INCOSE – HRC Chapter Update

August 19, 2021

Agenda

Time	Meeting Topic	Presenter
5:30 – 6:00 PM 5:45 PM	Meet-and-Greet Meal Time ZOOM meeting start time	
6:00 – 6:10 PM	INCOSE Announcements · Chapter o Membership Report o Finance Report o Upcoming Events & Conferences o UAH Student Division Status o Board Elections for 2022 o Corporate Sponsorship Program Proposal o Circle Award 2021 Status	Paul Sullivan Tony Lindeman
6:10 – 6:15 PM	INCOSE International Symposium 2021 Observations	Tony Lindeman
6:15 – 6:30 PM	Calhoun Community College – System Engineering Technician (SET) Curriculum Update	Victory Solutions: Dan Hicks Chris Crumbly David Allen Smith
6:30 – 7:00 PM	INCOSE Systems Engineering Professional (SEP) Certification Overview	Tony Lindeman
7:15 – 7:45 PM	INCOSE – HRC Board Meeting · Recognition Letter Status · October 2021 Board Recruitment & Elections • Corporate Sponsorship Program Proposal · HATS Professional of the Year nomination	Paul Sullivan

Membership Report

- August 2021
  - Active members
  - Renewal members

Home >
Huntsville Chapter

Chapter Information

	127
Chapter Name:	Huntsville
Active Member Count:	215
Expired Member Count:	936
Total Member Count:	1151

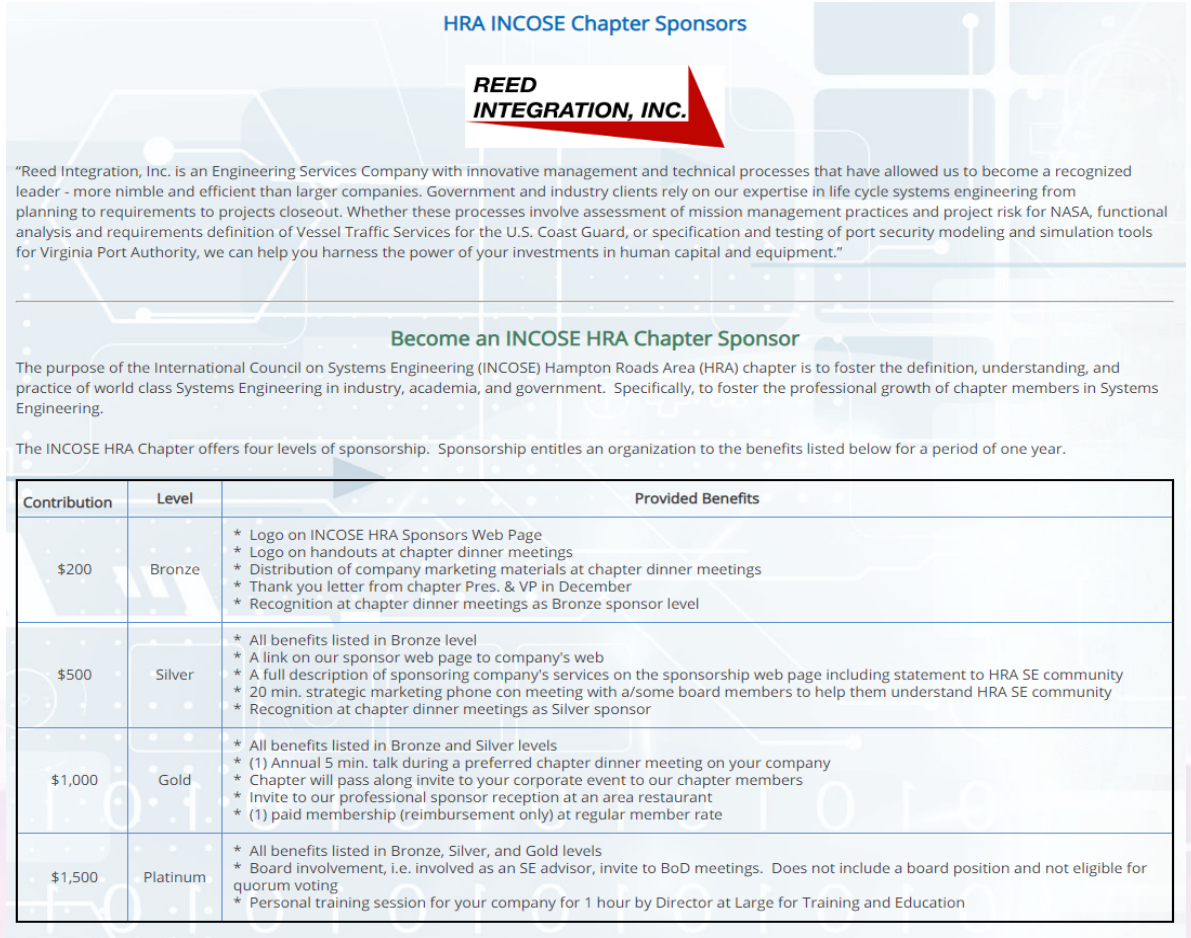
- July 2021
  - New members
  - Non-renewals
- January 2020 – July 2021
  - Lost 97 members

Finance Report

Corporate Sponsorships

- INCOSE Hampton Roads Area – Chapter Sponsors

https://www.incose.org/incose-member-resources/chapters-groups/ChapterSites/hampton-roads-area/chapter-home/chapter-sponsors



HRA INCOSE Chapter Sponsors

REED INTEGRATION, INC.

