Foreword

The Experiment Safety Data Package (ESDP) is the sole medium for exchanging technical information about an experiment between the experimenters and NOVESPACE. This document is provided to the experimenters by NOVESPACE at the experiment selection stage.
It is initially used between the experimenters and NOVESPACE to present briefly:

- The purpose of the experiment
- The technical specifications of the experiment
- The experiment design points, whether frozen or still under consideration
- The experiment risks

During the experiment preparation phase, NOVESPACE will critically review your experiment as presented in the ESDP and will provide guidance as to your technical options. Most technical exchanges will take place by email or during a visit at your laboratory. During the experiment building phase, the document shall be updated with pictures of the experiment. All experiment related changes, answers to technical questions or data updates must be included in the ESDP.
About 8 weeks before the first flight date, the experiment design and risk analysis must be frozen and the present document updated with the latest changes. At this date, the ESDP will be used by the Centre d'Essais en Vol (CEV) to review your experiment and assess flight safety. The CEV is sole responsible for flight safety. As such, the CEV may ask you for additional information and require changes to the experiment or additional tests before installation on board the aircraft.
The printed and signed ESDP will be requested at your arrival to NOVESPACE for the parabolic flight campaign.
In addition to the tables to fill in, written explanations are required and please remember that sometimes a good schematic or synoptic replaces long explanations.

Please, mention "N/A" every time something is not applicable to your experiment.
Send only WORD documents (and not PDF), excepted for the MSDS as explained at the end.

Styles

To help you to complete this document, comments and explanatory notes are provided, in light-gray font. This type of text uses a word style called « EF_explanation ». To hide these explanation notes, use Word menu "Format" / "Style …", select the style « EF_explanation » and select hidden option "Modify" / "Format" / "Font" and then "Hide".
You should only change the text in black and italics contained in < > symbols.

Reference Documents

Reference Documents:

Rules and guidelines document [REF 1] :
RG-2009-1 / NOVESPACE A300 ZERO-G RULES AND GUIDELINES

Health and safety guide [REF 2] :
HS-2008-1 / WORKING RULES AT NOVESPACE / HEALTH AND SAFETY GUIDE

These documents can be downloaded here :
http://documentation.novespace.com/externe/last_applicable_rq/
ID: exp
Password: doc71_u3

< DEEP IMPACT >

State the title of the experiment above. For biomedical experiments, the title shown here must be identical to the experiment title shown in the protocol submitted to the Ministry of Health (Ministère de la Santé) and to the Personnel Protection Committee (Comité de Protection des Personnes).

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1. Investigators

2.

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3. Document Updates and Experiment Changes Table

List of changes to the Experiment Form

Please state in the table below the changes made to the present document. If the experiment has flown before, please resume table from Revision 0.

Rev.	Date Revised	Revised Sections	Description of Changes
0	*< dd/mm/yyyy >*	*< §x >*	*Initial issue of document*

Changes made to the experiment since last campaign

For those experiments which have flown before, please state and explain the changes made since the last parabolic flight campaign. Include changes to equipment, procedures and products used.
Please specify the number or participation dates to the last parabolic flight campaigns.

Information on previous campaigns:

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Campaign #	Type	Date
<PFC #...>	*<ESA/CNES/DLR >*	*<..date..>*

Changes since last campaign:

- *<..change #1 ..>*
- *<..change #2 ..>*

4. Experiment Objectives

Describe here briefly (in the order of a dozen lines max.) the scientific objectives of the experiment. Please keep in mind that your explanations should be easily understood by non-scientists or non-specialists technicians and engineers. The theory need not be developed here.

The experiment is related to the modeling and understanding of dust production due to asteroid collisions in late debris discs, in order to improve theoretical and numerical models that relate the dust observed around stars to the existence of large bodies like exoplanets which are not directly observable.
The aim of our experiment is therefore to study the dust resulting from the collision between a projectile and a target made of compacted dust and particles simulating asteroids. We focus on the production rate, the size distribution as well as the velocity field of the dust produced by the impact. We intend to investigate a range of collision velocities and impact parameters as well as different chemical types and shapes of samples. This will enable to refine actual simulation of collisions which do not take into account the asteroids composition and the impact parameters in cratering processes.

5. Experiment Description

Present a simple overview of the entire experimental set up. A synoptic (or functional diagram) along with literal explanations can be envisaged to describe the global functioning of the experiment.

The central part of the experiment is a vacuum chamber (approximately 50*50*50 cm) in which the experiment takes place. The primary vacuum (a few mbars) is created at the beginning of the flight by a membrane vacuum pump, and monitored by a pressure gauge.
Rock simulating samples (approx. 5cm in diameter) are placed in a sample charger connected to the vacuum chamber. Each sample is picked by a motorized arm at the beginning of microgravity and released at the center of the chamber. A spring gun/crossbow shoots a small projectile towards the sample.
The dynamics of the impact and ejected dust is recorded by two cameras connected to a PC. A light source illuminates the interior of the chamber.
At the end of microgravity, the sample falls in a net that guides it towards a reception chamber.
The dust and small particles fall on the bottom of the chamber in a cartridge covered by sticky carbon tape. A new cartridge is placed in the chamber at each parabola by a cartridge loader where a pile of cartridges is stored. Used cartridges are stored in a cartridge collector (for further analysis after the campaign).

