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# THEATER MISSILE DEFENSE PRIMER

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Abstract: To stimulate discussion about TMD in joint operations, SSDC, in its role as the TMD advocate within the Army, has released this document. The primer focuses on how TMD fits into joint responsibilities and command relationships, and examines how the Army fits TMD into battle management, attack operations, active defense and passive defense- also the four pillars of TMD. The primer is not doctrine, but it follows Joint and Army doctrine where it applies.

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*April 1996*

**PREFACE**

This document is intended to generate discussion for soldiers about Theater Missile Defense (TMD). TMD has been a subject of some heated arguments among the Services since Operation DESERT STORM, particularly during the recurring roles and missions debates and budget decrements of the past few years. However, despite the in-fighting, there has been significant progress made. We have effective joint TMD doctrine; improved attack operations; passive defense; and command, control, communications, computers, and intelligence (C4I) capabilities; and have made real progress in the active defense operational element.

This publication has been prepared under the auspices of Headquarters, United States (US) Army Space and Strategic Defense Command. It is not intended to be a doctrinal publication, although it scrupulously adheres to joint and Army doctrine. Rather it is to let you know where we are now in this area and how we see our TMD role as part of a joint force through the mid-term.

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## **CHAPTER I**

### **INTRODUCTION**

#### **The Old Paradigm**

During the Cold War, America's Army was on the defense. Even though our doctrine emphasized offensive spirit and the necessity to seize and maintain the initiative, the Army's mission was to defend North Atlantic Treaty Organization's (NATO) Central Region from a massive attack by the Soviet Union and Warsaw Pact. This necessarily had an effect on how we organized to fight. Nowhere is this more apparent than in the extremely centralized command and control (C2) procedures used to employ ground-based Air Defense Artillery (ADA) units.

In the Central Region, all defensive air and ground-based air defense units at echelons above division were controlled by the Area Air Defense Commander (AADC), usually the air component commander. Although there was a significant missile threat, there was not much we were capable of doing about it, so the AADC concentrated on defeating the overwhelming manned aircraft threat. He established air and ground-based air defense belts to fight a defense in depth. The plan was to keep rearranging assets to plug holes in the belts as long as possible. Most air engagements would occur over friendly territory, well within range of ground-based ADA units. But, in the heat of combat, it would have been difficult for air defense units to keep track of friendly and enemy aircraft. Since aircraft and trained crews were in very short supply, at least on the NATO side, ground-based air defense fire was very tightly controlled through restrictive weapons control measures and rules of engagement (ROE). This was designed to provide synergy between the air and ground forces and prevent fratricide.

On the other hand, Soviet commanders were on the offensive. Their primary organizational objectives were to establish C2 that allowed rapid, deep maneuver to establish land dominance and to achieve quick victory.

The strategic battle was to be conducted by Long Range Aviation bombers and Strategic Rocket Force missiles. (Unlike the US Strategic Air Command, Soviet bomber and missile forces remained separate armed forces.) Air defense of Soviet and Warsaw Pact territory was the responsibility of homeland air defense air forces, which were roughly equivalent to the North American Air Defense Command. However, the tactical air battles, both offensive and defensive, were run by the Army front commanders, who commanded organic tactical air armies and ground-based air defense units. This organization allowed front commanders to synchronize all forces operating in their area of operations, in order to seize the initiative, maneuver rapidly, and fight deep. As

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we look beyond the Cold War (Figure 1) toward the warfighting requirements facing future joint force commanders (JFCs), we can appreciate the strengths of the Soviets' combat organization.

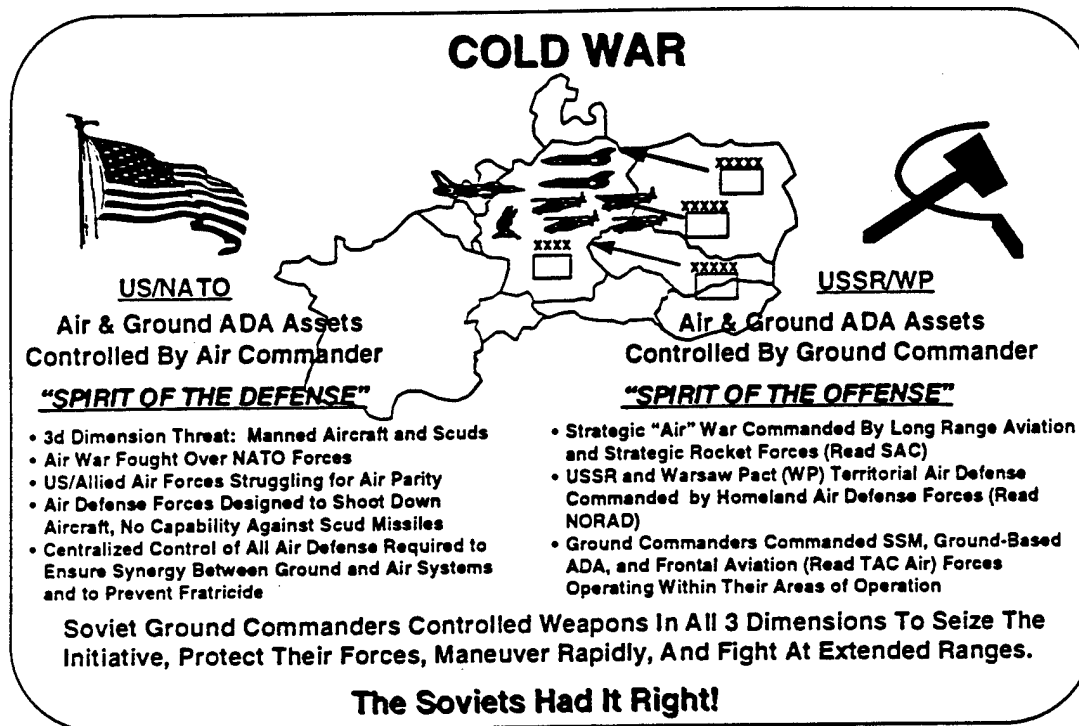


Figure 1

## Force XXI's Strategic Environment

The Army's role is to project land power for prompt and sustained land combat, as part of a joint force. Our tasks in any joint operation are to project, control, protect, and maneuver land forces the JFCs require to achieve their objectives (Figure 2). However, combat operations are not the only way in which the National Command Authority (NCA) can use the armed forces to achieve strategic objectives. Future Army missions will encompass a variety of operating conditions, from purely humanitarian disaster relief efforts through intense combat during a major regional conflict.

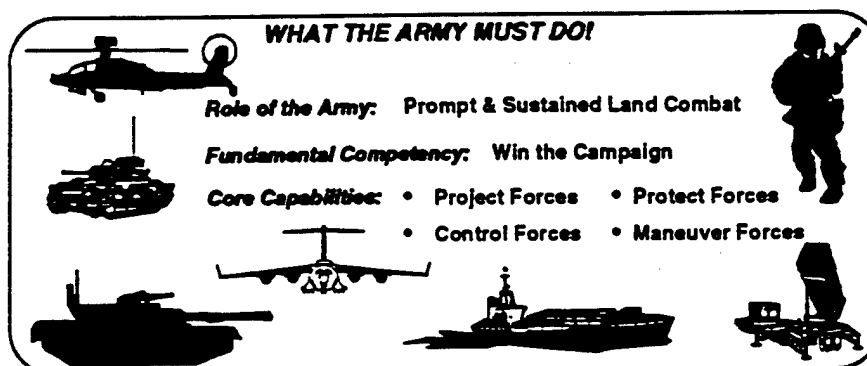
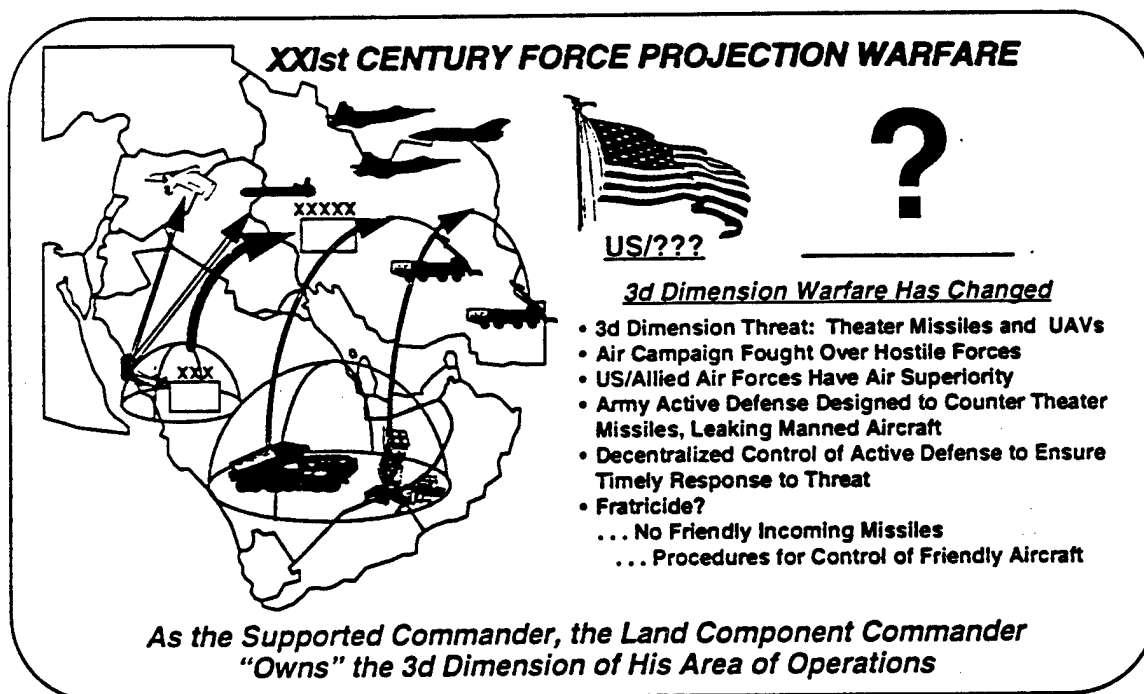


Figure 2

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As the Army prepares to conduct 21st Century joint operations (Figure 3), there are many uncertainties. Potential foes and allies or coalition partners are unknown. The geographic area to which the Army will deploy is equally uncertain. But one certainty is that the nature of the third dimension battle has changed since the Cold War. Most notably, US and friendly air power has the capability to establish air superiority early in the conflict. As a result, the majority of air battles will be fought over enemy, not friendly, territory and the role of ground-based active defense will shift to defending against the primary threat to friendly forces and assets: theater missiles and unmanned aerial vehicles (UAVs). Another change is the level of risk to friendly pilots from Army ground-based air defense weapons. First, there is no such thing as a friendly incoming ballistic missile. So, with regard to theater ballistic missiles (TBM), fratricide is not an issue. Second, the number of enemy aircraft breaking through the air defenses will be small and the joint force's capability to identify and track them is good now and progressively improving. The challenge will be to discriminate between damaged friendly aircraft trying to return to base and enemy cruise missiles and UAVs. Improved combat identification capabilities, increased emphasis on procedural controls, and well-defined and clearly understood ROE will serve to minimize the risk.



**Figure 3**

Because these operational conditions are different than those during the Cold War, the TMD C2 arrangements are different. Joint doctrine states that when a JFC creates a surface area of operations (AO), the surface component commander [i.e., the Joint Force Land Component Commander (JFLCC) or Joint Force Maritime Component Commander (JFMCC)] is the supported commander



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within that AO. As a result, the surface commander controls the priority, timing, and effects of both maneuver and fires throughout the entire three dimensional battlespace of that AO. In the case of a ground commander's AO, other components and forces must use it to execute their own missions and functions. Doctrinally, they are free to do so, but their activities must be coordinated with the ground commander to ensure they do not interfere with his operations and priorities. For example, before diverting a flight of fighters to a TMD target of opportunity beyond the fire support coordination line (FSCL) within the JFLCC's AO, the Joint Force Air Component Commander (JFACC) coordinates with the JFLCC to ensure the target is *not already* being engaged and that active defense forces are made aware of the aircrafts' presence.

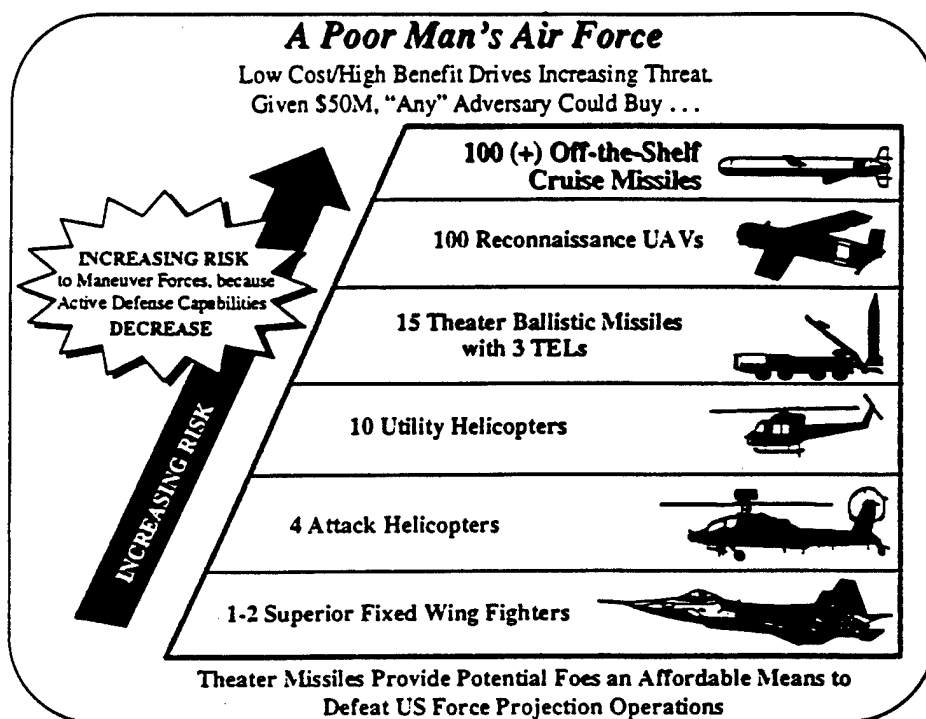
## **Theater Missiles**

One method superpowers previously used to influence client states was to provide relatively modern weapon systems at bargain prices. As a result, regional powers such as India, Iraq, and Libya could build an effective military capability. With the end of the superpower rivalry, there is no longer any incentive to provide inexpensive military equipment. Although a lot of modern equipment remains available for sale to any paying customer, most countries will be unable to finance the purchase of a first-rate military capability. In addition, Operation DESERT STORM demonstrated conclusively that the United States could project sufficient forces to defeat even a major regional player like Iraq. But DESERT STORM and other recent operations also highlight to potential foes a number of US vulnerabilities. Force projection operations require:

- Ports, airfields, and other critical transportation facilities
- Multi-national support, if only to the extent of providing landing, overflight, and transit rights
- Host nation support
- Substantial domestic political and public support

Without superpower sponsorship in the form of subsidized weapons, there is little likelihood that a regional foe will have the money to develop traditional armed forces capable of meeting and defeating a US Joint Task Force (JTF). However, theater missiles present a grave and rapidly growing threat to the combatant commanders' ability to conduct force projection operations. Theater missiles are defined as TBMs, cruise missiles, and air-to-surface missiles whose targets are within the theater. The widespread proliferation of these technologies provides potential foes an affordable means to prevent a JFC from achieving his objectives. The potential foe does not even have to be a country. As shown in Figure 4, sub-national groups, such as terrorist organizations, can easily afford TBMs, cruise missiles, or UAVs to conduct a surprise attack on US forces engaged in humanitarian efforts or some other military operation other than war (MOOTW).

