



Why A Grizzly?

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Battlefield of the 21st Century

Doctrine drives Army Policy in Major Areas such as training, force design, modernization, personnel and logistics

Trends, Opportunities, Needs:

- Commander's Ability to Make Decisions Quickly Increased
- Synchronize Movements/Operation of Widely Dispersed Units
- Precise and Deadly Massed Fires
- Smaller Units and Decentralized Decision-Making
- Integration of RSTA, C², Firepower for Quick Response

Characteristics:

- Increased Tempo
- Increased Lethality
- Greater Dispersion
- Greater Complexity
- Stealth
- Digitization

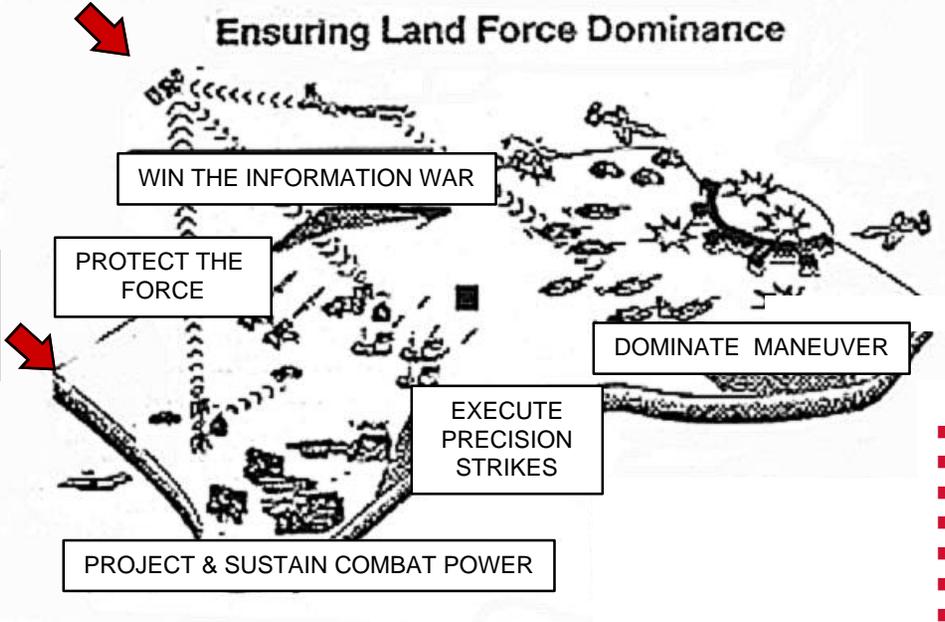


BUT...

Controlling the Dimensions of Battle: Speed, Space and Time



Science and Technology



- Complex Obstacles Neutralize our Force XXI Capabilities
- **Hinder Friendly Mobility and Maneuver Flexibility**
 - Isolate and Fragment Forces
 - Block Attacking Forces; Channelize Them Into Killing Zones
 - Delay Reinforcement, Hold Forces for Attack
 - Minimize Direct Contact with Superior Forces
 - Disrupt Our Timetables
 - **Mines Can Negate Advantages of Information Dominance**
 - Attain Superior Force Ratios at Decisive Moment and Place
- Dynamic Emplacement of Obstacles in the Future Amplifies the Problem
And... Complex Obstacles are Cheap, Effective and Prolific.

AN ASYMMETRIC THREAT

The Combat Engineer Deficiency Defined

■ COMPLEX OBSTACLES

- Current systems Cannot Breach “In Stride,” Under Fire
 - »Lack of Speed and Survivability
 - »Inhibits Cdr’s Flexibility
- Organic Assets Have Limited Capability
- Extremely Complicated C2 in Execution

■ OBSTACLES

- Fundamental Part of Land Warfare
- An Active Ingredient for Success Across the Entire Spectrum of Conflict
- Almost Always Complex, Includes Mix of Mine Types & are Covered by Direct/Indirect Observation and Fires

■ MINES

- Increased use in Mines evident Worldwide; They are Cheap
- More complex Fuzing/Anti-Handling Devices - inhibits Manual Clearing
- “Full Width” Attack is now Common Place
- Easily Upgradeable

■ Surface and Buried MINES

- Increased Threat Propensity to Rapidly Deploy
- Increased Threat to Employ reinforcing types in multiple “Belts”
- Quantity of Countermine/Counterobstacle Equipment Inadequate to In-Stride Breach Requirements Repeatedly

