

SPIRE STM Optics Integration & Optical Alignment Verification

Summary of Activity

- RAL, May 2003 -

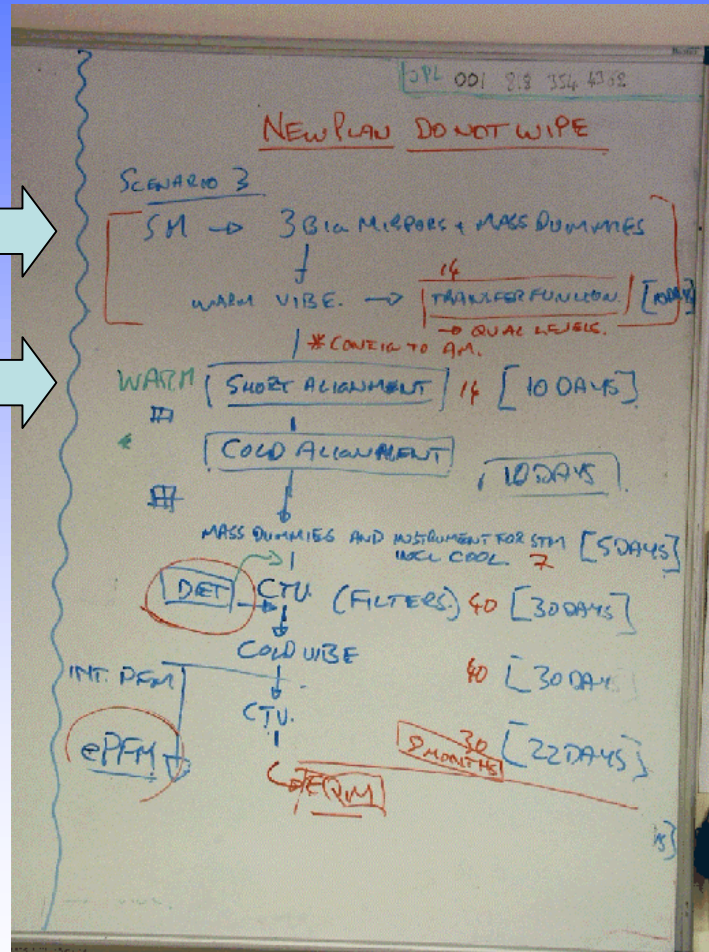
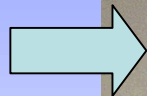
SPIRE-RAL-REP-001721

SPIRE STM: Plan of activities

Optics integration
(before early warm
vibration test)



Optical alignment
verification (room
temperature)



- Location: RAL, R25-G56
Tunnel area: class 100

- Structure integration and support by MSSL

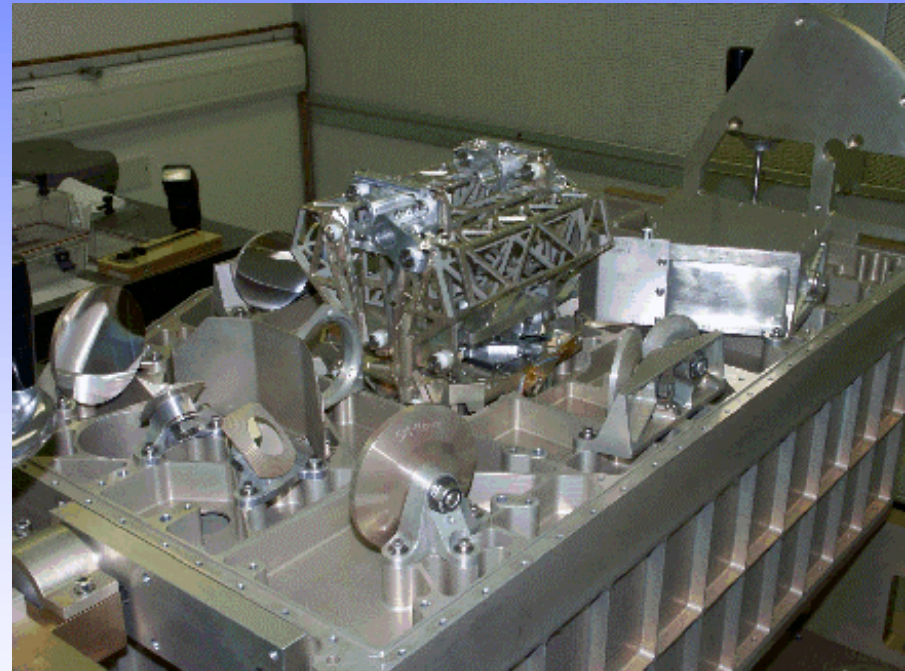
- Mirror integration and optical alignment verification with LAM

Optics integration

**Common optics and
Photometer optics on SOB**



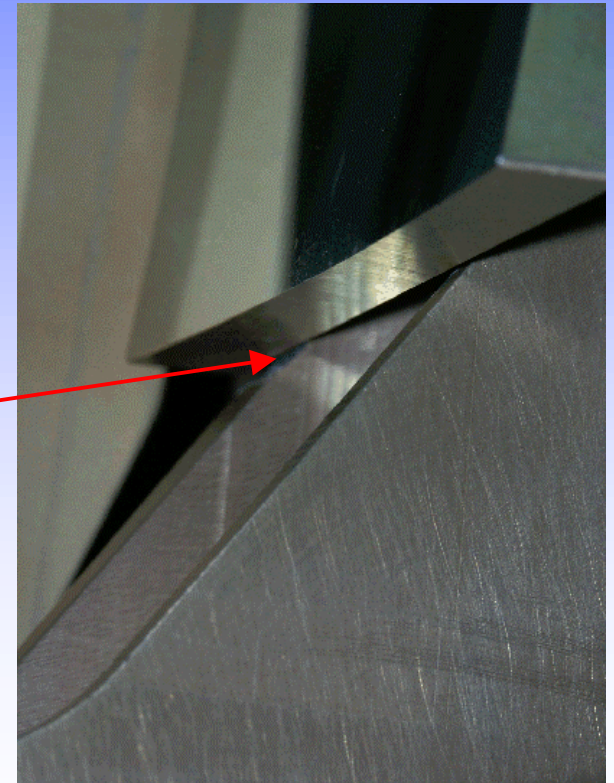
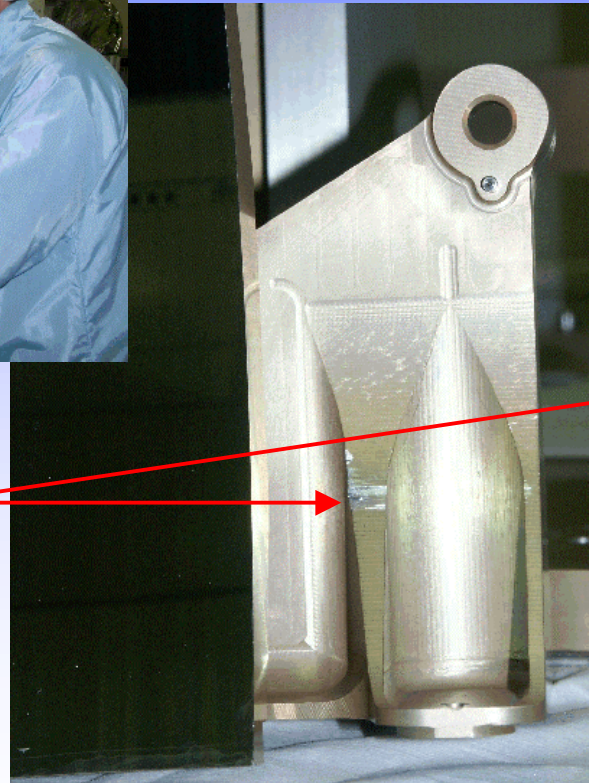
Spectrometer optics and SMEC



