Government/Industry Microelectronics DMSMS Workshop 2000
August 25, 2000

MINUTES

The Government/Industry Microelectronics DMSMS Workshop 2000 was conducted at the Sawgrass Marriott Resort in Ponte Vedra Beach, Florida.

Ron Shimazu, of the Defense Microelectronics Activity (DMEA) expressed his appreciation to the 80 attendees at the workshop, an indication of the impact DMSMS is having on the Government/Industry community. He summarized ground rules for the workshop to ensure a productive and informative session that would encourage feedback from the DMSMS community. Mr. Shimazu reminded everyone that the objective of this Government/Industry Microelectronics DMSMS Workshop is to identify and discuss technical, management, funding, contractual, and/or policy issues of concern, and formulate a strategy for resolving these issues. This strategy could include--but not be limited to--establishment of ad-hoc government/industry committees and recommendation of new and revised DoD policy.

The workshop consisted of two sessions. Each session was initiated with a set of preplanned question to each panel member. This set of questions was followed by questions from the audience to various panel members. The documented questions and answers that follow are not listed verbatim. If the question was succinct, then it is documented in its entirety. Non-succinct questions were edited down to their essence. All answers were edited down to their essence for reasons of brevity and practicality. A sincere effort was made to avoid altering the meaning of any answer.

SESSION ONE—OBSOLESCENCE MANAGEMENT APPROACHES

Panel Members

Henry Livingston—Sanders, A Lockheed Martin Company
Ron Siegel—Abrams Tank Program Office
Steve Tanemura—Boeing - Information, Space & Defense Systems
Walter Tomczykowski—ARINC

Introductory Questions from the Moderator, Carolynn Drudik, DMEA

—**To Henry Livingston (Introductory Question): Why is GEIA developing a Best Practices Manual?** The primary motivation for the manual—titled DMSMS Management Practices—is that throughout industry, companies possess varying levels of understanding of DMSMS and varying methods for there resolution. The manual is an attempt to bring some standardization to how we all deal with DMSMS. Additionally, we are trying to involve systems design and development and move toward open architecture to better accommodate use of COTS.

—**Ron Siegel (Introductory Question): Are there documented DMS procedures that your program has that others can use as a baseline for how they should build an obsolescence management plan for their program?** The prime contractor has a detailed plan for how they deal with DMSMS issues. Each program needs to develop a tailored plan but can leverage lessons learned from similar programs.

—**Steve Tanemura (Introductory Question): Are there commercial airlines obsolescence management plans or guidelines that DoD can tailor to be used by military programs by other contractors?** We have similar processes, practices, and tools. These tools could be used, however, commercial industry passes responsibility to contractors where possible. Commercial industry seems better able to incentivize than DoD.

—**Walter Tomczykowski (Introductory Question): Who is targeted to use the Program Managers Handbook, and why would they use it?** The Program Managers Handbook's primary audience is program managers recently introduced to DMSMS. The handbook summarizes results of surveys with program managers familiar with DMS and provides a shopping list of common practices and resources. It complements case resolution guides and the DMSMS Management Practices bulletin that Henry Livingston summarized. A natural follow-on to the Program Managers Handbook is to address acquisition guidelines.

Open Discussion

The following summarizes the panel member responses to the questions from the audience. In addition, some comments from the audience that were not presented in the form of a question have also been noted.

—**Henry Livingston from Bill Pumford, GIDEP: If you had an opportunity to make some decisions for DoD, involving all the services and DLA, what would you have them do regarding working with GEIA on obsolescence?** The primary area of importance would be what Walter Tomczykowski discussed, which is acquisition guidelines and an appropriate funding scheme so that knowledge and funding are available to avoid downstream problems. Contract structure must address implementation of best practices.

—**Steve Tanemura from George Sacarelos, Lockheed-Martin, F-22: You have a series of both commercial and military programs, and many of the solutions that enable commercial programs to mitigate DMS issues simply can't be done in the military environment. What are some of the things that Congress needs to change to make the military more commercially adaptable to obsolescence?** The main difference I see is that Boeing commercial uses long-term contracting and allows flexibility for known DMSMS problems. The military is more short-term and the contracts are not as flexible with things like single year procurement. The military has some long range roadmaps that they've developed to determine what they'll need, and if the funding could match that for five or ten years in the future, then I think improvements could be made.