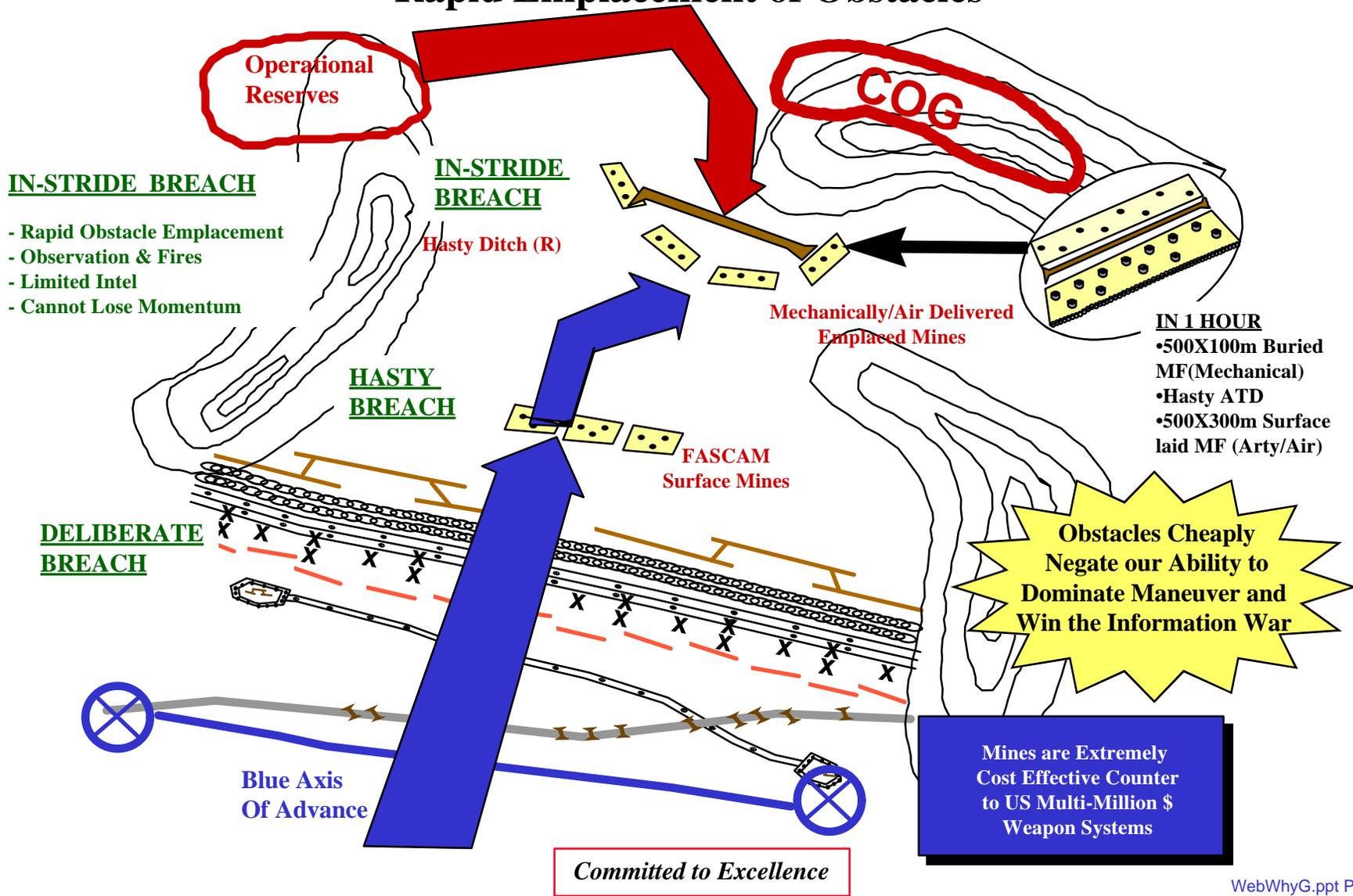
THE FUTURE:

- Increased Distribution of High Tech Fusing
- Proliferation of Rapid Delivery
- Less Detectable
- Smarter
- Full Width the Norm
- Deeper Mechanical Emplacement
- Easy Upgrade of Existing Inventories

Today, Soldiers Lack The Resources to Successfully Execute an In-Stride Breach. It Gets Worse In the Future!

The Threat

Rapid Emplacement of Obstacles



“Orchestrated Ballet”

- **Today: Complex Battle Command**
 - Each Complex obstacle unique====>No battle drill
 - Deliberate breach required
 - Slow--Detailed rehearsal required
 - **Situational Awareness=Grease pencil + FM Voice**
 - **Multiple Systems of Limited Capability/Survivability**



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The Mission Need Statement (MNS)

