



ACQUISITION & TECHNOLOGY

THE WILL TO CHANGE

OSD Systems Engineering Revitalization

July 10, 2008

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Senior Systems Engineer

Office of Deputy Director for Enterprise Development

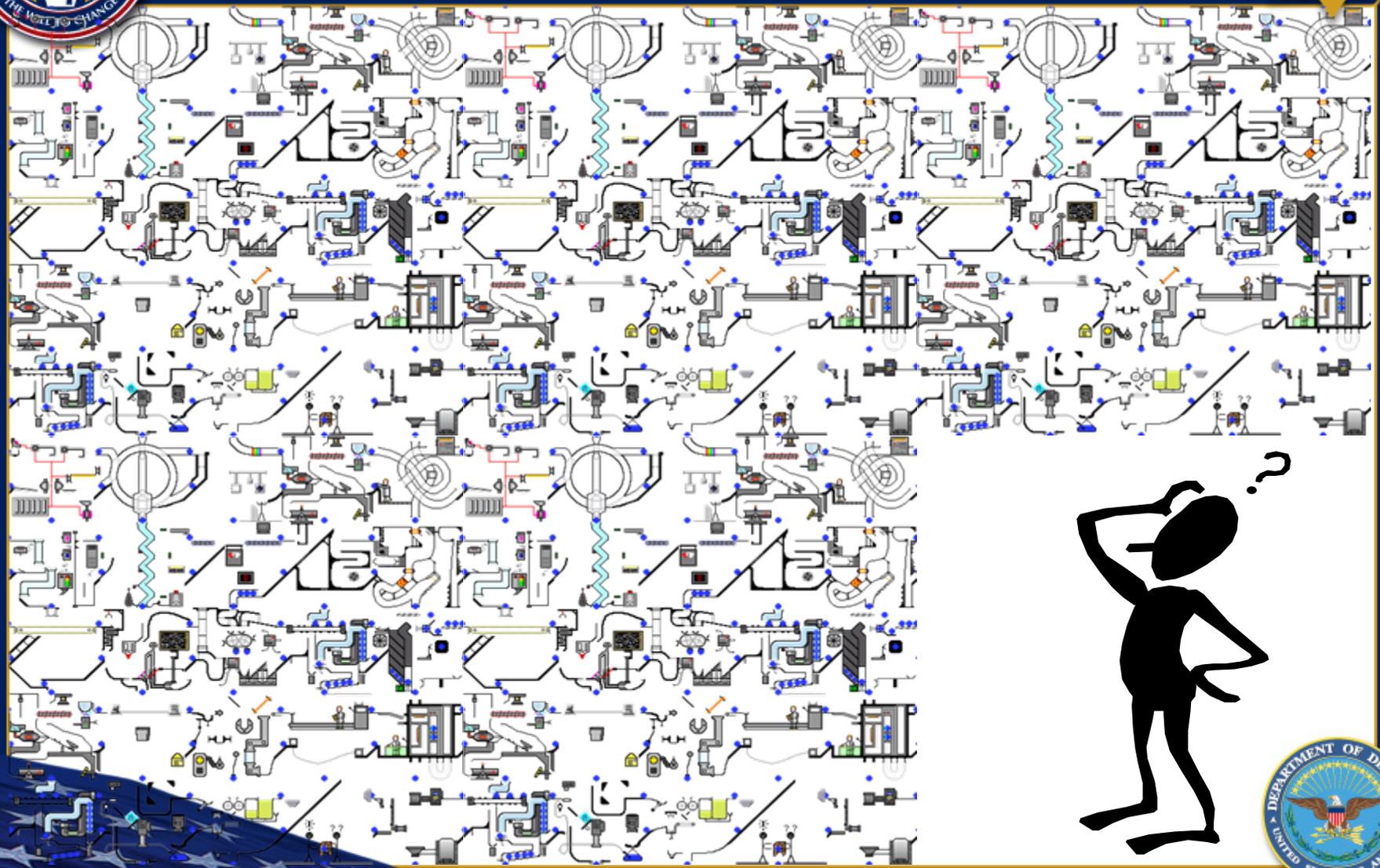
Systems and Software Engineering

Office of the Deputy Under Secretary of Defense (A&T)





Systems Engineering...





