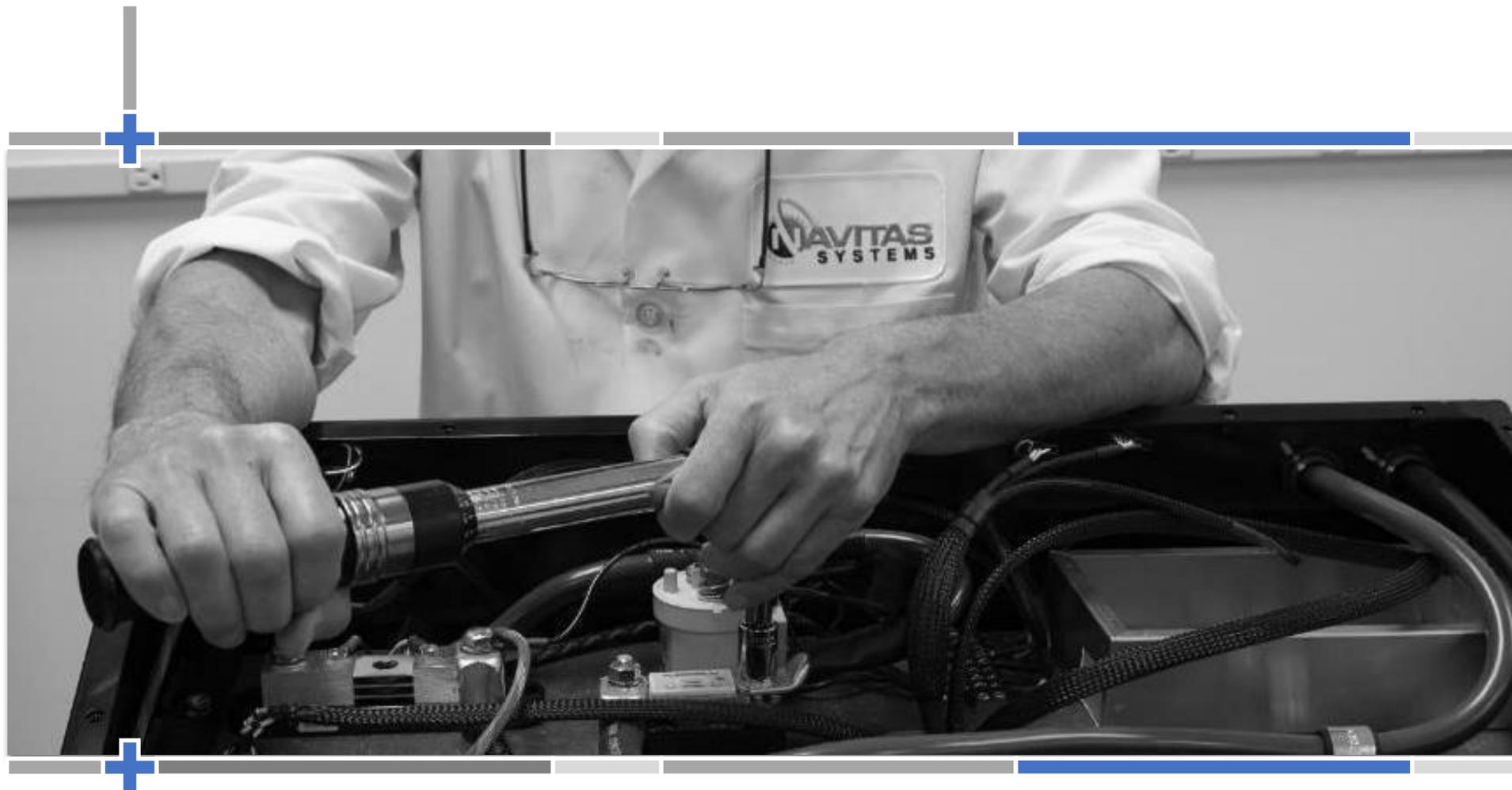




# Navitas Systems Capabilities for Electrified Powertrain Flight Batteries



# Navitas Systems operates three business units

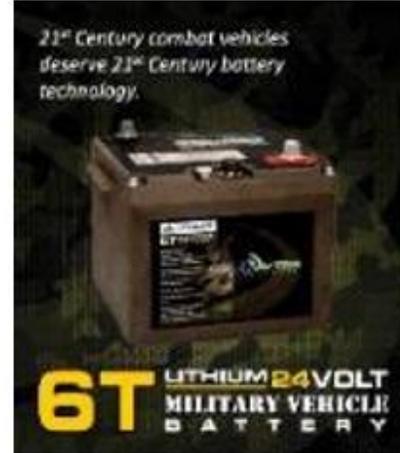
## Commercial



Lithium Forklift Batteries



## Government



Lithium Heavy Duty Vehicle Batteries



Advanced Lithium Cell Manufacturing

## Advanced R&D



Research Contracts