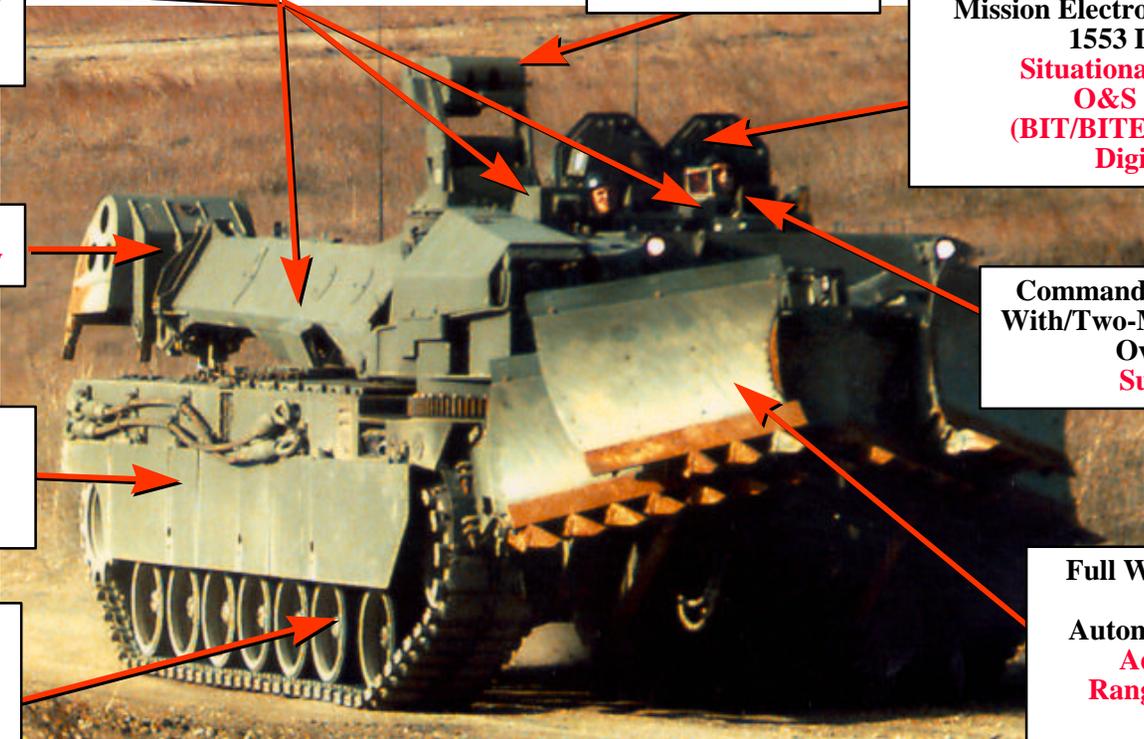
- Urgent Need Exists for System to Breach Obstacles at Brigade Combat Team Level
 - Defeat Natural/Simple/Complex
 - In Stride with Heavy Maneuver Forces (M1, M2/3 Task Force)
 - Under Enemy Defensive Fires, Heavy Smoke/Obscurants
 - Bring Closure on Enemy Operational Center of Gravity
- Mobility, Protection, Agility Equivalent to Maneuver Force
- Integrate Countermine/Counter Obstacle Into a Single Platform

The ORD Requirement

- Comparable Mobility and Agility to an M1A1 *Abrams Main Battle Tank*
- Comparable Survivability and Vulnerability characteristics as the *M1A1 Abrams series Main Battle Tank*
- In *one* attempt, *move* to, *reduce complex obstacle systems*, create a *safe, trafficable lane* for vehicles to follow

Commander's Goal: Close the Fight Quickly

GRIZZLY System Attributes



**External Cameras
For Crew Visibility**
Survivability
Adverse Weather

Weapons Station
Self Defense

**Mission Electronics System With
1553 Data Bus**
Situational Awareness
O&S Benefits
(BIT/BITE/Diagnostics)
Digital C2

Power Driven Arm
Multi-Role Capability

**Commanders Control Station
With/Two-Man Crew and NBC
Overpressure**
Survivability

**Refurbished M1
Chassis**
O&S Commonality
Speed & Range

70 Ton Suspension
Keeps Pace with
Maneuver Force
Agility

**Full Width Mine Clearing
Blade With
Automatic Depth Control**
Adverse Weather
Range of Effectiveness
Versatility

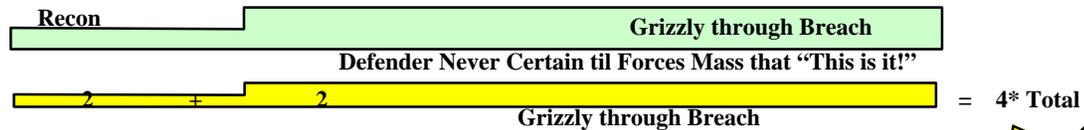
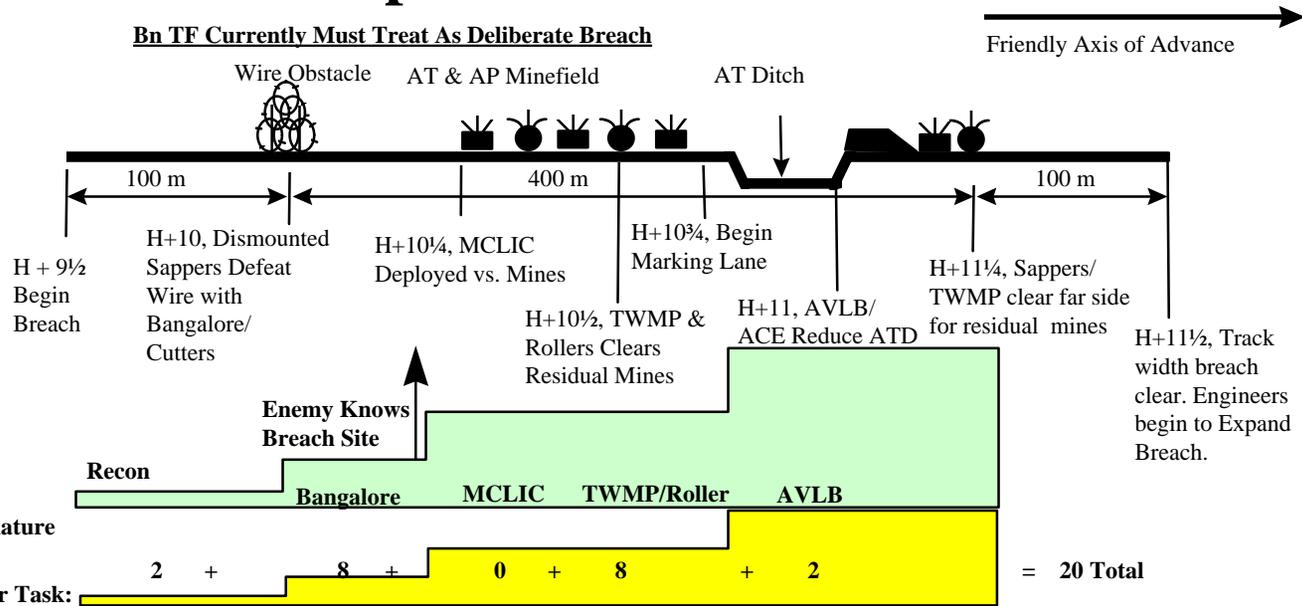
- Performance Requirements:**
- Clear Complex Obstacle: 21 minutes
 - Mobility Equivalent Maneuver Force
 - Abrams Level Survivability
 - Weight NTE GCW 70 tons
 - Supportability Equivalent to M1A1

