Agile Defense
The transformation of how wars are fought, how logistics are delivered, and how the Department of Defense does business.

Hosts:  Jeff Sutherland
        JJ Sutherland
Scrum Inc. is the Agile leadership company of Dr. Jeff Sutherland, co-creator of Scrum. We are based in Cambridge, MA.

We maintain the Scrum framework by:
• Capturing and codifying evolving best practices,
• Conducting original research on organizational behavior
• Adapting the methodology to an ever-expanding set of industries, processes and business challenges

We also help companies achieve the full benefits of Scrum through our full suite of support services:
• Training (Scrum Master, Product Owner, Agile Leadership, online courses, etc.)
• Consulting (linking Scrum and business strategy, customizing Scrum)
• Coaching (hands-on support to Scrum teams)
• Publishing and new content development

We run our services company using Scrum as the primary management framework, making us a living laboratory on the cutting edge of “Enterprise Scrum”

Find out more at www.scruminc.com.
Biographical Sketch - Jeff Sutherland

• 1960-1975 - West Point, Fighter Pilot, U.S. Air Force
  - 100 missions over North Vietnam F4 Phantom
• 1973-1986 - Univ. Colorado School of Medicine
  - Asst. Prof. Radiology, Biometrics, and Preventive Medicine
  - Complex adaptive systems research, mathematical simulations of cancer cell formation
• 1983-2008 - VP/CTO/CEO 10 technology companies, Agile coach to 21 startups
  - 1983-1993 prototyping new development processes
  - 1993 created first Scrum, now the leading software development methodology
  - 1996-2008 CTO IDX (GE Healthcare) and PatientKeeper
  - 2006-present Senior Advisor, OpenView Ventures
  - 2008-present Chairman Scrum Foundation
• 2006-present CEO Scrum Inc.
Biographical Sketch – JJ Sutherland

- Former Sr. Producer and Correspondent, NPR
- Covered the wars in Iraq and Afghanistan from 2004-2011, spending 3-4 months a year in country.
- Covered 9/11, 7/7 attacks in London, Israel-Lebanon War, Tsunami in Japan
- Scrum Master for teams that produced NPR’s coverage of the Arab Spring in 2011 in Egypt and Libya.
- Winner of numerous Peabody, DuPont, Overseas Press Club, Edward R. Murrow and other awards.
- Co-author, with Jeff, of upcoming book “Scrum: The Art of Doing Twice the Work in Half the Time”
Agenda

• How some key elements of Scrum were influenced by military strategy and tactics.

• The US Department of Defense requiring Agile in IT acquisition.

• Common Issues and Best Practices for Success:

• How Agile practices are not just to save money and build better products. It’s about delivering value to the warfighter.
Scrum and Military Thinking
The Infamous Gantt Chart

source: infoq.com
“Delays in developmental flight testing of the F-35’s critical software may hinder delivery of the warfighting capabilities the military services expect... Challenges in development and testing of mission systems software continued through 2013, due largely to delays in software delivery, limited capability in the software when delivered, and the need to fix problems and retest multiple software versions.”

GAO-14-322
Burndown Chart
“Scrum is a productivity super weapon.... It is shockingly efficient.”

-Rick Horgan, Sr. Editor, Crown Business
Saab JAS 39E Gripen
Costs less than previous version with all systems improved
$43M – about 20% of the final cost of an F35
Biannual Scrum releases of system software
Make Work Visible
Captain Edwin Atterberry, August, 1967
OODA Loop

John “Forty Second” Boyd
Genghis John
The Mad Major

F-100 Super Sabre
Cross Functional Teams
Collaborative Warfare in Iraq

The interagency teams made it possible to eliminate the organizational seams between the different coalition actors in Iraq, placing an “unblinking eye” on high-value targets. . . . Passing responsibilities between units and organizations represented an “organizational blink” during which momentum slowed and the target might escape.

-Joint Force Quarterly

- “One of the true breakthroughs...[Like] the tank or the airplane. The stuff of which military novels are written.
  - Bob Woodward on 60 Minutes
“...as soon as the near-failure in Iraq was averted, bureaucratic support for interagency teams began to decline. By 2008, other departments and agencies, particularly one unidentified intelligence agency, began pulling back people and cooperation, believing information-sharing and collaboration had gone too far.”