# US Government and Military Products

Centurion Telecom Lithium System



Providing Back up Power for FAA

Centurion UPS Lithium System



Providing Back up Power for NASA

Safe High Energy Cell for Navy F18



Lithium Sulfur Battery for F35



Novel "Round Cell" For Tubular Applications

Vehicle to Grid (V2G) System



ESU + TVGM on skid in back of HMWV

Ultanium 6T Lithium Military Vehicle Battery

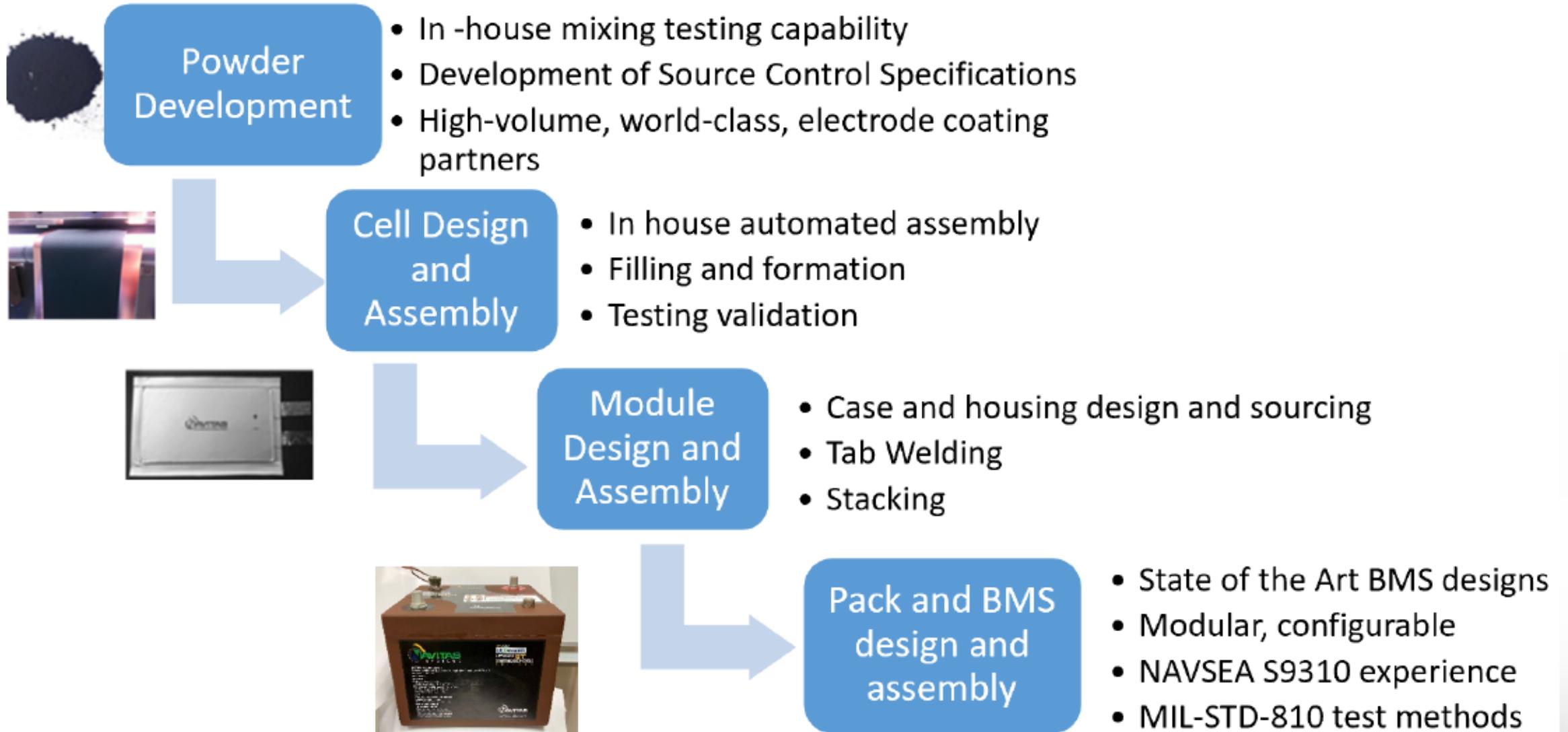


