

# Composable Capability on Demand (CCOD®)

*A New Paradigm for the Design, Acquisition  
And Employment of IT-Based C2*

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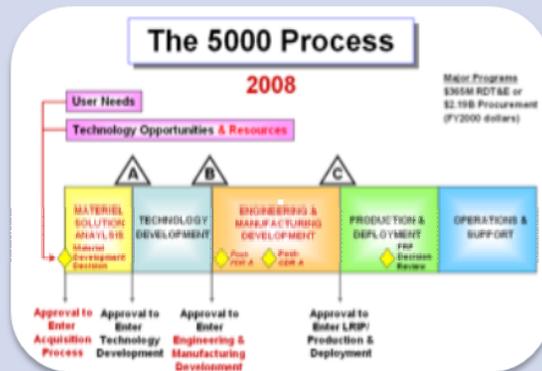
*“What is needed is a portfolio of military capabilities with maximum versatility across the widest possible spectrum of conflict. As a result, we must change the way we think and the way we plan - and fundamentally reform - the way the Pentagon does business and buys weapons.”*

- Secretary of Defense Robert M. Gates  
Chicago IL, 16 July 2009

*“The Defense Department must change the way it develops software systems to get programs and tools to ‘the corporal on the street’ in a matter of days, rather than on the current multiyear cycle.”*

- General James Cartwright,  
Vice Chairman, Joint Chiefs of Staff

## THE PROBLEM



## IT – Based Systems

- *RIGID*
- *LATE TO NEED*
- *EXPENSIVE*
- *FIGHT THE LAST WAR*

## CCOD HYPOTHESIS

Robust, responsive IT-based C4ISR may be achieved by providing users with technical means to dynamically assemble and employ elements of the enterprise in response to mission needs

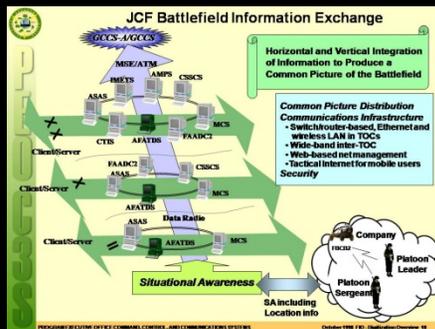
- *Driven by Operational Need*
- *Enabled by Technology Advances*

