



Speaker Meeting: Experiences at the INCOSE 2022 IW

INCOSE Los Angeles
February 8, 2022



Agenda

- **Virtual Welcome & Introductions**
- **Announcements**
- **Presenter Introductions**
- **Experiences at the 2022 IW**
- **Meeting Closing**





Announcements

- **Speaker Meeting (March 1):** "Future-Proofing Systems Engineering Skills", Rick Hefner, Ph. D., Executive Director, Caltech Center for Technology and Management Education
 - Topic: Trends in Systems Engineering from the perspective of new skills a system engineer must master
 - Followed by a tutorial on **March 12** (more information forthcoming)
- **26th Annual Ground System Architectures Workshop (GSAW)**
 - Theme: "Driving Innovation for Enterprise Integration"
 - February 23 – March 3, 2022 (Virtual)
 - <http://gsaw.aero.org/registration>





Announcements

- **FIRST Robotics Volunteer Opportunities**
 - Volunteer and judges for regional events in Orange and LA counties, March 9-12 and March 31-April 3
 - POC: Dorothy Benveniste





Presenters

- **Phyllis Marbach**, INCOSE Assistant Director of the Transformational Enablers Working Groups
- **Andrew Murrell**, Secretary INCOSE LA
- **Nazanin Sharifi**, Vice President INCOSE LA
- **Dorothy Benveniste**, President INCOSE LA





2022

Annual **INCOSE**
international workshop

HYBRID EVENT

Torrance, CA, USA

Jan 29 - Feb 1, 2022

Working Groups and Initiatives

Technical Operations

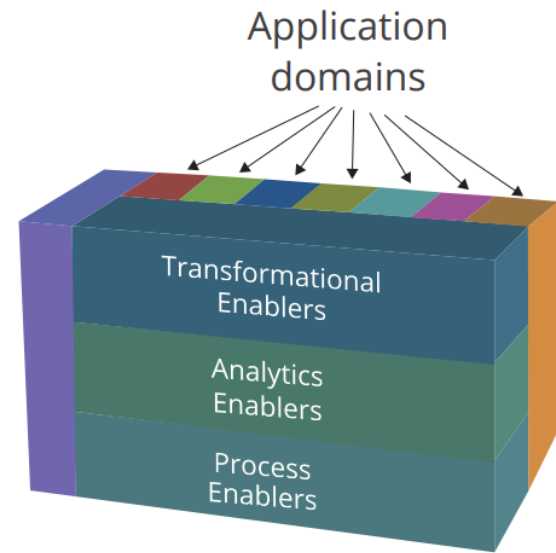


Tips for Effective Working Groups

At the request of Technical Operations, the Measurement Working Group (Paul Frenz – Chair) in conjunction with Assistant Director – Bob Swarz conducted a survey of all the INCOSE working groups chairs and follow-up interviews with 13 of the respondents who indicated a willingness to participate. After the Technical Operations brief at the IS2014, the following Tips for Effective Working Groups was created.

1. Forming a Working Group
2. Working Group Leadership
3. Working Group Communications
4. Working Group Product Development
5. Working Group Productivity
6. Sustaining a Working Group
7. Other Comments

Today's presentation will revisit selections from this guide, with recent examples from working groups and reflections from the past 7 years.



Olivier Dessoude – Deputy Technical Director

TechOps Working Group Structure



Four Domains and Some Initiatives

- What follows is a reminder for most attendees...
- ...But it may help new members, or encourage those interested in contributing more
- With a growing number of Working Groups across the years, TechOps took the decision to structure them into domains :
 - For clarity and to allow specialization
 - To balance management load between several ADs



