



# Army S&T Essential Core Competencies

**Army Science Board Summer Session**

**Fort Carson**

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  - Findings and Recommendations
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# Introduction



# The Challenge

- **Today's environment calls for reform of the Army's approach to managing its comprehensive S&T activities**
  - Failed acquisition programs, with S&T a contributor to the difficulties
  - Reduced budgets today and going forward
  - Globalization of the technology base
  - Potential adversaries access to this global technology base, with attendant increasing probability of technology surprise
- **Key to this reform is access to the best human capital that our university system produces**
- **Such reform is essential if we are to remain the most technologically dominant military in the world**



# Study Overview

- **Terms of Reference**

- Sponsored by the Secretary of the Army

- Critical Terms

- **TASK 1:** Determine what the Army must maintain / develop as RDECOM S&T core competencies
- **TASK 2:** Of the core competencies identified the study should recommend what must be performed in-house / on-site and why
- **TASK 3:** Identify a business model and / or organizational models that would strengthen performance of these core competencies and provide appropriate justification

- Schedule

- Study conducted over the period January – July 2013
- Briefing to be provided before 30 September 2013
- Final Report to be submitted by 31 October 2013

- **Additional line of inquiry regarding human capital**



# Study Organization, Visits, Interviews & Meetings

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## Experience

### Study panel consists of 28 members

- **Areas of expertise:**

Physics, Engineering, Computer Science, ISR, Air Defense, Modeling & Simulation, Rapid Manufacturing, Optics, Wireless Communication, Network Architecture, National Security, Analytics, Robotics, Autonomy, Program Management, SE&I, Military Space, Missile Systems, Sensors, Aerospace Technology, Logistics, Materials, Biochemistry

- **Experience from:**

- Academics
- FFRDCs
- National labs
- CEOs, CTOs
- Commercial industry

- **6 members are now experiencing applying a core competency model**

- Universities, FFRDCs, industry

## Data Collection

- **Conducted a total of 48 visits and interviews**

- **DoD Organizations included:**

- OSD/Joint (AT&L/OASD, R&E, DARPA, NGIC, SOUTHCOM)
- Air Force (Air Force S&T, AFRL)
- Navy (ONR, NRL)
- Army (DUSA-IATC, ASA(ALT), DASA(R&T), SoSE&I, G8, 11 PEOs, MRMC, USAMRICD, USAMRIID, TRADOC, ARCIC, AMC, RDECOM, ARL, 6 RDECs, Watervliet Arsenal, Benet Labs)

- **DHS (NBACC)**

- **Met with 4 industry organizations**

- **Consulted with Dr. Gary Hamel, Core Competencies expert**

- **Conducted 9 study meetings**



# Core Competencies Discussion

## TOR Tasks 1 & 2



# Defining Core Competencies

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HBR  
MAY-JUNE 1990

## The Core Competence of the Corporation

C.K. Prahalad and Gary Hamel

The most powerful way to prevail in global competition is still invisible to many companies. During the 1980s, top executives were judged on their ability to restructure, declutter, and delay their corporations. In the 1990s, they'll be judged on their ability to identify, cultivate, and exploit the core competencies that make growth possible—indeed, they'll have to rethink the concept of the corporation itself.

Consider the last ten years of GTE and NEC. In the early 1980s, GTE was well positioned to become a major player in the evolving information technology industry. It was active in telecommunications. Its operations spanned a variety of businesses including telephones, switching and transmission systems, digital PABX, semiconductors, packet switching, satellites, defense systems, and lighting products. And GTE's Entertainment Products Group, which produced Sylvania color TVs, had a position in related display technologies. In 1980, GTE's sales were \$9.98 billion, and net cash flow was \$1.73 billion. NEC, in contrast, was much smaller, at \$3.8 billion in sales. It had a comparable technological base and computer

businesses, but it had no experience as an operating telecommunications company.

Yet look at the positions of GTE and NEC in 1988. GTE's 1988 sales were \$16.46 billion, and NEC's sales were considerably higher at \$21.89 billion. GTE has, in effect, become a telephone operating company with a position in defense and lighting products. GTE's other businesses are small in global terms. GTE has divested Sylvania TV and Telenet, put switching, transmission, and digital PABX into joint ventures, and closed down semiconductors. As a result, the international position of GTE has eroded. Non-U.S. revenue as a percent of total revenue dropped from 20% to 15% between 1980 and 1988.

