GVPM Non-primary Power Systems Overview

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Non-primary Power Systems

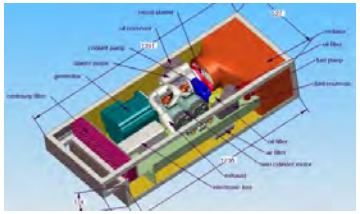
GVSETS
GROUND VEHICLE SYSTEMS ENGINEERING AND TECHNOLOGY SYMPOSIUM

Challenges we have:

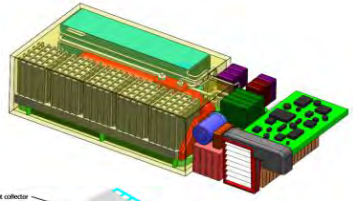
- Small engines and fuel cells need further reliability improvements for military ground vehicle applications
- Small engine APUs and fuel cell based APUs utilize components not designed for APUs; (fuel injectors, pumps, blowers)
- Heavy fuel combustion in small and unconventional engine applications
- APU system integration: cooling, noise, confined space claims and operation in a military environment

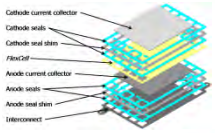
Solutions we are investigating:

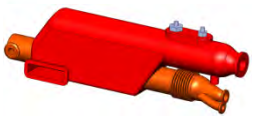
Development of efficient, reliable small engines for APUs



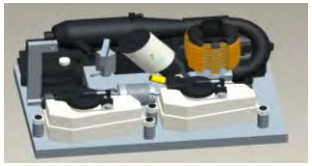
Develop fuel reformers and fuel cells for APUs

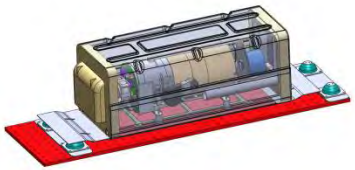




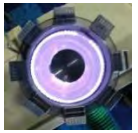


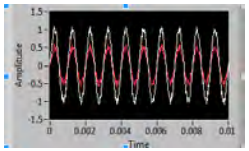
Optimize and integrate micro engines and fuel cells into small robotic systems





In-house research on sulfur tolerant reformation, noise analysis, robotic range extension





Where we need your help:

- Optimizing fuel injection, sealing, noise mitigation and packaging for small engines
- Endurance testing of JP-8 reformer systems integrated with fuel cells
- Micro engines and small fuel cells that utilize JP-8
- Fuel cell and JP-8 reformer sulfur tolerance
- Innovative solutions for utilizing COTS small engines for fixed space claims

