

NOVSPACE	DM-2015-ed1-en
Parabolic Flight Medical Document	Mai 2015

## Medical document

**NOVSPACE**



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You are about to take part to a parabolic flight. Being in good health is required and a medical examination is mandatory. These flights last between 2 to 5 hours and the human body will undergo several variations in g-acceleration.

You have two options to get your medical examination done:

## **OPTION 1**

You choose to have your medical examination with your **treating physician** or with a physician that has followed you as a patient for at least one year, and has access to your complete medical record.

### **Type of medical exam**

Similar to the one to obtain a medical certificate of no contraindication in a sport practice

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

## **OPTION 2**

You choose to have your medical examination with **an authorized aviation medical examiner**

### **Type of medical exam**

Identical as the one for a private pilot

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

*For more information, please contact:*

**AVICO**

**+33 1 58 61 27 27**

**France@airZeroG.fr**

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# **Option 1**

## **Treating physician**

**You will find enclosed:**

- **a letter for your treating physician,**
- **a Parabolic Flight Medical Certificate:**

**Please return this certificate (duly completed, dated and signed by your treating physician) to:**

**France@airZeroG.fr**

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## Letter to the Treating Physician

Dear Doctor,

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

The decision on your patient's aptitude must be based among other things on **an electrocardiogram less than 1 month old at the date of examination.**

For people **aged 65 and over, it must be an exercise electrocardiogram.**

- **What is a parabolic flight?**

The aircraft flies in a reserved area, at an altitude of 20,000 ft to 28,000 ft. In flight, the pilots perform up to 31 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 hypergravity phase, of 20 seconds each, where the passengers will be subjected to close to twice their weight (1.8g).

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

Similar to 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 date.

As the flight includes acceleration changes between 0 and 2g, this activity generates fatigue, and severe fatigue in passengers prone to motion sickness (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 more have flown. In France, passengers are admitted from the age of 18. This activity may also be stressful, and rare instances of tetany have been observed (less than one in 1000 passengers).

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

**During hyper gravity periods**, an initial decrease in systolic blood pressure and tachycardia occur. 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 instruction to keep their head steady during aircraft accelerations. These passengers are then escorted to their seat, and in most cases the symptoms remain moderate and temporary. A physician is on board at each flight.

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

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

There is no legal requirement to see a physician approved by an aerial sports federation, or an aeronautical physician authorized by the civil aviation authority to take part in a zero g flight, but the knowledge of an aviation medical examiner is relevant to decide on the aptitude.

And there is no medical or legal physical and mental fitness requirements standard to participate in a zero g flight.

We believe that, as the treating physician, your knowledge of the medical history of the candidate and your expertise are the most relevant to assess your patient's fitness. To help you, the table below lists some disorders or conditions which may rule out or be cause to postpone parabolic flights, or require a specialized opinion.

- **Upon completion of examination, we suggest you make one of the following decisions:**

**Fit:** Your patient is in good health, and any condition the patient may have will not, in your opinion, interfere in flight.

**Unfit:** Your patient has a condition which, in your opinion, could compromise his/her safety and health in flight.

**Not sure:** You cannot be definitive: we suggest you direct your patient to an aeronautical physician, authorized by the civil aviation authority, who will make the final decision, after consulting if necessary the Parabolic Flight Medical Commission.

- **Documents to give to the candidate**

Following the medical examination, you should give the above-mentioned documents to the candidate (including ECG, if required, and an exercise ECG if the candidate is over 65).

If you have any questions relating to this medical procedure or for additional information, please contact Novespace at +33 1 44 76 75 37.

