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Customer Success Is Our Mission

2012 ITEA Annual Symposium

"Testing at the Speed of Need"

Succession Planning as a Critical Component of Technical Education

17-20 September, 2012

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Workforce Development: What's the Answer for this Growing Problem?

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The bow wave of retiring T&E experience will ultimately arrive with limited capability for backfill. We can attack this issue on two fronts:

1) Push education in Science, Technology, Engineering, and Math (STEM) related fields as early in students' academic careers as possible as a key way to enter the interesting field of T&E.

2) Design a technical education plan for the current workforce in industry and government that stresses the subjects needed to complete scientifically-based T&E.

These two entirely different thrusts have the same ultimate focus: a T&E workforce that can meet the T&E challenges of today and tomorrow.

Engineer Workforce Statistics

- Latest data from National Science Foundation (NSF) from 2006
  - Senior engineers (> 40 yrs) is ~61% of the engineering workforce
  - Junior engineers (<30 yrs) is ~13 % of the engineering workforce
-

Age	All Engineers	Total	Full Time	Part Time
		Employed		
Engineering	2,899,000	2,437,000	2,269,000	168,000
< 30	351,000	324,000	299,000	25,000
30-39	664,000	630,000	604,000	26,000
40-49	817,000	770,000	735,000	35,000
50-59	526,000	478,000	454,000	24,000
60+	540,000	235,000	176,000	59,000

Proudfoot, Steven; Project Officer, Human Resources Statistics Program, National Science Foundation, National Center for Science and Engineering Statistics, "**Characteristics of Scientists and Engineers in the United States: 2006"**

Loss of Senior Engineering Talent Will Impact T&E Knowledge Base

We (S&E Community) Are Getting Older (And Wiser!)

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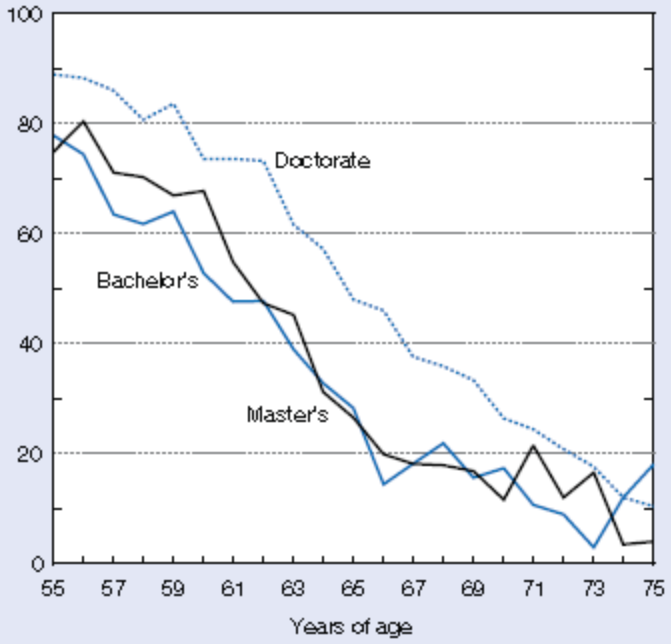
- Labor force exit / work reduction among the older members of the Scientists & Engineers (S&E) workforce suggest that by age 55 participation rates decline and are markedly reduced by age mid-60s.
- Labor force participation rates among older S&E degree holders by highest level of education decline quickly with age.

  By age 61,~50% of S&E BS : not working FT

  By age 62,~50% of S&E MS : not working FT

  By age 64,~50% of S&E Doctorate : not working FT
- Other indicators, including full-time employment rates and retirement rates, show similar patterns.

Figure 3-44
Older individuals with highest degree in S&E who work full time, by age and degree level: 2008



SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Scientists and Engineers Statistical Data System (SESTAT) (2008), http://sestat.nsf.gov.

Science and Engineering Indicators 2012

".an aging S&E workforce that is drawing nearer to retirement ,."

(Science and Engineering Indicators 2012,* Chapter 3. Science and Engineering Labor Force *pg 3-62)

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The Problem: Reactive Not Proactive

- Problem:
  - Design a technical education plan for the current workforce (industry and government) that stresses the subjects needed to complete scientifically-based T&E.

