SYSTEMS ENGINEERING
Research Center

Defense Acquisition University

Accelerating the Development of Key Technical Leaders (RT-140)

Dr. Michael Pennotti
Stevens Institute of Technology

SERC Sponsor Research Review
December 3, 2015

With appreciation for the contributions of Steve Jones and Dr. Chris D'Ascenzo of DAU, Pamela Knight of MDA and Dr. Pam Burke of Stevens

Agenda

- The Technical Leadership Challenge
- Previous Leadership Development Tasks
- RT-140 Results to Date
- Conclusions and Future Plans

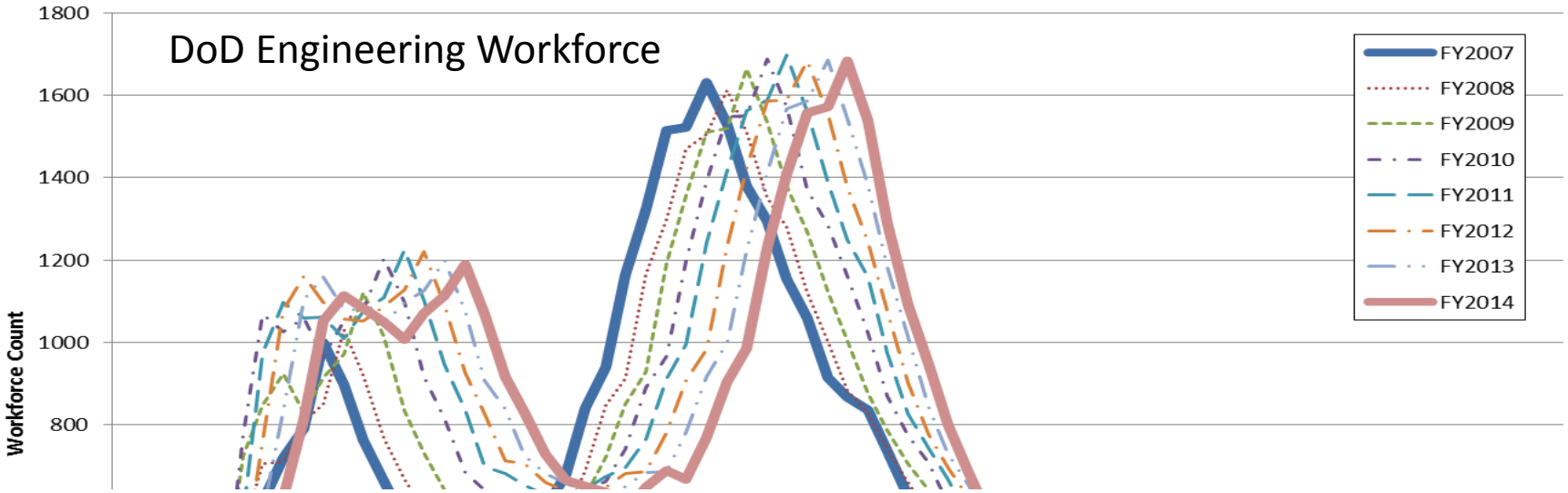
The Complexity Challenge

- "Our workforce must deal with complexity. The problems we solve are not simple—we are entrusted to develop and field some of the most complicated and technically advanced systems in military history**. It is an illusion to believe that defense acquisition success is simply a matter of applying the right, easily learned 'check-list' approach** to doing our jobs. There are no silver bullets that apply to all situations.

- "It is not enough to know acquisition best practices; **acquisition professionals must understand the 'why' behind the best practices**—that is, the underlying principles at play. Many of our products consist of thousands of parts and millions of lines of code. They must satisfy hundreds of requirements, and take several years to bring into production. Managing and understanding complexity is central to our work."

Testimony of Mr. Kendall, USD(AT&L), before the SASC
April 30, 2014

The Demographic Challenge



"Right now 21,000 members of our workforce are eligible for retirement, and 25,000 more soon will be. **Those approaching retirement represent 50% of our workforce.** Behind them – the bathtub – the mid-career workforce with low year groups – represent only 22% of our workforce – they were largely hired during the significant downsizing efforts in the 1990's. We must learn from the 1990s and be strategic now, even in a period of downsizing. **Investing in our future leaders is essential for acquisition success.**"

