



## MEDICAL DOCUMENT

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## Table of contents

You are about to take part in a parabolic flight. ....	3
Letter to the medical doctor .....	4
Conditions always RULING OUT (CI) the flight, causing the flight to be DELAYED (D) or requiring compulsorily a EXPERT OPINION (EO) of the parabolic flight Committee .....	7
Parabolic flight medical aptitude certificate .....	8
Appendix 1: Medical summary form .....	9

NOVSPACE	DM_AZG_2026_03_EN
Parabolic Flight Medical Document	MAJ : 06/02/26

## You are about to take part in a parabolic flight.

Being in good health is required and a medical examination is mandatory.

Call your doctor, who is familiar with your condition, to examine you and complete the enclosed medical certificate for parabolic flight. However, you can also contact an authorized aviation medical examiner or another doctor of your choice. On the website [www.airzerog.com](http://www.airzerog.com) you will find a list of doctors who have experienced parabolic flight (Tab "Public Weightless Flights", section "Medical fitness")

### Validity period:

- 2 years for people aged under 40 at the date of the medical examination
- 1 year for people aged 40 and over at the date of the medical examination

### Mandatory examination:

- For all: **an electrocardiogram less than a month old** at the date of the examination
- For people aged 65 and over: **an exercise ECG done less than a month** at the date of the examination

### You will find in the document:

- a letter to give to your doctor
- the medical certificate for parabolic flight. **(no other document will be accepted)**

**Please send the certificate duly completed** (in both case of aptitude or unfitness) **or the request for review of the medical file to:**

[oceane@airzerog.com](mailto:oceane@airzerog.com)

If your doctor requests an evaluation of your medical file by the Parabolic Flight Medical Committee (**box C3 on the certificate**), you will be contacted within three weeks by one of the doctors on the committee for further details and/or to ask you to undergo additional medical examinations. **You must provide us with the results of these examinations within 30 days or inform us within the same period of the date on which they will be carried out. If we do not receive a reply from you, you will have to undergo another medical examination and provide a new certificate.**

### For more information, please contact:

Océane LEGUTKE

AIR ZERO G

+33 6 66 77 15 34

[oceane@airzerog.com](mailto:oceane@airzerog.com)

## Letter to the medical doctor

Dear Doctor,

Your patient<sup>1</sup> wishes to take part in a zero-g flight (parabolic flight) on board Novespace's Airbus A310 ZERO-G. We need your opinion concerning your patient's medical aptitude to take part in this flight.

Your patient must produce **an ECG less than 1 month old at the date of your examination.**

For people **aged 65 and over**, it must be a normal electrocardiogram during a maximal exercise test or any other negative test for coronary ischemia (myocardial perfusion scan, CT coronary angiogram, cardiac MRI, stress echocardiography or coronary angiography) less than one month before the date of the medical visit.

The decision regarding the aptitude of your patient to participate in the parabolic flight shall consider the result of the ECG.

- **What is a parabolic flight?**

The aircraft flies at an altitude of 20,000 ft to 26,000 ft (pressure on board is similar to a commercial airliner). In flight, the pilots perform between 15 and 45 times a special maneuver by which the aircraft follows a parabolic trajectory, during which the passengers are in microgravity for 22 seconds. Each microgravity phase is preceded and followed by a hyper gravity phase, of 20 seconds each, where the passengers will be subjected to close to twice their weight (1.8g).

- What physical condition does your patient need to be in to participate?

As an indication, participants must be able to easily climb two floors at a normal speed without assistance or short breath. They must have sufficient joint mobility to do squats (leg flexions), sit down, lie down and get up without any difficulty. The mobility of the cervical spine must be normal.

**The table on page 7 lists some disorders or pathologies that contraindicate flight (CI), or that should delay it (D), or that require the advice of the Medical Parabolic flight Committee (EO).**

- **Is this activity hazardous and stressful?**

Like any aviation activity, this activity carries a risk. However, parabolic flights where weightlessness conditions are recreated have been carried out for many years, and no accident has been reported to this date.