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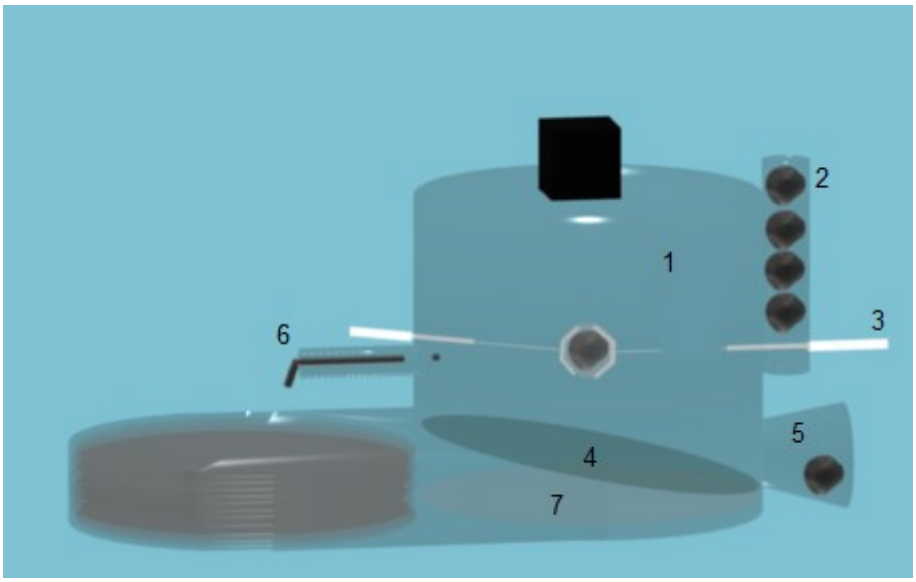

1- The experiment chamber: this is the place where the impact will take place. A primary vacuum will be done inside and will be kept during the flight.
2- Sample storage : all the samples used during the flight will be stored there and released one after the other.
3- Telescopic arms: they will take the sample and release it at the center of the chamber.
4- The net: Put under the impact zone, it will collect the impacted sample. The net will be slightly bent so as to direct the sample to the reception chamber
5-Reception chamber: collects the sample after the shot.
6-The gun: will launch the projectile.
7- The tape: will collect the dust during the 2g phase. It will give us the way to study the size distribution later (thanks to an electronic and/or a microscope). A tape layer will be used and stored for each impact.

6. Description of the Experimental Equipment in Flight

System description

In this section, present each system of the experiment one by one. Typical systems are gas or hydraulic circuits, electrical system, laser/optical system, ... Each system description should include:

- an individual synoptic showing every components and references. As much as possible, standard symbols should be used.
- a table giving the reference, the function of every components of the synoptic

In particular, all the pressurized systems dealing with a relative pressure >1,5 bars must be detailed by means of the “Functional Description Table” included in appendix of the Rules and Guidelines document [REF 1].

- a written description of the system functioning

System 1:
Experiment chamber + vacuum pump: we project to make a cylindrical chamber connected to a vacuum pump. The size of the chamber will not exceed 50cm in diameter. A primary vacuum of about 1mbar is created using a membrane pump with a debit of 60l/min. It will mainly work before the first parabola, and sometimes during long breaks to maintain the vacuum. The pressure is monitored by a pressure gauge. The vacuum chamber is equipped with several ports to connect the other systems

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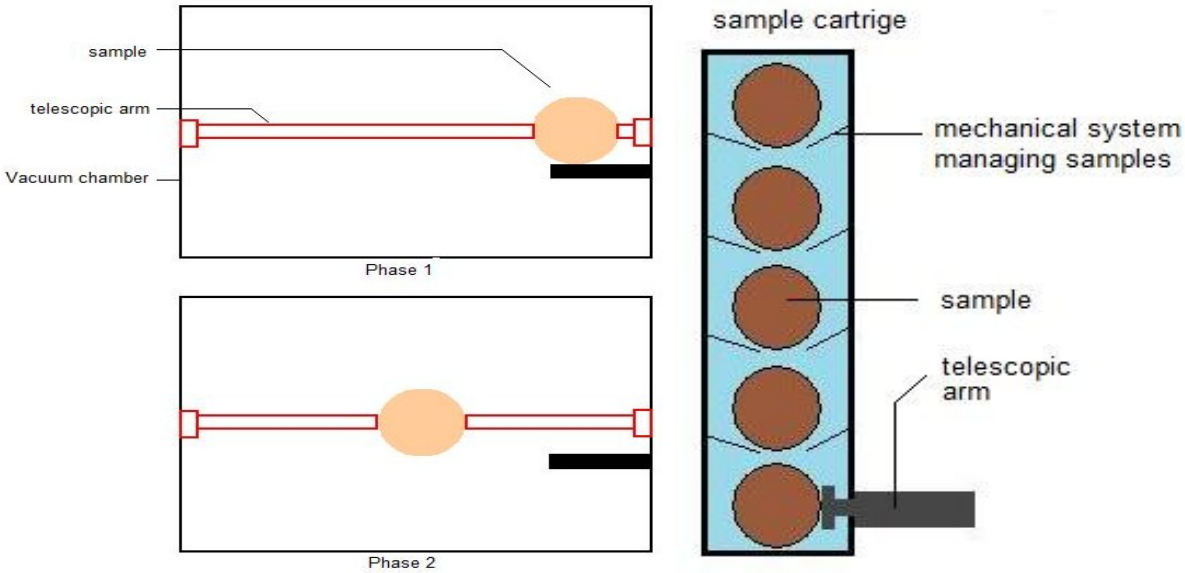
described below. The chamber should be permanently under vacuum and no opening is foreseen during the flight.

System 2:
The imaging system: two cameras allow to observe the collision in two directions (at 45° from each other to have redundant information that will permit stereoscopy). Images are recorded on a laptop computer and a light source (stroboscopic light) illuminates the interior of the chamber.