- Obstacles:
  - Time: No time to do it right, but we make time to do it again.
  - Money: We always find the $$ to do what we believe is important.
  - Resources: People? Where do we spend our time /$$
  - Behavioral Attitudes
  - Organizational Structures
  - Lack of Vision and Leadership

Need to be Intentional and Passionate in Understanding the Processes and Making Them Work Better.

The Current State (My Perspective):

- Team Leads/Section Heads/Middle Managers,… Increasing Responsibilities…
  - Program: Cost/Schedule/Performance, EVMS, ...
  - Functional: Technical Training (OTJ), Performance Development, …
- Corporate Programs
  - Learning Systems, Mentoring Programs, SME Pools, …
  - Required Learning Programs Spend Increasing Amount of Indirect
- Databases
  - Lesson Learned
  - Design Guides (How?)
- Online Resources
  - Technology Advance Put Employee in Control

Limited Time, No Interaction

Lofty Objectives/ Corporate Focused

No Accountability / Feedback

Mask Real Utility / Cost

Current State is Requirements Based…Not Relational Based

Notional Current State Technical Training Planning Flowchart

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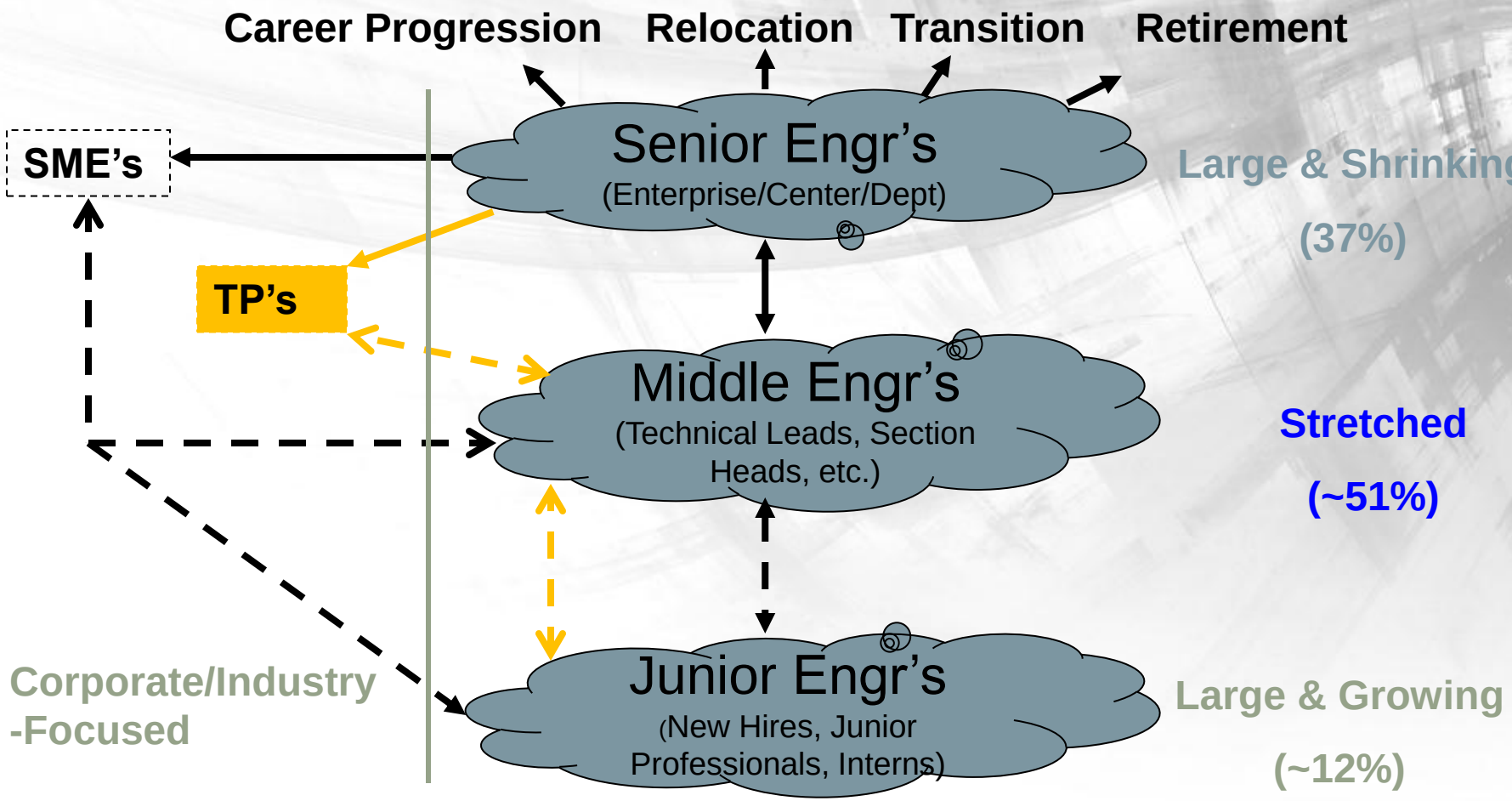

