# THE MILITARY SPACE PLANE

## PROVIDING TRANSFORMATIONAL AND RESPONSIVE GLOBAL PRECISION STRIKING POWER

A White Paper on the Operational Utility of a Military Spaceplane
in the Emerging 21st Century International Security Environment

Proposed by members of ONE TEAM in Conjunction With
the 120 Day Reusable Launch Vehicle Study


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Peterson AFB, Colorado
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*The weapon of superior reach or range should be looked upon as the fulcrum of combined tactics. Thus, should a group of fighters be armed with bows, spears and swords, it is around the arrow that tactics should be shaped; if with cannons, muskets, and pikes, then around the cannon; and if with aircraft, artillery, and rifles, then around the airplane*

—Maj. Gen. J. F. C. Fuller, Armament and History, 1945

*Operations that now focus on air, land and sea will ultimately evolve into space*
—Global Engagement

## Symbols of a World Power

At the turn of the 20th century, nations that possessed battleships were world powers that shaped and determined how military and economic power would be employed during crisis and war. Today, nations with a robust and indigenous space capability firmly integrated into political, economic and military activities might be considered world powers. For the United States, the dominant spacepower, space is becoming more important to the Nation's economy and security. Just as airpower broke the stalemate of World War I and empowered our land forces to wage the Gulf War in 1991, so may spacepower in the form of a military spaceplane, become the force to ensure the United States has unfettered access and global reach to vital targets and prevails in all conflicts. It can also play a role in homeland security and defense.

The defense challenges posed in the 21st century demands a responsive space capability that provides near-real-time global force application based on critical intelligence, surveillance, and reconnaissance (ISR). This entails "launch on warning" non-nuclear weapons and space-based sensors that are available for and responsive to the National Command Authority (NCA)and the warfighter. The NCA requires timely, accurate, and responsive intelligence information for informed decision-making in crises and wartime. For the warfighter, timely execution of NCA direction could be accomplished through the use of space-delivered weapons on alert and ready to strike targets in less than 100 minutes from launch and rapidly deploys space-based sensors that can become available for use by the warfighter within three hours of launch. Current studies show that such power and capabilities are possible within 10 years.

*Joint Vision 2020* and the Quadrennial Defense Review 2001, explicitly identifies the need for a transformed, capabilities-based military force structure that can create asymmetric

advantages for our nation. The military spaceplane is a transformational system that can fill a critical niche within the Chief of Staff of the Air Force's Global Strike Task Force and the Chairman's Joint Strategic Capabilities Plan (JSCP). As envisioned, the Military Spaceplane is a responsive, survivable, flexible launch and delivery platform, capable of:

- Enabling joint force operations that will overwhelm adversary threats to terrestrial forces—such adversary threats include:
  - Weapons of mass destruction (WMD) and Effect (WME)—these must be destroyed before they can be used against our land, sea and air forces by terrorists, despotic governments, or adversary forces.
  - New and emerging longer range enemy air defenses (EAD)—by 2010, long range surface to air missiles may be able to prevent our traditional airborne collection platforms (e.g. AWACS, Rivet Joint, and JSTARS) and even Unmanned Aerial Vehicles (UAV) from orbiting close enough to the front lines to be effective.
  - Advanced radars (e.g., bi-static and millimeter wave) that could vitiate the advantage our stealth assets currently provide and negate our ability to conduct parallel warfare (i.e. the simultaneous application of force across the breadth and depth of an entire theater). In some cases, our air forces could be forced to engage in a lengthy, inefficient and costly sequential "rollback" campaign around the edge of a robust integrated air defense system (IADS) (akin to peeling a skin off an onion) rather than striking deep and hard throughout the theater.
- Augmenting and replenishing space-based ISR capabilities during the pre-crisis phase
- As a protective asset, helping to ensure commanders can see the enemy while effectively commanding and controlling their own forces from peacetime through war termination

In many conflicts where anti-access and other asymmetric threats to traditional US military power abound, the military spaceplane could be the leading edge of a Global Strike Task Force that can open land, sea, and air corridors for joint strike packages without the need for forward basing or carrier battle group support. Firmly integrated with other warfighting capabilities, its 100-minute or less on-alert delivery time from CONUS bases to points around the globe, provides the United States a seemingly impervious response platform for precision engagement, space control, predictive battlespace awareness and combat effectiveness assessment throughout the theater and all phases of conflict.

