



Innovation • Quality • Reliability

Microsystems Reliability & Test Challenges

An Aerospace Perspective

Alistair Sutherland, BCF Designs Ltd. 26th April 2007



Reliability in Aerospace

- Lighter structures
- Smaller airframes (UAVs)
- Smart wings
- More compact “muscle”
- Electrical drive and actuation



Reliability in Aerospace

- Application of HUMS systems
- Enhanced monitoring (in-situ, in real time)
- Diagnostics & prognostics
- Preventative maintenance (predictive & proactive)
- High fidelity reliability models (through life support)



Microsystems Reliability & Test Challenges (Manufacturing & Fabrication)

- Residual stresses
- Improper adhesion (delamination)
- Mechanical strength
- Hermetic seals
- Long term drift



Microsystems Reliability & Test Challenges (Packaging)

- Environmental protection
- Electrical signal conduit
- Mechanical support
- Thermal management
- Robustness in handling & testing



Microsystems Reliability & Test Challenges (Testing & Failure)

- Infant mortality
- Flight qualification methodologies
- Lifetimes & failure modes
- Integration of diagnostic characteristics
- Internal failure detection





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