"Reed Integration, Inc. is an Engineering Services Company with innovative management and technical processes that have allowed us to become a recognized leader - more nimble and efficient than larger companies. Government and industry clients rely on our expertise in life cycle systems engineering from planning to requirements to projects closeout. Whether these processes involve assessment of mission management practices and project risk for NASA, functional analysis and requirements definition of Vessel Traffic Services for the U.S. Coast Guard, or specification and testing of port security modeling and simulation tools for Virginia Port Authority, we can help you harness the power of your investments in human capital and equipment."

Become an INCOSE HRA Chapter Sponsor

The purpose of the International Council on Systems Engineering (INCOSE) Hampton Roads Area (HRA) chapter is to foster the definition, understanding, and practice of world class Systems Engineering in industry, academia, and government. Specifically, to foster the professional growth of chapter members in Systems Engineering.

The INCOSE HRA Chapter offers four levels of sponsorship. Sponsorship entitles an organization to the benefits listed below for a period of one year.

Contribution	Level	Provided Benefits
$200	Bronze	* Logo on INCOSE HRA Sponsors Web Page * Logo on handouts at chapter dinner meetings * Distribution of company marketing materials at chapter dinner meetings * Thank you letter from chapter Pres. & VP in December * Recognition at chapter dinner meetings as Bronze sponsor level
$500	Silver	* All benefits listed in Bronze level * A link on our sponsor web page to company's web * A full description of sponsoring company's services on the sponsorship web page including statement to HRA SE community * 20 min. strategic marketing phone con meeting with a/some board members to help them understand HRA SE community * Recognition at chapter dinner meetings as Silver sponsor
$1,000	Gold	* All benefits listed in Bronze and Silver levels * (1) Annual 5 min. talk during a preferred chapter dinner meeting on your company * Chapter will pass along invite to your corporate event to our chapter members * Invite to our professional sponsor reception at an area restaurant * (1) paid membership (reimbursement only) at regular member rate
$1,500	Platinum	* All benefits listed in Bronze, Silver, and Gold levels * Board involvement, i.e. involved as an SE advisor, invite to BoD meetings. Does not include a board position and not eligible for quorum voting * Personal training session for your company for 1 hour by Director at Large for Training and Education

INCOSE – San Diego

- INCOSE SEP Program
  - August 28 – 29, 2021
  - 11:00 AM – 7:00 PM CDT
  - $40
  - Recorded for later viewing by registered students

https://sdincose.org/rsvpmaker/2-day-virtual-workshop-incose-systems-engineering-professional-sep-certification-2021-08-28/

INCOSE Western States Regional Conference

- INCOSE – San Diego Chapter
- Friday – Sunday, September 17-19, 2021
- Virtual registration:
  - Regular $225
  - Student $40

https://www.incose.org/wsrc/wsrc2021/home/when-where

INCOSE New England 3rd Annual Fall Workshop

- **Two Tracks**
  - Systems Thinking
  - Integration, Verification, & Validation (IV&V)
- **Call for Abstracts**
  - Presentation abstract / Tutorial Proposal Submission: August 27, 2021
  - Acceptance notification: September 7, 2021
  - Final Presentation copy submission: October 1, 2021
- Two-day virtual workshop
- October 22 – 23, 2021

https://www.neincose.org/2021-incose-ne-fall-workshop

INCOSE International Workshop 2022 MBSE TED-talk type Proposals

- International Workshop 2022
  - Hybrid planned event – both in-person and virtual
  - January 29-32, 2020
  - Torrance, CA
- Soliciting 18-minute MBSE Lightning Round proposals
  - Provide MBSE inspiration based on stories, experiences, case studies, research, issues, etc. and subsequently provoke further conversations
  - Presentations will be recorded and added to our MBSE INCOSE YouTube Channel library for reference
- Respond with a title, abstract, contact information, and brief biography to INCOSE Central at Mbse-submissions@incose.org by September 15, 2021
  - Acceptance Response by October 30, 2021