Thank you for your cooperation.  
Regards,

***The Novespace Team***

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Conditions always <b>RULING OUT (RO)</b> the flight, causing the flight to be <b>POSTPONED (P)</b> or requiring obligatorily a <b>SPECIALIZED OPINION (SO)</b>	
Cardiac	Heart failure <b>(RO)</b> . Coronary heart disease <b>(SO)</b> . Any previous or present cardiac rhythm or conduction disorder <b>(SO)</b> . Abnormal ECG <b>(SO)</b> . CHD event or bypass < 6 months <b>(RO)</b> or older <b>(SO)</b> . Major <b>(RO)</b> , minor <b>(SO)</b> valvular anomaly Poorly controlled high blood pressure <b>(RO)</b> New blood pressure control treatment <b>(P)</b> Non-cardioselective beta blockers <b>(RO)</b> Accumulation of cardiovascular risks <b>(SO)</b>
Pulmonary	Respiratory failure <b>(RO)</b> Unbalanced asthma <b>(RO)</b> History of spontaneous pneumothorax not treated by pleural symphysis <b>(RO)</b>
Endocrine	Type 1 diabetes or Type 2 diabetes requiring insulin <b>(RO)</b>
ORL	Inner ear conditions causing vertigo, (or a patient prone to vertigo for other reasons) <b>(RO)</b> Recurring motion sickness <b>(RO)</b> Severe hearing loss preventing the candidate from hearing the crew's messages <b>(RO)</b>
Rheumatologic	Conditions impairing motor abilities, bone fragility <b>(RO)</b> . Evolutive osteoarticular conditions, or conditions which may be made worse by a fall <b>(SO)</b> .
Ophthalmologic	Severe visual impairment which may compromise an urgent evacuation <b>(RO)</b> . Severe myopia or retinal detachment history <b>(RO)</b> .
Hematologic	Bleeding disorder, anticoagulant treatment <b>(RO)</b>
Psychiatric	Psychoses <b>(RO)</b> Debilitating anxiety, panic attacks, claustrophobia, fear of flying, fear of heights <b>(RO)</b>
Neurological	Epilepsy <b>(RO)</b> , debilitating neurological diseases <b>(RO)</b> , History of stroke or TIA <b>(SO)</b> Migraine attacks <b>(P)</b>
Gastroenterology	Unhealed peptic ulcer <b>(RO)</b> Untreated or persistent GERD under treatment <b>(RO)</b> Large hernia <b>(RO)</b>
Miscellaneous	Any recent surgery (<3 months) <b>(SO)</b> . Motor or mental disability compromising an urgent evacuation <b>(RO)</b> Alcoholism <b>(RO)</b> . Drug consumption <b>(RO)</b> Use of medicines with bothersome adverse effects <b>(RO or P)</b> Pregnancy <b>(P)</b>

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## Parabolic Flight Medical Certificate

*Certificate adapted to the parabolic flight candidate's treating physician.  
If you are an Authorized Medical Examiner, an adapted certificate is available*

**Note: The certificate will be considered not valid if the boxes (A1 or A2), (B1, B2 or B3) and (C1 or C2) are left blank.**

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

Treating physician of Mr. / Mrs. / Ms. (full name): .....  
(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)  
Date of birth: ..... (DD/MM/YYYY) Place of birth: .....

Certify that my patient

**A1**  has a normal routine electrocardiogram less than a month ago on: ...../...../.....  
**A2**  (if aged 65 and over) had a normal exercise ECG less than a month ago on: ...../...../.....

**B1**  is FIT to participate in this activity.  
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 aged 40 and over.

**B2**  Is UNFIT to participate in this activity.

**B3**  I am not sure. The opinion of an aeronautical medical examiner authorized by the civil aviation authority is required.

**C1**  has no contraindication to motion sickness medicine with potential anticholinergic or antihistaminic effects that may be delivered by Novespace

**C2**  has contraindication to motion sickness medicine with potential anticholinergic or antihistaminic effects (**example: glaucoma, prostatic adenoma**)

Place and date (DD/MM/YYYY):

Physician's signature and stamp:

***Do not write anything here***

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## **Option 2**

# **Authorized Aviation Medical Examiner**

**You will find enclosed:**

- **a letter for your Authorized Aviation Medical Examiner,**
- **a Parabolic Flight Medical Certificate:**

**Please return this certificate (duly completed, dated and signed by your authorized medical examiner) to:**

**France@airZeroG.fr**

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## Letter to the Authorized Medical Examiner

Dear Doctor,

The bearer of this letter wishes to take part in a zero-g flight (parabolic flight) on board the Airbus A310 ZERO-G of Novespace. We need your opinion concerning your patient's medical aptitude to take part in this flight.

The decision on your patient's aptitude must be based among other things on **an electrocardiogram less than 1 month old at the date of examination.**

For people **aged 65 and over, it must be an exercise electrocardiogram.**

- **What is a parabolic flight?**

The aircraft flies in a reserved area, at an altitude of 20,000 ft to 26,000 ft. In flight, the pilots perform up to 31 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 hypergravity phase, of 20 seconds each, where the passengers will be subjected to close to twice their weight (1.8g).

