NORTHROP GRUMMAN ANALYSIS CENTER

DOCUMENTED BRIEFING

The QDR Capability Mix

Problems, Analyses, Solutions

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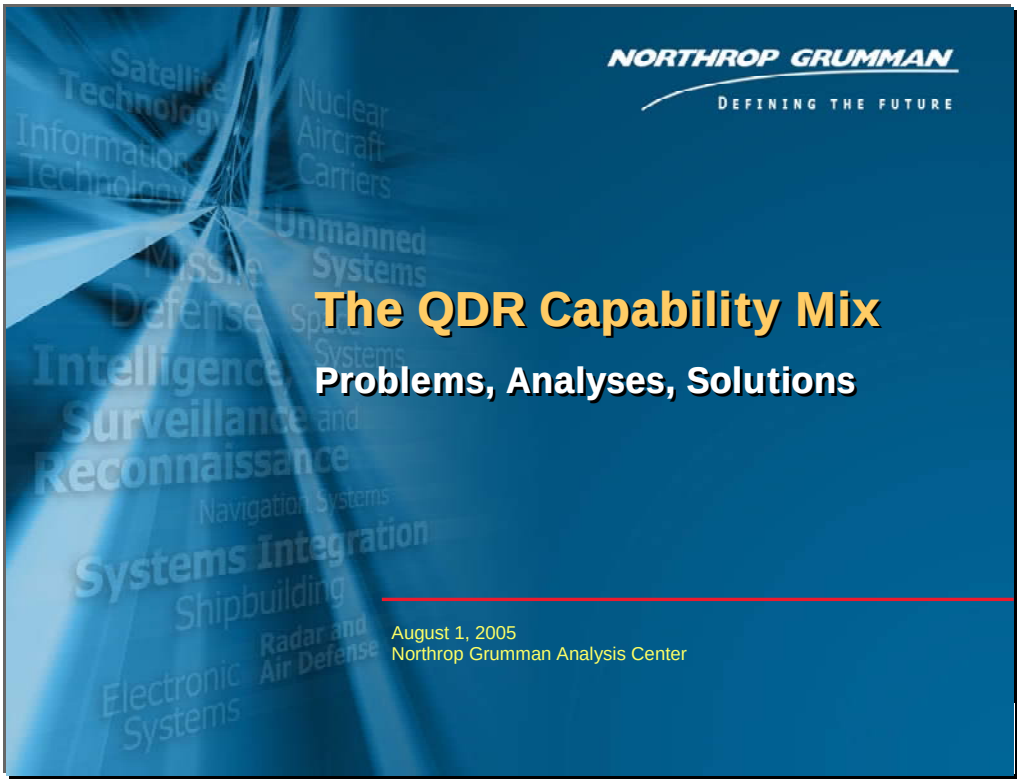
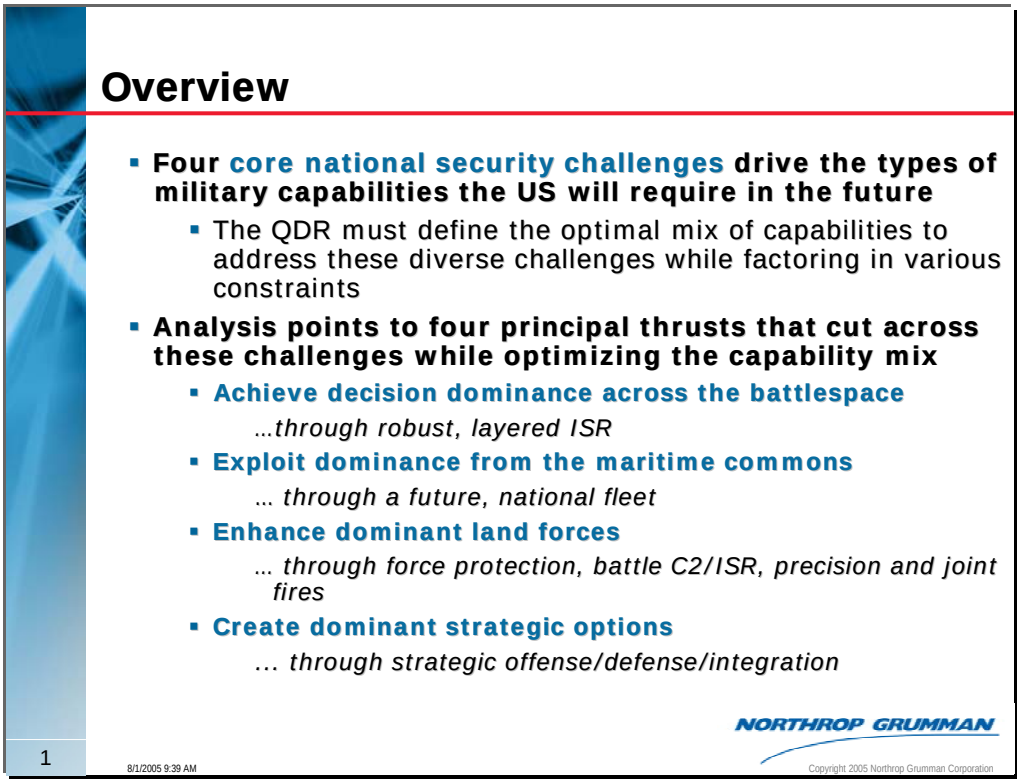
NORTHROP GRUMMAN



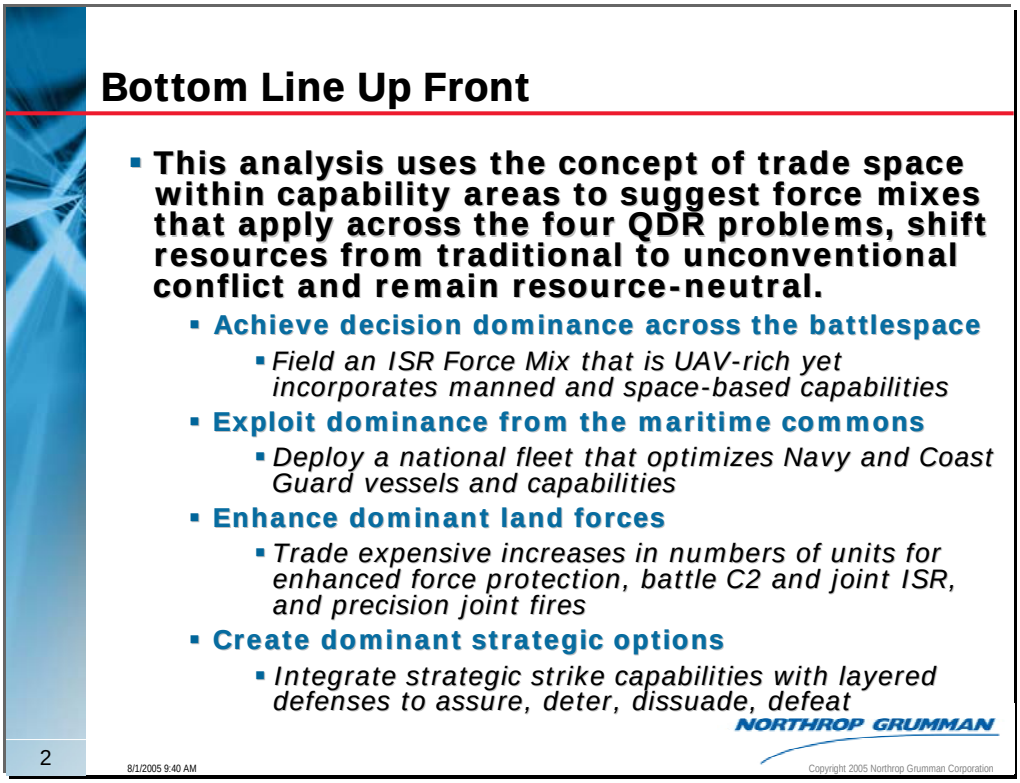
The Department of Defense (DOD) is directed by Congress to conduct a major review of military strategy and forces every four years. The purpose of the Quadrennial Defense Review (QDR) is to define a path for the next four years and beyond by addressing key areas such as force planning, plausible contingencies, ongoing operations, and force modernization. The 2001 QDR established an intellectual basis and agenda for defense transformation and the 2006 QDR promises to continue and extend that objective.

Because of our work in defense transformation, our studies of future conflict, and our ability to look across the entire company from a vantage point in Washington, the Northrop Grumman Analysis Center was asked to coordinate ongoing efforts within Northrop Grumman to help our Defense customers think about the QDR. This briefing captures our efforts thus far.



The focus of this year's QDR is on four central national security problems, ranging from fighting the war on terrorism and defending the Homeland to confronting actors armed with weapons of mass destruction and shaping long-term strategic competitions. After we briefly describe each of those problems, we will examine the military capabilities required to meet these challenges.

As we analyzed the QDR problems and needed capabilities, we developed recurring themes that cut across these problems and suggested an approach to optimizing these capabilities. If the United States can dominate the "strategic commons"– across the domains of air, land, sea, space and cyberspace—then we will occupy an advantageous position when we confront unknown and uncertain future dangers.

