



INCOSE

Systems Engineering Professional (SEP) Certification Program

Program Summary

July 2021

Tony Lindeman, ESEP-Acq, PMP, CBAP

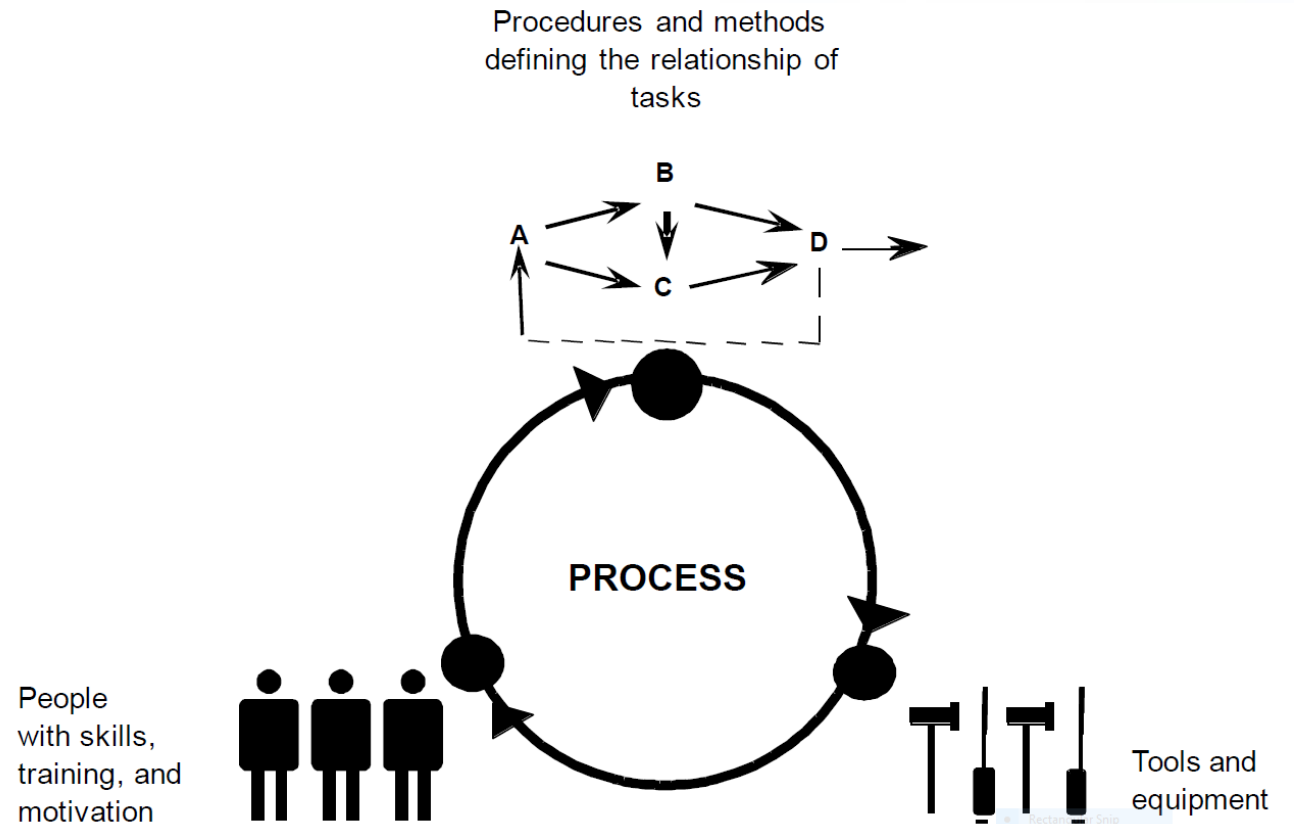
INCOSE – HRC President-Elect

August 19, 2021



Why certification is important

- Organizational Capability
 - Processes
 - People
 - Tools
- Translates to...
 - Documented processes
 - Qualified, experienced, proficient, and competent workforce
 - Process-enabling tools



Reference: CMMI® for Development, Version 1.3, **CMU/SEI-2010-TR-033**; Software Engineering Institute; November 2010



INCOSE SEP Architecture

For wherever you are in your career

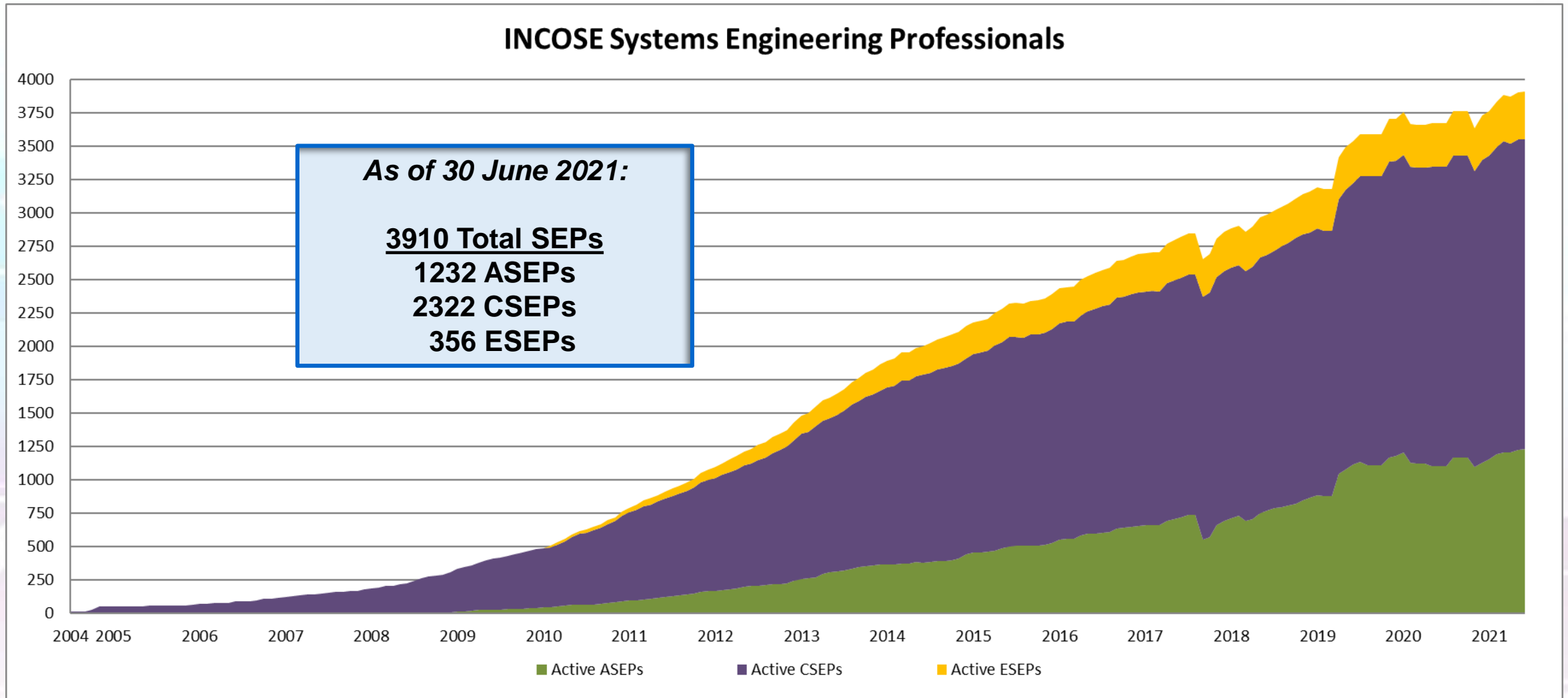
Multi-Level Base Credentials

The base ASEP, CSEP, and ESEP credentials cover the breadth of systems engineering at increasing levels of leadership, accomplishments, and experience.