Passed NAVSEA Testing

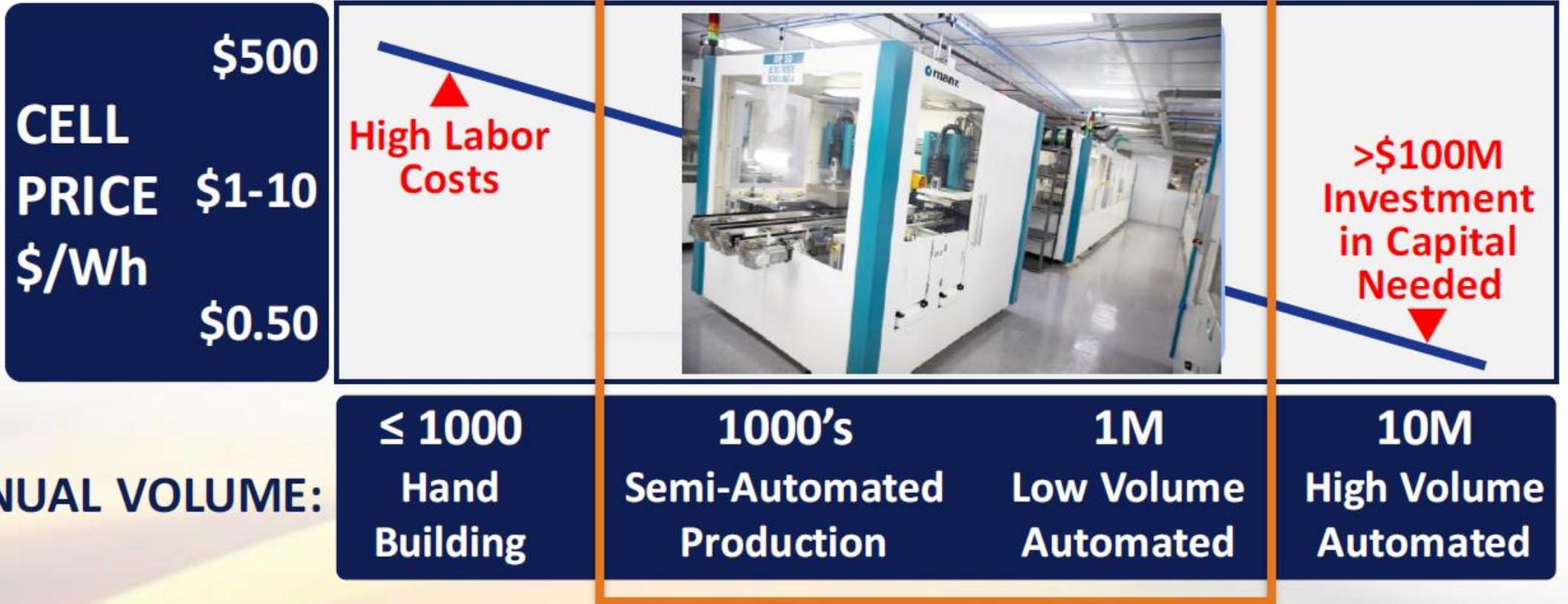


Solvent-Free Mfg. Process for Solid State Batteries

# Vertically integrated 'powder-to-pack' advanced solutions



# Novel form factors and chemistries on North America's most flexible automated production line.



*Few cell makers operate efficiently at mid-volume or flexible format. Non-auto or electronics markets are underserved.*