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Timing Required to Defeat 600 m Complex Obstacle

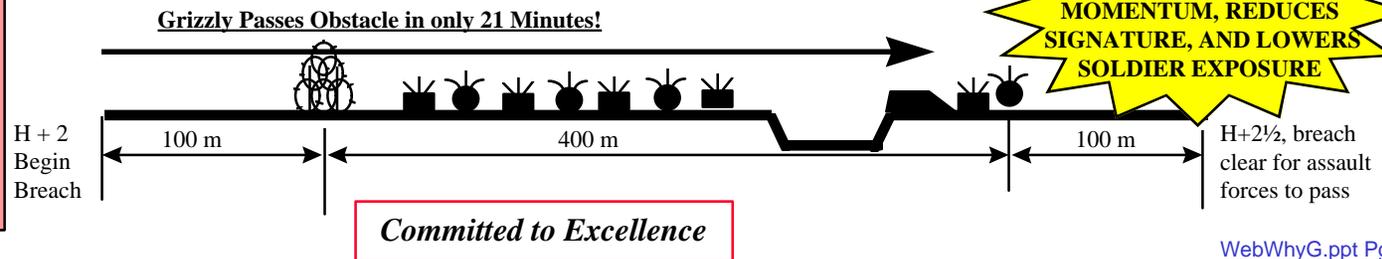
**Time Sequence to Breach
Current Operations**

H, Recon Discovers Obstacle
Calls Rollers Forward
H + 1, Recon/Cdr's Concept
H + 3, Issue TF Opns Ord
H + 5, Assemble Fire Spt/Equip
H + 6, Install Rollers/Plows
H + 6, Leader Rehearsals
H + 8, Move Forces to Attack Positions
H + 9, Fire Support Begins
H + 9½, Cross LD



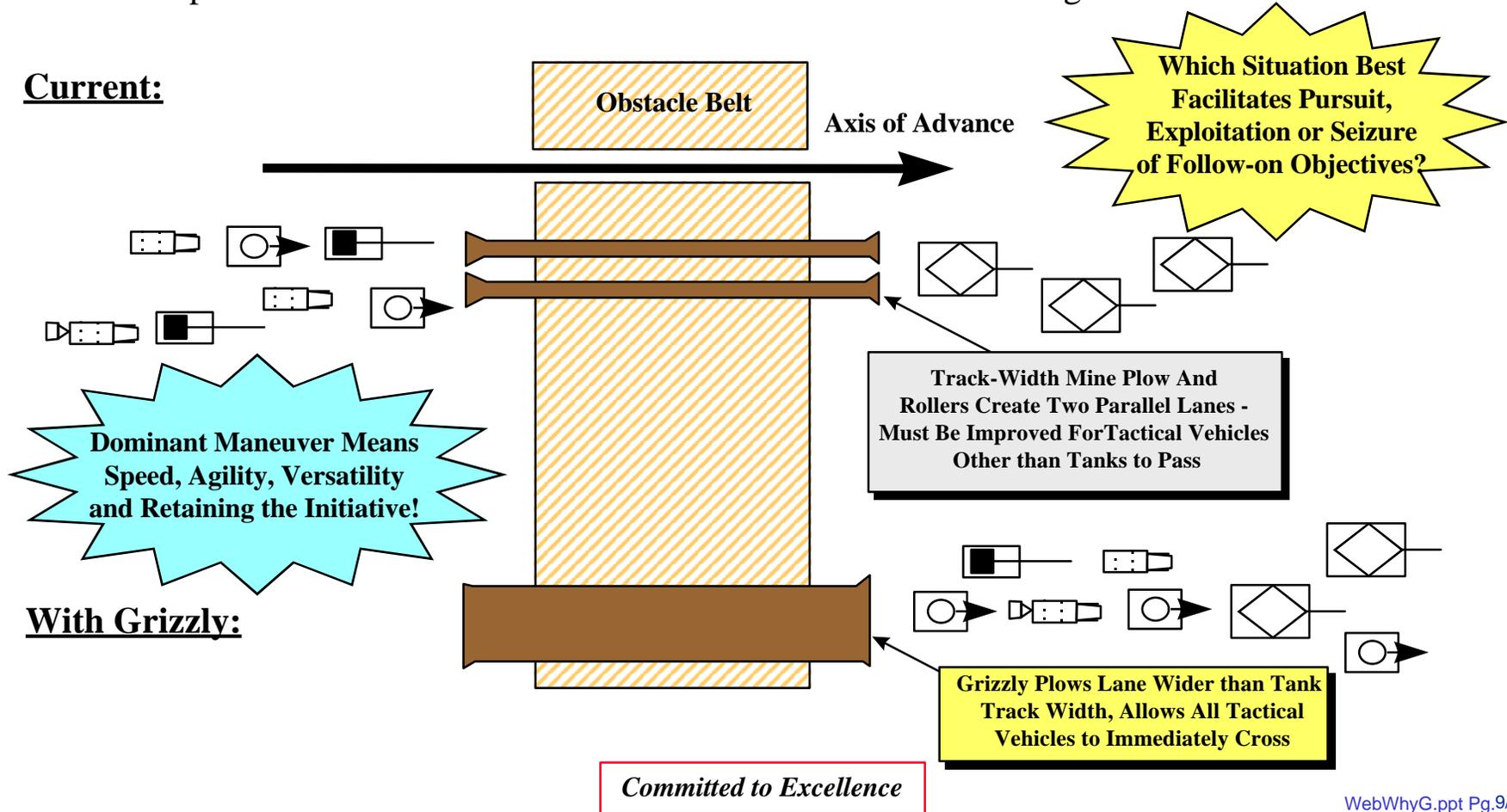
**Time Sequence to H Hour
Grizzly Operations**

