

# Realizing Weapon Integration within Hours, not Weeks

## The Challenge

“The only constant for DoD Systems is change<sup>1</sup>.” For our forces to maintain operational superiority, our Defense systems must be resilient with the ability to adapt quickly, assimilating new novel capabilities to outpace and outsmart threats. This vision led the DoD to adopt, develop, and mandate Open System Architectures for streamlined communications, enabling rapid integration of novel technologies and lowering the barrier of entry for adoption. However, even as standards are mandated across the Force, introducing new capabilities and technologies into legacy systems that were not designed to those standards and architectures makes compliance with the mandates difficult for the DoD.

## The Problem

The Weapon Open System Architecture (WOSA) is the standard established by the DoD to address the challenge above within weapon systems. WOSA provides standardized integration points by describing the message constructs between hardware and software components, allowing for modularity and extensibility throughout the lifecycle of the platform and mission. However, even with a standard like WOSA for architecting capabilities into a solution, there are still hurdles to overcome often involving hand-coding and ensuring appropriate interfaces are established for final integration. Our Government customer was struggling to integrate a non-compliant new capability (black box) and additional data set into a WOSA compliant weapon system. Not only did they not have a ‘quick fix’ to meet the standardization, they also were short on man-hours and did not have the cycles available to focus resources on the problem.

## The Approach

By using Tangram Pro, the Customer was able to model how the two systems interacted, create a library of message sets between the components, and then develop transforms to allow the disparate systems to communicate within days- all while meeting Open Standard Architecture mandates. Specifically, the Customer generated a library of code which provided data models of black-box systems that could be integrated with the WOSA standard components. This library, once created, provides a repeatability function for the customer to save time and avoid rework as new components are added to the system. Next, using Flex language within Tangram Pro, the customer built adapters between the components to optimize interoperability. Those adapters, built by correctness using the transform function within Flex, removed the challenge of manual errors and through ‘completeness in construction’, can now be manipulated or modified rapidly, avoiding future hand-coding for the team.

*“This saved me a week of keyboard time. Having the ability to generate a message set library is HIGHLY valuable because I don’t have to rewrite things each time there is a change”*

*- DoD Customer*

## Why It Matters

Tools like Tangram Pro allow users to understand how to address open Architecture mandates, like WOSA, through code generation, repeatability, and automation. Users realize interoperability within hours to days instead of weeks to months; providing solutions that meet mission needs today.

<sup>1</sup> Quote by: Mr. Stephen Welby; Deputy Assistant Secretary of Defense for Systems Engineering (2014)