Outline



- ★ **Organization and Mission Statements**
- ★ **Key Initiatives and Leadership Direction**
- ★ **Systems Engineering Policy and Guidance**
- ★ **Certification Training**
- ★ **Systems Planning, Research, Development, and Engineering (SPRDE) Career Field Update**





OUSD (AT&L) Organization



USD, Acquisition
Technology & Logistics

DUSD, Acquisition &
Technology



Dir, Joint Advanced
Concepts

Dir, Systems and
Software Engineering

Dir, Portfolio
Systems Acquisition

Defense Acquisition
University

Defense Procurement
and Acquisition Policy

Industrial
Programs

Small Business
Programs

Defense Contract
Management Agency





Systems and Software Engineering Mission Statement

- ★ Shape acquisition solutions and promote early technical planning
- ★ Promote the application of sound systems and software engineering, developmental test and evaluation, and related technical disciplines across the Department's acquisition community and programs
- ★ Raise awareness of the importance of effective systems engineering and drive the state-of-the-practice into program planning and execution
- ★ Establish policy, guidance, best practices, education, and training in collaboration with academia, industry, and government communities
- ★ Provide technical insight to program managers and leadership to support decision making

Evolving System Engineering Challenges





Systems and Software Engineering Organizational Core Competencies

Director, Systems & Software Engineering

Kristen Baldwin (Acting) SES

**Deputy Director
Enterprise Development**

Nic Torelli SES

CORE COMPETENCIES

- SE Policy
- SE Guidance
 - SE in *Defense Acquisition Guidebook*
- Technical Planning
- Risk Management
- Reliability/Maintainability
- Integrating SE into Systems Acq contracting
- SE Education and Training
 - DAU SE Curriculum
 - SPRDE/SE and /PSE Certification Rqmts
- Corrosion
- R-TOC
- Value Engineering

**Deputy Director
Developmental Test & Evaluation**

Chris DiPetto SES

CORE COMPETENCIES

- DT&E Policy
- DT&E Guidance
 - T&E in *Defense Acquisition Guidebook*
 - TEMP Development Process
- DT&E Education and Training
 - DAU DT&E Curriculum
 - DT&E Certification Rqmt
- Joint Testing, Capabilities & Infrastructure
- Targets Oversight
- Acq Modeling & Simulation
- Energy
- DSOC/Acq Tech Task Force

**Deputy Director
Software Engineering & System Assurance**

Kristen Baldwin SES

CORE COMPETENCIES

- SWE and SA Policy
- SWE and SA Guidance
 - SoS, SA Guides
- SWE and SA Education and Training
 - DAU SW Acq Curriculum
 - Continuous Learning Modules for SWE, SoS, SA
- Software Engineering
 - Acquisition Support
 - Software Engineering Institute (SEI)
- Process Improvement
 - CMMI Sponsor
- DoD/National Software Investment Strategy

**Deputy Director
Assessments & Support**

Glynn James (Acting)

CORE COMPETENCIES

- Support of ACAT I and Other Special Interest Programs (MDAP, MAIS)
- Assessment Methodology (Program Support Reviews - PSRs)
- T&E Oversight and Assessment of Operational Test Readiness (AOTR)
- Systems Engineering and Developmental Test Planning and Support
- Lean/6-Sigma Training/Cert

Acquisition program excellence through sound systems and software engineering



Enterprise Development (ED) Mission Statement

- ★ **ED Mission:** To raise awareness of the importance of systems engineering within the DoD acquisition workforce and institutionalize sound SE practices through policy, guidance, education and training, and outreach.
- ★ **ED Outreach Strategy:** Actively communicate the value of SE on acquisition programs throughout their lifecycle and facilitate the advancement of the state of practice of SE within DoD, including industry partners and the academic community, through a variety of targeted outreach methods and continuously monitor results through defined measures of effectiveness.





