1   PURPOSE

Purpose

The purpose of this working group is to identify and develop a body of knowledge that will inform systems engineering and related processes which require agile system capability. Agile systems of interest to this working group include both systems engineering processes and systems-engineered systems.

This working group views agility as a sustainable system capability, enabled and constrained fundamentally by system architecture. This architecture delivers agile capability as reconfiguration, augmentation, and evolution of system functionality, after deployment; enabling the system to respond to new and immediate situational requirements effectively. Effectiveness of response is measured in response time, response cost, response predictability, and response scope sufficient to sustain the system's functional intent.

Need
The need to understand sustainably agile system design and project management concepts exists on multiple INCOSE-relevant fronts:

- Agile Systems-Engineering development processes have become of interest to the CAB companies, and they are asking that INCOSE develop appropriate guidance.
- Agile systems-engineering processes employed in software development benefit from having an agile-product architectural infrastructure (object oriented architecture and/or loosely-coupled web-pages), which enables and facilitates affordable change to development work-in-process. Hardware development has no equivalent readily-available development infrastructure.
- Defense organizations have an interest in how agile system concepts might inform agile acquisition processes, and how these concepts can provide composable systems.
- Quick Reaction Capability (QRC) has been a defense acquisition need for some time and would benefit from an agile response capability by suppliers, yet generally QRC is achieved today by the employment of costly and error-prone overtime work and the increased risk of relaxing formal Systems Engineering processes.
- Both commercial and governmental organizations are finding that the pace of technology, systems-environment evolution, and user expectation evolution are reducing the effective life time of deployed systems.

Confusion exists in the relevance of agile software development processes to more general systems development processes, and in the relationship of lean concepts to agile concepts. This confusion needs clarifying perspective.

- A large body of experience and a variety of beneficial process approaches now exists in the area of Agile Software Development (ASD). In the growing interest for more general agile system project management processes these ASD processes appear to many to be a model for more general systems engineering development; but they are tailored to the specifics of the

software development environment, and exist in a variety of different approaches more akin to brand-specific practice – such as Scrum and XP to name only two.

- In a very general interpretation, Lean values efficiency of operation and achieves this mainly through process principles; Agile values effective response ability and achieves this mainly through architectural principles. To be sure, both are concerned with operational effectiveness. Since the two have a different means for achieving different ends they are not necessarily in one-or-the-other conflict – but can be. When efficiency dominates the requirements, a lean Concept of Operations (ConOps) should dominate; taking additional value from Agile if and only if Lean requirements (as required by stakeholders) are not adversely compromised, and stakeholder requirements recognize some value from Agility. Vice versa, when an Agile ConOps is called for by stakeholder requirements, the design focus goes to architecture; streamlining process with Lean principles if and only if dominating Agile requirements are not adversely compromised. A useful set of requirements will make the nature of Lean vs. Agile design tradeoffs clear, when tradeoff is unavoidable. In general, an Agile design should be as efficient as possible, and a Lean design should be as Agile as possible; but focus and values are found in the requirements.

2   GOALS

- Goal: Fundamental System Engineering concepts and principles supported with application examples that enable and facilitate Agile Systems-Engineering development processes.
- Goal: Fundamental System Engineering concepts and principles supported with application examples that can inform agile acquisition processes and acquisition of agile systems.
- Goal: Fundamental System Engineering concepts and principles supported with application examples that can inform supplier design of Quick Reaction Capability (QRC).
- Goal: Fundamental System Engineering concepts and principles that can inform the design of Agile systems that can respond effectively to the pace of technology, system-environment evolution, and evolving user expectations.
- Goal: Attract an international cadre of engaged participants to broaden the understandings and effectively deal with multi national interests and differences.
- Customer(s)/Stakeholder(s): Systems engineering educators, systems engineering process developers and managers, defense acquisition procedure developers, system suppliers, systems engineers, CAB members, the SEBoK and the SE Handbook.

3   SCOPE

The primary focus of this WG is on fundamentally necessary and sufficient architectural concepts and concept-employment principles that enable any system or process to be agile, and to show how these architectural concepts and principles are or might be applied advantageously to a variety of INCOSE-relevant systems and processes of interest. These examples will be directed at the application of necessary and sufficient agility-enabling concepts and principles, avoiding prescriptive interpretation and disclosure of organization-specific competitive-advantage differentiation. Application examples will include, for instance, systems engineering and management processes, Quick Reaction Capability, and acquisition processes, to name only a few.

4   SKILLS AND EXPERTISE REQUIRED

Required are skills and expertise in responsive systems concepts, systems architecture, project management processes, acquisition policy and procedure, quick reaction capability, system engineering processes, human and organizational behavior, and cross-community collaboration. Most important, however, is an engaged sense of mission, which is neither a skill nor an expertise, but rather an internal drive that shapes the acquisition and application of skill and expertise. This WG will pursue a phased approach to the acquisition of participants and cross-community collaborative involvement required to round out the necessary skill and expertise set. WG activities will lay groundwork and develop participation infrastructure to attract participants with the breadth of necessary skills and expertise to achieve the goals.

