

## CALL FOR CONCORDIA RESEARCH MD

### Background

Since 2001, ESA has been cooperating with the French Polar Institute (Institute Paul Emile Victor, IPEV) and the Italian Antarctic Programme (Programma Nazionale di Ricerche in Antartide, PNRA) on some activities at the Antarctic station Concordia.

Examples of this cooperation include a common research announcement for medical and psychological research, the adaptation of technologies for grey water recycling, which ESA developed for spacecraft life support systems, to Concordia (where such a recycling unit is operating since March 2005) and long-term medical, psychological and microbial monitoring.

With ESA's interest in human long-duration exploration missions in the future, the characteristics of Concordia make it a very interesting analogue for future human space exploration missions, as it experiences many of the expected conditions of a Lunar or Martian base, such as isolation, confinement, autonomy, limited resources etc.

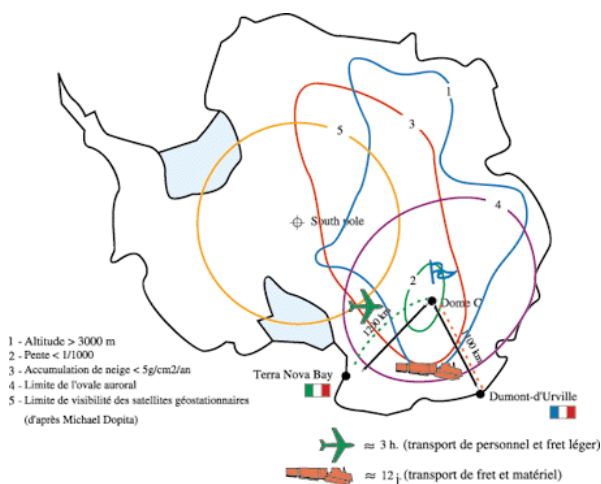
In order to support the implementation of these activities, ESA is looking for a candidate medical doctor, to fill one position in the next Concordia winter-over crew (leaving end 2015).

S.C.r.l.. The station has been permanently manned since November 2004.

The objective of Concordia station is to operate as an international research facility to conduct scientific programmes. The main fields of research at Concordia are glaciology, atmospheric sciences, astronomy and astrophysics, Earth sciences, technology, human biology and medicine.

The area in which Concordia station is located is considered to be one of the most hostile places on Earth. Some characteristics of the extreme environment are the following:

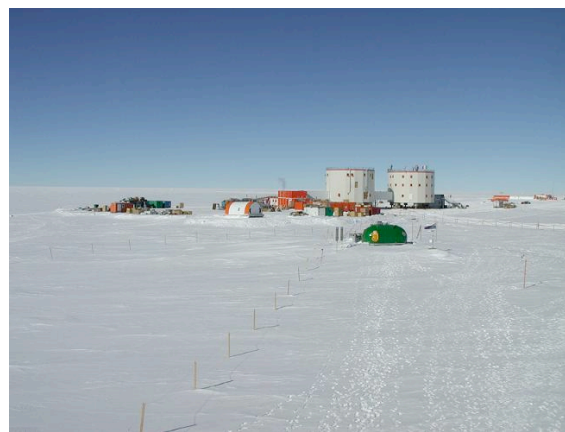
- An altitude of 3200m, equal to an equivalent altitude of almost 4000m on the equator, air pressure is 645 hPa (→ chronic hypobaric hypoxia).
- The time from mid-November to mid-February is considered the summer period, the winter-period correspondingly from mid-February to mid-November.
- Access to the station is only possible during the Antarctic summer season.
- Overall mean temperature is  $-51^{\circ}\text{C}$ , with a mean value of  $-30^{\circ}\text{C}$  during summer and  $-60^{\circ}\text{C}$  in winter (lowest record in 2002  $-85^{\circ}\text{C}$ ).
- The landscape is "completely" flat.