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**Figure 4**

Clearly, theater missiles, particularly when armed with a weapon of mass destruction (WMD), make it possible for a potential enemy to drive the costs of military action to a level where the United States may not be able to afford the political, diplomatic, and human price. Armed with theater missiles, an enemy can attack a number of weak points:

- During the planning or early execution phase of an operation, the use or threatened use of theater missiles as area weapons against population centers in the JFC's area of responsibility (AOR), or even on US territory, may prevent the United States from garnering sufficient diplomatic and public support to deploy a JTF or take other appropriate military action.
- During deployment, the use of theater missiles may damage ports and airfields and inflict enough casualties to prevent the JFC from establishing a lodgment.
- Should a lodgment be established, the use of theater missiles against ports, airfields, assembly areas, and logistics facilities may prevent the JFC from marshaling enough combat power to initiate and sustain decisive operations. If casualties are high, difficult questions will arise as to whether the national objectives are worth the cost and whether the military strategy and campaign plan are sound and should be continued.

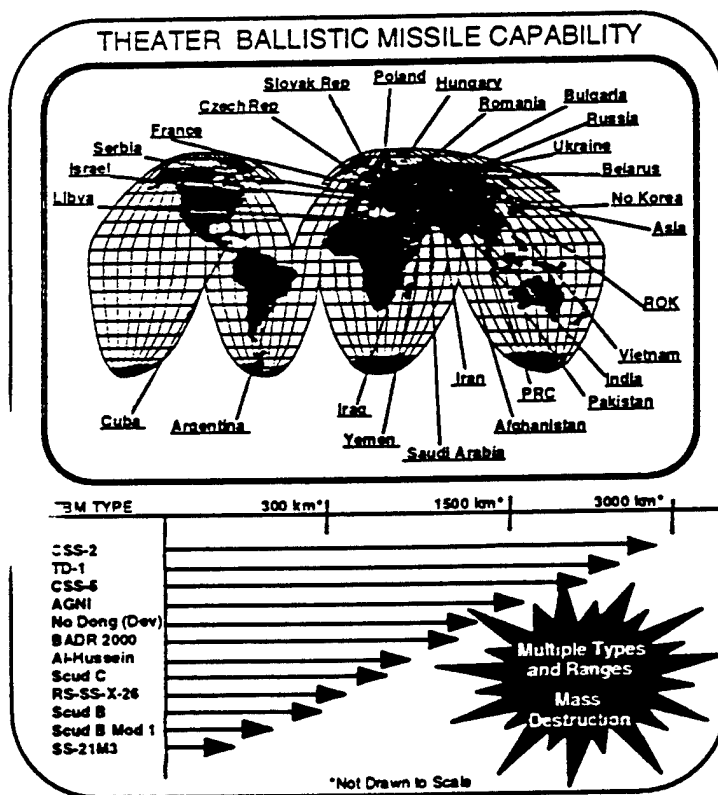
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- During combat, the use of theater missiles against maneuver forces (at choke points, assembly areas, command posts, and logistics sites) may restrict the JFC's freedom to maneuver and ability to establish the OPTEMPO necessary for decisive operations.

Clearly, the theater missile threat is both complex and extensive. The mere presence of hostile theater missile and UAV capabilities in an operational area, especially if they pose a WMD threat, creates significant political and diplomatic stress. This, in turn, could impose equally significant constraints on military forces. The threat of a theater missile attack against US troops by a hostile force--even a terrorist group--may create political and diplomatic pressures sufficient to force withdrawal of US forces before they accomplish their mission. Such potential exists even during humanitarian missions.

The theater missile threat is here today. As shown in Figure 5, approximately 26 countries possess TBMs. Approximately 100 countries possess some form of TBM, cruise missile, or UAV capability. Although the number of countries with



**Figure 5**

launched covertly and have long ranges and short flight times. In flight, TBMs can present challenges, such as maneuver, penetration aids, or decoys, that complicate active defense operations. Further, theater missile launchers are mobile and easily concealed, increasing their survivability.

theater missile capability is likely to remain constant, both improved technology and a large increase in the number of deployed systems will pose significantly increased risks to deployed US forces by the year 2000.

In addition to being relatively low technology and relatively inexpensive, these systems pose particular problems for a defender: TBM and cruise missile warheads are capable of delivering a variety of payloads--high explosive, chemical, biological, and nuclear.

TBMs are difficult to destroy because they can be

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Cruise and air-to-surface missiles are difficult to destroy because they can be launched from a variety of platforms at long ranges, and can enter friendly airspace from any direction at low altitude. In addition, they present a relatively small radar cross section to sensors, reducing acquisition range and shrinking engagement battlespace.

UAVs are small and may be constructed of a variety of materials, making them very difficult to detect. Hostile forces may use UAVs to deliver weapons, but they are typically intelligence collection and target acquisition platforms. UAVs may carry a variety of sensors to provide near real time information on the location, composition, and activities of US forces.

A summary of the theater missile threat is contained in Figure 6.



Figure 6

## Theater Missile Defense

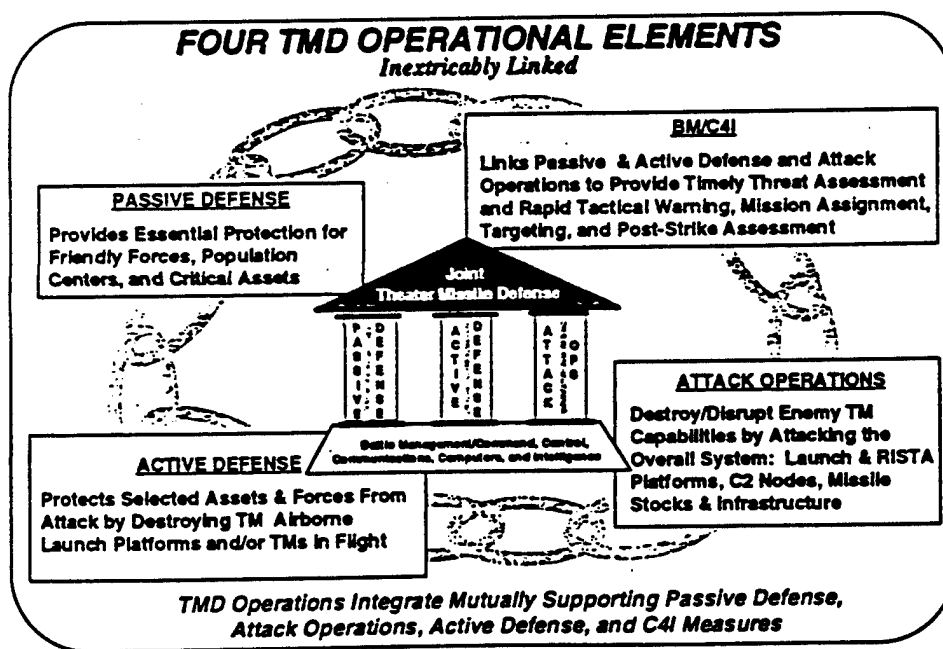
In recognition of the theater missile threat, the US is developing TMD capabilities with which joint forces will destroy theater missiles on the ground; attack their supporting infrastructure; destroy theater missiles and their airborne launch platforms in-flight; degrade the enemy's theater missile targeting capability; and protect themselves from the effects of any theater missile attack.

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TMD is inherently a joint effort. For success, the JFC must coordinate capabilities of the US and friendly forces he has been provided with those of supporting combatant commanders and national agencies. A synchronized effort is essential to detect, locate, identify, track, and destroy hostile theater missiles, while minimizing their effects on friendly forces, critical assets, and important areas. Joint force components conduct TMD by executing an integrated mix of mutually supporting measures that joint doctrine groups into four operational elements (Figure 7):

- **Passive Defense.** All defensive measures, excluding active defense, taken to reduce vulnerability and to minimize the effects of damage caused by theater missile attack.
- **Active Defense.** Operations initiated to defend against theater missile attack by destroying theater missiles and airborne launch platforms in-flight.
- **Attack Operations.** Offensive actions by air, land, sea, space, and special operations forces to destroy, disrupt, or neutralize theater missiles and their launch platforms; their command, control, and communications and logistics infrastructure; and reconnaissance, intelligence, surveillance, and target acquisition (RISTA) platforms on or below the earth's surface.
- **Battle Management (BM)/C4I.** An integrated system of doctrine, procedures, organizational structures, facilities, communications, computers, intelligence, and missile warning sensors and ground stations that provides commanders at all echelons with timely, accurate, and relevant data and systems to plan, coordinate, and deconflict theater missile defense operations.



**Figure 7**

## CHAPTER II

### RESPONSIBILITIES AND COMMAND RELATIONSHIPS

#### General

Joint forces must be prepared to conduct some TMD operations at all levels of conflict, from humanitarian and nation-building operations through general war. Chapter II sets forth the responsibilities and command relationships of the JFC and those subordinates involved in combating the theater missile threat.

Countering the modern and evolving theater missile threat is a complex operation. To be successful, the JFC must integrate all available offensive and defensive capabilities provided by the joint force, multinational forces, host nation authorities, and supporting theater and national capabilities. As illustrated in Figure 8, all the joint force components, supporting combatant commanders, and national agencies make significant contributions in countering hostile theater missile capabilities. Because of their complexity, the short reaction times presented by the threat, the large number of forces, and size of the geographic areas involved, joint TMD must be a centrally planned and decentrally executed--but closely coordinated--operation.

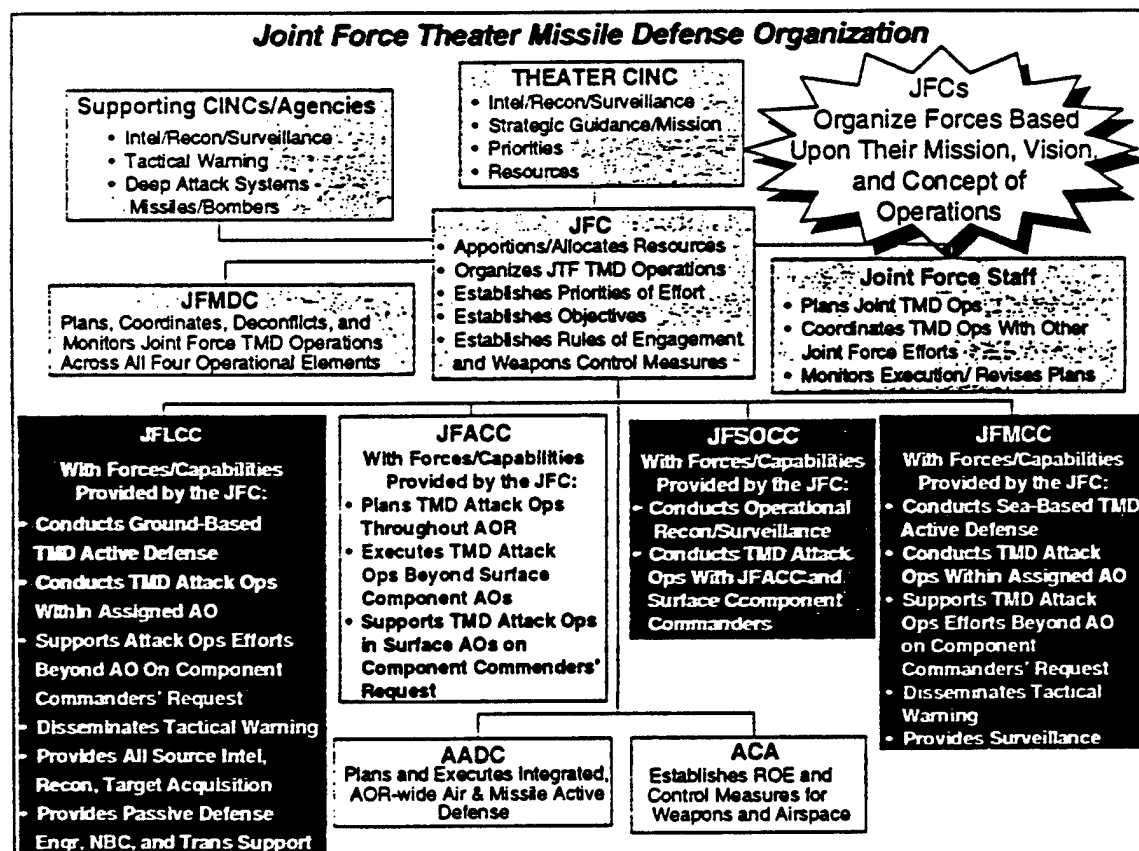


Figure 8

## **Joint Organization**

**Theater Commander-in-Chief (CINC).** The theater CINC is concerned with operations throughout the entire theater. He establishes theater-wide TMD guidance and objectives and assigns or apportions appropriate forces and resources. The CINC uses staff elements and component commanders and their staffs to plan, monitor, advise, coordinate, and execute overall operations, including TMD. The CINC then integrates subordinate forces' plans and operations at theater level and resources them appropriately.

**Joint Force Commander.** The JFC defines and implements an overall concept of how he wants TMD conducted throughout his AOR. He does this to ensure all elements in the joint force and all those supporting it understand how TMD is to fit within the overall joint force effort. To ensure coordination, the JFC includes his guidance and delineates TMD responsibilities in appropriate plans and annexes. JFC guidance may include, but is not limited to:

- How to plan, coordinate, and deconflict TMD within the AOR. This includes defining the Joint Staff's role and that of such organizations as the JTCB and designating a JFMDC if the situation calls for one.
- Priority of effort. What are high value/high payoff targets for offensive action? What friendly forces, assets, and critical areas must be protected by active defenses? Which facilities must be decontaminated first, in case of chemical or biological attack? What is the engineer priority for constructing berms and other passive defense protective fortifications?
- Establishing surface component AOs.
- The apportionment of air sorties between various missions, including those associated with TMD attack operations.
- The TMD forces and capabilities made available to functional components and the governing command relationships, e.g., operational control (OPCON), tactical control (TACON), etc.
- The component-to-component coordination necessary to facilitate and deconflict offensive and defensive TMD measures.

Figure 9 summarizes the JFC's TMD role and responsibilities.

### **The Joint Force Commander**

#### **Establishes AOR TMD Guidance & Objectives**

- Delineates Joint Planning Methodology
  - Planning, Coordination, and Deconfliction Role of Joint Force Staff
  - Role of Joint Targeting Coordination Board (JTCB)
- Establishes Priority of Effort for All Four TMD Elements
- Apportions Air Power
- Establishes Surface Component AOs
- Designates Functional Component Commanders, Allocates Forces and Military Capabilities to Them, and Defines Command Relationships
- Mandates Required Inter-Component TMD Coordination



***The JFC's Staff and the Service and Functional Component Commanders  
Plan & Execute TMD IAW the JFC's Guidance & Objectives***

**Figure 9**

**The Joint Force Staff.** The JFC uses the joint force staff to advise plan, deconflict, and monitor overall joint force operations. One of the joint force staff's major responsibilities is to develop and issue the JFC-approved concept of operations to the components. TMD subjects included in the JFC's concept of operations include objectives for TMD attack operations, active defense, and passive defense; active defense priorities; guidance on planning, allocating, and employing TMD resources; surface component AOs; and requirements for components to develop, coordinate, and integrate TMD plans that achieve the JFC's objectives.

The joint force staff, in coordination with component commanders, coordinating authorities, and subordinate staffs also ensures TMD requirements, capabilities, and operations are integrated into overall joint operations and support the JFC's objectives. For instance, TMD intelligence requirements are integrated into the joint force's intelligence preparation of the battlefield (IPB), collection management, and production efforts. Additionally, procedures are established to ensure effective dissemination of launch warnings. The staff develops ROE for TMD attack operations, coordinates the development of active defense ROE with the AADC, and gains the JFC's approval of both. The staff ensures the integration of TMD BM/C4I requirements and capabilities into the overall AOR-wide BM/C4I architecture and establishes procedures to ensure its capability to plan, coordinate, monitor, and deconflict TMD operations. It also integrates components' TMD forces, capabilities, and supply requirements into the time-phased force deployment list (TPFDL) and resupply priorities.

Figure 10 illustrates the joint force staff's TMD role and responsibilities.



