Transformation Study Report

Executive Summary

Transforming Military Operational Capabilities

Prepared for the
Secretary of Defense

April 27, 2001

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Contents

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Introduction

The Transformation Study Group[1] was convened at the direction of the Secretary of Defense on March 5, 2001. Guidance given to the study group charged it to identify:

- capabilities needed by US forces to meet the challenges of the twenty-first security environment;
- capabilities needed to meet national intelligence and space defense needs;
- transformation recommendations— how to develop and field the needed capabilities; and
- opportunities for cost savings, where feasible.

This paper summarizes a report presented to the Secretary in the form of briefing charts on April 27, 2001.

The Changing Need for, and Expectations of, US Military Forces

With the demise of the Soviet Union, there was a fundamental change in what the United States needs and expects from its military forces. The overriding priorities during the Cold War were a clear capability to (1) deter a nuclear attack against the United States and its allies; (2) deter war between superpower coalitions; and (3) if deterrence failed, ensure marginal superiority over Cold War opponents sufficient to assure that a conflict would be resolved on terms favorable to the United States and its allies. All other demands that might be placed on our military forces were regarded as lesser-included capabilities in the forces needed for these three overriding priorities. Even when those forces proved to be inadequate to deter lesser conflicts, such as the Korean and Vietnam wars, the focus remained on the priorities described above.

With the end of the Cold War, the demand quickly evolved to forces able to dominate opponents across the full range of military operations, from strategic nuclear deterrence to humanitarian relief, with the expectation they could do so with little or no loss of life in our forces and minimum unintended damage. This dramatic change in the demands placed upon

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1 Membership listed in Appendix A.

our forces leads logically to a need for significant changes in their capabilities— a transformation of the United States Armed Forces to meet twenty-first century demands. The demand for such a transformation is not theoretical: we are routinely tasking our forces to accomplish missions demanding capabilities that are clearly beyond the lesser-included capabilities of the Cold War force. While transformation needs are complex and far-reaching, successful transformation will build on existing forces that are unarguably the most capable in the world.

In contemplating transformation, we assumed there will continue to be a need for robust forward-stationed air, sea, and land capabilities to contribute to shaping the environment and to provide dissuasion and deterrence. The uncertainties of the future also demand a much more responsive and potent conventional capability, both to underwrite dissuasion and deterrence and to be decisive when crisis intervention is necessary. It is in this response capability area that transformation is most needed. More specifically, transformation activities must:

- **Capitalize on the relevant capabilities** in what is currently the most effective set of military forces in the world.
- **Preserve current strengths**— nuclear sufficiency, worldwide power projection, decision superiority, technological superiority, high quality human resources, and training superiority— from erosion in the face of new challenges.
- **Meet new threats and environments** to include ballistic and cruise missiles, opposed access, dependence on networks, counters to precision strike systems, and widening commercial availability of wideband communications and high-resolution imagery.
- **Exploit new opportunities** including, but by no means limited to, information technology; standing joint command and control systems; all-weather, persistent battlespace surveillance and targeting; global rapid mission planning and retargeting systems to exploit a potentially massive increase in lethality per weapons platform; rapidly deployable, versatile, lethal, and survivable joint, combined arms forces— land, sea, and air; and joint training and experimentation environments featuring human-in-the-loop simulation and live exercise capabilities.

Broader Transformation Capabilities and Issues

While we believe that conventional force capabilities need to be the prime focus of transformation, conventional forces depend on a set of military capabilities that have roles broader than military operations. Previous studies have highlighted essential changes required, and our study assumed additional capabilities in these key areas, as described in the following appendices:

- Strategic Nuclear Forces (Appendix B)
- Missile Defense (Appendix C)

- Space Dominance (Appendix D)
- Information Dominance (Appendix E) and classified Annex F
- Intelligence (Appendix F) and classified Annex F
- Special Access Programs (Appendix G)

Transformation

Transformation is a process of change that involves developing new operational concepts, experimenting to determine which ones work and which do not, and implementing those that do. Transformation deals with

- changes in the way military forces are organized, trained, and equipped;
- changes in the doctrine, tactics, techniques, and procedures that determine how they are employed;
- changes in the way they are led; and
- changes in the way they interact with one another to produce effects in battles and campaigns.

The objective of the transformation process is to realize military capabilities that can deal effectively with the new demands of a changing security environment. Transformation involves preserving current US strengths, meeting new threats and environments, and exploiting new opportunities. To some extent, transformation means accelerating the development and fielding of capabilities that we know we need. But it also means exploring capabilities that are less well understood, and correcting the course we are on, as necessary, to ensure that those needed new capabilities are realized.

It is neither possible nor necessary to transform the entire force at once. A relatively small fraction of the force transformed can enable new and revolutionary ways to fight. Thus it is reasonable and prudent to begin transforming a portion of the force to meet particularly pressing challenges while at the same time experimenting with new concepts and technologies to arrive at judgments about new capabilities and the changes necessary to achieve them.

The charter of the Transformation Study Group was to focus on the capabilities needed by US forces to effectively address the twenty-first century security environment. To do that, we examined the spectrum of demands placed on conventional forces— a spectrum ranging from major theater conflicts to humanitarian operations. While we endorse without reservation the need to steadily modernize current forward-deployed capabilities, we identified as our prime focus for transformation a set of capabilities, over and above force modernization and recapitalization, that would enable a joint force to respond rapidly and potently to a wide spectrum of contingencies. We selected the **Joint Response Force concept** as the focus of transformation for a number of reasons:

- It meets a US strategic need in situations where response time is the critical factor— where there is a need to act decisively before conditions become too hard to change.
- It presents an ambitious and demanding set of objectives much beyond what we can do today and whose achievement would be truly transformational.
- The "tip of the spear" capabilities we envision would permit longer effective life for the legacy forces, enabling them to be used in new and innovative ways.
- It builds on emerging thinking and efforts in the Services and joint communities (e.g., Future Combat System, Network-Centric and Effects-Based Operations, Operational Maneuver from the Sea, Rapid Decisive Operations).
- Its achievement does not require new physics or technical discovery, but rather the still-challenging integration of available (and soon-to-be-available) technologies into new concepts, doctrine, organizations, and systems.
- The enabling capabilities needed to achieve Joint Response Force objectives are broadly relevant to other elements of the force and other situations.

Representative Operational Demands and Operational Phases

To translate the broad need for transformation into future military forces, it is useful to select a set of representative situations as the basis for defining needed capabilities. These representative situations need not be comprehensive— they need only explore a wide enough range of demands to lead to a force sufficiently flexible and adaptable to meet real-world response needs. We selected a set of three such situations to accomplish that goal:

- **major regional conflicts** that include significant adversary military access denial capabilities;
- **lesser regional conflicts** with no significant adversary access denial, as well as forces deployed to deter; and
- the range of demands for **peacekeeping and humanitarian operations.**

Across the spectrum of these situations are common tasks that must be accomplished, requiring our forces to have certain capabilities to meet the range of national security needs. While our construct describes three notional tasks, it does not imply a distinct sequence of operations or a "one size fits all" concept of operations for all situations. Rather, it seeks to identify the actions necessary to achieve a decisive result. Depending on the situation and desired effects, the actions may overlap, and be either continuous or discrete in their execution. The three essential tasks or phases common to any of the representative situations are to:

- **Set the Conditions.** Whatever the situation, this phase is intended to ensure access and freedom of action for friendly operations and to provide the underlying

basis for subsequent operations. Forces already in theater clearly would play a major role here. Joint Response Force capabilities that could begin affecting the situation within hours would be a powerful augmentation to those in-theater forces and would contribute to deterrence.

- **Control the Situation.** Whether the mission is to stop the dying, stop the killing, or stop the use of weapons of mass destruction (WMD), the common element is a need to act quickly. The needed Joint Response Force capability is to begin to take control of any of these situations within only a few days.

- **Decisive resolution.** The remaining task common to all three situations is to resolve the conditions that led to the crisis in the first place, whether that means deposing a despotic regime, establishing a secure environment in which contending parties can work out their differences peacefully, or restoring vital services. Decisive resolution means achieving the desired end state established by the National Command Authorities. It may require the build-up of sufficient combat power in the theater to defeat large enemy formations, or the imposition of forces to monitor and enforce a peacekeeping agreement. Decisive resolution may take months, as in the case of Desert Storm; years, as in Bosnia; or decades, as in the Middle East or Korea.

In addition, continuous observation and information gathering, done as part of the overall regional strategy of a geographic combatant commander in chief (CINC), is essential to rapid relevant response. Information superiority is an enabler of decisive operations and campaigns. The complexity of future contingencies and the likelihood of facing adaptive and technologically sophisticated adversaries require joint forces to begin the fight for information superiority long before the crisis or conflict erupts. It is during normal peacetime operations, working with allies and partners, that the foundation for decision superiority is laid.

Meeting the range of twenty-first century demands leads to a complex matrix of needs for enhanced or new capabilities, as depicted in Figure 1. While capabilities need to be robust across all three phases and across the range of contingencies, it is in the early stages of a crisis or conflict that current capabilities fall shortest of need. In developing the notion of a Joint Response Force, we therefore concentrated on building a force able to set the conditions within 24 hours and establish control within 96 hours.

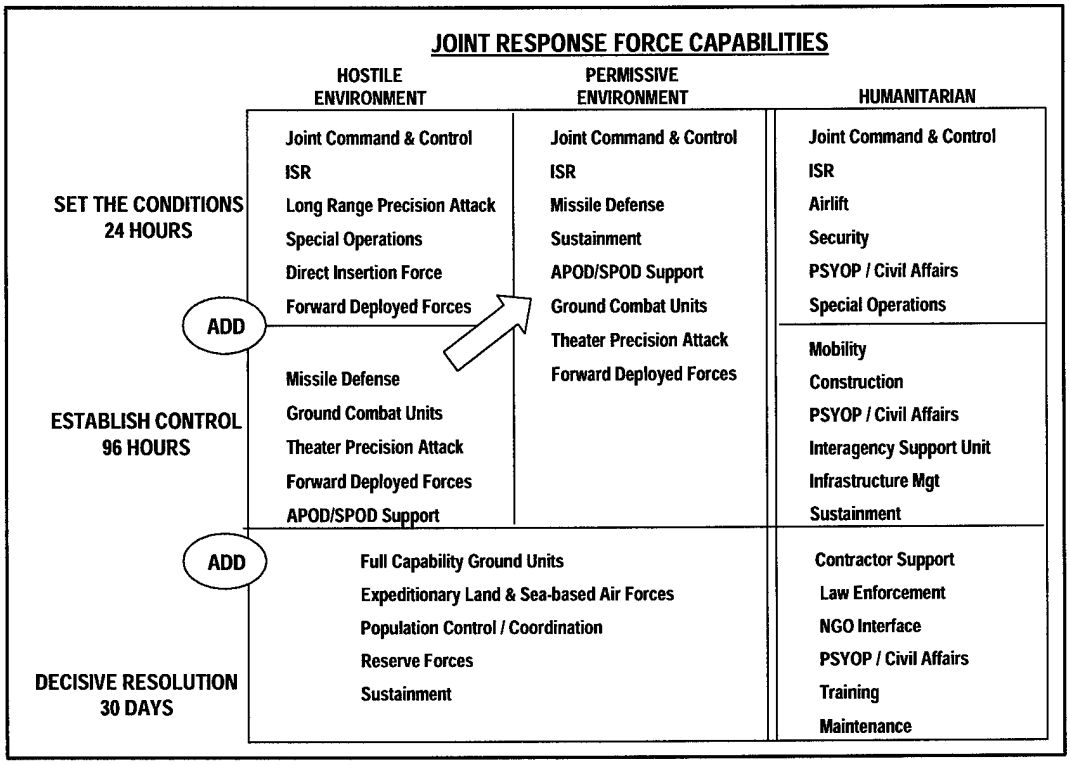

Figure 1. Joint Response Force Capabilities Matrix

Force Modules

A Joint Response Force must be quickly tailored to meet the CINC's specific mission needs. This requires a set of standing force modules with specified capabilities, response times, readiness standards, and a system of verification that ensures the tailored response force has the expected capabilities.

The capabilities needed to set the conditions and establish control in a hostile (anti-access) environment can be summarized as follows:

- Standing joint command and control system with a rapidly tailored force that has trained and exercised together.
- Pervasive networks of intelligence, surveillance, reconnaissance (ISR) and targeting assets (space-, air-, sea-, and land-based) which— when coupled with robust connectivity (horizontal as well as vertical) among all elements of the joint force and reach-back to resources and expertise worldwide— provide shared situational awareness, knowledge, and understanding.
- Stealthy bombers, stand-off cruise missile carriers, other long-range precision-attack means, and information operations to destroy or render ineffective enemy

missile systems, air defenses, command and control nodes, centers of gravity, and other anti-access capabilities.

- Special Operations Forces (SOF) that are specially equipped; know the region, its geography, its people, its cultures, and its politics; and are able to infiltrate during a crisis to conduct special reconnaissance and position for direct action.
- A tailored, rapidly deployable potent ground component that can be inserted directly into the battlespace, that arrives ready to fight, is enriched with its own organic ISR and targeting assets (that contribute to and benefit from the larger situational knowledge picture), can fight in a distributed posture, and can help shape the battle through maneuver, fires, and information operations.
- A capability to deploy and sustain these forces without robust in-theater infrastructure or vulnerable logistics nodes or lines of communication.
- A capability to defend against/defeat ballistic and cruise missiles, WMD, mines, and other anti-access measures.

Power of Jointness

The synergy that true jointness brings is the most powerful transformation concept. Jointness mandates more cohesion and continuity to the operational level of war. Jointness is essential to gain the synergy inherent in greater integration and interdependence of Service capabilities. Integration and interdependence go beyond merely deconflicting Service operations or even stitching the seams between them. Integration and interdependence will bring the robust connectivity, shared engagement-quality situational knowledge, and other capabilities described in this paper. These in turn allow the joint force to operate inside the adversary's decision cycle and allow the joint force commander to apply force with greater precision, speed, and simultaneity throughout a multidimensional battlespace.

Defining Military Capability Needs

A focused effort across multiple administrations and Congresses, involving the civilian and military leadership of the Department of Defense (DoD), produced a broad vision, currently embodied in Joint Vision 2020, of what is needed to meet the range of emerging situations and expectations. That vision is intended to refocus goals from the marginal superiority of the Cold War to the dominance demanded across the spectrum of twenty-first century challenges to US and allied national security. The need is to translate that vision into transforming concepts and required capabilities, and then into the transforming systems and structures that provide those capabilities.

The following sections of this paper describe some concepts and systems, focusing primarily on early entry capability. In offering these ideas, it is important to stress that some parts of our defense capabilities are more in need of transformation than others. Capabili-

ties that have remained relevant over time as part of the national defense "tool box" will continue to remain relevant through technological modernization and evolution. Accordingly, the specific system recommendations that follow must be balanced against the evolutionary need for modernization of enduringly relevant force capabilities.

Transformational key operational objectives, enabling capabilities, and specific transformational programs for Joint Response Forces are organized into four desired military capabilities:

- Achieving Information and Decision Superiority
- Striking with Precision
- Deploying and Sustaining Military Power Rapidly
- Dominating Land, Sea, Air and Space Operations in the Battlespace

Achieving Information and Decision Superiority

The first and most urgent need is for information and processes that enable rapid decisions on the right course of action and the command and control necessary to communicate, coordinate and direct joint forces to implement the chosen course of action. The appropriate standard is **decision superiority**— the ability to make better and faster decisions than any adversary, regardless of the information available to that adversary.

The basic need is appropriate across the range of military operations, even those where the only "adversary" is nature's ability to produce its own brand of disaster. This set of capabilities must also provide feedback to furnish the decision-maker with the results of the current set of decisions and implementation actions. This allows timely new decisions to produce dynamic responses to the inevitably imperfect initial understanding and changing situation. In this context, **joint command and control** is the process by which direction (commander's intent) is formulated and disseminated to forces, and the process by which decision-makers assess outcomes and dynamically adjust guidance.

There are critical gaps in enabling decision superiority, though the technology is available to meet those needs. Additional emphasis and investment are needed to provide cohesive joint command and control, robust connectivity, responsive and available ISR and targeting, and fully integrated information operations. To a large extent, command, control, communications, computers, intelligence, surveillance, and reconnaissance systems are individually developed by the Services. Steps toward integration range from attempts at meeting jointly developed standards to occasional use in joint training. These all fall short in creating a trained joint system; at times of rapid deployment, command and control of joint forces is handled as a pick-up team. Needed are:

- A standing, responsive, deployable **Joint Command and Control System** and capabilities in forward theaters. This system, essential to effective use of ready military forces and realizing synergy among them, needs to be treated as a

weapon system—with defined response and performance standards and regular inspection and testing to verify readiness to meet those standards. The **Joint Command and Control System** needs:

- to exploit reach-back to resources and expertise to a much greater extent than today, enabling forward command centers to be much more agile and effective; and
- to be supported by **families of interoperable operational pictures** and **collaborative planning, execution, and assessment tools** (battle management systems).

- Integrated, robust, networks of communications and information systems—a **combat information system** providing commanders and operating forces rapid access to the information needed for decision superiority. The availability of wideband, robust, high-capacity, pervasive communications is a key enabler of developing joint command and control. Management of its acquisition goes well beyond the capability and responsibility of any individual Service. Key elements of the envisioned **combat information system** are:
  - an information management concept;
  - more robust reach-back connectivity including the **Teleport Program**;
  - a **new space-based long-haul communications system** employing both advanced laser and radio frequency (RF) technologies and appropriate modification of **Military Strategic and Tactical Relay System (MILSTAR) follow-on**, **Advanced Wideband System**, and **Multi-User Objective System**;
  - **airborne relay nodes on unmanned aerial vehicles (UAVs)** to provide in-theater connectivity to the global grid;
  - an enhanced and accelerated **Joint Tactical Radio System (JTRS)** program to provide a high-capacity tactical data link common among all Services;
  - **databases and decision support tools** to make the needed information available to operational decision-makers ranging from the dismounted platoon leader or single fighter pilot to the Joint Response Force commander; and
  - an expanded **Joint Communications Support Element (JCSE)** to match the growing need for communications support to joint operations.
- An ISR and targeting capability that contributes to a comprehensive, dynamic depiction of the battlespace, enabling commanders to shape the campaign, maneuver to gain advantage, and engage targets. This requires that ISR and targeting assets be networked, high density, and responsive to the joint force commander as well as the needs of subordinate tactical commanders. Robust

connectivity will allow every node on the network to serve as a sensor (eyeball, laser ranging devices, smart weapons), and thus add to the richness of the shared situational knowledge.