- Secret Weapon: High-value Target Teams as an Organizational Innovation
Institute for National Strategic Studies: Strategic Perspectives, no. 4, 2011
2010 Defense Acquisitions Act

New Acquisition Process Required- The Secretary of Defense shall develop and implement a new acquisition process for information technology systems...

...designed to include:

(A) early and continual involvement of the user;

(B) multiple, rapidly executed increments or releases of capability;

(C) early, successive prototyping to support an evolutionary approach; and

(D) a modular, open-systems approach.
“…the policy addresses the realization that information technology capabilities may evolve so “desired capabilities” can be traded-off against cost and initial operational capability to deliver the best product to the field in a timely manner. “

“Early discovery of system vulnerabilities can facilitate remediation to reduce the impact on cost, schedule and performance....The Director for Operational Testing and Evaluation (DOT&E) is now examining regression test procedures as part of its suitability evaluations. DOT&E has also begun helping some programs convert to automated regression testing so as to gauge the extent of the problem the Department faces.”

Assistant Secretary of Defense (Acquisition)  
Katrina McFarland  
Testimony before Senate Armed Services Committee 2/26/14
GAO on Major Automated Information Systems.

- $4.5 Billion. Total IT budget $39 Billion
- Only 13 of 15 could even provide data
- Of those 13:
  - 7 cost increased: 4% to 2,233%
  - 4 cost decreased: 4% to 86%
  - 12 dates slipped. 3 by more than 5 years.
- ONLY 3 “met system performance targets”
GAO GUIDANCE

Common Critical Success Factors

• Program officials were **actively engaged** with stakeholders
• Program **staff** had the **necessary knowledge and skills**
• **Senior** department and agency **executives supported the programs**
• **End users** and stakeholders were **involved in the development of requirements**
• **End users participated** in testing of system functionality **prior to formal end user acceptance testing**
• Government and contractor staff were **consistent and stable**
• Program staff **prioritized requirements**
• Program officials maintained **regular communication** with the prime contractor
• Programs received **sufficient funding**
Scrum Patterns

GAO Common Critical Success Factors

Program officials were **actively engaged** with stakeholders; Program staff prioritized requirements; Program officials maintained regular communication with the prime contractor
- **PRODUCT OWNER**

Program staff had the necessary knowledge and skills
- **CROSS-FUNCTIONAL TEAMS**

**Senior** department and agency executives supported the programs
- **PATRON PATTERN**

End users and stakeholders were involved in the development of requirements
- **BACKLOG**

End users participated in testing of system functionality prior to formal end user acceptance testing
- **SPRINT REVIEW**

Government and contractor staff were consistent and stable
- **STABLE TEAMS**

Programs received sufficient funding
- Well...
Deliver usable capabilities to users every 6-12 months

Active user involvement to prioritize requirements and provide responsive feedback during development

A different approach to project management - Small, dynamic, and empowered teams

Roadmaps and architectures align agile increments into larger capabilities

Small scoped releases responsive to changes in ops, tech, budget...

Streamlined contracting processes leveraging existing contract vehicles for rapid Task/Delivery Order execution

Leveraging common infrastructure platforms, standards, and interfaces

Integrated test and evaluation, certifications during development leveraging common test infrastructure, automated tools

Source: DoD’s CIO 10 Point Plan for IT Modernization
The Old Way

Figure 4. Model 2: Defense Unique Software Intensive Program

Legend: △ = Milestone Decision  ◊ = Decision Point
This model is distinguished from the previous model by the rapid delivery of capability through several limited fieldings in lieu of single Milestones B and C and a single full deployment. Each limited fielding results from a specific build, and provides the user with mature and tested sub-elements of the overall capability.
If the Project Management Office (PMO) is doing a request for proposal (RFP), no matter which phase, ensure that the RFP contains language that allows the use of Agile.

Be prepared to mine and effectively use the metrics data that naturally occur in typical Agile teams.

