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Guidelines for Acquisition Planning

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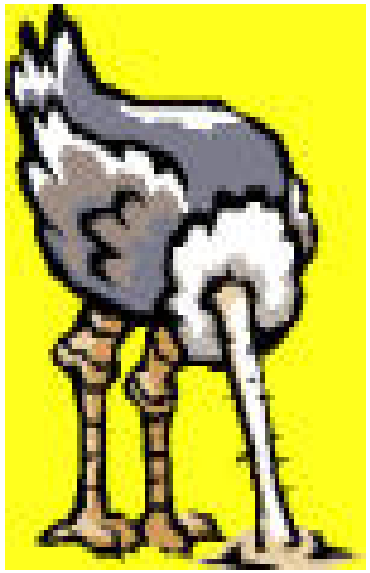
System Acquisition Approach -1

"We Got it Covered" Approach



What software? I am buying a system – my contractor will take care of all of the implementation issues!

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System Acquisition Approach -2

"Let's Cross that Bridge When We Come to It" Approach

Software is inherently flexible – so define the rest of the system first and then we can define and build the software

System Acquisition Approach -3

"Attack the High Risk Issues at the Outset" Approach

Software poses major system risk – give software issues full consideration and adequately address them from the start

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Purpose of the Guidelines

Help project managers select and defend acquisition strategies that explicitly consider and mitigate the software risks in their software-intensive system acquisition

- **Provide a framework for effectively reasoning about the software risks in the project**
- **Provide the insights necessary to mitigate those risks in design of the project's acquisition strategy**
- **Create a shared understanding of why specific strategies have been selected from among the myriad of possibilities**

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To Mitigate Software Risks

Profile the software risk in the project early - and continuously - so that stakeholders can make reasonable mitigation decisions

Create - and update - the program's acquisition strategy based on an understanding of the program's exposure to software risk

Reason about and defend the efficacy of a given acquisition strategy based on its ability to mitigate the software risk

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Determining Exposure to Software Risk

A primary concern in acquisition planning is understanding the degree to which software components in the system pose risk.

The level of software risk depends on

- The amount of software in the system
- The importance of software performance to system operation
- The precedence or difficulty of a given software component to build and/or integrate with other system component

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System Software Risk Elements

Scale of Software

Software is an insignificant portion of system

Software is the system

Dependence on Software

Little dependence
– Mission not limited by software
– Minimal consequences.

Very dependent
– Mission failure likely from software failure.
– Severe consequences

