TRENDS IN
AEROSPACE SOFTWARE

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Pressure to control costs

Introduction of COTS hardware onto weapons platforms

COTS software development tools

Support for graceful system evolution

Adaptable, multi-purpose systems

Coordination among aggregates of heterogeneous systems

Design of information environments
Systems must be designed to support graceful evolution

Example program: DARPA Evolutionary Design of Complex Systems

Systems become progressively harder to maintain as design coherence breaks down

Particularly serious for large distributed real-time mission-critical systems

Tension between rapid system adaptability and high assurance
COTS hardware on military platforms

Phenomenal progress along all axes:

processor speed

memory cost

mass storage

Small-lot proprietary military processors lose

Hardened packaging to address environment issues
Individual systems (aircraft, ships, satellites) are components of a larger 'warfighting virtual machine'.

This 'system of systems' must meet the following requirements:

Adaptive - must be quickly re-configurable

Fault-tolerant - must function after damage

Fast - Our decision loop must be inside their decision loop
Information environment needs

Pilots and aircraft operate in a close, almost symbiotic relationship

Situation awareness is a life-and-death issue— in 80% of air-to-air kills, victim was unaware of threat

Information environment must be customizable both in time and on a per-pilot basis