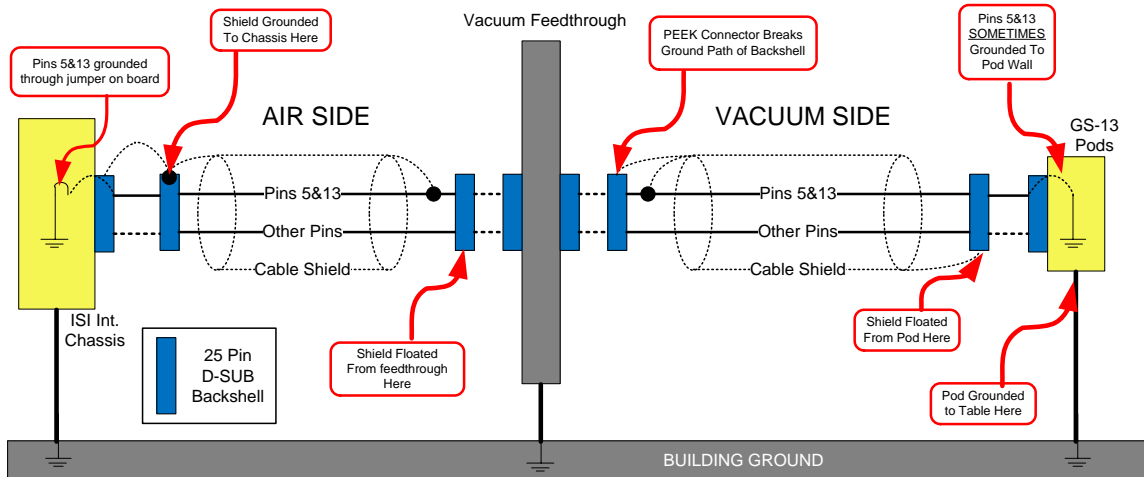**Seismometer Grounding and Shielding**
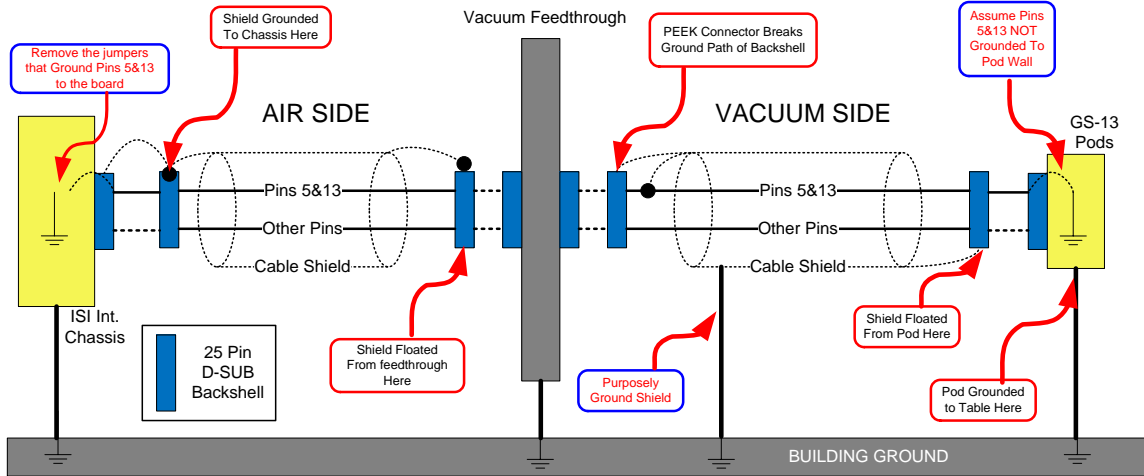**Ben Abbott**
26 September, 2013

Here is the current condition of the cable grounding and shielding for the current GS-13 system as I understand it. From left-to-right, there is a jumper on the board that grounds the two shields (pins 5&13), the shell of the cable is grounded to the chassis, the shell of the cable is floated from the flange on both sides, and from the pod, and then pins 5&13 are sometimes grounded to the pod wall, which is grounded to the table. If you look at the following figure, the grey bar labeled "Building Ground" completes a ground loop, and is not optimal. In figure 2, a more optimal solution is suggested. Any new actions are in a blue bubble with red writing. The idea is to purposely ground the in-vacuum shield, but remove the board jumpers that ground the shields on the board. This purposeful grounding might be accomplished with an un-insulated (grounded) mounting bracket, D1200884. Because shields are grounded only sometimes, it might be the best idea to do this to every one, thereby assuring that we don't have a case where the shield is ungrounded in the vacuum.