This paper will briefly explore the warfighting utility of a military spaceplane against the context provided by the QDR transformation study, joint warfighting capabilities analysis, Joint Vision 2020, and warfighter requirements identified in mission need statements and other requirement documents, particularly those required to support the Air Force's Global Strike Task Force in the 2010-2012 timeframe. The bottom line: the nexus of technology, operational military requirements, specialized weapons and sensors, and a trained cadre of space professionals presents a unique opportunity for a new warfighting system—the military spaceplane, its associated weapons and payloads, and a robust architecture to provide the combat identification, predictive battlespace awareness and combat effectiveness assessment required to overwhelm any adversary. It also offers a robust means to support our ability to protect our space assets and capabilities while denying access to other space powers or those capabilities which might be provided by a third party during a conflict or war.

## The Emerging International Security Environment

In 2002, and the immediate near term future, the international security environment may be more fluid than during much of the 20th century. The superpower standoff that dominated the Cold War is over, national borders are more porous, and transnational non-governmental organizations and terrorist networks have had a disproportionate impact on state-to-state relations. According to the most recent Quadrennial Defense Report, "the challenges the Nation faces do not loom in the distant future, but are here now. They involve protecting our critical bases of operation - including the most critical base of operation, the U.S. homeland - and projecting and sustaining U.S. forces in distant anti-access environments."

While the threats today are uncertain and dynamic, what hasn't changed is the need for responsive and effective weapons and real-time information that can give skilled warfighting commanders an edge against traditional, dynamic and asymmetric threats. Consistent with U.S. national security goals, we must transform the force structure with its inherent capabilities and functions to shape and respond to the new international security environment. We must continue to control access to vital targets and deny our adversaries access to their key capabilities and terrain while preventing them from threatening our systems and territory. Our adversaries are not static—they have demonstrated a willingness to invest in asymmetric capabilities (e.g. WMD, ballistic and cruise missiles, long-range SAMs, advanced radars, etc.) to challenge our

most capable warfighting systems. By 2010, anti-access threats, improved Integrated Air Defense Systems (IADS), and advanced weapons make it less certain that our forces will remain dominant.

## Transforming the Force

> *Space is a medium like the land, sea, and air within which military activities shall be conducted to achieve U.S. national security objectives.*
>
> — DoD Space Policy, 21 October 1998

### Vision

With a largely CONUS based force, the United States is faced with a dilemma of divining a strategy and developing capabilities allowing it to protect its vital international interests and meet its global responsibility to maintain a stabile international security environment. The long-lead time required to project terrestrial power (i.e., land, sea, and air) can allow adversarial regimes and forces to gain a foothold or take actions relatively free of fear of immediate retaliation. How then, can the United States project and employ sufficient striking power that is responsive enough to compel nations and transnational actors to conform to international law and behavioral norms without resorting to a potentially bloody and difficult "boots on the ground" strategy? One possible solution is to invest in responsive systems that allow decision-makers and military planners to detect, find, fix, track, target, engage and assess possible threats to international stability and vital national interests early. Precision engagement weapon systems, space superiority and responsive ISR are key elements to that solution.

### Defense Planning Guidance

Nuclear weapons carried by land-based intercontinental ballistic missiles and submarine launched ballistic missiles continue to provide deterrence and serve as an immediate, although in many ways impractical, response force. Since the Gulf War, precision munitions, standoff weapons and a variety of land, sea, air and space sensors provide a significant combat edge and have altered the dynamics of war. The combat synergy they create, shapes the military equation. These technologies enable precision strike and provide persistent presence. Imagery and electronic intelligence provide information dominance and build the battlespace picture for

fighting forces resulting in a transformation of the Nation's warfighting forces. The new Defense Planning Guidance (DPG) directs that a transformed force must:

- Protect our bases of operation and be able to defeat nuclear/biological/chemical weapons and ballistic missile attack
- Project and sustain U.S. forces in distant anti-access or area-denial environments
- Deny enemy sanctuary through various means, particularly through long precision strike of different kinds
- Conduct space operations
- Ensure joint and combined interoperability and integration of long-range strike and deep maneuver forces

The military spaceplane will become a key-enabling element in every aspect of this transformed capabilities-based defense force by 2012.