H, Recon Discovers Obstacle
H + ½, Recon/Cdr's Concept
H + 1, Issue TF FRAGO
H + 1½, Alert Fire Spt
H + 1¾, Move Forces to Attack Positions
H + 2, Fire Spt Begins
H + 2, Cross LD



Combat Power Throughput

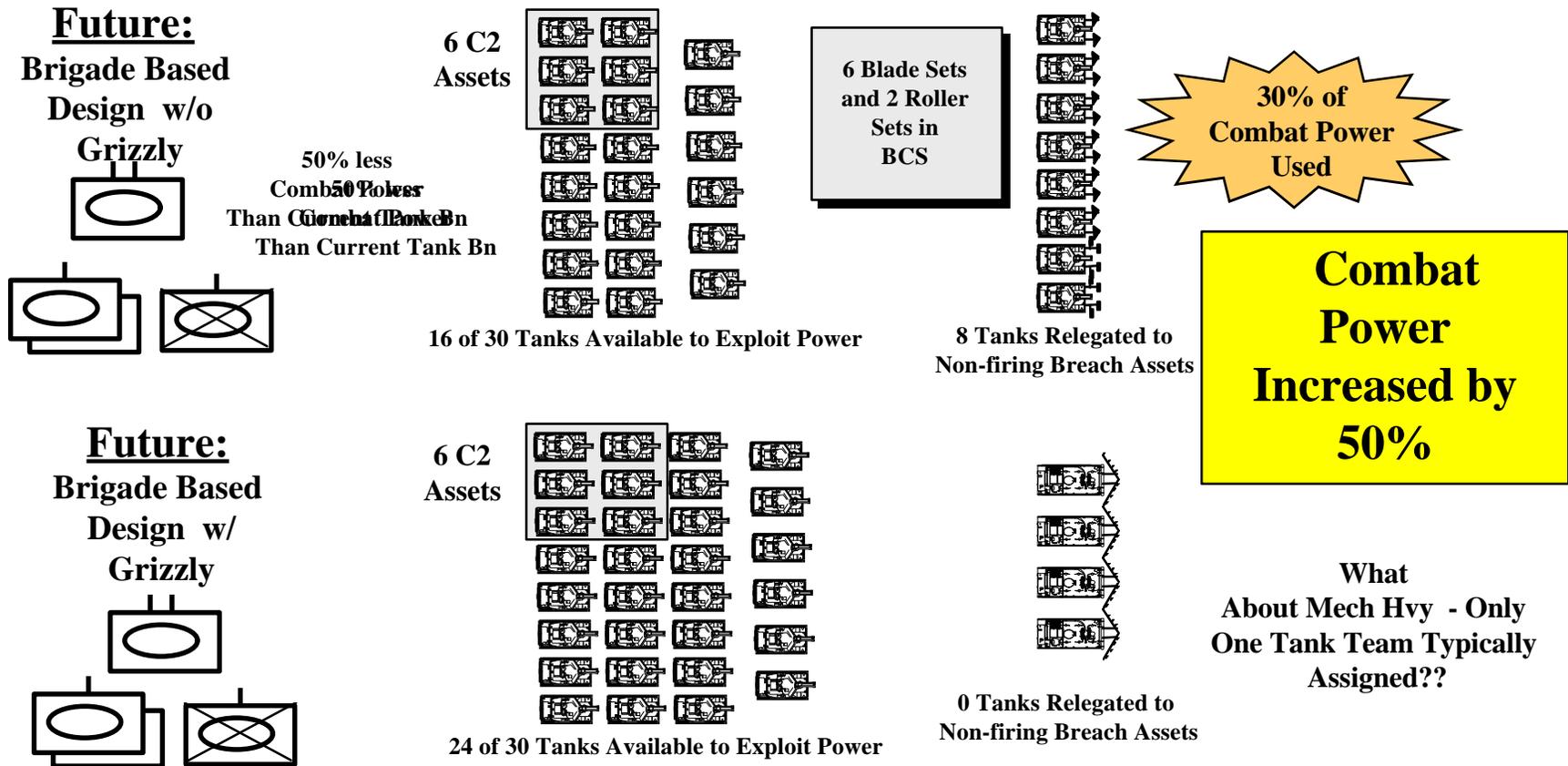
- ➔ A Full Width Mine Plow Lane Created By the Grizzly Results in Greater Throughput, Task Force Buildup is Much Faster on Far Side of Breach. Current Lane Must Be Improved to Permit Follow-on Forces Other Than Tanks through the Breach.



