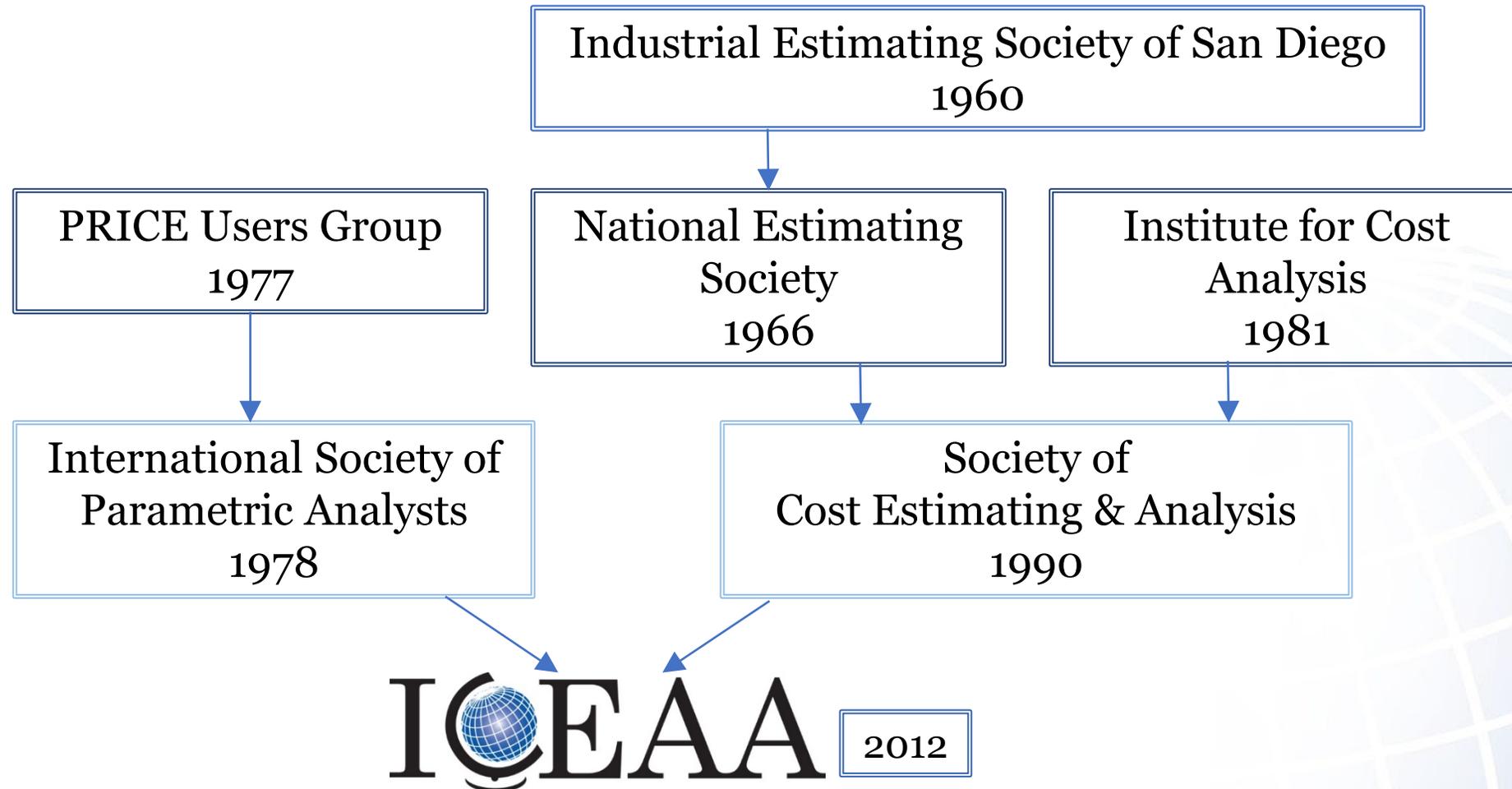


**International
Cost Estimating and Analysis
Association:
An Introduction**

**Megan Jones
ICEAA Executive Director**



History



Mission Statement

The International Cost Estimating and Analysis Association is a 501(c)(6) international non-profit organization dedicated to advancing, encouraging, promoting and enhancing the profession of cost estimating and analysis, through the use of parametrics and other data-driven techniques.

