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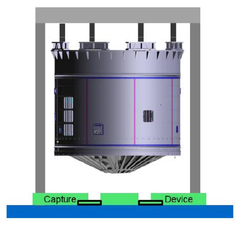
Aerospace Europe Conference 2023 – 10TH EUCASS – 9TH CEAS

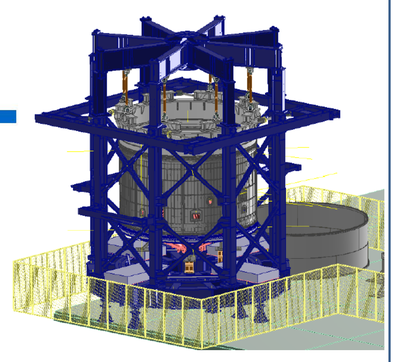
Ariane 6 – Second Stage Separation Test

TEST CONFIGURATION & OBJECTIVES

Background: A6 coming soon!

Set-up & principle



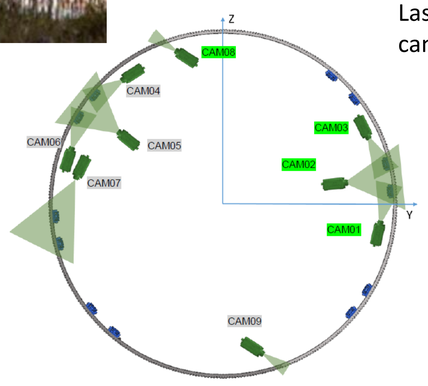


Objectives

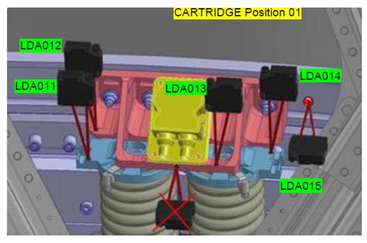
- Optical detonator initiation with shock ambiences
- Pyro cutting perfo & integrity
- Distancing system performance & functional behaviour with ambiences
- Dynamic modes
- Very short term disengagement
- Bracket deformations
- Source Shock & transmission to equipment
- Distancing sensor functional behaviour

Measurement plan:

Laser displacement sensors, inclinometer, High speed camera, accelerometers, strain gauges



Camera positions



Laser sensors around spring brackets

FLANGE & SPRING BEHAVIOURS

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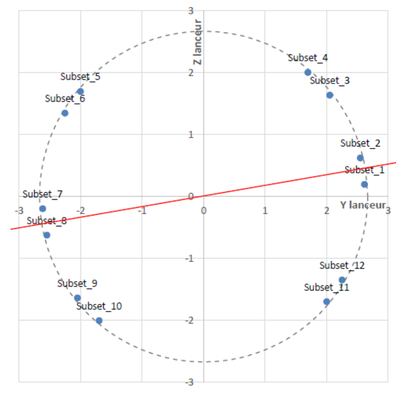
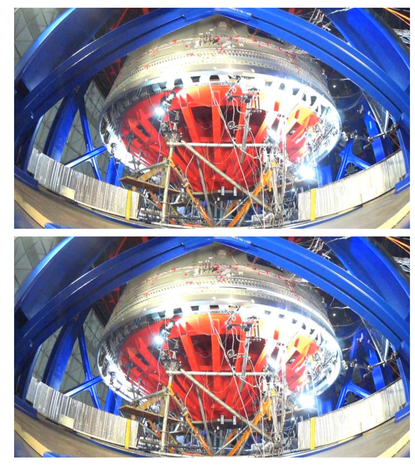
Out-of plane mode

