



**Workshop
on
Fracture Control
of**



**Spacecraft, Launchers and their Payloads and
Experiments
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CONCLUSION

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RFCP - Fracture control of spacecraft composites

- **Existing proof test approach is not suitable for all applications**
 - effort required for good proof test is in many cases underestimated;
 - additional rationale is normally needed based on performed NDI and assessment of criticality of defects;
 - risk of damage after NDI/proof testing is not systematically addressed – it is not clear whether all cost effective protection measures are implemented (some failures are reported – damage happens!)
- **Catastrophic vs. critical failure: intention is to cover catastrophic STS/ISS definition (partly covered by critical ECSS hazard)**
 - ECSS allows for tailoring. This may be subject for tailoring, e.g. limit to catastrophic failure.
- **TRP study will start in 2009.**
 - One aim is to help quickly evaluate uncritical parts of the structure, so that effort can be focused on really critical locations (if any)
- **Note: ISO 21347-2005 ‘Space systems - Fracture and damage control’:**
 - It also establishes mechanical damage control requirements for mechanical-damage-critical items (MDCIs) fabricated from composite materials.

RFCP - Fracture control of spacecraft composites

- **Important: to achieve early agreement based on fracture control plan**
 - Work towards generic (company) plan that could even be included in offers
 - Including tailored approach to composites fracture control, achieving maximum alignment with existing practice (what can be derived from e.g. protoflight testing?)
 - Need for a working group on ‘generic fracture and damage control plan’ for satellite composite structures?
- **Goal:**
 - rational assessment of criticality of defects, both during manufacturing and afterwards (i.e. potential impact damage)
 - use as much as possible acceptance criteria defined in qualification
 - it is important to know whether critical damage is visible (and inspections or protection are foreseen)
 - it is important to know whether critical, undetectable damage could be introduced (or is effectively prevented)

RFCP - general

- **GSE was already addressed in 6.1. New text is intended to clarify and focus.**
- **General note: safe life assessment is not just crack growth, it also includes residual strength (critical crack size)
Knowledge of at least critical crack size is important!**
 - > **is it detectable by applied NDI;**
 - > **is the item 'screened' by acceptance testing?****As was stated: In many space applications growth of defects is of secondary importance.**

Finally ...

- **Thank you for your participation to this successful Workshop.**
- **We hope that this will be the start of a renewed tradition.**
- **Proceedings:**
 - Presentations will be made available as soon as possible via the Workshop website. This will be announced to the participants;
 - Presenters, please provide electronic version during the Workshop. Please indicate any restrictions on distribution. Please confirm that the version provided during the workshop can be distributed, or provide updated one.