Projects
Current & Future

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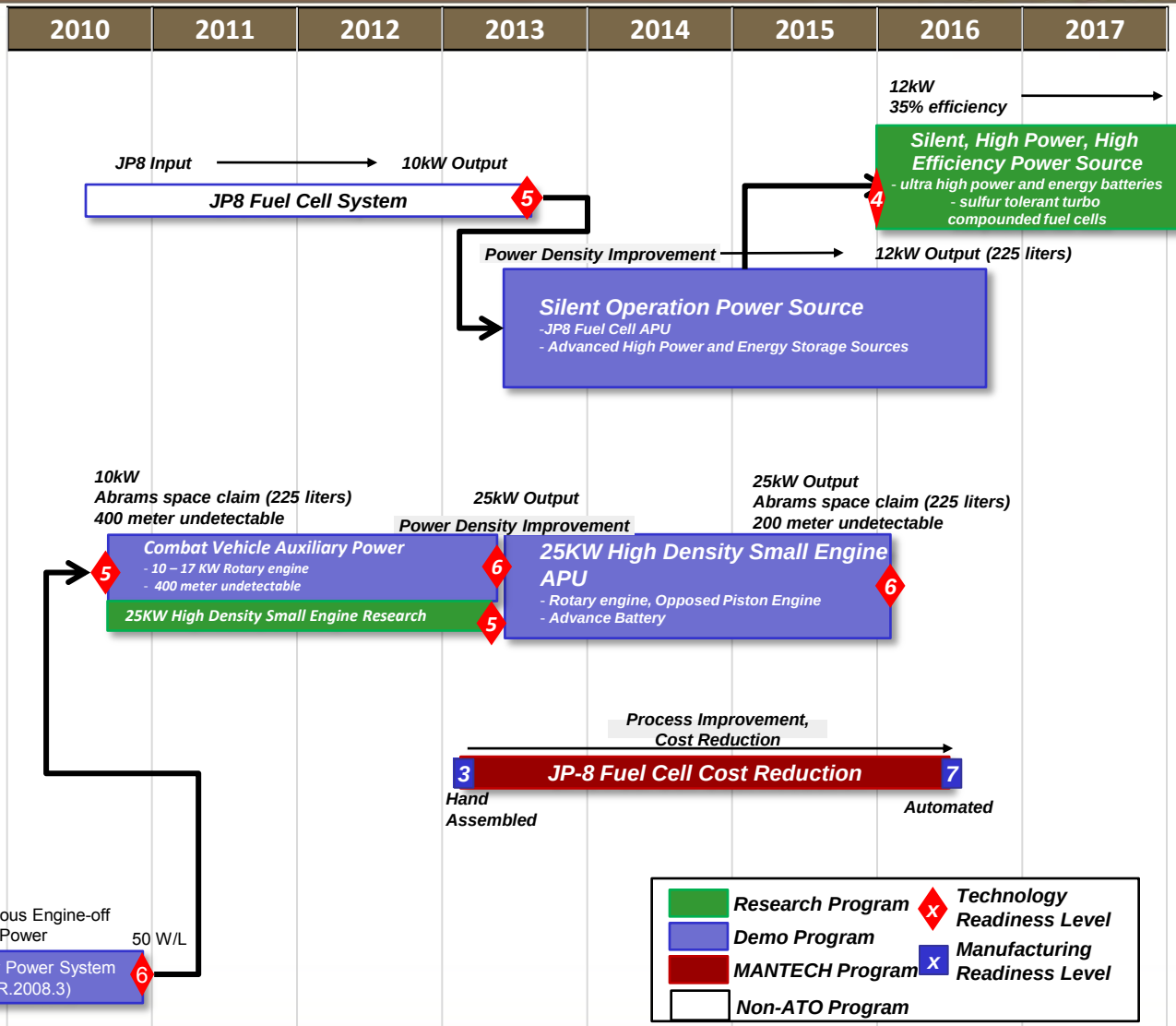
GROUND VEHICLE SYSTEMS ENGINEERING AND TECHNOLOGY SYMPOSIUM

Near Silent operation (undetectable at 50m)

25KW Small Engine based APU (undetectable at 400m)

Fuel Cell Cost Reduction



Laboratory Capability Current & Future

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GROUND VEHICLE SYSTEMS ENGINEERING AND TECHNOLOGY SYMPOSIUM

Current Capability

- Bldg 212 Test Cell

- Bldg 7 Environmental Chamber

GSPEL
Ground Systems Power and Energy Laboratories

NPS Roadmap

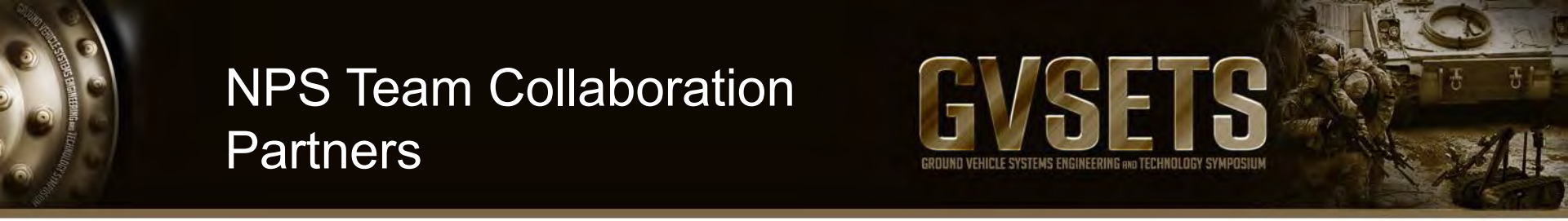
Future Capability

- Fuel Cell Laboratory

- Limited bench top assemblies
- Use of Bldg 212 test cells and Bldg 7
  - APU validation testing

- 3 walk in and 1 bench top fume hoods
- Fuel cell APU system testing
- Fuel reformation research and testing
- APU set up area and inspection space
- Full power source characterization

NPS Team Collaboration Partners



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