cleansat

BBO2
Thermoplastic propellant tank
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ThalesAlenia Space
A Thales / Finmeccanica Company

Description of proposed technology Building Block

Baseline

- Liner material: rotomolded thermoplastic liner
- Shell: thermoplastic composite overwrap

Trade off variable

- Liner material (thermoplastic grade)
- Composite shell material (carbon / kevlar)
- Propellant management system

Trade-off criterion

- Compatibility with propellant
- Demisability
- Mass
- RC/NRC
- Development time

Description of proposed technology Building Block

— Applicability range (satellite class and target orbits in LEO)

- LEO platform with blowdown chemical propulsion
- Propellant tank size about 200L and less

— Discussion of the system level impacts (risk, mass budget, power budget and link budget)

- Main risk identified during trade-offs is a versatility of thermoplastic liner grade to futur green propellant

- Main impact at system level is the limitation to bladder type propellant management of this concept

Development

— Main technical challenges during development

- Final choice of liner material grade vs futur green propellant
- Bladder interface to tank as to be challenged
- CFRP composite overwrap is still baselined but additional work has to be performed to show compliance with demisability requirements:
    - Behavior of hollow composite tank after matrix pyrolysis
    - Ground impact of an almost dry fiber tank