

## AGENDA OF MATERIALS AND PROCESSES

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### DAY 1 – June 24

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- 9:00 Welcome and Introduction: B. Dunn
- 9:15 The Spacecraft Environment and Materials Interaction: *M. Van Eesbeek*
- Pre-launch and launch
  - Solar radiation
  - Atomic oxygen
  - Thermal cycling
  - Micrometeoroid and debris
- 10:30 Coffee Break**
- 11:00 Materials Properties & Associated Test Methods for Metallic Materials: *A. de Rooij*
- Material selection criteria (ECSS-Q-70)
  - Joining techniques
  - Corrosion and Mechanical testing
  - Thermal cycling
  - Macroscopic and microscopic examination
  - Non-destructive examination
  - Failure analysis
- 12:30 Lunch Break**
- 13:30 Materials Properties & Associated Test Methods for Non-metallic Materials: *M. Van Eesbeek*
- Thermal analysis
  - Outgassing
  - Thermo-optical properties
  - Radiation
  - Thermal cycling
  - Atomic oxygen
  - Failure analysis
- 15:00 Coffee Break**
- 15:30 Composites: *M. Van Eesbeek, A. de Rooij*
- Carbon fiber reinforced polymers (CFRP)
  - Ceramic matrix composites (CMP) for high temperature and high stability applications and metal matrix composites (MMC)
- 16:30 Electronic Materials: *A. de Rooij*
- Manufacturing of Printed Circuit Boards
  - Soldering, crimping, wrapping, soldering schools
  - Packaging
  - Quality assurance
  - Failure modes
- 17:00 Discussion on Topics from Day 1 and Adjourn
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## AGENDA OF MATERIALS AND PROCESSES, continued

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### DAY 2 – June 25

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- 9:00            Electronic DML/DPL/DMPL: *A. de Rooij*
- The declared materials list (DML)
  - The declared process list (DPL)
  - The declared mechanical part list (DMPL)
  - Material databases, website
- 9:45            Cleanliness and Contamination Control: *Van Eesbeek*
- Why contamination control
  - Types of contamination
  - Contamination monitoring, testing and analysis
  - Preventative measures
  - Cleaning methods
  - Effects of contamination on spacecrafts
  - Requirements for contamination and cleanliness control
- 10:30            Coffee Break**
- 11:00            Materials and Means of Thermal Control: *Ph. Poinas*
- Basics of heat transfer
  - Why is thermal control required onboard a satellite
  - Interacts of TCS with other sub-systems.
  - Establishment of thermal balance of a satellite
  - Performance of a simplified satellite thermal analysis
  - Means of the thermal control sub-system
  - How important are the materials
- 12.30            Lunch Break**
- 13:30            Human Spaceflight: *M. Van Eesbeek, A. de Rooij*
- Space inhabited environment
  - Selection of materials
  - Testing and Requirements (*e.g.* off-gassing, flammability stress corrosion cracking)
- 14:30            Practical Demonstrations: *M. Van Eesbeek, A. de Rooij*
- Infrared analysis for contamination control
  - Particulate analysis for contamination control
  - Thermo-optical properties
  - Microscopy (optical, confocal, SEM)
  - Mechanical and corrosion testing
  - Space retrieved Materials
- 17:00            Discussion on topics of Day 2 , Certificate, and END Of COURSE**
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