SSE FY08/09 Thrust Areas



- ★ **Systemic Root Cause Analysis** – the collection and analysis of systemic program performance issues, determination of root causes, and development of corrective action
- ★ **System Assurance** – the reduction of vulnerability to malicious intent in our systems, considering the full spectrum security of information, technology and hardware/software components
- ★ **Software Engineering Competency** – the focus on software engineering as a critical element of complex systems acquisition, and strategic initiatives to ensure future Defense software demands can be met by government and industry
- ★ **Systems of Systems** – augmenting acquisition and engineering practices to better plan, develop, and manage interdependent systems of systems
- ★ **Early Systems Engineering** – the institution of technical management and engineering practices prior to program initiation (MS B) in order to enable risk informed, balanced acquisition and budgeting decisions





SSE FY08/09 Thrust Areas (cont'd)

- ★ **Revitalizing Developmental Test & Evaluation** – comprehensive strategy for early T&E involvement and integrated testing to manage technical risks across the acquisition system, sustaining systems and capabilities, and rebuilding government T&E expertise.
- ★ **System Engineering Research UARC** – establishment of a system engineering research program
- ★ **Energy** – reducing DoD energy consumption across our operations, to include force development, deployment, and support
- ★ **Reliability** – ensuring rigor, discipline and an integrated approach in systems engineering practices and T&E strategies for improving the reliability of systems
- ★ **Safety** – integrating safety process advances into Department acquisition policies
- ★ **Modeling and Simulation** – ensuring rigor in M&S policy and guidance to advance the state-of-practice; execute acquisition M&S Master Plan





Leadership Direction for SE



USD(AT&L)
Direction

★ AT&L Source Document Objectives:

- ★ **Capabilities:** Balance and rationalize requirements; Review key capability areas to seek greater efficiency; Evaluate mission capability gaps against technology opportunities
- ★ **Programs:** Accurately price programs and insist schedule and budget reflect realistic pricing, recognizing technical and integration risks; Build prototypes and conduct experiments to provide options; Arm the Program Manager with tools
- ★ **People:** Play an appropriate stewardship role for the science and engineering community

DoD SE
Leaders

★ Strategic Objectives identified by the SSE Forum:

- ★ Enhance SE pre-MS B to ensure programs succeed
- ★ Transform Architecture to support Systems Engineering Enterprise
- ★ Establish a Human Capital Strategy for SE
- ★ Assess needs for additional SE Tools

Deputy
Secretary
of Defense

“We believe we have gone too far in reducing Systems Engineering capability ... we need to re-build.”

Honorable Secretary England, 7 November 2007, PEOSYSCOM Conference Keynote





Policy and Guidance





System Engineering Policies



All programs shall develop a SE Plan (SEP)

Each PEO shall have a lead or chief systems engineer who monitors SE implementation within program portfolio

Event-driven technical reviews with entry criteria and independent subject matter expert participation

OSD shall review program's SEP for major acquisition programs (ACAT ID and IAM)

Technical Planning

Technical Leadership

Technical Execution

Technical Excellence

Upfront Technical Planning





Enhanced SE Working Group (E-SEWG)

Purpose: To foster collaboration within the SE community and key stakeholder organizations to establish unified SE Guidance to implement the changes in DoDI 5000.2

★ Participants

- ★ AOs from each SSE DD, Services and Agencies
- ★ Key Stakeholders as necessary (DPAP, J8, PA&E, and DDR&E)

★ Address the key areas of DoDI 5000.2 we “Own”

- ★ PDR - PSR, Transition to all ACATs
- ★ CDR, Post CDR Report - AOTR, for all 1Ds

★ Influence key areas where SE needs to contribute

- ★ Materiel Development Decision - AoA Guidance, Plan
- ★ Technology Development Strategy - Prototype Planning
- ★ AoA Conduct and Oversight





E-SEWG Achievements to Date

Completed a bottom up review and update of the Materiel Solution Analysis (MSA) and Technology Development (TD) Phases

★ **Systems Engineering “Vee” Diagrams**

- ★ Materiel Solution Analysis Phase
- ★ Technology Demonstration Phase

★ **Gained working group consensus on the Entry / Exit Criteria on both MSA and TD phases and their associated technical reviews**

- ★ Initial Technical Review placed prior to Materiel Development Decision
- ★ Renamed Alternative Systems Review to Systems Concept Review (SCR)
- ★ Preliminary Design Review (PDR) & PDR Report

★ **Emerging need: Establish workshops to collaborate with stakeholders outside of the SE community in order to establish comprehensive guidance for the Defense Acquisition Guidebook**