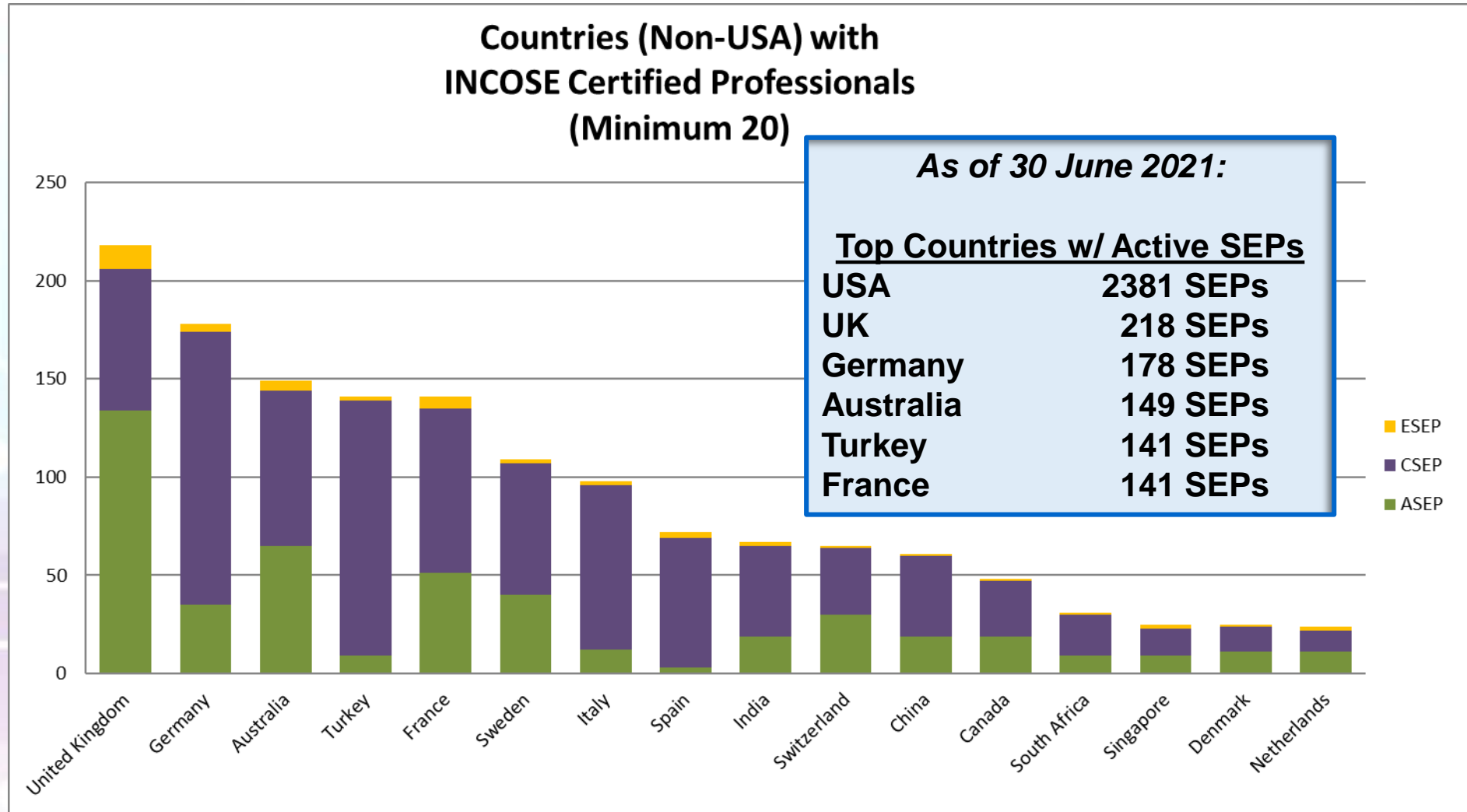


Total SEPs since 2004



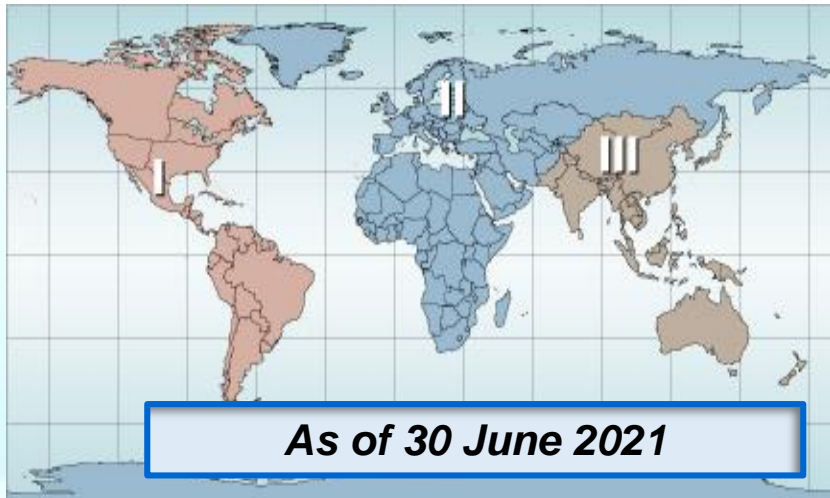


SEPs by Country

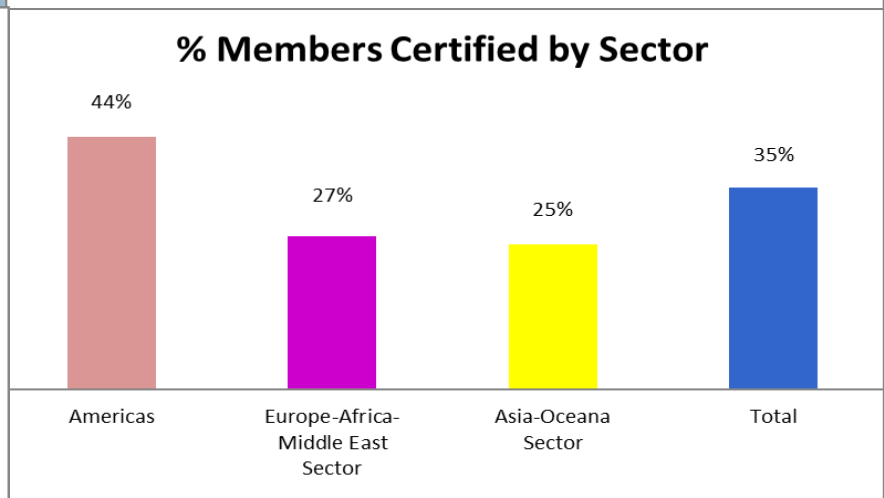
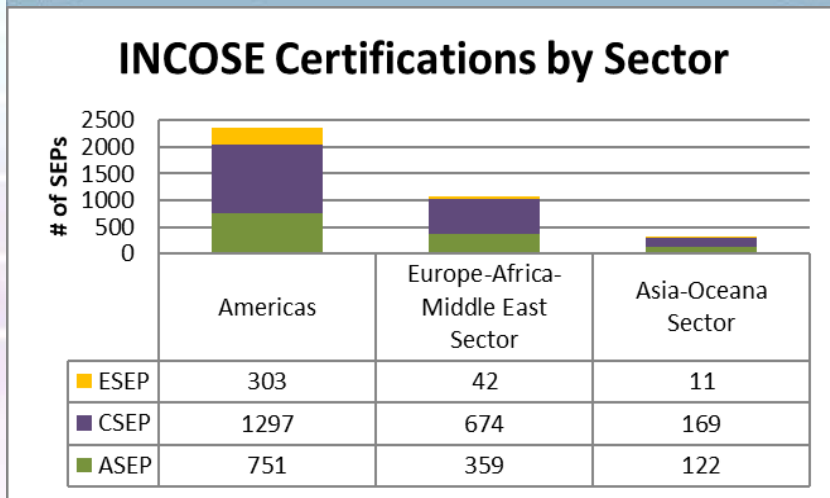
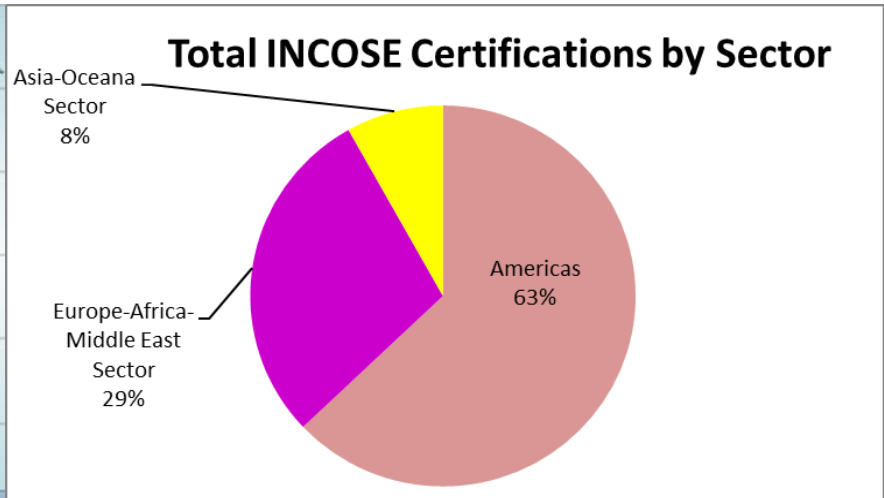