# Today's Reality: Example Army Battle Command Systems (ABCS)

**BATTLE COMMAND:  
FULL INTENSITY CONFLICT**

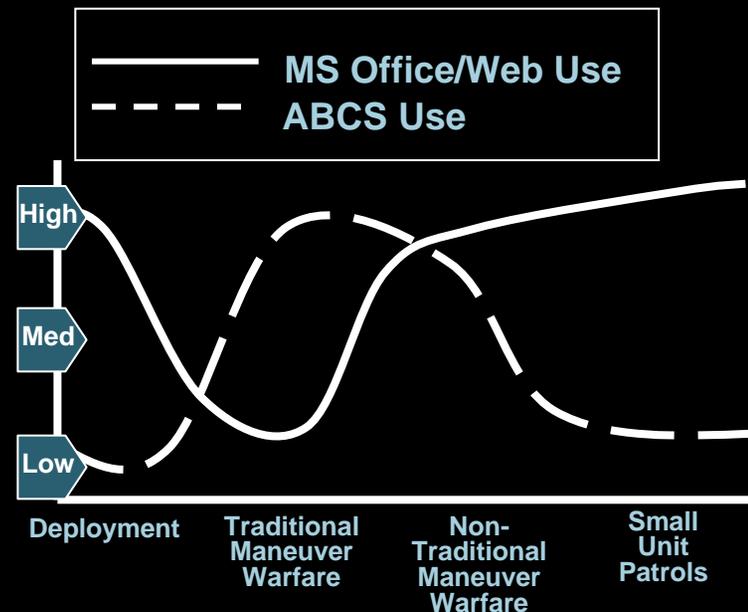


Force XXI Circa 90's



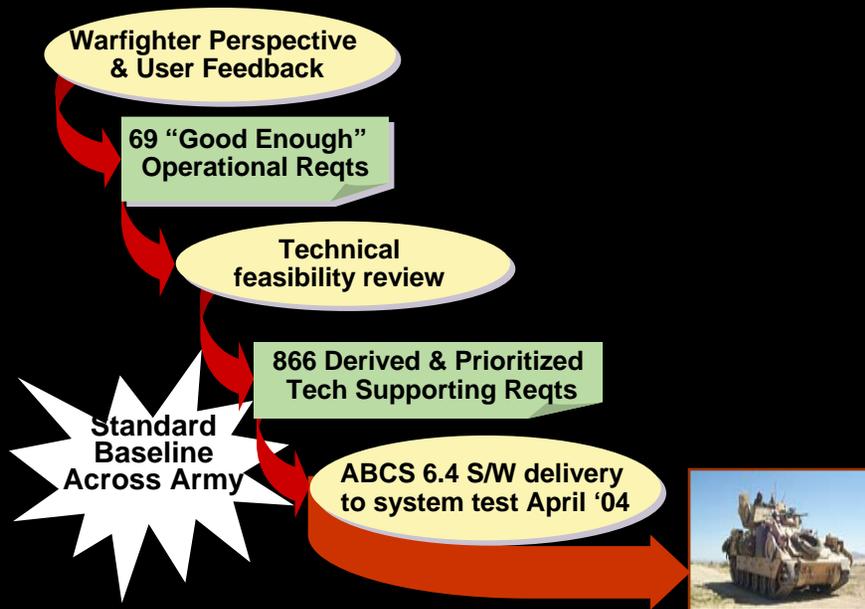
- Small number of systems ~11
- Software Tightly Configuration Controlled
- Fielded Systems were the only ones on the Network

**THE GLOBAL WAR ON TERROR**



# The Rest of the Story

## ABCS 6.4 “Good Enough”



**Field ABCS 6.4 across force...**  
**...Within 48 months**

## Capabilities Cobbled Together Replaced Programs of Record

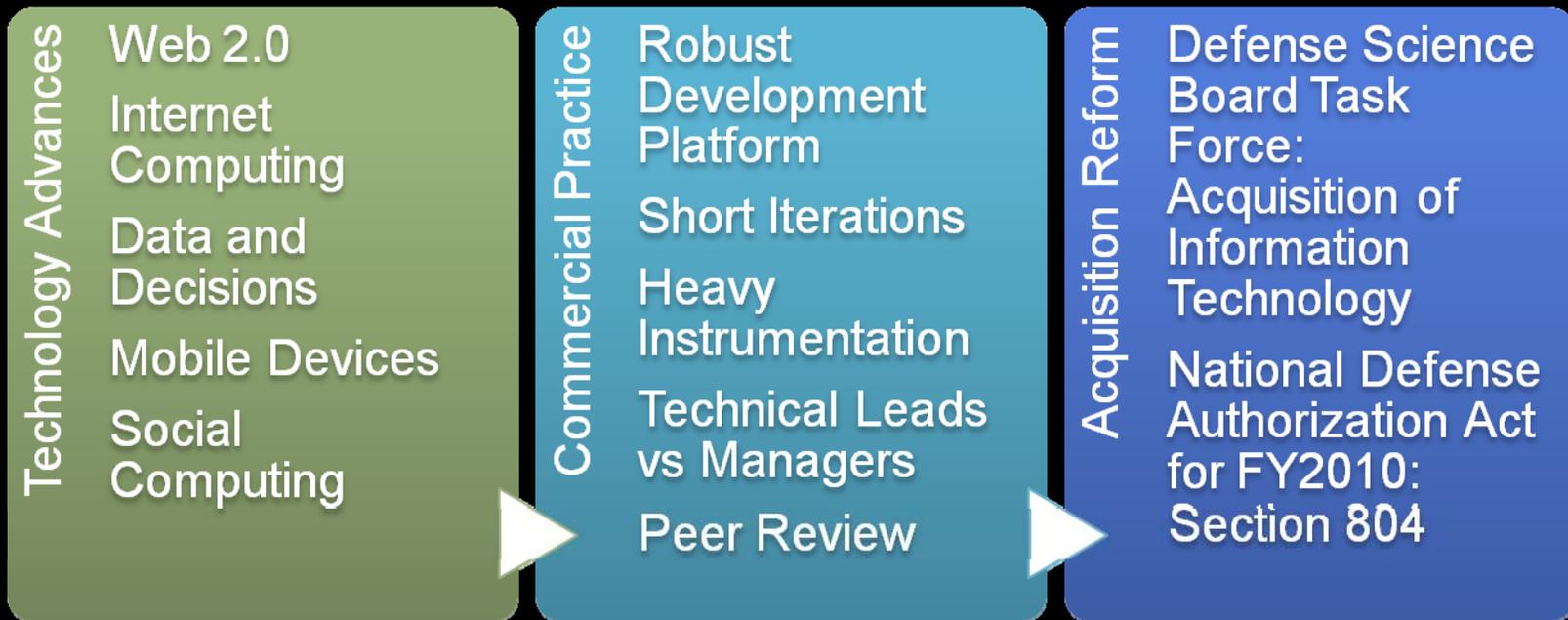
- **FUSION NET**  
- 101<sup>st</sup> Airborne
- **CIDNE**  
- 82<sup>nd</sup> Airborne
- **CPOF, TIGR**  
- DARPA
- **Sharepoint**

