

# WHAT IS MIURA-ORI

HIROMASA SUZUKI

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# 1. About Origami

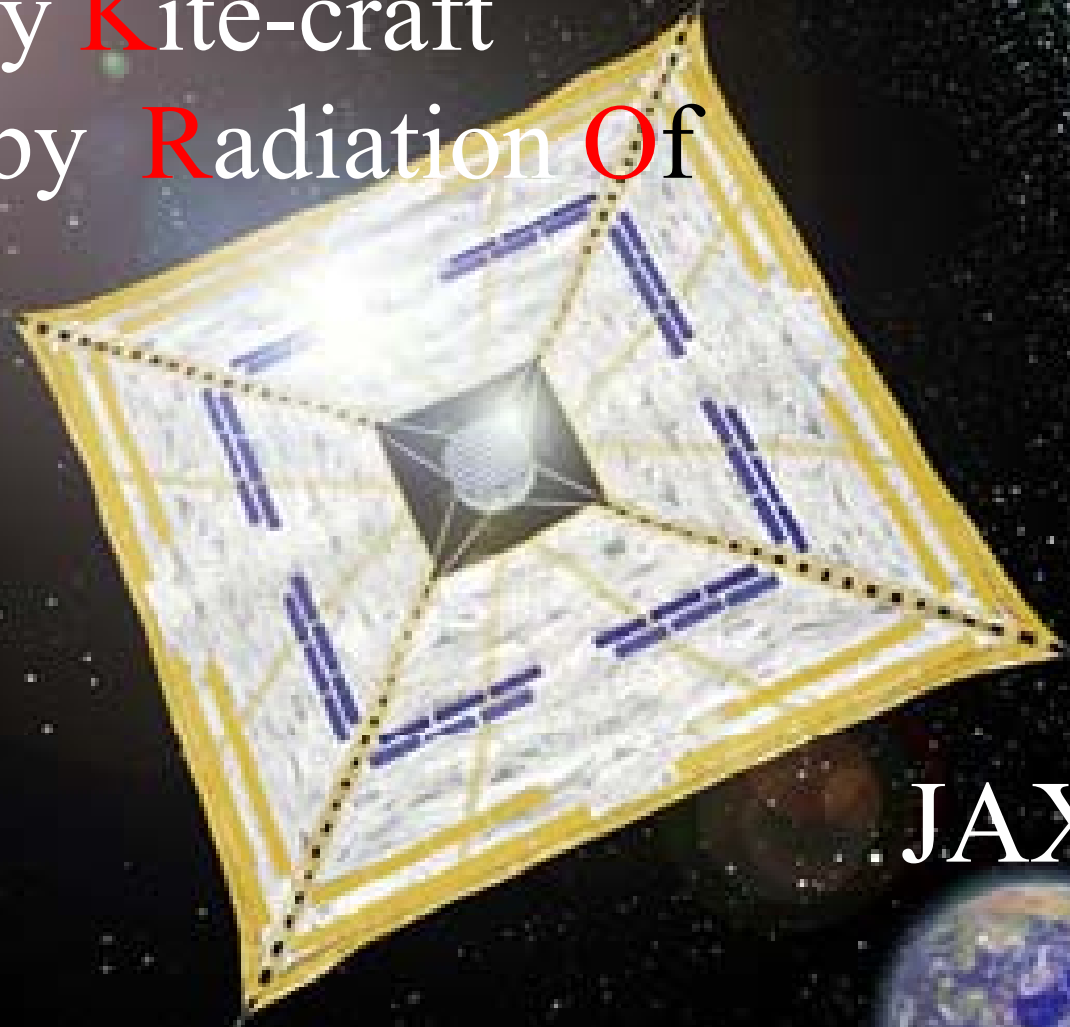
## Origami

- A unique game in Japan (culture)
- Just a piece of paper
  - Various things
- Does not require scissors and glue

Today I will introduce origami.

