

European Astronaut Selection



ESA prepares for the missions of the 21st century

With the selection of its first astronauts in 1978 and the first Spacelab mission in 1983, the European Space Agency (ESA) took its first steps into human spaceflight. The advent of the Columbus orbital laboratory project required a second selection of astronauts in 1992.

ESA's human spaceflight activities are now entering a new era, with ESA astronauts working aboard the International Space Station (ISS), Columbus starting operations, and the new 'ATV' cargo ship delivering fresh supplies to the Station.

The exploration of the Solar System will be one of humanity's most exciting adventures in the near future. All of the world's spacefaring nations are preparing for this huge enterprise, and an astronaut corps is essential for Europe, thanks to ESA, to take part in this endeavour.

Now is the time for ESA to seek new talents to reinforce its astronaut team, to prepare for missions to the ISS, the Moon and beyond.

A man with short brown hair and glasses, wearing a dark blue pinstriped blazer over a light blue button-down shirt and blue jeans with a black belt. He is standing outdoors with green trees in the background. The right side of the image has a red overlay with white text.

How can I apply?

You can apply online via the ESA web portal (www.esa.int/astronautselection).

Registration is in two steps:

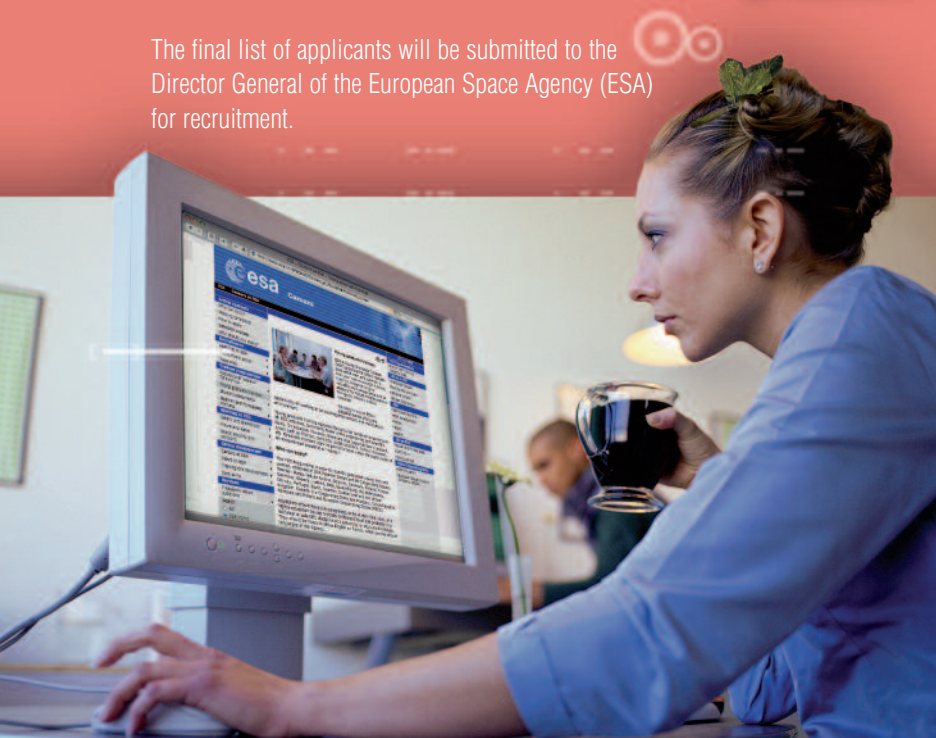
- pre-registration: provide identity information and a JAR-FCL 3, Class 2 medical examination certificate, from an Aviation Medical Examiner who has been certified by his/her national Aviation Medical Authority;
- a password then allows you to access the application form.

The Selection | How? When? Where?

- initial selection according to basic criteria;
- psychological tests for selected candidates;
- second round of psychological tests and interviews;
- medical tests;
- job interview.

What are the steps in the selection process?

The final list of applicants will be submitted to the Director General of the European Space Agency (ESA) for recruitment.



Where can I apply?

Registration takes place online.
The selected candidates will be
informed about the locations
for the testing and interviews.

