Rapid Prototyping
The RSG

Information Briefing on the
Reconnaissance Strike Group (RSG)
as presented in the FY 17 National Defense Authorization Bill

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1. **What you should take away from this presentation!**
2. **Background: The RSG—a Special Purpose Organization;**
3. **RSG Overview—Structure, Sustainment, Deployment:**
4. **Rapid Prototyping the RSG’s Base Platform: PUMA;**
5. **Recommendations for Consideration.**

**Backup Slides**

“Over the past thirty years, the U.S. Army has cancelled some 20 major acquisition programs including armored fighting vehicles, helicopters, artillery pieces, communications systems, infantry weapons and munitions. If you count designs that never got out of the research and development (R&D) process that number more than doubles.”

What you should take away from this presentation:

“If I'd asked customers what they wanted, they would have said "a faster horse."
-Henry Ford

- The RSG is a 6,000 man “All Arms/All Effects” Battle Group, a departure from “business as usual” in Army force development and acquisition;

- The RSG involves full spectrum rapid prototyping of the operational capability—organizing construct, human capital strategy and equipment—not just the technology;

- The RSG is based on the assumption that change in “Cross Domain” Warfare must drive U.S. Army Force Design and Modernization;

- The PUMA IFV is central to the RSG Force Design and a key driver of Ground Force Transformation;

- RSG is about what works now; not “Unobtainium!”
In January 2016, The National Commission on the Future of the Army recommended piloting an initiative called the RSG;

The current version of FY 17 NDAA directs the Secretary of Defense and the JCS Chairman, not the U.S. Army, to establish an RSG Office, to model, assess and report to the SASC on the RSG’s simulation performance.

In *The Innovator’s Dilemma*, Clayton Christensen argues that corporations must create specialized, autonomous organizations to exploit new technologies or risk squandering revolutionary capabilities inside status quo organizations.

The RSG is a special purpose organization designed to lead change by exploiting new, but proven technologies in a joint, integrated operational context.
After WW I, Germany’s senior military leaders wanted to understand the impact of new technology.

In 1933, the German Military Leadership created a special purpose organization to exploit the new technologies of war that was not subordinated to the existing German Army branch structure.

Free of interference from the Army’s conservative, branch-oriented hierarchy, the special purpose organization created new combined arms formations that included tanks, motorized infantry, artillery, signal, logistics and anti-aircraft elements, all designed to cooperate closely with German fighter and reconnaissance aircraft.

In 1935, Germany established the HQTRS for five new Panzer (armored) Divisions. By 1940, Germany fielded 10 Panzer Divisions.

The outcome in 1940 was revolutionary change in warfare. But the revolution began in 1933 with a special purpose organization.
**Bottom Line: RSG Must Develop within a Joint Setting**

- Single Service Warfare is obsolete.
- The RSG’s success depends on its development within a Joint Operational Framework that is unconstrained by Status Quo Army Doctrine, Organization and Thinking.

- The ISR-Strike-Maneuver-Sustainment Framework is not just about “things.” It’s about integrating existing and future capabilities within an agile operational framework guided by human understanding.

- It’s an intellectual construct with technological infrastructure.

- The Framework is the next logical step in the evolution of warfare beyond the ad hoc coordination of Federal Agencies or combined arms, air-ground cooperation, air-sea battle, amphibious and special operations.
RSG is a 6,000 Soldier formation designed to execute “all arms/all effects,” in Joint Warfighting;

RSG is functionally organized around Maneuver, Strike, ISR (intelligence, surveillance, reconnaissance) and Sustainment capabilities for cross domain warfare under Joint C2;

RSG is a self-contained, all arms, mobile armored combat formation under a Brigadier General;

RSG punches above its weight, mobilizing fighting power disproportionate to its size (“High lethality, Low density”);

RSG offers more Joint capability, survivability and firepower with less overhead at lower cost;

RSG offers the modular continuum of response that cross domain warfare demands;

RSG is faster to deploy via sea and air (see backup slides).
RSG C2 is designed for Cross Domain Warfare:

- Responds Directly to Joint Force CDR
- Integrates Army, USAF/USN Strike Assets (STRIKECOORD);
- Collects, Analyzes and Exploits Information.

Brigadier General
Recon Strike Group Commander

- Absorbs additional Battalions or gives up battalions as needed;
- Additional Staff Functions such as Civil Affairs, SJA can be integrated as needed.