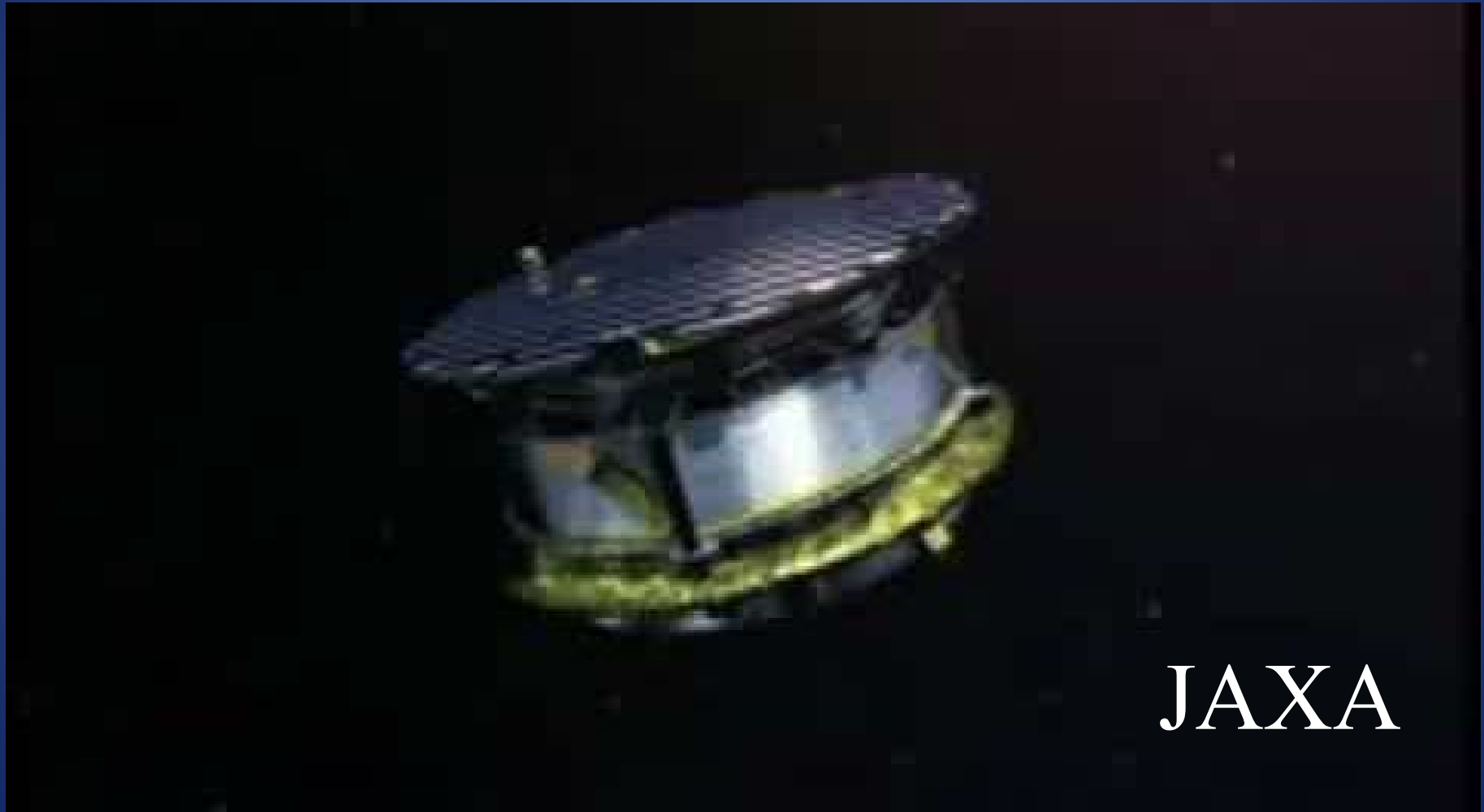
## 2. Introduction of IKAROS

(Interplanetary Kite-craft  
Accelerated by Radiation Of  
the Sun)