Testimony of Mr. Kendall, USD(AT&L), before the SASC
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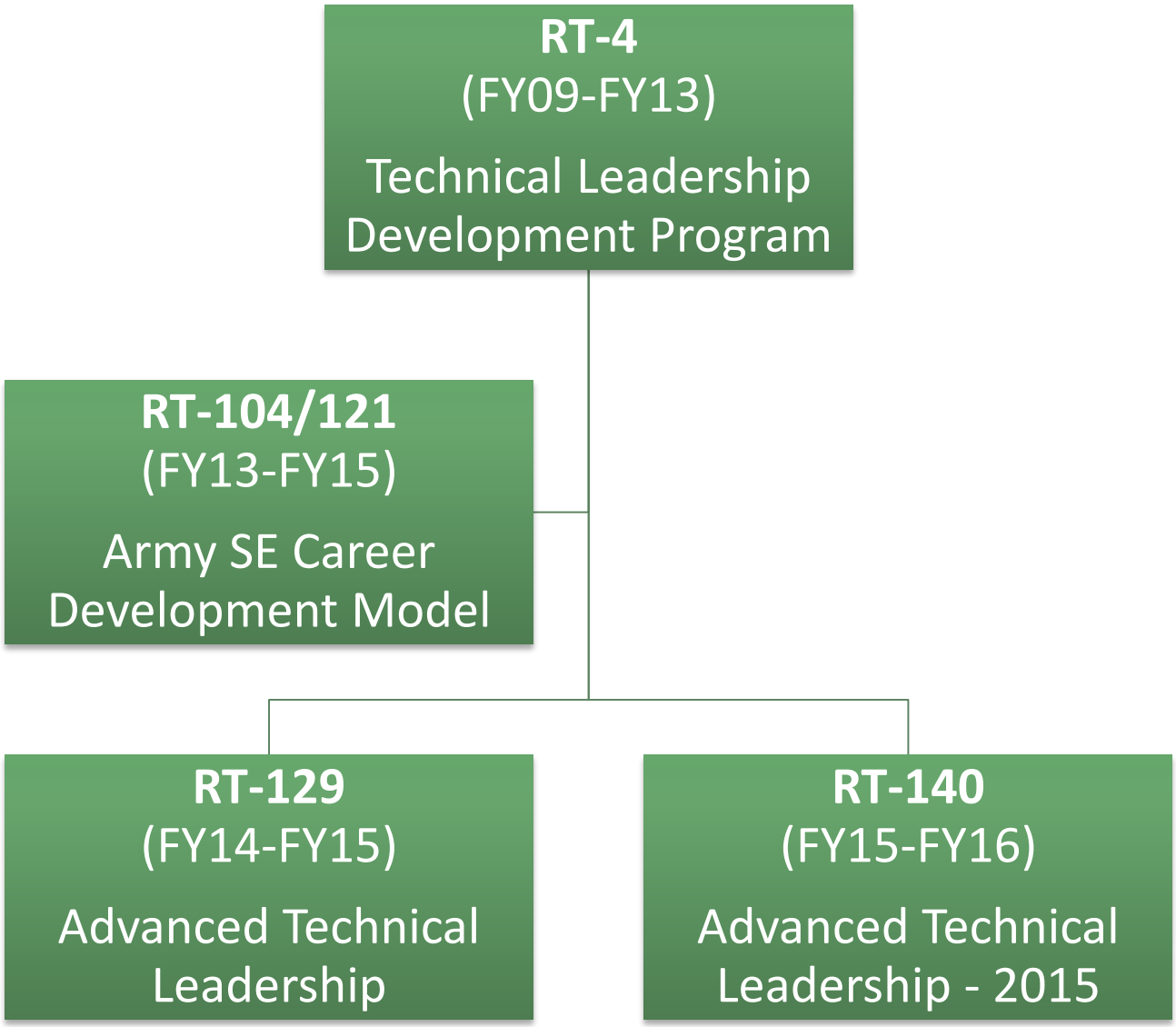
Source: AT&L Defense Acquisition Workforce Data Mart

