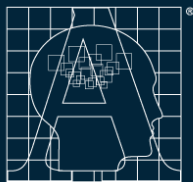


APTIMA[®]
HUMAN-CENTERED
ENGINEERING

KEEL: Knowledge & Experiences of Expert Labor

Rebecca Grier

May 10, 2006



Focus:

Human Centered Engineering

- Design of Organizations
- User-Centered Technology
- Training Systems
- Performance Assessment

Enhance relationship between humans and work environments

Market Leader

- Fastest growing Human Engineering firm in the US (50% CAGR)



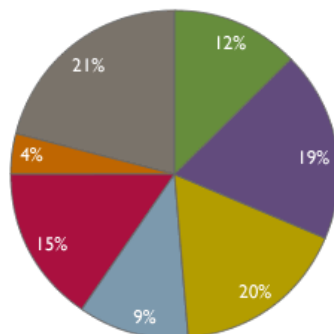
Raytheon



Interdisciplinary Small Business

Staff > 90 with 80% Graduate Degree

- Software
- Human-System Engineering
- Cognitive Science
- Modeling & Simulation
- Industrial-Organizational Psychology
- User Interface Design
- Business Administration



Over 120 Partners & Consultants

University Partners

- Arizona State University
- Carnegie Mellon University
- George Mason University
- Georgia Institute of Technology
- Harvard University
- Massachusetts Institute of Technology
- Michigan State University
- New Mexico State University
- University of Central Florida
- University of Connecticut
- University of Georgia
- University of Iowa
- And Many More...

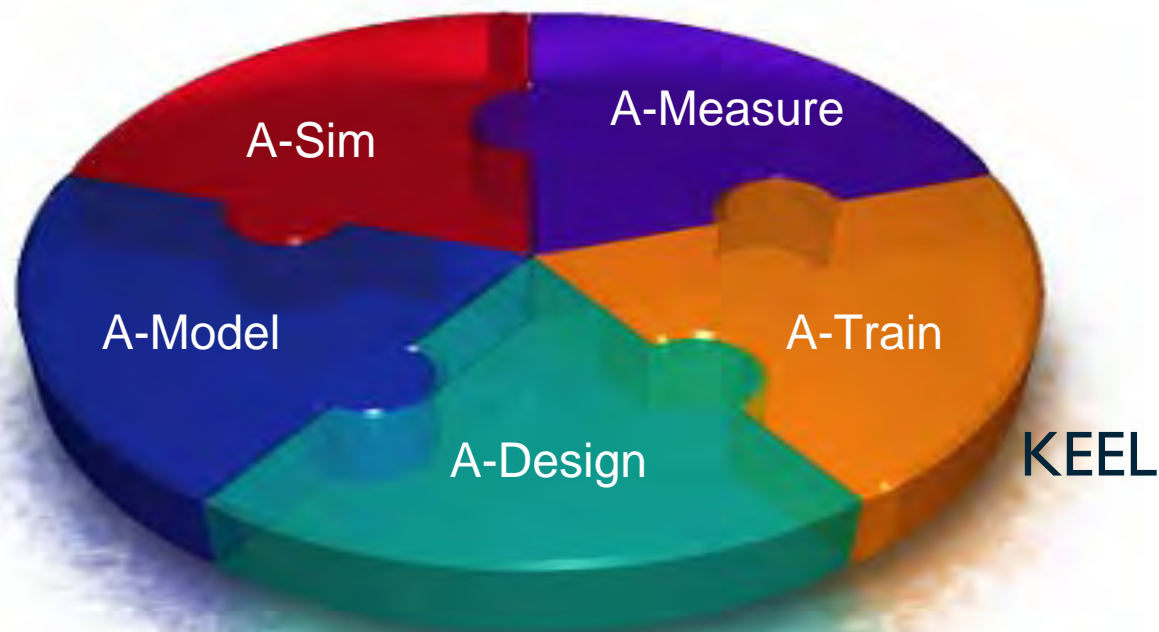
Industry Partners

- American Institutes for Research
- Antech
- Anteon
- BAE Systems Advanced Information Technologies
- Ball Aerospace & Technologies
- BBN Technologies
- BCI
- Beth Israel
- Blue Force
- Boeing
- Boston Children's Museum
- And Many More...



