NJ Physics Professor Has the 'Right Stuff'

Valorie Sands

In 2005, Dr. Greg Olsen became the third person ever to travel into outer space as a private citizen. Unlike NASA astronauts who earn a generous salary, he bought his own ticket into space. He paid about $20 million for the trip, a ten-day orbit aboard the Expedition 11 Russian Soyuz rocket, which docked at the International Space Station. He also took responsibility for his own training. The space flight was the achievement of a lifetime for the New Jersey entrepreneur and college physics professor.

Olsen's fascination with outer space and astronomy began when he was still a boy. He was born in 1945, years before space travel was close to becoming a reality. In fact, space exploration did not really heat up until the post-WWII rivalry known as the Cold War between Russia and the U.S. Both countries fought to win the race to space.

The Race to Space

In 1957, Russia took the lead when it sent Sputnik, the world's first artificial satellite, into space. But by 1962, U.S. President John F. Kennedy made it clear that the nation would not take a backseat to Russia. “We choose to go to the moon in this decade... because that challenge is one that we are willing to accept, one we are unwilling to postpone, and one which we intend to win,” said Kennedy.

When asked why he loved space travel, Dr. Olsen talked about his professional crewmates, NASA astronaut Bill McArthur and Russian cosmonaut Valery Tokarev. “For the same reason they love it -- to be weightless, to see the awesome sight of earth from space,” he said.

Spaceflight Training School

Going to space school for the Expedition 11 spaceflight “was also like being a college student again,” said Dr. Olsen. That is, except for some of the training, which involved zero gravity flights and spins around in a centrifuge of up to 8 Gs acceleration (eight times earth’s gravitational pull). However, most of Dr. Olsen's training was spent in classrooms and in flight simulators. He was expected to know his way around the Soyuz vehicle, the space station, and to help with day-to-day routines. Yet neither NASA nor the Russians assigned him to heavy- duty responsibilities during the space flight.

According to Olsen, the most physically challenging part of the training was the water-landing exercise to practice 'splash down.' This is a demanding and dangerous method of landing a spacecraft by parachute into a body of water. To prepare for the grueling task, Olsen and his crewmates wore wet suits and other protective survival gear. During just two hours of practice, he sweated off more than three pounds from his 170 pound frame.

Learning Russian

Despite demanding tests of endurance, Olsen described the physical training as the easiest part of preparation for the experience. He said that for him the hardest part “was trying to learn Russian. I love Russians and the Russian culture… but I’ve never been good at languages since I was a young person.”

Dr. Olsen learned Russian well enough to succeed in bonding well with his Soviet crewmate and training personnel. “I’m just in awe of them,” he said. “When I watched them operate the Soyuz spacecraft and the simulators, they seemed to know every nut and bolt on the vehicle. I just tried to soak up the knowledge.”

Overcoming fear was no problem for Dr. Olsen. He was “very, very confident” about space travel aboard the Russian Soyuz vehicle. “It has a great safety record, and I have no qualms about doing this whatsoever.” The main goal of the Soyuz mission was to switch crews, and to replace emergency capsules that must always be attached to the space station in case of an emergency escape.

A Smooth Launch

Olsen’s launch from the Cosmodrome, a space launch facility in Kazakhstan, went smoothly. He reported that one of the most unforgettable highlights of his ten-day trip was the lift-off experience during takeoff. He was also awed by the sight of the earth passing by in the rocket's window and the memorable feeling of floating around the space station.

Radio Broadcast from Space

A licensed ham radio operator, Dr. Olsen spoke to New Jersey students from space via a ham radio. In the first of three broadcasts from the International Space Station (ISS) Olsen said, “Welcome to space. It's really nice here. It's nice and roomy."

"In some ways it's like camping out, because we have no running water, no sinks, and we kind of have to fend for ourselves for food," said Dr. Olsen. He reported that the professional astronauts had made him feel welcome aboard the space station.

Olsen expressed appreciation to many of his teachers, colleagues, and family in his space broadcast. He thanked his professors at Fairleigh Dickenson University in Teaneck, New Jersey, where he earned a Master’s Degree in Physics. He also thanked engineering students and former classmates at the University of Virginia, the school where he earned his doctorate. It was with their support that he was able to first build a spectrometer that became the basis for his New Jersey Company, Sensors Unlimited. Spectrometers are sophisticated space age tools that use light to help astronomers and astronauts collect information. Using a spectrometer, astronauts can calculate the temperature of an object in space, learn which direction it’s moving, calculate its speed and weight, and find out what it is made of.

