

Looking Back #28

Charlevoix Goes to the Moon with the Apollo Space Program



by

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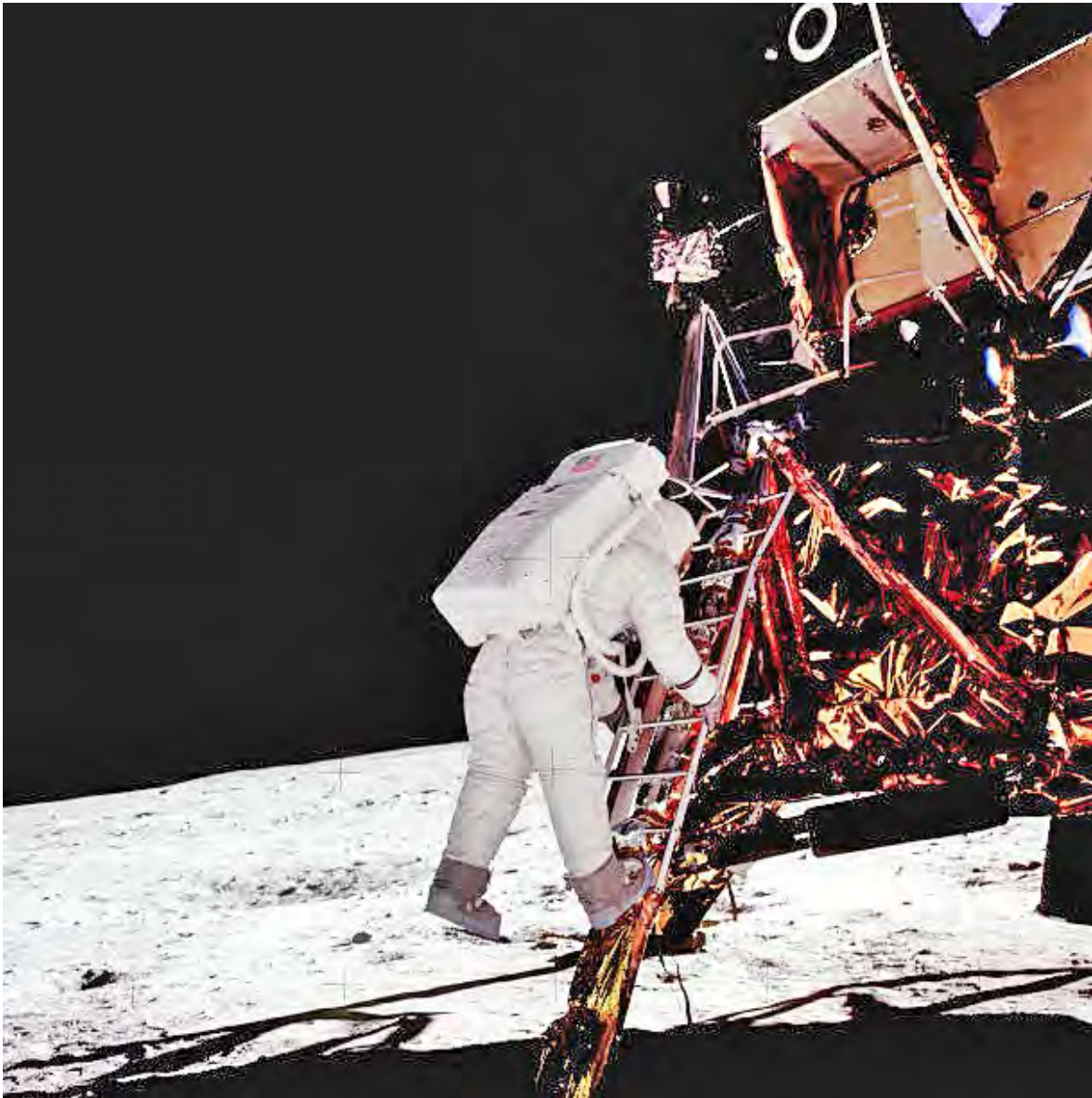
A little-known chapter of the space race unfolded at the facility of Hoskins Manufacturing Company on M-66, two miles south of Charlevoix, here seen during its 1966 expansion.

When the United States sent Neil Armstrong, Edwin “Buzz” Aldrin, and Michael Collins to the moon in July, 1969, it became one of the defining moments of the century and a huge milestone in human history.

