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An Experience Accelerator for the Engineering Workforce

9th Annual Acquisition Research Symposium

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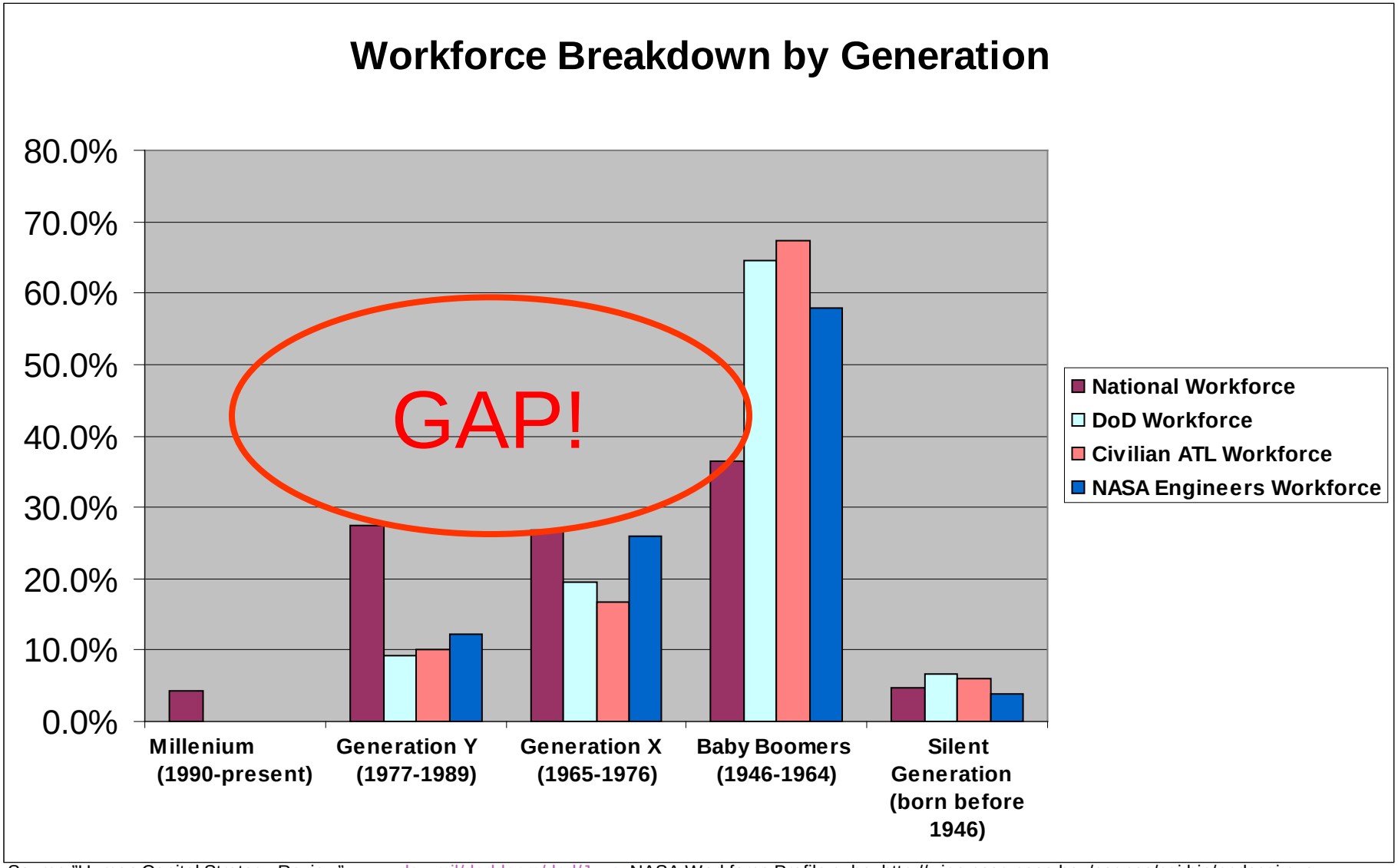
The Workforce Challenge



Source:"Human Capital Strategy Review", www.dau.mil/doddacm/dod/Juza; NASA Workforce Profile cube, http://wicn.nssc.nasa.bov/cognos/cgi.bin/ppdscgi.exe

What's More Effective?

