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PEO AICS and PAINS, DAU's Senior Dynamic Cross-Functional Multi-Program Leadership Simulation

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Abstract

In support of Mission Assist efforts with several major acquisition programs, the Defense Systems Management College (DSMC) developed a simulation emulating a fictional portfolio of multi-program schema within a program executive officer (PEO) organizational structure. This simulation poses challenges to participants in two areas: (1) Maintaining situational awareness relative to self, own team, and overall team-of-teams dynamics in navigating a real-time volatility, uncertainty, complexity, and ambiguity (VUCA) environment, and; (2) stretching cross-functional acquisition expertise by exploring numerous challenges posed by the simulated. The organization is called PEO Advanced Integrated Combat Systems and PAssive INtelligence System, or PEO AICS and PAINS. The authors, along with their team, used an action research approach. Twelve lessons learned are noted from the almost two dozen times in various venues the simulation has been run. The simulation recently replaced Looking Glass within the PMT-401 course as the capstone simulation. Overall, the simulation provides a train-as-you-fight environment that is proving to be very useful for mid- and senior-level acquisition work force training.

Overview

PEO A/P is a much-needed equivalent of a high-level war game for DoD operators for mid-career to senior-level acquisition professionals. It places them into a realistic environment where they must use their experience and training to solve complicated and complex acquisition challenges. The simulation presents the learners with multiple stressful challenges they will experience in the real world, giving them an opportunity to improve their performance as acquisition leaders.

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This paper reviews the history, lessons learned, and evolving results of an action research approach in creating the Portfolio[1] Executive Office (PEO) for Advanced Integrated Combat System and Passive Intelligence System (PEO AICS and PAINS) defense acquisition simulation. The authors applied an action research approach upon the effort to create a participant-safe environment for participants to integrate newly learned skills. The simulation was designed to be both complicated and complex at both the program and portfolio level so participants could utilize not just the skills they had recently learned, but also use all their prior experiences as well as allowing for observations of colleagues and reflecting on how the cohort performed as a team of teams.[2] The effort sought to assist mid- and senior-level acquisition workforce training by providing a realistic defense acquisition simulation that simulated a worst-case environment for defense acquisitions. DSMC, as well as the rest of DAU, has lacked a "train as you fight" realistically complicated and complex cross-functional simulation.

Portfolio Executive Office (PEO)
for **A**dvanced **I**ntegrated **C**ombat **S**ystems
and **PA**ssive **IN**telligence **S**ystems

Training How We Fight

In 2014, a comprehensive study of program management training and experience was conducted.[3] The study was an update of a 2009 study. The 2014 study was based on interviews with 59 program managers and program executive officers (PEOs) of major acquisition programs. The report notes,

> Cited repeatedly by a strong majority of program managers, training continues to need greater content "depth." Specifically, important methods to convey practical knowledge and insights that program managers need to know include more details, specificity, and real-world examples of both effective and ineffective management. They suggest this information can be conveyed most effectively though real examples, practical exercises, and case studies containing facts, metrics, and other technical information important to those implementing management techniques in the field."[4]

The 2014 report notes a senior program manager's comments made during the 2009 study, stating, "Some people think that all one needs in higher-level acquisition proposition is 'leadership.' They seem to think that program managers preside over functional specialists who do all the substantive work, so there is no need to go toe-to-toe with the functional managers and industry managers. In reality, program managers need to engage and [be] involved" with the challenges that occur on larger acquisition programs. They need to challenge their functional subordinates, peel back the onion of the functional area, and understand what is being said and the weakness that exist in the reports they're receiving. They need to understand: Why are we doing what we are doing? Have you thought about this? Why are we behind in executing our budget? What is your spending plan?"

Research Approach

The approach's twofold effort—to create the simulation while systematically linking

[1] PEO usually stands for Program Executive Officer; we used "portfolio" to note the portfolio nature of the effort.
[2] "Team of teams" is a reference to the DoD IPPD, August 1998. The term is also the title of Gen McCrystal's book *Team of Teams*, which was used as a reading in the F-35 ELCP.
[3] DoD 2014 Study of Program Manager Training and Experience, USD AT&L, May 2014.
[4] Ibid.

critical reflection—drove a continuous evolution of the simulation. The effort resolved a long-standing challenge within defense acquisition education for an environmentally relevant simulation. The team,[5] led by the authors, brought their prior research and experiences in creating realistic training environments within both leadership and technical education, and created a simulation structure that evolved into a flexible framework for utilization across several venues. This framework is shaped partly by a deep appreciation of decision-making in challenging environments.

Writing almost 200 years ago, Prussian general-turned-theorist Karl von Clausewitz (1989) spoke about what was then a new scientific concept called friction. He told us that friction was what separated "real war" from "war on paper." Clausewitz's admonition is timeless. Friction—mismatches between assumptions and reality—is just as true for program managers today as was relevant to the 19th-century commander in von Clausewitz's time, albeit the latter dealt with a greater degree of violence[6] than a typical program manager might. This friction exists because our world is characterized by volatility, uncertainty, complexity, and ambiguity (VUCA). VUCA environments are where leaders—be they agency directors, PEOs, PMs, or team leads—often make decisions under severe time constraints.[7]

Time pressure is one of many VUCA-induced sources of stress. We all think and behave differently when under stress depending upon conditions. Often, especially if we are not mindful of our own thinking, stress opens the door for our brains to interpret the world from a survival standpoint. Our reactions, in turn, take on a "fight or flight" aspect with sometimes serious consequences for the point of view we adopt, the decisions we make, and the interpersonal relationships in which we engage.[8]

VUCA		
	Volatile	The environment requires you to react quickly and adaptively to ongoing changes that are unpredictable and out of your control.
	Uncertain	The environment demands that you take action without certainty.
	Complex	The environment is dynamic with many interdependencies, not all of which may be known. Cause and effect are frequently not obvious.
	Ambiguous	The environment is unfamiliar and outside of your and others' experience. Lack of clarity. Meaning/goals may not be shared.

Ironically our schooling often leads us to believe, even if it was with the best of intentions, that stress can be minimized or planned away. For example, back in high school physics, we were told that it was okay to simplify messy problems by assuming away factors that were just too complicated to deal with. We navigated our assigned homework and quiz word problems by assuming the blocks were pushed along a frictionless floor and the two

[5] The initial team included Professors Richard Hansen, Alvin Lee, Deacon Hoen, Ellen Evanoff, and Candice Murray, with support from Abby Straus of Maverick and Boutique LLC and Donna Carroll. The initial senior executive was Brigadier General Mike Brogan, USMC (Ret.).

[6] There's physical violence, and then there is intellectual violence (e.g., being told to execute patently unexecutable programs by oblivious senior leadership). Both are destructive to the executor (in today's case, the PM). Observation by Professor John Higbee.

[7] Cognitive psychologist Gary Klein is a leader in the field of naturalistic decision-making, and much of what we value in terms of decision dynamics comes from Klein. We also prefer to reflect writings of the late John Boyd, particularly in the types of work (such as "Destruction and Creation," 1975) leading to his OODA model of adaptation.