Almost the entire planet was awash in wonderment and awe at what the Americans had accomplished — the soaring achievement of President John F. Kennedy’s prediction, before his death in 1963, that the goal could, and would be reached before the end of the decade. Today the United States stands poised to return to the moon, along with the intent of several other countries to make their first ventures.

What is not known by many outside this area is that when Armstrong made that one “small step for man,” Charlevoix was right there with him, and every other step of the way.

As Armstrong inched his way out of the Lunar Module *Eagle* to descend its small ladder to the moon’s cold, dusty, dry surface, he was looking directly down onto the tops of his moon boots, at a fabric made from a fine wire manufactured by Hoskins Manufacturing Company, at a small industrial plant a couple of miles south of Charlevoix on M-66.



Buzz Aldrin descends the Lunar Module *Eagle*'s ladder to the moon's surface, July 20, 1969 in a photograph by Neil Armstrong. Source: NASA/AS11-40-5868

To safeguard the Apollo astronauts in this hostile environment, their spacesuits were encased in the Integrated Thermal Micrometeoroid Garment (ITMG) — a protective outer skin utilizing a thirteen-layer composite barrier against extreme temperatures and conditions.

The ultra-lightweight fabric manufactured from Hoskins' wire yarn was a small but vital component of this outer defense. It was layered over the uppers of their lunar overshoes, the palms of their extravehicular gloves, and into a protective panel sewn onto the suit's back to prevent the Portable Life Support System backpack from tearing the primary pressure layer.

Hoskins Manufacturing Company was based in Detroit, with its four main plants in Michigan at Detroit, Hamburg, Mio, and Charlevoix, plus subsidiary plants in Brookfield, Massachusetts and Toronto, Ontario, Canada.

The company started in 1908 with nickel-chromium alloys that greatly increased the efficiency of heat-related products in the form of rods, wires, ribbons, and strips. These were employed in hundreds of products such as heating elements, electric appliances, and furnaces. The company's thermo-electric materials were capable of withstanding temperatures beyond 5200° F.

Known for its ability to manufacture extremely thin wires, Hoskins stood poised to contribute to the Apollo Space Program, which began 1961, the same year the company arrived in Charlevoix.

The *Charlevoix Courier* never did provide an adequate explanation as to how or why our town was chosen for the plant's location, but it was, and Hoskins went on to develop, then produce here what was said to be the thinnest metal wire on the planet.

Hoskin's specialty wire for the space program was an alloy of chrome and nickel called Chromel-R. This wire had the unique capability of being stretched beyond comprehension, almost to invisibility. After this was done, it was processed into a different form, and that is what went into the space suit components.

**FOR TRIPS TO THE MOON-
ASTRONAUTS
MUST BE
WELL DRESSED**

They'll be wearing Appolo space suits made from metallic cloth. Hoskin's, Charlevoix plant, is now in full production of wire yarn used to knit this space-age fabric.

FEMALE PRODUCTION EMPLOYEES ARE NEEDED
THESE OPENINGS OFFER

1. Pleasant, safe factory working conditions
2. Interesting and challenging work
3. Good starting pay with regular increases
4. LIBERAL PROFIT SHARING PLAN

Plus Other Fringe Benefits

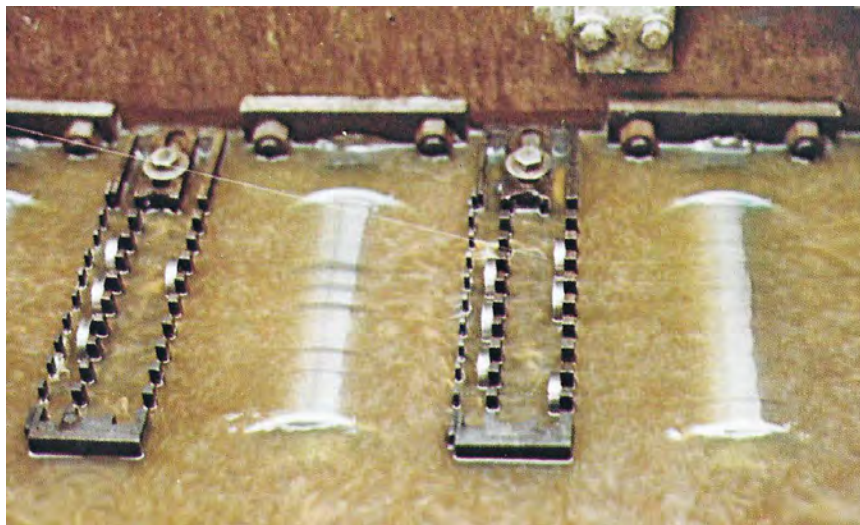
IF YOU ARE SINCERELY INTERESTED
PHONE
HOSKINS MFG.
547-9411

Regular interview-appointments 9 a.m.-4 p.m.
Special arrangements can be made for evening interviews.
ALL INQUIRIES HELD IN THE STRICTEST CONFIDENCE.