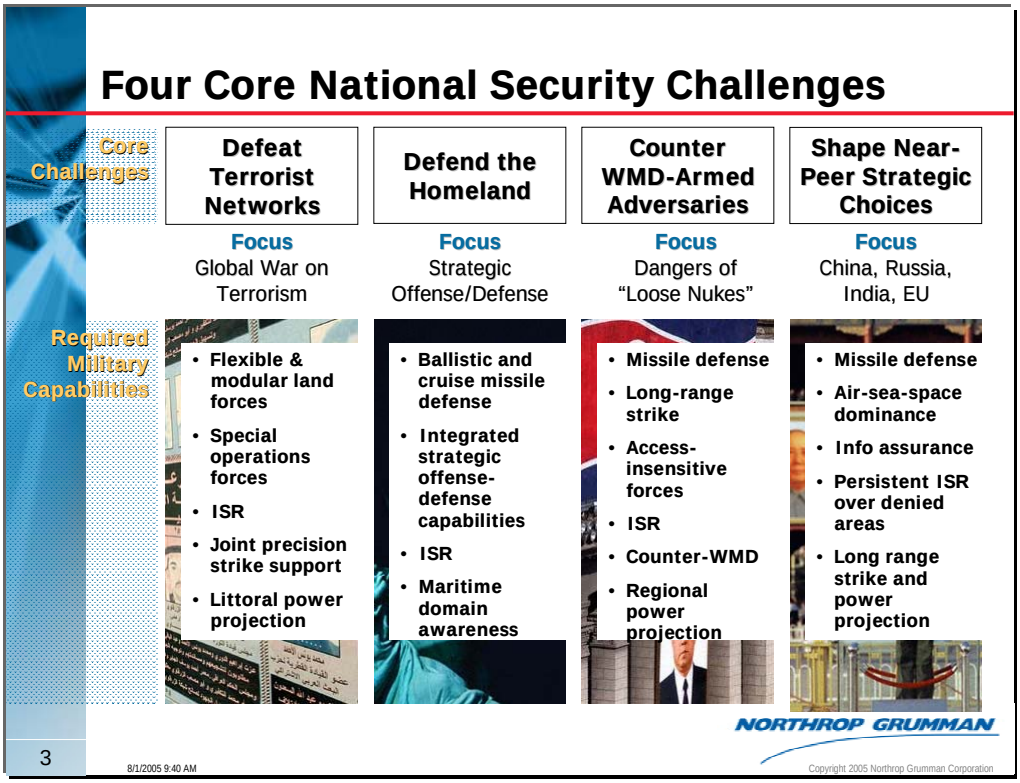


To put the bottom line up front:

There are two recurring themes you will hear throughout this analysis:

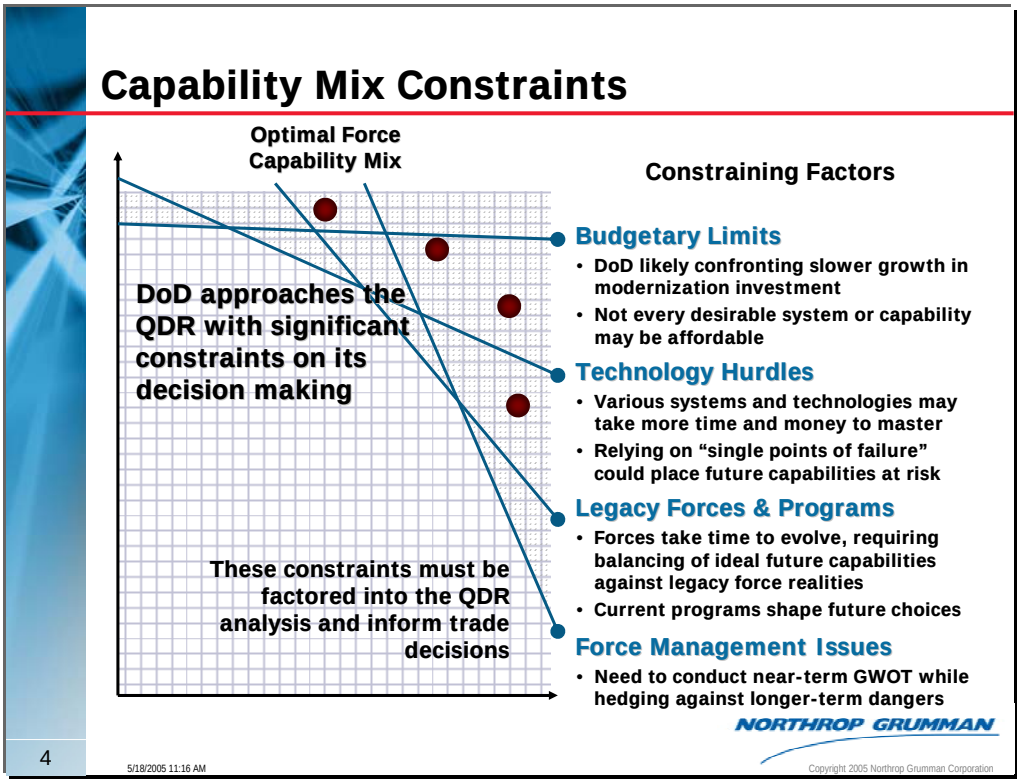
The first is “trade space.” Making choices within a revenue-neutral environment suggests that there will be winners and losers. But shifting resources across service budget lines or attempting to realign service roles and missions often prove very difficult to implement. Our analysis, for the most part, suggests actions that can be taken within service-specific budgets.

The second theme is trading technology for manpower. You’ll see this reflected in the Unmanned Air Vehicle (UAV)-rich ISR (Intelligence, Surveillance, Reconnaissance) constellation we recommend, the size and shape of a future Navy and Coast Guard, enhanced ground forces, and the generation and integration of dominant strategic options.

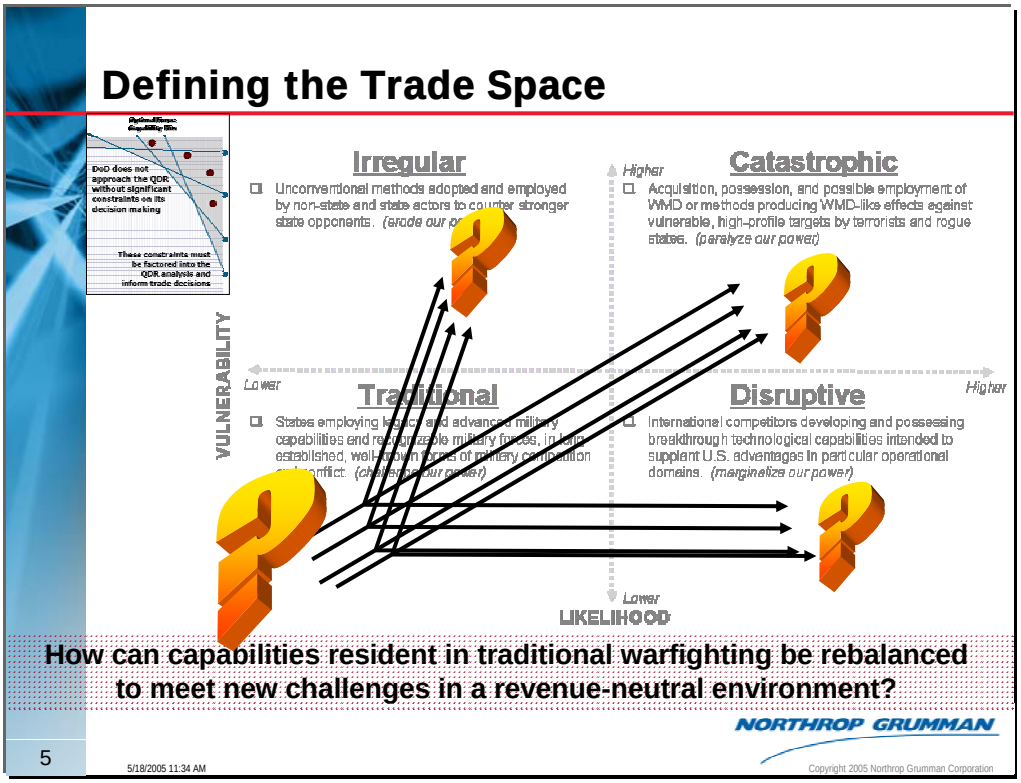


The Armed Services, OSD, the Joint Staff and the regional combatant commanders use planning scenarios based on plausible, hypothetical contingencies to size and shape future military forces. An important step in the QDR's planning process was to formulate scenarios that, in addition to addressing traditional challenges, would consider operations against asymmetric foes. DOD began to construct these scenarios, designed to recalibrate U.S. military capabilities, during the summer of 2004 with the understanding that the U.S. possessed an enormous capability to decisively defeat medium powers, as demonstrated in the major combat operations phase of Operation Iraqi Freedom, but was lacking capabilities and investment required to conduct a global war on terrorism, or to hedge against an emerging near-peer with disruptive capabilities. Thus, planning scenarios were developed to focus on areas of U.S. military undercapacity against the types of non-traditional threats we are already facing today. These scenarios, refined through the process of developing QDR Terms of Reference, emerged as four distinct planning "challenges."