Optics integration – CM3 issues

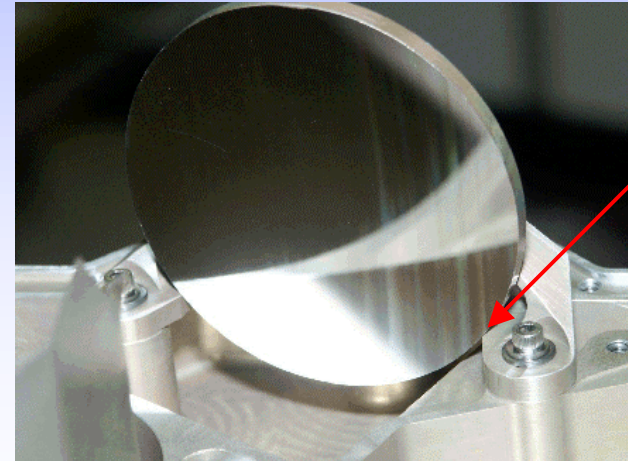
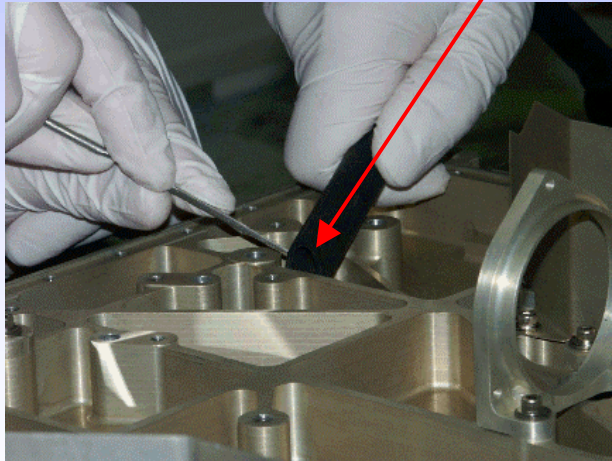
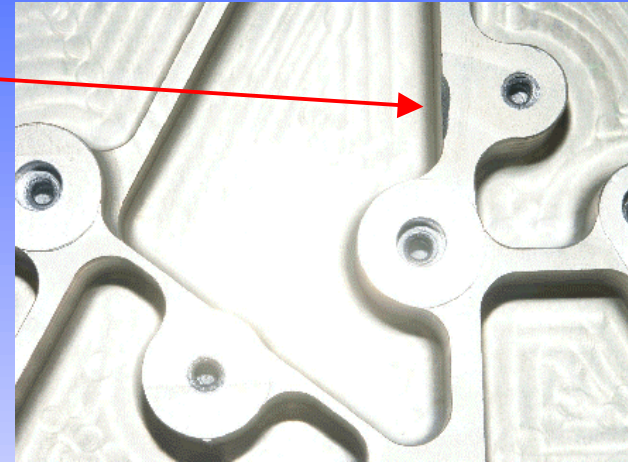
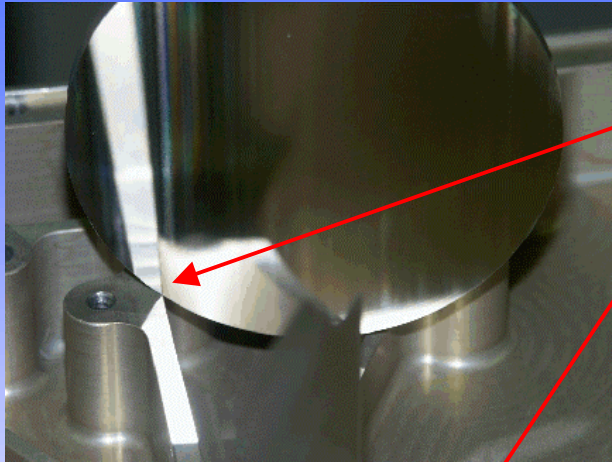


CM3 “extraction” to allow local cut in bracket (because of mirror/bracket clash)



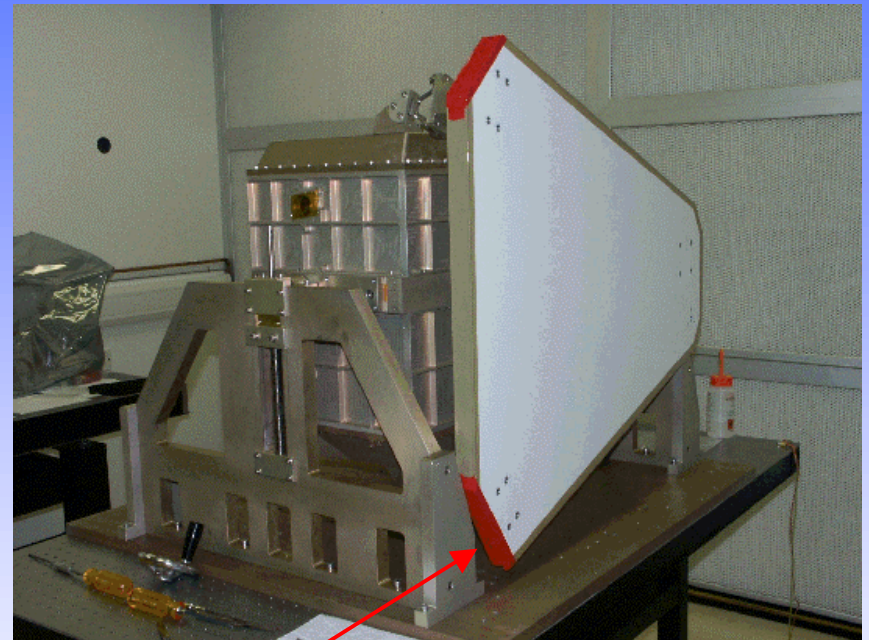
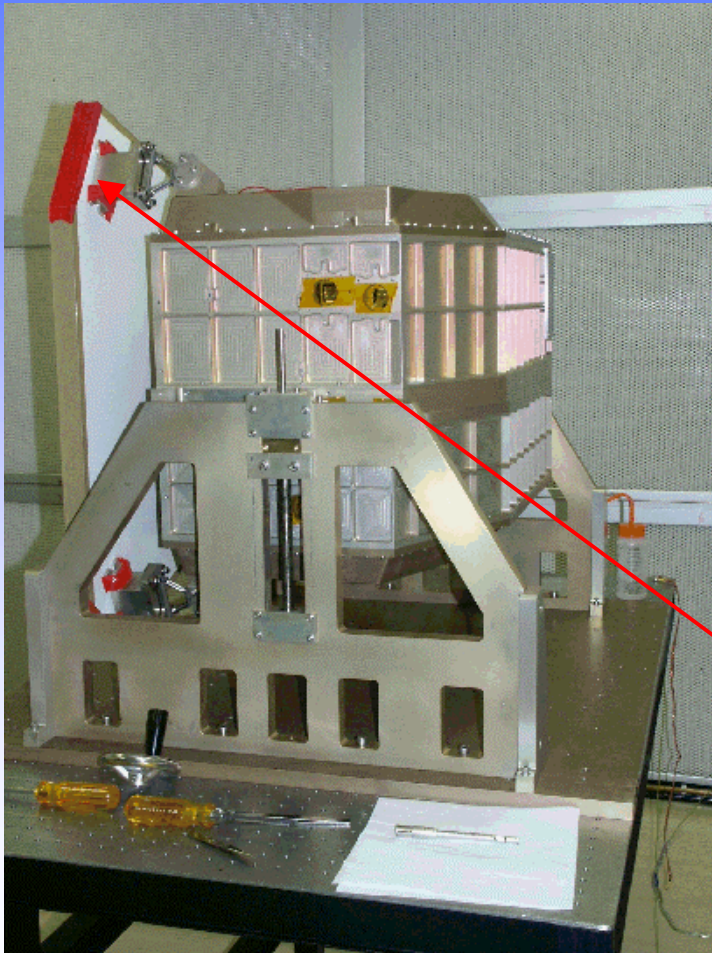
Optics integration – SM11 issue