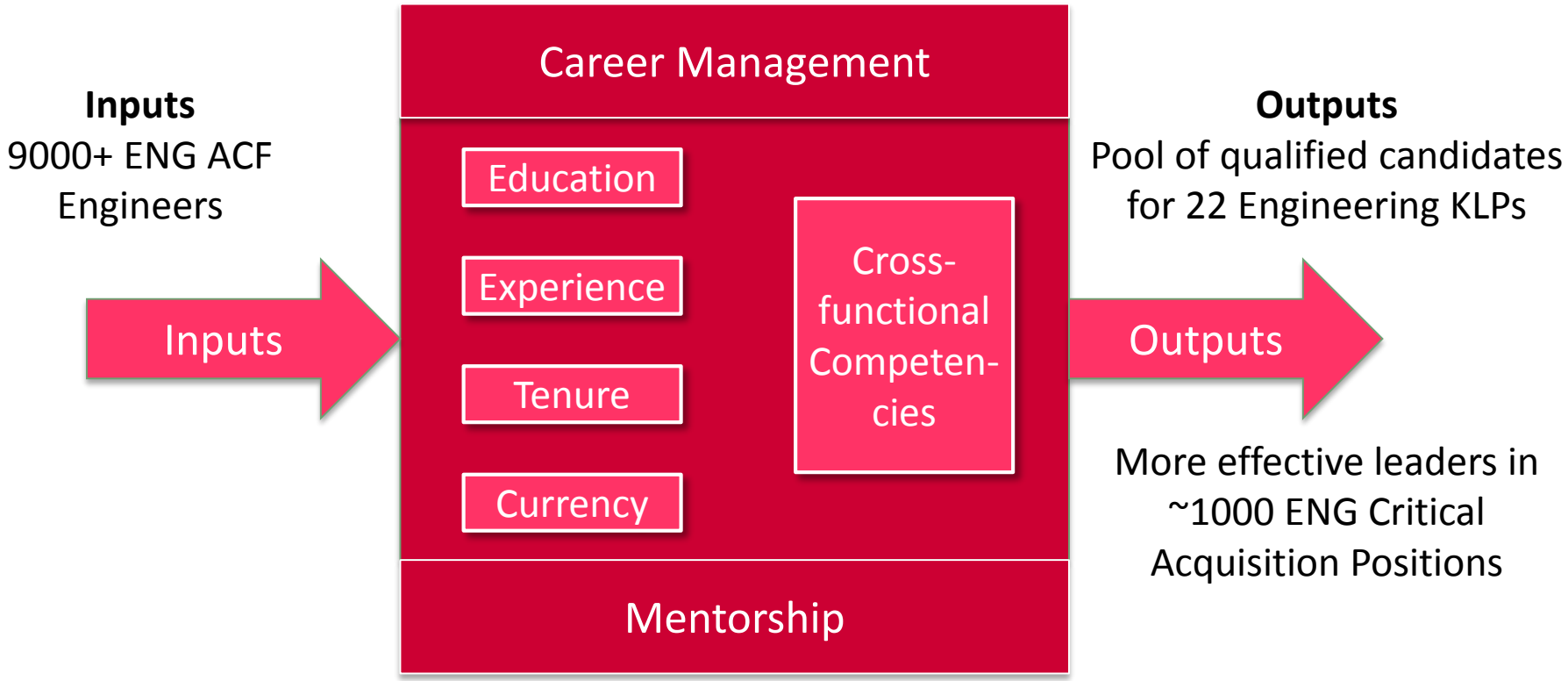
Technical Leadership Task Evolution



RT-104/121 Research Hypothesis

A Career Development Model can be defined that can systematically prepare Army Civilian Systems Engineers to assume Key Leadership and Critical Acquisition Positions.

Army Career Development System



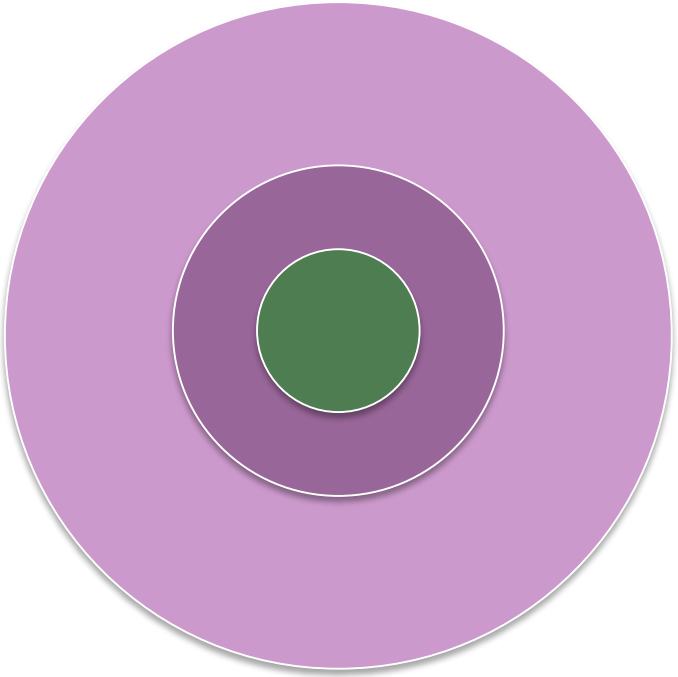
RT-104/121
Conclusions and Recommendations

- The Army already has all the components required for an effective Career Development System; what is required is to integrate them and actively manage them as a coherent whole.
- Technical leadership training should start much earlier in an acquisition professional's career and should assume increasing emphasis throughout and following functional certification.
- It is recommended that the Army shift its career development focus from capabilities ("what I have learned") to evidence-based value propositions ("what I can do" and "how I have demonstrated I can").