JAXA

# IKAROS sail deployment method



JAXA

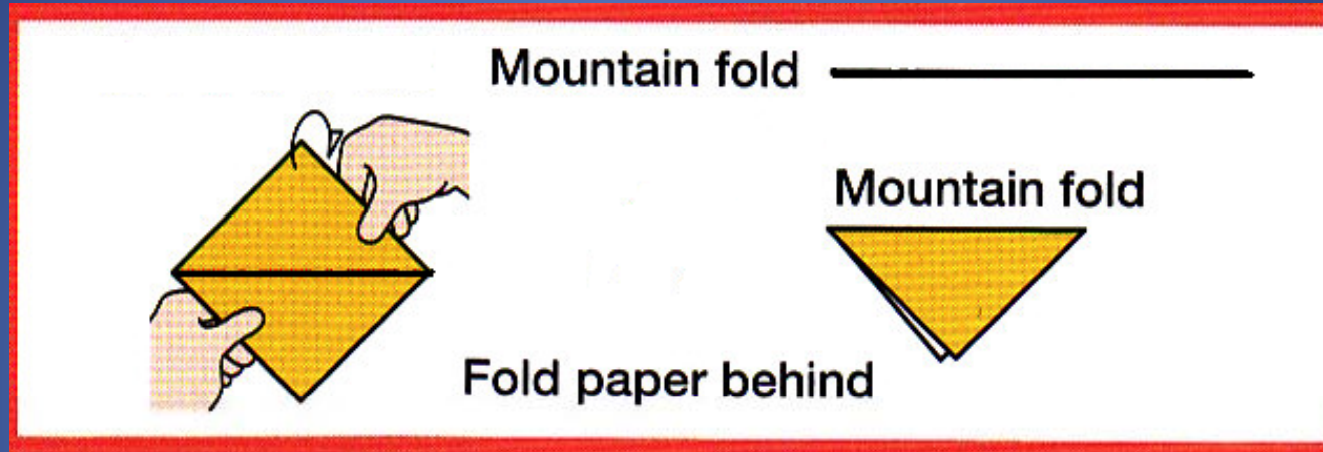
### 3. "MIURA-ORI" Introduction and Demonstration

"MIURA-ORI" features

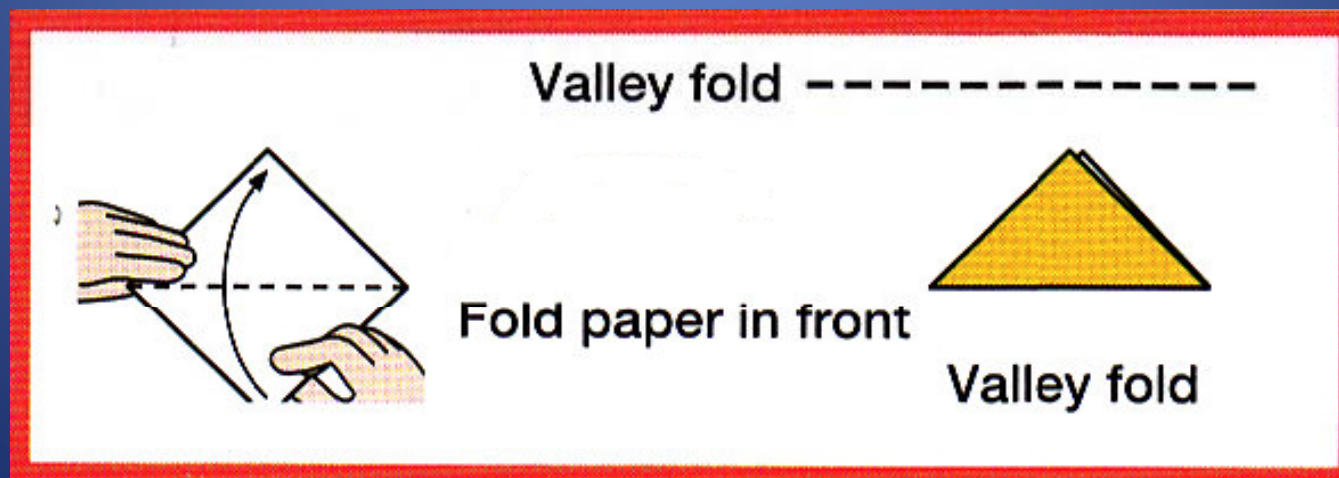
- Becomes very small
- Easy to open and close
- Hard to break

