



# A Lifetime of Test and Evaluation

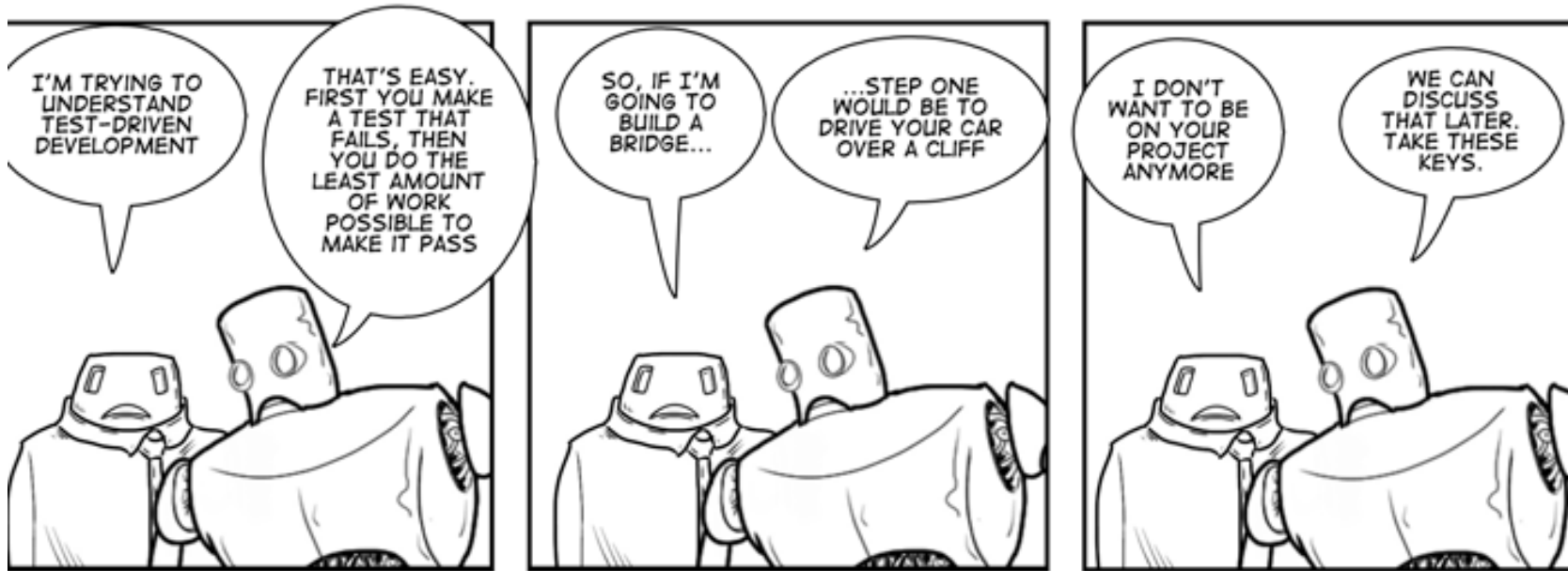
## *Choosing T&E as a Career*

Presented to the  
17<sup>th</sup> ITEA Test Instrumentation Workshop  
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***Technology Driven. Customer Focused.***

# T&E as a Career



# T&E as a Career



# Future Vision

How do we influence these folks:



To become these folks:



# When did you choose to become a T&E Professional?

- We all knew that the things we bought or used were tested, but few of us thought about a career in T&E!
- In general, we stumbled into the T&E career field!
- Name another discipline where you get to:
  - Find out why/how something works and operate it at the edge of the design spectrum
  - Touch every element of the system
  - Use technology even before Beta testers
- So how do we make T&E a career Choice?

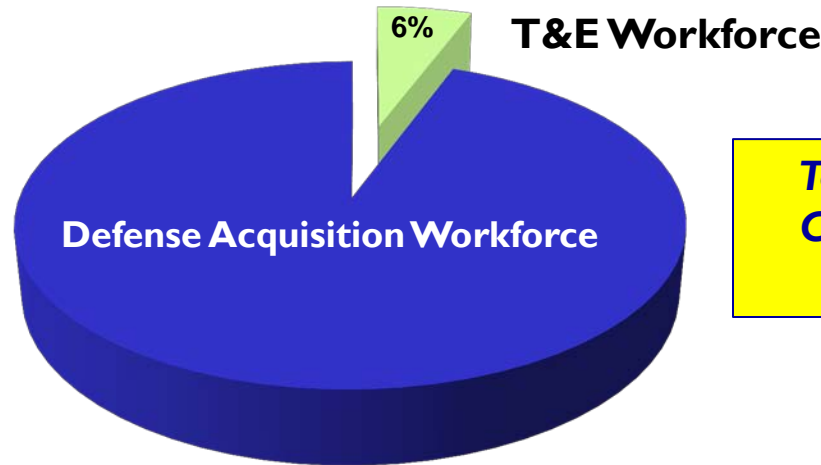
**Through S.T.E.M.**



# The DoD Test & Evaluation Workforce Picture



**6% of our workforce - to ensure \$167B of complex systems do their job**



**Average age of DoD T&E Civilian: 44.2 years old**

**Total DoD Budget for T&E Capabilities Development: \$675M**

The DoD's FY2014 acquisition budget: \$167B, of which

- \$99B is for Procurement
- \$68B is for Research, Development, Test and Evaluation

Source: FY14 President's Budget Request

**We Need More T&E STEM Professionals in our Workforce**

Thanks to Dr. David Brown and Mr. Derrick Hinton for these slides.



