



# PA PHOTOS REPORT

## RPW ANTENNA 3 ANOMALY

Project limited diffusion  
Until 11<sup>th</sup> of July 2034

ERIC LORFEVRE  
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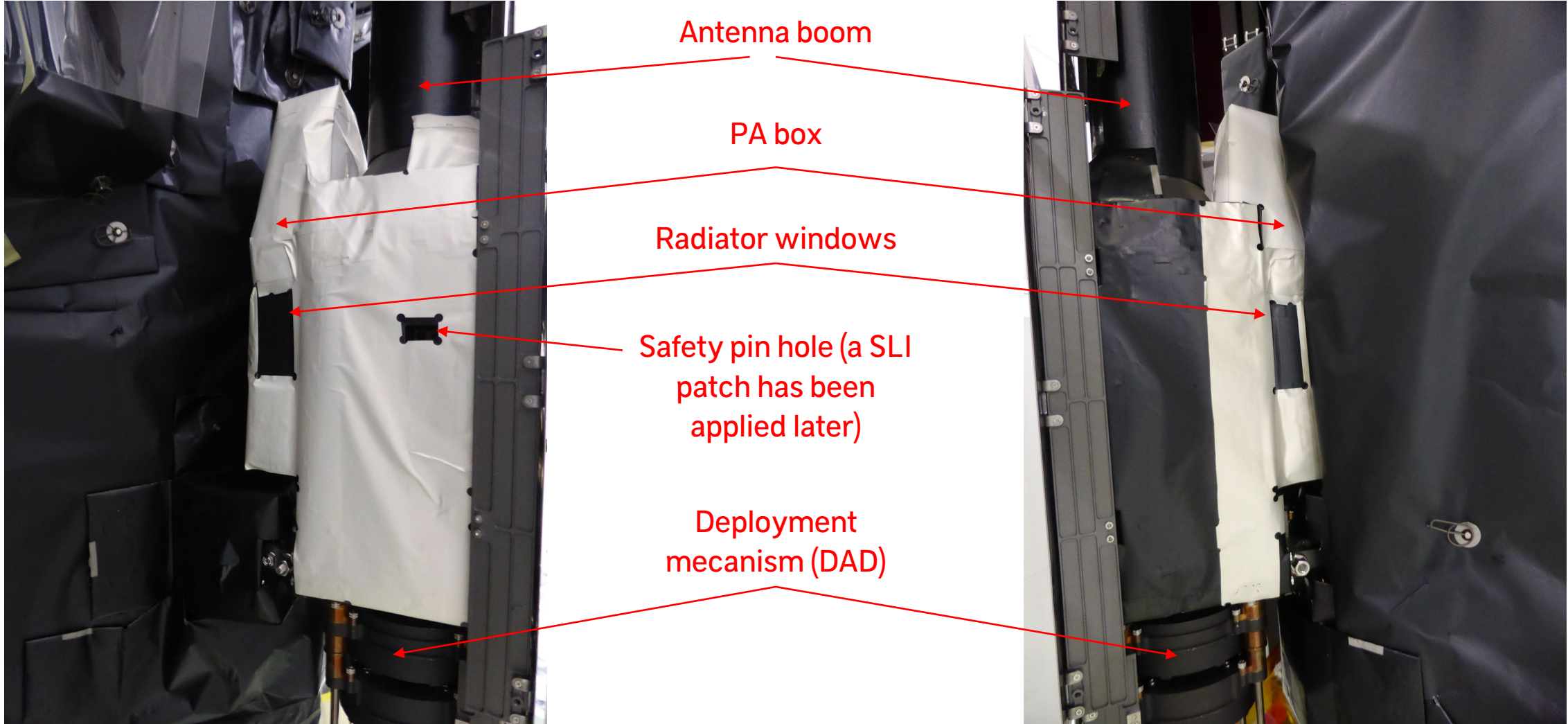
# CONTEXT



## **Action AI-2: To prepare a short report detailing PA photos and related data analysis results.**

- ✓ Photos are the last ones issued by CNES team during White SLI installation onto Antennas 2 & 3.
- ✓ Other photos have been certainly taken later by ESA/Airbus people before SOLO's launch.
- ✓ The installation of a white SLIs onto both antennas has been done in order to reduce thermal effect induced by solar panel yoke reflections. This installation has been performed by Stellar people and CNES team on the antennas already mounted on the spacecraft. The SLI has been put over the initial black kapton MLI of the antennas.
- ✓ The white SLI material has been provided by NASA GSFC and Y966 tape has been used to.