System 3:
A “setup and release of the sample” system: the providing system will be motorized by a step- by- step system that leads each sample in front of the telescopic arm. Then both parts of the sample positioning system (telescopic arms) will take the sample and retract to release it on the center of the vacuum chamber when zero-G is reached.



System 4: The crossbow is filled with an impactor from the charger with the system designed bellow. The energy of the shot can be set quite precisely so that different velocities can be reached. And since this crossbow is fixed on a rail, we can modify the impact parameter.

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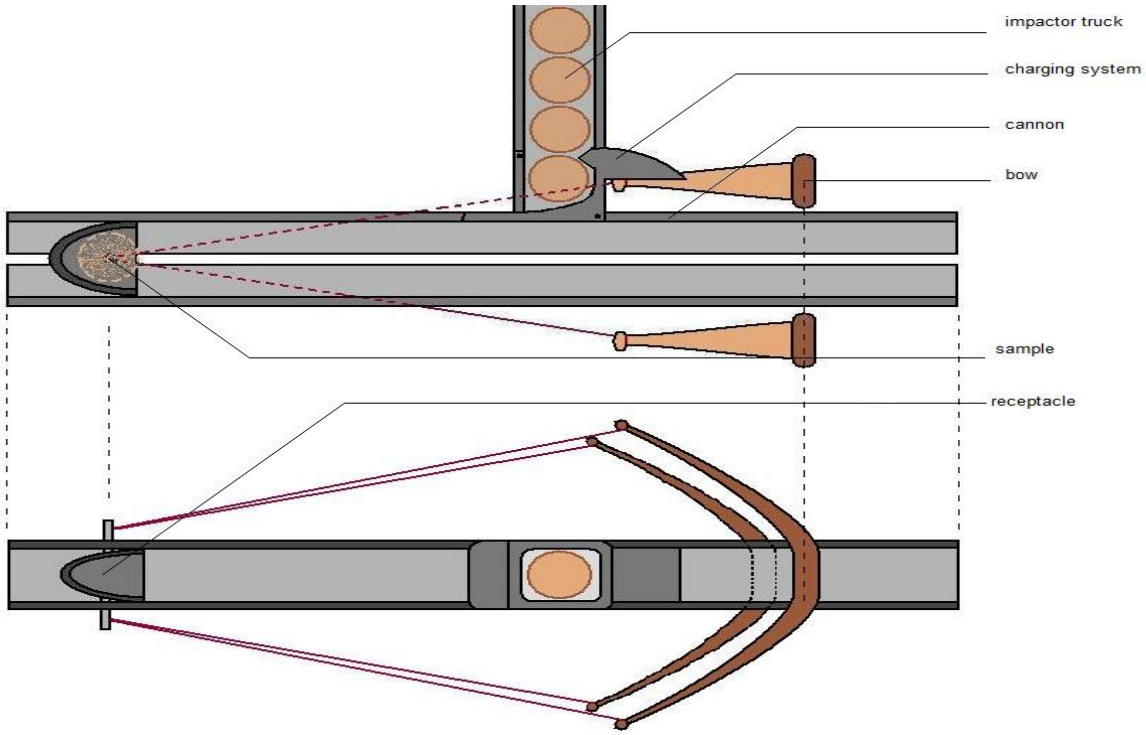
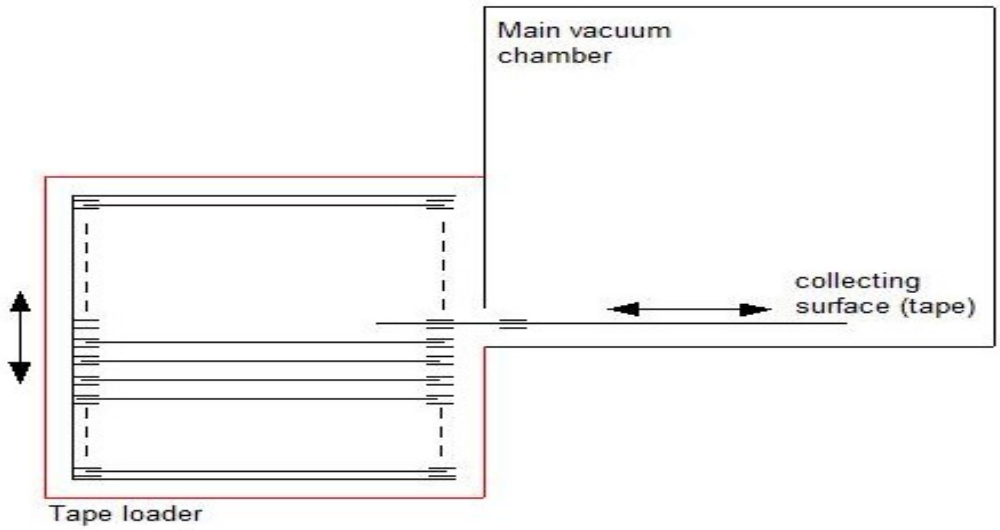


System 5: The collecting system
The net permits to collect the sample and leads it in the filling box, lets the dust pass through it thanks to sufficiently large meshes. The dust falls onto a collecting surface made of tape covering a cartridge/drawer. A tape loader containing a pile of cartridge allows to change the cartridge after each parabola by a simple translation system. The tape collects the dust during the 2g phase.



Components description

For each rack, fill in a complete list of all components of the considered rack: it should include all equipment, sensor, actuator. Also state total weight of structure parts of the rack (strut profiles,..) and weight of base plates)
Only the weight of components above 5Kg must be written.
We list below the main components of our experiment. The weights given are estimations and may vary when we will choose them.

