Titanium
Non Aerospace Defense Market

Deployability and Survivability in Modern Warfare

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Introduction

- The Changing Military
- How It Effects Titanium
- Programs Rich In Titanium
- The Future of Military Ground Programs
New World Requires New Military

- Cold War is Old War.

- Modern military forces are reorganizing to better counter the current threats.

- Allowing for greater deployability while increasing survivability.

- Result is more titanium will be needed for lighter weapon systems.

- Titanium industry has responded with improved products and increased capacity.
What This Means for Titanium

- Traditionally titanium has been extensively utilized by the military aerospace industry.

- It’s not just in the air that titanium is being employed. There are many active ground vehicle programs currently using titanium in the United States and Europe.
What This Means for Titanium

- Several future programs are evaluating the use of titanium.
- The military is now more willing to pursue the weight and strength advantages of titanium than ever before.
Development of Titanium Products

Forged hatch for BFV [after ballistic testing]

Prototype hull welded and fabricated from EBSM and PAM Ti-6-4

Ring for turret armor [after ballistic testing]
Where is Titanium in the Military

BAE

Bradley w/Reactive Armor
CV90 w/Passive Armor
M777 (155mm)

NEXTER (GIAT)

Leclerc w/Passive Armor
Where is Titanium in the Military

GDLS Stryker MGS

Passive Armor

GDLS M-1 Abrams

Reactive Armor

Body Armor
Possible Near Term Applications for Ti

An Up Armored HMMWV after IED attack

Joint Light Tactical Vehicle (HMMWV Replacement)

Mine Resistant Ambush Protected Armored Vehicles (MRAP)

Photo Courtesy of US Army
Future of the Military Around the World

**USA**
Future Combat Systems (FCS)

**EU**
Future Rapid Effect Systems (FRES)
Common Chassis for the FCS Ground Vehicles

- Reconnaissance & Surveillance Vehicle
- Command & Control Vehicle
- Upgraded M-1A3
- Non-Line-of-Sight Mortar
- Recovery and Maintenance Vehicle (RMV)
- Medical Vehicle
- Infantry Carrier Vehicle (ICV)
- Non-Line-of-Sight Cannon

Photos Courtesy of U.S. Army
Performance of Titanium in Service

- Most equipment sees action immediately.
- No degradation of capability in operational environments.
- Titanium has consistently provided the expected level of protection.
- Titanium has a key role in saving lives and the successful completion of missions.
Conclusion

- Threats have changed. So must our militaries.
- Greater acceptance for titanium in ground programs.
- Titanium is being added to existing ground vehicle programs and is in consideration for future ones.