Titanium in the Defense Market: Driving Growth through Innovation

Eric Roegner
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• Western Defense expenditures have stabilized

• While the market has bright spots, the challenges are increasing

• Titanium will thrive when leading with innovation
Global defense market fundamentals have plateaued

US and Europe return to pre-surge; MENA growing

- Geo-political tensions and active conflicts are increasing

Global conflict continues Driving recent weapons buys

- Egypt
- Afghanistan
- Qatar
- Kuwait
- India
- Japan

Source: Information from the Stockholm International Peace Research Institute (SIPRI), public news sources
US Defense spending stabilized, robust on select programs

Proposed FY16 Presidential budget request and Congress signaling increase

- Acquisition focused on priority programs
- Growth in USAF & Navy investment accounts

Source: TCG and GAO
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Aerospace defense remains attractive

**Continued life in legacy programs**
- F-18
- Eurofighter
- C-130
- V-22

**Healthy growth in new programs**
- F-35
- A400M
- KC-390
- Rafale

Source: IHS.Jane’s Teal Group
Strong titanium growth in aero structures

Materials % by weight on military airframes

Notes: (1) not including propulsion engines, auxiliary engines and props
Increasing market pressure for cost reduction

Source: Alcoa
Aggressive multi-material competition

FS 496 Bulkhead (titanium)
FS 518 Bulkhead (Aluminum)
FS 556 Bulkhead (Aluminum)
FS 472 Bulkhead (Aluminum)
FS 450 Bulkhead (Aluminum)
FSW 425 Bulkhead (Aluminum)
Fwd Root Rib (Aluminum)

Trades are being made

Source: Lockheed Martin
World UAV Market 2002-2024

Continuously evolving mission landscape

Source: Teal Group to AIA, July 2015

- Every incremental unmanned flight displaces a traditional system

Includes UCAVs; excludes R&D.
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Innovation across value chain is the path to success

INGOT
Melting
(Ingot, Cast Slab)

PLATE
Billetizing, Rolling
(Mill Products)

CASTINGS
Conversion
(Forging, Extruding, Investment Casting)

FORGINGS

FINISHED PART
Machining, Assembly, Testing

Revert-utilization

INNOVATIONS

New Materials

Productivity

Additive Mfg.

Adv. Fabrication

Source: Alcoa