—**Henry Livingston from Mike Barkenhagen, NWAS: A lot of our programs are just getting into roadmaps for product development. It seems to me that roadmaps need to be built off of technology roadmaps for by commodity, by technology, and also by capability. Everyone is developing their own, which seems to be counter-productive. Is GEIA working on coming up with technology roadmaps for the different commodities you deal with and maybe you could post them on GIDEP?** The primary area we've been focusing on in the DMSMS Management Practices document towards technology roadmapping is to do a better job of coupling the system-level architecture approaches to the available piece part technologies and those life cycles. GEIA co-sponsors (with Hanscom AFB) technology roadmap workshops with semiconductor manufacturers. I will bring back to the G-12 committee a question on how better to work the roadmaps between the needs of the DoD and communicate that to the semiconductor industry. **Steve Tanemura** added that the airline industry regularly meets with their parts manufacturers to discuss what products show the most promise, and the manufacturers obviously use this information to modify their roadmaps for increased profitability.

—**Steve Tanemura from Bob Lewsen, ARINC: Regarding about non-electronics obsolescence issues, can you give us some specific ideas on how you handle those types of issues?** Boeing (commercial side) spends 98% of time on electronics and 2% of time on mechanical. Non-electronic items and fasteners are not getting much attention. Boeing passes responsibility for this on to the subcontractors.

—**Ron Siegel from David Gillmore, WR-ALC: We've recently found that our customer is not really excited about cost-savings from DMS. His real interest is when his product will be unsupportable. Have you been able to show to your customer how DMS affects supportability?** To this point, the end customer (the soldier in this case) has been separated from the aspects of cost. The ideal situation

would be to know both the cost savings and when the product will be unsupportable. It didn't take long to convince the Foreign Military Sales customers that obsolescence was a problem, but it was problematic convincing them that they had to pay for the solutions because of a vague clause in the contract stating that the tank would be supportable for 15 years, which they took to mean that the U. S. Government would ensure that those parts would be available for that time. However, according to U.S. law, we cannot expend U.S. funds to maintain foreign assets.

—**Walter Tomczykowski from Dave McIlhaney, PHD NSWC: How will the Acquisition Guidelines be distributed?** The acquisition guideline progress will be put out for comment, and will be published on the DMEA website (**www.dmea.osd.mil)** as the document evolves. Initial documentation is planned to be available in the fall of 2000.

—**Walter Tomczykowski from Mike Barkenhagen, NWAS: What metrics of accountability would be applied to DMSMS decisions made by the Captain (Program Manager) who has left the outcomes of his decisions to his successor?** There are no metrics of accountability for DMSMS or any of their decisions. After a short discussion, a general consensus was reached that accountability for decisions reach across all aspects of programs and are not specifically tied to DMSMS resolutions.

—**Henry Livingston from George Sacarelos, Lockheed-Martin, F-22: Will there be boilerplate DMSMS terms in specifications and Statements of Work (SOWs), or appropriate contractual language in the GEIA Best Practices document?** That was not the direction in which we were going with the DMSMS Management Practices document. **Walter Tomczykowski** responded that standard terms would be proposed as part of Acquisition Guidelines effort.

—**Henry Livingston from Jim Bauswell, Army TACOM: I have a contract and I want someone to be accountable to solve an obsolescence problem, how long should the contract be for and what is the timeline I should give to solve that problem? If the contractor is on contract for 3-5 years, and I want to make sure that obsolescence doesn't bite me after that, what should I ask him to do?** From the contractor side, as we go through EMD we identify those problems that will bite us in the relatively long-term. Once those items have been identified, we need to propose an alternative. A lot of this has to do with framing the projects from the standpoint of setting up a process and a mechanism by which you can identify solutions to implement, and the extent of the leeway the contractor has to sort out issues and to set up mechanisms to do this. **Ron Siegel** added that the Abrams program made a conscious decision of whether they would address the obsolescence program during the production contract or afterwards. They determined that addressing 20 years of obsolescence in the production contract would be cost prohibitive, plus the Government would have lost control of the approach in resolving obsolescence issues. We analyzed the available funding and the best interests of the program during this process. **Steve Buss, Northrop-Grumman**, added that the problem with requiring the contractor to address obsolescence for the life of the system is that the price will then escalate infinitely. The more prudent approach is to develop a transition plan with roadmaps that involve the primes, OEMs, and subcontractors in the development of these roadmaps.

—**Steve Tanemura from Steve Buss, Northrop-Grumman: As we get better at individual solutions and as they get older, we will be replace boxes and cabinets. When this happens though, the cost of requalification become cost prohibitive, and we need to be doing things to reduce these costs. How does the commercial industry solve this problem?** The FAA is very strict on requalification and has to sign off on Category 1 changes. The military has to become flexible at a certain level and give up strict control and allow contractors to resolve issues. These decisions must be made with safety in mind, but the proper levels of requalification need to be looked at to avoid excess testing costs. **Ron Siegel** added that, from the Abrams perspective, the whole system is very sensitive to parts changes, and they tend to run all tests up to the system level.