ICEAA's official training course material

CEBoK®
Version 1.2

User-friendly training resource

Organized into 16 interactive modules
within five general subject areas

Covers all topics tested in the CCEA® exam

Designed to facilitate self-study and study in small groups
or can be used effectively in a classroom environment

www.iceaaonline.com/cebok

CCEA® and PCEA® Certification

- Provide professional credentials that set the standard for the entire cost estimating and analysis community
- Offer employers and individuals a means of distinguishing and achieving excellence. Certification serves as a measure of an individual's mastery of the basic and intermediate knowledge in cost estimating and analysis
- Strengthen the individual's and their organization's ability to produce quality cost estimates and analyses

CCEA®

ICEAA's Primary Professional Certification
Valid for five years
Renewable Through Points System
Requires Passing Parts I & II of the Exam

PCEA®

ICEAA's Apprentice-Level Certification
Valid for three years
Requires Passing Part I of the Exam
Renewable by Exam Re-Take Only

Certification Exam: Two Parts

Take Part 1 Only for PCEA

foundation knowledge
practical application

PASS TO
ATTAIN

PCEA[®]

Candidates who pass part 1 will be awarded the PCEA designation regardless of experience level.

Take Parts 1 & 2 for CCEA:

advanced analysis

Pass
With

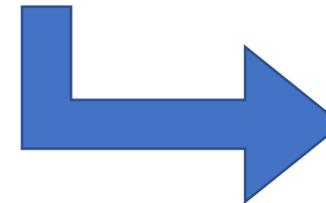
Pass
With

2-5 years cost estimating
experience:

Awarded CCEA[®] when 5
years experience met

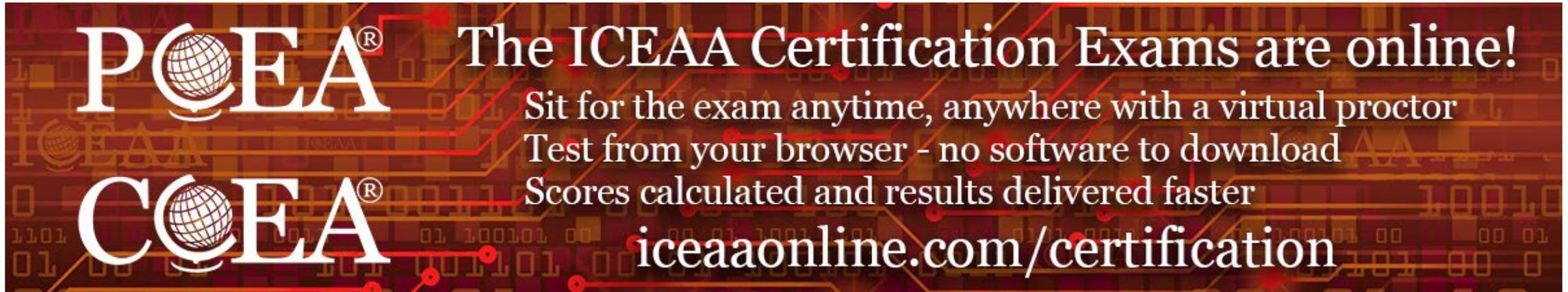
5 or more years cost
estimating experience

ATTAIN



CCEA[®]

To be awarded CCEA, candidates must pass both parts of the exam and have 5 years of cost estimating (or related) experience.

A banner with a dark red background featuring a circuit board pattern and binary code. On the left, the logos for PCEA® and CCEA® are displayed in white, with a globe icon integrated into the letter 'O'. To the right, the text reads: "The ICEAA Certification Exams are online!" followed by "Sit for the exam anytime, anywhere with a virtual proctor", "Test from your browser - no software to download", and "Scores calculated and results delivered faster". At the bottom right of the banner, the URL "iceaaonline.com/certification" is written in white.

PCEA® **The ICEAA Certification Exams are online!**
Sit for the exam anytime, anywhere with a virtual proctor
Test from your browser - no software to download
Scores calculated and results delivered faster
iceaaonline.com/certification

CCEA®

ICEAA's PCEA® and CCEA® exams can now be taken online using any computer with an integrated webcam and microphone.

The browser-based testing software only requires an extension to deploy the virtual AI proctor that monitors your test.

