ESA ASTRONAUT SELECTION 2021

Your way to space
For the first time since 2008, ESA is seeking new astronauts to join a journey of discovery for the benefit of Earth.

This collection of infographics gives a small insight into the role of an ESA astronaut, selection requirements, astronaut training, what ESA does and – most importantly – how you can apply!

Are you ready? Read on for your way to space.
WHO CAN APPLY?

There are many paths to becoming an astronaut...
ESA is seeking candidates with a Master’s degree (or higher) and a minimum of three years' experience in:

- Medicine
- Mathematics
- Computer Sciences

Applications from all qualified candidates, irrespective of gender, sexual orientation, ethnicity, beliefs, age, or other characteristics, are welcome.

ESA is also issuing a special call for candidates with physical disabilities to apply to its astronaut reserve. Discover this new opportunity on the ESA astronaut selection website.
REQUIREMENTS TO APPLY

All aspiring astronauts must fulfill requirements described in the vacancy notice. These include, but are not limited to:

- Citizen of an ESA Member State and associated states.
- Master's degree (or higher) in: natural sciences (including physical sciences, Earth, atmosphere or ocean sciences, biological sciences, medicine), engineering, mathematics, computer sciences; or an experimental test pilot degree.
- Three years' relevant professional post-graduate experience, showing progressive increase in responsibilities.
- Fluent in English (minimum CEFR C1). Knowledge of additional languages (minimum CEFR B1-B2) is an asset.
- Strong motivation and ability to cope with irregular working hours, frequent travel, and long absences from home, family and regular social life.
- Flexible with regards to place of work (inside or outside Europe).
- Calm under pressure.
- Willing to participate in life science experiments.
As part of ESA's commitment to enhance inclusiveness and fair representation, the Agency is launching the parastronaut feasibility project to assess the conditions for including astronauts with disabilities to work in space. This project is a new endeavour for Europe and a global first.

The feasibility project aims at offering professional spaceflight opportunities to a wider pool of talents. Starting with selected disabilities to have a thorough understanding of the potential challenges in terms of safety and operations in space, the scope of disabilities may then be extended aiming at broader inclusion.

The selected candidate(s) will work with ESA to assess and optimise the conditions allowing people with physical disabilities to work and live in space.

The educational and psychological requirements for these candidates are the same as for the ESA astronaut selection. However, with respect to physical requirements, this feasibility project will allow the inclusion of candidates with the following disabilities:

- a lower limb deficiency, as follows:
  - Single or double foot deficiency through ankle
  - Single or double leg deficiency below the knee
- a pronounced leg length difference
- a short stature (<130 cm)
The situation regarding COVID-19 may change this schedule.
HOW TO APPLY

1 Applications open 31 March 2021 and close 28 May 2021
2 Submit a complete application online through the ESA careers website before the vacancy closes
3 Create an account and answer an online questionnaire
4 Upload all documents specified in the vacancy notice:
   - a Europass CV (in English)
   - a motivation letter (in English)
   - a copy of your passport
   - a medical certificate issued by an aviation medical examiner showing you are medically certified for a Private Pilot Licence or higher. You do not need to actually hold a pilot licence.

Please take care when applying. All incomplete, late, or incorrectly submitted applications will be disregarded without exception.
Established in 1975, ESA now has 22 Member States, with more than 500 million European citizens. If you’re one of them, then we’re working for you.

Our mission is the peaceful exploration and use of space for the benefit of everyone. We watch over the Earth, develop and launch inspiring and unique space projects, fly astronauts and push the boundaries of science and technology, seeking answers to the big questions about the Universe.

We are a family of scientists, engineers and business professionals from all over Europe working together in a diverse and multinational environment. We are dedicated to united space in Europe and united Europe in space.
BENEFITS OF SPACEFLIGHT

Human and robotic spaceflight contributes to a **circular economy**. Our research and technology developments improve energy efficiency, automation, robotics and artificial intelligence, as well as habitation, recycling, waste management and additive manufacturing processes and technology.