NEC has emerged as the world leader in semiconductors and as a first-tier player in telecommunications products and computers. It has consolidated its position in mainframe computers. It has moved beyond public switching and transmission to include such lifestyle products as mobile telephones, facsimile machines, and laptop computers—bridging the gap between telecommunications and office automation. NEC is the only company in the world to be in the top five in revenue in telecommunications, semiconductors, and mainframes. Why did these two companies, starting with comparable business portfolios, perform so differently? Largely because NEC conceived of itself in terms of "core competencies," and GTE did not.

C.K. Prahalad is professor of corporate strategy and international business at the University of Michigan. Gary Hamel is lecturer in business policy and management at the London Business School. Their most recent HBR article, "Strategic Intent" (May-June 1989), won the 1989 McKinsey Award for excellence. This article is based on research funded by the Gatsby Charitable Foundation.

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- 1990 HBR article was a game-changer in terms of defining the importance of core competencies for corporations
- Still one of the most quoted and cited business articles
- According to Hamel, the article has relevance to the Army Institution in defining core competencies at various levels
- Acknowledged differences between government and corporate setting





# Applying Hamel Model to Army S&T Core Competencies

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## Hamel's Definition:

### 1. Are integrated bundles of skills and technologies

*"A competence is a **bundle of skills and technologies** rather than a discrete skill or technology. **Integration** ...is the hallmark"*

### 2. Must pass three tests:

- Customer Value
- Competitor Differentiation
- Extendibility

### 3. Must be kept in-house

*"competencies, which are core and uniquely define the firm... **must be kept in-house..**"*

### 4. Are hierarchical

*"a team (should have) a good understanding of the entire **hierarchy** of competencies, from core competencies to **constituent** skills"*

## ASB Application to Army S&T:

### 1. Are integrated sets of skills, technologies and capabilities (e.g., facilities, tools) for which Army S&T is uniquely qualified

### 2. Are essential for identifying, developing and transitioning key and enabling technologies into end products that:

- Satisfy important current and future operational needs
- Are superior to adversary capabilities
- Provide the basis for disruptive capabilities

### 3. Must be kept in-house

### 4. Constituent components may be supplemented through external sources



# Definitions of Key and Enabling Technologies

## Key Technologies

- **Disproportionate** contribution to operational capability (Customer Value)
- **Discriminating** contribution to product superiority (Competitor Differentiation)
- **Potentially disruptive** new operational capabilities (Extendability)

**C4ISR Examples:** Precision navigation and timing, Unique night vision sensors

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## Enabling Technologies

- **Important** contribution to operational capability (Customer Value)
- **Prerequisite** contribution to product superiority (Competitor Differentiation)
- **Evolutionary** new operational capabilities (Extendability)