Hoskins ad from the *Charlevoix Courier*, October 25, 1967



From tub to tub to tub to tub went the wire, reduced at each step until it was almost invisible at .0005, sometimes .0004 inches in diameter — thinner than a human hair. A worker oversees the operation, ca. 1978.



"Diamond die tub drawing." Successive wire reduction operations took place in a bath of soap and water, which acted as a lubricant and coolant. The wire filaments were incredibly fragile — a former Hoskins production worker recalled that a human breath or the simple draft of a person walking by was enough to break a strand.

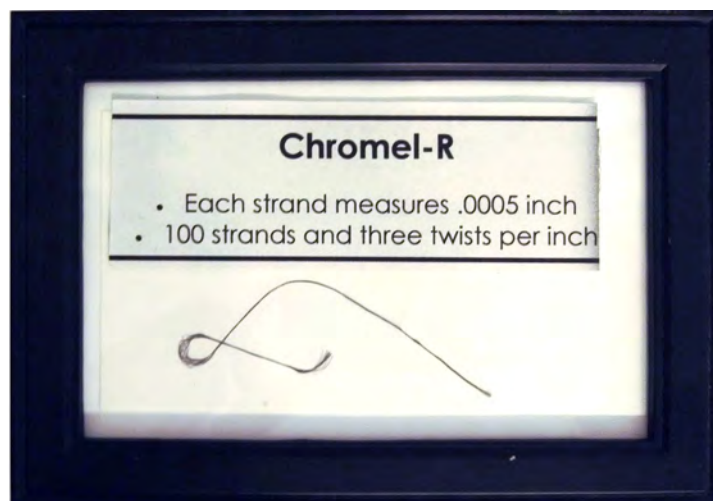
According to a detailed account in the *Charlevoix Courier* on November 15, 1967, Hoskins received the alloy in huge reels of 1/32" wire from one of its other plants. This "course" wire then went through hundreds of diamond dies that looked like a couple of quarters welded together with a pin-prick hole in the center. Each succeeding die had a smaller hole in it. As they became smaller, a magnifying glass and the right lighting was needed to find the hole.

Each time the wire went through one of the dies it was "stretched" 15% smaller than it was when it came through the preceding die. Toward the end of the operation the wire was so tiny, it could hardly be touched without breaking it. Each inch of this strand was then checked for flaws before it was spun with ninety-nine other strands to make a single thread of yarn. The proprietary process by which the 100 strands were formed into one thread was said to be "off limits" to newspaper reporters and cameras, so the competition would not get hold of it.

The article went on to note that Hoskins had gotten "into the spacesuit business almost by accident." It had been developing an "ultrafine wire process for other applications when the space people became interested." Only about 10% of the plant's total effort was devoted to wire for the spacesuit at the time. But it was hoped that other applications for its .0005" wire would eventually be found. Meanwhile, its main production focused on heavier wire for general industrial uses.

A framed sample of 100 individual strands of .0005 inch Chromel-R wire, before being twisted three times per inch into a metallic thread. It was said that 1.7 million feet, or 322 miles, of strand — the distance from Charlevoix to Detroit — weighed one pound.

The thread was wound on spools, which were sent to the East Coast to be woven into a cloth. The cloth went on to Delaware where it was incorporated into the spacesuits.





Source: NASA/AS11-40-5903



Above: A sampling of Hoskins' capabilities with wire, ca. 1978. Its Chromel-R invention that went to the moon and back six times from Charlevoix is wound on the three small spools at lower right.

Top: Lunar module pilot Buzz Aldrin standing at Tranquility Base on July 20, 1969, taken by mission commander Neil Armstrong. The iconic image was featured on an August 11, 1969 special edition cover of *LIFE* Magazine under the headline "To the Moon and Back."

Right: Flown overshoes worn by Apollo 17 Commander Eugene Cernan, featuring ultra-durable sides and uppers woven from proprietary Hoskins Chromel-R wire fiber for extreme thermal and tear protection.

