

# The STMicroelectronics perspective on radiation tests

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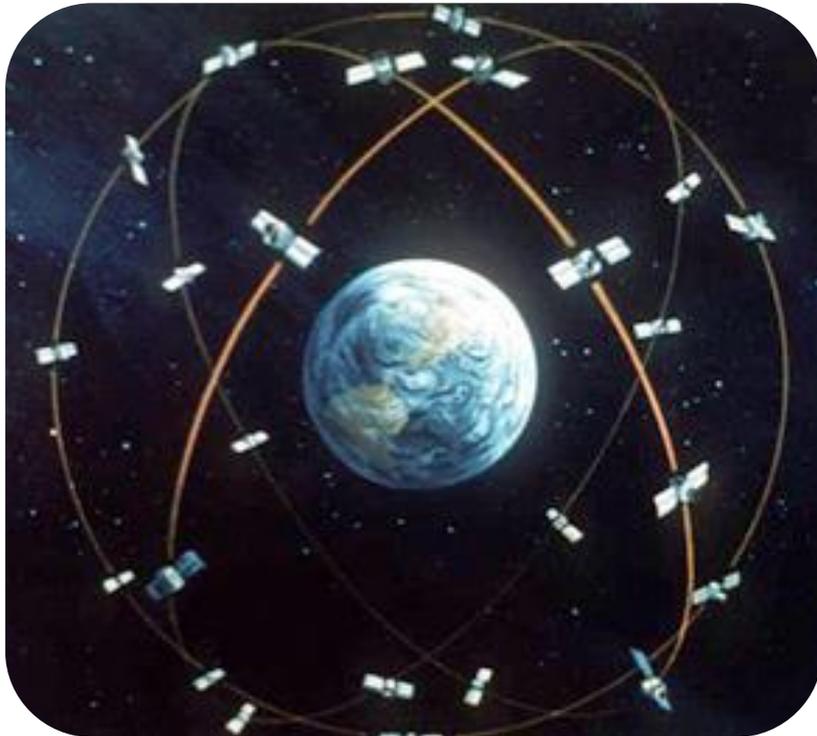


**RADIATION TEST**  
WORKSHOP 2016

SEVILLE - SPAIN 31<sup>st</sup> MARCH - 1<sup>st</sup> APRIL

# Customer expectations

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- Need qualified RH parts
- Focused on TID and heavy ion tests
- Low request about proton test and Displacement Damage, but increasing trend
- New projects (LEO constellations) → radiation requirements change
  - TID performance decrease (below 100krad)
  - Strong interest about SEE behavior
  - Cost pressure
  - Please refer to R.ECOFFET, GT MIL-Aerospace Radiation effects, 01-12-2015

# Problems we are facing on

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- Strong impact of the radiation costs on the project
- Source availability impacts the schedule (mainly for heavy ion tests)
- How to clearly share the SEE data ? No specification available for SEE on ICs.
- Few MIL-STD-883 cond A (50 – 300 rad/s) sources available in Europe
- No lab suitability certification available in European system
- No European subcontractors with MIL-STD-750 lab suitability for Cond. A

# What we need from the agencies

- To provide terms of reference for the radiation tests that guarantee:
  - The radiation robustness of the parts
  - The customer expectations
  - The competitiveness of the European space industry (cost, deadline, international recognition,...)
- To be at the forefront of the emerging technologies
  - How to test MEMS, GaN devices, SEE on SiC diodes, test on ASIC, etc ?,...
  - Quick update of the reference specifications to be aligned with the market development (ECSS-Q-ST-60-15,...)

# Radiation assurance: the ST approach

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- Portfolio mainly based on hardened technologies
- Laser – heavy ions SEE correlation could be done on the 1<sup>st</sup> product from the technology → to harden the design
- TID evaluation done on all products
- Laser tests done on all digital and logic products
- If the TID level request decreases, the cost will not decrease but the portfolio could be enlarged.

# Deliverables on ST RH products

Radiations	Integrated Circuits	Bipolar Transistors	Power MOSFETs
<b>TID</b>	<ul style="list-style-type: none"><li>• RVT on each lot</li><li>• ELDRS carac. on request if app.</li></ul>	RVT on each lot	RVT on each lot
<b>SEE</b>	On request	n/a	On request
<b>DD</b>	n/a	On request	n/a

At that time our diodes are sold without radiation guarantee

# Products in the road map

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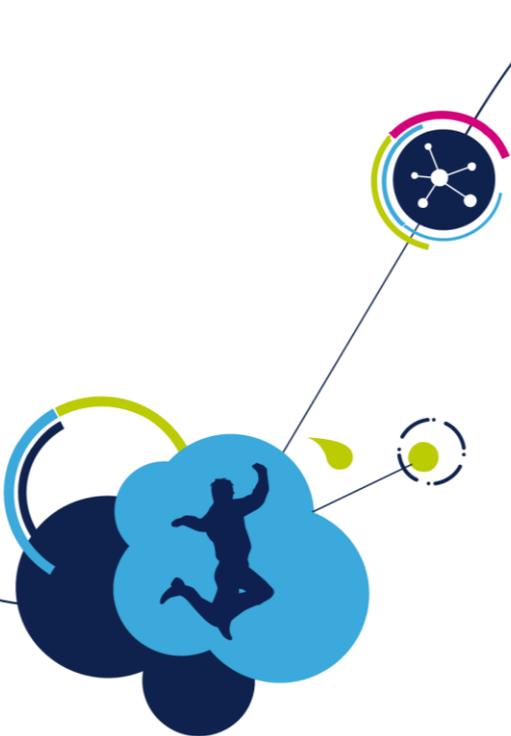
## Recently / on the way to be qualified

- VREF RHF100 & RHF1009A
- RHFLVDS31, 32, R2D2 and 2281
- SERDES LVDS217/218
- Voltage Regulator RHFL6000 with SET hardness improvement
- Bipolar transistors portfolio with LDR TID tests

## Under development

- Low Side MOSFET Driver RHRPM4424
- RHRDAC1612
- Point Of Load RH-POL01
- New Schottky Portfolio up to 200V tested under HI
- New Rectifier Portfolio up to 400V

- Appropriateness between trends of COTS use and radiation requirements
- How agencies will surround this new request ?



# Thank You