Matthias, Diego Rodriguez, and the University Space Research Association for giving me this opportunity to work at NASA. Lastly, I would like to thank everyone else that has met with me in order to enhance my experience this semester.