

## Space Poem Chain

The Space Poem Chain is an activity by which participants consider space, Earth, and life across the borders of nations, cultures, generations, specialties, and roles; their words are spun into a poem chain. Words spun in this way are launched to and stored aboard Kibo, the Japanese experiment module attached to the ISS, which can be seen as a bright shining star from all countries in the world.

The Poem Chain is a technique of dialog that Shin Ohoka, a Japanese poet, developed from Benga and Renku, which are fields of Japanese traditional culture. We are compiling a Space Poem Chain by combining the poems publicly solicited via the Internet and contributions by poets and men of culture under the supervision by Shin Ohoka. Both Japanese and English poems are compiled without discrimination so that people worldwide can participate.

The Japan Aerospace Exploration Agency (JAXA) began a trial compilation of a Space Poem Chain in fiscal 2003 and has proceeded with full-scale compilation of the Space Poem Chain since 2007, as an application of Kibo. We are accepting contributions from people of ages ranging from the second year of elementary school to 98 years, regardless of nationality, specialty, or role. The wonder, splendor, and possibility of being born on Earth and living in space are spun with words. The work can be seen at the web site indicated below.

JAXA is also seeking to develop and distribute the Space Poem Chains. JAXA is compiling space poem chains characteristic of each region and school, in cooperation with other institutes, including the Japan Planetarium Association, regional planetarium associations, the Japan International Cooperation Agency (JICA), and schools (Japanese language lessons in elementary schools and high schools). Anyone who is interested in participating should consult the person in charge of Space Poem Chains via the web site below. JAXA will continue to develop and distribute the Space Poem Chains, in an effort to share the preciousness of life and the pleasure of living via Kibo.

### ●To persons who wish to participate in Space Poem Chains:

People throughout the world, of ages ranging from the second year of elementary school to 98 years, have thus far contributed to the Space Poem Chains. We are awaiting additional contributions. We will continue to operate the consultation desk on the JAXA Space Poem Chain website; those who are interested in the development and distribution of Space Poem Chains are invited to contact the desk.

JAXA Space Poem Chain website : <http://iss.jaxa.jp/utiliz/renshi/index.html>

### <Flow of the Space Poem Chain Activity>

#### 2003

The first space poem chain "Life on the Earth" was compiled as a collaborative effort. English space poem chains were then compiled at the International Space University. Support in order to compile space poem chains characteristic of each region and to compile school space poem chains characteristic of each school from the planning stage was started in cooperation with local planetariums and science museums.

#### 2006

Full-scale compilation of space poem chains was started as an initial mission for Kibo. They were recorded on a DVD, together with space poem chains compiled by regional planetariums and science museums, for storage on Kibo.

#### 2007

Compilation of the space poem chain "Volume of the Stars" was started.

#### 2008

Plans included launching the space poem chains compiled in 2006 to Kibo in March and storing them there, as part of the 1JA mission. After the "Volume of the Stars" is completed, it will be recorded on a DVD, along with the space poem chains compiled by local planetariums and science museums, including the Yamanashi version of the space poem chain "Star Spinning Song," which was compiled mainly by the Yamanashi Prefectural Science Museum, and the space poem chains compiled by Keio Women's High School, Kofu Municipal Yamashio Elementary School, and junior high schools in Uganda, Africa (in cooperation with the Japan International Cooperation Agency (JICA)), and will be launched on Kibo in the latter half of 2008.

# Education Payload Observation

## Space Experiments on Kibo Utilization for Education, Culture/Humanities and Social Sciences

### EPO: Education Payload Observation

The picture of Earth was taken in 2007 with a high-definition television camera on KAGUYA (SELENE), a Japanese satellite orbiting the Moon. Its fantastic beauty reminds us, nearly 40 years after the landing of Apollo on the Moon's surface, that the Earth is a matchless place for human beings to live. Individuals who have been launched into space have gained a new perspective of Earth and space; they have offered various descriptions, such as "The Earth was blue" and "You cannot see national borders on the Earth." The purpose of Education Payload Observation, or EPO, is to make new discoveries through artistic expression in the space environment, in addition to utilizing it for scientific experiments. EPO will help pursue the development of global citizenry, expanding the future of mankind, and creating new values through educational activities and cultural and humanistic trials, using Kibo,