INCOSE UAH Student Division

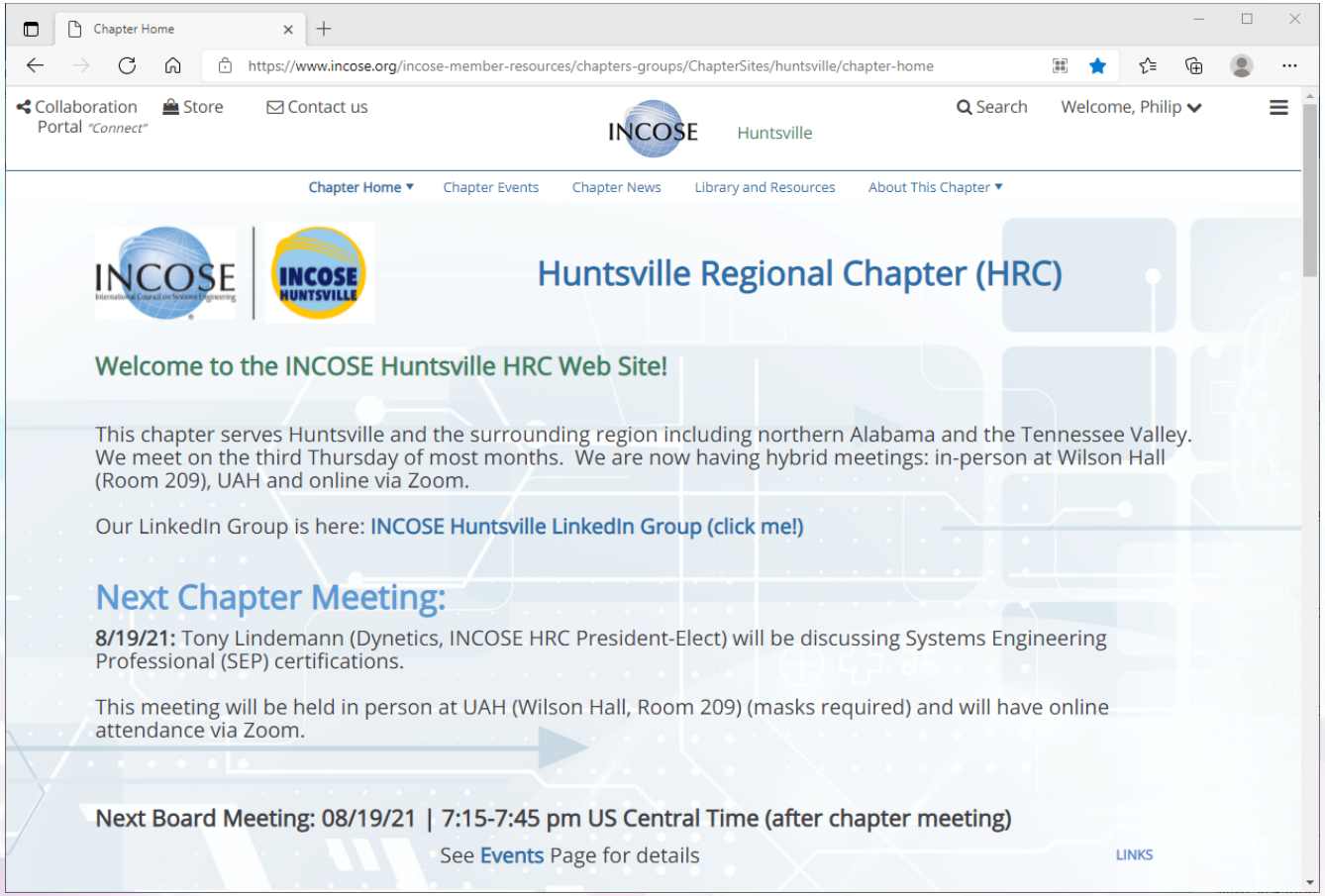
- Application Submission Status
- Social Event @ UAH in Sep-2021 (tentative)

INCOSE – HRC Board Elections

- President-Elect
- Secretary
- Treasurer
- Membership
- Programs
- Communications
  - Chapter Website
- Industry Representative
- Government Representative
- Academic Representative

