In control: Combined MCC team successful in historic power-down event

By Julie Burt

While Hurricane Lili was gaining strength in the storm-nurturing waters of the Gulf of Mexico last month, a group of Johnson Space Center contractors and civil servants was hard at work with emergency preparedness.

Numerous teams worked in tandem to perform two major tasks: To transfer control of the U.S. segment of the International Space Station to a waiting NASA team stationed in Russia and to entirely power down the Mission Control Center (MCC). This was the first time such a transfer of control had occurred.

Powering down MCC is a daunting task in itself because of the many intricate details involved. However, last month's process was even more challenging considering the team had a potential Category 4 hurricane looming and three ISS crewmembers depending on the teams' combined efforts to successfully shut down vital systems safely.

The historical event began to unfold on Tuesday, Oct. 1. At 5 p.m. JSC management declared a Level 3 Preparedness status (*see timeline*). The threat of a hurricane was serious enough that decisions were made to postpone STS-112 flight activities, power down shuttle flight system equipment and transfer control to the Backup Control Center. The Backup Control Center is located in the Houston Support Room outside the Mission Control Center-Moscow in Russia.

When Mission Operations Director Jon Harpold informed MCC Facility Manager Sheri Gray of those decisions, the ball was already rolling. Team members on both the Consolidated Space Operations Contract (CSOC) and the Shuttle Flight Operations Contract (SFOC) were already preparing for the process.

"The contractor team did a great job in anticipating the situation and were ready when the decision to power down the MCC was made," said Milt Heflin, Chief of the Flight Director Office. "Bottom line: They were prepared."

NASA JSC 2002e39950 Photo by James Blair

This is the Mission Control Center after it was powered down and covered in preparation for Hurricane Lili.

The team members involved in the process spent numerous hours making the process a success. For example, Cimarron's Mike Thomasson, the MCC/Integrated Planning System Maintenance and Operations Department Power Outage Coordinator, worked a full day and had been home for just two hours when he was asked to volunteer. He then spent the next 19 hours helping with the effort.

With the addition of the volunteers like Thomasson, there were at least three times as many people in the facility for this procedure than would have normally been there, said CSOC's Steve Dry, who is responsible for the MCC's Integrated Planning System.

The equipment was shut down in order of priority – from the non-shuttle and non-ISS systems to the final handover of control of the U.S. segment to the Backup Control Center. Once that happened, the NASA team in Moscow had to step right in and take over.

"Talk about unsung heroes – the Houston Support Group picked right up without missing a beat. They too were prepared, and not by accident. We periodically test their capability to provide backup command and control," Heflin said. "Some folks think we handed over control of the station to the Russians. That's not true. We handed over control of the U.S. segment to our American colleagues in Moscow."

Back here in Houston, the process was an orchestrated effort as well. For example, one team worked diligently to shut down the software and then another next team would physically power down the machines, wait for them to cool off and cover them with plastic to protect them from any water that might get into the buildings.

"In order for us to be successful in bringing the MCC back up in the shortest amount of time, it needed to be powered down in a very deliberate manner," Heflin said.

Once it was determined that Hurricane Lili was going to strike the Louisiana coast, a decision was made to return the MCC back to regular operations. The equipment was powered up and Houston regained command of the U.S. segment at 7 p.m. on Thursday, Oct. 3.

With all that transpired during that process, shuttle systems were still up and running in time for shuttle check-out tests the next day. Just three days later, Space Shuttle *Atlantis* lifted off to a successful mission.

Through it all, CSOC's Gray was the glue that held the combined teams together, said United Space Alliance's Larry Bourgeois. This was the first time that all of the elements involved in the support of human spaceflight missions had to be powered down at the same time. He said it took a person with outstanding knowledge and understanding of the detailed MCC workings to integrate the power-down plans. Gray was that person. In fact, her leadership during the process earned her a special honor: Gray was selected to hang the STS-112 plaque in the MCC to recognize the combined partnership of all the teams.