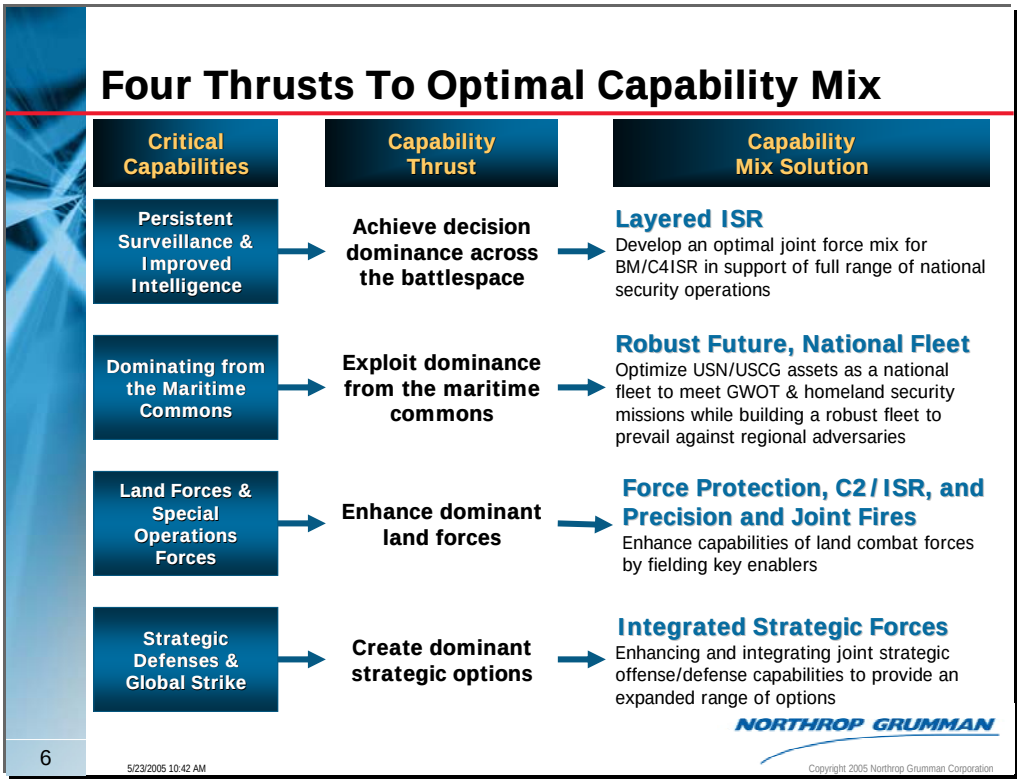
Six panels are charged with conducting the QDR analysis. Panel 1 will address the four challenges with the purpose of identifying an optimum capability mix that cuts across them and balances near-term needs with long-term requirements. This slide shows the capabilities identified with each challenge. As you see, there is considerable overlap.



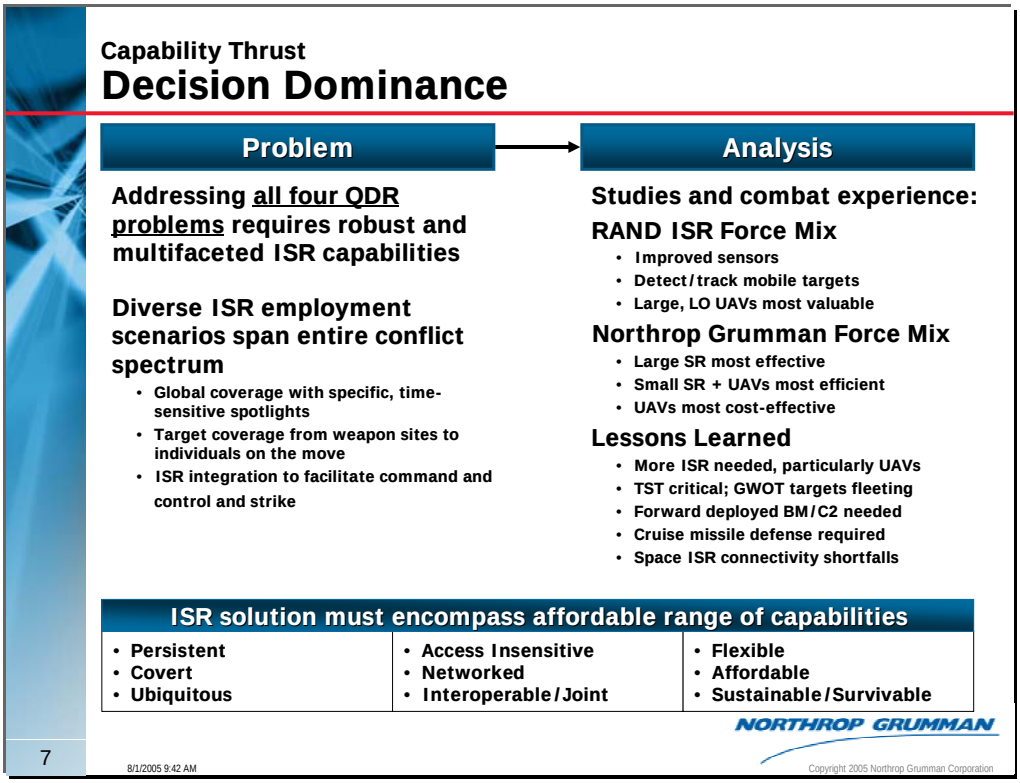
That there is such overlap across the planning challenges is fortunate, because as this notional "linear programming" analysis suggests, various constraints weigh against designing separate capabilities and forces to meet each QDR challenge. Limited budgets, immature technology, and existing plans and forces compress the solution space. Perhaps the most difficult issue facing QDR planners is balancing the present requirements of the Global War on Terrorism (GWOT) with the long-range goal of shaping the environment and hedging against future strategic competitors.



The National Defense Strategy providing the conceptual basis for the 2006 QDR posits that the U.S. military predominates in traditional forms of warfare. But it also notes there remains an array of traditional, irregular, catastrophic and disruptive capabilities threatening U.S. security interests. Because these categories overlap, the Department of Defense has called for capability-based planning to confront these challenges wherever they may arise and to apportion risk across them.



To help address the QDR challenge, we used an "alternative futures" approach, looking across the four QDR problems to determine what capabilities added value to all of the planning scenarios. Four broad thrusts emerged that cut across the four challenges: layered ISR, the future naval fleet, enhanced land forces, and integrated strategic offense and defense. We then analyzed each of these capability areas in terms of methodology and prospective solutions. That is, we examined recently-accomplished studies in these capability areas and adopted a "meta-study" approach to distilling and rationalizing their findings. We then framed a series of solution sets for each capability area suggesting the gaps that existed along with prudent and affordable steps to plug those capability gaps. The following outlines the steps we took for each initiative. We will outline our approach to these problems in the rest of the briefing, but separate, more detailed presentations are available on each thrust.



In the 20th century air and space dominance was a necessary prerequisite for US military success. That is no longer sufficient. Today we need Decision Dominance. Our adversaries are more agile and use the Internet, cell phones and satellites. They are moving quickly, and to remain inside their OODA (Observe, Orient, Decide, Act) Loop, we must move even more quickly. Robust ISR is therefore critical.

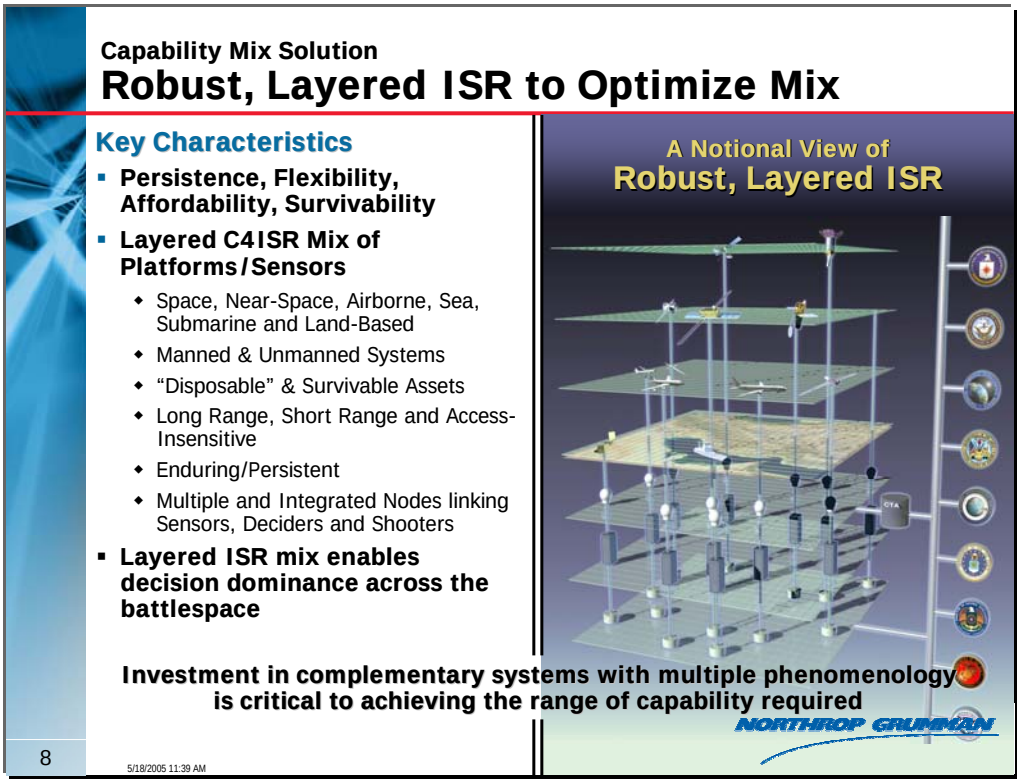
In fact, robust ISR is fundamental to all we do militarily—from time-sensitive targets (TST) to missile defense to air and space dominance.