- Working Group Chairs - TBD

INCOSE – HRC Website



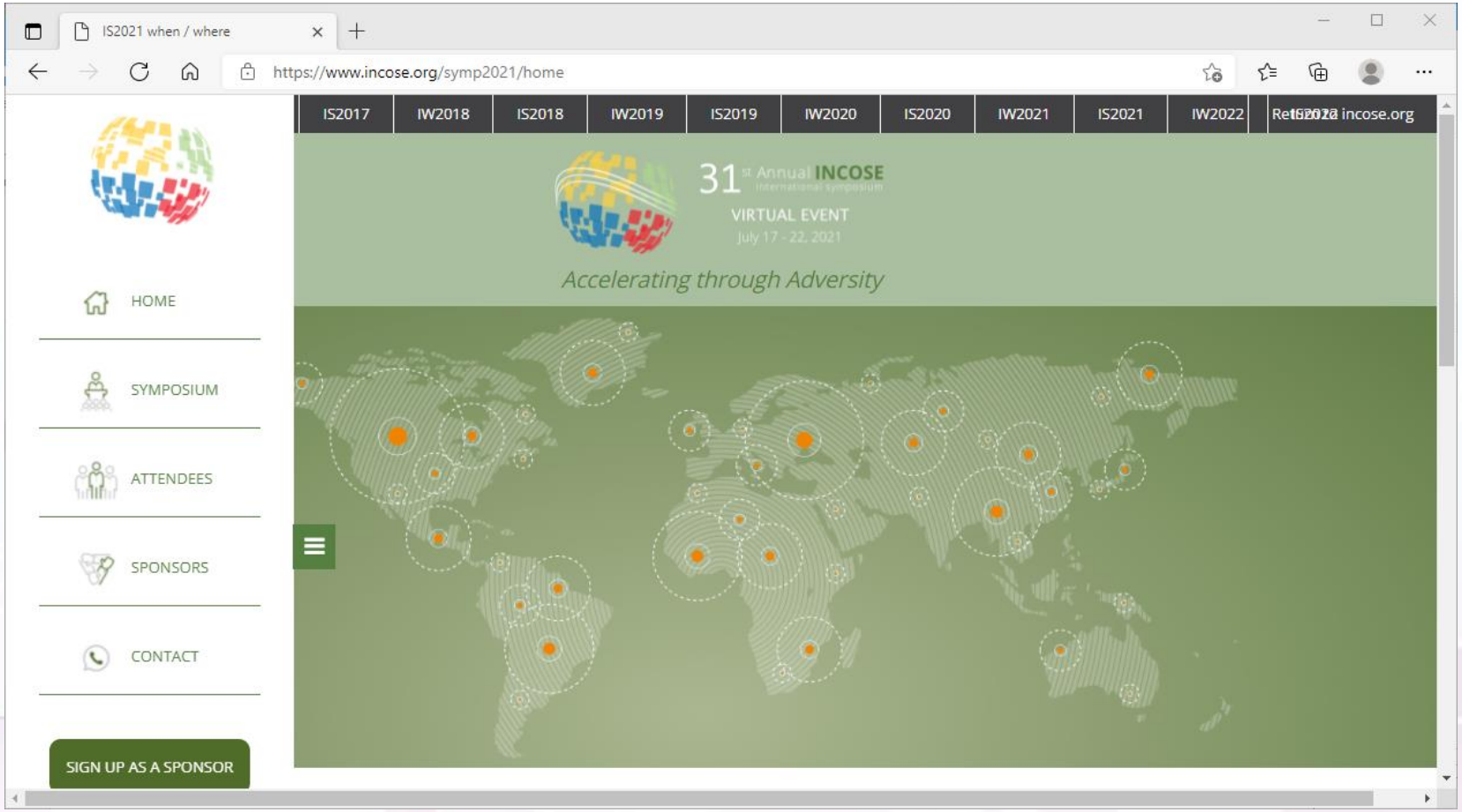
https://www.incose.org/incose-member-resources/chapters-groups/ChapterSites/huntsville/chapter-home

INCOSE – HRC Circle Award 2021 Status

- We have some catch up to do…

INCOSE 31st Annual International Symposium

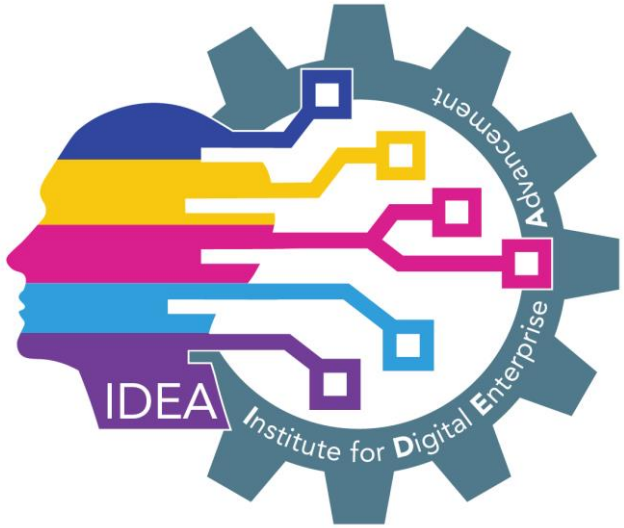
- 100% Virtual
- July 17-21, 2021
- Registration:
  - Member $750
- Tutorials
  - Member $30



Calhoun Community College

- Systems Engineering

INSTITUTE FOR DIGITAL ENTERPRISE ADVANCEMENT



Chris Crumbly/IDEA Executive Director
Dan Hicks/Subject Matter Expert

System Engineering Technician (SET) 2-Year Degree

USG Industrial Base Investment

CORNERSTONE
Cornerstone of the American Military competitive edge

Academic Partners

CALHOUN COMMUNITY COLLEGE

Digital Engineering Applications for Industry

VictorySolutions

Non-Profit Implementation

Institute for Digital Enterprise Advancement

System Engineering Technology Degree Goals	
Problem Statement	• Technology Development takes too long in the U.S. Our adversaries are rapidly advancing in high-tech fields including hypersonics. • The US Government has increasingly turned to Model Based Systems Engineering (MBSE) to accelerate R&D by efficiently automating manual analysis processes and integrating disparate digital tools.
Challenge	• The supply of a competent systems engineering technical workforce does not meet demand for a trained workforce that can build, manipulate, and exploit MBSE tools in the needed SysML (Systems Modeling Language) format
The SET Approach	• Follow the analog from Computer Aided Design/Computer Aided Manufacturing (CAD/CAM) technician discipline and develop a new 2-year degree Systems Engineering Technician training program with the pathfinder at Calhoun Community College
Objective	• Fill increasing government and industry demand for MBSE/digital engineering capabilities to reduce product time to market • implement 24-month SET degree through community colleges which should appeal to incoming freshmen and career transitioning professionals including returning veterans.
Plan of Action	• Initiate a pathfinder instruction program at Calhoun (Aug 21) • Expand through University/Community College nodes • Move upstream to high schools and downstream to Universities