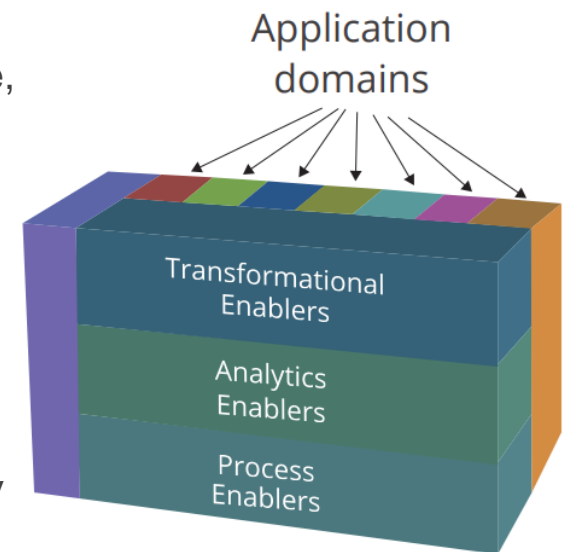
Initiatives

- Initiatives are usually created upon request from some higher instance (e.g., the INCOSE BoD)
- They generally address topical issues of importance (e.g., MBSE, SmartCities, Value Proposition...)
- They often involve external partners, requiring formal agreements
- Their lifetime may be limited in time (to 3 years by default)
- It does not preclude an initiative to foster the creation of a WG that will outlive it



Domains

- Application domains: Business sectors where SE is applied with some specificity. These are WGs where people want to meet and share practices from their industry (e.g., automotive, defense, healthcare...)
- Process Enablers: Engineering disciplines that are typical of the main engineering effort, and are directly related to the technical processes of SE (e.g., architecture, IV&V, requirements management...)
- Analytics Enablers: Transverse or specialty engineering domains that are essential to the engineering of successful systems (e.g., safety, security, HSI...)
- Transformational Enablers: New approaches or technologies that are already changing, or will change in the future the way SE is performed (e.g., Agile, DEIXWG, Social Systems...)





Past Year Successes

- Progressing impactful products & services
 - SE Vision 2035
 - SE Handbook Version 5
 - SE Tools Database
 - Complexity Primer
 - SE4SME
 - NRVVL
- Engaging sessions at IW and IS
- Online experiences & increased adoption



2022 Liaison Working Groups – Standards



ISO	Project	Working Group	
JTC1/SC41/WG3	IoT Architecture	Architecture	C. Crowder
JTC1/ SC7/WG04	26581 (PLE Tools) 24641 (MBSSE)	Product Line Tools	C. Krueger R. Malone
SC7/WG07	WG Mgmt	TechOps	J. Marvin
SC7/WG07	15288 15026	Any WG with LC Process relevance	SE Handbook PoC
SC7/WG07	24748-1/2	Any WG with LC Process relevance	D. Kitterman
SC7/WG10	33060 (xx)	Process Improvement	D. Walden
SC7/WG20	24773-3 (Cert)	CAG/Competency	CAG Chair
SC7/WG24	29110-1 Ed3 (VSE)	Small Business Systems	K. Ptack
SC7/WG42	420xx (Arch)	Architecture	R. Siegers
JTC1/SC27	SD 19 (Cyber Risk)	Security	TBD
TC184/JWG21	Smart Manufacturing	Architecture	R. Martin
SAE & ASME	Under Development	Automotive/ Infrastructure	Pickard/deLamare
JTC1/SC7	System Resilience	Resilience	J. Brtis
SysML.SIG	SysML 2.0	MBSE Initiative	S. Friedenthal
UAF.SIG	UAF	Architecture	M. Hause/J. Martin
IEC SyC SC	IEC 63205 SC RA	Smart Cities Initiative	J. Russell
JTC1/SC7	Digital Engineering – SG	DEIX	C. Tseng / S. McGervey

29 Jan 2022

www.incose.org/iw2022

6

New standard, number and name in work, put out a call for a liaison and got a vol



Looking Forward

- Find gaps in our products and fill them
 - A new Technical Product Plan system is coming soon (Q1) to improve everyone's experience



- Use the language of others
 - Be an approachable expert, but don't wait to be approached.
- Leverage INCOSE's collaboration tools
 - Burst your Zoom bubbles!





Process Enablers (Bob Swarz, Assistant Director)

WG Name

WG Chairs

Architecture ~~← Richard Martin →~~ Jean-Luc Garnier / Anand Kumar / Rolf Siegers

Configuration Management

~~Adriana D'Souza ← Dale Brown / Alek Przybylo / Aryes Lahiry →~~

Integration, Verification and Validation

Jim Armstrong / Russell Kubycheck

Measurement

Paul Frenz

PM-SE Integration

Jean-Claude Roussel / Tina Srivastava / John Lomax

Requirements

Tami Katz / Lou Wheatcraft / Mike Ryan

Risk Management

Jack Stein / Bob Parro

Systems Engineering Quality Management

Barclay Brown / Bill Scheible

Enterprise Systems

Tom McDermott



Analytic Enablers (Jimmie McEver, Assistant Director)