Scientific Studies from Space

Olsen had planned to take an infrared spectrometer built by his Princeton, New Jersey firm with him on his space trip. However, it failed to pass through U.S. Export Customs, so the project had to be shelved. Instead, he conducted three medical experiments designed to study the human body's reaction to the absence of gravity. He also conducted studies on bacteria growth in zero gravity, and on how spaceflight affects the lower back and inner ear. He contributed his scientific findings to the European Space Agency.

The Journey Home

During Olsen's return trip to earth, there were pressurization problems aboard the Soyuz TMA-6 spacecraft carrying him and his crew home. Overcoming the difficulties at undocking and during the descent tested the astronauts' skill, emotional strength and mental capability. In fact, at a press conference, a Russian News Agency announced that it had been a fairly serious situation. Fortunately, disaster was avoided because the Expedition 11’s astronauts all kept their cool and monitored the glitch very closely during re-entry. All three space travelers wore Russian-built Sokol spacesuits, a standard precaution, for an extra layer of protection, according to Olsen.

“At no time was there panic or alarm, or anything of that sort,” said Olsen about the pressurization problems during re-entry. He added that at one point during the descent, he needed to add more oxygen into the Soyuz cabin. “We had practiced this many times during simulation practice, and I thought everyone handled it like pros.” Ten days after liftoff, the Soyuz crew landed safely back on earth, in a desert in Kazakhstan.

1. Who is Greg Olsen?

1 a man who used to be the President of the United States
2 a student at Fairleigh Dickenson University in New Jersey
3 a NASA astronaut aboard the Expedition 11 Russian Soyuz rocket
4 a physics professor who traveled to outer space in 2005

2. What does this passage describe?

1 This passage describes the classes that Olsen took to earn his Master's Degree in Physics.
2 This passage describes the results of Olsen's studies on bacteria growth in zero gravity.
3 This passage describes the trip that a private citizen took into space and his preparation for it.
4 This passage describes what the desert in Kazakhstan looked like when the Soyuz crew landed.

3. Training for spaceflight takes a lot of physical effort. What

evidence from the passage supports this statement?

1 Olsen tried to learn Russian even though he has never been good at languages since he was a young person.
2 During just two hours of practice, Olsen sweated off more than three pounds from his 170 pound frame.
3 While NASA astronauts earn a generous salary, Olsen had to pay $20 million for his trip into space.
4 After World War Two, the U.S. and Russia fought to win the race to space during the Cold War.

4. How did Olsen feel when he was up in space?

A nervous and scared
B foolish and embarrassed
C sad and disappointed
D happy and thankful

5. What is this passage mostly about?

A Gary Olsen's preparation for a flight into space and his experience in space
B the pressurization problems aboard the Soyuz TMA-6 spacecraft
C the infrared spectrometer that Gary Olsen planned to take on his space trip
D three ham radio broadcasts from the International Space Station

6. Read the following sentences: "In 2005, Dr. Greg Olsen became the third person ever to travel into outer space as a private citizen. Unlike NASA **astronauts** who earn a generous salary, he bought his own ticket into space."

What does the word "**astronauts**" mean?

A people who teach physics
B people who travel into space
C people who like to wear wet suits
D people who build spectrometers

7. Choose the answer that best completes the sentence below.

Greg Olsen enjoyed his trip into space _____ preparing for it was not easy.

A second
B currently
C although
D specifically

8. What language did Olsen learn during his training?

_____

_____

_____

_____

9. For Olsen, what result did learning Russian have?

_____

_____

_____

_____

10. Explain how Olsen's training prepared him for his trip into space. Give one example of something he learned during training that he used while in space.

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_____

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Mission to Mars

By Sheela Raman

It had taken decades of hard work, but at long last the day arrived. Hundreds of spectators gathered at NASA's Kennedy Air Force Base to watch the Orion 254 shuttle shoot up into outer space, headed for Mars. Almost everyone in the world had tuned in to watch live footage of the launch on their smartphones or on TV. Onboard the shuttle two astronauts, dressed in puffy white spacesuits, patiently waited for blastoff. Roy and Ciara Thomas were a married couple NASA had specially selected to undertake this risky mission. In just a few minutes, they would begin an adventure that would carry them further away from Earth than anyone else in human history.

A voice came over the speakers that hovered above the excited spectators. Suddenly the crowd hushed. "In 1969, human beings walked on the moon for the first time," said the deep, confident voice, "and now, in July of 2020, we expand our frontier to Mars. Please send your salutations and blessings to our brave astronauts as they embark on this groundbreaking mission. "

Everyone erupted into cheers and whistles, and Ciara and Roy smiled as they heard these expressions of support over their shuttle radio. Family and friends of the astronauts stood at the front of the crowd. Tears streamed down their faces. They were proud of Roy and Ciara, but they did not know when or if they would ever see them again. The voyage would take at least a year to complete, and it involved many risks. Although Earth was now at its closest possible distance to Mars, the famed Red Planet was still 34 million miles away. The moon, which is 240,000 miles away from Earth, seemed a walk around-the-block by comparison.