Combat Power Effectiveness In An In-Stride Breach

➔ The Grizzly Performs its Mission as a Specialized Role, allowing a significant Portion of the Combat Power of the Maneuver Task Force to Perform Their Primary Specialized Roles - Close With and Destroy the Enemy With Direct Fire and Maneuver

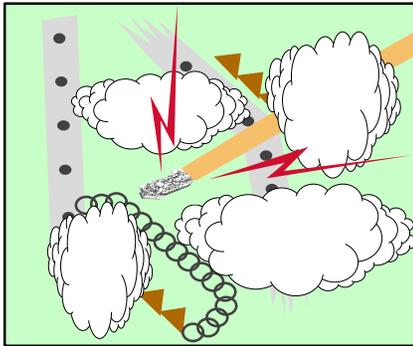
Combat Power In Breaching Mission Scenario Remaining Breaching Assets w/BCS



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Breach in Stride from the March

Relationship to Information Dominance

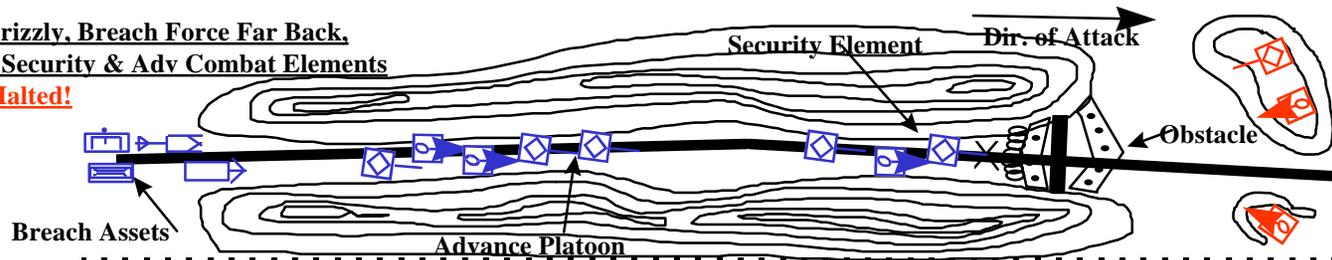


- Smoke/Obscurants used to cover breach operations (tends to delay current opns)
- Breacher on board digital position locating and radio transmission systems transmit status of breach continuously to follow-on exploitation forces

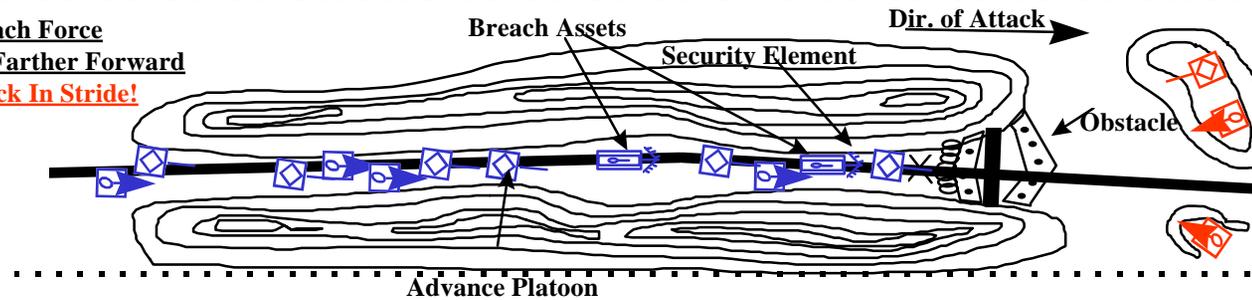
- Units can mass and move instantly into the breach to enhance surprise/maintain momentum of attack
- No time consuming “ballet of farm implements”
- C² in Execution of Breach is Simplified/Breach Opns Can Now Be Battle-Drilled

Combat Echelon March Formation Advantages

Without Grizzly, Breach Force Far Back, Must Pass Security & Adv Combat Elements
Attack is Halted!



With Grizzly, Breach Force May Move Much Farther Forward in Formation
Attack In Stride!