CCEA® and PCEA® Certification

CCEA®
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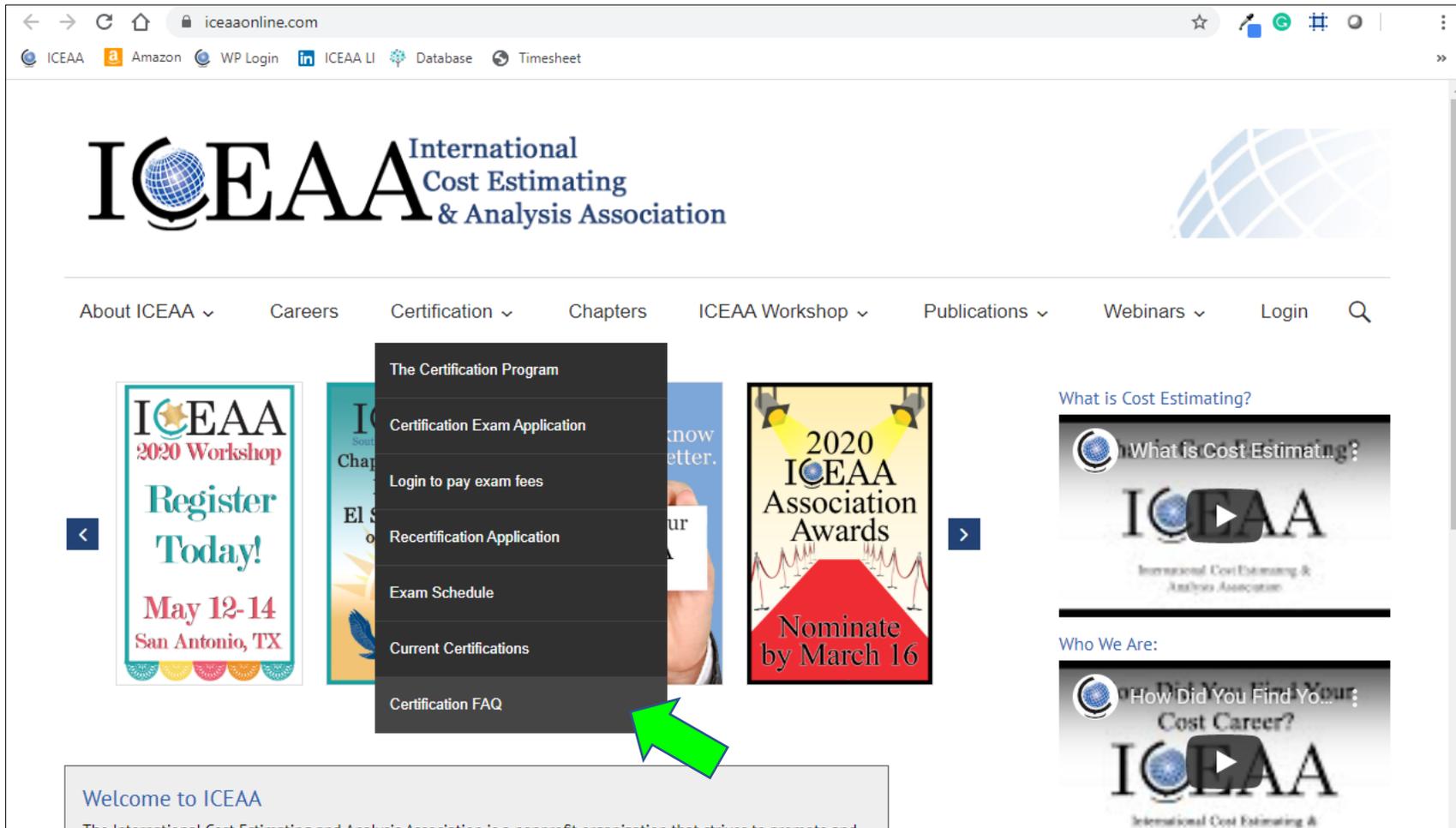
Join ICEAA (/year)	\$ 95
Complete the CCEA® Application*	\$ 300
Purchase & study CEBoK®	\$ 235
<hr/>	
Total Investment:	\$ 630

Join ICEAA (/year)	\$ 95
Complete the PCEA® application*	\$ 150
Purchase & study CEBoK®	\$ 235
<hr/>	
Total Investment:	\$ 480

**For applicants taking their exam online. Offline paper exams fees are subject to a 20% surcharge to cover shipping, printing, and other coordination.*

More certification questions?

www.iceaaonline.com/certificationfaq



The screenshot shows the ICEAA website with the 'Certification' dropdown menu open. The menu items are:

- The Certification Program
- Certification Exam Application
- Login to pay exam fees
- Recertification Application
- Exam Schedule
- Current Certifications
- Certification FAQ

A green arrow points to the 'Certification FAQ' option. The website header includes the ICEAA logo and navigation links: About ICEAA, Careers, Certification, Chapters, ICEAA Workshop, Publications, Webinars, and Login. The main content area features promotional banners for the 2020 Workshop, 2020 Association Awards, and video content.

