SAND2018-1972C

Mine Rescue Robotics: Gemini-Scout

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Gemini Scout: Mine Rescue Vehicle

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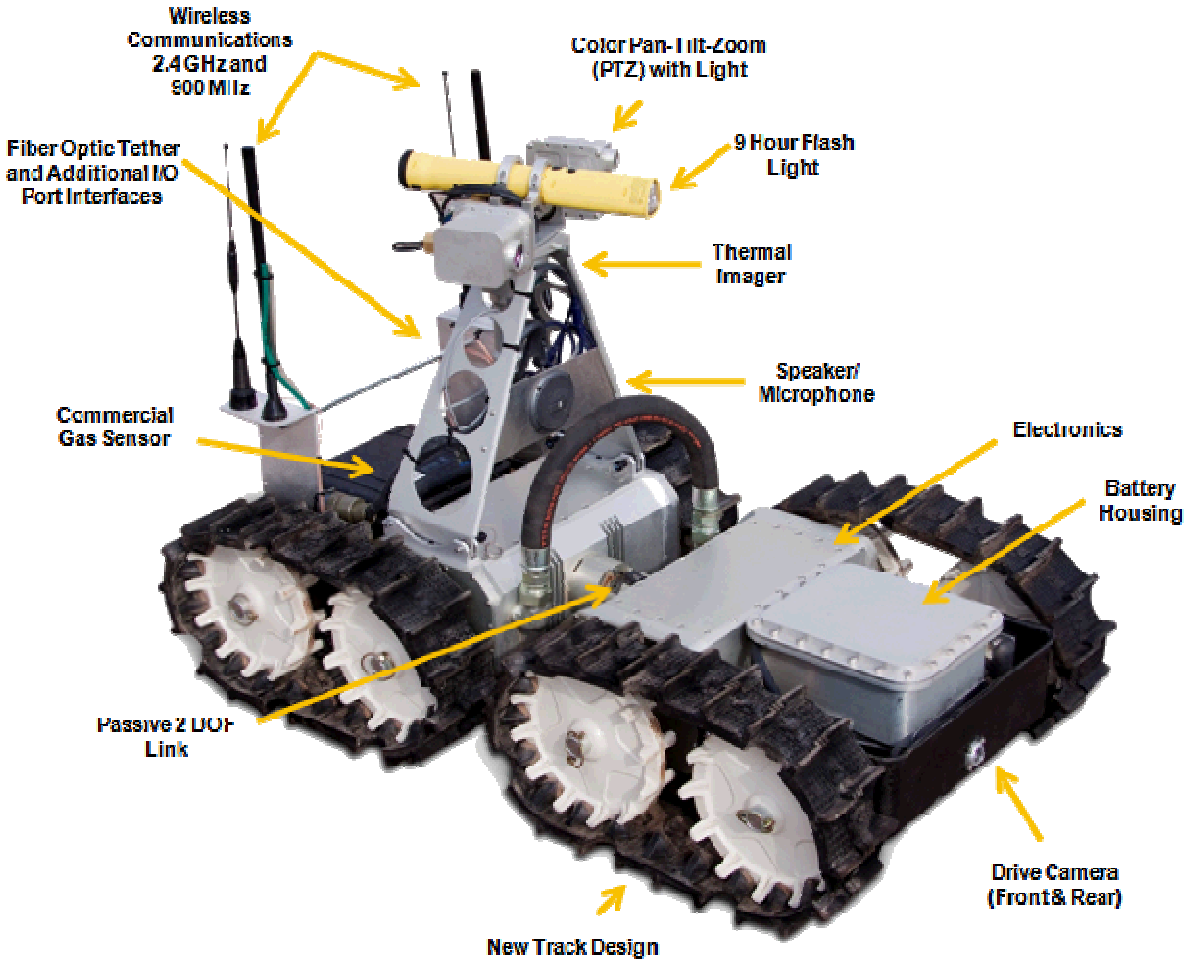
- Developed for NIOSH/MSHA as proof-of-concept (2008-2010) to:
  - Assist in underground mine recue operations
  - Enter and provide assessment in dangerous situations
  - Locate trapped miners without endangering first responders
  - Provide extreme mobility in harsh environments

Gemini-Scout Mine Rescue Vehicle



Specifications:

- Extreme Ground Mobility Platform
- Fully Operational in ~18 inches of water
- Explosion Proof Housing
- Modern PC-based Control Interface
- Pan-tilt-zoom color and IR cameras with 2-way Radio and lighting
- Gas and temperature sensors integrated
- Available I/O's for adding payloads and sensors
- Integrated fiber optic interface

- Speed – 3.5 MPH
- Weight – 190 LBS (w/ 4hr minimum battery life)
- 4ft x 2ft Footprint
- 2ft Tall at Tower

Gemini Scout: Project background

- Three proof-of-concept units built (2008 -2010)
- NIOSH performed independent evaluation
  - Tested operational limits of platform
  - Completed in 2012
- Design updates completed 2016

NIOSH Testing

NIOSH Requirements Testing – Dec 2010

NIOSH Testing

NIOSH Requirements Testing – Dec 2010

Demonstration – NIOSH 2016

Demonstration – NIOSH 2016

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Demonstration – NIOSH 2016

Applications for Waste Management

- High mobility sensor platform
  - Sensors specific to application
- Send Gemini-Scout type vehicle in to assess situations that are
  - Dirty
  - Dangerous
  - Unknown

Applications for Waste Management

- Add manipulator for increased ability
  - Turn valves
  - Move blockages
  - Take samples

Lessons Learned

- What worked
- Recommended enhancements
- Development considerations