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American Competitiveness Institute

***Lead Free Soldering Summit
Opening Remarks
July 13, 2005***



Lead Free Soldering Summit

- Welcome

- **Welcome To The Lead Free Soldering Summit**
- **American Competitiveness Institute**
 - *Philadelphia, Pennsylvania*
 - *Website: <http://www.aciusa.org>*
- **Operates Electronics Manufacturing Productivity Facility**
 - *For the Office Of Naval Research*
 - *National Electronics Manufacturing Center Of Excellence*
- **ACI Lead Free Soldering Team**
 - *M. Nelson, Manager Applied R&D Engineering*
 - *F. Verdi* – *B. Partee*
 - *J. Stong* – *B. Berta*
 - *L. Whiteman* – *R. Deshmukh*



Lead Free Soldering Summit

- Summit Rationale

- **Environmental Legislation Issues**
 - *Military / Aerospace are exempt from EU Legislation*
 - *WEEE Directives*
 - *RoHS Directives*
- **Military / Aerospace Market ~ 1% of Electronics Market**
 - *When Commercial markets go Lead Free → Military and Aerospace markets will be forced to go Lead Free*
- **Major Areas of Concern**
 - *Component Availability*
 - *Manufacturing Processes Documentation*
 - *Hardware Reliability*
 - *Programmatic Concerns*
 - *Configuration Management*
 - *Program Sustainment*
 - *Transition From Tin Lead (SnPb) to Lead Free materials*



Lead Free Soldering Summit

- Aerospace Market Demands

- **Requires High Reliability**
- **Operates In Hazardous Environment**
 - *Extreme thermal variations*
 - *Vibration and mechanical shock*
 - *Humidity*
- **Life Cycle Up To 30 Years**
- **Program Sustainment**
 - *Hardware repair*
 - *Hardware upgrade*
 - *Component availability*
- **Use Of Commercial Off The Shelf Components**
 - *COTS usage directed by Congress*
 - *Less expensive than military rated hardware*

Is Lead Free Equivalent To Or Better Than Tin Lead?



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- Lead Free Soldering Functional Impact

- **Manufacturing**
 - *Manufacturing Processes*
 - *Hardware Reliability*
 - *Operator Training*
- **Supply Chain**
 - *Solder Paste Vendors*
 - *Board Vendors*
 - *COTS Introduction*
 - *Component Vendors*
 - *Material Vendors*
- **Configuration Management**
 - *Component Identification*
 - *Transition*
- **Program Sustainment**
 - *Field Service Requirements*
 - *Component Identification*
 - *Component Obsolescence*
 - *Rework & Repair Requirements*



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- Lead Free Soldering Functional Impact

- **Quality Control / Assurance**
 - *Supplier Quality*
 - *Inspection*
- **Design Engineering**
 - *Materials and Finishes*
 - *Component Availability*
 - *Hardware Changes*
- **Program Management**
 - *Internal PMO*
 - *Customer / Government*
- **Compliance Offices**
 - *Executive Order 13148: Greening the Government Through Leadership in Environmental Management*
 - *Environmental Protection Agency's (EPA) Toxic Release Inventory Status*



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- Lead Free Soldering Conclusion

**Lead Free Soldering Is Not
Just A Manufacturing Problem**

**It Impacts The Entire Military and
Aerospace Electronics Supply Chain
And Life Cycle**



Lead Free Soldering Summit

- Summit Objectives

- **Invite Lead Free Soldering Contributors**
 - *Industry*
 - *Academia*
 - *Government*
 - *Military*
- **Share Technical Lead Free Soldering Data**
 - *What's currently being done*
 - *What activities are being planned*
 - *What areas require additional support*
- **Discuss Programmatic and Logistics Issues**
 - *Customer Requirements*
 - *Configuration Management*
 - *Program Sustainment*



Lead Free Soldering Summit

- Summit Goals

- **What Do We Know?**
 - *Identify what Lead Free Soldering research and development activities have been done supporting the military and aerospace electronics community*
- **What Do We Need To Know?**
 - *Identify areas of concern that requires additional research and development*
- **How Do We Get There?**
 - *Establish a strategy on how to implement Lead Free Soldering in the military and aerospace electronics community*



Lead Free Soldering Summit

- July 13, 2005: What Do We Know?

- **9:00 JG-PP / JCAA Lead Free Soldering Program**
 - *B. Greene, ITB / NASA*
- **9:30 Lead Free Soldering Rapid Response Project**
 - *R. Inacker, Lockheed Martin*
- **10:00 Lead Free Manufacturing for Navy Systems**
 - *M. Nelson, American Competitiveness Institute*
- **10:30 Break**
- **11:00 European Space Agency Lead Free Soldering Position**
 - *B. Dunn, European Space Agency c/o L. Whiteman, ACI*
- **NASA Lead Free Soldering Position**
 - *M. Sampson, NASA – Goddard Space Flight Center*
- **11:30 iNEMI / NIST Lead Free Soldering Program**
 - *C. Handwerker, NIST*
- **12:00 Lunch**



Lead Free Soldering Summit

- July 13, 2005: What Do We Know?

- **1:00 The Impact of Reflowing A Lead Free Solder Alloy Using A Tin/Lead Solder Alloy Reflow Profile On Solder Joint Integrity**
 - *D. Hillman, Rockwell Collins*
- **1:30 Raytheon Lead Free Soldering Program**
 - *A. Rafanelli, Raytheon*
- **2:00 CALCE Lead Free Soldering Program**
 - *M. Osterman, University of Maryland / CALCE*
- **2:30 Break**
- **3:00 AIA LEAP Lead Free Soldering Program Briefing**
 - *A. Touw, Boeing*
- **3:30 XRF Technology**
 - *M. Haller, Fischer Technologies*
- **4:00 Tour of ACI Facilities / Equipment Demonstrations**
- **5:00 Closing Remarks / Adjournment**



Lead Free Soldering Summit

- July 14, 2005: What Do We Need To Know?

- **8:30 Opening Statements**
- **9:00 Configuration Management and Logistics Impact**
 - *K. Brockel, SOLE*
- **9:30 USAF Lead Free Soldering Position Presentation**
 - *T. Kalt, USAF*
- **10:00 US Navy Depots Lead Free Soldering Presentation**
- **10:30 Break**
- **11:00 Impact of Lead Free Solders (LFS's) on Standard Electronic Parts in the DoD Standardization Program**
 - *D. Moore, Defense Supply Center*
- **11:30 US Army Lead Free Soldering Position**
 - *J. Jarvis*
- **12:00 Lunch**



Lead Free Soldering Summit

- July 14, 2005: How Do We Get There?

- **1:00 Open Discussion**
- **2:30 Break**
- **3:00 Open Discussion**
- **4:00 Closing Remarks / Adjournment**



Lead Free Soldering Summit

- Summit Acknowledgements

- **NASA**
 - *C. Brown*
- **ITB / NASA**
 - *B. Greene*
 - *K. Kessel*
- **ITB**
 - *C. Loden*
 - *D. Jarvi*
- **NAVAIR**
 - *LCDR. M. Whelan*



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Thank You For Attending The Lead Free Soldering Summit

ACI will provide presentations and a summit summary to
summit participants