



Advanced Technology Laboratories

# TECH BRIEFS

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*Technology: Computer Systems Performance Engineering Course (CSPEC)*

## “Timing is Everything,” the Instructor Said

Successfully meeting processing deadlines in real-time systems is essential to avoid potentially disastrous system failures. Systems engineers must design systems to meet timing requirements. Lockheed Martin Advanced Technology Laboratories (ATL) is providing critical performance engineering support in this area through two key services: (1) the ATL Scheduling Tool Suite (ASTS) and (2) the recently developed Computer Systems Performance Engineering Course (CSPEC).

The ASTS—a collection of tools for modeling and analyzing the timing performance of parallel and distributed systems—is described in Tech Brief V3N3 (June 2008).

CSPEC—a one-day “Computer Systems Performance Engineering Course”—was developed under the Corporate Systems and Software Initiative for Lockheed Martin’s technical training curriculum. The day-long course contains a wealth of basic information on the critical importance, design choices, and modeling and analysis of timing performance in distributed computer systems. The course is intended for systems engineers and

architects, requirements and test engineers, and software engineers who want to better understand timing performance issues.

The CSPEC highlights fundamental concepts based on expertise that ATL and the course instructors have acquired over more than a decade of work in timing per-

### Key CSPEC Topics Include:

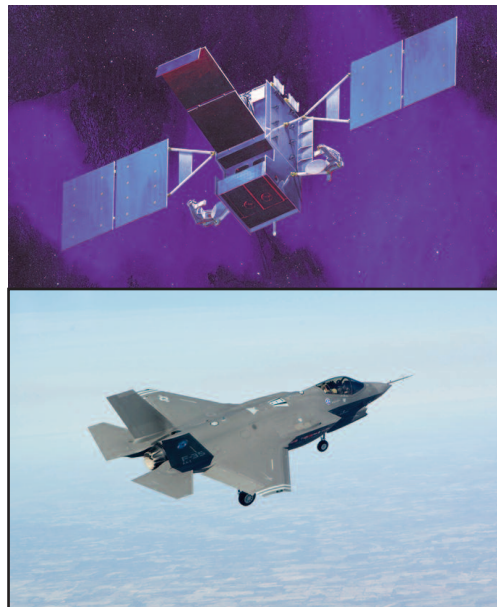
- Design choices to achieve timing performance
- Methods for modeling and analysis of timing performance
- Use of the LM ATL Scheduling Tool Suite (ASTS)
- Integration of performance engineering with Systems Modeling Language (SysML)

formance engineering. Over that time, ATL has applied the principles and tools covered in

the course at LM Electronic Systems (DDG 1000 program), LM Aeronautics (F-22 and F35 programs), and LM Space Systems (SBIRS satellite program). The objective of the course is to broaden the appreciation and application of performance engineering for the benefit of future Lockheed Martin systems.

The course is now available for delivery throughout Lockheed Martin and can be tailored to meet the needs of specific audiences. For example, the instructors can include a discussion of a specific performance engineering problem submitted in advance. A half-day, overview course is also available.

The course (1) presents basic timing performance concepts, (2) outlines design choices to achieve timing performance, (3) describes methods for modeling and analyzing timing performance, (4) demonstrates the ATL Scheduling Tool Suite (ASTS) for response time modeling and analysis, (5) points to ATL’s Quality of Service (QoS) Website for middleware performance evaluation, (6) introduces ATL’s Emulab as a web-accessible testbed for distributed systems experiments, and (7) discusses the integration of performance modeling and analysis with system modeling in SysML.



**The principles covered in the CSPEC have been applied to major Lockheed Martin programs.**

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