OHB's Current Challenges and Future Solutions in LEO EoL

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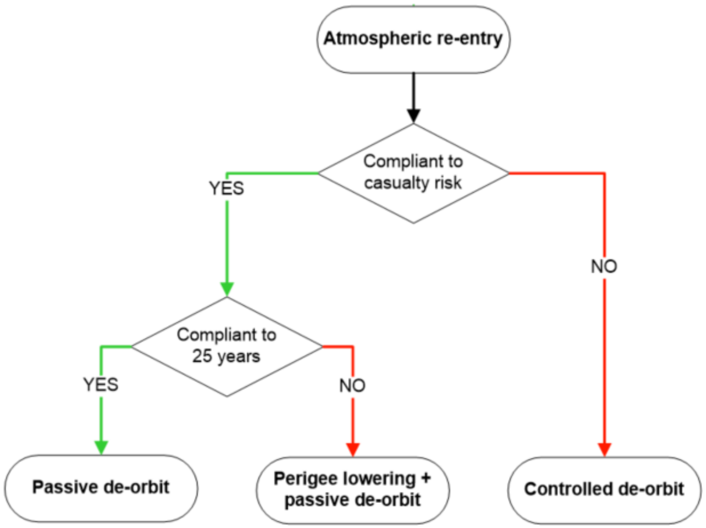
Key Challenge for LEO: Controlled vs. Uncontrolled

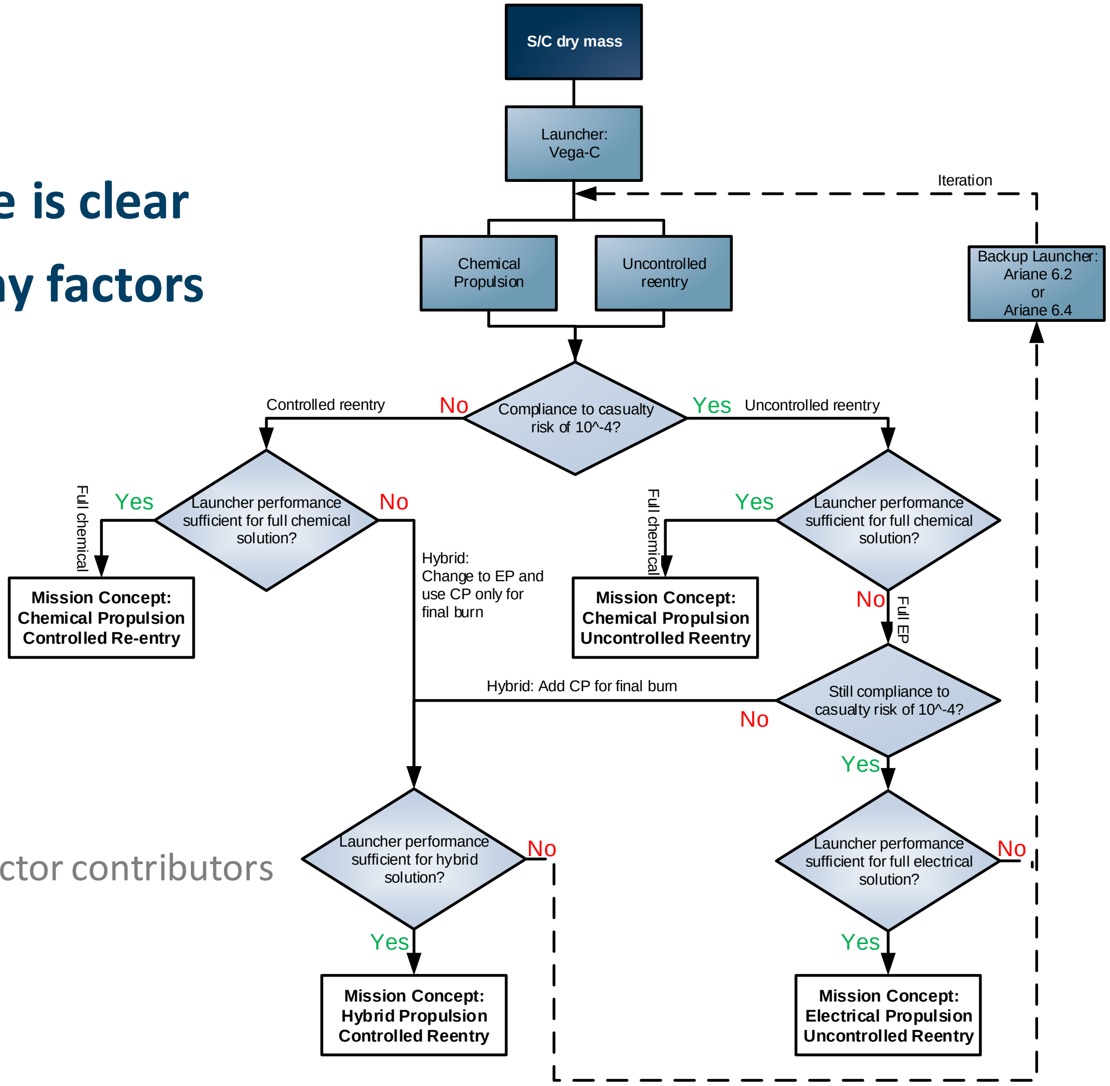
- **How to best fulfil mission requirements for each case?**