WG Name

WG Chairs

Competency

Cliff Whitcomb / Lori Zipes

Complex Systems

Michael Watson / Ali Raz / Michael Do

Decision Analysis

Frank Salvatore / Greg Parnell

Human Systems Integration

Guy Boy / Grace Kennedy

Natural Systems

Curt McNamara / Randy Anway / Alex Wolf

Product Line Engineering

Rowland Darbin / Drew Stovall

Resilient Systems

Ken Cureton / John Brtis

Systems of Systems

Judith Dahmann / Alan Harding

System Safety

Duncan Kemp / Meaghan O'Neil / Russell Kubycheck

Systems Security Engineering

Rick Dove / Beth Wilson / Keith Willett

Training

Gabriela Coe / John Clark

Represent some specialized subject matter or perspective relevant to the practice of systems engineering in certain contexts



Transformational Enablers (Phyllis Marbach, Assistant Director)

WG Name

WG Chairs

Agile Systems and Systems Engineering

Rick Dove / Ron Lyells / Larri Rosser / Keith Willett

Artificial Intelligence

Tom Shortell / Tom McDermott / Barclay Brown / Ali Raz

Digital Engineering Information Exchange

Sean McGervey

Tamara Hambrick / Terri Chan / Celia Tseng / Frank Salvatore / Chris Schreiber

Enterprise Systems

Kevin Nortrup / Tom McDermott

Knowledge Management

Robert Nilsson / Jean Duprez

Lean Systems Engineering

Arthur Hyde

MBSE Patterns

Bill Schindel / Troy Peterson

NAFEMS-INCOSE System Modelling and Simulation

Peter Coleman / Frank Popielas

Object-Oriented SE Method

Howard Lykins / Loren Walker

Process Improvement

Jeffrey Brown / John Clark

Professional Competencies and Soft Skills

Sean McCoy / Cliff Whitcomb

Small Business SE

Angela Robinson / Ken Ptack / Claude Laporte / Rudiger Kaffenberger

Social Systems

Erika Palmer / Randy Anway

Systems Engineering Tools Database

John Nallon / Stephane Lacrampe / Rene King

Systems Science

Javier Calvo-Amodio / James Martin / Swami Natarajan / Anh Tong

Systems-Software Interface

Jeannine Sivi

Tools Integration and Model Lifecycle Management

John Nallon

www.incose.org/IW2022





Application Domains (Carl Landrum, Assistant Director)

WG Name

WG Chairs

Automotive	<i>Alain Dauron / Gary Rushton</i>
Critical Infrastructure Protection and Recovery	<i>Daniel Eisenberg / John Juhasz / Anthony Adebajo</i>
Defense Systems	<i>Karl Geist</i>
Financial Services and Systems	<i>Gina Guillaume-Joseph / Bradford Leigh</i>
Healthcare	<i>Chris Unger / Bob Malins</i>
Infrastructure	<i>Alain Kouassi / Laura Uden / Marcel van de Ven</i>
Power and Energy Systems	<i>Ray Beach / John Juhasz</i>
Systems Engineering in Early Stage Research and Development	<i>Ann Hodges / Michael DiMario / Heidi Hahn / Nicholas Lombardo</i>
Space Systems	<i>David Kaslow / Alejandro Levi</i>
SySTEM	<i>Bill Chown</i>
Telecommunications	<i>John Risson / Daniel Spencer / Susan Ronning</i>
Transportation	<i>Dale Brown</i>



Other Groups and Initiatives

Initiative/Objective

Assistant Directors/Champions

Empowering Women Leaders in SE

Alice Squires / Erika Palmer / Stueti Gupta / Lisa Hoverman

Model-based SE (MBSE) Initiative

Mark Sampson

Smart Cities Initiative

Jenn Russell / Marcel van de Ven

Value Proposition Initiative

Juan Amenabar

Products Value Stream (Impactful Products Committee)

Chris Hoffman

Standards Development Department

Richard Martin / Daniel Siegl



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Andrew Murrell Section

INCOSE IW 2022





Saturday 1/29/2022

- Opening Plenary - <https://www.youtube.com/watch?v=2mget30H2FU>
 - Membership
 - 19,310 individual INCOSE Members world Wide
 - 88 Corporate Organization Members
 - 37 Academic Organization Members
 - P&L 2022
 - \$4.2 Million in
 - \$4.9 Million out
 - IT investments driver
 - IW 2022 Plan
 - Vision 2035 Officially Released
 - SE Handbook V5
 - Focus on Virtual/Digitizing experiences
 - IT investment and social development
 - Increase in paid full time positions
 - Digital library development
 - Increased focus on STEM initiative and education