RT-4 Research Hypothesis

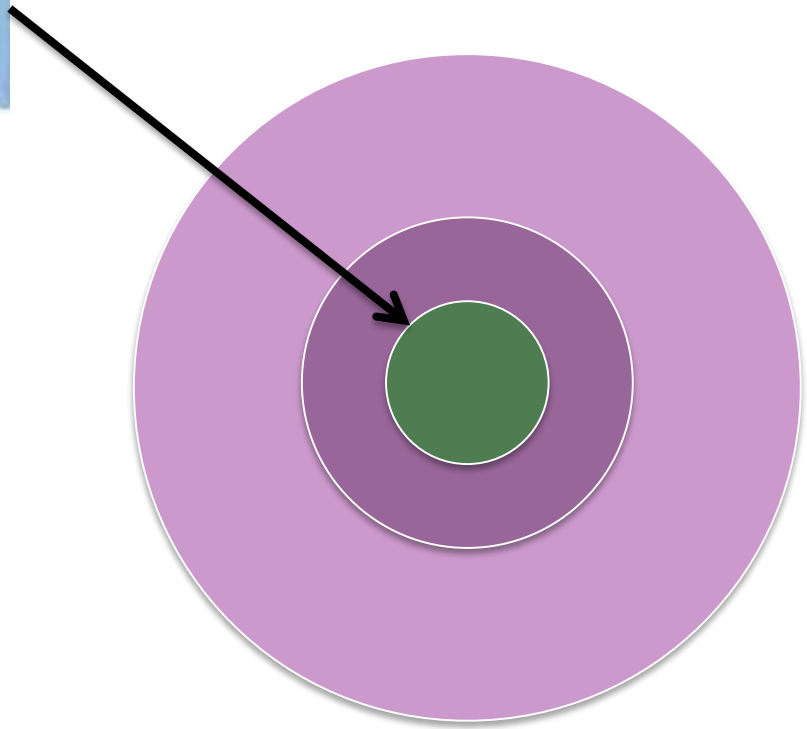
The technical leadership capabilities of high potential, senior DoD systems engineers and technologists can be accelerated through an educational program in technical leadership.

Leadership Development Architecture
Three Concentric Lenses



Program Architecture
Three Concentric Lenses

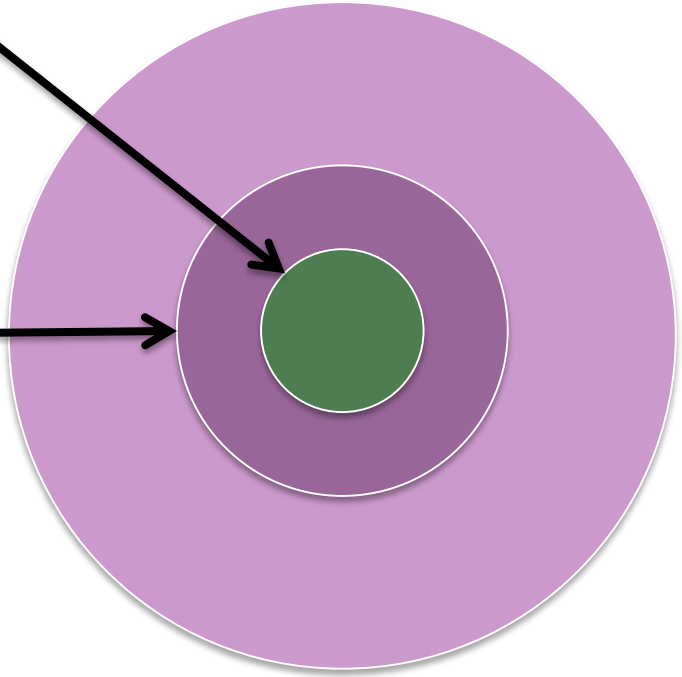
The Car



Program Architecture
Three Concentric Lenses

The Car

The Wheel



Program Architecture
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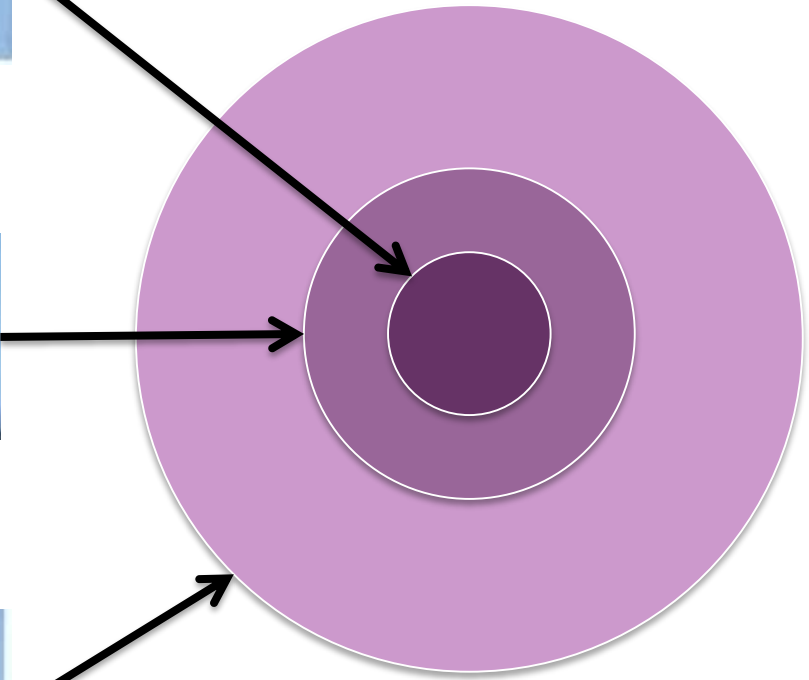
The Car