Colonel
Chief of Staff

- Lieutenant Colonel
  Maneuver (Operations including PSYOPS)

- Lieutenant Colonel
  ISR

- Lieutenant Colonel
  Strike COORD

- Lieutenant Colonel
  Sustainment (Personnel + Logistics)

- Lieutenant Colonel
  Communications + EW & Cyber

Intelligence functions split, but integrated to support maneuver, strike and ISR
RSG’s Key Weapon Systems are available today:

- **PUMA.** PUMA has a welded armor hull with add-on modular armor. Weight varies from 29.4 to 43 tons depending on the desired protection level. Current PUMA mounts a 30 mm autocannon. ATGM Option exists. The system is fielded
  One RSG contains 242 ‘30mm’ and 161 ‘120mm’ (or potentially ‘130mm’) variants.

- **AMOS®.** "Advanced Mortar System," (BAE Systems Hagglunds AB). A double barreled breech-auto-loading 120 mm mortar turret mounted. System operates autonomously with direct and indirect fire capability together with Multiple Rounds out to 10 km. The system is fielded.
  One RSG contains 60 ‘120mm Mortar’ variants.

- **MLRS (Lockheed Martin Missiles and Fire Control).** The weapon can fire guided and unguided projectiles from 42 to 300 km. The system is fielded.
  One RSG contains 12 MLRS launchers/systems variants.

- **NASAMS.** National Advanced Surface to Air Missile System (Raytheon) is a medium range, air defense system that identifies, engages and destroys 72 targets simultaneously. System is fielded.
  One RSG contains 18 NASAMS variants.

- **TARES (Tactical Advanced Recce Strike) is a UCAV with a 200 km range and endurance time of four hours.** It autonomously searches for, identifies and engages targets. Up to 24 TARES can be flown simultaneously. System is ready for fielding.
  One RSG contains 24 TARES launcher variants.
U.S. Army maneuver forces must be capable of dispersed, mobile, operations to survive and fight in an integrated, Joint ISR, EW and STRIKE-dominated battle space.

This new battle space demands self-contained independent battle groups; formations that operate on land the way the Navy’s ships operate at sea: within the range of their organic ISR and STRIKE capabilities.

RSG suppresses or destroys enemy air defense and missile assets—RSG is effective when immediate responsiveness is required, in complex terrain or in poor visibility.
The RSG: How it Fights

RSG is designed to *Jointly* find, target and maneuver to annihilate the enemy:

- Focus is on enemy’s destruction, not on holding ground;
- 360 degrees warfare plus defense against top attack demands capability for rapid change in posture and direction;
- Multiple radars provide layered top attack/air and missile defense;
- Use of medium and long range unmanned ISR and Strike systems is maximized through cross domain integration;
- Subordinate elements (battalion battle groups, manned and unmanned aircraft) enjoy freedom to maneuver in depth, to attack or defend as required (*Dispersion plus Concentration of Effects*).
In 5 Days of simulated combat against attacking Russian Independent Brigades (23,000 troops):

- Brigade Combat Teams (BCTs) including support brigades (24,000, and 28,500 troops respectively) were defeated.
- (2) RSGs of 11,000 troops decisively defeated the attacking Russian Force.
- (1) RSG of 5,500 troops defeated the attacking Russian Force.

The StrongPoint Combat Power Builder and Combat Calculator (CBCC) designed for division and below simulation provided unclassified results for combat in the Baltic Littoral against contemporary Russian Army Forces comparing the performance of current U.S. Army BCTs with an alternative Army force design, the Reconnaissance Strike Group (RSG).
Adding more Armored Brigade Combat Teams (ABCTs) equipped with legacy systems only marginally increases aggregate combat power.

4 PUMA-based RSGs of 24,000 troops and 6,020 rolling stock provide 3 times more combat power than 18 ABCTs with legacy equipment of roughly 76,000 troops and 19,530 rolling stock.
RSG employs a diverse set of Strike assets to achieve rapid and volume effects at various ranges.

The Fires BN of an ABCT is one dimensional and lacks stand off capabilities to destroy enemy air defense and ground launched missiles that outrange conventional artillery.
PUMA-based RSG is about Innovation, not Invention:

- PUMA is the fully capable platform FCS *hoped* to build;
- PUMA delivers: Superior protection (active and passive) with modular armor, and an unmanned turret;
- PUMA’s 1003 HP engine means PUMA can also mount 120mm (or potentially 130mm) Tank Guns, Artillery, Engineering, Air and Missile Defense Systems;
- The PUMA hull is a new 21st Century design, not a derivative of an older hull;
- When used as a common chassis/platform, PUMA offers enormous savings in logistics;
- PUMA research, development and testing are complete at a cost of less than 1 Billion Dollars;
- When a proven platform like PUMA is leveraged, the savings in time and cost are phenomenal!