To address the chronic problem of high-demand, low-density assets, space sensors and manned and unmanned air and ground-based sensors are needed to provide all-weather, all-hours, multi-perspective, multi-phenomenology, pervasive surveillance and reconnaissance of the operational space—whether it be battlespace or a non-combat operating area. Sufficient numbers of sensor systems need to be available pre-crisis for training and experimentation and pre-conflict for intelligence and commander's preparation of the battlespace. Assets of the intelligence community and the Service elements need to be considered collectively in terms of requirements generation, development and acquisition, and operations. We need to accelerate fielding of:

- tools for sensor tasking, exploitation, sensor data fusion, target discrimination, tracking, prediction and hand-over to weapon systems;
- a constellation of **Space-Based Radars (SBRs)** with both high resolution and moving-target-indicator capabilities;
- a family of tactical and operational UAVs to include the **Global Hawk** family and a stealthy **long-endurance, high-altitude UAV**;
- substantial sensor upgrades on existing manned surveillance and reconnaissance assets that are deficient both in quality and quantity—**Joint Surveillance Target Attack Radar System (JSTARS)**, the **Airborne Warning and Control System (AWACS)**, and other intelligence collection assets such as **Rivet Joint** and **EP-3**.
- new sensor capabilities including the capability to provide needed information on activities covered by dense foliage—**foliage-penetrating radar**; and
- organic assets that are highly responsive to ground units operating in a distributed mode and that also make important contributions to the overall theater-wide picture. Examples include **Aerial Common Sensor (ACS)** to replace Guardrail and Airborne Reconnaissance Low (ARL), the **Prophet Ground Sensor Software Upgrades**, and **robotic aerial and ground reconnaissance.**

- Information operations encompass disparate activities such as computer network operations (defense and attack) and psychological operations (PSYOP) and deception. Elements of information operations need to be fully integrated into military campaigns as a complement to air, land, sea, space, and special operations. Conducting information operations to gain and maintain information superiority needs to become as essential and natural to the joint force commander as the fight for air superiority. Information operations are equally critical during

peacetime activities to shape the environment, develop understanding of our vulnerabilities and those of our potential adversaries, or execute propaganda campaigns. To achieve these capabilities we need to:

- Establish a decision process and supporting command and control system for employing information operations. Roles need to be established for the many stakeholders in this arena so that timely decisions can be reached to meet opportunities and challenges in crises and combat.
- Incorporate information operations into joint doctrine, operational planning, and training. This is a particularly complex subject which, to be successful, requires the interests of operations, intelligence, and command and control components to be integrated and balanced. Such issues as when to employ destruction and jamming versus signals intelligence or computer network attack need to be addressed to achieve effects-based outcomes.
- Broaden the **Joint Warfare Analysis Center (JWAC)** capability to depict adversaries as complex, adaptive systems.
- Establish a center of excellence and institutional base for information warfare (just as DoD has done for armor/anti-armor, anti-submarine warfare, etc.).

Developing and acquiring these decision-superiority capabilities presents a special set of challenges, requiring special attention from the Secretary of Defense and the Chairman of the Joint Chiefs of Staff. Many of the elements of information and decision superiority are inherently joint and interagency, stretching across Service and organizational lines.

- To achieve a truly joint command and control environment, a CINC should be designated to ensure the forging of a joint force command and control system. The candidate CINCs are US Joint Forces Command (JFCOM) and US Space Command (SPACECOM).
  - Establish a CINC/Defense Advanced Research Projects Agency program to support this prototype effort.
  - Establish a joint program office to field the systems and continue development.
- Recommendations for global connectivity:
  - Get tough with technical architecture standards and protocols, and embed enforcement of these standards into a disciplined process that includes operational testing of interoperability in a joint environment.
  - Grant an organization (perhaps a new National Communications Office) the resources and authority to plan and direct development of the joint connectivity. Consider both DoD and intelligence community needs.

Striking with Precision

Unlike the nearly universal applicability of capabilities for decision superiority, the nature of capabilities needed to exploit decision superiority varies widely, depending on the nature of the contingency and the phase of operations. Still, there are clearly some transforming capabilities needed to set the conditions for a wide range of contingencies. In conditions requiring a heavy strike at the outset of intervention and in which forward-deployed capabilities are insufficient, the fastest response is provided by long-range aircraft, cruise missiles, and forward land- or sea-based based air. If a less-lethal application of force is appropriate, a mix of air, land and sea combatants must be either forward-deployed or on rapid call. In the latter option, the air-land team must be rapidly deployable, versatile, lethal, and survivable. This very rapid response force provides highly effective force application in conflict situations as well as powerful deterrent and dissuasion effects in situations still short of conflict. Essential to effective use of any force application is freedom from crippling interference by adversary actions. Hence, important enabling capabilities requiring increased emphasis include:

- Near-instantaneous air superiority followed shortly by air supremacy— freedom from interference by adversary air or missile capabilities. Planned capabilities to deal with air threats meet foreseeable needs, but the pace of the programs is inefficient and costly in terms both of program costs and the need to sustain aging systems that are increasingly difficult and expensive to maintain. The **F-22** provides the capability to meet this need.

- To protect against ballistic missile attacks and contribute to terminal defense against air and cruise missile attacks, the **PATRIOT Advanced Capability—3 (PAC-3)** should be forward-deployed in adequate numbers. The **Navy Area Defense (NAD)** program should also be available for deployment in the near term. In the mid-term, the **Theater High Altitude Air Defense (THAAD)** system should be available. The combination of these systems provides layered defense against intermediate- and short-range missiles and can provide defense of forces in the field and support and host nation assets. In some situations, it can constitute national defense for the host or allied nations.

- The **Airborne Laser (ABL)** program promises a mid-term, boost-phase capability against ballistic missiles in key geographic areas. The schedule for this program has been extended to meet both technical and fiscal challenges. The schedule should be restored consistent with technical progress.

Greatly enhanced precision strike is available from a series of possibilities:

- The contribution of all strike platforms is greatly enhanced by increasing quantities of available precision stand-off weapons to include converting more nuclear Air-Launched Cruise Missiles (ALCMs) to **Conventional Air-Launched Cruise Missiles (CALCMs)** and the development and fielding of the **Joint Air-to-Surface Strike Missile (JASSM).**

- Given the need to leverage deployed capabilities and minimize collateral damage, precision-attack capabilities are likely to be the preferred option in many situations. The means to achieve precision in ground-, sea-, and air-launched weapons is well in hand. What is needed is to assure that essential enablers are robust and dependable, particularly the **Global Positioning System (GPS)**. Hence, fielding **GPS III** and enhancing anti-jamming capabilities in the GPS-to-weapon interface should be a high-priority issue.

- Converting the four fleet ballistic missile submarines (SSBNs) excess to Strategic Arms Reduction Treaty (START II) limits into missile-carrying **guided missile submarines (SSGNs)** that carry conventional land attack missiles to provide a potent and stealthy capability that can be moved to the needed proximity on earliest warning.

- Faster production of the **F-22** will provide improved early strike capability. An earliest practical fielding of the **Joint Strike Fighter (JSF)**, even if not fully developed to its design capability, will give the Navy a forward-based stealthy fighter. It will also replace aging F/A-18, AV-8, and F-16 aircraft with greatly increased capabilities that can be further enhanced through a continuing program of preplanned product improvement.

- **B-2 enhancements** can provide greatly improved all-weather strike capability. As with the F-22 and JSF, the target attack potential can be multiplied several times over, with the **Small Diameter Bomb** raising the target attack potential from 16 aim points per mission to hundreds. However, effectively using such capability will require **Mission Planning Systems** and a responsive command and control system that far exceeds anything currently planned. The need for such capabilities has been recognized for more than a decade, but efforts to meet the need fall far short.

- Start concept development for the **follow-on long-range attack** capability.

- To provide more responsive stand-off attack against critical, movable targets, development should begin on a **Supersonic Strike Missile.**

- Operationalize the capability of precision weapons against moving targets.

While long-range and tactical air play an important role in setting the conditions in a wide variety of conflict and potential conflict situations, ground forces are essential to setting the conditions in many situations and to establishing control in most. The need is for ground forces with the responsiveness and agility of light forces and the potency of heavy armored forces. The vision for creating agile, potent ground forces is found in the Army's **Future Combat System (FCS)**. Interim Brigade Combat Teams (IBCTs) are being developed to provide an agile lethal force capable of deploying directly to the battle area in 96 hours. The Marine Corps' parallel development is its concept for Operational Maneuver from the Sea.

There is a need to accelerate the process of converting the Army's FCS from a vision into fielded capabilities, and to get on with those force modernizations in the Marine Corps that will move its capabilities into the twenty-first century. Hence, we recommend strong support for the Army's planned IBCTs while moving rapidly to transforming other Army units into a strategically mobile, agile, and potent decisive land force through development of the FCS. Similarly, ground and air mobility for Marine forces must move quickly to more modern and lethal, longer-range systems.

- Responsive firepower that lessens the need to close with adversary forces in order to produce decisive resolution should include the **Army Tactical Missile System (ATACMS) Block II.**
- The effectiveness of agile forces against heavy armor opponents is greatly enhanced by the anti-armor firepower of the **Javelin anti-tank system** and robotic fire support systems.

As our precision weapons capability grows, precision targeting proficiency will become an especially critical transformation capability. There is little value in wielding a scalpel if we don't know what, where, and when to cut. Precision targeting should become a primary focus for operationalizing the emerging thinking about effects-based operations as a disciplined approach at the operational-level of war to link tactical actions much more explicitly to strategic ends in a campaign. Key enablers include:

- A greatly expanded effort to characterize adversaries as complex adaptive systems. This requires more attention to JWAC-like efforts to analyze an adversary's capabilities. This effort would make use of intelligence and open sources, red teaming, and multi-disciplinary teams of experts. Robust reach-back from the joint force commander to these efforts is needed during a campaign as we learn what we had wrong and the enemy learns to adapt to what we had right.
- Pervasive networks of ISR and targeting assets responsive to the joint force commander and the means to dynamically task these assets in real time. The planning and execution of sensor operations to support effects-based operations and precision targeting will become an increasingly important operational function.
- The tools and informed judgments to gauge the effects of multi-dimensional actions, such as kinetic strikes and information operations. This systemic effects-based operations approach to battle damage assessment (not merely damage to individual targets) requires in-depth understanding of the joint force commander's campaign intent.

Deploying and Sustaining Military Power Rapidly

Because air and ground forces in combination are needed for many missions, including early entry, it is necessary to make ground forces more strategically mobile, less dependant on re-

ception infrastructure and large forward support complements, and more interdependent with external sources of fire support. It is also necessary to make air forces less dependant on large support deployments to forward airfields, and to provide sufficient strategic air and sea mobility to enable synergistic, near-simultaneous employment of air, land, and sea forces.

An appropriate goal for strategic mobility is to insert forces within 96 hours that are ready to fight and that are far more agile and more potent than either the Army's current brigades or its planned IBCTs.

- The most obvious near-term contribution to earliest deployment to staging areas is to continue procurement of the **C-17**.
- Air and sea ports are highly vulnerable until friendly control is established. Hence, direct insertion into the battlespace of agile, potent forces from secure areas, ashore or at sea, is essential in many situations to set the conditions and establish control. This requires combinations of **short takeoff and landing (STOL) aircraft** with capacities somewhat greater than the C-130. These STOL aircraft need to operate from hastily prepared surfaces. **Shallow-draft, high-speed ships** capable of carrying combat-ready ground forces and supporting STOL flight operations would provide an ideal mix of capabilities, allowing the direct insertion of ground forces into the battlespace without passing through vulnerable fixed facilities.
- **Fast lighterage** is important to rapidly move larger ground forces from strategic sealift to the battlespace or potential battlespace. There are several prototype concepts now afloat. Funding and direction are needed to move forward.

Once technical challenges are in hand, the **V-22 tilt-rotor aircraft** will provide dramatic changes in crisis response, force projection, and battlefield maneuver for Marines and SOF elements at twice the speed and four times the range of any current or foreseeable helicopter. The aircraft will replace the Marine Corps' critically aged helicopter fleet, as well as ten other type/model/series aircraft in the Air Force and Navy.

The air-refueling fleet will continue to be vital to support the range of operational demands. The current fleet is aged and becoming increasingly unreliable and inadequate. There is an opportunity for a **commercially derived tanker** replacement.

Dominating Land, Sea, Air, and Space Battlespace

Once battle is joined, there are a number of operating systems at work in the joint operations area, each of which must be effectively integrated into a "system of systems" to ensure the dominance that flows from synchronization. A number of individual improvements are needed in each area, some of which are key to transforming individual capabilities, but the totality of these changes has the real prospect of transforming the basic character of how we fight in terms of pace, breadth and depth of action, precision of action, and economies of sustainment.

- **Command and control.** The networked battlefield will generate substantially compressed planning and decision cycles, will allow unprecedented continuity of command regardless of conditions, and will, in effect, generate an "infosphere" in which secure and timely information flow will create conditions for dominant application of strike, maneuver, fires, and protection measures.
  - Ground elements will need **Future Battle Command Brigade and Below (FBCB2), Warfighter Information Network—Tactical (WIN-T)** and **Global Command and Control System (GCCS)** to ensure their part of the joint command net.
  - The naval force will continue **Joint Command and Control Experimental (JCCX)** exploration.
  - The aerospace element will both ensure command of air operations and provide air- and space-based enabling capabilities through the development of such systems as **SBR, stealthy UAVs**, and **Military Satellite Communications (MILSATCOM).**

  Achieving joint interdependence is a key goal in this area—**JTRS, Cooperative Engagement Capability (CEC), GPS III**, and sustained **joint experimentation** will all be crucial to attaining effective joint battlefield command and control.

- **Maneuver and mobility.** Speed and agility will be the dominant outcome of mating agile information networks with space, air, land, sea and undersea warfighting equipment. Mismatches in the inherent characteristics of either would suboptimize the potential of each, and eradicate the leap-ahead potential of their pairing.
  - To satisfy the ground capability requirement, the Army is developing a totally new warfighting capability that will be as deployable as today's light forces and more lethal than today's heavy forces. **The Future Combat System** is being developed as the centerpiece of this force. The FCS will be clusters of command and control, ISR and targeting, attack, and protection capabilities emphasizing robotics and longer-range strike capabilities. It will ultimately replace today's heavier systems and operate with 50-percent reduction in logistics. The **Comanche** helicopter is crucial "seed corn" for this force (technology carrier) and will be its rotary-wing "quarterback." As this capability is developed, the Army is concurrently building a number of **IBCTs** centered on wheeled, armored vehicles. Each will be a versatile, lethal, sustainable force capable of worldwide deployment by air in 96 hours and ready to fight in close, complex, or urban terrain.
  - Amphibious operations will require the unique sea-to-land agility of the **V-22** and the **Advanced Amphibious Assault Vehicle (AAAV).** Naval forces will be a key player in the anti-access measures necessary to ensure

initial maneuver through **mine countermeasures** and with supporting fires.

- The **Common Aerospace Vehicle (CAV)** will "overwatch" air, ground, and sea maneuver, and enhance space operations.
- These transformations in both land and amphibious capabilities will assure the following significant improvements:

  We will achieve the ability to project joint forces directly to centers of gravity with minimal intermediate staging or support buildup.

  We will be able to apply forces simultaneously throughout the joint operations area, and to recast or reorient forces in the midst of battle.

  We will be able to overcome or avoid any anti-access measures and to protect the force from launch to conclusion.

  We will be able to operate either independently or as a part of a coalition.

The result of the transformation will be greater force agility in the near term and dramatically increased strategic relevance and decisive warfighting capability in the more distant future.

- **Intelligence.** Dominance in the battlespace will require a consistent, timely, accurate, and secure situational picture and targeting support, seen and understood in near real time by all friendly elements. The most challenging part is delivering continuous precision location of the enemy. The range of possible future protagonists and their motivations will drive us away from templating and other threat-based techniques toward the creation of a family of collectors (human, signal, imagery, etc.) that ensure an ongoing baseline from which change can be readily discerned and quickly assessed. This will require revolutionary change in areas such as affordable space-based collectors, sensor management tools, advanced interactive displays, standardized data and management protocols, and advanced distribution systems with no single-point failure. The information gleaned from this family of collectors must be processed as rapidly as necessary to make it quickly available and useful to tactical commanders. As the pace of operations increases, timely intelligence has the potential, on one hand, to be made easier by advances in collection technologies— but, on the other hand, to be made less effective through the difficulties experienced in using the information. Intelligence must be less and less the domain of the "intelligence family," and more and more a direct tool of the commander. Appendix F provides a comprehensive listing of intelligence observations related to transformation.
- **Fires and Precision Engagement.** Rapid advances in precision technologies have added precision engagement to the traditional roles of air, land and sea fires as enablers of ground maneuver. An integrated system of systems is needed to

assure destruction of time-critical targets at greatly increased ranges in all weather conditions. A robust air, land, sea system of systems will, in addition to precision engagement, be capable of direct ground force support if that is the nature of the fight.