Antarctica and the Location of Concordia Station © IPEV

### Concordia Station

Concordia station is a permanent international research facility high on the Antarctic ice cap. The station was built by IPEV and PNRA



Concordia Station © Y. Frenot/IPEV

Further details on Concordia Station can be found at

[http://www.esa.int/Our\\_Activities/Human\\_Spaceflight/Concordia](http://www.esa.int/Our_Activities/Human_Spaceflight/Concordia)

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### Challenges

The challenges for a winter- over crew at Concordia are manifold. They include e.g.:

- Prolonged isolation and confinement (typical duration of a stay in the station is 12- 13 months).
- Fascinating, but hostile natural environment (extreme low outside-temperatures, chronic hypobaric hypoxia).

Autonomy: the crew needs to be totally self-dependent especially from February to November where no access to and from the station is possible, even in emergencies.

- Life in a small multicultural setting (typically 12-14 crewmembers, with French and Italian as the main spoken languages as well as different behavioural customs).
- Limited mobility outside of the station buildings, especially during winter
- Night/Daylight variations (constant light in summer, constant darkness in winter).
- Managing life with limited resources and with consideration for the environment

**In order to pursue ESA related activities at Concordia, ESA and the Steering Committee of Concordia initiate a call for candidates for a medical doctor, to fill one position in the next Concordia winter- over crew.**

### Tasks will include (non-exhaustive list):

- Participation in pre-departure meeting (one week in October) and relevant training, including briefing the winter crew about the up coming physiology and psychological science programme
- Preparation of the implementation of physiological and psychological experiments before departure.
- Implementation of physiological and psychological experiments during the stay.
- Sampling of recycled water and analysis thereof.
- Participation in the normal shared tasks on the station (housekeeping).
- Some support for activities of other crewmembers.
- After the stay providing a debriefing report (“lessons learned”)

The selected candidate will not be responsible for the operational medical provision for the crew. However, in this constrained situation, openness to some support function for the station MD (if needed) is required, especially in case of a medical or surgical emergency and in the field of medical training and preventive medicine.

It is expected that the selected candidate will also participate as a test subject in the physiological and psychological experiments. However, for the other crewmembers, this participation is voluntary and can be stopped at any time without negative implications. More information on the experiments will be provided before the stay and “informed consent” will be collected from participating crew members prior to departure.

The preliminary winterover 2016 list of proposed experiments include:

**Simskill:** using a spacecraft simulator to evaluate training input on skill maintenance

**Sunrise:** exploring the effects of dawn/ dusk simulators on sleeping patterns and mood.

**Bone Health:** monitoring skeletal health of crewmembers during isolation and low ambient light conditions during winter.

**Follow-Up:** exploring interpersonal relationships and psychology of the crewmembers and their family.

**Choice II:** looking at immunological changes during isolation, and the mechanisms behind those changes.

**Neurocognitive Changes:** looking at the changes in brain architecture and cognition following isolation and hypobaric hypoxia.



# human spaceflight

## CALL FOR CONCORDIA RESEARCH MD CANDIDATES

### **Candidate profile:**

- Interest in working in Antarctica
- Medical doctorate (or equivalent) and work experience
- Strong interest in medical and psychosocial research
- If possible some laboratory/research experience
- Very good English language skills desirable; French or Italian language skills are of benefit
- Excellent health
- No addictions
- Nationality and residence in one of the ESA member states (Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden, Switzerland, the United Kingdom and Canada).

The occupation will be implemented via a contract with the French Polar Institute, IPEV (typically approximately 1 month preparatory time in Europe and 13 months in Antarctica). The final amount of the salary will depend on the exact contract duration. It has to be taken into account that e.g. transport, special clothing, communication facilities etc. will be provided by the Concordia partners.

**Please send your CV and a letter of motivation to:**

**Concordia@esa.int**

**(Questions before application should be sent to the same address)**

### **Process and timeline**

Deadline for applications: 1st April 2015.

Based on the Letters and CVs, 3-5 candidates will be invited for a thorough medical examination, psychological assessment and interview to Paris in May 2015. The final selection will be made as soon as the results from all medical tests are available.

Pre-departure meeting: one week in the first half of October 2015.

Departure between end November 2015 – January 2016.