Effective Model Based System Engineering (MBSE) Workforce Development

Institute for Digital Enterprise Advancement – *A non-profit, national collaborative center for identifying, sharing, and recommending Digital Engineering and Manufacturing best practices and applications in the workplace*

IDEA applies a Digital Twin approach to Model Based System Engineering

- ❑ Postsecondary Programs
  - 2-Year SET Degree
  - Internships & Apprenticeships
  - OSCMP Certifications
  - Career Placement
- ❑ Working professionals
  - SET derived Courses
  - OSCMP Certifications
- ❑ Undergraduate & Graduate
  - SET derived Labs/Projects
  - SET derived Electives
  - OSCMP Certifications

Partners

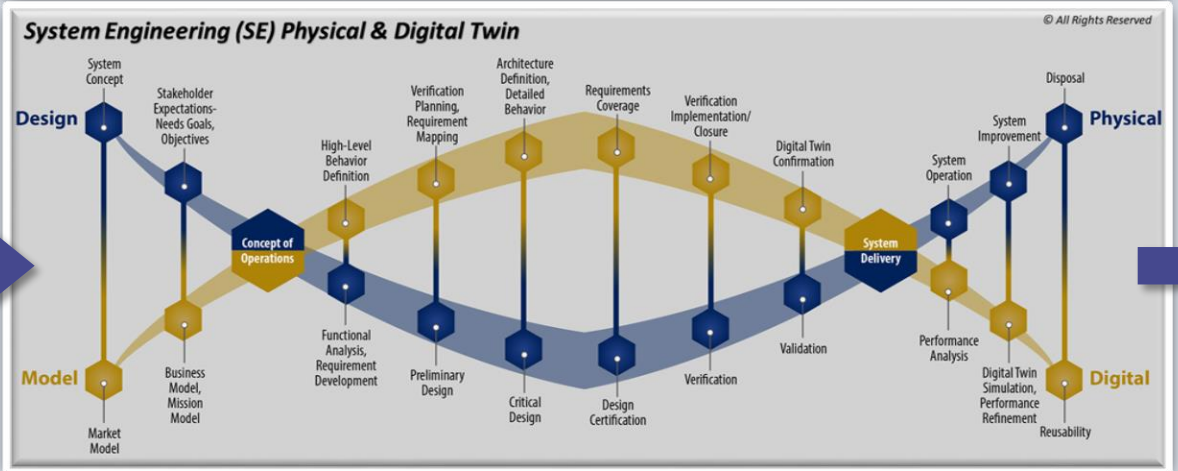
CALHOUN COMMUNITY COLLEGE

Victory Solutions

IDEA Industry/Community Sponsorships

- ❑ Sponsor IDEA education Nodes near MBE/MBSE centers of excellence
- ❑ Sponsor internships & apprenticeships
- ❑ Employ SET Graduates

A digital twin is a "virtual" model of a physical design across a product's life cycle



Professional Certificate Courses Across Range of OCSMP Certification

Manager/Non-Modeler Introduction to MBSE (8 course hours) – *What MBSE is, what it does, how it can be implemented.* Provides industry "use" context, terminology, and application emphasizing benefits and challenges as well as an overview of MBSE implementation approaches including SysML® for modelers and/or system engineers. *Applicable to all OSCMP Modeler certifications.*

Basic MBSE Modeling (40 course hours) – *Best practice modeling building blocks and applications across the system engineering life cycle.* Expands on Introduction to demonstrate model interactions/behaviors application across physical/digital system engineering life cycle of requirements, design, analysis, verification and validation. *Applicable to OSCMP Modeler 1.*

Advanced MBSE Modeling (60 course hours) – *Leverage tool capabilities to build models that enhance design efficiency and collaboration across organizations.* Expands on Introduction and Basic courses to allow participants to build SysML® modeling competencies using a basic digital twin model. *Applicable to OSCMP Modeler 1 and Modeler 2.*

Systems Engineering Technology (SET) Degree

- ❑ 2-Year System Engineering Technician Associates Degree
  - SysML Modeling
  - Database Management
  - Systems Engineering Process & Concepts
- ❑ Practical applied learning from latest industry lessons learned

SET Placements & Capability Enhancement

- ❑ Counseling during Internships/Apprenticeships
  - Student assistance/support
  - Employer feedback to SET curriculum improvement
- ❑ Graduate placement assistance

www.idea-set.org

210 Wynn Drive Huntsville, AL 35806

256-808-5651

Systems Engineering Technician (SET)

Timeline

2018 – Ron Porter and Chris Crumbly develop the MBSE Center of Excellence Concept