# Vision

- Operator Empowered to Leverage Information as an Effective Weapon... *On Demand*
  - Users rapidly combine, adapt and extend C4ISR capabilities to respond to evolving threats and mission needs
- A New Acquisition Paradigm
  - Rapidly develop and field infrastructure, components and a method to employ them

*Strategic Advantage for IT-based C4ISR:  
Regain the OODA Loop Advantage to Out-Innovate the Enemy*

# Environmental Scan





# From Web 1.0 to Web 2.0

## PHOTO: UPLOAD YOUR PHOTOS

**easysite.com** "the easy way to create a website"

Call Easysite for Free  
Name:   
Phone:

Promotion Code:

Gallery items:

- easysite.com/TheGarnetFamily
- easysite.com/OurBabyAndrew
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- www.SavvySeasons.com
- 

## FLICKR: BE PART OF THE WORLD'S PHOTOS

### Where'd you take that?



Explore millions of geotagged photos!

Location search:

Here are a few maps that we think are cool:

- ['The World Through My Eyes', Southern Hemisphere](#)
- [Uluru, the "Red Centre" of Australia](#)
- [The Persian Gulf](#)
- [Machu Pichu, Peru](#)

Watch video tutorials on [how to explore](#) and [how to geotag your own photostream](#) or [start geotagging now!](#)

### Explore Flickr Through Tags

art australia baby beach birthday blue bw california canada canon cat chicago china christmas city dog england europe family festival flower flowers food france friends fun germany green holiday italy japan london macro me music nature new newyork night nikon nyc paris park party people portrait red sanfrancisco sky snow spain summer sunset taiwan travel trip uk usa vacation water wedding

# From Web 1.0 to Web 2.0

## BRITANNICA ONLINE : PROTECTED & CONTROLLED

The screenshot shows the Britannica Online homepage. At the top, it says "ENCYCLOPEDIA BRITANNICA online" with a tagline "knowledge since 1768". There are navigation links for "Home", "About Us", "Why Subscribe?", "Shop", and "30 Day FREE TRIAL". A prominent banner advertises a "FREE 30-day trial to Britannica Online". Below this, there are several bullet points highlighting features like "Trusted by millions of students", "Written by more than 4,000 recognized experts", and "Presents correct facts in a world of unreliable and time-consuming online research". A sidebar on the left lists various categories such as "American Presidency", "Shakespeare", "D-Day", "Literature", "Earth & Geography", "Medicine", "Philosophy & Religion", "Sports & Recreation", and "Science & Mathematics".

