

ule or critical path activities. There is no actual or implied relationship between E³ engineering personnel performance and equipment technical performance. Good E³ engineering advice can be overridden or ignored by project and/or program management, when technical performance is balanced against product cost, weight, schedule, reliability and other valid requirements or constraints. TPMs are not intended to take the place of risk evaluations, even though they are based on risk assessment techniques. Risks should continue to be identified, assessed, and mitigation plans developed for requirements compliance or system integration issues.

Conclusion

This E³ TPM tool has successfully been used at Lockheed Martin and has proven to be useful for communicating E³ concerns and status to program management. It is fast and easy to use because it is based on a readily-available spreadsheet application, and uses familiar project risk assessment techniques. It provides multiple layers of performance evaluation that enable justification of complex technical assessments. Although this spreadsheet is intended for use primarily by the E³ specialists, it can be useful to share the detailed assessment data with project/program management. They seldom want or need all the minutiae supporting the top-level system E³ performance confidence assessment, but are often reassured to know that it exists and can be produced if necessary. E³ TPM evaluations can easily be defended when they are based on supplier qualification test data or very detailed assessments by subject matter experts.

This E³ TPM approach provides a consistent methodology for assessing, predicting and tracking E³ performance by allowing for archiving assessments to give a way to track the history of system and subsystem performance and the historical performance can be used with trend analysis for predictions for future similar equipment. This tool also provides technical assessments with little time invested. The most recent evaluation update required only three man-hours of labor for more than 45 subsystems on a current Lockheed Martin program. It is expected these TPMs will evolve further, as we refine our tools for effective communications with our program and technical managers.

February 2006 Reflector Submission from the Reliability Chapter

CENTER SECTION

Reliability – 6:00 PM, Wednesday, February 8
Impact of the ESD Trend Toward Ultra-sensitive
Components

Terry L. Welsher and G. Theodore Dangelmayer

The IEEE Reliability Chapter held a joint meeting with the ESD (Electro Static Discharge) Society. This meeting focused on proactive measures to deal with the challenges of unexpected ESD failures in new locations in the manufacturing process due to the industry wide trend towards ultra-sensitive (ESD Class 0) components. The interactive discussion stressed countermeasures including both manufacturing and design enhancements.

The meeting was held at RSA Security in Bedford, MA. Visit the IEEE Boston Reliability Chapter website: <http://www.ieee.org/bostonrel>.

ARTICLE

Reliability Society – 6:00 PM, Wednesday, February 8

Impact of the ESD Trend
Toward Ultra-sensitive Components

Terry L. Welsher and G. Theodore Dangelmayer

ESD failures are occurring with increasing frequency, in unexpected ways and at new locations in the manufacturing process due to the industry wide trend towards ultra-sensitive (ESD Class 0) components. Even wafers are now failing due to ESD damage and mathematical models indicate these failures will increase with the scaling trends. Device design experts are experiencing increasing difficulties designing-in adequate ESD protection. The SEMETECH and ESD Association technology roadmaps are projecting sensitivities below 100 volts for all three simula-

tion models (HBM, CDM, MM) by 2010.

The IEEE Reliability Chapter held a joint meeting with the ESD (Electro Static Discharge) Society. This meeting focused on proactive measures to deal with the challenges of unexpected ESD failures in new locations in the manufacturing process due to the industry wide trend towards ultra-sensitive (ESD Class 0) components. The interactive discussion stressed countermeasures including both manufacturing and design enhancements.

Dr. Terry L. Welsher retired from Lucent Technologies-Bell Laboratories Engineering Research Center in 2001 as the Director of the Quality, Test & Reliability department. He has also been active in quality standards and roadmapping activities with SEMATECH, the ESD Association and the JEDEC 14 Quality and Reliability Committee. He holds a BS in Chemistry from Florida State University and Ph.D. in chemical physics from the University of Texas at Austin.

G. Theodore Dangelmayer is the president of Dangelmayer Associates, L.L.C. and has been developing ESD programs since 1978 for large global corporations as well as individual proprietorships. He is currently president of the Northeast Chapter of the ESD Association and a member of the ESD Association International Council of Education, 2003 Technical Program Committee and is the chairman of the ESDA Corporate Sponsorship Programs.

This meeting was held on Wednesday, **February 8** at RSA Security in Bedford, Massachusetts. It will began with pizza and personal networking at 5:30 PM. The presentation followed at 6:00 PM. IEEE members and non-members are welcome. See the RSA Security website at <http://www.rsasecurity.com/node.asp?id=1059>

GETTING OUT OF CALCUTTA

By Russell V. Carstensen, PE, NCE

It started at 1 AM. First, let me say that I hate flying into or out of Orlando. It is like flying out of Calcutta. Everyone wants to go at the same time. They are traveling in great family hordes. They are tired and cranky with mouse ears on their heads – not an example of humanity at its best. Even so, sometimes you just have to bite the bullet and go with the flow.

Such was my case. I had flown in for a one-day meeting. I had trouble getting a flight in at a reasonable time and even worse luck getting out. The best I could do was a 6 AM departure. Loyal to the “two hour rule,” I concluded that I would have to be at the airport at 4 AM. I asked the hotel for a 3 AM wake up call to allow for shaving, packing and checkout.

My wife called from home (10 PM her time, 1 AM my time) to say that my flight had been delayed until 9 AM and I would not get to Denver in time to catch my scheduled flight so I have been booked on a 2 PM departure for Seattle. That schedule will have me in at about 5:30. I had a prior commitment to a meeting that evening at 7:30, but if all went well I could just make it. My wife then casually mentioned an “800” number I could call for details. She then announced that it was her bedtime and left the matter in my hands.

I called the 800 number. It apparently was the airline’s Bangladesh office. The fellow on the other end had a thick accent along the lines of Apu from the Simpsons. He confirmed that the flight had indeed been delayed but added that I still had to check in for the 6 AM departure in case the plane left earlier than the now anticipated 9 AM. In my sleep deprived state I accepted his fuzzy logic. It was now 1:45 AM. My 3 AM wake up still stood. Did you ever try to go back to sleep with the pressure of only having one hour to do it? Don’t tell me about your success because I really don’t care. I can only say that it does not work for me.

I counted cracks in the ceiling for about an hour. At 2:45 AM I said (well, we will forget what I said - but rest assured that it wasn’t nice) and got up to shower. I finished freshening up, packing and straightening the room and headed to the check out desk. When I got there the night clerk couldn’t check me out because she was backing up their accounting system