- There is a need for air strike forces capable of creating precise effects rapidly with the ability to retarget quickly against large target sets anywhere, anytime, for as long as required. **F-22, Small Diameter Bombs,** and **advanced stand-off munitions** are all crucial capabilities in setting the conditions for successive operations.
- The **High-Mobility Artillery Rocket System (HIMARS)** and **ATACMS Block II** are ground-based systems with sufficient range and volume to lessen or delay the need to close with adversary forces. The **Crusader** indirect fire system is a crucial technology carrier for development of the **FCS.** From the **Crusader** program will come the robotics, digital ports, sensor-to-shooter linkages, integrated mission planning, and embedded training devices of the transformed ground force.
- **Tactical Tomahawk** and **Advanced Land Attack Missile (ALAM)** provide sea-based long-range missile capabilities and the retargeting flexibility to strike relocatable targets.
- As the battle is joined in the four- to two-kilometer "red zone," the C-130 deliverable **Line-of-Sight Anti-Tank (LOSAT)** can acquire and track two targets simultaneously. Within the two-kilometer battlefield, the **Javelin** gives the individual soldier or Marine a shoulder-fired, top- or direct-attack, fire-and-forget, anti-tank weapon that can be fired from enclosures— a truly transforming individual weapon.

This suite of advanced fires and precision engagement capabilities enabled by effective information networks will extend the ranges from which effective fires can be brought to bear and will increase the density of fires available to support ground forces and assure precision against a wider range of fleeting targets.

- **Logistics.** Future logistical effectiveness will require a transformation in the information networks underlying the accountability and application of goods and services. Moreover, the cultural and doctrinal logistics patterns must also be transformed. The goal must be a system that transcends responsiveness and approaches anticipatory capability. To reach this goal, operations and logistics must merge into a near-seamless process— the logistician cannot simply wait to respond to a stated battlefield request but must be capable of arriving at the point of need with the capability required precisely when it is needed.
  - The basis for such a condition is a merged worldwide operations and logistics database accessible by authorized users from a single terminal. This database must offer near-real-time visibility of cargo, transportation assets, and services.

- Another element requiring transformation is the capacity and speed of the strategic lift fleet. More and enhanced **C-17** airlift is clearly the near- and mid-term fix to a long-standing deficit but **shallow-draft high-speed sealift** and **ultra-heavy airlifters** will be the future of strategic lift. The **V-22, STOL airlift**, enhanced **materiel handling equipment**, and a family of new **Joint Logistics Over-the-Shore (JLOTS)** capabilities will begin to underwrite the agility and flexibility needed to optimize reach-back and rapid throughput on the battlefield without the need for intermediate or in-theater staging and extensive reception infrastructure.

- **Protection.** The space, air, land, sea, and undersea battle force of the future requires a vested family of protective capabilities to shield it from home station into the theater and throughout all operations. The protection measures must counter enemy air and missile threats and an array of conventional and unconventional sea and ground threats, and must be a credible deterrent to WMD attack or coercion. In all these areas, the protective systems must seek a predictive or anticipatory ability; we can no longer lean on reactive response for protection. A consistent, complete, secure, and timely operating picture of all entities in the joint operations area is the essential underpinning for adequate sensing, reduced sensor-to-shooter times, and effective application of protection in a fleeting target environment. A family of theater-level systems will use the common operating picture to defend against aircraft and missile attacks. Each offers significant improvements in deployability, range, target coverage, and protection assurance.

  - **Tactical High-Energy Laser (THEL)** uses directed energy to defeat targets outside the capability of other systems and also opens the technological path into the tactical and operational use of lasers.

  - At the tactical level, **SENTINEL radar** offers 360-degree, all-weather digital air pictures at twice the current range.

  - **HUMRAAM/CLAWS** (Advanced Medium-Range Air-to-Air Missiles mounted on a "Hummer" vehicle, which the Marine Corps calls the Complementary Low-Altitude Weapon System) is the C-130 deployable air protector for all future ground forces.

  In addition to the air defense systems described above, a transformation in protective theory of ground forces and platforms is underway and must be accelerated. Whenever possible, battlefield agility—empowered by information, physical lightness, and dispersion—is being pursued as a key contributor to protection rather than historic and current focus on physical protection (armor, discrete protective formations, reserves, etc.). As in other battlefield systems, this will require significant cultural change both internal to the force and in industry.

Transformational Research and Development

Force transformation is a dynamic condition rather than an end state—a journey, not a destination. In a world where technological change is unrelenting, it is not just necessary but imperative to constantly reach for the new enablers needed to maintain the technological advantage that has always been our greatest asymmetric strength. Much of militarily relevant technology now comes from the commercial sector, which puts out its products to the global marketplace. Nevertheless, the culture resulting from several decades of being the sole customer is deeply rooted in DoD acquisition, and the Department often still conducts its affairs as if it were a monopsony.

Thus, DoD must transform its research, development, and acquisition processes. It must learn how to better engage the information and biotechnology sectors, understand and exploit technology opportunities, adapt to product cycles of months to a few years rather than decades, and understand the ways adversaries might use these same technologies. To maintain the edge and remain on the path toward transformation, major DoD research and development thrusts should include the following:

- **Information and decision superiority.** Our ability to gain and maintain the initiative is dependent on our ability to get accurate and timely information about all aspects of the battlespace, analyze it, and disseminate militarily exploitable information to the commanders of space, air, land, sea, and undersea forces while denying adversaries access to that information. DoD will depend on commercially developed information technology.

  However, there are unique requirements such as collaborative software and components that will survive in hostile environments, and high-end computing. For example, not only must we make GPS more robust and resistant to jamming, we must also develop capabilities to deny our adversaries its use.

  Our current sensor suites are advanced, but they limit us to use of a single band in the infrared spectrum. We need to pursue development of ultra-large focal plane arrays that would allow a single sensor to work in multiple spectra (i.e., visible, mid-wave infra-red; long-wave infra-red; ultra-violet).

  Laser-based communication links will allow us new degrees of freedom beyond digital broadband fiber-optic infrastructure, enabling all-weather, all-locations communications and providing needed redundancy and connectivity with the fiber-optic communications nodes. Information and decision superiority will be achieved through our ability to develop effective decision support tools.

- **Information warfare.** A focus on both offensive and defensive information warfare capabilities calls for additional infrastructure. A complex of laboratories and research and development facilities connected through secure means to the information warfare offense and defense nodes is also necessary.

- **Directed energy.** We must continue to pursue advances in high-energy beam propagation and control and push the maturation of solid-state devices.
- **Stealth and counter stealth.** It is necessary to maintain sustained investment in stealth technology for next-generation bombers, fighters, and other weapons to include unmanned systems. We must also continue technology development that would allow us to maintain the advantage by countering the stealth technology of our adversaries.
- **Robotics.** Focus needs to be on the integration of unmanned systems into future forces. Robotic systems based on current technology lack a robust perceptual capability to detect and adapt to nuances in the environment. This limitation dictates a greater need for human-in-the-loop today than is envisioned for the future. The way forward calls for dedicated experimentation tied closely to doctrine development. Phased requirements will allow us to get a useable capability to the field in the near term with a commitment to conduct spiral development for air, land, sea, and undersea capabilities in the future as the technology matures.
- **Non-lethal capabilities.** More and more robust options are needed for dissuasion, influence, and control. There is a need to expand means to conduct experimentation in this area.
- **Chemical and biological warfare.** There is need for a sustained program to develop reliable means to detect and characterize chemical and biological agents so that active and passive protective measures can be developed to counter them. We must leverage dual-use technology from the commercial biotechnology industry.
- **Power Supplies.** There is a growing need for high-energy-density power sources to supply power for military operations in remote areas. This is an area where dual-use technology holds promise (e.g., fuel cells, micro fuel cells, and microturbines).
- **Modeling and simulation.** A new generation of models and simulations will be needed to support distributed training; robust and continuous experimentation; and operational planning, execution, and assessment tools.

Transforming to a Joint Force of the Future

The future joint force will take special attention from the Secretary of Defense and the Chairman of the Joint Chiefs of Staff, not only to get the necessary resources but also to create an environment conducive to transforming. To transform our military capabilities we need to transform the way we prepare forces, including the requirements, acquisition, infrastructure, training, and personnel (including leader development) processes. The Secretary and Chairman will need to provide oversight for the joint integration that brings force components together to achieve full synergy. This includes standing, ready, exercised and tested

joint command and control, and joint theater air and missile defense systems. Transformation will require aggressive experimentation to identify the risks and work out solutions.

To provide the means for focusing top-level attention on transformation, we recommend the following:

- **Establish a means for independent input and assessment of the Department's transformation vision.**
- **Set up a standing "red team"** to aggressively challenge transforming concepts and to help provide adaptive adversary inputs to experiments.
- **Establish a process that links results of joint experiments more directly to the decision and budgeting process.** One means to do so would be a Secretary of Defense Transformation Discretionary Fund of about $500 million, allowing the flexibility to quickly fund transformation initiatives of extraordinary potential.
- **Establish a periodic review process whereby the Secretary has an opportunity to assess and refine overall transformation goals and initiatives in light of evolving circumstances.** This review should become a major input to the Planning, Programming, and Budgeting System.
- **Mature JFCOM as an integral part of stimulating and developing future transformation visions and initiatives.** JFCOM's mission and responsibilities should focus on concept development, experimentation, and training activities in direct support of the overall DoD transformation vision resulting from the Secretary's periodic transformation review process. JFCOM needs resources, focus, and clear guidance from the Secretary of Defense about its role in transformation. We recommend the following:
  - Divest CINCJFCOM of his Supreme Allied Commander, Atlantic, and geographical responsibilities.
  - Establish a national joint experimentation capability (including a distributed human-in-the-loop synthetic environment) to support continuous experimentation promoting innovation and "skunk works" type spiral development.
  - Establish an experimental joint task force headquarters at JFCOM to be the focus for experimentation on the Joint Response Force concept
  - Establish closer relationships between JFCOM and technologists by creating a "skunk works" venue for the integration of emerging technology into joint experimentation.
  - Tie JFCOM's concept development and experimentation much more closely to the Services' centers for change.

- The Secretary should establish an educational initiative to engrain transformational thought processes throughout the professional military and civilian career development paths.

Overarching Study Conclusions

- The synergy that true jointness brings is the most powerful transformation concept.
- Joint command and control is the most enabling transformation program.
- Focus transformation on new capabilities for Joint Response Forces.
- Initiate new programs identified as essential in transformation.
- Review and accept acceleration of black programs identified.
- Missile defense, space dominance, information dominance, and intelligence are also essential transformation areas.
- Institutionalize the transformation process in DoD.

Appendix A.
Transformation Study Group Membership

General Jim McCarthy, USAF (Ret.)
Chairman

Admiral Stan Arthur, USN (Ret.)

Mr. Vic DeMarines

Dr. Ted Gold

Dr. Bill Graham

General Bill Hartzog, USA (Ret.)

Dr. Paul Kaminski

General Carl Mundy, USMC (Ret.)

Admiral Bill Studeman, USN (Ret.)

General Larry Welch, USAF (Ret.)

Appendix B.
Strategic Nuclear Forces

US strategic force posture will remain our country's highest and most sensitive security requirement, but new thinking needs to go into definitions of US nuclear strategy, policy, doctrine, organization, the forces themselves, and the weapons technology and mix that constitute our future capabilities. As we move to a smaller inventory of weapons, the nature and character of these weapons; their delivery context; and the support, surety and control setting into which these capabilities are cast need adaptation and further evolution.

This strategic area was not the major focus of this task force, but the Transformation Study Group recognizes that strategic capability underlies our effective conventional capabilities and that some generalized considerations can be advanced.

In general, a smaller weapons mix will require new doctrinal considerations as to how concepts such as deterrence, dissuasion, and response should be characterized. This needs to be underpinned with secure command and control organizations and processes; a deliberate planning process; revalidation of safety, surety, and security issues; and new looks at technologies and the specific mix of weapons to be retained in the inventory, including careful consideration of new weapon activities. A specific review of the vulnerabilities inherent in our future nuclear capability is required.

It is important that future scenarios relating to how nuclear and nuclear-like weapons might be applied by both the United States and our adversaries be wargamed and simulated. These reviews should take into account a future environment (1) where the United States has multiple large and small adversaries and (2) where considerations of stability and secondary effects of nuclear exchange potentials need to be analyzed. To prevent a not-invented-here perspective from a policy point of view, the United States should carefully review and analyze the nuclear strategies and policies of other countries, including potential adversaries, that have smaller inventories of weapons. This analysis should also address how US nuclear capabilities might be relevant to preventing nuclear conflict between two nations where the United States is not a direct combatant, but where the use of nuclear weapons by others on others has broad implications for the United States and its allies.

Finally, the Transformation Study Group supports the continued maintenance of a US nuclear triad for the foreseeable future, and also emphasizes the ability of the US nuclear force to conduct rapid assured retargeting and to maintain full functional flexibility in the context of the overall strategy.

Appendix C.
Missile Defense

Ballistic Missile Defense

Ballistic missile defenses cover the spectrum of needs from defending forces in the battlespace to protecting homelands— US and allies— worldwide. At least three classes of missile defense capabilities are needed to deal with threats of varying ranges, varying trajectories, varying basing modes, and varying countermeasures. There are advantages and disadvantages to each of the three.

- **Mid-course systems** provide wide coverage from a minimum number of sites against intermediate-to-long-range threats. These systems can be configured to defend both the United States and its allies. The disadvantage is vulnerability to sophisticated countermeasures that include fractionated payloads (early release submunitions). The existing mid-course program is the product of extensive development work and provides the nearest term capability for defense of large areas.

- **Terminal systems** (currently under development against only shorter-range ballistic missiles) are useful to defend limited areas, and are also highly resistant to certain kinds of countermeasures. But large numbers of systems are required to cover substantial areas or to deal with even medium-size raids. At least two of the ongoing terminal systems are sufficiently mature to have high confidence in their effectiveness and could be fielded in significant numbers in the near to mid-term.

- **Boost phase intercept** has the advantage of global protection against the covered launch area. Boost phase also deals with a wide range of countermeasures. However, there are formidable technical and geo-political challenges to fielding boost phase systems; the only program currently underway is the ABL system.

Cruise Missile Defense

Recent intelligence estimates have helped focus increased attention on the cruise missile threat and the availability of technologies and systems to a wide range of potential adversaries. Air defense systems— aircraft and missiles— have some capability against cruise missiles, and there are a number of important technological developments underway to enhance capabilities. Still, there is not yet a defined, comprehensive program to deal with this threat. Classification constraints have hampered the sharing of technologies and should be removed or opened up to a broader audience. (See Appendix G.)

Battle Management

Robust command and control capabilities exist within missile and air defense programs. It should be a matter of priority to ensure that they have a seamless interface into the common operating picture.

Appendix D.
Space Dominance

Space capabilities developed by the United States during the Cold War were a national resource of fundamental strategic importance. Our superiority in space is no less valuable in today's security environment. Our everyday life and military capability depend on space assets. Space capabilities are inherently global, unaffected by territorial boundaries or jurisdictional limitations; they provide direct access to all regions and, with our advanced technologies, give us a highly asymmetrical advantage over any potential adversary.

But our space superiority is not guaranteed. Space systems are potentially vulnerable to attack in a number of ways. Overhead systems themselves can be attacked from the ground or by other systems in space. The ground stations that control our satellites and receive their data are vulnerable, and so are the communications links that connect them to overhead systems. Therefore, we recommend the following:

- To assure our continued space superiority, accelerate the use of space for our national interests— military, commercial, and scientific— and be prepared to protect US assets from all hostile uses of space.
- To make US access to space more robust and to assure its uninterrupted availability in view of the termination of production of the current generation of space boosters, provide adequate support to the Evolved Expendable Launch Vehicle (EELV) program.
- To enable the United States to project power through space to any region in hours, accelerate research and development to develop the Space Maneuver Vehicle (SMV) as a sortie platform and the Common Aerospace Vehicle (CAV) as its primary payload.
- To establish and maintain a robust commercial space sector, make commercial space capabilities the preferred choice for DoD and intelligence community peacetime requirements (communications, imaging, and sensing).
- To ensure US dominance on the space battlefield, establish a high-performance micro-satellite program for both offensive and defensive missions.
- To ensure continuing US information dominance in conventional military operations, integrate present and future space systems (including moving-target-indicating radar and spectral imaging) into a global ISR capability and improve the integration of airborne and space-based reconnaissance and surveillance.
- Finally, address the recommendations of the US Space Commission, including the development of military and civilian cadres in space-related activities and implementation of organizational change.

Appendix E.
Information Dominance

Information superiority is currently an important asymmetric advantage for the United States and its allies. Decision superiority enabled by information is central to most of our twenty-first century military concepts. This brings both a growing set of opportunities and a potential vulnerability: our adversaries are also focused on the importance of information warfare in the Information Age. The solution is a comprehensive program of offensive and defensive information warfare, supported by strong intelligence exploitation capabilities. This area of operations is greatly complicated by a number of factors:

- the pre-eminence of the civil sector in information systems (particularly in developing defensive technologies),
- the wide set of equities involved (interagency, industry, financial community, infrastructure systems),
- the international interdependence of information technologies, and
- the pace of technological advance, to name but a few.

Information operations is a broad emergent warfare area that involves a number of topics related to computer network (cyber) operations (both attack and defend), hard kill, and exploitation activities—all placed within the context of affecting the adversary's perception about the degree to which he can control his own warfighting information and knowledge environment, and negatively affect ours. A strong relationship must exist between US intelligence and information operations disciplines in order to prevail in information warfare.

Elements of information operations need to be fully integrated into military campaigns as a complement to air, land, sea, space and special operations. Information operations need to become as essential and natural to the joint force commander as the fight for air superiority. While it is essential to fully integrate information operations into warfighting, it is also important in the pre-engagement or peacetime activity to "shape the environment" (including the conduct of covert operations); understand vulnerabilities; conduct targeting; or execute PSYOP, electronic warfare, and propaganda campaigns. Four transformational activities are needed:

- **Defining a decision process.** There are many stakeholders in the US Government and industry (including the National Security Council, the Departments of State and Justice, various DoD elements, and the critical infrastructure protection community). Roles need to be established so that decisions can be reached quickly to support the pace and nature of actual information operations in warfare. Some decisions have broad national implications and therefore need broad discussion but many others can be pre-judged and appropriate authorities can be delegated to the joint force commander. The supporting command and control

system enabling collaborative interactions among the stakeholders should be reviewed for adequacy.

