Transforming Defense Industry, Science and Technology for the 21st Century

Presented to the

Strategy Review Board

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PIPER PACIFIC INTERNATIONAL

Overview

Much has been written about

- The Revolution in Military Affairs (RMA),
- Asymmetric Warfare,
- the Information Technology (IT) revolution, and more recently
- Global Terrorism.

Operation Iraqi Freedom: Transformation in Action

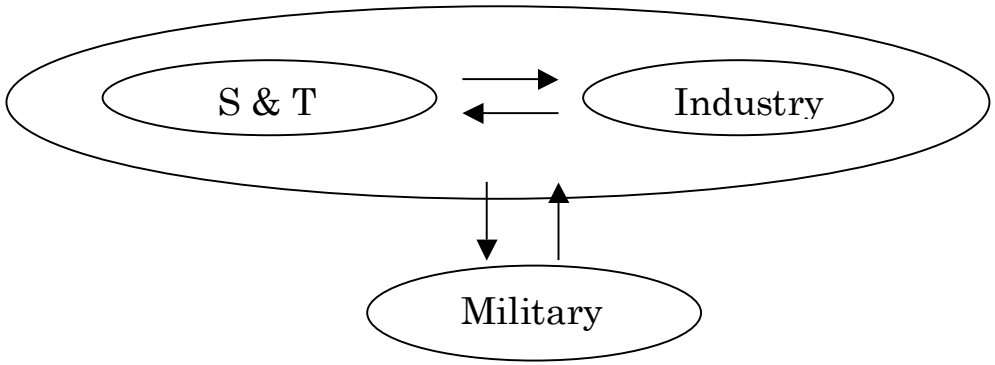
We should address the "Who, What, When, Where, Why?" of defense transformation.

Overview

- The global security environment in the 21st century is very much changed, for most of us.
- But for some —particularly of Taiwan, Republic of China and the Republic of Korea — the major security threat is perhaps more changed in terms of *magnitude*, than in *nature*. The challenge is how to counter the growing magnitude of the threat.
- It is far too soon to understand the many "Lessons Learned" of the Iraq war of March/April. But certainly history will show this as the initial demonstration of "network-centric warfare."
- At the same time we must caution ourselves that the next war will <u>not</u> be the same as the last one.

Overview

- The challenge is to structure, or cause to be evolved, a defense industry that provides the capabilities to assure national security. Effective capabilities require dynamic scientific and technological investment and development. The S&T and industrial communities must be interactive, between them, and also with the military force (or “user”) community.



Revolution in Military Affairs

- The character of U.S. Military forces is changing, perhaps much more rapidly than most appreciate, for, driven by the information revolution, a revolution in military affairs is at hand. This American-led revolution stems from advances in several technologies and, **more important, from the ability to tie these developments together and build the doctrines, strategies, and tactics that take advantage of their technical potential**....

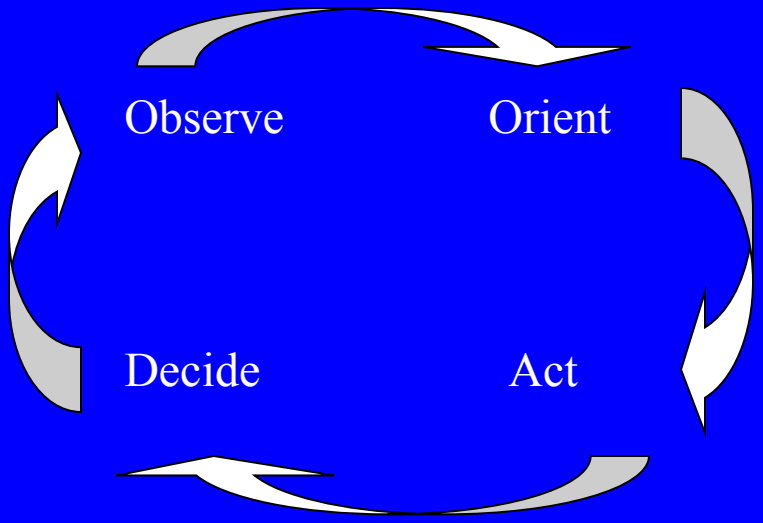
- Information technologies provide the ability to gather, sort, process, transfer, and display information about highly complex events that occur in wide geographic areas....

- Sensors, for example, will give real-time continuous surveillance in all types of weather over large terrain. Fusing and processing information--making sense of the vast amount of data that can be gathered--will give U.S. forces dominant battlespace.

Admiral William Owens
formerly Vice Chairman of the U.S. Joint Chiefs of Staff,
Foreign Affairs, March/April 1996

OODA Loop

The OODA Loop!—"Observe, Orient, Decide, Act"



Transformation

- Military Transformation

  is not it an *event*,

  is a *process.*

- "Spiral" acquisition strategy:
  - Field a set of capabilities
  - Continue R&D to improve these capabilities
  - Field that improved set of capabilities
  - Continue R&D to improve further these capabilities.

Operations

- Operation Iraqi Freedom (OIF) is truly a case of “transformation in action.”
  - Different from previous military campaigns, because of the types of forces utilized, the organizational concepts and tactics employed, and the equipment available.

