

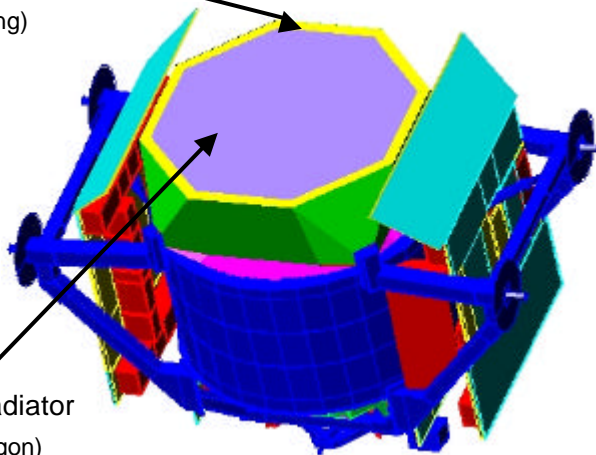
Zenith radiator

Effects of area enlargement

NEW CRYOS radiator CONFIGURATION

former configuration

MLI on TRD radiator
(yellow ring)

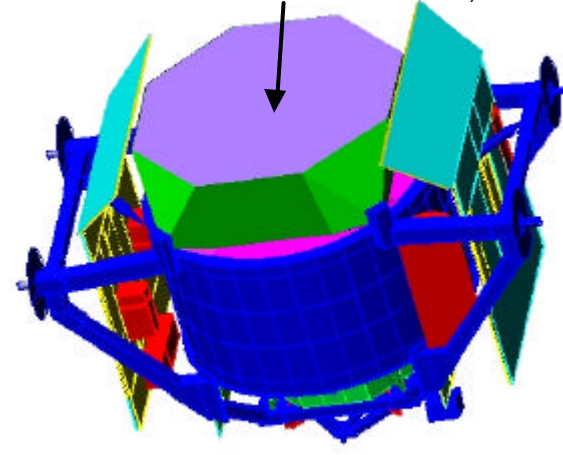


CRYOS radiator
(purple octagon)

Cryos radiator area = **4.1** m²
MLI area = **0.76** m²
(yellow ring, former TRD radiator)

new configuration

CRYOS radiator (purple octagon
extended to former TRD radiator)

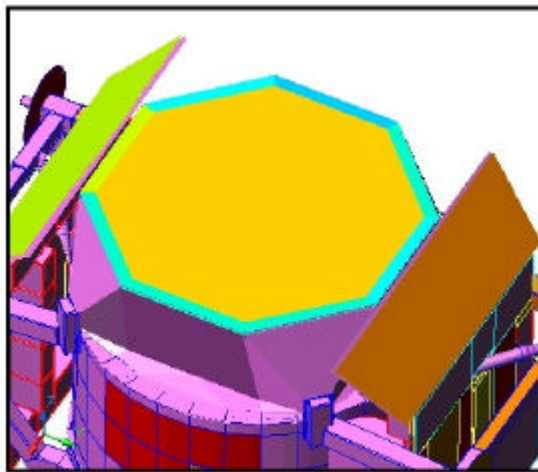


Cryos radiator area = **4.86** m²
NO MLI

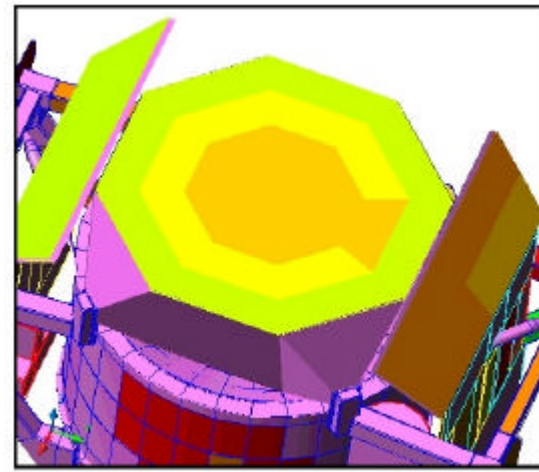
SIMULATION RESULTS :
comparison between former and new configuration