- **Training and doctrine.** Within DoD, doctrine for information operations should continually evolve and be incorporated into operational planning, leader development, legal analysis, and training. This is a particularly complex subject, requiring that the interests of operations, intelligence and command and control components be integrated and balanced. Such issues as employing information operations in conjunction with signal intelligence and the associated coordination issues need to be addressed to achieve effects-based outcomes. This leads to the need for improved efforts to model adversaries as complex adaptive target systems. Classification issues will need to be resolved since many of the information operations tools are necessarily protected because they are fragile (disclosure could allow an adversary to create relatively simple countermeasures).

- **Development of tools.** Techniques for electronic attack by jamming are well developed by the electronic warfare community. However, computer network attack is accomplished by various organizations in DoD and the broader intelligence community. The needs of the operational commander are somewhat different from those of the intelligence community, and the two need to be harmonized. SPACECOM and Joint Task Force–Computer Network Operations need to accelerate the implementation of a comprehensive approach for leadership and management of DoD information warfare activities. Coordination among intelligence community organizations for warfare support should be a responsibility of the National Security Agency. There are also issues related to DoD-industry relationships that need to be improved.

- **Defense.** Network-centric warfare offers dramatic advantages but carries the risk of a major loss of capability if our networks are disrupted or penetrated. The more DoD relies upon commercial off-the-shelf based computer networks to provide command and control and ISR functions to warfighters, and the more military concepts exploit the advantages of having good, shared information, the more important it becomes to defend these computer networks. While information assurance is a problem being addressed in the commercial sector, DoD cannot depend on industry alone and must invest in protection. For example, improvements in tools to detect enemy activity are needed, and a form of integrated attack and warning system needs to be established. Defense-in-depth needs to be established so that adequate backups are provided once a system is determined to be unreliable. This situation will be improved with the consolidation of the very many systems currently in use into fewer but more robust systems. Specific transformation and capability recommendations for information operations are contained in classified Annex F.

Appendix F.
Intelligence

The twenty-first century environment creates increasingly complex intelligence demands, beginning with the need for deeper understanding of the capabilities and likely intentions of a wider range of potential adversaries. High expectations for rapid and decisive military (and political) success across the spectrum of situations multiply the expectations and needs from the range of intelligence disciplines— human intelligence, imagery intelligence, signals intelligence, technical intelligence, etc. The demand is for faster, more precise information for political decisions and military operations in a wider range of situations in a wider range of places. Meeting that demand is likely to require changes in organization, authorities, technologies, human resources, and management and leadership focus.

For a Joint Response Force to succeed on distant battlefields in the face of asymmetric threats possessing potential surprise anti-access features, it requires premier ISR capabilities. Collection, target access and sensing capabilities must be linked to a responsive tasking, processing, exploitation, and dissemination system that provides complete, accurate, relevant, and timely intelligence to decision-makers at all levels. Simultaneously, intelligence must strongly support the conduct of information warfare defense and attack (both kinetic and non-kinetic) operations.

To adequately respond to these demanding warfighting requirements, US intelligence must be transformed, focusing on three major thrust areas.

- First, on a steady state and surge basis, intelligence must be able to gain better access to the adversary's deepest "secrets" in order to prevent surprise and to support crisis and conflict planning and operations. Our national capabilities in particular must be dramatically transformed in order to improve our capabilities against more highly developed, hard-to-penetrate, hard-to-track, modern threats— whether posed by a nation-state or terrorist organization.
- Second, the ability to see on, over, into, and under the modern battlefield with arrays and cooperative apertures of complex multi-sensing means must be incorporated into a transformed ISR and targeting architecture to provide responsive dwell, synoptic coverage, and search capabilities. These upgraded ISR and targeting means can also support electronic and information warfare. Improved ISR and targeting capabilities require that the US intelligence community focus on its ability to effectively manage the "river" of information and intelligence to truly support high intensity "knowledge-based" decision-making.
- Finally, there are many issues associated with maintaining defense against information warfare threats and ensuring the security of our information and intelligence means from unauthorized access and timely exploitation by adversaries.

Specific intelligence, counter-intelligence and security recommendations are contained in classified Annex F. They focus on improvements in the three main thrust areas where transformation is required, as well as providing some recommendations in related areas where streamlining of intelligence community organization and processes is warranted.

Investment in improved intelligence and overall ISR and targeting capabilities, and the "back end" that quickly manages and accurately packages and delivers this information to key decision nodes, is critical to future battlefields where power and success are defined, expressed and measured in terms of directing "smart" force capabilities to the points of maximum leverage and effectiveness against the modern enemy.

Appendix G.
Special Access Programs

Classified Report Held by Maj Gen H. Marshall Ward, USAF
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Appendix H.
Glossary of Acronyms and Abbreviations

AAAV – Advanced Amphibious Assault Vehicle

ABL – Airborne Laser

ACS – Aerial Common Sensor

ALAM – Advanced Land Attack Missile

APOD/SPOD – Aerial/Sea Port of Debarkation

ARL – Airborne Reconnaissance Low

ATACMS – Army Tactical Missile System

AWACS – Airborne Warning and Control System

CALCM – Conventional Air-Launched Cruise Missile

CAV – Common Aerospace Vehicle

CEC – Cooperative Engagement Capability

CINC – commander in chief

CINCJFCOM – Commander in Chief, US Joint Forces Command

DoD – Department of Defense

EELV – Evolved Expendable Launch Vehicle

FBCB2 – Future Battle Command Brigade-and-Below

FCS – Future Combat System

GCCS – Global Command and Control System

GPS – Global Positioning System

HIMARS – High Mobility Artillery Rocket System

HUMRAAM – a system consisting of Advanced Medium Range Air-to-Air Missiles (AMRAAMs) mounted on a High-Mobility Multi-Purpose Wheeled Vehicle ("Hummer"), called Complementary Low Altitude Weapon System by the Marine Corps

IBCT – Interim Brigade Combat Team

ISR – intelligence, surveillance, reconnaissance

JASSM – Joint Air-to-Surface Strike Missile

JCCX – Joint Command and Control Experimental

JCSE – Joint Communications Support Element

JFCOM – US Joint Forces Command

JLOTS – Joint Logistics Over-the-Shore

JSF – Joint Strike Fighter

JSTARS – Joint Surveillance Target Attack Radar System

JTRS – Joint Tactical Radio System

JWAC – Joint Warfare Analysis Center

LOSAT – Line-of-Sight Anti-Tank

MILSATCOM – military satellite communications

MILSTAR – Military Strategic and Tactical Relay System

NAD – Navy Area Defense

NGO – non-governmental organization

PAC-3 – PATRIOT Advanced Capability-3

PSYOP – psychological operations

RF – radio frequency

SBR – space-based radar

SMV – Space Maneuver Vehicle

SOF – special operations forces

SPACECOM – US Space Command

SSBN – fleet ballistic missile submarine

SSGN – guided missile submarine

START – Strategic Arms Reduction Treaty

STOL – short takeoff and landing

THAAD – Theater High Altitude Air Defense

THEL – Tactical High-Energy Laser

UAV – unmanned aerial vehicle

WIN-T – Warfighter Information Network-Tactical

WMD – weapons of mass destruction

Transformation Study Report

April 27, 2001

Transforming Military Operational Capabilities

General Jim McCarthy, USAF Retired -- Chairman

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Admiral Bill Studeman, USN Retired
General Larry Welch, USAF Retired

Transformation Study Report

April 27, 2001

Transforming Military Operational Capabilities

Overview

- Charter, Approach, and Purpose of Transformation
- Broader Transformation Capabilities
- Transforming Conventional Capability
- Joint Response Forces Capabilities
- Military Capabilities
- Transforming Capabilities
- Summary of Transformation Programs
- Transformational Research and Development
- Transformation Enablers
- Study Conclusions

Transformation Study Group Charter and Approach

Charter

- The Study Group will identify
  - Capabilities needed by US forces to effectively address the 21st century security environment
  - Capabilities needed to meet national intelligence and space defense needs
  - Transformation recommendations – how to develop and field the desired capabilities
  - Opportunities for cost savings, where feasible
- The Study Group will complete its work and brief the Secretary by 30 April, 2001

Approach

- Identify key capabilities
- Select key transformation areas to explore
- Take briefings, conduct individual research
- Develop transformation priorities and gain group consensus
- Build final report briefing

Describing Transformation

Changes in the concepts, organization, process, technology application and equipment through which significant gains in operational effectiveness, operating efficiencies and/or cost reductions are achieved

Why Transform

- Preserve current strengths in danger of eroding in the face of new challenges
- Meet new threat and environments
- Exploit new opportunities, e.g., those offered by the information technology revolution

Fundamental Purpose of Transformation

Move from marginal superiority over Cold War opponent to dominance across the full spectrum of 21st century military operations – full spectrum dominance with Joint Response Forces

Scope of Transformation

- Focus the effort on a set of very high leverage capabilities that enable new ways to fight (10%)
- Support this focus by Improving/accelerating critical complementary capabilities (10%)
- Maintain course and momentum of sound capabilities that support transformational vision (80%)

Broader Transformation Capabilities

- **Conventional Forces depend on military capabilities that are also essential beyond their support of military operations:**
  - **Missile Defense**
    - **Ballistic**
    - **Cruise**
  - **Space Superiority**
  - **Information Dominance**
  - **Intelligence**
  - **Forward Deployed Forces**

Transforming Conventional Capability

- Focus transformation on Global Joint Response Forces
- Ensure US forces have the capabilities to operate across the full spectrum -- major conflict through peacetime activities
- Significantly enhance operational capability by building a true joint integrated force capability
  - Organize, train and equip a standing, deployable joint command and control system
  - More frequent exercising and experimentation with Joint forces
- Transform early entry forces (the Joint Response Force Concept) as the first phase of eventual transformation of more of the force --
  - Priority recipient of proven transformational technologies and concepts
  - Experimentation and actual use will determine when and what to transform
- Build on forward deployed capability (stationed and rotating deployments)

Why We Use the Early Entry Joint Response Force Concept As the Focus for Transformation

- It meets a US strategic need: a greatly enhanced capability to act decisively before the facts on the ground become too hard to change
  - Relevant to a range of situations: to stop the dying, stop the killing, stop aggression and prevent use of WMD
- It presents an ambitious and demanding set of objectives much beyond what we have today and whose achievement would be truly transformational.
- Its "tip of the spear" capabilities permits longer effective life for the legacy forces
  - They can then be used in new and innovative ways
  - Enables more efficient use of both existing and new systems/capabilities
- It builds on emerging efforts in the Services and Joint Communities
  - Future Combat System, Network-Centric and Effects-Based Operations, Operational Maneuver from the Sea, Rapid Decisive Operations
- Its achievement does not require new physics or technical discovery
  - Does require the challenging integration of available technologies into new concepts, doctrine, organizations and systems
- The enabling capabilities needed to achieve the Joint Response Force objectives are broadly relevant to other elements of the force and other situations

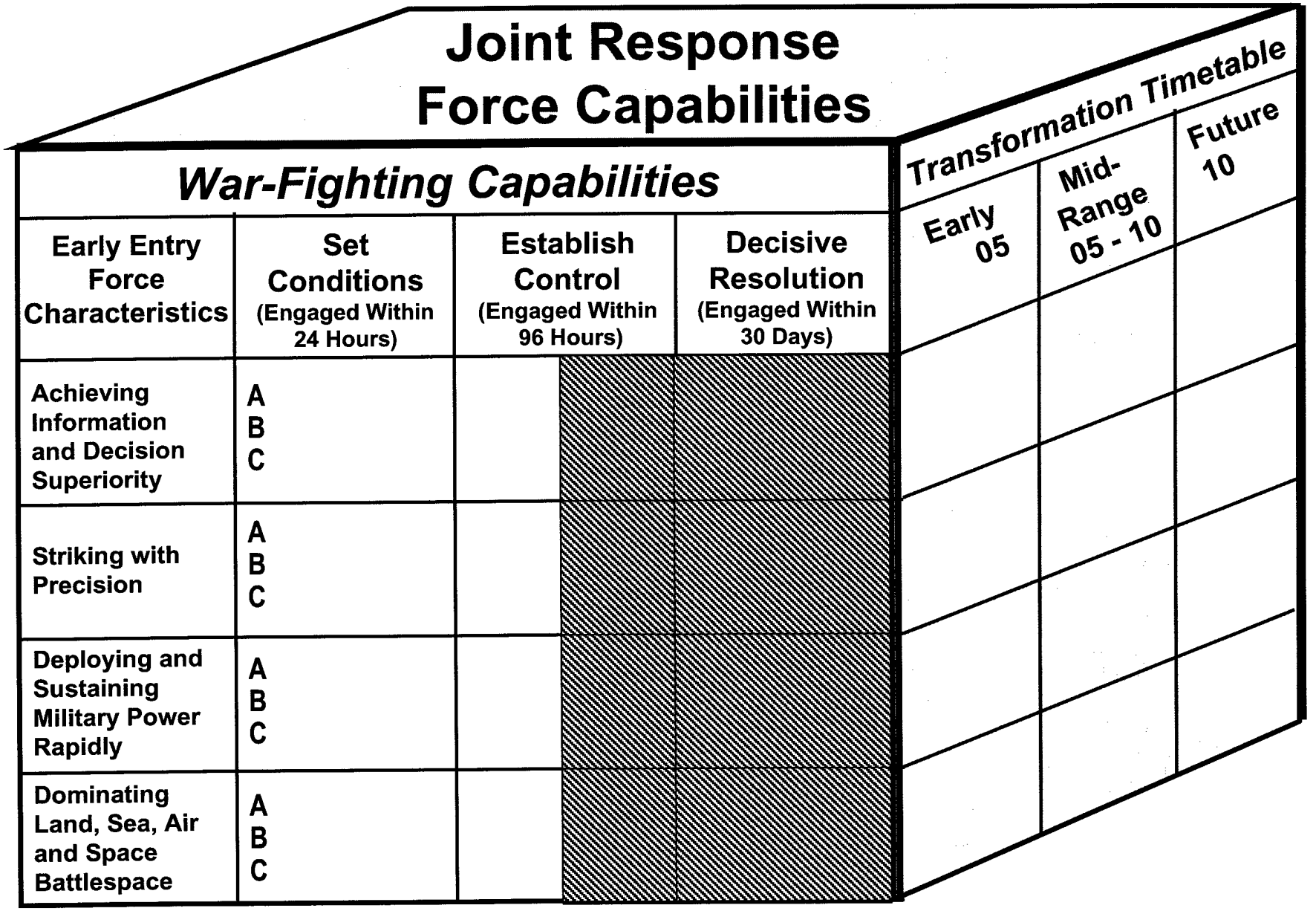
Future Warfighting Concepts -- New and Different

- No capability is more important than situational knowledge shared among all elements of the joint force (much greater emphasis on "shared," "all,"and "joint"). This shared situational knowledge provides the foundation for new capabilities.
  - Knowledge, vice just awareness, to capture experience, context, training, judgment
  - Shared situational knowledge, guided by commander's intent, enables the self-synchronization needed to operate inside the adversary's decision cycles
- New warfighting concepts include:
  - Projecting force both rapidly and potently to stop the aggression, killing, dying ...
  - Combining precision with speed (controlling the tempo)
  - More parallel, continuous and seamless operations (vice sequential, scheduled and segmented)

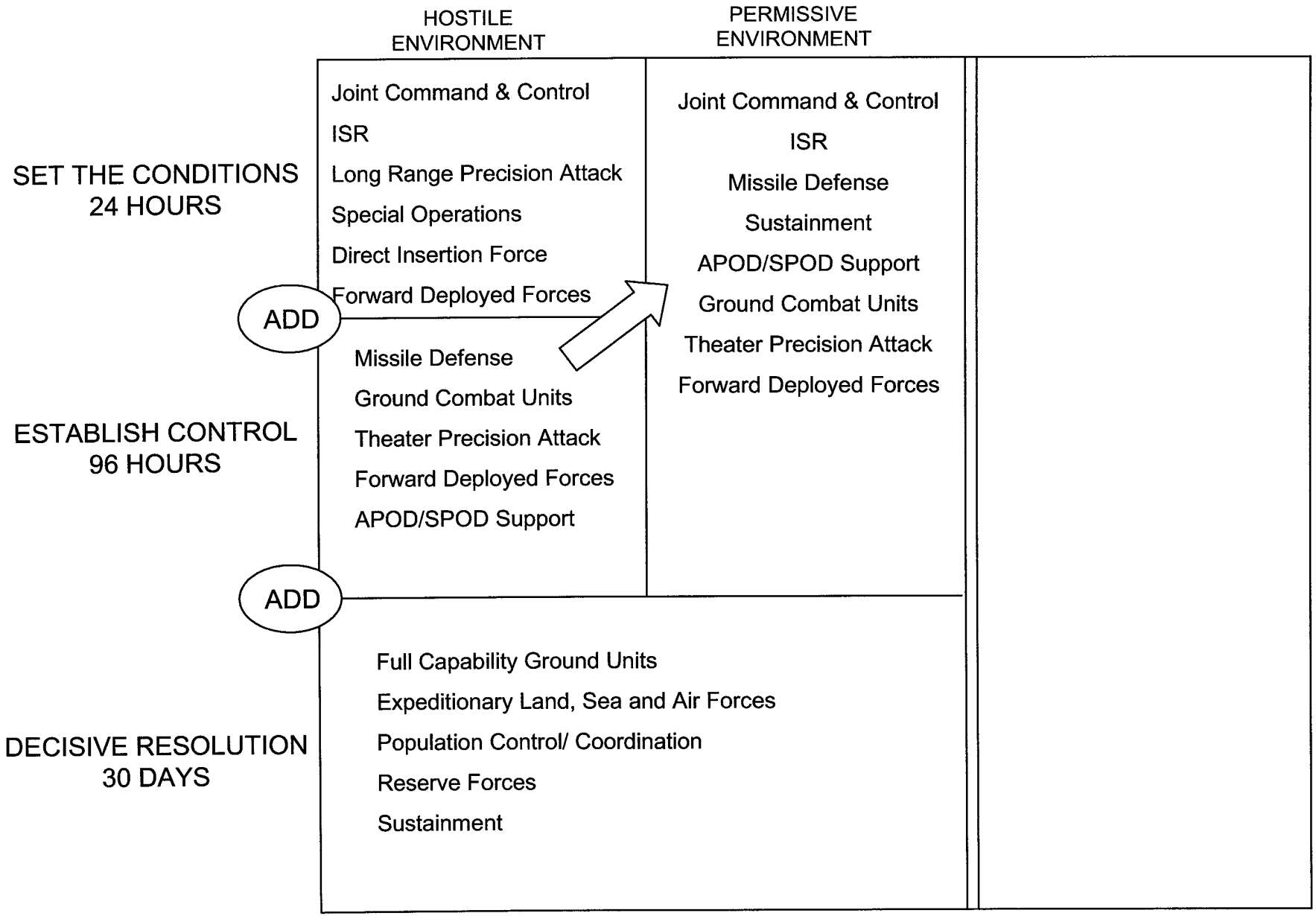
Analytic Approach

- Examine stages of military operations
  - Set the Conditions
  - Establish Control
  - Decisive Resolution
- Organize by key military capabilities
  - Achieving Information and Decision Superiority
  - Striking with Precision
  - Deploying and Sustaining Military Power Rapidly
  - Dominating Land, Sea, Air and Space Battlespace
- Arrange into transformation groups
  - Transformational, enabling new ways to fight: Group A
  - Transformational, preserving capabilities for new ways to fight: Group B
  - Programs That Provide Robustness to Transformation: Group C
- Availability
  - By 2005
  - 2005 - 2010
  - After 2010