Figure 1

GS-13 CIRCUIT

Figure 2

Vacuum Feedthrough

Remove the jumpers that Ground Pins 5&13 to the board

Shield Grounded To Chassis Here

PEEK Connector Breaks Ground Path of Backshell

Assume Pins 5&13 NOT Grounded To Pod Wall

AIR SIDE

VACUUM SIDE

GS-13 Pods

Pins 5&13

Other Pins

Cable Shield

Pins 5&13

Other Pins

Cable Shield

ISI Int. Chassis

25 Pin D-SUB Backshell

Shield Floated From feedthrough Here

Purposely Ground Shield

Shield Floated From Pod Here

Pod Grounded to Table Here

BUILDING GROUND
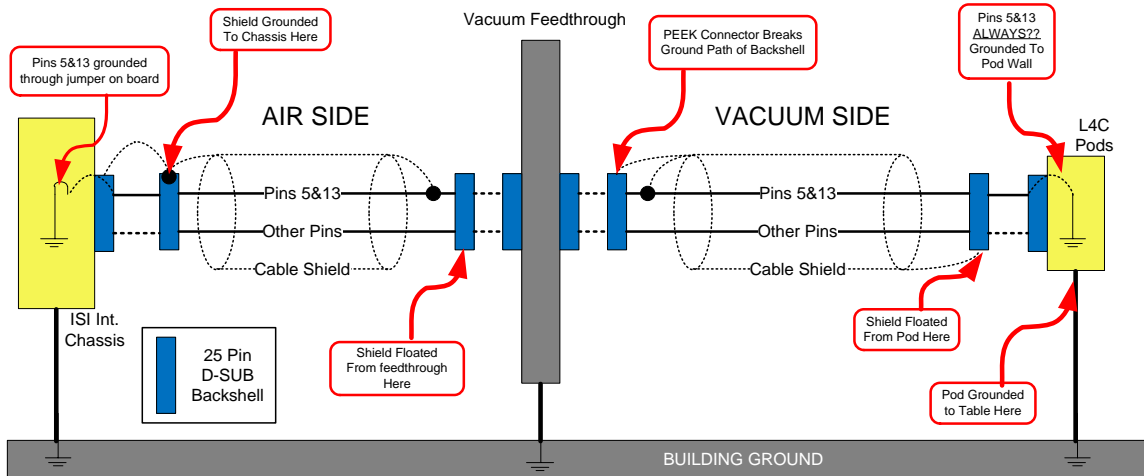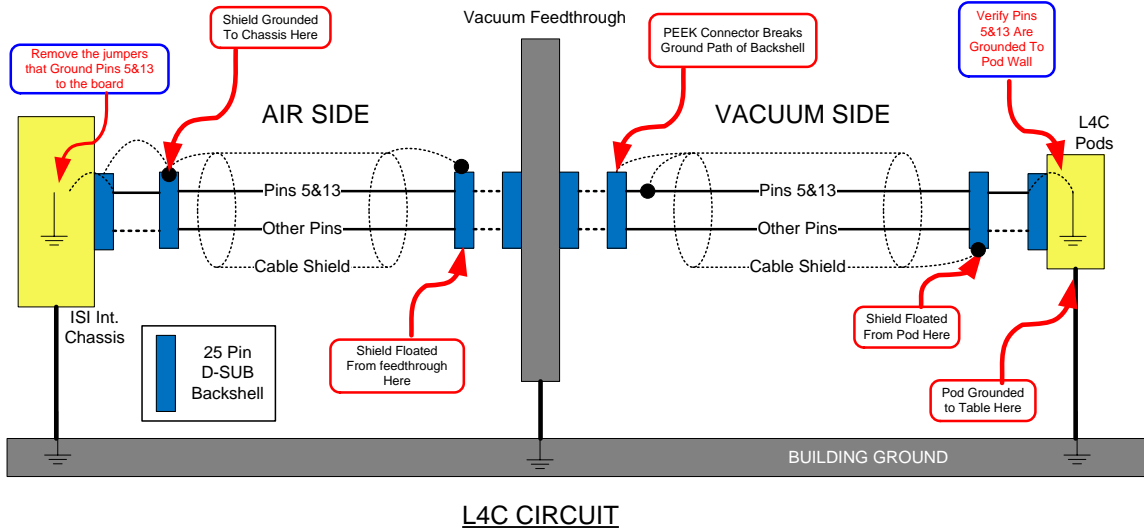
GS-13 CIRCUIT

For the L4C circuit, the problem is similar but, as I understand it, the pod is more reproducibly grounded to the shield (this will need further verification). In this case, we will still remove the jumpers, but purposeful grounding of the cable shield is unnecessary (see figures 3&4).

Figure 3

Vacuum Feedthrough

Pins 5&13 grounded through jumper on board

Shield Grounded To Chassis Here

PEEK Connector Breaks Ground Path of Backshell

Pins 5&13 ALWAYS?? Grounded To Pod Wall

AIR SIDE

VACUUM SIDE

L4C Pods

Pins 5&13

Other Pins

Cable Shield

Pins 5&13

Other Pins

Cable Shield

ISI Int. Chassis

25 Pin D-SUB Backshell

Shield Floated From feedthrough Here

Shield Floated From Pod Here

Pod Grounded to Table Here

BUILDING GROUND

L4C CIRCUIT

Figure 4

L4C CIRCUIT

For the Trilliums, the circuit grounds are reproducibly grounded to the pods (this needs more verification), but the shield grounding scheme is sound. The shield is only grounded at the chassis end via a jumper on the board. Everywhere else, it is ungrounded, and floating. Unfortunately, there is not much we can do about the Trillium grounds being attached to the pod, so we will live with it, and be aware of it (see figure 5).

Figure 5

Trillium Circuit