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

Similar to 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 date.

As the flight includes acceleration changes between 0 and 2g, this activity generates fatigue, and severe fatigue in passengers prone to motion sickness (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 more have flown. In France, passengers are admitted from the age of 18. This activity may also be stressful, and rare instances of tetany have been observed (less than one in 1000 passengers).

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

**During hyper gravity periods**, an initial decrease in systolic blood pressure and tachycardia occur. 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 instruction to keep their head steady during aircraft accelerations. These passengers are then escorted to their seat, and in most cases the symptoms remain moderate and temporary. A physician is on board at each flight.

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

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

There is no legal requirement to see a physician approved by an aerial sports federation, or an aeronautical physician authorized by the civil aviation authority to take part in a zero g flight.

Please note that this examination is not an official medical examination for qualifying for a private pilot license (JAR-FCL 3 Class 2 in Europe or FAA class 3 in USA), although the forms used for this visit are similar. Parabolic flight experiment participants have no crew responsibilities, thus some medical conditions that disqualify candidates for private pilot aptitude may not disqualify them for parabolic flight aptitude (problems in visual system, color vision, hearing, if they do not prevent the applicant from behaving in an appropriate way in case of emergency).

Please note that at each examination, your patient must produce an ECG less than 1 month old at the date of your examination, though it is not mandatory for a private pilot license aptitude, because the repetitive gravity changes cause fatigue. Your decision to declare the candidate fit, will be based on the interpretation of the electrocardiogram. For people aged 65 and over, an exercise electrocardiogram less than 1 month old at the date of the examination is required.

- **If you are not sure if the candidate if fit or unfit**

If the candidate does not comply with Class 2 requirements but you are not sure he/she complies with parabolic flight requirements, the *Parabolic Flight Medical Commission* will pronounce the final decision regarding the candidate's medical fitness for flight onboard the A300 ZERO-G based on the specificities of parabolic flights and based on the results you collected during the examination. In this case, please give to the candidate all the forms completed during the exam (personal health and medical record Form Class 3).

- **Documents to give to the candidate**

Following the medical examination, you should give the above-mentioned documents to the candidate (including ECG, if required, and an exercise ECG if the candidate is over 65).

If you have any questions relating to this medical procedure, or for additional information, please contact Novespace at +33 1 44 76 75 37.

Thank you for your cooperation.  
Regards,

***The Novespace Team***

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## Parabolic Flight Medical Certificate

*Certificate adapted to an Aero Medical Examiners (AME)*

*If you are the candidate's treating physician, an adapted certificate is available*

**Note: The certificate will be considered not valid if the boxes (A1 or A2), (B1, B2 or B3), (C1 or C2) and if necessary (B21, B22 or B23) are left blank.**

I, undersigned, Doctor .....

Holder of Aeromedical Examiner approval N° .....

Address .....

Certify that (Forename and Surname): .....

Address: .....

Date of birth: ..... (DD/MM/YYYY) Place of birth: .....

**A1**  has a normal routine electrocardiogram less than a month ago on: ...../...../.....

**A2**  (if aged 65 and over) had a normal exercise ECG less than a month ago on: ...../...../.....

**B1**  Complies with the Physical and Mental requirements for non-professional technical flying personnel (Commission Regulation (EU) N° 1178/2011 of 3 November 2011 and AMC GM to Part-MED: Class 2 Certification).

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.

**B2**  Does not comply with the Physical and Mental requirements for non-professional technical flying personnel

In that case:

**B21**  Complies with parabolic flight medical requirements (i.e. has problems only in visual system, color vision or hearing that would disqualify the applicant for a pilot medical certificate but does not constitute a safety hazard, even in case of emergency, for a participant without crew responsibility).

**OR**

**B22**  Does not comply with parabolic flight medical requirements.

**OR**

**B23**  I am not sure about the candidate's medical fitness and I request a medical commission evaluation.

**C1**  has no contraindication to motion sickness medicine with potential anticholinergic or antihistaminic effects that may be delivered by Novespace

**C2**  has contraindication to motion sickness medicine with potential anticholinergic or antihistaminic effects (**example: glaucoma, prostatic adenoma**)

Place and date (DD/MM/YYYY):

Examiner's Signature and Stamp:

***Do not write anything here***