Current Technical Education Plan is Disconnected

SME: Subject Matter Expert
TP: Technical Program

Commercial Model of Success: Apple®

- Apple® Products Have Revolutionized Our World. Why?
  - Visionary Leadership / Management
  - Technological Innovation / Excellence
  - Exceptional Customer Service / Apple Store
  - Greatest Achievement: They have masterfully aligned technology with the customer demands for an effective and flexible content while seamlessly providing for device interconnectivity.

→ **Branding**

Effective:
- Download content of your choice.

Flexible:
- Arrange content according to your preferences

Interconnected:
- Connected to other technologies.

Technical Training Plan: Effective? Flexible? Interconnected?

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- Are our Technical Education Plans effective?
  - Stop and Assess the current state.
  - Learning is continuous... ∞
  - Adopt a learning attitude and posture…a learning culture.
- Are our Technical Education Plans flexible?
  - One-Size-Fits-All approach not always best. Single-minded approach can stifle creativity and innovation and limit the impact.
  - Institutionalized learning may need to be retooled
  - Be flexible in our methodology. Greater influence and reach.
- Are our Technical Education Plans interconnected?
  - Collaborators vs. Competitors (foster knowledge sharing not hoarding)
  - Interconnected vs. Isolated (foster productivity and efficiency)
  - Intentional vs. Inadvertent (foster purposeful planning)

Current Technical Education Plan is Ineffective, Inflexible, Disconnected

The Proposed State: Culture of Learning

- Solution:
  - Develop a Succession Planning Culture … Need a Champion…Someone willing to Work with the Younger Generation.
  - Need a Knowledge Engineer

- Keys:
  - Be Intentional
    - Understand the current state of "Technical Education Plan" and the "current workforce" demographics
    - Balance the existing competencies/skills with company goals/objectives, industry direction/opportunities
  - Be Innovative…Be Disruptive
    - Institutionalized learning stagnates growth
    - Facilitate Interactions/Communication