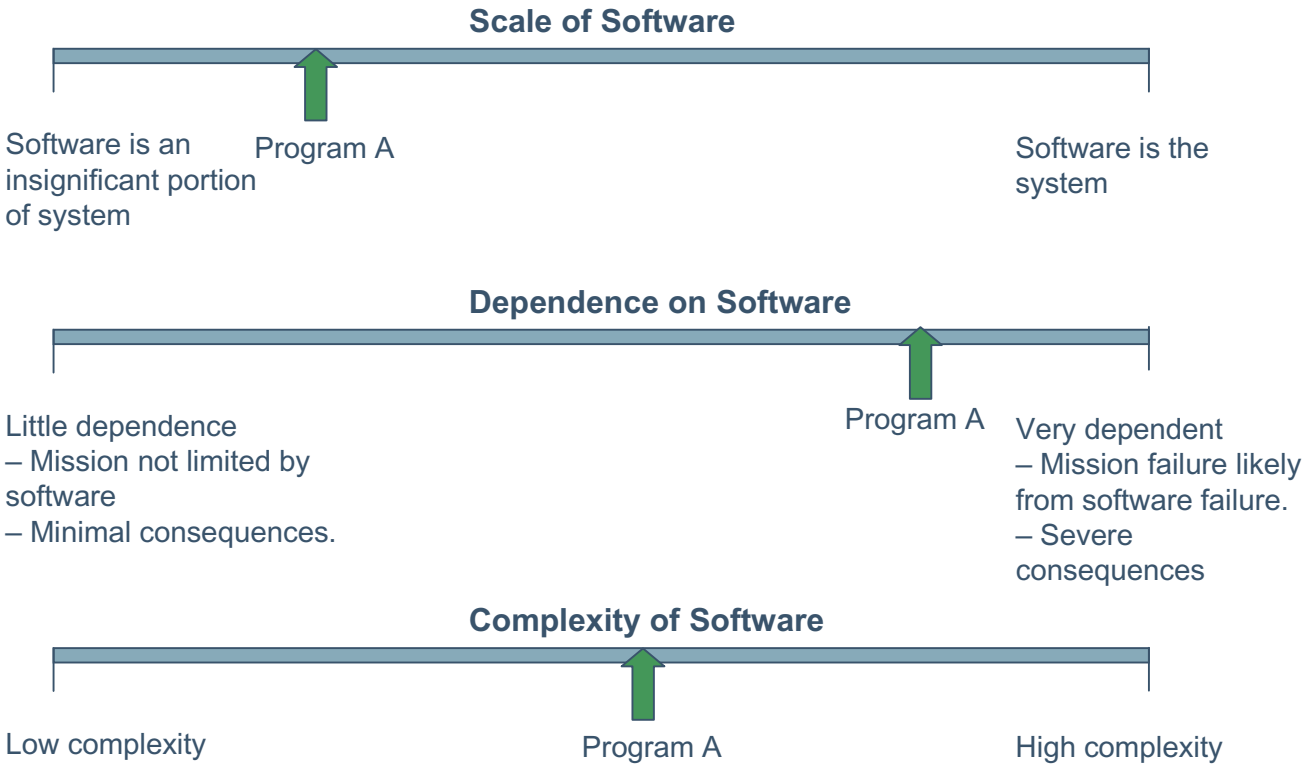
Complexity of Software

Low complexity

High complexity

Low risk → High Risk

System Software Risk Elements



