XMM Optical Monitor

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MATERIALS AND PROCESSES SELECTION AND CONTROL PLAN

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1. INTRODUCTION

It is the purpose of this plan to identify and use those materials and processes in the XMM-OM programme that will enable it to meet its full mission capabilities.
Those materials and processes selected will be collated into "Declared Lists" which will form part of this plan. These lists will be submitted to ESA.
Materials or processes that could be considered critical shall be identified at an early stage. Special care will be taken to ensure timely provision of critical materials, critical process specifications and any other facilities or controls.

2. APPLICABLE DOCUMENTS

ESA PSS-01-70 Materials and Process Selection and Quality Control for ESA Space Systems
ESA PSS-01-700 The Technical Reporting and Approval Procedure for Materials and Processes
XMM-OM/MSSL/SP/0027 Cleanliness Control Plan

3. MATERIALS

3.1 Selection

Materials shall be selected, as far as possible, from an MSSL preferred list which has been established over many years. Well known materials, for which test data applicable to space use are available, will be used wherever possible. Materials will only be selected that are capable of meeting the operating, environmental, physical, chemical, safety, quality and reliability conditions for the experiment. Wherever possible, the materials shall be manufactured in Europe. The number of material types shall be kept to a minimum.

3.2 Evaluation

Where it is necessary to use materials that are not on existing preferred lists, then very careful screening will be undertaken to assess their suitability for use.
Outgassing performance will be determined(TML and CVCM), but consideration will also be given to the quantity of material to be used. Other possible evaluation considerations will be thermal cycling, radiation, stress corrosion, flammability, mechanical and electrical tests.

3.3 Purchasing and Storage

Materials will be purchased from reputable specialist suppliers and will be stored under suitable conditions, clearly labelled as to their specification. Short life materials will be dated on receipt and will not be used for flight or flight representative hardware beyond their expiry dates.
Materials such as adhesives will be kept refrigerated, in order to control their chemical degradation and to ensure that their shelf lives are achieved.
A Declared Materials List(DML) will be prepared for the experiment.

4. SMALL PARTS

Small mechanical parts such as nuts, bolts, rivets, screw locking devices etc., are regarded as MSSL standard items. They are held in stock and replenished from reputable suppliers to British National Specifications. Special fasteners and other small parts will be screened by MSSL for their suitability for the particular application.

5. PROCESSES

5.1 Selection

Processes will be selected that are capable of meeting the requirements of the experiment. Standard processes will be selected wherever possible, preferably those that have previously been used for space applications. Every process application however, will be considered separately and on its own merit. Should a process be selected for which there is no known previous history, then it will be fully justified and subjected to an evaluation programme.
A Declared Processes List(DPL) will be prepared for the experiment.

5.2 Evaluation

The process will be defined by a detailed process specification with relevant inspection points, together with acceptance/rejection criteria. Its repeatability will be assured.
Products resulting from this process will be passed through a test programme geared to the requirements of the experiment.

5.3 Critical Processes

A critical process is one which:-

- in case of failure, can adversely affect the performance of or destroy a major part or function of the spacecraft.
- cannot be assessed. in its quality, solely by examining the end product.
- has caused problems previously.
- has an ESA specification available, but which is not being implemented.
- is outside the applications experience of the experimenter.

If a process is classified as critical, then it will be subjected to stringent controls in the form of documentation, quality assurance and final inspection/tests.
Critical processes will be highlighted on the DPL.

6. CLEANLINESS/CONTAMINATION CONTROL

A Cleanliness/Contamination Control Plan has been prepared for the Optical Monitor and this has been published separately(XMM-OM/MSSL/SP/0027).

7. QUALITY ASSURANCE

The quality assurance requirements are defined in the Optical Monitor Product Assurance Plan. Of particular importance are:-

- procurement
- incoming inspection
- fabrication
- inspection and test
- contamination and cleanliness
- non-conformance
- calibration
- handling and storage