



MARIA CABALLERO

CONSULTING ENGINEER



Lexile Ranges

Level 1: Less than 810

Level 2: 810-1000L

Level 3: 1010-1200L

Level 4: 1210-1400L

Level
4

If Maria Caballero could have one superpower, it would be to fly.

When she was young, Maria would lay in her yard, stare up at the California sky and let her imagination transport her to a wondrous place in which she would design and build airplanes of the future.

She wasn't sure how she would get there. Based on her upbringing, the path seemed tortuous, blocked with many obstacles. Could she do this? What would she have to do to realize her dream. Answers to her questions weren't immediately forthcoming. There were more pressing matters to attend to, chief among them just growing up.

Maria was confident of only one thing. She knew she loved airplanes.

If ever there were any doubt of her intentions, that hesitancy was vanquished forever on April 14, 1981 during a trip to Edwards Air Force Base on the high desert of California. Astronauts John Young and Robert Crippen were coming back to Earth aboard the Space Shuttle Columbia to end the first shuttle mission. Standing on the dry lakebed a few thousand yards from the runway, Maria watched a tiny black and white speck turn into a beautiful winged spaceship. Two NASA chase planes flanked Columbia as it dropped like a brick

toward the lakebed. Twin sonic booms heralded Young and Crippen's arrival. Flying as a glider, Columbia's landing gear kissed the clay runway and soon rolled to a stop.

Resting still, having been moving 17,500 mph in Earth orbit just an hour before, Columbia in a single glance represented NASA's future in space and an aeronautical research legacy that began in 1915. Maria was hooked for good.

"Since I cannot fly, the next best thing is working for and being part of an agency that is involved with things that fly and blast through our atmosphere, such as airplanes and rockets," Maria said.

Fast forward more than three decades. Today, Maria is an aerospace engineer working for NASA at the Armstrong Flight Research Center in California, the very place Columbia landed at all those years ago.

Maria is part of the Flight Safety and Mission Assurance Office at Armstrong. She is an Unmanned Aerial Vehicle (UAV) Range Safety Risk Analyst. Her job is to calculate the chance someone from the general public might get hurt should a UAV – commonly called drones – have a problem or fail during flight tests. A big part of that job is to ensure the remotely-piloted vehicle remains in restricted airspace that is specifically set aside for flight



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test purposes. If the drone must fly beyond the test range, her job is to work with the operations engineers and flight planners to make sure the aircraft doesn't stray over dense population areas or important structures on the ground. And it's more than just plotting a course on a map. Part of the risk assessment must address the vehicles systems, especially if the drone is designed to work autonomously – deciding for itself how to respond to any equipment failures or the presence of nearby air traffic.

Maria hasn't always had this job, however. The path Maria took to get to her current position is one that started in California, launched her across the country to the Atlantic shores of Virginia, then back full-circle to the California desert.

Maria grew up in a migrant family in the San Joaquin Valley in California.

From the age of 12 until she began attending college, her summer days were filled with the difficult, back-breaking work of picking garlic and grapes with her friends and family. Nights during the school year were spent grappling with homework, often with little assistance from her parents, who couldn't speak English.

While her parents may not have been able to help her with her schoolwork, Maria remembers and most appreciated the emotional support they provided, which

helped keep her going. Maria also remembered how her father wanted her and her siblings to experience life working in the fields so they could see how hard life could be without an education.

Her hard work hitting the books paid off. After high school, Maria was accepted into the Honors Program at California State University in Bakersfield, California. Later she transferred to the California Polytechnic State University in San Luis Obispo, where she majored in engineering.

Maria's time in college was a challenge, both in learning engineering and in figuring out how to survive as a college student.

As the first in her family to go to college, she didn't know what to expect. In her first semester, she signed up for calculus and physics, thinking, "How hard can this be?" Unfortunately, she hadn't taken any physics classes in high school. The learning curve was steep as she struggled with basic physics terms and other concepts her professor just assumed everyone knew. Not knowing where to go for help, she dropped the class.

However, she didn't give up. She found help, signed up for the course a second time, and earned an 'A.' Even though she had other ups and downs throughout her college experience, her persistence paid off.



Affording college was another struggle. With some money in scholarships, but not enough to cover the entire cost of college, she took weekend jobs through the work study program at school, and went back to work in the fields during the summer.

Looking back, she realizes it would have been helpful for her to find internships or other similar experiences that would have better prepared her for a career in engineering, but she had little guidance pointing out what educational resources were available or how to apply for something like an internship. Maria understands now that finding a mentor to show her the ropes and open doors for new learning experiences is a great asset to have in college.

At the same time, she said, successful college students must be willing to work hard at everything they do, even if it requires long hours and sacrificing the chance to participate in a more appealing activity. This kind of college experience prepares students for times when persistence and long hours are required to complete an important project with an imminent deadline.

After graduating with a Bachelor's Degree in Aeronautical Engineering, Maria accepted a job as a contractor working as an electrical technician for the Army at Fort Hunter Liggett in California. While there, she installed instrumentation into military tanks that were to participate in simulated warfare.

She also spent some time working for the NASA Sounding Rocket Program at the Wallops Flight Facility in Virginia. Sounding rockets come in a variety of types and sizes, and are typically used to launch small science payloads into the upper atmosphere or to the edge of space.

Nearly all engineers have favorite projects they've worked on, and Maria is no exception. One of her favorite projects was the first project assigned to her as a civil servant at NASA. Helios was a 12-foot-long, 247-foot-wingspan solar powered airplane. When it flew in August 2011, the Helios Prototype aircraft reached 96,863 feet in altitude, setting a world record for a non-rocket powered aircraft flying in level flight.

Maria was sent to Hawaii as a NASA Safety Witness for the aircraft's flight termination test.

Back at Armstrong, Maria's own educational experience inspired her to remain active with some of NASA's education outreach programs. She is currently the consulting engineer for Armstrong's Office of Education, and is involved with NASA's Engineering Design Challenge involving quad-copter drones. Maria also teaches the Engineering Design Process to students of all ages, working with them to build rockets, gliders, rovers and satellites.

Maria also volunteers to speak at community schools and colleges about life as a rocket scientist, aerospace engineer, and her humble beginnings as a migrant kid who worked in the fields during her summer breaks. Having seen the importance of what it means to have a mentor when she was in college, Maria also is active as a mentor at Armstrong, working with newly-hired employees and student interns.

Her hope is that her work at NASA will instill in a young child the excitement and wonder of aviation and space, just as she experienced so many years ago.

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