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Rack # 1 (main rack)		
Components	**Commercial Equipment? (Y/N)**	**Weight (kg)**
chamber	*N*	*20*
Pump *Cameras* *Samples* *Laptop*	*Y* *Y* *N*	*10* *10* *5* *10*
Rack (strut profile, brackets, screws)		*25*
Base plate		*18*
Total		

Please check the total weight is the same one used in the safety calculations.

Rack schematic

- For each rack, provide a detailed schematic showing the rack layout and the position of the experimental equipment:

< >

List of auxiliary equipment

List auxiliary equipment not secured directly to the experiment, which may be used in flight: camera, storage containers, …

Components	Commercial Equipment? (Y/N)	Weight (kg)	Max Power Consumption
< >	< >	< >	< >*VA*
< >	< >	< >	< >*VA*

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7. Description of the Products Used

You must declare in the tables below all products (fluids, gases, dusts, particles, chemicals,…) that you use in flight, even those products deemed innocuous, such as cleaning agents.

The use of each one of these hazardous products must be justified.
If a product presents obvious hazards, it must be, as far as possible, replaced by another one.
IMPORTANT INFORMATION: for all products, please read carefully the Material Safety Data Sheets. These sheets identify the risks associated with each product, the storage conditions and the Individual Protective Equipment. This information should be entered in the tables below. For each product, please provide NOVESPACE with the MSDS separately in PDF file. Whenever several products are mixed, provide the Material Safety Data Sheet for the mixture.

Products used in Flight

List in the table below the pure products or solutions which will be used in flight and which have a related MSDS. If a solution has no related MSDS, all the compounds must be written here.
The "Hazard Category R and Precautions S" column shall be completed with the legal information listed in Section 15 of the Material Safety Data Sheets in compliance with European Directives 67/548/EEC and 1999/45/EC.

All the Material Safety Data Sheets should be provided under a single unprotected PDF file format as attachment to a separate email. Do not embed MSDS within the ESDP.

Products Used for In-Flight Operations				
Product Description * **Name**	**MSDS provided ? (Y/N)**	**Total Quantity (per flight)**	**Confinement Method**	**Hazard Category R and Precautions S**
peridotite	< >	< >	*vacuum chamber*	< >
Carbon	< >	< >	*vacuum chamber*	< >
serpentinite	< >	< >	*vacuum chamber*	< >

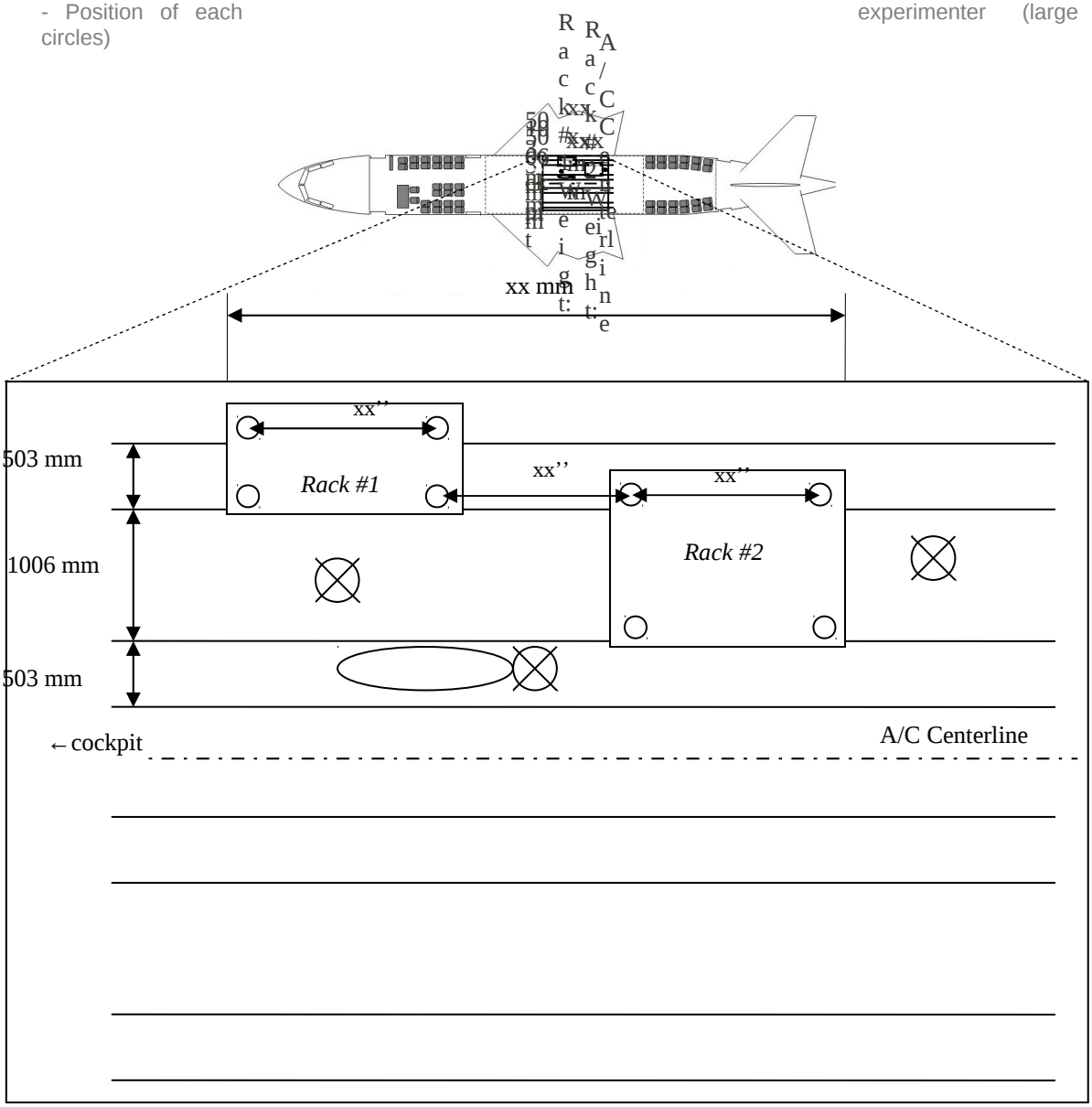
*Solutions and pure products used in flight