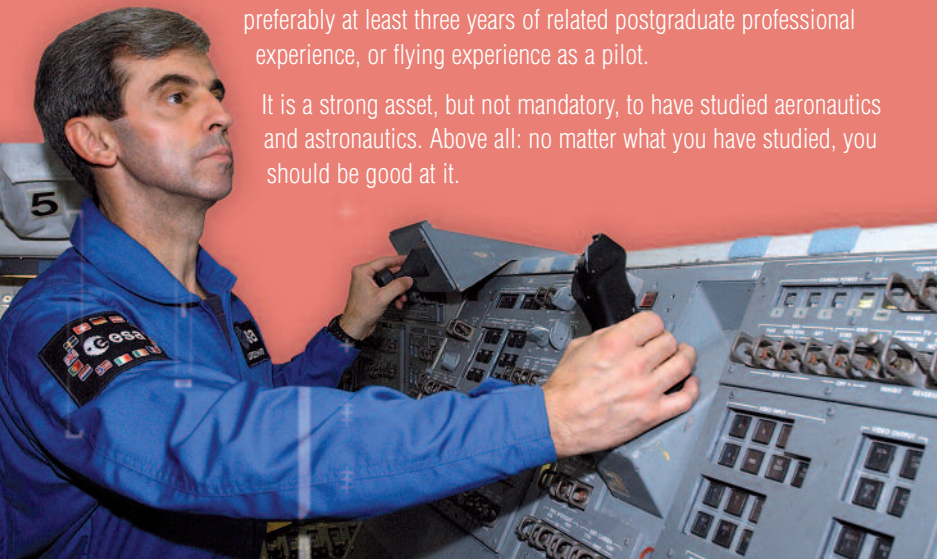


What are the required disciplines and qualifications to apply? What should I study?

Typically, candidates should be knowledgeable in the scientific disciplines and should have demonstrated outstanding abilities in appropriate fields, preferably including operational skills.

Applicants must have a university degree (or equivalent) in Natural Sciences (physics, biology, chemistry, mathematics), Engineering or Medicine, and preferably at least three years of related postgraduate professional experience, or flying experience as a pilot.

It is a strong asset, but not mandatory, to have studied aeronautics and astronautics. Above all: no matter what you have studied, you should be good at it.



I don't speak English, should I apply?

Applicants must be able to speak and write English, and it is an advantage to know another foreign language.



I don't speak Russian, should I apply?

Yes, speaking Russian is an asset but not a requirement. This is the second official language aboard the ISS, so you will learn it during astronaut training.



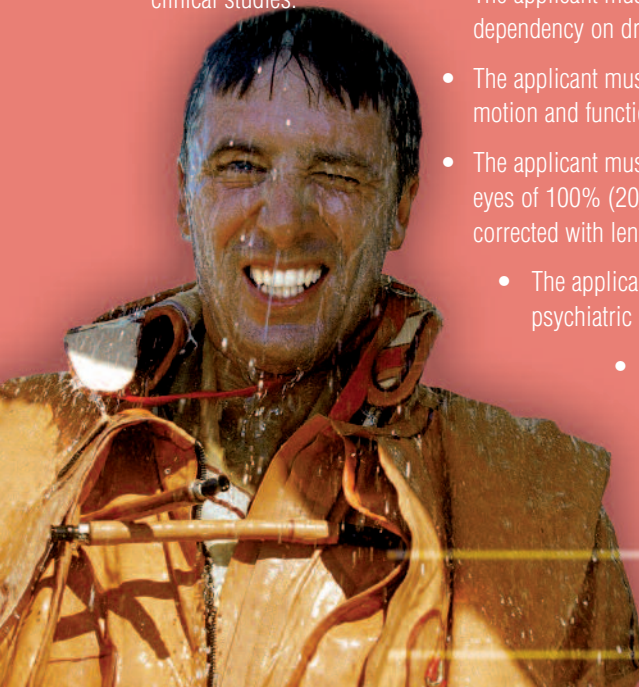
Which medical and psychological standards will be used to select the candidates?

An ESA Astronaut requires a multitude of skills, capabilities and characteristics. One important component of finding someone with the 'right stuff' is an assessment of how healthy each applicant is from a medical and psychological perspective. A general overview of the types of medical and psychological health criteria that will be used in assessing each candidate is given overpage.



In general, normal medical and psychological health standards will be used. These standards are derived from evidence-based medicine, verified from clinical studies.