Click on the benefits to the right for more information about each subject and how it is helping people on Earth.
ASTRONAUTS IN SPACE

**Sleep**
Eight hours per day.

**Lunch**
Exit the Space Station to install new experiments or carry out maintenance. Usually an all-day event.

**Dinner**
Perform experiments autonomously or in contact with mission control.

**Social**
Phone calls with family and friends.

**Breakfast**
Exercise for two hours per day, seven days a week.

**Experiments**
Daily meeting
20-minute meeting about the day’s planned activities and any changes to the schedule from mission control.

**Maintenance**
Make sure all equipment as well as the Station itself is in tip-top shape.

**Weekends**
Carry out housekeeping, public relations and voluntary tasks, plus spare time.

**Fitness**
Health check
Participate in weekly conferences with doctors.
ASTRONAUTS ON EARTH

Tasks ESA astronauts perform when they are not in space.

Office work
Attend meetings and briefings, serve on boards, advise on procedures and protocols.

Mission control
Guide astronauts through spacewalks and spacecraft operations by radio from mission control.

Training
Refresher sessions, language classes, medical training, mission-specific training.

Public relations and media
Give interviews, host visits, record special messages, social media.

Education and outreach
Attend special events, speak with young people about ESA and space topics.

Mission support
Lead team in charge of ESA astronaut operations and crew support.

Exercise
Maintain an adequate level of fitness through sport and exercise.

Travel
Travel for events, conferences, training and longer-term postings with partner agencies.

Special assignments
Participate in analogue missions such as NASA’s NEEMO and ESA’s CAVES and Pangaea training.

Education and outreach
Attend special events, speak with young people about ESA and space topics.
Space exploration is a team effort, requiring many functions. Here are a few other roles that help ensure mission success.

**Eurocoms**
Europe's specialist communicators and biomedical engineers are the voice link between astronauts in space and ground control teams on Earth.

**Crew support**
The wellbeing of astronauts and their families is supported by a dedicated crew operations team.

**Medical experts**
Flight surgeons, exercise specialists, administrators and other experts take care of an astronaut’s health.

**Scientists and researchers**
Principal investigators and their teams develop and support the experiments astronauts perform in orbit.

**Trainers**
Astronaut trainers prepare crew members to carry out tasks and experiments in space.

**Planners**
An astronaut’s time is a precious resource, planners make sure this is scheduled for use in the most efficient way.

**Flight directors**
The team at ESA’s Columbus Control Centre make sure astronauts work safely in Europe’s space laboratory, and command and control systems from the ground.

**Public relations, media and communications**
This team brings the fascinating science and operations of astronaut missions to the attention of the public.

Find out more about ESA careers.
Astronaut training is constantly evolving. However, there are three key phases for European astronauts.

**BASIC TRAINING**
One year, at European Astronaut Centre

Introduction to:
- ESA
- International space programmes
- Engineering and science fundamentals
- Space systems and vehicles
- Basic astronaut skills
- Russian language
- Survival skills

**PRE-ASSIGNMENT TRAINING**
Length varies, at all partner sites

Gain in-depth knowledge:
- Resource and data operations, robotics
- Navigation
- Maintenance
- Spacewalks
- Medical practices and payloads
- At this stage astronauts also support operations for ongoing missions

**INCREMENT TRAINING**
Around two years, at multiple locations

Once assigned a spaceflight:
- Prepare for assigned mission
- Focus on specific tasks and experiments to be performed in space

**PHASES OF TRAINING**
TRAINING LOCATIONS

Canadian Space Agency
Robotics Training Centre
Montreal, Canada

ESA
European Astronaut Centre
Cologne, Germany

Roscosmos
Yuri Gagarin Cosmonaut Training Centre
Star City, Russia

SpaceX
Dragon training
Hawthorne, United States

NASA
Johnson Space Center
Houston, United States

JAXA
Tsukuba Space Center
Tsukuba Science City, Japan

Roscosmos
Baikonur Cosmodrome
Baikonur, Kazakhstan

European Astronaut Centre
Home to ESA’s astronaut corps, it trains Europeans to fly to the International Space Station, while preparing for an exciting future of space exploration beyond low Earth orbit.

200+
People involved in astronaut training across the globe.