—**Henry Livingston from John Davidson, Northrup-Grumman: I have not heard discussion on warranty or post-production support. Is there a reason for this?** We haven't specifically considered structuring contracts this way, but Walter Tomczykowski's Acquisition Guidelines should include some wording for these cases. **Walter Tomczykowski** states that he concurred with Henry's assessment that

this is potential material for the Acquisition Guidelines. As an example of such a warranty contract, Walter cited JTIDS as using a warranty for obsolescence. It is a small, 18-month, warranty, but it's a start.

—**Henry Livingston and Walter Tomczykowski from Glen Colman, NAVSEA: Are your documents cataloging the relative successes and failures of various solutions, including distinguishing between solutions that may cause fatal errors such as incorrect quantities of a LOT buy?** The DMSMS Management Practices document is not in that context. Rather than ranking solutions by risk, this document talks more about the lasting effects of a particular approach from a high level perspective. Options must be weighed and carefully selected from the case resolution guides.

—**Steve Tanemura from Bob Gibbs, Army AMCOM: Several years ago, I heard a senior Boeing executive talk about you practices, and he said that when Boeing sells an airplane, they guarantee that they will support that airplane for ten years support. What are your thoughts about taking that same practice and applying it to the military under the situation we have with acquisition reform of going more towards commercial practices?** In fact it's worse than that, because essentially the wording is that we will support that model as long as one aircraft is flying we will support it, which is generally about fifty years. That is a requirement placed on us in the contract. However, there is a difference between a warranty and DMS support. A warranty is actually only for a few years where they have to repair equipment. After that window, we support, but the customer airline will pay for it. When we do LOT buys, we track them carefully to determine whether the initial calculations on those LOT buys were insufficient. **Ron Shimazu** added that the Government needs to do their part to incentivize contractors to choose optimum DMS solutions by investing to pay the contractors investment to five or ten years. This is not so much of a program issue as it is a funding issue with the limits on how one can spend congressional appropriations. **Steve Tanemura** concurred, saying that Boeing does get incentives because on their commercial contracts they can keep certain amounts of their contracts when they meet performance standards, or any amount under a certain ceiling that is targeted. Boeing even takes this approach with their subcontractors because it works so well.

—**Comment by George Underwood, Boeing:** Warranties come with a high price. A full warranty for twenty years is not affordable. Some common questions regarding warranties include: What is normal? What is the appropriate term? How do you properly price it?

—**Steve Tanemura from Vincent Spellane, Lockheed Martin: Are there any tools in place to help calculate Total Ownership Cost (TOC)?** Boeing has a tool that determines the best opportunity to perform a redesign. TOC will always be program specific.

—**Ron Siegel from David Gillmore, WR-ALC: How does the Abrams program handle nuclear requirements?** The Abrams tank is totally different due to nuclear requirements so they do not pass these on to the contractor. The Government makes these decisions.

—**Steve Tanemura from Rob Holmes, VisiCom: With regards to designing for obsolescence tolerance, does Boeing acquire the intellectual property for complex ASICS that are designed by others, and with regard to Boeing's design and analysis tools, do those tools take obsolescence into account?** Concerning ASICS, Boeing has no requirement for intellectual property for ASICS, though our subcontractors understand that without it, it's a problem for Boeing. **Greg Krumholtz** added that this is an area where Boeing needs to improve for future obsolescence mitigation.

—**Comment by Hal Williams, TASC:** Mr. Williams summarized stated that through his experience, to be successful a program must "Plan the work, and work the plan." **Walter Tomczykowski** responded that Mr. Williams' comment is the essence of the Program Managers Handbook.

—**Henry Livingston** commented that the DMSMS Management Practices document is on the GEIA G-12 Solid State Devices Committee's web site and that the G-12 is seeking constructive comments.

Summary of Session One

Ron Shimazu reminded attendees that the Program Managers Handbook will be in the conference CD and constructive comments are welcomed. He also summed up the first session and highlighted the following topics needing further consideration:

- Using warranties as a part of the acquisition process
- A need for templates for RFPs, Specs, and SOWs with words telling contractors to address DMSMS
- Work with the commercial airlines more regarding DMSMS best practices to make sure both parties are in sync in the areas of leveraging expertise and microelectronics purchases
- A need for better technology roadmaps and dialogue with vendors.