## WIKIPEDIA: OPEN SOCIAL KNOWLEDGE

The screenshot shows the Wikipedia article for "Wiki". At the top, it says "Help us provide free content to the world by donating today!". There are navigation tabs for "article", "discussion", "view source", and "history". The main heading is "Wiki" with a sub-heading "From Wikipedia, the free encyclopedia". The text explains that "Wiki wiki" redirects here and provides disambiguation for other uses. It defines a wiki as a page or collection of web pages designed to enable anyone to contribute or modify content using a simplified markup language. It mentions that Wikis are often used to create collaborative websites and to power community websites. The collaborative encyclopedia Wikipedia is noted as one of the best-known wikis. It also mentions that Wikis are used in business to provide intranets and Knowledge Management systems. A quote from Ward Cunningham, developer of the first wiki software, WikiWikiWeb, is included: "the simplest online database that could possibly work". The article further explains that "Wiki" (/wi:ki:/) is originally a Hawaiian word for "fast". It has been suggested that "wiki" means "What I Know Is". However, this is a backronym. "Wiki Wiki" is a reduplication of the same word. The page includes a navigation menu with links like "Main page", "Contents", "Featured content", "Current events", and "Random article". There is also a search box and a "Go" button. A "Customer feedback" section contains a quote from Joseph Lippa: "Gives me a perspective on what has happened in the past and what is happening now." and another from Julie Brown: "Backs up research and clarifies facts - such good value!".

# From Web 1.0 to Web 2.0

## OLD PORTAL: SCREEN SCRAPING

The screenshot shows the classic Yahoo! homepage layout. At the top is the red "YAHOO!" logo. Below it are navigation links for "Web", "Images", "Video", "Local", and "Shopping". A search bar is prominently displayed. The main content area is divided into sections: "Featured" with a story titled "People's best dressed" featuring Fergie and Michelle Obama, and "News" with a headline about the Fed injecting \$55 billion into the financial system. The "News" section includes a list of headlines such as "Wall Street opens higher after previous session's massive rout" and "Israel poised for first female prime minister in 34 years".

## MASHUPS: COMPOSING CUSTOM PRODUCTS

The screenshot shows a Mashup.com search results page. The search term is "10 Fascinating Googlers". The results are sorted by "Name". The first result is "10 Fascinating Googlers" by Fortune Magazine, which has been mapped onto a Google Map. The second result is "100 Most Powerful Celebrities" by Yahoo! Geocode, which has been mapped onto a Google Map and includes related YouTube videos. The third result is "100+ Bike Rides in California" by a cycling blog, which has been mapped onto a Google Map. The fourth result is "1001 Secret Fishing Holes" by Google Maps, which has been mapped onto a Google Map. The fifth result is "2008 Basketball Tourneys" by Google Maps, which has been mapped onto a Google Map. The page also includes a sidebar with a list of categories such as "mapping (1760)", "photo (490)", "shopping (424)", "search (394)", "video (372)", "travel (307)", "news (225)", "social (220)", "music (192)", "messaging (190)", "sports (189)", "realestate (180)", "mobile (161)", "widgets (130)", "uk (126)", "bookmarks (115)", "visualization (106)", "reference (103)", "events (101)", and "auction (96)".

## Imposable Capability on Demand (COD®)

- Architectural construct that provides users with technical means to dynamically assemble and employ elements of the C4ISR enterprise to successfully accomplish missions
  - Of widely ranging scale
  - With reduced deployment
  - Responsively
  - Employing a shared and distributed IT environment
  - *As non-technocenti*

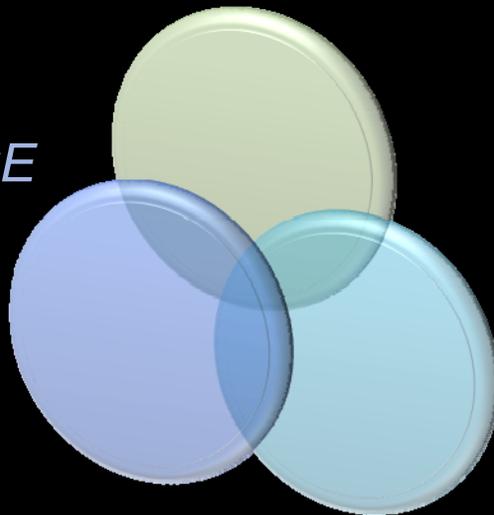
# Investment Outcomes

## *TECHNOLOGY INNOVATION*

Develop and Demonstrate Composability  
Methods, Tools & Technology Enablers

## *OPERATIONAL RELEVANCE*

Demonstrate CCOD value  
through Mission Threads, Use  
Cases, Composable Ops  
Centers