**Quadrennial Defense Review Transformation Study**

In April 2001, the Transformation Study for the Quadrennial Defense Review expanded on this direction. Specifically, the Quadrennial Defense Review identified six critical operational goals transformational efforts must address:

- Protecting critical bases of operations (U.S. homeland, forces abroad, allies, and friends) and defeating CBRNE weapons and their means of delivery;
- Assuring information systems in the face of attack and conducting effective information operations;
- Projecting and sustaining U.S. forces in distant anti-access or area-denial environments and defeating anti-access and area denial threats;
- Denying enemies sanctuary by providing persistent surveillance, tracking, and rapid engagement with high-volume precision strike, through a combination of complementary air and ground capabilities, against critical mobile and fixed targets at various ranges and in all weather and terrains;

- Enhancing the capability and survivability of space systems and supporting infrastructure; and
- Leveraging information technology and innovative concepts to develop an interoperable, joint C4ISR architecture and capability that includes a tailorable joint operational picture

A responsive military spaceplane would provide revolutionary capabilities that significantly improve our ability to meet these goals. The military space plane could enable prompt global strike and Intelligence, Surveillance, and Reconnaissance (ISR) system augmentation from space, while also enabling "launch on demand" capabilities to augment, replenish, project, deploy and sustain the U.S. military and intelligence space force structure. The military spaceplane addresses the force needs specifically enumerated in the QDR transformation study.

The critical elements required to achieve these actions include integrated command and control architectures; information operations; robust ISR capabilities; long-range precision attack platforms; time critical precision targeting; and maneuver and mobility. A review of Unified Commanders' Integrated Prioritized Lists (IPL), their prioritized list of warfighting requirements, supports the results of the transformation study. All indicate a need for these capabilities in the near and mid-term (2002-2015). A Joint Warfighting Capabilities Analysis of unified requirements measured against a significant threat to the Nation's power projection capabilities in 2010, reveals shortfalls in the areas of intelligence operations (e.g. sensors, payloads and processes), battle management (e.g. command and control), and attack execution. The common shortfall element is responsiveness.

Given that U.S. military forces are largely based in the continental United States (CONUS), each service has developed or is developing expeditionary forces to project power, as required, address threats and resolve conflicts. Much of our power projection capability is predicated on at least 72 hours of unambiguous warning. Advanced warning allows the Army to deploy its medium weight brigades to almost any location within 96 hours of callup. The Navy routinely uses carrier battle groups to project power and the Marine Corps has at least two Marine Expeditionary Units (MEU) at sea at any time. The Air Force is evolving its air expeditionary forces (AEF) to provide a Global Strike Task Force (GSTF) capable of striking any target in the world within 24 hours. In the absence of advanced warning, our forces face a

daunting task of moving forces into theater fast enough to thwart the advances of a well-prepared adversary. Beginning in 2010, the challenges facing the Nation's expeditionary forces will include more robust and well integrated anti-access threats (e.g. long-range surface to air missiles, ballistic and cruise missiles, weapons of mass destruction and effect, etc.).

The volatile security environment and evolving defense challenges demand a new fulcrum of combined tactics. It requires a weapon of superior reach and range . . . one that is responsive enough to maneuver quickly to target with sufficient mass to surprise and overwhelm an adversary while remaining secure from his countermeasures. It must be technologically advanced enough to provide economy of force—so that by placing the right weapon at the right time and place, we apply overwhelming force to the greatest effect. In 1925, airpower pioneer Brigadier General Billy Mitchell wrote about a new kind of defense, *Winged Defense*, built around bomber and pursuit airplanes, to contend with a new security environment. In the dynamic international security environment of 2002, we need to expand his vision beyond terrestrial airplanes to a military spaceplane. We need to consider a new dimension to defense, an *Empyreal Defense* . . . a defense of and from the celestial sky based on integrated air and space capabilities with global presence, reach and power that form the foundation for these expeditionary concepts.