The arrows represent the judgment of the program manager

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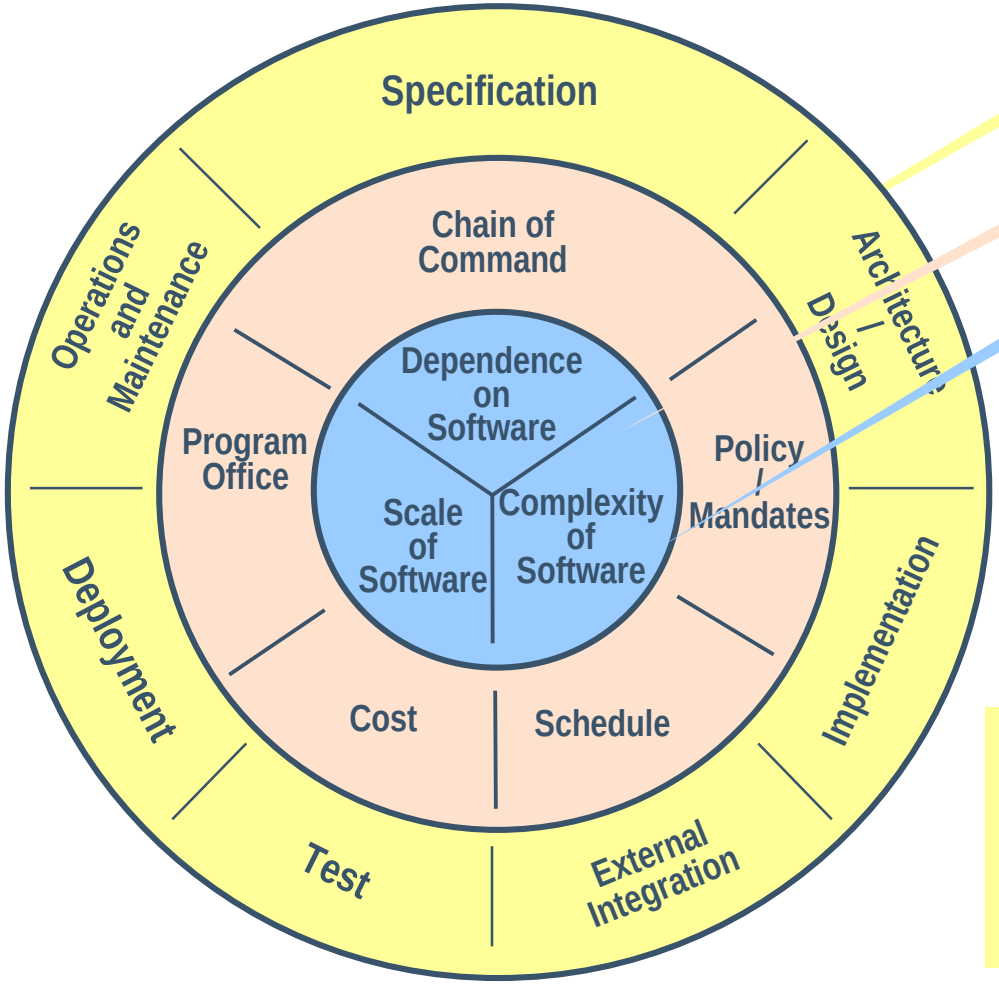
Elements of Software Risk