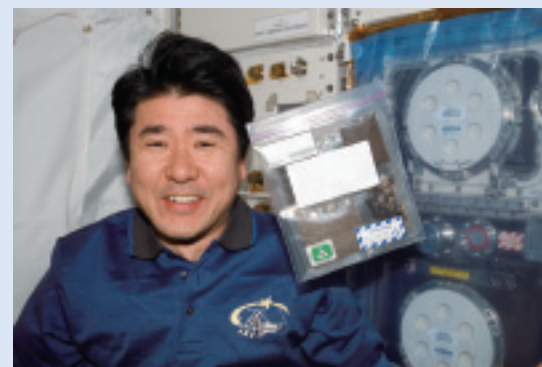
the Japanese Experiment Module attached to the International Space Station (ISS). We believe that trying artistic expression in space, with a focus on the future, necessary for human beings to learn that they can lead productive lives in space.



Logo mark of the JAXA EPO Mission  
(Designed by Prof. Noriyasu Fukushima)

## Sample Return Mission - Life in the Universe

On Kibo, plans include proceeding with studies of life sciences by utilizing a special environment that is available only in the experimental module floating in space (e.g., microgravity and cosmic rays). JAXA initiated the Sample Return Mission primarily to support educational activities concerning life sciences for teachers in schools and local science museums. In the 1JA mission in March 2008, some life forms that are familiar to us (e.g., eggs of water fleas and seeds of plants) were launched aboard Kibo, stored there for half a year, and then returned to Earth. Samples with their soundness confirmed will be distributed to teachers who want to use them in their educational activities. Details will be made available later.



Astronaut Doi and plant seeds

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■Utilization in space ... <http://iss.jaxa.jp/utiliz/index.html>

## Pilot Missions of Utilization for Culture/Humanities and Social Sciences - First Ever Attempts at Space Art

Human beings have looked up at the starry sky, been moved by it, and achieved evolution driven by curiosity since our earliest days. Even in modern society, where we have extended the range of our activities to space, many space-related areas remain uncovered. One of the objectives of the ISS is to introduce impressions that human beings have never experienced and to expand the wisdom of human beings by exploring the space environment. JAXA has long considered the significance of space exploration in the fields of culture/humanities and social sciences. At last, the opportunity has arisen to try related activities aboard Kibo, the Japanese Experiment Module. Thus, we solicited proposals for utilizing Kibo for culture/humanities and social sciences in order to try artistic activities in the space environment governed by microgravity and subsequently selected ten themes. These themes consist of artistic expressions that utilize viewpoints from space and the microgravity environment, and lead to the creation of social values on the ISS.

### Selected ten cultural and humanistic experiments

#### Artistic Experiments Using a Water Sphere

**Takao Fujiwara**

Kyoto City University of Arts

#### Marbling painting on a water ball

**Takuro Osaka**

University of Tsukuba

#### Sparkling Neurons

**Hitoshi Nomura**

Kyoto City University of Arts

#### Space Clothes Experiment

**Michiyo Miyanaga**

Tokyo National University of Fine Arts and Music

#### Modeling Clay in Space

**Yuichi Yonebayashi**

Tokyo National University of Fine Arts and Music

#### 'moon' score : ISS Astronaut

**Hitoshi Nomura**

Kyoto City University of Arts

#### Spiral Top

**Takuro Osaka**

University of Tsukuba

#### Hiten

**Setsuko Ishiguro**

Ochanomizu University

#### Dewey's Forest\*

**Shiro Matsui**

Kyoto City University of Arts

#### Message in a Bottle\*

**Shiro Matsui**

Kyoto City University of Arts

\* "Dewey's Forest" and "Message in a bottle" are under feasibility study phase.