**Warfighting Needs**

Warfighting requirements for a new and more capable defense force includes many references to the military spaceplane. Specific mission needs for a military spaceplane are documented in AFSPC 001-01 *Operationally Responsive Spacelift (ORS)* mission needs statement, which calls for the "capability to rapidly put payloads into orbit and maneuver spacecraft to any point in earth-centered space and to logistically support them on orbit or return them to earth"; AFSPC 002-01 *Prompt Global Strike (PGS)* mission needs statement seeks the capability "to strike globally and rapidly high value difficult to defeat targets in a single or multi-theater environment"; and Air Combat Command's 2002 Global Attack Mission Area Plan (MAP) and its associated mission needs statements. The ACC Global Attack Map states:

> To counter the [US Air Force] Global Attack capability, potential adversaries have, and are developing, sophisticated integrated air defense systems (IADS) and are pursuing anti-access strategies and capabilities. These defenses and strategies are designed to force the US to operate on the periphery of the theater rather than in it.

On 14 December 2001, Air Combat Command's Advanced Programs Division specifically identified the need for responsive and reusable spacelift stating "we see the potential combat capability for [a] Reusable Launch Vehicle (RLV) with ISR and precision engagement. The RLV provides a unique opportunity for AFSPC to address aspects of all USAF core competencies from space." The GSTF is designed to rapidly establish air dominance and subsequently guarantee that joint aerospace, land, and sea forces will enjoy freedom from attack and freedom to attack. GSTF will be an on-call rapid-reaction force employed within the Air Expeditionary Force (AEF) construct that maintains interoperability with joint, coalition, and allied assets. Space systems provide deterrence, presence, power projection and coercive force for GSTF operations. As noted earlier, anti-access challenges and collateral damage concerns are at the heart of ACC's precision engagement requirement.

While GSTF is designed to be responsive to impending or actual conflicts, even stealthy platforms like the F-22 and the B-2B bomber will find it difficult in some instances to penetrate a robust IADS in 2010. A military spaceplane armed with a variety of weapons payloads (e.g. unitary penetrator, small diameter bombs, etc) will be able to precisely attack and destroy a considerable number of critical targets while satisfying the requirement for precise weapons (i.e. circular error probable [CEP] of less than or equal to three meters). Most importantly, the responsive nature of the military spaceplane allows for seamless integration of MSP sorties with terrestrial aircraft sorties within a Global Strike Task Force.

Air Combat Command also noted in their December 2001 requirements memorandum that ISR requirements for the GSTF are more demanding than current national systems can handle. Future anti-access threats will also make it more difficult for airborne platforms like UAVs, AWACS, Joint STARS, and Rivet Joint to operate. Satellite constellations can be augmented with additional sensors or wolfpacks composed of many small satellites equipped with specialized sensors. These can be tailored to meet warfighter requirements until a permissive environment can be established allowing terrestrial sensors to provide their traditional level of operational support. A military spaceplane will allow the rapid deployment of operationally responsive space-based ISR sensors that in the initial phases of conflict can allow analysts to prepare the battlespace for decision makers and warfighters.

The critical need for forensic level detail of the battlespace environment requires robust and persistent ISR capabilities to enable combat identification, predictive battlespace awareness and combat effectiveness assessment. In a high terrestrial threat environment, current and projected national systems will likely require rapid and survivable augmentation and replenishment in order to achieve the National Imagery Interpretability Rating Scale (NIIRS) standards required for rapid target acquisition and identification (NIIRS 4-6) and combat effectiveness assessment (NIIRS 6-7) to support time critical targeting and re-strike. Beyond visual range combat identification of adversary aircraft will likely require detection by a robust constellation of space-based radar and other sensors in order to cue other sensors and direct real-time engagement information to the shooters. The military spaceplane could serve as both a responsive satellite deployment system or as a sensor platform, providing time critical targeting data.

