



INTERNATIONAL ACADEMY OF ASTRONAUTICS

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Paris, February 12th, 2013

ANNOUNCEMENT

THE INTERNATIONAL ACADEMY OF ASTRONAUTICS AND THE UNITED NATIONS HUMAN SPACE TECHNOLOGY INITIATIVE COOPERATION

Human spaceflight is a global endeavor to fulfill societal and academic needs. In recognition of these considerable stakes, the International Academy of Astronautics (IAA) has released a report entitled

“Future Human Spaceflight: the Need for International Cooperation”

during the Heads of Space Agencies Summit organized by the Academy in November 2010. The report, written by a team of senior international experts, discusses the needs for global cooperation in Human Spaceflight.

Heads of Space Agencies and their delegations will gather again, in company with policy makers, government representatives, distinguished scientists, and leading Academicians from all over the world, on January 9 and 10, 2014, in Washington, DC for an unprecedented IAA Heads of Space Agencies Summit on Exploration to follow-on with the 2010 Summit Declaration. In part with the gathering, renowned leaders from space-faring nations will engage in dialogue on topics of international concern: Planetary Robotic Exploration and Human Space Flight.

This IAA Summit will be taking place in cooperation and conjunction with the International Space Exploration Forum, a policy dialogue on space exploration at government-level hosted for the first time by the US Department of State with Ministers and government representatives from the US and around the world. The Department of State has enthusiastically supported the Academy proposal to organize in conjunction the restricted ministerial International Space Exploration Forum and the IAA Summit of Heads of Space Agencies. This excellent and active support has also been echoed by the European Commission which is strongly welcoming the events.

The United Nations Office for Outer Space Affairs (UNOOSA) has launched the Human Space Technology Initiative (HSTI) in 2010 under the frame of the UN Program on Space Applications. HSTI aims to promote international cooperation for human spaceflight and space exploration-related activities and create awareness among countries on the benefit of human space technology and its applications. In view of their common goals, IAA and UNOOSA are cooperating on several projects.

As part of this cooperation the International Academy of Astronautics is pleased to release the United Nations Office for Outer Space Affairs (UNOOSA) Announcement of Opportunity for the Zero Gravity Instrument Project (ZGIP), a project aimed at contributing to the promotion of Space Education and Research around the world.

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Announcement of Opportunity

**United Nations Human Space Technology Initiative
Zero-Gravity Instrument Project**

Applications for 2013

1 February 2013

Dear Sir/Madam,

The United Nations Office for Outer Space Affairs (UNOOSA) is pleased to announce the opportunity for the Zero-Gravity Instrument Project (ZGIP) as part of the Human Space Technology Initiative (HSTI) under the framework of the United Nations Programme on Space Applications.

ZGIP is aimed at contributing to the promotion of space education and research in microgravity around the world, particularly for the enhancement of relevant capacity-building activities in developing countries and countries with an economy in transition. Under this Project, a fixed number of microgravity simulation instruments called clinostats will be distributed free of charge to qualified schools, universities, research centers and institutes around the world.

On behalf of the United Nations, it is my pleasure to extend this invitation to any qualified educational and research institution to submit an application. All further information about ZGIP, including the application requirements and the application forms, are available from our website at: <http://www.oosa.unvienna.org/oosa/en/SAP/hsti/index.html>. To be considered in the selection process, the completed application form must be received at the United Nations Office for Outer Space Affairs by no later than 31 May 2013.

If you have any questions, please do not hesitate to contact us at: hsti@unoosa.org.

