



# Round table: Do's and Don'ts of laser testing: towards a standard approach

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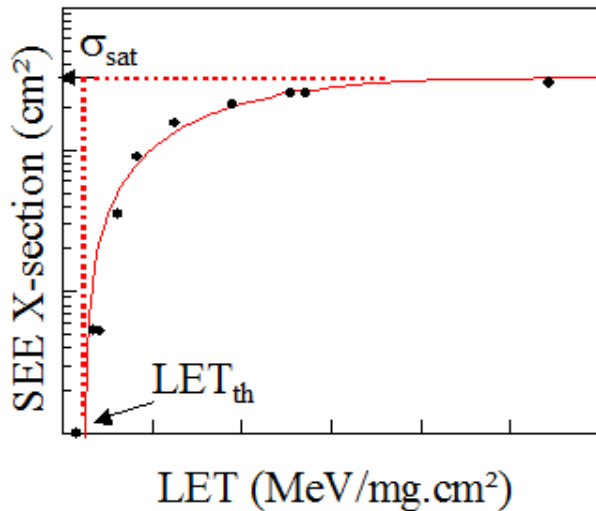
DEFENCE AND SPACE

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**AIRBUS**

# Radiation Hardness Assurance – SEE – 1/2

At EEE level, Airbus DS methodology relies on device SEE categorization



SEE LET threshold in MeV.cm <sup>2</sup> /mg	Analysis Requirement
> 60	SEE risk negligible, no further analysis needed
15 < $LET_{th}$ < 60	SEE risk, heavy ion induced SEE rates to be analyzed
$LET_{th}$ < 15	SEE risk high, heavy ion and proton induced SEE rates to be analyzed

Note: LET value shall be obtained in valid conditions

**Analysis is just starting at that stage...**

## Radiation Hardness Assurance – SEE – 2/2

If  $LET_{th} < 60 \text{ MeV.cm}^2/\text{mg}$ , RHA methodology may rely on

- SEE rate predictions

or

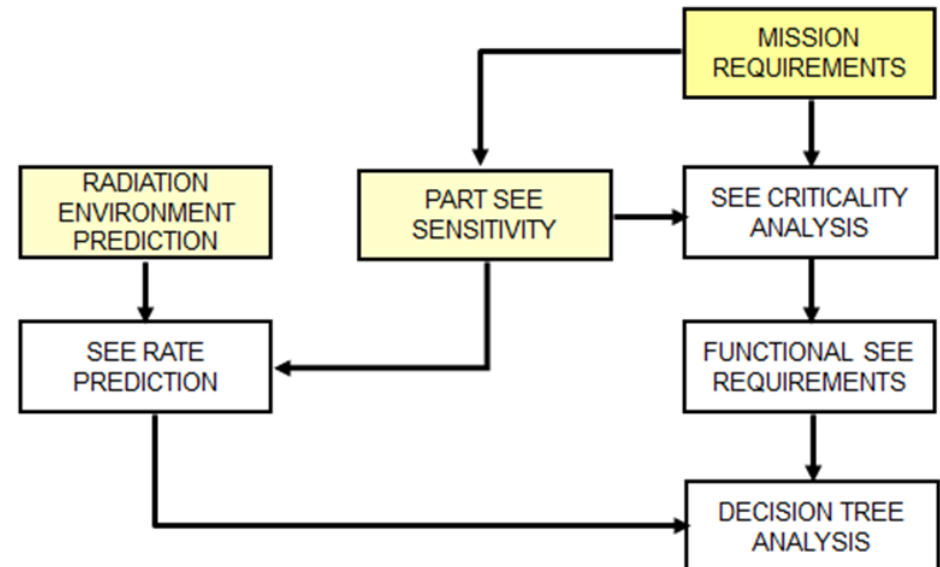
- Derating rules (derating is employed in the RHA program to ensure that the device operates in a manner so as to be insensitive to SEE effects)

SEE rate prediction methodology has to be validated

SEE test data have to be validated

Beware of “similar” devices!

RHA process for SEE is based on the **consideration of acceptable risks and rates** and therefore involving **equipment/system level** considerations



# Do's and don'ts of laser testing: toward a standard approach - 1/2

## Some basic questions about laser capabilities vs SEE

- **Laser testing known to be likely a qualitative approach for SEE**
  - SEL testing: energy to SET to insure device is not sensitive (according to RHA)?
  - SPA, TPA: optimized perimeter for each technique as a function of device type/SEE nature
    - How do they compare for qualitative screening
  - Similarity with HI test reference: when is it “good enough”?
- **Real cost of laser test: no beam to pay however delidding/ preparation and test software/hardware preparation time remains**
- **Status about calibration**
  - Still need for a reference heavy ion test? If not, when can we skip it?
    - SEE rate prediction
  - Trend: do we hope getting rid of HI testing in a near/medium/never ever future?

# Do's and don'ts of laser testing: toward a standard approach – 2/2

Some basic questions about laser capabilities vs SEE, cont.

- **Laser facility to facility variability? How to monitor repeatability?**
  - Sensitivity to optical losses etc...
- **Sample preparation: what kind of devices still not testable with laser (especially in the COTS domain); trend?**
  - Device thinning (SEL?), metallizations
- **GaN, SiGe, SiC: what we can do (already), what we cannot**
- **Technology “limit” versus laser beam size or other technical intrinsic characteristics?**

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Thank you