



# Power & Energy Focus Area Forum Ground Platform Challenges

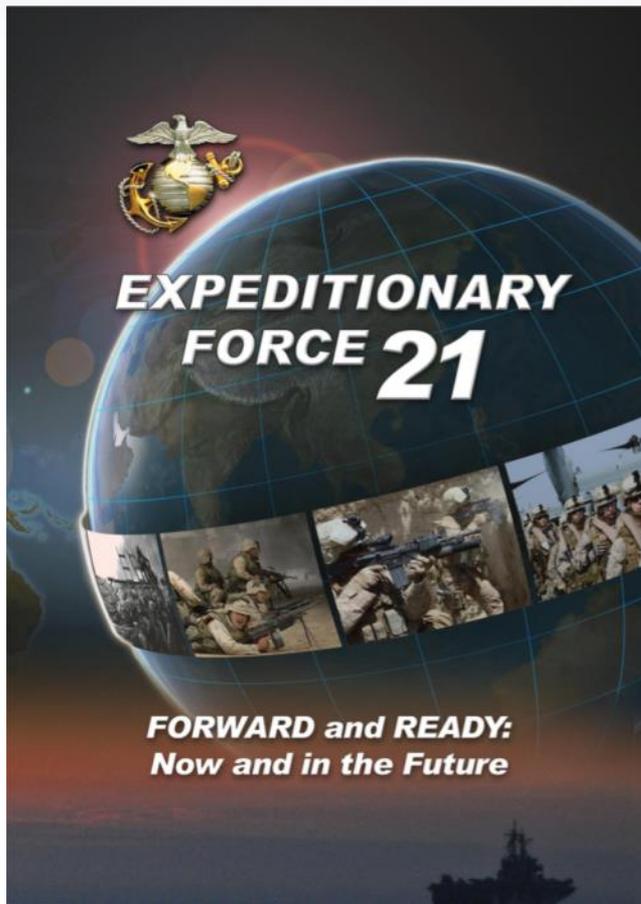
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Expeditionary Logistics  
Expeditionary Maneuver Warfare and  
Combating Terrorism Department

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## Expeditionary Force 21 describes the vision to form, train, equip, organize, and employ the Marine Corps



- *naval in character*
- *expeditionary —mobile force that is light enough to get to the crisis quickly; forward, ready and flexible*
- *tailored, economical forces*
- *distributed operations*
- *self-sustaining under austere conditions*
- *extended or indefinite sustainment from the sea...*
- *use the Sea as a Base; reduction of the logistics footprint ashore*
- *employing more efficient electrical generation and distribution systems, leveraging ground renewable expeditionary energy systems (GREENS) to maximum extent possible.*



# Ground & Sea Platform Col

## Platform Maneuver



### 3.3 Enhanced Propulsion

3.3.1: Power Density

3.3.2: Powertrain Efficiency

3.3.3: Multi-fuel Capability

3.3.4: Thermal Management

3.3.5: Operational Availability

### 3.4 Enhance Energy Efficiency

3.4.1: Energy Recovery

3.4.2: Fuel Economy

3.4.3: Power Density

3.4.4: Hybrid / All-Electric Platform

3.4.5: Onboard Power Generation

### ENDURING CHALLENGES

- Improve fuel efficiency of platforms with increasing energy demands
- Maneuver a range of challenging terrains and threat environments

## COI Purpose

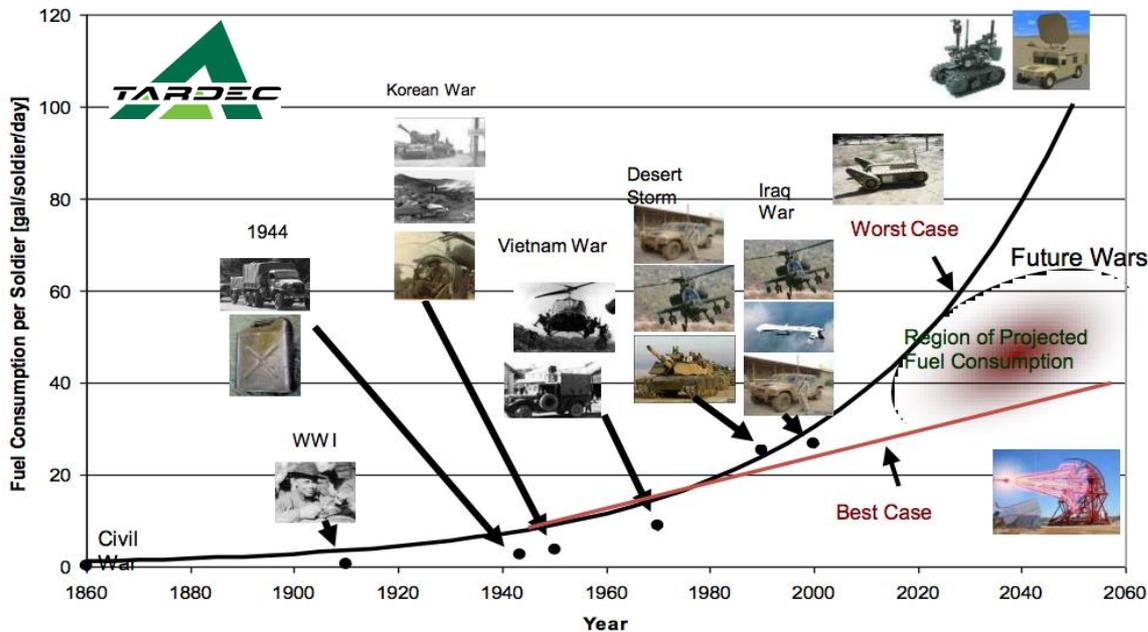
Advancing a broad range of science and technology to optimize vehicles

Focus, align, develop, and integrate advanced component technologies using innovative and new systems engineering tools

*Vision: Provide global operational reach regardless of terrain or sea state at rapid speeds while minimizing the logistics footprint*

# Ground Vehicle Platform Challenges

- Ground vehicles have experienced an exponential growth in power needs



- New C4ISR technologies
- Counter-IED jammers
- New weapons
- Future continued growth:
  - Silent Watch
  - Lasers and advanced weapons
  - Active protection systems
  - Sensors



# Ground Vehicle Platform Challenges

- Ground vehicle fleet employs technologies optimized for the commercial vehicle fleet
  - Performance / fuel efficiency not optimized for Marine Corps mission profile (70% off-road + 30% on-road)
    - Army mission profile is inverse (30% off-road + 70% on-road); lack commonality
  - Divergence of commercial and tactical technologies: commercial emission requirements reduce fuel efficiency; military vehicles exempted but OEMs focused on meeting commercial standards





# Ground Vehicle Platform Challenges

- Ground vehicles idle up to 60% of the time
  - Not designed for this mission attribute





# Ground Vehicle Platform Challenges

- Increased vehicle weight for armor after fielding added wear and tear and further taxed vehicle fuel efficiency



Photo courtesy of Headquarters, U.S. Marine Corps



# Future Trends

- Continue tailored military fuel efficiency efforts that optimize fuel economy for the Marine Corps Mission Profile
- Standardized vehicle electronics architecture
- Expect and anticipate continued power growth
- Enable modular upgrades
- Vehicle to grid technologies