The Wheel

The Park



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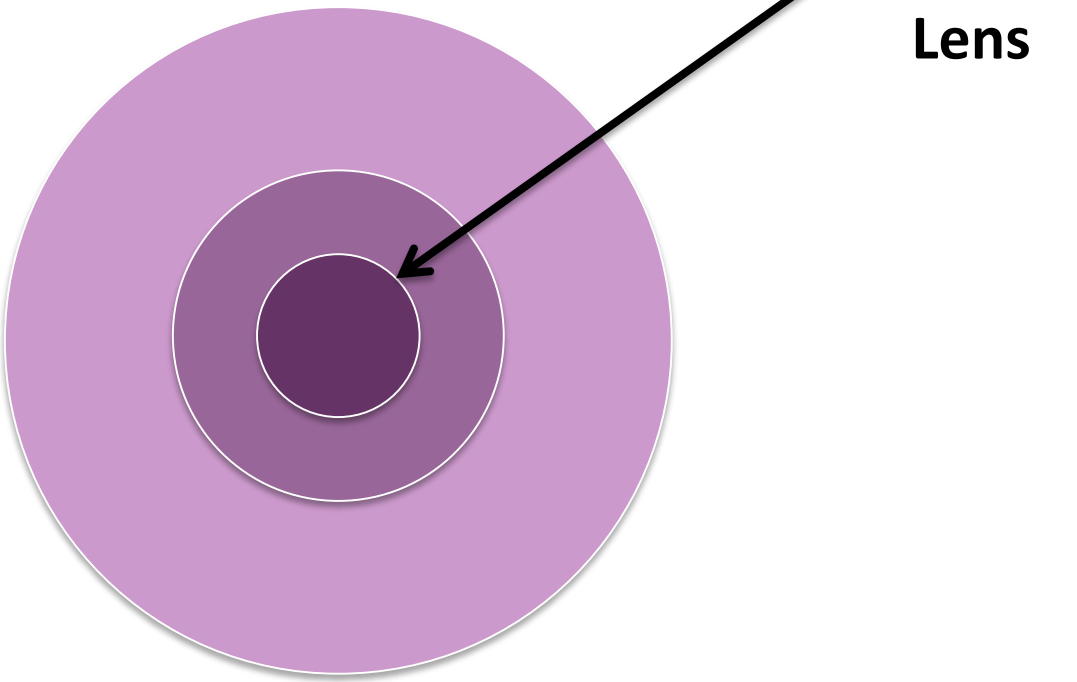

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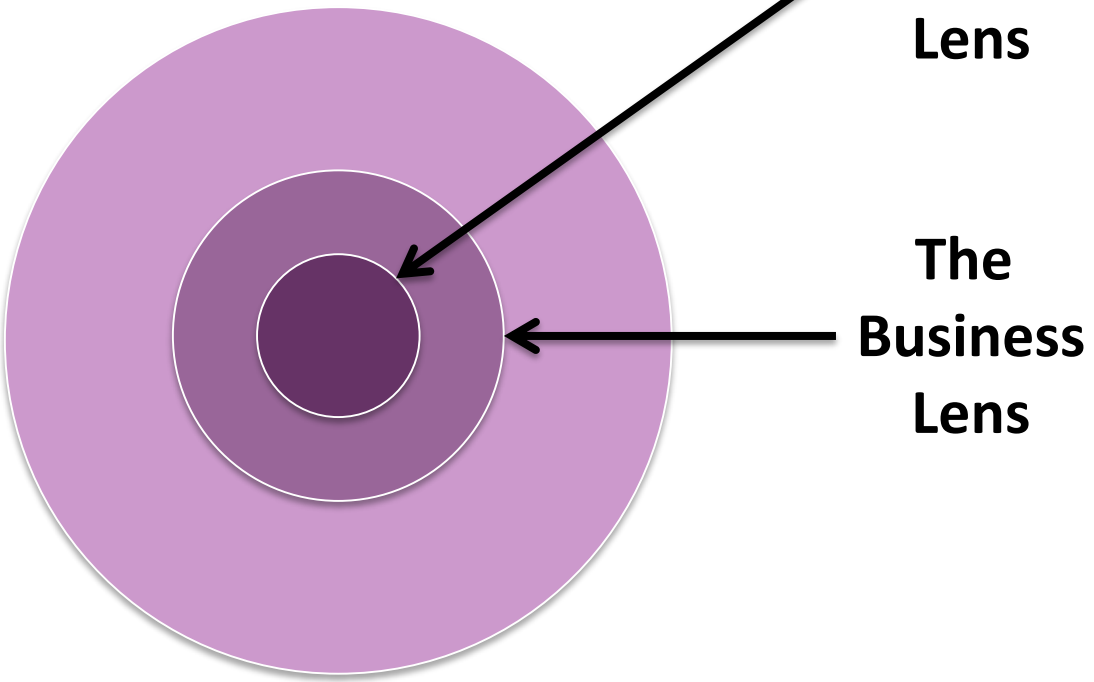