30+
Astronauts from all over the world train each year at ESA’s astronaut centre.
CAVES stands for Cooperative Adventure for Valuing and Exercising human behaviour and performance Skills. The three-week course prepares astronauts to work safely and effectively in multicultural teams in an environment where safety is critical – in caves.

The cave environment provides many space-relevant conditions, including isolation from the outside world, confinement, minimal privacy, technical challenges, as well as limited equipment and supplies for hygiene and comfort. Participants must adapt to living and working together in a unique environment to meet scientific and exploration objectives.

Constant attention to safety rules, procedures and equipment is critical to the successful completion of the mission.
The Pangaea course provides European astronauts practical knowledge of **geology of Earth, Moon and Mars** to prepare them to work with planetary scientists and engineers in the next exploration missions.

Astronauts train to work together with robots, scientists and engineers on Earth, using the best field geology and planetary observation techniques.

The course is split into several parts over a year, in these locations:

- **Earth and lunar geology**
  - Nördlinger Ries crater, Germany
- **Moon highland terrain**
  - Lofoten, Norway
- **Martian sedimentary geology and surface processes**
  - Bletterbach canyon, Italy
- **Geological field training and astrobiology**
  - Lanzarote, Spain
ESA's Human and Robotic Exploration programme will see astronauts and robots explore low Earth orbit on the International Space Station, the Moon and Mars to bring back knowledge and benefits on Earth.
The International Space Station is an example of broad cooperation, uniting Europe, USA, Russia, Japan and Canada in one of the largest partnerships in the history of science.

The Station is one of the greatest engineering works achieved by humankind, and proof that it is possible to sustain life away from Earth. Results relating to the effects of long stays in orbit teach us how to manage the risks of future human missions farther out in space.

The endeavour has brought humankind together to live and work in space uninterrupted for over two decades.
The lunar Gateway will be assembled and operated in a highly elliptical orbit around the Moon.

It will be a staging post for missions to the Moon and Mars. It will provide shelter and a place to stock up on supplies for astronauts en route to more distant destinations.

Astronauts will be able to occupy the Gateway for up to 90 days at a time.

The space station will also offer a place to relay communications and is a base for scientific research.

Astronauts will use the Orion spacecraft to travel to the Gateway.

The Gateway has a mass of around 40 tonnes and will consist of a service module, a communications module, a connecting module, an airlock for spacewalks, a place for the astronauts to live and an operations station to command the Gateway's robotic arm or rovers on the Moon.
Orion is a NASA spacecraft set for missions to the Moon, Mars and beyond. ESA has designed Orion’s European Service Module – the powerhouse that will supply the spacecraft with electricity, propulsion, thermal control, air and water. This is the first collaboration between ESA and NASA on a transportation vehicle that will carry astronauts farther into space than ever before.
Going to space

Getting to space requires a **rocket launch**. These are the rockets that ESA astronauts could be launched on.

- **Roscosmos Soyuz FG**
- **Soyuz MS spacecraft**
- **SpaceX Falcon 9**
- **Crew Dragon**
- **Boeing Starliner**
- **NASA Space Launch System**
- **Orion spacecraft**

The Russian Soyuz, commercial SpaceX Crew Dragon and Boeing Starliner fly to the **International Space Station**.

The Space Launch System rocket will launch the **Orion spacecraft** on Artemis missions to the Gateway and the Moon.
ESA is an international organisation with 22 Member States. By coordinating the financial and intellectual resources of its members, it can undertake programmes and activities far beyond the scope of any single European country.
ESTABLISHMENTS AND FACILITIES

**ESA ESTEC**
ESA’s technical and research heart.

**ESA EAC**
Europe’s hub of astronaut activity.

**ESA ESOC**
Where space missions come alive.

**ESA ESRIN**
Keeping watch over our planet.

**ESA ESEC**
Innovating in space security and education.

**ESA HQ**
Guiding Europe’s activities in space.

**ESA ECSAT**
Applying space to daily life.

**ESA ESAC**
ESA’s window on the Universe.

**EUROPE’S SPACEPORT**
Guaranteeing European access to space.
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