

## 24C - Benefits of a Collaborative Approach to RAM and Supportability Modeling

### Presenters

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### Session Summary

The presentation highlights the relationships between the RAM and Supportability parameters along with their sensitivities. Common assumptions, omissions, and their potential pitfalls are also identified during the presentation. As part of a more collaborative approach, the presentation introduces recommended process flows for developing and maintaining iterative and closely coupled RAM and Supportability models throughout the lifecycle. The process flows highlight the critical decision points and the potential pitfalls to avoid. The discussion is generic enough so that the application is not limited to a particular RAM or provisioning analysis tool set.

While RAM and Logistics professionals and their analysis tools sometimes cross boundaries, this presentation calls for improved collaboration and knowledge sharing during system design and development. Such collaboration is needed to ensure that both the RAM and Logistics analyses are aligned and consistent with the operational/maintenance concept and profile. This, in turn, ensures a more accurate assessment of system level RAM, supportability, and Life Cycle Cost (LCC) projections earlier in the program when changes are still viable in a cost effective manner. This collaborative approach gained increased visibility, since recently the DOD directed that RAM and Cost (RAM-C) rationale be used in the development of system RAM and sustainment requirements.

RAM and supportability analyses of complex systems are often performed by separate organizations, as well as at different phases of program development. RAM subject matter experts perform most RAM analysis and trade studies during early program phases, from system concept to architecture development and through critical design. Logistics professionals, sometimes overlapping the RAM analyses, often perform supportability and provisioning analyses. More often, the majority of the effort is deferred to later program phases when the design has firmed, maintenance items are well defined, and material costs are clear.

This collaborative approach leverages the skills of the RAM and Logistics professionals in a manner that more efficiently and accurately assesses RAM performance and LCC. Such improvements are increasingly important as a larger portion of total system costs shift from design and development to O&M, and as support contracts increasingly shift to Performance Based Logistics (PBL) models. In addition, accurate and comprehensive RAM and LCC are increasingly becoming an integral part of the evaluation criteria for down select during proposals and subsequent program phases.

### About the Presenters - Philip A. Bedard and James Perreira

**Philip A. Bedard** is Engineering Fellow in the Whole Life Engineering Directorate of Raytheon Company's Integrated Defense Systems (IDS) Business in Sudbury, Ma. Phil has worked in the reliability and quality engineering disciplines for 20 years, including 3 years at Digital Semiconductor, with the balance at Raytheon. He has earned the ASQ Certified Reliability Engineer certificate, is a member of the IEEE's Boston Reliability Chapter, was awarded Raytheon IDS Technical Honors, and is a graduate of Raytheon's Systems Engineering Technical Development Program. Phil was responsible for the RAM analysis and modeling efforts on a variety of high availability radar programs. He earned a BS in Electrical Engineering from Worcester Polytechnic Institute, and an MS in Engineering Management (w/concentration in Quality/Reliability) from the University of Massachusetts, Amherst.

**James Perreira**, Engineering Fellow in the Whole Life Engineering Directorate of Raytheon Company's Integrated Defense Systems Business in Sudbury, Ma. Jim has 30 years experience as an electrical engineer working on the reliability, availability, and maintainability for state of the art radar systems. Jim is a member of the IEEE's Boston Reliability Chapter, and was awarded Raytheon IDS Technical Honors. He received his BS in Electrical Engineering from the University of Lowell. Currently, Jim is working at Raytheon Company supporting the RAM activities for the DD (X) & CVN78 Dual Band Radar Programs.