

A photograph of an astronaut in a white spacesuit floating in space. The astronaut's helmet is prominent, reflecting the bright light of the sun. The background shows the Earth's blue and white horizon against the blackness of space. The text "European Astronaut Selection 2009" is overlaid in white on the upper right portion of the image.

European Astronaut Selection 2009

Andreas Mogensen

Milestones in Manned Space Flight

- 1961 April 12 – Yuri Gagarin first person in space
- 1961 May 5 – Alan Shepard first American in space
- 1964 – Formation of European Space Research Organization (ESRO) and European Launch Development Organization (ELDO)
- 1975 – European Space Agency (ESA) created by merger of ESRO and ELDO
- 1978 March 2 – Vladimir Remek (CZE) first European in space
- 1978 – ESA selects its first group of astronauts

First ESA Astronaut Selection

- 1978 – First ESA astronaut selection
 - Ulf Merbold (D) STS-9 1983 November 28
 - Wubbo Ockels (NL) STS-61A 1985 October 30
 - Claude Nicollier (CH) STS-46 1992 July 31
- 1980 – First CNES astronaut selection
 - Jean-Loup Chrétien (F) Soyuz T-6 1982 June 24
 - Patrick Baudry (F) STS-51G 1985 June 17
- 1982 – First DLR astronaut selection
 - Reinhard Furrer (D) STS-61A 1985 October 30
 - Ernst Messerschmid (D) STS61-A 1985 October 30
- 1989 – First ASI astronaut selection
 - Franco Malerba (I) STS-46 1992 July 31
 - Umberto Guidoni (I) STS-75 1996 February 22

Second ESA Astronaut Selection

- 1990 - European Astronaut Center (EAC) built in Cologne
- 1992 – Second ESA astronaut selection
 - J. F. Clervoy (F) STS-66 1994 November 3
 - Thomas Reiter (D) Soyuz TM-22 1995 September 3
 - Maurizio Cheli (I) STS-75 1996 February 22
 - Pedro Duque (E) STS-95 1998 October 29
 - Christer Fuglesang (SE) STS-116 2006 December 9
 - Marianne Merchez (B) Resigned before flight
- 1998 – National astronauts corps merged into single ESA astronaut corps
 - Hans Schlegel (D) STS-55 1993 April 26
 - Léopold Eyharts (F) Soyuz TM-27 1998 January 29
 - Roberto Vittori (I) Soyuz TM-34 2002 April 25
 - Frank de Winne (B) Soyuz TMA-1 2002 October 30
 - André Kuipers (NL) Soyuz TMA-4 2004 April 19
 - Paolo Nespoli (I) STS-120 2007 October 23

