"I suppose the one quality in an astronaut more powerful than any other is curiosity. They have to get some place nobody's ever been." JOHN GLENN

Spinoffs

NASA defines *spinoffs* as technologies that can be patented, then licensed to commercial companies. The space shuttle program alone has generated more than 100 technology spinoffs. Here are some of its contributions.

- Materials from the shuttle's thermal protection system are used on **race cars** to protect drivers from the extreme heat generated by the engines.
- A sensitive infrared handheld camera that observes the blazing plumes from the shuttle also is capable of scanning for fires. The camera has been used to point out hot spots for **firefighters** during brush fires.
- A gas leak detection system originally developed to monitor the shuttle's hydrogen propulsion system was used in the production of a **natural-gas-powered car**.
- A **rescue tool** that helps crews remove crash victims from vehicles uses a miniature version of the explosive charges that separate devices on the shuttle.
- **Jewelers** no longer have to worry about inhaling dangerous asbestos fibers from the blocks they use as soldering bases. Shuttle heat shield tiles offer jewelers a safer soldering base with temperature resistance far beyond the 1400 °F generated by a jeweler's torch.

NASA

"Somewhere, something incredible is waiting to be known."
Carl Sagan

If you have a cartoon, anecdote, joke or interesting safety item you'd like to submit for publication on this page, send your contribution to professionalsafety@asse.org. All submissions become the sole property of ASSE and will not be returned. While there is no guarantee of publication, ASSE will pay $25 for each submission that appears in print.

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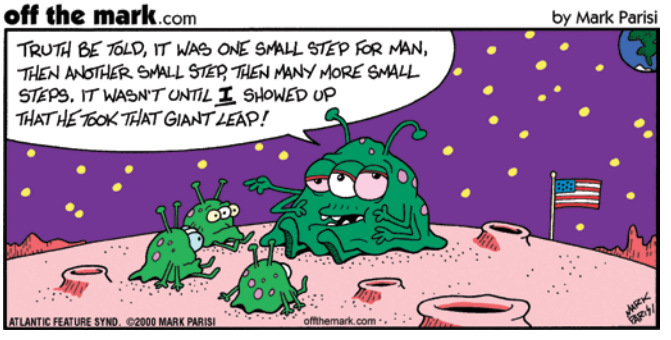
Legacy of the Space Shuttle

After three decades and 135 missions, the U.S. space shuttle program ended with the landing of *Atlantis* on July 21, 2011. To mark the end of the program, NASA published *Wings in Orbit*, a book that documents the program's history, its scientific and engineering accomplishments, and its cultural influences.

"The focus of the book was the legacy of the space shuttle," says Helen Lane, Ph.D., editor in chief. "So much has been made of its failures that we wanted to explore its accomplishments."

The book was developed over the course of a year, and involved engineers and scientists who worked on the program over its 30-year life span. It is available digitally at **www.nasa.gov/centers/johnson/wingsinorbit/index.html**. Print copies can be purchased at **http://bookstore.gpo.gov/collections/wings.jsp**.



Cultural Influences

- The space shuttle has appeared as a cast member of four major motion pictures: *Moonraker, Space Camp, Armageddon* and *Space Cowboys*.
- Members of the band Rush were present at the first shuttle launch. That experience inspired the song "Countdown."
- The first shuttle mission patch was designed by space artist Robert McCall. In fact, it was astronaut John Young who urged McCall to design it.
- The space shuttle program commemorative patch was designed by aerospace engineer Blake Dumesnil, whose work in the Avionics and Energy Systems Divisions of the NASA Johnson Space Center Engineering Directorate supported the program.

NASA

Factoids

- Snoopy, the *Peanuts* comic strip character, is the astronauts' personal safety mascot.
- Burping in space is not advised. There is no gravity to separate liquid from gas in the stomach. As one astronaut says, "It's gross."
- Each shuttle astronaut accounts for about 500 lb, including food, clothing and support systems.
- Zero gravity causes the fluids in the body to rise to the head, which feels like a constant head cold.

NASA

November Safety Photo of the Month

Up, up and away!
Ed Langmaid
San Diego, CA