If you use solutions based upon the pure chemicals above, please mention them and mention the concentrations

The samples will be spheres of compacted dust composed of the previous materials. We want to probe two general kinds of compositions : the normal and carbonated chondrites. The normal chondrites are composed of serpentinite and a small fraction of metal, mainly iron. The carbonated chondrites are based on peridotite and of a percentage of carbon that doesn't exceed 5%. The diameter of the spheres should not exceed 5cm.
Normal chondrite :
If we assume that it is mainly based on serpentinite, which has a volume mass of 2.5gcm-3, one sphere of normal chondrite weighs about 170g. Then, if we assume that we need 30 samples for each campaign of 30 parabolas, the total weight of the samples will about 5 kg.
Carbonated chondrite :
Carbonated chondrites are composed mainly of peridotite, which is mainly olivine, and at the most 5% of carbon. The chemical composition of olivine is : $(Mg, Fe)_2[SiO_4]$ and its density is 3,5g.cm-3.
Therefore, for a sphere of 5cm in diameter, the total mass of olivine is : 0.95*4/3*pi*2,5^3*3,5 ~220g.
The mass of carbon is thus : 0.5*4/3*pi*2,5^3*2.3 = 75g.
Thus the mass of a carbonated sphere is of about 300g.
Impactor :
The shape of the impactor will also be a sphere of a diameter of 1cm maximum. They will be of the same chemical composition of the targets. Then the total weight of the impactor will be almost 40g.
All the samples as well as the dust created will be confined to their loader and to the vacuum room. Thus, even though those components are perfectly innocuous, no release into the plane atmosphere is possible.

8. Installing the Experiment in the Aircraft

Adapt the diagram below (top view) to show the various racks of your experiment in the aircraft, with:
- Desired position of the experiment rack(s) on the aircraft rails
- Experiment overall dimensions
- Weight of each rack
- Distance between attachment points of racks to aircraft rails (center-to-center distances)
- Position of each experimenter (large circles)



Desired location in the aircraft:
specify whether there is a preferred direction relative to the A/C front/rear and indicate if the layout can be turned by axial/rotational symmetry (installation on the left or right side of the A/C)

< >

Operator lying

Operator standing or sitting

9. Electrical System

Please refer to §4.3 in the Rules and Guidelines document [REF 1].to fill in this part.
Reminder: the electrical system must be designed and installed by an electrician. The electrician shall place special emphasis on correct installation of the experiment's Ground Fault interrupter (GFI), crimping of electrical cables and grounding of all equipment and structure. An electrical schematic must appear in this part, including the fast fuses, the GFI, the equipments grounding and the emergency stop push-button.

Total Power Consumption and Fast Fuse

Mention in the first column the sum of all the components consumptions according to their manufacturer manual.
Total power consumption: shall be measured using an analog ammeter or an oscilloscope
Caution: Some devices as vacuum pumps, motors, and others can present important inrush current.
These currents must be measured carefully.
Fast fuse: the complete electrical system shall be protected by a fast fuse rated at the maximum power consumption as specified in §4.3.2. of the Rules and Guidelines document [REF 1].

	Estimated Total Power Consumption	**Measured Total Power Consumption**	**Fast Fuse**
220 VAC Power Supply	*700 W*	*<TBD> VA*	*4 A*
28 VDC Power Supply	*<value> W*	*<TBD> W*	*<value> A*

Electrical schematic

Please provide here an electrical schematic with all the electrical safety devices: GFI, emergency stop button, fuses, phase and neutral wiring.

Electrical safety devices

	Y/N, Date
Please confirm that the complete electrical system of the experiment is protected by a single **emergency stop button** in compliance with §4.3. of the Rules and guidelines document [REF 1].	*<Y/N>*
Confirm that the complete electrical system of the experiment is protected by a **differential circuit breaker** (GFI) rated at 30mA	*<Y/N>*
Confirm that the emergency pushbutoon switch-off both phase and neutral of the power line	*<Y/N>*
Confirm that the electrical circuit has been performed by an electrician	*<Y/N>*
Confirm that the experiment elect. consumption has been measured on	*<Date>*
Confirm that the elect.grounding has been performed on	*<Date>*
Confirm the availability of technical documentation of all electrical equipment	*<Y/N>*
Confirm that the 220V-AC power plug(s) is/are compliant with French standard with right-angled backshell	*<Y/N>*
Confirm that the 28V-DC power plug(s) is/are compliant with SOURIAU 840-23-832 with right-angled backshell	*<Y/N>*
Confirm that the power cord, and all electrical wires, are tightened safely to the rack and to the electrical box so as to avoid the risk to have a live floating wire	*<Y/N>*

Batteries

List here the batteries used aboard the aircraft

	Related powered device	Purchase date (*)	V oltage	Technology	Confirm the battery is not recalled by its manufacturer (Y/N) (**)
< battery ref #1 >	*<name>*	*< Date>*	*<value> V*	*<Li-Ion? NiMH?NiCad? Lead?Other?>*	< >
< battery ref #2 >	*<name>*	*< Date>*	*<value> V*	*<Li-Ion? NiMH?NiCad? Lead?Other?>*	< >
< >	< >	< >	< >	< >	< >

