



SMEC Integration



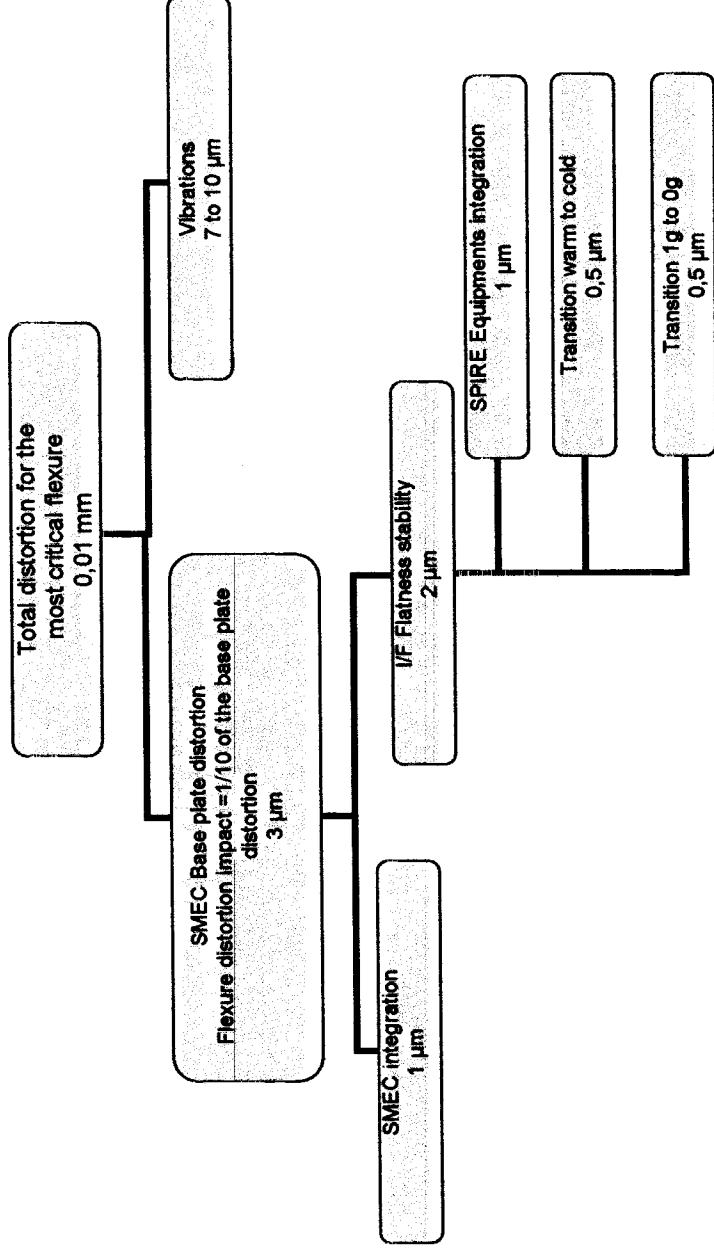
1. SMEC characteristics

- SMEC is equipped with 16 flexures that do not accept a displacement in shearing higher than 0.01 mm
- This specification has to be met during all the phases of the SMEC life
 - ✓ Integration of the mechanism
 - ✓ Integration of the SPIRE equipments
 - ✓ Transition to the cold conditions
 - ✓ Vibrations
 - ✓ Transition 1g to 0g
- According to the SMEC FEM analysis, the acceptable SMEC base plate distortion shall not be higher than 0.03 mm



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2. SMEC flexure distorsion budget allocation





SMEC Integration



3. SMEC Baseplate distortion

3.1 SMEC Integration on the SOB

The deformation is induced by the I/F flatness deviation (SMEC and SOB)

Attachment philosophy : Defined in the MICD ref : ~~821-MEC-00-DI-01-A~~ 821-MEC-00-DI-01-A.

- 4 attachment points for the mechanism plus 3 other attachment points for the preamp PCB
- No particular flatness requirement at the SOB I/F level
- Shimming requested after SOB I/F verification (MSSL/LAM)
- Flatness requirement after shimming (better than 0.01 mm)

Remark : SMEC integration and tests at LAM will be performed with the SMEC baseplate attached on a stiff plate whose flatness is better than 5 μ m



SMEC integration

3.2 SMEC I/F flatness stability ($2 \cdot 10^{-2}$ mm)

- **During the SPIRE Equipment Integration (mainly the covers)**

The distortion allocation during the cover integration shall not be higher than 0.01 mm.