A Trade-off Space

- **For some missions, the choice is clear**
- **For the others, there are many factors**

- **Drivers:**
  - Type of Mission
  - Launcher
    - Spacecraft mass restrictions
  - Propulsion System
    - Chemical vs. Electric Propulsion
  - Payloads
    - Can contain large casualty risk factor contributors



Why Focus on Uncontrolled Re-entry?

- Cost benefits
- Lower mass due to lower propellant
- Less complexity in mission operations
- Higher certainty of maintaining compliance at EoL for potential mission extensions

Model Uncertainty

- **No model is perfect**

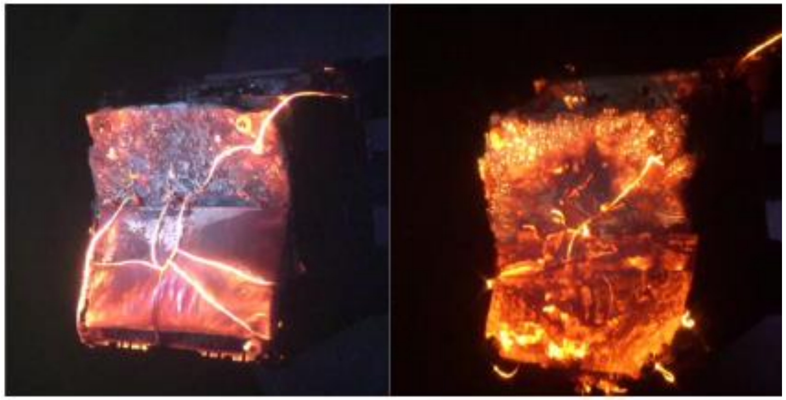
- **Uncertainty in the models accuracy and in the modelling accuracy itself can drive results in an unrealistic direction**

- **Small differences in models can result in big differences for results!**

CFRP

D4DBB

Electronic Cards



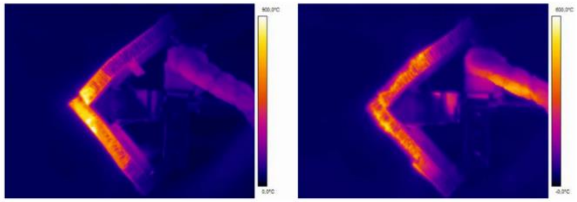
Improved Representation of Destructive Spacecraft Re-entry from Analysis of High Enthalpy Wind Tunnel Tests of Spacecraft and Equipment, Beck et al.

Hurdles to Uncontrolled Re-entry

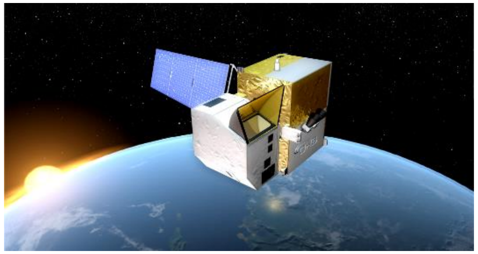
- **Early resolution of re-entry type is needed**
  - Needed to design and size spacecraft appropriately

- **Hurdles to broader adoption:**
  - Design adaptation and resultant costs
  - More expensive unit solutions
  - Heritage of current designs
  - Restrictions on selection of units

Outlook for the Future



- **Better modelling of spacecraft**
  - Understanding built on ground and flight tests
  - Standardisation
- **Lower kinetic energy options**
  - Break up into small low mass elements
- **Further units with increased demisability**
  - Selecting units for low Casualty Risk impact
  - Tailoring selection for spacecraft compliance



- **Designing spacecraft for better demise**
  - Payloads designed for demise
  - Structures and accommodation to promote earlier demise

What will that look like?

- **Bespoke solutions to address critical areas in order to enable uncontrolled re-entry**
  - Spacecraft utilising combinations of D4D solutions for low casualty risk
- **More certainty for casualty risk compliance at EoL**
  - Enabling mission life extension
- **Maintaining fulfilment of key requirements for Spacecraft whilst allowing for more uncontrolled re-entry**
- **Lower and lower casualty risks enabled through uncontrolled re-entry**

Thanks for listening!

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We. Create. Space.