**NOTE:** US Systems at TRL 8 + can be modified/ruggedized for use on the PUMA. All PUMA variants can be configured for WIN-T and SOTM (SATCOM–on-the-Move).
RSG versus BCT

Sustainment

RSG Operating Range: 1800 km or 10 days combat without replenishment.

Total Group Fuel Capacity: 762,000 gallons.

VS

ABCT

X

Operating Range: 500 km or 2-3 days of combat without replenishment.

Total Brigade Fuel Capacity: 500,000 gallons.

NOTE: M1A1/2 tank with turbine engine has 500 gal fuel capacity for a maximum 8 hours of operation. For 87 M1 tanks in an ABCT the total fuel consumption is 130,500 gal per 24 hours. After 2 days of combat the ABCT will have consumed approximately half of its fuel.

RSG is capable of independent operational maneuver within a Joint Task Force. The BCT is not.

NOTE: 959 Pumas = IOC. FOC RSG = 1505 Pumas with 6,000 soldiers. (TEL and logistics variants would also be Puma variants.) A single ABCT contains 1085 pieces of rolling stock for only 4222 soldiers.
The RSG is faster to deploy:

# of Large, Medium-Speed Roll-on/Roll-off (LMSR) ships required to deploy:

- SUST
- ABCT
- X
- CAB
- X
- FA
- X

104,238 metric tons
168,725 square meters

VS

48,214 metric tons
56,045 square meters

RSG requires a third fewer LMSRs than a BCT based division equivalent.
A Comparison for Perspective:

**FCS**
- Delays and cost overruns. One partially working prototype self-propelled cannon. **Total Cost:** ~$20 billion.

**GCV**
- More delays and cost overruns. Design would be heavier than an M1 tank! **Estimated Total Cost of both Programs over 5 years before cancellation in Jan 2015:** $29-34 billion.¹

**PUMA**
- Estimated cost of fielding (1) PUMA-based RSG (FOC) in 12-36 months: $5.8-6.5 billion (1505 PUMA Variants).
- Estimated cost of fielding (3) additional PUMA-based RSGs in 72—96 months: $17.4 billion. (Variant NRE paid for in first RSG)
- (4) RSGs: 23—25 Billion Dollars in 5—8 Years.

1. FOC = 1504 PUMA variants in RSG (6,000 Soldiers).
2. 4 RSGs = 6,016 PUMA (tracked) variants (24,000 Soldiers).
3. PUMA Logistics variants: 478
4. PUMA Tracked launcher Variants: 67
5. Current ABCT contains 1,085 pieces (tracked and wheeled) of rolling stock. (4222 Soldiers).

In the end, nothing of enduring strategic value for the Nation, the Joint Force or the Army resulted from FCS or GCV!
Recommendations for consideration:

“All men are by nature conservative but conservatism in the military profession is a source of danger to the country... To rest upon formula is a slumber that, prolonged, means death.”

_Vice Admiral_ Hyman G. Rickover in an address to the US Naval Post Graduate School, 16 March 1954

- First, the RSG must be developed in a Joint setting to ensure its value to ”All Arms/All Effects-Cross Domain Warfare”—Aerospace and Naval Force participation is vital!

- Second, Rapidly Prototype the RSG within a Joint Operational Framework beginning with proof of concept prototypes and a “Battalion Set” as soon as possible—*build PUMA in the USA*;

- Third, Stand up a Puma-equipped RSG inside the German Army and other NATO States as part of the _NATO Rapid Response Force initiative_ (Transatlantic Partnership).
“The advanced world, too vulnerable to survive a war of attrition or mass destruction, must learn to conduct its affairs by the Rapier.”

Combat Power Comparison:
WW II & Desert Storm Divisions vs. the RSG

- The 6,000 soldier RSG exploits organizational change plus new technology to create new, more lethal capabilities and a dramatic increase in fighting power.

- The decrease in the 15,000-18,000 soldier Armored Division’s combat power since Desert Storm is due to a reduction in the number of platforms and soldiers inside the BCTs.
161 Puma or equivalent Armored Gun System (AGS)
242 Puma or equivalent Infantry Fighting Vehicle (IFV)
60 Puma or equivalent Auto-loading 120mm Mortar
36 Puma or equivalent Command, Control, and Communications
38 Short Range Air Defense 35mm + (SHORAD)

12 Multiple Launch Rocket System (MLRS)
24 Tactical Advanced RECCE Strike (TARES)
15 ADA launchers (NASAMS 2)
12 AH-64E Apache Helicopters *(Place Holder until UCAV exists)*
30 Strike Coordination (Fire Direction) Vehicles and Mobile ADA Targeting