Develop a Succession Planning Culture Through Intentionality and Innovation

Notional Proposed State Technical Training Planning Flowchart

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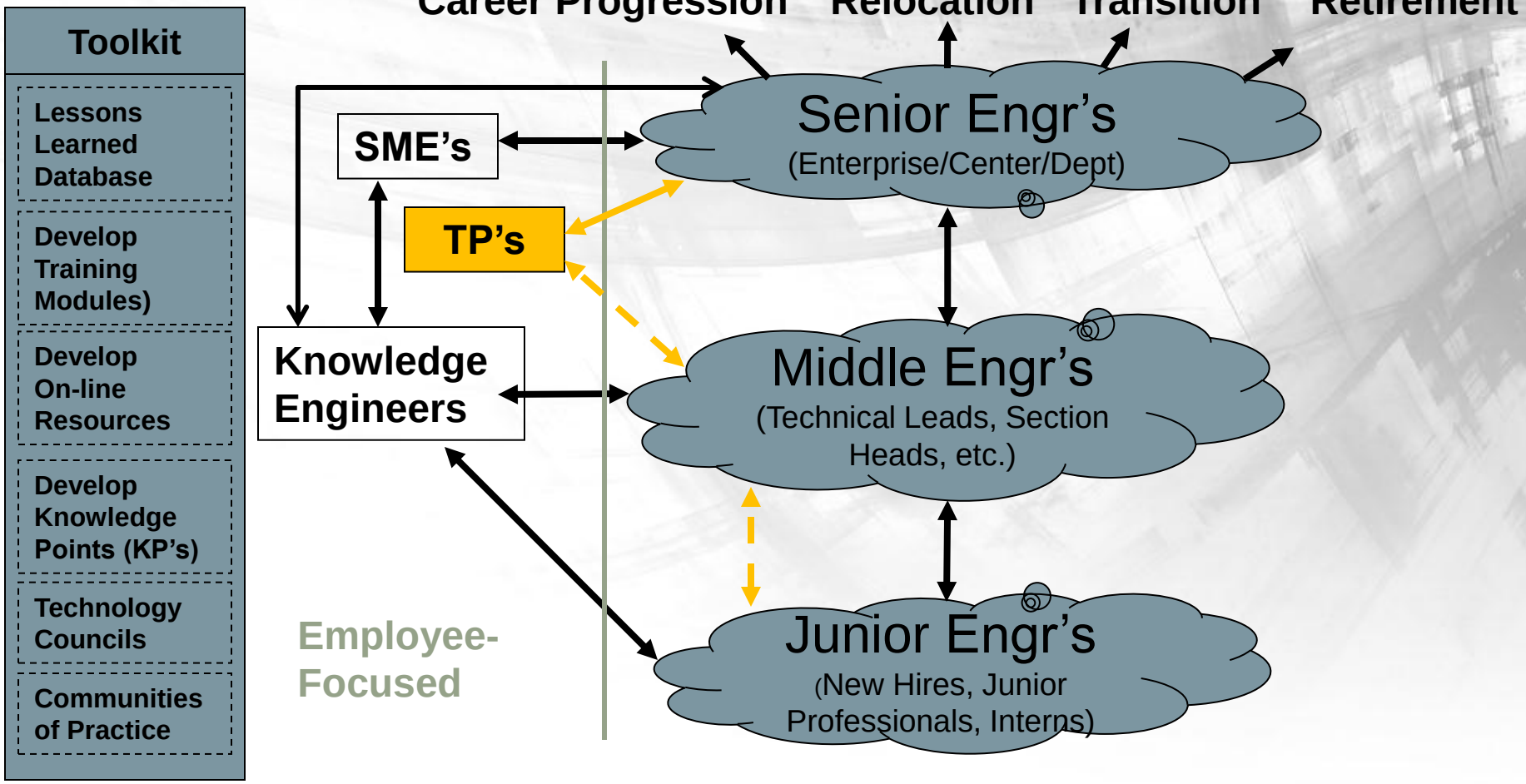
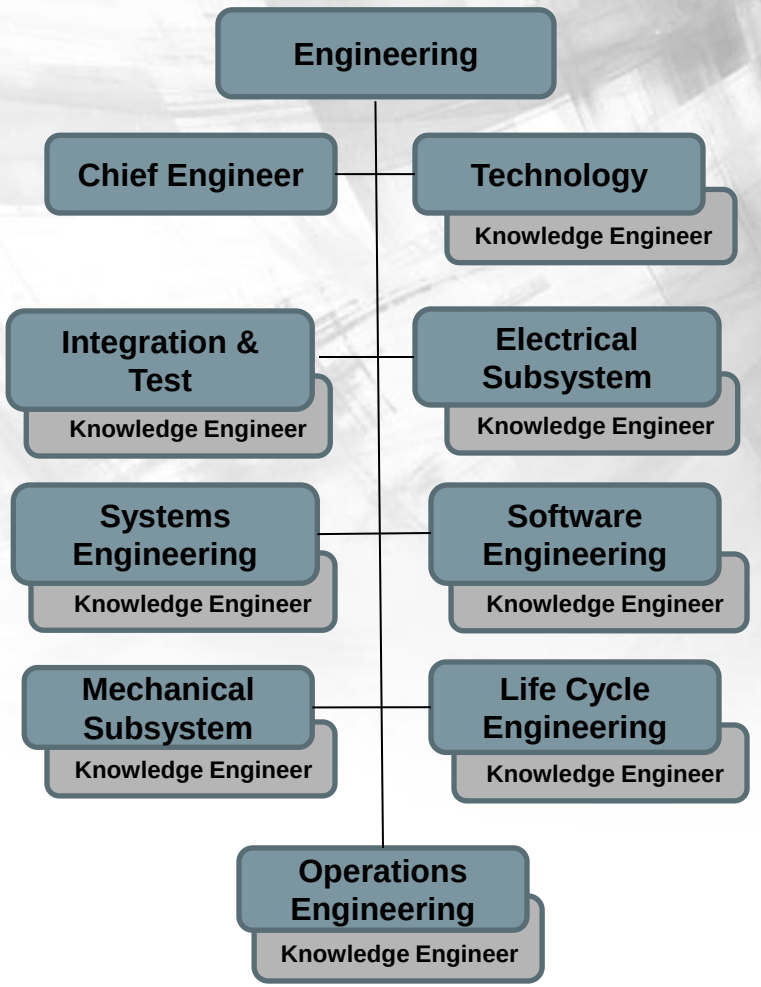