Systems and Software Engineering Guidance

★ Sample of what's available:

- [Systems Engineering Plan \(SEP\) Preparation Guide, V2](#)
- [Risk Management Guide for DoD Acquisition](#)
- [DoD Guide for Achieving Reliability, Availability, and Maintainability](#)
- [Integrated Master Plan/Integrated Master Schedule \(IMP/IMS\) Guide](#)
- [Guide to Integrating SE into DoD Acquisition Contracts](#)
- [Understanding and Leveraging a Supplier's CMMI Efforts: A Guidebook for Acquirers](#)
- [Risk Assessment Technical Review Checklists](#)

★ Sample of what's coming:

- [Systems of Systems SE Guide](#)
- [Engineering for Systems Assurance](#)
- [Update to Defense Acquisition Guidebook](#)
 - [Chapter 4 -- Systems Engineering](#)
 - [Chapter 9 -- Test and Evaluation](#)

More guides on Systems and Software Engineering Website:
<http://www.acq.osd.mil/sse>





Certification Training





Background

- ★ In October 2003, an Education and Training Summit found that while SE processes were sound, their application in acquisition programs was often lacking in rigor.
- ★ Among other initiatives, the Director, DS/SE, (now SSE/ED) issued a directive to re-baseline the SE competencies and curriculum for the SPRDE/SE career path.
- ★ The SPRDE/SE FIPT, working with the Institute for Defense Analysis, developed almost 200 learning outcomes to serve as a basis for the new curriculum.
- ★ The new curriculum was structured to focus on the 16 DoD SE processes at Level I, 5 SE phases at Level II, and leadership and management skills at Level III.
- ★ From August 2004 until February 2007, DAU developed four new certification courses: SYS 101, SYS 202, SYS 203, and SYS 302.





Certification Training (SYS 101)

★ SYS 101: Fundamentals of Systems Planning, Research, Development and Engineering (SPRDE)

- ★ Technically rigorous, comprehensive online course that provides an introduction to systems engineering.
- ★ Based around the 8 technical management processes and the 8 technical processes outlined in the Defense Acquisition Guidebook.
- ★ Also suitable for personnel in technical management and program management positions who want to understand more about systems engineering and the details of its processes.





Certification Training (SYS 202)

★ **SYS 202: Intermediate Systems Planning, Research, Development and Engineering, Part I**

- ★ Intermediate-level online course that provides a description of how the SE processes can be applied within the context of the various phases of the Defense acquisition framework.
- ★ Course content includes the scope and role of SE and its key technical inputs and outputs; the key aspects of technical baselines and the role of technical reviews; and important design considerations.

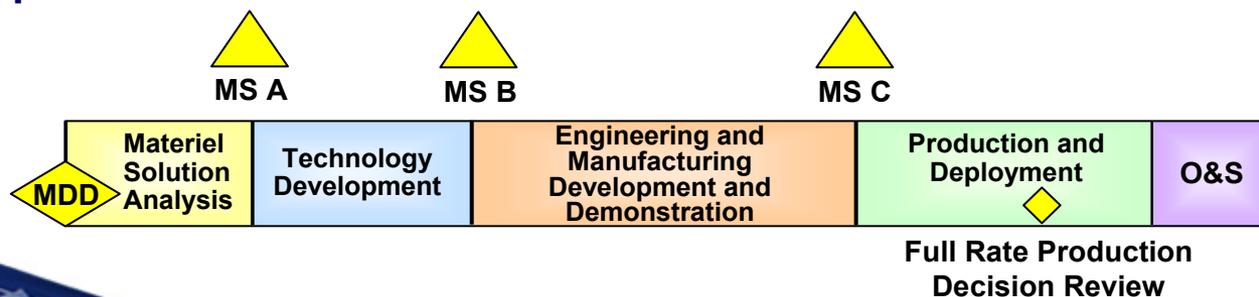




Certification Training (SYS 203)

★ SYS 203: Intermediate Systems Planning, Research, Development and Engineering, Part II

- ★ Intermediate-level 1-week long classroom course that requires students to apply the DoD Systems Engineering processes and techniques learned in SYS 101 & SYS 202.
- ★ Students work in integrated product teams and apply systems engineering technical processes and technical management processes to a defense system across the various phases of the Defense acquisition framework.