Take advantage of the transparency provided in Agile processes. Don’t wait for the metrics to come to you. Go look at what the Agile team is doing.
Scrum Makes Work Visible

- Scrum Board
- Burndown Chart
Velocity is the Key Metric

Estimated velocity = 26

Actual velocity = 18
Release Burndown

Work remaining (story points)

Sprint
Agile Earned Value

1. Gather all stories and prioritize in a single backlog
2. Estimate all work in points.
3. Those points are the single unite of measurement for Planned Value and Earned Value.
4. Value is *only* earned when a story is “done.” No value for partially complete work
Earned Value - cost per sprint

- You have a project backlog estimated at 240 points
- The team has a velocity of 40 points (2 week iterations)
- The team’s cost is $50,400 per iteration (7 people @ $90/hour x 80hrs)
- Schedule is 12 weeks (6 iterations)
- Budget is $302,400 ($50,400 \times 6)
- EVM CONVERSION
  - PV = $50,400 per iteration (your planned costs)
  - EV = $1260 per Story Point delivered ($302,400 / 240 = $1260)
Earned Value Calculation

• **ITERATION #1**
  • The team delivered 42 story points
  • EV = $52,920 ($1260 \times 42)
  • AC = $50,400 (actual cost)
  • PV = $50,400
  • CPI = 1.05 (EV/AC) – you’re under budget!
  • SPI = 1.05 (EV/PV) – you’re ahead of schedule!

• **ITERATION #2**
  • A developer resigned from the team effective day-1 of the iteration. They’re not replaced
  • The team delivers 38 story points
  • EV = $100,800 ($1260 \times 38 + $52,920)
  • AC = 93,600 ($43,200 + $50,400)
  • PV = $100,800
  • CPI = 1.08 (EV/AC) – you’re under budget!
  • SPI = 1.0 (EV/PV) – you’re exactly on schedule!
Change for Free

- Create a prioritized backlog of work to be done with highest business value items first.
- Implement in short sprints, always less than a month.
- When higher priority requirements emerge, put them in the next sprint.
- Cut lowest priority items out of the project equal to the amount of work added. These features are unlikely to ever be used anyway.
- Change for free allows you to meet your budget and deliver on time with lower risk.
Money for Nothing: Even Better Than Change for Free

- Projects are usually prioritized by return on investment.
- Ordering your Product Backlog allows you to prioritize features by return on investment.
- Since 65% are never or rarely used, during the project it will become evident when the next low priority feature costs more than the value it delivers.
- Stop the project at that point and deploy the valuable features.
- All projects should deliver early and generate money for nothing.
Auftragstaktik

“‘His Majesty made you a major because he believed you would know when not to obey his orders.’”

Field Marshal Helmuth von Moltke the Elder
Chief of the German General Staff
1857-1888

Commander’s Intent:

“A clear and concise expression of the purpose of the operation and the desired military end state that supports mission command, provides focus to the staff, and helps subordinate and supporting commanders act to achieve the commander’s desire result without further order, even when the operation does not unfold as planned.”

- JP 3-0 Joint Operations
“Scrum is mandatory reading for any leader, whether they’re leading troops on the battlefield or in the marketplace. The challenges of today’s world don’t permit the luxury of slow, inefficient work. Success requires tremendous speed, enormous productivity, and an unwavering commitment to achieving results. In other words success requires Scrum.”

General Barry McCaffrey

Available 9/30 from Crown Business
Pre-Order at Amazon or Barnes and Noble
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ScrumLab
• Scrumlab.scruminc.com
• Articles, videos, papers on all things scrum

Online Courses
• Advance your learning with our interactive online courses. Visit scrumlab to view upcoming topics.
Sources and Documents

- **National Defense Authorization Act of 2010 section 804**
  - Response from DoD:
  - SEI Guidance on section 804
    [http://www.sei.cmu.edu/reports/11sr015.pdf](http://www.sei.cmu.edu/reports/11sr015.pdf)

- **Katrina McFarland, Asst. Sec. of Defense (Acquisition) testimony Feb. 2014**
  - Full transcript of hearing:

- **Department of Defense Instruction on Acquisition (Interim 5000.02)**
  - [http://www.acq.osd.mil/docs/DSD%205000.02_Memo+Doc.pdf](http://www.acq.osd.mil/docs/DSD%205000.02_Memo+Doc.pdf)

- **GAO Information Technology: Critical Factors Underlying Successful Major Acquisitions**

- **GAO report on Major Automated Information Systems**

- **DoD CIO Modernization Plan**

- **SEI Guidance on Agile in Defense**
  - [https://www.sei.cmu.edu/reports/11tn002.pdf](https://www.sei.cmu.edu/reports/11tn002.pdf)

- **SEI Guidance on Agile Metrics**
  - [http://resources.sei.cmu.edu/library/asset-view.cfm?assetid=77747](http://resources.sei.cmu.edu/library/asset-view.cfm?assetid=77747)