As the flight includes acceleration changes between 0 and 2g, this activity generates fatigue, and increased fatigue in passengers prone to motion sickness (5 to 10% of passengers). However, in the United States, children may take part in flights from the age of 8, and many senior citizens aged 80 and

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<sup>1</sup> Note to the Authorized Medical Examiners. The candidate to a parabolic flight can contact his regular doctor or an Authorized Medical Examiner. Please note that this examination is not a "private pilot" aptitude test. Class 2 certificates are not accepted. The duration of the flights can vary from 2 to 5 hours, and the body must support repeated variations of the load factor.

NOVSPACE	DM_AZG_2026_03_EN
Parabolic Flight Medical Document	MAJ : 06/02/26

more have flown. In France, passengers are admitted **from the age of 18 for scientific flights, and from 13 years old for discovery flights open to public.**

This activity may also be stressful.

- **What physical consequences may be expected?**

**During hyper gravity periods**, an initial decrease in systolic blood pressure and tachycardia occurs. The cardiac workload increases by close to 70%, and transient cardiac conduction and heart rate disturbances have been observed (PVC in particular). At lung level, the work of breathing increases. When lying down, the passengers feel mild chest tightness. Repeated hyper gravity phases create fatigue.

Some passengers experience the symptoms of motion sickness, in particular if they fail to comply with the instructions to keep their head steady during aircraft accelerations. These passengers are then escorted to their seats, and in most cases the symptoms remain moderate and temporary.

**During microgravity phases**, collisions between passengers or against the cabin walls may occur, and although it is padded, falling to the cabin floor may be hard.

NOVSPACE	DM_AZG_2026_03_EN
Parabolic Flight Medical Document	MAJ : 06/02/26

- **Deciding on whether a patient is fit/unfit**

To help you decide if the patient may take part in parabolic flights, the table hereafter lists some disorders or conditions which may rule out or be cause to postpone parabolic flights or require a specialized opinion.

- **Documents to give to your patient:**

At the end of your medical examination, you must provide the candidate with the certificate of aptitude (page 8) and, **in the case of a request for an evaluation by the medical Committee, the medical summary form (appendix 1), the ECG and any other medical document (medical report, complementary exam, etc.) necessary for the Committee.**

If you have any questions relating to this medical procedure, or for additional information, please contact Novespace at +33 6 66 77 15 34.

Thank you for your cooperation.

Regards,

***The Novespace Team***

Conditions always **RULING OUT (CI)** the flight, causing the flight to be **DELAYED (D)** or requiring compulsorily a **EXPERT OPINION (EO)** of the parabolic flight Committee

Cardiac	Heart failure (CI). Coronary heart disease (EO). Any Cardiac rhythm or conduction disorder (EO). Abnormal ECG <b>(EO)</b> . CHD event or bypass < 6 months (CI) or more (EO). Major (CI), minor (EO) valve anomaly Poorly controlled high blood pressure (CI) New blood pressure control treatment (D) Non-cardio selective beta blockers (CI) Accumulation of cardiovascular risks (EO)
Pulmonary	Respiratory failure (CI) Uncontrolled asthma (CI) History of spontaneous pneumothorax not treated by pleural symphysis (CI)
Endocrine	Type 1 diabetes or Type 2 diabetes well equilibrated, with no cardiovascular complications (EO)
ORL	History or current pathology of inner ear especially any vestibular syndrome or vestibular disease (CI) Severe hearing loss preventing the candidate from hearing the crew's messages (EO)
Othopedics- Rheumatologic	Any motor disability (EO): passengers must be able to move around, go up the stairway to the aircraft, sit down, lie down on the floor and get up without difficulty. The mobility of the cervical spine must be normal. Any condition impairing bone density (CI) Evolutive osteo-articular pathology, or abnormality which may be made worse by a fall <b>(EO)</b>
Ophthalmologic	Severe visual impairment (EO) Severe myopia or retinal detachment history <b>(EO)</b>
Hematologic	Bleeding disorder, anticoagulant treatment (CI)
Psychiatric	Psychosis (CI) Mental disability (CI). Debilitating anxiety, panic attacks, claustrophobia, fear of flying, fear of heights (CI)
Neurological	Epilepsy (EO), debilitating neurological diseases (EO) History of stroke or TIA (EO) Migraine attacks (D)
Gastroenterology	Unhealed peptic ulcer (CI) Untreated or persistent GERD under treatment (CI) Large hernia (CI)
Others	Any recent surgery (<3 months) (EO). Alcoholism (CI). Drug consumption (CI) Use of medicines with bothersome adverse effects <b>(CI or D)</b> Pregnancy (D)