# Basic folds

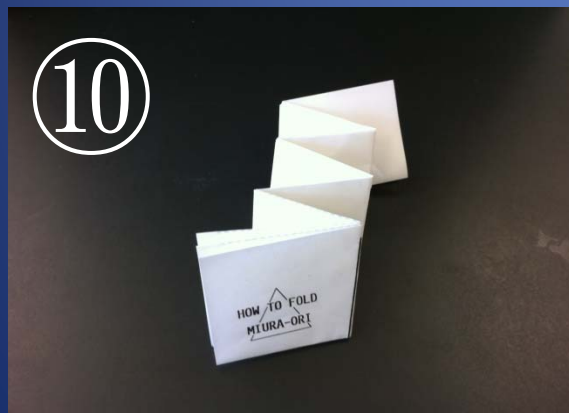
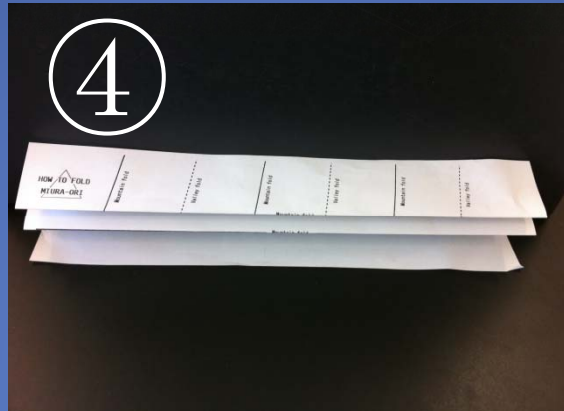
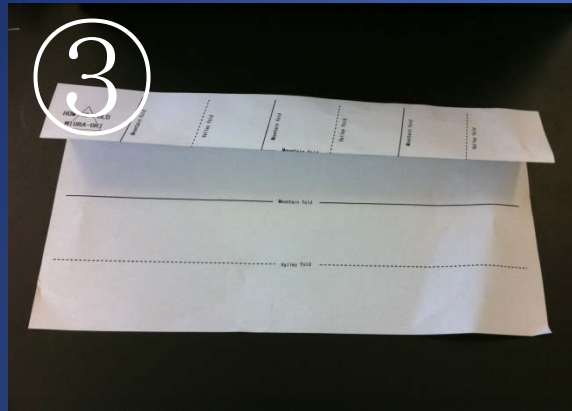
- Mountain fold