Saturday 1/29/2022

- Opening Plenary - <https://www.youtube.com/watch?v=2mget30H2FU>
 - New Officers
 - President – Marilee Wheaton
 - President Elect – Ralf Hartman
 - Treasurer – Michael Vinarcik
 - America Sector Director – Renee Steinward
 - Marcom Director – Honor Lind
 - Services Director – Richard Beasley
 - CAB Chair – Ron Giachetti
 - IT infrastructure
 - Improved Website
 - Replacement of Connect
 - Yammer – Social media tool
 - MS Teams – Collaborate tool
 - INCOSE Intranet





Saturday 1/29/2022

- Opening Plenary - <https://www.youtube.com/watch?v=2mget30H2FU>
 - INCOSE Certification
 - Academic Equivalency program for INCOSE SEP Certification
 - 11 professional certification programs in US and Australia
 - 1100+ students through program





Saturday 1/29/2022



- MBSE Initiative
 - University of Michigan Program – George Halow
 - Integration of Industry Tools, SE, and Cost into a program run by
 - Design, Build Fly Program with focus from stakeholder analysis to
 - Part of AE 495 (3 series courses with advancing class taking a leadership role over the project)
 - Sponsors include Collins, Blue Origin, Aerospace Corp, Pratt and Whitney, and Raytheon
 - Program has resulted in multiple first place regional and global competition placements
 - 5 Lessons we can learn from the way other industries manage complexity - Pari Singh
 - Product Manager are equivalent SE in Software companies
 - All Engineers must have SE mindset
 - Leverage digital twin for iterative design
 - End to end traceability is required
 - Baseline often



Saturday 1/29/2022

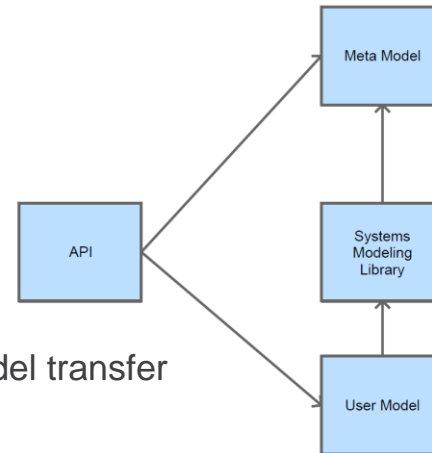
- Yammer/Connect/Teams Tools Training
 - MS Teams will hold artifacts for Chapter Circle awards
 - Yammer will be primary INCOSE social experience
 - All INCOSE members will receive guest accounts to INCOSE MS teams
 - Increases chapter management in common tools
 - INCOSE awards director is re-baselining for 2022 submissions





Sunday 1/31/2022

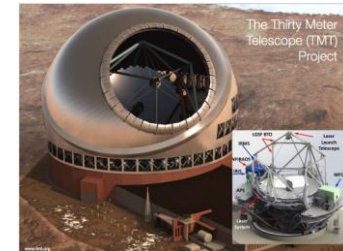
- **MBSE Initiative - SYSML 2.0**
 - Focus is on Visualization
 - Develop a metamodel without using UML
 - Develop a standard API to facilitate cross platform model transfer
 - Expression language for Part properties
 - Modifiable usage of part properties
 - I.E. Variants of models that inherit partial properties



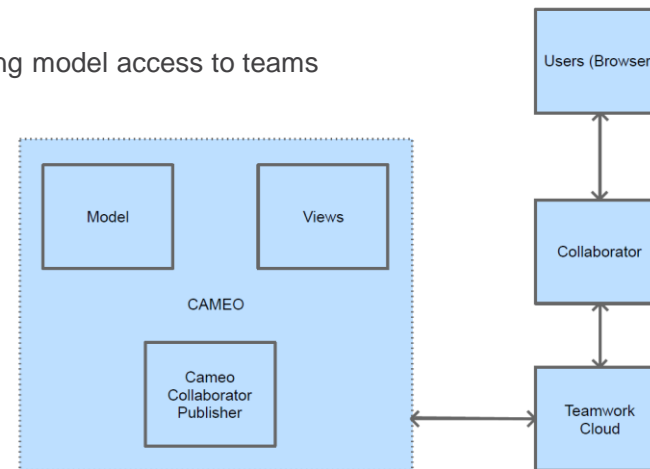
- **MBSE SYSML V2.0 Demo**
 - Q2 2023 for formal adoption
 - Language is no longer based on UML
 - API driven cross platform integration
 - Commit/Branch/merging/tagging architecture from software development
 - Eclipse Model Framework utilization Java classes for structure
 - Demo used open source Jupiter interface



