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Technology: Expedited Large-Scale Software Integration for Net-Centric Systems

STI – Software Technology Initiative

Introduction

Interactive battlefield maps, teaming autonomous unmanned vehicles, real-time situation awareness—the whole digitally interconnected battlespace is shifting the emphasis of Lockheed Martin's customer base in defense, intelligence, and homeland security to broad network-centric systems.

The challenge is to develop and field—rapidly and economically—large-scale, reliable network-centric systems. The most efficient approach is to make maximum use of existing software (government legacy, commercial, and free off-the-shelf software). But, existing software systems are difficult to integrate into larger systems, tend to fail in rapidly changing environments, and are difficult to maintain as systems are upgraded.

The problems associated with integrating existing and new purpose-built code are complex. Current methods are labor intensive, time consuming, and costly and still may not achieve the needed operational capability and reliability. A new approach is needed to design, develop, and integrate large-scale software systems-of-systems.

Meeting the Need

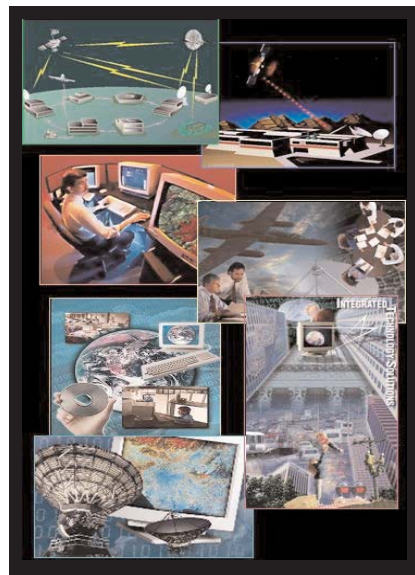
To meet this need, Lockheed Martin Integrated Systems and Solutions (LM IS&S) and Lockheed Martin Advanced Technology Laboratories (LM ATL) have established the Software Technology Initiative (STI).

STI's goal is to construct innovative software development processes and integration technology for the development and delivery of reliable, resilient software and system-of-systems solutions to enable the warfighter. The vision for STI is to establish Lockheed Martin Corporation as a software development and systems integration technology innovator in the Intelligence, Department of Defense, and the Department of Homeland Security communities.

Source of Solutions

STI will provide a center of synergy, integrating the tal-

STI is positioned to be the premier source of innovation and solutions for challenging large-scale software integration programs within Lockheed Martin.



Rapid integration of existing and new software into reliable systems-of-systems supports the shift to large-scale, network-centric defense and intelligence systems.

ents of resident LM ATL engineers, universities, and leading engineers from across Lockheed Martin. STI will develop practices and technologies to expedite complex software integrations that pro-

duce dependable and sustainable solutions.

Several initial challenge areas have been identified for STI research, including: (1) prevention of system failures as a result of unresolved design issues, (2) reduction in time and cost to diagnose and repair late-stage integration problems, and (3) effective development of large-scale systems by decentralized and geographically distributed engineering and design teams.

The 2006 research program is pursuing technologies aimed at these challenge problems. Many elements of this research are tool-oriented to provide support for behavioral analysis of concurrent (existing) systems, model-driven development, design and realization of product-line architectures, and program analysis based on design intent.

The 2006 program also includes seedling efforts in customized fault tolerance frameworks, distributed team development and semantic extraction from software documentation artifacts.

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