[8] Take a closer look at those relationship dynamics in Emerald, 2019.

billiard balls collided in a perfectly elastic fashion. That is okay to a point, but the reality is that we do not move furniture across frictionless surfaces, and our roadside fender benders do not result in perfectly elastic collisions. These deep-seated assumptions from our schooling play out in other ways as adults whether we realize it or not, so we likewise need to be cognizant how VUCA tends to promote mismatches between expectations and realities:

- Things do not always play out as we anticipate.
- People do not always act in the way we expect.
- We never seem to have the time we need.
- The path from cause to effect is not clear-cut.
- We don't always collectively have a shared understanding of the same thing.

By contrast, many individuals prefer a relatively predictable and stable environment in which to operate. Imagine, if you will, a canoe or kayak gliding on calm waters. Throughout our schooling, from primary school through university, as well as most professional certification training, we are taught concepts most of the time in a frictionless environment, not unlike rowing a boat along these types of waters. There is nothing inherently wrong with any of these characterizations because it helps us simplify matters so we can gain an initial understanding of fundamental principles, demonstrate competency, and explain these principles to others.

Acquisition training, more often than not, takes place in calm waters. The assumptions are clearly laid out, concepts are taught with the rest of the acquisition environment running frictionless, classroom exercises typically have a "school solution," and each question on a test is designed to have only one correct answer. As a general rule, we place high value on procedures as a way to develop expertise. We like to espouse "data-driven decisions" and prefer to downplay the role of emotion and intuition in decision-making. We tend to imply there is a right way to do things, including making decisions. Biases and heuristics are seen as sources of negative influence on our preferred outcomes.[9]

Yet we all know there is something not quite right in this style of training because we typically do not experience our daily work in the form of smooth rowing in calm waters. We often face wicked problems at the same time in various combinations as opposed to one at a time precisely constructed, even if complicated, problems with clear solution sets.[10]

We work daily in an environment of Class 4 rapids. In short, we do not train how we fight as we do with the warfighter. The warfighter gets the simplified environment to digest concepts, then a wargame or simulation comes along in the training to challenge the use of those concepts in a VUCA environment. The defense acquisition workforce is different because it is hardly ever in peacetime. For the mid- to senior-level acquisition workforce personnel, the war—balancing cost, schedule, and technical performance with evolving challenges—doesn't pause.

Create a Team of Teams

Although the defense acquisition environment is one of the most complicated and complex system of systems environments, the approach and lessons learned can be applied to other mid- and senior-level leadership training. The handling of multiple disciplines working with a team of teams environment not reflected within the organizational structure is not a unique environment to the DoD. The Cynefin framework[11] is often used within DAU Mission Assist (MA) engagements to help characterize the complicated, complex, and chaotic domains in which

[9] For more on these dynamics, see Klein, G. (2014) *Streetlights and Shadows*

[10] The existence of wicked problems is one reason why polarity thinking is useful as a simulation design element. See Johnson, B. (2014) *Polarity Management*.

[11] https://en.wikipedia.org/wiki/Cynefin_framework, April 8, 2020.

leaders need to consider.

Since the evolution of the defense decision support system (DSS)[12] in the 1960s, the defense system program organizations have been operated in an ever-increasing complicated and often complex network of teams. John P. Kotter recently has noted that beyond the hierarchical structure there is a need for a second system, a network, that is assigned the work which "demands innovation, agility, difficult change, and big strategic initiatives executed quickly."[13] Defense acquisitions evolved its approach to this second system with the creation of Program Executive Officers (PEOs) with portfolios of programs in the 1990s. PEOs executed their missions through an Integrated Product and Process Development (IPPD) using Integrated Product Teams (IPTs).[14] The Advance Program Management Course (PMT-302) taught by DSMC and then DAU for decades used cross-functional teams within the course.[15] The course was replaced in 2001 with PMT-352 and PMT-401, but these courses have grown to be more and more oriented to program managers and have lacked mid- and senior-level cross functional participation. None of the courses included a PEO-based multiprogram environment that recreated the challenges faced within a portfolio of programs working within a network of teams.

Why Simulate the Most Painful PEO in Defense

Based on a fictional PEO organization using documentation from real programs and PEOs, DSMC developed a simulation environment dubbed PEO Advanced Integrated Combat Systems and PAssive INtelligence System, aka "PEO AICS and PAINS" or PEO A/P. The authors created the simulation to provide a chaotic but realistic defense acquisition environment so participants can practice skills and observe fellow participants in a dynamic, cross-functional, chaotic and troubled multi-program/portfolio environment.

Concepts within the PEO A/P simulated environment have evolved over the past 15 years and have been further honed over the past three years utilizing DAU Mission Assist (MA) engagements. These MA engagements included running mid- to senior-level (GS13 to O-6) leadership training which developed and tailored multisession cohort structures focusing on leadership for specific acquisition organizations. The organizational-specific leadership training started with the Missile Defense Agency (MDA), then with PEO for F-35 Lighting II, followed by the Columbia Class submarine program within NAVSEA, and starting in 2020, the Defense Health Agency.

Within a multisession (usually three to five sessions, with two to 10 days per session) course structure that is stretched over several months, DSMC addresses numerous leadership and systems thinking frameworks, as well as selected technical topics. Technical topics, such as utilization of Work Breakdown Structures (WBSs) and other program and portfolio assessment and analysis frameworks, are tailored to link with leadership frameworks. Each cohort program has been tailored to the customer. DSMC has achieved cross utilization of material and lessons learned though cross utilization of professors who have guided reuse of material. The simulation started within the F-35 PEO Executive Leadership Cohort Program (ELCP) was used toward the end of the MDA leadership training program, and was built in from the start for the NAVSEA and DHA programs.

The simulation moved in 2018 to DAU's premier Program Manager's Course, PMT-401,[16] an eight-week case-based course, and implemented across the remaining DAU

[12] A good description of the DSS is in Section 809 Panel Report, Volume III, Section 2.
[13] Kotter, 2014.
[14] DoD policy memo 1996 and DoD Integrated Product and Process Development (IPPD) Handbook, 1999.
[15] DSMC is a college within the Defense Acquisition University.
[16] Transition of the simulation into PMT-401 was led by Professors Jim Ryan and Owen Gadeken.

campuses for all offerings of PMT-401 in 2019. As with the cohort program, there was always a desire for a type of capstone event that allowed for the material covered to be utilized in an integrated, mission-relevant manner. DAU and DSMC had been using the Looking Glass simulation, which was developed by the Center for Creative Leadership (CCL) in the late 1970s funded thought a grant by the Office of Naval Research.[17] This simulation has been very popular with those who participated in the course or trained where the Looking Glass simulation was used. The challenge with the Looking Glass simulation was the setting within a glass company, not the defense acquisition environment.

Lessons Learned

With over 20 PEO A/P simulations conducted with over 300 participants from April 2017 through Mar 2020 across all DAU campuses, across four major acquisition organizations, and DAU's PMT-401, numerous lessons have been learned through the action research approach. These include:

1. Putting participants into a simulation which elevates them to the next higher level with the team and organizational structure. In PEO A/P, participants get a chance to lead from a PEO/Program level, though they are typically mid- and senior-level staff working for a program manager or a PEO. This approach allows participants to stretch their leadership skills and to think beyond their functional expertise and address challenges within a system of systems environment.