## Cell assembly line overview

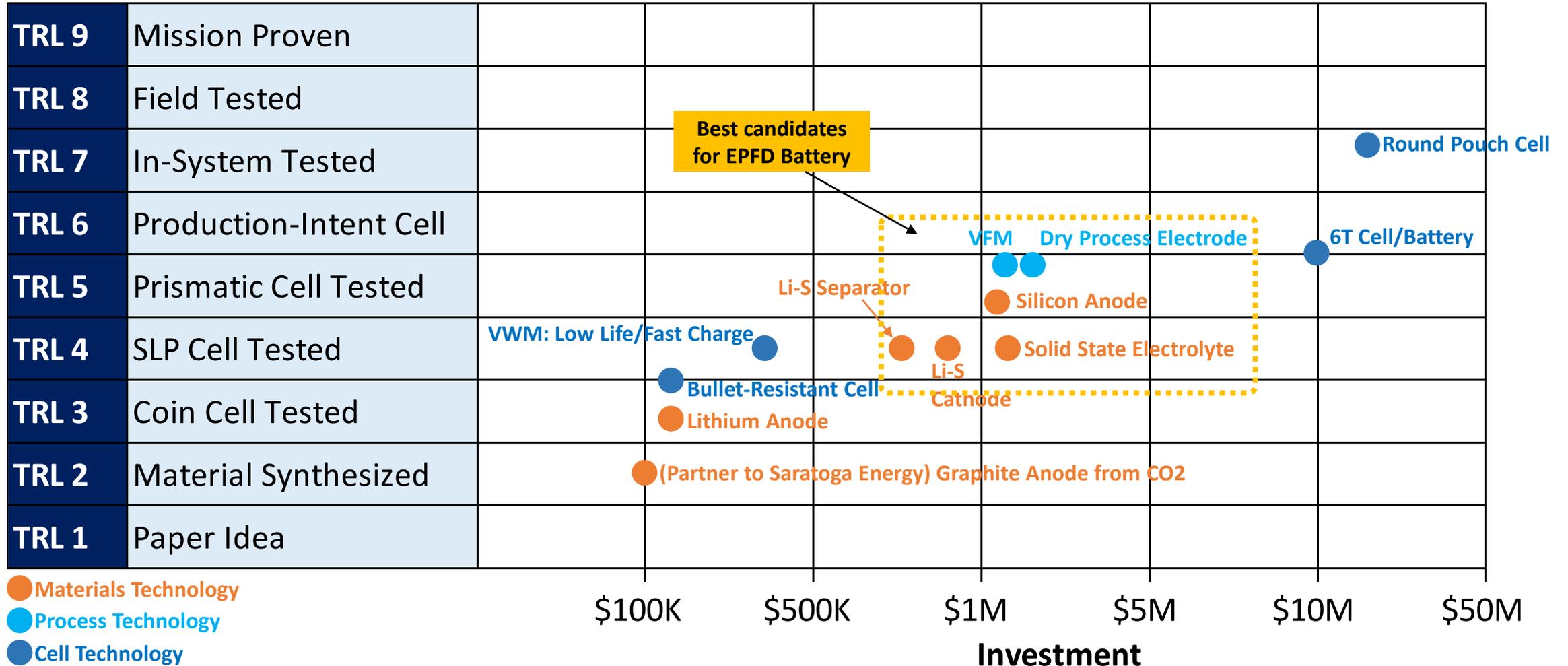


- Size range: 20 x 30mm ↔ 200 x 200mm
- Form factor flexible: square, prismatic, notched, curved, or arbitrary-shape cells
- “3D” cells possible
- High volume electrode coating with partner
- ISO 9001:2015 registered
- ITAR-compliant, controlled access facility
- Expert development and support team

*Serving Government Agencies; DOD Primes and Subcontractors; and Specialty Commercial, Medical, and Industrial Users*



# Navitas expertise in translating from bench to production-intent custom cells.





## High Energy/High Power Cells for Aviation

- High power cells for airborne directed energy
- Next gen Li Ion for aviation start/back-up power (Si anode)
- Cathodes for LiS aviation start/back-up power
- Separators to LiS battery cycle life (NASA)
- Multi-platform airborne Li ion battery

*Navitas teams with DOD primes that have system integration, safety and thermal management expertise complementing our cell development and production capability.*