Monday 1/31/2022



- MBEE Workshop - <https://openmb.ee.atlassian.net/wiki/spaces/OPENMBEE/pages/320667649/INCOSE+IW+OpenMBEE+Workshop>
 - OpenSE Cookbook – Erik Karlsson
 - SE operations manual and Lessons learned from development on the Thirty Meter Telescope
 - https://www.omg.sysml.org/The_OpenSE_Cookbook-SPIE-2018-Karban-et-al.pdf
 - Cameo Collaborator - Andrius Armonas
 - Development of a cameo interface tool for improving model access to teams
 - June/July rollout for tool





Monday 1/31/2022



- **PM-SE Integration**

- PMBOK V7 was released in August 2021
- PMBOK V7 does not map to SE Handbook V5
- Expected v2.6 PM/SE SEBok update in April 2022
- Expansion of PM-SE integration 'quiz' into academics through socrative.com
- Development of a PM-SE interactive hydrogen powerplant 'game' by Jean-Francois Vernon to widen outreach

- **Sector Leadership Meeting**

- Technical Leadership Institute (TLI) initiative is expanding - <https://www.incose.org/about-incose/tli>
 - INCOSE professional leadership pipeline program started in 2015
 - 63 total TLI leaders
 - 101 total leaders in program
 - 8th Cohorts is in progress
 - Package is required to be submitted to info@incose.org by March 31st
- INCOSE.buzz accounts for INCOSE members on MS teams/architecture





Tuesday 2/01/2022



- Chapter Leader Demo – Andrew Murrell
 - At the request of the Seattle chapter, INCOSE-LA presented and demonstrated a hybrid communication infrastructure system to INCOSE leaders
 - Included a 3 architecture trade study from stakeholder analysis to integration
 - Live assembly and demonstration by untrained leaders in the room
 - Low cost, low maintenance solution for wide INCOSE adoption
 - Disseminated documentation as of 2/6 to a dozen INCOSE chapter leaders from the US, Europe, Middle East, and Africa have requested feedback and support adopting their own systems
 - Reach out to secretary@incose-la.org for deliverables
- Closing - <https://conference.confir.com/IW2022/fullscreen/400106>
 - 659 Participants at IW both live and virtual
 - 27 Countries, 60 Chapter's participates
 - June International Symposium 2022 is in Detroit
 - <https://www.incose.org/events-and-news/search-events/2022/06/25/international-symposium/incose-32nd-annual-international-symposium-2022>



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Nazanin Sharifi

INCOSE IW 2022





Hybrid Event Review



- Virtual attendance
 - Recording made available same/ next day
 - No connection issues
- Missed out on Networking/ Socialization
 - Event Attendance
- Wealth of resources offered
 - Working Groups
 - Chapters
- Look ahead:
 - Online SEP exams
 - Academic Equivalency to INCOSE Certification Program
 - Hybrid INCOSE IS 2022
 - Spotlight Series, extended conversation in Virtual Community
 - Addition to Cafes and Webinars



Great Content



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Dorothy Benveniste
LA Chapter President
February 8, 2022
djbenven@outlook.com

Realizing the Sys Engineering Vision Workshop

Sat/Sun. Jan. 29 & 30, 2022



Systems Engineering Vision 2035

<https://www.incose.org/about-systems-engineering/se-vision-2035>



Charter is to Realize the SE Vision 2035

Purpose: Evolve the practice, instruction and perception of SE to:

- 1) Position SE to leverage new technologies in collaboration with allied fields
- 2) Enhance SE's ability to solve the emerging challenges
- 3) Promote SE as essential for achieving success and delivering value

Goal: Create a road map that drives the evolution of SE to:

- 1) Be increasingly *adaptable, evolvable and fit for purpose*
- 2) Account for human abilities, needs as an integral system element and their interactions with a system
- 3) Be more responsive in resolving increasingly challenging societal needs
- 4) Realize and enhance Systems Engineering Vision 2025 & 2035 and other visionary inputs

Scope: Identify the needs, priorities and means for transforming SE including:

- 1) Underlying foundations, systems theory, and principles
- 2) People, methods, tools, processes, education and training
- 3) The future social and ethical duties, contributions, and responsibilities of future systems engineers





Systems Engineering Vision 2035

Current State

- Systems engineering is more important- and more valued - due to rising complexity, increased interconnectivity, and societal impacts.
- Systems engineering is not just for systems engineers- all engineers need it.
- Systems engineering is addressing challenges - in tool and data integration, the impact of artificial intelligence and autonomous systems - and rising software complexity, agility, and scale.