ICEAA Workshop Archives

Read abstracts and download presentations from past events:

ICEAA International Cost Estimating & Analysis Association

About ICEAA ▾ Careers Certification ▾ ICEAA Workshop ▾ Publications ▾ Papers Library Webinars ▾ Login

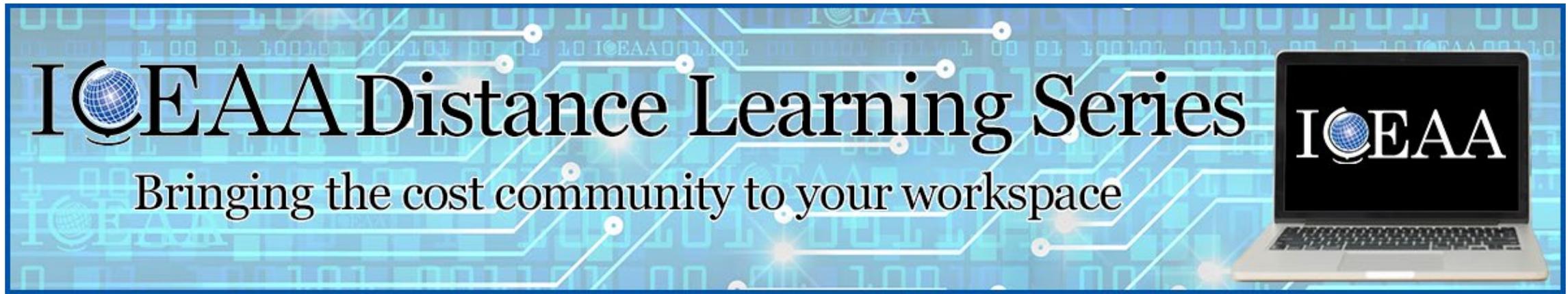
ICEAA Archives

Search past ICEAA Workshop Proceedings in the table below and click the title to access the downloadable files

2007-2019 Workshop Proceedings are available online. For 2006 and earlier, please [email us](#).

Show entries Search:

Title	Author(s)	Summary	Year	Track
Establishing Standards as the Basis for Effective Measurement and Affordability	Pete Pizzutillo	Measurement of application development output has long been a controversial topic. Yet as contracting relationships within industry and public sector become more strategic, buyers and sellers of	2018	Software Estimating



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Webinars are recorded and featured on our YouTube page for later viewing

Each webinar counts as 1 hour of training towards CCEA[®] certification renewal



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A reduced membership rate
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When signing up for ICEAA membership, Active Military may choose the Student Membership rate. Rather than the usual transcript required to qualify for this rate, send us a PDF of an email from your commanding officer, supervisor, or manager verifying your current military status.

Upon approval of your completed PCEA or CCEA exam application, you will receive a discount code to be used towards your exam fees.

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PURCHASE A
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INTRODUCTION TO MACHINE LEARNING FOR COST ESTIMATORS

DR. CHRISTIAN B. SMART

KIMBERLY ROYE

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ICEAA MEMBERS: \$25



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Software Cost Estimating Body of Knowledge: past, present, and future

Dr. Christian B. Smart



Introduction

- ICEAA has maintained a Cost Estimating Body of Knowledge (CEBoK) for a long time, which serves as the foundation for its certification
- While there is a CEBoK module on software cost estimating, ICEAA recognizes that
 - Software is an ever-increasing portion of total systems cost
 - There are unique aspects of software cost estimating that merit special attention to this subject
- Recognizing these facts, ICEAA decided to develop a Software Cost Estimating Body of Knowledge (SCEBoK) and plans to finish the initial version in early 2021
- This briefing provides an overview of SCEBoK



2016-2018

2015: Established the Software Cost Estimation Training and Certification Steering Committee with ICEAA, Nesma, and IFPUG

2016: Started the **Software Certification Curriculum Working Group in 2016 to identify important topics, structure a table of contents for a software cost estimating curriculum**

2017: First appearance of the content that would become the Software Cost Estimating Body of Knowledge. Seven software estimation training sessions featured at the ICEAA Professional Development & Training Workshop In Portland, Oregon, USA

2018: 14 Software CEBoK Training offerings at the 2018 ICEAA Workshop



2019

ICEAA and Nesma sign a MOU committing to continue the project

16 Software CEBoK training offerings at the 2019 ICEAA Workshop

The same training is offered October 2019 at the IWSM-Mensura Conference in Haarlem, Netherlands

ICEAA begins negotiating contracts to accelerate the effort using paid v. volunteer contributions

ICEAA has partnered with the U.S. Defense Acquisition University (DAU) to use their existing course materials, known as BCF-250: Software Cost Estimating, as one of the foundations for SCEBoK.