- OIF as the first application of
  - “Network-centric Warfare.”
  - Space war.

Network-centric Warfare: What is it?

- Linking of sensors, communication devices, weapons, and war-fighters into a seamless digital network that boosts military effectiveness
- Provides war-fighter with situational awareness, robust communications, and cutting edge technology
- Enables diverse forces—infantry, helicopters, artillery—to move quickly across large distances to engage in quick strikes against enemy
- Allows war-fighter to see beyond his own field of vision

Network-centric Warfare: What does it look like?

- *Early surveillance*: digital images from satellites and UAVs, intercepted radar and telephone transmissions
- *Airborne vigilance*: scanning of battlefield by manned and unmanned aircraft
- *Weapons links*: tank commanders use "situational awareness" computers to transmit data to command post and receive back information on enemy vehicles
- *Increased communications*: helps to shorten "kill-chain"
- *Increased bandwidth usage* — bandwidth used in OIF 30 times more than in 1991 Gulf War
- *Supply chains*: networked tracking systems that supply all of military's needs in timely manner

Equipment

Precision Guided Munitions (PGMs)

- 80 percent of munitions delivered in OIF were PGMs
- 60 percent in Afghanistan
- 30 percent in Kosovo
- 5 percent in 1991 Gulf War

PGM Advantages

- *A force multiplier*: instead of multiple aircraft attacking a single target, now a single aircraft can attack multiple targets.
- *Reduced logistics burden*: critical for the security threats confronting U.S. forces in the 21st century, when pre-positioned ammunitions are limited, if not non-existent.
- *Reduced collateral damage*: critical in the era of 24/7 live TV broadcasting.
- *Quicker kills*: essential for time-sensitive or threatening targets, and most important for friendly force survivability.

Equipment

Unmanned Aerial Vehicles (UAV):

- Key benefits:
  - Bird's-eye view of battlefield
  - Ability to hit targets quickly, efficiently
  - Shortens "kill-chain"
  - Long duration "on station" for Global Hawk

Equipment

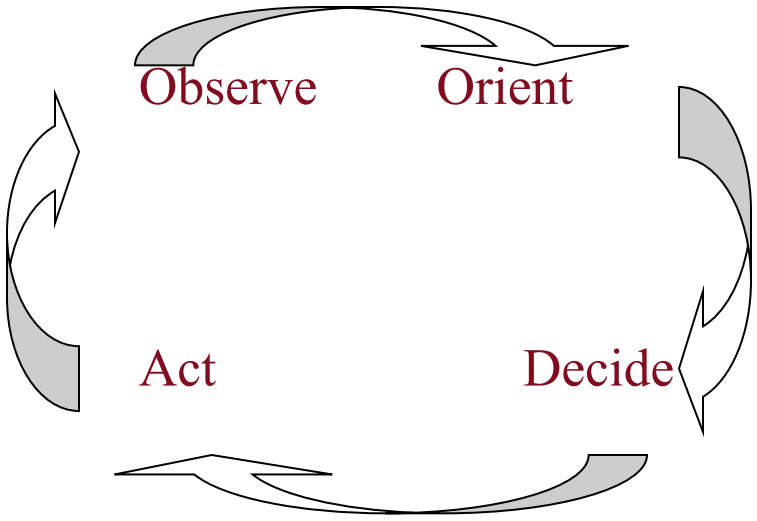
Role of Space Assets

- PGM/GPS
- Intelligence, Surveillance, and Reconnaissance (ISR)
- Blue Force Tracking (Common Operating Picture)
- Situational Awareness
- Reliable Communications

Tactics

New War Strategy

- The Iraqi conflict revealed new thinking in the Pentagon about modern warfare: move swiftly and control situation.
- The OODA Loop!—"Observe, Orient, Decide, Act"



Tactics

New Warfare Strategy

- Remove center of power
- Eliminate Saddam Hussein's ability to govern
- Destroy opponent's will to fight
- Minimize civilian casualties and impact

Tactics

Key Strategy

- Primary U.S./coalition goal was to quickly overwhelm and destroy seat of power in Baghdad
- Motto of U.S. forces was “Baghdad first”
- U.S. forces pressured Baghdad, instead of working their way through southern and central Iraq
- Destroy opponent’s will to fight
- Minimize civilian casualties and impact

Units

Special Operations Forces (SOF)

- Largest number of SOF units in OIF since Vietnam War

- Examples of SOF Operations:
  - President Bush promised Israel that U.S. would deploy SOF in western Iraqi desert at start of OIF to destroy facilities that could be used to launch missiles at Israel
  - Worked with Kurdish resistance fighters in northern Iraq
  - Assisted in bringing in 173rd Airborne Brigade

Units

Special Operations Forces (SOF)

- Examples of SOF Operations:
  - Marked and called air power on enemy targets
  - Joined with CIA paramilitaries to sever communications, take down observation posts, and prevent Iraqi military from using chemical or biological weapons before the “official” start of the war
  - Targeted WMD sites, airfields, and Command and Control (C2) headquarters

Units

SOF Capabilities

- Able to leverage battlefield awareness
- Able to tap into growing wellspring of situational awareness
- Can link operationally with conventional forces

Lessons Learned

- Regular ground forces need to be more like SOF
- Hundreds of small-units operated throughout Iraq
- In future, small units must work together to create integrated network force that uses

Defense Science Board

- Invest in new S&T initiatives to support four transformational challenges:
  - *Defending against biological warfare*
  - *Finding difficult targets*
  - *Making timely and accurate decisions*
  - *Enabling high-risk operations.*
- Maintain S&T investment at 3% of DoD budget.
- Exploit commercial technology through expanded use of commercial products and processes; eliminate barriers for commercial firms to do business with DoD; pursue new initiatives to forge relationships with commercial industry.