# T&E Acquisition Workforce Demographics



Race	T&E TOTAL		Entire DAW	
WHITE	6,921	80.7%	114,662	75.8%
BLACK	374	4.4%	17,497	11.6%
ASIAN	558	6.5%	9,642	6.4%
MULTI	116	1.4%	2,477	1.6%
AMI/AN	47	0.5%	859	0.6%
PI	25	0.3%	616	0.4%
Unspecified	539	6.3%	5,602	3.7%
<b>TOTAL</b>	<b>8,580</b>		<b>151,355</b>	

Gender	T&E TOTAL		Entire DAW	
Males	7,364	85.8%	106,895	70.6%
Females	1,207	14.1%	44,227	29.2%
Unspecified	9	0.1%	233	0.2%
<b>TOTAL</b>	<b>8,580</b>		<b>151,355</b>	

Numbers may not add to 100% due to rounding

Project Source: OUSD (AT&L) HCI

Data Source: AT&L Data Mart (as of 09-30-2013)

Based on increasing complexity of systems as well as a need to develop more rigorous, scientific and statistically based T&E design methodologies, the T&E acquisition workforce require a STEM degree.

Specifically, a baccalaureate or graduate degree in a technical or scientific field such as:

- Engineering
- Physics
- Chemistry
- Biology
- Mathematics
- Operations Research
- Engineering Management
- Computer Science

Effective October 1, 2012



# Benefit of Hands-On Learning for STEM Studies



- **Engages new parts of the learning mind**
- **Incorporates noise, activity and discussion**
- **Students collaborate and consult one another to solve problems**
- **Students learn team work and leadership skills – vital for their future and not often nurtured in traditional settings**
- **There is conversation, observation, comparison and note taking occurring.**
- **Questions are being asked continuously, showing the value of teamwork and idea sharing**
- **Educators facilitate instructions and using well-formed questions to guide the learning that is occurring in a “live” environment**
- **Students use all their senses, stimulating learning by all aspects of their brain and retain knowledge longer**

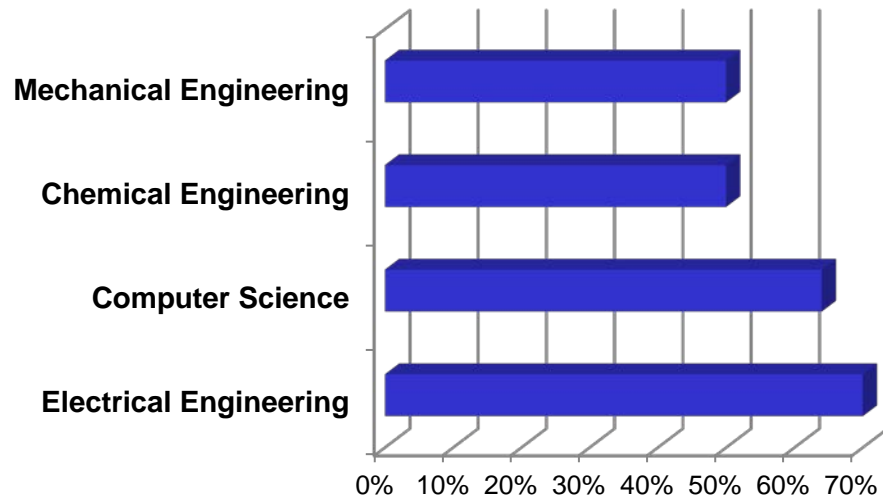




# The Brain Drain



## Foreign students enrollment in U.S. graduate programs



Source: National Foundation for American Policy ; 2010

- The U.S. has 36 graduate programs in Electrical Engineering where the proportion of international students exceeds 80%
- There are seven where it exceeds 90%
- There are seven Computer Science graduate programs that exceed 90%

## The U.S. – Not as much a Destination as it is a Pit Stop

- We lose most of this talent under the best of conditions
- Recent surveys have found that as few as 10% of Indian and Chinese students wish to stay in U.S. after graduation
- It is a national imperative to recruit more American students into grad school

# It's not all bleak....

- There are several shining lights
  - Auburn University has established a MEMS graduate and undergraduate research center in an on-campus SCIF!
  - The University of Alabama in Huntsville just announced a new Scholarship for Service grant that provides \$20K annual stipend for US Citizens seeking a degree related to cyber – must be able to hold a clearance and sign an agreement to work for the Government for 2 years after graduation
  - TRMC just initiated its 2014 summer internship. Approximately 20 college students will spend 10 weeks working at Eglin AFB, WSMR, Pt. Mugu, Pax River, and the National Cyber Range.

# So the Challenge

- Through Government, Corporate, and ITEA initiatives, we need to expose students in College, High School, and even elementary levels to careers in STEM
- Events, such as FIRST Robotics challenges, introduce the concept of test and evaluation to the participants
- Internships and Work-Study programs provide real, practical skills
- Sponsoring research in partnership with academia allows ready transition into the workforce at graduation
  
- But that is not the end....Once we get them into the workforce, we are not done!

# Continuing Education

- Maintaining a leading-edge workforce requires training
  - Classroom training to teach the principles
  - Hands-on training and On-the-job Training to reinforce best practices
  - Certifications to distinguish the trained workforce

Education is a Life-Long endeavor!

# My Challenge to You

- Through your job, professional organizations, social organizations, and other groups, work to establish STEM activities
  - As simple as “bring your child to work day”
  - Expose young minds to the concept of Test and Evaluation
    - Every “iWidget” they have went through some type of T&E
- Talk with students about what you do, be a mentor
- Always encourage them to “seek their passion”
  - We want the best!

# Questions?



Someone Always Has To Test and Evaluate the System