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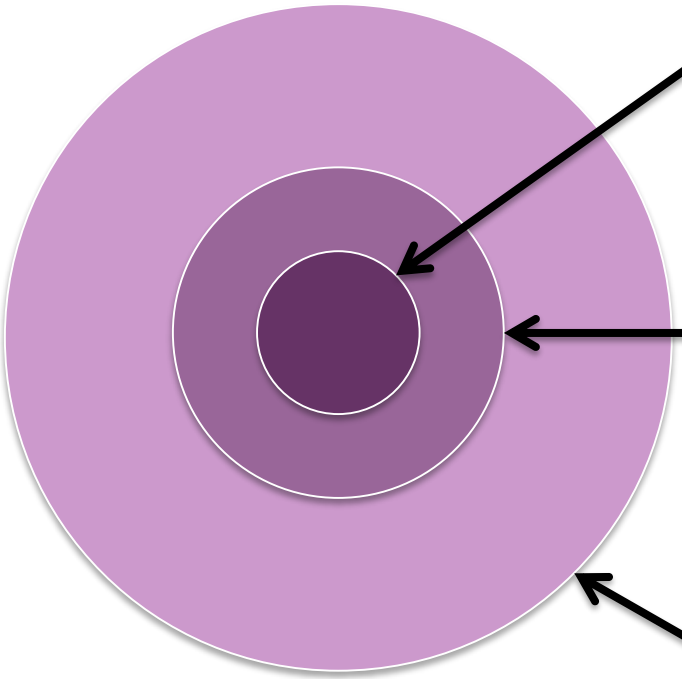

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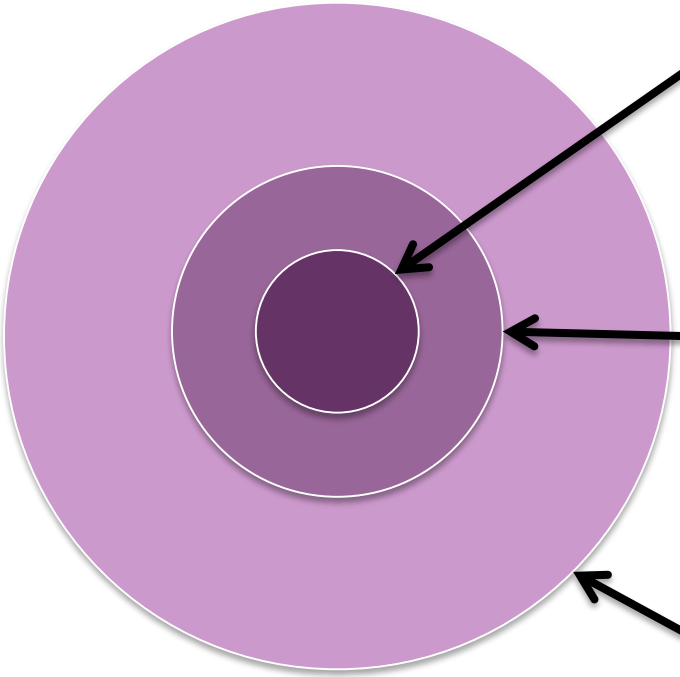
Three Concentric Lenses

