

## Notes on meeting to discuss provision of SPIRE Thermal Straps:

QMW 16 August 2000

SPIRE-RAL-MOM-000496

### Present:

Peter Hargrave (QMW)  
Geoff Gannaway (QMW)  
Berend Winter (MSSL)  
John Coker (MSSL)  
Bruce Swinyard (RAL)

### Summary:

The meeting was convened to discuss how to proceed with the detailed definition of the 300-mK straps from the detectors to the  $^3\text{He}$  cooler. The concept for the implementation is based on having “bus bars” rigidly fixed on thermally isolating mounts from the 2-K structure. The detectors will then connect to these bus bars via compliant links and clamps mounted on the bus bar. This concept has been looked at in some detail by John Coker – see attached CAD drawings and sketches.

Whilst it seems possible to implement the straps in this manner several engineering difficulties present themselves:

- The design and number of the mounts – what is the requirement in terms of heat leak and can it be met given the very small amount of space available?
- The interface with the detector thermal links – how long can these links be; is it possible to have more than one per detector; can the position of the connection point on the detector module be different for different detectors?
- The integration and replacement on the detector modules – the preliminary design worked up by John envisages the bus bars and detectors mounted off the same structure which then mounts and de-mounts from a piece of 2-K structure fixed to the optical bench by the stainless steel blades. This is fine but there are concerns about how many times the links between the detector modules and the bus bars can be made/un-made. The issue is then whether the link should be entirely replaced each time the detector module is integrated and whether it is possible to replace the link at the detector module.
- How does the straylight baffle get fitted and how does the mounting at the entrance to the 2-K box get implemented. Several ideas here including a kevlar string up device.
- How does the cooler connect to the bus bar – there has to be compliance in the link but it also has to have good thermal conductivity.

### Agreements:

There was discussion over who should be responsible for taking the work further – the provisional agreements were as follows:

1. MSSL will be responsible for the final mechanical drawings etc and all the interface issues with the structure.

2. MSSL will be responsible for the procurement of the hardware.
3. QMW will work on the design of various concepts for the thermal strap and straylight baffle mounts for both the 2-K and 300-mK straps.
4. QMW will cryogenically test these concepts and test the effectiveness of the straylight baffle design.
5. QMW will provide MSSL with the preliminary design of the 2-K and 300-mK thermal straps for MSSL to produce the engineering drawings and procure.
6. The STM hardware will be vibrated using a mocked up 2-K structure before integration into the FPU. The need for a cryo-vibration is TBD.

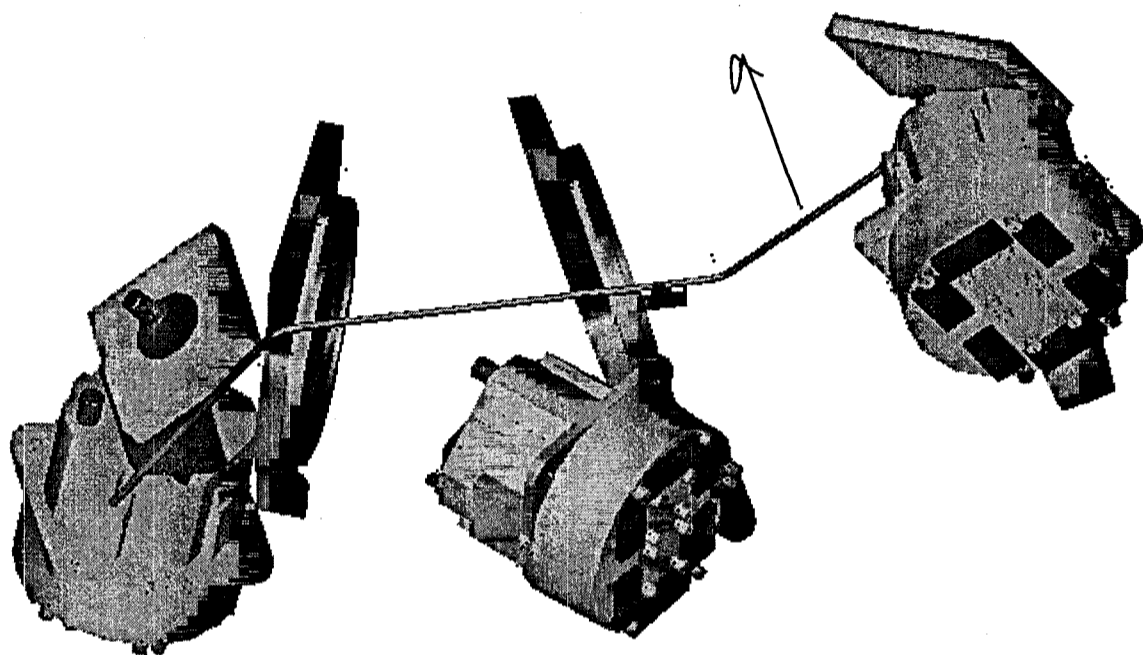
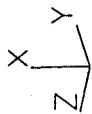
**Immediate Actions:**