Knowledge Engineers Enable Intentional Direct Knowledge Sharing.

SME: Subject Matter Expert
TP: Technical Program

Notional Knowledge Engineer Organization

- Create a Knowledge Engineer(s) in each Engr. Directorate/Center
- Number Will Vary
  - Enterprise Goals
  - Population Mix
  - Organization Size
  - Competencies



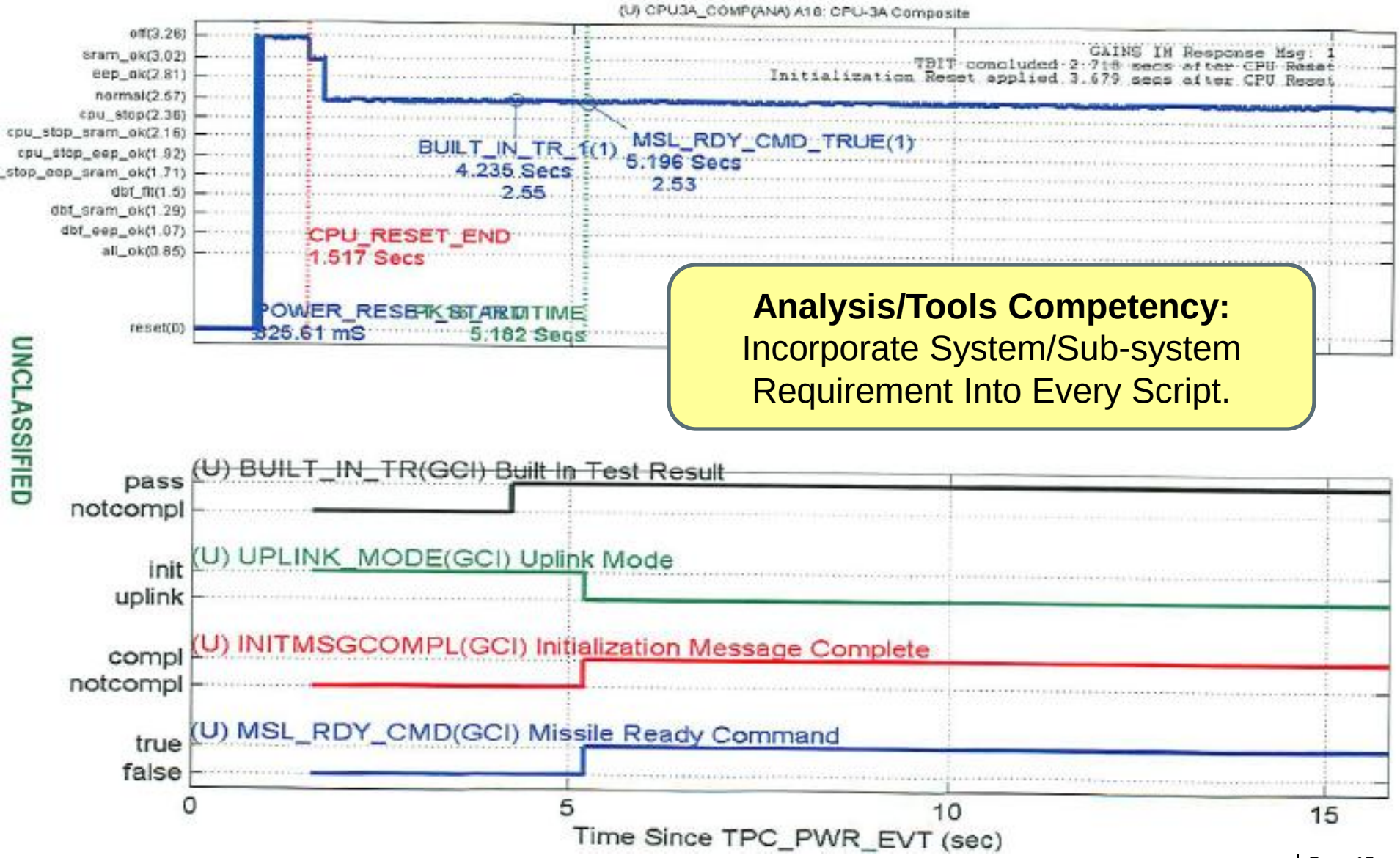
The Proposed State: The Knowledge Engineer