SM11b issue with local
SOB rib



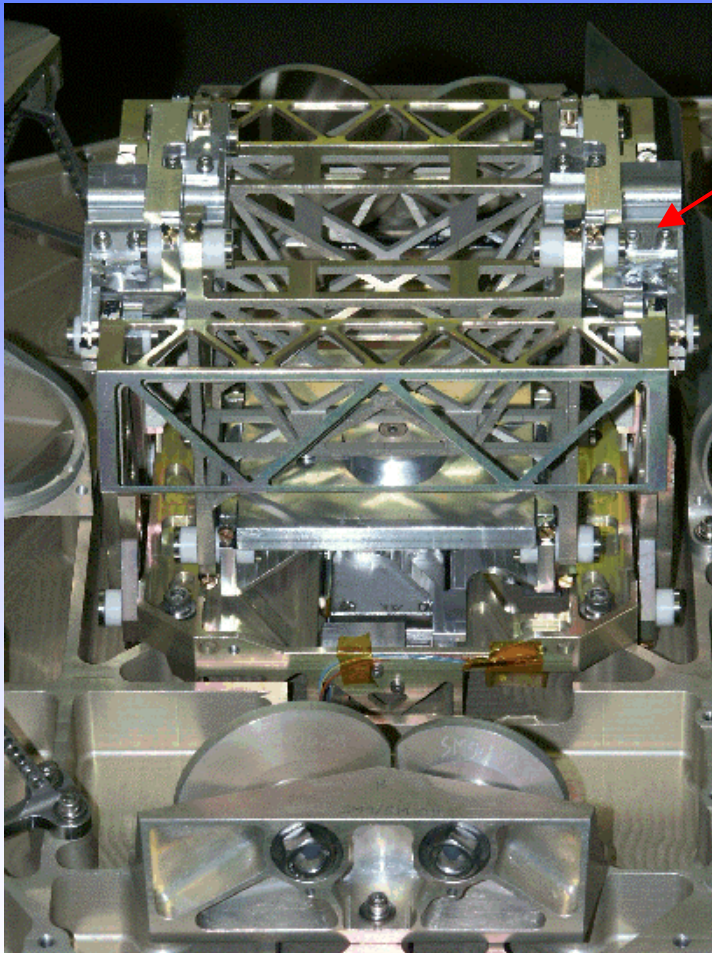
SM11a
bracket
issue

Optical alignment verification: preparation – LAM HOB plate

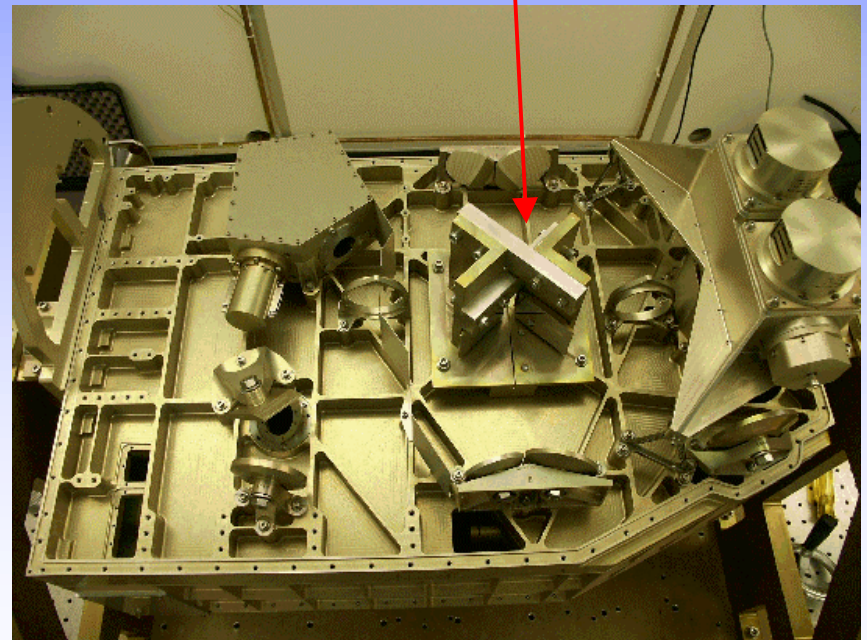


**Cuts of LAM lightweight HOB plate
to fit with instrument and MGSE**

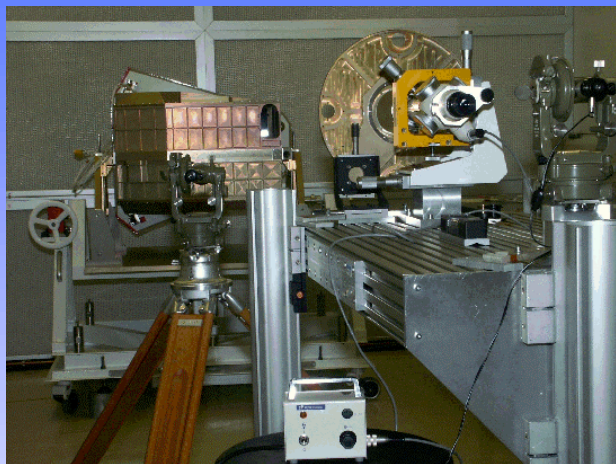
Optical alignment verification: preparation – SMEC and simulator



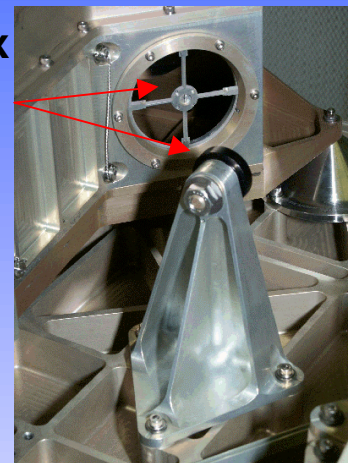
SMEC replaced by SMEC simulator
(with non-moving mirrors for alignment)