2. Providing a starting team structure, which is neither efficient nor effective for addressing the challenges presented but which explicitly allows participants to reorganize. This approach encourages participants to think about the challenges. Within the PEO A/Ps simulation, workload (reading) is not equally assigned, information is not always provided to the team initially assigned the specific challenge, and team assignments specifically misplace participants who are experts in a particular challenge into a different group. This approach provides an opportunity for the participants to practice cross team communications and reorganize given team expertise.

3. Allowing participants to select team leaders and an overall simulation leader. Changing this leadership structure at least once within the simulation allows other participants the opportunity to lead. Keeping teams relatively small, three to six participants, allows each more opportunities for leadership. Asking participants with extensive leadership experience to forgo team leader positions encourages them to practice being in a team member (follower) role.

4. Using an email format within PEO A/P, from a fictional senior Federal Funded Research and Development Center (FFRDC) senior engineer named Bob Closehold, to tailor the challenges within the simulations to the real-world dynamics within the participant's day to day environments. If the simulation material is sufficiently robust, participants will "fill in the missing information" and incorporate their current challenges. Adding specific programmatic data that has been rewritten to match the simulation environment can be helpful, but not often required.

5. Creating an environment of urgency and importance, which allows participants the opportunity to reflect upon the role of stress in individual behaviors and decision-making. This opens the door on several fronts. The role of stress and how it helps bring about reactive behaviors allows participants to explore the role of mindsets and drama in environments of

[17] *DSMC Simulations, Games that teach engineering and scientist how to manage*, Gadeken, 0, Program Manager, Journal of the Defense Management College, May-Jun 1989.

change.[18] Time-pressured decision-making environments enable participants to reflect upon how they make decisions, which offers an excellent segue into use of decision models such as Recognition-Primed Decision-Making.[19] This environment also courts the prospect of information overload—some students will be fine and some will shut down. All need to develop some sort of strategy, as an individual and small team, as to how to sift through large volumes of information in a short time period.[20]

6. Using real program artifacts, maintained in their original formats, errors included (e.g., spelling and grammar mistakes) even if confusing. This is the real world within the defense acquisition environment. This level of realism is often appreciated by participants at the end of the simulation. It can be a real source of frustration during the simulation, but upon reflection, what is important is how they handled the leadership challenge.

7. Crafting a chaotic set of data from programs that are clearly in trouble. The simulation is built with a compilation of real data, but mostly from programs with identified problems. The idea within the simulation is to create a worst case PEO portfolio, thus earning the name PEO AICS and PAINS. This can be taken too far, but enough challenges need to be incorporated so no individual or small group of participants can solve them without the rest of the participants within the team structure. The reading and level of challenges needs to be overwhelming for a subset of the groups, thus the leadership challenge to use everyone in the teams so that participants get to the best team of teams result.

8. Using real program information with enough of the program environment described impels the participants to quickly own the fictional structure and have an overwhelming desire to fix the challenges. Within the simulation, the situation is created to consider declaring a program breach and/or canceling one program for the good of the other programs. This is accomplished by allowing participants to move any funds across "colors,"[21] but this is not a way for all programs to be sufficiently funded for warfighter/end-user function. Participants are amazingly hesitant to declare a failed program—a learning opportunity for the faculty to discuss.

9. Creating the option throughout the simulation for reflection periods in which the participants "come out" of the simulation and reflect on how it is progressing. Faculty can engage with participants on how they feel the teams are handling the VUCA within the simulation environment and how they are or aren't utilizing the tools in their leadership frameworks.

10. Having faculty take on the role of participant and experience the simulation, both to gain additional feedback from experienced educators, but also before faculty plays a role within the simulation. This lesson learned was accidently discovered when one of the early cohorts lost enough participants to their real-world organizational priorities that "additional players" were needed to provide a minimal number of participants. We have since further extended this role to a "phone a friend" where students can phone DAU faculty working at other locations.

11. Learning that the simulation could be accomplished with as little as three groups of four participants (12 total) to as many as five groups of six people (30 total) with relatively the

[18] This links to the works of David Emerald in his book, *3 Vital Questions* (2019).
[19] For more information, see Gary Klein's *Source of Power: How People Make Decisions* (2017) and *The Power of Intuition* (2004)
[20] The concepts have been explored through a simulation piloted in PMT-401 and evolved for further use in DSMC MA efforts. The simulation recreates dynamics of the 1862 Maryland Campaign in the American Civil War and can be operated standalone (as was the case in PMT-401) or in conjunction with a staff ride at Antietam National Battlefield (as will be the case in MA as part of a leadership Cohort program with the Defense Health Agency).
[21] Color of money reference to the type of Appropriation, Research, Development, Test and Evaluation (RDT&E), Procurement, or Operational & Maintenance

same results. Though the simulation has an extensive number of artifacts, the participants in small cohorts just prioritized and worked though the challenges, but with less detail. Larger groups dug much deeper into artifacts and developed more detailed recommendations. The lesson was the base case did not have to change. The smaller groups could be given the same packages in three sets, while the larger groups were given packages in four and five sets.

A 10-Year Evolution

Late in the 2000s, while working for a government consulting firm, the authors developed an in-class workshop equivalent to the DAU's PMT-250 Part B, known today as PMT-257, for intact teams. DAU taught the Program Management Tools Course as a five-day virtual course using a Facilitated Online Learning Environment (FOLE) approach with students working within teams. The DAU workshop during this period used the DAU Firebird UAV fictional program as the scenario. It was also used in ACQ 101 and 201 courses.[22] The concept behind this approach recognized that students taking PMT-250 from DAU were in groups of students who would likely never work together again. Successfully taking the PM tools back into their program offices was greatly inhibited because no one on their IPT had taken the same course. Professor Driessnack's concept was to teach intact integrated product teams (IPTs),[23] thus allowing the whole team to go to the workshop, moving to the next level of performance together, using the PM tools they were all taught. The PM tool set—Work Breakdown Structures (WBS), cost estimating, scheduling, risk management, and technical performance—was not just for program managers, but should be known across the program teams, especially those working in IPTs.

The PMT 250 scenario was based on a change to the Firebird program baseline: adding a Global Positioning System (GPS). The authors, working together as subcontractors, in 2005−2006 on a breaching NAVSEA ACAT1D program,[24] observed an overall lack of knowledge in acquisition workforce personnel, both government and support contractors, to link information across **c**ost estimates, **r**isk, **e**arned value, **s**chedule, and **t**echnical data (later known as CREST[25]). The experience led to the combining of PMT-250 Firebird scenario with a program level analysis and assessment across CREST performance data. Using the breaching NAVSEA program, the authors created the CREST workshop. Within the workshop, the breaching program data was mapped into a new scenario, known as Firebird 3, and included the following notable changes:

(1) Major radar systems were converted into mission packages on UAVs.
(2) The "common back end" software integration subsystem was moved to a similarly named ground system controlling the UAVs.
(3) The quarterly Defense Acquisition Executive Summary (DAES) was converted to Firebird format.
(4) CREST-related data and reports were mapped through a Firebird 3 WBS.

