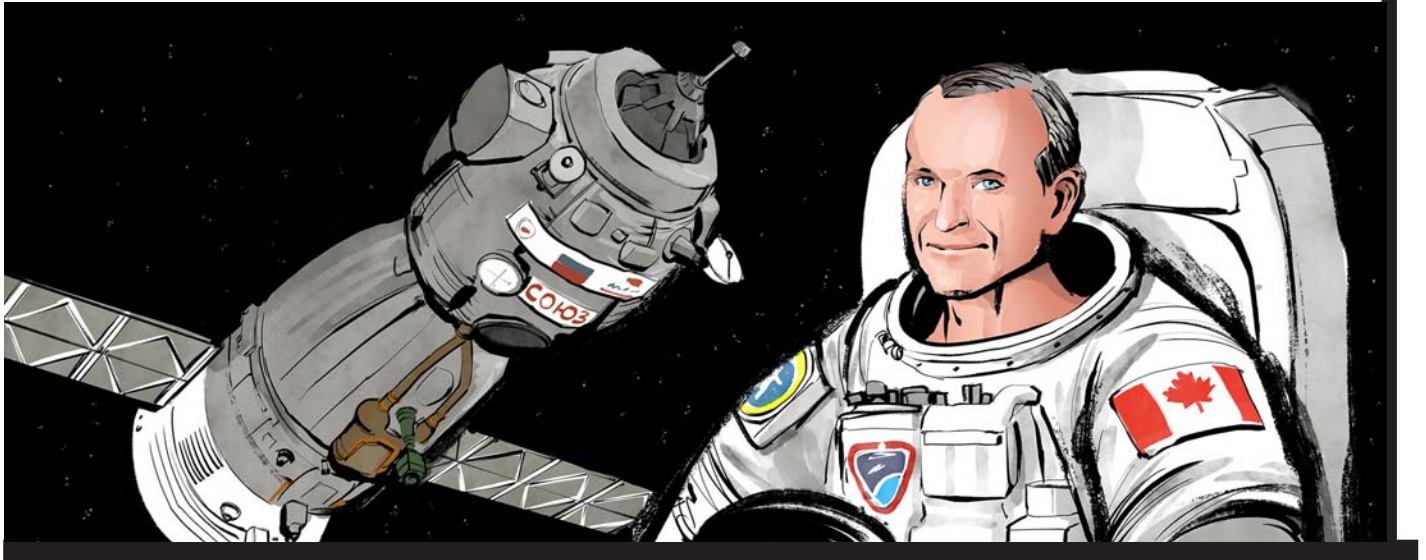




3-2-1, BLAST OFF!

— A CANADIAN HEADS TO THE INTERNATIONAL SPACE STATION



David Saint-Jacques is seeing stars. On December 3, Canada's newest astronaut blasted off from Kazakhstan in a Russian Soyuz rocket. With him were Russian cosmonaut Oleg Kononenko and NASA astronaut Anne McClain. The three-person crew is spending the next six months on the International Space Station (ISS).

Dr. Saint-Jacques is the ninth Canadian to work aboard the orbiting science lab. He follows Chris Hadfield, the first Canadian to command the ISS. Dr. Hadfield shared thousands of tweets, photos, and videos on his 2012-2013 mission. Dr. Saint-Jacques will also share his mission with folks back home.

THE RIGHT STUFF

Astronauts have extraordinary skills and knowledge. David Saint-Jacques started with an engineering degree from École

polytechnique de Montréal. He added degrees in astrophysics and medicine. He also earned a commercial pilot's licence and speaks five languages. He learned English and French growing up in Montreal, but speaks Spanish, Japanese, and Russian, too.

Dr. Saint-Jacques worked as a physician in Puvirnituk, Quebec. It's a small Arctic Inuit community on the eastern shore of Hudson Bay. That's where he found out the Canadian Space Agency (CSA) was looking for astronauts.

"It was as if the world stopped for a second," he remembers. "I had to apply."

It was a tough, two-year process. He went through interviews and medical tests. There were puzzles to solve that took teamwork and decision-making.

THE CANADIAN SPACE AGENCY

The Canadian Space Agency (CSA) is the federal government agency responsible for Canada's space program. It has 670 employees and a budget of about \$332 million.

The CSA promotes the peaceful use and development of space. It advances the knowledge of space through science, and ensures that space science and technology benefit Canadians.

"We practiced fires and floods, did a simulated sinking ship, and learned how to survive a helicopter water splash," he said.

