

# Government As The Integrator: Why, Why Not, and How?

William E. Novak

James D. Smith II

Software Solutions Conference 2015

November 16–18, 2015



Software Engineering Institute

Carnegie Mellon University

© 2015 Carnegie Mellon University

Distribution Statement A: Approved for Public Release;  
Distribution is Unlimited



Copyright 2015 Carnegie Mellon University

This material is based upon work funded and supported by the Department of Defense under Contract No. FA8721-05-C-0003 with Carnegie Mellon University for the operation of the Software Engineering Institute, a federally funded research and development center.

NO WARRANTY. THIS CARNEGIE MELLON UNIVERSITY AND SOFTWARE ENGINEERING INSTITUTE MATERIAL IS FURNISHED ON AN “AS-IS” BASIS. CARNEGIE MELLON UNIVERSITY MAKES NO WARRANTIES OF ANY KIND, EITHER EXPRESSED OR IMPLIED, AS TO ANY MATTER INCLUDING, BUT NOT LIMITED TO, WARRANTY OF FITNESS FOR PURPOSE OR MERCHANTABILITY, EXCLUSIVITY, OR RESULTS OBTAINED FROM USE OF THE MATERIAL. CARNEGIE MELLON UNIVERSITY DOES NOT MAKE ANY WARRANTY OF ANY KIND WITH RESPECT TO FREEDOM FROM PATENT, TRADEMARK, OR COPYRIGHT INFRINGEMENT.

This material has been approved for public release and unlimited distribution except as restricted below.

This material may be reproduced in its entirety, without modification, and freely distributed in written or electronic form without requesting formal permission. Permission is required for any other use. Requests for permission should be directed to the Software Engineering Institute at [permission@sei.cmu.edu](mailto:permission@sei.cmu.edu).

Carnegie Mellon® is registered in the U.S. Patent and Trademark Office by Carnegie Mellon University.