- Roles & Responsibilities:
  - Set the Vision, Mission, Charter
  - Liason between Engineering and Programs/Functional
  - Learning/Training Champion
  - Develop/Present Knowledge Points
  - Develop/Present Training Modules
  - Maintain/Instruct Lessons Learned Database
  - Maintain/Instruct FRACAS database
  - Support Communities of Practice
  - Work with SME's
  - Work with Middle/Junior Engr (OJT)
- Expectations:
  - Provide Voice Across Organization
  - Recognized technical expert (SME)
  - Committed to successful knowledge transfer
  - Passionate about teaching/coaching
  - Right personal skill set
  - Committed to the technical development of Middle/Junior Engrs
  - Available and Accessible

Examples Provided

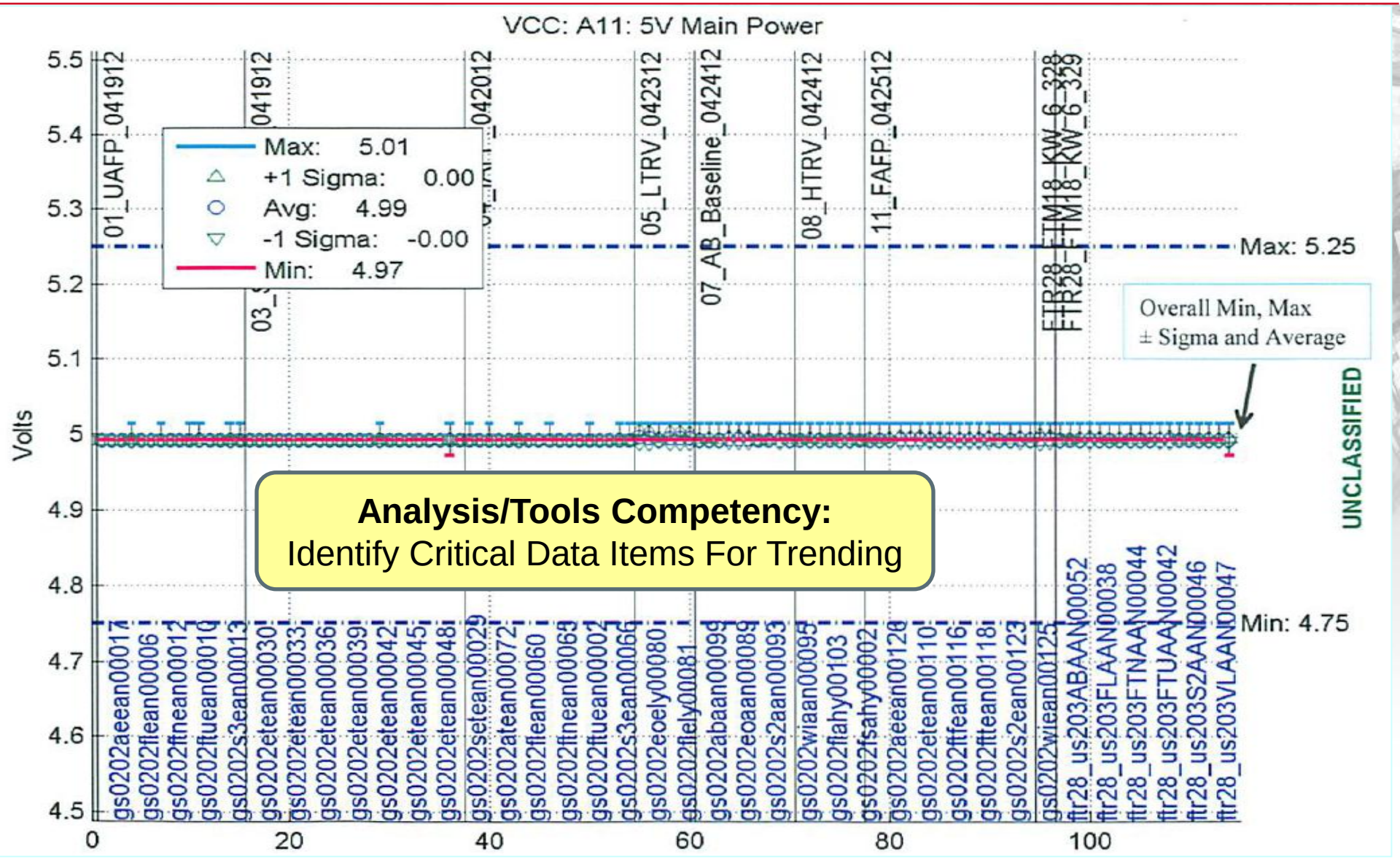
Develop a Culture of Succession Planning.
Intentional Knowledge Sharing.

