Agile in the Air Force—
The Future of Software Development

Agile in Government Summit
Kellogg Conference Center
9 May 2019

Steven D. Wert, SES
PEO Digital, AFLCMC/HB
The explosive pace of technological change means we all need to be empowered to embrace new approaches.
Acquisition Has Been Isolated from Technology Rates of Change by Bureaucracy

“Defense acquisition is a complex process ... that cannot be displayed on a two-dimensional chart”
“The United States must bolster its **competitive military advantage**—which the NDS sees as having eroded in recent decades—relative to the threats posed by China and Russia.”

Summary of the National Defense Strategy

“The **traditional requirements-driven process** that the DoD has to deal with for acquisition has become more than inefficient ... it’s become dangerous.”

Milo Medin, Alphabet Inc.
Defense Innovation Board
At AFA National 2017
Mission: Expedite delivery, and effectively support, warfighting battle management systems in partnership with users and industry

Vision: Our people make the Digital Directorate the most proactive and effective DoD life cycle management organization

Goal 1: Plan and execute extremely well achieve 85% on-time or early for planned critical events in FY19 to build the trust and confidence of our stakeholders

Goal 2: Speed and innovation, a majority of our programs in FY19 include innovative approaches to speed capability to the warfighter

“An organization’s ability to learn, and translate that learning into action rapidly, is the ultimate competitive advantage.”

Jack Welch
Factors Enabling Innovation

- Outside influencers—DIB, DDS, DIU, AFWERX, AFSBs, and others
- Unprecedented delegation of authority
- Changing strategies—agile devops, rapid prototyping, and MVP
- Working with accelerators and start-ups
- Technology—commercial tools, ML/AI
- New partnerships
- AF leadership—SECAF, CSAF, USECAF, and VCSAF

VCSAF: “Status quo is not acceptable”

Dr. Roper: “Be radical! Make me nervous!”
Kessel Run

THE VISION
Revolutionize the way the Air Force builds and delivers software.

KESSLER RUN BOSTON HIRING EVENT
January 23-24
Registration required.
Register at afciviliancareers.com/kesselrun

#ItsACivilian
Personnel Recovery C2
ISPAN Msn Planning and Analysis System
ISPAN Nuclear Planning and Execution System
ISPAN GAP CIE
NCR-IADS
Mission Planning CSAR Pedro King
C-sUAS Medusa C2
C2AOS/C2IS
Targeting and GEOINT
UC2
AF-DCGS Phoenix
OA-DCGS
DMO DIB
Weather Data Analysis
Cheyenne Mountain CIC2S
Legacy SPADOC SPEARR
Cobra Dane ADPE Re-host
Integrated Broadcast Service
F-35 ALIS
Growing revolution

- Bespin, PEO/BES, Montgomery
- Level Up, PEO/C3I&N, San Antonio
- Kobyashi Maru, SMC West Coast
- Rogue Blue, PEO/Digital, Offutt
- RPF Proposal, PEO/Digital & SMC/SY, Colorado Springs
- Software Engrg Groups, Hill, Robins, and Tinker

We have successfully implemented agile devops with:

- Organically-led PMO coding teams
- Government as integrator—industry coding teams
- Traditional contract relationships with industry
- Organic SEGs at Robins, Hill, & Tinker
Not every program can migrate to the cloud and create a continuous delivery pipeline

But every software program can:
• achieve a release cadence of weeks
• use automated testing for quality and cyber-security
• and work directly with end-users
## NDAA Section 804—Enabling Agile DevOps