Transforming SE Development

We postulate that a new paradigm is necessary which must be:

- **Experience Based**: Providing accelerated learning opportunities through experience-based interactive sessions.
- **Agile:** Allowing for quality, timely development of course material that is most appropriate for the target students.
- **Lean:** Providing the greatest amount of benefits with the minimal number of steps and least amount of effort
- **Integrated:** Provides an integration point of multi-disciplinary skills and a wide range of Systems Engineering knowledge in a setting that recreates the essential characteristics of the practicing environment.

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Hypothesis & Goals

Hypothesis: *By using technology we can create a simulation that will put the learner in an experiential, emotional state and effectively compress time and greatly accelerate the learning of a systems engineer faster than would occur naturally on the job.*

Goals: To build insights and "wisdom" and hone decision making skills by:

- Creating a "safe", but realistic environment for decision making where decisions have programmatic and technical consequences
- Exposing the participants to job-relevant scenarios and problems
- Providing rapid feedback by accelerating time and experiencing the downstream consequences of the decisions made

SE Maturity

Maturity in Systems Engineering requires:

- Viewing a program through the entire lifecycle
- Seeing the relationships between elements of the system, and the system developing the system
- Encountering the challenges faced in a complex system development
- Being able to navigate through the “gray” zone
- Creating mental templates which can be applied to similar future situations

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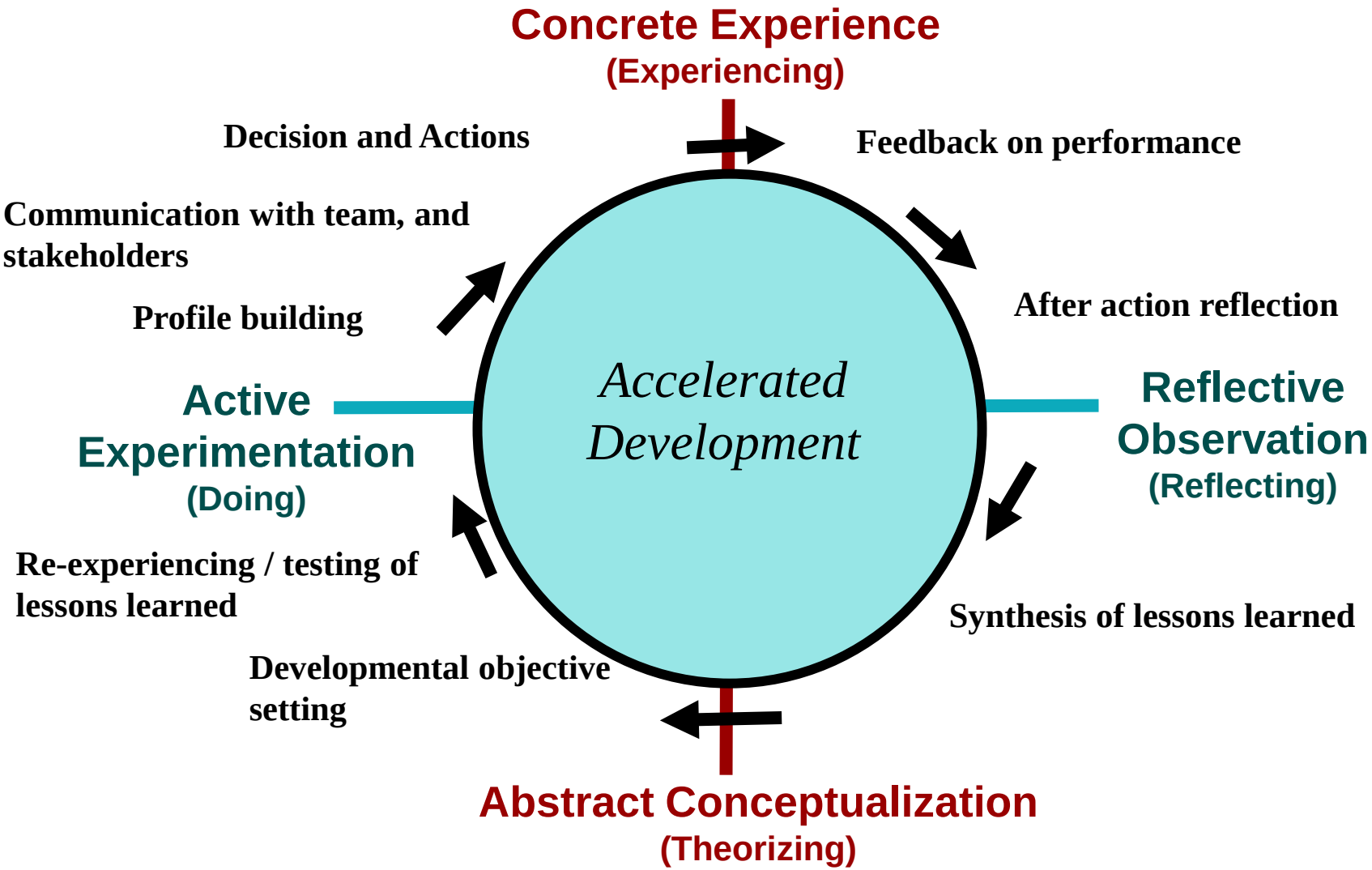
Learning Process



