

The background of the slide is an aerial photograph of the Pentagon and its surrounding area in Arlington, Virginia. Overlaid on this is the official seal of the United States Department of Defense. The seal is circular, with a gold outer ring containing the text 'DEPARTMENT OF DEFENSE' at the top and 'UNITED STATES OF AMERICA' at the bottom. Inside the ring is a blue field with a white eagle with wings spread, holding an olive branch and arrows. The eagle is superimposed on a map of the United States. The text 'Land Attack Weapons Capability Area Review' is centered over the seal in a large, black, sans-serif font. Below it, the text 'An Update' is also centered in a slightly smaller font.

Land Attack Weapons Capability Area Review

An Update

July 25, 2006

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DUSD(A&T)/PSA-AW



Capability Area Reviews

Capability Roadmaps

- Provides Department an overall context and understanding of a mission area
 - Integrated Air and Missile Defense, Joint Battle Management Command and Control, Electronic Warfare, Land Attack Weapons
- Critical Link to roadmaps
 - Provide a framework for decision-making
 - Highlight trade spaces, inform decision-makers, and capture decisions made
 - For Land Attack Weapons – Conventional Engagement Capability Roadmap (Version 0 released, and Version 1 in work)

Conventional Engagement Portfolio



GPS & Comm

ISR

- **Large Portfolio:**
- **Army, Air Force, Navy, Marine Corps**
- **Air-, ground-, and surface-launched**
- **Precision capability (INS/GPS, seekers, etc)**
- **Direct attack to long range standoff**
- **Prosecute fixed, relocatable, and moving targets**





Agenda

- Calendar year 2005 activities
- 2005 Overarching Integrated Product Team (OIPT) and Defense Acquisition Board (DAB) meetings
- Focus for 2006
- Way ahead



CY 2005 Focus

Topics of Interest

- Energetic Technologies
 - Warheads
 - Fuzes
 - Insensitive Munitions
- Geo-Intelligence
 - Targeting
 - Target Location Error*
- SAASM Policy*

* *USD(AT&L) Special Interest*





CY 2005 Focus

Topics of Interest (cont)

- Moving Target Challenges
- Munitions Requirements Process
- Joint Organizational Structures
 - Joint Air Dominance Organization (JADO)
- Test/Training Range Infrastructure
- Conventional Engagement Capability Roadmap





CY 05 CECR Activity

- Completed Version 0 in late Spring
 - Incorporated two Joint Staff (J8) assessments
 - Moving Target Gaps
 - Area Weapons (submunitions) sufficiency
- Routed for 06 Review, followed by FO/GO
- Vetted through the JCIDS process
- Signed jointly by VCJCS and USD(AT&L)
- Presented at the July DAB



Version 0 Overview

- **Purpose**

- Document an initial capabilities-based review of the DOD's ability to attack land-based targets
- Inform decision makers of known weapons-related issues and surface issues for action

- **Scope**

- Focus is on Engage link of the Find, Fix, Track, Target, Engage, and Assess kill chain, specifically the weapon component
- Included are conventional kinetic munitions in inventory or proposed for production during next two FYDPs (as of PB-05)
- Target engagement capabilities of interest
 - Moving targets
 - Area targets



Version 0 Document Structure

1. **INTRODUCTION**
 - Purpose
 - Scope
 - Key Terms and Understandings
 - Assumptions and Limitations
 - Challenges
2. **ROADMAP CONTEXT**
 - Strategy-to-Solution Construct
3. **DEPENDENCIES AND ISSUES**
 - Kill Chain
 - Engagement Interdependencies and Issues
4. **WEAPONS INFORMATION**
 - DOD Weapons Portfolio
 - Joint Conventional Munitions Database
5. **ENGAGEMENT CAPABILITY ASSESSMENT RESULTS AND GAP ANALYSIS**
 - Moving Target Assessment
 - Area Target Assessment
6. **ROADMAP**
7. **EXPERIMENTATION AND EMERGING TECHNOLOGY**
 - Conventional Weapon Science and Technology Investments
 - Future ACTDs
 - Other Emerging Technology Efforts
8. **CONCLUSIONS & RECOMMENDATIONS**
9. **APPENDICES**