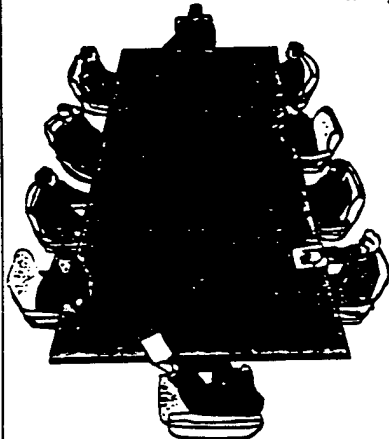
### THE JOINT FORCE STAFF

Develops and issues JFC-approved concept of operations, to include :

- Specific TMD attack operations, active defense, and passive defense objectives
- The active defense priority of US, Allied, and Coalition forces, and areas of vital interest
- Guidance on planning, allocating, and employing TMD resources
- Components' TMD planning requirements
- Surface component AOs

Integrates joint force TMD requirements, operations, and capabilities:

- Collects, fuses, and disseminates all source intelligence, targeting data, and launch warnings
- Develops attack operations ROE
- Develops active defense ROE with AADC
- Integrates TMD BM/C4I into the joint force's architecture, establishing and maintaining near real time BM/C4I procedures for planning, coordinating, deconflicting, and monitoring TMD operations
- Integrates components' TMD forces and capabilities into TPFDL and resupply effort
- Develops TMD plans, ensuring TMD requirements are contained in appropriate annexes
- Reviews and evaluates Components' and AADC TMD plans
- Assists multinational forces and host nation authorities with TMD planning



*The Staff Integrates TMD Requirements with the Available TMD Forces and Capabilities to Support the JFC's Overall Concept and Objectives*

**Figure 10**

**Functional Components.** The JFC may task organize the joint force by forming functional components, consisting of units or military capabilities from two or more Service components, to:

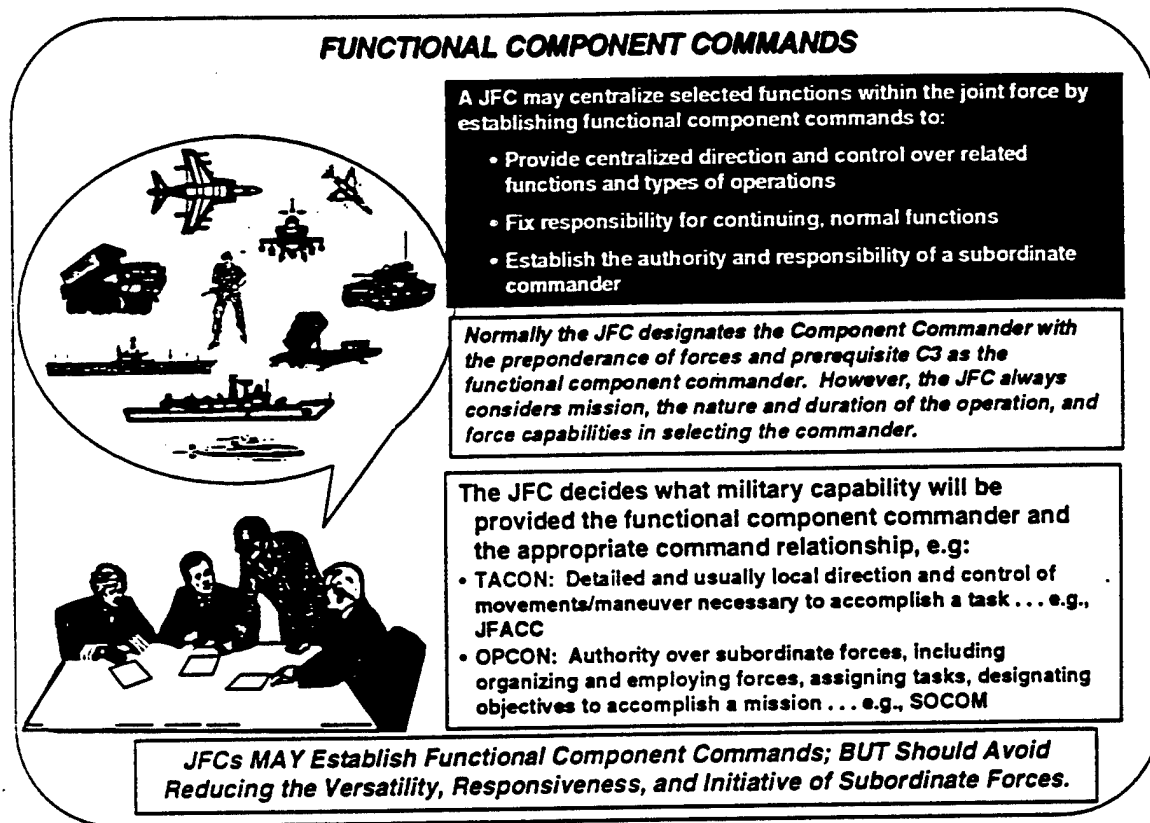
- Provide centralized direction and control over related functions and types of operations.
- Fix responsibility for continuing, normal functions.
- Establish the authority and responsibility of a subordinate commander.

Based on his concept of operations, the JFC organizes functional components and delineates their commanders' authority and responsibilities, to include the command relationship between the commander and the provided forces and capabilities. Usually, the JFC appoints the Service component commander with the preponderance of forces available to accomplish the specific function and the capability to provide required command and control as the functional component commander. However, the JFC also considers other important factors such as the nature of operations, the mix of Service forces, and available capabilities. Typically, functional component commanders retain

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OPCON over their assigned forces and TACON over forces and capabilities supplied by other Service components.

As his concept of operations changes, as the campaign moves into a different operational phase for instance, the JFC may alter these task organizations. Figure 11 summarizes the discussion on functional components.



**Figure 11**

**Surface Component Commanders.** Normally, the JFC will task organize Army, Navy, and Marine forces into surface functional components. He will then designate the Service component commander with the preponderance of forces and required C3 capabilities as the functional component commander. The JFMCC usually will be the Naval Component Commander. The JFLCC will be either the Army Force (ARFOR) or Marine Force (MARFOR) commander. As component commanders, the JFLCC and JFMCC plan and execute combat operations as part of a joint force, coordinating and prioritizing their combat operations and requirements with the JFC and other component commanders.

The JFLCC and JFMCC plan and execute TMD operations as directed by the JFC. Within their AOs, they are supported commanders for TMD attack operations. In turn, they are supporting commanders to the JFACC, who executes attack operations beyond the borders of the surface AOs. For active defense, the surface component commanders generally retain OPCON of their

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TMD active defense forces and capabilities. They execute missions assigned to them in the joint force's integrated Air and Missile Defense Plan and defend their own priority assets in accordance with ROE and weapons control measures established by the AADC. The surface component commanders also have the responsibility to provide warning to assigned forces in sectors vulnerable to missile attack.

Coordination between Service and functional component commanders, the joint force staff, and the JFC ensures effective, integrated, and timely joint operations and is essential to successful TMD. Two critical areas requiring coordination are component commanders' concepts of operations and their assigned TMD missions. Both active and passive air and missile defense capabilities and operations must be coordinated to ensure seamless and effective defense, warning, and decontamination. Attack operations coordination includes the availability, capability, and activities of RISTA assets; special operations; targeting and target deconfliction procedures; and joint suppression of enemy air defense (J-SEAD). The JFC's concept of operations outlines TMD coordination requirements.

Figure 12 summarizes the above roles, responsibilities, and requirements.

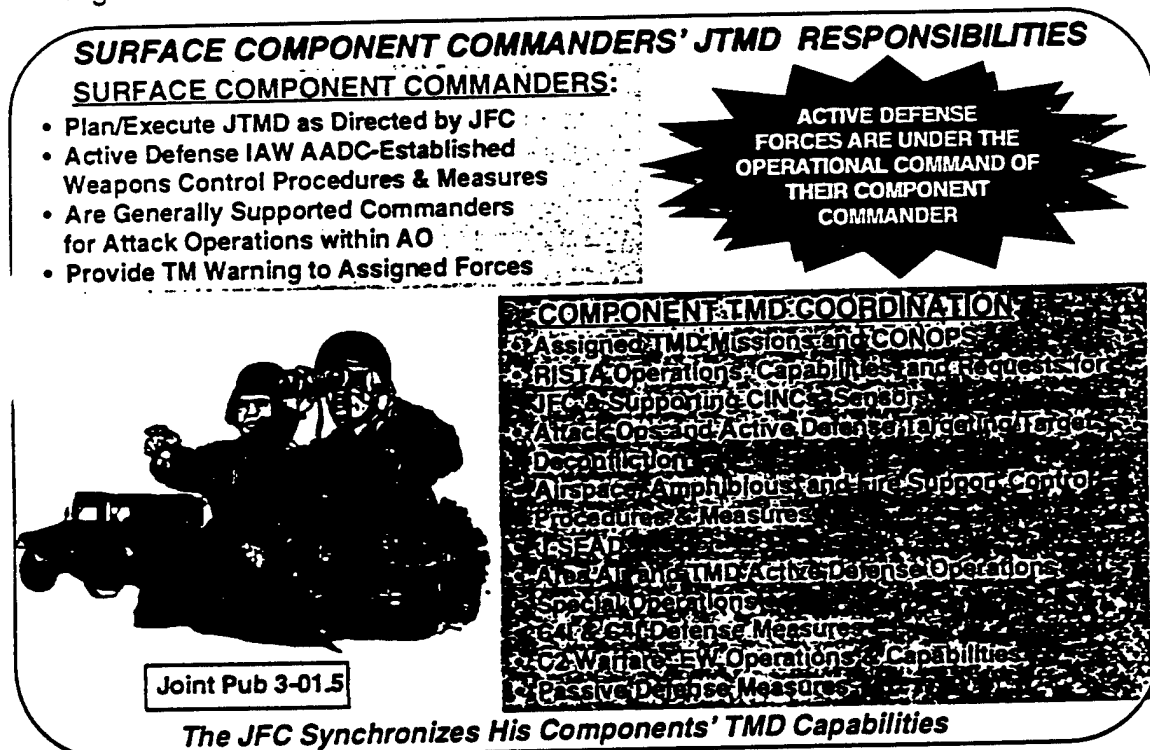


Figure 12

**Joint Force Air Component Commander.** The JFC normally designates a functional air component commander to plan, coordinate, allocate, and task joint air operations in accordance with the JFC's concept of operations and air

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apportionment decisions (Figure 13). Service and functional components provide the JFACC appropriate liaison and staff elements to assist integrating, coordinating, and deconflicting joint air operations and those air operations conducted in direct support of surface commanders. As supported commanders, **surface component commanders are responsible for determining the priority, timing, and effect of all air operations conducted within their AOs.** Therefore, the JFACC must closely coordinate counterair, strategic attack, and air interdiction operations conducted within a surface component AO to ensure such attacks support the component commander's concept of operations.

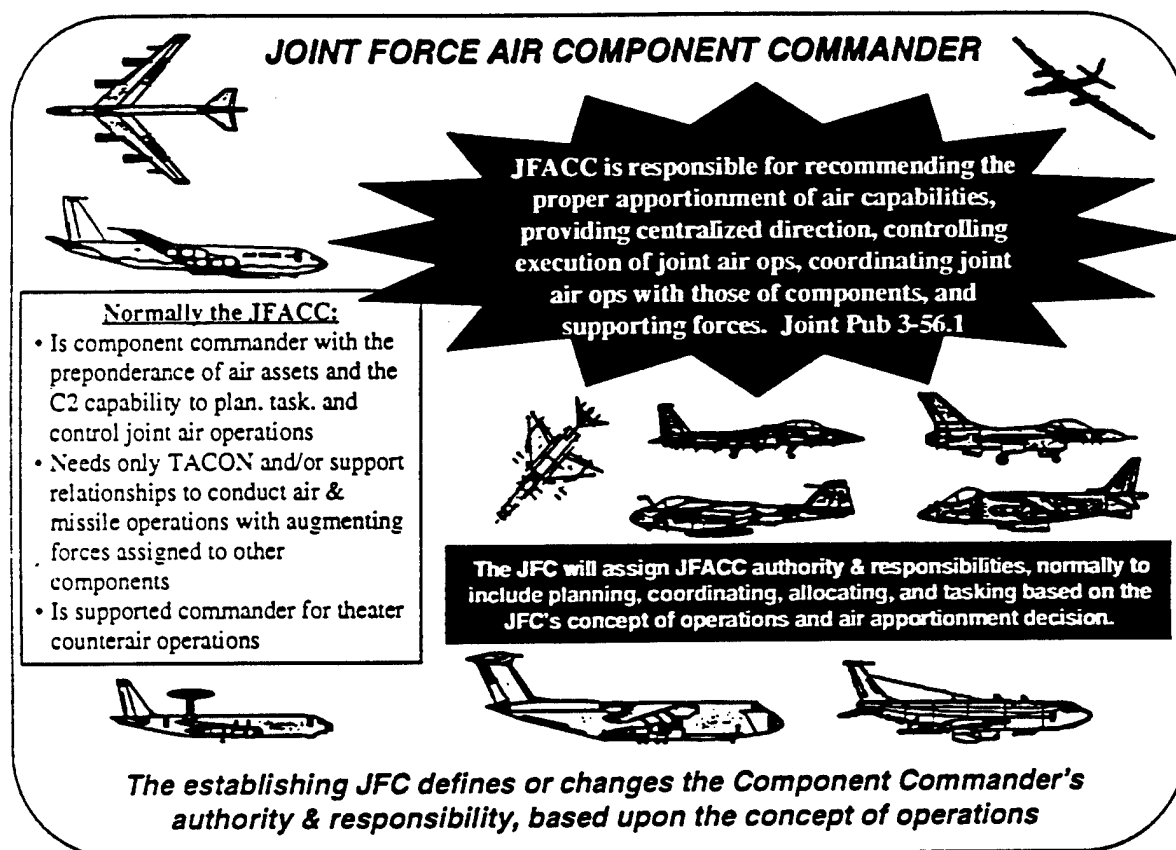


Figure 13

The JFC generally assigns the JFACC a number of specific TMD responsibilities:

- Supported Commander for TMD Attack Operations. Beyond Surface AOs. Counterair operations are those joint air operations conducted to obtain the level of air superiority necessary to support the JFC's concept of operations and to protect friendly forces, assets, and critical areas from air and missile attack. It includes both offensive counterair (OCA) and defensive counterair (DCA) operations. Generally the JFACC will dedicate some portion of his OCA effort to support TMD attack operations. The attack of fixed missile sites; command, control, communications, and intelligence (C3I)

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facilities; and other theater missile infrastructure targets may be accomplished during strategic attack and air interdiction operations.

- Supporting Commander for TMD Attack Operations within Surface AOs. Surface component commanders are responsible for TMD attack operations within their AOs. The JFACC will plan, coordinate, and execute direct support air interdiction to attack TM targets within surface AOs as requested by the component commanders, in accordance with the JFC's guidance and air apportionment decision.

Other Joint Authorities. There are several other joint authorities the JFC may designate to ensure the joint force effectively plans and executes TMD:

Area Air Defense Commander. The JFC normally will designate an AADC to integrate both active air and active missile defense throughout an overseas land AOR, including the littoral. The AADC will usually be the component commander with the preponderance of active air defense capability and sufficient command, control, and communications (C3) capability to synchronize components' active defense operations with all other tactical operations over land, over sea, and in the air, in accordance with the JFC's concept of operations and priorities.

The AADC is responsible for developing, coordinating, and, in coordination with the joint force staff, obtaining JFC approval of the ROE, weapons control measures, and the integrated active air defense and active missile defense plan. These will provide the parameters within which component commanders will employ their assigned active defense forces and capabilities. If an Army Air Defense Coordinator (AADCOORD) has been designated, the AADCOORD may perform duties as the deputy AADC. In this case, he would be responsible for ensuring that ground-based air and TMD active defense is integrated effectively into the AADC's air and missile defense plan and for monitoring and deconflicting active air defense and active missile defense operations. The AADC and deputy AADC functions are illustrated in Figure 14.