* Applicable for laptop, UPS and powerful battery
** Applicable for laptops only

Power supplies and Converters

List here the power supplies and converters used on-board the aircraft

	Related powered device	Input Voltage	Ouput Voltage	Power
< converter ref #1 >	*<name>*	*<TBP> V*	*<value> V*	*<value> W*
< power supply ref #1>	*<name>*	*<TBP> V*	*<value> V*	*<value> W*
< >	< >	< >	< >	< >
< >	< >	< >	< >	< >

10. Mechanical Strength of Structures

The design, fabrication and assembly of the structures, as well as attachment of the equipment onto the structures, shall be carried out by a mechanic. The mechanic shall ensure that all structures and equipment are capable of withstanding required load cases. Examples are available in Appendix F of the Rules and guidelines document [REF 1] for the computation of the whole racks.
The sections below provide a computation methodology based on the explanations given in Rules and guidelines document [REF 1] (§4.2.). However, the experimenters are free to adopt other, more accurate, computation methods (finite-element analysis, …). In this case, the method, assumptions and results shall be given in Appendix C to this document.

PLEASE PROVIDE NOVESPACE WITH THE STRUT PROFILES TECHNICAL DATA SEPARATELY.

Characteristics of the Rack(s)

For each rack complete the table below. In this table, mass is understood as the rack's overall mass (inclusive of plates and sections).
As described in Rules and guidelines document [REF 1] (§3.5.), the distances between points of attachment to the aircraft rails are:
- a multiple of an inch in the X axis (1 inch <=> 25.4 mm). Please refer to §3.5. in the Rules and guidelines document [REF 1] for minimum distances between attachment points.
- 503 mm or 1006 mm (lateral distance between 2 successive rails) in the Y axis.

Rack #	Description	Overall dimensions (X x Y x Z in mm)	Mass (Kg)	Center of gravity height (mm)	Number of attachment holes
1	< >	*800x1200x1000-*	*98*	< >	*4*
2	< >	< >	< >	< >	< >

Specify or add a diagram if the number of holes is not symmetrically distributed along the aircraft rails, or if distances are not identical.

< >

Distance between holes (mm)	Manufacturer's Part Number of the strut profiles	Section cross-section (mmxmm)	Material	Ultimate Strength R_m (N/mm^2)	Number of vertical uprights	Section Modulus Wx (mm^3)
< >	< >	< >	< >	< >	< >	< >
< >	< >	< >	< >	< >	< >	< >

inches / mm converter	
inches	mm
TBD	#VALEUR!
#VALEUR!	TBD

Calculations on screws					
Parameters	Units	Rack #1	Rack #2	Rack #3	Rack#4
Mass (M)	kg	TBD	TBD	TBD	TBD
Height of center of gravity (H)	mm	TBD	TBD	TBD	TBD
Number of screws (N_{attch})	-	TBD	TBD	TBD	TBD
Number of rear floor attachments ($N_{rearattch}$)	-	TBD	TBD	TBD	TBD
Distance between front&rear attachments (D)	mm	TBD	TBD	TBD	TBD
Shear safety factor (SFs)	-	#VALEUR!	#VALEUR!	#VALEUR!	#VALEUR!
Traction safety factor (SFt)	-	#VALEUR!	#VALEUR!	#VALEUR!	#VALEUR!
Calculations on uprights					
Mass (M) *tuned for this calculation*	kg	TBD	TBD	TBD	TBD
Height of center of gravity (H)	mm	TBD	TBD	TBD	TBD
Material ultimate strength (Rm)	MPa~N/mm²	TBD	TBD	TBD	TBD
Section modulus (W)	mm^3	TBD	TBD	TBD	TBD
Number of uprights ($N_{uprights}$)	-	TBD	TBD	TBD	TBD
Bending moment safety factor (SFm) under 9g	-	#VALEUR!	#VALEUR!	#VALEUR!	#VALEUR!

Computing Linear Load

For each rack, show that the A/C rail linear load requirement is complied with. Computations should also take account of the distance between two racks. Please refer to §4.2.2.5. in the Rules and guidelines document [REF 1].

The 1,5 safety factor used for the previous calculations must not be applicated here.

< *computation of linear load* >

11. Personnel Configuration in Flight and on Ground

State the number of persons required for your experiment at each flight,
Briefly describe the role of each person.

Number of Operators per Flight: *3*

For biomedical experiments

Number of Subjects per Flight: *0*

Total Number of Persons present in NOVESPACE premises: *< number >*

12. Procedures for Ground and In-Flight Operations

Procedure on the day of the flight

Please describe the tasks of each operator before, during and after the flight, using the format of the tables below. This table must closely match your protocol. If the table sequence below is not representative of your own procedures, feel free to use a more convenient one. This customized table should at least have the same level of information as shown here below.
Regarding the in-flight breaks (their duration, number and pattern) please refer to the NOVESPACE document describing the campaign schedule.

ON GROUND – PRE-FLIGHT		
# Tasks	**Description**	**Operator #**
1	*Loading of: target, projectile and the dust collecting system.*	*1*

IN FLIGHT – BEFORE THE FIRST PARABOLA		
# Tasks	**Description**	**Operator #**
1	*Switch on the experiment*	*1*
2	*Checking of the systems: Camera, acquisition system, mechanical systems*	*2*
3	*Make the vacuum*	*3*

IN FLIGHT – BEFORE EACH PARABOLA		
# Tasks	**Description**	**Operator #**
1	*Set samples, set parameters of the experiment*	*2*

IN FLIGHT – 1.8g PARABOLA ENTRY PHASE		
# Tasks	**Description**	**Operator #**
< >		< >

IN FLIGHT – 0g PHASE		
# Tasks	**Description**	**Operator #**
1	*Sample moved and liberated, shot, filmed*	*1,2*