Joint Conventional Munitions Database (JCMD) – source data for Roadmap



Weapons ▾ Predefined Set ▾ User Defined Set ▾

Land Attack Weapons	Weapon Types	Land Attack Weapon(s) Selected
155 MM XM982	Excaliber	ATACMS
AGM-114	Hellfire	Hellfire
AGM-114L	Longbow	GP Bombs
AGM-130/A	AGM-130 (Mk-84)	Cluster
AGM-130/C	AGM-130 (BLU-109)	LGB
AGM-142A/B	AGM-142A (BF)	JDAM
AGM-142C/D	AGM-142C (Pen)	Maverick
AGM-154A	JSOW (CEM)	JSOW
AGM-154B	JSOW P3I (SFW/P3I)	JASSM
AGM-154C	JSOW (Unitary)	WCMD
AGM-158A	JASSM	TLAM
AGM-158B	JASSM ER	SLAM
AGM-65B	Maverick	AGM-130
AGM-65D	Maverick	Have Nap

WEAPON CHARACTERISTICS

Service <input type="checkbox"/> Army <input type="checkbox"/> Marines <input type="checkbox"/> Air Force <input type="checkbox"/> Naval	Weapon Effect <input type="checkbox"/> Point/Penetrator (0-6' RIC) <input type="checkbox"/> Point/Penetrator (7-15' RIC) <input type="checkbox"/> Point/Penetrator (>15' RIC) <input type="checkbox"/> Point/Blast Fragmentation <input type="checkbox"/> Point/Anti-armor <input type="checkbox"/> Area Denial <input type="checkbox"/> Area Destruction/Hit to Kill Submunition <input type="checkbox"/> Area Destruction/Unguided Submunition	Range <input type="checkbox"/> Direct Attack <input type="checkbox"/> Close Standoff <input type="checkbox"/> Standoff > Point Defense <input type="checkbox"/> Standoff > Area Defense <input type="checkbox"/> Standoff > Theater Defense	Weather <input type="checkbox"/> All Wx <input type="checkbox"/> ILOS <input type="checkbox"/> CLOS	Accuracy <input type="checkbox"/> Precision <input type="checkbox"/> Accurate <input type="checkbox"/> Guided <input type="checkbox"/> Unguided
TLE Level <input type="checkbox"/> Level 0 <input type="checkbox"/> Level 1 <input type="checkbox"/> Level 2 <input type="checkbox"/> Level 3		Guidance/Seeker <input type="checkbox"/> None <input type="checkbox"/> Autonomous/BOC <input type="checkbox"/> Autonomous/Terminal Seeker <input type="checkbox"/> MITL with Terminal Seeker	Day/Night <input type="checkbox"/> Day Only <input type="checkbox"/> Day/Night	C4ISR Load <input type="checkbox"/> None <input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High
			Midcourse Guidance <input type="checkbox"/> None <input type="checkbox"/> GPS/INS <input type="checkbox"/> INS/IMU	

ILOS NUM



Roadmap Content

Nomenclature	Common Name	PY 05	PY 06	PY 07	PY 08	PY 09	PY 10	PY 11	PY 12	PY 13	PY 14	PY 15	PY 16	PY 17	PY 18	PY 19	PY 20	PY 21	PY 22	PY 23	PY 24	Approved by C- Address Book Book Book
209 n 209 n 0		info not available at time of writing																				
209 n 209 n 0		info not available at time of writing																				
2.10'	Hydra 10 Rockets	[Production bar]																				
0' 21x1		info not available at time of writing																				
AGM-114B/K	Hellfire II	[Production bar]																				
AGM-114L	Longbow Hellfire	[Production bar]																				
AFMWS		[Production bar]																				
AGM-710	TDW 2	[Production bar]																				
CEU-07	CEM	[Production bar]																				
CEU-09/100		info not available at time of writing																				
CEU-10 / BLU-109	2000 lb LGB	[Production bar]																				
CEU-10 / HHS4	2000 lb LGB	[Production bar]																				
CEU-12 MK 82	500 lb LGB	[Production bar]																				
CEU-12	Passive II LGB	[Production bar]																				
CEU-16	Passive II LGB	[Production bar]																				
AGM-119B	Peightli	info not available at time of writing																				
AGM-65B	TV Maverick	[Production bar]																				
AGM-65D	IR Maverick	[Production bar]																				
AGM-65C	Locke Base tick	[Production bar]																				
AGM-65F	IR ion is gnat- flop Maverick	[Production bar]																				
AGM-65G	Naval Feasibility Maverick	[Production bar]																				
AGM-65H	CCD Maverick	[Production bar]																				
AGM-65K	CCD Maverick	[Production bar]																				
CEU-103	WECOM, CEM	[Production bar]																				
CEU-105	WECOM, SFM	[Production bar]																				
CEU-15	Orion Standoff Weapon	[Production bar]																				
AGM-130	Powered Standoff	[Production bar]																				
ATACMS Bk II		info not available at time of writing																				
JCM		PB-06 terminated the JCM Program.																				
SDB II		[Production bar]																				
AGM-84K	SLAM-ER	[Production bar]																				