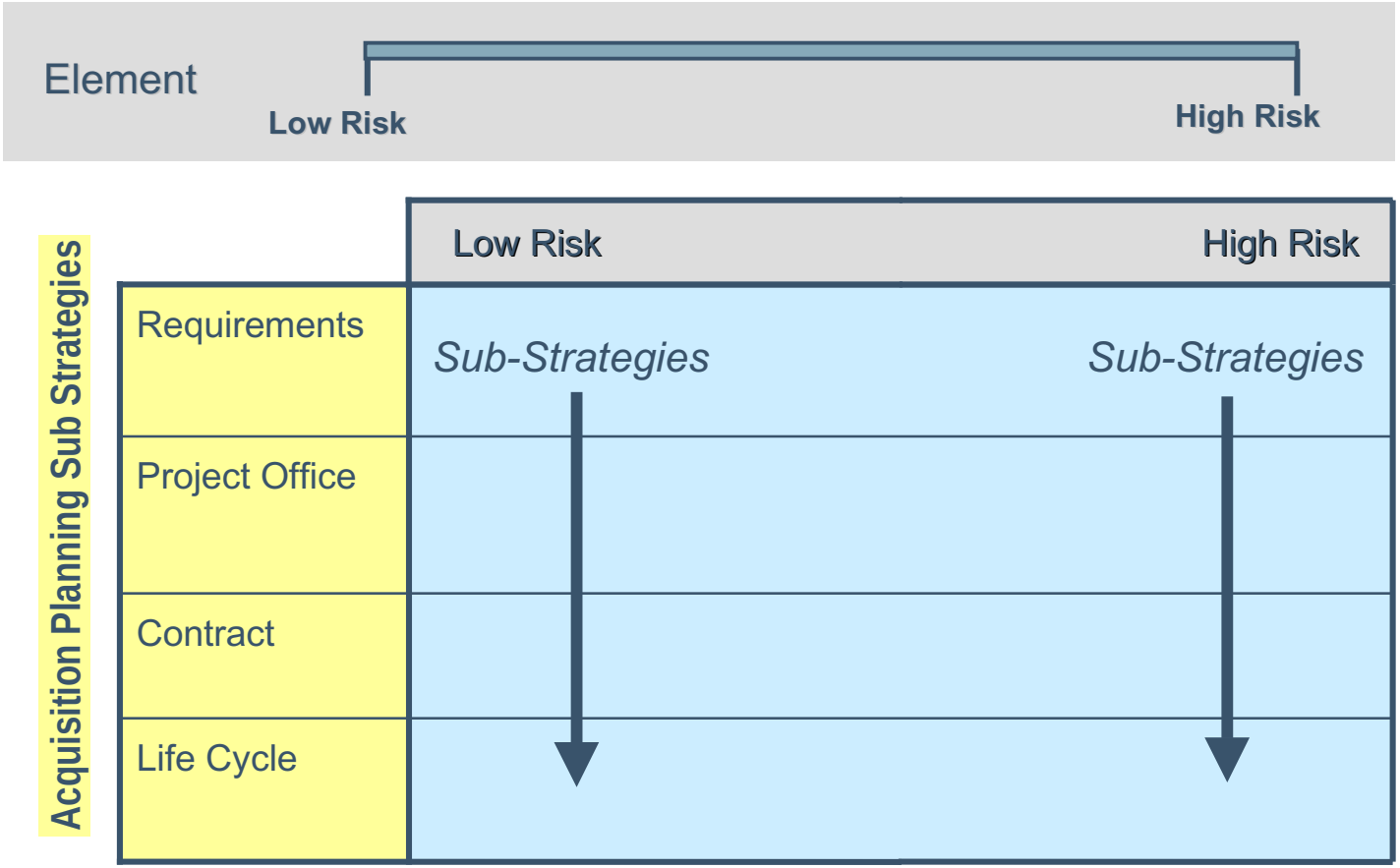
Lifecycle Elements

Programmatic Elements

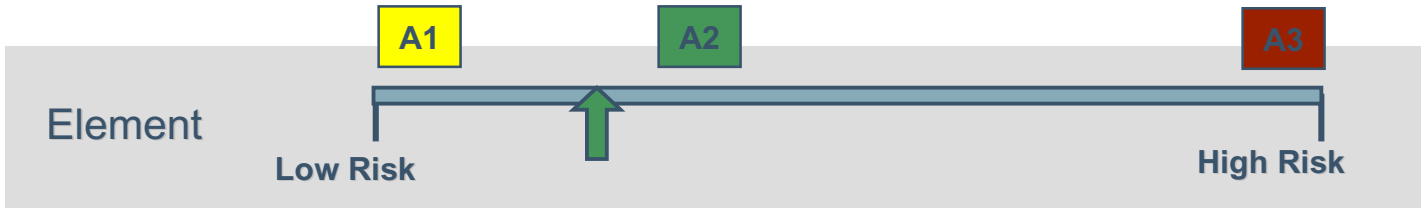