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Breaching Complex Obstacles - User Perspective

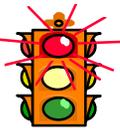
	Minefields				Safe Force Passage	Complex Obstacles								Safe Force Passage
	Pressure Fuze	Tilt-Rod Fuze	Simple Mag Fuze	Multi-Sensor Fuze		Ditch or Crater	Rubble	Abatis	Log Crib	Berns	Wire	Prefab. Barrier	Wire & Post Obstacle	
TMWP	Green	Amber	Red	Red	Amber	Red	Red	Red	Red	Red	Amber	Red	Red	Red
TMWP(SIP)	Green	Amber	Green	Red	Amber	Red	Red	Red	Red	Red	Green	Red	Red	Red
BCS w/MICLIC	Green	Green	Amber	Red	Amber	Red	Red	Red	Red	Red	Green	Red	Red	Red
MICLIC	Amber	Amber	Amber	Amber	Amber	Red	Red	Red	Red	Red	Green	Red	Amber	Red
WOLVERINE	Red	Red	Red	Red	Red	Green	Red	Red	Red	Amber	Amber	Red	Red	Red
ACE	Red	Red	Red	Red	Red	Green	Green	Amber	Amber	Green	Red	Amber	Amber	Red
GRIZZLY	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green

Green  Good Effectiveness

Amber  Marginal/Conditional Effectiveness

Red  Limited/No Effect

Note: 1) Safe force passage evaluates the system's ability to safely allow follow-on forces and vehicles to pass by guaranteeing the absence of mines in the lane.
2) Evaluation does not consider survivability and effectiveness of system or vehicle AFTER a mine blast.

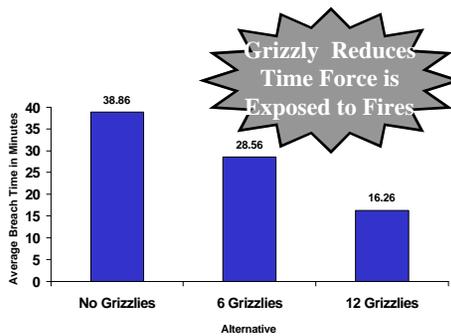
	System	Defeats	Stopped By*	Losses Expd.
	Engr Squad	Wire w/Bangalore	AP/AT Mines/Fires	Heavy ≥50%
	MICLIC	Mines	Wire/Ditch/Fires	Mun. Expended
	M9 ACE	Ditch/Berm	Mines/Wire/Fires	Heavy ≥50%
	System	Defeats	Stopped By*	Losses Expd.
	AVLB	Ditch	Mines/Berm	Medium <50%
	System	Defeats	Stopped By*	Losses Expd.
	BCS	Mines/Wire	Ditch/Berm/Point Obstacles/Terrain Irregularities	Medium <50%
	System	Defeats	Stopped By*	Losses Expd.
	Grizzly	All	None	Medium <50%

*Stopped means System does not have capability to defeat obstacle and must call for additional support

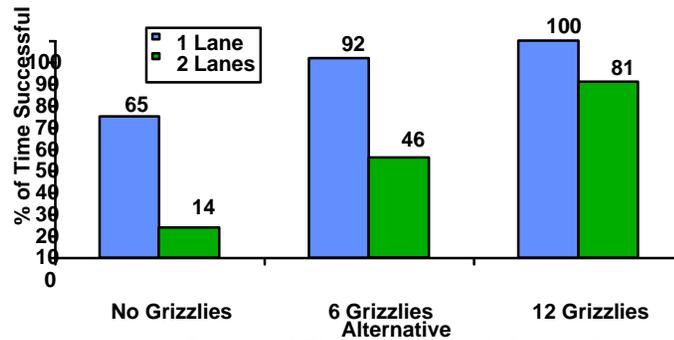
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Grizzly CASTFOREM Analysis

Emerging Results of the PAE Directed Review of Grizzly Requirements Analysis Provided to the Grizzly Study Advisory Group (SAG) on 8 July. Analytical Underpinnings of Grizzly Requirement Provide Adequate Support to Program.