Those challenges are combined with the diverse threat structure articulated in the QDR that spans the conflict spectrum and posits threats ranging from individual, highly mobile terrorists to armored divisions.

These diverse threats require equally diverse solutions that in some ways are almost contradictory. How do you get sensors/platforms that are ubiquitous and survivable yet also affordable?

The problem has been studied several times. RAND favored UAVs; our company believes a space radar system augmented by manned and unmanned systems is most cost-effective. We especially recognize the need for a low-observable (stealthy) long-dwell UAV.

Combat operations in Afghanistan and Iraq similarly highlighted the importance of UAVs, TST—in the war on terrorism it seems virtually all our targets are fleeting or pop-up—forward-deployed Battle Management platforms for the close battle, cruise missile defense, and better connectivity at all levels and between all systems.

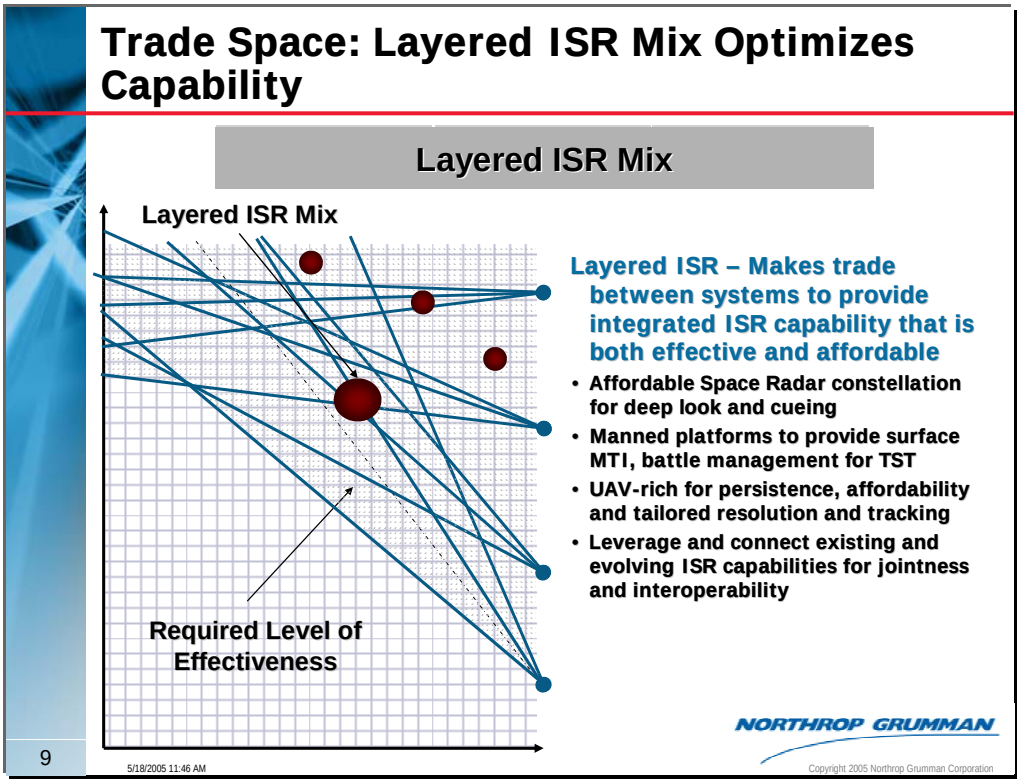


Essentially, all of these studies and conflict experiences identified as critical the diverse characteristics of persistence, flexibility, affordability and survivability. This presents a formidable challenge.

The solution is a Layered ISR mix of sensors and platforms. But by layered we don not just mean in the sense of altitude—although as this diagram illustrates, we include sensors/platforms in space, near space, air, land, sea and even beneath the sea. But layered also in the sense of knowledge. Various sensors and platforms are able to "peel back the layers of an onion" on a given target: one moving target indicator (MTI) sensor might locate and track a moving vehicle; a synthetic aperture radar (SAR) will identify the specific vehicle type; and yet another sensor will listen in on the cell phone conversations of the vehicle's occupants.

Depending on the threat, target or scenario, there may be a need for a penetrating platform with sensors that look deep into denied territory, or it may require a persistent platform to track moving targets, or it might just be a temporary, low altitude and short-range platform to perform reconnaissance in front of a ground convoy proceeding down a highway.

These integrated sensors and platforms will produce a Layered ISR mix that will achieve Decision Dominance.



The bottom line is that a layered mix of various platforms and sensors, each possessing its own strengths and weaknesses, helps to optimize our capabilities for a diverse range of threats.

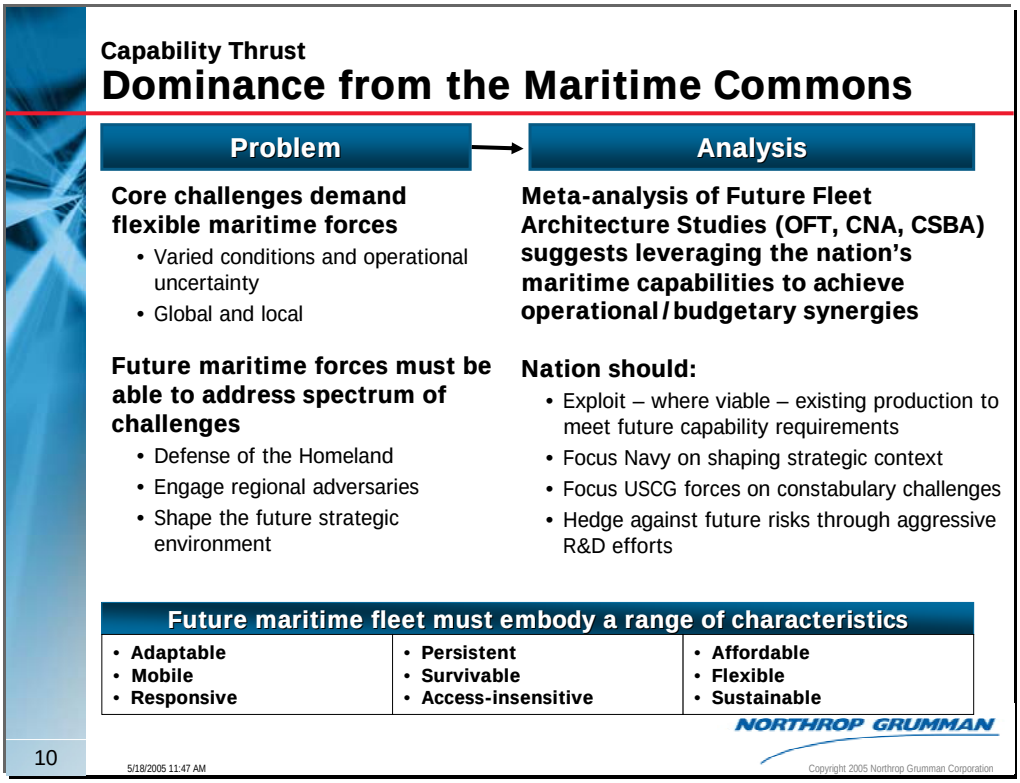
The layered ISR mix suggests a trade off between systems so as to provide an integrated capability that is both effective and affordable.

Space radar is needed for deep looks into denied territory and cueing other sensors.

Manned platforms are needed to house the powerful MTI radars so necessary for tracking targets on both the ground and in the air—for cruise missile defense—while also providing the line-of-sight communications and battle management still essential in the tactical ground battle.

UAVs, some stealthy, are needed for persistence, affordability, and to reduce risk to aircrews.

