

Where Our National Security Begins...

NRO Industry Advisory WG

Speed to Capability (STC) / Accelerating Acquisition Action Team

Joe Chioda Mike Moran Ben Chicoski (Lead)

Scott Lawler

Ron Alford

Pete Epstein

Eric Viglione

Ben Chicoski bchicoski@cloudbees.com 202.746.1124



NRO IAWG Mission, Charter & Objectives

- Mission: Help move NRO realize the Future Ground Architecture vision
 - Identify business models that will support government and industry objectives
 - Identify potential pitfalls and recommend potential solutions
- Charter: Provide expert industry resource and sounding board focused on Business aspects of emerging models to acquire software services
 - Ramifications of componentizing software applications,
 - Benefits accrued to the government & industry,
 - Intended and unintended consequences against the industry base,
 - Limitations and viability as a reasonable course of action
- Objectives:
 - Provide strategic industry input to a changing acquisition landscape
 - Provide an objective and neutral venue for discussing approaches to business models
 - Foster effective communication between government and industry leadership

Industry Self-Organizing as a Mission Partner to Evolve Business & Acquisition Practices



Speed to Capability / Agile Acquisition: Purpose

- Accelerate time to get new capabilities on contract, and then...
- Accelerate delivery and approval of relevant, performant systems

Current Landscape

Desired

Outcomes

- Delivered products can be too late to be relevant or don't satisfy end user needs
- Ineffective processes & incentives for prime contractors to realize faster delivery cycles
- High-Level Observations and Ideas
 - This is a big Lean Six Sigma challenge: how to increase throughput, increase predictability, minimize variability
 - Success is driven by government and industry embracing their relationship from acquisition through delivery

- Complex acquisitions + risk aversion + preference for status quo = expensive, lengthy, ECP-driven programs
- Skills gap in acquisition workforce caused by increasing complexity of acquisitions in areas like IT

"Top 3"Focal AreasPre-A

- Outcome-Based Contracts
- Right-Sized RFPs
- Pre-Award Communications

Over 35 ideas harvested from across IAWG membership



Methodology





Speed to Capability Context: Sources of Delay by Phase

Goals: Increase throughput; Decrease acquisition variances

Requirements	Acquisition/RFP	Contracting	Development & Tech Transfer
 <u>"Requirements Lock"</u> Observation Inhibits ability for programs to weave in new capabilities Contributing Factor SOWs that "bake out" innovation or don't articulate means to innovate (e.g., need to use study CLIN) Ideas Dynamic Reqts Management Involve end users up front to define the "what" not the "how" Expand use of IDIQs 	 <u>"Solicitation Bloat"</u> Observation Drives away qualified performers, creates extra work – on both sides – without necessarily providing benefit Contributing Factor Path of least resistance and lowest risk: "Include everything" Ideas Right-size compliance documentation to effort size Involve security teams in the solicitation creation More two-way exchanges 	No Contracting MetricsObservation• Lack of specific, shared objectives for improving contract(ing) performance. Lack of concrete actions means status quo winsContributing Factor• Dearth of metrics for assessing quality of docs, RFPs, and contracting timelinesIdea• Measure against STC metrics based on industry standards and tailored to program profiles. [See template]	Waterfall CultureObservation• Inconsistent capability delivery chain and clunky transition to operationsContributing Factor• Inertia within current hybrid infrastructure and lack of end user involvementIdea• Create nexus where technologist, operator/analyst, MSI, and advance solutions immediately, then document "requirements"
			- 51

Outcome-Based Contracts

Emphasize speed and functionality without directing implementation

Observation

Requirements "lock-in" inhibits ability for programs to weave in new capabilities

Contributing Factors

- Static requirements force solutions to be compliant and score well vice outside-the-box thinking gearing toward impact
- SOWs that "bake out" innovation or don't articulate means to innovate
- Change processes biased toward the status quo

Ideas

- Define the why, what, and who for....but don't dictate the how
- Create contract structure (e.g., CLINs for innovation) to allow program to pivot in flight
- Incentivize risk-taking and fast failure on small things (e.g., MVP). Start small, iterate, learn fast, and build on success – or terminate quickly.
- "How" options:
 - SOO vice SOW; Government buys X number of sprints; User stories vice requirements
 - More IDIQs to facilitate innovative industry base broad scope, pools, periodic on-ramping and off-ramping



AIPP Focus Area #2: Innovation

Outcome-Based Contracts, cont. Performance Metrics

Understanding cause-and-effect is challenging in a multivariate universe.