DM-0002792



# Agenda



**Introduction**

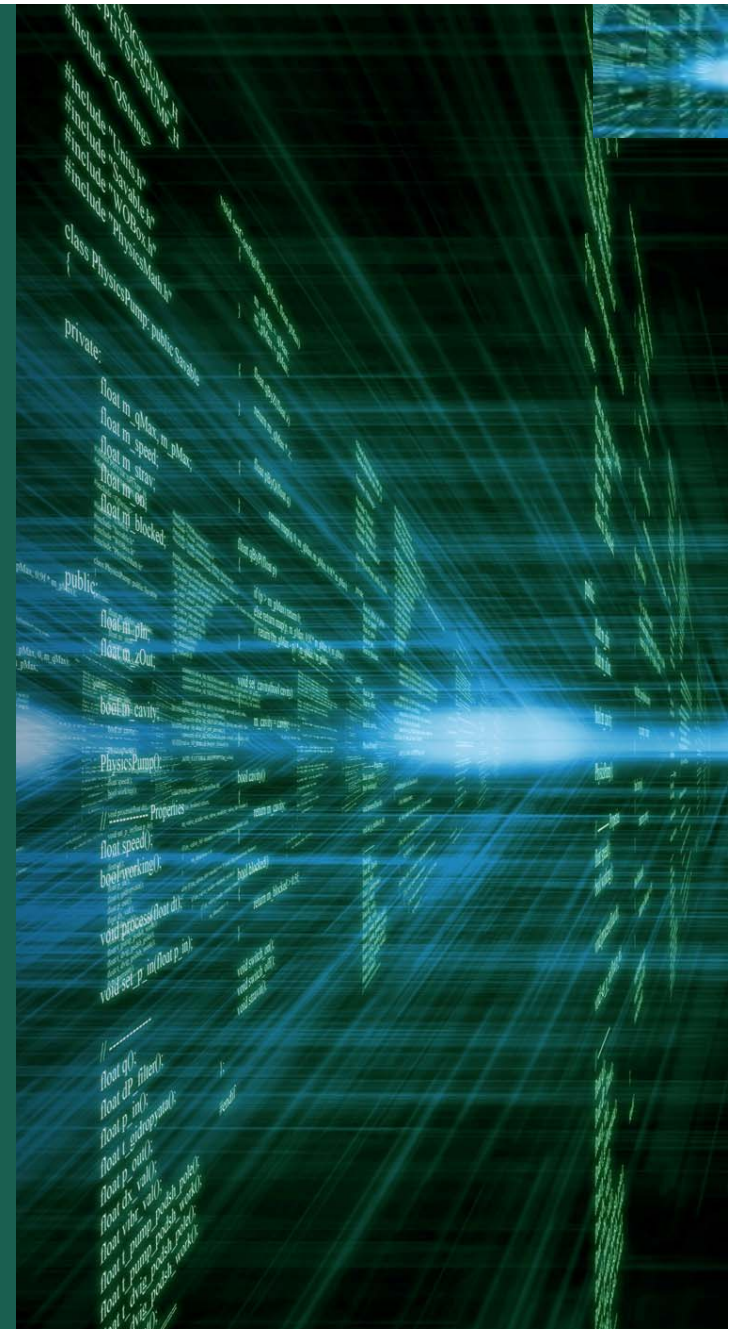
**Findings**

**Options**



# Government As The Integrator

## Introduction





## Introduction

# Background and Driving Forces

The Lead System Integrator (LSI) approach has not worked well

- Contractor LSIs directed work to other affiliated corporate entities
- Contractor LSIs downplayed risks to allow programs (and program revenue) to continue

Total System Program Responsibility (TSPR) intended to put risk on contractor, but caused programs to act against government interests, costs spiraled, and technical expertise moved out of the government

Poor outcomes of many LSI-led MDAPs in the 1990s/2000s: Army FCS, USCG Deepwater, USAF ECSS, USN LCS, DHS SBINet

National Defense Authorization Acts (NDAAs) of 2008 & 2009 barred award of most new LSI contracts after FY 2010 to any contractor who had not already done LSI work previously, prohibited it for programs beyond LRIP, and LSIs were barred from doing substantial development work

### Take-away

Government As The Integrator became an attractive alternative to the poor outcomes of LSI-led programs





## Introduction

# What is “Government As The Integrator”?

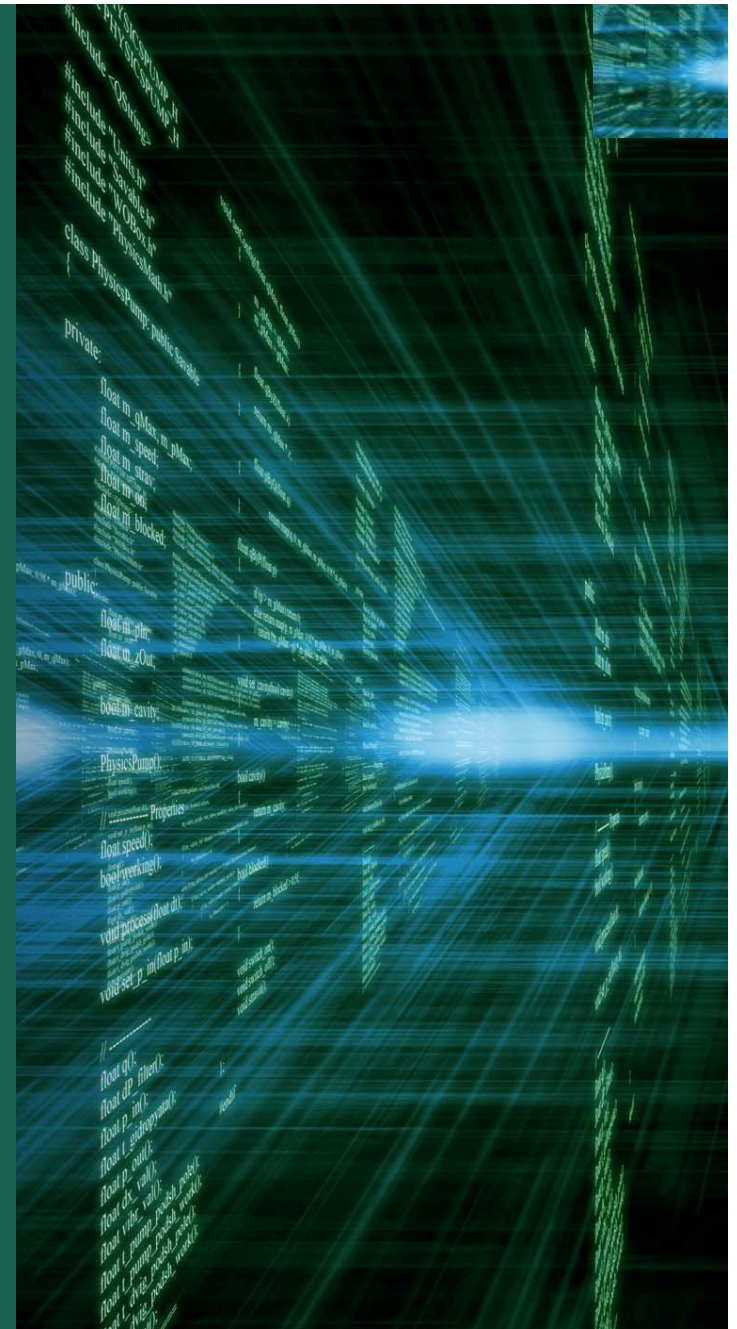
The government takes on the systems engineering and integration role of executing “...a large, complex, defense-related acquisition program, particularly a so-called system-of-systems (SOS) acquisition program<sup>1</sup>” that would commonly have been performed by a lead systems integrator (LSI)