## Military Spaceplane Combat Power

*In war, to strike quickly is the first step towards striking hard*

—Gabriel Darrieu, *War on the Sea*, 1908

### Generating Combat Power

In order to produce the desired operational effects required of air and space forces in a modern conflict, the military spaceplane must be responsive. Like the B-2B bombers, the military spaceplane will likely be a high value, low-density strike and support asset. To illustrate its utility, it is useful to juxtapose a spaceplane fleet operability and responsiveness against that of the B-2B bomber.

There are 21 B-2B aircraft in the inventory. For discussion purposes, we assume that a base force of approximately six bombers are committed to support the Single Integrated Operations Plan (SIOP); one is typically being serviced by the depot; up to two may be undergoing testing and modification; while the remainder are at various states of readiness. Some may be undergoing required maintenance while others may be used for training. All are normally staged out of their CONUS operating location.

The Joint Operational Planning and Execution System (JOPES) provides a systematic way of increasing the readiness of the bomber fleet to meet contingency requirements or to support a long military campaign. Upon receipt of an alert order, the percentage of operational B-2Bs will increase—some aircraft of this enhanced force may be forward deployed to other operating locations. Upon receipt of a warning order, almost all of the bombers will be made ready for execution. With an execution order, the robust execution force of B-2Bs will be tasked through the air and space tasking order to strike assigned targets.

A robust fleet of spaceplanes may include 10 vehicles staged at four CONUS operating bases. Daily, a base force of perhaps two vehicles and their associated launch infrastructure and payloads would be ready for immediate tasking and launch. Upon receipt of an alert order, additional vehicles and support structures will be made launch ready. This enhanced force of operational vehicles may launch to deploy ISR or space control assets to bring them up from a base force to an enhanced force level. A warning order will trigger full generation of all vehicles and infrastructure and increased taskings for support and precision engagement operations against terrestrial and space targets. An execution order may require the spaceplanes equipped with the Common Aero Vehicle (CAV) and weapons to strike in concert with terrestrial aircraft assigned to a Global Strike Task Force. Like the bomber fleet, both the spaceplane fleet and ISR and space control constellations will have achieved robust execution force levels of readiness.

Apart from being a key element in effecting space control, the military spaceplane serves as a multi-role vehicle with rapid global reach of missiles, flexibility similar to aircraft, and the weapons delivery precision of a cruise missile. Spaceplanes can support a wide range of military missions including a worldwide precision strike capability; rapid unpredictable reconnaissance; new space control and missile defense capabilities; and both conventional and new tactical spacelift missions that enable augmentation and reconstitution of space assets. Less understood is how robust space weapon systems, other than conventional or nuclear tipped ICBMs could play a role against asymmetric threats such as terrorism, rogue nations and simultaneous firefights at multiple sites around the world.

**Homeland Defense and Security**

Cold War era nuclear deterrence theory relies on rational actors who appreciate the power of nuclear weapons, protect and control the weapons through sophisticated means, and who have

credible second strike capabilities that ultimately obviate the need for their use in a preemptive strike or in a preventative war. Nuclear deterrence as practiced by the traditional five declared nuclear powers (U.S., Russia, Great Britain, France and China), is possibly less of a deterrent in a multipolar world where even the most unsophisticated and poorest nations and the richest trans-national terrorist groups can arm themselves with nuclear weapons using non-traditional launch platforms.

The challenges posed by nuclear weapons in the hands of these nations and groups is a lack of rational civilian control; the absence of a high fidelity, positive command and control system to prevent unauthorized use; no credible second-strike capability; geographical proximity (e.g. India and Pakistan); hyper nationalism combined with militaristic extremist movements; and leadership that is seemingly sanguine or oblivious to the dangers and consequences of using nuclear weapons. Should one of these unstable nuclear nations attempt to use or lose control of its nuclear weapons, an alert-ready military spaceplane could provide the national command authority with a non-nuclear immediate response option to destroy these weapons before they could be used or proliferated to terrorist organizations.