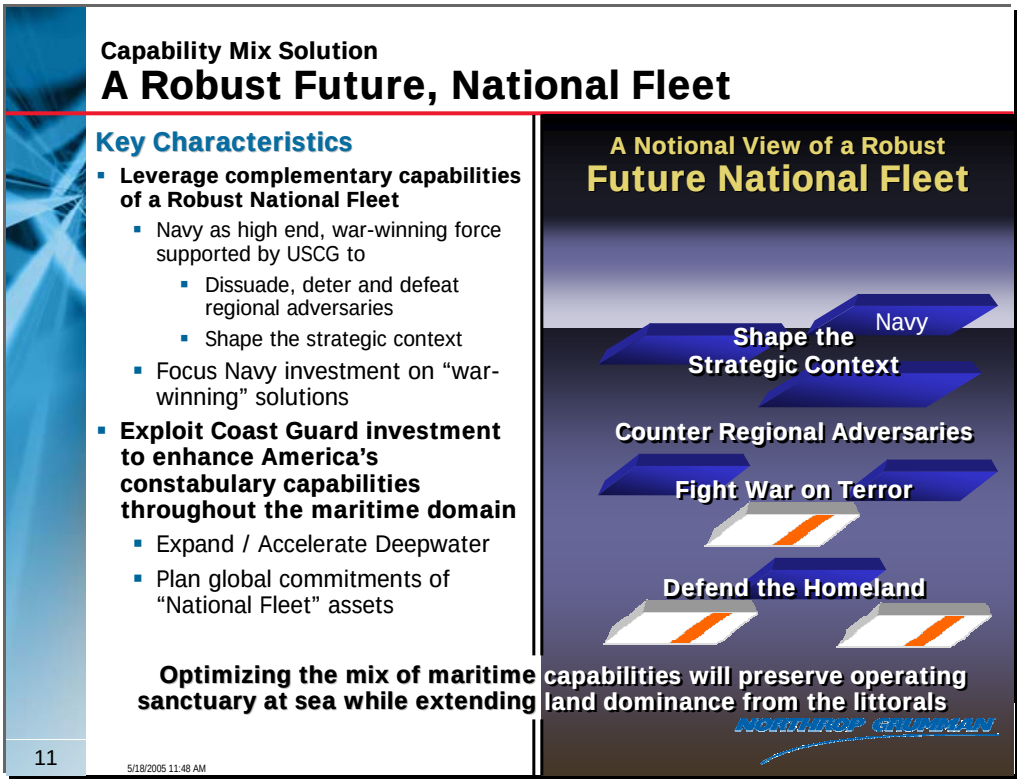
Above all, we need all of the platforms and sensors of the Layered ISR mix to be connected to each other and able to collect data, convert them into actionable knowledge, and then disseminate them to warfighters and decision makers at all levels.



The United States enjoys a key asymmetric advantage – a near total dominance of the global commons. These include space, international air space, cyberspace, and the maritime commons. Key challenges for the US include protecting the commons, maintaining and expanding our dominance in them, and exploiting that dominance in support of national interests.

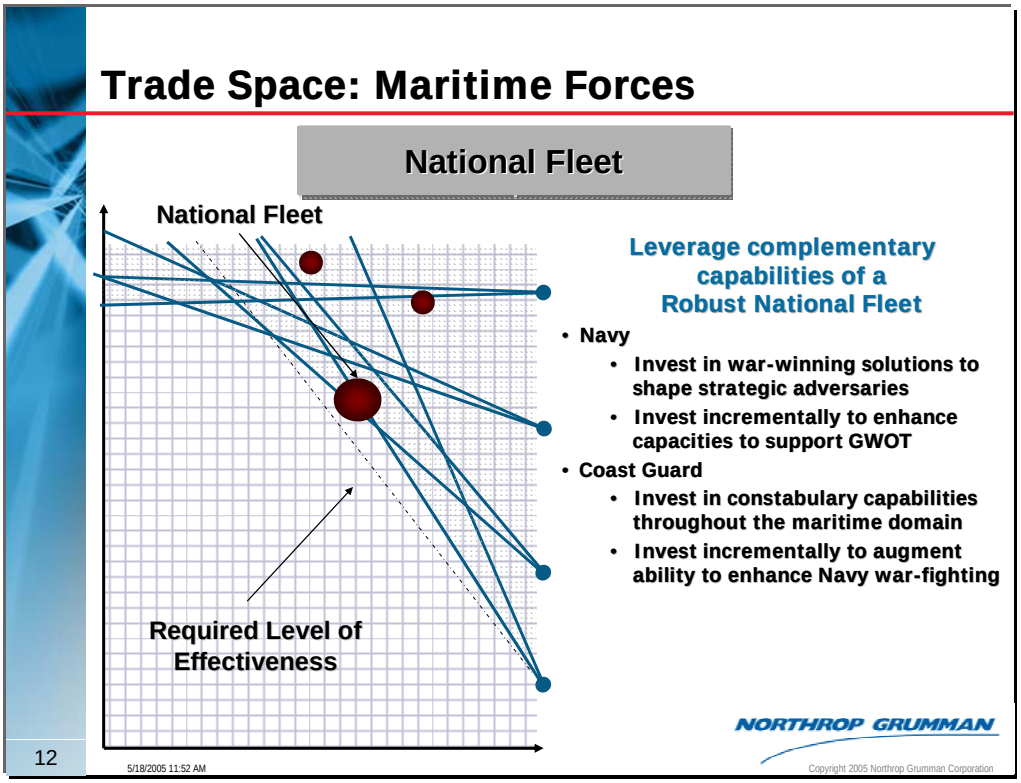
These challenges span the spectrum of conflict. To defend the homeland and fight terrorism, the nation requires global maritime security ensured principally through constabulary-type capabilities. To shape strategic choices of near-peer competitors, and to dissuade, deter and defeat potential adversaries, the nation requires maritime capabilities to dominate in and from the maritime commons to provide – as part of the joint force – war-winning capabilities.

The past several months have seen publication of three major "Future Fleet Architecture" studies. Our analyses examined these in depth – along with concepts related to the future maritime environment – through the lens of how to "manage risk" while "creating opportunity." These studies also attempt to translate capability into force structure – a necessary step in ensuring dominance from the maritime commons.



Our meta-analysis suggested a number of paths toward controlling risk (such as exploiting existing production lines to meet future capability requirements) and creating opportunities for tomorrow's decision-makers (such as aggressive research and experimentation to exploit new technologies). Perhaps most important, however, is the opportunity to mitigate risk and encourage innovation through a reinvigoration and expansion of the National Fleet concept first developed by the Navy and Coast Guard in the late 1990s.

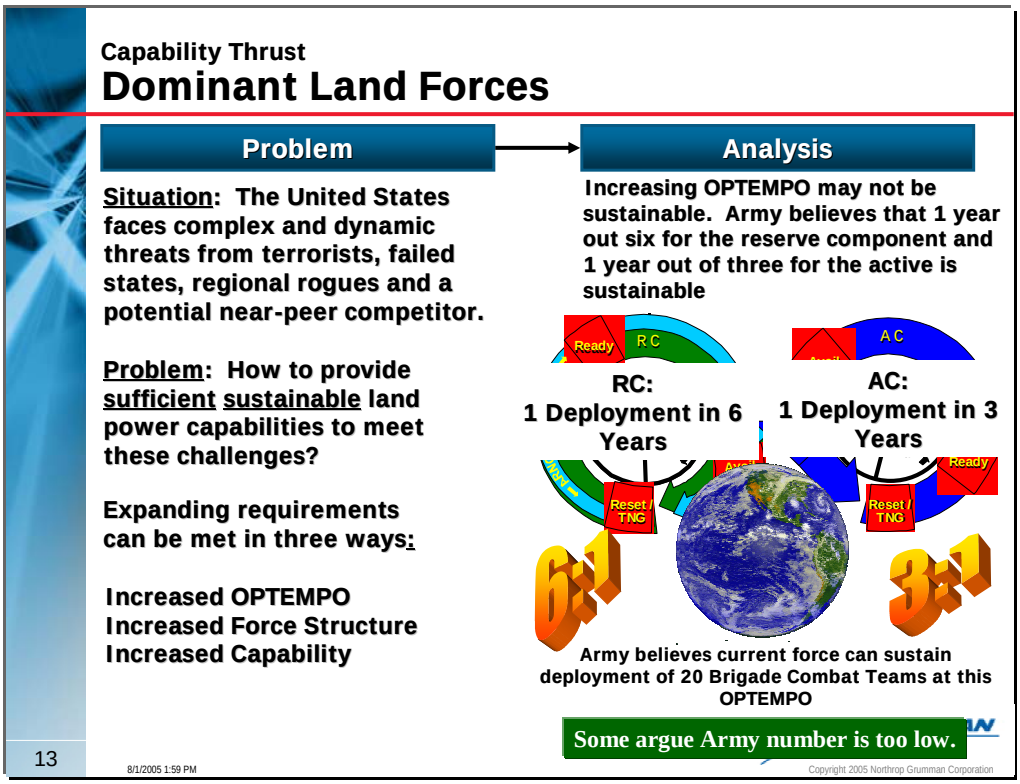
The QDR problems pose clear "war-fighting" and "constabulary" requirements for present and future maritime capabilities. The nation's premier maritime war-fighting force, the Navy-Marine Corps team, has conducted constabulary-like missions throughout its history. The US Coast Guard, the world's preeminent maritime constabulary force, has always played a role supporting the U.S. Navy in war-fighting. Technological advances (such as the incorporation of high-end command and control in the Coast Guard's Deepwater program), QDR challenges (such as the war on terrorism and homeland defense), and new operational concepts (such as Maritime Domain Awareness) suggest that the nation would be best served through a synergistic approach toward America's National Fleet.



