

Research Task / Overview

Helix is a multi-year longitudinal research project that is focused on understanding what makes systems engineers effective and what creates an effective systems engineering capability in an organization.

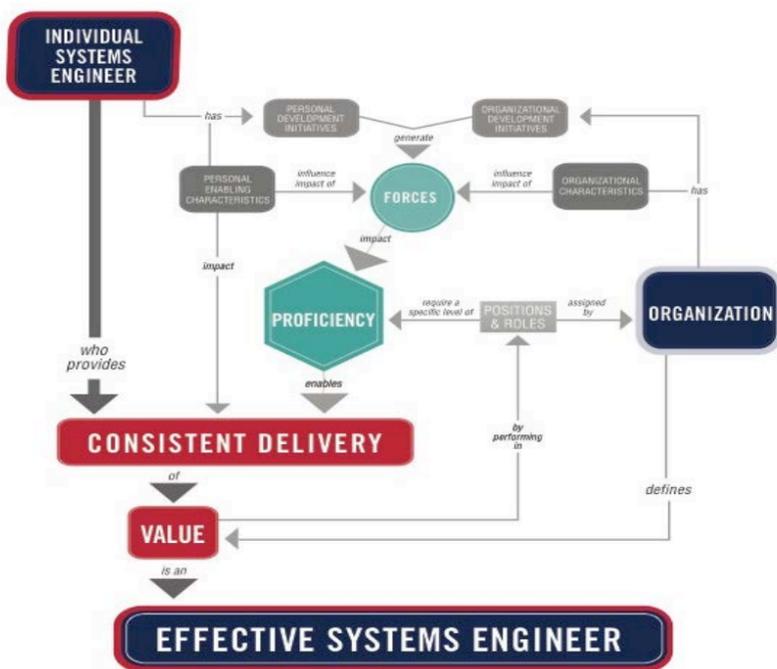
Atlas, the theory of what makes systems engineers **effective** was released in December 2016 based on data from 287 individuals in 22 organizations.

Atlas outlines what makes individual systems engineers effective. It provides guidance for assessing a systems engineers' skill and guidance on using this information for planning for both individuals and organizations.

Helix has transitioned from a focus on individual systems engineers to organizational systems engineering capabilities.

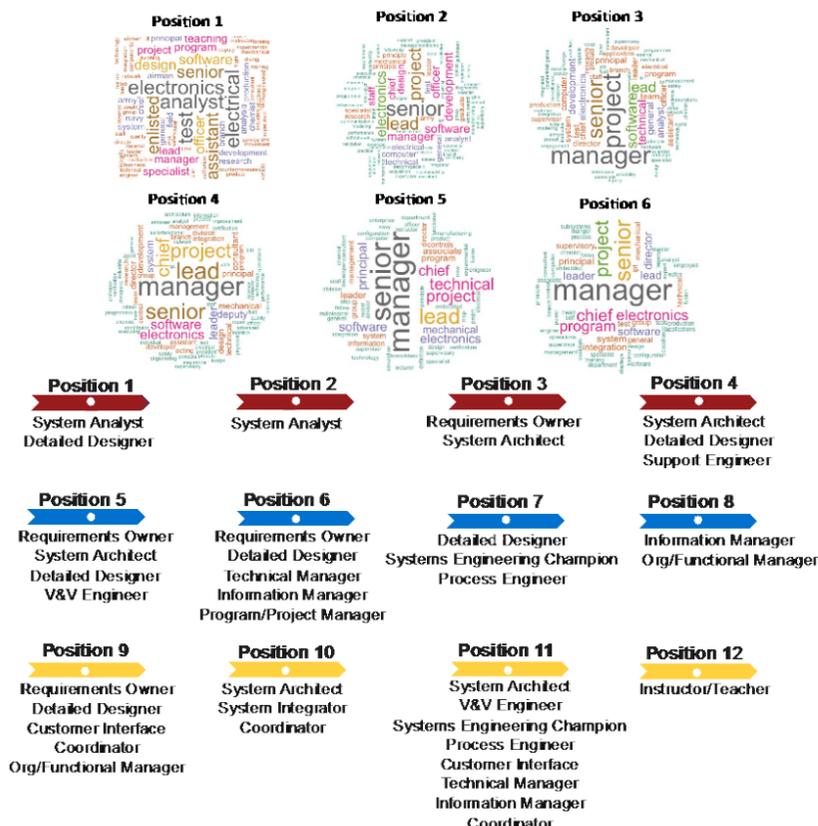
Data & Analysis

- Building on Atlas 1.0:



In 2017, Helix team has:

- Completed additional analysis of career paths for 4 new organizations.
- Conducted interviews at 2 new organizations, with the new format focusing on the organization.
- Implemented text mining principles for knowledge discovery.
- Identified most frequent job performed by chronological positions
- Defined and tested organizational metrics.
- Published findings at INCOSE, NDIA, IISE



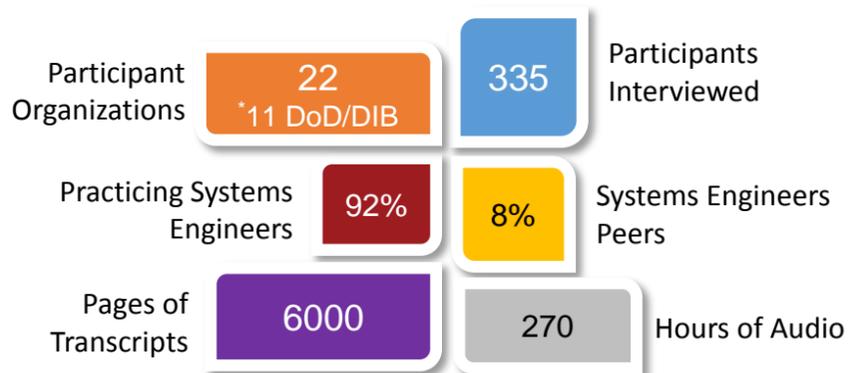
Goals & Objectives

Helix has updated research questions:

- How can organizations improve the effectiveness of their systems engineering workforce?
- How does the effectiveness of the systems engineering workforce impact the overall systems engineering capability of an organization?
- What critical factors, in addition to workforce effectiveness, are required to enable systems engineering capability?

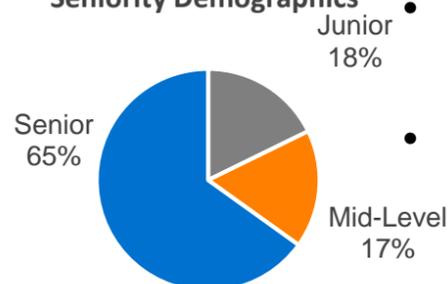
The ultimate goal is to have a theory that is equivalent to *Atlas* which explains the key variables that define organizational systems engineering effectiveness. Current variables include workforce effectiveness and organizational culture, structure, and policy.

Methodology



- Research methodology is based on a Grounded Theory approach.
- Initially open-ended, exploratory interviews intended to provide a broad variety of data.
- Analysis focused on identifying key patterns and themes.
- Further interviews explored the patterns identified.

Seniority Demographics



- New questions around organizational culture structure and capability.
- 48 interviewees focused on organizational capabilities.

Future Research

- Additional data collection/analysis on effective organizational systems engineering capability.
- Additional analysis (cluster, syntactic, paradigmatic, etc.)
- Organizational metrics verification and validation.
- Development of models:
 - System dynamics
 - Agent-based
- Upcoming Deliverables:
 - Career Path Guidebook
 - Implementation Guide
 - Atlas 1.1

Contacts/References

Nicole Hutchison
nicole.hutchison@stevens.edu