- We request the possibility to check the SOB distortion, at the SMEC interface level, after the SPIRE cover integrations.
 - ✓ LAM will perform the measurement operations and will provide the measurement tool.
 - ✓ RAL or MSSL support is needed during the measurement sequences for the cover mounting/dismounting operations.
- Could an FEM analysis be performed to check what is the effect on the SMEC contact area of a distortion of the SOB of 1mm (displacement and local slopes at SMEC contact areas)



SMEC Integration



SMEC I/F flatness stability ($2 \cdot 10^{-2}$ mm) (continued)

- **During the transition warm to cold ($5 \mu\text{m}$)**

We have considered as negligible this distortion and its effect on the flexure, and ask for the RAL/MSSL agreement.

- **During the transition 1g to 0g ($5 \mu\text{m}$)**

We have considered as negligible this distortion and its effect on the flexure, and ask for the RAL/MSSL agreement.
Anyway this effect will only occur after the vibration phase and is not critical versus the flexure integrity



SMEC Integration



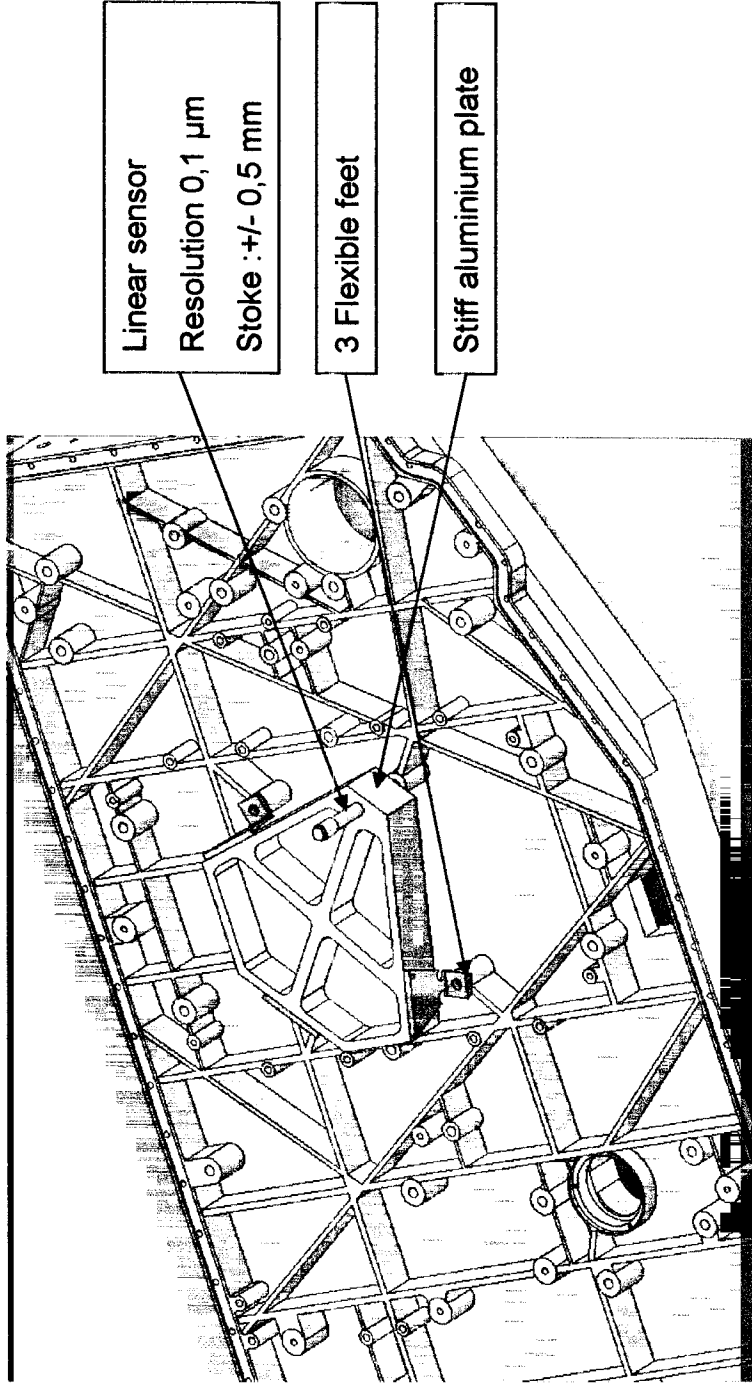
3.3 Displacement on the flexure during the vibration phase