The Federal Emergency Management Agency (FEMA) and the national, state and local governments can make good use of a military spaceplane to immediately enhance existing ISR capabilities in response to large scale natural disasters such as earthquakes, floods or hurricanes. Space-based sensors could provide robust imagery of the affected areas to recovery and survey teams. Specialized multispectral imaging (MSI) and hyperspectral imaging (HSI) sensors could identify hidden areas resulting from natural disasters such as those areas affected by toxic spills or severe erosion. Such information can help response teams and planners mitigate the long-term effects of disasters. The experience gained through homeland defense and security operations is relevant to counter threats and to future combat operations.

**Coercive Spacepower and Asymmetric Threats**

Our national leaders have made clear that the fight against terrorism cannot be waged with point solutions. The military spaceplane is part of the solution set as might help deter terrorism. In conjunction with other human and overhead intelligence assets, the spaceplane can rapidly employ a targeted reconnaissance payload to help find the enemy. The spaceplane's

responsiveness allows it to unpredictably overfly targets soon after take-off. This ability complements the very predictable orbits used by today's intelligence satellites and airborne platforms. Clearly, the spaceplane's ability to surprise and rapidly surveil an enemy camp must be used in conjunction with today's overhead systems and expanded human intelligence sources.

Once a target is identified, the spaceplane can respond from the U.S. and strike worldwide targets in under an hour. The munitions employed are generally the same as those used on conventional aircraft, only they are released from a small, low cost, precision guided missile called a Common Aero Vehicle (CAV). The CAV enables interchangeable use of virtually the entire arsenal of next generation air munitions currently in development at the Air Force's Air Armaments Center. It protects the munitions during hypersonic reentry and dispenses them with the same accuracy and effect as if being dropped from aircraft. These munitions are designed to selectively strike surface targets, mobile vehicles, deeply buried bunkers, aircraft in flight, and potentially even bio-terrorism targets requiring Agent Defeat munitions designed to destroy biological weapons.

A key advantage of CAVs is that they reenter controlled airspace only over the target country, and the U.S. need not seek over flight permission from any other countries. Currently there are few potential defenses against munitions delivered by CAVs. Thus, they can be used to strike hard and deeply buried land targets, naval bases and surface combatants, airbases, and military and civil infrastructure. These are the same target sets identified in the ACC Global Attack MAP. Military space planes armed with CAVs provide global power projection without the massive logistics tail required when employing conventional airpower overseas—a critical capability for a transformed force.

The conflict in Afghanistan provides an example of how these weapons will be used. As human and technical sources provide fleeting intelligence locating key Al Qaeda and Taliban leaders, the military spaceplane is tasked to respond. The spaceplane takes-off from the United States within minutes of being tasked and either drops the weapons over the target country or stages the weapons to their target without any over flight. Approximately 35 minutes after take-off, multiple precision guided weapons begin striking CINC priority and time critical targets. Potential strikes include the use of hypersonic deep earth penetrators to take out Al Qaeda forces hiding in caves; the use of small diameter bombs to take out Taliban troop concentrations; or even the use of low cost autonomous attack systems to take out an Al Qaeda leader driving

between cities. Selection of specific targets and weapons will depend on the political and military objectives of the conflict, sufficient and timely intelligence, and on the level of conflict.

**Space Combat Power on Demand**

The Military Space Plane could be deployed on orbit awaiting an execution order from the NCA or a CINC. This type of deployment could be more responsive to key targets on the CINC's Prioritized Target List – this approach would be similar to that employed by immediate close air support tactics. Orbiting the earth, a CAV-armed military spaceplane would be ready to precisely strike fixed or mobile WMD and other high value targets within moments of combat identification. Since the military spaceplane has the unique legal right to overfly all nations during peacetime, this pre-deployment strategy offers many unique advantages to the NCA. The most important being to immediately remove many potential WMD-related issues early in a crisis and to dominate all phases of integrated air and space operations.

This unrestricted overflight capability resembles the early presence of a carrier battle force during a crisis, the denial ability of task forces to coerce belligerents, and the SIOP effects of our nuclear triad during the Cold War. This potential to expand or to control the warning time gives our decision-makers a means to control response time calculus during a crisis. It also allows us to strike quickly with precise effects and support integrated joint operations to meet national objectives. Each of these reflects the transformational effects of this new capability.

