

# A Worldwide Effort Made It Happen

Aug. 10—While millions watched, listened, and electronically communicated around the world while the Curiosity Mars Science Laboratory was landing on Mars, people from many nations involved in the mission shared the pride of a global accomplishment with their NASA colleagues. Here are highlights:

**South Africa's** space agency SANSA invited the public to come to its Hartebeesthoek Radio Astronomy Observatory to join its “early bird team,” and watch the live landing broadcast by NASA the morning of Aug. 6. South Africa's special pride in the mission stemmed from the role it played in the launch of the Mars Science Lab. When the spacecraft separated from the Atlas V rocket that launched it in November 2011, to continue its travels to Mars, SANSA tracked that critical event, accessible only in the Southern Hemisphere. Its Hartebeesthoek radio telescope facility was originally built by NASA in 1961, to help track its deep-space craft.

Similarly, the Deep Space Network radio dish at Canberra, **Australia**, which relayed Neil Armstrong's first words from the surface of the Moon in 1969 (“One small step a for man; one giant leap for mankind”), collected the beep signals, as Curiosity descended through the Martian atmosphere, and relayed them to NASA's Jet Propulsion Laboratory (JPL), in Pasadena, Calif.

On the rover itself is a suite of 10 scientific instruments, contributed from nations around the world. Using data from the Rover Environmental Monitoring System (REMS), which was built in **Spain**, a team of 40 Spanish scientists and engineers will post daily weather reports from Curiosity.

**Canada** built the Alpha Particle X-Ray Spectrometer, which will identify chemical elements in rocks and soils. A “pinch” of radioactivity “queries” a target, by emitting radiation, and the X-ray detector “reads” the answer. The instrument rides on the multi-tool turret at

the end of Curiosity's 7-foot-long arm. The instrument was built by Canada's MDA company, which designed and built the magnificent robotic arms that flew on the Space Shuttle, and services the International Space Station.

### A Great Moment of Triumph

**Russia**, which has not had success yet in landing its own spacecraft on Mars, made an important contribution to the Curiosity rover. The Dynamic Albedo of Neutrons instrument shoots neutrons into the Martian ground, and measures how they are scattered. To a depth of about 20 inches, scientists will be able to detect hydrogen, a key marker for hydrated minerals and underground water on Mars.

**France** provided a laser for the chemistry and camera suite mounted atop Curiosity's mast. The laser can hit a rock or soil target up to 23 feet away, to vaporize a small spot of material, creating a plasma. A telescope observes the glowing plasma gas, and analyzes the spectrum of light created, to identify the chemical elements in the target.

**Germany** produced the Radiation Assessment Detector, which measured the penetration of galactic and solar radiation in the spacecraft on Curiosity's trip to Mars, and will provide a detailed assessment of the radiation environment astronauts will face on the surface, in the future. To check and calibrate the instruments, particle accelerator research facilities were used in **Europe, Japan, and South Africa**.

**Italy's** contribution is unique to its history: Leonardo da Vinci's Codex on Bird Flight, a document dating from about 1505, was reproduced on a microscopic scale and fastened to the chip on Curiosity. A copy of Leonardo's self-portrait is also on the rover, along with some essays, drawings, and other submissions from finalists and semi-finalists who participated in the “Send Your Name to Mars” rover-naming contest.

And this is not to mention the scientists and engineers of various nationalities—including Argentine and Peruvian—who were working at the Jet Propulsion Lab on the project, and whose work has stimulated tremendous pride within their home countries.

For the scientists and engineers around the world who have created Curiosity, the landing was a great moment of triumph, which was celebrated “with the rest of humanity.”