Joint Response Force Capabilities



JOINT RESPONSE FORCE CAPABILITIES



Elements of the Joint Response Force Concept

- Deployable Joint Command and Control system
- Tailorable force modules that train and exercise together
- Robust connectivity
  - horizontal and vertical within the force
  - reachback to expertise and resources
- Pervasive networks of intelligence, surveillance, reconnaissance and targeting assets
  - enables shared situation understanding, precision targeting and maneuver
- Long range precision strike and Information Operations
- Forward deployed forces
- Rapidly deployable ground component of the joint force
  - inserted directly into the battlespace ready to fight
- Deploy and sustain without buildup of vulnerable logistic nodes and lines of communication
- Able to cope with WMD, missiles, mines, other anti-access measures

Set the Conditions in a Hostile Environment

- Pre-contingency preparation
  - Commander's preparation of the battlefield
  - Coalition building
  - ISR support to early allied operations
- Rapid response (within 24 hours) with the right mix of forward-deployed and immediately employable forces assures access to crisis area and freedom of action for subsequent operations:
  - National and theater ISR assets expand Situational Awareness, confirm location and posture of targets for initial attacks, do post-strike assessment, identify areas for force insertion
  - Stealthy bombers, standoff cruise missile carriers, and sea platforms destroy enemy missile launchers, IADS, other anti-access weapons
  - Stealthy fighters gain control of airspace and strike with precision
  - Joint Command and Control capability deploys to region and arrives ready
  - SOF infiltrate for strategic reconnaissance, position for direct action
  - Direct insertion forces (airborne or carried in rotary-wing or fixed-wing STOL aircraft and or amphibious platforms) attack enemy critical nodes to limit or foreclose enemy options, draw enemy ground forces out of hiding for attack by long range precision strike

Establish Control in a Hostile Environment

- Follow-on response (within 96 hours) with mix of potent forces halts aggressive behavior and lays groundwork for decisive operations to resolve the crisis
  - Expand missile defense coverage
  - Expand information base
  - Maritime and afloat prepositioned forces arrive, to expand and support operations
  - Ground combat units conduct distributed operations to threaten enemy Command and Control nodes, capture information, and force enemy forces out of hiding
  - Available platforms conduct theater precision attack
  - Prepare air and sea ports for follow on forces
  - While achieving decisive effects is the goal, the Joint Response Force will also continue to set the conditions for extended operations as necessary

Set the Conditions and Establish Control in a Permissive Environment

- Joint Response Forces deploy to crisis area to deter, dissuade or conduct combat operations.
  - National and theater ISR assets expand Situational Awareness
  - Standing Joint Command and Control deploys to region, plans en route, arrives ready
  - Sea-based air and missile defenses extend protection over lodgment area; ground-based defenses extend protection
  - Direct insertion forces (airborne, air-landed, and amphibious) are positioned to limit or foreclose adversary options
  - Preparation of air and sea ports for follow-on forces continues
  - Land- and sea-based prepositioned forces prepare for action
  - Additional forces that can apply combat power without extensive buildup arrive and are postured for subsequent operations. While achieving decisive effects is the goal, the Joint Response Force will also set the conditions for extended operations as necessary
- Long Range Precision Attack forces and Direct Insertion forces on alert posture for rapid response to hostilities

Decisive Resolution

- As ports and bases are secured, follow-on elements arrive (within 30 days) to undertake operations aimed at isolating and rendering ineffective remaining enemy capabilities. If needed, this force conducts a short, violent offensive to bring about end state conditions. Force then initiates stability and support operations and prepares for transition to a peacekeeping/ humanitarian force. Follow-on forces for decisive resolution include:
  - Full capability ground forces (Active and Reserve Component)
  - Air expeditionary forces
  - Additional sea-based forces
  - Sustainment
  - Population control/coordination

Military Capabilities

- **Achieving Information and Decision Superiority**
  - Command and Control
  - Information and Communications
  - Intelligence, Surveillance and Reconnaissance
  - Information Operations
- **Striking with Precision**
  - Long Range Precision Attack
  - Time Critical Precision Targeting
  - Supporting Forces
  - Direct Force Insertion
- **Deploying and Sustaining Military Power Rapidly**
  - Command and Control
  - Deploying
  - Focused Logistics
  - Forward Basing and Infrastructure
- **Dominating Land, Sea, Air and Space Battlespace**
  - Command and Control
  - Maneuver and Mobility
  - Intelligence
  - Fires and Precision Attack
  - Logistics
  - Protection
  - Nuclear Chemical and Biological Defenses

Achieving Information and Decision Superiority

- **Value of the Capability**
  - To a much greater extent than today, be able to conduct operations that:
    - Operate inside the adversary's decision cycles
    - Combine both precision and speed (controlling the tempo)
    - Can respond rapidly and potently to the full range of contingencies
    - Are parallel, continuous and seamless rather than sequential, scheduled and segmented
    - Match tactical actions to strategic and operational ends (effects-based operations)
  - Move from multi-service operations that merely deconflict services' jobs to joint operations that exploit the potential for synergy of true teams (whole greater than sum of the parts)
- **Critical Elements**
  - Command and Control
  - Information and Communications
  - Intelligence, Surveillance and Reconnaissance
  - Information Operations

Achieving Information and Decision Superiority: Command and Control

Key Operational Capabilities

- A cohesive, always available, joint Command and Control system (people, networks and decision tools) able to conduct rapid and decisive operations with distributed joint forces across the full spectrum of contingencies

Enabling Capabilities

- Joint Task Force headquarters (vice Service-centric)
  - Cohesive standing teams (vice pick-up)
  - Small, mobile, employing reachback, collaborative tools
  - Flatter, adaptive structure
- Standards of readiness, response and performance (expect and enforce these standards as we do for weapon systems and other force elements)
- Integrated planning, execution, assessment (vice sequential and separate)
  - Family of decision support tools

Achieving Information and Decision Superiority: Command and Control

Key Transformation Programs

"A"

- Develop Joint Command and Control as a core competence
  - Provide JFCOM the resources and authority (working with other CINCs) to design, organize and equip prototype lean, distributed and adaptive Command and Control system and associated joint headquarters
    - Establish more frequent, tailored training and exercise cycles to provide the necessary levels of readiness and cohesion for those forces that may be part of the Joint Response Force
    - Establish a major cooperative JFCOM/DARPA program to develop new joint command and control systems and headquarters
    - Co-evolve new Command and Control concepts, doctrine, organizations, leader development and training with technology and materiel
    - Involve interagency and coalition partners

Achieving Information and Decision Superiority: Command and Control

Key Transformation Programs (Continued)

"A"

- Develop Joint Command and Control as a core competence (2)
  - Establish and enforce standards of performance, readiness, response
    - Treat joint Command and Control (and associated networks) as we do combat systems
  - Establish lean standing, deployable joint headquarters for rapid joint force response at the regional CINCs
  - Evolve capabilities from JFCOM and theater experiments and exercises
  - Implement Family of Interoperable Operating Pictures (FIOP) and other collaborative tools for planning, execution and assessment
    - Multi-level, user tailored

Achieving Information and Decision Superiority: Information and Communications

Key Operational Capabilities

- Robust networking among all elements of the Joint Force and supporting data bases and other resources that provides the promulgation of commander's intent, shared situational knowledge (including fire control quality), feedback and assessment
  - Horizontal as important as vertical
  - Need also to extend to interagency and multinational partners

Enabling Capabilities

- Web-based, robust, wide-band, ubiquitous networks with associated information management capability
  - Integrated space-based capabilities and airborne relay to provide robust global reach
  - Pervasive, flexible tactical entry portal into the network
  - Intelligent software agents to monitor the network and support users
  - Data and symbology standardization (or data bases that can communicate with each other)
  - Use of commercial standards and systems to reduce DoD investment and insure a growth path

Achieving Information and Decision Superiority: Information and Communications

Key Transformation Programs

"A"

- Establish much more robust and higher capacity reachback and intra-theater connectivity
  - Establish Joint Signal Brigade (extension of JCSE) to coordinate and direct activity for joint communication assets
  - Field Teleport – in-theater nodes to facilitate reachback (Phase 1 has been approved but only after overcoming strong Service opposition)
  - Modify GBS terminals and injection systems
- Modify/accelerate JTRS program to develop common battlefield data system (becomes pervasive in-theater user portal to the GIG)
- Accelerate fielding of Joint Airborne Communication Relays for tactical and ground-air-space (with laser up-links) connectivity
- Develop and field national EHF and Laser SATCOM systems to support DoD and IC
- Assign clear responsibility and resources to an executive agent to plan and direct development of this robust capability

Achieving Information and Decision Superiority: Intelligence, Surveillance and Reconnaissance

Key Operational Capabilities

- An engagement quality, shared, comprehensive, dynamic depiction of the entire battle space that enables commanders to shape the battle as well as engage targets
  - Not merely sensor-to-shooter, but sensor-to decider-to action

Enabling Capabilities

ISR assets that are

- Networked
  - Common geo-spatial reference
  - Tasking, fusion, tracking, discrimination and other sensor data exploitation tools
  - Everything on the network becomes a sensor (eyeballs, laser range finders, smart weapons)
- High Density
  - Upgrades of airborne sensors, many more UAVs, introduction of space- based radar (to provide persistent, operationally useful coverage)
  - Multi-phenomenology: advanced radars, hyperspectral, unattended ground sensors
- Responsive to the Joint Force Commander
  - Available for pre-hostility presence, engagement and intelligence preparation of the battlefield as well as an "ISR Deterrent" option to restrain/influence adversary's behavior

Achieving Information and Decision Superiority: Intelligence, Surveillance and Reconnaissance

Key Transformation Programs

"A"

- Network existing ISR assets (space, air and other)
  - Enhance tasking, processing, exploitation dissemination of national assets
  - Accelerate fielding of geo-location referencing, tasking, tracking, discrimination, fusion and other sensor exploitation tools
  - Establish a simulation capability to familiarize JTF commanders and staff with ISR and Targeting capabilities before they have to use them in real operations.
- Turn Low Density/High Demand ISR and Targeting assets into a high density, networked ISR and Targeting capability responsive to Joint Force and subordinate Commanders
  - Increase substantially the quantities and capabilities of unmanned platforms
    - Global Hawk family, TUAV, Aerostats, Unattended internetted ground sensors, foliage penetrating sensors, ground penetrating sensors
    - Complement the unmanned systems with selected upgrades of sensor suites on manned airborne platforms : AWACs, JSTARs, E2C...
  - Add space-based radar (persistent, all weather)
  - Increase HUMINT through increased FAOs, language skills, multinational cooperation

Achieving Information and Decision Superiority: Information Operations

Key Operational Capability

- The elements of IO fully integrated into campaign operations that allow Joint Force Commanders to fight for, and achieve, information superiority
  - The fight for information superiority becomes as essential and natural to the Joint Force Commander (JFC) as the fight for air superiority

Enabling Capabilities

- IO integrated with fires and maneuver
- Potent IO tools, available to the Joint Force Commander knowledgeable and experienced in their use
- Robust protection for information infrastructure

Also see classified annex

Achieving Information and Decision Superiority: Information Operations

Key Transformation Programs

- Define and implement a decision process for employing the full set of IO tools
  - clarify roles of various DoD and other USG players and stakeholders
  - support the decision process with a Command and Control system for real-time use
- Incorporate IO in
  - Joint operational doctrine, operational planning, multi-level training
- Strengthen integrated attack and warning capability to provide early assessments of attack on DoD systems
- Create a process to orchestrate the various IO tools together with combat ops to achieve effects-based outcomes
  - strengthen efforts to model adversaries as complex adaptive systems
  - complement JWAC capability with other "Centers of Excellence" (e.g., to cover all of electronic space, influencing adversary's perceptions)
  - Establish a "Center-of-excellence" to provide the intellectual understanding of IO as we have done in the past with IW, ASW, etc.

An observation: The maturation of IO may be hampered by the aggregation of such disparate elements -- from computer network defense to psyops --within the IO label

Decision Superiority: Four Suggestions

- **Get tough with technical architecture standards, protocols**
  - Embed enforcement of standards into a disciplined process that includes operational testing of interoperability in a joint environment
  - Expand roles for JITC and ASCIENT
- **Assign resources and authority to develop and acquire the joint Command and Control system**
  - JFCOM and US SPACECOM are likely candidates for development role.
    - If JFCOM, relieve them of some other UCP responsibilities
    - If US SPACECOM, clearly direct them to become US Space and Information Command
    - Provide them resources (technical work force and control of funds) to direct system changes through spiral development
  - Select a complementary acquisition authority
- **Assign resources and authority to plan and oversee joint connectivity**
  - Rationalize SATCOM, commercial procurement, synchronization of service programs
  - Converge disparate communications programs to a robust high capacity cross-linked space/regional air relays/consolidated fiber grid
  - One approach: establish a National Communication Program Office to create joint system architecture and control funds for implementation
  - The intelligence community will be a partner in the NCPO in building the integrated communication networks
- **Assign resources and authority to develop and field family of interoperable operational pictures**
  - E.g., create a Joint Program Office (Task Force) with funds, technical support
  - Would work closely with JFCOM and other CINCs

Striking with Precision

- **Value of the Capability**

Forces that Deter, Assure, Dissuade with capability to:

  - **Rapidly respond globally with U.S. based long range forces to lead or support deployed forces to strike many critical targets nearly simultaneously**
  - **Integrate with forward operating forces as a single integrated force package**
  - **Plan operations enroute to reduce response time**
  - **Responsiveness improved by various alert postures that also demonstrate U.S. resolve.**
  - **Directly insert ground forces to control centers of gravity**

- **Critical Elements**
  - **Long Range Precision Attack**
  - **Time Critical Precision Targeting**
  - **Supporting Forces**
  - **Direct Force Insertion**

Striking with Precision:
Long Range Precision Attack

Key Operational Capabilities

- Offset the adversary's key access denial strategies
- Execute operational strikes from relative sanctuaries
- Penetrate defended air space and disable or destroy defenses
- Gain control of key airfields, seaports, and infrastructure
- Defend deployed forces

Enabling Capabilities

- ISR assets that can locate key adversary's defenses and nodes
- Stealth aircraft with precision munitions
- Cruise missiles with precision strike capability
- Escort aircraft for force protection
- Direct Insertion Forces with standoff protection

Striking with Precision:
Long Range Precision Attack

Key Transformation Programs

"A"

- Convert four Ohio SSBNs to SSGNs with maximum number of cruise missiles
- Enhance the B-2A force with large carriage capacity and flexible targeting capability
- Produce the Small Diameter Bomb
- Convert ALCMs to CALCMs; Increase B-52 conventional force for carriage
- Accelerate an improved Global Hawk deployment
- Develop stealthy Joint Long Range Cruise Missile
- Develop a new long range precision strike capability
- Accelerate Navy JSF fielding

Striking with Precision:
Time Critical Precision Targeting

Key Operational Capabilities

- Gain situational awareness
- Find Fix and Track fixed, mobile and moving targets
- Target and engage with precision target location
- Command and control within short timelines
- Assess success and re-attack quickly

Enabling Capabilities

- Space and Airborne ISR platforms discussed in previous section
- Direct target insertion into platform and weapon
- Inflight or reachback planning capabilities

Key Transformation Programs

- Joint Command and Control program initiative
- ISR and Communications programs described in previous section
- Planning and execution and assessment tools
- Inflight corrections to precision weapons after release

Striking with Precision: Supporting Forces

Key Operational Capabilities

- Extend the range of bombers, fighters, transports and helicopters
- Protect aircraft entering hostile airspace
- Escort aircraft unable to counter attacking aircraft
- Provide command and control in the battle area when required

Enabling Capabilities

- Develop tankers with long range and large offload capabilities
- Develop advanced electronic countermeasures capabilities
- Provide stealthy air superiority fighters as escorts
- Develop communications relay and direct system access on unmanned platforms

Striking with Precision: Supporting Forces

Key Transformation Programs

"A"

