Terms of Reference
S&T for Modular Systems

Objective

To review and assess the relationship of Science & Technology (S&T) to modular systems acquisitions, system engineering, open architectures and spiral development and make recommendations for improving these relationships where appropriate.

Background

New systems are being developed using open system architectures and modular constructs that allow for "flexible mission modules", spiral development enhancements as technologies mature, and interoperability in net-centric systems of systems. Examples include LCS, MMA, BAMS, SSGN, DD(X), F-35, JTRS and X-Craft. Robust system engineering practices will be key to the success of these efforts.

Minimal work has been done to investigate whether S&T programs, with potential application to multiple types of systems and mission packages, can or should be planned in conjunction with acquisition system engineering. There could be high payoffs if advanced capabilities could be developed in S&T with a "modular" vision. Payoffs could be realized in terms of faster transition, lower development costs, economies of scale for production, reduced logistic support costs, and decreased training requirements.

If system-engineering analysis is done at the early stages of concept development with the involvement of the S&T community, the needs of future mission modules and spiral upgrades can be used to guide S&T investments. This may require a more structured type of interaction between the S&T and acquisition communities than currently exists.

Specific Tasking

This study will specifically address the linkage between the S&T community and modular system developments.

- Review and assess Navy system engineering efforts on programs of record and the extent to which modular open systems and provisions for spiral upgrades and S&T are factors in the requirements definition and acquisition processes.

- Identify candidate high-payoff S&T areas for modular development and horizontal integration; and assess the opportunities for S&T engagement with systems engineering efforts.

- Where appropriate, recommend guidelines for structuring modular S&T initiatives that would enable utilization of results in multiple platforms/missions packages.

Recommend changes required to improve the interface between Navy's S&T planning and acquisition processes.