- At the moment the SMEC FEM analysis has demonstrated that, at the critical frequency ($\approx 200\text{Hz TBC}$), the displacement at the flexure level could be of the order of 0,01 mm.
- In these conditions, the combination of the vibration effects and of the distortion due to the mounting plus the other effects (Spire cover integration and transition to cold) does not allow us to certify that after integration on the SOB, the SMEC is able to withstand the cold vibrations without any problem
- A decrease of the vibration level (or agreed notches) is necessary to guarantee a safe continuation of the mechanism development.

SMEC Integration

4. SMEC I/F Measurement

- The tool concept is given here after



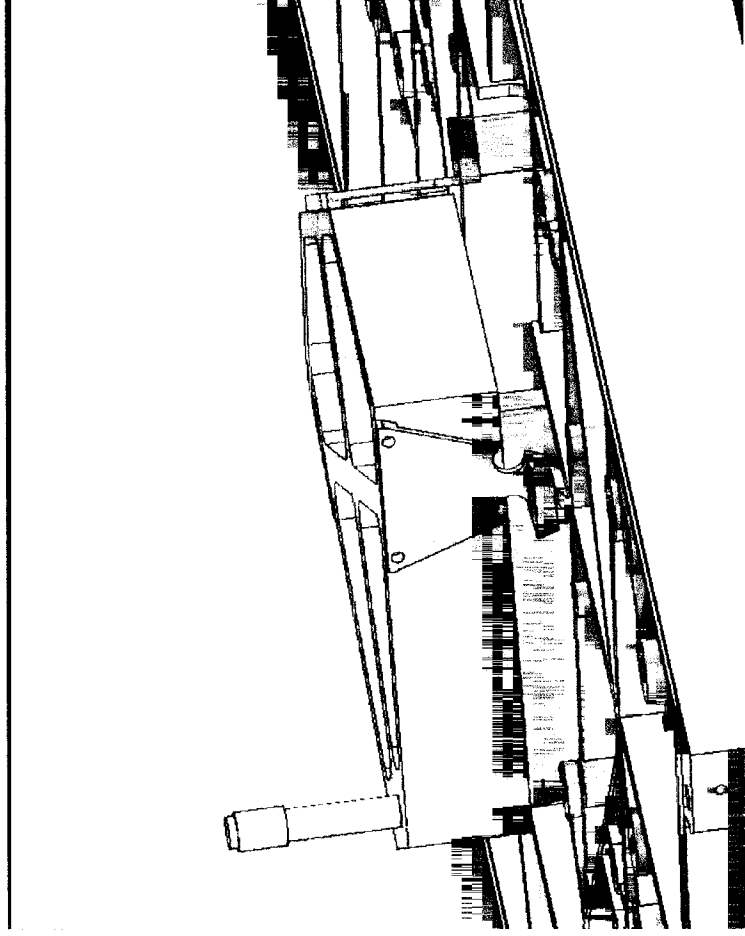


SMEC Integration



SMEC I/F Measurement (Continued)

- Tool concept





SMEC integration

SMEC I/F Measurement (Continued)

- Measurement sequence proposal

Seq. N°	Spectrom	Photom	Remark
1	0	0	SOB without cover
2	0	0	Measurement after SOB turnaround with the measurement tool upside down
3	0	1	Measurement After PM cover integration
4	0	0	Verification after screws loosening
5	0	1	Verification after tightening of the screws
6	1	1	Verification of the effect of the mounting of the opposite cover on the SMEC I/F
7	0	1	Verification after screws loosening
8	0	0	Verification at the initial condition
9	1	0	Verification after Spectro cover integration
10	0	0	Verification after screws loosening
11	1	0	Verification after tightening of the screws
12	1	1	Mounting of the opposite cover then measurement
13	1	0	Verification after screws loosening
14	0	0	Return to the initial condition