



TARDEC/NAC

Research Development and
Engineering Command



- The U.S. Army Tank Automotive Research, Development and Engineering Center (TARDEC)-National Automotive Center (NAC) is the DoD/Army focal point for collaborative ground vehicle research and development and serves as a catalyst linking industry, academia and government agencies in the development, exchange, and commercialization of automotive technologies.
- The NAC accelerates the commercialization of advanced vehicle technologies by demonstrating new technologies in a safe, controlled environment and recognizes the inherent linkage between mobility platforms and the energy infrastructure necessary to support these platforms.

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Selfridge Air National Guard Base



Selfridge Air National Guard Base is a true joint military facility, with units from the Air National Guard, Air Force Reserve, United States Army, Navy, Coast Guard and Marine Corps.

*Located on Lake St. Clair, the base
consists of 3,000 acres and supports a joint service training environment.*

Cold weather demonstration, evaluation and test site

Average high in January 33°F with lows of 0°F. Snowfall typically occurs November to April and ranges from 1-10 inches per month.



Vision, Opportunity & Goals

Vision: Selfridge Air National Guard Base (SANG)
A “21st Century Base”

Opportunity: Demonstrate fuels, energy and mobility technologies in a joint service environment close to TARDEC to evaluate technical readiness and show potential customers – military and commercial – opportunities for adoption.

Goals:

- Show advanced energy technology demonstrations
- Provide hands on training on advanced energy technologies
- Provide data collection and analysis of advanced energy technology – know the technical readiness
- Partner with others in cold weather evaluations



Team Members

NAC

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SANG

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Maj Drew Causey 127 CECE Chief

2LT Shaun Modock, 127 LRS/LGV

SSgt Harold Potter, 927 ARW





Demonstration Partners



Government

- Office of the Secretary of Defense
- U.S. Air Force-Advanced Power Technology Office (APTO)
- RDECOM Power and Energy IPT
- Construction Engineering Research Laboratory (CERL)
- U.S. Department of Energy
- U.S. Department of Transportation
- Federal Transit Administration
- Defense Logistics Agency

Academia

- Kettering University
- Macomb Community College
- Wayne State University

Private

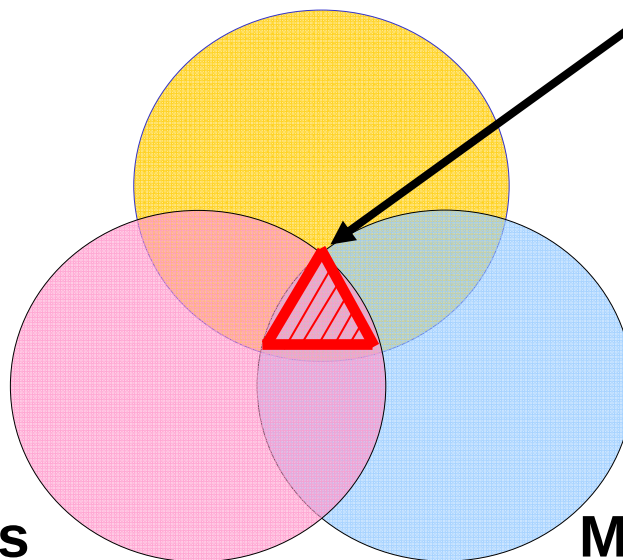
- Chevron Technology Ventures
- Hyundai
- Ballard
- ECD Ovonic
- Harlan
- General Hydrogen
- NextEnergy
- Titan Energy Development
- Southwest Research Institute
- Syntroleum
- Select Engineering Services
- Alion
- Quantum Technologies
- GM
- Blue Bird
- ICRC
- Enova
- Nextek Power Systems
- NOVI Energy
- Northern Electrical Testing

SANG Projects

- Advanced Mobile Microgrid
- Mobile Encampment Waste to
Electrical Power System
(MEWEPS)

Energy

*Energy
Infrastructure*



- Hydrogen Infrastructure-Cold Weather
Test Site (DOE)
- Hydrogen Maintenance Facility
- Hydrogen HyHauler
- U.S. Air Force Synthetic Fuel (GSE)

Fuels

- Fuel Cell Ground Support Equipment
(GSE)
- Hydrogen Metal Hydride Storage
(GSE)
- Hydrogen Fuel Cell Vehicles

Mobility



Mobility



Mobility-H2 Fuel Cell GSE

Project Objective:

Evaluate the gap in technology, training, infrastructure while expanding the use of fuel cell technology to the 14-18kW range in Ground Support Equipment (GSE).
Integrate, instrument and test two fuel cell GSE and instrument and test one diesel electric tow tractor
Develop fuel cell technician training curriculum.