Airspace Control Authority (ACA). The JFC normally designates an airspace control authority with overall responsibility to establish an airspace control system that is responsive to the JFC's needs and integrated with the Host Nation's airspace control system. (Because AADC and ACA functions are intertwined, the JFC normally assigns both duties to the same individual.) Although the JFC delegates authority to centrally direct airspace control to the ACA, this does not imply OPCON over components' forces or capabilities.

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## **AREA AIR DEFENSE COMMANDER**

The JFC normally:

- Assigns overall active air and missile defense responsibility to a single commander . . . generally the component commander with the preponderance of air defense capability and C3 capability to plan and execute an integrated active air and active missile defense.
  - Delegates authority to integrate air defense forces and operations to the AADC. This includes authority to establish weapons control procedures & measures.
  - Leaves active defense forces OPCON to their component commanders, who employ these forces under the weapons control procedures and measures established by the AADC and approved by the JFC.
- (Joint Pub 3-01.5)

The senior Army air defense commander is also the ARFOR AADCOORD. The JFC also could task him to be the Deputy AADC to assist the AADC by planning, coordinating, monitoring, and deconflicting ground-based active defense.

*As the Deputy AADC, the AADCOORD Provides Surface-Based Air and Missile Defense Expertise to Active Defense Planning*

**Figure 14**

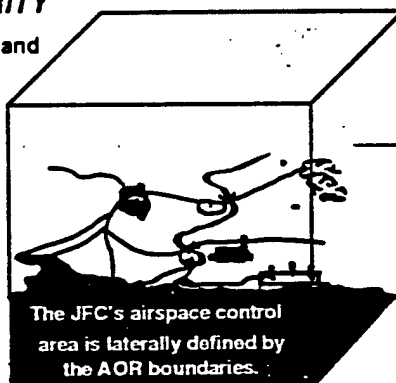
Subject to JFC authority and approval, the ACA develops broad policies and procedures for airspace control; delineates the coordination required among units within AOR airspace; coordinates and deconflicts users' airspace requirements; and ensures the airspace control system is flexible enough to react quickly to contingencies requiring rapid force deployment. Well planned airspace control procedures can add to the effectiveness of TMD active defense. **For instance, procedural controls should be implemented to enhance active defense systems' capabilities to separate cruise missiles from friendly aircraft.** Figure 15 details the duties of a joint force ACA.

## **AIRSPACE CONTROL AUTHORITY**

The JFC normally designates an ACA to coordinate and integrate use of airspace within the AOR. The ACA:

- Develops broad airspace control policies and procedures
- Delineates required airspace coordination within AOR
- Establishes an airspace control system (ACS)
- Integrates military ACS with that of the host nation(s)
- Coordinates & deconflicts user requirements
- Ensures ACS is flexible enough to meet contingency situations requiring rapid force deployments

**CENTRALIZED DIRECTION  
 BY THE ACA DOES NOT IMPLY  
 ASSUMPTION OF OPCON**



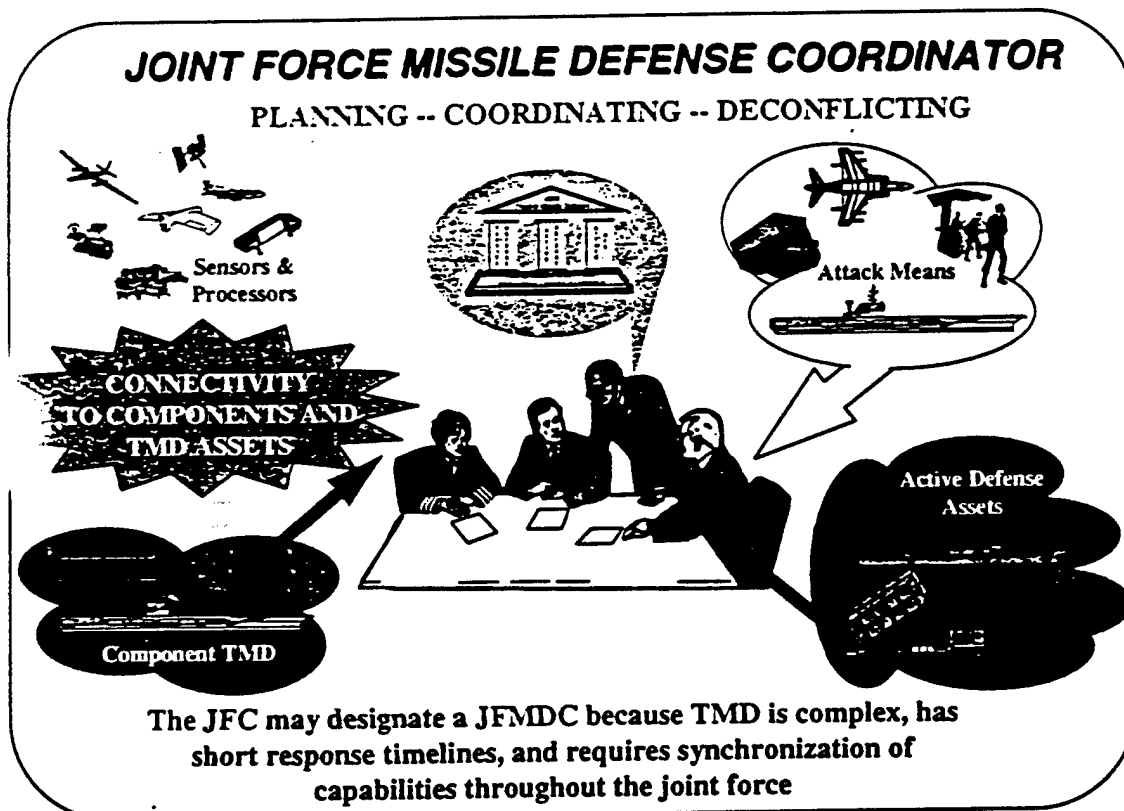
*Joint Doctrine Recommends that the AADC  
 be Dual-Hatted as ACA*

**Figure 15**

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**Joint Targeting Coordination Board (JTCB).** The JFC usually organizes a JTCB to coordinate target information, provide targeting guidance and priorities, and prepare or refine joint target lists. The JTCB may be chaired by the deputy JFC (DJFC) or joint force J3 and includes appropriate joint force staff and component representation. However, the JFC tailors the JTCB according to the specific situation. Its TMD role is to ensure attack operations are integrated into the components' counterair, strategic attack, interdiction, counterfire, fire support, strike, special operations, and similar tactical operations to ensure the JFC's TMD objectives are met.

**Joint Force Missile Defense Coordinator (JFMDC).** Countering the modern theater missile threat is a complex, time-sensitive task that requires a high degree of joint integration to ensure success. Depending on the situation and mission, enemy, terrain, troops, and time (METT-T), the JFC may designate a JFMDC and provide him sufficient resources to plan, coordinate, and deconflict joint force TMD (Figure 16). The JFMDC may be a member of the joint force headquarters, such as the DJFC or J3; a component commander; or another officer.



**Figure 16**

The JFC will delineate the JFMDC's specific authority and responsibilities to plan, coordinate, and deconflict joint TMD operations across all four operational elements. JFMDC functions generally include:

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- Determining missile defense requirements and courses of action
- Coordinating or monitoring the production of specific missile defense IPB products to identify probable courses of enemy action and specific missile defense intelligence requirements
- Publishing or monitoring the publication of plans and annexes pertaining to missile defense issues, to include recovery and reconstitution planning
- Coordinating TMD input to ROE and active missile defense weapons control procedures with the AADC and joint staff

During the planning phase of joint force TMD operations, the JFMDC makes specific contributions to ensure all operational elements are integrated into the JFC's plan. For active defense, the JFMDC coordinates with the AADC, the joint force staff, and the components to develop the prioritized defended asset list approved by the JFC and a recommended allocation of TMD active defense forces and capabilities. The JFMDC role in TMD attack operations planning includes coordinating targeting strategy with the JTCB and components and coordinating sensor coverage, priorities, cueing, and sensor-to-shooter links with the J-2 and components. In the passive defense arena, it is the JFMDC who ensures that appropriate vulnerability analyses are done to ensure that adequate engineering, transportation, operations security (OPSEC), and tactical warning measures are planned to prepare for the theater missile threat. He also ensures the joint force is prepared for the possibility of a successful theater missile and WMD strike, with detailed reconstitution, medical, and decontamination plans. The JFMDC coordinates TMD BM/C4I requirements in coordination with the J2, J3, J6, AADC, ACA, and the components to establish the required policies, priorities, and procedures to enhance TMD operations. As implied by the above discussion, particularly crucial procedures the JFMDC will ensure are emplaced are those required to collect, process, and disseminate missile launch and tracking data for appropriate offensive and defensive actions; cross-cue sensors in near real time; establish cross-component sensor-to-shooter links; and monitor missile defense operations and maintain situation awareness.

Once operations commence, the JFMDC continuously monitors the joint force's TMD execution, and recommends changes required to enhance the effectiveness of TMD operations throughout the campaign.



## **CHAPTER III**

### **HOW THE ARMY DOES BM/C4I**

#### **General**

The tenet "centralized planning, decentralized execution" is basic to the Army's military culture. Centralized planning ensures all subordinates know what a commander intends to do and how he intends to do it. However, commanders understand that a plan must be flexible. Subordinates will need this flexibility to make a plan work when the realities imposed by the situation--weather, enemy, and terrain--take effect. Provisions for decentralized execution enable such adjustments and tactical decisions. If these decisions are to be effective, a subordinate must understand the current situation. He must also have a set of capabilities and procedures enabling rapid coordination.

As the Army digitizes its systems enroute to Force XXI, and as Army capabilities improve, expectations placed on systems and their operators will increase. Accuracy and responsiveness will be increasingly critical. This requirement is particularly applicable to operations fought within the stressing TMD time lines. Within six to eight minutes, for example, the joint force must detect theater ballistic missile launches, warn units at risk, engage incoming missiles, locate the launchers, and destroy them.

Given such demanding time lines, the Army believes highly centralized execution will prove slow and ineffective. This view especially applies to active defense. To defeat missiles in flight, centralized planning but decentralized execution will be essential. Authority for weapon-target pairing must be decentralized; the commander who can direct active defenses in a timely manner must have the authority to do so.

The Army advocates development of an open, interoperable BM/C4I architecture (Figure 17). This developing architecture will meld emerging technology (communications, sensors, automation), doctrine (Decide-Detect-Deliver-Assess, Commander Driven Intelligence, Split-Based Operations), with weapons, decisionmakers, and soldiers throughout the battlefield. Army systems in this architecture will interface and be interoperable with those of the joint force and other components. The architecture will be designed to meet the JFC's requirements and provide the JFLCC the capability to centrally plan and decentrally execute near real time TMD operations in support of the JFC's objectives and to protect his own forces and critical assets.

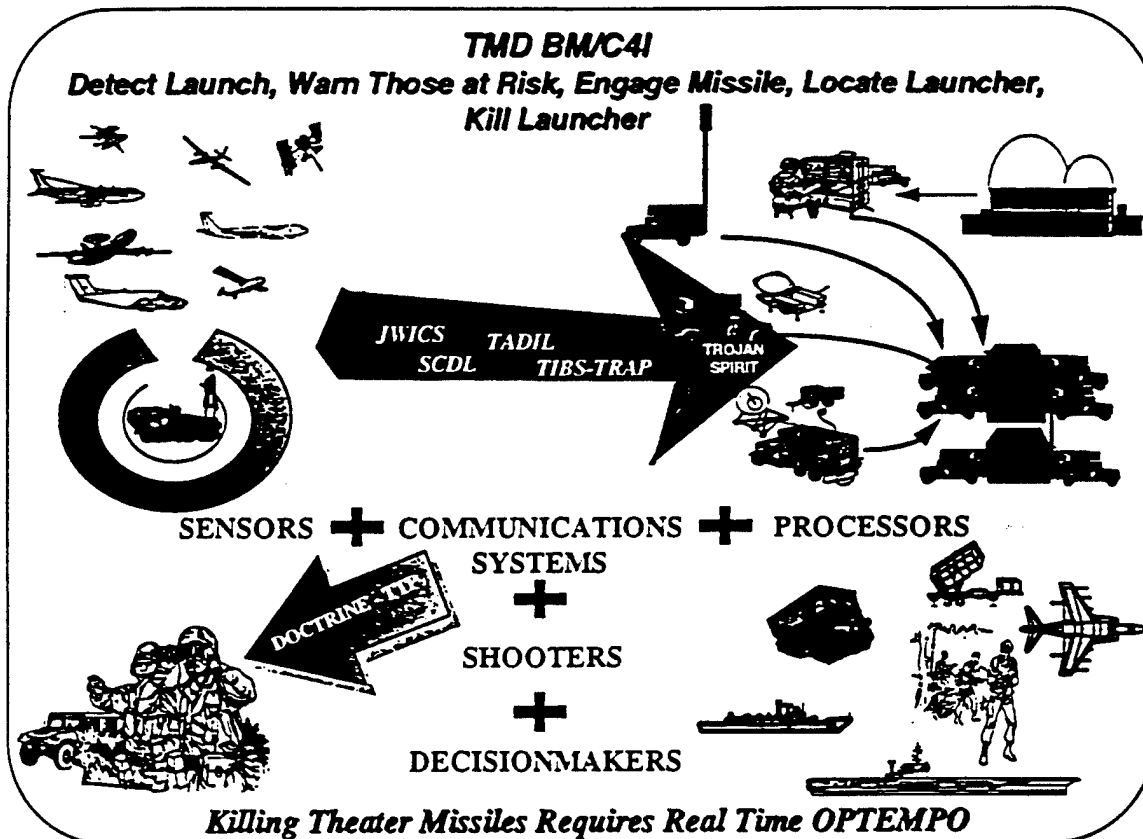


Figure 17

## BM/C4I Requirements

BM/C4I is the nervous system that directs and connects the TMD warrior's eyes, sword hand, and shield arm. Because the Army decided to meet TMD operational requirements by leveraging ongoing developmental efforts in all the battlefield operating systems, rather than creating a new mission area, BM/C4I is arguably the most critical TMD operational element. It fuses the disparate passive, active, and attack capabilities found throughout the force into a focused effort that is synchronized with the overall joint TMD effort and supports land operations. It enables the commander to detect theater missile targets and to react with a speed well within the enemy's decision cycle and fast enough to neutralize and destroy his theater missile capability.

The BM/C4I architecture must allow the JFLCC to centrally plan TMD operations, ensuring they fully support his concept of operations, and to coordinate and deconflict his TMD operations with the joint force, other components, supporting agencies, and subordinate units. This ensures that land component TMD operations fully support the JFC's concept of operations, are in accordance with his guidance and priorities, and are integrated into the overall joint effort.