Accomplishments to date



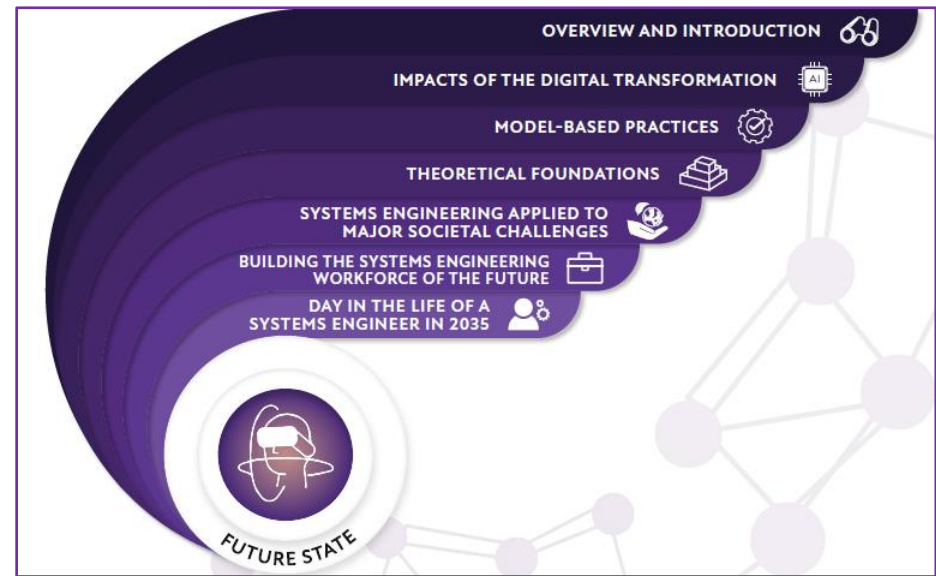


Systems Engineering Vision 2035

Future State

- Future SE is model-based, enabled by digital transformation.
- SE practices will make significant advancements to deal with systems complexity and to enable enterprise agility.
- SE will leverage practices from other disciplines - such as data science - to help manage the growth in data.
- Significant change in SE education - starting with early education with a heavy focus on lifelong learning.

Where we need to go



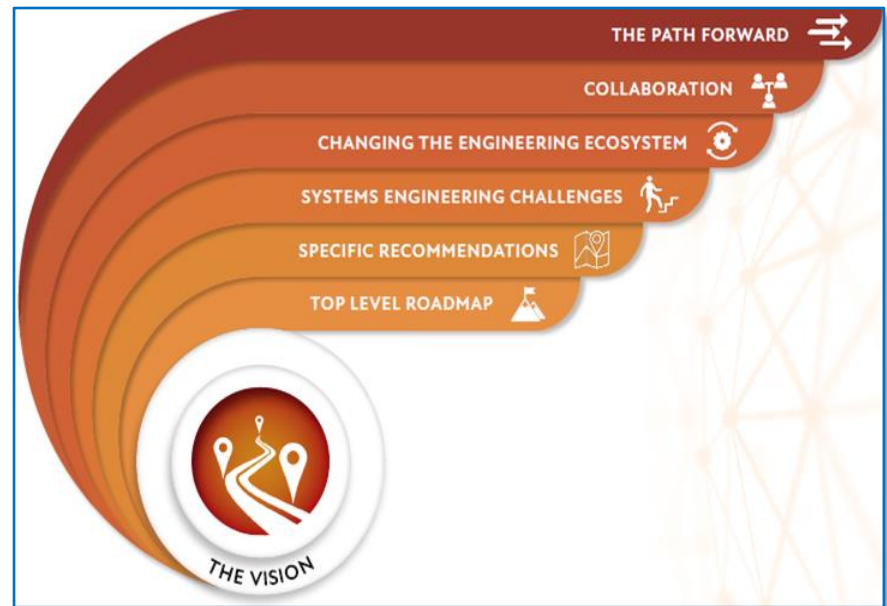


Systems Engineering 2035

Realizing the Vision

- Manage culture change - political, social, technical, environmental, legal
- Evolve the Sys Eng knowledge base
 - Roadmaps for Research, applications, SE Practices, competencies and Education, Tools and Environments
- Achieve the vision through collaboration
- Sys Eng by 2035 is responsive to major societal challenges - extreme weather, sea-level rise, global warming

