

Helix

Investigating the DNA of the Systems Engineering Workforce

Presentation to the INCOSE International Symposium

By

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A. Research team:

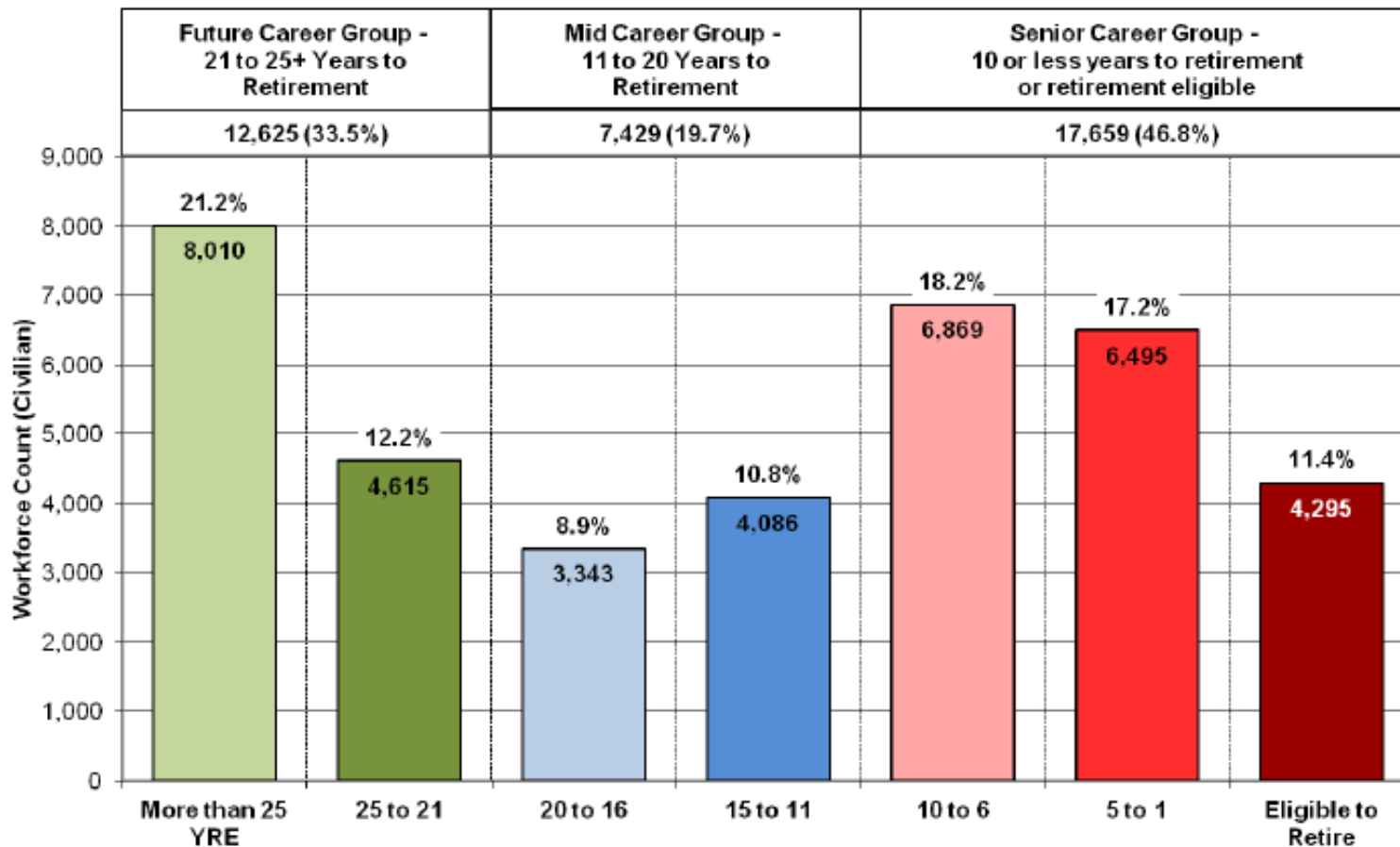
1. Dr. Art Pyster, principal investigator (Art.Pyster@Stevens.edu)
2. Dr. Stan Rifkin, co-PI
3. Dr. Kahina Lasfer
4. **Mr. Deva Henry (dhenry@stevens.edu)**
5. Mrs. Nicole Hutchison

B. Helix Advisory Panel chairs:

1. Mr. Nic Torelli, Mission Assurance, Office of the US Assistant Secretary of Defense for Systems Engineering. Financial sponsor.
2. Dr. Don Gelosh, head of the Education & Training Committee in the Systems Engineering Division of the National Defense Industrial Association, and Worcester Polytechnic Institute.