Partners:

Select Engineering Services
Kettering University
Macomb Community College
Harlan
Ballard Fuel Cell
General Hydrogen
Enova

Project Start/End Date at SANG:

September 07-December 07

SANG Participation:

Operate GSE and participate in technician training





Mobility-Metal Hydride H₂ Storage GSE

Project Objective:

Convert a GSE tractor by integrating an optimized hydrogen fuel cell with metal hydride hydrogen storage. The tractor will be tested at SANG to evaluate traction, efficiency, emissions and run-time per tank. Installation of hydrogen dispensing for metal hydride storage.

Partners:

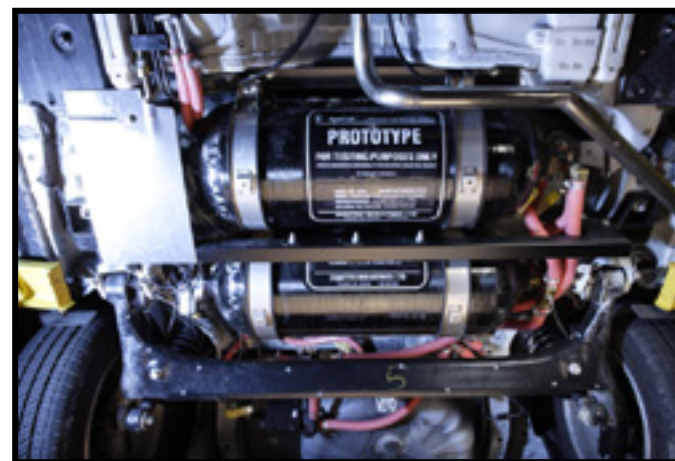
ECD Ovonic
Harlan

Project Start/End Date at SANG:

September 07-April 08

SANG Participation:

Operate GSE and hydrogen refueling





Mobility-Fuel Cell Vehicles

Project Objective:

Participate in DOE Freedom Car hydrogen fuel cell vehicle program, using vehicles in base missions. The vehicles will be driven 500 miles per week, per vehicle. Evaluate freeze cycle of $<15^{\circ}\text{F}$ for 3 days. Perform multiple fueling events, monitor data collection, analyze performance and perform basic maintenance.

Partners:

Hyundai

Project Start/End Date at SANG:

March 07-December 09

SANG Participation:

Operate fuel cell vehicles





Fuels



Fuels-Hydrogen Refueling Station

Project Objective:

Install a hydrogen production and dispensing station at Selfridge Air National Guard Base as part of the Department of Energy program. The hydrogen will be produced on-site from natural gas reforming.

Partners:

Chevron

Project Start/End Date at SANG:

August 06-December 09

SANG Participation:

Refuel fuel cell vehicles





Fuels- Hydrogen HyHauler

Project Objective:

Provide interim and back up hydrogen dispensing at SANG.

Partners:

Quantum Technologies

Project Start/End Date at SANG:

Mid February 07-December 08

SANG Participation:

Assistance with setting up and fueling.





Fuels-Synthetic Fuel Demonstration

Project Objective:

Test and evaluation of 2300 gallons of Syntroleum Synthetic fuel, used in ground support equipment and bus applications at SANG. Operation in a turbine, 2-cycle, light 4-cycle and medium 4-cycle to include storage/delivery.

- **1200 gallons** of JP-8 will be blended with 1200 gallons of S-8 for use in the -60 generator set and Dodge Flightline tow tractor
- **800 gallons** of JP-8 will be blended with 800 gallons of S-8 for use in the -86 generator set and tractor
- **300 gallons** of pure S-8 will be used in the Bluebird 28 passenger bus

Partners:

Air Force, APTO
Syntroleum
Federal Transit Administration
ICRC

Project Start/End Date at SANG:

August 06-May 07

SANG Participation:

Fuel blending and data collection





Working Together

- **Cooperative agreements**
 - CRADAs
 - MOAs
- **Sharing of information**
 - Program plans
- **Clear lines of communication**
 - Established points of contact
 - Clear understanding of processes and approvals
- **Project involvement-development to implementation**
- **Coordination of media event and information**
 - Press events (Ribbon cuttings)
 - Press releases
 - Training
 - Community outreach