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As illustrated in Figure 18, effective, decentralized TMD execution requires the BM/C4I architecture to support the other operational elements and enable them to accomplish critical, time sensitive functions:

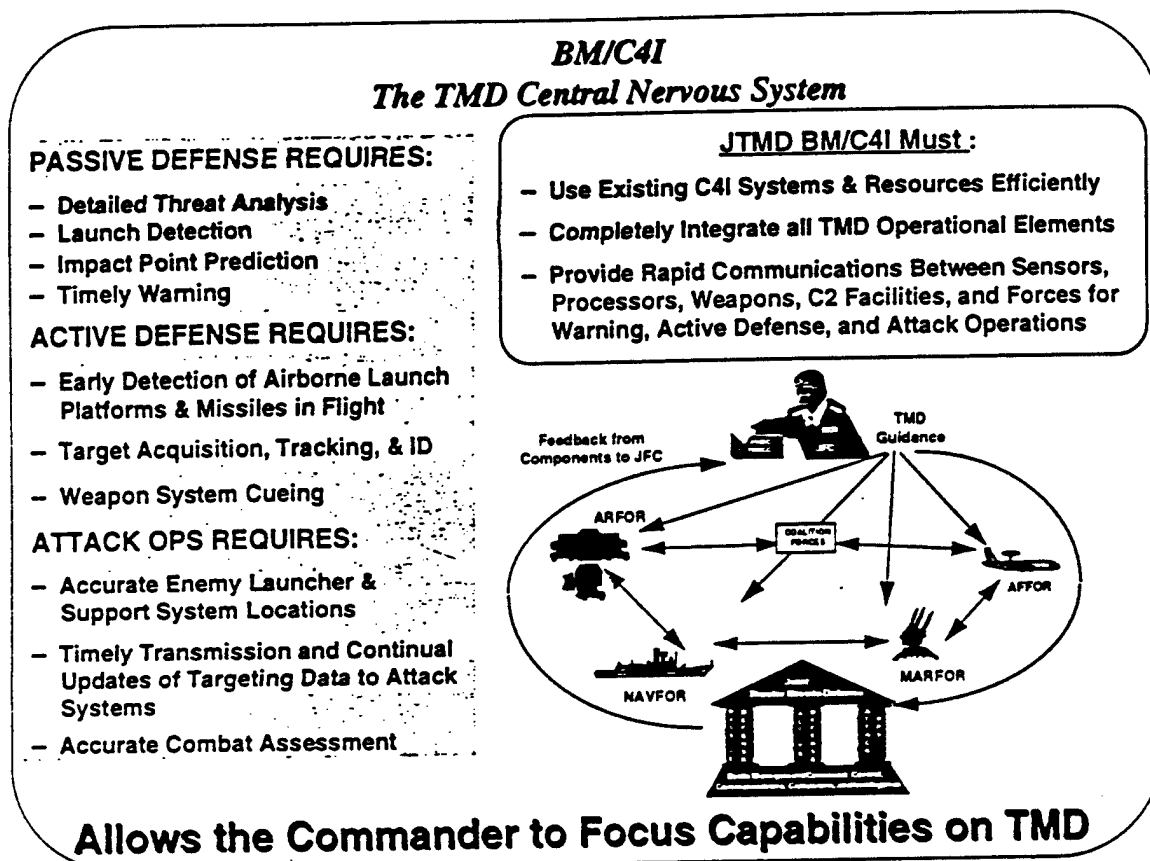


Figure 18

- **Passive Defense.** For the force to continue operating effectively, even in the event of a theater missile impact, it must be able to execute passive defense measures. This means the joint force must focus its intelligence collection and analysis to attempt to determine whether the theater missile threat is conventional or equipped with WMD warheads. It must conduct a detailed vulnerability analysis based on the threat and be able to plan, coordinate, and execute the required OPSEC, force protection, and reconstitution plans. The force also must be able to detect missile launches in real time, i.e., within seconds, and be able to rapidly disseminate launch detection and estimated impact point data to its units. Timely dissemination of warning to multinational forces and host nation authorities is also a critical requirement.
- **Active Defense.** To acquire, identify, and destroy theater missile targets in-flight, the force must be able to rapidly detect and accurately track airborne launch platforms and theater missiles, disseminate estimated flight paths quickly, and rapidly cross-cue sensors and weapons.

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- Attack Operations. The joint force's TMD efforts have the biggest pay-off when attack operations destroy or degrade enemy theater missile capability before missiles are launched. To do this, the force must be able to accurately detect, locate, identify, and track launch platforms and theater missile infrastructure. Once found, the attack operations targets must be rapidly coordinated, deconflicted, and transmitted to attack systems. Accurate and timely combat assessment is also a critical requirement for conserving scarce resources and ensuring achievement of the commander's objectives.

## **Command and Control**

The Army's mission is to dominate land operations for the JFC. It does this by being present in the AOR in sufficient strength to accomplish the JFC's objectives quickly and effectively. Other components of the joint force do not actually have to be stationed in the AOR to provide adequate support to the JFC. As previously discussed, theater missiles and WMD provide hostile forces useful weapons to defeat a US joint force. Because Army forces are present in the AOR, they are the prime target for theater missile attack. Even if other components' facilities are in the AOR, they are generally within the JFLCC's AO and he is responsible for providing active defense. Because of the threat to his force, the depth of most enemy theater missile targets, the short response time lines, and the fact that he has the joint force's **only anti-TBM active defense capability**, TMD is a major JFLCC concern.

All commanders within the land component are concerned with effective passive defense measures, and chemical, medical, and engineer commanders provide specific capabilities in this area. Artillery, aviation, and special operations commanders are concerned with attack operations, and the Deep Operations Coordination Center (DOCC) and G3 ensure these efforts are synchronized with the main effort. ADA commanders conduct active defense, and the AADCOORD, as part of the G3's staff, ensures the effort is coordinated throughout the AO and integrated in the joint effort. Military Intelligence (MI), Field Artillery, and ADA commanders provide sensors needed for attack operations and active defense. The Analysis and Control Element (ACE) and G2 ensure the timely processing, analysis, and dissemination of critical information. But, it is the JFLCC who ties these capabilities together and fights them as part of the joint force.

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The JFLCC may appoint a Missile Defense Coordinator (MDC), under the G3's supervision, to plan, coordinate, deconflict, and monitor land component TMD operations. Army Space Command's (ARSPACE) deployable Army

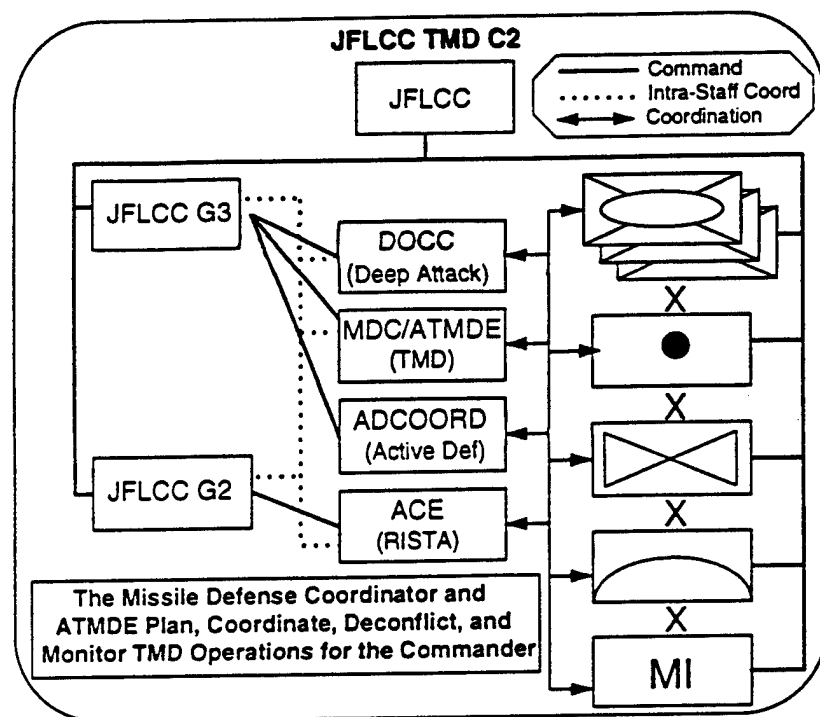


Figure 19

theater missile defense element (ATMDE) is available to support him. The ATMDE provides the MDC the staff and equipment necessary to execute his responsibilities throughout the force projection operation. Although Army force structure concepts continue to evolve, Figure 19 illustrates how a JFLCC might organize his staff under this concept to conduct effective TMD operations.

The ATMDE is composed of intelligence, fire support, aviation, chemical, air defense, special operations, and signal personnel, melded into an effective TMD team. It is equipped with the ARSPACE force project tactical operations center (FP TOC), which is described in detail in the following section on communications and computers. The ATMDE will attach itself as an integral part of the command post and operate as a specialized plans and operations cell. During the early stages of force projection operation, the ATMDE uses the FP TOC's automation and communications systems to supervise execution of attack operations and active defense. During later stages of the operations, after additional C3 capabilities arrive in the AO, the ATMDE will focus on planning, coordinating, deconflicting, and monitoring land component TMD, ensuring its integration with the joint TMD effort.

The ATMDE does not supplant any of the land component's other command and control facilities, such as the DOCC, ACE, or ADA headquarters. Each of these facilities has a range of functions and responsibilities that include all activities within the purview of the land component. The ATMDE's function is to focus on the four TMD operational elements. It ensures that, with all the other critical warfighting tasks the land component must accomplish, everyone knows what their TMD roles are, when they are supposed to do them, how they are supposed to be done, and how they are integrated into overall joint TMD operations. In addition, the ATMDE interfaces with the Space and Strategic Defense Command's (SSDC) Battle Integration Center to take advantage of its

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state-of-the-art simulation capabilities. The ATMDE uses the Battle Integration Center to enhance the conduct of TMD training with attack operations and active defense elements and to wargame potential courses of action. The Battle Integration Center will simulate the enemy's systems; doctrine; and tactics, techniques, and procedures (TTPs); synthetically create the weather and terrain in the JFLCC's AO; and allow soldiers to fight future battles virtually, before ever deploying from home station. As a result, the JFLCC will deploy with a TMD plan and personnel that are "virtually" battle-hardened in the theater in which they are preparing to deploy.

## **Communications and Computers**

Successful TMD requires an open, automated, interoperable BM/C4I architecture that allows the JFC to synchronize all elements of the joint force so that he can conduct active defense, passive defense, and attack operations faster than the enemy's theater missile operations tempo (OPTEMPO). The Army Battlefield Command System (ABCS) provides the JFLCC a BM/C4I system that effectively fuses disparate, geographically separated capabilities into a focused effort. This will allow the land component to detect theater missile targets and react fast enough to neutralize or destroy the enemy's theater missile capability. ABCS complements the joint Global Command and Control System (GCCS). It is a critical TMD BM/C4I element, as it provides automated interfaces between deployed Army units, other Service units within the land component, and national, joint, sister Service, and multinational C4I systems. The resulting rapid exchange of critical, accurate information is key to successful TMD because commanders and battle staffs at each echelon can form a common picture of the battlefield, quickly make necessary decisions, and rapidly issue clear orders.

Additional BM/C4I elements in the Army's TMD warfighting concept include: using broadcast communications and direct satellite downlinks to provide recipients information simultaneously rather than sequentially; satellite communications for reliable, high capacity, long distance communications; and equipping tactical units with high capacity, reliable, digital communications, such as the Joint Tactical Information Distribution System (JTIDS). The combined effect is that the JFLCC will disperse his units as a passive defense measure, yet have them electronically co-located. Electronic co-location speeds information dissemination for TMD tactical warning, active defense, and attack operations and allows split-based combat support (CS) and combat service support (CSS) operations.

The ARSPACE FP TOC is an initial operating version of an Army Force XXI TOC. It provides automation support and secure operations and intelligence communications with Army units, the command centers of other components, the joint force staff, and supporting organizations within theater and in the United States. The FP TOC deploys with the initial land component C2 sections and provides the supporting ATMDE a central location to plan, coordinate, deconflict,

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and monitor the execution of all four TMD operational elements for the JFLCC. Figure 20 illustrates this interoperable communications and computers concept.

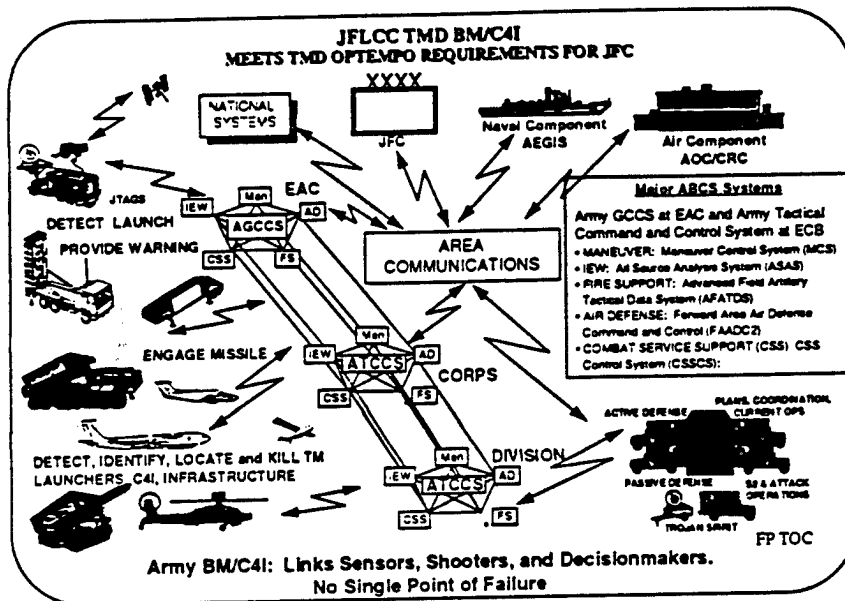


Figure 20

As previously mentioned, the FP TOC is electronically co-located with SSDC's Battle Integration Center (Figure 21). This enables the JFLCC to exploit the center's simulation and modeling capabilities to conduct realistic training, use sophisticated wargaming techniques to examine alternate courses of action, conduct realistic mission planning and rehearsal simulations, and analyze ongoing operations to determine what variables he can change to improve the effectiveness of TMD operations. Electronic co-location between the FP TOC and the Battle Integration Center is truly a powerful tool that enhances commanders' capabilities to conduct effective TMD operations well within the enemy's theater missile decisionmaking cycle.

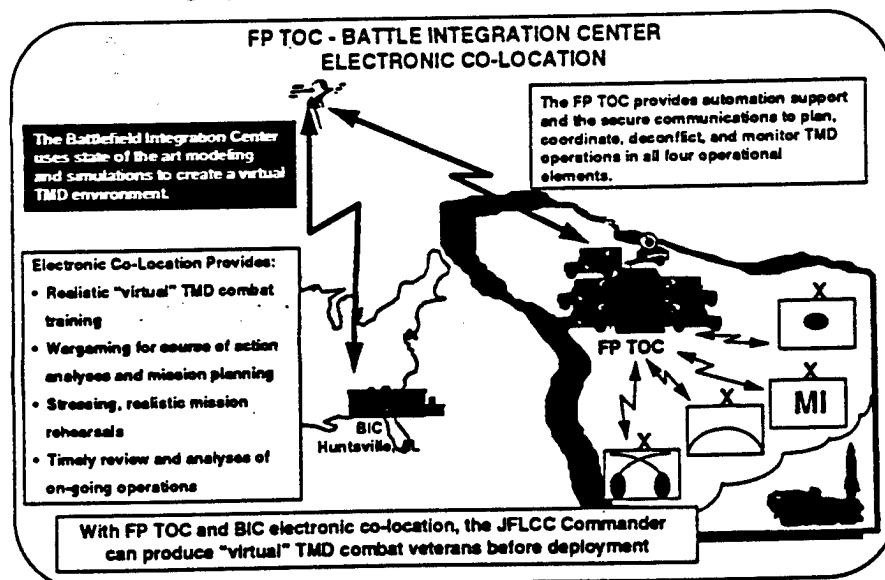


Figure 21

## Intelligence

Timely, accurate, and relevant intelligence is vital to TMD decisionmaking in attack operations, active defense, and passive defense. National, ground-based and aerial sensors--both stand-off aircraft and penetrating UAVs--collect signals intelligence (SIGINT), imagery intelligence (IMINT), and radar intelligence (RADINT). Analysts using preprocessors, such as the Joint Surveillance Target Attack Radar System (JSTARS) Common Ground Station (CGS), Tactical Exploitation of National Capabilities (TENCAP) systems, and the Defense Support Program (DSP) sensor's Joint Tactical Ground Station (JTACS) receive and process near real time sensor data and other intelligence products and provide the results of their analyses to all source analysts throughout the joint force and supporting agencies. Joint doctrine demands, and current capabilities provide for, disseminating intelligence and intelligence products to the commanders who need them. The key is to organize the force so that combat information, intelligence, and target acquisition information is disseminated in time to initiate required passive defense measures, shoot down the incoming missiles in flight, and destroy the launchers before they relocate. Effective TMD is impossible without minimal sensor-to-shooter time lines.

Since the end of the Vietnam War, the Army has been quietly building an intelligence architecture that brings timely, accurate, and relevant all source intelligence to the tactical commander. As shown in Figure 22, with the All Source Analysis System (ASAS) and the Block I JSTARS CGS in the field, Army commanders have the capability to exploit national, theater, and tactical intelligence efforts, to develop and use the information they need to fight in the high OPTEMPO TMD environment.

