



# Non-linear, fatigue and creep analysis of LiDAR-based unit



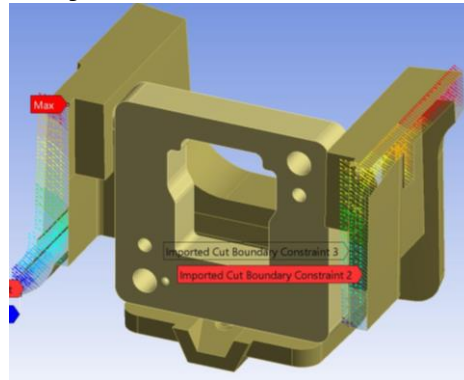
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## Objectives:

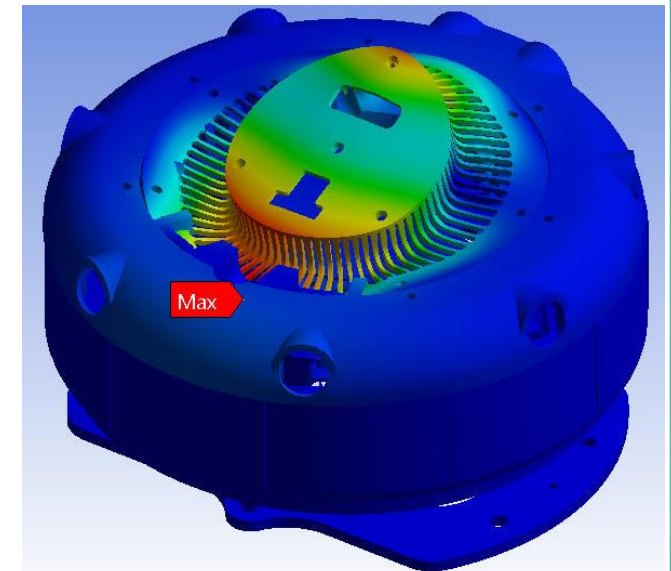
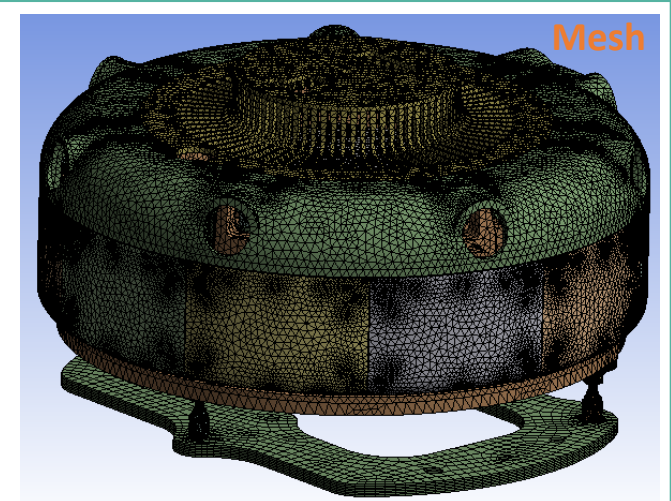
- Structural analysis of the sensor unit assembly subjected to both static and dynamic loading
- To predict the Load Carrying Capabilities, Durability, Dynamic, and Creep behaviour of the unit under different loading conditions.
- To suggest design modifications if needed and optimize the design.

## Task Executed

- Necessary modifications of the model for FEA were carried out in Ansys Space Claim.
- A sub-modeling technique was used to simplify the problem.
- The unit assembly was analyzed for the behavior of the structure for static loads, Durability, Vibrational characteristics, and Creep.
- The structure was also so analyzed for a crash loading condition of '30 g' acceleration.