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- Foster operational experimentation as an integral element of a new S&T enterprise through assigned experimental units and sustained senior attention.
- Establish a new technology transition process with wide use of spiral development and acceleration of the acquisition cycle.
- Enable development and acquisition of joint R&D by establishing points of clear responsibility in joint C4ISR and biological warfare defense.
- Restructure the DoD laboratories and rebuild the scientific and engineering workforce based on a major review of the function and workforce in each laboratory.

Defense Science Board

DoD must pursue a three-pronged approach:

- Provide incentives within DoD to use commercial products, practices, and processes as the norm;
- Reduce barriers that inhibit commercial firms from working with DoD contractors and with DoD directly; and
- Foster relationships and create new incentives with critical technology sectors to motivate them to apply their knowledge and people to critical national security challenges.

Science and Technology Transformation

DARPA's primary responsibility is

- to help maintain U.S. military technological superiority and guard against unforeseen technological advances by potential adversaries. Consequently, the DARPA mission is:
- to develop imaginative, innovative, and often, high risk research ideas offering a significant technological impact that will go well beyond the normal evolutionary developmental approaches,
- to pursue these ideas from the demonstration of technical feasibility through the development of prototype systems.

U.S. Defense Industry Restructuring

- The past decade has seen significant reorganization or restructuring of the U.S. defense industry — both on a domestic basis, and also in terms of international partnerships.
- The defense industry of a decade ago is barely recognizable today. What were 51 separate U.S. defense business units in 1980 had become five large defense-focused firms by 1997.
- In the mid-1980s, the top ten firms received more than 33% of all DoD prime contract awards. A further 28% of direct DoD revenues were widely distributed among an additional 40 firms.
- By the early 1990s, many commercial firms in sub-tier defense niches left or dramatically reduced their presence in defense-specific product markets.

Defense Industry of the Future

- Current prime contractors that have understood the transformation mandate will change with the times. They will be joined by lower-tier firms.
- Lower-tier firms and innovative small companies now in joint ventures with prime contractors will achieve critical mass on their own and will grow to be prime contractors.
- Commercial companies or divisions of commercial companies that will form around defense requirements.

Defense Industry of the Future

- DoD framework for the defense industrial base should be organized around five effects-based sectors:
  - *Combat support*: functions that equip troops and move them to battle locations.
  - *Power projection*: transporting troops and equipment to the battlefront; includes airlift programs, sealift, and logistics functions.
  - *Precision engagement*: includes strike aircraft, such as Joint Strike Fighter, F/A-22, F/A-18, and munitions programs for these aircraft.
  - *Homeland and base protection*: functions to protect troops and homeland, such as missile defense.
  - *Integrated battlespace*: includes network-centric warfare.

Joint Forces Interoperability

Joint Requirements Oversight Council

- Making equipment suitable for joint forces interoperability
- JROC formed in 1986 to review requirements generated by the Army, Navy, Air Force, and Marines from joint operations perspective
- As part of organizational transformation and “capabilities-based” development, Secretary Rumsfeld strengthens JROC

Joint Forces Interoperability

- Joint Capabilities Integration and Development System (JCIDS). Jointness is now to be "designed in." — June 24

- Focus on warfighting capabilities, not platforms

- 5 FCBs advise JROC:
  - Force Application
  - Force Protection
  - Battlespace Awareness
  - Focused Logistics
  - Command and Control

Considerations for Taiwan

Who?

- Military organizations and forces
- Military acquisition process
- Defense industrial base
- Defense S&T.

Considerations for Taiwan

What?

—Recast approach from “requirements-based” to “capabilities-based.”

—Emphasize joint forces and special forces

- interoperability; if not interdependence

—Emphasize flexibility and responsiveness, need quick response forces, take advantage of the IT-provided Situational Awareness

—Network sensors and shooters

—Operate inside the opponents’ OODA Loop

—Spiral acquisition

—Refocus S&T — from improving existing to thinking of how to address new categories of threats.

Considerations for Taiwan

When?

— Now and continuing
— Spiral deployments of capabilities.

Where?

— National leadership levels
— Corporate planning levels
— Military commander level
— In the Training Base and the School Houses.

Considerations for Taiwan

Why?

—It is all about national security.

—We want to achieve national objectives with minimum cost to friendly forces and innocent combatants.

Considerations for Taiwan

- I have sought to raise questions!
- Now my final question: what are the best answers in the context of Taiwanese security?

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Hsieh Hsieh !!!