**BMS – Have the thermal model run and harden up specification on thermal straps.**

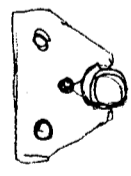
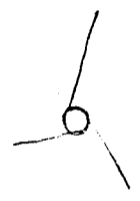
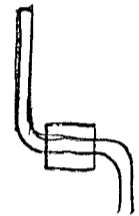
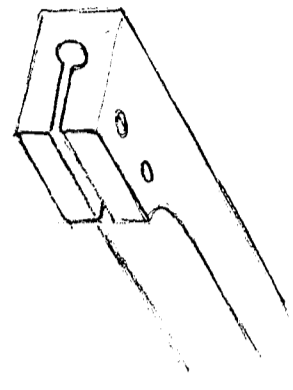
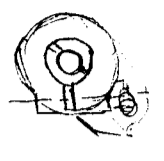
**PH – Draw up detailed workpackage description for QMW**

**PH – Circulate data on thermal properties of Vespel SP22**

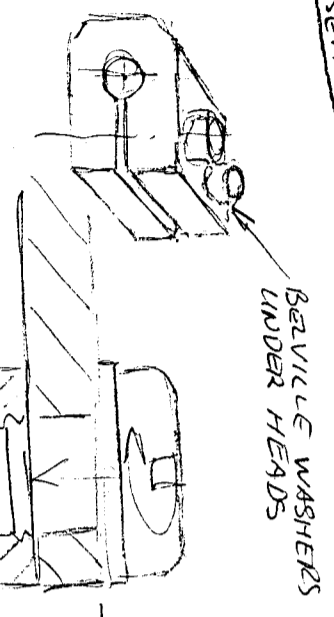
**BW – Contact Dustin Crumb to check whether it is feasible to have more thermal links to the detectors; alternative connection points and to be able to replace the link on integration/de-integration.**



COLD STRAP ASSEMBLY IN VARIOUS VIEWS OF DETECTOR  
 & JOINED TO DETECTOR LEGS DETECTOR ASSY IS FITTED  
 TO BACK COVER WHICH CARRIES MOUNTS TO  
 ORB. FEEL ZK BOX - CAN'T REMOVE JUST ONE DETECTOR!

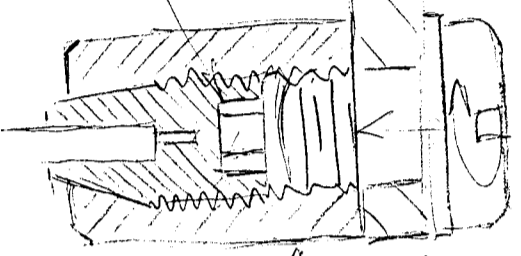


INVAR WASHER  
 FORCING SCREW TO SEPARATE

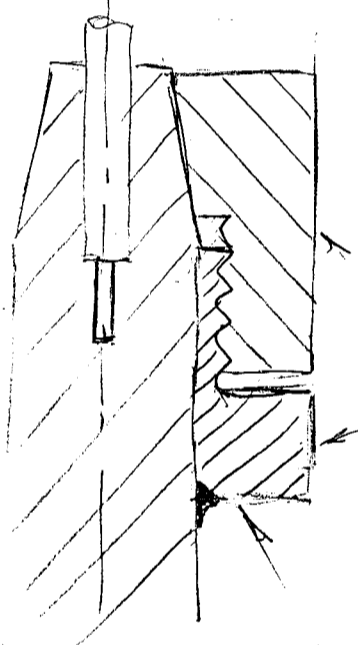


BEVILLE WASHERS  
 UNDER HEADS

HEX SKT  
 OR SLOT



HEX

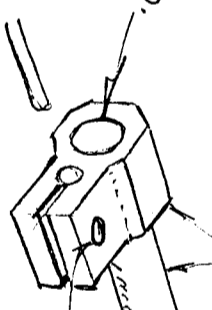


HEX

SHANK FIT  
 TO COLD STRAP  
 THEN SOLDER

$\phi 3$

ERS WELD.