12 UH-60 Blackhawk Helicopters
8 Armored Vehicle Launch Bridge (AVLB)
12 Engineer Mobility/ Assault Vehicles

58 Medical Evacuation and Treatment Vehicles
48 Forward Repair Shops
228 Palletized Loading Systems (PLS) or Load Handling System (LHS)
187 Large Capacity Fuel Carriers including self contained water purification system.
### 4G (New Broadband) vs SINCgars/EPLRS (Old)

<table>
<thead>
<tr>
<th><strong>4G (WiMAX, LTE-A)</strong></th>
<th><strong>SPECS</strong></th>
<th><strong>SINCgars</strong></th>
<th><strong>EPLRS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>2010s and later</td>
<td>Fielding</td>
<td>Since 1989</td>
<td>Since 2000</td>
</tr>
<tr>
<td>Up to 70 Mbps*</td>
<td>Data Rate</td>
<td>16 Kbps</td>
<td>56Kbps</td>
</tr>
<tr>
<td>Broadband Digital</td>
<td>Transmission</td>
<td>FM</td>
<td>Digital</td>
</tr>
<tr>
<td>LTE-A: 700 MHz to 2.6 GHz</td>
<td>Frequency Range</td>
<td>30-80 MHz</td>
<td>420-450 MHz</td>
</tr>
<tr>
<td>WiMAX: 2-11 GHz</td>
<td></td>
<td>VHF</td>
<td>UHF</td>
</tr>
<tr>
<td>40-50 km</td>
<td>LOS Range</td>
<td>10 km**</td>
<td>10km***</td>
</tr>
</tbody>
</table>

- Forcing old communications technologies to do more advanced functions that will demand broadband data rates is doomed to failure.
- SINCgars and EPLRS performs at rates no differently than dial up modems used in the 1990s.
- Newer Technologies exist that will allow rapid catch up to modern telecommunication standards.

* Potential increase in data rate currently in development.
**With power amplifier the range could be extended out to 40 km (not normally used in vehicles).
***EPLRS must be within range with other EPLRS to hop and extend transmission.
**BMG, LLC**

**4G Wireless technology-WiMAX**
( Worldwide Interoperability for Microwave Access)

<table>
<thead>
<tr>
<th>Technical Data</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Network Type</strong></td>
</tr>
<tr>
<td><strong>Antenna Type</strong></td>
</tr>
<tr>
<td><strong>Frequency</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Horizontal Coverage (area)</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Instrumented Range (radius)</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Data Rate</strong></td>
</tr>
<tr>
<td><strong>Antenna Weight</strong></td>
</tr>
<tr>
<td><strong>Power Consumption</strong></td>
</tr>
</tbody>
</table>

- WiMAX conforms to 4G digital IEEE 802.16 and 802.20 digital wireless communications standard.
- Draws far less power than current WiFi.
- WiMAX range of 50 km vastly outranges current WiFi (30 meters).
- Horizontal projection focus of signal limits vertical overhead detection by enemy EW aircraft or drones.
- Projection range could be adjusted to needed as needed by adjusting power or antenna height.
- Signals uses be digitally encrypted data keys to prevent cyber attacks.
- Antennas can be mounted on SkySapience tethered drone on C2 Puma.
## TARES (Tactical Advanced Recce Strike)

<table>
<thead>
<tr>
<th>Armament</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drone dimensions L x W (wingspan) x H</td>
<td>2.3 m x 2.6 m x 1.1 m</td>
</tr>
<tr>
<td>Max takeoff weight</td>
<td>160 kg</td>
</tr>
<tr>
<td>Warhead</td>
<td>20 kg HE shape charged proximity fuse</td>
</tr>
<tr>
<td>Max range</td>
<td>200 km</td>
</tr>
<tr>
<td>Max duration</td>
<td>4 hours</td>
</tr>
<tr>
<td>Engine</td>
<td>34 kW, 4 stroke</td>
</tr>
<tr>
<td>Fuel</td>
<td>Kerosene</td>
</tr>
<tr>
<td>Medium cruise speed</td>
<td>180 kph</td>
</tr>
<tr>
<td>Max cruise speed</td>
<td>202 kph</td>
</tr>
<tr>
<td>Terminal attack speed</td>
<td>500 kph</td>
</tr>
<tr>
<td>Navigation</td>
<td>GPS / INS</td>
</tr>
<tr>
<td>Target scan system</td>
<td>IR and SAR 35 GHz</td>
</tr>
<tr>
<td>Targeting and image resolution</td>
<td>0.7 m</td>
</tr>
<tr>
<td>Target scan area</td>
<td>2000 m^2</td>
</tr>
<tr>
<td>Drones per launcher</td>
<td>16</td>
</tr>
<tr>
<td>Communications and Data</td>
<td>225MHz to 400MHz UHF data link</td>
</tr>
</tbody>
</table>

- TARES has a range of 200 km and can remain airborne for up to four hours.
- TARES can autonomously search, classify identify and engage, if desired.
AMOS (Advanced Mortar System)

- AMOS is fitted with automatic electronic target engagement and firing systems.
- The system is fitted with muzzle blast protection and an NBC protection system.