The marriage of today's precision weapons, new deep earth penetrators, and the responsive global reach of spaceplanes ensure our ability to kill future terrorists if we know where they are. With such responsiveness, even fleeting intelligence can be acted on with a good chance of success. As the military spaceplane shrinks the U.S. decision-to-action loop, the terrorist is forced onto the defensive and must move to simply survive. Essentially, terrorism is deterred with terrifying responsiveness—this is the effect of coercive spacepower.

The responsiveness and lethality of spaceplanes are also useful against both conventional and emerging threats, particularly if the U.S. is forced to fight at geographically dispersed locations or against rogue nations. The CAV weapons can target any worldwide location from U.S. bases. A single military spaceplane flight can potentially even target multiple sites on separate continents. In terms of firepower, each flight of the spaceplane shown earlier is capable

of attacking from 15 to 30 separate surface targets, 30 to 60 mobile armored vehicles, 5 to 10 deeply buried bunkers or some mix of the above.

## Combat Spacepower and the Global Strike Task Force

Areas denied to terrestrial forces can be struck from space with some level of impunity within 100 minutes of launch. The speed of space delivered weapons can produce decisive operational effects by cutting the time to target thereby reducing adversary reaction time. An attack from space can surprise an adversary and reduce confidence in his ability to defend his vital resources. Additionally, precision delivery of weapons at high mach numbers can produce greater kinetic effects and higher resultant damage expectancy against hardened targets.

Given the high mach speed of delivery from high altitude standoff ranges, the military spaceplane is a highly effective and survivable combat platform capable of penetrating and opening access to denied areas. Once long-range threats are removed and air access corridors are opened, high demand, low-density airborne sensor platforms (UAVs, JSTARS, Rivet Joint, and AWACS) can move forward or activated from passive orbits to support suppression of enemy air defense (SEAD) and strike operations. At this point, the full power of a Global Strike Task Force can be brought to bear.

The DPG and Joint Publication 3-0, *Doctrine for Joint Operations*, define five phases of conflict. Within these phases, various targets are rank ordered based on priority and are struck or serviced based on the national level and campaign objectives. Within this construct, operational tasks, targets and priorities for a military spaceplane can be discerned. The GSTF is designed to function primarily during Phase I and Phase II, however it can be used in any phase to enhance the combat power of joint forces. Firmly integrated into GSTF and other combat operations and tasked through the Air and Space Operations Center, the military spaceplane will, like other systems, be apportioned a number of targets and tasks. A skilled cadre of space experts and weapons officers will conduct strike and other employment planning based on the tasking order.

A notional construct for military spaceplane combat employment in accordance with the phases of conflict identified in Joint Pub 3-0, can be found in Attachment 1. This unclassified construct is based on real-world targeting concerns found in a major regional conflict. The military spaceplane has utility throughout the spectrum of conflict, from a discrete response to a

fleeting threat to a sustained, long-term regional war. Its use is limited only by orbital parameters and the willingness of political and military leaders to employ it in support of national security objectives.

## Conclusion

Full range combat spacepower with global vigilance, reach and power is a key transformational system. The Military Spaceplane is the "battleship" of this system. Its ability to rapidly strike with precision; to deploy pervasive theater ISR systems which integrate with the UAV and airborne assets to enable robust, persistent predictive battlespace awareness from peacetime through conflict; combined with its ability to enable deep and persistent Global Strike Task Force operations with the survivability, lethality, and mission success required to deny "anti-access" strategies, mark this system as a dominate transformational capability *par excellence*. The Military Spaceplane and its versatile payloads are essential to meeting the threats predicted by our national intelligence estimates that will be present by 2010. The entire spaceplane architecture provides a robust, versatile and responsive tool that can be part of the solution set the NCA and warfighting CINC's can use to help solve the most vexing challenges to homeland security and international peace—from terrorism to full scale war. Technology exists today to create this capability and evolve it now. It is time to approve the operational concepts, deploy the ISR and strike capabilities for this system and begin the acquisition of this crucial transformational capability.