



Integrating Disruptive Technologies in DoD... A Bridge Too Far?

Tom Ehrhard, Ph.D.

September 4, 2008



CSBA

Center for Strategic & Budgetary Assessments
Ehrhard@csbaonline.org



Briefing Outline

- Disruptive or really... *DISRUPTIVE?*
- How to think about military innovation
- Current receptivity to innovative technology
- Disruptive system to legacy system--how?
- Challenges to technology integration
 - Concentrating on Service technology integration

Goal: Tech transition and *diffusion*



Military Innovation

- Three historical change mechanisms
 - External (civilian) mandate
 - Internal (service) adoption
 - Interservice rivalry
- Today's environment – “the strategic hiatus”
 - Civilians (OSD, Congress, think-tanks) can only effect Service programs at the margins
 - Few internal Service engines for change
 - Goldwater-Nichols submerged interservice rivalry

All three indicators are pessimistic...



Current Political Situation

- **High degree of strategic uncertainty**
 - Geopolitics in flux, Iraq war uncertain, threats evolving rapidly
 - Technology advancing at a rapid rate
 - Worrisome budget trends, downturn likely
- **No clearly-defined national security strategy**
 - More reactive than proactive, priorities unclear
 - Threats diffuse, outside preference zones
- **“Lame Duck” administration(s)**
 - Services generally unresponsive to direction
 - “New guys” disoriented

Conducive to incremental tech



The Perceptual Chasm

- One of the greatest obstacles to technology integration: *understanding military technology*
 - Magic or con game?
 - Invisible technologies = impenetrable to laymen
- OSD's "Future Warfare 20XX" project
 - Directed energy, biotech, nanotech, robotics
 - Major problems with baseline tech understanding
- Technologist // layman gap: huge & growing
 - Talking past one another all too common

Must employ a team approach with "bridgers"

Institutional Integration Challenges

- The Services
- Congress
- Industry
- Think-tanks

They all have their issues, but...

Let's concentrate on the Services...



The Services

- Toughest nut to crack—extremely deep, Byzantine organizational cultures, hard to pattern
 - Some are “monarchic,” some are “feudal”
 - They sit at fulcrum of the “iron triangle”
- The Services are most likely to welcome a new system or capability when it meets three “tests”
 - Solves an operational problem they *prefer* to solve
 - Sustains a *familiar* form of warfare
 - Sustains the *dominant sub-cultures* within the Service

Disruptive... to Legacy System

How does an **disruptive** weapon system “graduate” to become a **legacy** system?

Four indicators:

1. Integration into core mission areas
2. Dedicated (exclusive) units
3. Committed *officer* constituency
4. Follow-on systems

The ICBM Model

- Development in 1950s spurred by V-2, nuclear proliferation, Sputnik
 - ICBMs operational in 1959
- Initially, SAC employed excess aviators (B-47 crews) as missile crews
- Also opened ICBM-only training pipeline
- ICBM-only cadre rose through ranks, advocated follow-on ICBM systems
- 1981—ICBM-only colonels assume wing command, *now three four-stars*

The “misfit” became a legacy system

The Diffusion of Precision

- Precision-guided bombs and military aviation
 - Over 28,000 expended in Vietnam; hit rates approached 50%
 - LGBs assessed as “spectacularly” successful
 - The Air Force did not fully embrace LGBs until after Desert Storm
 - Naval aviation lagged even farther behind
- Precision fires and Army field artillery
 - Laser-guided Copperhead 155 failed in 1980s
 - 2004: Army doctrine emphasized mass use of legacy rounds
- Almost 40 years after precision-guided munitions had been demonstrated in Southeast Asia, and over a decade after aviators fully adopted precision warfare, the Army finally woke up
 - First used Guided MLRS in 2005; Excalibur in 2007

The Threat of Precision

- Proliferation of guided rocket/ artillery/ mortar/ missile (G-RAMM) looming in the near future
 - Guided ground-ground indirect-fire rockets (e.g., GMLRS)
 - Guided artillery (e.g., Excalibur, Krasnopol)
 - Guided mortar (e.g., Strix, Merlin, Aquila, Fireball, PGMM)
 - Guided missiles (e.g., MANPADS, Kornet, cruise missiles)
- Requires new thinking about defensive systems
 - Directed energy—an obvious answer
 - SSLs developing rapidly in the laboratory
 - Service interest weak, diffused
 - Will only act when threat clear, enduring

*Which Service(s) will prefer to solve this threat?
Will they compete or defer?*

Where are the Visionaries?

“The goal of modern strategy will be to achieve a decision with highly mobile, highly capable forces, before the masses have begun to move.” **General Hans von Seeckt**

“...sea craft of all kinds, up to and including the most modern battleships, can be destroyed easily by bombs dropped from aircraft— aircraft constitute a positive defense of our country against hostile invasion..” **Maj Gen Billy Mitchell**

“[I] don’t think it is even faintly realized— the immense impending revolution which the submarines will effect as offensive weapons of war. . . . The oil engine will govern all sea-fighting, and all sea-fighting is going to be governed by the submarine.” **Admiral Sir Jackie Fisher**

They’re always out there — you have to find them

Overcoming Service Barriers to Innovation

- **Outside (civilian) intervention**
 - OSD, Congress, DDR&E/DARPA, think-tanks
 - Influence mapping, OSD guidance, accountability
- **Internal receptivity to change**
 - Sponsors, mavericks, labs
 - Threats, wargames, experimentation
- **Uniformed rivalries**
 - Create incentives to stimulate competition
 - Inside and outside the Service...

Needed: a targeted infiltration campaign

Summary

To create the conditions for disruptive systems to evolve into “legacy” systems:

- Service commitment is required
- Two-way cultural understanding matters
- Officer constituencies are key
- The expertise you must marshal lies well outside the technologist’s comfort zone

As technologies mature, Service integration becomes just as important as technical details

Questions?



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