5   MEMBERS, ROLES AND RESPONSIBILITIES

- Chair: Rick Dove
    o The Chair shall build consensus among the engaged membership as to appropriate goals and strategies for satisfying the purpose of the WG, and be responsible either directly or through delegation for acquiring and applying necessary resources to execute strategies in pursuit of goals.
    o The Chair shall initiate and lead at least one project at all times that supports the achievement of one or more WG goals.
    o The Chair shall be responsible for status reporting to designated Tech Ops personnel.
    o The Chair shall keep the WG membership participation page current for scheduled events, progress, work in process, and relevant supporting documents.
- Co-Chairs: Ron Lyells, Larri Rosser, Kevin Gunn
    o The Co-Chairs shall assist in the consensus building among the engaged membership as to goals and projects
    o The Co-Chairs shall be responsible to act in the absence of the Chair.
    o The Co-Chairs shall initiate and lead at least one project at all times that supports the achievement of one or more WG goals.
- Chair and Co-Chairs serve at the pleasure of the engaged membership and INCOSE technical Operations.
- Engaged Membership:
    o Actively engaged in at least one project as lead or participant.
    o Contributes in person or remotely in at least one of the two regular workshops each year.
- Membership:
    o Names carried on the membership list at their request, entitling them to activity announcements and access to working group work-in-process web-pages and documents.

6 OUTCOMES (PRODUCTS/SERVICES)

- Customer(s)/Stakeholder(s): Systems engineering educators, systems engineering process developers and managers, defense acquisition procedure developers, system suppliers, systems engineers, CAB members, the SEBoK and the SE Handbook.
- Intended outcome(s)/product(s)/services(s):
  o Identification and justification of necessary and sufficient fundamental concept for any system/process to be agile.
  o Development of appropriate INCOSE SE Handbook contributions that provide fundamental enabling concepts and considerations for engineering agile systems/processes and for employing agile systems engineering processes.
  o Development of an understanding of how Lean concepts and Agile concepts can be complimentary, and how tradeoffs between the two concepts can be reconciled.
  o Identification and development of informative examples of fundamental agile architectural concepts employed in a variety of relevant system/process applications.
  o Discovery of generic Agile Systems Engineering Life-Cycle Model fundamentals and patterns that are necessary for life-cycle agility, based on analysis of agile hardware and software SE processes in agility-effective practice.
  o Socialization of work efforts with papers for the Systems Journal, the International Symposium, and Insight theme issues; with International Symposium tutorials, and with educational and tutorial Webinars.

7 APPROACH

The general approach that will guide this WG/Initiative includes:

- The WG shall meet in working sessions during IW and IS sessions each year as a minimum, to advance project work in process and consider new projects. Live Meeting (or equivalent) shall be used to allow participation by members unable to attend sessions in person.
- This WG will work in collaboration with other relevant WGs, such as the Healthcare and Critical Infrastructure and Protection.
- Prime methods for raising awareness and displaying progress toward goals will include papers written by WG members and associates for relevant conferences and publication outlets, panel sessions at INCOSE and other appropriate conferences, essays for INCOSE INSIGHT, International Symposium tutorials, and Webinars.
- Decision making will be done by engaged WG members toward achievement of the recognized goals of the WG, with the requirement that leadership for decision achievement is accepted and active. Decisions will be made twice yearly during IW and IS sessions as appropriate.

8 MEASURES OF SUCCESS

Primary measures of success for this WG include:

- Continual active progress toward goals defined in this charter.

- Periodic achievement of goals defined in this charter.

9 RESOURCE REQUIREMENTS

This WG will assess budget requirements yearly and submit budget requests to INCOSE Technical Operations as deemed appropriate to achieve goals. Effective enabling and facilitating Infrastructure support from INCOSE for WG activity is an ongoing requirement. Human resources outside of INCOSE are anticipated as requirements, and methods for identifying and obtaining such resources will be identified as needs arise.

10 DURATION

This Charter will remain in effect until rescinded by INCOSE, the signatory, or the signatory's successor as WG Chair.

11 SIGNATURES

Enter the signature block of the submitter   Date: 9-Jul-2016

1st Level of Approval

Technical Director, INCOSE   Date   30-May-2017

12 REFERENCES (Un-cited)

1. Dove, Rick. 2001. *Response Ability – The Language, Structure, and Culture of the Agile Enterprise.* John Wiley and Sons.

2. Dove, Rick, and Ralph LaBarge. 2014. Fundamentals of Agile System Engineering – Part 1 and Part 2. Proceedings IS14 International Symposium, INCOSE.

Revision History

Date	Revision	Description	Author
12 Sep 2012	1.0	Initial Draft	Rick Dove
9 Jul 2016	2.0	Update, and revision for new co-chair	Rick Dove, Ron Lyells, Larri Rosser
15 May 2017	2.1	Addition of co-chair Kevin Gunn	Dove, Lyells, Rosser

INCOSE Agile Systems and Systems Engineering WG Charter