"Ten," counted the deep voice, "nine, eight, seven, six, five, four, three, two, one!" And with that, colossal fuel jets attached to the shuttle shot white-hot streaks of fire into the ground, and the shuttle and tanks immediately shot upward into the sky. In order to generate enough
force to propel the shuttle from the earth's surface all the way into outer space, the shuttle's fuel tanks had to send an enormous amount of opposite pressure against the ground. That's why NASA scientists designed the jets to be so big and powerful. The jets created a great show of fire and smoke when they released.

Within minutes, Roy and Ciara passed through the top layers of the earth's atmosphere. The fuel jets, which were no longer necessary, broke away from the shuttle and drifted off into the vastness of outer space. Roy and Ciara began to float inside the shuttle because Earth's gravitational pull no longer weighed them down. Oxygen tanks fed air into their surroundings so they could breathe. Roy and Ciara took their first deep breaths in space and gazed out the window. A brilliant blue sphere rose before them amid the blackness like a giant, shimmering jewel. That was Planet Earth, home to their fellow men and women, and they were now hurtling away from it at 75,000 miles per hour.

"Ground control to Roy and Ciara," said a happy voice on the radio from Mission Control.

"Roy Thomas to Mission Control," replied Roy.

“That was a textbook takeoff,” the officer said. “Congratulations!”

“Thanks,” said Roy. “We’ll keep you posted as we move along.”

NASA chose Roy and Ciara for the Mars mission not only because they were both very intelligent and physically fit, but also because they were happily married. Over such a long trip, NASA felt it was better to send people who would not easily get into fights. If anything went wrong on board the spacecraft, Roy and Ciara would have to work as a tight team to fix the problem. For an entire year they would have to survive without a single freshly cooked meal— all their food was stored on the craft in vacuum-sealed packs and tubes. A finite cargo of oxygen tanks contained their air supply. If at any point the mission stalled for too long, they ran the risk of running out of air to breathe. To maintain a good attitude amidst these challenges, the two astronauts really had to enjoy each other’s company.

The risks of the Mars voyage did not seem to faze either Roy or Ciara. They were excited about the contribution they would make to human understanding of the universe. Roy was tall and broad-shouldered, and had been an Air Force captain before joining the team at NASA. Ciara was a petite, fine-boned woman, who worked as an astrophysicist for most of her career before volunteering to train as an astronaut.

For one whole quiet year the couple sailed across space. Every now and then Roy grew claustrophobic inside the small craft, but when this happened he exercised on the special fitness machines, or donned his spacesuit and opened the door of the craft, climbing on top of its surface to check that all parts were running smoothly. Ciara wrote in a journal about the beautiful sights she saw out the window—distant galaxies and stars, a giant asteroid not so far away. By the time Orion 254 finally approached the arid, rust-colored surface of Mars, people on Earth had almost forgotten about them. But as the craft got closer and closer to the red surface, news channels on Earth started buzzing. “Men on Mars, at long last! Another giant leap for mankind!” they proclaimed.

Roy manned the gears of the craft now, directing it to a flat plain on the surface of Mars, just between two deep craters. He was an expert pilot, and he landed the spacecraft with a gentle thud. “Bravo!” shouted Mission Control. Everyone was clapping in the background. “You’re about to make history!”

With great care and attention, the astronauts put their spacesuits back on. On top of these suits they strapped an extra layer to protect against radiation, much like a doctor puts a protective layer over a patient before performing an X-ray. Unlike Earth, Mars does not have a very thick atmosphere or an ozone layer, so the radiation from the sun is many times stronger there. In a pouch attached to her spacesuit, Ciara carried jars and a small shovel to collect samples of Martian soil. She would be the first person to bring this precious material back to Earth. What would they discover in it? Alien bacteria? Some powerful, indestructible metal?

Roy switched on the television monitors outside the spacecraft, so citizens of Earth could watch this historic, first walk on Mars. The two astronauts fixed microphones to the insides of their suits so they could talk to Mission Control, each other, and the rest of the earthly world. They fastened their spacesuits to cords inside the craft, and stepped out into the swirling dust.

