

Military/Aerospace (Class 3) Lead-Free Interests of 2005 Lead-Free Summit Attendees

Issue		Definition	Possible Action	Possible Technical Working Group (TWG) ^a Members	TWG Leader
Quality & Reliability					
1	(High-) Reliability Data	Not all short-term (<5 years) rel studies readily available, database desirable, industry needs are pragmatic. Long-term (>5 years) rel studies even more scarce, especially field data.	- New Project, especially field testing. - Look for existing information on lead free equipment in the field for several years - Work out tools to investigate the long term reliability of electronic equipment through accelerated tests.	F-15 (M. Stibitz, Raytheon), JCAA/JG-PP (K. Kessel, ITB/NASA)	
2	Lifetime Prediction Modeling	Parameters (and test results) required for FEM modelling, acceleration factors, and lifetime prediction	Look for existing information or New Project	CALCE (M. Osterman), LEAP (A. Touw, Boeing), EADS, Airbus, Boeing	
3	Requalification	Not fully defined	Further define issue, collate existing information	LM Rapid Response/ Phase Shift Driver (Rich Inacker, Lockheed Martin)	
4	Quality & Reliability Guidelines	Develop and implement LF performance standard and technical guidelines, including tin whisker mitigation.		ACI (L. Whiteman), LEAP (A. Touw, Boeing)	
Communication					
5	Knowledge-base	LF activities done in several places and SMEs scattered across the country, but not necessarily in projects known to the public.	Publish (?Web) and regularly update this list of military/aerospace (Class 3) lead-free issues being worked. Link to other websites, e.g., LEAP.		
Process					
6	Solder/Finish Compatibility	Transitional issues for forwards and backwards compatibility not fully assessed - eg. Bi coatings, lead-free BGA's/SnPb process	Further define issue, review status, ?New Project	JCAA/JG-PP (K. Kessel, ITB/NASA)	
7	Rework & Repair	Not fully defined, effect on reliability	Further define issue, review status, ?New Project	NEMI (C. Handwerker), JCAA/JG-PP (K. Kessel, ITB/NASA)	
8	Voiding	Temperature dependence, joint quality, via in pad & BGA	Authoritative review	LEAP (A. Touw, Boeing)	
Materials					
9	Tin Whiskers	Pure tin finishes are very popular lead-free component coating but threat of shorts from whiskers. No industry standard measurement. Mechanism not yet fully understood for mitigation	Authoritative review, e.g., collect information about: -standardized test methods proposals -last research results on growth mechanisms and mitigation countermeasures and build a database.	CALCE Tin Whisker Forum (M. Osterman), NEMI (C. Handwerker), NASA (J. Brusse), LEAP (A. Touw, Boeing)	
10	Intermetallics	More technical information required	Authoritative review	LEAP (A. Touw, Boeing)	
11	Solder Alloy Properties	Much work has been done but properties info not widely available	More military/Class 3 support to NIST	NIST database (C. Handwerker), CALCE (M. Osterman)	
Design					
12	Standards	Need more information and more action on lead-free standards	Participate in standards committees, ?Summarize standards status	IPC/JEDEC, LEAP (A. Touw, Boeing)	
13	Best Practice Guidelines	Not available - alloys/process selection, board design, patents		?LEAP (A. Touw, Boeing)	
Supply Chain					
14	Component numbering	Only half components manufacturers plan new part numbers - issues for configuration control, tracking etc	Develop and flow down guidelines to components industry bodies	LEAP (A. Touw, Boeing)	
15	Marking & Labelling	No universal agreement makes tracking, compliance, repair etc complex. JEDEC 97 too complex.	Summarize marking & labelling industry status	LEAP (A. Touw, Boeing), NEMI Component & Board Marking Group	
16	Component Availability/ Obsolescence	Repair of long life products will require availability of leaded components. Awareness of urgent transition timescales in supply chain SME's poor, transitional logistics huge, supply restrictions/cost increases possible	Publicize and update (and broaden to EU?) CALCE database on components	CALCE (M. Osterman), IPC	

^a Purpose of TWG is to create and maintain a mechanism for coordination of North American lead-free studies from a detailed technical perspective in several fields

Communication