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Aptima's Five Product Families





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Operational Relevance and Impact



DEPARTMENT OF THE NAVY
NAVAL SPECIAL WARFARE CENTER
2440 TRIDENT WAY
SAN DIEGO, CALIFORNIA 92155-5484

1650
Ser 00/350
23 Nov 05

From: Commanding Officer, Naval Special Warfare Center
To: Director, BioSystems, Office of the Undersecretary of
Defense, (Science and Technology) Mr. Robert E. Foster,
PhD

Subj: LETTER OF APPRECIATION

1. We would like to thank you for supporting the recent Phase II SBIR project titled "Instructional System for Enhancing Seakeeping Cognitive Readiness and Decision-making Skills" (Contract No. USZA22-03-C-0029) with the United States Special Operations Command. Our goal for this project was to further the development of a curriculum for teaching new Special Warfare Combatant-craft Crewmen (SWCCs) the skills needed to safely maneuver boats in various sea conditions and maintaining the best possible speed. It was our hope that the training would result in reduced injuries and increased mission effectiveness.

2. Aptima, Inc. (the contractor awarded the Phase II SBIR project) developed a multimedia-based training system that enhanced our basic seakeeping skills to new SWCCs with no prior helmsman experience. The resulting training system, Instructional System for Enhancing Seakeeping (ISES), was delivered on time and was a quality product. More importantly, as an introductory curriculum to seakeeping, it addressed our needs as SWCC instructors. Since delivery of the final product, we have used aspects of the system in training courses and plan to continue using these materials in the future. In fact, we would welcome the funding of additional work to develop training materials that address more advanced seakeeping issues.

3. We appreciate the Office of the Secretary of Defense funding this project. Without your financial support, this training system would not have been developed. We believe that this project is an excellent example of how the SBIR program can positively impact the operational community.


C. R. LINDSAY

Copy to:
Daniel Serfaty
President
Aptima, Inc.
12 Gill St., Suite 1400
Woburn, MA 01801

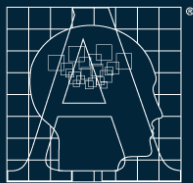
Aptima, Inc... developed a multimedia-based training system that enhanced our basic seakeeping skills to new SWCCs with no prior helmsman experience