SEPs by Sector

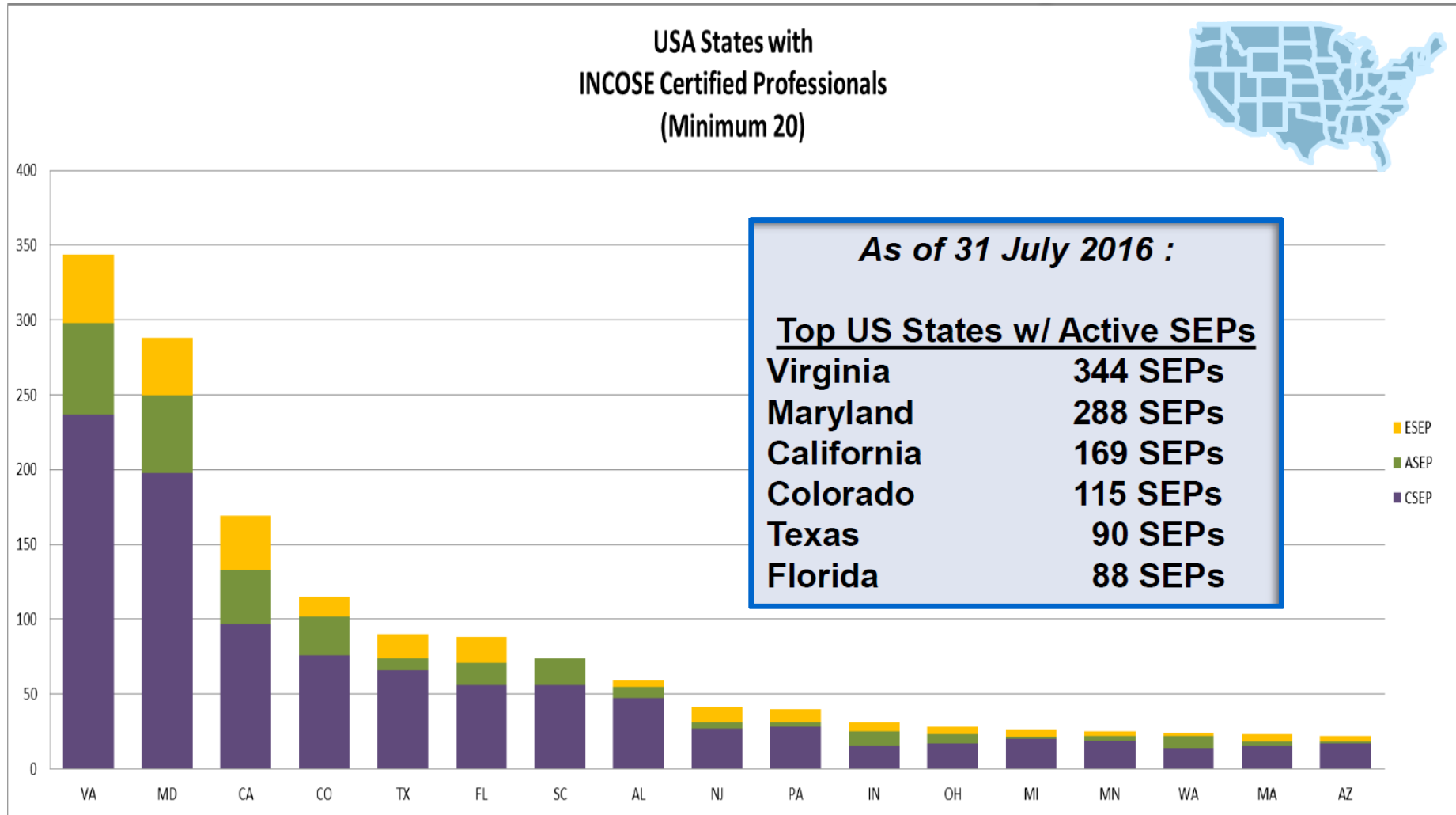


As of 30 June 2021



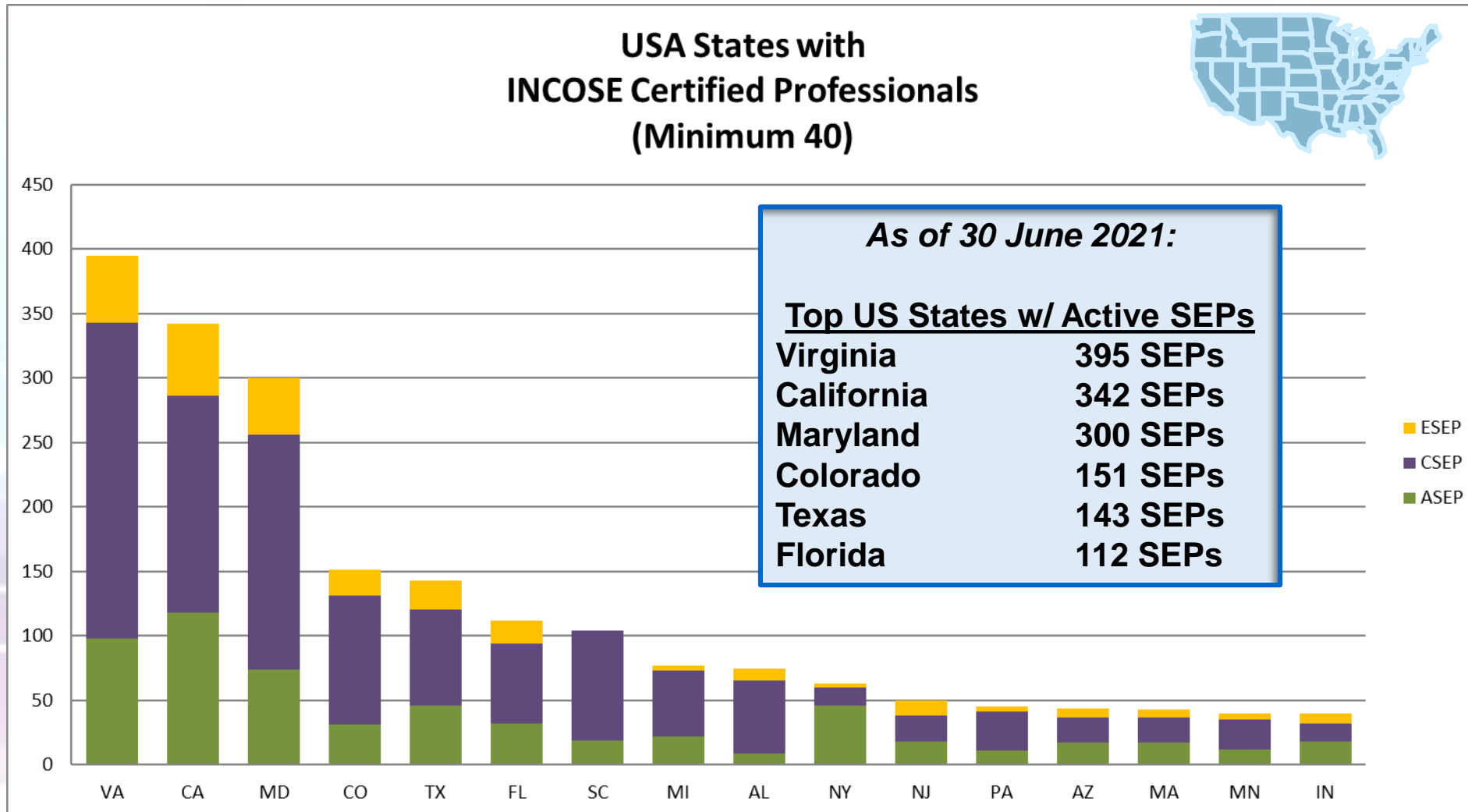


SEPs by U.S. State – July 2016