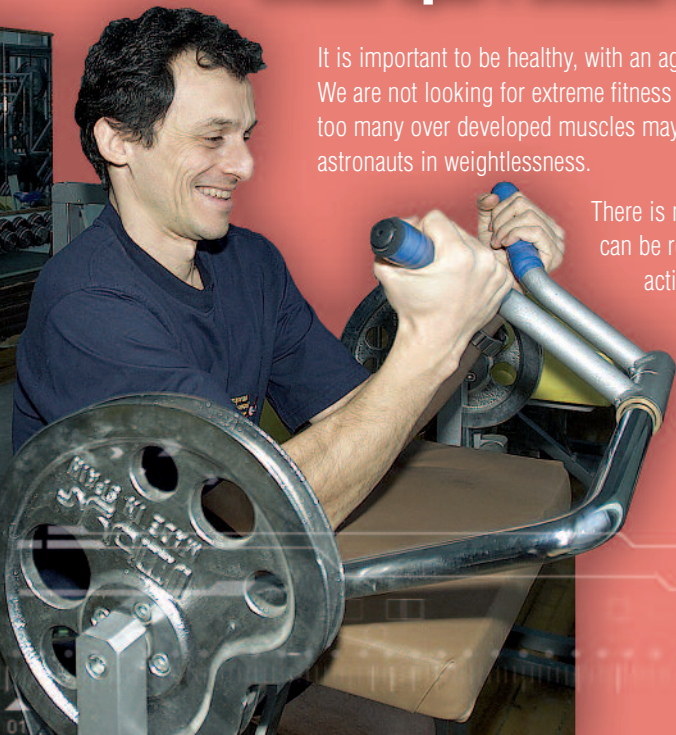
- An applicant should be able to pass a JAR-FCL 3, Class 2 medical examination, conducted by an Aviation Medical Examiner certified by his/her national Aviation Medical Authority.
- The applicant must be free from any disease.
- The applicant must be free from any dependency on drugs, alcohol or tobacco.
- The applicant must have the normal range of motion and functionality in all joints.
- The applicant must have visual acuity in both eyes of 100% (20/20) either uncorrected or corrected with lenses or contact lenses.
 - The applicant must be free from any psychiatric disorders.
 - The applicant must demonstrate cognitive, mental and personality capabilities to enable him/her to work efficiently in an intellectually and socially highly demanding environment



Do I need to be fit to become an astronaut? Which sport should I pursue?

It is important to be healthy, with an age-adequate fitness level. We are not looking for extreme fitness or top level athletes – too many over developed muscles may be a disadvantage for astronauts in weightlessness.

There is no specific sport that can be recommended. Physical activities are in general beneficial to your health.



How can I prepare for the medical tests?



During the medical selection, applicants will undergo numerous tests across many health areas. Some tests are physically demanding, like bicycle or treadmill exercises. Some may also be invasive and others may be just questionnaires.

There is nothing you can do generally to prepare for these medical examinations. If an examination requires specific preparations, such as fasting before giving a blood sample, applicants will receive instructions.

Do astronauts develop serious health problems during their stays in space?

No, there are no dangerous conditions that develop because of spaceflight. However, the space environment is hazardous and the astronauts' well-being depends on life-support systems.

Weightlessness does have potentially temporary negative effects on human physiology, such as physical deconditioning and bone demineralisation.

The ESA Crew Medical Support Office and its staff are responsible for avoiding such hazards and preventing the space environment from affecting the physical and mental health of the astronauts.

The environment and life-support systems are closely monitored, and there is a thorough preventive and countermeasure programme.



Is it more difficult for a woman to become an astronaut?

No, from the physical point of view, it is not harder for a woman. The medical and psychological requirements for women and men are identical, apart from, of course, some gender-specific medical examinations.

Physical fitness and cardiovascular fitness are always evaluated on an individual basis and the fitness target values are adjusted to the physiological differences between men and women. A woman therefore does not have to meet the male norms, and vice-versa.



My vision is not perfect; can I still become an astronaut?

There is no clear yes/no answer because there is such a multitude of visual defects. However, vision problems account for most disqualifications. The main tests involve visual acuity, colour perception and 3-D vision.

Wearing spectacles or contact lenses is not a reason for disqualification per se, but it has to be evaluated if, for example, a visual defect is known to progress rapidly. This could mean disqualification. Minor visual defects, even though requiring lenses, may be regarded as compatible with space duties.