EXAMPLE: HOT CASE: Beta= +50°; YPR –15 –20 –15, hot environment

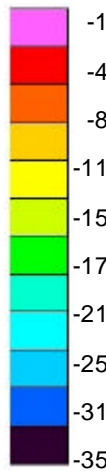
former configuration



new configuration



T [°C]




Long-time transients analysis for Zenith radiator: environmental parameters

- Assumptions**

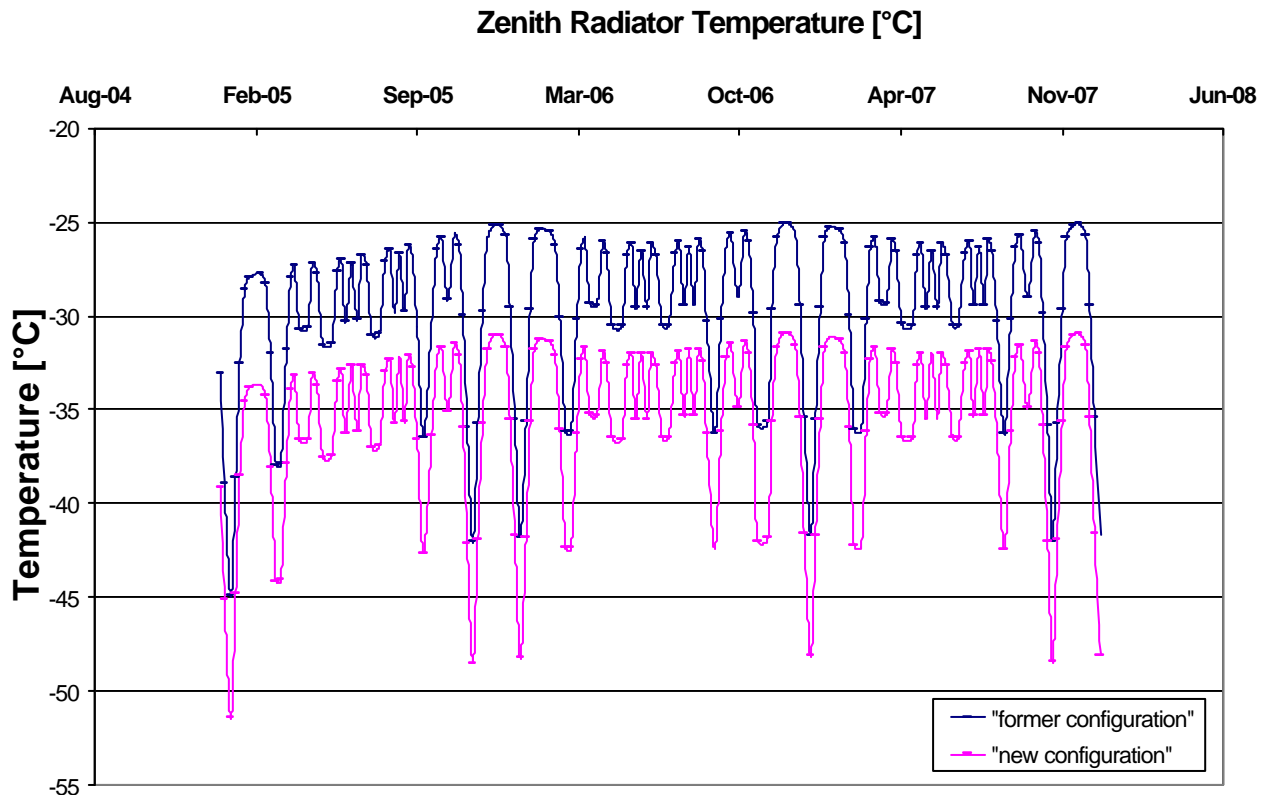
- Minimum propulsion attitude: Y, P, R = -2 -10 +1
- 5 parameters varying:
 - Beta angle
 - Solar Constant (Sc)
 - Albedo (Al)
 - Earth temperature (T_E)
 - thermo/optical properties (EOL/BOL)

