For **Frank Cepollina '59**, it was probably the most terrifying moment in his entire career. On April 9, 1984, astronauts from the space shuttle *Challenger* were attempting to capture and repair the failed solar research satellite Solar Max. Cepollina had championed the mission—and the untested notion of repairing spacecraft in orbit—despite the significant skepticism of his bosses. Many in NASA as well as in the private sector doubted that such repairs could be done effectively or were worth the cost. On that day, the skeptics appeared to be right.

Frank Cepollina's official title is associate director of the NASA Satellite Servicing Capabilities Office. Some call him Mr. Fix It. Plenty have called him crazy.

Not only was Solar Max spinning too fast for the shuttle's robot arm to grab it, the spin was preventing the spacecraft's solar panels from catching sunlight. Solar Max's batteries were steadily draining, and within a dozen hours the spacecraft would be dead. Worse, the first effort by Cepollina's engineers to use Solar Max's torquer bars, designed to create a small electrical field that could interact with Earth's magnetic field and slowly ease the spacecraft's spin, failed because of an error in the software. New software had to be uploaded, which would take hours. Then it would take hours more for the torquer bars to neutralize the spacecraft's spin.

As far as Cepollina could tell, the future of in-space servicing—an idea that *he* had been promoting for years—was about to die. Along with it would go his career.

Engineers managed to upload the software, however. And the spacecraft drifted into daylight long enough—a mere 10 minutes—for its solar panels to draw sufficient power to re-energize its batteries.

The next day, Shuttle Commander Robert Crippen flew the shuttle in formation with the satellite so that crew member Terry Hart could grab the satellite with the robot arm. Two astronauts went out into the shuttle cargo bay and successfully repaired Solar Max, installing a new attitude control module as well as new electronics.

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"They had to do two EVA days' worth of stuff in one day, and they finished it all," remembers Barbara Scott, the Hubble Flight Software manager at the Goddard Space Flight Center in Maryland. "Everything got done!"

Cepollina and his team at Goddard would go on to lead a number of satellite rescue missions. Perhaps Cepollina's most enduring legacy is this: He organized and in many ways conceived the spectacular repair missions that made the Hubble Space Telescope the most successful scientific instrument ever launched into space.

He is known as "Cepi" by practically everyone in the aerospace industry. He has led five repair missions of Hubble. By the time of the last shuttle Hubble repair mission, in 2009, Cepollina's ideas of repairing and reusing spacecraft were no longer considered radical or impossible. In fact, today those ideas are about to become routine.

"Cepi is a visionary. He could always see the future better than his peers," says Elmer Travis, who has been an engineering branch chief at Goddard during most of Cepollina's career there. However, "Sometimes he created trouble for himself. He would do something that would turn out better in the end, but his supervisors didn't see it as soon as he did."

TRASH AND TECH

A cheerful and overpoweringly enthusiastic man, Cepi was born in 1936 at the tail end of the Depression. He was raised on his grandparents' farm in Alameda, California. His grandfather, Giobatte Cepollina, had come to America from Italy in 1900. Starting out as a farmer, Giobatte soon discovered that when he sold his produce door to door he could make additional money hauling his customers' garbage back to his farm to bury it. So Giobatte went to A.P. Giannini, who had founded Bank of Italy, a small bank catering primarily to local Italian immigrants, and borrowed money to buy three wagons and three teams of horses to get his garbage business started.

When the 1906 San Francisco earthquake hit, the banker Giannini found himself in a ravaged city with about $2 million in cash that he had salvaged from the wreckage. Giannini arranged for Cepollina's grandfather to bring his garbage wagons into the city. They secretly loaded the cash onto the wagons and hid it under the garbage, then brought it safely out. That favor made it possible for Giannini's bank to reopen immediately—when other banks couldn't. That favor also got Frank Cepollina's father a job at what became Bank of America.

As a child growing up on the farm, Cepi was tasked with maintaining the tractors. "I used to have fun, taking things apart and seeing how they worked," he says. That didn't always turn out well. "The mechanics would sometimes look at me and just shake their heads."

By the time Cepi was in high school, engineering seemed to be the ideal career for him. He continued to take things apart to see how they worked—and wanted to make a living at it. His grandparents encouraged that notion. "My grandfather always used to tell me, 'You never want to work with your hands.' And my grandmother added, 'You want to go to college, learn a profession!'"