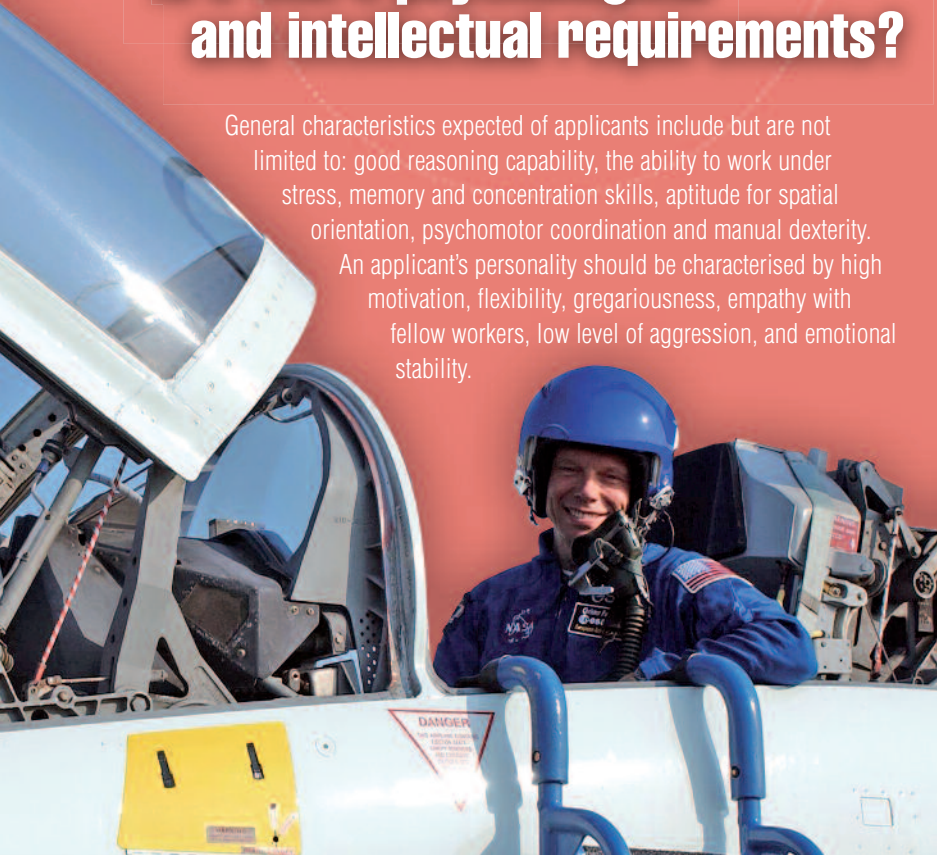
Recently, a variety of surgical interventions to correct visual acuity has become more common. Some of these procedures will lead to disqualification, while others are acceptable. Every case will be judged individually.



Are there psychological and intellectual requirements?

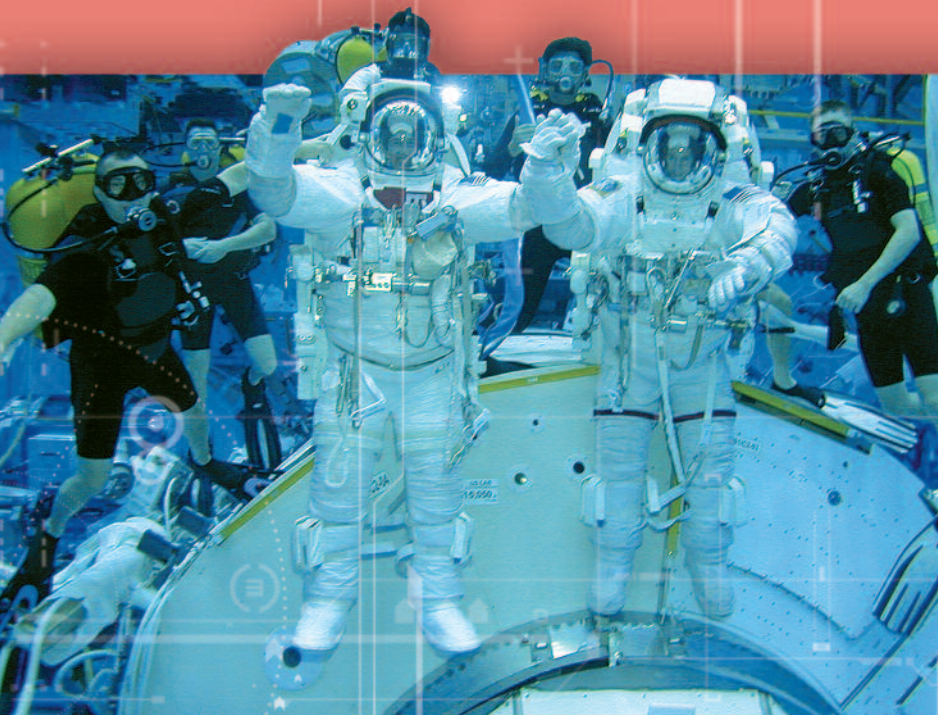
General characteristics expected of applicants include but are not limited to: good reasoning capability, the ability to work under stress, memory and concentration skills, aptitude for spatial orientation, psychomotor coordination and manual dexterity.