Firebird 3 was a comprehensive set of documentation, including a major program contractor's full set of Earned Value Management data mapped to a schedule, all in electronic form. This allowed for easy modifications, such as resetting the time period from 2006 to 2016,

[22] Today PMT-257 uses a M1235 Medium Light Tactical Truck (MLTT) scenario. Reference PMT-257 Syllabus V1.0 23 Jun 2015.
[23] Intact Team Integrated Product Team is a standing team within a program or project.
[24] The authors were fired off the NAVSEA program after delivering an analysis that predicted the ACAT 1D program would breach in the coming years. The program did, in fact, breach several years later, following the path predicted.
[25] Driessnack formed the initial mnemonic CREST standing for Cost, Risk, Earned Value, Schedule and Technical. This was made broader for CREST to stand for Challenges (broader term for Risk), Resources (broader term than Cost), Evaluation (broader team than EV), Schedule and Technical.

and again to 2020. This is key for keeping the "time now" date current for participants.

Between 2006 and 2016, the authors continued to expand the documentation for Firebird 3. This included modifying a PMT-401 case written by the authors on the breaching NAVSEA program, which outlined how the Integrated Baseline Review (IBR) conducted for the program's EVM baseline foretold the challenges that eventually occurred. That case data was integrated into a four-day CREST workshop which involved the participants conducting an analysis and assessment of the breaching NAVSEA program, six months post Critical Design Review (CDR), approximately 18 months after the IBR—in effect a version of the PMT-250 workshop on steroids. As anticipated, the expanded CREST workshop was utilized by the authors at various venues, including Air Force Space and Missile Center (SMC), NASA, and the American University (AU) Key Executive Leadership Program as part of the AU Federal Acquisition Certification course for a senior level Project and Program Management. Many lessons were learned through the noted engagements on how to best use a program level set of data.

As part of the American University Cohort programs in 2009, Pat Barker introduced the use of staff rides to nearby Antietam National Battlefield as a way for students to explore leadership dynamics in novel settings. Walking the actual ground with targeted, student-centered discussions, allowed participants—regardless of military experience—to bridge basic gaps between classroom PowerPoint charts and battlefield dynamics.[26] The overwhelmingly positive student responses to the staff rides drove Barker to investigate development of a simulation that somehow integrated salient characteristics of program management and leadership yet have a twist of the VUCA battlefield environment. An avid hobbyist wargamer for over 40 years, he turned to key wargame design literature for answers.[27]

Barker joined DSMC in 2012 as a full-time professor and by 2014 had used portions of the Firebird material in various half day workshops within the construct of two executive courses, PMT-400 (Program Manager's Skills Course) and ACQ-405 (Executive Refresher Course) over a period of several years. At first the materials reflected the style of the Space and Missile Center (SMC) workshops, but evolved given participant feedback and faculty observations. As the success of the exercise took hold, the material base expanded to include sanitized artifact extracts from various DSMC mission assist (consulting) engagements. Outside of DSMC, as part of support to an American University leadership program with the Transportation Security Administration, Barker converted the base material to reflect a TSA environment. Information for some of the unmanned aerial vehicle programs became sophisticated baggage handling systems and other technologies germane to TSA's environment. Scenario requirements were likewise adjusted to reflect a lower degree of acquisition acumen in the students (although with equivalent leadership experience). As a general observation, both within the DoD and other government agencies, the authors found that GS14/O-5 level senior program managers were better able to synthesize and evaluate cross-functional program information and performance data than their GS-15/O6 level senior functional counterparts.

John Driessnack rejoined DSMC in 2015 as an intermittent professor focused on mission assistance. Driessnack proposed the Firebird 3, which was based on the Cobra Judy Program, as a follow-on, a B case, for the PMT-401 Cobra Judy Program case the authors had written for

[26] For more on the staff ride see Beehner & Collins. (2018). A staff ride for the modern battlefield. *Journal of Military Learning.* Army University Press.

[27] A classic text in wargame design and development would be that of Peter Perla. (1990). *The art of wargaming*. United States Naval Institute. A recent bibliography of wargaming design and development can be found at: James Fielder, "Reflections on Teaching Wargame Design," in War on the Rocks (Jan 1990).

DSMC some years earlier. However, the broad A-B case format was rejected, in part due to the volume of technical complications and leadership complexities within the proposed case. A narrower version addressing the Cobra Judy DAES issues was added as the B case. The lesson learned was not to try to insert the complicated and complex case by itself into PMT-401 or any other course. The Firebird 3 became the base for the PEO AICS and PAINS simulation for what becomes the worst PEO in Defense scenario needed to evolve within an engagement.

Mission Assist Becomes the Incubator for PEO A/P

When staff rides and wargames combined with the lessons learned with expanding the PMT250 scenario, the concept of a more complicated and complex simulation was hatched. In 2017, in conjunction with DAU's Capital North East (CNE) Regional Campus, DSMC took over a cohort leadership program within the F-35 PEO program after the initial offering by their consulting firm failed to meet the expectations. Barker led this revamping of the leadership cohort program, known as Enterprise Leadership Cohort Program (ELCP), in part based on ongoing experience with DSMC's leadership cohort program with the Missile Defense Agency (MDA). Both programs emphasized leadership development recognizing a VUCA environment, and thus had similar intellectual material from which to draw.

Within the cohort, the first session provided foundational material, basic frameworks for leading self and team. As designed, the second session provided an environment to practice the foundational material. The third session focused on lessons previously learned, both in seminar and practice formats, and for participants to execute a transformation initiative within the F-35 PEO. Within this third session, the participants developed initiatives that they would lead, further practicing their newly acquired knowledge and skills, and doing so in a manner that provided value to the F-35 PEO. Participants briefed their initiatives directly to the F-35 PEO leadership at the end of the course. This cohort approach has been very successful. The F-35 ELCP program has completed 10 cohorts between 2017 and 2019, with numerous cohort participants' initiatives driving changes across the PEO with documented savings in the tens of millions of dollars, and organizational process and other changes, with significant cost avoidance. Both Admiral Winter, F-35 PEO from 2017 to 2019 and General Frick, deputy PEO to Admiral Winter and the current PEO, have noted the positive impacts for their workforce and have supported the ELCP.

As part of the applied research approach, all team members were asked to document observations starting with the first simulation—the first expansion of the Firebird 3 program into the PEO A/P structure with another portfolio of earlier firebird UAVs (Firebird 1 and 2) that were in operations and production. As part of the development and applied research approach, Candice Murray, a systems engineering professor, was assigned specifically to focus on observing the simulation and gather observations to help the team reflect on the simulation and drive changes. Professor Murray performed this role through several of the F-35 cohorts with the PEO A/P evolving each time. Assigning a specific professor to make observations was key to understanding the dynamics within the simulations and drive needed changes to continually improve the simulation.