## Behavior of water that no one has ever seen before ~Beauty of Water~

What form does water take in the microgravity environment of space? It will be a curious sight that no one has ever seen on Earth. Water needs no vessel, but floats by itself in the form of a sphere, because the surface tension of water, which is latent in Earth's gravity, has a large influence in the microgravity environment. We assume that many people who watched an astronaut forming drinking water into a sphere became interested in this phenomenon. Liquid can be molded freely on the ISS. Artists who focus on these interesting properties will be able to use water to create beauty such as no one has ever seen before.

### Theme Artistic Experiments Using a Water Sphere

Deforming a whole water ball by vibrating two points on its surface. The water ball will take forms other than a sphere, such as a triangle and a rectangle, in response to vibration.

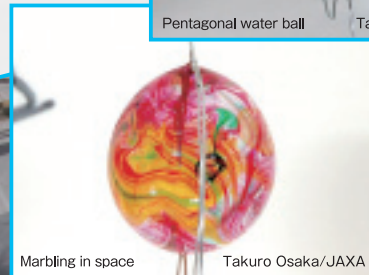
### Theme Marbling painting on a water ball

Producing a pattern on the water ball so that it becomes an image of "water planet = Earth" using marbling, a painting technique that is familiar to people across national borders.

The marbling pattern was absorbed on Japanese paper and brought back to Earth.



Pentagonal water ball Takao Fujiwara/JAXA



Marbling in space Takuro Osaka/JAXA

## Relationship between microgravity and the human body

Long stays in space have become routine for human beings in the age of the ISS. Although space is a special environment, food, clothing, and shelter are as important there as they are on Earth. Clothing, in particular, is important for our comfort. The time has come for us to consider making the life in space comfortable with clothing that is designed to utilize the characteristics of microgravity.

### Theme Space Clothes Experiment

The use of the body in a microgravity environment differs greatly from that on the ground.

For example, the legs, which evolved primarily for moving, do not play a large role under microgravity conditions. This theme aims to express the relationship between the body and microgravity through fashion designs, by imagining how the human body will evolve in the space age.



Design: Naoki Takizawa CG produced by Jun Kurumizawa

## Protected Earth and Wisdom of Human Beings

The atmosphere protects living beings on the Earth from the Sun's cosmic rays and those of distant heavenly bodies. Living outside the Earth's atmosphere in space would be difficult. However, human beings have managed to stay aboard the ISS for over half a year. The challenges for human beings in space have been overcome by the wisdom and efforts of engineers and scientists. The sustainable development of human beings requires that we understand the Earth and face the challenges of technology and science. Such goals can be partially achieved by imaging the space environment.

### Theme Sparkling Neurons

Astronauts reported that while they were aboard the space shuttle they sensed light via routes other than the retina, when cosmic rays hit their optic nerve. Cosmic rays impact not only the human body but also various devices; for example, they cause white damage to the CCD of a high-definition television camera. Viewing space using such a camera will create images that depict the preciousness of the Earth and bring attention to the challenges that humans must still overcome.



## Trial of Three-Dimensional Expression - Attractiveness of spirals -

The spiral phenomena that exist in space (e.g., galaxies), on Earth (e.g., typhoons, growth of plants, cilium), and in the human body (e.g., DNA) have a mysteriousness that charms many people. We assume that a new world of beauty will be created by modeling three-dimensional luminous spiral movements that humans have never seen before, which is released from gravity.

### Theme Spiral Top

The revolution and parallel movement of a top having four arms with flashing LEDs will generate various tracks of light to express multiple spirals in the air. A new world of expression will be created from the sharing of new viewing experiences through recorded images between astronauts and people on the ground.



Luminous spirals in space Takuro Osaka/JAXA

# Creating Impressions in Space Activities on Kibo to produce new values

## Impressive human posture - From the Silk Road to space -

Motions of human beings on Earth are completely governed by gravity. All natural movements, ranging from those in daily life to sports and dancing, are expressed under the influence of gravity. For the people who have watched astronauts floating in space, such scenes are surprisingly refreshing. Released from the restriction of gravity, human motions produce beauty that has not been seen before.

### Theme Hiten

"Hiten", which means the flying deities in Japanese, came to Japan along the Silk Road a thousand years ago. You can see the East Asian tradition on the murals in Horyuji. In "Hiten" project, astronaut will perform some posture of the flying deities in space as a message to wish happiness for all people of the world.