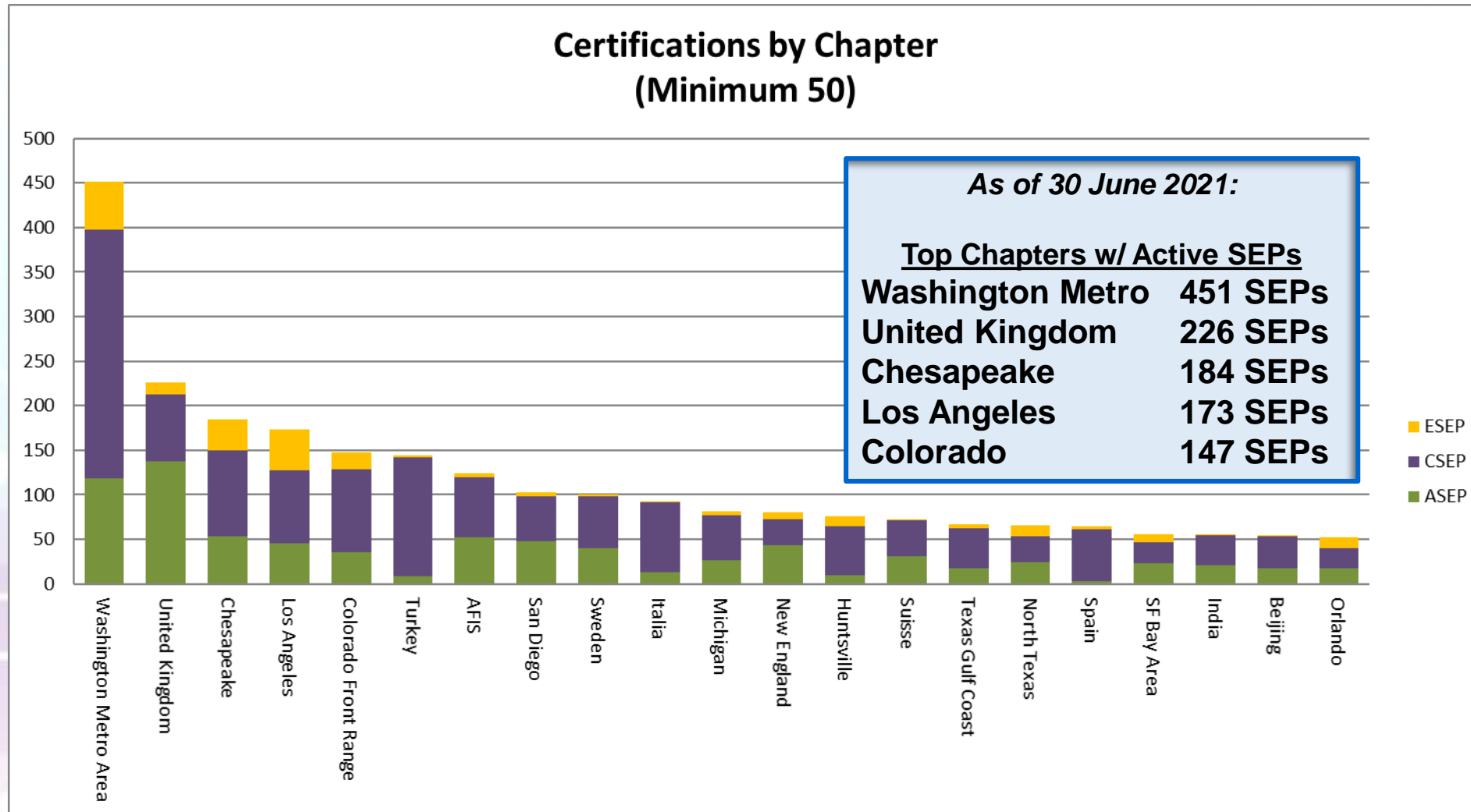


SEPs by US State – June 2021



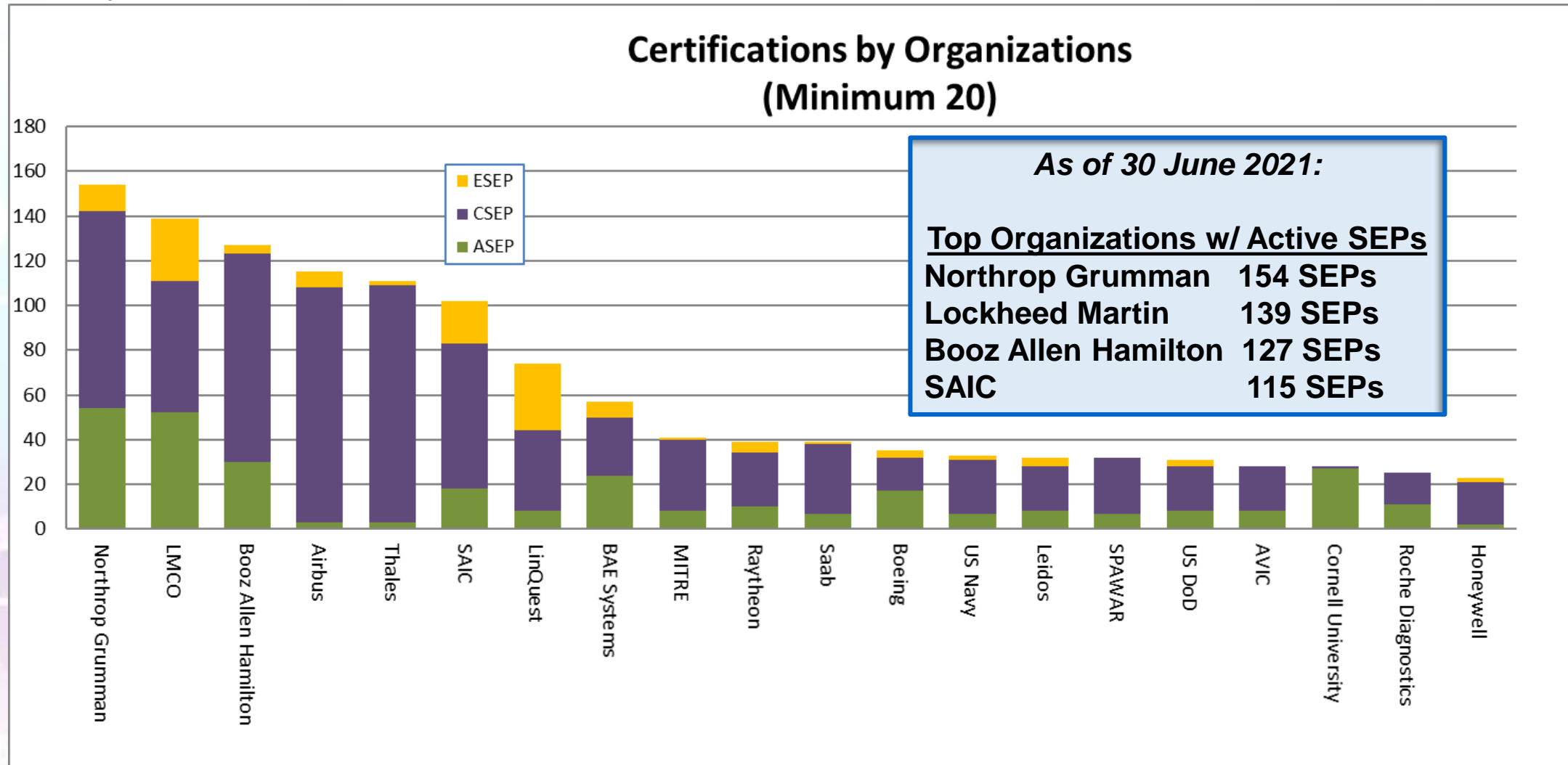


SEPs by Chapter





SEPs by Organization



As of 30 June 2021:

Top Organizations w/ Active SEPs

Northrop Grumman	154 SEPs
Lockheed Martin	139 SEPs
Booz Allen Hamilton	127 SEPs
SAIC	115 SEPs



INCOSE SEP Program Purpose and Benefits

- The INCOSE SEP program offers independent assessment of system engineering professionals benefiting:
- Systems engineering community:
 - Creates the standard to identify and develop systems engineering professionals.
 - Establishes a formal, recognized body of knowledge for the systems engineering community.
- System engineering professionals:
 - Provides a portable standard of recognition for attainment of knowledge, education, and experience.
 - Serves as a mechanism for continued professional development through recertification requirements.
- Organizations/institutions:
 - Offers a universal, industry-approved measure of a professional's knowledge –achieved through the independent evaluation of relevant tasks, projects, and programs.



Topics



- What is INCOSE?
- Who is recognizing and supporting INCOSE certification?
- What are the levels of certification?
- What is the application process for certification?
- How is certification renewed?





What is INCOSE?

- The International Council on Systems Engineering (INCOSE) is a not-for-profit membership organization founded in 1990 to develop and disseminate the interdisciplinary principles and practices that enable the realization of successful systems.
- **Mission**
Share, promote and advance the best of systems engineering from across the globe for the benefit of humanity and the planet.
- **Vision**
The world's authority on Systems Engineering.

Certification is just one of many INCOSE products and offerings.



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Job Postings ask for SEP

- Aspiration Software
- Barrios
- Belcan Government Services
- Booz Allen Hamilton
- Central Intelligence Agency
- ClearMotion
- DRS Technologies
- Engility
- Georgia Tech Research Institute
- IDEMIA
- INNOVIM
- JB Management
- KBRWyle
- Leidos
- Lockheed Martin
- Logistics Management Institute
- The Mitre Corporation
- National Geospatial-Intelligence Agency
- Newbrook
- Noblis
- Northrop Grumman Corporation
- Oceaneering
- OG Systems
- Raytheon
- SAIC
- Sanmina Corporation
- Vencore



Certification Agreements: Industry

- The Airbus Group
- ASTER Technology & Engineering
- AVICIT
- BAE Systems
- Booz Allen Hamilton
- Cummins
- Jacobs Technology
- KBR Wyle
- L-3 Communications
- LinQuest
- Lockheed Martin
- ManTech
- MITRE
- OPS Consulting
- Perspecta
- Raytheon
- Roche
- SAIC
- Thales



Certification Agreements: University

- Streamlined Process

- École Polytechnique
- ISAE/Supaero
- University of New South Wales
- University of Texas – El Paso
- Worcester Polytechnic Institute

- Academic Equivalency

- Colorado State University
- Cornell University
- Drexel University
- Missouri S&T
- Naval Postgraduate School
- University of Alabama – Huntsville
- University of Detroit – Mercy
- University of Maryland – Baltimore County
- University of Michigan
- University of New South Wales
- Worcester Polytechnic Institute



Certification Agreements: Other

- Object Management Group (OMG) OCSMP
- GfSE (Germany)
- SESA (Australia)
- INCOSE UK Chapter
- US Defense Acquisition University (DAU)



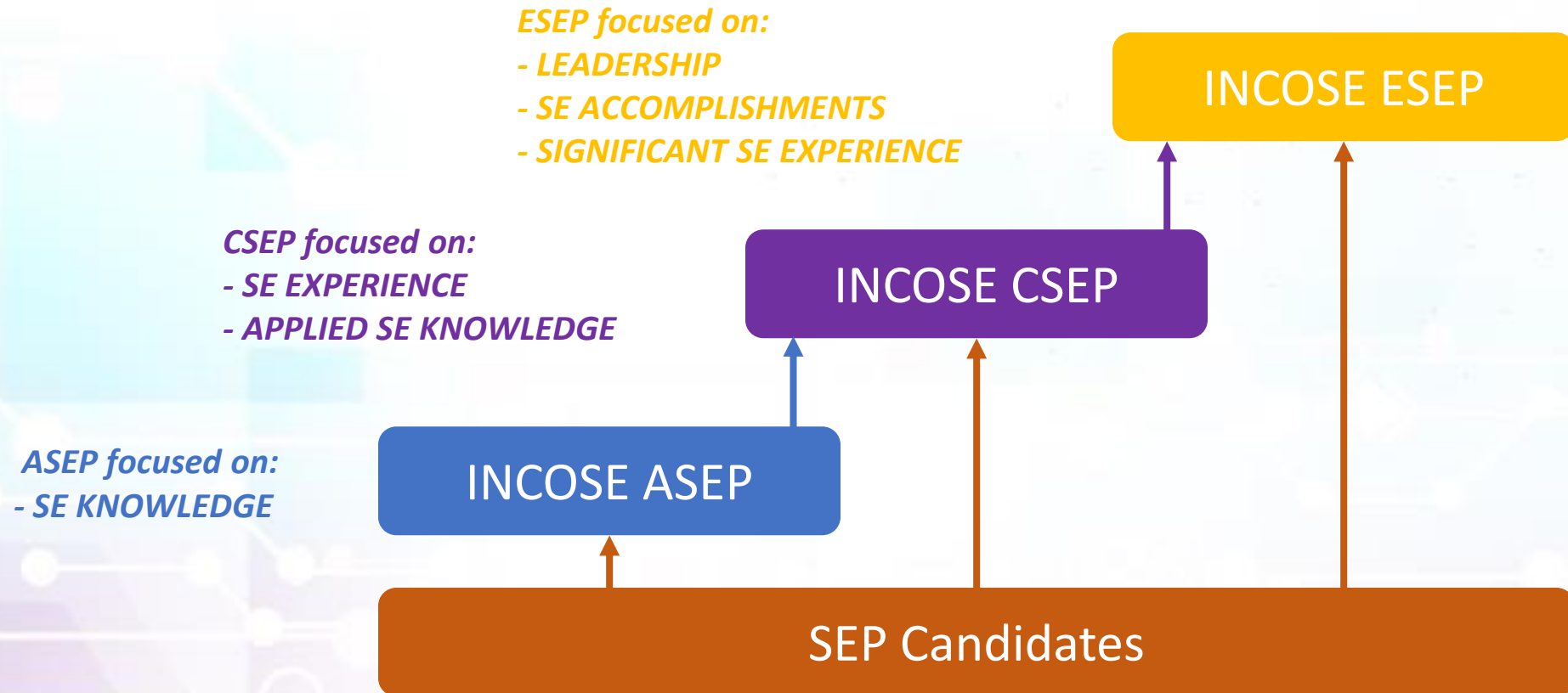
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SEP Describes Career Path

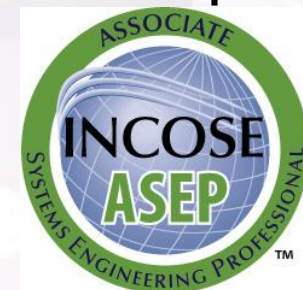


You can enter at whatever SEP level is appropriate and can seamlessly transition between levels when ready.



