



MMS Transporter Fire

Importance of IRT Training

Senior Management VITS Meeting

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This and previous presentations are archived at
<https://sma.nasa.gov/safety-messages>

Background

- The Magnetospheric Multiscale Mission (MMS) consists of four identically instrumented spacecraft used to measure plasmas, fields, and particles in a highly elliptical orbit.
- MMS was managed and built in-house at Goddard Space Flight Center.
 - During the Integration and Testing phase of the project, MMS used the Naval Research Laboratory (NRL) facilities for thermal vacuum testing.
 - Testing was completed at NRL because thermal vacuum chambers at Goddard were occupied by other flight programs.

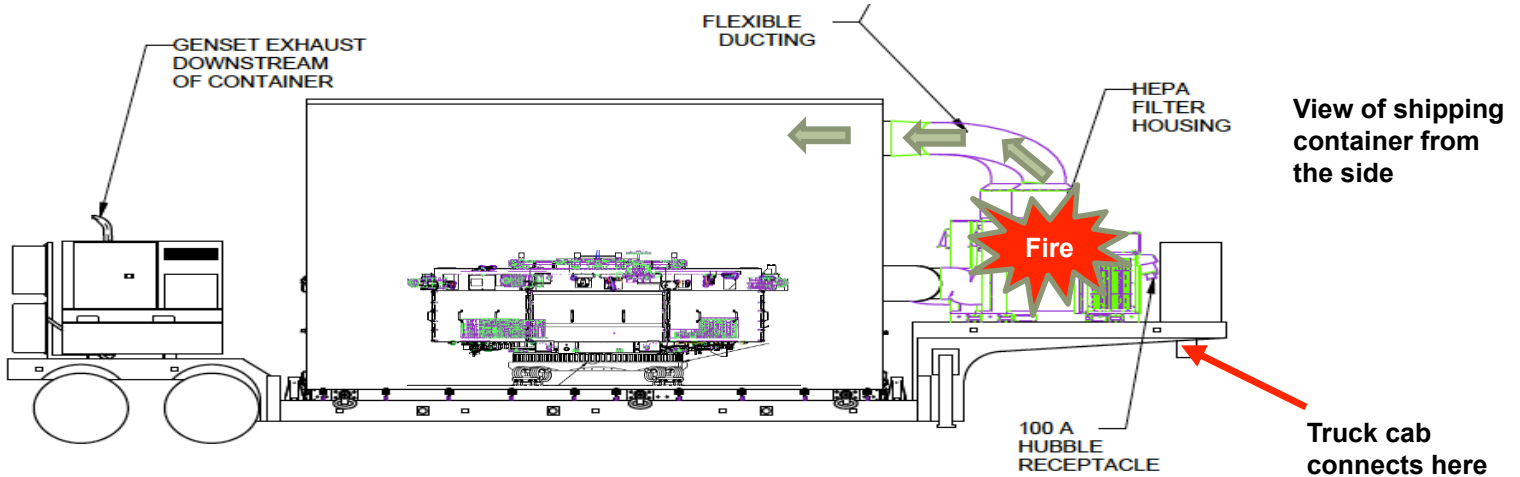


MMS Spacecraft



MMS Transport Container and Vehicle

← Simplified movement of contaminants and smoke from fire in ECU



Actual picture of transport vehicle and MMS shipping container

What Happened

- MMS Spacecraft 1 was transported to NRL (approximately 30 miles) for testing in a shipping container with two Environmental Control Units (ECUs).
 - Once on site at NRL, smoke was observed coming from one of the ECUs.
 - Project personnel already on site at NRL attempted to extinguish the fire with a fire extinguisher.
 - A forklift was then used to remove the ECU from the transporter and place it on the ground away from the shipping container which contained the flight hardware.
 - The NRL Fire Department then proceeded to completely extinguish the fire.
- Interim Response Team (IRT) responders were subject to minor smoke inhalation.
- Investigation revealed that one of the filters in the ECU caught fire during the transport.
 - The filter was not properly supported and fell directly onto the heating element in the ECU causing the fire.



Environmental
Control Unit

Quick Action

- The Project Safety Manager (PSM) acted as the Incident Commander and IRT Lead in accordance with the Mishap Preparedness and Contingency Action Plan (MPCP). The MMS Go-Kit that was on site at NRL was retrieved and contents were utilized by the IRT Lead.
 - Flight hardware was secured.
 - Pictures of the incident were taken.
 - Witness statements were recorded.
 - Data was impounded.
 - Worked with the safety organizations and protective services personnel on site.
 - Contacted the Goddard Safety Division to request health assessment for personnel working around the incident due to potentially toxic fumes.
- After the IRT Lead released the scene, the spacecraft was examined to ensure that there was no residual damage to the spacecraft.