The Path Forward





Projects Dashboard

What	Lead(s)	Support	TPP Status	Status	Products	When
TPPs Project Management	Miller	FuSE Project Leads	N/A	In Process	Set of Approved TPPs	Ongoing
SEV2035 Review/Roll-out and Engagement Action (REAct) Team	Friedenthal / Stoewer / Roedler Schreinemakers (REACT)	FuSE Core Team +	(TPP-2020-97 Approved)	Rollout at IW2022	1 SE Vision 2035 2 Marketing Strategy 3 Web Presence (Updates)	1 Rollout IW2022 2 Develop at IW2022 ?? 3 Post IW2022
SEHv5 Inputs and Review	Miller	FuSE Core Team +	(TPP-2019-? Approved)	SE-5.4 & 5.5 Revisions 2 April 2021	SEH5e	IS2023
FuSE Roadmap	Miller	FuSE Core Team +	TPP-2021-121 Draft	Adjudicate with SE Vision 2035 and FuSE Project Roadmaps	SEV Realization Roadmaps	Draft Framing IW2022 FuSE Workshop
Horizons Scanning	McDermott	Ad Hoc Team	Needed	Post IS2021 Planning Meeting	Horizon Scan 1.0	TBD
SE Principles	Watson	SE Principles Action Team	TPP-2020-103 Approved	AIAA & IEEE Reviews Complete Awaiting NDIA Review	SE Principles Article SE Principles (Revised)	<i>INSIGHT</i> 22:1 May 2019 IW2022 Target
SE Heuristics	McKinney / Brook	Fellows & UK Ch.	TPP-2020-54 Approved	WG engagement; to be hosted on Professional Development Portal	Beta Version OK SE Heuristics Version 1	IW2022 Open House Version 1 1H2022
Bridge Team	Rousseau / Brook / Pennotti	Reps from 2 Teams	Review after IS2021	IW2022 Panel IS2022 Transdisciplinary SE Panel	Draft Framework for Principles & Heuristics	IW2022: Guidelines and Transdisciplinary SE Model
Science Foundations for SE (Portfolio)	Javier Calvo-Amodio	ISSS, SysSciWG	Postpone until IW2022	Workshop Postponed due to COVID impacts	Research Agenda & Roadmap	SysSciWG IW2022
SE4AI and AI4SE	Brown (chair) Co-chairs: McDermott, Raz	AI WG	TPP-2020-102 in Review	Need to adjudicate with CAB need for AI V&V	SE & AI Book (Springer) AI Primer (Ali Raz lead)	AI-SE Primer Draft IS2022 Publish 3Q2022
Human Systems Integration (HSI)	Boy	IEA / HSIWG	TPP-2021-125 Approved	IW2021 HSI Virtual Workshop	HSI Reference (HSI-R)	IS2022 Target Release
Systems Security	Dove	Sys Security WG	N/A (?)	11 Foundation Concepts (Roadmap) 11 Planned Workshops	Foundation Papers <i>INSIGHT</i> Themed Issue	IS2021 Paper; IS2022 ?? June 2022 <i>INSIGHT</i>
Agility	Dove Larri Rosser (support)	Agile Sys & SE WG	N/A (?)	9 Concepts (Roadmap) 9 (TBR) Planned Workshops	Framework Paper(s)	IS2021 Paper; IS2022 ??
Complex Systems	Watson	Complex Sys WG	TPP-2021-124 Approved	Revision awaiting technical editing	Complexity Primer Rev1	Available INCOSE Store
Contextual Ecosystems (TBR)	Chris Nemeth (IEEE SMC)	IEEE SMC (Lead) INCOSE Support TBD	INCOSE Supporting Role TBD	Forming: address PESTEL, scale, complexity, non-determinism	Portfolio of models (TBR)	Draft IW2022



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