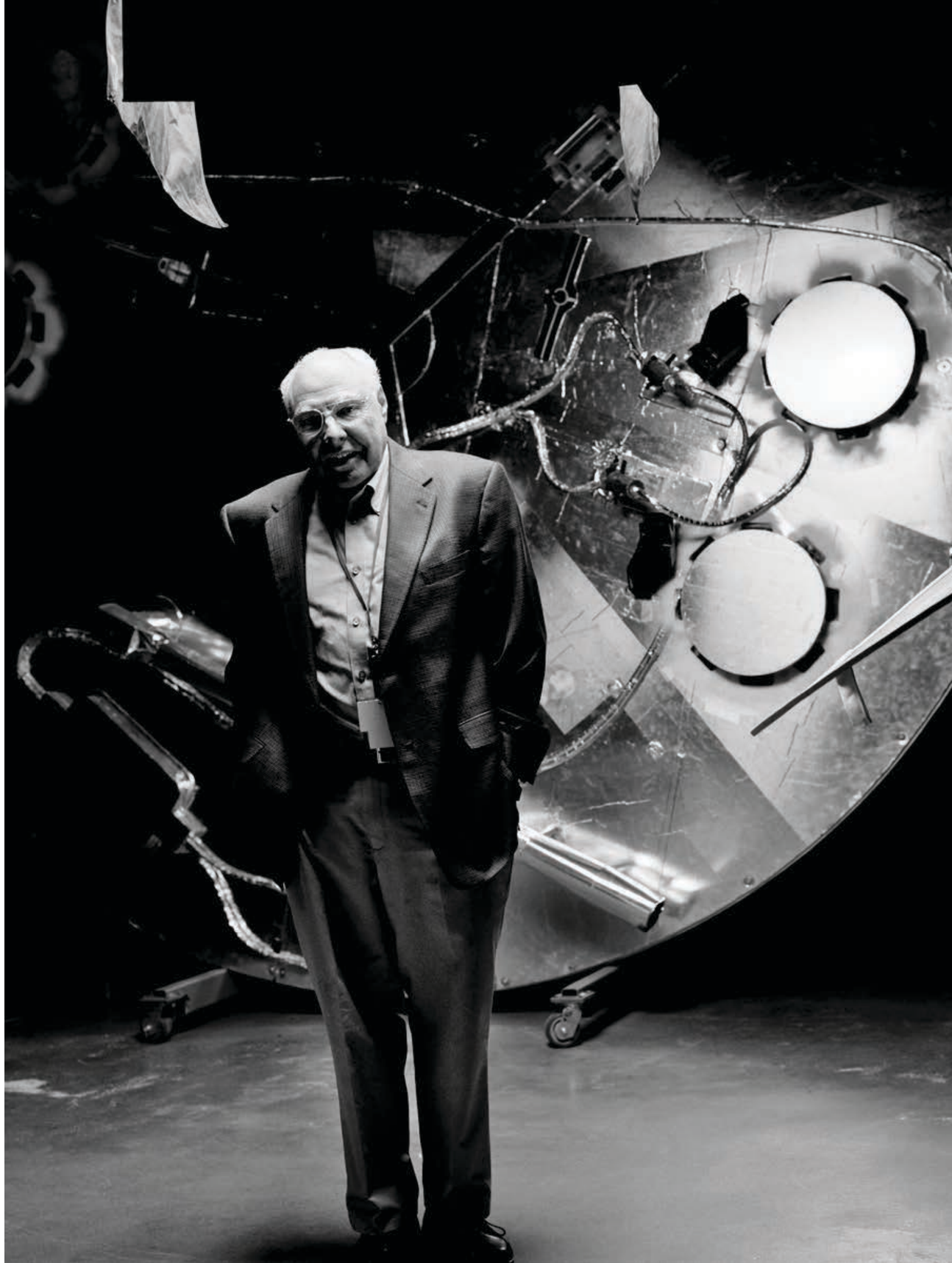
His mother and father were more doubtful. "My parents told me, 'You will never be an engineer. You're not smart enough. You won't work hard enough.'"

Cepi arrived at Santa Clara University in 1955 to study mechanical engineering. "I had to work my butt off," he says. "The first two years were really tough. I can remember a lot of times working four or five hours in the lab and coming back to the dorm to immediately write my report so I wouldn't forget, working until 10 p.m. on a Friday night."

He also found help when he needed it. "If I had a problem or a question, I could go talk to the professor, and he would always take the time to go through it and explain. That was a great thing about going to a small university."

In gaining his degree in 1959, Cepollina learned one crucial lesson that he would apply for the rest of his life: "Never believe the word 'No'!"

It was also the time of Sputnik and the beginning of the Space Age. When Cepi was a sophomore, one professor



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