<table>
<thead>
<tr>
<th>Armament</th>
<th>2 x 120-mm mortars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main gun</td>
<td>2 x 120-mm mortars</td>
</tr>
<tr>
<td>Machine guns</td>
<td>1 x 7.62-mm / 12.7-mm</td>
</tr>
<tr>
<td>Max indirect firing range (mortar mode)</td>
<td>10 km</td>
</tr>
<tr>
<td>Max direct fire range (assault gun mode)</td>
<td>1.5 km</td>
</tr>
<tr>
<td>Max rate of fire</td>
<td>24 rpm</td>
</tr>
<tr>
<td>Multiple Round Simultaneous Impact</td>
<td>16 rounds</td>
</tr>
<tr>
<td>Ammunition Capacity</td>
<td>~80 rounds (48 in turret autoloader)</td>
</tr>
<tr>
<td>Loading System</td>
<td>Breech Autoloader and Manual</td>
</tr>
<tr>
<td>Elevation range</td>
<td>-3 to +85 degrees</td>
</tr>
<tr>
<td>Traverse range</td>
<td>360 degrees</td>
</tr>
<tr>
<td>Setup time to fire mission / pack and move</td>
<td>30 seconds / 10 seconds</td>
</tr>
<tr>
<td>Ammunition Resupply Time</td>
<td>10 minutes</td>
</tr>
<tr>
<td>Munition types (slightly modified for breech</td>
<td>Standard HE</td>
</tr>
<tr>
<td>Loading)</td>
<td>Illumination</td>
</tr>
<tr>
<td></td>
<td>Smoke</td>
</tr>
<tr>
<td></td>
<td>STRIX anti tank terminally guided</td>
</tr>
<tr>
<td></td>
<td>M971 RUAG mortar cargo bomb (32 sub-munitions w/ 70 mm penetration) 100 x 100 meter effect area</td>
</tr>
</tbody>
</table>
The Skyranger anti-aircraft gun system is a short-range air defense system, designed to protect mobile units and stationary installations.

It was developed by Oerlikon Contraves, a subsidiary of the German Rheinmetall Defence, but a similar system could easily be built by U.S. Defense Firms.
Improved Sentinel Radar

- The AN/MPQ-64F1 Improved Sentinel is an aerial surveillance and tracking radar.
- It was developed in joint venture by Thales and Raytheon.
- It is a component for NASAMS.

<table>
<thead>
<tr>
<th>Radar Technical Data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Radar Type</td>
<td>Stacked beam 3D, Doppler</td>
</tr>
<tr>
<td>Antenna Type</td>
<td>AESA</td>
</tr>
<tr>
<td>Frequency</td>
<td>X band</td>
</tr>
<tr>
<td>Elevation Coverage</td>
<td>-10 to 55 degrees</td>
</tr>
<tr>
<td>Rotating Rate</td>
<td>30-60 RPM</td>
</tr>
<tr>
<td>Search Volume</td>
<td>360 degrees or assigned sector</td>
</tr>
<tr>
<td>Instrumented Range</td>
<td>Aerial Surveillance: 75 km</td>
</tr>
<tr>
<td>Capacity</td>
<td>Aerial Surveillance: &gt;50 tracks</td>
</tr>
<tr>
<td>Climate Zones</td>
<td>All climate zones; in-land, coastal, desert, and arctic</td>
</tr>
</tbody>
</table>
The Giraffe 4A is a multifunctional aerial surveillance, tracking, and weapons locating radar. It was developed by SAAB and variants are used in NATO countries. Provides aerial and land based ISR for air defense (NASAMS) and STRIKE (TARES and MLRS).

<table>
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<td><strong>Frequency</strong></td>
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<tr>
<td><strong>Elevation Coverage</strong></td>
</tr>
<tr>
<td><strong>Rotating Rate</strong></td>
</tr>
<tr>
<td><strong>Search Volume</strong></td>
</tr>
<tr>
<td><strong>Instrumented Range</strong></td>
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<tr>
<td></td>
</tr>
<tr>
<td><strong>Capacity</strong></td>
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<tr>
<td></td>
</tr>
<tr>
<td><strong>Power Plant</strong></td>
</tr>
<tr>
<td><strong>Climate Zones</strong></td>
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</table>
**ARTHUR Mod C**

- The ARTHUR Mod C is a C-RAM and weapons locating radar.
- It was developed by SAAB and variants are used in NATO countries.
- Provides battalion level ground based ISR to RSG’s STRIKE Battalion.