"Sheri Gray led the ground team in an unprecedented effort and really exemplifies the commitment of our teams. These folks do an outstanding job, and often don't get the recognition they deserve," said Phil Engelauf, STS-112 Lead Space Shuttle Flight Director. "It's really great to have an opportunity to acknowledge their work by having them hang the plaque." ❖

MCC power-down timeline

Sept. 23
A developing tropical storm was moving quickly, fluctuating in intensity from nearly a hurricane to a weak depression, as it crossed the central Caribbean Sea.

Oct. 1

5 p.m.
NASA notified the Consolidated Space Operations Contract, or CSOC, to start the powering down of the Mission Control Center in Houston.

5:30 p.m.
STS-112 equipment was released to the CSOC team.

7 p.m.
Hurricane Lili was about 560 miles southeast of New Orleans with winds at 105 mph. The storm was moving northwest at 15 mph.

Oct. 2

4:20 a.m.
The International Space Station Flight Control Team transitioned control to the Backup Control Center in Moscow.

10 a.m.
Lili became a major hurricane, located 365 miles south-southeast of New Orleans. Winds were near 120 mph. The storm was moving northwest at 15 mph.

2 p.m.
At Mission Control Houston, the powering down of equipment was completed and most equipment was covered.

4 p.m.
Lili had maximum sustained winds near 140 mph. The storm was then a Category 4 on the Saffir-Simpson Hurricane Scale.

10 p.m.
JSC cancelled Hurricane Readiness activities. Lili was southeast of Louisiana, with winds at 145 mph.

Oct. 3

4 a.m.
The MCC teams began uncovering equipment.

10 a.m.
Lili made landfall in Louisiana as a Category 2 hurricane.

7 p.m.
Control of the U.S. segment returned to Mission Control Houston.

Oct. 7

2:46 p.m.
Space Shuttle *Atlantis* successfully launched from the Kennedy Space Center and the mission was fully controlled by Mission Control Houston.

Joel Montalbano is a NASA Flight Director on a temporary assignment in Russia with the Moscow Technical Liaison Office. Here, Montalbano shares his thoughts and experiences on the following:

The process of receiving control from Houston...
This went very smoothly. Operations Lead Adam Baker is the Houston Support Group (HSG) expert on Backup Command and Control (BCC) and Mr. Baker was in Moscow for his regular rotation. His experience and the experience of the other HSG leads, Sean Fuller and James Lyons, allowed this transition to occur very smoothly.

What it felt like to be in Russia, helping out the Houston MCC Team...
The Houston team was anything but lifeless. They were with us on the telephone the whole way. The HSG is really just an extension of the Houston Flight Control Team. Together we were able to operate in BCC function.

How NASA works with the Russians in International Space Station flight control operations...
The Houston Flight Control Team is the Lead Flight Control Center for ISS Operations. We handed over the responsibility for Lead Control Center to Moscow with the understanding that the HSG would be responsible for the U.S. segment. The HSG is located in the same building at the Moscow Mission Control Center and has full commanding capability to the U.S. segment. The main difference is that the U.S. segment commands, which are sent by HSG flight controllers, are uplinked via Russian ground systems/network and onboard systems.

The NASA teamwork in Moscow...
The team in Moscow did great. The leadership shown by the shift leads – Adam Baker, Sean Fuller and James Lyons – proved this concept can work. Additionally, the support by the remaining team members was invaluable.

NASA JSC 2002e45249 Photo by Joel Montalbano

Pictured here are just three of the members of the Houston Support Group (HSG) in Moscow, Russia. From left to right is Phillippia Simmons, Lisa Whalen and Kevin Metrocavage. The HSG team spends most of their console time monitoring telemetry and talking to the International Space Station U.S. crew. Even when the Houston Mission Control Center is fully functional, the HSG still receives telemetry almost full time.