Heating element of the ECU where the filter fell and subsequently caught fire

Lessons Learned

- IRT-trained personnel should accompany high-value hardware, spacecraft, instruments, etc., during transport.
- Fully stocked IRT Go-Kits should be available at all locations and on transporters. In this case, the IRT Go-Kit was on site at NRL. There was not one on the transporter.
- Project personnel should know emergency reporting procedures for all facilities and off-site locations.
- IRTs should be prepared to interface and work with multiple safety officers and organizations if an incident occurs at an off-site facility.
- IRTs should understand and be able to comply with any special site restrictions while still coordinating an appropriate mishap response (e.g., restrictions on photo documentation).
- Mishap practice exercises prepare personnel to appropriately respond to an incident. Practice exercises should be conducted prior to each phase of operations.

Summary

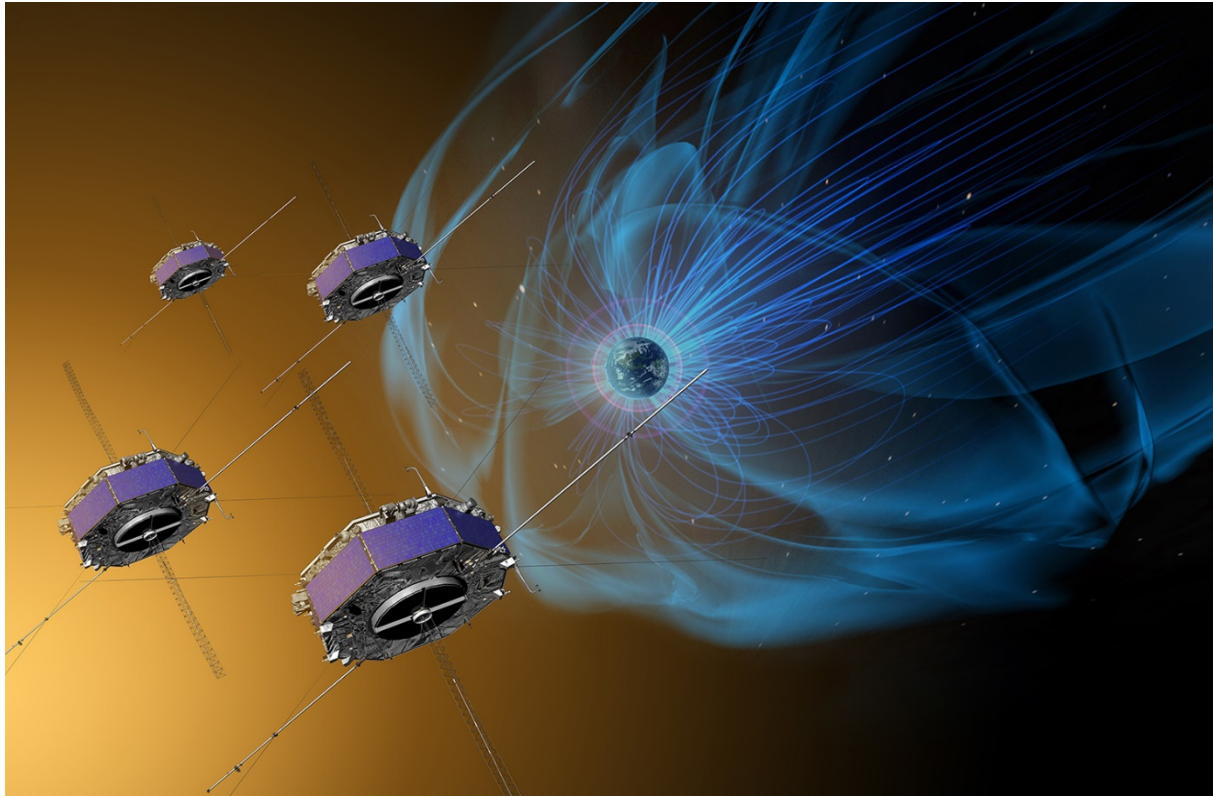
- MMS Spacecraft 1 was exposed to multiple hazards due to an unexpected event during transport.
- Quick and decisive action by the PSM and the IRT prevented harm to personnel and damage to the spacecraft. The IRT training provided the PSM with knowledge and skills to act quickly and appropriately.
- Proper safety training and quick-acting personnel can mean the difference between a delay in a testing schedule or the total destruction of flight hardware. In this case, there was minimal impact to the schedule and no flight hardware damage.

Have you taken your IRT training?

Has your IRT conducted MPCP tabletop exercises at increased hazard milestones (i.e., testing, shipping, launch, etc.) or, at a minimum, annually?

Would you remember what to do if something happens?

Wrap Up



Artist's concept of the MMS mission to study how magnetic fields release energy in a process known as magnetic reconnection.

- Due to appropriate actions being taken, MMS is on orbit delivering amazing science.
- MMS just celebrated its first year in space!