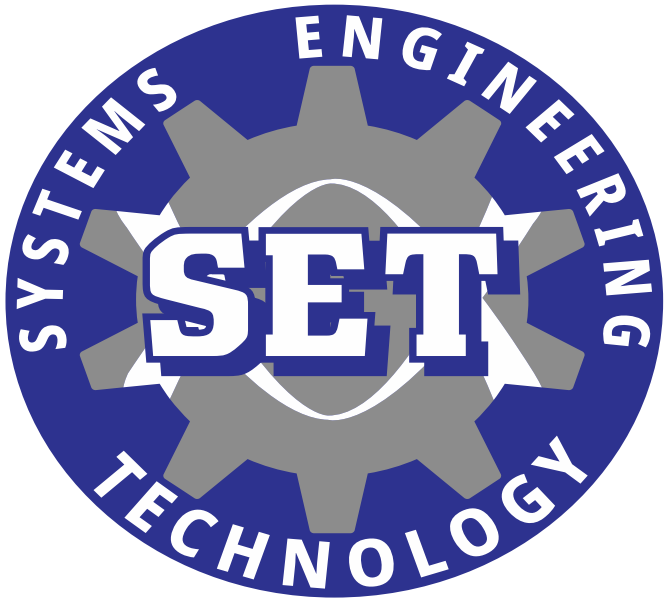
2019 – Kris McGuire of Victory Solutions develops a concept for CM/DM in the Community College System for returning veterans

2019 – Crumbly and McGuire combined the concepts to provide MBSE Instruction within the Community College system

2020 – OSD/IBAS awarded our team a 5-year OTA to develop the Systems Engineering Technician curriculum

- Auburn University
- Victory Solutions
- Calhoun Community College
- IDEA

Calhoun College SET Logo



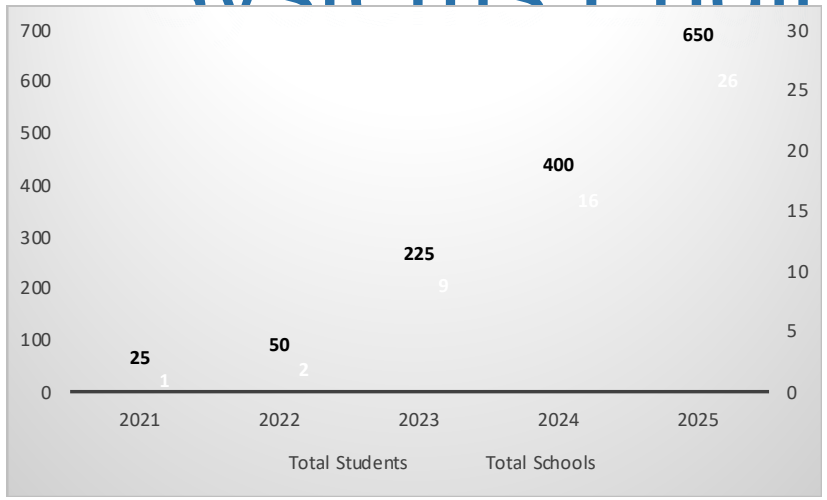
CAD/CAM Analog

- Systems modeling now is in the same state as CAD/CAM in the early years
  - Personnel skill similarities; complex tool manipulation, attention to detail, understanding of technical field
  - Employer assumption similarities: Employers currently expect, as they did early with CAD/CAM, engineers to be fluent with current modeling tools
  - Tool reality similarity: Tool advancement and complexity is and will continue to exceed practicing Engineers' ability to keep up
  - Community Colleges developed CAD Technician programs to fill the gap

- As in CAD/CAM, there is an opportunity for tool application specialists
  - Engineers must focus on the eventual product not the modeling tool
  - Modelers have a near development level of understanding of the software tools, operate those tools, and apply tech understanding and access to knowledge base to find solutions to tool-based issues.
  - We do not have, but we need, a pool of trained technicians for systems modeling
  - IDEA has created a CAD/CAM designer analog for Systems Modeling

Community Colleges can fill the gap once again with SET

Systems Engineering Technician Data



SET Projections

Huntsville, AL Job Postings on *indeed.com* (4/7/21)

- 2600+ Systems Engineering Jobs
- 354 are entry level
- 296 mention Model Based Systems Engineer
- 124 mention MBSE

Current academic instruction is not keeping up with the demand for MBSE specialists

- SET is a 5-year plan to introduce a pathfinder curriculum and expand in the region and beyond
- Computer modeling and simulation is changing how engineering is practiced
- Model-Based Systems Engineering (MBSE) is one of the primary accelerators in the digital engineering advancement
- 4-year engineering curricula are structured such that MBSE is not typically introduced until a student reaches the master's degree level.
- The SET degree will produce an entirely new skillset between administration and engineering
- SET is scalable, repeatable, and the North Alabama region is an excellent pathfinder.
- SET will introduce workforce pathways upstream into High Schools and move modeling instruction downstream into four-year Universities