<sup>1</sup>Grasso, “Defense Acquisition: Use of Lead Systems Integrators (LSIs) – Background, Oversight Issues, and Options for Congress”, Congressional Research Service, 10 Feb 200



# Government As The Integrator

## Findings





## Findings

# Why Use Government As The Integrator?

Avoid vendor lock-in of the LSI's services

Control the design/evolution of the system architecture

Avoid potential conflicts of interest in LSI decisions

Reduce contention between PMO and contractors

Better visibility/information flow to PMO

Develop and maintain government technical expertise

Government needs to learn how to integrate a growing number of interconnected government systems becoming systems-of-systems

Government is best suited to perform “inherently governmental functions” in mission-critical areas of systems acquisition

SecDef's formal goal is to develop the acquisition workforce “...to minimize and eventually eliminate the use of contractors to perform lead systems integrator functions”







## Findings

# Why NOT use GATI?

50% downsizing of the government acquisition workforce size and loss of expertise over 20 years

Insufficient size of government acquisition staff with adequate management/programmatic expertise

Government lacks sufficient system engineering expertise to do GATI

Programs using GATI do not have a good track record due largely to the lack of the necessary government expertise

Government involvement in the architecture & interfaces makes them liable if anything goes wrong, and gives the contractor an easy out from bearing responsibility



## Findings

# Relation to Open Systems Architecture (OSA)

- OSA supports the goals of GATI
- Government control of the OSA allows for multiple independent tasks by multiple separate contractors
- Government control of the OSA allows system components to be replaced if/when needed
- Government control of the OSA enables a product line approach that serves the government, and reduces separate/redundant/overlapping implementations of software which contractors have incentives to develop
- A good OSA gives PMOs great flexibility, allowing more components of the system to be contracted out





## Findings

# Contractual Recommendations

IDIQ-style contract flexibility simplifies awarding multiple tasks to multiple vendors, each with different contract types as needed

- reduces/eliminates contract mods
- levels playing field allowing smaller companies to bid

Associate Contractor Agreements (ACAs) between multiple contractors in a GATI context allows freer exchange of information

“Shared Destiny” award fees can help to encourage contractors to make their interfaces as easy as possible for others to integrate with.

Make the LSI a “directed sub” so all contractors must use the LSI as the integrator (*avoids contractors circumventing the LSI*)

Negotiate data & IP rights early when defining a system OSA. The architecture, interfaces, and data standards used to allow interoperability among components are key IP and must be public domain or government-owned.



## Findings

# Appropriateness of GATI for a System

### Positive factors

- Less complex
- Smaller size
- Non-real-time
- Collection of **independent** components
- Open interfaces
- Loosely coupled
- Enterprise IT
- Access to integration lab
- Sustainment
- Significant PMO software expertise