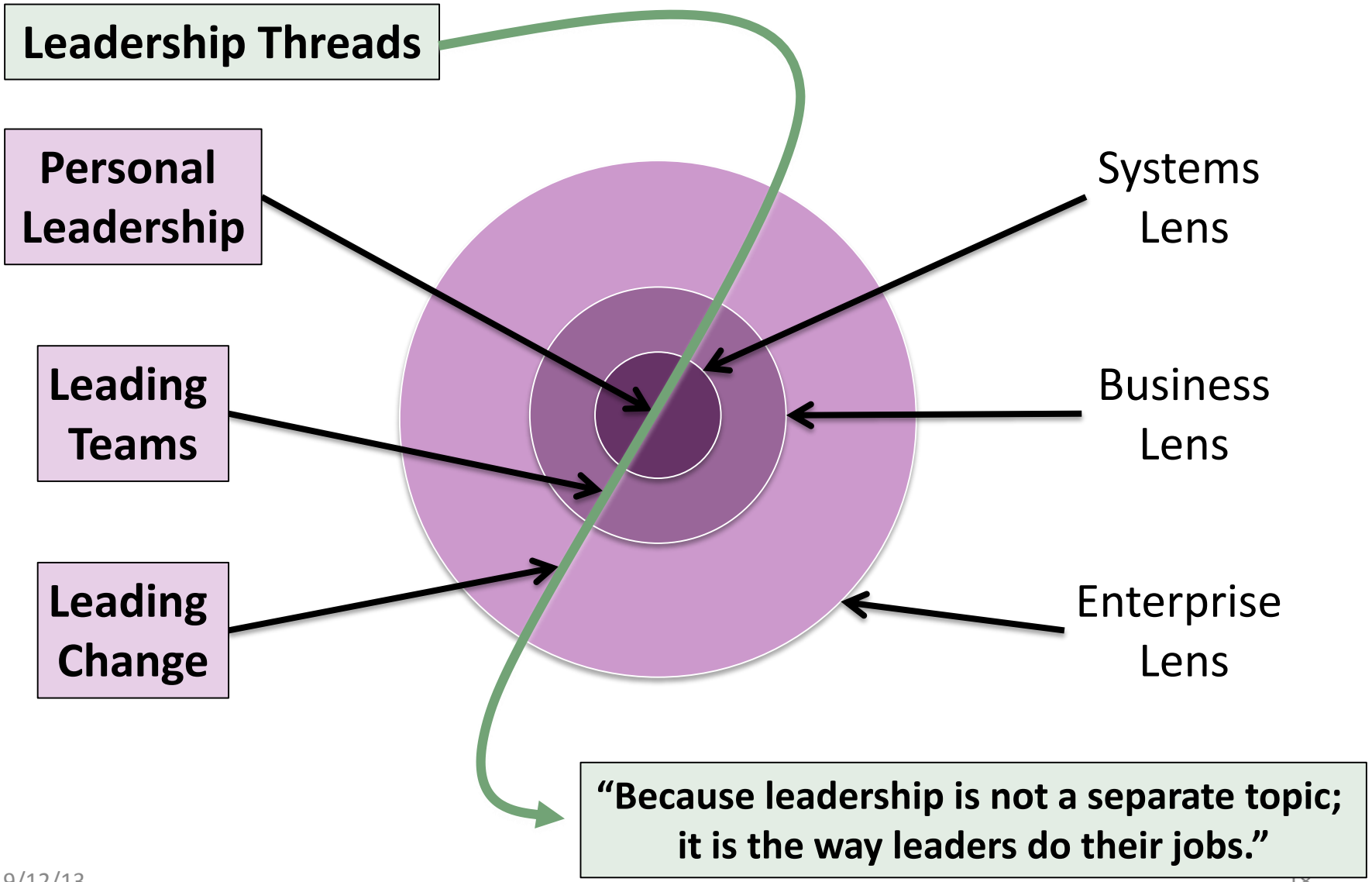


SYS 350A The Systems Lens
- Focuses on the technical product, system or system of systems
- Emphasizes the technical challenges faced by a **Systems Engineering Lead**

SYS 350B The Business Lens
- Focuses on the complete development project
- Emphasizes the challenges faced by the an **Integrated Product Team (IPT) Lead**

SYS 350C The Enterprise Lens
- Focuses on the entire defense acquisition enterprise
- Emphasizes the challenges faced by a **Chief Engineer**

Program Architecture
Three Concentric Lenses + Threads



The Technical Leadership Program Triptych

	Systems Lens	Business Lens	Enterprise Lens
Focus	System Development	Program Disruption	Organizational Evolution
Metaphor	Win the Battle	Win the War	Preserve the Union
Image	Colonel Chamberlain	General Grant	President Lincoln
Context	Static; Fixed	Dynamic; Changing	Emergent; Adaptive
Embedded Thread	Personal Leadership	Leading Teams	Leading Change
Extended Simulation	Lifecycle Project	Disruptive Events	Cultural

RT-4 Accomplishments

- Nine 5-day pilots conducted over four years for acquisition professionals chosen for their demonstrated leadership capability and potential to assume greater responsibility in the future.
- More than 100 lectures, case studies, exercises and group project modules developed and tested.
- More than 5200 student-contact-hours delivered.
- Valuable feedback obtained from participants in the Army, Navy, Air Force, Marine Corps, Missile Defense Agency and Defense Acquisition University.
- At the conclusion of the pilots all three courses were judged ready for transition to the government.

RT-129 Research Hypothesis

The Systems Lens can be successfully transitioned to government instructors.

RT-129 Accomplishments

- A successful SERC-led pilot was conducted at DAU Capital in January 2015 with target DAU instructors participating
- The DAU instructors then conducted a government-led pilot at DAU South in May 2015 that was judged “a resounding success.”
- At the debrief in June, one of the DAU instructors remarked, “I would teach this course ten times a year if they would let me.”
- The course has been integrated into the standard DAU curriculum.

RT-140 Research Hypothesis

The Business and Enterprise Lenses can be successfully transitioned to government instructors.

FY15 MDA KLDP Pilot Overview

	Segment 1	Segment 2	Segment 3	Segment 4	Segment 5	Segment 6	Segment 7
	Workshop (5 Weeks)	3 Months	Workshop (1 Week)	3 Months	Workshop (2 Weeks)	3 Months	Workshop/Capstone Exercise (2 Weeks)
Pre-Work	Critical Thinking in the Acquisition Environment	Blended Learning	Technical Leadership: The Business Lens	Blended Learning	Technical Leadership: The Enterprise Lens	Action Learning	Program Leadership: The Executive Lens