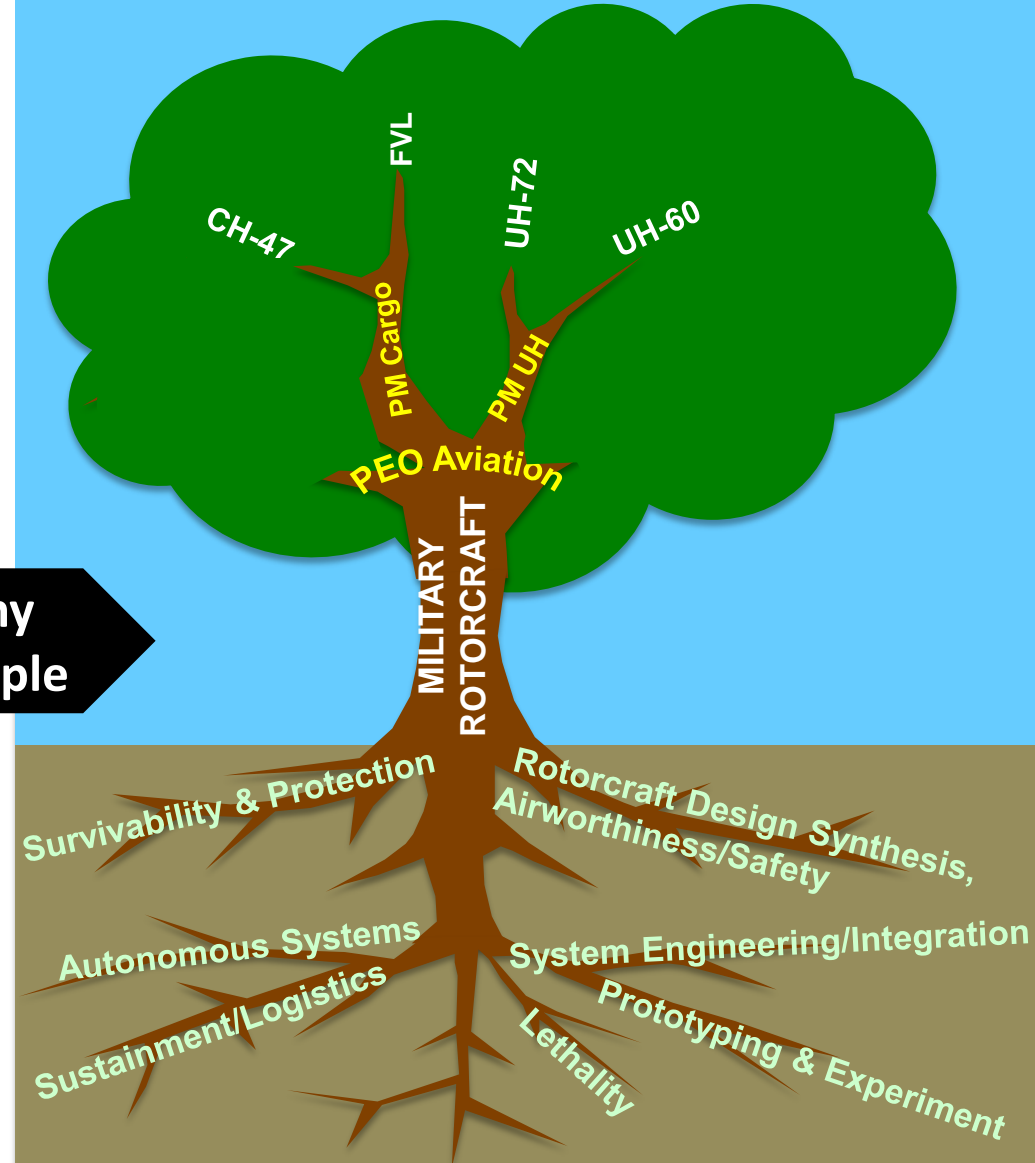
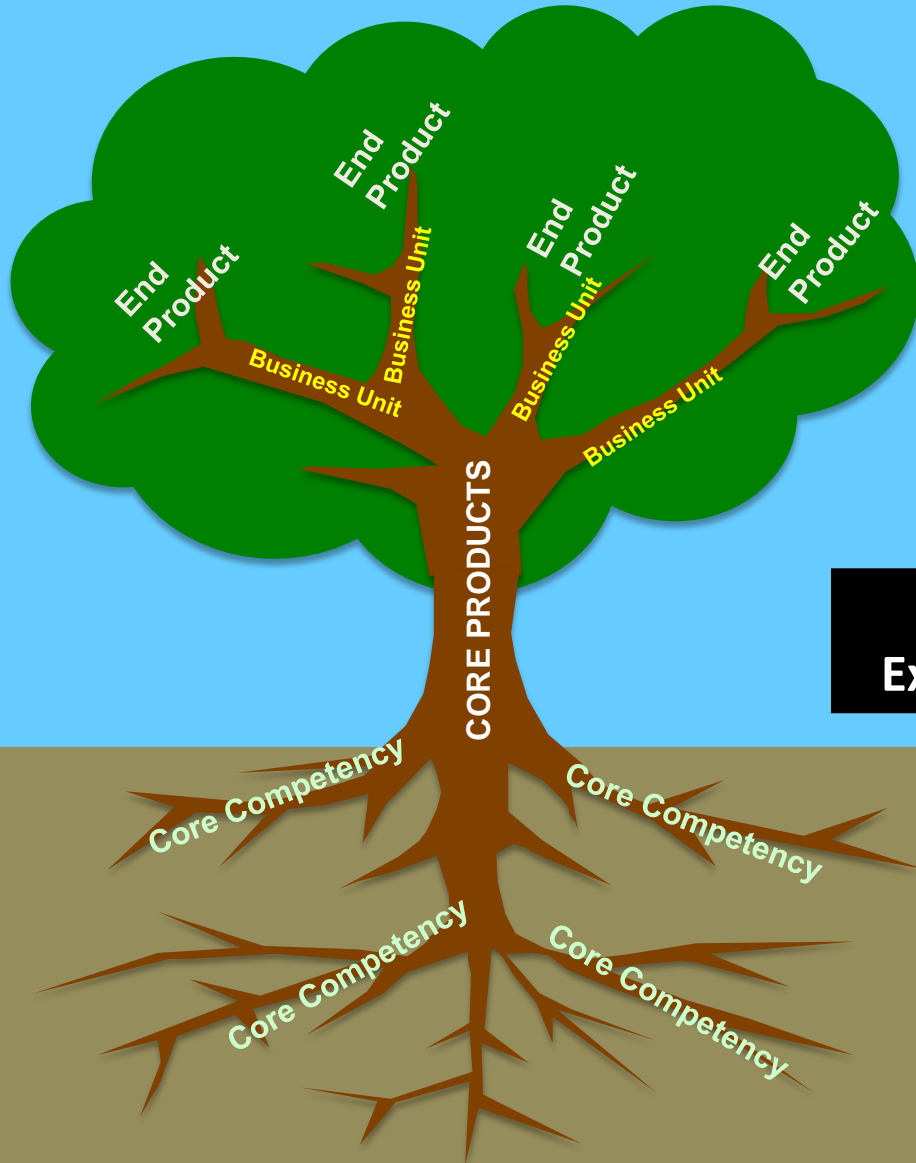
**C4ISR Examples:** Batteries, Displays, C<sup>2</sup> software improvements