Knowledge Level: Associate Systems Engineering Professional

- Targeted towards junior/maturing systems engineers and recent college graduates with limited systems engineering work experience
- ASEPs are certified against knowledge requirements
- Knowledge confirmed through an exam based on the INCOSE SE Handbook
- ASEPs must be, and remain, INCOSE members
- Renewal every 5 years through ongoing professional development, maximum duration of 15 years
- Available since 2008





Foundation Level: Certified Systems Engineering Professional

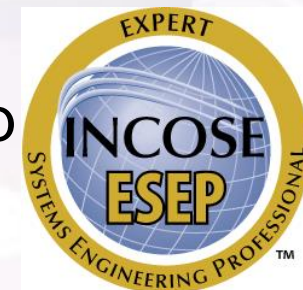
- Targeted towards systems engineers with five or more years of systems engineering work experience
- CSEPs are certified against substantiated experience, education, and knowledge requirements
- Experience must be substantiated by 3-5 work-related references
- Knowledge confirmed through an exam based on the INCOSE SE Handbook
- CSEPs must be, and remain, INCOSE members
 - Does not apply to those who applied in 2015 or earlier
- Renewal every 3 years through ongoing professional development
- Available since 2004





Senior Level: Expert Systems Engineering Professional

- Targeted towards senior systems engineering leaders with recognized systems accomplishments, who have many years of systems engineering work experience
- ESEPs are certified against substantiated professional leadership, systems engineering accomplishments, experience, and education requirements
- At least 10 years of experience must be substantiated by 3-5 work-related references
- Interviews used to validate leadership and significant systems accomplishments
- ESEPs must be, and remain, INCOSE members
- No renewal requirements other than INCOSE membership
- Available since 2010





What Certification is Right for You?

- If you have just started (or plan to start) practicing systems engineering or have recently graduated and are interested in systems engineering
- If you are a practicing Systems Engineer with more than five years of systems engineering professional work experience
- If you are a systems engineering leader with recognized systems accomplishments and have many years of systems engineering professional work experience





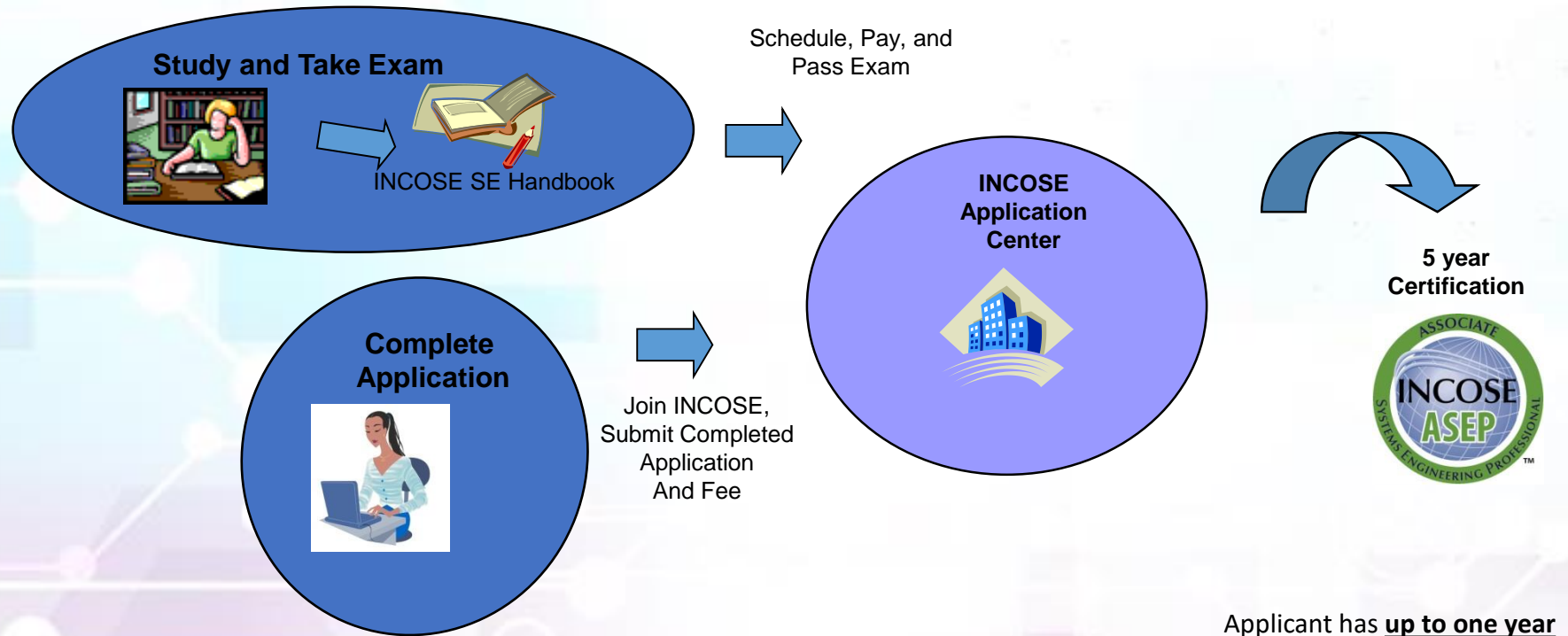
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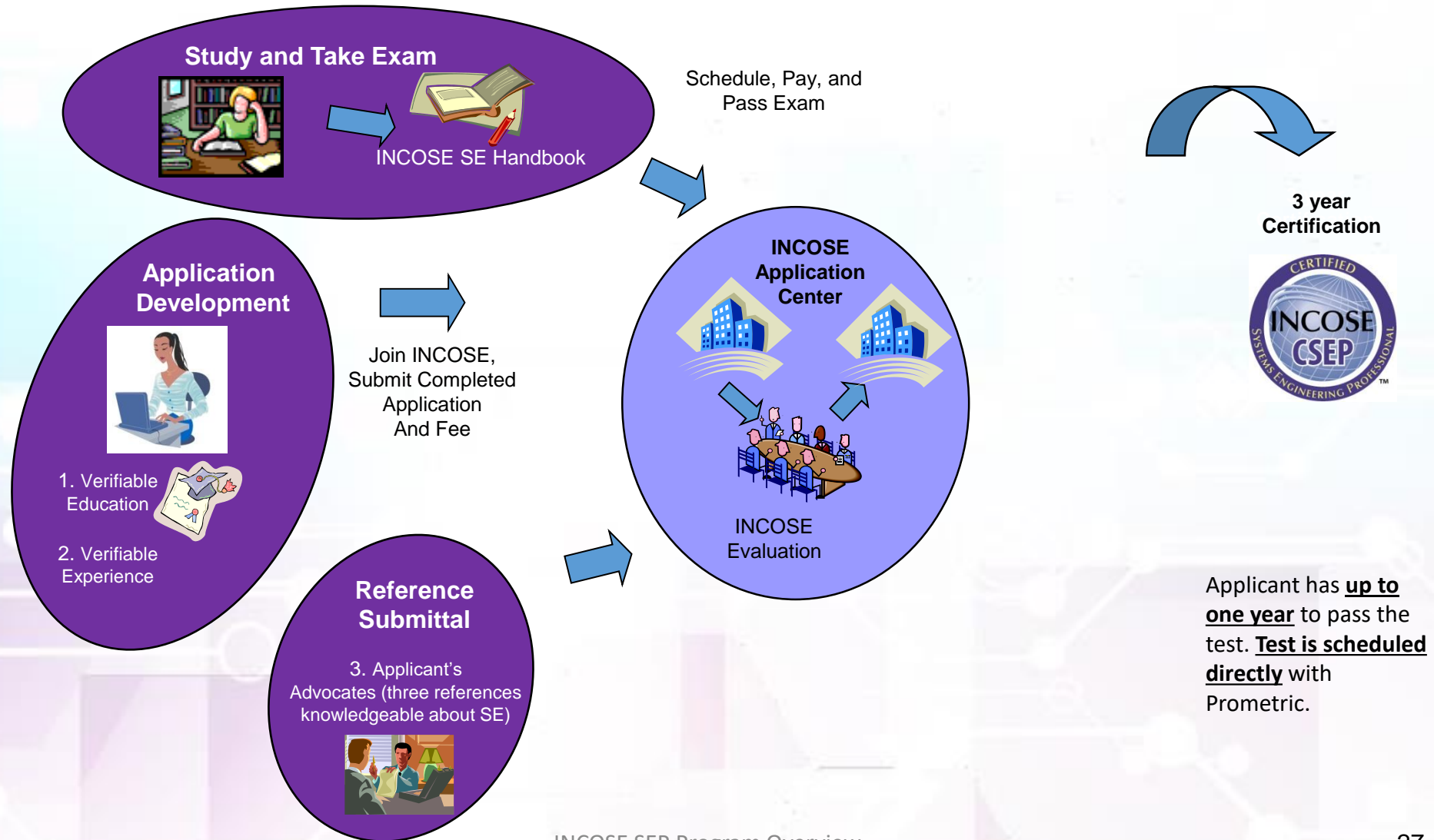
ASEP Application Process



Applicant has **up to one year** to complete the process once started.