- Develop a more efficient and operationally effective air refueling tanker
  - Establish a blended wing body program office to exploit US contractors' initiatives
- Field Global Hawk for communications relay and test with remote Command and Control concepts

"C"

- Seek advanced means of providing electronic support to penetrating aircraft
  - Establish a program to develop alternatives
- Support increasing F-22 production rate
  - Ensure integrated situational awareness with supported aircraft

Striking with Precision:
Direct Insertion Forces

Key Operational Capabilities

- Substantial ground force presence inserted directly into enemy centers of gravity within 24 hours of launch
- Agile, lethal and sustainable forces ready to fight on arrival

Enabling Capabilities

- Global constant, accurate fused common relevant operating picture
- Enroute rehearsal capability
- Adequate air and amphibious lift capable of inserting ground forces by airborne, airland or amphibious means
- Greatly enhanced battlefield mobility through STOL and VTOL techniques
- Lethal and sustainable close air support
- Robust, light weight antitank capability
- A means of integrating each individual ground warrior into the "infosphere"

Striking with Precision:
Direct Insertion Forces

Key Transformation Programs

"A"

- Space Based Radar - Provides continuous global wide area surveillance to include time critical targeting
- Enroute rehearsal - Integrated situational awareness data allows data updates and enroute planning and rehearsal changes for a force being air or sea lifted to objective areas.
- Comanche - Multirole (scout and strike) helicopter - crucial "seed corn" for Army's future force - Link-16/SATCOM for interoperability - capable of digital targeting and full ISR integration w/ air, ground and sea nodes
- Javelin - Individual, shoulder fired AT weapon - Top attack or direct fire - 250% range increase, fires from enclosures, fire and forget.
- JSF - Stealth air support for ground forces

"B"

- V-22 - Advanced tactical delivery options in austere / geographically challenging environments
- FBCB2 - Premier ground / air situational system worldwide - essential to direct insertion force situational awareness - expands current battlespace by 250% - integrates w/ Joint COP
- Land Warrior - Modular, integrated fighting system for dismounted combat soldiers - integrates ground warriors into "infosphere"

"C"

- STOL - Provides C-130+ equivalent tactical and operational airlift
- AAAV - Ground centerpiece of future Marine force amphibious mobility - 4x the speed, 8x the sea launch range, substantial increases in protection and lethality

Deploying and Sustaining Military Power Rapidly

- **Value of the Capability**
  - Enables all Joint Response Force activities
- **Critical Elements**
  - Command and Control
  - Deploying
  - Focused Logistics
  - Forward Basing and Infrastructure

Deploying and Sustaining Military Power Rapidly: Command and Control

Key Operational Capabilities

- A faster, more responsive world-wide logistics distribution, deployment, mobility, force-closure, and sustainment function
- Timely oversight, control, and direction of the overall logistics process

Enabling Capabilities

- Blend strategic supply and transportation functions
- Integrate a system of network-centric logistics with strategic mobility capabilities and advances

Key Transformation Programs

- Establish a distribution network to achieve synergy of all logistic functions, optimize support, and provide a single point of accountability, which will:
  - Close the planning and execution gap between operations and logistics ("opergistics")
  - Reduce overall DoD inventories significantly
  - Offer significant reductions in management overhead

Deploying and Sustaining Military Power Rapidly: Deploying

Key Operational Capabilities

- Ability to lift high volume of personnel, equipment or supplies by point-to-point, fast, advanced airlift
- Ability to deploy by Strategic or Intra-Theater Sealift at speeds significantly faster than today's ships
- Reduced build-up of logistics "footprint" in or near the area of operations through faster, more responsive, more focused delivery of sustainment
- Reduced dependence on developed ports and large destination airfields
- Ability to exploit pre-positioned assets, afloat, or ashore, by substantially improved speed and ability to move them intra-theater

Enabling Capabilities

- Collaborative Command and Control network that integrates strategic supply and transportation functions
- Adequate numbers of short, or very short take-off and landing strategic lift aircraft and/or other advanced airlift systems

Deploying and Sustaining Military Power Rapidly: Deploying

Enabling Capabilities (continued)

- High speed strategic, intra-theater, and afloat prepositioning ships
- Effective means of off-loading ships in-stream, without dependence on developed ports

Key Transformation Programs

"A"

- Monitor industry development of Blended Wing Body technology for application to long range tanker and transport aircraft

"B"

- Continued C-17 procurement and/or C-5 modernization in conjunction with advanced airlift programs to correct current airlift shortfall
- Advanced tactical airlifter capable of 80,000 pound lift and delivery to a 750 foot, unimproved runway (twice the C-130 lift capacity in 1/4 the runway length)
- High-speed sealift ships capable of sustained speeds of 45 knots (twice the speed of current fast ships) with significant on/off load capability
- Ultra heavy airlifters capable of lifting up to 2 million pounds of cargo (11 times the capacity of C-17) 5,000 miles in 3-4 days

"C"

- Advanced strategic tanker
- Joint logistics-over-the-shore (JLOTS) to enable sea-state-3 in-stream off-load (5-8 foot vs current 2-3 foot seas capability)

Deploying and Sustaining Military Power Rapidly: Focused Logistics

Key Operational Capabilities

- Ability to move from "just in case" large logistics storage and operating area build-up to focused, accurate and responsive distribution
- Total, world-wide asset visibility of spares, parts, and supplies, with real time access for quick distribution
- Faster, more focused, better integrated response to customer

Enabling Capabilities

- Web-based automation capabilities
- Direct linkage between the oversight and management of principal items of supply, and the means of distributing them

Deploying and Sustaining Military Power Rapidly: Focused Logistics

Key Transformation Programs

- Network Centric Logistics: A collaborative, web-based, logistics operations network of accurate, real-time data and on-demand communications
  - Accelerate total visibility of world-wide assets -- both supplies, and transportation means -- under a single commander with 50% reduction in customer wait time
- Reduced cannibalization of equipment to achieve on-scene readiness
- In CONUS storage and volume carried with deploying forces
  - Accelerate automated planning and training system to focus on logistics as a key element of force deployment planning, and to build confidence in the warfighter ("opergistics")

Deploying and Sustaining Military Power Rapidly: Forward Basing and Infrastructure

Key Operational Capabilities

- Ability to provide support, maintenance, and sustainment training to forward deployed, and forward based forces.
- Ability to maintain critical relations with military allies, or potential allies throughout the world.
- Ability to deploy rapidly, and add robustness and operational depth to forward deployed, forward based, or CONUS deploying forces.

Enabling Capabilities

- System of overseas installations or basing rights that sustain forward-deployed forces, and deployment of en-route transiting forces.
- Worldwide force positioning to maintain and enhance critical relationships through military-to-military contact.
- Installation usage agreements to enable training for forward based, and forward deployed forces.
- Network of prepositioned stores and equipment to expedite force deployment, enhance sustainment, and significantly reduce demands on strategic and intra-theater lift assets.

Deploying and Sustaining Military Power Rapidly: Forward Basing and Infrastructure

Key Transformation Programs

- Expand access to and provide infrastructure funding to upgrade overseas en-route, and return route refueling and maintenance bases
- Expand access to overseas ports that provide support and maintenance for forward deployed forces
- Maintain overseas bases that enable training of forward based, or forward deployed forces
- Modernize Maritime and Afloat Prepositioning Forces that enable rapid deployment expansion and application of forces to littoral crisis locations, and that provide dramatic reductions in lift requirements

Dominating Land, Sea, Air and Space Battlespace

- **Value of the Capability**
  - Forces that are decisive on any battlefield with capability to:
    - Respond globally to build on forward deployed and rapid response forces
    - Integrate with or absorb previously deployed operating forces into a single integrated campaign force
    - Provide all required force sustainment
    - Conduct robust space, ground, sea and air campaign through integrated fires and maneuver enabled by advanced intelligence and logistics
    - Provide continuous joint or combined command and control capability
- **Critical Elements**
  - Command and Control
  - Maneuver and Mobility
  - Intelligence
  - Fires
  - Logistics
  - Protection
  - Nuclear Chemical and Biological Defenses

Dominating Land, Sea, Air and Space Battlespace : Command and Control

Key Operational Capabilities

- Ability to anticipate future battle space events and conditions
- Substantially compressed planning and decision cycles
- Continuous exercise of command and control regardless of battlefield conditions
- CJTF ability to interface directly with lowest echelon headquarters of the force
- An "infosphere" that encompasses land, sea, air, space and undersea

Dominating Land, Sea, Air and Space Battlespace: Command and Control

Enabling Capabilities

- **Battle space awareness**
  - Real-time ISR support to combatants at all levels
  - Integrated all source information in near real-time at each operating headquarters
  - Constant, accurate common relevant operating pictures to include the lowest operating entity
  - Cross service platform and echelon integration of relevant information
  - Integrated management of intelligence collection with the planning and operations cycle
  - Decision support: The ability to develop accurate estimates of future enemy and friendly capabilities
- **Leader development programs**
- **Force level integration**
  - Full integration/ operability of systems across functional areas
  - Integration of personnel, organization structure, systems and procedures
- **Communications**
  - Adequate voice, data and video capability to avoid saturation or excessive queing
  - Joint interoperability at every operating level

Dominating Land, Sea, Air and Space Battlespace : Command and Control

Key Transformation Programs

"A"

- Information Operations (Computer Network Defense/Computer Network Attack) - Dynamic effects-based operations across the entire spectrum
- E-2C Radar Modernization Program (RMP) - provides capability for precision overland surveillance for air defense against advanced air contacts and supports an OTH SAM

"B"

- FBCB2 - Premier Ground/Air Situational Awareness System Worldwide - Essential to interim and objective force operations - Expands current battle space by 250% - Feeds joint COP
- JTRS - Radio that enables joint interoperability - 500% increase in data throughput - Combines multiple legacy radio systems in one box
- WIN-T - "Adequate Pipes" for objective force operations - 400% increase in current network capacity and data transfer velocity - 25% reduction in force structures - Allows tactical Command and Control on the move

Dominating Land, Sea, Air and Space Battlespace : Command and Control

Key Transformation Programs

"C"

- **GCCS-A - Army's only link to the joint common operating picture; provides army's blue force input to COPS; army's only interface to JOPES**
- **Distributed Common Ground Station, Air Operations Center - (w/ Family of interoperable Operational Pictures, Global Information Grid, GTACS) - improves our ability to make better decisions faster - faster than an enemy can react - assured decision dominance over adversaries**
- **Cooperative Engagement Capability (CEC) - Provides ability to engage LO contacts beyond the sight of onboard sensors or targets in a jamming environment**

Dominating Land, Sea, Air and Space Battlespace : Maneuver and Mobility

Key Operational Capabilities

- Rapid application of joint forces directly to centers of gravity with minimal Intermediate Staging Bases or support buildup
- Flexibility to recast or reorient forces in the midst of conflict
- Ability to apply decisive combat power throughout the battle area

Dominating Land, Sea, Air and Space Battlespace: Maneuver and Mobility

Enabling Capabilities

- Ability to project forces from home station directly into forward operating areas
- Consistent, timely, accurate and complete total force visibility
- Ability to position the right force in the right place at the right time
- Ability to overcome enemy anti access measures
- Capability to quickly move, shift or reconfigure forces
- Ability to simultaneously concentrate overwhelming joint combat power at a chosen place and time
- Light lethal high mobility systems
- Day, night, all weather close air support for amphibious and land operations ashore
- Ability to apply force visibility to effectively exploit movement capability
- Fire support for land operations and deep strike ashore

Dominating Land, Sea, Air and Space Battlespace : Maneuver and Mobility

Key Transformation Programs

"A"

- Interim Armored Vehicle (IAV) - Centerpiece of brigade combat team - Worldwide deployable in 96 hours (212x C-17 sorties) ready to fight in close/complex/urban terrain
- Future Combat System (FCS) - Centerpiece of objective ground force - Will replace Abrams, Bradley, Crusader, Paladin, and current tactical Command and Control Systems - 50% Reduction in logistics - 100KPH burst speed - High capacity wireless networks
- Comanche Helicopter - Crucial "Seed Corn" for objective force - Link-16/SATCOM for interoperability - Capable of digital targeting, ISR integration, minimal logistical burden - First objective force system to be fielded
- Space Maneuver Vehicle / Space Operations Vehicle - Full dimensional mobility

"B"

- V-22 Tiltrotor Aircraft - Aviation centerpiece of Marine Forces/SOCCOM battlefield mobility. Replaces 13 type/model/series aircraft. Provides 5x the range at 2x the speed of any current or envisioned helicopter.
- MV-22 and CV-22 - Advanced tactical delivery options in austere/geographically challenging environments
- Organic Mine Countermeasures (MC) is a family of ship launched, submarine launched and airborne sensors and weapons integral to the Battle Group allowing in-stride detection and neutralization of mines.

Dominating Land, Sea, Air and Space Battlespace : Maneuver and Mobility

Key Transformation Programs

"C"

- GCCS/GCSS - Real-time, advanced, link communications at the core of real-time execution of military operations
- Advanced Amphibious Assault Vehicle - Ground Centerpiece of Marine forces mobility. 4x the speed; 8x the sea-launch range; twice the armor protection. MK-46 chain gun acquires target and shoots accurately at 20x current capability
- Active Electronically Scanned Array (AESA) Radar - provides capability to precisely locate and direct PGMs against fixed and mobile land targets and outreach all current threat air-to-air radars

Dominating Land, Sea, Air and Space Battlespace: Intelligence

Key Operational Capabilities

- A consistent, timely, accurate and secure enemy picture in any conditions
- Anticipation of change in both enemy capability and intent

Enabling Capabilities

- Consistent, accurate and timely enemy information to entity level of detail
- Unimpeded transport of enemy information in multi-media throughout all environments and situations
- Network robustness - Access control, advanced interactive visualization and displays, standardized data and management protocols, no single points of failure
- Multi-level access with security
- Decision support systems
- Ability to accurately apply enemy information to functions in support of Joint operations

Dominating Land, Sea, Air and Space Battlespace: Intelligence

Key Transformation Programs

"A":

- Tactical Unmanned Aerial Vehicle (TUAV) - Provides maneuver commanders dedicated day/night reconnaissance surveillance and target acquisition capability - has laser spotting and designation capability, communications relay and high resolution imagery
- Space-Based Radar, spectral imaging JSTARS w/ RTIP, Advanced AWACS, U-2, SENIOR SCOUT, ABCCC - Key elements:Dominant battlespace awareness -- the full range of vigilance necessary to anticipate and deter emerging global threats
- Sea-Based UAV - Adds carrier-based surveillance and increased precision targeting capability for 24 hour / day surveillance and targeting over land or water to support the rate at which precision strike firepower is increasing.
- Advance UUV - Family of SSN-launched, untethered UUVs to conduct maritime reconnaissance, undersea search and survey (for anti-access weapons such as moored or bottom mines), aid in communications and navigation, and submarine track and trail.

Dominating Land, Sea, Air and Space Battlespace: Intelligence

Key Transformation Programs

"B":

- Maritime Multi-Mission Aircraft (MMA) - multi-mission (undersea warfare, anti-surface warfare, C4ISR) patrol aircraft/UAV -- or a combination of both -- providing armed surveillance of maritime and littoral regions working in concert with distributed sensor networks such as sonobouys or fixed sonar arrays.

"C":

- Aerial Common Sensor (ACS) - Replaces Guardrail and ARL supports deep fires in excess of 250KMs - (HIMARS, ATACMS) - Provides multi-int from maneuver force to JTF
- PROPHET - Highly mobile multi-sensor ground collector/jammer - Quadruples frequency coverage, reduces footprint and sustainment cost (replaces three current systems)
- Distributed Common Ground Systems- Army (DCGS-A) - Replaces five current intelligence processors - Allows reachback for national and theater inputs - Reduces footprint, force structure and sustainment costs - Distributed Common Ground Station, Air Operations Center-X (w/ Family of Interoperable Operational Pictures, Global Information Grid, GTACS)
- Advanced Deployable System (ADS) - Provides cueing for an ASW area denial capability with rapidly-deployable (in areas and times of crisis) fixed sonar arrays that have near-certain probability of detecting diesel and nuclear submarines or mine laying ships

Dominating Land, Sea, Air and Space Battlespace: Fires and Precision Attack

Key Operational Capabilities

- Assured destruction of time critical targets at much increased range in all weather conditions
- A rapid deployable, sustainable and agile set of ground direct and indirect fire systems capable of rapid use and rapid integration into the joint fires family
- Air strike forces capable of creating precise effects rapidly with the ability to retarget quickly against large target sets anywhere, anytime for as long as required. Deterrence against WMD attacks and coercion.