Agile and Lean thinking drives to new areas of focus: Flow vs. Utilization

- Flow vs. Utilizat
- Value
- Concept-to-Capability time



http://www.psmsc.com/

Define/track value and metrics that resonate with mission owners and acquisition officials

o Metrics should be explicitly used to solve problems in the process, not punish contractors

- o Value can vary by customer based on need for speed, quality, productivity, or more.
- Defining value as "user satisfaction" enables useful adaptations, with work pegged to end user priorities

• Requires continuous feedback from users and stakeholder groups

- Then apply discrete and sensible metrics, without being restrictive, that measure throughput and productivity (a la Lean Six Sigma)
 - Industry-standard metrics:

deployment freq., change-failure rate, mean lead time, mean time to recover,

Right-Sizing RFPs

Observations

- "Solicitation Bloat" deprives government of qualified, innovative performers (mostly SBs), creates extra work – on both sides – without necessarily providing benefit
- Increasing complexity of acquisitions in areas like IT has caused a skills gap in the acquisition workforce; challenge increases with advent of AI / ML

Contributing Factors

- "Include Everything" being historically seen as easiest and lowest risk re compliance
- High variance and low predictability of acquisition timing
 - Dr. Will Roper (Under Secretary for AT&L) at INSA Summit: "Work with users for Acquisitions" and get to "...shorter description of needs"

Movement within DoD

- USAF Chief Software Officer: "Mandate the use of Agile methodologies, including for the creation of RFPs, by using user stories....RFPs should NOT define precise requirements with pre-defined technologies but focus on establishing mission outcomes and precise metrics to prove success of those end-goals."
- DAU (Sean Brady): Agile / DevSecOps training for acquisition staff

Ideas for Right-Sizing RFPs

- Avoid complex RFPs with long planning phases which include deliverables and milestones and fixed budgets, and which can stifle ability to learn and adopt new ideas along the way.
- Right-size compliance documentation (especially docs listed as "reference," which can be misleading, overly onerous, or unnecessary) to match the work being procured.
- Train program officers and contract managers to specialize in IT acquisition (e.g., mimic Digital IT Acquisition Professionals Program).
- Train people from variety of functions (tech, finance, contracting, security) on Lean-Agile practices.
- Minimize CDRLs to extent practical to avoid unnecessary effort and disrupting execution flow
 - Start with minimum (e.g., financial CDRLs required by law) and add more only if deemed mission-essential
 - $\circ\,$ Match program size and contract type
- Make CDRLs "contractor format" to mitigate anti-patterns tied to delivering classic CDRLs and allow for CDRL delivery via Agile development environments (e.g. Confluence)

Benefits include:

- Access to more qualified performers
- Clearer and shorter acquisition process
- Less disruption to flow during execution



Pre-Award Communications

Better communications pre-award: open and iterative, with the right people involved

Observation

Unclear expectations lead to guesswork by industry and thus harder time delivering what government needs Risk aversion and inertia have led to a victory for the status quo

Contributing Factors

- Fear of tainting the procurement process
- Those who will ultimately be affected by the work are left out of planning phases
- Interactions at Industry Days often yield little useful insight

Ideas

- Applies to industry ← → government communication but also within government. For example:
 Involve multiple stakeholders to collaborate up front in solicitation creation
 - Benefits: Government asks for right thing, industry better understands govt intent, industry prepares better proposals and solution hits mark. Ensures relevancy and enhances uptake/adoption. Helps to right-size the compliance documentation.
- Need ample opps for govt-industry communications and iterative feedback (e.g., developers, operations, security). Need to vet industry ideas and get feedback within proprietary environment, multiple times, well in advance of Draft RFP.
- More two-way exchanges. Allowed by FAR§15.201 but eschewed by many acquisition officials and lawyers, except in large "Industry Day" forums (where vendors won't talk about their IP).