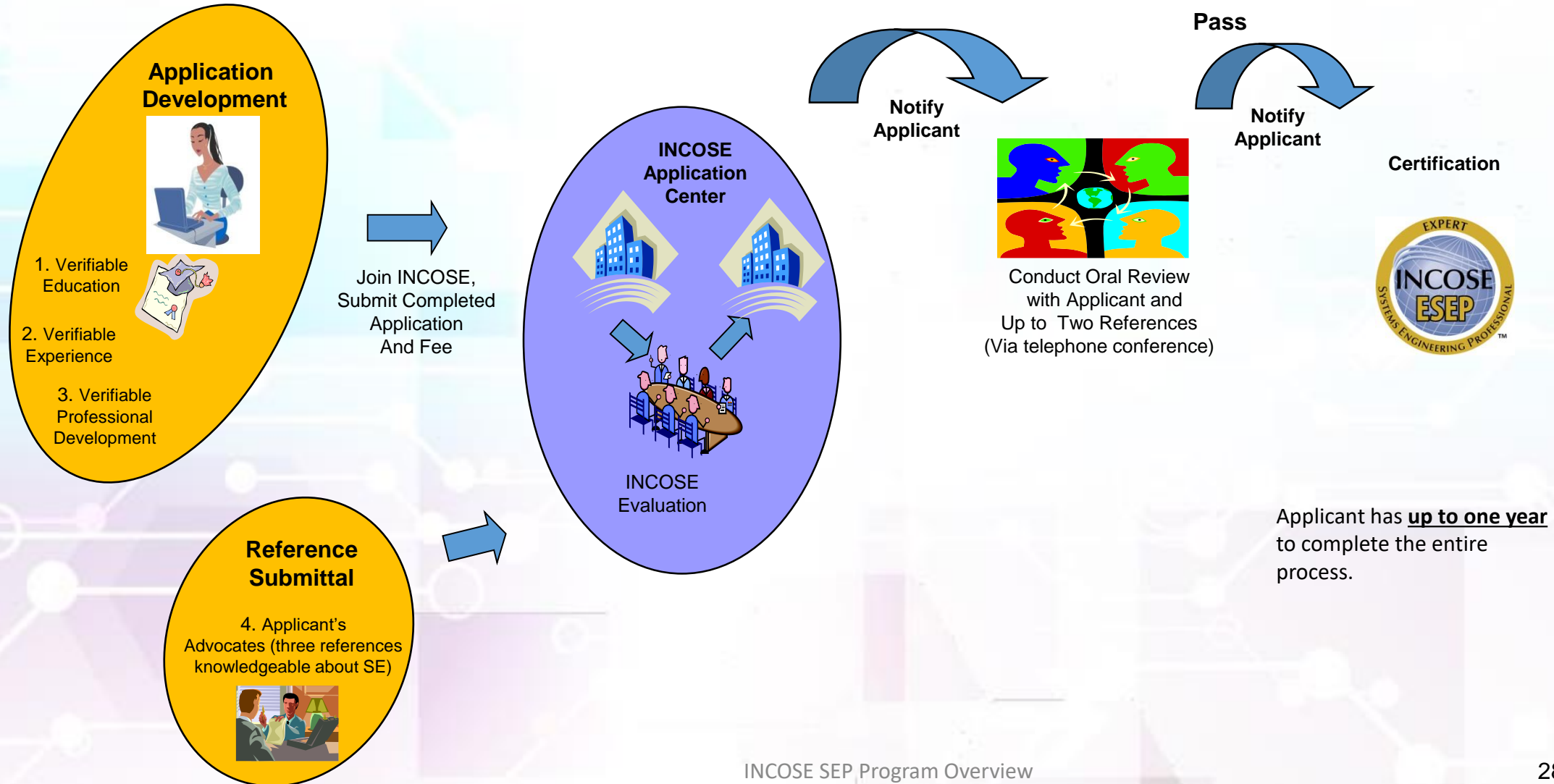


CSEP Application Process





ESEP Application Process





Knowledge verified by exam

- CSEP/ASEP Exam Basis
 - INCOSE Systems Engineering Handbook v4
- Exam is
 - 100 or 120 questions, 100 or 120 minutes long
 - Administered online with video proctoring
 - Offered as a pencil-and-paper test at many INCOSE events
- Candidates are eligible for three attempts within one year





Education verified by diploma

- Education
 - Qualifying Bachelor's Degree (or international equivalent)
 - Acceptable engineering fields of study include: aeronautics, biomedical, chemical, civil, computer, electrical, environmental, industrial, mechanical, nuclear, software, systems
 - Other acceptable fields of study include: chemistry, computer science, mathematics, physics
 - If the Bachelor's degree does not come from the above fields, then a Masters or Doctorate degree (or international equivalent) in those fields is acceptable
 - INCOSE is the final authority on degree applicability
 - Additional Experience Can be Substituted
 - Minimum of 5 additional years of general engineering experience for non-technical Bachelor's degree
 - Minimum of 10 years (with at least 5 in SE) for CSEP
 - Minimum of 25 years (with at least 20 in SE) for ESEP w/ CSEP
 - Minimum of 30 years (with at least 25 in SE) for ESEP w/o CSEP
 - Minimum of 10 additional years of general engineering experience if no Bachelor's degree
 - Minimum of 15 years (with at least 5 in SE) for CSEP
 - Minimum of 30 years (with at least 20 in SE) for ESEP w/ CSEP
 - Minimum of 35 years (with at least 25 in SE) for ESEP w/o CSEP



Experience documented across specific areas

- Requirements Engineering
- Architecture / Design Development
- System Integration
- Verification and Validation
- Technical Planning
- Technical Monitoring and Control
- Acquisition and Supply
- Information Management and Configuration Control
- Risk and Opportunity Management
- Process and Lifecycle Definition
- Specialty Engineering
- Organizational Project Enabling Activities
- Other

Successful candidates must have balanced experience across multiple areas



CSEP Certification Experience Requirements

- CSEP Systems Engineering Experience
 - Minimum 5 years of professional level experience in multiple SE functional areas (and any additional general years of experience necessary due to education status)
 - Minimum of at least 1 year of professional level SE experience in each of 3 or more of the SE experience areas
 - Must be documented on the INCOSE application form
- Experience Confirmation
 - Recommendations from at least 3 colleagues / peers / managers
 - References must cover at least 5 years and 3 areas of SE experience claimed by the applicant (including any additional years)
 - References must be knowledgeable in Systems Engineering (or general engineering for any additional years) and have at least five years of relevant experience
 - Must be documented on the INCOSE reference form



ESEP Certification Experience Requirements

- ESEP Systems Engineering Experience
 - Minimum 25 years (20 if already a CSEP) of professional level experience in multiple SE functional areas (and any additional general years of experience necessary due to education status)
 - Minimum of at least 2 years of professional level SE experience in each of 6 or more of the SE experience areas
 - Must be documented on the INCOSE application form
- Experience Confirmation
 - Recommendations from at least 3 colleagues / peers / managers
 - References must cover at least 10 years of SE experience claimed by the applicant
 - References must be knowledgeable in Systems Engineering and have at least five years of relevant experience
 - Must be documented on the INCOSE reference form