Defense Acquisition Workforce Lifecycle Model (WLM)

by Years to Retirement Eligibility (YRE) - Civilian (FY11) - SPRDE (SE/PSE)



OUSD(AT&L)/HCIDefense Acquisition WorkforceSPRDE (SE/PSE)Summary Data FY 2011, Ver. 2, p. 6. Available at <https://dap.dau.mil/workforce/Documents/FY11-Functional-Career-Fields/FY11-SPRDE%28SE-PSE%29-DataAddendums-v2.pdf>

Research Questions

OVER TIME...

- 1. WHAT ARE THE CHARACTERISTICS OF SYSTEMS ENGINEERS?**
- 2. HOW EFFECTIVE ARE SYSTEMS ENGINEERS AND WHY?**
- 3. WHAT ARE EMPLOYERS DOING TO IMPROVE THEIR EFFECTIVENESS?**

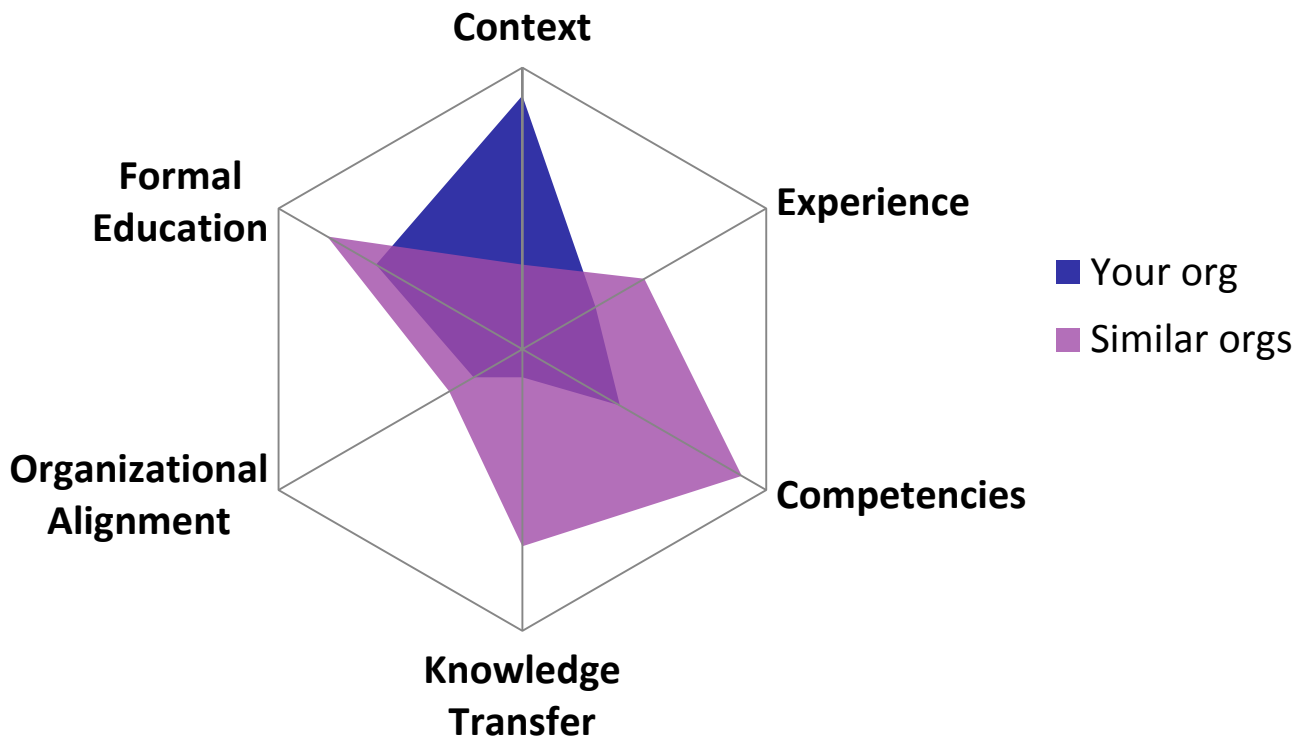
Value to Participants

- 1. DEEPEN YOUR UNDERSTANDING OF YOUR SYSTEMS ENGINEERING WORKFORCE OVER TIME**
- 2. IDENTIFY GAPS AND KNOW WHERE TO FOCUS YOUR INVESTMENTS TO IMPROVE YOUR SYSTEMS ENGINEERING WORKFORCE**
- 3. BENCHMARK YOUR SYSTEMS ENGINEERING WORKFORCE**
- 4. DEEPEN YOUR UNDERSTANDING OF WHAT MAKES YOUR WORKFORCE EFFECTIVE**
- 5. RECEIVE RECOMMENDATIONS ON HOW TO IMPROVE THE EFFECTIVENESS OF YOUR SYSTEMS ENGINEERS**

- 1. WHO ARE THE SYSTEMS ENGINEERS?** What are the various definitions and characteristics of a “systems engineer” in DoD and NDIA-SED organizations and how do they differ? Does the distinction make any difference?
- 2. HOW EFFECTIVE ARE THEY AND WHY?** How can the effectiveness of systems engineers (not systems engineering) be measured in DoD and NDIA-SED organizations? Which forces, such as competencies, attrition, education, culture, environment, expectations, and experiences, have the greatest impact on the effectiveness of systems engineers?
- 3. WHAT ARE EMPLOYERS DOING TO IMPROVE EFFECTIVENESS?** What efforts do DoD and NDIA-SED organizations currently employ to maintain and improve the effectiveness of their SE workforce and how aligned are those efforts with the forces that have the greatest impact on effectiveness?

- Effectiveness
 - An individual *systems engineer* is effective when the outcomes for which he is individually responsible are achieved as a result of the systems engineering activities he performs.
 - An organization's *systems engineering workforce* is effective when the outcomes for which they are collectively responsible are achieved as a result of the systems engineering activities they perform.

Comparing Key SE Effectiveness Factors



Axes are for illustration. Real axes will emerge from collected data.

- Collect data from US DoD and NDIA organizations over 5 years = longitudinal study.
- May add non-defense and non-US organizations beginning in 2014.
- Periodically report anonymous aggregated data.