Yours sincerely,

Takao Doi

United Nations Expert on Space Applications
Office for Outer Space Affairs

Announcement of Opportunity

United Nations Human Space Technology Initiative (UN-HSTI)

“Zero-Gravity Instrument Project (ZGIP)”

1 February 2013

- 1. Thematic Area:** Human Space Technology Initiative (HSTI) Science Activity
- 2. Title:** Zero-Gravity Instrument Project (ZGIP)
- 3. Executing Agency:** United Nations Office for Outer Space Affairs (UNOOSA)
- 4. Duration and Beginning Date:** 2 years, beginning 1 August 2013
- 5. Deadline for Applications:** Completed application forms should be received by the United Nations Office for Outer Space Affairs **by 31 May 2013**. Successful applicants will be notified on the outcome of their applications by 1 July 2013.
- 6. Number of Available Instruments:** One (1) unit for each successful applicant. A total of 20 units are available for distribution around the world.
- 7. Expected Applicant Profile:** Heads of research groups, university professors with scientific orientation, or science teachers.
- 8. Language of the Project:** English
- 9. Brief Project Description:**

The United Nations Office for Outer Space Affairs (UNOOSA) is pleased to announce the opportunity for the Zero-Gravity Instrument Project (ZGIP) as part of the Human Space Technology Initiative (HSTI) under the framework of the United Nations Programme on Space Applications.

ZGIP is aimed at contributing to the promotion of space education and research in microgravity around the world, particularly for the enhancement of relevant capacity-building activities in developing countries. Under this Project, a fixed number of microgravity simulation instruments called clinostats will be distributed free of charge to qualified schools, universities, research centers and institutes around the world.

ZGIP will provide unique opportunities for students and researchers to study the gravitational effects on samples, such as plant seeds and small organisms, in a simulated microgravity condition with hands-on learning in classroom or research activities conducted by each institution. While ZGIP is aimed at motivating research institutions to invest in activities in space and microgravity research and at fostering a global network of participating institutions in this field, it is

also expected to create a dataset of experimental results in gravity responses that could contribute to the design of future space experiments and to the advancement of microgravity research.

10. Zero-gravity Instrument (Clinostat) Description:

The instrument to be distributed is a one-axis clinostat that simulates certain aspects of microgravity on the ground in a cost-effective manner. For details, please find information on the clinostat in [Annex-1](#) and on microgravity science experiments in [Annex-2](#).

11. Project Schedule:

Timeline of the Application and Selection Process:

- a) Deadline for application submission: **31 May 2013**
- b) Selection of applicants: **1 July 2013**
- c) Distribution of the instrument to the successful applicants: **1 August 2013**

Timeline of the Experiment Process:

- d) 1st Annual Report submission by the participating institutions: 1 August 2014
- e) 2nd Annual Report submission by the participating institutions: 1 August 2015

12. Requirements for Applicants:

a) Eligibility:

Applicants are required to act as leaders of the proposed activities of the Project in their institutions in developing countries or countries with an economy in transition. Applicants are required to

- be either heads of research groups, university professors with scientific orientation, or science teachers at schools,
- provide, in the attached Application Form, his/her ideas on how he/she plans to utilize the distributed clinostat. The plans should clearly show the purpose of the project which has to be in the following areas:
 - conduct microgravity research in order to increase knowledge in certain fields, and/or
 - provide science education to students at school.
- have a good command of spoken and written English.

b) Requirements in Experimentation:

Selected applicants who receive the instrument are expected to conduct experiments with at least five (5) plant seeds (indigenous to the region of the applicant) per year.

c) Annual Report Submission:

Selected applicants who receive the instrument are expected to submit annual activity reports for a period of two (2) years after receiving the instruments. It is also expected that research centers and institutes will share the results of their activities with the world by publishing in journals and by participating in relevant conferences. Furthermore, all successful applicants are expected to return a questionnaire on request by UNOOSA.

13. Delivery and Maintenance of the Clinostat:

In donating the clinostat to the successful applicant, UNOOSA shall bear the cost of shipment of the clinostat to the location of the successful applicant. Any additional import duties, taxes, or fees, however levied, shall be borne by the successful applicant. The successful applicant bears full responsibility for proper operation and maintenance of the clinostat and shall, if necessary, undertake and arrange, at its own expense, any shipment or delivery for warranty work or otherwise directly with the manufacturer. UNOOSA shall be informed immediately of any loss of or damage to the clinostat.

The recipient understands and agrees that the receipt of the clinostat is a non-commercial donation and that no fee of any kind may be levied against or charged to any person for the use or operation of the clinostat under any circumstances, regardless of whether such use or operation is in connection with the experiments envisioned under this project.