Start: Jul 2015

Complete: Jun 2016

LAYING THE FOUNDATION

Think Outside the Functional Silo

Think Critically

Identify Proven Practices

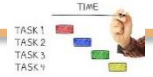
Communications

BUILDING THE BUSINESS

Think from Industry Perspective

Construct the Business Strategy

Build a Business Plan



MANAGING THE PROJECT

Think from Other Functional Perspectives in the Context of the Project

Build Project Plans

Evaluate Plans from an Enterprise Perspective

CAPSTONE EXERCISE

Think From Your Boss and Your Boss's Boss Perspective

Evaluate Strategy and Plans

4 CLASSROOM WORKSHOPS + BLENDED / ACTION LEARNING

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Complete: Jun 2016

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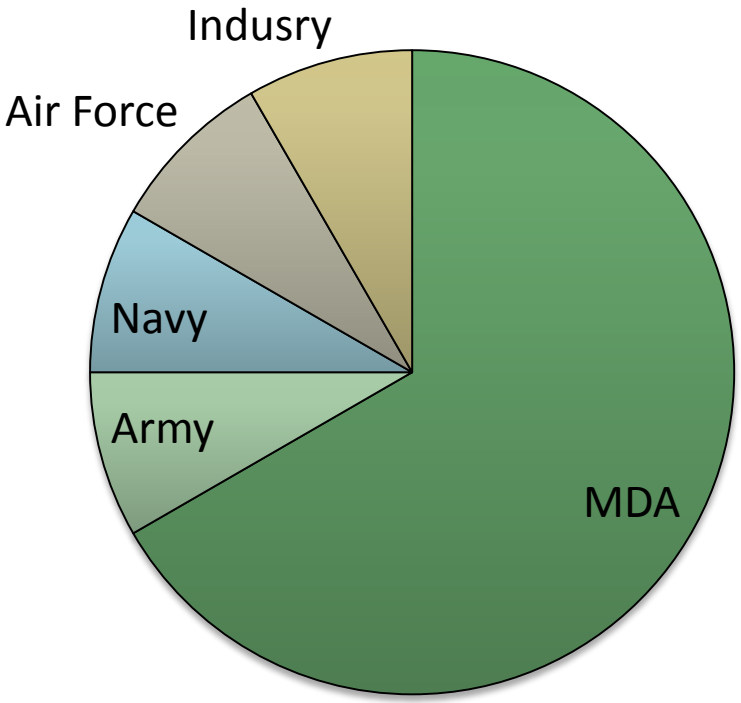
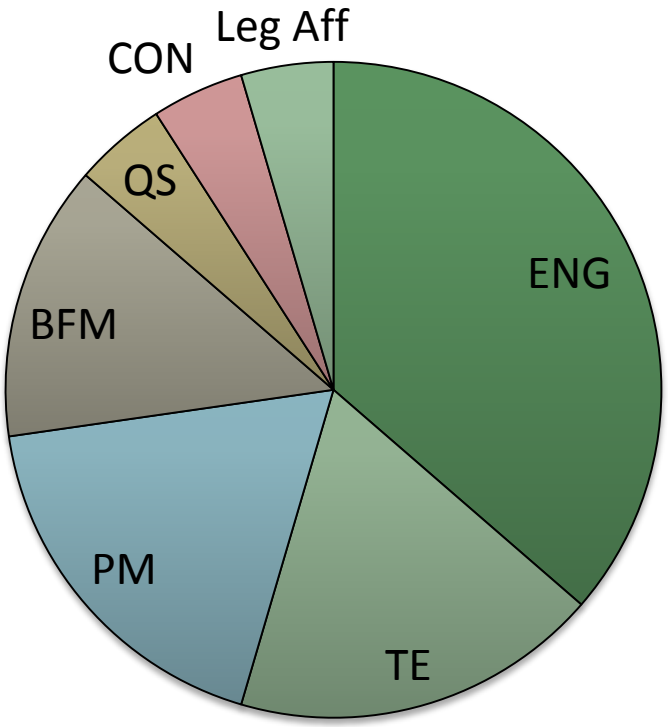
KLDP Pilot Learners



24 Person Cohort



SYSTEMS ENGINEERING Research Center

SYS 350B/KLDP Segment 3 Pilot
November 16-21, 2015

Defense Acquisition University

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Overview and Introduction	Check-In	Check-In	Check-In	Check-In	Team Presentations
Technical Value Propositions	Business Strategy	Business Finance	Plant Tour	Technology and Acquisition	Conclusion, Feedback and Close
Simulation 1: Value Propositions	Emotional Intelligence	**Simulation 3:** Financial Disruption	Technology and Innovation	**Simulation 4:** Technology Disruption	Adjourn
Leadership Value Propositions	**Simulation 2:** Strategic Disruption	Declaring Your Future	Influencing Without Authority	Next Steps for Growth	
Leadership Reflection	Leadership Reflection	Leadership Reflection	Leadership Reflection	Team Presentation Prep	

Technical Leadership Development Conclusions and Future Plans

- All three technical leadership courses developed as part of the program have been strongly endorsed by the acquisition community.
- While fully validating the research hypotheses will obviously require more time and additional evidence, the results of the research to date have been very encouraging.
- On the basis of numerous successful pilots, all three courses have been judged suitable for transition for government delivery.
- The Systems Lens was successfully transitioned to DAU during Spring 2015 under SERC Research Task-129.
- Transition of the Business and Enterprise Lenses is currently underway as part of the DAU/MDA KLDP Pilot under SERC Research Task-140