CALHOUN COMMUNITY COLLEGE

Systems Engineering Technology (SET) AAS Degree
Major Course Requirements

			Credits
INTRO	CIS 134	IT Fundamentals *(CompTIA ® ITF+)*	3
	SYS 101	Introduction to Systems Engineering	3
SECURITY	CIS 199	Network Communications *(CompTIA ® Network+)* **OR**	3
	CIS 270	Cisco CCNA I	
	CIS 280	Network Security *(CompTIA ® Security+)*	3
PROGRAMMING	CIS 202	Python Programming	3
	CIS 207	Introduction to Web Development	3
	CIS 209	Advanced Web Design	3
	CIS 251	C++ Programming	3
	CIS 285	Object-Oriented Programming	3
SysML	SYS 231	Systems Modeling I	3
	SYS 232	Systems Modeling II	3
	SYS 233	Systems Modeling III	3
DATABASE	CIS 222	Database Management Systems	3
	SYS 221	Database Management for Systems Engineering	3
CAPSTONE	SYS 241	Dynamic Data Visualization Applications	3

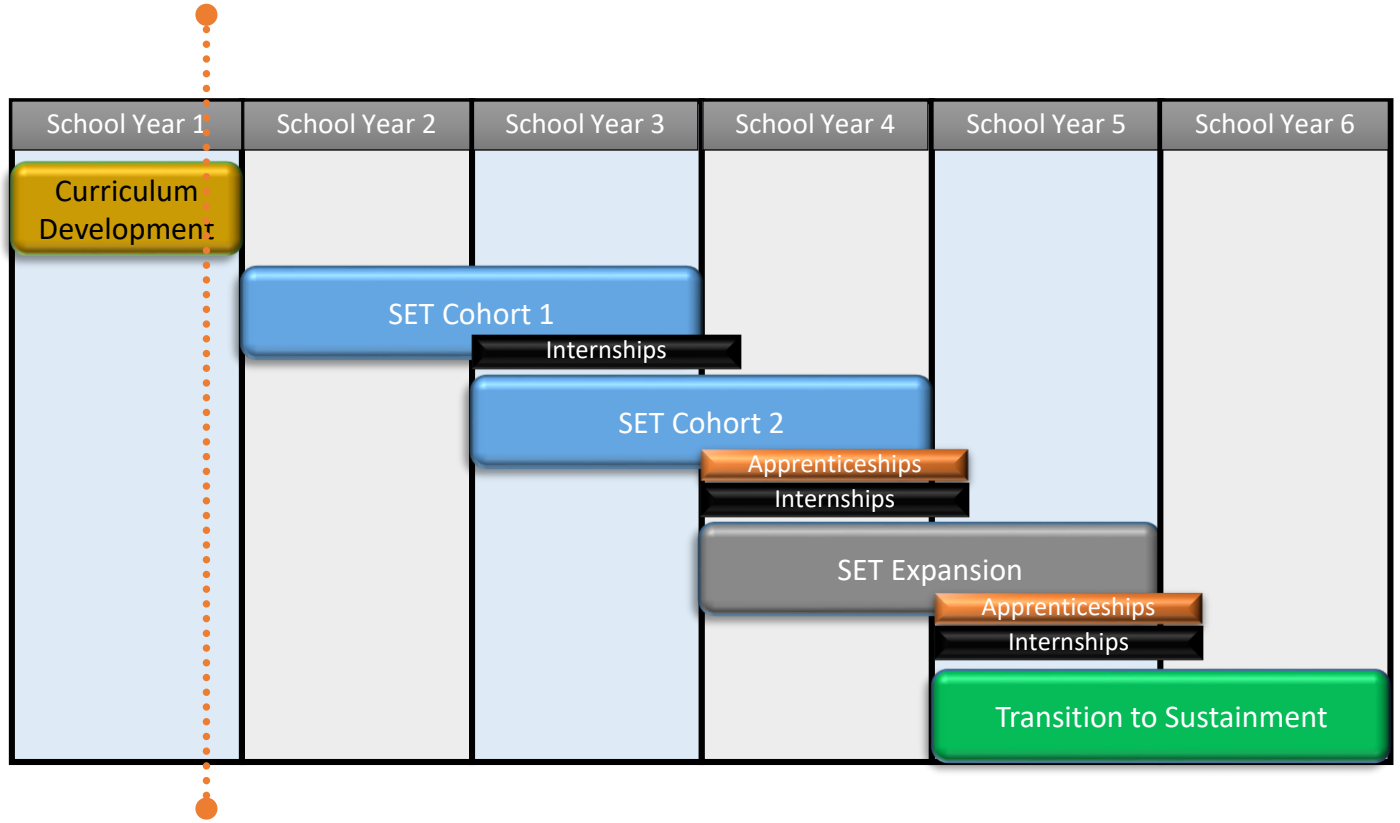
SET Program: 6-Course Overview

Course Complete
Ready for Instruction

Course Outlines Established – Requires Curriculum Development

Course 1: Introduction to Systems Engineering	Course 2: Systems Modeling I	Course 3: Database Management for Systems Engineering	Course 4: Systems Modeling II	Course 5: Systems Modeling III	Course 6: Dynamic Data Visualization Applications
Yr1 Sem1 Fall 2021	Yr1 Sem2 Spring 2022	Yr2 Sem1 Fall 2022	Yr2 Sem1 Fall 2022	Yr2 Sem2 Spring 2023	Yr2 Sem2 Spring 2023
Module 1: Systems Thinking	Module 1: Understanding a Model	Module 1: Essential Database Management Concepts	Module 1 Organizing a Model Using Basic SysML Constructs	Module 1 Building a Package Diagram Using a Full Set of SysML Constructs	Module 1 Role of Data Visualization In a Model Manipulation and Communication
Module 2: The product and product life cycle	Module 2: Building a MBSE model	Module 2: Database Analysis and Design	Module 2 Building a Structural Model	Module 2 Building a Requirements and Use Case Diagram Using a Full Set of SysML Constructs	Module 2 Use Data Visualization Tools
Module 3: Engineering a System	Module 3: SysML Diagram Types	Module 3: Database Implementation	Module 3 Building a Parametric Model	Module 3 Building a Block Definition and Internal Block Diagram Using a Full Set of SysML Constructs	Module 3 Use Various Data Visualization, SysML Programming, and Web Development Tools to Store and Visualize Data and Views and Manage Models
Module 4: Systems engineering in the product life cycle	Module 4: Requirement Development	Module 4: Designing and Building a simple Database suitable for MBSE	Module 4 Building a Behavioral Model	Module 5 Defining and Using Constraints On Diagrams	Module 4 Build an Interactive Website Suitable For the Interchange of Data In an MBSE Context
Module 5: Systems engineering and the SET in the life cycle			Module 5 Customizing a Model and Understanding Allocation Relationships	Module 5 Building an Activity, Sequence and State Machine Diagram Using a Full Set of SysML Constructs	

SET Project Strategy



- SET Cohort 1 Instruction begins August 2021
- Internship 1 begins May 2022

- SET Cohort 2 begins August 2022
- Internship 2/Apprenticeship 1 begins May 2023

SYS 101 First SET Cohort 8/19/21

Professional Education Opportunities- IDEA

1. Specialists to handle the complex MBSE modeling and modeling IT overhead (SE Techs)