Nomenclature	Common Name	PY 11	PY 12	PY 13	PY 14	PY 15	PY 16	PY 17	PY 18	PY 19	PY 20	PY 21	PY 22	PY 23	PY 24	Approved by C- Address Book Book
CEU-103	WCOM ER	[Production bar]														
CEU-105	WCOM ER	[Production bar]														
GMRS-DPICM		[Production bar]														
GMRS-Udry		[Production bar]														
AGM-158	JAS EM	[Production bar]														
AGM-84K	SLAM-ER	[Production bar]														
MSM-86A	ATACMS Bk I	[Production bar]														
MSM-140B	ATACMS Bk IA	[Production bar]														
BM-100EH	TACTOM	[Production bar]														

SOD PRODUCTION SUSTAINMENT DECOMMISSIONING

CEU-103 WCOM ER PB-06 terminated the WCOM ER Program.
 CEU-105 WCOM ER PB-06 terminated the WCOM ER Program.
 GMRS-DPICM [Production bar]
 GMRS-Udry [Production bar]
 AGM-158 JAS EM [Production bar]
 AGM-84K SLAM-ER [Production bar]
 MSM-86A ATACMS Bk I [Production bar]
 MSM-140B ATACMS Bk IA [Production bar]
 BM-100EH TACTOM [Production bar]



FY 05 CAR DAB

- ADM Direction:
 - Continue LAW IIPT; build Conventional Engagement Capability Roadmap Version 1
 - Include weapon/target pairing and surface-to-surface area fires assessments
 - Focus on gaps, overages, and identification of marginal value in inventory
 - Updated Munitions Requirements Process and test range information
 - Maintain the Joint Conventional Munitions Database and Land Attack Module
 - OUSD(AT&L), in coordination with the Joint Staff (J8) and Services, assess potential joint solutions for INS/GPS/laser-guided munitions



CY 06 Efforts

- Joint Staff (J8) completed the weapons targets pairing assessment
 - In JCIDS staffing
- The Army, in coordination with Marine Corps and Naval Surface gunfire, developed a plan of action for surface-to-surface fires assessment
 - The LAW IIPT reviewed and agreed the plan was feasible
 - The plan calls for bi-monthly Interim Progress Reports with a final assessment, JCIDS-ready by April 2007
- Continued attention to Joint Management Structures
 - Joint Air Dominance Organization



CY 06 Efforts (cont)

- Continued improvements in Geo-Intelligence and Target Location Error (TLE)
- Continued attention by Director, Defense Research and Engineering to allocating weapon-related Science and Technology
 - Fuze and warhead technologies
 - Power sources
- Continue to monitor Munitions Requirements Process
- Cross-weapon programmatic issues
 - Universal Armament Interface & Common Launcher
 - Weapons Data Link – Network
 - Test ranges infrastructure



Surface-to-Surface/Area Fires

- The Army, Training and Doctrine (TRADOC) has Lead on this assessment
 - Working with Naval Gunfire, ground Marine Corps and Air Forces
- Assessment requires one year – completes April 2007
 - Informs CECR and POM 10 – 15
- Categories of Munitions
 - Surface-to-surface indirect fires, area fires for suppression, precision and non-precision fires, air-to-surface
 - direct fires not considered



Surface-to-Surface/Area Fires

- Scenarios/Vignettes will represent the approved Multi-Service Force Deployments (MSFD)
 - Department of Defense Analytic Agenda
 - Consistent with the Defense Planning Scenario descriptions
 - Consider multiple types of terrain such as urban, desert and mixed
- Target Sets will include mobile, fixed, hard and soft, or any combination
- Timeframe for the analysis is FYDP 2010-2015