## *BUSINESS STRATEGY*

Develop viable business  
processes – new acquisition  
paradigm for IT-based  
capability

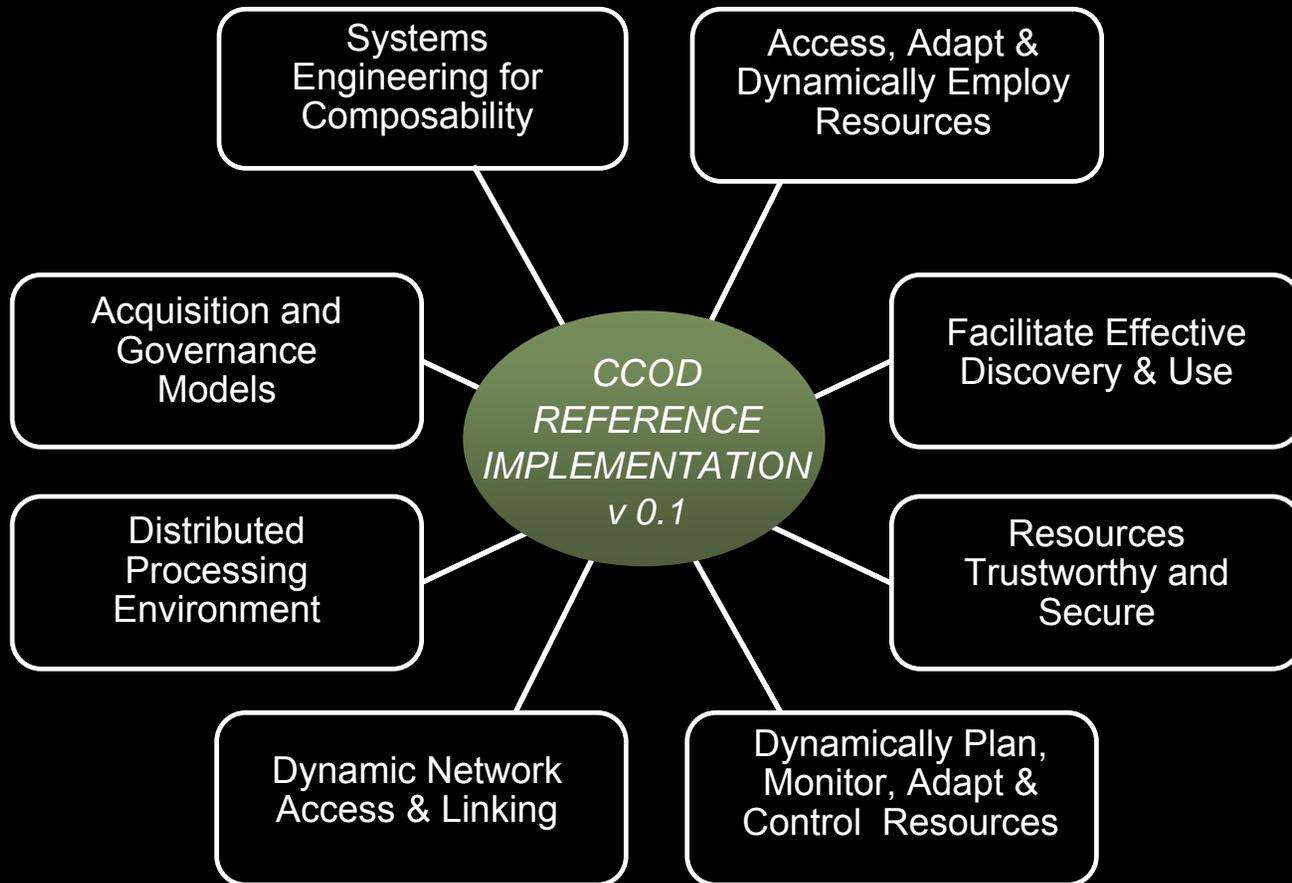
# **COD Research Agenda Elements**

**Access, Adapt and Dynamically Employ Distributed Resources**

**Represent Resources to Facilitate Discovery and Use**

- **Determine Distributed Resources Trustworthy and Secure**
- **Dynamically Plan, Monitor, Adapt and Control Resource Provisioning**
  - **Dynamic Network Access & Linking Responsive to Needs**
    - **Distributed Processing Environment – Dynamic Resource pool**
      - **Enterprise Acquisition and Governance Models**
        - **Systems Engineering Principles and Methods for Composability**

# search Agenda



# CCOD Evaluation Criteria

The function of a *resource* can be rapidly and easily understood by a user.