Enabling Capabilities

- Simultaneous real time predictive target information at each operational level
- Significantly enhance nodal analysis of targets and objectives
- Greatly enhanced capability to focus dynamic operations at detecting, identifying and directing fires/forces effects against time critical targets
- Greater dispersal of fires platforms with emphasis on massed effects vice massed forces
- Ability to effectively integrate Ground Fires capabilities with combined arms capabilities

Dominating Land, Sea, Air and Space Battlespace: Fires and Precision Attack

Key Transformation Programs

"A"

- JAVELIN -Individual, shoulder fired AT weapon - Top attack or direct fire - 250% range increase, fires from enclosures, fire and forget, low maintenance
- HIMARS - First light (17 ton) C-130 deployable multiple rocket launch system - Attacks SCUDs, TELs and armor at 10 to 300 KM range - Joint program with USMC
- Small Diameter Bomb (SDB) - Greater precision, decreased collateral damage
- Unmanned Combat Air Vehicle (UCAV) - Full dimension attack capability
- Vertical Take-off UAV (VTUAV) - operate from surface combatants and amphibious ships
- Trident SSGN - carry land attack missiles, potentially doubling on-scene precision strike firepower that cannot be located or targeted by any known threat

Dominating Land, Sea, Air and Space Battlespace: Fires and Precision Attack

Key Transformation Programs

"B":

- ATACMS - All weather precision engagement to 145KM Block II and IIA - Up to 300 KM w/ IIA - Greatly expanded target set

"C":

- LOSAT - KE missile defeats projected armor to 4+ KM range - C-130 deployable, airlifted by UH-60 - Can acquire and track 2 targets simultaneously
- F-22 - All aspect/multiple frequency stealth, supercruise, data integration provides aircraft capable of day one access in 2010+ threat environment.
- Joint Strike Fighter (JSF) - Replaces 20-30 year old tactical strike/CAS aircraft fleet. Dramatic increase in lethality, survivability and supportability. Increases world-wide existing runway usage by 600%. Employed from platforms at sea, expeditionary airfields and pads, or available fixed airfields.
- Tactical Tomahawk (TACTOM) -- In-flight GPS or stored mission flex-targeting. Range increase of 50% and new loiter and battlefield surveillance capability. Can quickly strike relocatable targets
- Advanced Stand Off Munitions (JASSM-ER, ERCM, LRCM) - Improved stand-off capability enhancing anti-access challenge for joint follow-on force
- Supersonic Strike Missile - Capable of striking time-critical relocatable targets promptly (3x as fast) from standoff ranges.
- Crusader Technology Program - 250% improvement over current rate of fire, 66% increase in range, 59% increase in accuracy - Leap ahead technology carrier for FCS in Command and Control, logistics, integrated mission planning, proactive decision aids, imbedded training

Dominating Land, Sea, Air and Space Battlespace: Logistics

Key Operational Capabilities

- Accurate, timely and consistent situational awareness of all logistics entities from CONUS to the point of use
- Greatly reduced theater logistics requirements and mature reach back capability
- An agile and pervasive doctrine that underwrites the meshing of logistics and operations to allow logistics to become anticipatory rather than responsive

Enabling Capabilities

- Access by any user to operational and logistics data worldwide from a single terminal
- Robust networks that link operational and support force networks
- Integrated pictures showing operational and logistic unit readiness
- Total asset visibility of transportation and cargo
- Ability to effectively apply logistics status/capability support of force capabilities/needs
- Reduced theater footprint and inventories
- Delivery of tailored support and sustainment packages directly to the JOA
- Mobile, modular, light equipment to expedite movement and support
- Leveraged industrial base to streamline military response

Dominating Land, Sea, Air and Space Battlespace: Logistics

Key Transformation Programs

"A"

- Space Maneuver Vehicle / Space Operations Vehicle - Full dimension combat support

"B"

- C-17 - Enhancement /acceleration to provide critical strategic and operational logistic movement of men/materiel -- fundamentally expands JFC options for force deployment/employment
- High Speed Sealift ships for strategic intra-theater, and prepositioning lift at 2x the speed of current fast ships

"C"

- Additional C-17s combined with ultra-heavy airlifters with 11x the capacity of C-17 and Advanced Theater Transport Aircraft with twice the capacity of C-130s

Dominating Land, Sea, Air and Space Battlespace: Protection

Key Operational Capabilities

- Consistent, complete, secure and timely common operating picture of the AOR
- The ability to gain and maintain air superiority as desired
- The ability to anticipate and act to counter threats before initiation
- The ability to deny information to an enemy
- Credible deterrence against WMD attack and coercion
- The ability to render an adversary's cruise and ballistic missiles ineffective

Enabling Capabilities

- Common, accurate, near real-time situational awareness of all detected airborne objects at each operational level
- Multi-source, joint correlation and integration of air and missile threats
- Near real-time fusion of all source fire control quality data
- Efficient use of engagement systems to minimize deployment footprint
- Consistent near real-time detection and tracking of all militarily significant entities within the AOR
- Anticipatory actions to dissuade terrorist attacks
- Deception and security programs
- Ability to effectively plan an use protection capabilities in support of force activities

Dominating Land, Sea, Air and Space Battlespace: Protection

Key Transformation Programs

"A"

- PATRIOT – "Hit to kill" technology - Simultaneously engages 3x as many TBMs as PAC-2, increases the defended battle space by 7 - Radar has 3x current range - 4x increase in firepower
- Improved Tactical High Energy Laser (THEL) - to defeat targets that cannot be defeated by either PAC-3 or THAAD
- Airborne Laser (ABL) - Provides boost-phase intercept capability
- Space Based Radar (SBR) - Continuous global wide-area surveillance to include time critical targeting
- Space Based Laser Technology (SBL) - Continuous global boost phase ballistic missile intercept/space control
- Space Control - Full spectrum force protection, denies adversary capabilities (Micro-sat, laser, directed energy systems)

"B"

- SENTINEL - 360 degree /24 hour, all weather digital air picture, double current range - Addresses fixed and rotary wing aircraft, cruise missiles, large caliber rockets and UAV threats
- Navy Area Defense - Immediate sea-based defense against short/medium range ballistic missiles; protecting, in the earliest days of a conflict, on-scene joint forces and littoral ports and airfields, critical infrastructure required for the rapid deployment and sustainment of the Joint Force
- Navy Theater Wide Defense against medium/long range ballistic missiles, providing wide-area protection for regional targets such as population centers, reassuring threatened allies and providing second layer of defense for ports and airfields

Dominating Land, Sea, Air and Space Battlespace: Protection

Key Transformation Programs (Cont'd)

"C"

- HUMRAAM/ CLAWS - Extends current SHORAD capability by 8 times over STINGER - C-130 and CH-47 deployable - Operational on arrival MEADS - 60% less lift required than PATRIOT – 360 degree coverage - C-130 deployable, transportable by CH-47 and CH-53
- F-22 - All aspect/multiple frequency stealth, supercruise, data integration provides aircraft capable of day one access in 2010+ threat environment. Distills air dominance, suppression of enemy air defense and precision attack into a single platform
- THAAD - First system to engage intermediate range ballistic missiles - Designed to counter threats that exceed PAC-3
- Large Aircraft Infrared Counter Measures (LAIRCM) - Platform protection against IR missiles

Dominating Land, Sea, and Space Battlespace: Nuclear, Biological and Chemical (NBC) Defenses

Key Operational Capabilities

- **Ability to project force and conduct military operations in the face of the NBC threat (deny adversaries the use of NBC as a high leverage threat)**
- **Minimize casualties**

Enabling Capabilities*

- **High quality attack warning and contamination assessment**
- **Individual and collective protection compatible with mission accomplishment**
- **Advanced decontamination**
- **Multi-threat vaccines and therapeutics**
- **New deployment force concepts that reduce the vulnerability to attacks, e.g., through reduced reliance on easily targetable deployment and logistic nodes.**
- **Hardening of selected systems**
- **Ability to attribute source of NBC use**
- **Attack operations against NBC**

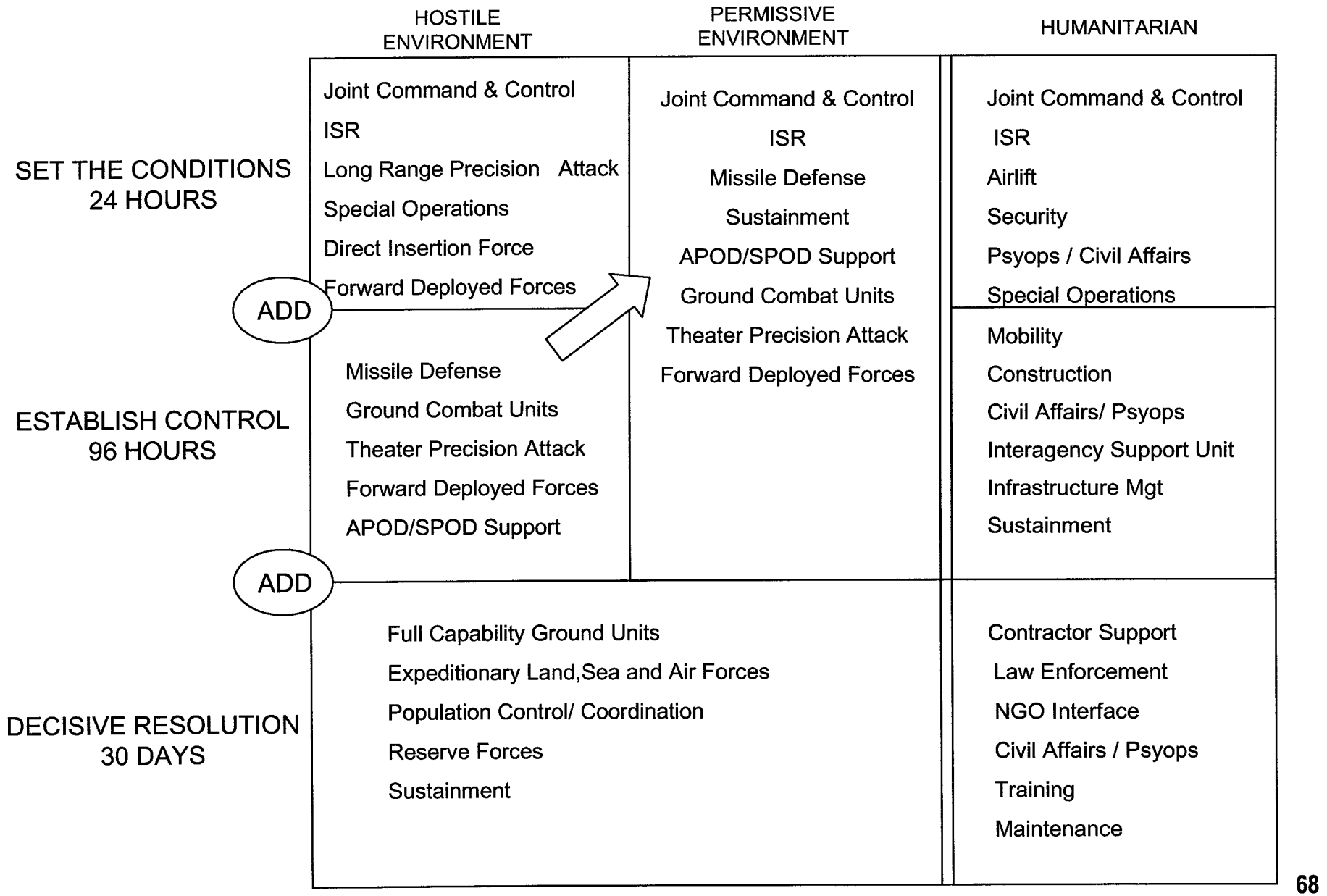
*These constitute only a part of a comprehensive posture to deal with these weapons

Dominating Land, Sea, and Space Battlespace: Nuclear, Biological and Chemical (NBC) Defenses

Key Transformation Programs

- Establish reachback Joint NBC Environment Analysis Center to support operations commands in NBC related planning and consequence management
- Expand and accelerate current efforts to provide warning and protection at CONUS and OCONUS force projection sites
- Develop next generation hazard prediction modeling and simulation capability
- Increase NBC forensics capabilities to facilitate attribution
- Expand program to detect, characterize and attack hard and buried targets
- Expand electronics hardening capability
- Ability to project force and conduct military operations in the face of the NBC threat (deny adversaries the use of NBC as a high leverage threat)

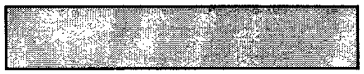
JOINT RESPONSE FORCE CAPABILITIES



Humanitarian Relief Operations

- Create a small Joint headquarters capability that can respond globally to be the catalyst for swift resolution of natural or man-made disasters and set conditions for introduction of government and non-governmental organizations. Creates environment for use of commercial contract operations and law enforcement
  - Maintains an experienced planning and command and control element ready for deployment
  - Maintains staff with specialties that coordinate US government response and interface with NGO's (includes interagency representatives where possible)
  - CINC provides Commander and key staff when committed
  - Draws on national and CINC assets for ISR
  - Maintains staffing capabilities for airlift, security, PSYOP/Civil Affairs, Special Ops
  - Draws on theater and CONUS-based "decisive resolution" forces as necessary for mobility, construction, infrastructure management, and sustainment, but objective is to employ non-DoD support as much as possible (contractors, law enforcement, training, maintenance)
- Primary purpose in maintaining this as a separate capability is to keep the more rapid deployable Joint Response Forces modules combat ready for regional contingencies against armed adversaries

Summary of Transformation Programs

- Organized by military capabilities
  - Achieving information and decision superiority
  - Striking with precision
  - Deploying and sustaining military power rapidly
  - Dominating land, sea, air and space battlespace
- Arranged in transformation groups
  - A: Enable new ways to fight
  - B: Preserve capabilities for new ways to fight
  - C: Provide robustness to transformation
- New programs highlighted by 

Achieving Information and Decision Superiority Programs

A Enable new ways to fight

Joint Command and Control
Robust High Capacity Reachback Connectivity
Modify/Accelerate Joint Tactical Radio System (JTRS)
Accelerate Joint Airborne Communication Relays
National EHF and Laser SATCOM
High Density, Networked ISRT
- Increase quantities/capabilities: Global Hawk Family, Tactical UAV, Aerostats, Unattended Ground Sensors, Foliage Penetration Radar, Ground Penetration
- Complement with upgrades to AWACS JSTARS, E-2C

Info Warfare

Striking with Precision Programs

A Enable new ways to fight	Trident SSGN B-2A Avionics Modernization/Enhanced Conventional Carriage Miniaturized Weapons Capability: Phase I, Small Diameter Bomb ALCM/CALCM Conversion; Increase B-52 force for Carriage Accelerate Improved Global Hawk Deployment Stealthy Joint Long Range Cruise Missile Develop New Long Range Precision Strike Capability Accelerate Navy JSF Fielding Advanced Electronic Support for Penetrating Aircraft Space Based Radar Comanche V-22 Javelin
B Preserve capabilities for new ways to fight	Exploit Blended Wing Body Technology Initiatives for Advanced Tanker Enroute Rehearsal JSF – Stealth Air Support for Ground Forces STOL Tactical Airlift
C Provide robustness to transformation	F-22 Increased Production Rate AAAV Land Warrior

Deploying and Sustaining Military Power Rapidly Programs

B	Preserve Capabilities for new ways to fight	C-17 Advanced Tactical Airlifter High Speed Sealift
C	Provide robustness to transformation	Advanced Strategic Tanker Exploit Blended Wing Technology Initiatives for Long Range Transport Ultra Heavy Airlifter Network Centric Logistics

Dominating Land, Sea, Air and Space Battlespace Programs

A	Enable new ways to fight	Future Combat System (FCS) Information Operations E-2 Radar Modernization Program (RMP) Interim Armored Vehicle (IAV) Comanche Space Maneuver and Operations Vehicle Tactical Unmanned Aerial Vehicle (TUAV) Space Based Radar JSTARS w/RTIP Advanced AWACS Senior Scout

Dominating Land, Sea, Air and Space Battlespace Programs

A	Enable new ways to fight (cont.)	Sea-Based Endurance UUV Advanced Unmanned Underwater Vehicles JAVELIN High Mobility Artillary Rocket System (HIMARS) Small Diameter Bomb (SDB) Unmanned Combat Aerial Vehicle (UCAV) Vertical Takeoff Unmanned Aerial Vehicle (VTUAV) Trident SSGN PATRIOT Tactical High Energy Laser (THEL) Airborne Laser Space Based Laser Space Control

Dominating Land, Sea, Air and Space Battlespace Programs

B Preserve Capabilities for new ways to fight

Force XXI Battle Command Brigade-and-Below (FBCB2)
Joint Tactical Radio System (JTRS)
Warfighter Information Network – Tactical (WIN-T)
V-22/MV-22/CV-22
Organic Mine Countermeasures
Maritime Multi-Mission Aircraft (MMA)
Army Tactical Missile System (ATACMS)
C-17 Enhancement/Acceleration
High Speed Sealift Ships
SENTINEL Radar
Navy Area Ballistic Missile Defense
Navy Theater Wide Ballistic Missile Defense
Nuclear, Biological and Chemical defenses

Dominating Land, Sea, Air and Space Battlespace Programs (cont'd)

C	Provide robustness to transformation	Global Command and Control System – Army (GCCS-A) Distributed Common Ground Station (DCGS) Cooperative Engagement Capability (CEC) Advanced Amphibious Assault Vehicle (AAAV) Active Electronically Scanned Array (AESA) Aerial Common Sensor (ACS) PROPHET Distributed Common Ground System - Army (DCGS-A) Advanced Deployable system (ADS) Line-of-Sight Anti Tank-KE (LOSAT-KE) F-22 JSF Tactical Tomahawk

Dominating Land, Sea, Air and Space Battlespace Programs (cont.'d)

C Provide robustness to transformation (cont.)