2020

ICEAA partners with the U.S. Defense Acquisition University (DAU) to use their existing software cost estimating course materials as one of the foundations for SCEBoK (along with previously-presented software training slides and other sources)

Establishes the ICEAA SCEBoK Review Group (ISRG) to collaborate and best develop an industry and globally accepted product

Contracts a project manager to integrate the source material with ISRG feedback to create a written, readable SCEBoK body of knowledge and a series of PowerPoint slides to use when training SCEBoK content



Expected Rollout: Early 2021

- **First edition will be in PowerPoint format**
- **Available for learning and instructing**
- **ICEAA is preparing a standalone specialty certification for Software Cost Estimating, due later in 2021**
- **Eventual goal to offer an online narrative-format body of knowledge**

SCEBoK Target Audiences

- **Commercial organizations**
- **Original Equipment Manufacturers (OEMs)**
- **Government organizations**
- **Consulting firms**
- **Quasi-government organizations (e.g., Federally Funded Research & Development Centers)**
- **Academic institutions**

SCEBoK Goals

SCEBoK will be developed to:

- **Ensure content is not biased towards or focused on the the US Government or US Department of Defense**
- **Provide users with an understanding of software estimating that will compliment and enhance cost estimates and analyses**
- **Factually and objectively present all software sizing methods to allow users to draw their own conclusions about the merits of any given method**
- **Provide guidance to the essential considerations in software cost estimating**



SCEBoK and CEBoK®

SCEBoK will be a specialty version of ICEAA's Cost Estimating Body of Knowledge (CEBoK®)

- **Fundamental cost estimating lessons will not be repeated in SCEBoK**
- **SCEBoK will only be available as an add-on purchase to CEBoK**
 - **References and links will cross between core CEBoK lessons and SCEBoK modules**



Lessons 1-6 (subject to change)

Lesson 1: Software Cost Estimating Overview

Why software cost and schedule estimating is important

Lesson 2: Software Development Paradigms

Explore each software development paradigm with descriptions and considerations

Lessons 1-6 (subject to change)

Lesson 3: Preparing the software estimate

Step 1: Definition & Planning (includes Scope)

Step 2: Data Collection, Normalization, and Analysis

Step 3: Estimate Formulation

Step 4: Risk & Uncertainty Analysis

Step 5: Documentation & Presentation

Lessons 1-6 (subject to change)

Lesson 4: Tools and Techniques to Streamline the Software Estimate

- Developing a CER
- Software Schedule Estimating
- OTS tools for developing software estimates

Lesson 5: Software Maintenance

- Definition of software maintenance and why it is important
- Primary software maintenance cost drivers
- Methods of estimating software maintenance
- Software obsolescence

Lessons 1-6 (subject to change)

Lesson 6: COTS & ERP Software Costing Considerations

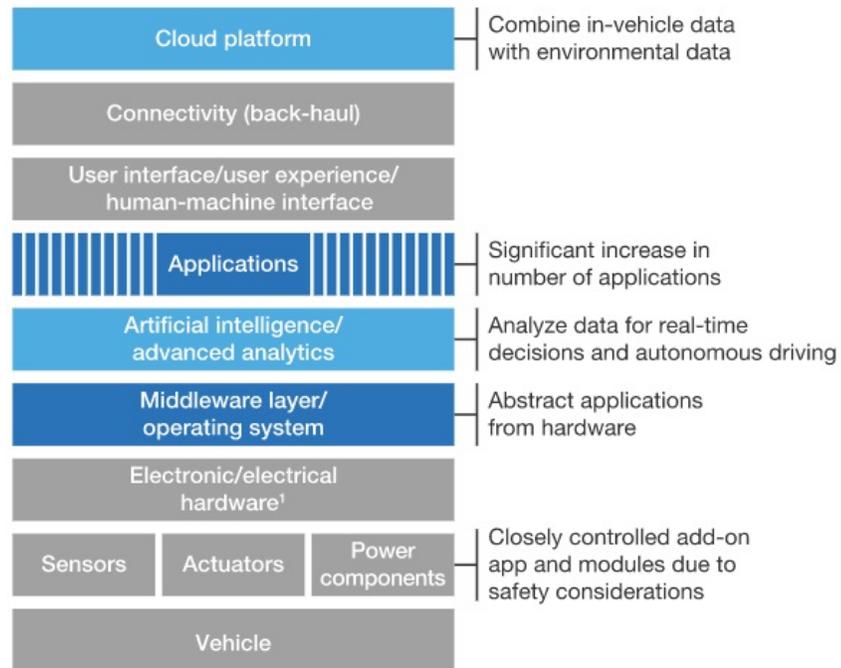
- Description of COTS software and its importance
- Primary COTS cost drivers
- Best practices in COTS projects
- Description of ERP and its importance
- Primary ERP system cost drivers and estimating techniques