Certification Training (SYS 302)

★ **SYS 302: Technical Leadership in Systems Engineering**

- ★ **Advanced 2-week long classroom course designed for senior DoD acquisition personnel.**
- ★ **Focuses on the application of technical leadership skills within a typical DoD SE IPT environment.**
- ★ **Students take turns leading and participating in an engineering team that analyzes and resolves a variety of technical engineering critical issues.**
- ★ **Class exercises are supplemented by lessons on current policy, architectures, design considerations, ethics, etc.**





Certification Training (LOG 204)

★ LOG 204: Configuration Management

- ★ Fast-paced, cross-disciplinary course that provides the knowledge necessary to apply configuration management (CM)
- ★ Includes the interrelationship of CM to such life cycle activities as systems engineering, data management, logistics support planning, and weapon system sustainment.
- ★ Provides an overview of the concepts and basic practices of CM, including configuration identification, status accounting, audits and verification, configuration change management, performance measures, and CM planning.





Continuous Learning Modules (CLMs)

★ CLE 003: Technical Reviews

- ★ Presents essential practical guidelines for integrating several different technical reviews into the systems engineering process and DoD acquisition life cycle based on best engineering practices.

★ CLL 008: Designing for Supportability in DoD Systems

- ★ Provides a comprehensive overview and introduction to incorporating the principles of systems engineering throughout the system life cycle to design, develop, produce, and sustain operationally reliable, supportable, and effective systems.

★ CLE 017: Technical Planning (Proposed standard for FY 10)

- ★ Presents essential and practical technical planning guidance on how to integrate program management tools, such as earned value management and risk management, with systems engineering tools like requirements management, technical baseline management, and event-based technical reviews into an effective approach for managing programs.





Additional CLMs



★ What's available

- ★ Reliability and Maintainability
- ★ MOSA
- ★ Trade Studies
- ★ Engineering Change Proposals