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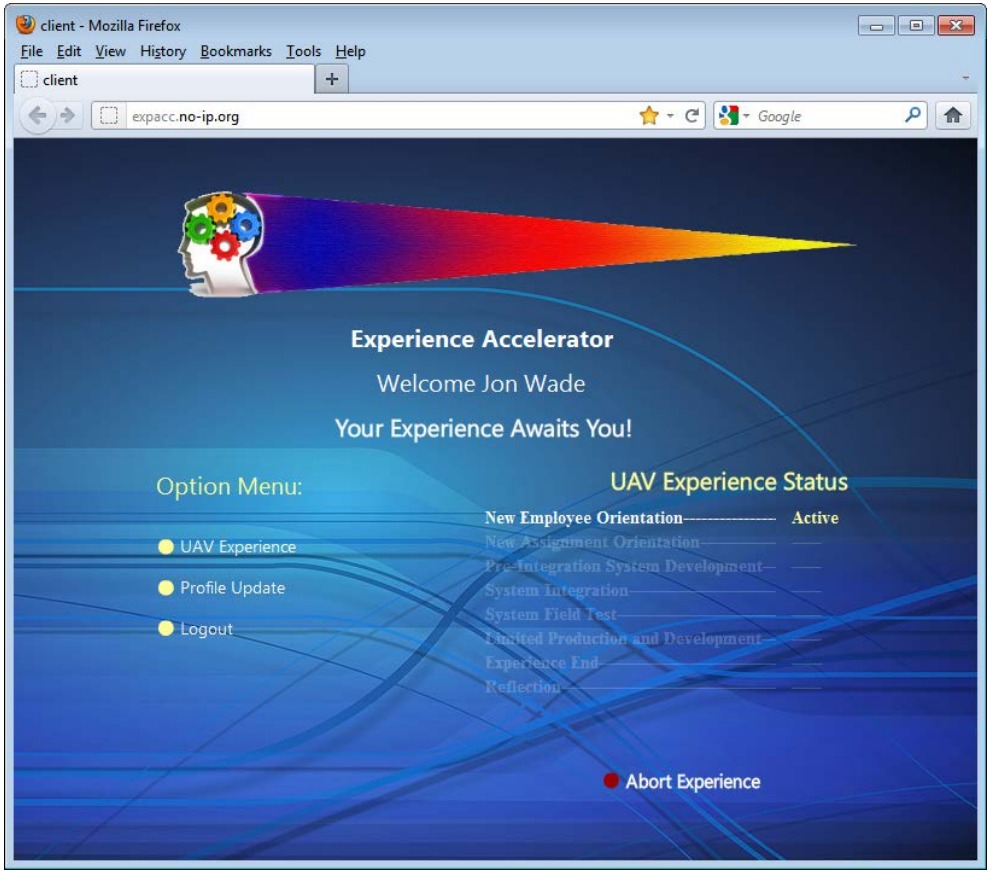
Target Users

The initial focus of this program will be on the Systems Engineering *Executive* Level skills of a DoD *Lead Program* Systems Engineer necessary to effectively manage *complex* systems throughout their lifecycle from an acquisition/acquirer viewpoint in a typical Project Management Office (PMO).