## Parabolic flight medical aptitude certificate

**Important:**  
**The certificate is invalid if any of the following sections are not completed:**  
**A1, A2, or A3; B1 or B2; C1, C2, or C3; D1 or D2.**  
**The certificate is also invalid if box C3 is checked without Annex 1 being completed.**

**Schedule date of the parabolic flight:** .....  
 First and last name of the patient: .....  
 Date of birth: ..... (DD/MM/YYYY) Place of birth:.....

I, undersigned, Doctor .....  
 Address.....  
 .....

- A1**  **treating physician** (when this person has designated no treating physician, I hereby certify that I have been seeing him/her on a regular basis for over a year, or [for those countries where this is possible] I hereby certify that I have had access to this person's complete medical record)
- A2**  **Authorized Medical Examiner, Holder of Aeromedical Examiner approval n°** .....
- A3**  **Other physician:**.....

**Certify that my patient:** \_\_\_\_\_

- B1**  had a normal routine electrocardiogram less than a month ago on: ...../...../.....
- B2**  (if aged 65 and over) had a normal maximal exercise ECG or a negative coronary ischemia test performed less than one month ago: ...../...../.....

**C1**  Does not present any apparent contraindications to parabolic flight  
 The candidate sends only this certificate (**no ECG, no Appendix 1**) to [oceane@airzerog.com](mailto:oceane@airzerog.com)  
*Subject to change in his/her state of health, which would void this certificate, this certificate for parabolic flight is valid for two years for patients less than 40 years old on the date of the examination, and one year for patients more than 40 years old on the date of the examination.*

**C2**  is UNFIT to participate in this activity.  
 The candidate sends only this certificate (**no ECG, no Appendix 1**) to [oceane@airzerog.com](mailto:oceane@airzerog.com)

**C3**  I cannot decide on my patient's medical aptitude, and I request an evaluation by the parabolic flight medical Committee (*see table on page 7 regarding the pathologies requiring the opinion of the Committee*). **To this end, I fill out Appendix 1, check box E1, and give the form to my patient to be sent with this certificate, the ECG, and any medical document useful for the evaluation, to the postal address shown on Appendix 1**

**D1**  has no contraindication to motion sickness medicine with potential anticholinergic or antihistaminic effects that may be delivered by Novespace.

**D2**  has contraindication to motion sickness medicine with potential anticholinergic or antihistaminic effects (**glaucoma, risk of urine retention, banned drug combinations...**).

Place and date (DD/MM/YYYY):	<i>Do not write anything in this space</i>
Physician's signature and stamp:	

## Appendix 1: Medical summary form

(to be completed by the physician only in the case of a request for evaluation of the candidate's fitness by the parabolic flight medical Committee -box C3 of the certificate)

First Name:	Last Name:	Date of the planned parabolic flight:
Date of Birth:	Phone number:	Usual sports practice:
Height (cm):	Weight (kg):	
Address:	Email	

**Past or current medical condition(s) motivating the question of parabolic flight aptitude:**

**Details about this-these medical condition(s):**

**Additional examination results (specialized opinion if available):**

**Other past or current medical condition known. Remarks:**

**E1  Must be checked. Other than the condition described above, I certify that my patient has no contraindications to parabolic flight as described in table p7.**

**Current treatment:**

**Doctor's stamp, Email, phone number:**

The candidate must send this document as well as the medical certificate, the ECG and any other medical document considered useful to the medical Committee of parabolic flight by post mail to the following address, with the mention "medical confidentiality":

Anne-Clotilde Duchesne  
Novespace  
2 place Maurice Quentin  
75039 Paris Cedex 01  
France