Why is Software Cost Estimating Important?

Software is increasingly embedded (in everything)

Future layered in-vehicle and back-end architecture

■ Existing layer ■ Modified layer ■ New layer



¹Including operating system in status quo.

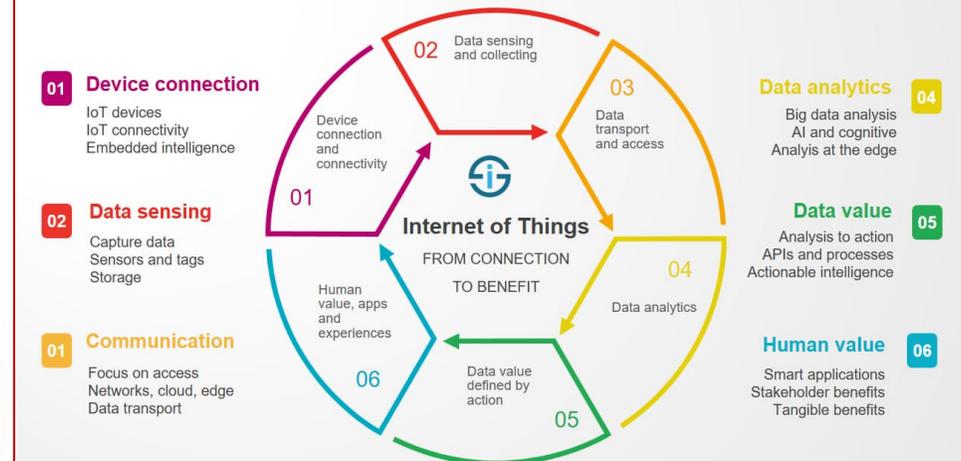
McKinsey&Company

Future factors for brand differentiation:

- Infotainment features requiring “plug and play” capabilities
- Autonomous capabilities including sensor-fusion algorithms as a complement to hardware
- Safety features based on “fail-operational” behavior
- Software will move further down the stack to hardware (smart sensors)
- Stacks become horizontally integrated
- New layers will be added to the stack

The Internet of Things

From connecting devices to human value



Why Cost and Schedule Growth Occur

Numerous Reasons, Both Internal and External

“The Non-Secret of Good Cost [and Schedule] Estimating: Don't Drink the Kool-Aid” -
Lawrence Goeller, OSD Cost Analysis Improvement Group

Source: Christian B. Smart, Solving for Risk Management: Understanding the Critical Role of Uncertainty in Project Management

1

OPTIMISM

Innate bias - Planning Fallacy
Project managers are risk-seeking

2

COST, SCHEDULE, TECHNICAL MISALIGNMENT

Like a three-legged stool, all need to be consistent in order for a project to balance

3

MOORE'S LAW

Exponential growth in technology Paired with projects that take a decade or longer to complete means that either there is a continual requirements update process, or the product is obsolete on delivery

4

BLACK SWANS

Unpredictable, rare, unprecedented events that have a huge impact

5

LAKE WOBEGON

Project managers and staff are not like the children of Garrison Keillor's fictional town – they are not all above average

Types of software estimates (1 of 5)

