Leroy Chiao is a Rising Star in the Commercialization of Space Travel

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By Miles Z. Epstein
Editor, COMMERCE

HIS BUSINESS CARD IS PLAIN, A SOFT, OFF-WHITE shade, with just a single word next to his name: "Astronaut." But there is nothing ordinary about Leroy Chiao, Ph.D., who has logged more than 229 days in space, 36 hours on spacewalks and speaks fluently in Chinese, Russian and English.

A chemical engineer, astronaut and a businessman, Dr. Chiao is surprisingly down to Earth. He is currently the executive vice president of space operations and a director of Excalibur Almaz Limited, a private orbital manned space firm that will carry passengers and cargo into space for a fee. On a mission to commercialize space travel and profit from taking CEOs and other high-net-worth adventure seekers to the stars, Dr. Chiao is living his childhood dream.

When he was just eight years old, he built his first space vessel in the family garage. His imagination took flight after he watched the first Apollo moon landing, which inspired him to dream about one day exploring space as an astronaut—just like his hero, Buzz Aldrin.

Fast-forward to his current resume and you have an impressive career in space exploration. After being selected for the elite Astronaut Corps by NASA in 1990, he flew his first mission four years later aboard the Space Shuttle Columbia. Dr. Chiao distinguished himself at NASA, flying on four space missions, and also served as the commander and NASA science officer of Expedition 10, a six-and-a-half month mission to the International Space Station.

COMMERCE magazine interviewed Dr. Chiao to find out more about his business venture to monetize space travel.

COMMERCE: *How did you combine engineering and entrepreneurialism when few can mix technical skills with business savvy?*

LEROY CHIAO: I transitioned from being an engineer to an operator to a leadership role during my 15 years at NASA. It was similar to what people do in business, working their way up the ladder—although more literally. I studied engineering, first at the University of California at Berkeley, and then at the University of California at Santa Barbara, earning degrees in chemical engineering. I worked in that field for a little while as an engineer involved in research.

When I joined NASA, I realized I was changing careers. I was no longer going to be a research engineer—I was becoming an operator. It was a conscious career change and something I wanted. On each of my successive missions, I was given more opportunities to be an operator and more and more responsibility, culminating in becoming the commander of the International Space Station.

Q. *What is required of a commander of the International Space Station?*

A. A space station mission is not just a flight—it's also managing the team on the ground. You have to understand team building, working with different cul-

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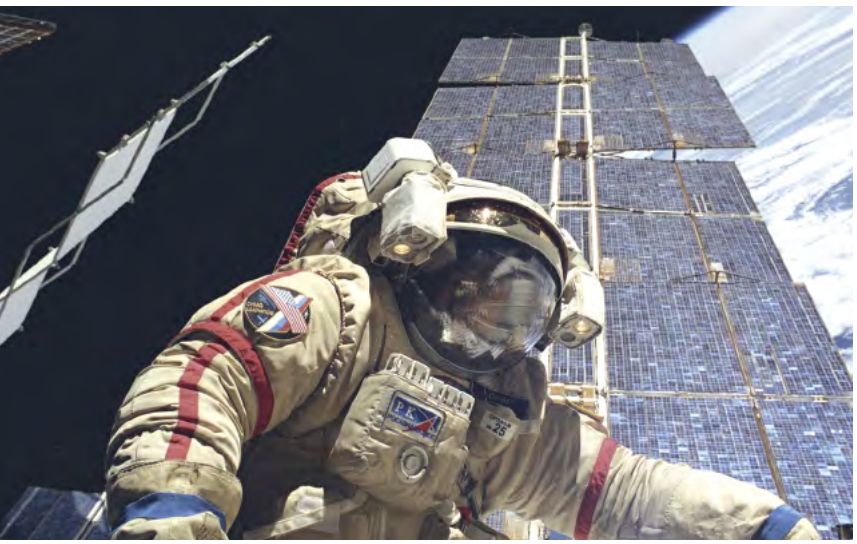
tures, conflict resolution and all of the same skills a CEO needs for running a business. Within NASA, you have the flight crew, mission control center, the flight director, training teams and management teams—all of which look to you to keep activities safe, coordinated and on target with the mission's objectives.

Q. *Why do nations have space programs? What is the purpose behind exploration?*

A. The commonality is that every nation wants to explore space for national prestige. For example, China has been very successful with its manned missions and has a great sense of national pride for this achievement. From a more practical standpoint, nations go into space to drive their technology forward, and to get young people interested in innovation, invention and the sciences. Space travel is inspiring new generations of scientists and explorers—people who will make a real difference in our collective future.



