policy
NEWS.

ELV PAYLOAD SAFETY STANDARD UPDATED TO COINCIDE WITH PREVIOUS NPR CHANGES

Sept. 30, 2015

A recent update to the standard aligns it with NPR 8715.7.

NASA's Expendable Launch Vehicle (ELV) Payload Safety Program updated NASA-STD-8719.24, NASA Expendable Launch Vehicle Payload Safety Requirements. The changes align with policy changes made to NPR 8715.7, Expendable Launch Vehicle Payload Safety Program, last February. The revised standard took effect on Sept. 30, 2015.

WHAT'S NEW.

Highlights from the updated standard:

1. An attachment outlines the **deliverables** that projects are **required** to prepare for the **Payload Safety Introduction Briefing** (PSIB) — content previously found in the NASA Procedural Requirement (NPR).

WHY IT MATTERS

Project teams often do not begin looking at the standard until after the PSIB when they begin to tailor the standard to meet their specific project needs; however, deliverables now outlined in the standard may be required for the briefing. Project teams need to be aware of this and how it may affect their timelines.

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2. New requirements for **Return-to-Earth payloads** include **expectations** for safety plans, roles and responsibilities, and guidelines for coordinating with other government agencies.

WHY IT MATTERS

Prior to this revision, NASA did not have any requirements for Return-to-Earth payloads because the agency uses them so infrequently. The additions affect the deliverables expected of Return-to-Earth payload project managers.

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3. Revised and new **definitions** for **catastrophic** and **inhibit** increase clarity.

WHY IT MATTERS

During the time period from post launch to payload separation from the launch vehicle, the ELV Payload Safety Program no longer focuses on payload processing safety, but instead coordinates with the project and Range Safety personnel to focus on public safety.

To reflect this change, the definition of catastrophic is split into pre-launch, when events could endanger personnel involved with the project, and post-launch until separation, when events could endanger the public.

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The definition of inhibit, added at the suggestion of Payload Safety Working Groups, increases consistency in the use of inhibits across projects. The new definition makes it clear that controls do not count as inhibits:

"Controls do not satisfy the inhibit or failure tolerance requirements for hazardous functions."

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4. Three **required forms** can be found in the standard: 1) NASA ELV Payload Safety Hazard Report **(NF 1825)**, 2) NASA ELV Payload Safety Post-Tailoring Equivalent Level of Safety Request **(NF 1826)** and 3) NASA ELV Payload Safety Waiver Request **(NF 1827)**.

WHY IT MATTERS

Although the information found in these forms always has been required, different projects used different forms. These new, required forms became official NASA forms in 2014 to increase consistency in the information received by the program from various payload projects and to ensure that the program receives all relevant information. This will allow the program to run metrics and ensure the review process is running correctly and efficiently.

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5. New design and **quality requirements** based on data from the NASA Engineering and Safety Center (NESC) improve the **quality** of **pyrovalves**.

WHY IT MATTERS

Previously, pyrovalves were required to have three inhibits in place to prevent a leak. There was a lack of clarity amongst the ELV payload community as to whether an inhibit with two seals counted as one or two inhibits, or how many additional inhibits were needed downstream of a pyrovalve. At the request of NASA, the NESC researched the situation and came to the conclusion that if a pyrovalve is built with high quality and high reliability, no additional mechanical inhibits are needed. A new NESC-developed NASA specification document, NASA-SPEC-5022, NASA Manufacturing and Test Requirements for Normally Closed Pyrovalves for Hazardous Flight Systems Applications, now is referenced. However, it is still required below the pyrovalve.

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6. Changes to the requirements for **Composite Overwrapped Pressure Vessels** (COPVs) **align** the standard with future updates to the **industry standard** from the American National Standards Institute. The updates require a **mechanical damage control plan** for every part of the vessel's life cycle including transport and testing.

WHY IT MATTERS

Once COPVs are installed in a spacecraft they become very difficult to inspect, so it is imperative that precautions are taken to prevent damage and that these vessels are monitored closely during all activities. Payload project managers are responsible for developing a mechanical damage control plan that explains how they intend to protect the vessels and documents their status at every phase.

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ELV PAYLOAD SAFETY STANDARD UPDATED TO COINCIDE WITH PREVIOUS NPR CHANGES *CONTINUED*

7. The role of **Payload Safety Working Groups** is **defined** clearly including how they should operate, the timetables they must meet for safety reviews and what is expected at each safety review.

WHY IT MATTERS

These clarifications make the safety review and approval process more efficient and result in a better process as the program progresses.

RATIONALE

When NPR 8715.7 originally was developed, NASA-STD 8719.24 did not yet exist, so the NPR was all encompassing. When the NPR was updated in 2014, content deemed more appropriate for the standard, such as the content of deliverables, was removed from the NPR because it is now covered in detail in the standard. Now, the two documents work together to form a complete set of policies, expectations and requirements for ELV Payload Safety. The changes to the standard also are meant to increase consistency between the various payload projects, regardless of who leads the design or build.

TAKE ACTION

ELV project managers, system engineers responsible for spacecraft involving NASA payload systems, and system safety engineers who perform safety reviews need to become familiar with the revisions of this standard and adhere to all applicable requirements.