Success Metrics

Success of the year one prototype will be indicated with a positive result in the following areas:

- Experienced Lead Program Systems Engineers authenticate the EA and provide useful feedback on areas of improvement.
- Learners express general satisfaction with the learning experience.
- The potential for learners that successfully complete the training to be able to immediately implement lessons learned from the training experience to the job, assuming the culture allows this.

Targeted Competency

Problem Solving and Recovery Approach:

- Identifying the actual/root cause problems amid often conflicting information.
- Marshalling the resources needed to solve problems.
- Recognizing the problems that have the most impact to the overall system and appropriately prioritizing plans for solving them.
- Making recommendations, using technical knowledge and experience, by developing a clear understanding of the system.
- Identifying and analyzing problems using a systems approach, weighing the relevance and accuracy of information, accounting for interdependencies, and evaluating alternative solutions.

EA Capabilities and Features

- Relevant, Authentic Experiences
  - —Experiential focused…incorporates experience base of DoD Chief Engineers
  - —Realistic simulations of complex system development through the lifecycle
  - —Challenges in the “gray zone” based on likely challenges
  - —Skill level adjustment, initial focus on expert level
- Cost Effective, Available and Open
  - —Approximately 1 hour time limit for each session
  - —Low Server utilization per client user…highly scaleable
  - —No special client hardware or administrative needs
  - —Open architecture + Open Source Software with no-cost licensing
  - —User-friendly tool-set in development

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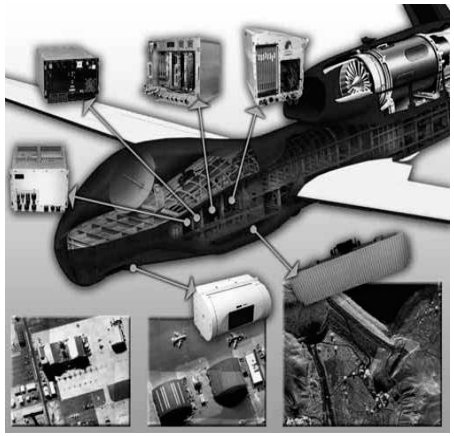
The Experience: A Day in the Life of a PSE

UAV System:

- S0 – System
- S1 – Airframe and Propulsion
- S2 – Command and Control
- S3 – Ground Support



UAV KPMs:

- Schedule
- Quality
- Range
- Cost

Phases:

- EA Introduction
  - Phase 0: New Employee Orientation
- Experience Introduction
  - Phase 1: New Assignment Orientation
- Experience Body
  - Phase 2: Pre-integration system development -> CDR
  - Phase 3: Integration -> FRR
  - Phase 4: System Field Test -> PRR
  - Phase 5: Limited Production and Deployment
  - Phase 6: Experience End
- Experience Conclusion
  - Phase 6: Reflection
- Each session = 1 day