Software Elements

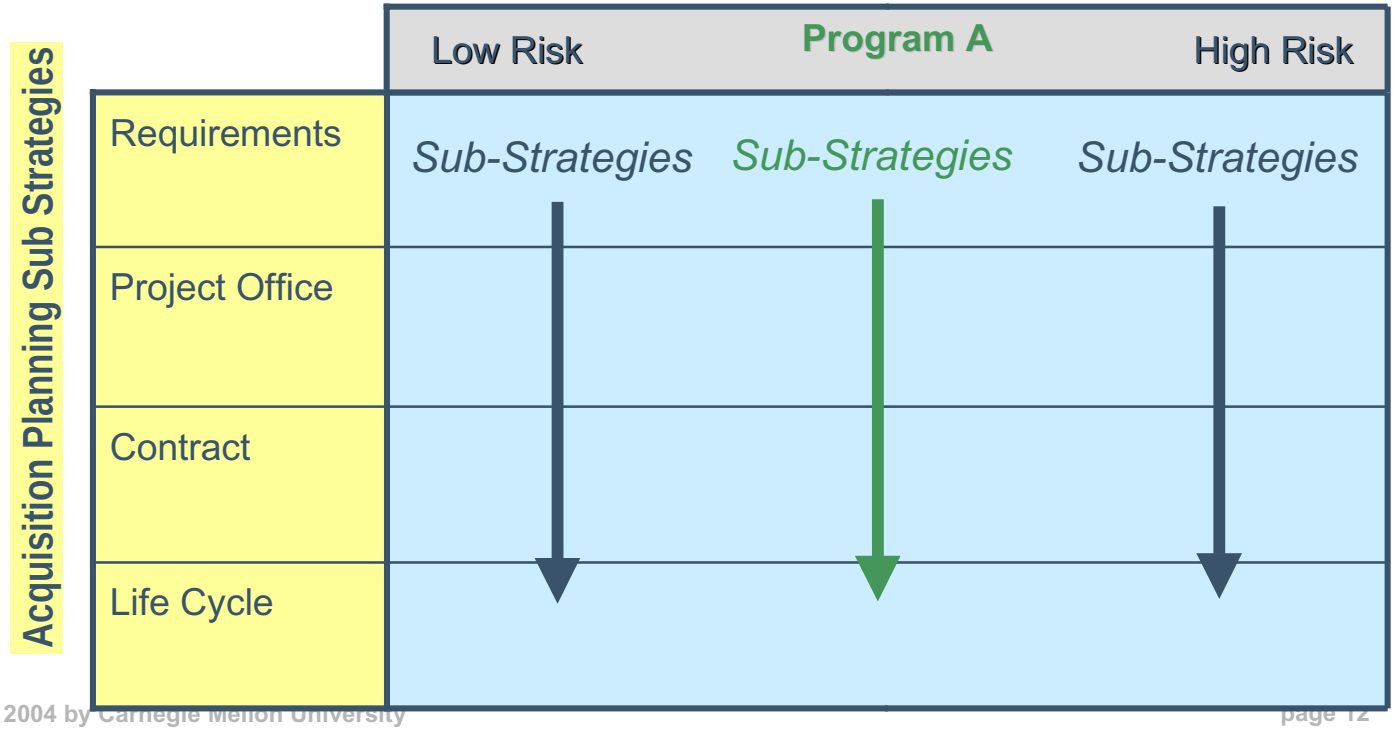
The level of software risk for a given project can be profiled in fifteen elements

