XMM Optical Monitor

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Cleaning & Handling Procedures for Flight DEM Units

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Clean Handling Procedures for Flight DEM Units

1 Background

We want to minimize the introduction of molecular and particulate contaminants on the exterior and interior of the DEM units. Molecular contaminants can adversely affect the transmission and reflection properties of optical surfaces, with UV wavelengths most attenuated. Molecular contaminants will evaporate in vacuum and spread to non-contaminated surfaces. They also can polymerize in UV light such that they do not evaporate even with long vacuum exposures. Particulate contaminants can scatter light, thus increasing overall background levels, and also can contribute to failures of electrical and mechanical systems.

2 Scope of document

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This memo outlines procedures for cleaning and handling the DEM flight units after cleaning to avoid particulate and molecular contamination. The period covered is starting with cleaning and coating of PCB's, and finishing with shipment of the DEM flight units to MSSL.

3 Cleaning and Clean Handling Procedures

The following procedures should be performed wearing solvent-proof cleanroom gloves.

3.1 DEM Mechanical housing

A. While the boards are out of the housing being cleaned and coated, the housing structures should be cleaned inside and out.

i. The interior should be blown out with clean, de-ionized forced air or dry nitrogen to remove particulates. A determination of the cleanliness of the available air supply should be made prior to performing this step and performed only if suitably clean air is available.

ii. If there are delicate parts remaining in the DEM housing, attention should be paid to the pressure of the forced air used.

iii. With the unit in a position so dislodged particles fall out of the unit undergravity, interior surfaces can be treated with forced air.

B. Cleaning the housing with solvents

i. The exterior of the box should be cleaned with Ethanol using lint-free Kleenwipes or equivalent. Accessible parts of the interior should be cleaned in this way also. ii. Inspect the interior and exterior of the box for any accumulated contaminants, finger prints, grease, etc. and clean accordingly.

iii. Repeat steps B.i. and B.ii using isopropanol.

At the conclusion of this step, the box should be clean. To keep the box clean, it should henceforth always be handled with clean gloves. It should be ideally kept in a clean room of class 100,000 or better. If this is not available, the units should be bagged with clean room bagging material (i.e. bagging material should not outgas contaminants to contents). ESD-proof bagging material is recommended. Failure to keep the unit either in a clean room or bagged particulate-tight will allow re-introduction of contaminants and require re-cleaning.

3.2 PCB Boards

A. Upon return from clean and coating, the boards should be handled with clean gloves at all times. The boards should be inspected for cleanliness. (If they are not clean, they will need to be cleaned. Consult as necessary to find out how to do this.)

B. Reassembly of DEM units should take place in a clean environment, preferably a class 100,000 or better clean area. At a minimum, working surfaces should be cleaned with Ethanol and Kleen-wipes prior to hardware being placed on the surfaces. Hair and beard containment is highly recommended.

For all subsequent work on DEM units (e.g. connecting of cables, mechanical work) the unit should be kept bagged as much as possible. The bagging materially should be changed if it becomes torn or dirty.

3.3 Transportation

A. For transporting DEM between work areas, the unit should always be bagged for ESD and cleanliness. This can be the same bagging material.

B. Vibration interface. The DEM unit should be bagged as much as possible for vibration test. Small holes (roughly the fastener radius) in the bagging material may be made as necessary for mounting. It is recommended to clean mounting fixture with isopropynol prior to attaching DEM.

3.4 Thermal Vacuum testing

A. The TV chamber should be inspected for particulate and molecular contamination prior to introducing the DEM units. An oil-free vacuum system should be used for TV tank. If it is a non-oil free system, consult Tim Sasseen for further information, as the interior of the chamber may have substantial molecular contamination. At a minimum, an Ethanol clean wipe rubbed on the surface for about 1 m should produce no visible contaminants.

i. THe TV tank should be wiped down with Ethanol or Isopropynol before proceeding, if contaminants are found.

B. The clean, bagged DEM unit should have its bag removed prior to installing in TV chamber. Again, hair and beard containment recommended for close work with un-bagged DEM.

C. Upon finishing the TV test, the DEM should be re-bagged before moving from the chamber area.

3.5 Final Shipment

A. At least one contamination-tight level of bagging should be used before DEM is placed in shipping container.