### Negative factors

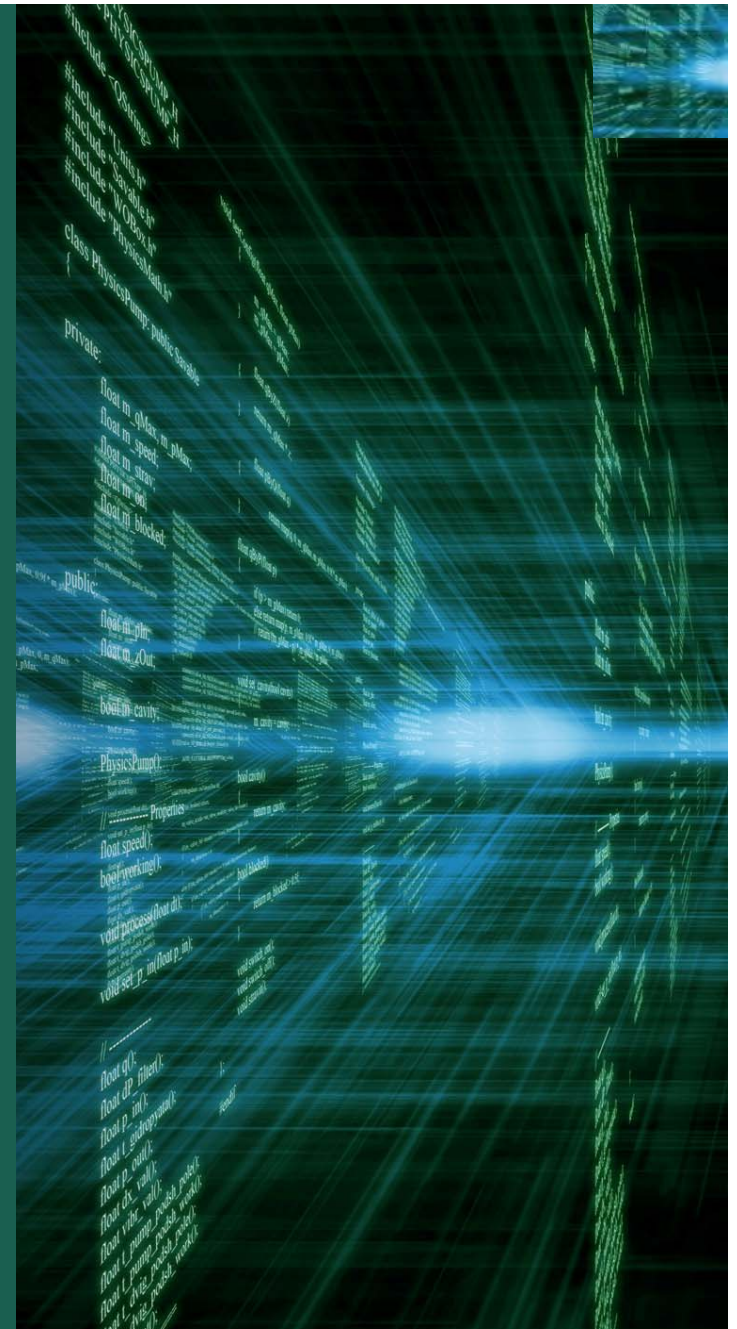
- More complex
- Larger size
- Real-time
- Monolithic
- Proprietary interfaces
- Tightly coupled
- Weapon system
- No integration lab access
- New development
- Little PMO software expertise

### Take-away

A significant majority of positive factors indicates a greater likelihood of success using a GATI approach



# Government As The Integrator Options





## Options

# Primary GATI Implementation Options

**#1:** PMO hires government lab to be integrator, and lab hires SETA contractors and FFRDCs to provide staff and integration expertise

- *Pros:* Lab expertise & size facilitates hiring of needed skills
- *Cons:* Varying quality of labs, PMO still delegating expertise

**#2:** PMO develops architecture and partitions the effort into multiple tasks/contracts, overseeing each one

- *Pros:* PMO remains close to the system architecture
- *Cons:* PMO must hire many skills from SETAs/FFRDCs

**#3:** PMO hires a system integration contractor (separate from the prime) with a dedicated PMO group to oversee

- *Pros:* Helps ensure independence of the system integrator
- *Cons:* Minimizes immediate need for extensive PMO SI expertise



## Findings

# Future Considerations

Government has a vested strategic interest and responsibility to own and direct the technical evolution of system requirements and architectures to best achieve the government's objectives *without conflict of interest*

Systems Integration expertise is a core competency that government needs to maintain and develop in order to properly oversee contractors, evaluate the relevance of new technologies to a vertical domain, and determine how to direct the system architecture in response

It takes commitment and many years to build back expertise into the government workforce—individual PMOs aren't in a position to do that. Using SETAs and FFRDCs to backfill missing technical expertise is difficult, and requires more people than most PMOs are used to using.





# For More Information

**William E. Novak**

[wen@sei.cmu.edu](mailto:wen@sei.cmu.edu)

412.268.5519

**James D. Smith II**

[jds@sei.cmu.edu](mailto:jds@sei.cmu.edu)

703.247.1380





# Thank You!