- Collect both institutional data and interview data. Seek 200 interviewees per year.
- Securely store all sensitive data (encrypt and password protect).
- Never collect classified or ITAR data or data about individual compensation or specific contracts.

Interviewee Time Commitments

- On average, a total of about 4-½ hours are needed over a 2 to 3 month period:
 - 30 minutes to read, sign, discuss and return the Informed Consent form, and send a career brief or resume.
 - 30 minutes to think about a few questions that will be provided in advance.
 - 90 minutes for the actual face-to-face interview at interviewees' site.
 - 30 minutes to review and possibly revise a written interview summary.
 - 60 minutes to participate in post-interview follow-up, usually by telephone, DCO, or WebEx.

- **Organizational Level:** Senior (lead, chief, ...) systems engineers who can provide perspectives on the organization's policies, definitions, improvement initiatives, and effectiveness measures of systems engineers. Also, those who consume the work products of systems engineers/systems engineering.
- **Individual Level:** Systems engineers who can provide perspectives on their individual roles in the organization and how their effectiveness is measured.

Some differences in interview questions for the two categories

Organization	STATUS
NDIA Companies	<ul style="list-style-type: none"> Working closely with NDIA SED E&T Committee, which has identified a number of prospects in the defense industry base. Conducted our first interviews: 20+ people in a single organization.
INCOSE	<ul style="list-style-type: none"> Helix project was presented at the INCOSE CAB meeting and Workforce Competencies Working Group in January 2013 and discussed further with INCOSE Board of Directors. INCOSE wishes to officially participate and help Helix expand data collection outside defense community and outside US.
AIAA SE Technical Committee	<ul style="list-style-type: none"> Helix project was presented at the AIAA SETC meeting on March 7th; will consider participation.
DoD	<ul style="list-style-type: none"> Several organizations in US Army, Navy & Air Force exploring participation. First interviews scheduled for week of July 22.

- Recruit and schedule DoD and DIB organizations.
- Analyze results quantitatively and qualitatively.
- Publish results periodically (4X per year?).
- Improve as we go.

We are interested in exploring participation with organizations for whom systems engineering is critical. If you are interested, please contact Mr. Deva Henry or Dr. Art Pyster at this Symposium.