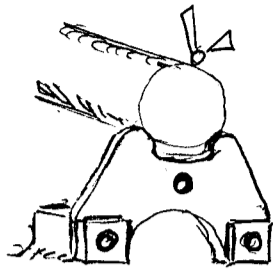


OXYGEN FREE COPPER

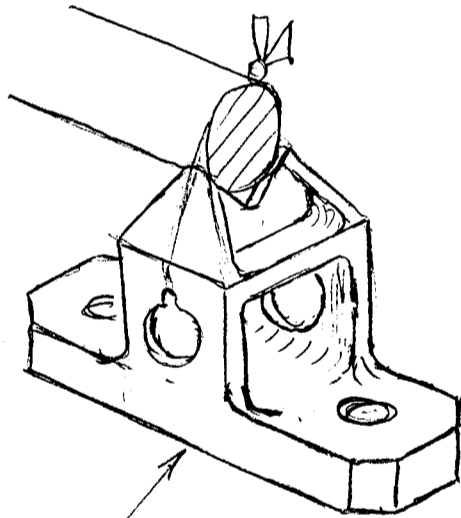
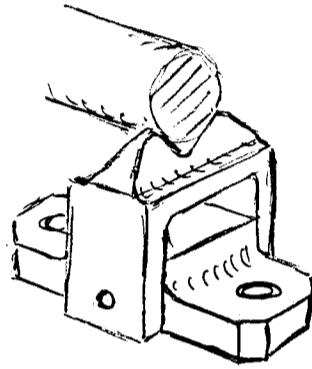
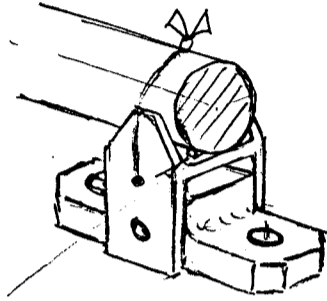
$\phi 3$

CLAMP SCREW  
 ST. STEEL WITH  
 INVAR WASHERS  
 UNDER HEAD & NUT

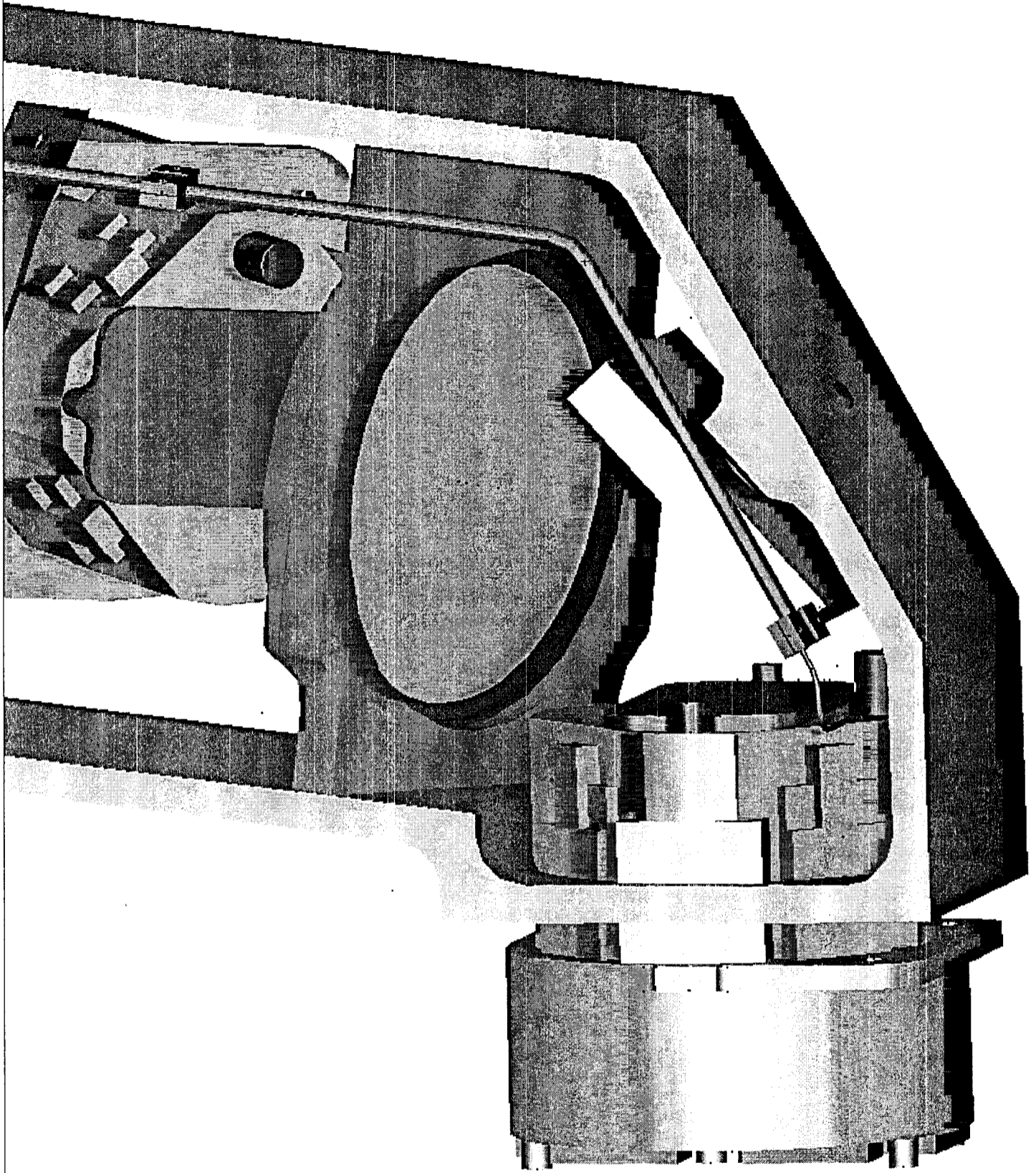
INVAR 20  
 100  
 50  
 150  
 180  
 170