## Playing Moon Scores

Many people on Earth experience peace of mind when they see the Moon shining faintly as they look up at the night sky. The Moon is also visible from the ISS, which is 400km from Earth. Looking at the Moon helps astronauts realize that they are not far from the Earth, their home. In the future, humans will expand their activities to the Moon and Mars. However, the familiar Moon is not visible from Mars. Astronauts may then sense the Moon's existence even more strongly. The theme here is an artistic expression that depicts the Moon with the meaning described above.

### Theme 'moon' score : ISS Astronaut

Photos of the Moon will be taken from a window of the ISS. Music will be created by expressing each photo as a score.



## Sharing the Future of Human Beings with Children

Expression by human beings began in prehistoric times. Ancient people drew pictures of cows and horses, hoping to obtain food for the next day. Pictures of human hands, apparently for the purpose of incantation, were left as wall paintings in caves. Furthermore, early man molded their own shapes using clay and gave them a special meaning. Aboard the ISS, splendid artistic expressions, which have been handed down from ancient times to today, will be explored through communication with children to pass on their values.

### Theme Modeling Clay in Space

In the microgravity of space, astronauts will create shapes of human beings, while on Earth, children will produce clay shapes of humans of the future. This theme aims to expand the image of human beings and the area of creation by comparing and combining the conceptions of the view of Earth from space and the view of space from Earth.



Human figure created in space Yuichi Yonebayashi/JAXA



# Education Payload Observation

## Space Experiments on Kibo

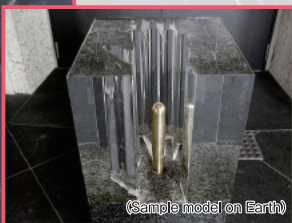
### Utilization for Culture, Humanities and Social Sciences

#### EPO -Education Payload Observation-

Space has always fascinated humankind. Looking into the Space environment and guiding the humankind to untold surprise or wonder, and broadening our wisdom are one of the goals of the International Space Station. Through ISS/Kibo Cultural and Humanistic Scientific Utilization, JAXA will pursue developing a global citizenry, expanding the future of humankind, and creating new values by utilizing space.

#### Feel space in your hand

An astronaut on Extra Vehicle Activity would capture space to the bottle and it will be brought back to earth. In doing so, the astronaut would not only create a memento of his or her time in space but also a message for present and future humankind. Once the Bottle is placed in people's hands, it would become a conduit between humans and space, between this world and the one beyond us. It would inspire wonder about our extra-terrestrial activities in this new Age of Exploration, and make us realize that earth itself is merely one small part of the entire universe.



(Sample model on Earth)

#### Theme Message in a bottle

The bottle, effectively filled with outer-space and be brought back to earth, would inspire wonder about our extra-terrestrial activities in this new Age of Exploration, and make us realize that earth itself is merely one small part of the entire universe.

#### The Green Planet, Earth

Since ancient times, humans have continued to make a particular type of garden even though their cultural background and natural conditions are different. The purpose, the form, the times, and the country are sure to characterize each garden, and various differences do exist, but there is a common feature among all gardens on Earth: they grow horizontally along the shape of the Earth, always expanding, just as the human race has expanded their sphere of activity into space. We wondered in what shape a garden would grow in the microgravity environment compared to gardens on Earth, which have been made according to the law of gravity. It is a self-evident truth that we hadn't even considered. In addition, what impact would the garden have on the new view of nature of people from different cultural backgrounds in the joint experiment facility called the ISS?

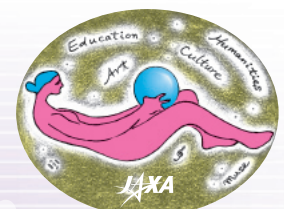
#### Theme Dewey's Forest

By growing plants and forming a living relationship between humans and gardens in the environment of space, we have been afforded an opportunity to understand nature on Earth, the cultural workings of gardening, and the relationship between the human race and nature from a new point of view—space.



(Sample model on Earth)

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JAXA EPO Mission Logo  
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