Our notional trade space diagram suggests a way of capitalizing on national assets to generate capabilities demanded by the four QDR problems. The responsibilities for maritime dominance are shared between services, but a rationalization of missions, budgets and capabilities can produce an optimum maritime force mix.

The Navy's 3/1 Strategy states: "While the Navy's focus is on fighting and wining the nation's war overseas, it also has responsibilities to protect the homeland through defense of the nation's maritime approaches. In executing these responsibilities, the Navy works closely with the Coast Guard, which has day-to-day responsibilities for the security of the nation's maritime approaches. The Navy maintains ships and aircraft in a readiness posture appropriate to the threat level, ready to rapidly augment Coast Guard forces should the need arise. Agreements exist to rapidly shift Navy forces to Coast Guard control, if necessary."

An examination of requirements to meet these missions – requirements met not just by they Navy and Coast Guard, but also potentially Army, Air Force, and even National Oceanic and Atmospherics Administration (NOAA) maritime assets – balanced against resource constraints suggest that an affordable National Fleet to manage risks while creating opportunities would total in the range of 600 hulls across all of these services. This reconceived and reinvigorated "National Fleet" would provide the maritime capabilities the nation requires to meet the QDR's four problems.



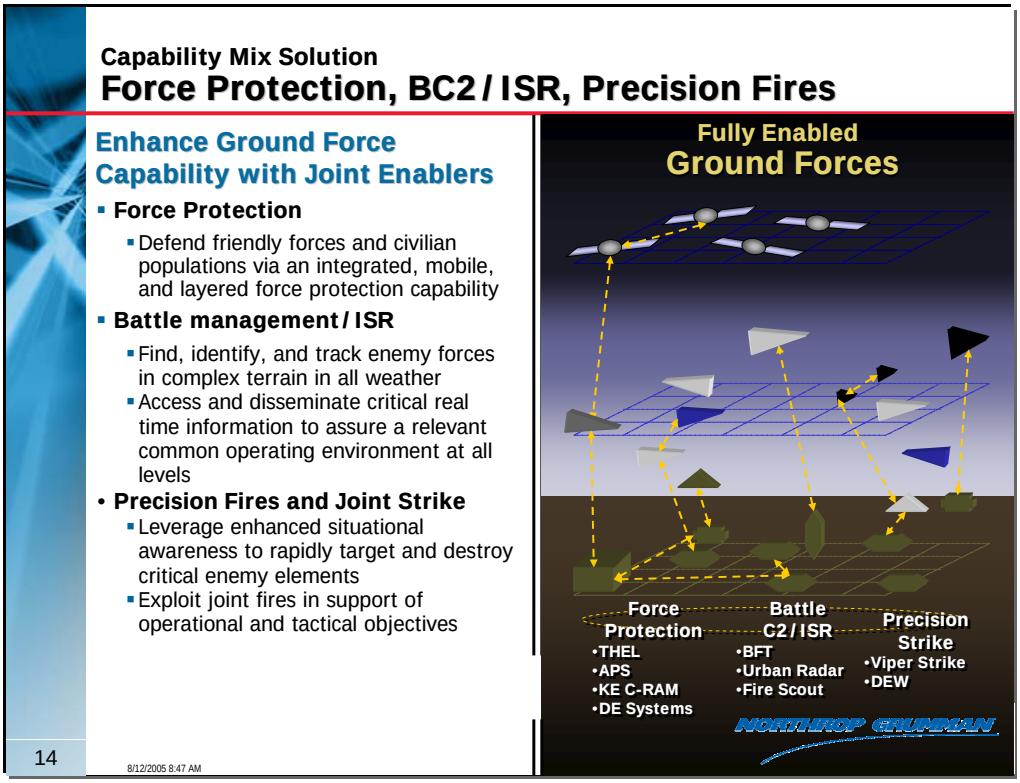
One of the biggest issues DoD faces in the QDR is determining how to provide sufficient land power on a sustained basis to meet all the challenges we face today and in the future. The expanding demands placed on U.S. land forces can be met by increasing OPTEMPO, increasing force structure and increasing capability. An increase in OPTEMPO has been the only viable choice in the near term. However, both the Army and the Marine Corps are strained by the requirement to provide forces for Iraq, Afghanistan, and other trouble spots that demand "boots on the ground."

To prevent this high OPTEMPO from breaking the force, the Army believes that Reserve Component (RC) forces should not do more than one deployment every six years, Active Component (AC) not more than one in three years.

This means that for every RC brigade combat team (BCT) deployed, the rotational base must contain six BCTs. For the AC, the rotational base must contain three BCTs for every one deployed.

Thus, the number of BCTs that must be deployed on a sustained basis drives the requirement for Army force structure. The Army believes that 20 deployed BCTs should be sufficient to meet requirements. Sustaining this number of deployed BCTs at the appropriate OPTEMPO requires a minimum of 34 RC BCTs and 43 AC BCTs. However, others argue that the Army number is too low. Some believe the Army requires approximately 60 AC BCTs, others advocate an increase in that Army end strength by approximately 100k vice the 30k the Army thinks is sufficient. However, increasing the

number of BCTs (at 3k personnel each) with each additional soldier requiring $100k annually in personnel costs alone is expensive, especially when additive costs of recruiting, equipping, training, maintaining, and housing each additional BCT are considered.

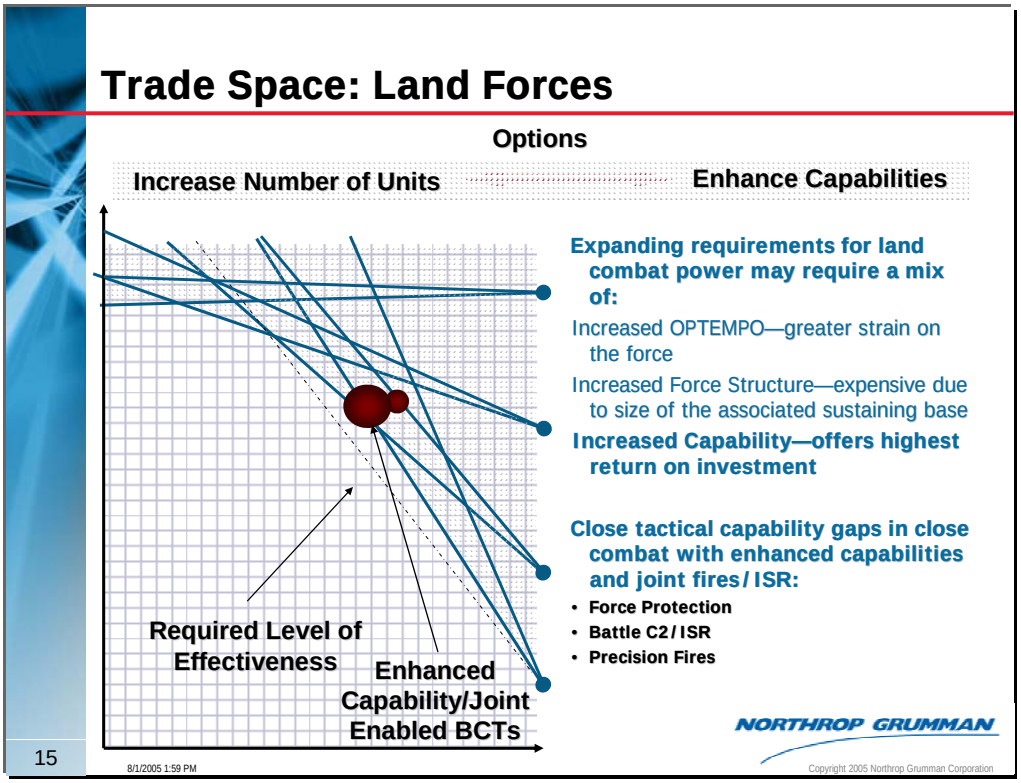


A more attractive alternative to increasing the size of the existing force is to enhance the capabilities of its existing and planned units. The Army is doing this already as it converts its current division-based structure into smaller, modular BCTs.

Army Training and Doctrine Command (TRADOC) is working hard to identify and field these critical capabilities. Its Capability Gap analysis has identified both near and mid-term gaps in capabilities that must be closed soonest. These can be synthesized into three major categories.