Advanced Stand-off Munitions
- Joint Air-to-Surface Strike Missile, Extended Range (JASSM ER)
- Extended Range cruise Missile (ERCM)
- Long Range Cruise Missile (LRCM)

Supersonic Strike Missile

Crusader Technology Program
Ultra-Heavy Airlifter
Advanced Theater Transport Aircraft (STOL)

HUMRAAM/ Complementary Low Altitude Weapons System (CLAWS)
Theater High Altitude Air defense (THAAD)
Large Aircraft Infrared Counter Measures (LAIRCM)

Transformation of Research and Development Infrastructure

- Government and Industry Defense R&D Base Decreasing
- R&D Primarily Organized by Individual Services and Agencies
- Joint/Integrated Issues Addressed Late – After Systems Are Developed
- Greater Coordination and Integration of Defense R&D Warranted
  - Competitive Technologies Should Be Encouraged
  - Critical Mass Will Require Inter-agency Cooperation
  - Technology Handoff Into Acquisition Community Needs Increased Emphasis
- Strong OSD Staff Oversight of Defense R&D Integration and Rationalization Required

Transformational R&D

- Develop and mature the technology needed to enable mid-long term continuous transformation
- Major thrusts
  - Information and Decision Superiority
    - Decision Support Tools
    - Navigation and timing
      - Robust navigation and timing in hostile environment
      - NAVWAR to deny adversary use of GPS
    - New sensors across electronic spectrum
    - Laser communications
      - Enhanced bandwidth with new degrees of freedom for spectrum use
      - Planned redundant links to connect fiber nodes
    - Advanced ELINT
  - Information Warfare - offensive & defensive
    - Need strong secure complex of labs and R&D efforts
    - Need to connect labs with operational vision
    - Need IW/IO career path
  - Advanced Power - high power density, portable
    - Energy storage (e.g. Advanced batteries, micro-fuel cells
    - Electrical generator and handling (e.g. Fuel cells, micro-turbines)

Transformational R&D (cont'd)

- Directed Energy
  - Continue advancement in high energy beam propagation & control
  - Push maturation of solid state devices
- Stealth & Counter stealth
  - Maintain sustained investment in stealth for next generation of bomber, fighter, weapons (to include unmanned)
  - Maintain our current edge to counter adversary stealth
- Robotics
  - Need for spiral development air, land, sea, undersea
  - Need for experimentation & development of doctrine
  - Need to leverage and share results (e.g. Air -- Land)
- Non-lethal Capabilities
  - Provide spectrum of options for dissuasion, influence and control
  - Need means for experimentation
- CW/BW Defense
  - Need sustained program for detection and characterization
  - Active and passive protection
  - Engage the bio-tech industry

See classified annex for additional information

Transformation Enablers

ESSENTIAL
ENABLING CAPABILITIES

UNIT TRAINING
LEADER DEVELOPMENT
COMBAT DEVELOPMENTS
RAPID ACQUISITION
DOCTRINE DEVELOPMENT

ESSENTIAL
MOVES TO JOINTNESS

EXPERIMENTATION
MODELING AND SIMULATION
JOINT EXERCISES / TRAINING

CINCs' ENGAGEMENT CAPABILITIES

PARTNERSHIPS
COMBINED EXERCISES
COMBINED EDUCATION
FOREIGN SALES/ASSISTANCE

INSTITUTIONALIZING
TRANSFORMATION

SKUNK WORKS
USJFCOM ROLE
FUNDING
REVIEW
TRAINING

Essential Enabling Capabilities

- Unit Training - Establish CONUS East Coast Joint Unit Training Area and West Coast JUTA. Integrate training areas through enhanced line, constructive and virtual links. Accelerate completion of JSIM
- Leader Development - Enhance JTF Command and Staff training (JFCOM). Accelerate electronic exportability of the program to widen availability and enhance standardization.
- Combat Development - Enhance JFCOM's role as executive agent for experimentation to the JROC. Link the timing of experimentation output to the PPBS.
- Acquisition - Establish a joint rapid acquisition resource line to allow acceleration of key emerging technologies. Candidates should emerge from joint experimentation be recommended by the JROC and approved by JCS (or CJCS).
- Doctrine Development - Develop joint training doctrine for JTF Command and Staff training programs to assist in performance standardization.
- Active/Reserve Component Integration - Accelerate efforts to optimize utility of reserve component forces in daily operations.

Essential Moves To Jointness

JFCOM and Experimentation

- Clear SECDEF guidance about JFCOM's role in transformation
- Divest JFCOM of its NATO and AOR responsibilities
- JFCOM should:
  - Formulate a clear concept of operations for 21st century joint warfighting as a cornerstone for transformational activity
  - Establish an experimental JTF headquarters structure
  - Continue development of a virtual national experimentation venue for scalable experimentation up to major theater of war - Include opposing force and red team
  - Partner with DARPA to link emerging technologies to experimentation
  - Chair a forum to engage CINCs and services through concept development and experimentation
- Generate a clear process for linking JFCOM experimentation outputs to the defense PPBS

Modeling and Simulation

- Accelerate integration of services modeling and simulation capabilities to form an effective joint capability

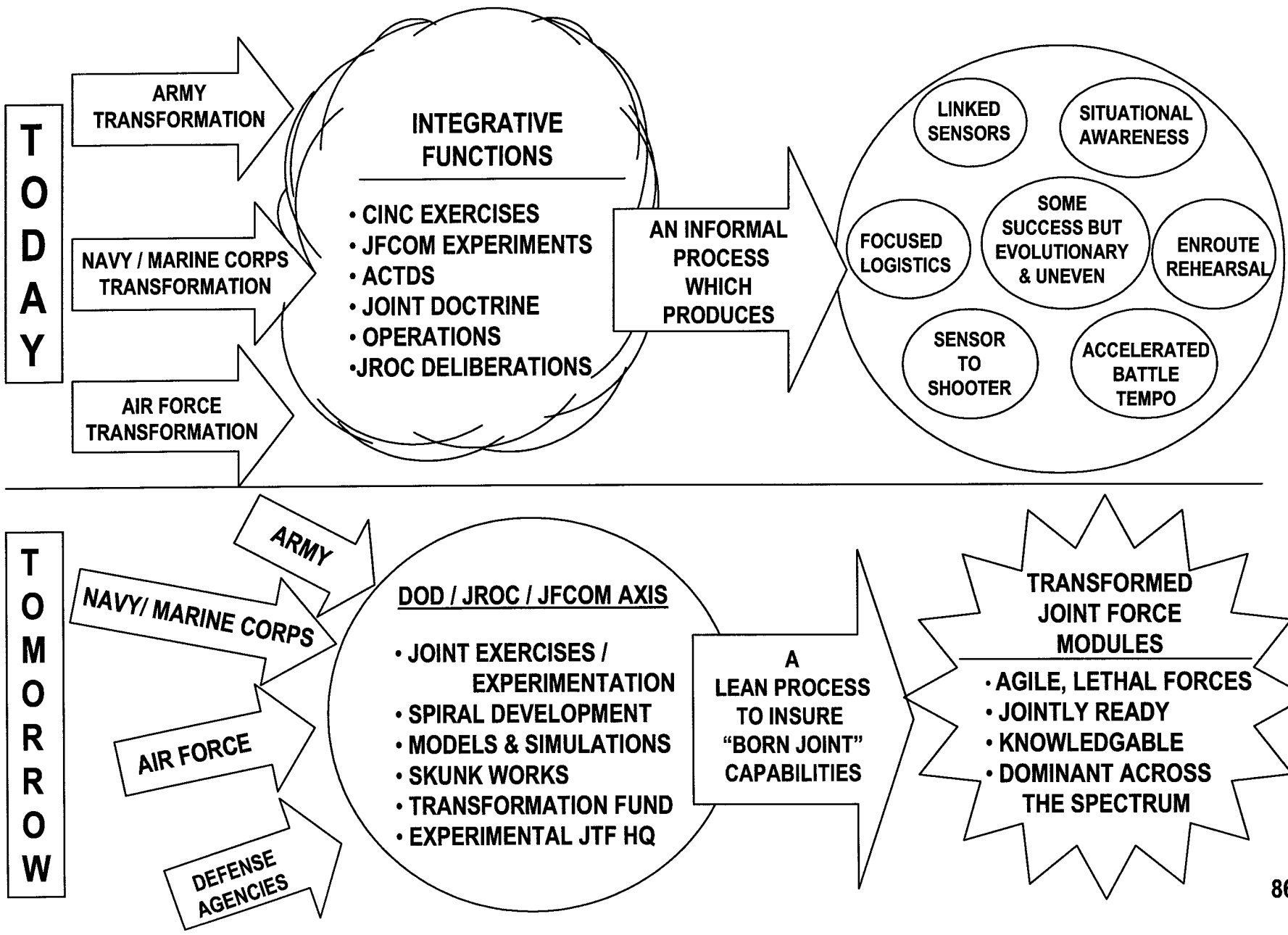
Joint Exercises and Training

- Focus live joint training efforts on early deploying headquarters and forces. Accelerate distributive training efforts for later deploying forces

CINCs' Engagement Capabilities

- Combined Exercises/Education/Partnerships - Review location and staffing of MILGROUPs worldwide to determine applicability to changing world environments.
- Foreign Sales/Assistance - Consider strategic shift of Security Assistance assets based on world geo/political shifts and changing influence patterns driven by US force relocations (i.e. Asia/ Africa/Latin America)
- Presence, Forward Stationing, Mobile Training Teams - Link deployable presence to service and joint rotational platforms. Optimize reserve component impact in this area.

TRANSFORMATION PROCESS AND PRODUCT



Institutionalizing Transformation

- Establish a means for independent input and assessment of transformation
  - Set up an internal, "skunk works" to form the intellectual underpinning for transformation
  - Set up a standing red team to aggressively challenge transformation initiatives
  - Assure that senior level, outside expertise is made available
- Establish USJFCOM as an integral part of the development and validation of future transformation visions and initiatives.
  - Mission and responsibilities should be focused to concentrate on concept development, experimentation and training activities in direct support to the overall DoD transformation vision
- Establish a SecDef Transformation Discretionary Fund
  - Flexibility to quickly fund transformation initiatives of extraordinary potential.
  - Funded on an annual basis on the order of $500M
- Establish a periodic SecDef Transformation Review Process
  - Reassess and refine overall transformation goals and initiatives
  - Major input to the PPBS and long range planning process
  - Responsibility for the review's conduct should reside in the Joint Staff.
- Establish an educational initiative to engrain transformational thought processes throughout the professional military and civilian career development paths.

Consequences of Transformation Focus

- **Establishes Integrated Joint Force Information/ Decision Superiority**
  - Harnesses the power of Joint network-centric operations
  - Leverages U.S. asymmetric advantages
- **Matches Weapons to Information/decision Capabilities**
  - Precision, discrimination, rapid employment
  - Integrates shooters with sensors, command, and control
- **Strengthens Global Power Projection of Forces**
  - Provides agile high-speed lift
  - Forces arrive quickly and ready to fight
  - Reduces logistics footprint
- **Allows Rapid Land, Sea, Air, and Space Battlespace Dominance**
  - Deters use of existing hostile forces
  - Dissuades development of future hostile forces
  - Minimizes risk to U.S. forces and interests

Some Consequences of Transformation

in addition to the significant enhancements in warfighting & dissuasion capability

- Force size offset by increased capability
  - Improved performance of new system allows replacement at less than 1 for 1
  - Robotics offer ability to leverage smaller number of manned systems
- Reduced O&S cost
  - Newer equipment is less expensive to support
  - Terminate SLEP of old equipment (e.g. C-5) as newer equipment (e.g. lighter forces) becomes available
- Reduced logistics tail
  - Total asset visibility minimizes misplaced / "lost" equipment
  - New system designed with reduced logistics footprint
- Faster application of new technology

Study Conclusions

- Integration and synergy that true Jointness brings is the most powerful transformation concept
- Joint Command and Control is the most enabling transformation program
- Focus Transformation on new capabilities for Joint Response Forces
- Initiate new programs identified as essential in transformation
- Review and accept acceleration of special access programs identified
- Missile defense, space dominance, information dominance and intelligence are also essential transformation areas
- Institutionalize the transformation process in the DOD

Annex--
Broader Transformation Capabilities

Broader Transformation Capabilities

- **Conventional Forces depend on military capabilities that are also essential beyond their support of military operations:**
  - **Missile Defense**
    - **Ballistic**
    - **Cruise**
  - **Space Superiority**
  - **Information Dominance**
  - **Intelligence**
  - **Forward Deployed Forces**

Ballistic Missile Defense

- Pre-launch defeat is the first line of defense
- Focus on the spectrum of needs – protecting deployed forces, allies, US homeland
  - Field the first block of the mid-course system as soon as possible – follow with block upgrades
  - Pick the highest potential terminal systems and focus resources to field as soon as possible
  - Adequately fund the first increment of the ABL system using the COIL laser while continuing R&D on follow-on laser systems
  - Start definition of a robust, sea-based boost phase system
  - Accept program risk to facilitate early deployment
- Focus the Space-based laser in-flight demonstration on collecting engineering and design information – devote more resources to recyclable laser systems

Cruise Missile Defense (CMD)

- **Increased emphasis on fielding CMD capabilities needed**
  - **Serious threat proliferation potential (conventional and advanced)**
- **Substantial technology investments have been made to develop significant CMD capabilities**
- **Critical actions:**
  - **Field integrated battle management / C3I system**
    - **Expand use of comprehensive joint simulation capability**
  - **Accelerate fielding of:**
    - **Advanced airborne surveillance and fire control sensors**
    - **Air directed Surface-to-Air missiles (SM, PAC3)**
- **Declassify mission area (not underlying technology)**

Space Superiority

- **Space capabilities are:**
  - **Inherently global**
  - **A source of direct access to all regions**
  - **Unaffected by territorial boundaries and jurisdictional limitations**
  - **Highly asymmetric in favor of the U.S.**
  - **Potentially vulnerable to attacks**
- **U.S. national security approach to space should:**
  - **Protect the U.S. from hostile uses of space**
  - **Accelerate U.S. use of space for national interest--military and commercial**
  - **Ensure U.S. access to space**
    - **Stockpile an additional two year inventory of Russian RD-180 engines**
  - **Make commercial space capabilities preferred choice for DOD/IC peacetime requirements**
    - **Communications**
    - **Imaging**
    - **Sensing**

Space Superiority

- Address Recommendations of Space Commission
  - Develop military and civilian cadre experienced in space-related activities
  - Organizational Change
  - Exercise Space Control
- Make U.S. Access to Space More Robust
  - Adequate government support of EELV Program
  - Accelerate R&D on Space Maneuver Vehicle and Aero-vehicle technologies
- Broaden National Security Space Capabilities
  - Add Defense of Space-based Capabilities to Forces
  - Integrate present and future capabilities into a global ISR Capability
  - Emphasize Surveillance to Complement Reconnaissance
- Expand Space Control programs

Exploiting Space Superiority

- **Enable Rapid Power Projection**
  - Develop rapid access to space
  - Project power through space to any region in hours
    - Develop Space Maneuver Vehicle (SMV) for sortie platform
    - Develop Common Air Vehicle as primary SMV payload
- **Dominate Space Battlefield**
  - Establish high-performance microsat program
    - Defensive missions
    - Offensive missions
  - Focus first deployment of SBIRS-LOW on BMD requirements
    - Offensive missile warhead discrimination
    - Offensive missile warhead tracking
    - Transmission of fire control data to interceptor system
  - Improve the integration of space-based and airborne reconnaissance and surveillance

Information Dominance

- **Policy**
  - Resolve organizations, authorities, relationships, roles & missions, etc.
  - Define roles and interfaces vis-à-vis law enforcement, national telecom coordination (NSTAC), and critical infrastructure protection activities
  - Develop and prove policies & doctrine including relationships with allies/partners
- **Partnerships**
  - Strong integrated partnership with intelligence community (especially NSA & CIA), infosec (NSA) and industry
  - Ensure intelligence community is supporting information warfare
  - Improved threat collection and analysis is critical
- **Resources**
  - CINC & JTF-CNO need increased resources, and to exercise, game & simulate, and empower for attack/defend missions and exploit (intel) coordination
  - Focus on protecting COTS against vulnerabilities
  - Pursue advanced R&D technology development
  - Attack includes both kinetic and non-kinetic capabilities

Information Dominance (Cont'd)

- **Space-Based Support**
  - Develop high resolution (DTED-5) Global Geospatial Framework
    - Provides foundation for spatial information management
    - Enables common operational picture of battlefield
  - Emphasize GPS-3 implementation and deployment
    - Improved access control
    - Additional jamming resistance
  - Accelerate Space-based Radar Development
    - Advance from intermittent coverage to persistent RSTC
      - Synthetic aperture radar imaging
      - Moving target indicator
      - Interferometric change detection

Information Dominance (Cont'd)

- **Space-Based Support (2)**
  - Increase space surveillance capability
    - Identify and track
      - microstats to GEO
      - nanostats to LEO
    - Develop and deploy hypersectral imaging system
    - Initiate R&D on ultraspectral imaging system
  - Accelerate COBRA BRASS F or deploy gap filler
  - COMINT and ELINT (classified annex)

Intelligence

- Dramatically improve access to adversary secrets (major deep penetration improvements)
  - Requires new sources and methods
  - Focus on improved SIGINT as a priority, but HUMINT also needs improvement (better tooth to tail)
  - Focus on preventing surprises
  - Focus equally on "what you don't know"
  - Improves overall security and info warfare posture
- Focus on transformation technologies & concepts that deliver strong intel results
- Better integrate ISR collection, processing, analysis & overall intel availability to customers
  - Focus on modernized integrated multi-sensor air & space platforms, capabilities (including links/onboard processing)
  - Improve the backend processing & analysis capabilities
  - Better customer access to intel via e-business-like solutions
  - Some form of better integration of SIGINT, imagery, ISR access to produce a more seamless intel project to users
  - Improve speed of service by reducing intel bureaucracy
- Fix counterintelligence & security (long list of recommendations here)
- Streamline intel acquisition processes using unique DCI authorities & DoD reform procurement concepts
- Create strong linkages between intel and info warriors

Also See Classified Annex

Importance of Forward Deployed Forces

- **Postured to provide a robust set of forces and capabilities to support warfighting CINCs and our global national security interests**
  - **Forward Stationed Forces**
  - **Forward Presence Forces**
  - **Prepositioned Equipment**
- **Strategic value**
  - **Signals US commitment and strategic intent**
  - **Sustains US global leadership by cementing coalitions and enabling alliances**
  - **Promotes stability, prevents conflict and deters aggression**
  - **Operationalizes treaties and security agreements, thus setting the conditions for peace and security over time**
  - **Sees and influences the environment in real-time**

Importance of Forward Deployed Forces

- Operational value
  - Trained and ready forces for crises
  - Capable of meeting many in-theater requirements
  - Force provider for other CINCs
  - Enhance interoperability and strengthen the capabilities of allies and potential security partners
  - Eyes and ears oriented on potential battlefields - clear mission focus, culturally and geographically acclimated
  - Provide foundation for rapid and decisive crisis response
    - Receive, integrate, support and/or control forces from out-of-theater
    - Assure access and improve force protection for early entry forces
- Essential contributor to broader CINC Theater Engagement Plans that shape the international environment in support of US interests

Last Slide