Third ESA Astronaut Selection

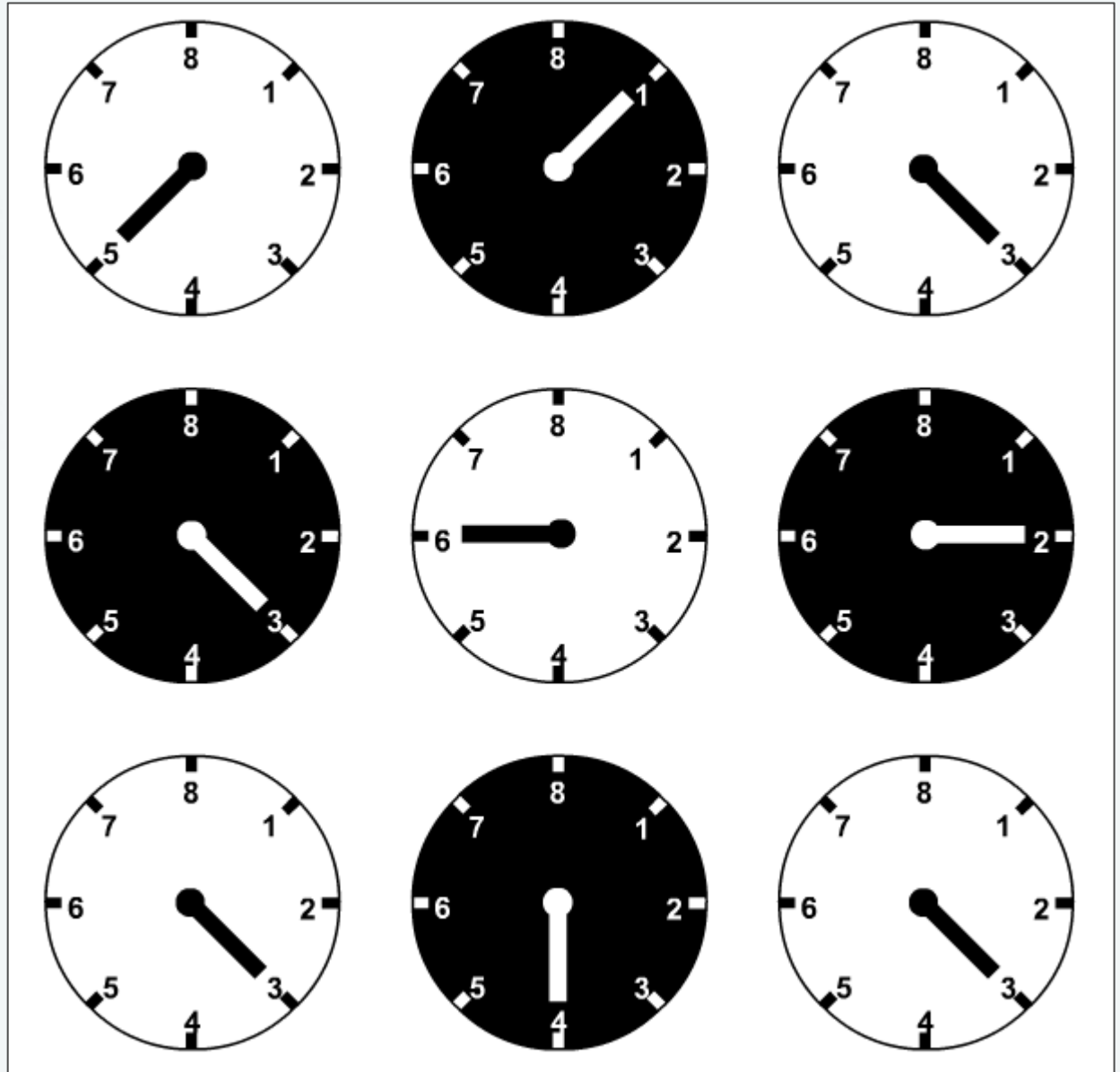
- 2008 Third ESA astronaut selection
 - Applications accepted from all ESA member states
 - First ESA selection without national pre-selection
- Application process
 - 0. Online application and medical pre-screening
JAR-FCL 3 Class 2 May 2008
 - 1. Cognitive tests July 2008
 - 2. Psychological tests October 2008
 - 3. Medical tests January 2009
 - 4. Professional interview March 2009
 - 5. Interview with the Director-General April 2009
 - 6. Final decision announced May 2009
- 8413 applications were successfully submitted
 - France 22%, Germany 21%, Italy 11%, Britain 10%
 - Female applicants 17%

Online Application

- Basic criteria
 - Background in science, engineering, medicine, or as a test pilot
 - Three years of work experience
 - Fluent in English
 - Age range 27-37
 - Physical fitness appropriate for age
- Medical JAR-FCL 3 Class 2 (PPL) certificate
- Online application questions:
 - Piloting experience
 - Language experience (Russian, French, German)
 - International experience / living abroad
 - Presentation /outreach experience
 - Participation in life science experiments
 - Medical / emergency experience
 - Hands-on experimental research experience
 - Participation in scientific expeditions
 - International research experience
 - Scientific publication
 - Professional associations
 - Sport activities (mountaineering, diving, caving, sky-diving etc.)
 - Manual skills
 - Charitable / community services