Optical alignment verification: photometer side – OGSE set-up

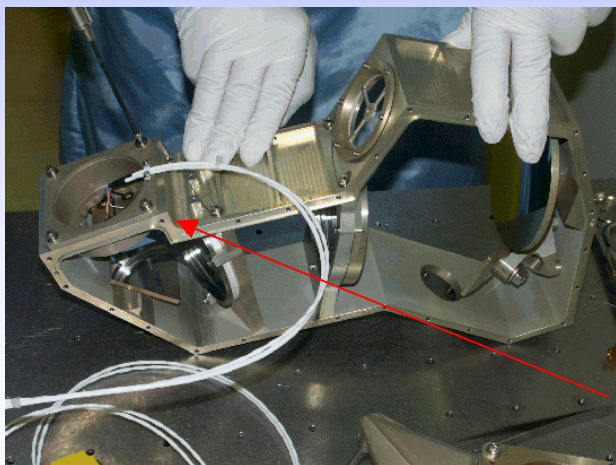


CS-tool (P) and Apex
tool in place of PM8

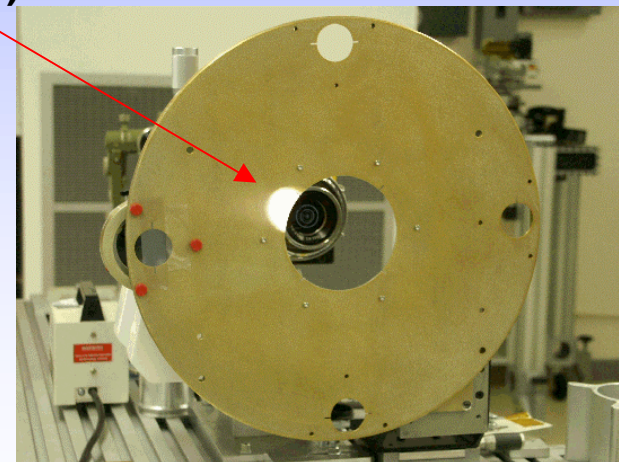


External OGSE: MAT,
Theodolites, M2-tool

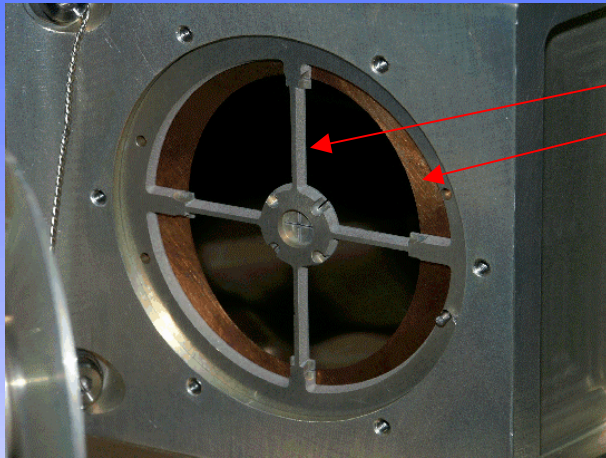
Projection of lighted
BSM (CM4) hole onto
M2-tool



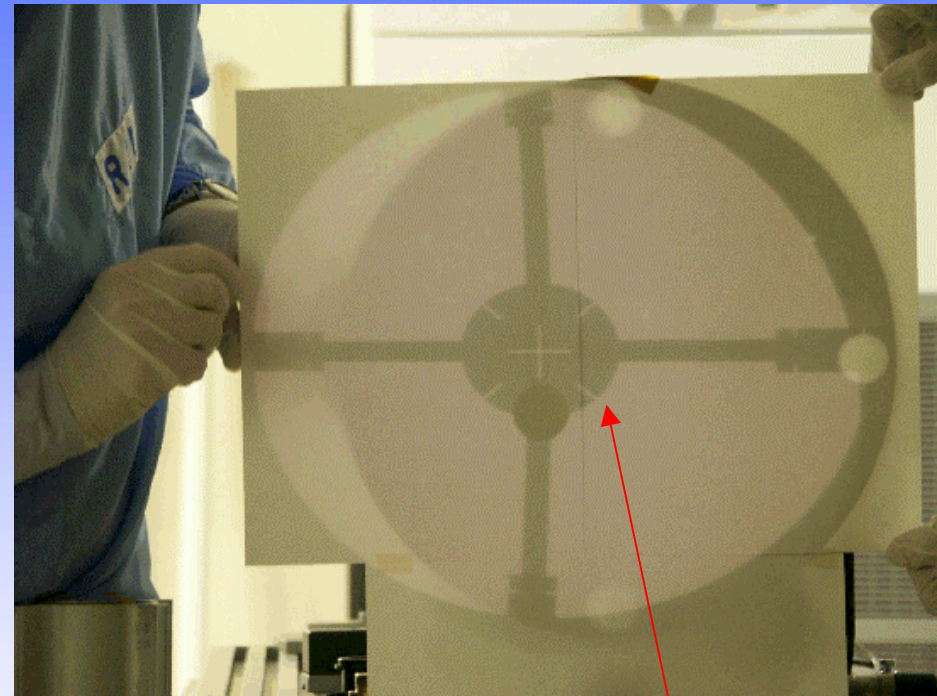
Vis. D-Tool (P)
in PLW



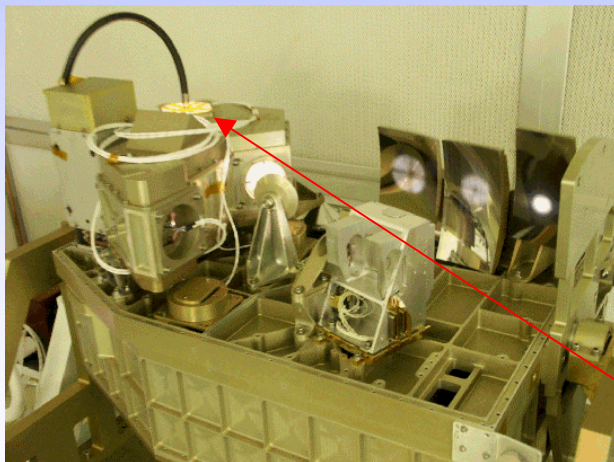
Optical alignment verification: photometer side – Pupil imaging I