Risk Elements



Risk and Acquisition Strategies





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For Example: Specification Risks

Stable, fully defined, unambiguous, consistent, complete, testable software requirements are rare.

- Some requirements are firm from the start
- Some requirements cannot be defined until other things about the system are known
- Some requirements may be in a constant state of flux as technology, off-the-shelf product, mission needs (or the understanding of what is needed) evolve.

Trying to fully define software requirements too early or trying to limit requirements changes in a changing environment may be riskier than having flexible requirements.

The acquisition strategy needs to accommodate the degree to which requirements can or should change.

Well-defined, complete, and stable

Incomplete or volatile

Specification

	Well defined and stable	Incomplete or volatile
Reqmts	§ Implement strong process oversight to control changes	§ Flexible, prioritized and negotiated requirements § Nimble process to manage and communicate changes
Project Office	§ Limited oversight required	§ Increased need for engineering staff to monitor system design/progress
Contract	§ Consider fixed price contract	§ Avoid completion contracts (use Cost-plus services contract?) § Offer incentives for delivered system performance
Life Cycle	§ "Waterfall" approach § Favorable terms for O&M may be defined with development contract	§ Spiral approach § May not be able to award an O&M contract better understood

Specification

	Well defined and stable	Incomplete or volatile
Reqmts	§ Implement strong process oversight to control changes	§ Flexible, prioritized and negotiated requirements § Nimble process to manage and communicate changes
Project Office	§ Limited oversight required	§ Increased need for engineering staff to monitor system design/progress
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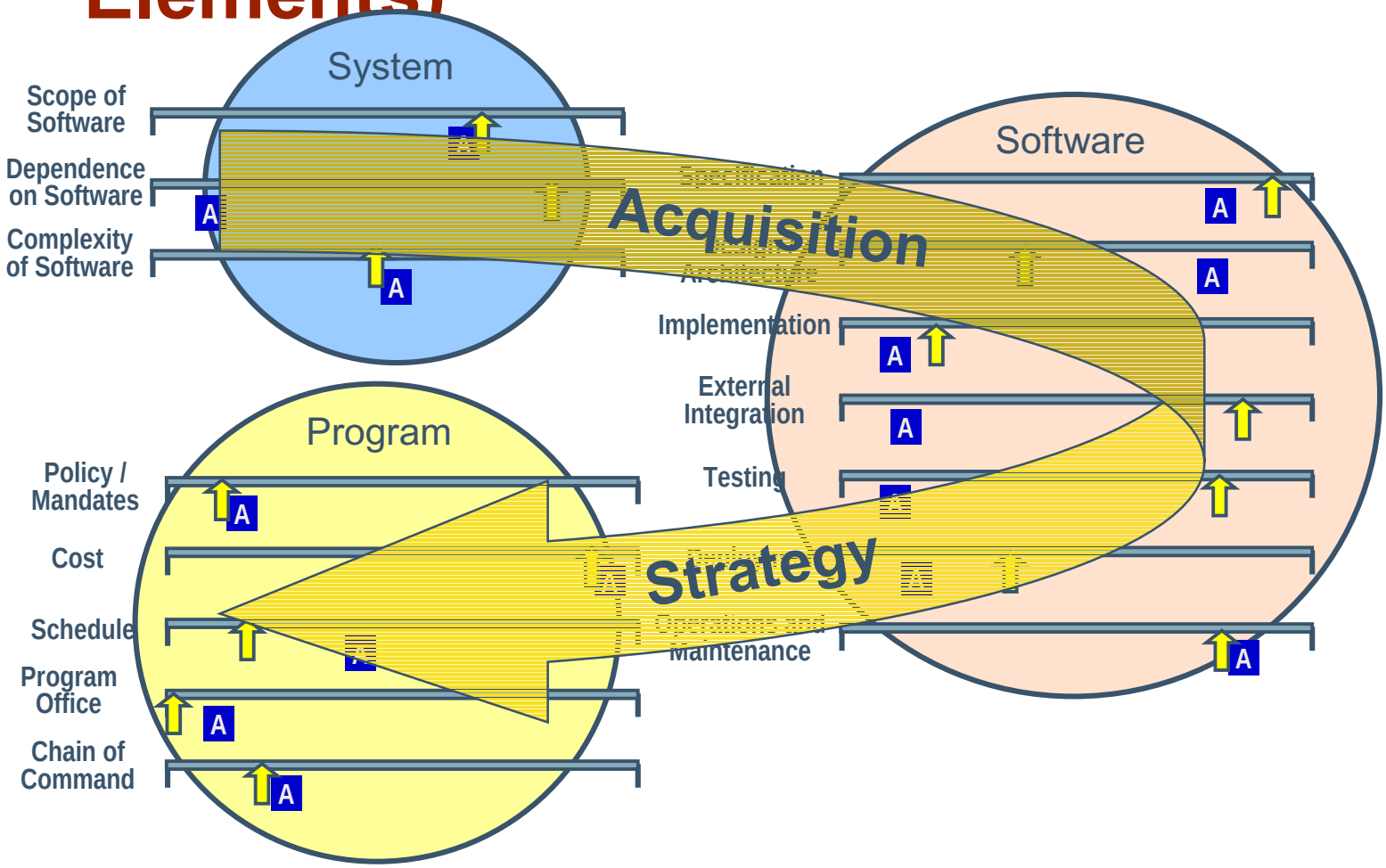
Life Cycle	§ "Waterfall" approach § Favorable terms for O&M may be defined with development contract	§ Spiral approach § May not be able to award an O&M contract better understood

Specification

	Well defined and stable	Strategy A2	Incomplete or volatile
Reqmts	§ Implement strong process oversight to control changes	• Isolate the affected requirements so the changes are obvious	§ Flexible, prioritized and negotiated requirements § Nimble process to manage and communicate changes
Project Office	§ Limited oversight required	• Track technology evolution to identify commitment point	§ Increased need for engineering staff to monitor system design/progress
Contract	§ Consider fixed price contract	• Separately price unknown requirements – incentivize low cost	§ Avoid completion contracts (use Cost-plus services contract?) § Offer incentives for delivered system performance
Life Cycle	§ "Waterfall" approach § Favorable terms for O&M may be defined with development contract	• Plan and budget for changes across the life of the system	§ Spiral approach § May not be able to award an O&M contract better understood

Project Profile (Composite of Elements)



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Next Steps in Use of Sliders

Validate the approach and the set of sliders by profiling the software risk in selected Army programs using the sliders

Show how each program's current acquisition strategy relates to their identified software risk

Pilot use of Guidelines in a new start

Document the Guidelines

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Contact Information

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