This life-saving material owed its success to an earlier, crucial testing phase: Hoskins had produced the identical metallic fiber for the protective pants worn by Cernan during his grueling Gemini 9 spacewalk in 1966. That trial verified the fabric's extreme thermal resilience under actual space conditions, directly paving the way for its vital role in protecting every astronaut who subsequently walked on the lunar surface.



Source: National Air and Space Museum /Smithsonian
Transferred from NASA in 1974.



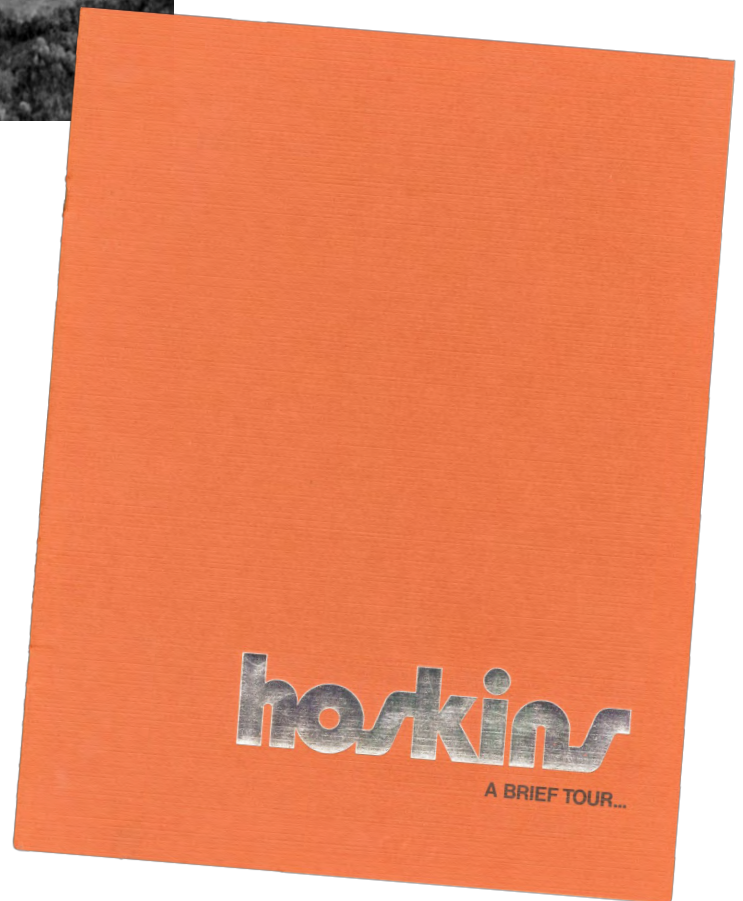
Left: The Hoskins plant appears at lower left in this 1960s aerial view northeast over M-66 — just yards from what is now called Castle Farms, at middle right. Lake Charlevoix, with Loeb's, or Two-Mile Point (now Evergreen Point) is in the distance.

The Hoskins Manufacturing Company facility in Charlevoix, Michigan broke ground in late 1961 to provide a dedicated, high-precision facility for drawing out specialized metallurgical wire alloys.

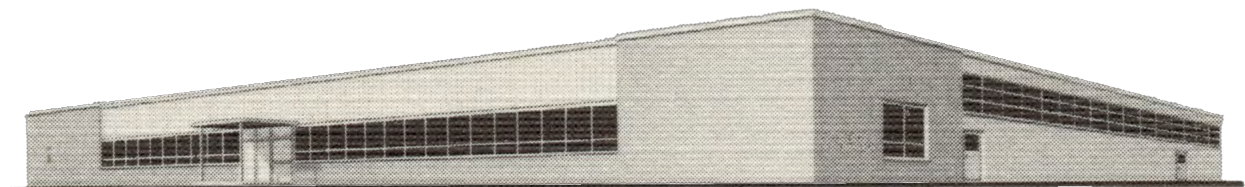
A 10,000 square foot expansion in September 1966 doubled its size, relieving overcrowding and providing for storage and even more expansion if needed. At the time, Hoskins had fifty employees, and now had room for eight to ten more.

Facing changing industrial demands, the landmark Charlevoix facility ceased manufacturing operations and closed its doors in 2001, marking the end of the town's historic direct link to the American space program.

The plant is currently ACAT (Advanced Clean Air Technologies) Global.



A Hoskins promotional brochure, 1978



The Hoskins facility in Charlevoix in the post-Apollo era, ca. 1978