SESSION TWO—USE OF COMMERCIAL PARTS

Panel Members

Mike Adams—Defense Supply Center, Columbus
Joe Chapman—Chapman Consulting
Gary Panzer—Raytheon
Jack Tucker — PEO Office -Tactical Missiles

Introductory Questions from the Moderator, Carolynn Drudik, DMEA

—**Joe Chapman (Introductory Question): What is IECQ doing and why is it important to managing DMSMS?** Boeing/Airbus approached the IECQ. The AWG (Avionics Working Group) thought IECQ would be a good host for worldwide DMSMS issues. IECQ is publishing documents that focus on DMSMS. The IECQ/AWG is publishing three documents. One of those documents focuses specifically on obsolescence management. The others focus on the reliability and on component management plans. Visit the IECQ website at **http://www.eccb.org/AWG/** for details.

—**Mike Adams (Introductory Question): For DoD to continue to be the number one global power in the world, can industry build high tech military avionics with just QML or military qualified parts?** The simple answer would be no. COTS/QML is not a panacea. It merely gives one a choice. It is up to the OEM to decide the best design decisions. DSCC is working to incentivize the IC manufacturers to develop a master list of common parts from which we can leverage. DSCC is trying to get information and guidelines regarding common COTS equipment out to OEMs so that intelligent choices can be made during design.

—**Gary Panzer (Introductory Question): What is GEIA and/or industry in general doing to replace many of the military standards for parts management or reliability assessment, etc. that have been discarded or outdated?** The transition to commercial parts was abrupt, and it left a lot of our customers—the program offices—scrambling to solve this problem of a lack of standards. Now we are starting to see GEIA and IECQ and others, including the Government, saying, “How can we solve this problem, in general?” So now what we’re seeing is that we are moving in the right direction, albeit slowly.

—**Jack Tucker (Introductory Question): From a program office perspective, what do you think industry should be doing to address the growing need to use commercial parts?** We are looking at the basic facts of life that the military no longer controls anything within the IC industry. We are trying to do the best we can with the parts that are available to us. It is incumbent upon industry to do what makes the best business sense. DoD must learn how to adjust and adapt to what the market is doing and therefore refocus programs to where they can deal with using commercial parts. We had an industry day a couple of months ago, and one emphasis was to try to convince program managers in general that though COTS is not the optimal choice in all cases, we must use COTS more often as that is where the real world is headed.

Open Discussion

The following summarizes the panel member responses to the questions from the audience. In addition, some comments from the audience that were not presented in the form of a question have also been noted.

—**Jack Tucker from Glen Colman, NAVSEA: What should the military do regarding radiation hardened item, where there essentially is no new market?** There is a disparity across the DoD on how to handle nuclear survivability. From the PEO perspective, radiation requirements are not going away. Ask yourself, "Can requirements be revised?" The few qualified contractors are on the edge of extinction.

—**Joe Chapman from Henry Livingston, Sanders: Why would I want to use parts outside of the manufacturers recommended range and why would there be industry guidelines to how to do it?** It happens. The goal is to protect the integrity of the system. Reputable contractors have upscreening processes that mitigate these risks. Liability is a major issue. The latest Motorola roadmap from 1993-1997 shows market acceleration in obsolescence. We are going to the sub-micron level much faster than predicted. **Gary Panzer** commented that we need guidelines and/or specifications to screen for specific reliability failure mechanisms.

—**Joe Chapman from Charlie Minter, BMPCOE: I've heard from other workshops that even though data sheets are provided, we cannot trust data sheets. Is that a true statement**? I don't think so. As far as I know, all of the IC manufacturers back their data sheets to the letter. The data sheets limit use beyond data sheet specifications or manufacturer does not accept liability. The main problem is that IC manufacturers rarely know what their part is being used for. Manufacturers have no control over use of their products beyond documented specifications. When I was at TI, we would absolutely not sell a commercial device to an OEM if they knew it would be for use outside of the specifications on the data sheet.

—**Jack Tucker from Glen Colman, NAVSEA: What are the effects of conformal coating on parts/ICs?** The Mantech program is looking at processes to protect PEMs and work is going on to protect commercial components. Vance Anderson, DMEA informed attendees of the existence several initiatives into examining the effectiveness of coating types and coating processes.

—**Jack Tucker from Dave McIlhaney, PHD NSWC: Have you had any success in finding suppliers for hard-to-find non-microelectronic DMSMS issues, such as chemical necessary for rocket fuel?** Esoteric chemicals for rocket fuel are rare and sources are getting out of the market. The market is consolidating. It was surprising to me how few suppliers there are out there.

