



Following the unlatching of the SMEC during the instrument level cryo vibration test, certain questions need to be addressed.

Will it unlatch during launch?  
If it does unlatch, will it cause damage?

If we concentrate on the second question, we could start a test campaign to understand the behaviour of an unlatched mechanism.  
It may turn out that the unlatched mechanism will tolerate launch environment without damage.

On the down side we may destroy the pivots on the DM.

Proposed test:

1. Mount the DM SMEC on an angle bracket on the shaker such that the X axis is vertical (the launch condition).
2. Unlatch the mechanism.
3. Carry out a low level resonance search to establish the unlatched natural frequency.
4. Carry out a low level flat random test up to 2KHz, for about 30 seconds, to assess the behaviour under random input.
5. Possibly do this at two or three increased levels.
6. Carry out a random test to the spectrum seen at instrument level, but at -12 dB (or even lower to start with) for 30 seconds, and observe the behaviour.
7. Increase the level in 3dB stages until the behaviour obviously becomes unacceptable.

Carrying out this test has some advantages:

- It should enable us to observe the behaviour in the unlatched condition but allow us to stop before any serious damage is done.
- If the behaviour is acceptable at full level then unlatching during launch may not present a serious problem.
- If the behaviour is not acceptable, then at least we know that we have to do something about the latch.
- If the fatigue test is carried out after this vibration test, it may in fact be a better simulation of the launch condition.
- I consider the consequences of damaging the DM pivots and therefore delaying or not doing the life test to be a much less severe than destroying the flight mechanism during launch.