An applicant's personality should be characterised by high motivation, flexibility, gregariousness, empathy with fellow workers, low level of aggression, and emotional stability.



What is the ideal age to apply?

The preferred age range is 27 to 37.



An astronaut is a person trained to command or pilot a spacecraft or serve as a crewmember during a space mission. The criteria for the definition of a spaceflight vary; for example, the Fédération Aéronautique Internationale (World Air Sports Federation) defines it as any flight reaching 100 km altitude.

What is an astronaut?



Is there a centre in Europe for training European astronauts?

Yes, it is the European Astronaut Centre (EAC),
ESA's centre in Cologne, Germany.



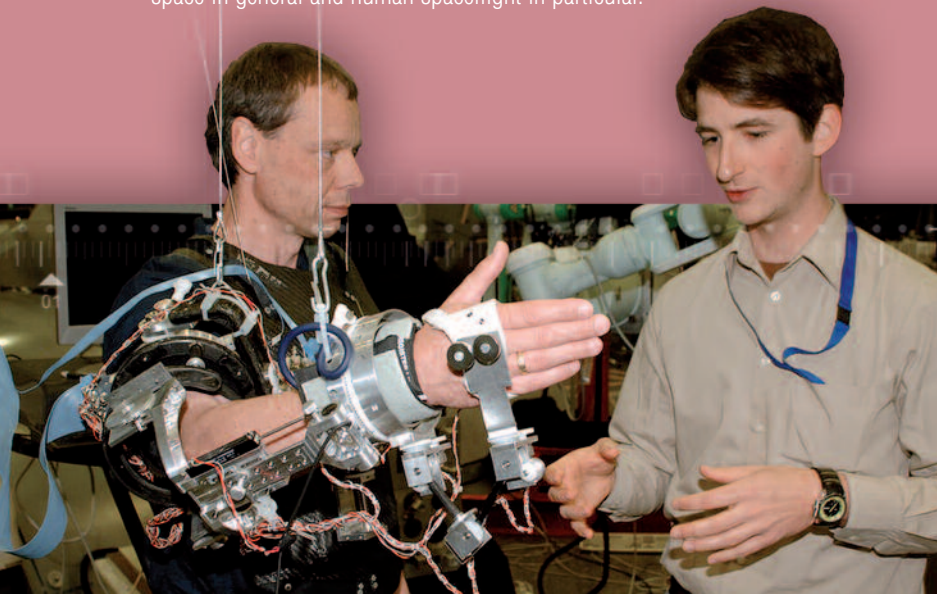
What is the typical role of an ESA Astronaut in a crew?

European astronauts will continue to make long-duration flights aboard the ISS, carrying out experiments and operating the Station's systems. They will assemble, activate and check out new Station elements, undertake scientific research and even act as test subjects in life sciences experiments.



What do the astronauts do when they are not training for a flight?

They provide technical support to spaceflight programmes, maintain their proficiency and contribute to public relations, to explain the importance of space in general and human spaceflight in particular.



How long is the astronaut training?

