

# ELECTRIC and fuel cell VEHICLES FOR MILITARY APPLICATIONS

---

February 2019

prepared by: [Andrew Christian](#)  
[VP Nikola Corporation](#)



# Why does the military need electric or Fuel Cell vehicles?

- ✓ Stealth
- ✓ Speed
- ✓ Reduced Thermal Signature
- ✓ Torque
- ✓ External Power Source
- ✓ Zero Emissions



# Hybrid vs. electric vs. hydrogen fuel cell?

## Commercial Development Path



We are here!

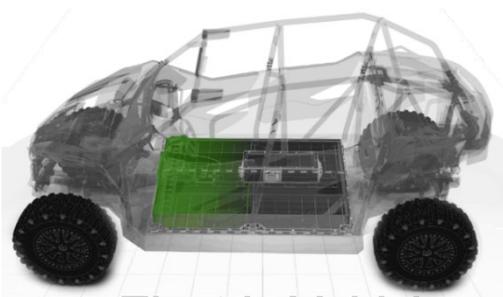
Toyota Prius

Tesla Model 3

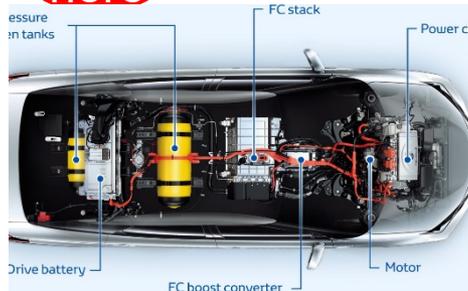
Hyundai Nexo

## Military (Build to requirements) Development Path

We are here!



Electric Vehicles

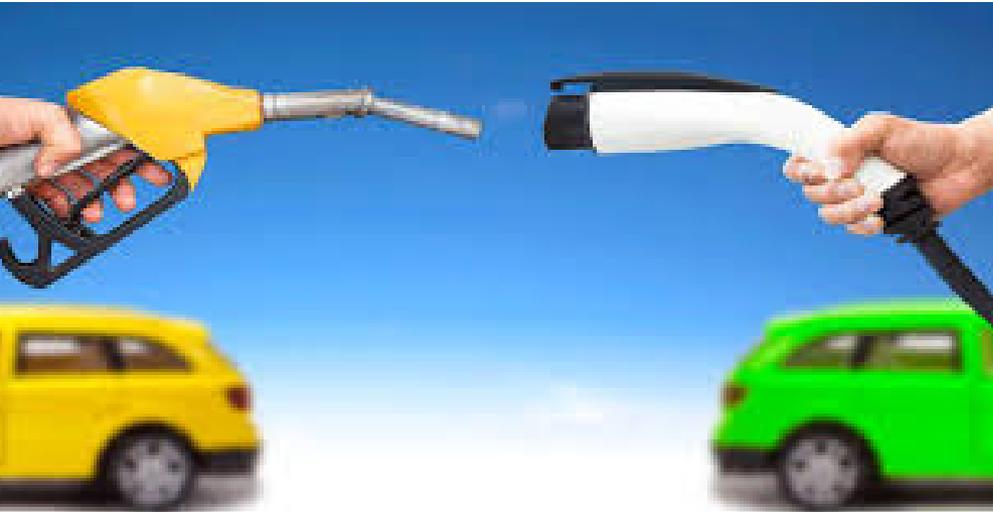


Hydrogen Fuel Cell Electric



Hybrid/Electric/Fuel Cell  
Powertrains  
Future Military Vehicles<sup>3</sup>

# Military Challenges with electric and fuel cell vehicles



- ✓ Range/Range Anxiety
- ✓ Charging / Speed
- ✓ Hydrogen Fueling
- ✓ Military Logistics



# Where are we heading?

“Every ground and rotary wing vehicle that the Army produces from now on ... every single one of them, the base requirement is it has to be and unmanned, either autonomous or ~~semi~~ autonomous,”

Army Chief of Staff Gen. ~~M~~ **M** Miley

- ✓ Hybrid (Now)
- ✓ Electric Powertrains (Future)
- ✓ Fuel Cell/Electric (Future)
- ✓ DOD Experimentation
- ✓ Securely Connect to IOT
- ✓ Autonomous Vehicles
- ✓ Manned/Unmanned



# QUESTIONS?