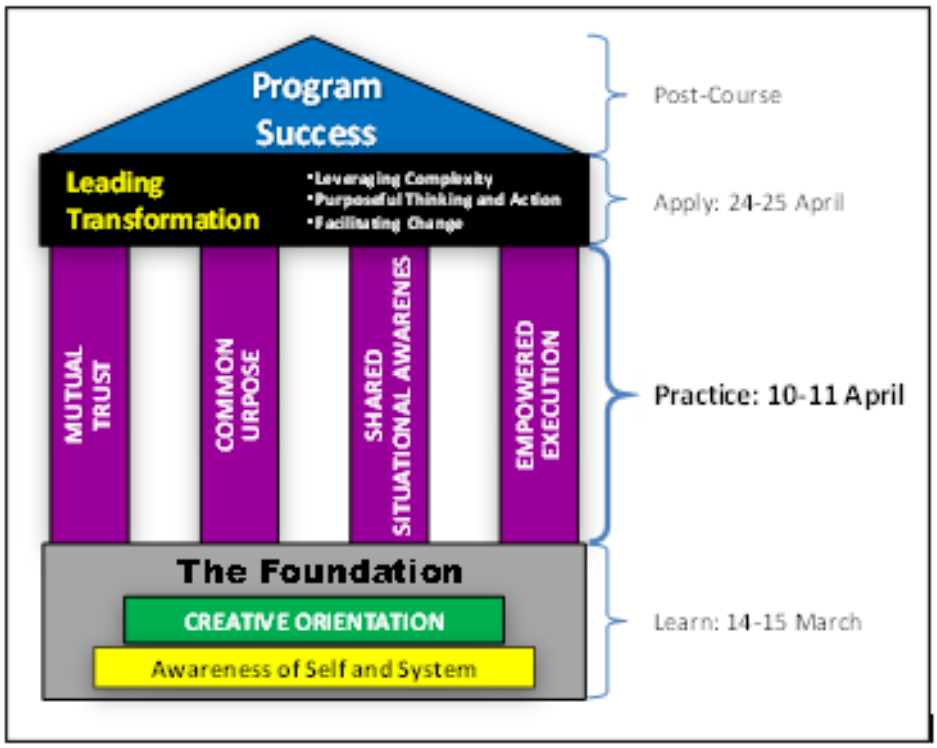


Figure 3. F-35 JPO Leadership Program Intellectual Model

The first observation report provided the team a reference for how the simulation was executed. The next couple pages are a summary of the findings for Cohort 1.

The JPO leadership program intellectual model (Figure 3 from the report) pointed out the focus of the simulation was to provide an opportunity for the participant to practice the foundation skills within the four pillars.

Key was looking at the simulation as "a system consists of two portions—the system elements and the enabling system elements.[28] When we look at the simulation from the perspective of a system, the tiger team is the system elements, as depicted in the report's Figure 4.

System elements include the F-35 JPO Leadership Program Intellectual Model, workbook,

[28] In this context, the enabling system elements are the processes and tools that the system elements need for certain performance.

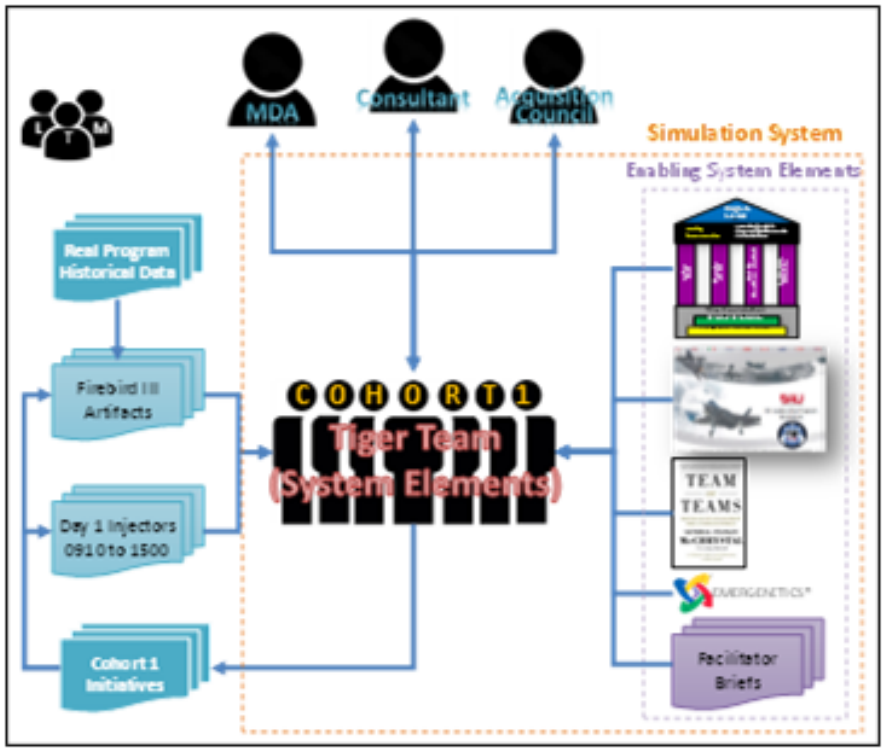


Figure 4. F-35 JPO N2 Program Cohort 1 Simulation System

Team of Teams by General McChrystal, EMERGENETICS® and the facilitator briefs. The inputs and outputs of the simulation system are the inputs and outputs of the system elements.

The questions of the course manager's interest are answered in the report's Table 2. The activity observations are summarized in the following sections.

One finding that was key from the first pilot was the lack of reorganization accomplished by the participants and the overuse of injects by the faculty. The way the participants organized was noted (see Figure 5 from the report, which outlines the migration of the teams for Day 1).

Table 2. Cohort 1 Participation

Participation	Observation
Who are the emerging leaders and how are the leading?	Todd volunteered, a leader in front.
Who are actively working to support the leaders and/or cohort goals and how are they doing it?	Most of them, by providing their areas of expertise.
Has anyone "checked out?"	No one. A few of them were less involved.
Are people playing in the scenario or are they just "going through the motions?"	Most of them were in the scenario. They didn't make the connection to the similarity of F-35 JPO.

The injects were sent at various times throughout Day 1 of the simulation; they included music playing, simulated lawn mowing noise, and 125 pieces of information. Many were annoyed by the music playing and the simulated lawn mowing noise coming from the speaker. One participant first turned off the speaker for sound injectors, then ceased the speaker. The 125 pieces of information were given to various individuals as preplanned. About 25 minutes into the simulation, the tiger team quickly recognized they would be given the injectors throughout the day; they decided to designate one person to handle all the injectors. Some of the recipients didn't bother to read the injectors, just sent to the injector handler directly. The