Please also refer to the enclosed document **“Terms of Participation”** in Annex-3.

14. Application to the Project:

The fully completed application form in Annex-4, properly endorsed by the applicant's institution, should be emailed to hsti@unoosa.org both in PDF format (.pdf) containing the signature page, and in MS WORD (.doc), **no later than 31 May 2013**.

The applicant should also mail the fully completed original application form to the following address:

Office for Outer Space Affairs
United Nations Office at Vienna
Vienna International Centre
P.O. BOX 500
A-1400 Vienna, AUSTRIA
Phone: (+43 1) 26060- 8716
fax: (+43-1)-26060-5830
E-mail: hsti@unoosa.org

UNOOSA will then proceed to evaluate each submission. At UNOOSA's sole discretion, additional information may be requested from applicants, if necessary, to assist in the evaluation of an application. Selected applicants will then be notified with the results of the selection process. All awards are final and made at the sole discretion of UNOOSA, not subject to challenge or review, and are contingent on the successful applicant's agreement to UNOOSA's terms and conditions of the donation agreement.

15. Additional Information:

The latest information on the Zero-Gravity Instrument Project will be made available on the website of the United Nations Office for Outer Space Affairs at <http://www.oosa.unvienna.org/oosa/en/SAP/hsti/index.html>.

For further information regarding the project and applications, please contact hsti@unoosa.org.

Annex-1

The List of Products for Distribution

For this Project, the following products along with documents and materials for experiments will be delivered by the United Nations Office at Vienna, Austria, to the location of the successful applicant.

1. One-axis Clinostat

The instrument to be distributed and utilized in this project is a clinostat – a laboratory device that allows us to conduct scientific experiments under a simulated microgravity condition. Among many types and designs, a one-axis, desk-top type clinostat has been selected for this Project, taking advantage of its scientific approval as well as its ease of use for educational and research purposes. The recommendation of this kind of simulation principle is based on comparative experiments in gravitational biology performed in real and simulated microgravity conditions.

The distributed clinostat has a horizontal rotational axis perpendicular to the gravity vector on the ground. By rotating samples - such as plant seeds and small organisms – around the axis, the clinostat can provide a simulated microgravity condition in equalizing the gravity vector assuming that the exposed system no longer perceives the turning g-vector. The direction of the rotation axis can be varied from 0 degrees (parallel to the ground) to 90 degrees (perpendicular to the ground). The rotation speed can be freely selected from 0 to 90 rpm with a 0.5 rpm increment from 0 to 20 rpm and a 5 rpm increment from 20 to 90 rpm. The rotational accuracy is 1%. Table 1 shows the specifications and picture of the one-axis clinostat to be distributed.

Table 1: Specification and picture of the one-axis clinostat to be distributed

Specification	Picture	
1) Equipment size (cm): Main body: 25 x 25 x 25 Control box: 23 x 20 x 11		
2) No. of rotation axes:		One
3) Rotation speed:		0-90 rpm. 0-20 rpm: 0.5 rpm increment 20-90 rpm: 5 rpm increment Accuracy: 1%.
4) Rotation axis angle:		0° (parallel to the ground) to 90° (perpendicular to the ground)
5) Rotation direction:		CW or CCW
6) Input voltage:		100V-240V
7) Building materials:		Aluminum
8) Experiment conditions: Maximum weight of samples is 500 g. Maximum diameter of a sample container is 10 cm.		

2. Teacher's Guide

A Teacher's Guide will provide teachers in schools and users for this Project with basic knowledge about microgravity, information on the clinostat, samples of basic biology experiments as well as guidance on how to perform clinostat experiments and to write experimental reports.

Annex-2

How to conduct experiments on Plant Growth or Other Systems (*depending on your ideas*) under Simulated Microgravity Conditions

1. What is microgravity?

Everything that is living and non-living on Earth is exposed to gravity. All life forms evolved under the effects of this constant force. It is an essential factor and stimulus in most physical and physiological phenomena observed on our planet. For microgravity platforms such as drop towers, sounding rockets, spacecraft, or the International Space Station, however, the effects of this gravitational force is absent, and organisms experience microgravity conditions, which allows scientists to examine physical phenomena and the reaction of living cells, small organisms and even the human body in the absence of gravity. This unique environment and the scientific research making use of it can provide new insights into certain phenomena and processes. Understanding how organisms and matter react to gravity and the absence of it may also lead to new applications benefiting humankind. New medical cures and materials may result from such knowledge. It may also open up the possibility for the human race to expand into space.