As he took his first steps, Roy saw a flicker of silver out of the corner of his eye. It seemed to move through the air and settle behind a rock to his right. Forgetting for a moment that he had to move slowly, Roy dashed forward to catch a better glimpse. In that one moment the cord attaching him to the spacecraft suddenly snapped, and he went floating into the air. People watching from Earth gripped their chairs in fear. There was not enough gravity on Mars to hold Roy steadily on the ground.

Ciara saw what happened and immediately shouted to him over the intercom. “Throw something out in front of you! As hard as you can!”

Roy knew when to listen to his wife. He removed a big hammer from his tool belt and hurled it with all his might directly ahead of him. The force of his throw generated an equal and opposite force that sent Roy hurtling backwards—right back

into the spacecraft. He grabbed hold of the doors of the craft to steady himself, and then looked at the broken cord. Fortunately they had the materials to fix the tear, and Ciara and Roy worked together quickly to patch it up. Within fifteen minutes they were back out on the surface. Mission Control and most of planet Earth cheered them along.

"Mars landing, take two," said Roy, to Mission Control.

"What happened?" asked the commander at Mission Control. "Why did you rush forward like that?"

"You're not going to believe this," said Roy. "But I swear I saw something silver, moving behind that rock just ahead."

"Are you saying…that you might have seen a life form?" asked the commander in a serious, quiet voice.

"Could be," said Roy. "Won't know for sure until we explore a bit."

"Indeed," said Ciara. "We'll have to be very quiet and slow."

Side by side, tools in hand, and Roy and Ciara Thomas ventured forth into the mysterious red landscape.

1. Where is the shuttle carrying Roy and Ciara going?

- **5** the moon
- **6** the sun
- **7** Mars
- **8** Venus

2. What is the climax of the action in this story?

- **5** The cord connecting Roy to the spacecraft snaps.
- **6** People from around the world watch as the Orion 254 shuttle takes off.
- **7** The fuel jets on the spacecraft drift off into outer space.
- **8** Roy gets claustrophobic while on the spacecraft.

3. Roy and Ciara work well as a team.

What evidence from the passage supports this statement?

- **5** Ciara is a petite, fine-boned woman who worked as an astrophysicist before becoming an astronaut.
- **6** Sometimes Roy exercises on special fitness machines when he gets claustrophobic on the spacecraft.
- **7** After his cord snaps, Roy saves himself by following the instructions that Ciara gives him.
- **8** Ciara says that she and Roy will have to be quiet and slow when they explore Mars.

4. How do people on Earth feel about the mission to Mars?

- **E** People on Earth only become interested in the mission during the landing on Mars.
- **F** People on Earth are interested in the mission during takeoff and landing, but they lose interest in between.
- **G** People on Earth are not interested in the mission during takeoff and landing, but they become interested in between.
- **H** People on Earth are interested in the mission during takeoff, landing, and every point in between.

6. What is a theme of this story?

A the pleasures of old age
B the importance of recycling
C the challenges of living in a big city
D the excitement of discovery

6. Read the following sentences: "'That was a **textbook takeoff**,' the officer said. 'Congratulations!'" 'Thanks,' said Roy. 'We'll keep you posted as we move along.'"

What does the phrase "**textbook takeoff**" mean above?

E a fuel jet that did not work the way it was supposed to
F a launch that went exactly the way it was supposed to
G an astronaut who likes to write about stars and asteroids
H a group of people who gather together for an important event

7. Choose the answer that best completes the sentence below.

Roy dashes forward _____ he sees something silver move through the air on Mars.

E after
F before
G as an illustration
H thus

8. Who are Roy and Ciara Thomas?

_____

_____

_____

_____

9. Why did NASA choose Roy and Ciara for the Mars mission?

_____

_____

_____

_____

10. Were Roy and Ciara a good choice for the Mars mission? Explain why or why not, using evidence from the story.

_____

_____

_____

_____

Paired Text Questions

Part 1: Use the article “NJ Physics Professor has the 'Right Stuff'” to answer the following questions:

1 What was the main goal of the Soyuz mission that Dr. Olsen went on?

2 What went wrong on Dr. Olsen’s return trip to earth?

Part 2: Use the article “Mission to Mars” to answer the following questions:

3 What is the goal of Roy and Ciara's mission?

4 What goes wrong on Roy and Ciara's trip to Mars?

Part 3: Use the articles “NJ Physics Professor has the 'Right Stuff'” **&** “Mission to Mars” to answer the following questions:

5 A) Compare Roy and Ciara’s mission with the Soyuz crew’s mission. B) Contrast Roy and Ciara’s mission with the Soyuz crew’s mission.

6 Who are more successful in achieving the goal of their mission, Roy and Ciara or Dr. Olsen and the Soyuz crew? Support your answer with evidence from both texts.