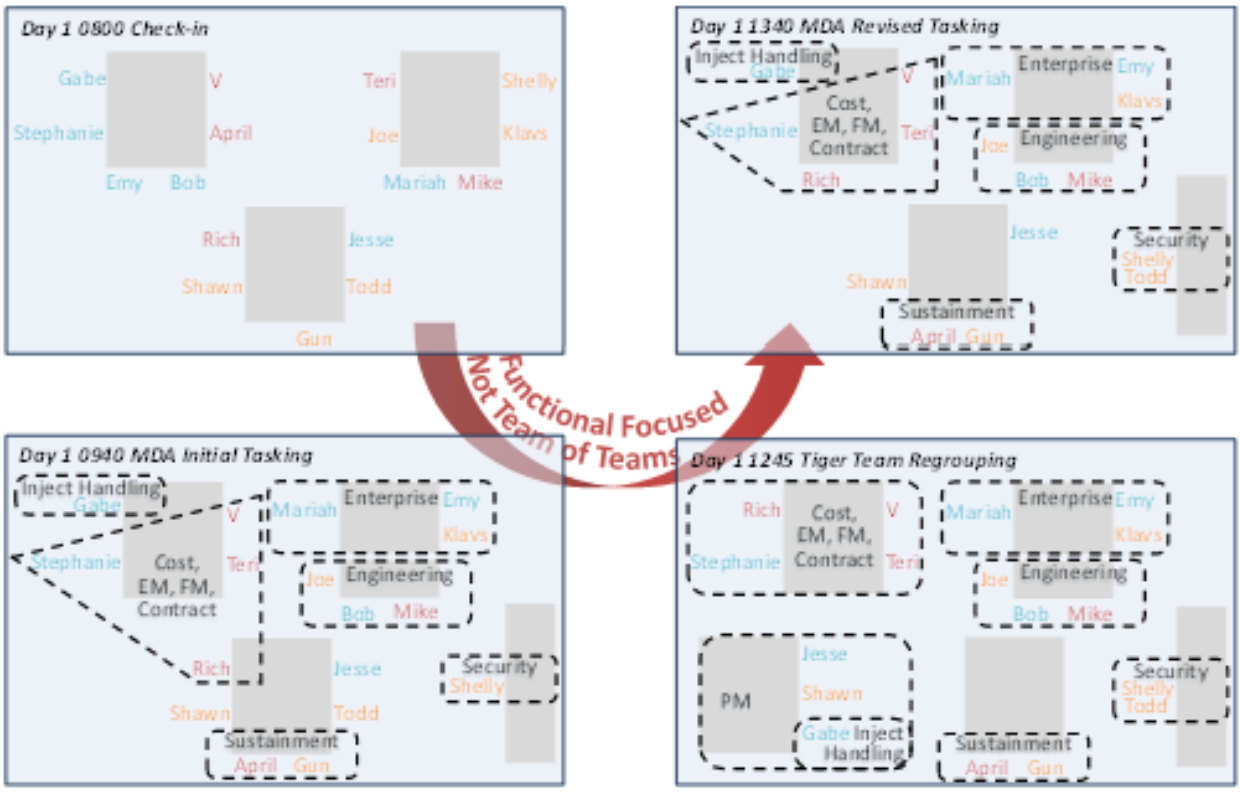


Figure 5. Day 1 Tiger Team Internal Interfaces

injector handler didn't have time to review the Firebird 3 artifacts for his own understanding. Some of the team members were glad about the injector handling process so that they didn't have to deal with the stress of the injectors.

A key evolution in the simulation was finding the balance between creating chaos and allowing the participants to handle the challenge. Two reflection periods were added to the simulation as an option for faculty to engage with participants on how they felt the teams were handling the VUCA within the simulation environment and how they were or weren't utilizing the tools in their leadership bag.

Numerous other changes were made with each offering as different professors were used for Learning Training Mentors (LTMs), who observe within each group. The simulations facilitators were changed, as well as the senior official taking the participants' presentations. Within each leadership cohort program different intellectual models were utilized. The F-35 ELCP program models and the initial pilot observation are noted in the reports Table 3.

Observations through each simulation demonstrated some changes improved the participants' experience, while others had little to no effect or were a step backwards. Organization of the simulation material also improved, with an Excel table outlining what was base material that did not change and the material that needed tailoring with each offering. Various educational technical staff and facilitating professors were used to help clarify

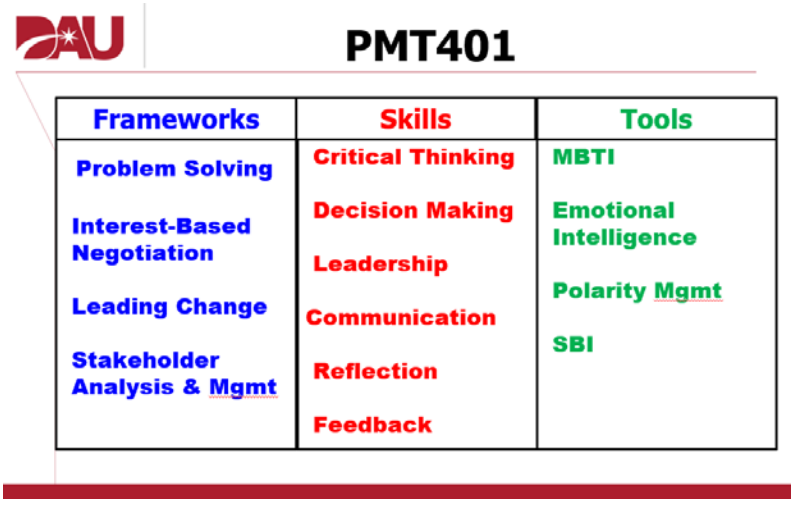
Table 3. F35 JPO Leadership Program Intellectual Model

Pillar	Observation
Mutual Trust (working together, sharing inputs with relevant SMEs)	Worked together well within each functional team. Limited information sharing.
Common Purpose (groups and/or teams able to quickly adjust to face new conditions)	Able to adjust to the redirections from the MDA. Followed the tiger team leader's direction well, but no collaboration among functional teams.
Shared Situational Awareness (SA) (consistent view of what is going on and what other groups are doing)	Designated a member for handling injectors and related to the associated functional team, creating a bottle neck. No shared SA as a whole at the tiger team level.
Empowered Execution (individual teams formed based on topic, challenge)	The findings and recommendations of each functional team were appreciated by the tiger team leader. Not recognize the matters that involved multiple functional teams need collaboration but treated them as duplicated findings.

operational directions, such as modification of the Bob Closehold memo and creation of an instructional guide. Beyond the initial team, additional faculty were asked to play the role of a participant first so they could understand the experience. This also provided excellent feedback from experienced educational professionals, which further helped the team to fine-tune the simulation.

The first simulation proved sufficient in both providing a positive experience for the participants and giving the faculty feedback to improve the initial offering. The team entered the F-35 ELCP program after an initial consultant effort had fail, which provided a level of urgency and pushed the team to use existing material, such as the FB 3 rejected more complex case and pull together a broader experience.

Evolving the Simulation from MA to a DSMC Course



The simulation had evolved to this point in time as a highly-tailorable learning asset to be used for DAU's consulting activities. Artifacts for each simulation could be modified to incorporate some of the specific challenges that the customer's organization was currently experiencing and current acquisition issues in the news. This flexibility became a powerful aspect of this simulation. However, bringing the simulation into a standardized DSMC course (PMT-401) that was going to be executed on four different campuses by four different faculty teams created a need for a more stable and repeatable learning asset. This created a polarity for this evolving simulation; the need for a stable product and the need for a

tailorable/flexible asset. A faculty PEO A/P Working Group of all users (both MA and PMT-401 course) was established to continue to evolve the simulation in a manner that managed the polarity between MA and the PMT-401 course.

The Working Group expanded upon an earlier effort to divide the simulation's 300 plus pages of artifacts into "Base" artifacts and "Tailorable" artifacts. Base artifacts typically do not change between uses (MA or course) or different customers/offerings. Tailorable artifacts are used for MA the same as previously—changing with each new customer. For the PMT-401 course, the tailorable artifacts were set up to be more stable over time—the artifacts were all "tailored" once to focus the simulation's learning points on the "Frameworks, Skills & Tools" that PMT-401 students learn and improve upon over the preceding several weeks of the course. While some minor improvements are made based upon student feedback, the majority of the PMT-401 tailorable material remains stable enough to allow the simulation to be run across the PMT-401 Enterprise by differing faculty teams. This Base and Tailorable Artifact approach has proven to be a successful way to manage the Polarity of Flexibility & Stability created by the differing uses of the simulation.