IN FLIGHT – 1.8g PARABOLA EXIT PHASE		
# Tasks	**Description**	**Operator #**
1	*Dust and samples recuperated*	*2*

IN FLIGHT – AFTER EACH PARABOLA		
# Tasks	**Description**	**Operator #**
1	*We change the target cartridge*	*2*

IN FLIGHT – DURING 4-MINUTE BREAKS		
# Tasks	**Description**	**Operator #**
< >		< >

IN FLIGHT – DURING 5-MINUTE BREAKS		
# Tasks	**Description**	**Operator #**
< >		< >

IN FLIGHT – DURING 8-MINUTE BREAKS		
# Tasks	**Description**	**Operator #**
1	*We change the target and the tape cartridge , checking of the systems*	*3*

IN FLIGHT – AFTER THE LAST PARABOLA		
# Tasks	**Description**	**Operator #**
1	*We switch off the electronic devices.*	*1,2*

ON GROUND – POST-FLIGHT		
# Tasks	**Description**	**Operator #**
1	*dismantling of the experiment, and cleaning it for the next flight.*	*1, 2, 3, 4*

Flight Auxiliary Procedures

Please describe in this section the procedures to be performed in the aircraft during the flight.
The procedures may concern the following aspects: calibration, preparation of biological cells, replacement of cylinders …
More convenient tables could be used if the following layout is not satisfactory

< Flight Procedure name >	
Number of people involved	<>
Place where procedure is performed	< >
Sequential description of tasks	• < > • < >
Means implemented	• < > • < >

13. Risk Assessment

This section should provide an overview of the risks pertained to your experiment.
NOVESPACE will draw your attention to certain risks related to parabolic flights (risks related to g variations, to operations inside an aircraft, …), but the experimenters who design their experiment are best qualified to assess the specific risks related to the use of their experimental device. Each experimenter must keep in mind that the risks inherent with his/her experiment concern both the handlers, the other experimenters and third-party personnel (NOVESPACE, CEV, space agency personnel, etc).
When assessing the experiment risks, the experimenters shall address the following aspects:

Are all systems/products/equipment used on a regular basis by the ground and flight team personnel, according to the current laws and manufacturer instructions?
< Yes / No>

If not, what are the means anticipated to inform or train the team members?
< >

Analysis of External Component Failure

This type of analysis shall focus on the consequences of unexpected failures from aircraft services.
The experimenter shall first investigate what happens if an external mean is no longer available (power outage, clogging of the vent-line, etc)? Consequence on the experiment should be detailed.

Failures External to the Experiment		
Item	**Probable Failure Mode**	**Impact on Experiment**
Electrical power	*Outage*	< >
Aircraft pressurization	*depressurization (effect on the experiment containers)*	< >
Vent line	*Clogging and abnormal flow towards external environment*	< >

Hazard Reports

The following Hazard Reports should be filled in compliance with the recommendations defined in §2.5. of the Rules and guidelines document [REF 1]. For a better understanding, please put a single hazard report per page.
For each identified risk, the experimenters shall complete the following sheet.
As an example, one “common” hazard report (electrical) is already presented but can be removed according to the experiment nature. If you want to use them, you must adapt them and agree the related consequences (functional tests to be performed, …)

HAZARD REPORT #<*EXAMPLE*>	
Writer name:	***NOVESPACE***
Hazard Classification:	**Catastrophic**
Hazard Description:	*Contact by personnel with power above 32V. Possibility of burns or death.*

Hazard cause #1:	*Defective wires*		
Hazard control	**A**	*Wire routing and cable connections performed by an electrician.*	
Verification method(s)	1	*Inspection of the whole electrical circuit after assembly and prior arrival at NOVESPACE.*	***Open***
	2	*Operational test of the experiment in the laboratory prior arrival at NOVESPACE.*	*Closed*

Hazard cause #2:	*Defective insulation of wires, terminals and/or connectors*		
Hazard control	**A**	*Equipment design ensures isolation of high voltage conductors and absence of exposed energized contacts/surfaces.*	
Verification method(s)	1	*Inspection of the whole electrical circuit after assembly and prior arrival at PFC site.*	***Open***
Hazard control	**B**	*Equipment design implements all supply connectors of socket type.*	
Verification method(s)	1	*Inspection of the whole electrical circuit after assembly and prior arrival at PFC site.*	***Open***

Hazard cause #3:	*Short Circuit to exposed conductive surfaces.*		
Hazard control	**A**	*Grounding of conductive equipment chassis to power supply common ground*	
Verification method(s)	1	*Verification (by means of tests) of equipment and metallic structure connection to the electrical ground prior arrival at PFC site.*	*Closed*
Hazard control	**B**	*Connection of the common ground to the rack structure.*	
Verification method(s)	1	*Verification of proper rack bonding prior arrival at PFC site.*	*Closed*
Hazard control	**C**	*Electrical Bonding of external conductive surface to ground*	
Verification method(s)	1	*Use of a multimeter*	***Open***
Hazard control	**D**	*Implementation of a Ground Fault Interrupter (GFI) adjusted at 30 mA.*	
Verification method(s)	1	*Confirmation written in paragraph 8*	***Open***

HAZARD REPORT #<>	
Writer name:	*<Names of writers>*
Hazard Classification :	**Catastrophic / Critical / Major**
Hazard Description :	*<Description of the hazard>*

Hazard cause #1:	*<Description of the studied cause leading to the hazard>*		
Hazard control	**A**		
Verification method(s)	1		***Open*** / *Closed*
	2		***Open*** / *Closed*
	3		***Open*** / *Closed*
Hazard control	**B**		
Verification method(s)	1		***Open*** / *Closed*
	2		***Open*** / *Closed*
Hazard control	**C**		
Verification method(s)	1		***Open*** / *Closed*
	2		***Open*** / *Closed*

Hazard cause #2:	*<Description of the studied cause leading to the hazard>*		
Hazard control	**A**		
Verification method(s)	1		***Open*** / *Closed*
	2		***Open*** / *Closed*
Hazard control	**B**		
Verification method(s)	1		***Open*** / *Closed*
	2		***Open*** / *Closed*
Hazard control	**C**		
Verification method(s)	1		***Open*** / *Closed*
	2		***Open*** / *Closed*

Any prevention or protection means identified in the here above Hazard Reports shall be provided by the experimenters. By default, if a means cannot be made available by the experimenters, contact NOVESPACE as early as possible to check that the said means exists and is available in our premises.