Software-intensive program¹

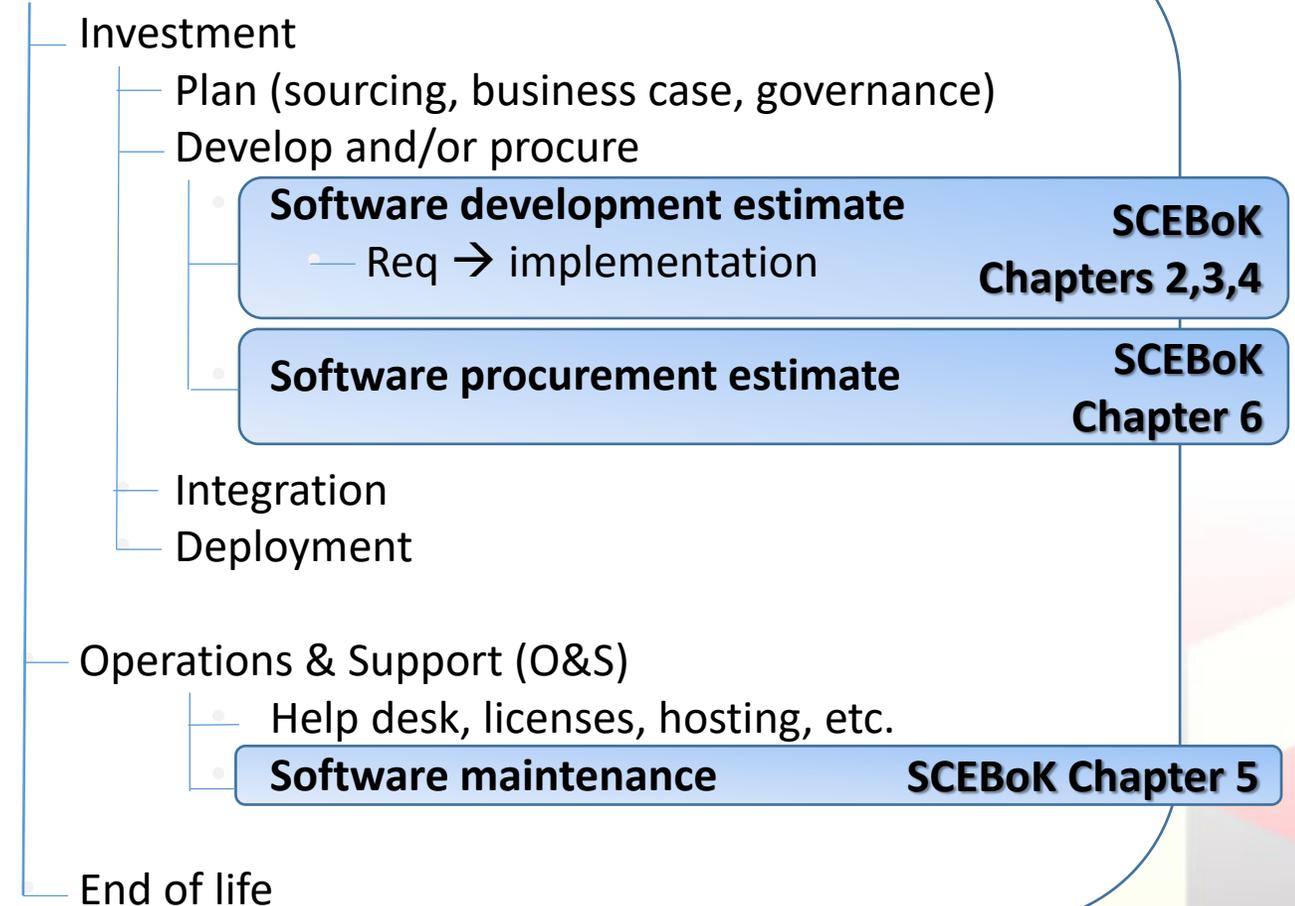
Investment:

- Program/project management
- Systems engineering
- BPR/ Change management
- System Development
- System Procurement
 - Hardware
 - Software
- System level integration & test
- System deployment/implementation