Surface-to-Surface/Area Fires

Issues

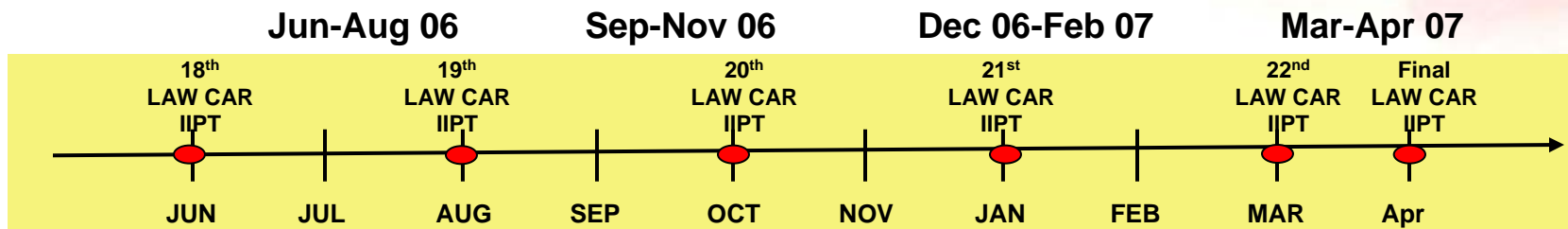
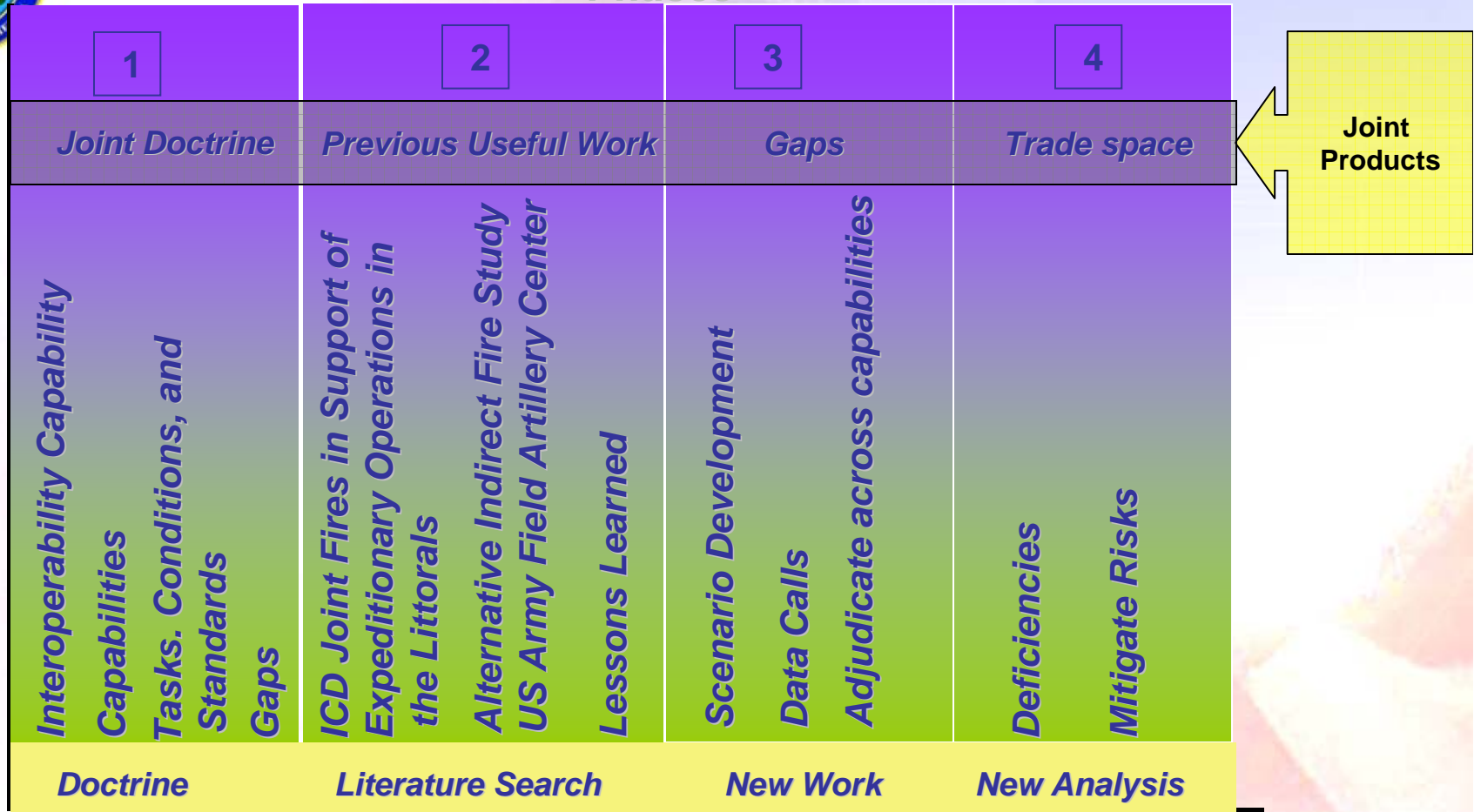