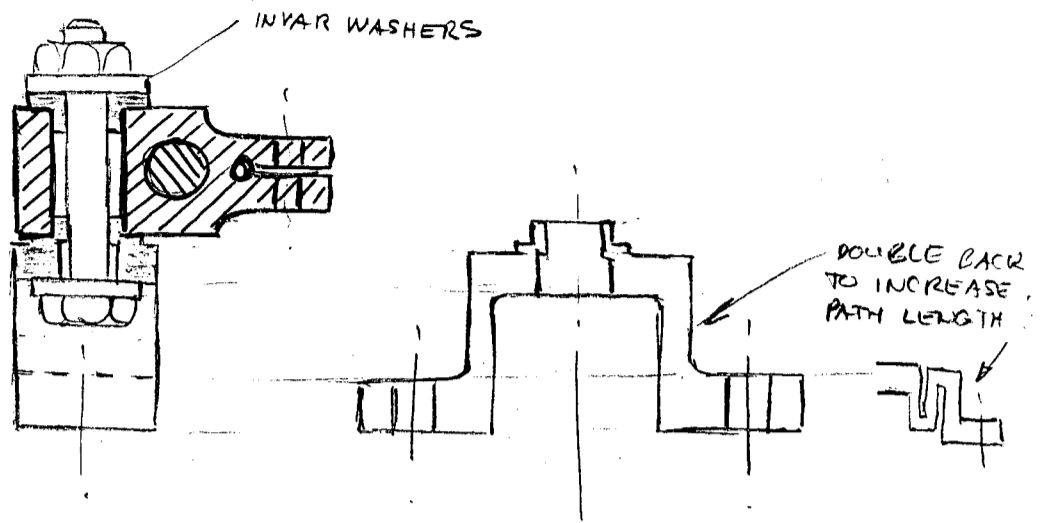


CENTRE "PIP"  
SUPPORT



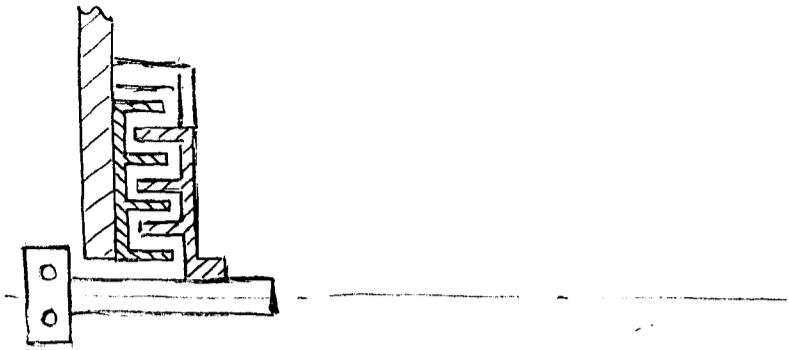
VESPEL?  
SP22 (BLACK)