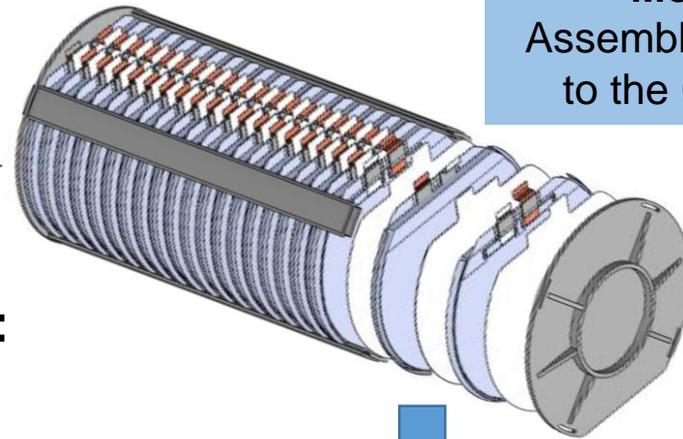


- 24V, 95Ah device
- 1100 cold crank amperes at -18°C
- 400 cold crank amperes at -40°C
- 1000 cycles at 38°C
- 500 cycles at 50°C
- 7S3P module
- Purpose-built cells
- Highly featured, advanced BMS
- Replaces 2 legacy lead-acid batteries with one Li-ion unit
- Cell design locked; LRIP in 2Q2020
- Initial battery production in late 2020

# US Navy Li-ion Sonobuoy Battery



**Round Pouch Cell**  
Manufactured at  
Navitas in Michigan



**168 V Battery  
Module**  
Assembly Adjacent  
to the Cell Line

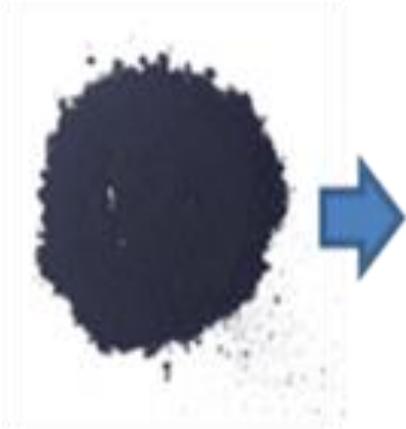
## Round Pouch Cell:

- NMC/Graphite
- 3.6 Ah, 165 Wh/kg
- 3.7 V (nominal)
- 4.2 V (full charge)
- In production; targeting 500,000 cells/year

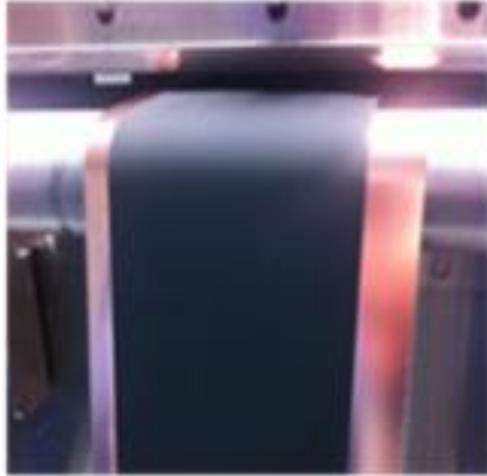


**Deployed in  
Lockheed Martin  
Sonobuoy**

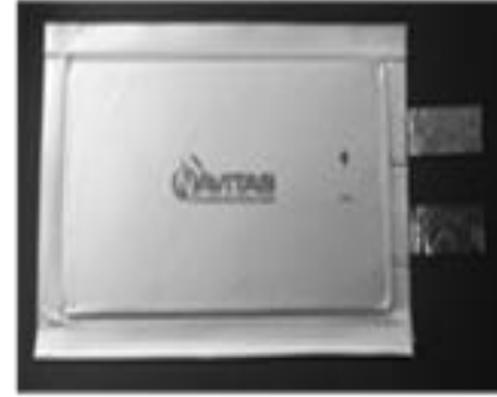
# Prototype cells and battery incorporating high capacity silicon alloy anodes.



Powder  
5kg



Electrode  
400 m



Pouch Cell  
2.5 & 7.5 Ah  
(350Wh/kg)



TRL 6:  
Battery  
26V, 30 Ah

- Custom cell formats and advanced cell chemistries.
- Rapid development cycle time.
- Process innovation and product differentiation based on SOA domestic electrode and cell production facility.
- Partnerships with DOD primes to access system integration, safety and thermal management for airborne systems.

***Thank You!***