14. Connection to the Aircraft Vent-Line

Should your experiment require connection to the aircraft vent-line (to exhaust products to the outside of the aircraft), please complete the following table:

Connection of the experiment to the vent-line:	*No*
Product types to be exhausted:	< >
Max. temperature of the exhausted products:	< > *°C*
Means used to monitor and control the temperature of the exhausted products:	< >
Max. resistance temperature of the exhaust duct to the vent-line:	< > *°C*

15. Sensitivities and Generation of Environmental Nuisances

Is the experiment noisy?	*Noise of a membrane pump* *Impacts*
Does the experiment generate odors?	*No*
Does the experiment use a wireless communication means (wifi, Bluetooth, IR, RF, …)?	*No*
Wireless communication type:	< >
Frequencies:	< >
Does the experiment use or generate magnetic or electrical fields, EMIs or anay type of radiations?	*No*
Field type:	< >
Measured field strength:	< >
Is the experiment sensitive to vibrations?	*no*
Does the experiment generate vibrations?	*no*
Estimated amplitude and frequency of the generated vibrations:	< >
Is the experiment sensitive to light?	*no*

16. Specific Requirements for In-Flight Operations

Please state in this section any specific requirement or request for performance of your experiment in flight.

APPENDIX A – ATTACHMENTS

Mention here the attachments sent separately of the ESDP, indicating the date and name of the documents.
These attachments can be additional calculations to demonstrate that specific parts (large parts) in the racks can withstand the 9g acceleration, a copy of the strut profiles technical data sheet, statements, test reports, etc…

The last column must not be filled in by the experimenters.

Attachment description	filename	Documents included in the ISDP
MSDS xxxx	*MSDS_"xxxx".pdf*	*<must remain empty>*
MSDS yyyy	*MSDS_"yyyy".pdf*	*<must remain empty>*
Upright profile mechanical data sheet	*upright_datasheet*	*<must remain empty>*
< >	< >	*<must remain empty >*

APPENDIX B- INFORMATION RELATED TO GROUND SAFETY

B1. Products Used on Ground

List in the table below the pure products or solutions which will be used and stored in the NOVESPACE premises and which have a related MSDS. If a solution has no related MSDS, all the compounds must be written here.
The "Hazard Category R and Precautions S" column shall be completed with the legal information listed in Section 15 of the Material Safety Data Sheets in compliance with European Directives 67/548/EEC and 1999/45/EC.
At the end of a work day the products must be stored in NOVESPACE premises, not in the aircraft.
Please refer to the Health and safety guide [REF 2] for storage instructions.

All the Material Safety Data Sheets should be provided under a single unprotected PDF file format as attachment to a separate email. Do not embed MSDS within the ESDP.

Products Used for Ground Operations				
Product Description*		**Total Qty**	**Storage requirements**	**Hazard Category R and Precautions S**
Name	**MSDS provided? (Y/N)**			
< >		< >	< >	< >
< >		< >	< >	< >
< >		< >	< >	< >

Please provide the meaning of each R and S symbol according to the European Directive 2001/59/EC dated August 6th, 2001.

Signification of each R and S symbol:
Rxx :
Rxx :
Sxx :

**Solutions and mixed products*

If you use solutions based upon the pure chemicals above, please mention them and mention the concentrations

Chemical incompatibilities

List below the products with known incompatibilities as listed in Section 10 of the Material Safety Data Sheets:

Products with Incompatibilities	
Product Name	**List of products with which an incompatibility exists**
< >	< >
< >	< >
< >	< >

B2. Ground Auxiliary Procedures

Please describe in this section the procedures related to:

- the handling of the experiment on ground
- the preparation of the experiment to be carried out in the NOVESPACE premises

The procedures may concern the following aspects: calibration, preparation of biological cells, replacement of cylinders …

More convenient tables could be used if the following layout is not satisfactory

< Procedure name >	
Number of people involved	*< value >*
Place where procedure is performed	*< Premises? Aircraft on ground? >*
Sequential description of tasks	• < > • < >
Means implemented	• < > • < >

B3. Description of the ground based hardware

Description of Ground-Based Experimental Equipment

Describe all equipment brought to the NOVESPACE premises, and which are not already mentioned in the previous section.

Components	Purpose
< >	< >
< >	< >

Configuration of the Experiment Upon Arrival at NOVESPACE

Describe:

- the experiment upon arrival at NOVESPACE
- the work to be performed in NOVESPACE's workshop for the experiment to be ready to be taken on-board the aircraft

Reminder: the experiment must have been fully assembled and tested in your laboratory before arrival at NOVESPACE.

< >

Configuration of the Experiment Upon Arrival On-Board the Aircraft

Describe:

- the status of the experiment upon arrival on-board the aircraft
- the work to be performed in the aircraft and/or the workshop to make it operational

< >

B4. Specific Requirements for Ground Operations

Describe you specific needs on ground concerning the preparation of your experiment.

< >