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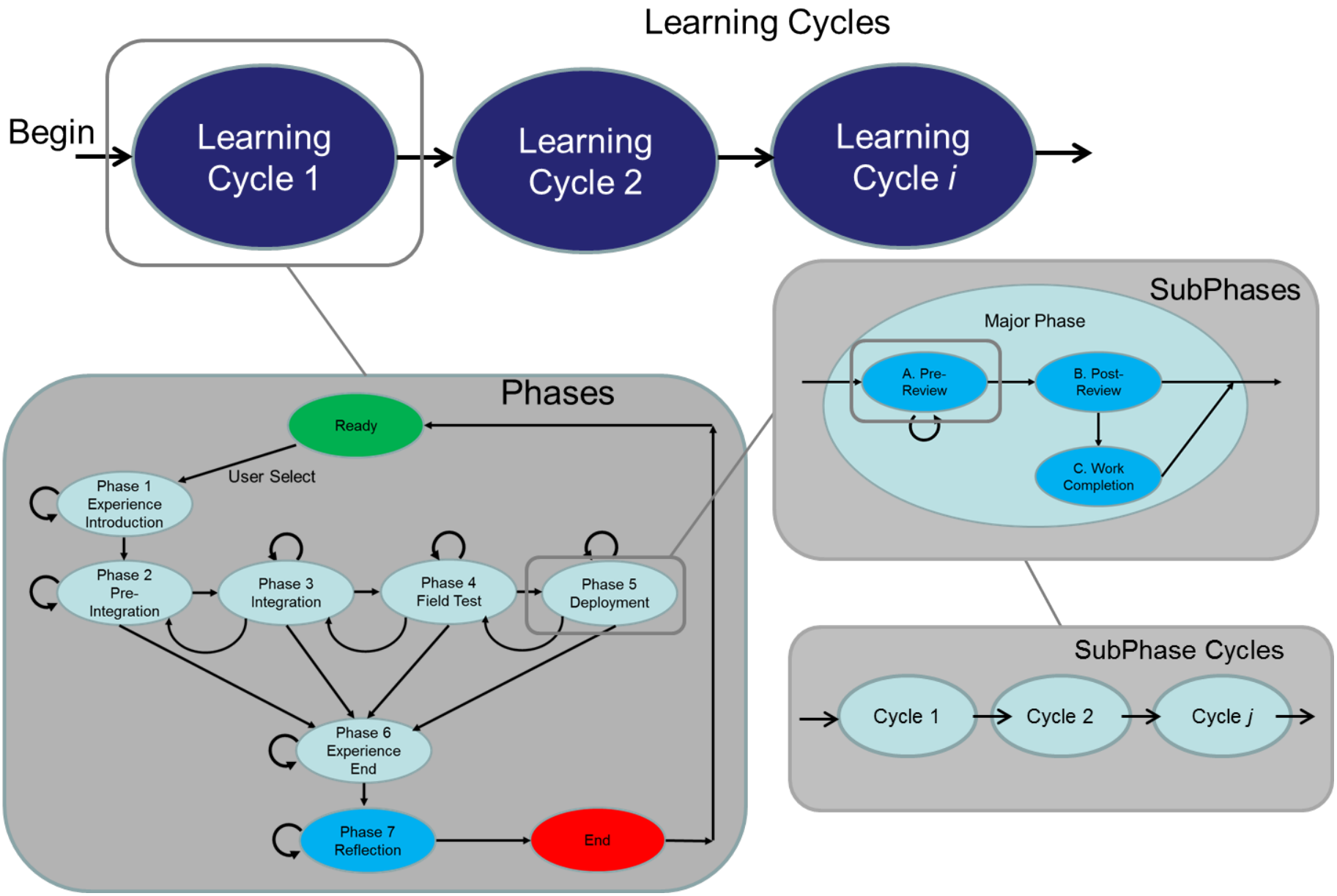
Experience Phases