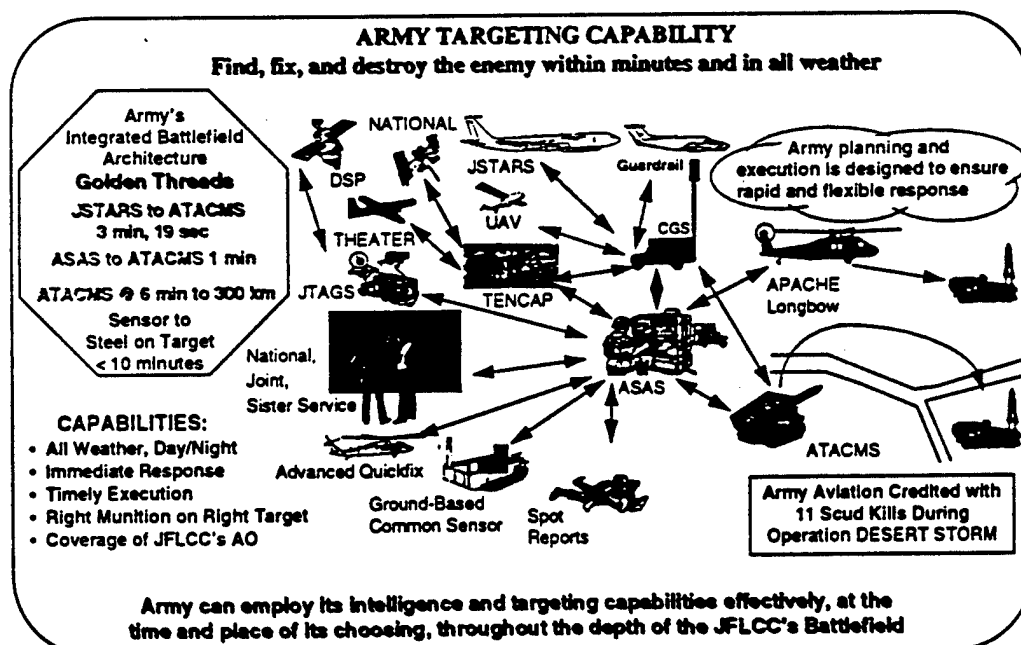


Figure 22



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The Block I CGS receives, processes, analyzes, and distributes near real time data from the JSTARS E-8C and UAVs, and receives intelligence reports over the Commander's Tactical Terminal-Hybrid (CTT-H). As the CGS operator detects, identifies, and tracks targets, he provides TMD attack operations units and the FP TOC near real time targeting information through ABCS to support engagement. He also provides the reports to ASAS analysts to be fused into the overall intelligence fusion and target development effort. Conversely, the CGS operators, who will generally be focused on a relatively small geographic area, rely on analysts within the ACE and the FP TOC to cue them when there are indications of TMD activity in a specific area.

ASAS provides Army commanders interoperability with joint, sister Service, and national intelligence organizations. Specifically, ASAS provides the collection management, situation analysis, IPB, as well as the target development capabilities Army commanders require to focus the national, joint, and tactical intelligence communities on TMD passive defense, active defense, and attack operations. Analysts in the ACE use ASAS to fuse intelligence from all sources, sanitize it, and disseminate it through ABCS at no higher than Secret level. This provides warfighters the timely intelligence and targeting information needed for successful TMD operations.

The ongoing improvement and fieldings of other intelligence systems will continue to improve the JFLCC's TMD capability. UAVs, based on cueing from JSTARS, Guardrail Common Sensor, and JTAGS, confirm TMD targets for FP TOC analysts. JTAGS provides ADA firing units and the FP TOC near real time missile warning, trajectory, launch point, and impact point information, which will be disseminated to unit level for tactical warning and to the DOCC, or directly to deep attack units, for attack operations. In addition, intelligence communications systems, such as TROJAN SPIRIT and CTT-H, allow tactical units to receive broadcast intelligence and to "pull" required intelligence and intelligence products from national, theater, and tactical intelligence producers.

The Army's intelligence architecture is designed specifically to support the joint force's operational and tactical ground commanders. With the FP TOC to plan, coordinate, deconflict, and monitor TMD requirements, the JFLCC's staff can easily focus on providing timely, accurate, and relevant TMD combat information, intelligence, and target acquisition data, without degrading its efforts in support of the commander's overall objectives.

## CHAPTER IV

### HOW THE ARMY DOES ATTACK OPERATIONS

#### Joint Doctrine

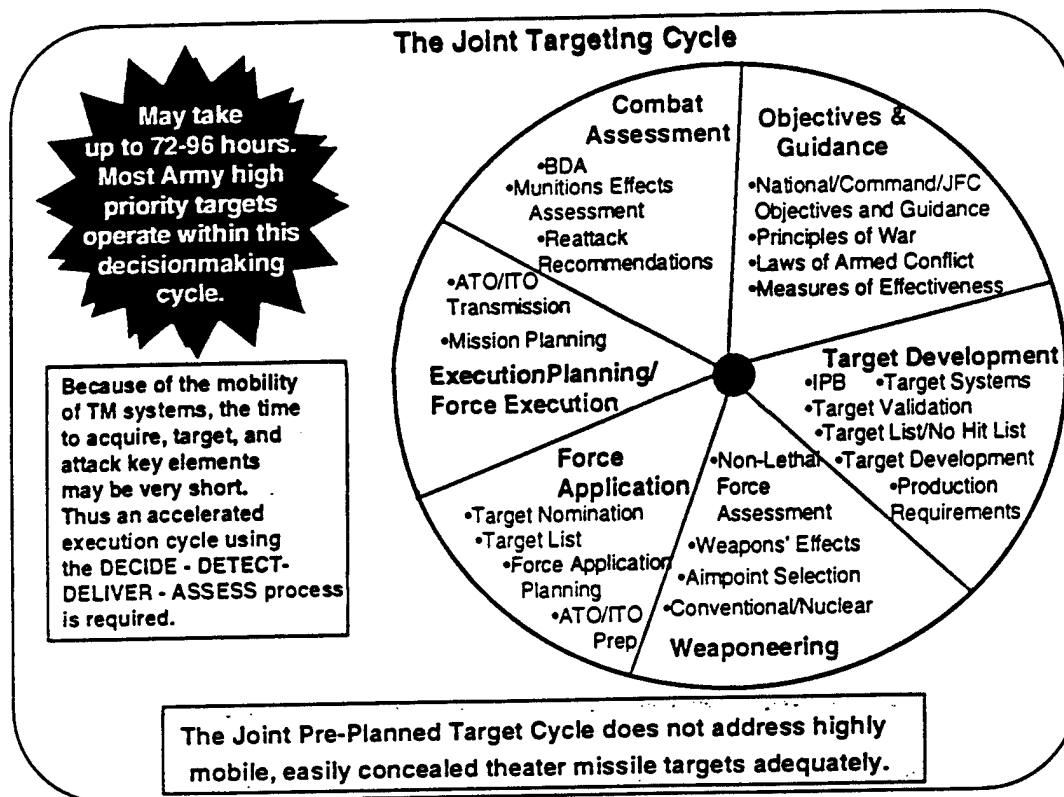
Joint doctrine generally views targeting from a pre-planned perspective. The JFC establishes a JTCB composed of the component commanders or their representatives and primary joint force staff officers, usually with the DJFC as chairman. The JTCB develops targeting strategy, establishes target priorities (i.e., the Joint Integrated Prioritized Target List), reviews the air tasking order (ATO) approximately 38 hours before execution and arbitrates any disagreements between components regarding specific targets. The JFC also designates a joint force fire support coordinator within the J3 staff section. He essentially coordinates joint targeting issues when the JTCB is not in session, in accordance with JTCB guidance and the JFC's decisions.

Based on recommendations from the JTCB and specific air power advice from the JFACC, the JFC apportions the deep attack capabilities of the joint force. The JFACC melds the JFC's decisions and targeting guidance with components' specific target nominations and priorities into the ATO, or integrated tasking order (ITO).

#### Joint Targeting

The amount of detail that must go into pre-planned targeting for a joint force AOR is immense. It is a massive undertaking that involves assets from all the joint force's components, supporting CINCs, and allied air forces. Planning usually begins 48 hours before H-hour and the final product is approved and provided to the executors 12-14 hours before H-hour. This is why the joint targeting process is described in Joint Pub 3-56.1, *Command and Control for Joint Air Operations*, as a six-phased cycle: objectives and guidance, target development, weaponeering, force application, execution planning and force execution, and combat assessment (Figure 23). Including the objectives and guidance and combat assessment phases, the complete cycle can take 72-96 hours. Automation support and revised procedures promise to shorten this cycle considerably. Nevertheless, because the joint pre-planned targeting process is necessarily deliberate, Joint Pub 3-01.5, *Doctrine for Theater Missile Defense*, specifically requires the use of a decide, detect, deliver, assess targeting process to attack highly mobile theater missile targets.

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**Figure 23**

## **Decide-Detect-Deliver-Assess Methodology**

The decide-detect-deliver-assess methodology compresses the joint targeting process by determining in advance what targets to kill, which sensors are to find them, and which weapons systems are to shoot them. Essentially, everything is pre-planned in the decide phase, except the time on target. A detailed IPB is key to this methodology. The commander relies on it to tell him:

- What targets can be expected and what impact their destruction will have on enemy and friendly operations.
- The best places to find the targets (Named area of interest [NAI]).
- The best places to kill the targets (Target area of interest [TAI]).

Once the commander determines his targeting priorities, the G2 (ACE) and G3 (DOCC) plan, coordinate, and execute the detect and deliver phases. A key aspect of this effort, particularly in TMD attack operations, is designating sensor cross-cueing procedures and sensor-to-shooter links. A theater missile transporter erector launcher (TEL) is a very difficult target to identify and shoot before it moves again. One of the most probable ways for this to happen is for a JSTARS CGS operator to receive a probable launch point location from a DSP

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sensor through JTAGS, zoom into that particular area and try to identify moving target indicators (MTI) that may be the TEL. However, before an Army Tactical Missile System (ATACMS) is fired, it may be necessary to determine which of several MTI dots is the TEL. This can be done through UAV imagery or spot reports from special operations units or other means. Once the target is confirmed, the CGS operator can continue to track it and provide continuous data to the ATACMS unit firing the mission. After the mission, a UAV can transmit imagery back to the CGS for battle damage assessment (BDA). **This scenario takes place over a span of minutes, not hours or days.** Coordination between the ACE, DOCC, and ATMDE is essential for effective TMD attack operations. If the cross-cueing and sensor-to-shooter procedures are not pre-established, TMD attack operations will not be successful. There is not enough time to develop ad hoc relationships and procedures.

The Army has developed the decide-detect-deliver-assess methodology summarized in Figure 24 over a period of several decades, because this is the

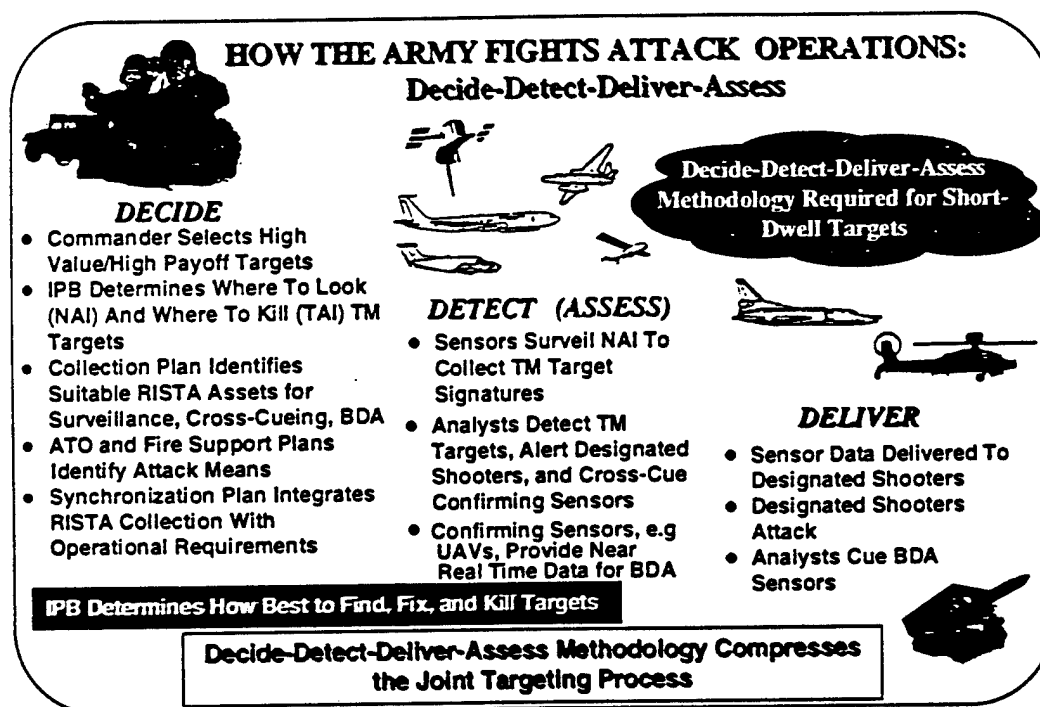


Figure 24

way we fight. The Army's BM/C4I system is built to give us an unparalleled capability to find, fix, and destroy mobile targets within the JFLCC's AO with organic and supporting forces and to support other components as directed or requested by the appropriate commanders.

Decide-detect-deliver-assess was not developed for TMD attack operations. TMD attack operations are merely an application of the methodology. This is where the ATMDE, equipped with the FP TOC performs a critical function coordinating the JFLCC's execution of his responsibilities as the

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supported commander for TMD attack operations within his AO. No matter how serious the theater missile threat, or how high a priority placed on attack operations, TMD is only a fraction of the land component's overall effort. The ACE and the DOCC have a wide area of responsibility to plan, coordinate, deconflict, and execute RISTA and deep attack operations in support of the JFLCC and his subordinate commanders. The ATMDE remains focused on TMD. Its intelligence specialists assist the ACE by refining its IPB products for TMD; providing expert knowledge of the enemy's theater missile order of battle, tactics, techniques, and procedures; and continuously focusing on theater missile target acquisition and development. Similarly, ATMDE fire support specialists work closely with the DOCC, the joint force staff, and other components to ensure TMD attack is integrated seamlessly with deep attack operations throughout the JFLCC's AO and with overall joint force operations.

## CHAPTER V

### HOW THE ARMY DOES ACTIVE DEFENSE

#### Joint Doctrine

Joint doctrine requires centralized planning and decentralized execution of TMD active defense. The JFC designates an AADC to integrate active air and active missile defenses throughout the AOR. Component commanders ordinarily retain OPCON of their active defense forces and capabilities. They execute assigned active defense missions in accordance with the integrated air and missile defense plan, ROE, and weapons control procedures developed by the AADC and approved by the JFC. Figure 25 summarizes active defense centralized planning.