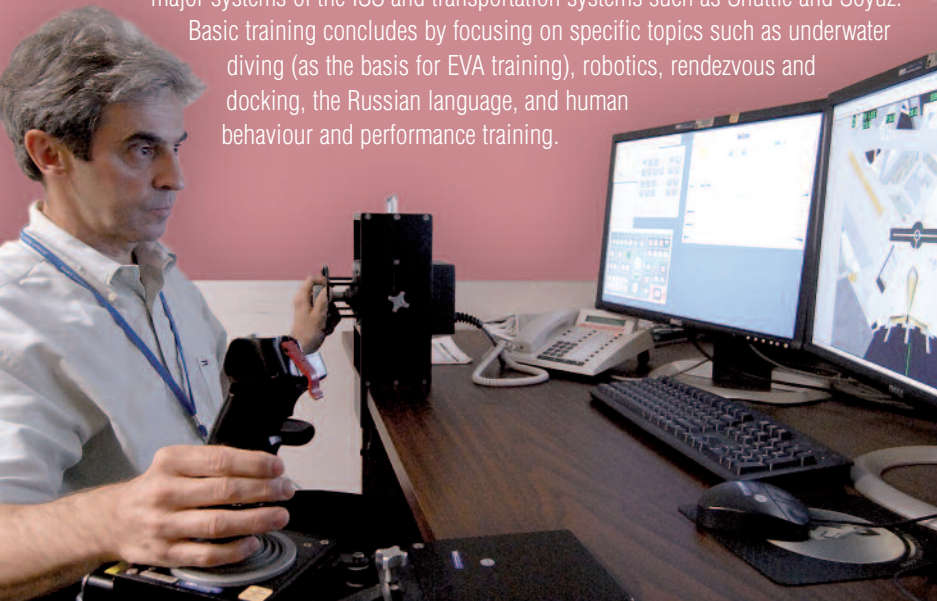
The Job

There are three phases: basic training, advanced training and mission-specific training. Astronauts spend half of their careers in training.

Basic training

Immediately after recruitment, the astronaut candidates will undergo a 1-year basic training at their duty station, the European Astronaut Centre. Training begins with information on ESA and other space agencies and their main space programmes. Basic knowledge of space engineering, electrical engineering and the different science disciplines is then provided. The third block deals with the major systems of the ISS and transportation systems such as Shuttle and Soyuz.

Basic training concludes by focusing on specific topics such as underwater diving (as the basis for EVA training), robotics, rendezvous and docking, the Russian language, and human behaviour and performance training.



Advanced training

Advanced Training also takes a year and provides international astronauts from all ISS partners with the knowledge and in-depth skills to operate, service and maintain ISS modules, systems, payloads and transport vehicles. The training is now more detailed but still generic, offering the expertise that future crewmembers would need for almost any flight to the ISS. It also entails specialisation in some functions, such as resource and data operations, robotics, navigation, maintenance, intra- and extra-vehicular activities, medical aspects and payloads. These are covered at all the partners' facilities in order to provide first-hand familiarity with specific flight elements and operations.



Increment-Specific training

The final stage is the Increment-Specific Training (an 'Increment' is the period between crew exchange aboard the Station), which gives assigned and backup crews the knowledge and skills required for their specific mission. Training together for about 18 months fosters team integration and spirit.



Do male and female candidates have different training?

There is no difference between the training of male and female candidates.



Are there medical follow-up examinations in space?

On a long mission, a crew surgeon (= medical doctor) takes care of each astronaut before, during and after the flight. The astronaut and doctor are often in contact, discussing health issues and performing medical tests in space.

In general, there is no doctor on board, but two astronauts ('Crew Medical Officers', CMOs) are trained to provide medical support per mission. They offer basic medical support, just like a paramedic on the ground. There is a special book on board, called the 'medical checklist', which helps laymen to diagnose and treat sick or injured crewmembers.