- Sensitivity approach:** evaluation of the temperature dependence on the 4 parameters 

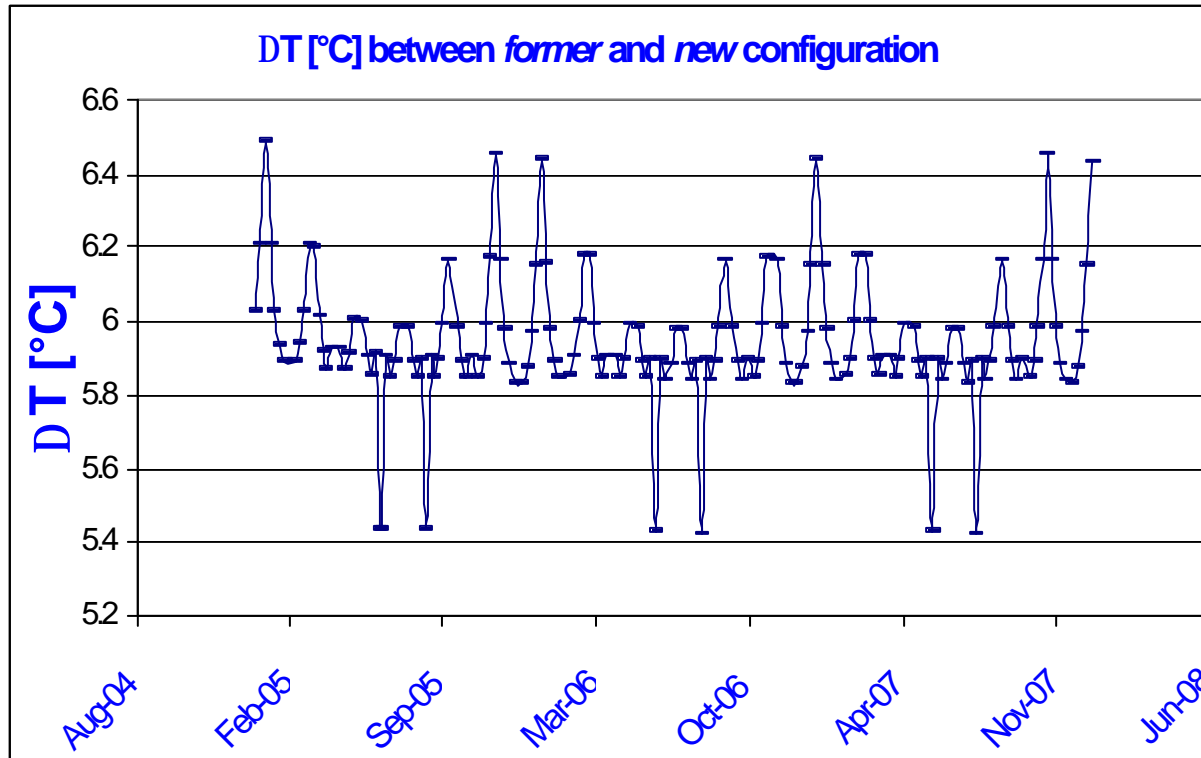
- Simulation run:** nominal cases run at different beta, and parametric corrections applied 

$\frac{\partial T}{\partial Q_{SUN}}$
$\frac{\partial T}{\partial ALBEDO}$
$\frac{\partial T}{\partial T_{EARTH}}$
$\Delta T \Big _{BOL-EOL}$

Long-time transients analysis results: *Zenith radiator (1)*



Long-time transients analysis results: Zenith radiator (2)



CONCLUSIONS

- Zenith radiator area enlargement provides less than 6°C decrease for the cryos radiator
 - Thermal detailed analysis needed
 - Fin effect to be taken into account
 - Structural assessment needed
 - Total mass: TBD