Users at various skill levels can effectively compose *resources* into capabilities.

Elements of compositions can rapidly be brought into semantic alignment to allow their execution as part of a composition.

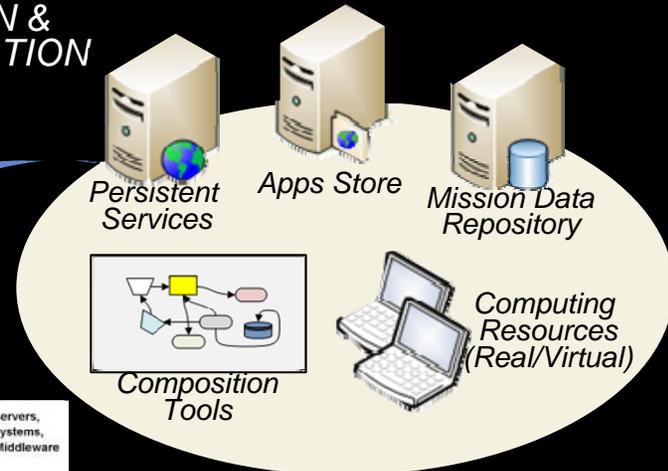
Compositions can be republished as reusable functions.

Ability to identify and respond to leakage in a composed capability.

- *Resource* or composition can be dynamically scaled by two orders of magnitude within minutes in response to demand.
- CCOD functions can be effectively executed across a span of infrastructure environment.
- Multiple simultaneous *resource* “storefronts” can function (i.e. deliver and/or execute) in harmony.
- A competitive and rapid solicitation/development market for *resources* can be established. Network operational parameters and interactions are sufficiently dynamic to support *resource* provisioning

# CCOD Build 2010

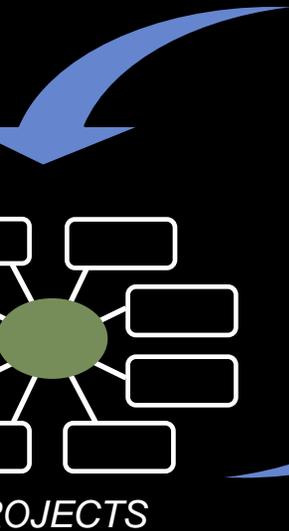
## INTEGRATION & EXPERIMENTATION



## CCOD PLATFORM



## TECHNICAL REFERENCE ARCHITECTURE



# 10 Integrated Build/Test

## *Technical Integration Event*

• Project Delivery & Initial Integration  
• Replacement  
• Functionality

• Technical Problems

## *Integrated Research Experiment*

- Hypothesis Testing
- Platform Content & Use
- Integration Methods
  
- Enterprise & Project-level learning

## *Operational Value Demonstration*

- Technology presented as Operational Capability
  
- User Value Focus
  
- Haiti Scenario

*Technical Problem Resolution*

*Operator Problem Resolution*

# Operational Value: The Cases and Scenario

Partnership for Americas  
Collaboration Center (PFACC)

Joint Air-Ground Integration Cell  
(JAGIC)