### Radar Technical Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radar Type</td>
<td>Pulse Doppler</td>
</tr>
<tr>
<td>Antenna Type</td>
<td>TWT, MTD</td>
</tr>
<tr>
<td>Frequency</td>
<td>C band</td>
</tr>
<tr>
<td>Rotating Rate</td>
<td>30-60 RPM</td>
</tr>
<tr>
<td>Search Volume</td>
<td>360 degrees or 120 degrees sector</td>
</tr>
<tr>
<td>Instrumented Range</td>
<td>Weapon Locating: 60 km</td>
</tr>
<tr>
<td>Capacity</td>
<td>Weapon Locating: &gt;100 tracks/min</td>
</tr>
<tr>
<td>Accuracy</td>
<td>25 meters on enemy</td>
</tr>
<tr>
<td>Power Plant</td>
<td>Internal w/ external option</td>
</tr>
<tr>
<td>Deployment Time</td>
<td>&lt; 2 minutes</td>
</tr>
<tr>
<td>Detection Target Ranges</td>
<td>Guns @ 31 km</td>
</tr>
<tr>
<td></td>
<td>Mortars @ 55 km</td>
</tr>
<tr>
<td></td>
<td>Rockets @ 50-60 km</td>
</tr>
<tr>
<td>Climate Zones</td>
<td>All climate zones; in-land, coastal, desert,</td>
</tr>
<tr>
<td></td>
<td>and arctic</td>
</tr>
</tbody>
</table>

**ARTHUR Mod C**

- The ARTHUR Mod C is a C-RAM and weapons locating radar.
- It was developed by SAAB and variants are used in NATO countries.
- Provides battalion level ground based ISR to RSG’s STRIKE Battalion.
RSG employs aviation in **austere environments without reliance on airfields**.

Aviation assets currently include:
- 12 AH-64E Attack Helicopters (*Place Holder until UCAV exists*)
- 12 UH-60 Utility Helicopters (*Place Holder until FVL exists*)
- 2 UAV launchers; each with 4 tactical ISR UAVs

RSG includes aerial surveillance coverage from modern surveillance UAVs. RSG has two pneumatic launchers. These are sling loaded. (Flight radius of around 1,000+ km, endurance for 15-18 hours, at speeds of 200+ KPH (124 mph)).

Future unmanned aircraft, as well as, improved helicopter/tilt rotor designs can be incorporated into the RSG’s Strike Battalion.
Rheinmetall designed the 120mm tank gun now used in U.S. and allied tanks.

Rheinmetall recently announced the development of a 130mm tank gun.

The new 130mm weighs about 3.5 tons or roughly the same as the 120mm gun and uses the same type of ammunition (fixed, with projectile attached to the cartridge case containing the propellant).

However, the 8% increase in caliber results in 50% more kinetic energy than the 120mm gun produces.

A turret with the 130mm cannon could be mounted on an extended PUMA chassis.

Source: Lars Hoffmann, “German Rheinmetall works on new 130mm Tank Gun,” Defense News, 15 June 2016
Rheinmetall’s new 130mm gun produces 50% more kinetic energy with the result that the 130 achieves 400 mm greater penetration than the current 120mm guns.

- The Red Bar depicts the T-14’s level of armored protection.
- The 130mm gun penetrates Russian armor at 3,000 meters and beyond.
The Army has decided to use the JLTV as the platform for its upcoming Light Reconnaissance Vehicle (LRV) program, instead of procuring a new system. Army officials note the JLTV is an interim solution, largely based on costs associated with developing a new system. [NOTE: The LRV has little survivability in any but a permissive environment with limited off-road capability and the LRV is not a stable platform for accurate fire on-the-move.]

- The Army awarded Oshkosh a $6.7 billion contract in August 2015 to build the first 17,000 production models of the JLTV. It placed a second order of $243 million in March 2016 for 657 JLTVs.

- The work could eventually be worth some $30 billion, as the Army and Marine Corps plan to buy nearly 55,000 of the combat vehicles, including 49,100 for the Army and 5,500 for the Corps, to replace about a third of the Humvee fleets.

“The light divisions were fast and maneuverable, but they had no potential to strike hard... The Polish campaign subsequently proved their uselessness, and they were reorganized into Panzer (armored) Divisions.”