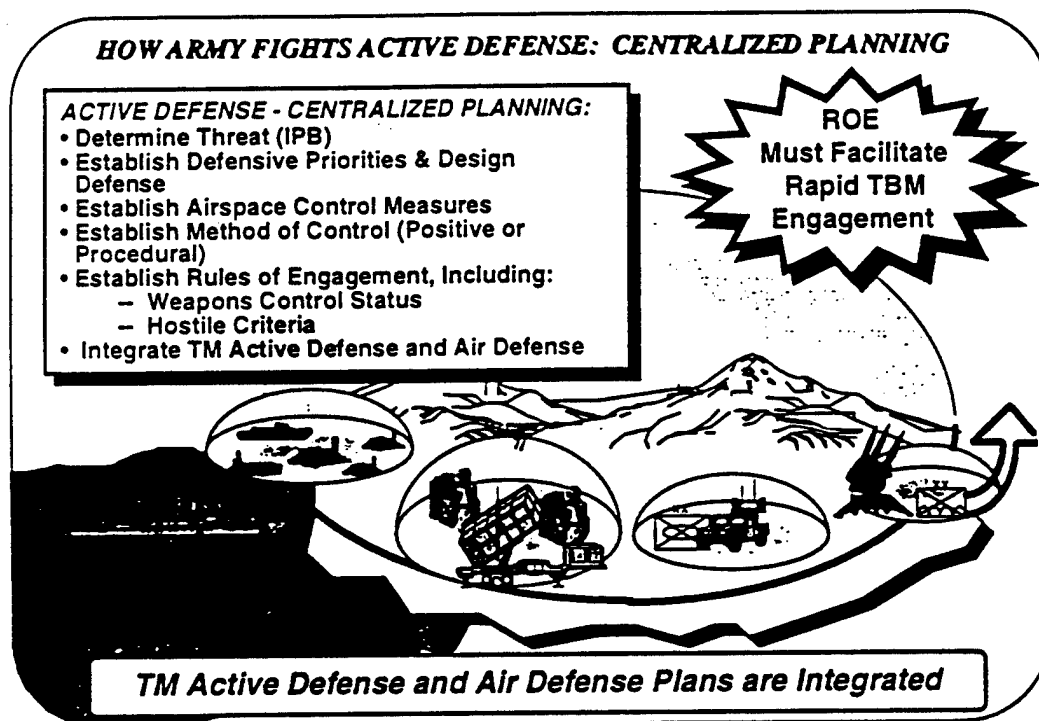


Figure 25

Generally, the AADC also will be the ACA. He also may be the JFACC, particularly if the Air Force has the preponderance of air capability. The AADC designs an integrated air and missile defense by:

- Identifying the threat and determining the JFC's and component commanders' defensive objectives and priorities.
- Identifying active defense capabilities within the joint force and assigning missions to components in accordance with their capabilities, the JFC's objectives and priorities, and the component commanders' requirements.

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- Establishing control measures such as airspace control measures, weapons control status, hostile criteria, and rules of engagement. These control measures must be formulated to allow air and ground-based active defense forces to be mutually supporting, permit the rapid engagement of hostile targets, and prevent fratricide.

Control measures range along a continuum from positive to procedural. Positive controls restrict defenders from firing until directed to do so from a central command and control location. Procedural controls allow defenders to engage targets on their own volition, as soon as specified thresholds are crossed. Positive controls are beneficial when friendly air power is operating over friendly territory, and there is difficulty--particularly on the part of ground-based defenders--in differentiating between friendly and enemy air. This situation is similar to the situation that existed in NATO's Central Region during the Cold War. Procedural controls optimize active defense capability against TBMs because they allow fire units to engage targets as soon as they are within range. Since ballistic missiles have such a distinctive signature, and there is no such thing as a friendly incoming ballistic missile, fratricide is not likely. Figure 26 depicts the use of procedural controls to enhance decentralized execution of TMD active defense.

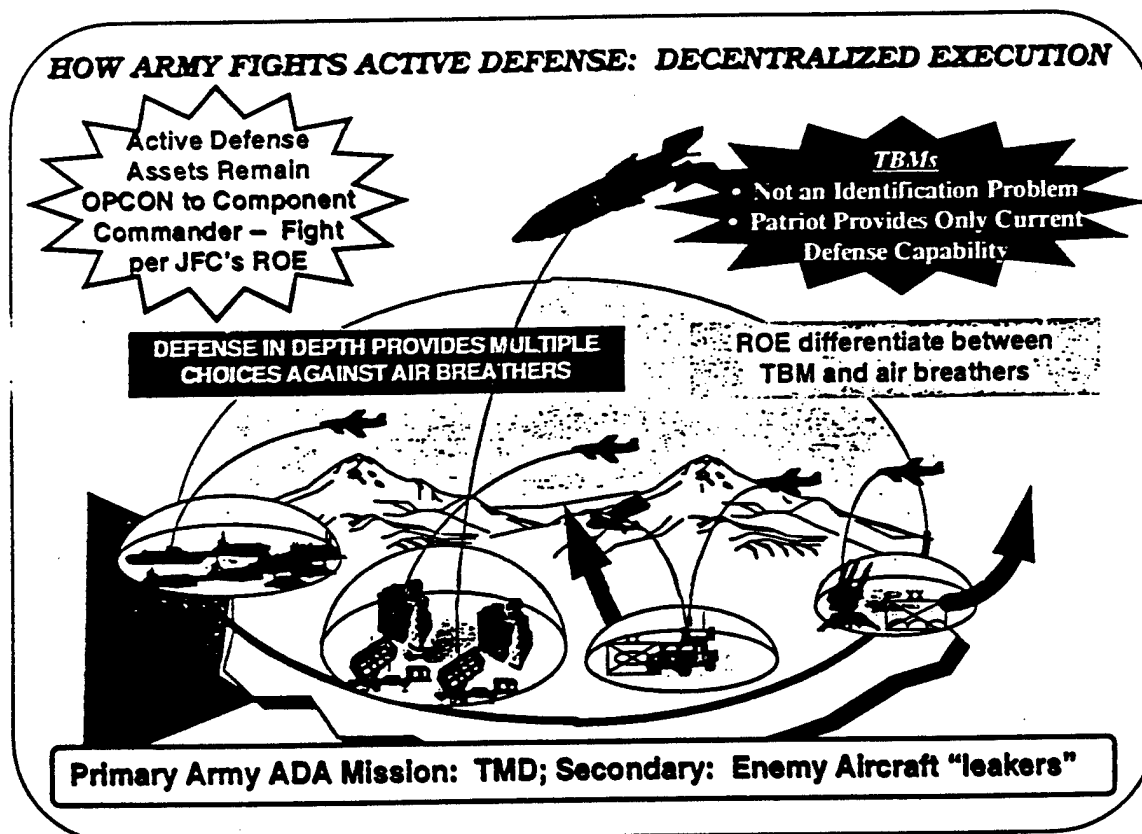


Figure 26

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The situation facing deployed US forces in force projection operations favors the use of procedural controls more than positive controls. US air power will dominate the airspace from an early stage, theater missiles will pose the primary threat, and the possible use of WMD mandates a near leakproof defense to protect forces and critical assets or areas. This changed threat is illustrated in

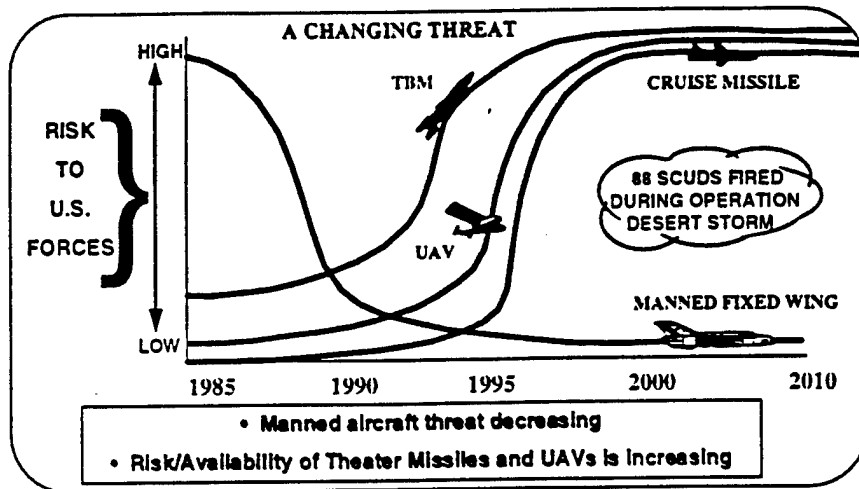


Figure 27

engagement of theater ballistic missiles, ensure early identification and engagement of cruise missiles, protect friendly forces, and prevent fratricide of friendly aircraft.

### Active Defense Organization

The Army executes its active defense missions and responsibilities with ADA units and organizations. Indeed, the aircraft threat to ground forces has declined since the days of the Cold War Soviet Air Force. This threat will continue to decline through the next decade. So, TMD is the primary mission of Army ADA units. Shooting down manned fixed and rotary wing aircraft will be necessary only when an extraordinarily skillful, and lucky, enemy pilot evades the defensive counterair operations mounted by US and allied air forces.

The senior ARFOR ADA commander may be dual-hatted as a special staff officer, the AADCOORD. In this role, he is responsible for:

- Planning, coordinating, and deconflicting an integrated active defense throughout the JFLCC's AO.
- Working with the ATMDE to ensure active defense is integrated and mutually supportive of the other TMD operational elements.
- Coordinating the land component's active defense plan with the joint force staff, AADC, and other components.



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During land-based joint operations, the AADCOORD may also serve as the Deputy AADC for Surface-to-Air Operations. In this role he is designated by the JFC and AADC as the ground-based active air and active missile defense coordinating authority. His responsibilities could include providing ground-based active defense expertise to the AADC; planning, coordinating, and deconflicting an integrated ground-based active defense throughout the joint force AOR; and assisting the AADC in integrating ground-based active defense into the overall joint force integrated air and missile defense plan.

Figure 28 illustrates a land-based joint force active air and active missile defense architecture.

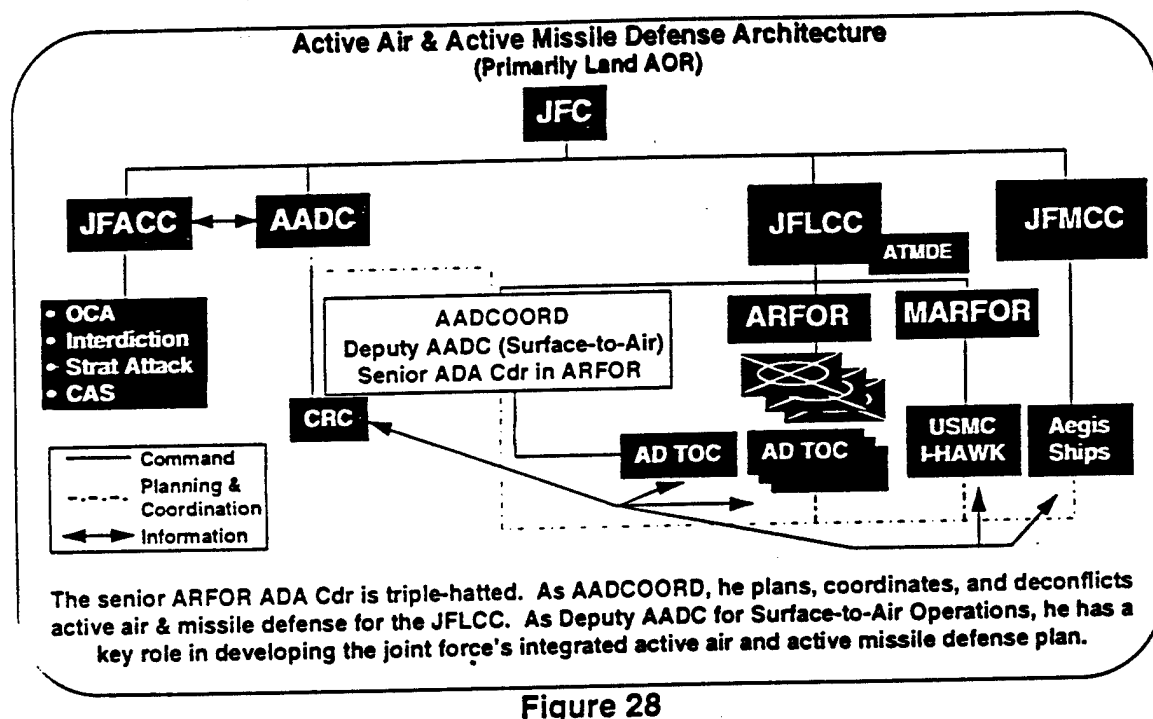


Figure 28

## Army Active Defense Warfighting Concept

The Army considers ground-based active defense a critical TMD operational element. Even with highly successful attack operations, some theater missiles and UAVs will likely be launched against deployed forces and critical assets. Additionally, an active defense capability is essential for force projection because units are most vulnerable while entering the area of operations, when the organization and forces required for passive TMD defense and TMD attack operations may not be fully established.

Active defense destroys missiles, airborne launch platforms, and UAVs in flight. Due to the WMD threat, this defense must be nearly leakproof. Thus, the Army's warfighting concept is to employ, as part of a joint force, a family of

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complementary and interoperable weapons and BM/C4I systems that provide a multi-tiered, defense in depth and the tactical mobility and operational agility to protect maneuver forces and JFC-designated critical assets.

Active defense upper tier missile interceptors operate at long ranges, in and above the atmosphere. They are very lethal against TBMs and re-entry vehicles. Lower tier aerodynamic missiles depend on the atmosphere's resistance to steer themselves. They defend maneuvering forces to altitudes of 25-30 kilometers (km) against short and medium range TBMs, low altitude cruise missiles, UAVs, and other aircraft. But they are also capable of defeating longer range TBMs that have leaked through the upper tier. The sole use of an upper tier interceptor would ignore a large portion of the theater missile threat and leaves maneuver forces without any means to defend themselves. Employing only lower tier missiles is high risk because it engages multiple, high velocity, maneuverable targets at relatively short range. This leaves only a limited opportunity to re-engage missed targets.

At the present time, **PATRIOT** provides the United States' only anti-TBM capability. However, the Army intends to deploy the Theater High Altitude Area Defense (THAAD), initially with **PATRIOT** Advanced Capability-3 (PAC-3) and ultimately with a Medium Altitude Extended Air Defense System (MEADS) or MEADS-like capability, to provide a two-tier, near leakproof capability. Figure 29 depicts the two-tier active defense concept.

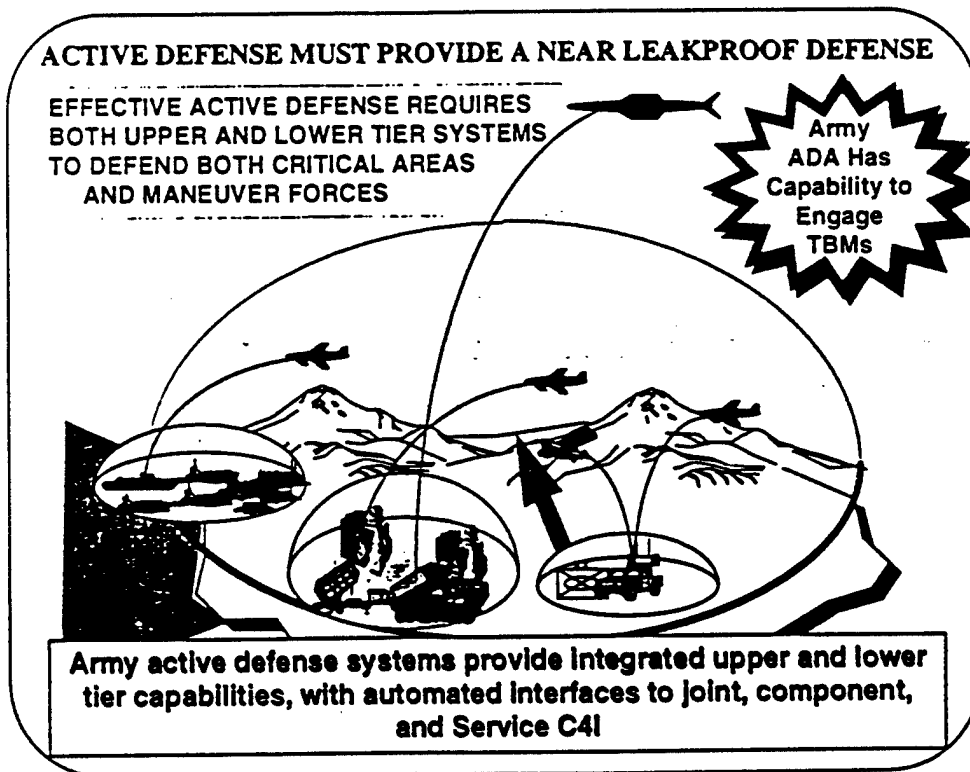


Figure 29

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Army Air Defense units at division, corps, and echelons above corps (EAC) execute TMD active defense in accordance with rules of engagement and weapons control measures established by the AADC for the JFC. Corps and divisional systems provide support to maneuver forces. EAC units, complemented by a lower-tier system, support the JFC by establishing active TMD task forces to protect critical areas. The Army coordinates active defense through its integrated Air Defense C4I system at each echelon of command, assisted by automated interfaces with ABCS, joint, sister Service, and multinational C4I systems.