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ENGINEERING

March 3, 2006

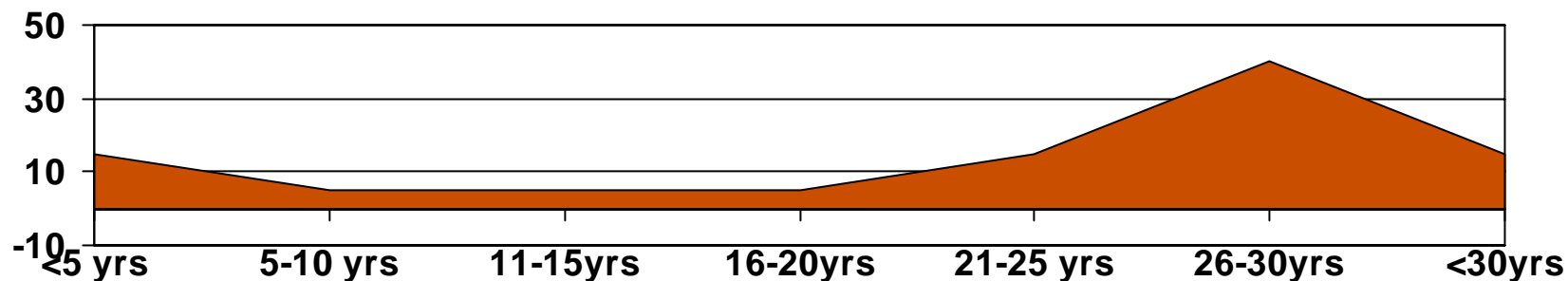
KEEL Project Overview

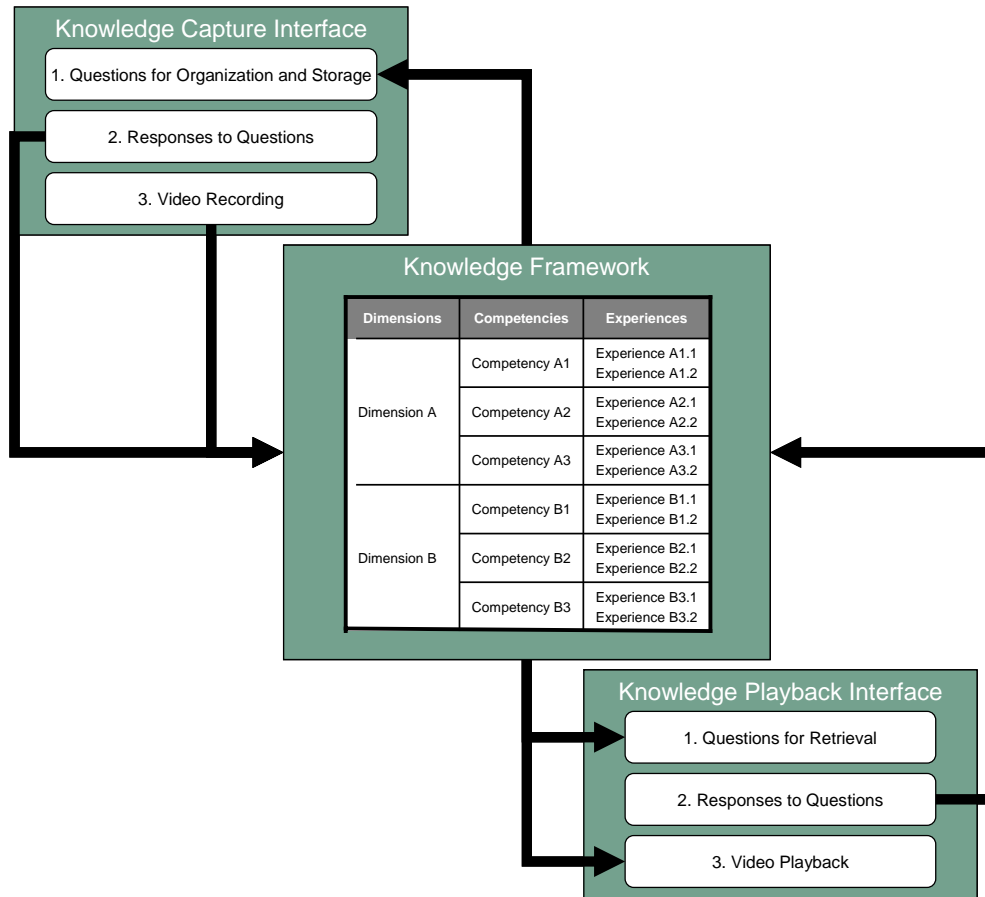
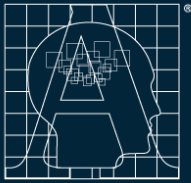


Too Few Experienced Employees to Mentor New Staff

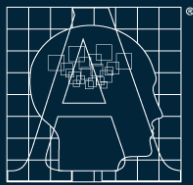
- How will the experiences of retiring staff be captured?
- How will these experiences be organized?
- How will these experiences be accessed by & presented to new staff?

Notional Chart of Shipbuilder Demographics





- Captures retiring shipbuilders “War Stories”
- Organizes these lessons into dimensions that
 - cut across all aspects of shipbuilding &
 - have a great impact on productivity & efficiency
- Plays these lessons to novice shipbuilders to
 - Increase expertise more quickly
 - Provide on demand knowledge



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Knowledge Capture Interface

1. Questions for Organization and Storage

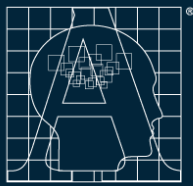
2. Responses to Questions

3. Video Recording

Knowledge Capture Interface



- Senior Employee
- Prompted to think of experiences
- Answers questions
 - What aspect of job?
 - What skill?
 - Etc...
- Tells story to video recording device



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Knowledge Playback Interface

1. Questions for Retrieval

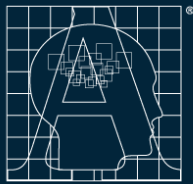
2. Responses to Questions

3. Video Playback

Knowledge Playback Interface



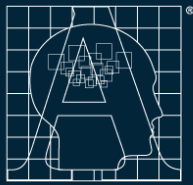
- Junior Employee
- Has a Problem
 - Answers questions
 - What aspect of job?
 - What skill?
 - Etc...
 - Watches senior employee tell story
 - Reads take-a-ways
- Has free time
 - Selects random mode
 - Watches senior employee tell story
 - Reads take-a-ways



Dimensions	Competencies	Experiences
Dimension A	Competency A1	Experience A1.1 Experience A1.2
	Competency A2	Experience A2.1 Experience A2.2
	Competency A3	Experience A3.1 Experience A3.2
Dimension B	Competency B1	Experience B1.1 Experience B1.2
	Competency B2	Experience B2.1 Experience B2.2
	Competency B3	Experience B3.1 Experience B3.2

Knowledge Framework

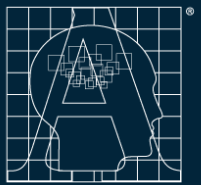
- **Dimensions:**
 - Themes that cut across jobs within the shipbuilding industry that are characteristics of everyone's job, and when done well the ship will be delivered on time and at or below cost.
- **Competencies:**
 - A set of KSAs that when properly performed their aggregate affect facilitates the completion of a dimension.
- **KSAs:**
 - Fine grain characteristics that are used to complete a job/task successfully
- **Experiences:**
 - The stories that give insight into KSAs & Competencies



