System of System Integration Technology and Experimentation (SoSITE)

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Technology and experimentation to enable rapid and custom integration of any distributed architecture

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Distribution Statement “A” (Approved for Public Release, Distribution Unlimited)
Interoperability Issues Abound in the DoD

Adding interoperability between aircraft takes years

- Aircraft are upgraded independently creating unique messages
- Machine-to-machine interfaces in an aircraft are highly coupled
- Even coupling between versions of the same spec (e.g., Link-16) is problematic

This interoperability problem occurs within the aircraft as well

- Components are tightly coupled together using a local message standard that doesn’t match the documentation
- Adding new technology (e.g., sensor) requires upgrades to multiple components, increasing expense and time

Global standards have similar issues

- No interoperability between generations of the standard
- Uncertain interoperability between implementations

Interoperability is programmed into each system
System upgrades compete in 2-3 year block cycles

Each aircraft is a collection of independent subsystems designed at different eras requiring interoperability
DoD yearly programs

~90 Yearly Major (ACAT I) programs

$93.2B

Platforms

Sensors

Data Processors

Jammers

Weapons

Network Links

Every program grades to their own requirements and coordinates external integration

~2,300 Yearly non-Major programs

$144.4B

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STITCHES is a toolchain to generate interoperability

**STITCHES efficiently generates message translators**
- System software is modified once for STITCHES compatibility
- Generated code is uploaded like mission data files (MDFs)
- Allows for fast and easy reconfiguration of mission capabilities

**Auto-generate efficient glue code to**
- Interoperate between new subsystems and existing components; old and new generations of the “same” open specification
- Transform platform data to comm’s message formats or encode any message inside fixed format standards like Link-16

A mission computer’s (MC) software is modified to allow STITCHES MDFs to translate and control data flow

Any data on buses connected to STITCHES MDFs may be translated and rerouted inside or outside an aircraft

STITCHES MDFs **efficiently translate data** and **control data flow** in order to create interoperability between and within connected platforms
SoSITE integrates via a new toolchain called STITCHES

A System of System is created by a user

Translations are automatically created through collection of known pairs

Automatically created translations are separated from the OFP

Translations are optimized and at least as fast and precise as those created by hand

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SoSITE integrates via a new toolchain called STITCHES

A System of System is created by a user

Interfaces automatically created producing STITCHES MDFs

Includes
- Cross domain rulesets
- Translation
- Authentication
- Bus monitors
- Data filters

Automatically created translations are separated from the OFP

OFP Core

Interface

Shim
Filter
EM
Deserialize
MAC
Transport

Shim
Transform
Serialize
MAC
Transport