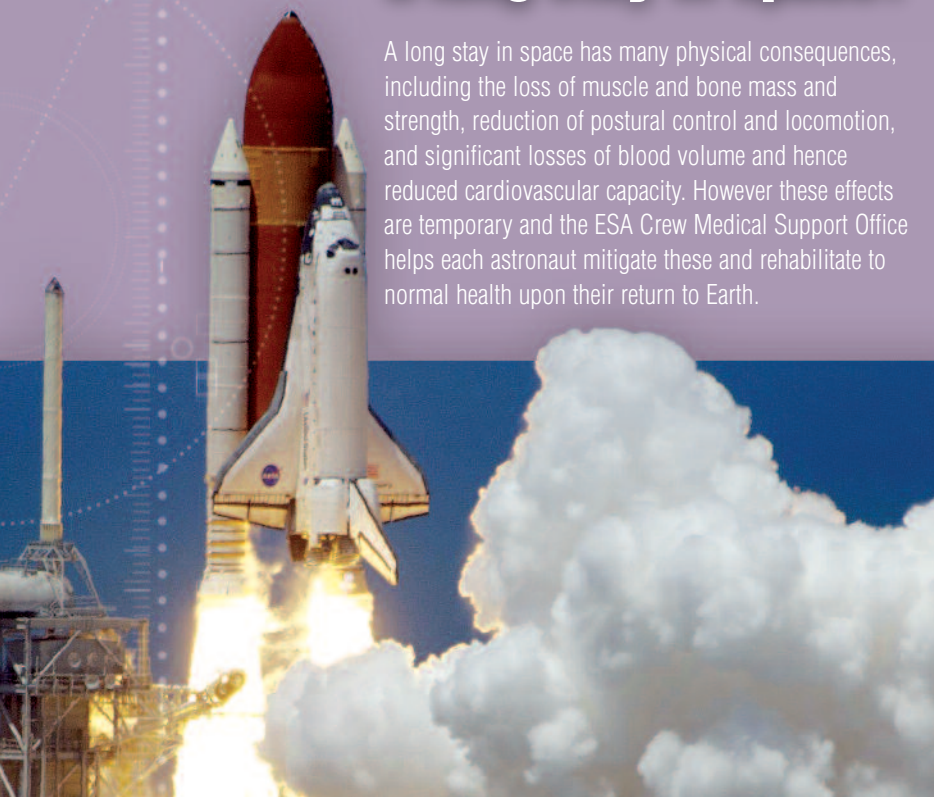
The astronauts and CMOs are supported by physicians (flight surgeons) on the ground; they help to make clinical decisions and guide the CMOs through the checklist. The crew has access to several medical kits for common drugs, such as aspirin or other mild pharmaceuticals, as well as to an emergency medical kit with painkillers, anaesthetics, dental medication, bandages, stethoscope, defibrillator and other advanced life-support tools and medications.

The flight surgeon can talk to the astronauts in a Private Medical Conference once per day on a secure channel for 15 minutes to discuss potential medical issues.



What are the physical effects of a long stay in space?

A long stay in space has many physical consequences, including the loss of muscle and bone mass and strength, reduction of postural control and locomotion, and significant losses of blood volume and hence reduced cardiovascular capacity. However these effects are temporary and the ESA Crew Medical Support Office helps each astronaut mitigate these and rehabilitate to normal health upon their return to Earth.





Life in space

Is it true that astronauts lose bone mass in space? Can it be cured?

Depending on the level of physical exercise and the individual, astronauts can lose about 1% of their bone mass per month in space. The time required to recover this mass after a mission depends on the flight's duration. For a long flight of around 6 months, it will take at least 6 months to return to pre-flight bone levels. It also depends on physical exercise: exercising during a mission speeds the recovery.

How is an astronaut's day in space organised?

Each day in orbit (apart from rest days) is carefully planned by Mission Control. The 12-hour working day on the ISS begins with a wake-up call. After a quick rub down with a soapy cloth, the crew has breakfast and runs through the jobs for the day with Mission Control.

Space stations are like large, complicated houses that need constant care and attention. A lot of time has to be spent on housekeeping chores like cleaning and repairs.

There are three meals (breakfast, lunch and dinner) and drinks and snacks are always available. Much of the crew's time is spent preparing and carrying out scientific experiments. This may involve speaking to scientists on the ground.

At least two hours each day are spent on exercise. This is essential to keep the crew fit and healthy. Loading the ferry craft with rubbish and unloading fresh supplies is a major task. Many hours can also be spent getting ready for spacewalks.

How do astronauts eat in space?

Most of their food has to be prepared in a special way to ensure that it can be eaten in weightlessness. The most common preparation for space is dehydration; the astronauts rehydrate it simply by putting it in their mouth or adding water.



How do astronauts go to the toilet in space?

The toilet is designed for use by both males and females. A seat belt and foot restraints hold the astronaut on the seat, while high-speed air currents pull the waste into the respective receptacles. The urine is combined with other water waste and the faeces are vacuum-dried, chemically treated to remove odour and bacteria, and stored.

How do astronauts take showers in space?

They do not take showers in space. With such limited access to the ISS, the Station has to work as efficiently as possible — and water is one of the most precious onboard resources. Anyway, showers are not convenient in weightlessness — the water just floats around. Instead, astronauts use wet towels.