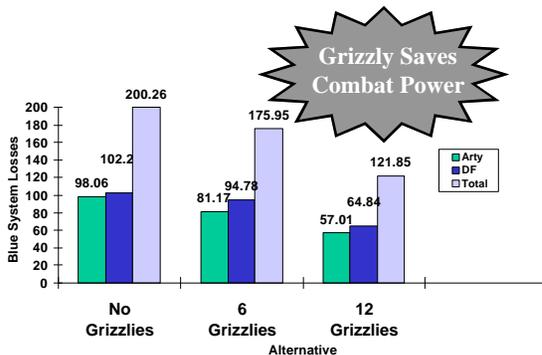
Average Time Per Task Force Breach



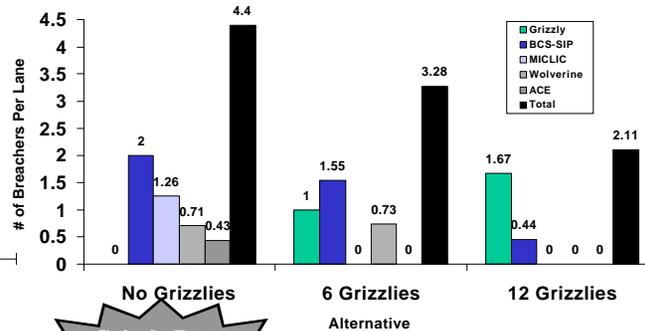
Percent of Time Lane Breach Successful



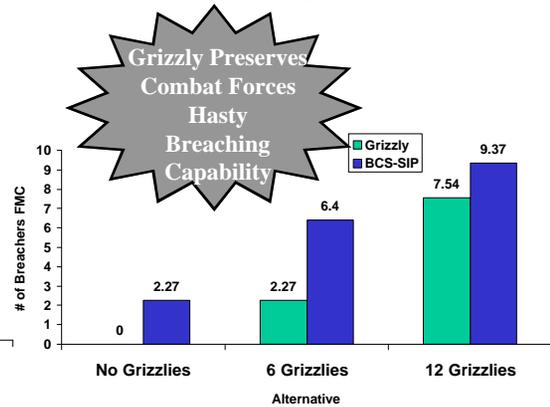
Loss Exchange Ratio (LER)



Blue System Losses



Breach Systems Required Per Lane



Number of Blades/Rollers Fully Mission Capable at End of Mission

Effectiveness

Minefield Effectiveness

Mine Types System	AP Mines	Track Width Pressure AT Mines	Full Width Pressure AT Mines	1st Gen Magnetic Fused AT Mines	Dual Impulse Pressure AT Mines	Multi Sensor AT Mines	Anti-Handling Devised AT Mines
MICLIC	Green	Green	Orange	Orange	Red	Red	Orange
TWMP	Green	Green	Orange	Green	Red	Red	Red
ROLLER	Green	Green	Orange	Red	Red	Red	Orange
GRIZZLY	Green	Green	Green	Green	Green	Green	Green

Soldier Exposure

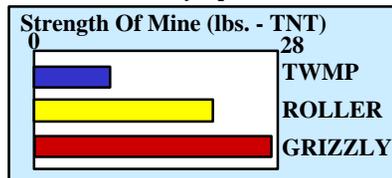
Obstacle System	Wire W/APM	Minefield APM & ATM	Anti-Tank Ditch & Berm	Point Obstacle
ESV (M113)	High Risk	High Risk	Cannot Defeat	Medium Risk
MICLIC	Medium Risk	Medium Risk	Cannot Defeat	Cannot Defeat
TWMP	Low Risk	Low Risk	Cannot Defeat	Cannot Defeat
ROLLERS	Low Risk	Low Risk	Cannot Defeat	Cannot Defeat
AVLB	Low Risk	Cannot Defeat	Low Risk	Cannot Defeat
M9ACE/BULDZR	Medium Risk	Cannot Defeat	Medium Risk	Medium Risk
GRIZZLY	Low Risk	Low Risk	Low Risk	Low Risk

■ High Risk
 ■ Medium Risk
 Low Risk
 ■ Cannot Defeat

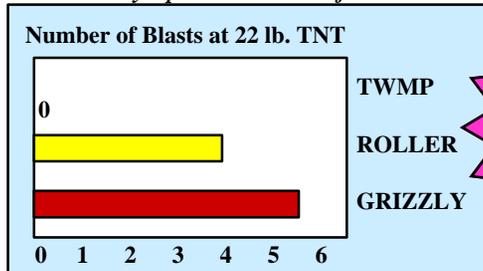
➔ Soldier Exposure is Function of Time performing Mission and Protection Level

Blast Survivability

Survivability Upon Detonation



Survivability Upon Detonation of Several Mines



Note That a Mine Strike on TWMP Equals a Mission Kill!

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Mine Depth Capability

Depth System	Surface	Sub-Surface	6 in.	9 in.	12 in.
MICLIC	Green Check	Green Check	Yellow Check	Red Check	Red Check
BCS/ROLLER	Green Check	Green Check	Green Check	Yellow Check	Red Check
SAPPERS W/PROBES	Green Check	Green Check	Green Check	Green Check	Yellow Check
GRIZZLY	Green Check	Green Check	Green Check	Green Check	Green Check

Commander's Operational Conditions for Success

- Did I accomplish the mission while maintaining maximum combat power?
- At the conclusion of this mission, will my unit be capable of conducting follow-on operations?
- Was the brigade able to maintain the momentum of the attack as the task forces passed through the complex obstacles?

No Grizzly Case: *Commander's conditions for success were not met*

- Unit did not maintain at least 50% of combat power
- Task Forces failed to breach at least one lane 35% of the time
- Unit had no residual breaching capability at end of mission
- Unit not prepared to conduct follow on operations.

6 Grizzly Case: *Commander's conditions for success were not met*

- Unit did not maintain at least 50% of combat power
- Unit had limited residual breaching capability at end of mission
- Unit was not capable of conducting follow on operations

12 Grizzly Case: *Commander's conditions for success were met*

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Why Grizzly?

Supports National Military Strategy



Versatile



High Battlefield Survivability



Digital

3/12/98



Preserves Combat Power of Maneuver Force



Day-Night/Adverse Weather



First In-Stride Capability



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