Dimensions	Competencies	Experiences
Dimension A	Competency A1	Experience A1.1 Experience A1.2
	Competency A2	Experience A2.1 Experience A2.2
	Competency A3	Experience A3.1 Experience A3.2
Dimension B	Competency B1	Experience B1.1 Experience B1.2
	Competency B2	Experience B2.1 Experience B2.2
	Competency B3	Experience B3.1 Experience B3.2

Candidate Dimensions

- Risk Management
- 5S
- Problem Solving/ Flexibility
- Process Control
- Productivity
- PM/Workflow
- Elimination of Waste
- Cost Control
- Self QC
- Supply Chain/Logistics
- Teamwork
- Leadership
- Organizational Management
- Ethics
- Vision
- Design for Production
- Planning
- Change Order Management



Phase I

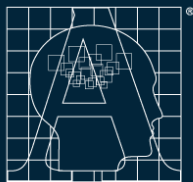
- ✓ Chose Dimension of Focus: **Risk Management**
- ✓ Interviewed Engineers with 10+ yrs experience
- ✓ Identified Competencies & KSAs for Risk Management
- ❑ Capture & Map “War Stories” to Competencies & KSAs
- ❑ Develop Conceptual Interface

Phase II: Technology Development

- ❑ Data Collection for Design & Manufacturing Frameworks
- ❑ Software Development & Testing

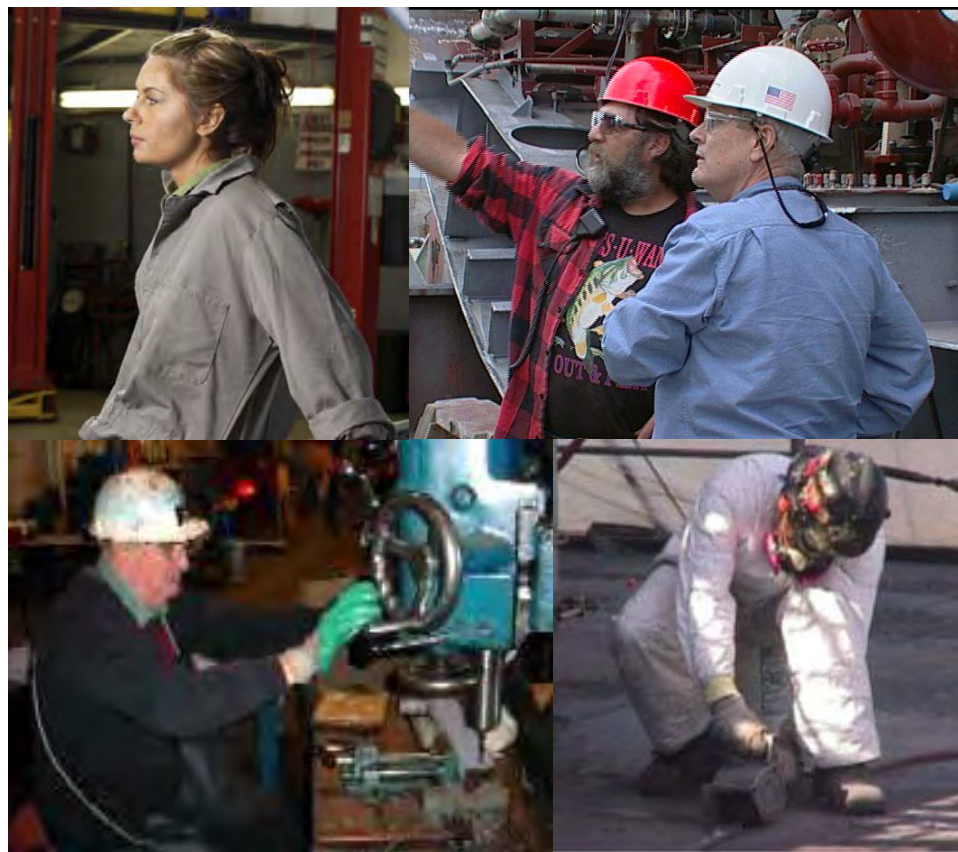
Phase II: Transition

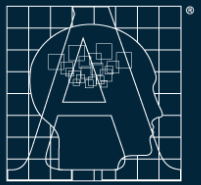
- ❑ ID User Test Site & Engage Users Towards Transition



Share Knowledge Across:

- Generations
- Time
- Space
- Vessels
- Companies





- Questions, comments?
- Participation in Interviews for Framework Definition?
- Interest in Submitting Experiences?