CS-tool (P) &
Cold Stop

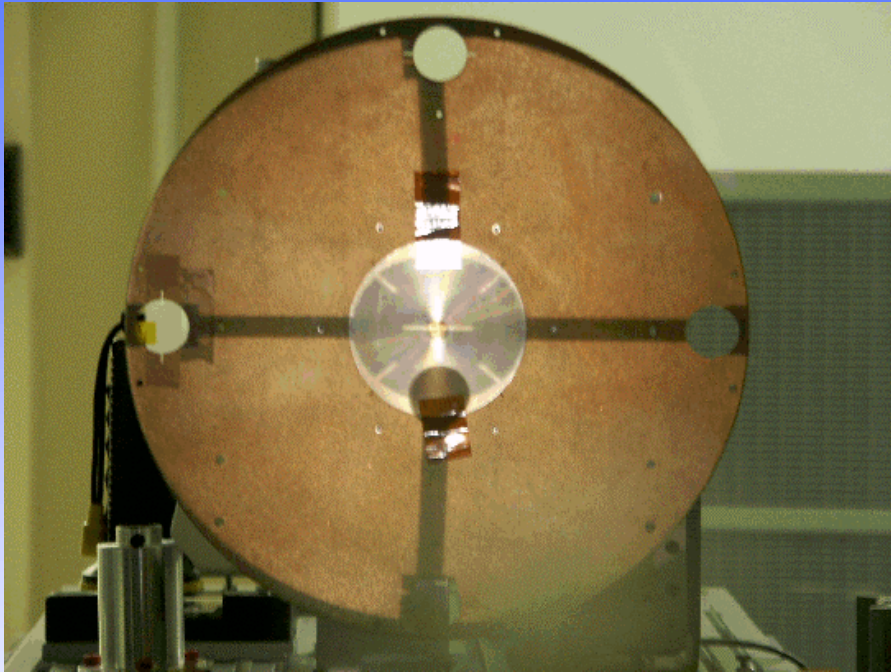


Projection/Image of CS-tool
on M2 (after BSM shimming)



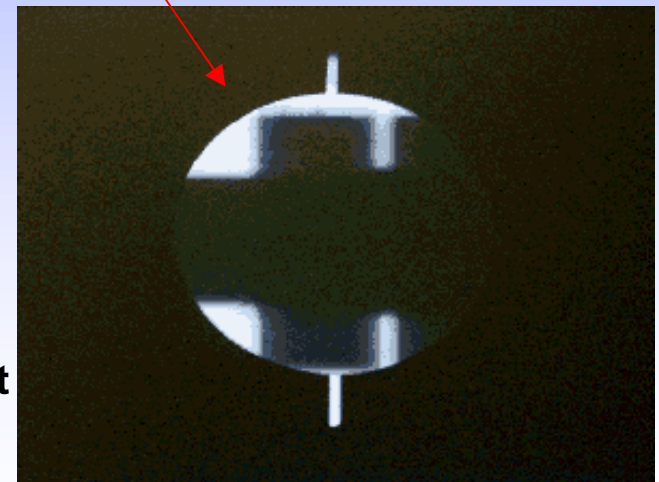
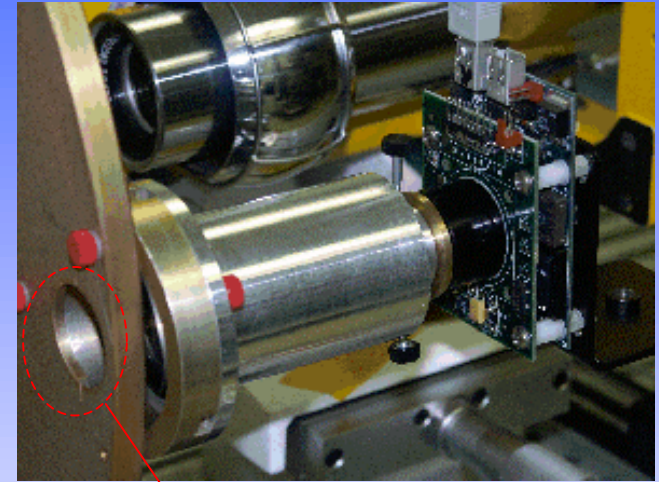
"Systeme D"-tool with
white light fibre in PSW

Optical alignment verification: photometer side – Pupil imaging II

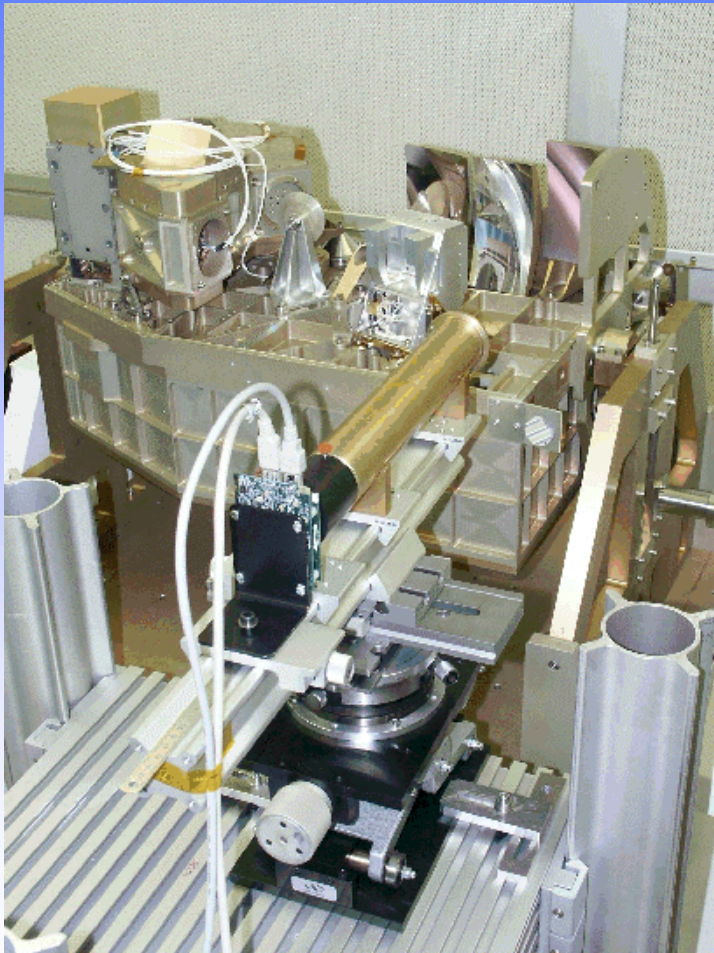


Projection of CS-tool on M2-tool after re-alignment on Phot. LOS (inc. CM3 tilt)

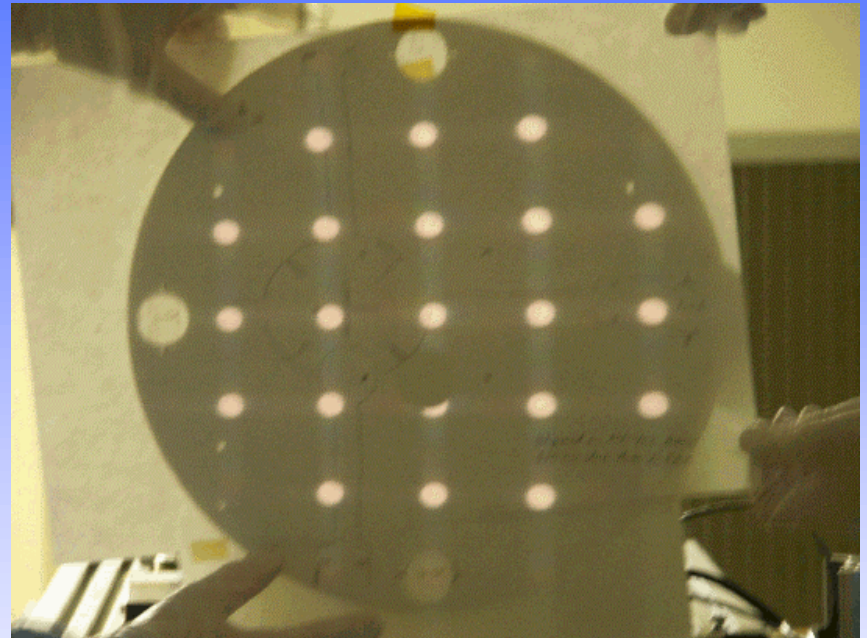
**CCD acquisition of pupil edge shift
between cold stop and M2**



