

# ROCKETSTAR

robotics

## Vision

Dedicated to providing actuators and mechanisms for spaceflight applications Rocketstar Robotics features a management and engineering team with over 25 years of experience in the design and manufacture of spacecraft mechanisms.

Armed with the latest state of the art analytical tools our tightly integrated and seasoned project team relentlessly pursue the optimum solutions to our customers' problems.

Rocketstar Robotics can analyze, design, and manufacture components to customer specifications for demanding spaceflight applications. All analysis and design is performed in-house with the latest analysis tools. Rocketstar Robotics makes effective use of parametric models that are dynamically linked to our analysis. Our manufacturing operations are supported by a select team of precision machining services.

Rocketstar Robotics broad technical capability means that our customers will never be forced to use a technology that is not the best option for their application.

## Products



*Rocketstar Robotics' engineers developed the Array Deployment Actuator for the Genesis project to sample the solar wind*



*Rocketstar Robotics engineers designed deployment actuators for the Shuttle Radar Topography Mapper, the largest deployable structure ever flown*

Some of our areas of expertise include but are not limited to:

- Brushless DC, Stepper and Coreless Motors
- Planetary, Spur, Helical and Harmonic Transmissions
- Planetary Gear Motors
- Solar Array Drives
- Bi-Axis Gimbals
- Linear Actuators
- Twist Capsules
- Slip Rings
- Wheel Drive and Steering Actuators
- Encoders, Resolvers and Potentiometers
- Brakes and Clutches



*Rocketstar Robotics' High Specific Stiffness Harmonic Drive Rotary Actuator for camera and antenna pointing mechanisms, solar array drives and robotics applications*



Rocketstar Robotics' engineers have been responsible for the design and manufacture of motors, gearboxes, actuators, gimbals, camera pointing mechanisms, deployment systems, and robotic manipulators. They are just a few of the many spacecraft they have contributed to including: (a) Global Positioning Satellites, (b) Radarsat I and II, (c) Sirius Satellite Radio, (d) Genesis, and (e) Mars Reconnaissance Orbiter.

## Flexibility

Motors, gearboxes, clutches, brakes, telemetry devices and twist capsules can be combined to provide custom electromechanical actuators and systems for a variety of applications including; antenna, instrument and camera pointing mechanisms, filter wheels, scan mirrors, sampling systems, deployment systems, and robotic manipulators.

## Trust

Prior to starting Rocketstar Robotics our engineers have been responsible for the design and manufacture of numerous high profile spacecraft mechanisms and actuators. In addition, they have been called upon on multiple occasions to serve as consultants to several spacecraft and spacecraft mechanisms suppliers including the Jet Propulsion Laboratory. From Earth orbit, to Mars and beyond our team is ready to support our customers' requirements.



Rocketstar Robotics' Lightweight Planetary Gearmotor Assembly provides exceptional torque and efficiency per unit mass through advanced gear tooth profile optimization and motor technology





deployment systems, suspension systems, robot arm actuators, instrument mechanisms and solar array drives for dozens of spacecraft applications. Presented here (e) Koreasat, (f) Orbview 3 & 4, (g) Satcom K1-K4, (h) Orbcomm, (i) A2100 and A2100M, (j) DMSP, (k) Mars Observer, and (l) Mars Pathfinder.

## Experience

The engineers at Rocketstar Robotics have been instrumental in the design of actuators and mechanisms for a lineup of satellite missions dating back over two decades. Some highlights include; release and deployment mechanisms for Satcom K1-K4, DMSP, Geostar, Radarsat 1 & 2, Telstar 4, Advanced Communications Technology Satellite, and Landsat, antenna pointing mechanisms for Intelsat, Immarsat, Orbview 3 & 4, A2100, A2100M, Sirius Satellite Radio and Advanced EHF and solar array drives for Orbcomm, Satcom K1-K4 and DBS. Our experience with manned missions includes actuators and mechanisms for the Space Station and deployment actuators for the largest deployable structure ever flown in space on the Shuttle Radar Topography Mission.

Our engineers' experience with designing actuators, gearboxes and deployment mechanisms for Mars Missions is unparalleled with over 50 mechanisms alone on the Mars Exploration Rover program including; actuators for azimuth, deployment, elevation, and camera pointing mechanisms for the pancam mast assembly as well as transmissions for the wheels, steering, suspension, wheel deployment, solar array deployment, antenna pointing, airbag retraction and sampling systems. In addition to MER, they have also been responsible for the design of mission critical mechanisms for Mars Observer, Mars Pathfinder, and Mars Volatiles and Climate Surveyor. But our experience does not just stop at Mars. Rocketstar Robotics' engineers have also contributed to deep space missions such as scan mirror components for Stardust and the main sampling system mechanism for Genesis. Clearly our engineers' have our customers' trust when it comes to mission critical mechanisms.