## CHAPTER VI

### HOW THE ARMY DOES PASSIVE DEFENSE

#### General

Commanders at all echelons are responsible for planning and executing passive defense measures to protect their units, and component commanders are responsible for implementing effective procedures to provide warning to all assigned forces. As discussed above, this is of particular concern to the JFLCC because of the number of personnel he has within the AOR, and because most of the facilities and personnel the JFC and other components have within the AOR are actually stationed within the JFLCC AO. Figure 30 depicts how passive defense measures are grouped into three major areas: tactical warning, reducing the enemy's targeting effectiveness, and reducing vulnerability. Army commanders employ a number of measures from each of these areas before, during, and after an attack to provide individual and collective protection to friendly forces, population centers, and critical assets. Because of the extensive theater missile threat, some measure of passive defense is required in all force projection contingency requirements.

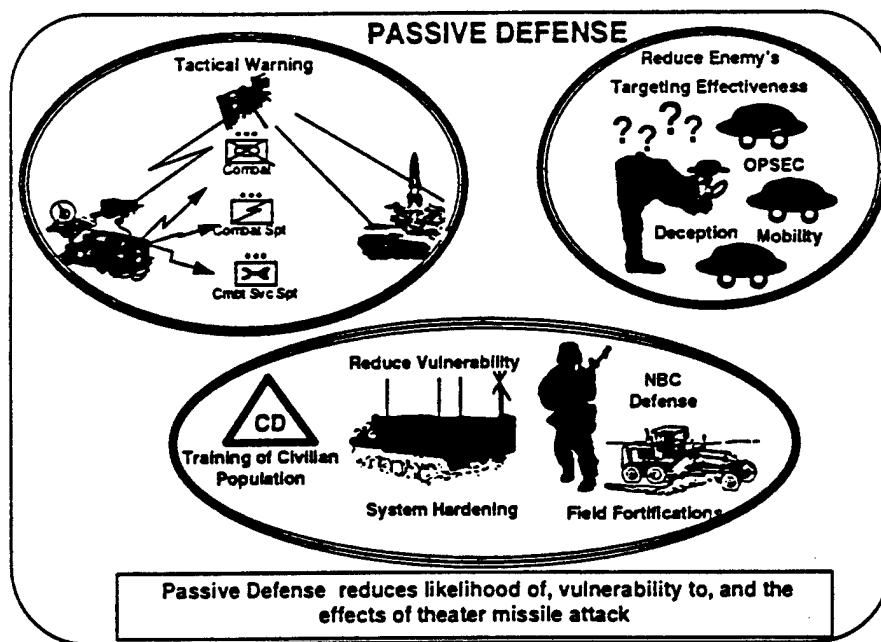


Figure 30

#### Tactical Warning

Tactical warning is both the general warning that a hostile missile launch is imminent, or has occurred, and the specific warning that units or locations are actually threatened by the missile or missiles. Tactical warning requires

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effective, interoperable sensors and intelligence processors, plus automated, interoperable, redundant C4I systems, to ensure critical, time-sensitive intelligence is disseminated rapidly to units, locations, and--in the case of specific warnings--to individuals. Furthermore, the effectiveness of warning is also a function of standing operating procedures and training throughout the joint task force.

The ATMDE and FP TOC provides the JFLCC a direct link with JTAGS supporting the JFC or geographic combatant commander and, as a back-up, information disseminated by US Space Command from Cheyenne Mountain. DSP sensor information provided through JTAGS is reliable support to deployed forces, because it transmits via a direct downlink rather than depending on a number of satellite and other communication links. The JTAGS launch alert is critical to the joint force's TMD efforts because it arrives rapidly. This speed allows the land component to provide a timely alert to active defense, attack operations, and intelligence elements. This alert increases the probability of successfully destroying the incoming missiles and attacking the TELs. The ARFOR also uses JTAGS reports to warn units in the expected impact area. Every effort must be made to accurately determine the expected impact point. Reducing the number of troops placed at a high protective posture over time, conserves combat power.

## **Reducing the Enemy's Targeting Effectiveness**

Deployed forces degrade the targeting capability of hostile forces through OPSEC measures, deception, and mobility:

- Effective OPSEC measures degrade the ability of hostile sensors, reconnaissance elements, and intelligence analysts to locate and identify friendly forces and locations. Deployed forces employ communications security, local physical security, counter-reconnaissance/countersurveillance measures, and signature reduction measures such as camouflage, cover, concealment, and emissions control, to deny hostile forces accurate and timely information.
- Effective deception misleads and confuses hostile decisionmakers by providing false or misleading information to their intelligence collection and target acquisition assets. Deployed forces tailor their deception activities in relation to the specific collection means of a hostile force.
- Changing one's location frequently, and faster than the hostile intelligence agency can process information from sensors and reconnaissance elements, reduces the likelihood of being targeted.

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## **Reducing Vulnerability**

A number of passive defense measures will reduce the effectiveness of theater missile attacks and will conserve the force's combat power. During materiel acquisition, the Army ensures critical systems are "militarized," "ruggedized," or hardened, so as to operate effectively in environments that might be subject to theater missile attacks. Building systems that can withstand electromagnetic pulse (EMP) is an example of hardening. Hardened systems are less vulnerable to the effects of an attack. Further, the Army's Force XXI concept of operations means large numbers of CS and CSS forces can remain outside theaters of operation or within the Continental United States (CONUS). This "split-based" structure minimizes forward deployed infrastructure and troops, reducing vulnerability to theater missile attack. Deployed forces can take steps to decrease their vulnerability to, or reduce the effectiveness of, a theater missile attack. For example, during deployment they can:

- Use site reconnaissance and selection, field fortifications, and dispersal
- Ensure critical functions and capabilities remain intact by using backup or alternate systems (redundant or robust means) to reduce vulnerability to attack; and
- Implement post-attack recovery and reconstitution procedures

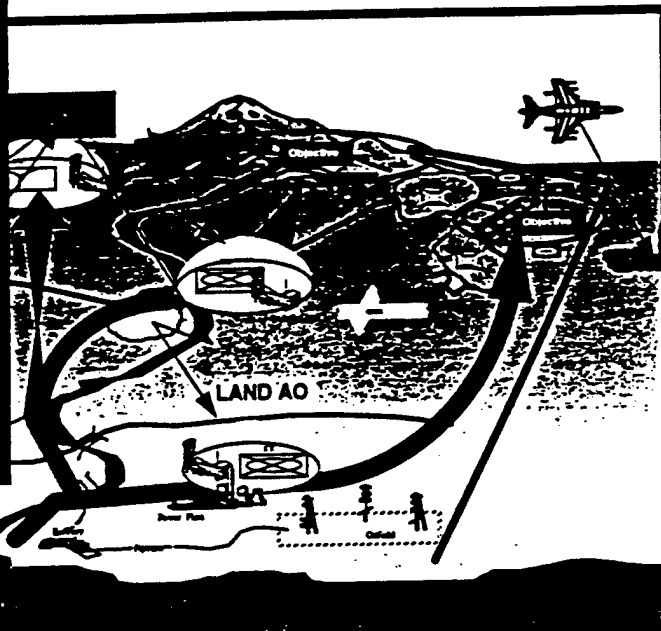
The use of theater missiles as weapons of mass destruction is an implicit aspect of the threat. A key aspect of reducing the vulnerability of the force and preserving combat power is ensuring soldiers are trained and equipped with the means to rapidly and accurately detect contamination; individual and collective nuclear, biological, and chemical protective equipment; and the capability to decontaminate personnel, equipment, and facilities quickly and completely. US forces also may train local civil authorities to take civil defense measures to reduce the vulnerability of civilian populations to attack. Timely warning of civilians is a key element in reducing the risk, and may decrease the political and diplomatic impact of a hostile force's theater missile capability.

## CHAPTER VII CONCLUSION

### ***Theater Missile Defense***

#### **TMD IS INHERENTLY A JOINT MISSION**

- Components', Supporting CINCs', and Multinational Force TMD Capabilities Must be Integrated to Neutralize or Destroy the Enemy's TM Capability.
- TMD Must be Integrated Into, and Support the JFC's Concept of Operations and Campaign Objectives.



***Joint Doctrine Provides Guidance for the Integration of JTMD Capabilities in Support of the JFC's Operation or Campaign Plan***

Figure 31

The proliferation of missile and WMD technologies around the world makes effective TMD a critical prerequisite for successful joint operations. As a JFC will normally be outnumbered in his AOR during the initial stages of a force projection operation, he will find it essential to synchronize all the capabilities of his force to achieve his objectives and accomplish the assigned mission. The school of thought that TMD should always be assigned to one component or another is erroneous. Such a command structure would inhibit the rapid response required to neutralize the TMD threat. Joint commanders of the 1980s knew that the Cold War threat required synchronized joint operations and developed Air Land Battle doctrine to provide both the authoritative guidance and the flexibility commanders needed to confront the threat. Likewise, the doctrine of the mid-1990s provides JFCs the guidance and flexibility they require

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to defeat the theater missile threat. The Army's primary contribution will be to fight the TMD battles in the JFLCC's AO. The Army will:

- Provide effective ground-based active defense to protect the JFC's priority assets and maneuver forces, most of which will be within the JFLCC's AO.
- Conduct attack operations against short dwell and relatively short range theater missile targets within the JFLCC's AO and integrate the JFC and component commanders' pre-planned attack operations targets within the ARFOR fire support plan.
- Support attack operations beyond the AO, especially against short-dwell targets, as directed by the JFC and requested by the supported component commander.
- Implement effective passive defense measures throughout the AO, assisting other components as required, and integrating their facilities and forces into area measures as appropriate.

Theater missiles represent a real and growing threat to deployed US forces. Countering the threat effectively demands that the JFC synchronize the capabilities within his joint force, maximizing the unique, but complementary, capabilities found within each component. Centralized planning is essential to ensure the efforts of all the components are integrated and that the joint force can act within the enemy's decision cycle. However, effective active defense, passive defense, and attack operations require the flexibility and initiative inherent in decentralized execution. It is necessary to form TMD staff sections, e.g. the ATMDE, within each component, and equip them with open, interoperable, automated BM/C4I systems, such as the FP TOC. The designation of a JFMDC and formation of a supporting staff to plan, coordinate, and deconflict the joint force's overall TMD effort is an important step that will help the JFC best obtain the proper mix of centralized planning and decentralized execution. This will ensure that TMD operations within each of the components are integrated into the overall joint effort and fully support the JFC's concept of operations.



**ANNEX**  
**ACRONYM LIST**

|          |                                                                                    |
|----------|------------------------------------------------------------------------------------|
| AADC     | Area Air Defense Commander                                                         |
| AADCOORD | Army Air Defense Coordinator                                                       |
| ABCS     | Army Battlefield Command System                                                    |
| ACA      | Airspace Control Authority                                                         |
| ACE      | Analysis and Control Element                                                       |
| ADA      | Air Defense Artillery                                                              |
| AFFOR    | Air Force Force                                                                    |
| AO       | Area of Operations                                                                 |
| AOC      | Area Operations Center                                                             |
| AOR      | Area of Responsibility                                                             |
| ARFOR    | Army Force                                                                         |
| ARSPACE  | Army Space Command                                                                 |
| ASAS     | All Source Analysis System                                                         |
| ATACMS   | Army Tactical Missile System                                                       |
| ATMDE    | Army Theater Missile Defense Element                                               |
| ATO      | Air Tasking Order                                                                  |
| BDA      | Battle Damage Assessment                                                           |
| BIC      | Battle Integration Center                                                          |
| BM/C4I   | Battle Management/Command, Control,<br>Communications, Computers, and Intelligence |
| C2       | Command and Control                                                                |
| C3       | Command, Control, and Communications                                               |
| C4       | Command, Control Communications, and Computers                                     |
| C3I      | Command, Control, Communications, and Intelligence                                 |
| C4I      | Command, Control, Communications, Computers, and<br>Intelligence                   |
| CGS      | Common Ground Station                                                              |
| CINC     | Commander-in-Chief                                                                 |
| CONUS    | Continental United States                                                          |
| CRC      | Control and Reporting Center                                                       |
| CS       | Combat Support                                                                     |
| CSS      | Combat Service Support                                                             |
| CTT-H    | Commander's Tactical Terminal-Hybrid                                               |
| DCA      | Defensive Counterair                                                               |
| DJFC     | Deputy Joint Force Commander                                                       |
| DOCC     | Deep Operations Coordination Center                                                |
| DSP      | Defense Support Program                                                            |
| EAC      | Echelons Above Corps                                                               |
| EMP      | Electromagnetic Pulse                                                              |
| EW       | Electronic Warfare                                                                 |
| FAADC2   | Forward Area Air Defense Command and Control                                       |
| FP TOC   | Force Projection Tactical Operations Center                                        |

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|         |                                                                    |
|---------|--------------------------------------------------------------------|
| FSCL    | Fire Support Coordination Line                                     |
| GCCS    | Global Command and Control System                                  |
| IMINT   | Image Intelligence                                                 |
| IPB     | Intelligence Preparation of the Battlefield                        |
| ITO     | Integrated Tasking Order                                           |
| JFACC   | Joint Force Air Component Commander                                |
| JFC     | Joint Force Commander                                              |
| JFLCC   | Joint Force Land Component Commander                               |
| JFMCC   | Joint Force Maritime Component Commander                           |
| JFMDC   | Joint Force Missile Defense Coordinator                            |
| JFSOCC  | Joint Force Special Operations Command                             |
| J-SEAD  | Joint Suppression of Enemy Air Defense                             |
| JSTARS  | Joint Surveillance Target Attack Radar System                      |
| JTAGS   | Joint Tactical Ground Station                                      |
| JTCB    | Joint Targeting Coordination Board                                 |
| JTF     | Joint Task Force                                                   |
| JTIDS   | Joint Tactical Information Distribution System                     |
| MARFOR  | Marine Force                                                       |
| MDC     | Missile Defense Coordinator                                        |
| MEADS   | Medium Altitude Extended Air Defense                               |
| METT-T  | Mission, Enemy, Terrain, Troops, and Time                          |
| MI      | Military Intelligence                                              |
| MOOTW   | Military Operation Other Than War                                  |
| MTI     | Moving Target Indicator                                            |
| NAI     | Named Area of Interest                                             |
| NATO    | North Atlantic Treaty Organization                                 |
| NAVFOR  | Navy Force                                                         |
| NCA     | National Command Authority                                         |
| OCA     | Offensive Counterair                                               |
| OPCON   | Operational Control                                                |
| OPSEC   | Operational Security                                               |
| OPTEMPO | Operation Tempo                                                    |
| PAC-3   | Patriot Advanced Capability-3                                      |
| RADINT  | Radar Intelligence                                                 |
| RISTA   | Reconnaissance, Intelligence, Surveillance, and Target Acquisition |
| ROE     | Rules of Engagement                                                |
| SIGINT  | Signal Intelligence                                                |
| SSDC    | Space and Strategic Defense Command                                |
| TACON   | Tactical Control                                                   |
| TAI     | Target Area of Interest                                            |
| TBM     | Theater Ballistic Missile                                          |
| TENCAP  | Tactical Exploitation of National Capabilities                     |
| TEL     | Transporter Erector Launcher                                       |
| THAAD   | Theater High Altitude Area Defense                                 |
| TMD     | Theater Missile Defense                                            |

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|       |                                     |
|-------|-------------------------------------|
| TOC   | Tactical Operations Center          |
| TPFDL | Time-Phased Force Deployment List   |
| TTP   | Tactics, Techniques, and Procedures |
| UAV   | Unmanned Aerial Vehicle             |
| WMD   | Weapon of Mass Destruction          |