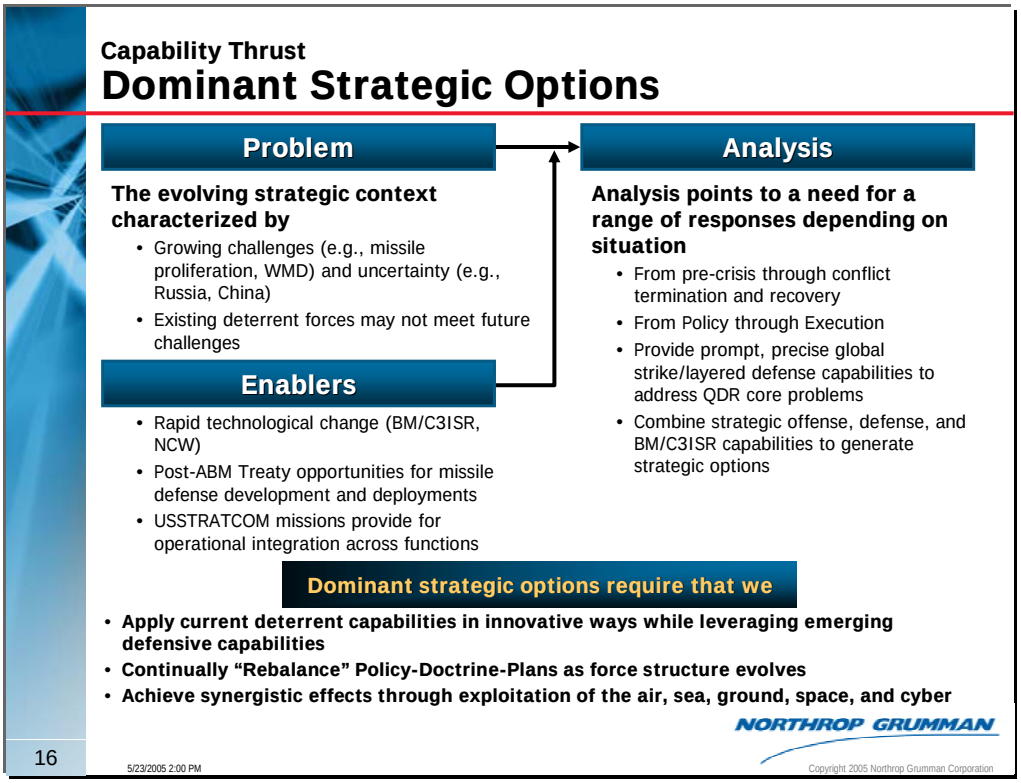
- Force protection: particularly the ability to defend both friendly forces and civilian populations from the full range of threats from IEDs to cruise and theater ballistic missiles.
- Battle Command and Control and Joint ISR, focused on two key capabilities: developing and sustaining situational awareness on the enemy regardless of his efforts to disperse and employ cover and concealment in all terrain, and getting critical information to the lowest tactical levels as rapidly as possible.
- Precision Fires and Joint Strike: As units become smaller, their organic lethality may decrease. We can reverse that with precision fires that take advantage of our enhanced situational awareness and with joint fires that mass the full effects of land, air, and maritime fires to support ground tactical operations at all levels.

We have developed a detailed briefing describing how existing and emerging systems might be combined to provide these three enhanced capabilities throughout our Army, Marine, and SOF land forces.



The QDR may well determine that the U.S. requires a higher level of deployed land combat power than currently planned. This requirement may demand increases in OPTEMPO, force structure and capability. Of these three options enhanced capabilities are likely to offer the highest return on investment.

There is a compelling case for achieving this greater combat power by enhancing the capabilities resident in our existing and planned land force units rather than increasing the number of units. The six-to-one ratio of sustaining base Army RC units to deployed RC units and three-to-one ratio for AC units demonstrates the "multiplier" for investing in enhanced capabilities. Enhancing unit capabilities reduces the number of units that must be deployed to meet requirements. Each unit that does not need to be deployed because of enhanced capabilities resident in the deployed force reduces the number of units in the RC sustaining base by six or the number of units in the AC sustaining base by three, saving substantial associated resources in personnel, equipment, facilities, operations and maintenance and other areas. For the Marine Corps the math is somewhat different but the same principle applies.



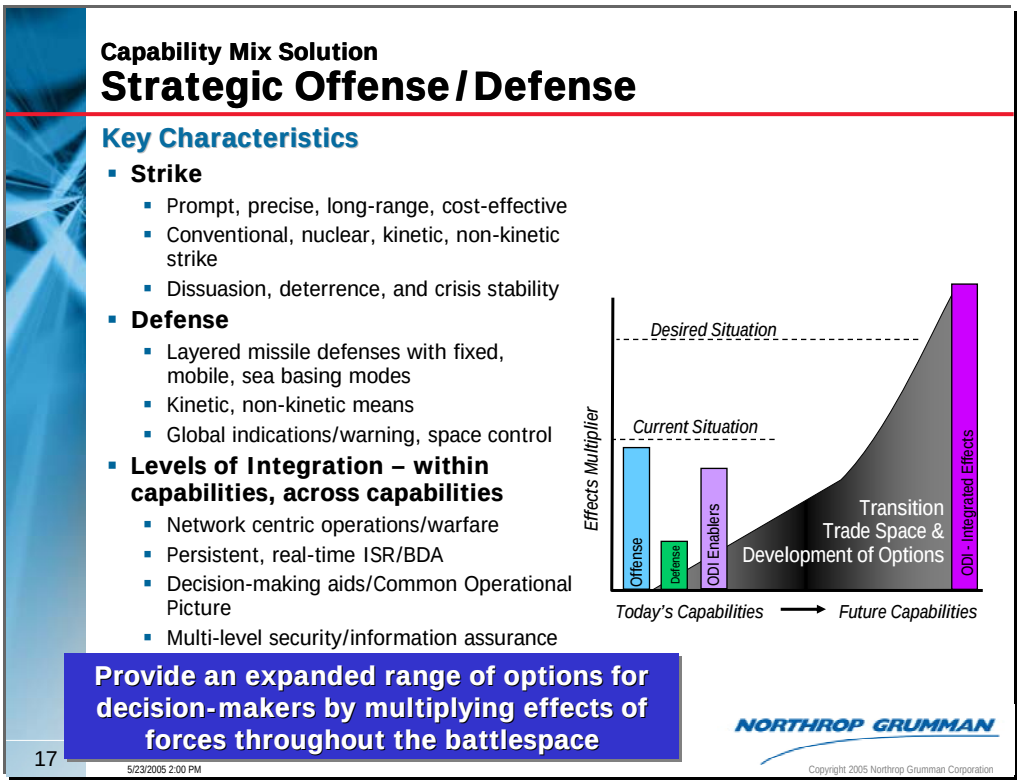
This segment of the briefing addresses creating dominant strategic options for key decision-makers. The strategic context that will shape those options includes an expanding range of challenges, threats, and missions facing the United States and its allies.

Through the "Triad" of intercontinental ballistic missiles (ICBMs), submarine-launched ballistic missiles (SLBMs), and long range heavy bombers, U.S. nuclear forces have provided a deterrent capability for nearly 60 years. While the Cold War has gone away, new threats are arising that will require these same forces to adapt or evolve to meet these future challenges. For example, there may be instances where a prompt, hard-target kill capability is required, as airborne or other ground-based assets may not be sufficient to meet a time-critical response requirement.

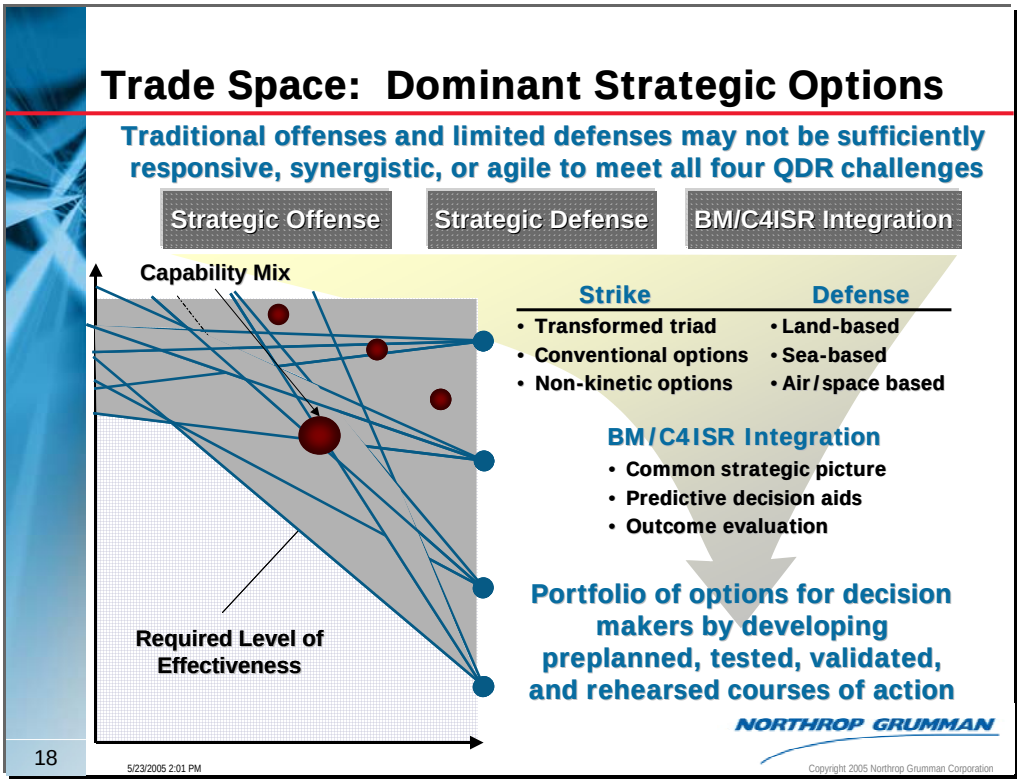
The introduction of missile defenses into the equation of possible U.S. response options and capabilities means also that national decision-makers will have alternative means other than nuclear to respond to threats that may be traditional (defending the homeland), catastrophic (countering WMD-armed adversaries), disruptive (deterring competitors from developing and acquiring breakthrough technological capabilities), and irregular (defeating terrorist networks). Furthermore, rapid technological changes in battle management/command, control, communications, intelligence, surveillance, and reconnaissance (BM/C3ISR) and network centric warfare (NCW) enable new means of strengthening and integrating these forces.