“In Najaf, two battalions of the Army’s tanks did what a lighter marine battalion could not, inflicting huge casualties on Mr. Sadr’s insurgents while taking almost none of their own.”


“A single infantry company in Diyala lost five Strykers this month in less than a week, according to soldiers familiar with the losses, who spoke on condition of anonymity because they are not authorized to release the information. *The overall number of Strykers lost recently is classified.*”

“Stryker Losses in Iraq Raise Questions,” *USA Today*, 13 May 2007

- Army Infantrymen killed in WW II: 155,749.
- Tank Crewmen Killed: 1,843 (More than 5,000 U.S. tanks destroyed in European Theater during WW II).
- Armor crewmen killed in Korea (530), Vietnam (725) and Desert Storm (7)
RSG Sustainment: Self-Contained Logistics

- **RSG Sustainment Battalion** is a “Stand Alone” unit unlike the BCT’s Brigade Support Battalion (BSB).
- Each RSG Battalion has organic support (roughly 25% of its BN assets).
- RSG integrates more sustainment troops (2,426 Soldiers) than an entire Brigade Support BN (1,357 Soldiers).

**Colonel Commands 4-4,500 troops**

- Recon Squadron
- MNVR BN
- MNVR BN
- MNVR BN
- Support Battalion
- SPT
- SPT
- SPT
- SPT
- SPT
- SPT

**BG Commands 5,500 troops**

- MNVR BN
- MNVR BN
- MNVR BN
- MNVR BN
- STRIKE BN
- C4ISR BN
- Sustainment BN

32% of all vehicles and 29% of soldiers in BCT are logistics support. BCT BNs lack organic support.

43% of all vehicles and soldiers in RSG consist of integrated logistics support.
959 (IOC) Puma Chassis:

- Single chassis significantly reduces maintenance logistics costs;
- PUMA also dramatically reduces the Fuel Requirement;
- With a single common chassis the only challenge is determining when to replenish the inventory.

Fewer specialty mechanic MOSs required.

Puma Chassis Repair MOS

Puma Turret Repair MOS

- 959 Pumas=IOC. An FOC RSG would have 1505 Pumas. TEL and logistics variants would also use a Puma chassis.
- ABCT contains 1085 pieces of rolling stock for 4222 soldiers.
Active Duty External Logistics Comparisons: Current Army Compared with a Reorganized Army

Only 2 active duty Sustainment Brigades and 1 Transportation Brigade available for external support.

Division Support

Total: 10 Divisions* and 13+ Separate Brigades
*50 Brigades and BCTs organized into Divisions.

RSG and all other combat groups have robust organic support troops

Total: 43 Combat Groups

8 External Combat Support Groups (6000 troops each)

1 AC Combat Support Group for every 5 AC Combat Groups

Must draw from USAR and ARNG

Theater Support and US Army Reserve / Army National Guard Support Units
# M2 vs Kurganets-25 vs T-15 vs PUMA

## Chassis Performance

<table>
<thead>
<tr>
<th>Performance Capabilities</th>
<th>M2</th>
<th>Kurganets-25</th>
<th>T-15</th>
<th>Puma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine Power</td>
<td>600 hp (450 kW)</td>
<td>800 hp (600 kW)</td>
<td>1200 hp (900 kW)</td>
<td>1100 hp (800 kW)</td>
</tr>
<tr>
<td>Power to Weight Ratio</td>
<td>19.7 hp/ton</td>
<td>32 hp / ton</td>
<td>30 hp/ton</td>
<td>34 hp/ton</td>
</tr>
<tr>
<td>Operational Range</td>
<td>250 miles (400 km)</td>
<td>310 miles (500 km)</td>
<td>340 miles (550 km)</td>
<td>373 miles (600 km)</td>
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<tr>
<td>Speed</td>
<td>35 mph (56 kph)</td>
<td>50 mph (80 kph)</td>
<td>43 mph (70 kph)</td>
<td>44 mph (70 kph)</td>
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<tr>
<td>Length</td>
<td>6.55 meters</td>
<td>7.2 meters</td>
<td>Unknown</td>
<td>7.4 meters</td>
</tr>
<tr>
<td>Width</td>
<td>3.6 meters</td>
<td>3.2 meters</td>
<td>Unknown</td>
<td>3.7 meters</td>
</tr>
<tr>
<td>Weight</td>
<td>27.6 tons</td>
<td>25 tons</td>
<td>~40 tons</td>
<td>32-43 tons</td>
</tr>
</tbody>
</table>

**NOTE:** PUMA incorporates active protection system and ATGM (SPIKE) too.

Comparably to most IFVs, but lacks engine power to mount heavier turrets.