Market Research (MR): Pre-RFP Communications

- Challenge: Technology cycle times demand knowledge refresh on 6-month centers
- Guidance: DoD Vendor Communication Plan, Administrator for Federal Procurement Policy emphasize industry-government DIALOG prior to Final RFP
 - Requests for Information (RFI) and one-way industry days do not constitute sufficient MR
 - Must be intentional, organized, diligent and rigorous (i.e. all program personnel have role)
 - Technical currency of Program SETA/FFRDC is critical
- Benefits: market research can provide understanding of:
 - what products/services the market can or cannot provide
 - the current market price/cost of product/services
 - what market is planning to provide/release in the near and not so near future
 - which companies provide which competing products/services
 - differences/discriminators between various products and services
 - differences in terms and conditions associated with services/products







NRO Exemplar: Seven Hills BAA (SIGINT Ground SPO)

- Contractor team was provided a top-level SOW describing the objectives to be achieved
 - Didn't drive an extensive proposal response
 - Discussion with customer helped explain the context of the SOW
- Customer explained budget constraints (providing price target ≠ exposing the budget)
 - Allowed team to focus on achieving the desired scope at expected cost
 - Team was able to bid capacity within an Agile methodology, reflecting desire to allow innovation and modifications as necessary
- Proposal outlined the agile interaction business rhythm with the customer
 - Detailed frequent touch points were identified allowing the customer to re-prioritize work between each 3-month increment and at each sprint/iteration
- Single CDRL with minimal requirements was requested
 - To be provided 30 days post award, as opposed to with submission, allowing time to work details
 - Content was viewed to be realistic and necessary to maintain oversight
- Products delivered with RFP were minimal, predominantly contractor format, and allowed the customer to quickly assess cost and schedule approach
 - Reduced production, review, and negotiation time

GPOC willing to share best practices

Ander Swanson, Contracting Officer, GED SG SPO email: <u>swansoan@xxx.ic.gov</u> Open phone: 703-808-8195 Secure phone: 850-8195

Other Useful Exemplars

- CATAPULT / GREEK FIRE contracts Agile pilot programs
- Iron Patriot (NRO // GED)
 - 15-day cycle from posting a solicitation to proposer submit
 - 15ish-day review period followed by award
 - Proposal is greatly simplified (set of charts and cost data) to cut down on effort to both create and review the material.
 - Initial, short chart package with technical approach and costing provided early on to allow down-select and to fine tune more formal response
- NISCC 2 (under OASIS IDIQ)
 - Structuring CDRLs/DIDs to allow contractor format supporting agile devt techniques
- Space Enterprise OTA Consortium (SpEC)
 - Process is well-defined but flexible
 - Open access to acquisition team up to proposal submittal. Some benefits:
 - Much less overhead and documentation for submissions
 - Typically shorter timelines from "industry day" to proposal submission (often within 30 days) as well as proposal submittal to award announcement



Other STC Best Practices

- Demand Continuous Delivery (CD)
 - Not possible to implement a genuinely compliant, regulated system in the absence of CD.
 - Highest quality approach to creating SW of any kind is a disciplined approach to CD. The evidence: <u>https://amzn.to/2P2aHjv</u>.
- CD gives you elements of Continuous Compliance:
 - Professional, safe approach to making changes
 - Audit trail for oversight and problem-finding after a failure
- More complex approaches to gatekeeping, like Change Approval Boards, are negatively correlated with both speed and SW quality.
 - See page 49 of 2019 State of DevOps report: <u>https://services.google.com/fh/files/misc/state-of-devops-2019.pdf</u>
- MITRE "Accelerate" playbook
 - Part of their Acquisition in the Digital Age (AiDA) website
 - Offers strategies and tools that acquisition professionals can tailor to their own orgs to help them address everything from streamlining processes to rethinking core elements of design, contracting, and requirements.