How do astronauts sleep in space?

Astronauts cannot lie 'down' in a bed because of the weightlessness. Sleeping bags are strapped to bunks to keep them from floating around. Astronauts can sleep standing up, upside-down, or even suspended in the air.



What do the astronauts wear in space?

There are no special clothes – the astronauts wear ordinary clothes like T-shirts. There is no washing machine on the ISS, and it is hard to pack enough clothes like underwear or socks, because each kilogram launched into space is very expensive. The result is that they cannot change their clothes every day: underwear is changed every 2–3 days. On average, ISS crewmembers get one pair of shorts and a T-shirt for every 3 days of exercising. Their work shirts and trousers/shorts are changed, on average, once every 10 days. There is usually a new T-shirt to wear under their work shirts every 10 days.





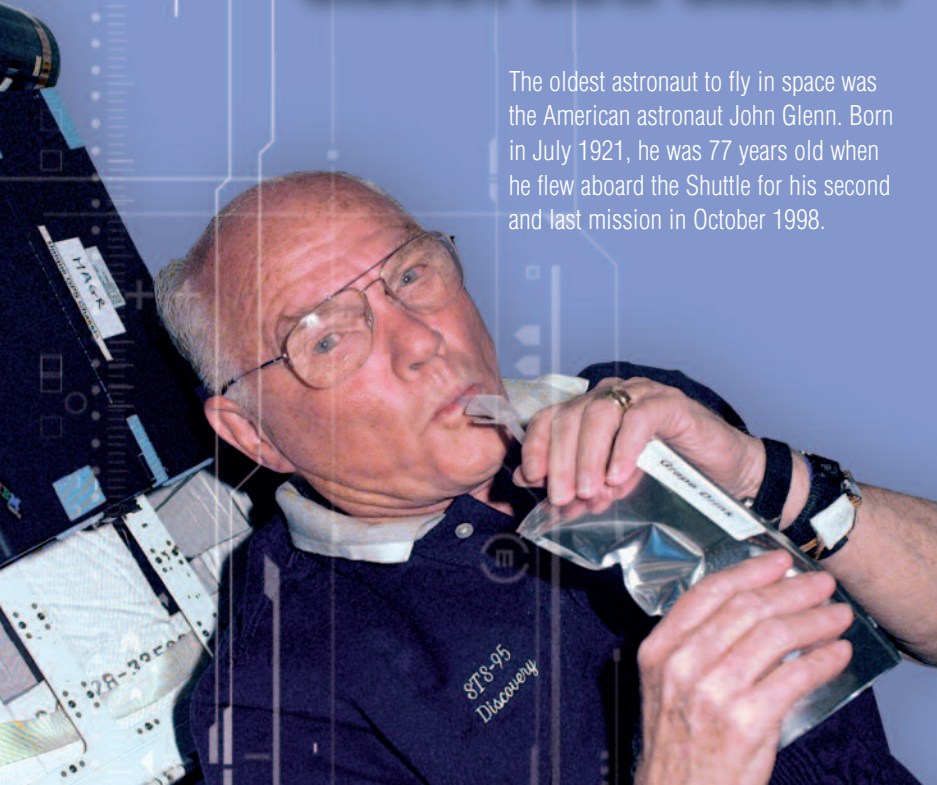
Space Facts

How old was the youngest astronaut?

The youngest astronaut at the time of his first flight is still the Russian cosmonaut Gherman Titov: he was 25 years and 329 days old when he was launched in Vostok-2 in August 1961 as the second human in orbit.

How old was the oldest astronaut?

The oldest astronaut to fly in space was the American astronaut John Glenn. Born in July 1921, he was 77 years old when he flew aboard the Shuttle for his second and last mission in October 1998.



Who was the first man in space?

The first man in space was the Russian cosmonaut Yuri Gagarin. He was launched into space on 12 April 1961 aboard Vostok-1.



Who was the first woman in space?

The first woman in space was the Russian Valentina Tereshkova. She was launched into space in June 1963 aboard Vostok-6.





Space Facts

What was the longest stay in space?

The longest stay in space was 437 days, 17 hours, 58 minutes, by Russian cosmonaut Valeri Polyakov aboard the Mir space station, from 8 January 1994 to 22 March 1995.



European Astronaut Corps 2008

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