Uses same engine that powers T-14 main battle tank.

Engine power comparable to tanks. Mounts unmanned turret with 30mm + ATGM. Can mount 120mm Cannon.
CAOC can command RSG!
The RSG in Joint Operations with an AEF

“It was imperative in future years, especially at the War College and at Leavenworth, that the officer be thoroughly trained in both ground and air operations so that logically by this system an air force officer could command a corps or an army.”

From the War Diary of General Courtney Hodges, Commander, First Army, August 1944—May 1945

- Under JFACC command, the RSG contributes to AEF success in the early phase of future crises and conflicts.
  - Linking the RSG to the AEF and CAOC facilitates air space control on the Joint and combined level.

- RSG conducts deep operational maneuver to key operational objectives bypassing or selectively attacking enemy elements immobilized or suppressed by air, space and missile power.

- RSG ISR-Strike assets augment and complement, rather than duplicate AEF/Naval strike efforts.
RSG is Scalable to Joint Mission Requirement:

Phase I: MEU Seizes Airstrip 50 kilometers from the port city in North Africa.

Phase II: RSG BN (-) Deploys to join MEU for follow on operations.

Phase III: MEU plus RSG BN (-) secure Port to facilitate deployment of follow on Marine/Army Forces (Maritime Prepositioning Force) [Marine Expeditionary Brigade (MEB)].

RSG Recon-Strike BN (-) (~350 Soldiers)

- HQTRS Element+ C4ISR Team
- (16) IFV
- (14) AGS
- (4) AMOS
- (1) C2 Strike Vehicles + (4) Medevac version
- (1) FISTV + (1) ARTHUR
- (2) SHORAD
- (1) NASAMS firing unit of 3 launchers, 1 Sentinel radar, (1) MLRS firing unit of 3 launchers, and (1) TARES firing unit of 4 launchers + (3) FDC and (1) Giraffe 4a
- Plus various other Puma variants

C17 Sorties Required: 42

(Using ACL of 65 Tons/ACL of 84 = (33) sorties)
"The more elastic a man’s mind is... the more it is able to receive and digest new impressions and experiences... Youth, in every way, is not only more elastic, but less cautious and far more energetic."

J.F.C. Fuller, Major General, British Army 1936

| Fewer Required Command Gates Create Flexibility in Professional and Intellectual Development. |
|-------------------------------------------------|-------------------------------------------------|
| GROUP CMD                                        | Combat Group Command Desirable, But Not Required for Promotion |
| DEPUTY GROUP CMD/STAFF                          | Battalion Command Gate Required for Future Command |
| BATTALION CMD/STAFF                              | Company Command Gate Required for Future Command |
| STAFF OFFICER                                    | Platoon Command Gate Required for Future Command |
| COMPANY CMD/STAFF                                | |
| PLATOON LEADER/STAFF                             | |

- Eliminating unneeded echelons offers the opportunity to promote younger, exceptional officers faster to flag rank. (Scraps Colonel level of command)
- New Human Capital Strategy values talent more than longevity! (C2I = Character, Competence, Intelligence).
Who is Douglas Macgregor?

- Colonel (ret) Douglas Macgregor is a decorated combat veteran, the author of five books, a PhD. He was commissioned in the US. Army in 1976 after 4 years at West Point and 1 year at VMI.
- In 1991, Macgregor was awarded the bronze star with “V” device for valor for his the leadership under fire in the Battle of 73 Easting that destroyed a full-strength Republican Guard Brigade. His book, Warrior’s Rage. The Great Tank Battle of 73 Easting (Naval Institute Press, 2009), describes the action.
- In November 1993, Macgregor’s Cavalry Squadron at Fort Riley, 1-4 Cavalry, set the record for victories over the NTC OPFOR as the U.S. Army’s High Performance Unit, a record that was never equaled.
- As the Director of the Joint Operations Center at SHAPE in 1999, Macgregor supervised the planning and conduct of operations during the Kosovo Air Campaign.
- At the SECDEF’s insistence, on 16-17 January 2002 Macgregor presented his concept for the attack to Baghdad to GEN “Tommy” Franks. The plan assumed Iraqi Army and administrative structures would be retained. Though modified Macgregor’s offensive concept was largely adopted.
- Macgregor’s concepts from his groundbreaking books on military transformation, Breaking the Phalanx (1997) and Transformation under Fire (2003) have profoundly influenced thinking about change inside Russian, Chinese, U.S. and allied ground forces. His newest book, Margin of Victory is available from Naval Institute Press.