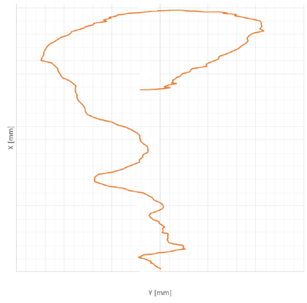


Distancing system distribution



Spring package dynamics

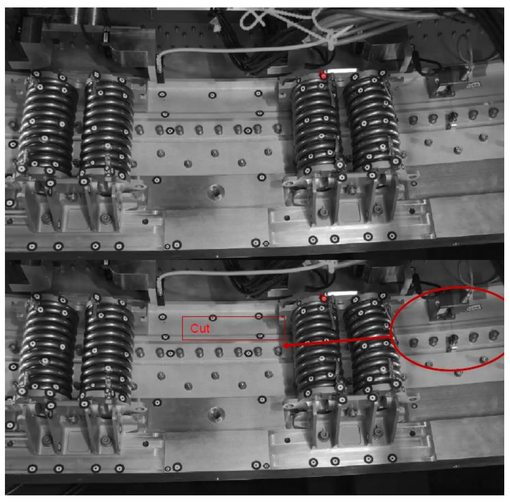
Spring package
Allocated Volume



Spring-end motion

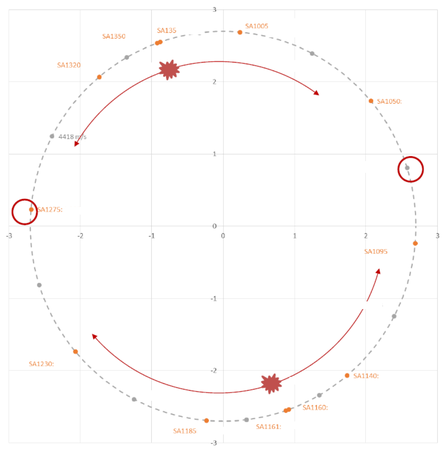
=> AV & holding flange modification

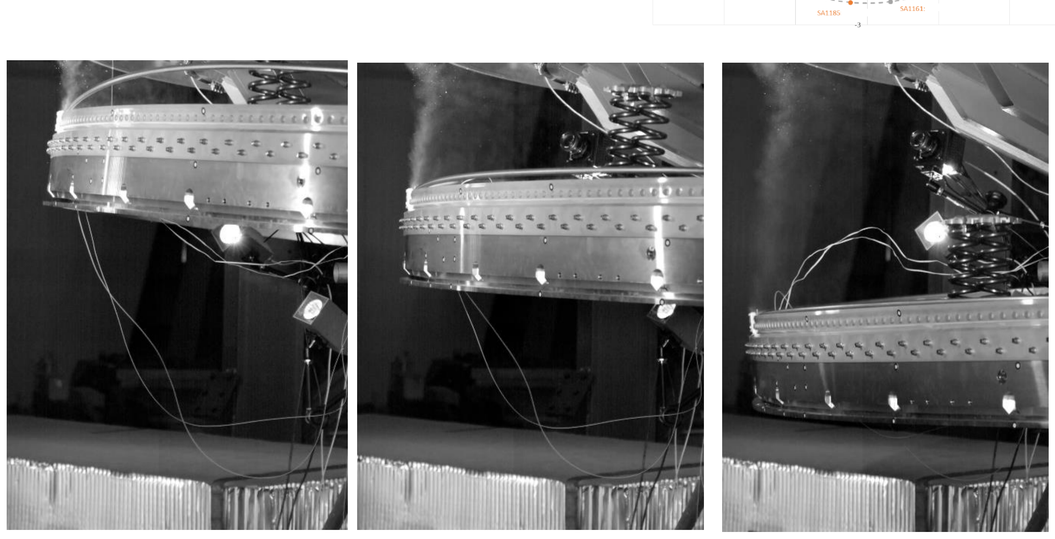
SEQUENCE & PYROTECHNICS



Detonation & severance propagation

Detonator ignition & dispersions

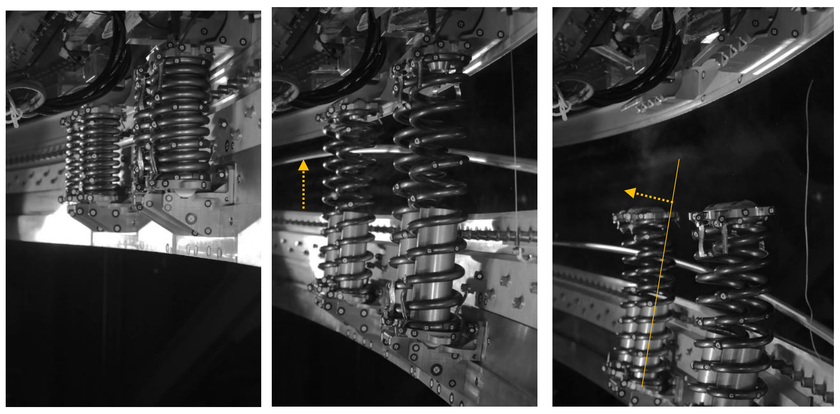




Interface Structure Separation System achievements:

- Low generated shocks
- Integrity with high accelerations (specific to test configuration)
- No debris
- Mastered pyro-tube motions

DISTANCING SYSTEM & KINEMATICS



Just before separation

End of spring stroke
Pyro tube above separation plane

Spring radial oscillations

Distancing achievements:

Verification of the simulator model & inputs relevance

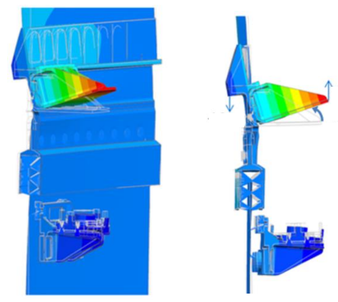
Verification of distancing system functional behaviour with separation ambiences:

- Integrity with high accelerations
- No contact spring / flange during stroke
- Distancing system bracket deformation before & after separation
- Dynamic oscillations => modification of spring allocated volume

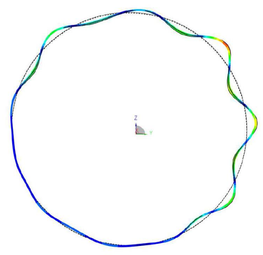
Verification of flange dynamics

Very short term disengagement justification

Verification of distancing sensors functional behaviour

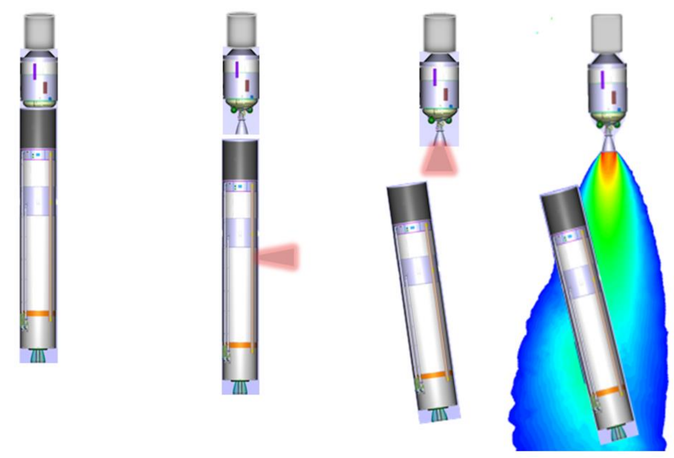


Bracket deformations



Flange dynamics

=> Contributes to system qualification:



Second stage separation disengagement margins