The PEO A/P Working Group continues to meet quarterly to share best practices and lessons learned and to continue to evolve the simulation to meet the ever-adapting needs of our acquisition workforce. More artifacts based on current examples are being developed, and improvements in faculty material are being adapted within the MA. Additionally, it was the working group that decided to migrate from Firebird (FB) to the SB nomenclature that can be tailored to Skybird, Seabird, or Sentrybird for the various services. The group is also assisting with the adaptation for the Defense Health Agency implementation planned for summer 2020, which also might be virtual.

Introduction to PEO AICS and PAINS

The team has learned that it is better to provide a short introduction to the simulation to the participant prior the actual start, which has always been the first activity of the day. In the following box is the update introduction for PEO A/P using the SB (or Skybird, Sentrybird, or Seabird) vernacular. The change from Firebird (FB) to SB is to separate the simulation from the other DAU uses of the Firebird fictional program. It also allows for a tailoring of the scenario to a military service, which was accomplished with the Columbia Class program office by changing Firebird to Seabird with relatively minor other changes. Reading the current introduction will give a sense of what the participants know as they enter the simulation.

PMT-401 INTRODUCTION TO THE PEO A/P SCENARIO

Scenario:

Tuesday, 26, July 2020: You have been detailed by your Component Acquisition Executive to a Red Team to assess the performance of the Portfolio Executive Office (PEO) for **A**dvanced **I**ntegrated **C**ombat **S**ystems **and PA**ssive **IN**telligence Systems (PEO AICS & PAINS) organization. This is the Red Team's first meeting; it will last two days.

The component acquisition executive (CAE), who is also the milestone decision authority (MDA) of this cross-federal agencies organization known as the PEO AICS & PAINS, is relatively new. The CAE has concerns about what he has heard to date about AICS & PAINS PEO execution. He has asked the PEO and Deputy PEO to provide their own assessments. Originally the PEO brought in DAU faculty as consultants to assist him and his Deputy analyze their program needs. However, he terminated the DAU assistance when he perceived the work not going in a direction to his liking.

Now the Red Team working for the CAE is tasked to brief out an independent assessment and recommendations at 1530 today.

The Red Team leader has structured the team into a two-level integrated product team (IPT) structure. The Red Team will be broken into several IPTs that report to the Analysis and Integration (A&I) IPT for coordination. The Red Team leader will chair the A&I IPT The Red Team, as a whole, will provide the CAE an integrated assessment.

Play your role

Conduct yourself as if you were detailed to this Red Team. Additionally, the simulation is designed to leave out some details about the scenario, so you need to fill in the blanks, based on your previous acquisition experiences. By doing so, you and the rest of your classmates will get the most out of this simulation.

At times, the simulation will be paused to allow you to reflect on what has been happening. During reflection, you should step out of the Red Team role, and objectively examine the simulation up to that point as an outsider. Refection periods allow us to discuss progress, how your team has been utilizing tools discussed during PMT-401.

Assignment

The class is formed into the five IPTs under the Red Team. The class's initial assignment is to provide an overall assessment of the situation. First, pick a team leader for your IPT. The IPT leaders then become members of the A&I IPT. Next, the A&I IPT should select a leader who will lead the Red Team effort, and be responsible for the briefing to the CAE. The CAE wants your assessment of the challenges for the PEO programs and the organization based on your observations and recommendations for corrective actions, where needed. He expects you to concentrate on the areas Bob Closehold has identified and is expecting your initial assessment this afternoon. Based on your recommendations, he will then decide what plan of action to take and how the Red Team will help.

Everyone has the following information:

a. An email from Bob Closehold, a recently retired Federally Funded Research and Development Center (FFRDC) lead engineer from the PEO
b. Draft PEO quad charts (presented at the beginning of the simulation)

Each IPT will receive the following information for their assigned portion of the PEO:

a. An IPT charter
b. Artifacts identified in your IPT charter
c. Finally, "fill in the blanks" portion of the scenario. If you are missing any information you would normally have, for example, the SB 3 acquisition strategy, fill in the gap with your previous acquisition experiences. For assessment

purposes, when you have no other information, consider the state of PEO AICS & PAINS as very similar to the state of PEOs you have worked with in the past.

The DAU team will provide some initial charts for you to use. You can also use white boards or 3M paper in your presentation. Note, the CAE doesn't care too much about how pretty the presentation is. They are interested in your assessment of the challenges the PEO is facing.

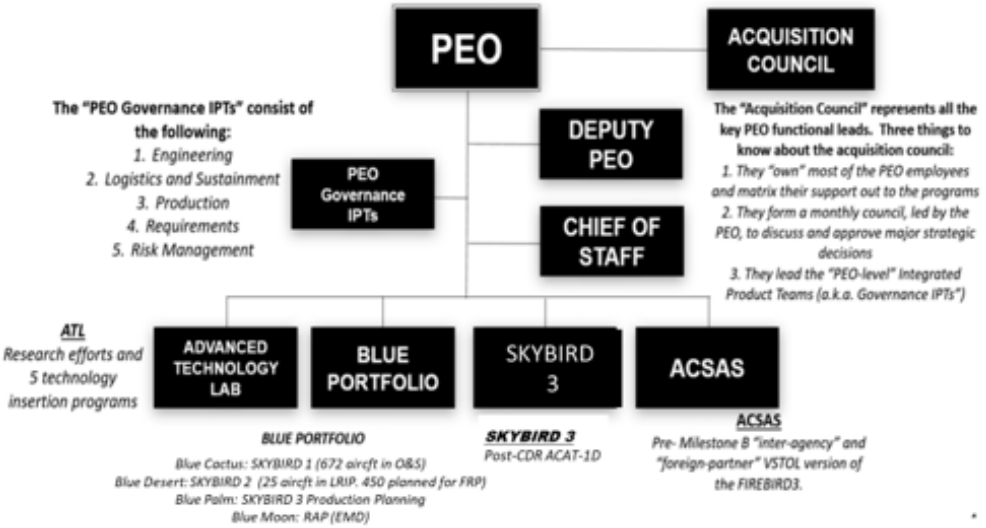
The PEO AICS & PAINS Background

In late 2016, responding to an increased demand for sharing of talent and resources across Federal and Department of Defense Agencies, the Department of Homeland Security (DHS) took the lead and established a test case for integrated acquisition and program management by creating a special-purpose organization chartered to integrate the development of detection and screening systems of interest to multiple parties, dubbed PEO AICS & PAINS. Work began right away to collect candidate projects and programs that epitomized collaboration across the Federal Government. Leadership of this PEO was envisioned to rotate across Government agencies every two to three years. Initially led in 2016 by U.S. Customs and Border Protection (CBP), PEO AICS & PAINS soon boasted multiple programs, from very large to very small, and stood apart as an example of how the Government could work together to acquire new systems, and leverage common skill sets and funds. Within two years, some of the PEO structure began to unravel. By 2018, leadership in the PEO was transferred to a special political appointee as a way of settling arguments erupting in the three agencies as to "who was next" to lead the PEO.