Eight thousand people applied. In May 2009, the CSA settled on two: Dr. Saint-Jacques and Jeremy Hansen.

PREPARE FOR LAUNCH

The 48-year-old astronaut has been training with NASA

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ever since. To prepare for his ISS mission, he practiced spacewalking and operating robotics. He also went to Russia to learn how to co-pilot the Soyuz rocket.

When the Quebecois astronaut packed his bags for the ISS, he brought along children's books by French-Canadian authors. They're not for him. They're to read to his three young kids while he's away. His children may miss their papa while he's in space, but they will not miss their bedtime stories.

SCIENCE IN ZERO-GRAVITY

The ISS is a state-of-the-art **microgravity** laboratory. It is the ideal setting for studying ways to keep astronauts healthy in space. Dr. Saint-Jacques will focus on "isolated medicine," techniques for treating astronauts remotely.

His medical practice in northern Canada was good preparation for his research. Keeping folks healthy in isolated communities is tricky, too.

One tool he is testing is a "smart T-shirt." This Canadian-made device sends a person's heart rate, blood pressure, and other vital signs to a medical professional in another location. It's perfect for monitoring the

health of astronauts in space. It would also allow nurses to check on sick or elderly patients living in remote areas.

The tools and techniques Dr. Saint-Jacques develops could one day support early manned flights to Mars. They may also help Canadians who live far from a medical clinic or hospital.

WHY GO THERE?

Our newest Canadian astronaut has thought a lot about why human space flight is important, and how it benefits humankind.

Science and technology developed in space is part of our daily lives. Satellite technology, for example. Whenever we make a phone call, look at a map, or check the weather forecast, we're tapping into the network of satellites in space.

Another benefit? Space exploration builds friendships with other countries. The four biggest partners to the ISS are the United States, Russia, Germany, and Japan. They have not always been allies on Earth.

"Space allows humans to rise above the fray, makes us want to work together," says Dr. Saint-Jacques.

Space travel also lets us look at the world a different way. Seen

THE INTERNATIONAL SPACE STATION

Five space agencies representing 15 countries, including Canada, began building the \$100-billion ISS under the leadership of the United States in 1998. It was put together piece by piece like Lego.

Today, the ISS is as big as a football field. Its power comes from solar panels. The drinking water is recycled from urine.

The station has room for six scientists at a time. They live and work 360 kilometres above the Earth, travelling 27,000 kilometres an hour. One orbit takes 90 minutes, so in 24 hours, astronauts see 16 sunrises and sunsets.

from space, the world has no borders.

"From the ground, the Earth feels solid and huge. The sky is infinite, the ocean is without end. But when you see it from space, it isn't so. You see it for what it is, an unbelievably fragile beauty. It is obvious that we can mess it up if we're not careful.

"That perspective of our planet seen from far away is ultimately one of the most important **legacies** of space flight. It makes us a bit wiser, more responsible. It makes it obvious that we're all in this together." ★

DEFINITIONS

LEGACY: something passed on by a predecessor

MICROGRAVITY: the virtual absence of gravity; weightlessness



ON THE LINES

Answer the following in complete sentences:

1. Where is the International Space Station located?

2. How fast does the ISS travel?

3. List at least three other important facts about the ISS.

4. Name the three astronauts who travelled to the ISS in early December.

5. Describe the qualifications of the astronaut from Canada.

6. Describe the initial training and evaluation that Canadian astronaut-candidates experienced.

7. What training has Dr. Saint-Jacques undergone since mid-2009?

8. Describe the T-shirt that Dr. Saint-Jacques will test during the mission.



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BETWEEN THE LINES

Making an inference: An *inference* is a conclusion drawn from evidence. A plausible inference is supported by evidence in the article and is consistent with known facts outside of the article.

Six astronauts will be living and working together aboard the International Space Station in a space about the size of a five-bedroom house for half a year. Under these circumstances, what personal qualities do you think it might be important for the astronauts to have? Give reasons for your suggestions.

JUST TALK ABOUT IT

1. a) As you see it, what are some of the costs of space exploration? Consider the Canadian Space Agency's annual budget, as well as the risks that space travel poses to the health and safety of astronauts that participate in missions on the ISS.
b) What are some of the benefits of human space travel? Give specific examples from Expedition 58 to support your response.
c) In your opinion, do the benefits of human space travel and exploration outweigh the costs and risks? Why or why not?
2. Would YOU be interested in becoming the CSA's next astronaut? Why or why not? Explain.

ONLINE

Note: The links below are listed at www.lesplan.com/en/links for easy access.