ESEP Professional Leadership Requirements

- Minimum of 5 years of professional leadership.
 - **Product Development Leadership Years**
 - Years of leadership in a product development position, such as chief engineer or development team lead
 - 1 year credit for each year in a leadership position - no limit
 - **Technical Society Leadership Years**
 - Leadership of a professional technical society, such as elected officer, appointed committee chair, editor, or thought leader
 - 0.5 year credit for each year of service – no limit
 - **Advanced Academics Years**
 - Technical Master's degree (or international equivalent)
 - 1 year credit
 - Technical Doctoral degree (or international equivalent)
 - 2 years credit if separate credit is given for a Master's degree
 - 3 years credit if separate credit is not given for a Master's degree
 - Systems engineering graduate-level teaching
 - 1 year of credit for each 500 hours of classroom instruction spread over a 3 year time period, limited to a maximum of 3 years
 - Category limited to a maximum of 4 years credit



ESEP leadership verified by oral review

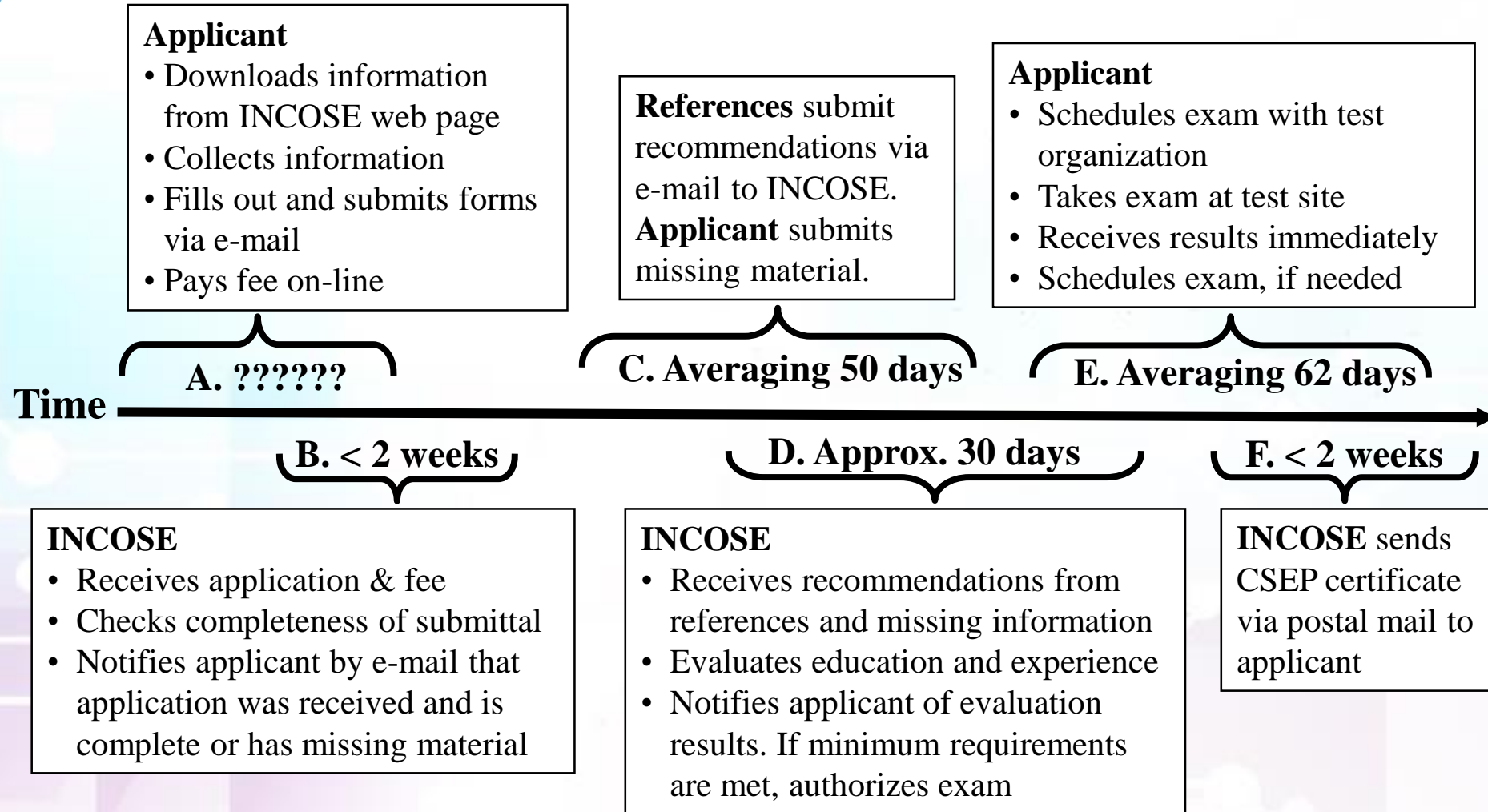
- Applicant must be willing to participate in an oral review
 - Purpose of the oral review is to confirm the applicant is a Systems Engineering leader and to verify the applicant's accomplishments and experience
 - The oral review questions are in behavior-based format
- At least two (2) of the references must be willing to participate in an oral review (if required)
 - Purpose of the reference oral review(s) is to confirm/supplement the applicant's information
- The oral reviews
 - Are done via phone
 - Typically do not exceeding 60 minutes (30 minutes for references)
 - Are in the English language
 - Are conducted by an evaluation panel consisting of INCOSE ESEPs trained as Certification Application Reviewers (CARs)

The oral reviews focus on verifying the applicant's leadership, accomplishments, and experience.



How Long Will It Take to Get CSEP?

There is no one answer. Much depends on the applicant.



While the times vary, the average time for CSEP is ~200 days.



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Certification maintained through continuing education or re-test

- Certification is Valid for
 - 3 Years for CSEP, and must maintain INCOSE membership
 - 5 Years for ASEP and must maintain INCOSE membership
 - Indefinite for ESEP, must maintain INCOSE membership
 - Extensions (e.g., Acq) are renewed concurrent with the base certification, regardless of when earned
- Certification renewal requires
 - Minimum of 120 Professional Development Units (PDUs)
 - Or, pass knowledge exam again once certification expires



PDUs for Certification Renewal (1 of 2)

Professional Development Activities (All must be relevant to the practice of systems engineering)	Credit	3/5 Year Limit
Technical Society Participation Category		
Be an INCOSE individual, senior, or student member	5 PDU/year	15 PDU
Attend non-peer-reviewed professional technical society event	1 PDU/hour	30 PDU
Attend peer-reviewed professional technical society event	1 PDU/hour	No limit
Participate on professional technical society working groups, committees, etc.	1 PDU/hour	No limit
Perform leadership role in professional technical society at local, national or international level	1 PDU/hour	No limit
Volunteer activities with youth in schools or community related to science, technology, engineering, and math (STEM)	1 PDU/hour	72 PDU
Volunteer activities with community, school, or non-profit organizations that help them accomplish their technical needs	1 PDU/hour	30 PDU
Earn an SE-relevant, exam-based, professional certification other than INCOSE SEP	5 PDU/certification (Up to 2 per renewal period)	10 PDU



PDU for Certification Renewal (2 of 2)

Professional Development Activities (All must be relevant to the practice of systems engineering)	Credit	3/5 Year Limit
SE Course Work & Publication Category		
Complete a technical graduate level course	2 PDU/class hour	No limit
Attend educational course, tutorial, or seminar	1 PDU/hour	No limit
Teach professional development coursework, including presentations not part of job function.	2 PDU/hour (prep) 1 PDU/hour (teach)	40 PDU
Write & publish SE article	5 PDU/article	No limit
Write & publish SE book	30 PDU (primary author)/book 10 PDU (contrib. author)/book	No limit
Attend vendor presentation with educational value	1 PDU/hour attendance	15 PDU
Consume SE-related media, including journal article, book, video, or audio	1 PDU/hour	15 PDU
SE Job Function Participation Category		
Receive patent award	10 PDU/award	No limit
Serve as designated lead systems engineer for a system, product or service	15 PDU/year	45 PDU
Lead organization to increase INCOSE systems engineering certifications	5 PDU/year	15 PDU
Volunteer (i.e., non-compensated) activities within your organization related to engineering and science	1 PDU/hour of effort	30 PDU



Any Questions?

Certification Office:

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Courtney Wright, CSEP

Certification Program Manager:

Courtney.Wright@incose.org

For more information visit:

www.incose.org/certification/



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