Optical alignment verification: photometer side – Hartmann test

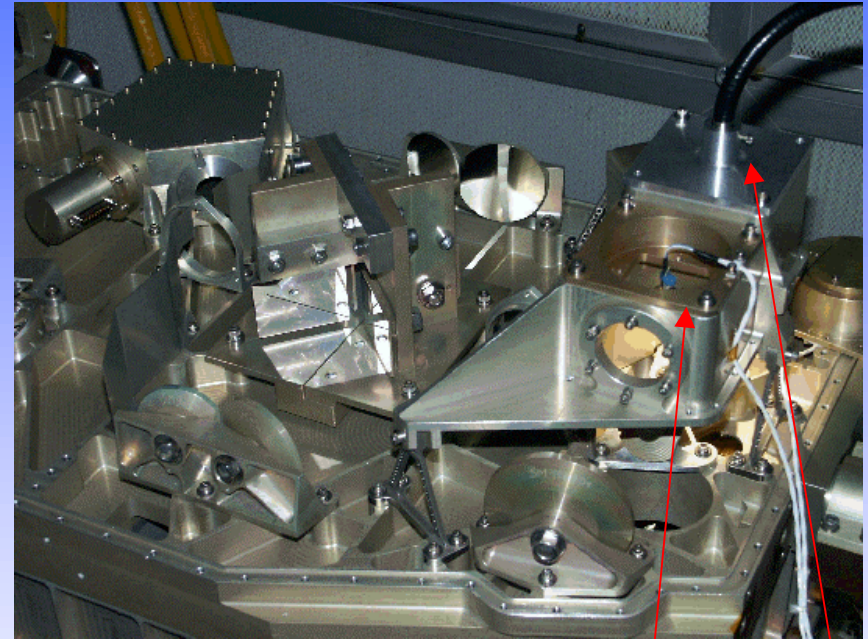


**Hartmann bench
with CCD camera**



**Image of Hartmann tool
(at cold stop) on M2**

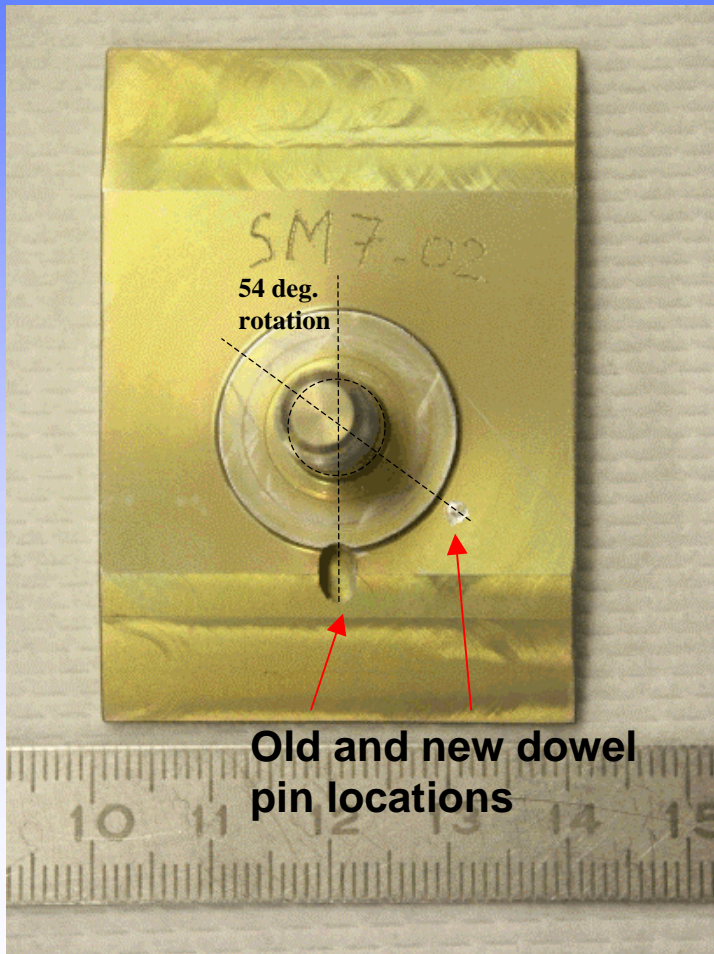
Optical alignment verification: spectrometer side – OGSE set-up



Variant of the vis. D-tools in SSW and SLW

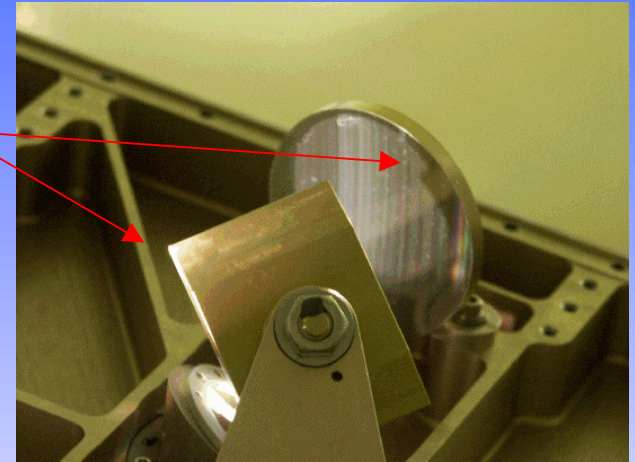
**External OGSE re-setup after rotating
instrument on spectrometer side**

Optical alignment verification: spectrometer side – SM7 issue

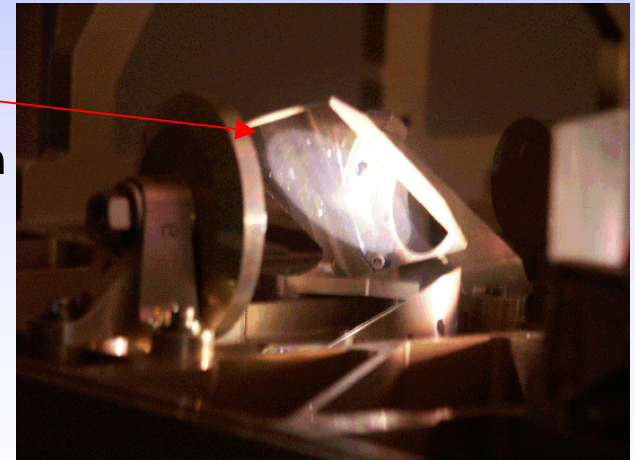


Vignetting
by SM7

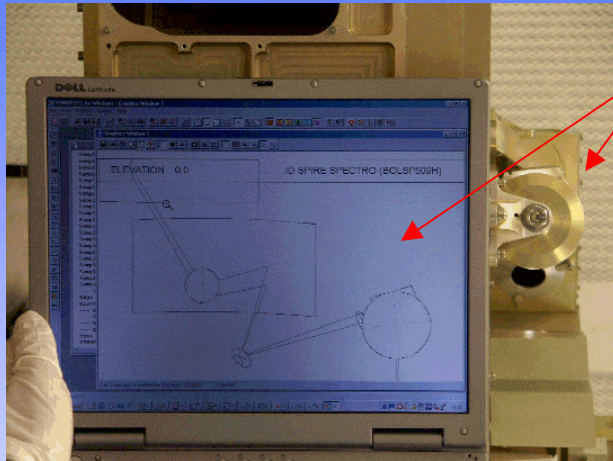
(SM7 = flat mirror)



