

## Advanced Vehicles for Rugged, Remote, and Hazardous Locations (Manned and Autonomous)

A NEW CO-DEVELOPMENT OPPORTUNITY

Reference No: NNJ14ZBH022L

**Potential Commercial Applications:** automotive industry, Department of Defense (DoD), emergency operations (police, rescue, first responders, etc.), disaster recovery operations, remote and hazardous environments, and others

**Keywords:** autonomous robotic vehicle, electric vehicles, robots, robotics, high energy density batteries, active suspension, obstacle avoidance and detection, vehicle with protective environment

### **Purpose:**

NASA JSC seeks to extend technology associated with their existing rovers for earth-bound applications such as rugged, remote and hazardous environments.

These rovers can be updated and adapted to address any earth-bound application that requires an autonomous robotic vehicle or a manned vehicle with a protective environment.

### **Technology:**

NASA JSC has developed two planetary exploration rovers, the Space Exploration Vehicle (SEV) and the Centaur 2. The SEV is a large electric rover that can function as a manned vehicle or as an autonomous robotic vehicle. The SEV consists of a chassis with six wheel modules capable of 360° of motion, enabling it to drive in any direction and to point-turn the entire vehicle, and a cabin for human-use which also serves as a mounting location for robotic sensors. The SEV chassis without the cabin can carry a variety of objects. The current SEV can cover very rugged terrain, maneuver steep inclines and perform straight-line driving at a top speed of 12 MPH using its Six Degrees of Freedom (6-DOF) chassis. The Centaur 2 rover has 4 wheel modules, and like the SEV, can point-turn and drive in any direction. Centaur 2 can carry science-payloads, geologic tools or even a Robonaut 2.



[Space Exploration Vehicle](#) (SEV)



[Centaur 2](#)

The primary technology challenges include higher energy density batteries and active suspension and obstacle avoidance/detection to achieve higher speeds in a wide range of environments. These challenges are directly applicable to the next generation of electric vehicles.

**R&D Status:**

The technology associated with these vehicles is advanced. NASA continuously addresses challenges associated with these technologies as advancements in specific components develop, e.g., lighter and higher energy batteries.

**Intellectual Property (IP):**

Multiple individual technologies associated with robotics are currently available for co-development and licensing. Visit [Robonaut 2](#) and click on [Licensing Opportunities](#).

This co-development project may produce new IP that could be jointly owned by NASA and the partner or may become the property of the partner.