   - A. Associate of Applied Science Degree in Systems Engineering Technology-
     1) Currently offered at Calhoun Community College, expansion across the US is expected
     2) Includes instruction in System Engineering as well as MBSE tools, and languages
     3) Prep for OMG Certified Systems Modeling Professional Level- Intermediate
     4) Student internships with MBSE implementing organizations to provide real experience
   - B. Continuing Education through IDEA Academy

2. System Engineers familiar with MBSE and capable of creating and interpreting models
   - A. Certificate Program at Calhoun Community College
     1) Prep for OMG Certified Systems Modeling Professional Level- Intermediate
     2) Education in the relationship of the MBSE to System Engineering practices
   - B. Short courses in MBSE familiarization and specific tools and languages (ala carte)

3. Project Team Members who are aware and understand the use of MBSE
   - A. Short course in MBSE familiarization and relationships with other project functions (40 hours)

4. Management who understand the best implementation of MBSE for their company
   - A. Short course in MBSE implementation, benefits, implications, and costs (8 hours)
   - B. Consultation in specific implementation as desired

Summary

Questions?

Can this program benefit your organization?

Interns◦ Apprentices◦ Graduates

Would you consider supporting SET?

Advisor◦ Mentor◦ Advocate

INCOSE Systems Engineering Professional (SEP) Certification

Tony Lindeman, ESEP-Acq, PMP, CBAP
INCOSE-HRC President-Elect

Mr. Tony Lindeman is a Senior Principal Systems Engineer with over 40 years of project management, systems engineering, business analysis, and operational military experience while supporting the Department of Defense (DoD), NASA, academia, and commercial industry. Tony currently working at Dynetics, a Leidos Company, providing digital engineering and systems engineering expertise to the Leidos Digital Engineering (DE) Community of Excellence (CoE) and a variety of projects in Huntsville, Alabama. He is a retired Naval Aviator who flew CH-46 helicopters while serving on active duty in the U.S. Marine Corps. Prior to his retirement, he attained his DoD Program Management, Level III, certification.

Tony is a Past President of the Project Management Institute (PMI) - North Alabama Chapter and currently serves as President-Elect for the International Council for Systems Engineering (INCOSE) - Huntsville Regional Chapter. He received a Bachelor of Science in Biology from West Virginia Wesleyan College and a Master of Science in Electrical Engineering from the Naval Postgraduate School.

Tony has obtained the INCOSE Expert Systems Engineering Professional – Acquisition (ESEP-Acq) credential, PMI Project Management Professional (PMP) credential, International Institute of Business Analysis' (IIBA) Certified Business Analysis Professional (CBAP) credential, and the OMG Certified System Modeler Professional (OCSMP) - Model User certification. He has served on the Board of Trustees as Enrollment Council Chair for his alma mater, West Virginia Wesleyan College from 2011-2019.

https://www.incose.org/incose-member-resources/chapters-groups/ChapterSites/huntsville/chapter-home