Operations & support (O&S)²

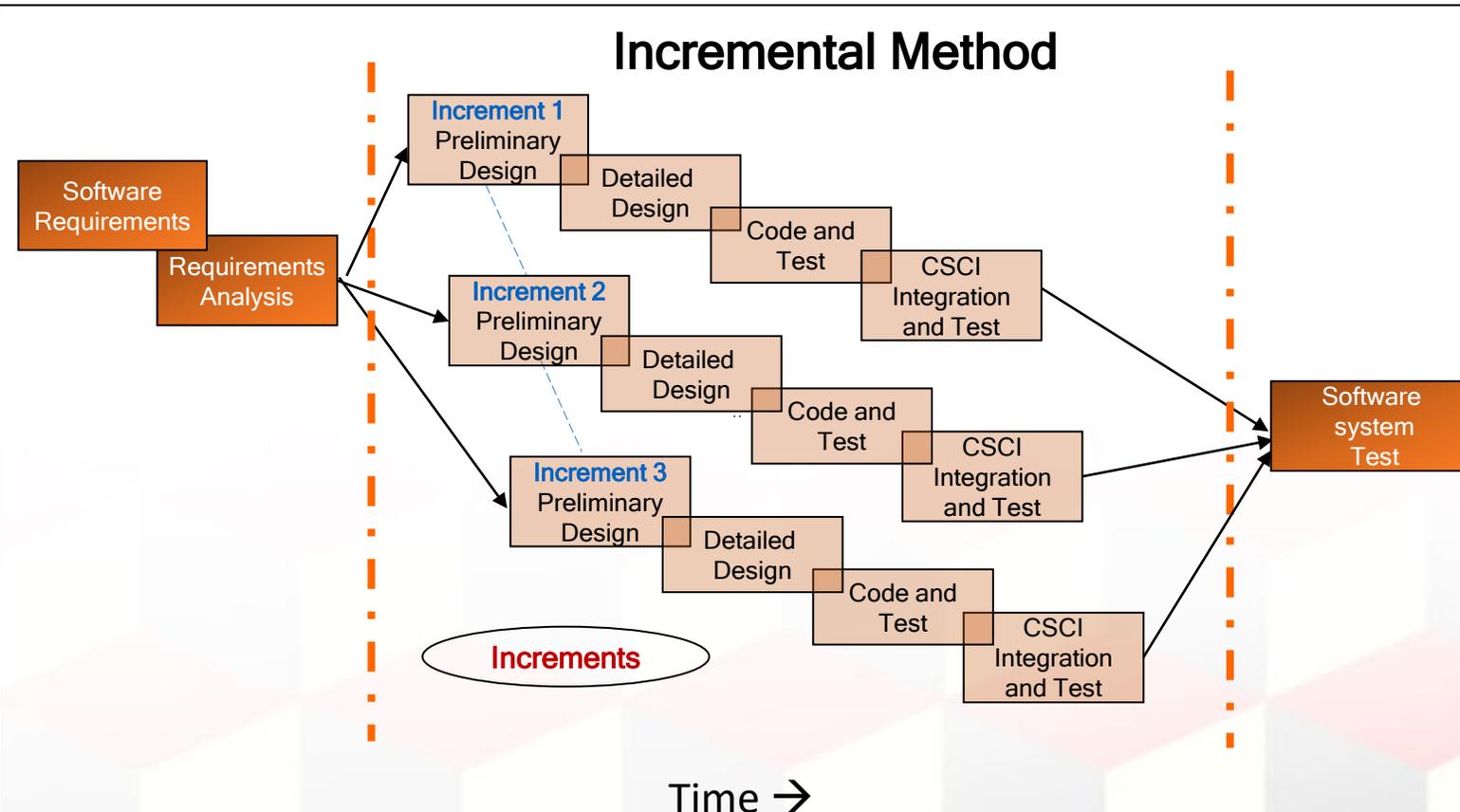
- Help desk/service desk support
- Technology refresh/upgrade
- System maintenance

Software life cycle (example)



1. Standard IT LCC WBS V5 from US Department of Homeland Security
2. O&S contains continuation of many investment categories + those new ones listed here... See definitions in notes

2. Elements of both Predictive and Adaptive/Agile: Incremental (1 of 2)^{1,2,3}



- Complete requirements are defined upfront and allocated to increments for development
- Design, implementation, verification (and often, delivery) are allocated to a series of increments (“software builds”), each of which is a waterfall and delivers a portion of software
- If increments are sequential, then completion of each is a “gate” through which the project must pass before proceeding to the next increment; successive waterfalls

1. Adapted from the DAU Glossary definition for the Incremental Approach (referenced by DoD Instruction (DoDI) 5000.2) and

2. An example for the Incremental Development Paradigm is available [here](#).

3. As noted on the previous slide, we categorize the Incremental paradigm as “Adaptive/Agile” in this lesson because of the opportunity for each increment to influence the requirements, quality, etc. of the subsequent increments. In cases where the increments are concurrent or rigidly defined, it may be more appropriate to categorize it as a Predictive paradigm