Related: Rapid Acquisition Pathways

Sec 873/874, 2018 NDAA

- Pilot programs using agile/iterative development to tailor major software-intensive warfighting and business systems
- Forbidden: requirements docs, IMS, LPTA, Cost Plus

Sec 806, 2017 NDAA

Prototyping to mature and demonstrate high-priority and emerging technologies

Sec 804/806, 2016 NDAA

Rapid fielding and rapid prototyping

"Priorities for defense acquisition reform are undergoing a major shift. In the first half of this decade, cost control was the major imperative . . . Today, the predominate push from both DoD leadership and Congress is for greater speed . . . and halting the erosion of DoD's technical edge."

- Center for Strategic & International Studies (Acquisition Trends 2018)



Sources

Sources

Yielded exemplar programs, tips, and other supporting material

CMU Software Engineering Institute **DAU Adaptive Acquisition Framework DIB SWAP report** Air Force Rapid Prototyping Memo Air Force Rapid Acquisition Activities Memo Navy Middle Tier Guidance Army Middle Tier Acquisition Guidance DHS / US Digital Services PIL GAO Contracting and Nat'l Security Acquisition Team



DoD DevSecOps Platform Kessel Run **Iron Patriot** Jarvis DIU **MITRE** Accelerate

NISCC2 OTAs (e.g., SpEC, ATI) GAO Report on Acquisition Reform **NITAAC CIO-CS**

Rationale for Accelerating the Acquisition Contracting Lifecycle



Courtesy of NGA Advisory Working Group (NAWG)

Valuable Additional Resource

Carnegie Mellon University's Software Engineering Institute (DoD FFRDC)

Agile in Government: Go for Insight, Not Just Oversight

July 2020 presentation

Key Highlights on Following Slides

Full presentation accessible at:

https://resources.sei.cmu.edu/asset_files/Presentation/2020_017_101_644218.pdf



Agile Acquisition Notional Manifesto for System Acquisition

- These four areas are key to shifting from oversight to insight:
 - Batch size
 - Feedback approach
 - Requirements expression and management
 - Compliance/Insight mindset





Moving from Oversight to Insight is a Big Shift for Many Program Offices

- Changes in skill profiles
 Changes in staffing curves
- Changes in character of interactions with contractors and stakeholders
- Changes in batch size



The payoff: faster delivery of certified, high value solutions to warfighters and our other stakeholders.

Agile in Government: Go for Insight, Not Just Oversight © 2020 Carnegie Mellon University [DISTRIBUTION STATEMENT A] This material has been approved for public release and unlimited distribution]



From Large Batch to Small Batch

Typical Large Batch Behaviors/Mindsets:

- "Nothing is done until everything is done"
- More Work in Progress is good
- 100% utilization of resources is a goal
- Tendency to hide bad news
- -False/optimistic reporting of progress in order to justify incentive/progress payments
- Integration events are riddled with defects and are pushed out "until we think we have it right"
 - Increases number of potential defects that affect multiple areas of the system
 - Reduces confidence in system robustness
 - Harder for engineers to find sources of defects
- Tendency toward "test quality in"

Typical Small Batch Behaviors/Mindsets:

- We can learn from even small pieces being implemented/done
- "Stop starting, start finishing"
- Work in Progress is limited to enhance flow through the system
- 100% utilization of resources is recognized as limiting flow, flexibility, and work accomplishment
- Short time between when a defect is found and when it was created
 - Easier for engineering/developer to find source of defect
- LOTS of integration happening across entire system, building confidence
- Tendency to "build quality in"



From Primarily Documentation Review to Demos and other Mechanisms for User Feedback

<u>Typical "Primarily Document</u> <u>Reviews"</u> <u>Behaviors/Mindsets:</u>

- Preference for larger, more infrequent demos
- Spotty participation in demos
- Requirements documents seen as "ground truth" for user needs, even when known to be superseded
- Few opportunities for feedback
- Incomplete, rushed feedback on documents
- More emphasis on "to be" documents than "as built" documents
 - Using documents to "lock down" design

Typical "Demos/Other Feedback Mechanisms" Behaviors/Mindsets:

- Recognition that demo doesn't EQUALtest, but INFORMS it
- Active participation in demos of small pieces of functionality
- Open, continuous feedback about both the fact of and the meaning of progress or lack thereof
- Info from demos is fed forward to testing and certification staff to ensure alignment
- Uses Defn of Done that includes certification criteria (cyber, DT/OT, ATC, ATO, etc.)
- Participation on continuous integration team by govt staff seen as a high priority



From Single Delivery of Requirements Document to Continuous Backlog Refinement

Typical "Single Delivery" Behaviors/Mindsets:

- Long lead time to get to the requirements document delivery reduces motivation to allow for refinement after delivery
- Task-switching from one large batch review to another
 - Hard to take in the large requirements set
 - Demotivates "digging in" on the need behind the requirements
- Get as far as we can with review in time available, but not expecting complete understanding in time allowed

Typical Continuous Backlog Refinement Behaviors/Mindsets:

- Mix of "push" and "pull" communication across govt/contractor interface on evolving refinements to requirements
 - Facilitated by workflow mgmt. tools like Jira, but both sides need to be on the same platform
- Frequent face to face/high bandwidth meetings to keep the relationship going, not just to do the refinement tasks
- Transparency among stakeholders that builds trust
- Frequent small batch prioritizations build a solid base of understanding of current state and progress





From Seeking Compliance to Seeking Insight

Typical "Seeking Compliance" Behaviors/Mindsets:

- Deadlines that don't have clear relationship to product evolution goals
- Silo'ed relationships
 - Independence=Isolation
 - Formal vs informal handoffs of information
- Agile events must conform to traditional Program
 events
 - Large batch SETR events
 - PMRs are disconnected from development cadence and cause value-based work to stop-start
- No/ too little sharing of test assets "if you know the criteria, you'll develop to it; I lose my independence!"
- Measures collected but not used for process improvement
- "Gotcha" mindset
- Work designed to pass the audit more than deliver value

Typical "Seeking Insight" Behaviors/Mindsets:

- Don't immediately react negatively to "bad news" treat it as information that is meant to help make a different decision
- Informal handoffs of information where feasible/allowed
- · Agile events allowed to preserve their cadence
- Lots of sharing of test/certification assets "if you know the criteria, you'll develop to it; that's the goal!!!"
- Measures carefully selected and visibly used to solve problems in the process, not punish the contractor
- Collaborative mindset



Agile in Government: Go for Insight, Not Just Oversight © 2020 Carnegie Mellon University

Full List of STC Ideas

- 1. Shorter time from RFI to award, with less Q&A back-and-forth, due to better two-way exchanges and clearer solicitation documents
- 2. Outcome-based contract that emphasizes speed and functionality without directing implementation (e.g., SOO vice SOW). Define vision of why, who for, what. Don't dictate the how (possible exception: tech stack). Define outcomes and milestones that measure progress along the way.
- 3. Payments/Incentives based on development velocity and/or industry standard DevOps performance metrics (i.e., deployment frequency, change failure rate, mean lead time, mean time to recover).
- 4. Incentivize risk taking and fast failure on SMALL THINGS to LEARN FAST. Start small, be iterative, and build on success or terminate quickly
- 5. Concept of Minimal Viable Product as a strategy to increase speed of delivery to the warfighter based on the user's highest needs
- 6. Payments/Incentives and performance metrics that make sense to both mission owners and acquisition staff. Based on development velocity and/or industry standard DevOps performance metrics (i.e., deployment frequency, change failure rate, mean lead time, mean time to recover)



- 7. Involve end users, COR, and security teams in solicitation creation (e.g., to increase chances of adoption, to right-size compliance clauses, etc). End users collaborate up front to define the "what," not the "how."
- 8. Contract structure (e.g., CLINs for innovation) that allows program to pivot in flight (e.g., in response to stateof-technology evolutions)
- 9. AO sits with the program and watches how they build SW. As long as they use laaS, deploy on an accredited PaaS, and incorporate a modern CI/CD pipeline, they get a continuous ATO.
- 10. Separate the development of mission-level software from the development of IA-accredited platforms (i.e., what is developed on that platform is automatically accredited)
- 11. Set a CAIV/price for procurement to which bidders would respond with how much of the requirements they can meet for that level
- 12. Start with Mission CONOPS and Capabilities as "requirements" then poll industry for solutions. Selected solutions immediately proceed to sole source awards to refine/deploy solution.
- 13. Unbiased entity ("Capability MSI") whose sole job is to move high-quality solutions (not their own!) into operational envts. Metrics: # of solutions govt deems qualified; # of solutions govt adopts.