Camera Base Sub-Model for Snap fit analysis

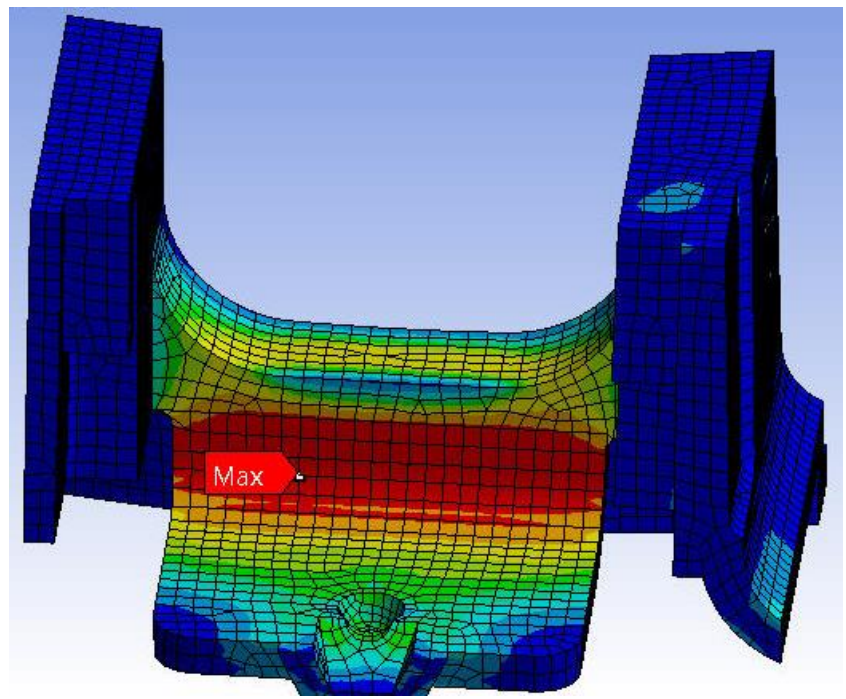


Modal Analysis

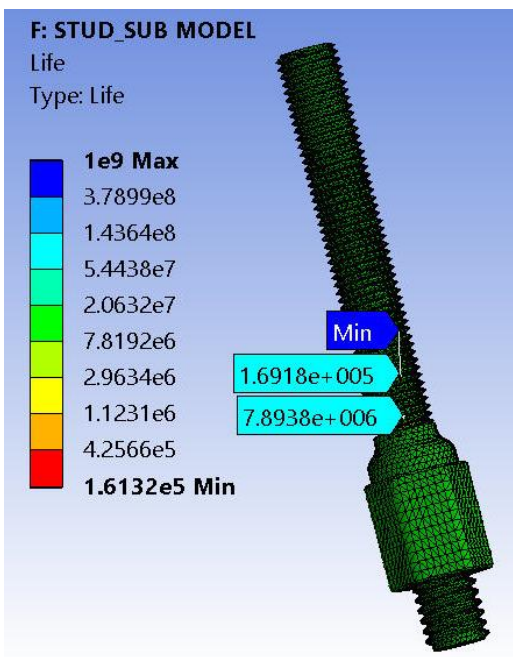
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## Benefits:

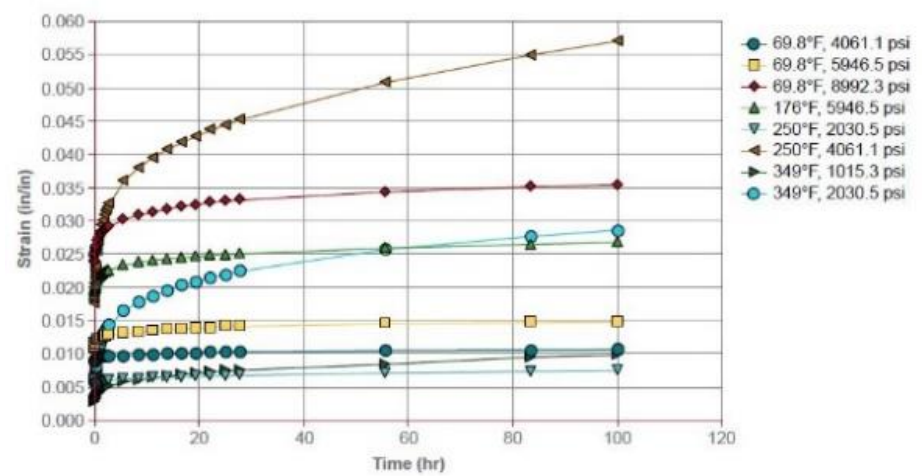
- Structure was corrected at the snap-fit locations based on the Reaction forces that were induced over 10 year period in a creep simulation.
- Geometric changes were incorporated to enhance the life of the component and to increase the minimum natural frequency.



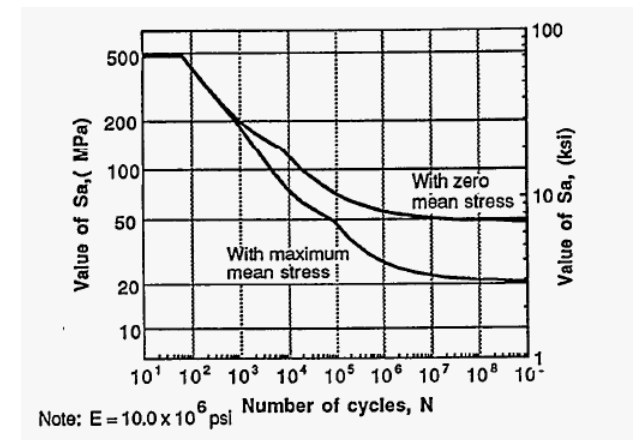
Creep Strain contours on the Sub model of the main bracket.



Bolt Life Evaluation



CREEP data for Ultem 1000



Note:  $E = 10.0 \times 10^6$  psi  
S-N curve for Aluminum 6061