Beam footprint
on SM7 after
optimal rotation

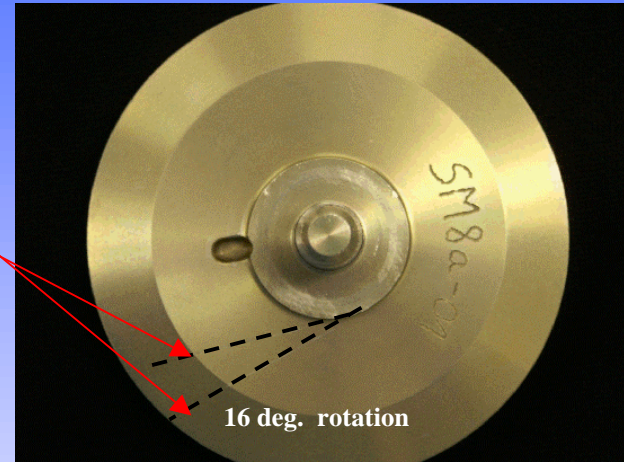


Optical alignment verification: spectrometer side – SM8 issue

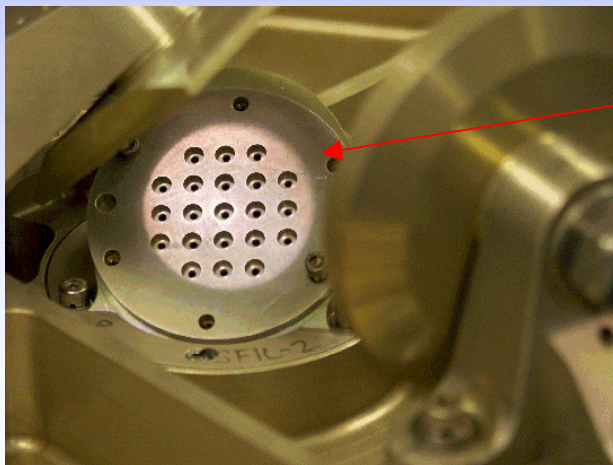


SM8 position
comparison
with design
and rotation

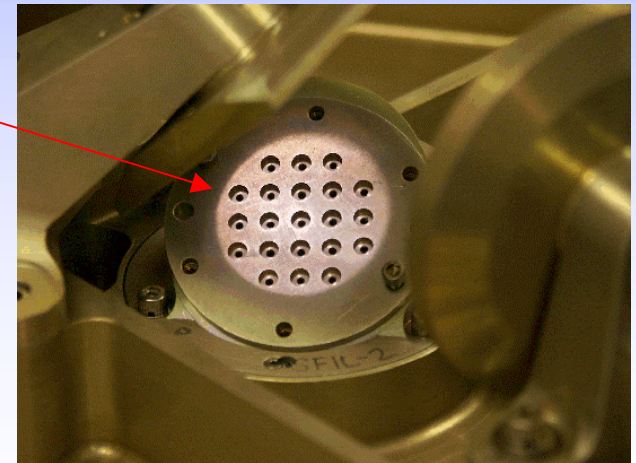
(SM8 = toric mirror)



16 deg. rotation



Pupil “wandering”
at cold stop
(Hartmann tool) due
to SM8 rotation



Optical alignment verification: spectrometer side – Pupil and Hartmann tests

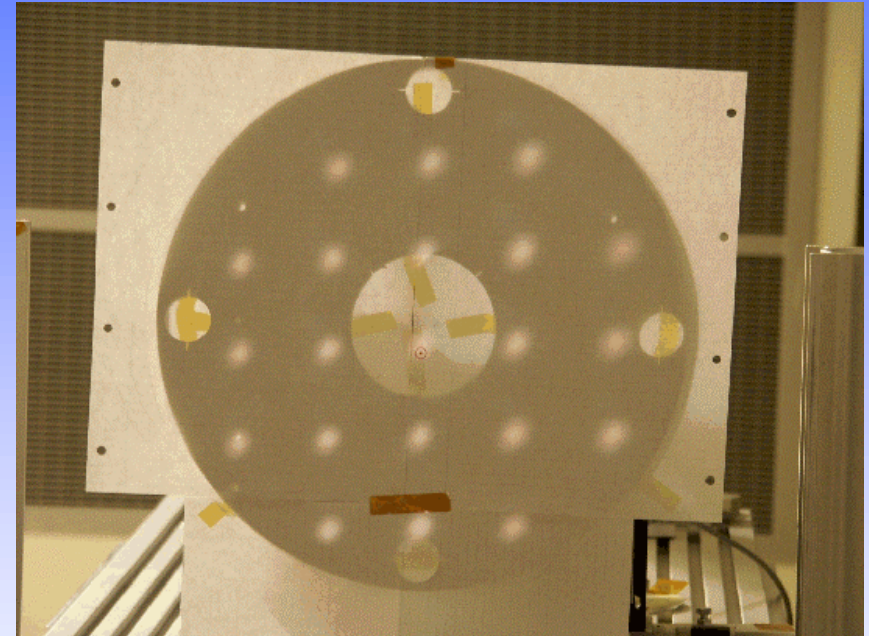
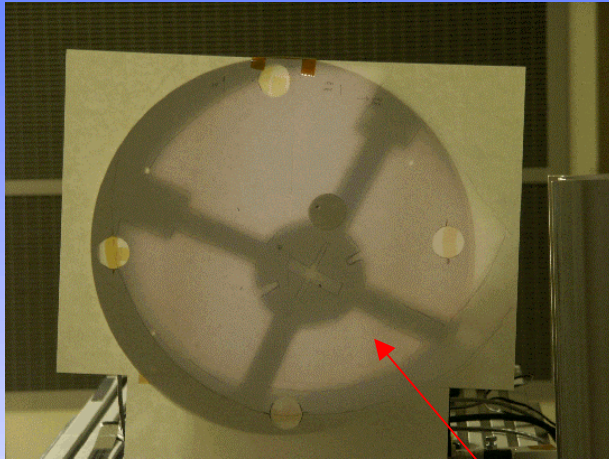
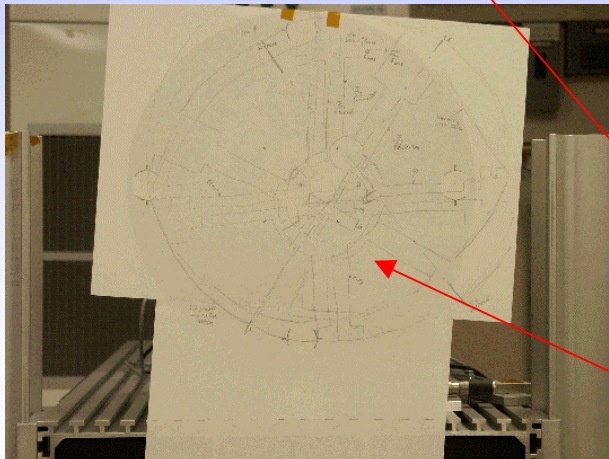
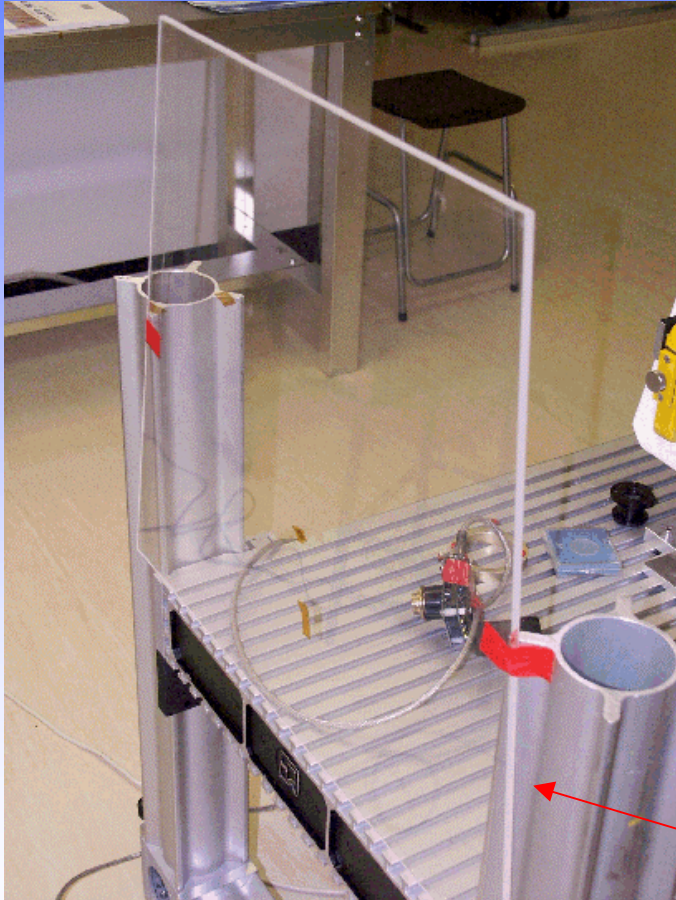