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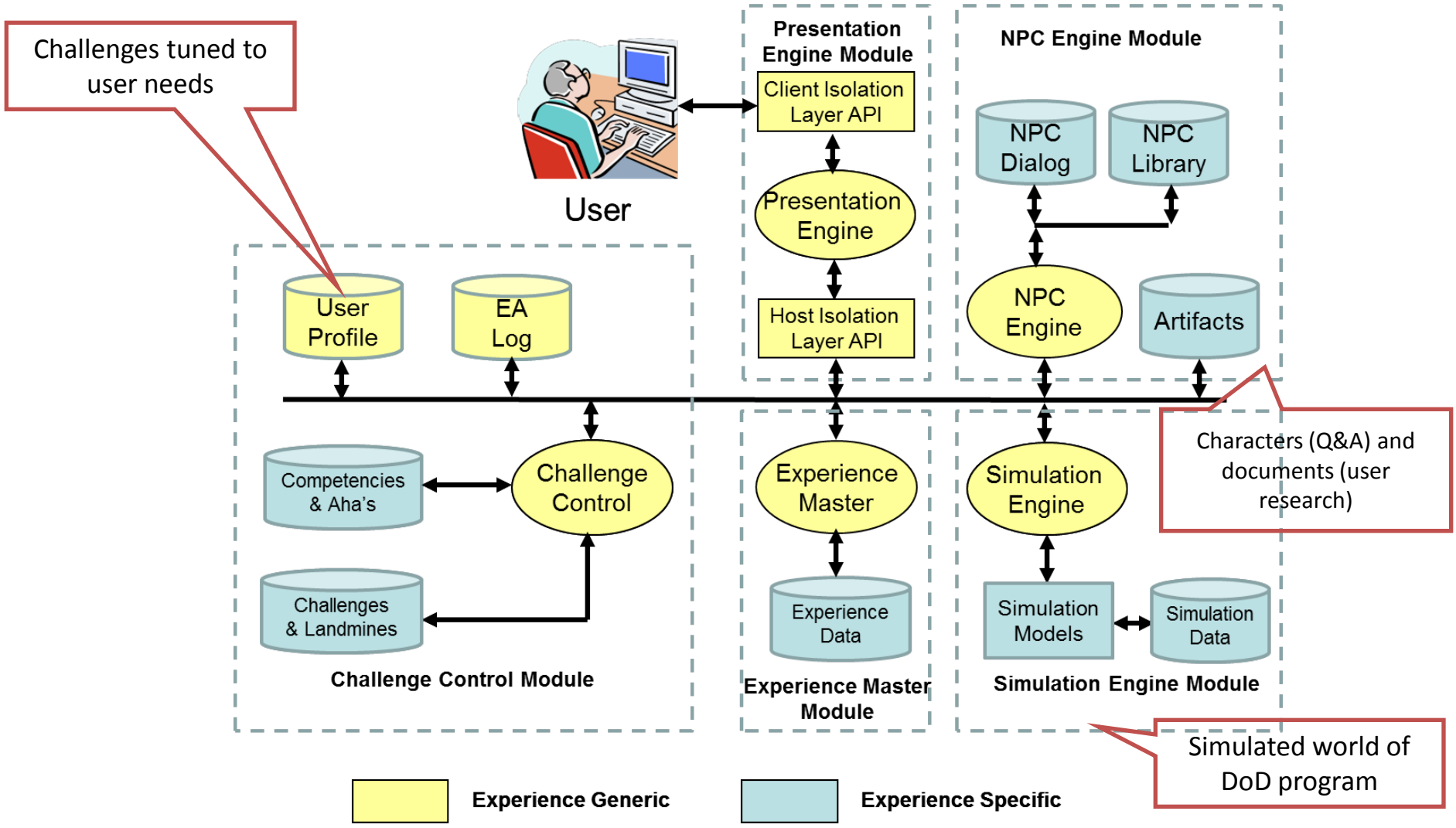
Experience Architecture

Experience Accelerator Block Diagram



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Experience Project Timelines

- **Year 1: 4/2010 – 5/2011**
  - Determine project goals & success metrics
  - Identify critical competencies & maturation points
  - Create appropriate learning experiences
  - Define open architecture & select technologies
  - Develop & demonstrate 1st Pass Prototype
- **Year 2: 6/2011 – 5/2012**
  - Refine and improve prototype
  - Evaluate results
  - Create tools to aid in develop
  - Release as Open Source Technology
- **Year 3: 6/2012 – 5/2013**
  - Pilot use
  - Bring on additional developers and users
  - Create self-sustaining Open Source community

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Experience Accelerator Team

Experience Design:

- Alice Squires – Stevens
- Dan Ingold – USC (year 1)
- James Armstrong - Stevens
- Rick Abell – consultant
- John Griffin – consultant
- John McKeown – consultant

Evaluation:

- Bill Watson, CoPI – Purdue
- Pete Dominick – Stevens
- Dick Reilly – Stevens
- Dana Ruggiero – Purdue

Technology & Tools:

- Jon Wade, PI – Stevens
- George Kamberov – Stevens
- Brent Cox – Stevens
- Vinnie Simonetti – Stevens
- Yagiz Mungan – Purdue
- Dan DeLaurentis – Purdue (Year 1)
- Masa Okutsu – Purdue (Year 1)
- Murali Medisetty – Purdue (Year 1)
- Varun Ramachandran – Purdue (Year 1)

Simulation:

- Doug Bodner – Georgia Tech
- Pradeep Jawahar – Georgia Tech
- Kyle Crawford – Georgia Tech

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Acknowledgement

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Questions?

Join the Experience Accelerator Team!

Contact for information:

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