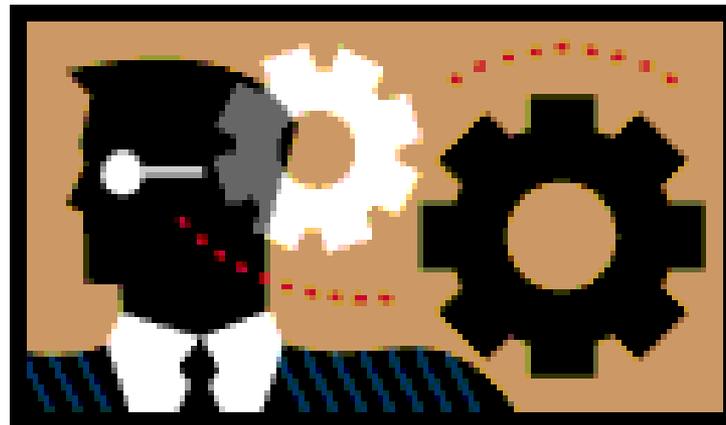
★ What's Coming

- ★ Contracting For DT&E CLM
- ★ Manufacturing Readiness CLM





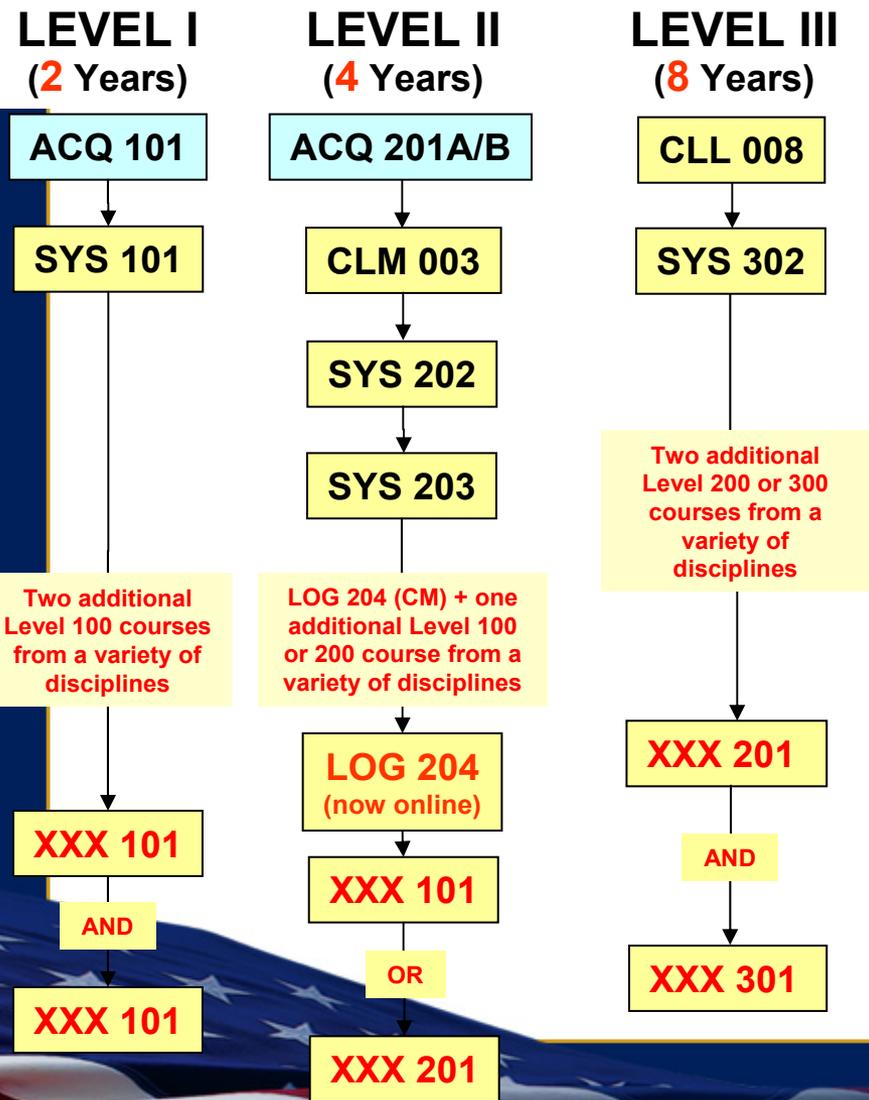
SPRDE Career Field Update



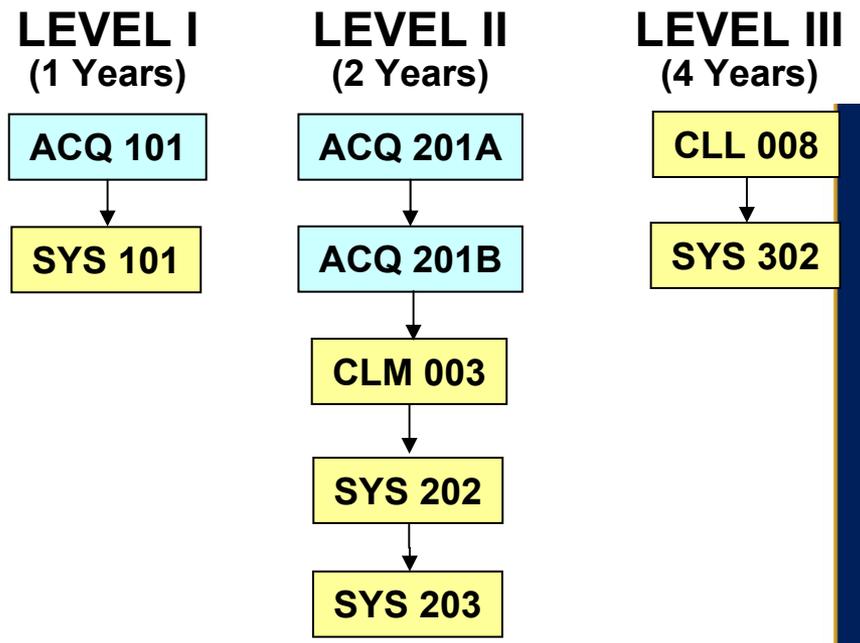


New SPRDE/PSE & SE Career Path Certification Criteria

SPRDE-Program Systems Engineer



SPRDE-Systems Engineering



Legend:

- Core
- Functional
- Additional





Questions?

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