2. The clinostat – A tool for microgravity education and research

On Earth, gravity with its distinct characteristic of pulling masses “down”, plays an important role in determining movement and growth directions. In microgravity, this preferential direction does not exist as gravity is absent. Clinostats are devices which allow a sample to rotate around an axis. The simplest clinostat rotates the sample around a horizontal axis. In this manner, the sample is exposed to a constantly rotating gravity vector around itself. As a consequence, the sample no longer experiences a preferential direction, which may be identical to real microgravity conditions in space. Even though gravity is still present, the clinostat may simulate some aspects of a true microgravity condition. It is important that the sample be located on or near the rotational axis for a one-axis clinostat in order to prevent any centrifugal forces, which would impose a directional force on the sample. Furthermore, the speed of rotation is important with respect to residual acceleration forces and time and therefore, the sensitivity of the sample.

3. How to conduct a basic experiment with the clinostat

One of the basic experiments with clinostats is to observe the germination and early growth of small plant seeds. The clinostat can provide insights into how plant seeds react to an environment with simulated microgravity during germination and early growth. For this purpose, some seedlings are placed on the rotational axis after proper preparation, and subsequent to running the clinostat until germination has occurred, the seedlings grown under rotation are compared to germinated seeds under normal gravity. Basically, any kind of seeds can be used for germination experiments with the clinostat. It is recommended to use seeds which show quick germination over those with slow germination time. Applicants are encouraged to design experiments using a clinostat and in addition, to change environmental parameters such as rotation speed, light conditions, temperature, and humidity. They are also encouraged to design their own scientific systems using a clinostat for experimental possibilities with not only plant seeds but also small organisms, cells, or small samples from material sciences.

Annex-3

TERMS OF PARTICIPATION

United Nations Human Space Technology Initiative (UN-HSTI) “Zero-Gravity Instrument Project (ZGIP)”

1. Participation

Applicants should be (i) nationals of developing countries or countries with an economy in transition, (ii) be heads of research groups, university professors with scientific orientation, or science teachers at schools, and (iii) have a good command of spoken and written English.

2. Application form required

Only applicants whose completed Application Form is received by the United Nations in Vienna by the deadline established for the project will be considered in the selection process for distribution of the zero-gravity simulation instrument.

3. Administrative arrangements

a) Responsibilities of the United Nations:

- i) The United Nations shall make available a one-axis clinostat (hereinafter referred to as “the Clinostat”), to the successful applicants for utilization at schools and public research institutions for the purpose of education and research. In donating the Clinostat to the successful applicant, the United Nations shall bear the cost of shipment of the Clinostat to the location of the successful applicant.
- ii) The United Nations shall provide technical assistance, with the support of the Human Space Technology Initiative Science Advisory Group (HSTI-SAG) for experimentation conducted by the selected institutions (recipients) throughout the period of the project.

b) Responsibilities of the selected applicant and his/her institution:

- i) The recipient of the Clinostat will conduct microgravity research in order to increase knowledge in certain fields and/or to provide science education to students using the Clinostat. The recipients are expected to conduct experiments with at least five (5) different plant seeds (indigenous to the region of the applicant) per year.
- ii) The recipient bears full responsibility for proper operation and maintenance of the Clinostat, and shall, if necessary, undertake and arrange, at its own expense, any shipment or delivery for warranty work or otherwise directly with the manufacturer or duly authorized repair center. The recipient shall be liable for injury to third parties arising from the Clinostat.
- iii) The recipient agrees to deliver annually a detailed report to the United Nations on the activities conducted with the utilization of the Clinostat, to the United Nations, and this for at least two (2) consecutive years after receiving the Clinostat. The recipient further accepts to truthfully respond to any questionnaires concerning the utilization of the Clinostat and issued by the United Nations.