The Programs within PEO AICS & PAINS

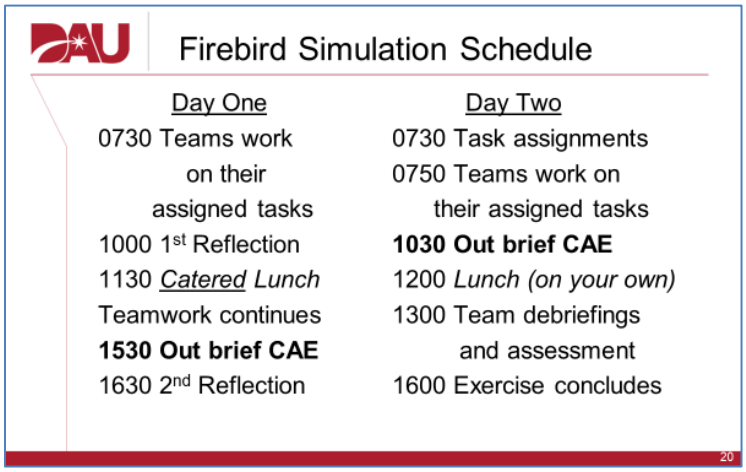
At this point in time, the following projects and programs reside within the larger PEO AICS & PAINS organization:

- Skybird (SB) 3 is the current major development effort in the Skybird series. It is a major program that is post critical design review (CDR).
- Blue Portfolio is the "SB" I and II family of systems. It was originally organized as a separate PEO (portfolio) structure and was incorporated into the current PEO in 2017. It currently has:
    - Blue Cactus – SB 1 with 672 aircraft in operations
    - Blue Desert – SB 2 with 25 aircraft in low rate initial production (LRIP); 450 planned for full rate production (FRP)
    - Blue Palm – the production planning part of SB 3
    - Blue Moon – an advance ground station redeployable air platform (RAP)
- Advanced Capability Situational Awareness System (ACSAS), currently working on an inter-agency Vertical and/or Short Take-Off and Landing (VSTOL) version with an emphasis on cooperation with foreign partners.
- Advance Technology Lab (ATL), the concept risk reduction part of the PEO, working on five technology insertion programs.



Simulation Dynamics and Flexibility

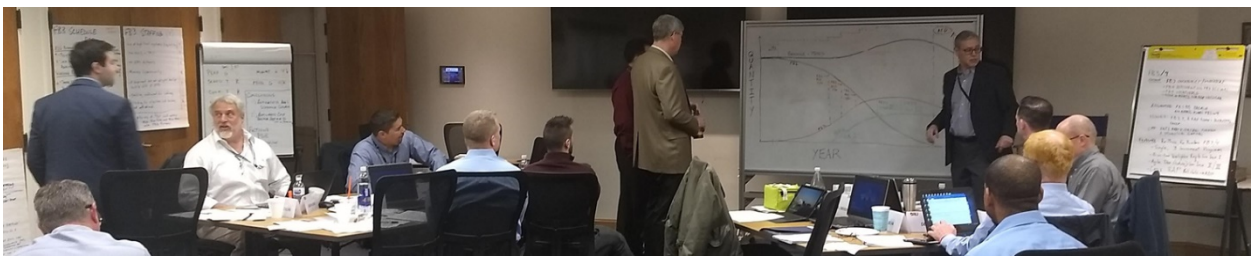
The simulation itself has evolved into a one-and-a-half-day session. Most uses of the simulation add a debriefing and assessment segment after the simulation ends and transitions the participant back into the course or mission assist engagement. The following chart is an example from a recent PMT-401 session.



The timing is flexible, but core to the structure is a kickoff session that sets the tone and declares the participants are entering into the simulation. This is key for the participants to play the role. Reflection periods can vary, but the team has found they are mostly needed on the first day, not the second. "The Out brief CAE" can either be characterized as a Component Acquisition Executive or a Milestone Decision Authority (MDA). PMT-401 has used CAE predominately; the mission assists efforts have used MDA. What is key is for the person playing this role to be significantly more experienced then the participants and, if possible, to have some providence. Our CAE/MDAs have included:

- Lt Gen N. Ross Thompson, USA (Ret.), DSMC Executive in Residence
- Brigadier Mike Brogan, USMC (Ret.), DSMC Intermittent Professor and prior MARCORSYSCOM commanding general
- Prior DoD executives David G. Ahern and Paul A. Schneider, who had extensive acquisition backgrounds

The role of the CAE/MDA is not just to hear the participants out brief, but to give them feedback on their analysis and assessment. Many groups find themselves being asked questions they don't have answers to or are asked about constraints and assumptions that don't match the simulation documentation. Done correctly, participants experience what it is like to brief a senior DoD executive, because they are briefing a prior executive. Expectations are high and the participants know when they have missed key aspects of the scenario. As seen in the picture, LTG Ross Thompson (in brown coat) is discussing participants' spread of Firebird quantities of units over the next several years, along with charts outlining schedules, staffing, budgets, etc. The CAE/MDA sessions take 60 to 90 minutes and are extensive; thus the faculty or guest playing these roles need to be well briefed, have read the material, and if possible observed another simulation. The participants' analysis and assessment are rolled into the next day's activities. This is a key part of the simulation: there is no school solution. The CAE/MDA



along with the simulation facilitator utilizes the participants responses and rolls them into the next tasking.

After the first presentation, the participants vote on new leaders, with prior leaders at all levels banned from being a leader in the second round. This is often a reality of the acquisition professional, inheriting prior leadership decisions. Given that some future participants might read this paper, suffice it to say, the setup of the teams, the injects (changes to the scenario in the middle of the scenario), and other techniques are all utilized to create a VUCA environment. It is up to the simulation facilitator to stay close to the action and decide during the simulation what VUCA needs to be added to keep the simulation dynamics in play.

Summary

In the lead article in the March−April 2020 edition of *Defense Acquisition Magazine,* PMT-401 Professors Owen Gadeken and Bobbie DeLeon noted,

> Our most extensive exercise is the 2-day "tiger team" analysis of a simulated Program Executive Office that includes a family of unmanned aerial vehicles in different development stages. This simulation was created by two DAU faculty members (John Driessnack and Patrick Barker) to give students "hands-on" leadership experience in a more strategic portfolio management scenario. … The simulation includes reflection periods and a debriefing where each student gets feedback on the student's contribution and personal skill development. … These activities encourage individuals and teams to develop their creative thinking, leadership, and communication skills, while building group cooperation and consensus.

The action research approach, though very dynamic, continues to allow the team to evolve the simulation while deploying a systematic reflection concept that informs the evolutions. The simulation is not a product of an afternoon brainstorming session, but the result of years of trial and error, building products, and testing approaches in various venues, as well as understanding the literature. The mission assist engagement along with willing clients allows for development of the simulation to a point to which it could be relatively standardized and incorporated into the PMT-401 course.

The 11 lessons learned came about because the team was willing to take action and move forward. The 12th and most important lesson is this: the leadership and team supporting the deployment and use of the simulation must be willing to take risks and adjust to observations. Although the authors developed strong beliefs about how the simulation could and should be created and deployed, those beliefs were loosely held so as observations indicated changes were needed, changes were made.

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