"Space travel is inspiring new generations of scientists and explorers—people who will make a real difference in our collective future," says Dr. Leroy Chiao.

Q. *How does NASA's approach to space exploration differ from the other countries that have space programs?*

A. I have become impressed by how engineers and scientists from different parts of the world attack the same problem. One example is that we in NASA always thought of the Russian space technology as big, clunky and not sophisticated. That was the Cold War propaganda that I grew up with and carried with me—until I trained for the International Space Station and spent half my time in Russia.

For example, instead of shaving as much weight as possible off a rocket, the Russians will use a larger engine to accommodate a bigger rocket.

During the space race, both the Russians and the Americans were trying to figure out how the astronauts or cosmonauts would be able to write in space. We of course developed a sophisticated space pen with a pressurized nitrogen cartridge that will write upside down and in zero gravity—we spent a lot of money on that pen. The Russians looked at the same problem and decided to use pencils.

This is indicative of how the Russians approach the design of their spacesuits and their spacecraft: very pragmatic, very simple mechanical devices. Americans often build something comfortable and complex, often requiring a lot of maintenance. The Russians go with the reliable pickup truck approach—less complex, less comfortable, simple—but it gets you where you are going.

Q. *How would you assess the business potential of space?*

A. The upside potential is pretty huge, but not without risk. With great risk, comes great reward. When the airplane was invented, some experts said it was interesting but had no military value. Commercial space travel is at that early stage, and it's taking a lot longer to sell because of how hard it is to get into space and due to the high expenses of a space program.

What our company is seeking is its own space program, its own spacecraft and its own space station. We hope to use space tourism as one means of financing these goals. We ultimately want to have a private space program that can serve all kinds of needs we know about today—satellites, exploration, tourism—and for opportunities yet to be discovered. We're hoping that industry will hire us to research in zero gravity—pharmaceutical companies come to mind.

Q. *There are studies that suggest nearby planets and asteroids have materials we need on Earth. Could we mine for these in space?*

A. It's going to be a few decades before we can consider undertaking a mining operation on another planet. But there are a number of scientists who are working on methods for mining asteroids—not necessarily using people—but with inexpensive probes and unmanned vehicles that could mine targets of opportunity, as they orbit the Sun. It's not out of the question for the future. There is also the possibility of manned mining missions to asteroids for precious metals. These opportunities are being studied.

Q. *What was your favorite experiment on your missions in space?*

A. One of my favorite experiments was a very practical one—we were demonstrating telemedicine. With

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my Russian counterpart on the International Space Station, I used a portable ultrasound that NASA had redesigned for space to give diagnostic-quality images of our internal organs to doctors on Earth. This has applications as we explore space and need a consult with an expert back home, and of course, this technology can be useful on Earth as well. These ultrasounds are the size of a laptop and could be used in remote areas, at rural hospitals or for global medical consults on a complicated medical procedure.

Q. *What can modern technology build as far as a spacecraft or a space station, since most of the equipment used today has roots in '70s tech?*

A. By definition, something that is flying in space is not cutting edge—because it has to be thoroughly tested, run through the ringer and absolutely reliable. The Space Shuttle's main computer is 1970's technology. The computers aboard the International Space Station are 1980's technology. We could build a craft today using stronger, lighter-weight materials, upgrade computer systems and certainly improve performance. By the time we could unveil the next generation craft, technology would have surpassed it again, however. Private industry might be able to do better. That's why my company's push for a private space program is one answer.

Q. *Will Excalibur Almaz Limited build its own space vehicle using modern technology?*

A. We actually acquired some hardware from an old Soviet military space program. We are refurbishing that equipment, but also modernizing it where it makes sense. We're blending the best of both worlds—we're taking a proven design and methodically upgrading parts where we can.

Q. *Is your company ready for passengers on trips to space?*

A. Not yet. We are staying under the radar until we have our technology and systems where we want them to be. For most people, a trip to space will be too expensive. But for a special few, we will be able to accomplish what was for years—mission impossible. ■

Editor's Note: Dr. Leroy Chiao was awarded many NASA decorations including: the Distinguished Service Medal, two Exceptional Service Medals, four Space Flight Medals, four NASA Individual Achievement Awards, two NASA Group Achievement awards, and the NASA Going the Extra Mile Award. He received several Federation Aeronautique Internationale awards, including the Koroliev Diploma, Komarov Diploma, and the De La Vaulx Medal. In 1994, the University of California honored him as Alumnus of the Year after his first space flight.

Astronaut Leroy Chiao, Ph.D., can be booked for motivational speeches at www.leadingauthorities.com/24172/leroy_chiao.htm.

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