- **What are the Joint fires doctrinal, organizational, and operational concepts for Army, Navy, Air Force and Marine Corps delivered munitions?**
- **Where, when, and why do we need to be precise?**
- **What are the Joint fires capability gaps?**
- **What are the required C4ISR enablers?**
- **What redundancy or duplication of capability is needed to reduce risk?**
- **What target sets/profiles require what munitions?**
- **What are the capability trades among Joint surface-to-surface and air-to-surface fires for the comprehensive set of surface targets?**
- **What are the capability trades among target location error, weapon precision, and weapon effects radius for Army surface-to-surface and air-to-surface munitions for the comprehensive set of surface targets?**
- **How do concepts of operation and doctrine change over time to reflect force transformation?**



Surface-to-Surface/Area Fires Study Implementation Timeline

Phases





Surface-to-Surface/Area Fires

Proposed Army Educational Topics

Near-term:

- Army will present FCS Organizational and Operational Concept at the LAW CAR IPT (Aug 15, 2006)

Mid-term:

- CAA present a QWARRM brief
- OPNAV and Air Force A5R present NNOR and NCAA briefs
- U.S. Marines presentation on Supporting Fires Operational Concept (TBD)

Long-Term:

- Army will present Modular Force Organizational and Operational Concept at the LAW CAR IPT (Oct 06 – Date TBD)



Joint Management Structures

- Joint Air Dominance Organization (JADO)
 - Mission is to produce and *maintain a coherent*, joint Air Dominance and Airborne Electronic Attack Roadmap
 - A formalized process that will survive the Resource Officer tenure
 - Three pillars
 - Counter-air/counter Air-defense
 - Air-launched strike weapons
 - Airborne Electronic Attack
 - Charter MOA at Army Staff



Geo-Intelligence/TLE

- National Geospatial Intelligence Agency (NGA)
 - Continues activities enhancing GEOINT
 - Comprehending objects and events
 - Planning and executing operations
 - Assessing effects
 - Meets most stringent TLE requirements for weapons
 - non-expedient methods of DMPI mensuration
 - Pursuing multiple technical approaches to bring necessary accuracy and consistency to expedient methods of DMPI mensuration



Science and Technology Resource Allocation to Weapons

- Continue to monitor DoD Fuze IPT activities
 - Technology plan status
 - Industrial base policy
 - POM 08 Issue to increase S&T
- Insensitive Munitions Technologies
- Novel energetic materials
- Thermobaric and dial-an-effect warheads



Munitions Requirements Process

- Fall of 06 will begin POM 10 MRP
 - Advance schedule from previous cycles
 - Munitions Requirements may suffer as Department focus changes
 - Force Structure, Stability Ops, Special Ops, etc.
 - Focus will be on precision munitions
 - Affect to Industrial base
 - Fewer procurements
 - Requirements such as IM drive higher costs
 - Munitions generally pay bills



Cross-Weapon Programmatics

- Universal Armament Interface and Common Launcher
- Weapons Data Link – Network
- Test Ranges Infrastructure



Summary

- A good forum for multi-organization team
- LAW CAR process has been a good communication tool
- Lots of diverse focus areas being reviewed
- We continue to investigate opportunities for improving weapons portfolio



Back-up





Surface-to-Surface/Area Fires

US Army Precision Munitions

Candidates

155 mm Cannon:

- M549A1 HE w/ PGK
- M864 DP ICM w/ PGK
- Excalibur (Unitary)
- Common Smart Submunition (CSS)
- M2005 HE w/ CCF (From the Advanced Cannon Artillery Ammunition Program)
- *KEAPER - Kinetic Energy Artillery with Precision & Extended Range (Excursion)*

120 mm Mortar:

- PGMM

MLRS/HIMARS:

- GMLRS (Unitary)
- GMLRS (DP ICM)
- Common Smart Submunition (CSS)
- ATACMS (Unitary)
- ATACMS (DP ICM)

NLOS-LS:

- PAM

MCS/M1A2SEP/MGS:

- MRM

*ARV variants:

- PAM
- Hellfire

AH64/ARH:

- Hellfire
- APKWS Blk I

AUAV:

- Hellfire
- APKWS Blk I
- Viper Strike

*ammunition resupply vehicle, armored recovery vehicle, armored repair vehicle



Surface-to-Surface/Area Fires

Joint Precision Munitions

Candidates

US Air Force/Naval Air Force

- AGM 88 (HARM)
- GBU 10,12 (LGB)
- GBU 31,32,38 (JDAM)
- AGM 65 (MAVERICK)
- AGM 158 (JASSM)
- GBU 29 (SDB/250 lb)
- WCMD (SFW/CEM)
- AGM 154 (JSOW)
- GBU 24 (BLU 109)

US Navy Surface

- Naval Fire Support (ERGM)

US Marine Corps

- HIMARS



Surface-to-Surface/Area Fires

Non-Precision Munitions Candidates

(Surface-to-Surface and Air-to-Surface)

US Army

ADD/modify

Cannon

155 mm

105 mm

Mortars

81 mm

61 mm

AH-64

Hydra-Rockets

US Air Force

MK 82

MK 83

MK 84

CBU 87/B

US Marine Corps

ADD/modify

US Navy

CBU 78

MK 82

MK 83

MK 84

Surface-to-Surface/Area Fires

Definitions



- Area Fires
 - Area bombing (DoD, NATO) – Bombing of a target which is in effect a general area rather than a small pinpoint target
 - Area target (DoD, NATO) – A target consisting of an area rather than a single point
- Suppressive Fires
 - Suppressive Fire (DoD) – Fires on or about a weapons system to degrade its performance below the level needed to fulfill its mission objectives, during the conduct of the fire mission
 - Suppression Mission (DoD) – A mission to suppress an actual or suspected weapons system for the purpose of degrading its performance below the level needed to fulfill its mission objectives at a specific time for a specified duration



Surface-to-Surface/Area Fires

Additional Definitions

- Neutralization Fire (DoD) – Fire which is delivered to render the target ineffective or unusable
- Destruction Fire (DoD) – Fire delivered for the sole purpose of destroying material objects



Surface-to-Surface/Area Fires

Use of Area/Suppressive Fires

- **Echelons that use Area/Suppressive Fires**
 - Maneuver elements, Brigade and below (DS Artillery Battalion and organic mortars)
 - Divisions (SEAD in support of rotary and fixed-wing missions)
- **Area/Suppressive Fires are used when:**
 - Responsiveness is more important than precision
 - Target is a large formation or facility
 - Large Target Location Error is indicated
 - Target is undefined/unobserved

Surface-to-Surface/Area Fires



How are Area/Suppressive Fires:

- **Called** – FM Voice or digital call for fire, generally initiated at small unit (platoon/company) level.
- **Controlled** – Generally initiated as an “Adjust Fire” mission, meaning the firing unit delivers one round at the reported target location and the observer adjusts subsequent rounds before “Fire for Effect”
- **Delivered** – Area/Suppressive Fires may be delivered from any number of weapons systems, including Artillery and Mortars, Naval Surface Fires, Fixed/Rotary-wing CAS, as well as direct fire weapons

Surface-to-Surface/Area Fires



Roles for Area/Suppressive Fires

- Standard Roles for Area/Suppressive Fires
 - Screening the initial Point of Penetration
 - Preparatory Fires
 - Close fire support
 - Disruptive deep fires
- Non-Standard Roles for Area/Suppressive Fires
 - Clearing IEDs from routes
 - Clearing minefields



Surface-to-Surface/Area Fires Fallujah 2004

US Army After Action Reports (AAR) Comments

“...the physical and psychological effects of massed artillery fires were the *preferred* effects.”

“...Close Air Support (though extremely effective on planned targets) was not a substitute for responsive artillery and mortars.”

“Fire missions took less than two minutes from call-for-fire to rounds down range.”

Surface-to-Surface/Area Fires Fallujah 2004



USMC AAR Comments

“Fixed wing CAS is an enormous weapon that has great effects on the ground. It took entirely too long for bombs to be dropped when Marines were in contact. The minimum safe distance of the ordnance was too great in order for even the block to be isolated and that allowed the enemy to escape countless times.”

“...rotary wing CAS was extremely timely, but the effects on target were not extraordinary.”

“Mortars and artillery proved effective by forcing the enemy to stay in the houses and not allowing the enemy to fight the Marines in the streets.”

Surface-to-Surface/Area Fires

Considerations



- Target Location Error (TLE)
 - Observer error, unobserved or undefined target
- Responsiveness
 - Situation requires immediate support vice allows time for increased precision
- Volume
 - Quantity desired to allow maneuver course of action
- Proximity of friendly forces
 - Location, degree of protection, situation