29th Annual **INCOSE**
international symposium

Orlando, FL, USA
July 20 - 25, 2019

- **Appreciative Methods Applied to the Assessment of Complex Systems**
- **Managing Complexity with Agility and Openness**

Agile/Complexity Papers 2019

Appreciative Methods Applied to the Assessment of Complex Systems

- Appreciative Inquiry Is an assessment method which focuses on understanding in context rather than problem identification and correction
- Complexity is not binary - Complexity in technical systems may originate it context: environment, usage, interfaces, etc.
- Distinguishing characteristics of complexity:
  - Diversity
  - Connectivity
  - Interactivity
  - Adaptability
  - Multi-scale
  - Multi-perspective
  - Behavior that cannot be fully defined as a response system
  - Dynamics
  - Challenging representation
  - Evolution
  - System Emergence
  - Disproportionate Effects
  - Indeterminate Boundaries
  - Contextual Influence

Selected as an INCOSE IS 2019 Best Paper

Managing Complexity with Agility and Openness

- Complexity in systems is challenging to identify via static analysis
- From a practical perspective, it may be best identified by its effects on system design, development or use
- Modern engineering concepts including agile development and open systems can help manage the challenges of complexity in engineered systems
- An understanding of the principles of agility and openness allow engineers to establish virtuous interaction cycles that address complexity challenges
- As an example, the use of short design and development cycles (agile) and modular design (open) decreases negative impact of unexpected emergence by enabling rapid and effective response to unanticipated conditions
- *Pilot projects are solicited to support additional research and a paper for INCOSE IS2021.*

Initial hypothesis based on observation, next step is data gathering from multiple pilots