<table>
<thead>
<tr>
<th>Program</th>
<th>Benefit</th>
<th>Current Schedule Savings Estimate</th>
<th>Initiation Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Operations Center Pathfinder (AOC)</td>
<td>Integrated product teams, software developers, platform teams, and platform operators together in the entire development process, creating a true user-centered design that supports continuous delivery</td>
<td>16 months (to IOC)</td>
<td>YES (30 Jul 18)</td>
</tr>
<tr>
<td>Command and Control Air Operations Suite Command and control Information Services (C2AOS-C2IS)</td>
<td>Utilizing Rapid Prototyping authority to develop Minimally Viable Products (MVPs) in support of deprecating TBMCS FL and other mission critical fielded applications to meet current warfighter needs</td>
<td>-3.0 Years (TBMCS deprecation)</td>
<td>YES (6 Oct 18)</td>
</tr>
<tr>
<td>Integrated Strategic Planning and Analysis Network Increment 5</td>
<td>Frequent software deliveries that are more responsive and aligned with customer needs</td>
<td>-2.5 Years (to IOC)</td>
<td>YES (8 Aug 18)</td>
</tr>
<tr>
<td>Nuclear Planning and Execution System Recapitalization (NPES Recap)</td>
<td>Delivers initial Minimum Viable Product (MVP) approximately 2 years prior and Minimum Operational Product (MOP) approximately 9-12 months prior to warfighter’s original requested IOC</td>
<td>9 mon (to IOC)</td>
<td>YES (14 Sep 18)</td>
</tr>
<tr>
<td>AWACS Communications Network Upgrade (CNU)</td>
<td>Enables CNU to modify multiple aircraft before the crypto mandate. A traditional acquisition approach would yield zero aircraft by the mandated date. The prototype will be based on the earliest available AWACS software baseline and integrated at the first opportunity. This prototype will then be incorporated within the next AWACS baseline software.</td>
<td>-1 Year (to IOC)</td>
<td>YES (10 Oct 18)</td>
</tr>
<tr>
<td>AWACS Mode 5 Acceleration</td>
<td>Mode 5 804 enables Mode 5 capability to be delivered separate from ADS-B out. Purchasing and quickly installing this GOTS solution enables AWACS to utilize a more resilient IFF capability in contested air space multiple years prior to the DRAGON update. Reduces the gap of not meeting the JROC Mode 5 mandate by five years (from DRAGON’s planned FY27 FOC date to FY22)</td>
<td>-5 Years (to FOC)</td>
<td>YES (18 Nov 18)</td>
</tr>
<tr>
<td>AWACS Electronic Protection</td>
<td>AWACS EP 804 enables the program to compete the AWACS EP system and to recover from the schedule delays from the previous sole-source effort. This competition will save cost and provide a better solution to the warfighter</td>
<td>6 months (to IOC)</td>
<td></td>
</tr>
<tr>
<td>MAF Modernization AGM</td>
<td>MAF Modernization 804 will enable the program to get on contract 1 year earlier than previously planned under 5000.2. In addition with by moving to Agile DevOps releases will be delivered to the field in a 3-month cadence enabling rapid user feedback</td>
<td>1 Year (to IOC)</td>
<td>YES (8 Nov 18)</td>
</tr>
</tbody>
</table>

15 years of potential savings already identified
AF Pitch Day NYC, 6-7 March
PEO Digital as a Venture Capitalist

**MD5 Starts**
Showcase Event, 22 May 19, Los Angeles
MDO/MDC2 Data Virtualization / Human Machine Learning

**MassChallenge**
Safety & Security Accelerator, Jun-Oct 19
MD5 Sponsored Problems: Secure ops in Cloud / AI/ML techniques
Accelerating high-potential start-ups with high success rate

**AF Pitch Day**
July 2019 at Kessel Run
Kessel Run
Identify product teams/tools/processes for Kessel Run
Focus on security and low-bandwidth networks

**AF Pitch Day**
Northeastern Kostas Research Institute, 17 July 19
UAS Event
UAS payloads, signature identification, software trust/verification
Set the stage for a CSAF Challenge Event at USAFA in Jan 2020

**AF Pitch Day**
SMC Pitch Day, Sep 19 in San Francisco
Space/SW
PEO Digital topics on software
Data Analytics

- Attacking underutilized data and lack of simple analytics
Advanced Battle Management System (ABMS) and Multi-Domain C2 (MDC2) are the Air Force’s IoT challenges
Machine Learning / Artificial Intelligence
Machine Learning and AI

**Infrared Persistent Surveillance**
- Compact, reproducible design
- Advanced algorithms with AI
- 640 x 480 LWIR CPI
- 360° x 125° coverage
- Hemispherical coverage
- 500 Mpix
- ½ Hz update rate

**Global Synthetic Weather Radar**

**Machine Learning Cloud Detection**

**RTES**
Implications for the Institution

Right skills versus traditional functions
- Kessel Run leader is a 17D Cyber Officer running a platform in operations and leading a team updating applications daily
- SrA are leading product teams

Hiring new skill sets for which there is no AFSC/job-series
- Coders, designers, platform operations, and data scientists
- Creating software SML/MLs

Demand for training programs
- Individual programs are self-funding
- Need for familiarization to reach other PEOs/teams

Traditional APDP certifications viewed as suspect—and traditional acquisition courses viewed as negative training
Agile is a Team Sport

We will not be agile by capturing hundreds of requirements up front and then not fielding unless all requirements are satisfied—this is basically how we’ve traditionally operated.

Beginning to change the tide working with AF MAJCOMs
- Rapid prototyping to discover high level requirements?
- Is it better than what we are currently operating?
- Is it more secure than what we are currently operating?
- How much faster can we iterate and improve it in a production environment working with operators?
- Can we address minor issues in parallel instead of stopping?

“It’s not that acquisition has decided to go fast ... the Air Force has decided to go fast!”
- Dr. Will Roper