# Applying Hamel Model to Army Technologies

## Hamel Model

## Army Aviation



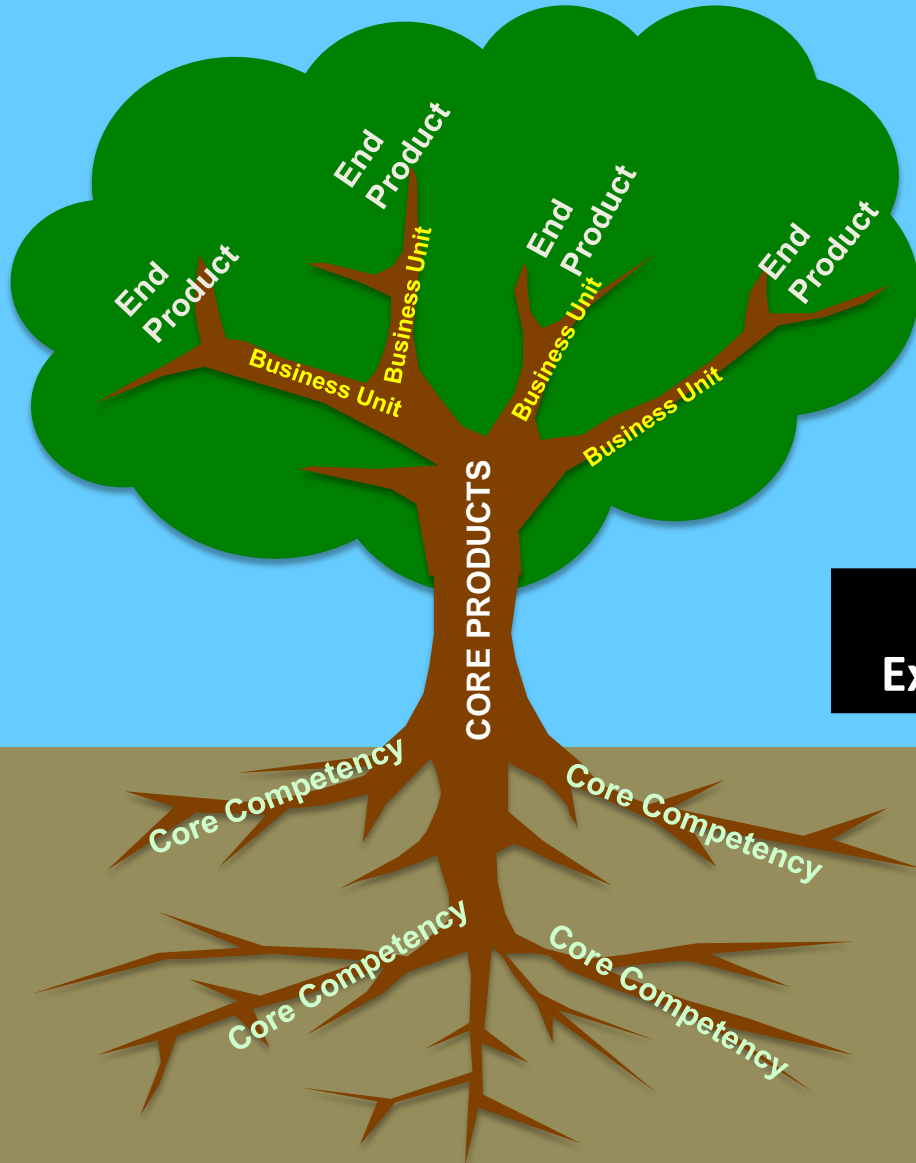


# Applying Hamel Model to Military Families in Transition

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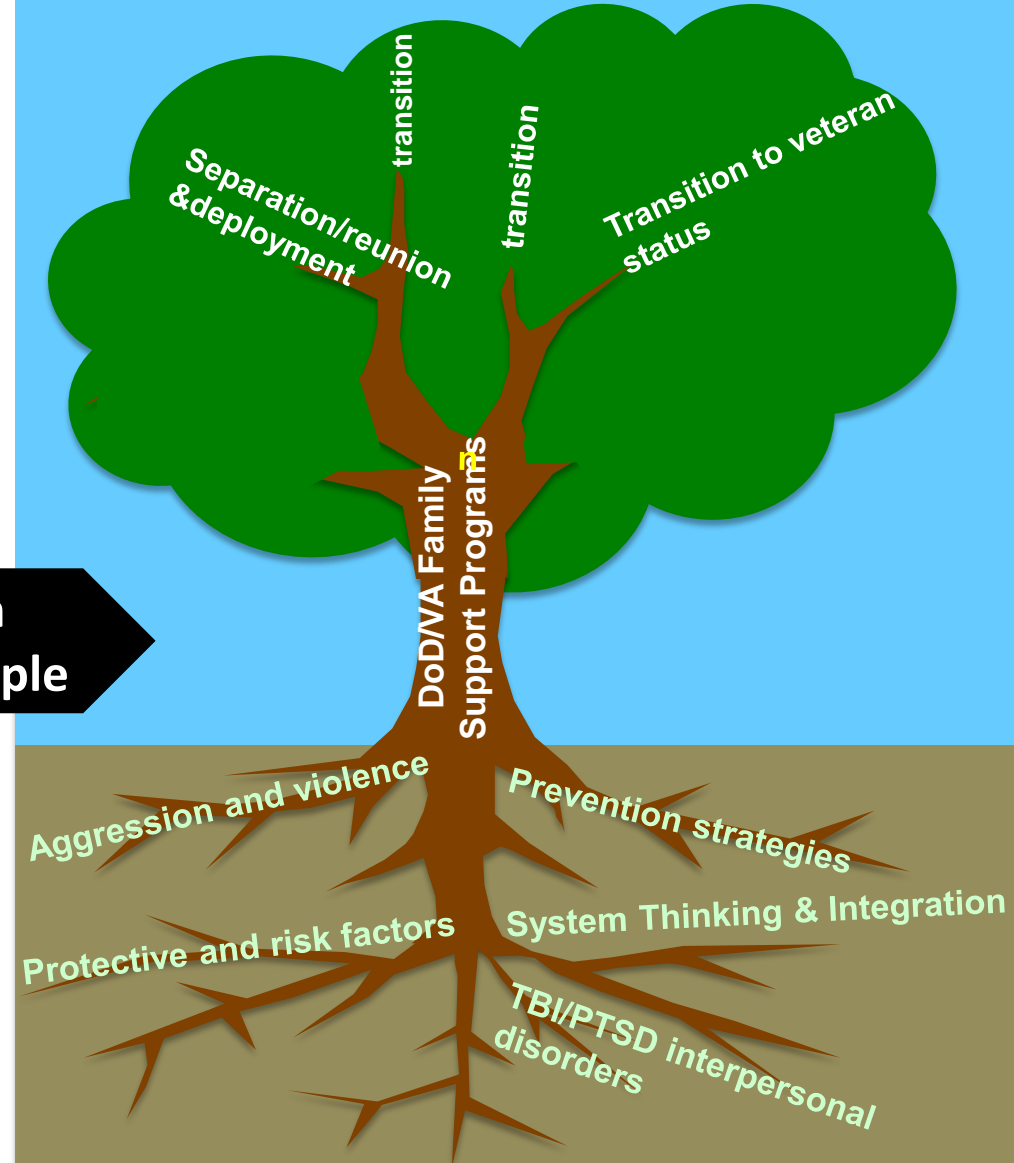
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## Hamel Model



An Example

## Military Families in Transition





# ASB 2012 Study: Focus on Army S&T Core Technologies and Best-in-Class Performers

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## In times of declining budgets:

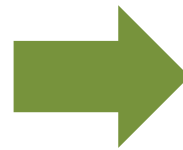
- **In-house efforts** must be best-in-class and focused on Army-unique **core competencies**
- Army sponsors best-in-class performers for other **Army-essential technologies**
- Relevant **external work** by well-funded, best-in-class performers should be leveraged

### Today

Monitor/Leverage

Sponsor

Perform  
In-House



### Tomorrow

Monitor/Leverage

Sponsor

Perform  
In-House

**Many technical areas have components in all three categories**