



Deploy: long-endurance small unmanned systems

GOAL: Deploy mission-ready small unmanned ground vehicle (UGV).

Fuel cell powered a continuous 12-hour patrol test with iRobot Packbot UGV at Camp Grayling, MI.

- Covered 40 miles of terrain with no refueling stops.
- Hybridized system with 150 W baseline power meets rock climbing, stair climbing, and rough terrain power needs.
- Standard battery pack limited to ~2.5 hours/8 miles in identical conditions.

Fuel cell powered 24-hour persistent stare demonstration on iRobot Packbot at Ft. Hood, TX.

- Enables new perimeter control and reconnaissance, surveillance, targeting and acquisition missions for UGVs.
- Standard battery unable to support extended missions.

Transitioned to Army TARDEC to further develop system for long endurance missions.





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GOAL: Deploy mission-ready small unmanned aircraft system (SAUS) with 6+ hour endurance.

Users have need for SUAS with 6+ hour endurance.

- SOA batteries provide only ~2 hour endurance.

March 2010 DARPA-sponsored SUAS demonstration easily surpassed 6-hour endurance with propane-fueled solid oxide fuel cell power source.

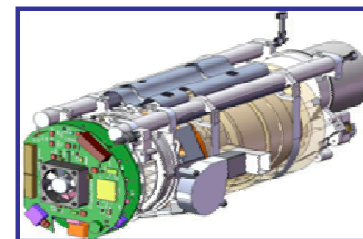
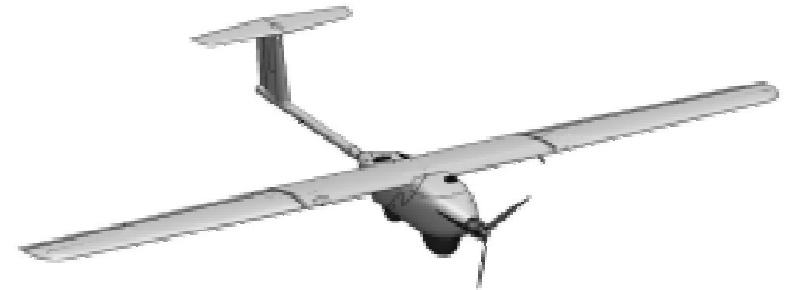
- Demonstration unit (optimized for light weight) not rugged enough for DoD operations – cannot survive multiple “deep stall” landings.

Current DARPA effort ruggedizes fuel cell/aircraft system to meet user need for 6+ hour endurance and survival of >10 landings.

Target: complete deployable system late 2011.



Unmanned aircraft system sized for small-unit ops.



Enabling technology:
Compact solid oxide fuel cell
Propane-fueled power source provides >3x improvement in endurance over SOA battery.