Our analysis points to a need for a range of integrated responses to achieve dominant strategic options. While current response options may focus on offensive forces, or defenses, integration occurs within those capabilities as well as across capabilities. Prompt, precise global strike and robust layered defense capabilities are needed to address the QDR core problems. Combining strategic offensive and defensive systems with BM/C3ISR capabilities will facilitate a more complete set of response options consistent with U.S. national interests across the spectrum of conflict.

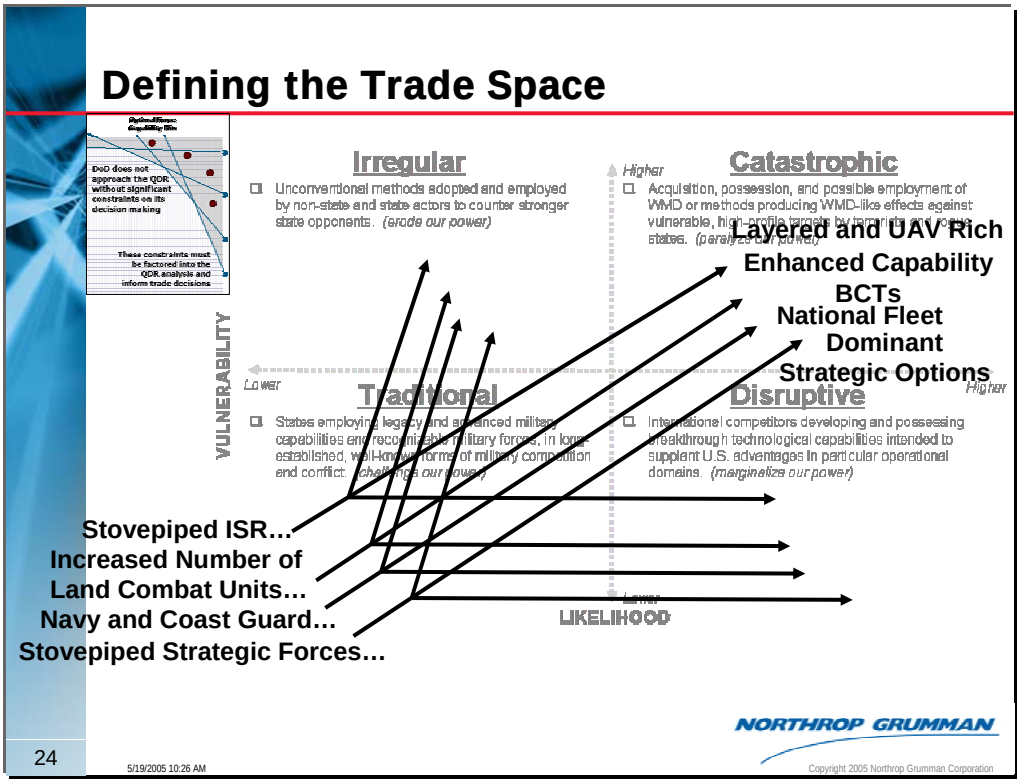
Consequently, dominant strategic options require that we apply our current deterrent capabilities in innovative ways while leveraging emerging defensive capabilities to meet new and emerging threats. We will need to continually "rebalance" the relationship between policy guidance, doctrine, and planning as the force structure evolves and matures. We need to develop new strategic capabilities and then exploit the synergistic effects of the combined offenses, defense, and BM/C3ISR wherever they are based, i.e., in the air, on the ground, on the sea, under the sea, in space, or in cyberspace.



The capability mix solution that addresses the QDR challenges consists of three elements: strike, defense, and what we term "levels of integration." The characteristics of strike include capabilities that are prompt, precise, long-range, and cost effective, and can span the range from conventional to nuclear, kinetic, and non-kinetic warfare. Defenses consist of layered systems with fixed, mobile, and sea basing modes; they can be kinetic or non-kinetic; and they can provide global indications and warning of impending attack, to include warning and defense of cruise missiles. By "levels of integration" we refer to the integration and interoperability that is necessary within strategic offensive forces, within defenses, and within BM/C4ISR; in many ways this is a necessary step, involving multi-level security and other considerations, that must be accomplished before integration across these capabilities can be accomplished. Integration between offense and defense should provide near real-time ISR and battle damage assessment, decision-making aids, a Common Operational Picture, and multi-level information assurance. In the future, the integration of these capabilities will provide a set of integrated strategic options greater than the sum of its parts.

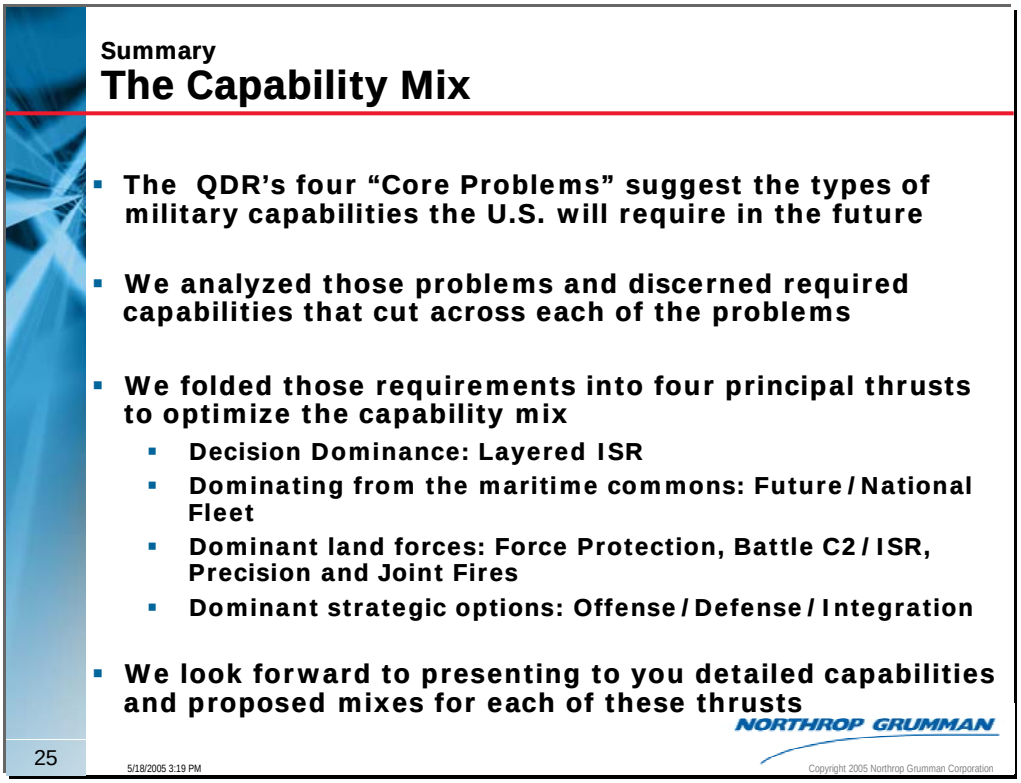


Finally, the opportunity of transitioning and integrating strategic offensive and defensive forces in support of national objectives offers new strategic options for decision-makers. Future capabilities, such as long range prompt conventional strike and mobile and sea-based missile defense supported by advanced intelligence, surveillance, and reconnaissance capabilities, are equally important as means by which to provide strategic options not available to decision-makers today. In parallel, developing preplanned, tested, validating, and rehearsed courses of action will familiarize decision-makers with existing capabilities to meet threats as well as generating new capabilities to deal with emerging threats.



A principal challenge facing the QDR is to re-balance the force by moving capabilities from the “traditional” quadrant of conflict, where we enjoy overmatch and dominance, to the asymmetric “irregular, catastrophic, and disruptive” regions where they are needed. We have suggested four thrusts to aid that process while keeping the trade space essentially within service budgets and offering technology as a substitute for manpower.

The combination of layered ISR, a national fleet, enhanced modular ground forces and dominant strategic options begins to optimize capabilities across these four quadrants and across the principal QDR planning scenarios.



This presentation has merely outlined the thrusts that cut across the four QDR problems and begin to develop an optimum capability mix. There are four separate briefings that explore these thrusts in greater detail that we would be pleased to present to you in the future.

The Northrop Grumman Corporation established the Analysis Center in 1977 to conduct objective analyses of strategic trends, defense policy, military doctrine, emerging threats and operational concepts, and their implications for the defense industry.

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