- 14. Make use of existing authorities such as OTAs and mid-tier acquisition (2016 NDAA Sec 804) to implement a DevSecOps approach to acquisition to the greatest extent possible under existing statutes, regulations, and processes
- 15. Require cost assessment and performance estimates for software programs (and software components of larger programs) to be based on metrics that track speed and cycle time, security, code quality, and useful capability deliver to end users
- 16. Get rid of distinctions in budget between procurement, O&M, and RDT&E
- 17. In solicitation, specify details on collaboration required b/w developers/ops/sec and other stakeholders
- 18. Right-size the compliance burden to match the work being procured
- 19. IDIQs (e.g., a la OASIS) broad scope, pools, periodic on-ramping and off-ramping
- 20. Reduce variance and increase predictability of acquisition timing
- 21. Better communications pre-award: open, iterative, with the right people involved (for govt, that means end users; for industry, that means line-of-business management).



- 22. Avoid complex RFPs with long planning phases with deliverables and milestones and fixed budgets. When we write RFPs, we assume we know what we need and know exactly what the solution is. This doesn't allow for us to learn and adopt new ideas along the way. This is NOT scope creep but proper agile scope management.
- 23. Provide the anticipated costs of the effort as part of the solicitation so cost will not be an evaluation criterion.
- 24. Contract language should allow for rapid change of scope based on learnings as long as it meets the target end goals.
- 25. Leverage 2018 NDAA Sec 873/874 (pilot programs using agile/iterative development). Forbidden: requirements docs, IMS, LPTA, Cost Plus.
- 26. Train people from a variety of functions (tech, finance, contracting, security) on Lean-Agile practices
- 27. Award fees for accurate estimation of velocity (story points) and delivery
- 28. Minimize CDRLs to the extent practical.



- 29. In RFP language, encourage industry use of laaS/PaaS from NISP/NASP and require explanation of value differential for not using GFE environment
- 30. Deliver desired solution ("working software, met requirements") vs. list of CLINs. Consider user stories instead of requirements.
- 31. To enable learning and improvement and increase institutional knowledge: Require contractor to produce documentation to leave behind and to conduct training
- 32. The desired output is working SW, so measure that
- 33. Rethink rigidity of traditional ATO process (e.g., new Fast Track ATO at USAF)Spend time up front getting the architecture right: modular, automated, secure
- 34. Make use of platforms (hardware and software) that continuously evolve at the timescales of the commercial sector (3-5 years between HW/OS updates)
- 35. Create and maintain cross-program/cross-service digital infrastructure that enables rapid deployment, scaling, testing, and optimization of software as an enduring capability



Voice of Industry Big Picture: Takeaways

- 1. Recognize the GOTS vs COTS question is a make/buy decision
 - Both use OSS extensively (why build it if you can grab it?)
 - Different risk models, indemnification, and life cycle cost implications
 - "Hybrid" COTS + GOTS leveraging open APIs may be best of both worlds
- 2. Requirements: "Under-asking" and "Over-asking" impact industry base response.
 - Investment profiles, architecture decisions, teaming, RFP responses
 - Over-asking can drive industry to game the system or gold-plate
 - Under-asking can turn Best Value into LPTA and leave capability on the table
 - The need for requirements prioritization is underappreciated
- 3. Technology is evolving faster than requirements:
 - 1-on-1dialogs with Industry are encouraged prior to RFP release
 - Guidance: DoD Vendor Communication Plan, Administrator for Federal Procurement Policy both emphasize industry-government DIALOG (not just industry day) prior to **Final** RFP