# ANTENNA 3 AFTER SLI INSTALLATION



Face exposed to yoke reflections windows

Opposite face

# OBSERVATIONS

About SLI/MLI:

- ✓ All black kapton MLI surfaces are initially conductive (requirement: to have less than  $3k\Omega$  between two points of any surface. Typical values = some hundred of ohms).
- ✓ Each MLI has a grounding stud to the structure. "bunny ears" have been performed on SLIs to insure electrical continuity with MLI.
- ✓ Folded flaps on SLI allow to fix it also on the internal surface of the MLI

About anomaly:

- ✓ Non permanent
- ✓ No thermal effect observed at antenna level,
- ✓ First anomaly occurs when SOLO moves away from the sun
- ✓ Important probability that anomaly occur during a sweep

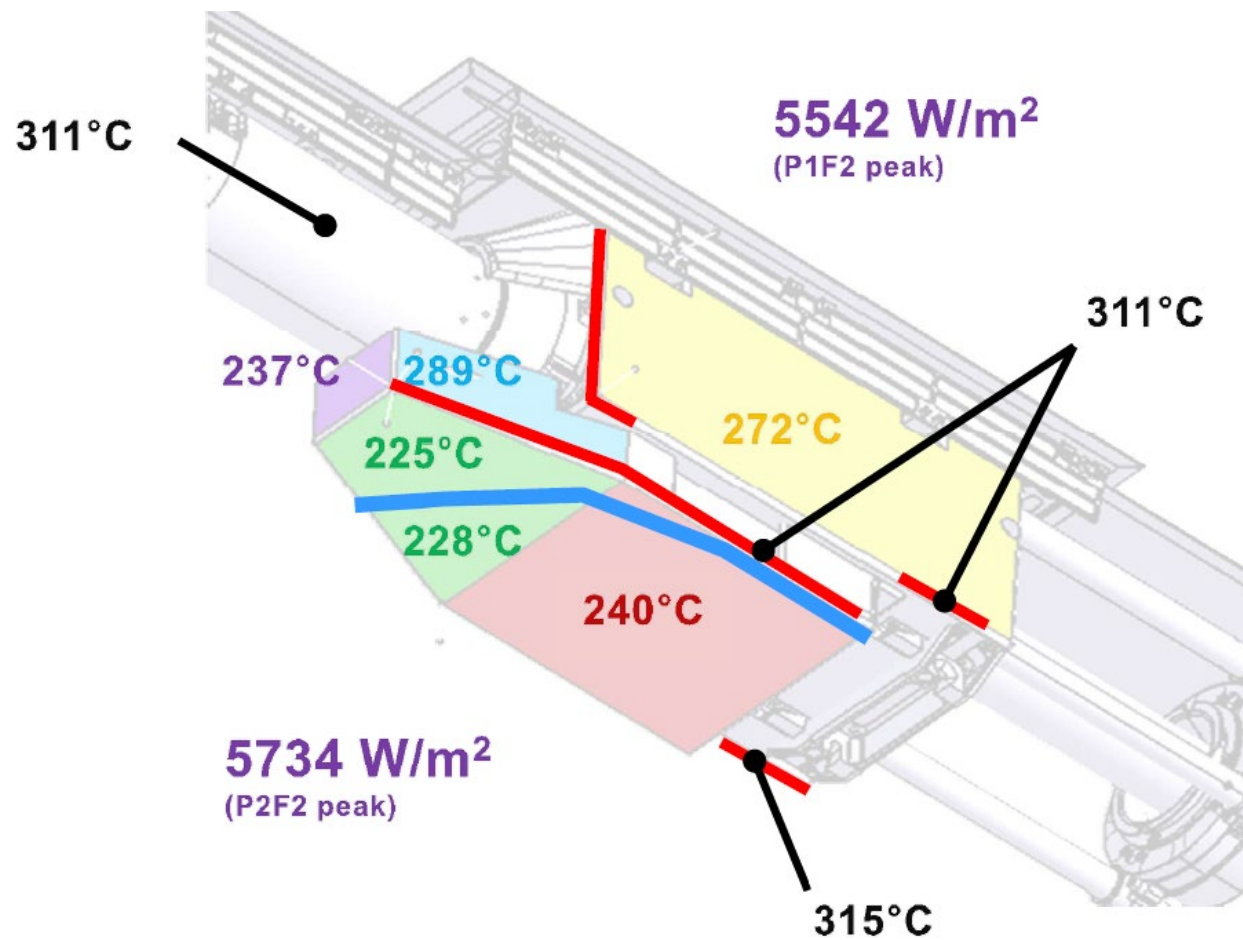
# RELATED DATA ANALYSIS RESULTS

## Brief anomaly root causes analysis (only considering that SLI/MLI are involved) :

- White SLI peeling off due to yoke reflection and inducing a shortcut
  - ➔ Unlikely. Need large part of "free" SLI to allow a contact with antenna (closer part protected by MLI). A huge thermal effect should be observed.
- Black kapton MLI peeling off inducing a shortcut
  - ➔ Very unlikely. Non expected by thermal predictions especially if SLI is applied. A huge thermal effect should be observed.
- MLI/SLI damaged by external cause inducing a shortcut
  - ➔ Likely/unlikely. Damage on MLI or MLI/SLI without critically damage anything else. Need electrostatic effect or changes of SC attitude to have non permanent anomaly (no correlation observed with attitude changes).  
Limited thermal effect could be observed (depending on the damaged part surface). The shortcut resistance should be around some hundred of ohms or more (if poor contact).

# BACK-UP SLIDES

# PREDICTED TEMPERATURES INDUCED BY YOKE REFLECTIONS ON ANT3



# SLI DESIGN

- Composed by 3 parts: stacer frame SLI (green), PA harness box (pink) and Cone protection (blue)
- Symmetric patterns in order to be useful for both antenna (PY & MY)
- Total surface  $\ll 1540 \text{ cm}^2$  per antenna (+ 1 or 2 spares ?)