c) Applicants for the project should also agree to the following conditions:

- i) The recipient understands and agrees that the receipt of the Clinostat is a non-commercial donation and that no fee of any kind may be levied against or charged to any person for the use or operation of the Clinostat under any circumstances, regardless of whether such use or operation is in connection with the experiments envisioned under this project.
 - ii) The Clinostat shall not to be loaned out, sold, transferred, or disposed of, nor can responsibility for the Clinostat be re-delegated or reassigned from the recipient and the official executing this activity, for any reason, without prior written approval of the United Nations.
 - iii) Should the Clinostat malfunction within the meaning of the manufacturer's warranty provisions, the recipient shall exercise such warranty provision or remedy directly with the manufacturer at no cost to the United Nations.
 - iv) Loss of or damage to the Clinostat shall be immediately reported to the United Nations.
 - v) The United Nations and the recipient will endeavor to resolve any dispute arising from joining this project through mutual cooperation.
- d) **Termination of the Project:**
The United Nations reserves the right to terminate the Project in writing at any time.

Annex-4

APPLICATION FORM

**United Nations Human Space Technology Initiative (UN-HSTI)
“Zero-Gravity Instrument Project”
(Deadline for submission: 31 May 2013)**

Please fill in the fields by typing the information and marking an “X” when a choice is required.

I. Basic Information of the Applicant and Institution

A. Information about the Applicant (Team Leader)

- a) First Name:
- b) Family Name:
- c) Other Names:
- d) Gender:
- e) Nationality:
- f) Date and Place of Birth:
- g) Position/Profession:
- h) Title: Mr. () Ms. () Dr. () Prof. ()
- i) Affiliation:
- j) Tel.:
- k) Fax:
- l) Email:

B. Information about the Institution (e.g. school, university, laboratory)

- m) Name:
- n) Status of your institution:
Public () Private ()
- o) Attached to (e.g. ministry, company, university):
- p) Age of students:
Normally from ____ to ____ years old.
- q) Gender of students admitted:
Male only () Female only () Mixed ()
- r) Language:
- s) Address:
- t) Tel.:
- u) Fax:

II. Your Institution's Activities and Planning with Clinostat

Please attach a detailed description of your planned educational/research project to your application. The following information has to be covered. (Select A and/or B for your application.)

A. For an Educational Activity

- a) Overview of your school
- b) Please describe activities related to science education in your school including the information about availability of teaching staff for such activities.
- c) Please describe the available infrastructure and activity means (available equipment or tools that can be used for the activities.)
- d) Please describe your planned educational activities using the Clinostat.
 - o about how the Clinostat will be employed;
 - o in which ways students will be involved in the project;
 - o expected average age of students taking part;
 - o the project schedule and planning.

B. For a Research Activity

- a) Overview of your institution
- b) Research focus of your laboratory
- c) Please describe the available infrastructure and project means (available rooms/laboratories, equipment and tools that can be used for the project, material, financial means.)
- d) Please describe your planned research activities using the Clinostat.
 - o Itemized planning and conducting of the experiment

Answer Section

Minimum length required for this section is a single A4 typed sheet with single line spacing. The information listed under the above A or B should be covered in your application (attach an extra page if necessary).

Please choose the goal for joining this project:

Educational Activity () Research Activity ()

a)
b)
c)
d)

You may use separate sheets of paper if necessary.

III. Signatures

APPLICANT'S CERTIFICATION

I hereby certify that the statements that I have made on this application form are true, correct and complete.	
If selected, I hereby confirm that our institution will comply with the Terms of Participation of the Project.	
Signature of the Applicant (Team Leader):	Date

Director of the Institution Name: Title: Signature:	Date
Official Seal of the Institution	

This form, FULLY COMPLETED, should be submitted to the United Nations Office for Outer Space Affairs, Vienna International Centre, P.O. Box 500, A 1400 Vienna, Austria, **no later than 31 May 2013**. Please also e-mail scanned copies of the application form or the e-file in MS WORD (.doc) to hsti@unoosa.org.

NOTE: The application is only considered valid if all the information requested is provided.