KP Example: Requirements Based Scripting



Analysis/Tools Competency:
Incorporate System/Sub-system Requirement Into Every Script.

KP Example: Data Trend Tool



KP Example: File Naming Convention

The following is to be used when creating SCSI file names for WIT testing and missile launches.
Create file name from left to right (13 characters) with .tel appended.

IOM / FTR	Missile Code	Mission Code	Test Code	WIT/Flight Test	WIT/Flt Test Code	Run #	TM Source	TM Site	Media Type
FTR-7	f7	fm6	l	Baseline	bl	00 > 99	l	s	h
FTR-11	f11	ftm10	s	Command Destruct	cd		r	t	x
FTR-13	f13	ftm11	w	Non Launch Select	nl		b	m	s
FTR-15	f15	ftm12		Flight	fl		v	b	f
FTR-16	f16	ftm13	l = live missile	TLM Quality	tq		l = LOS		
FTR-17	f17	ftm13	s = sim	FTS Checks	ft		r = RSS (Barge)	s = Ship	h = heim
FTR-18	f18	jftm1	w = wit	Other	ot		b = Best Source Select (BSS)	t = Tucson	x = direct to SCSI
FTR-20	f20	jftm2					v = VSAT	m = Makaha	s = serial metrum
								b = Barge	f = direct to FIBER
If FTR, then fx, where x = FTR				Apply 2 alpha character to depict the test type.					
IDR-3	d3	fm8 (ftm04-2)							
IDR-5	d5	fm7 (ftm04-1)							
If IDR, the dx, where x = IDR									
JCTV-1	j1	jctv1							

Data File Name = {Missile Code/Test Code/WIT&Flt Test Code/Run No./TM Source/TM Site/Media Type}

For FTR-20, JFTM-2 mission, Simulation, Baseline run, Run #01, line-of-site TM reception, Makaha Ridge, not from heim, SCSI collection: f20sbl01lmx.tel

For FTR-20, JFTM-2 mission, Live Missile, Flight Test, Run #09,RSS (C-Band) TM reception, Makaha, Heim recording (Flight Mission): f20lfl09rmh.tel

Standard Test File Naming Enables Quick File Identification Increasing Productivity and Turnaround

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Questions?