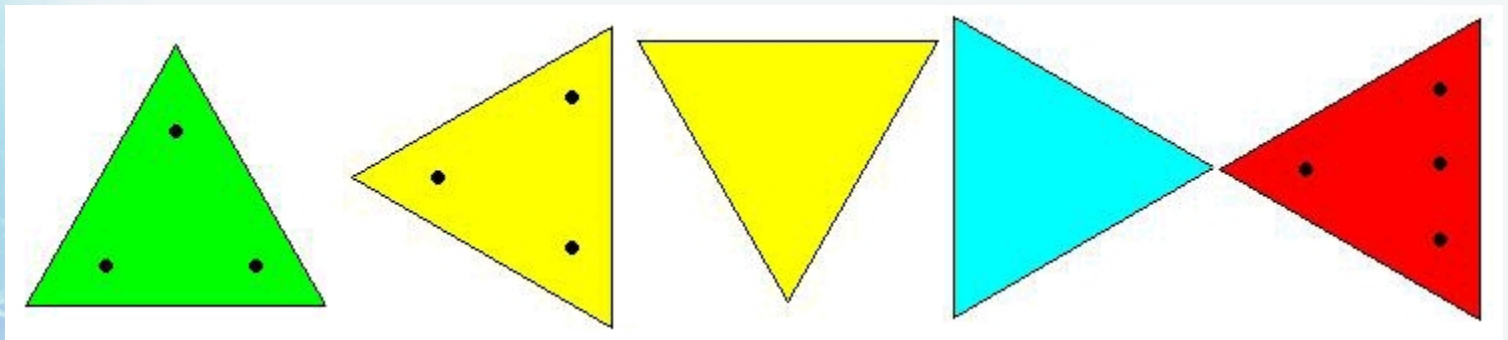
Cognitive Tests

- Individual computer-based cognitive tests lasting eight hours
- 918 candidates invited to participate in cognitive tests
- Several different types of cognitive tests, eg. perception test
 - Instruction: “Critical instruments: round and black”
 - Two seconds to memorize digits



Cognitive Tests

- Concentration test
- Instruction
 - Indicate whether the object has the same colour, orientation, or number of dots as the previous object.



Cognitive Tests

- Visual memory
- Auditory memory
- Spatial awareness
- Spatial orientation
- Multi-tasking



17

RC

83



60

KH

42

Cognitive Tests

- Mathematics
 - “A person goes from point A to point B. On foot it takes 3 minutes, on the conveyor belt 2 minutes. How long does it take if the person walks on the conveyor belt?”
- Mechanics/Engineering

Which construction is more useful to lift 100 kg?

1 2

100 kg 100 kg

1 2

none is useful

no difference

The diagram shows two pulley systems. System 1 is a block and tackle with a fixed upper pulley and a movable lower pulley. System 2 is a simple pulley with a fixed upper pulley. Both lift a 100 kg weight. The question asks which construction is more useful to lift 100 kg. The options are: 1, 2, none is useful, and no difference.

Psychological Tests

- Full day of psychological tests with six candidates participating per test day
- 192 candidates invited to participate in psychological tests
- Psychological tests encompassing:
 - Team problem solving
 - One-on-one cooperation tasks
 - Computer-based psychological questionnaire
 - Panel interview
 - Individual psychological interview

Medical Tests

- Week long series of medical tests
- 45 candidates invited to participate in medical tests
- Focus on medical fitness rather than physical fitness
- Medical tests encompassing:
 - MRI scans of brain
 - Ultra-sound scans of organs
 - X-ray scans of spine and hips
 - Heart-stress test
 - Visual and auditory acuity
 - Blood, urine, stool, and hair tests
 - 24 hour EKG and blood pressure tests
 - Colonoscopy
 - Psychiatric evaluation

Final Interviews

- Professional interview
 - 22 candidates invited to professional interview
 - Conducted by panel of senior ESA managers
- Interview with the Director-General of ESA
 - 10 candidates invited to interview
- Six new ESA astronauts selected
 - Samantha Cristoforetti (I) Fighter pilot
 - Alexander Gerst (D) Geophysicist
 - Andreas Mogensen (DK) Aerospace engineer
 - Luca Parmitano (I) Test pilot
 - Timothy Peake (GB) Test pilot
 - Thomas Pesquet (F) Air-France pilot / Engineer

Astronaut Training

- Basic training (18 months)
 - Class-room based learning
 - Russian language
 - Spaceflight, space systems, orbital mechanics
 - Private pilot license
 - Fast jet training
 - Scuba diving
 - EVA training (neutral buoyancy)
 - Survival training (eg. caving)
- Advanced training (12 months)
 - Hands-on training in mock-ups and simulators
 - Detailed study of all aspects of ISS
- Mission-specific training (18 months)
 - Training related specifically to an assigned mission
 - Full crew and back-up crew participation