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SPACE EXPLORATION

First Steps

As Chinese astronauts prepare for their first spacewalk, a NASA veteran describes what's in store for them.

By Leroy Chiao
airspace.com, September 18, 2008



The author, wearing a Russian Orlan spacesuit, prepares to venture outside the International Space Station in January 2005.

(NASA)

Sometime next week, three astronauts will emerge from a bus to the applause of a small crowd of VIPs waiting at the base of the main launch pad at the Jiuquan satellite launch complex in central China. They will wave and smile for photographs, turning their heads as much as the built-in helmets in their pressure suits allow. Taking one last look around, they will walk into the gantry elevator that leads to the top of their rocket.

As each astronaut carefully shimmies through the top hatch of the Shenzhou 7 spacecraft descent module and slides into his launch couch, he will, for what seems like the ten thousandth time, think through every detail of the strap-in and launch procedures. Then he will wait.

At liftoff, flames will erupt from the base of the Long March 2F and the quiet stillness of the Gobi Desert will be shattered briefly as the rocket rises off the pad to begin China's third manned space mission.

Coming off the high of the Beijing Olympics, this flight will be another milestone for the nation's young space program. Not only will it be the first to carry three people (previous Shenzhou missions carried one and two astronauts, respectively), it will be the first to add the drama of a spacewalk, or extravehicular activity (EVA).

I've been looking forward to that day for more than two years. In September 2006, I was the first American invited to visit the secretive Astronaut Research and Training Center of China (ACC) in Beijing. I spent a full day with Chinese astronauts Yang Liwei and Fei Junlong and the center director. Even then, technicians were well into preparing the EVA suit and procedures for the Shenzhou 7 spacewalk, and the building that houses the water tank

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When Zhai, tethered to the Shenzhou spacecraft, makes his way out of the hatch into open space, he may pause, just for a moment, to behold the surreal view of Earth. According to Chinese media reports, he will set up video cameras so the world can share in the experience.

Down here on the ground, I will perform a small ritual in my thoughts—same as I did before each of my own EVAs—for the crew's good luck. Then I will sit back and watch this exciting and important first, and quietly cheer on my brothers in space.

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used for EVA training was under construction ([see video here](#)).

Now, as launch day approaches (the window opens September 25), three Chinese astronauts—Zhai Zhigang, Liu Boming, and Jing Haipeng—are in final preparations for the flight. Zhai, a 41-year-old air force officer, has been selected to make China’s first 40-minute spacewalk, most likely a couple of days into the flight.

What will it be like? As a veteran of six EVAs (four in the American spacesuit and two in the Russian Orlan suit), I can offer my perspective. As China does not yet have a space station, this first EVA will be conducted from the cramped quarters of the transport vehicle, just as the first Russian and American spacewalks were 40 years ago. The Shenzhou’s upper (living) module will serve as the airlock where Zhai and Liu will don their spacesuits. Jing will assist, and during the EVA will monitor the events carefully from the descent module.

The airlock will be cramped and tight. By all accounts, the Chinese suit is based on the Russian Orlan. Indeed, some reports indicate that one of the two spacesuits to be used on this flight will be an Orlan. Once suited up, the astronauts will hear the loud, reassuring whir of the fan as it blows oxygen over their faces. They will find it easier to move about in the cramped airlock than it was in the water tank during training, but the pressurized suits themselves will be much more stiff. They will be surprised at how much strength it takes to break the pressure seal of the hatch, as the last bit of air pressure—which doesn’t even register on their sensitive gauge—and the stickiness of the compressed rubber O-rings conspire to hold it in place. Once the seal is broken, Zhai and Liu might see small paint flecks and bits of dust get sucked out into the vacuum of space as the hatch finally yields.

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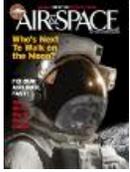
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