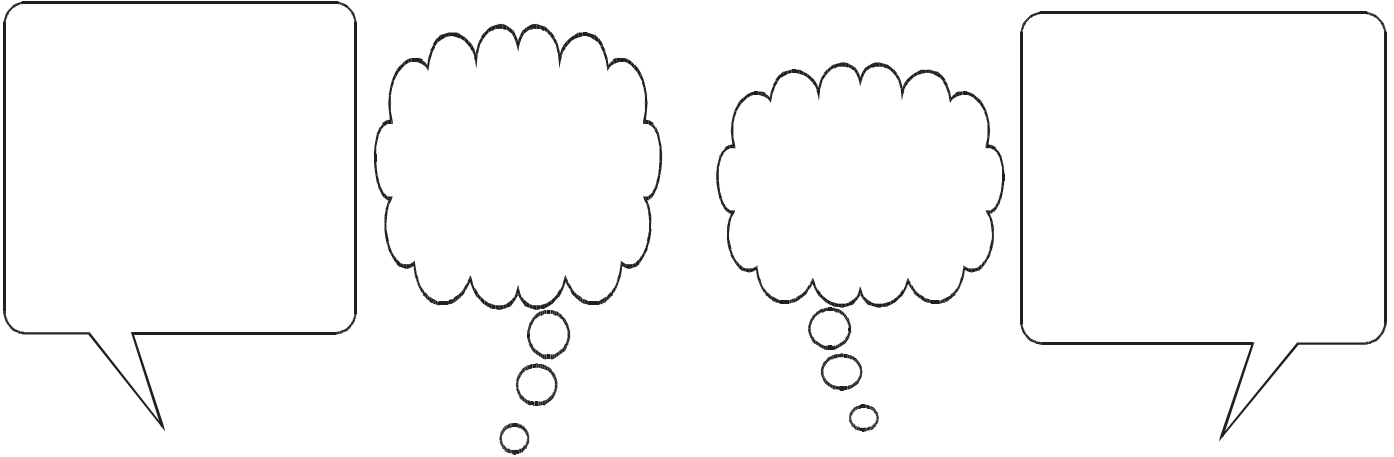
1. Follow David Saint-Jacques on Twitter at https://twitter.com/Astro_DavidS
2. Visit the Canadian Space Agency's website to find out more about Expedition 58, Dr. David Saint-Jacques, and Canadian science on the ISS at <https://www.canada.ca/en/space-agency.html>
3. Watch a video of the Soyuz spacecraft launch on December 3, 2018, at <https://spaceflightnow.com/2018/12/03/video-soyuz-lifts-off-with-new-space-station-crew/>
4. Find out more about the International Space Station at https://www.nasa.gov/mission_pages/station/overview/index.html ★



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Write the inner and outer dialogue for two or more people in this scene. Show what the person is thinking/feeling (inner voice) and saying (outer voice). *A believable conversation conveys appropriate ideas, thoughts, feelings or reactions; is on topic; extends the details of the scene; and is convincing.*



Expedition 58 Flight Engineer David Saint-Jacques of the Canadian Space Agency (CSA), right, who is in quarantine, makes a heart with his hands for his son on December 2, 2018 at the Cosmonaut Hotel in Baikonur, Kazakhstan. Photo Credit: (NASA/ Aubrey Gemignani). (<https://www.flickr.com/photos/nasahqphoto/45237139415/>)



QUIZ

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Write the letter that corresponds to the best answer on the line beside each question:

_____ 1. **How many countries helped build the International Space Station?**

- a) 5
- b) 9
- c) 15
- d) 32

_____ 2. **Where did the Soyuz rocket blast off from on December 3rd?**

- a) Florida
- b) Quebec
- c) Kazakhstan
- d) Russia

_____ 3. **How long is the mission to the ISS expected to last?**

- a) one month
- b) three months
- c) six months
- d) one year

Mark the statements below T (True) or F (False). Write one fact to correct or support each answer on the line below.

_____ 4. **True or False?** The ISS orbits 360 kilometres above the Earth.

_____ 5. **True or False?** Only 100 people applied to the CSA to become Canadian astronauts.

_____ 6. **True or False?** Five other astronauts traveled with Dr. Saint-Jacques to the ISS.

Fill in the blanks to complete each sentence.

7. CSA = Canadian _____ Agency.

8. The ISS is about the size of a _____ field.

9. Dr. David Saint-Jacques will test a smart _____ during the ISS mission.

Answer the following in a complete paragraph:

10. Explain what the ISS is and why it was built.