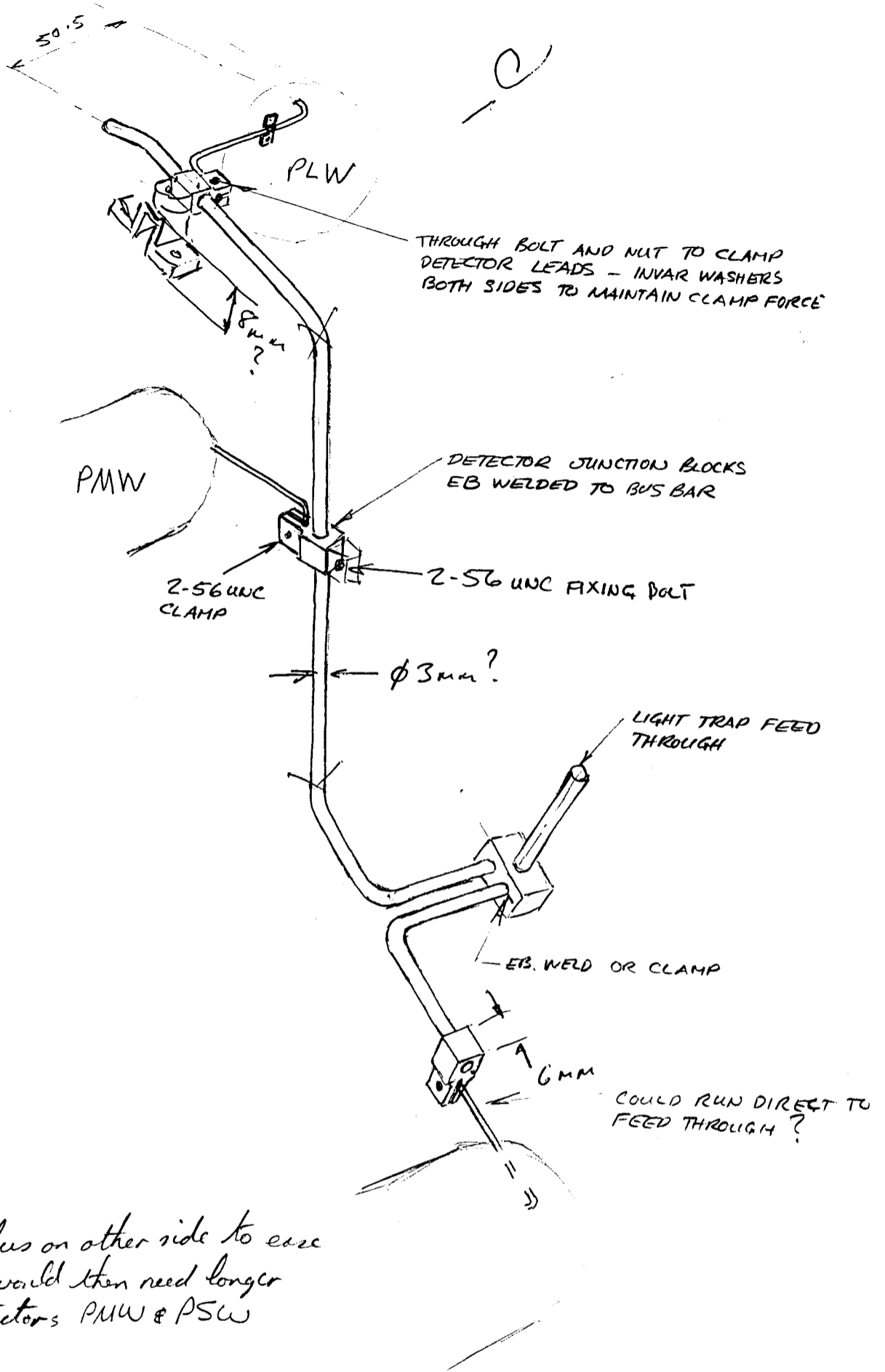


COMBINED BUS BAR SUPPORT / DETECTOR  
STRAP JUNCTION

LIGHT TRAP EXIT OF STRAP FROM  
2K BOX







Could run bus on other side to ease  
 access but would then need longer  
 feeds to detectors PMW & PSW