Image of Hartmann tool
(at cold stop) on M2 tool

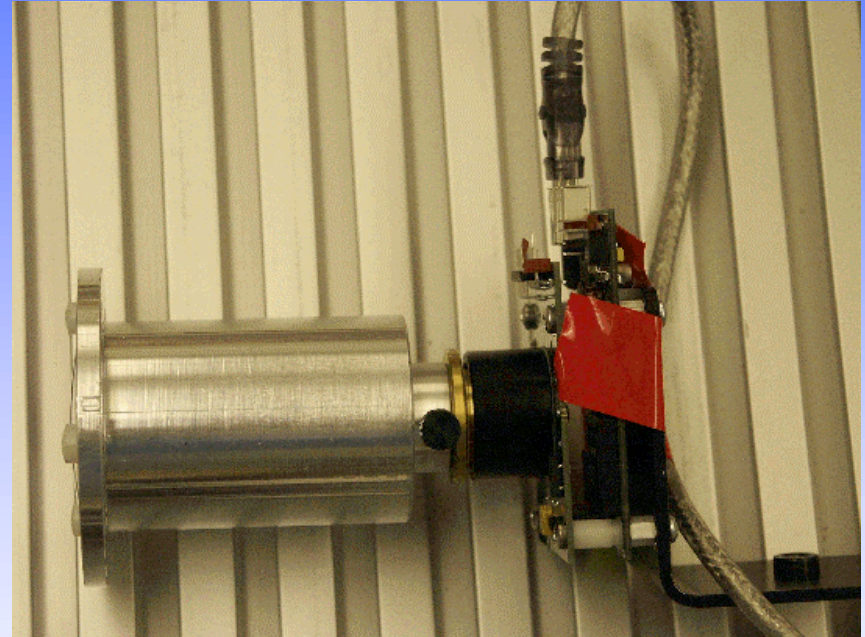


CS-tool (S) projected on
M2-tool, and after several
rotation of the CS-tool (S)

Optical alignment verification: OGSE modification for cold tests preparation

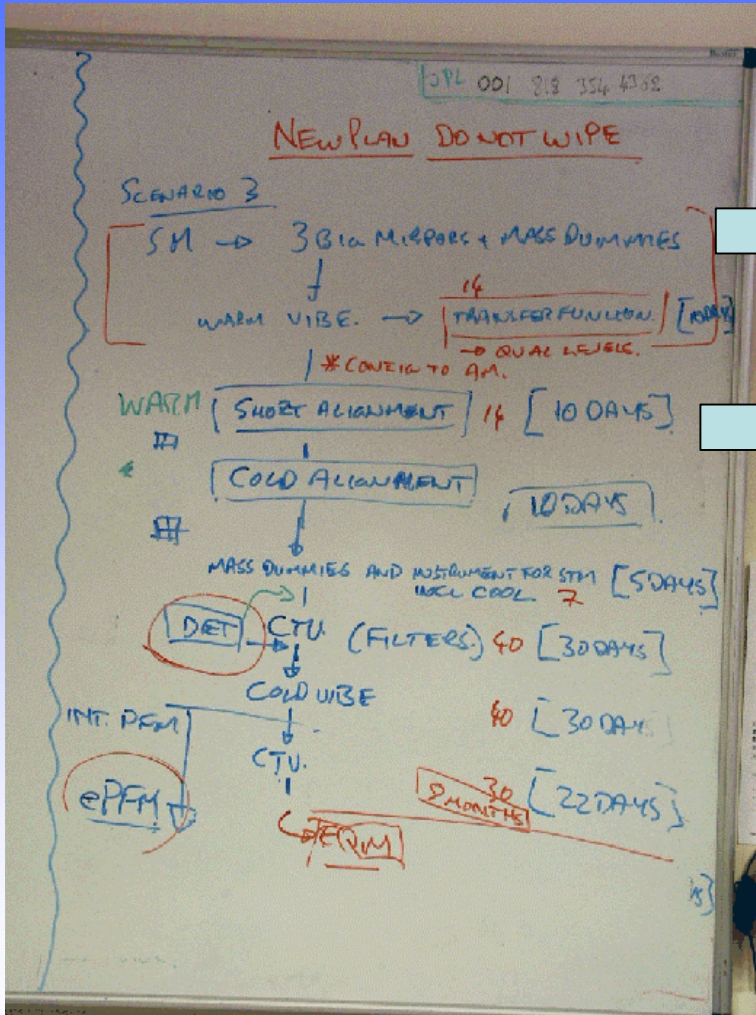


New M2-tool screen



**Camera system for search of
IR D-tool signals at M2**

Conclusion



COMPLETED in 2 days (Mid-April) before early (room temperature) vibration test

COMPLETED in 10 effective days (spread over 4 weeks in May with multiple visits by LAM)