—**Gary Panzer from Ron Shimazu: Considering the IECQ efforts and the component management plans that address reliability assessments and qualifying parts outside of their temperature ranges, what are the prime contractors and black box suppliers doing to ensure reliability in these commercial parts?** Mostly, they are conducting extensive testing to determine mortality rates. The problem is that no matter how much you test (the more testing, the more expensive it gets), you really do not know how good or how bad the part is. **Ron Shimazu followed up with: Does the GEIA's document on PEM Guidelines pertain to this area?** The GEIA guidelines help considerably, but the process constantly changes without notification. **Joe Chapman** commented that the telecommunications industry has similar environmental concerns as the military with switching gears on top of mountains and in the desert that require the use of IC in environments that are somewhat similar to ground based military. The military may be able to gain insight into the methods they use to ensure high reliability.

—**Mike Adams from Ron Shimazu: How do you see DSCC supporting commercial parts?** If you use commercial parts you need to understand (up front) how the manufacturer plans to support them. We still have the issue of parts that are upscreened or uprated, yet the part number stays the same. We are looking for a guideline from the DLA-level or DoD-level that will address this issue.

—**Mike Adams from Mike Catarina, Sarnoff: To keep track of legacy software in IC's, will DLA track components by serial number rather than just NSN?** It is highly unlikely. When we buy parts, we don't get any insight into where it was made and what testing it went through.

—**Ron Shimazu provided the following comment:** MIL-STD-965 will be replaced by the DoD's guideline "Parts Management ZZZ" that is currently being developed by DSCC and coordinated out of Greg Saunders' Defense Standardization office. Parts Management ZZZ will provide guidelines on how to perform parts management. DoD is using the IECQ component management plan that Joe Chapman has discussed. This is how DoD envisions industry managing their parts. Regarding reliability, G-12 is working on guidelines for reliability assessments and reliability acceleration factors. Hopefully, industry will use these documents more thoroughly. If parts are required to be used outside the specified temperature range, then it is recommended that industry use these IECQ guidelines.

—**Jack Tucker from Ron Shimazu: Are there other guidelines should DoD be using?** All the studies and working groups going on at this time are encouraging, but we are still building missiles and I have not seen a lot of guidance on the use of commercial components. We are telling contractors that they must have a parts management plan. Though we are not requiring specific a format, we are telling them the types of content we'd like to see in one.

—**Comment by Joe Chapman:** OEM's have plans that go through six to ten alternatives choices before finally having to select and use an upscreened part. There is no intent, as I see it, from the DoD level to go back to the contractor with any kind of directive that says, "You will have a component management plan." or "You will allow a government source inspector to periodically check your parts management plan." That is part of the reason why the IECQ/AWG has put together such a semi-prescriptive plan that requires certain things to be done. A final report should be ready by the end of the year that may help in this area.

—**Comment by Bill Johnson, DSCC:** MIL-HDBK-ZZZ will provide acquisition guidance on how to contract for a parts management plan including qualification, DMSMS, parts selection, etc.

—**Joe Chapman from Vince Spellane, Lockheed-Martin: As military systems use more COTS, do you see that this will cause even more problems for military weapon systems when these COTS items go obsolete?** Without question it will for some period of time. I don't know when we'll reach equilibrium. As industry introduces a new component (IC, microprocessor) they usually have one or two other models proceeding through development. This is indicative of a problem for military systems with such long life cycles.

—**Jack Tucker from Steve Tanemura, Boeing: Should we be standardizing parts management plans?** First we should assess what the contractor has in place. Trying to standardize remains a challenge.

— **Jack Tucker from Bill Pumford, GIDEP: Has the Single Process Initiative (SPI) failed us as it applies to parts management?** Theoretically, SPIs go off and everyone who has a significant contract in the area has a chance to take a shot at the SPI. We've had that come through where they are trying to get SPI under parts management. We've given them our comments, but they don't seem to go past that. Realistically, if you're bringing a large enough contract into a plant, they'll bypass SPI if they want your money.

Summary of Session Two

Ron Shimazu thanked the panel members, and expressed appreciation to the diverse audience for the challenging and thought-provoking questions/discussions. He summed up the second session and highlighted the following topics that were discussed or required summarization:

- IECQ documentation can be accessed at http://www.eccb.org/AWG/.

- Increase the widespread use of GEIA G-12 parts reliability (PEM) guidelines
- Industry wants the DoD to accept an SPI for parts management across all programs.

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