## HAITI EARTHQUAKE

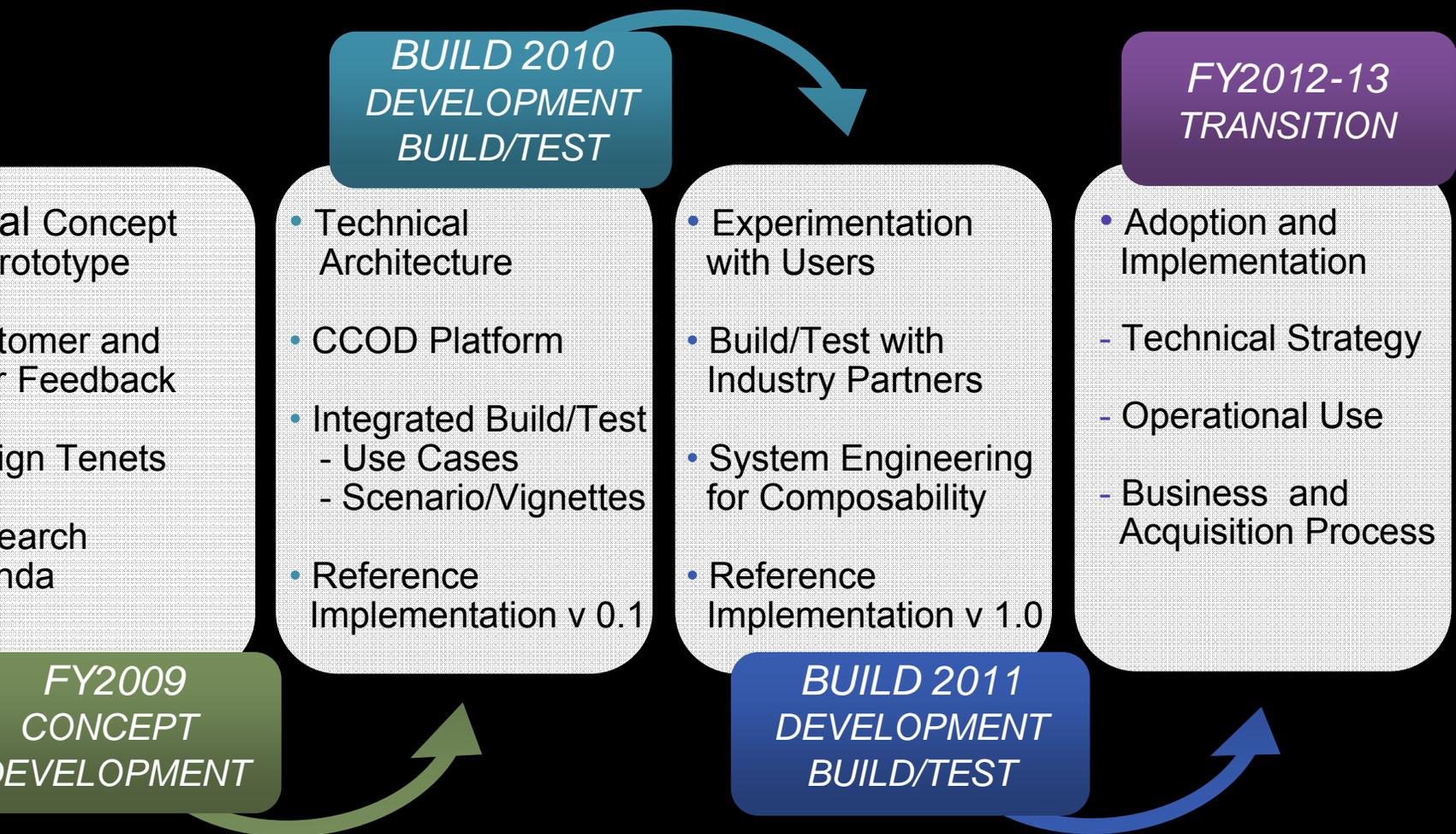
- SOUTHCOM AOR – PFACC ‘White Hot’
- Incident Command Crisis
  - Multi-National Response
  - Environmental Hazards
  - Astronomical Death Toll
- Tactical Command & Control Challenge
  - Assess & Repair Infrastructure
  - Deconflict Air and Port Space
  - Conduct Relief Missions



Incident  
Command



# CCOD Roadmap



*“Information technology offers immense capability in terms of agility, flexibility, responsiveness and effectiveness. It enables nearly all of our military combat capability and has become a necessary element of our most critical warfare systems. However, there is growing concern within Congress and among Department of Defense (DOD) leadership that the nation’s military advantage may be eroding. The deliberate process through which weapons systems and information technology are acquired by DOD cannot keep pace with the speed at which new capabilities are being introduced in today’s information age – and the speed with which potential adversaries can procure, adapt, and employ those same capabilities against the United States.”*

Report of the Defense Science Board Task Force on Department of Defense Policies and Procedures for the Acquisition of Information Technology (March 2009).