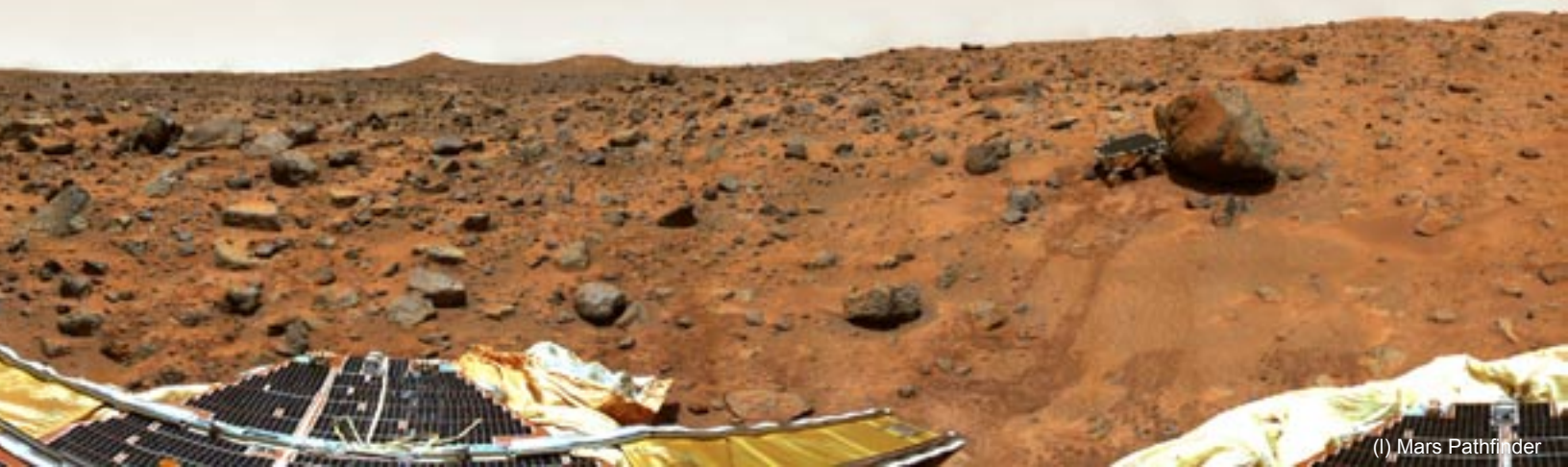
## Capability

Rocketstar Robotics design, analysis, and manufacturing capabilities provide exceptional performance and value. Our engineering team is well versed in the all disciplines of actuator and mechanisms design including; gear design, motor design, static and dynamic stress analysis, thermal analysis and tribology.



Rocketstar Robotics' engineers have been responsible for the design of more than 50 mechanisms and gearboxes on the Mars Exploration Rovers Spirit and Opportunity and they have all performed well beyond expectations

Our experienced design team uses state of the art parametric solid modeling and finite element analysis software for design optimization. Gear tooth profiles are optimized against load characteristics for absolute minimum mass gearbox designs in compliance with American Gear Manufacturers Association (AGMA) standards.



(l) Mars Pathfinder

## Manufacturing

Working in concert with a select team of outside machining services we have a manufacturing capability that is second to none without the overhead requirements of an in-house shop. Our manufacturing capability includes CNC machining, wire and sinker EDM, gear shaping and grinding, composites manufacture and precision OD grinding. Manufacturing efficiency is enhanced through our progressive 'art to part' system that reduces manufacturing lead times and inspection requirements while supporting our quality goals.

Plans are currently progressing towards acquisition of our assembly and test facilities. Critical processes such as cleaning, lubrication, assembly and test will be performed in-house. Cleaning, lubrication and assembly will be performed in our class 1,000 clean room environment per Federal Standard 209. Bearing processing will be performed at higher cleanliness levels in our clean room flow bench. Ambient performance, thermal and thermal vacuum testing will also be performed in-house using custom calibrated test equipment. Vibration testing supported at multiple locations nearby our facility.

## Quality

Our management philosophy is that quality is valuable, essential and inherent to a successful organization. Rocketstar Robotics' quality plan is compliant with AS9100 Revision B and plans are currently being prepared for certification.

## Management

Rocketstar was founded in 2002 by Douglas Petercsak. Mr. Petercsak holds a degree in mechanical engineering. He started his career in spacecraft mechanisms design in 1983 when he began working at RCA Astro Electronics in Princeton, New Jersey. In 1993 he was one of the founders of the American Technology Consortium (ATC), a small startup company dedicated to the design and manufacture of spacecraft mechanisms and actuators. ATC maintained an excellent reputation and quickly



*Douglas Petercsak, President*

grew to over two million dollars per year in sales prior to being acquired in 2000. He holds multiple patents for spacecraft mechanisms designs and is a member of AIAA and AGMA.

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