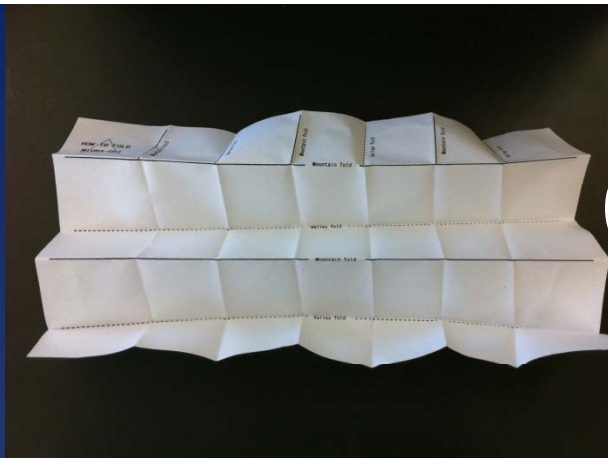


- Valley fold

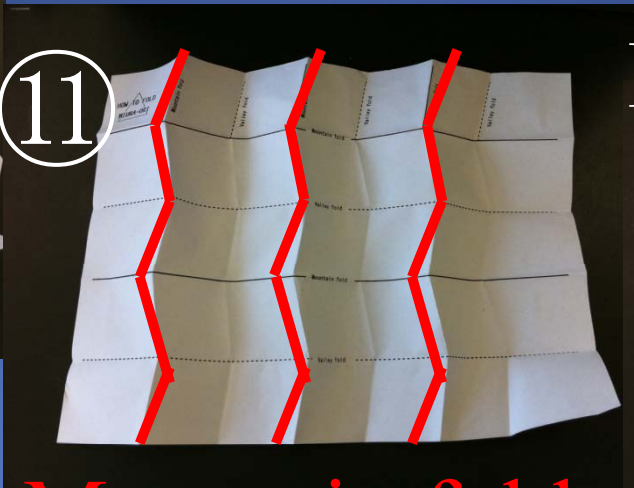


# Let's try!



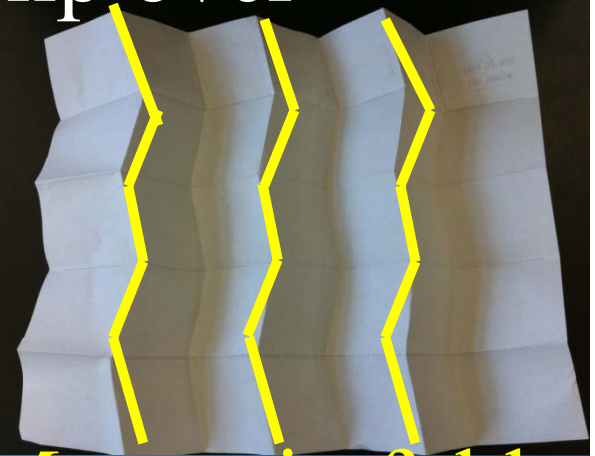


11



Mountain fold

Flip over

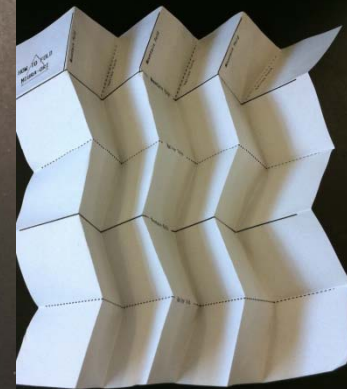


Mountain fold



COMPLETED!

12

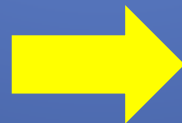
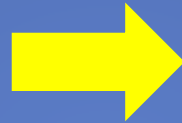
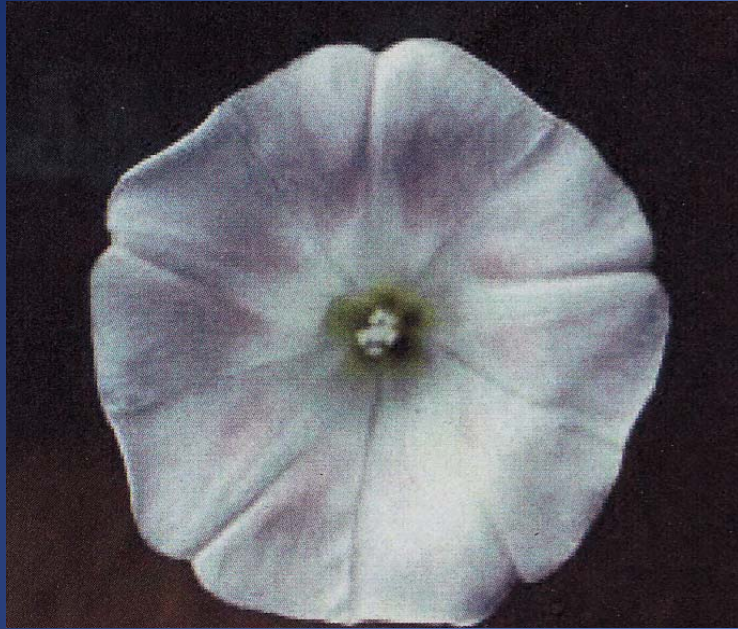


## 4. Conclusion

You have seen MIURA-ORI  
before.

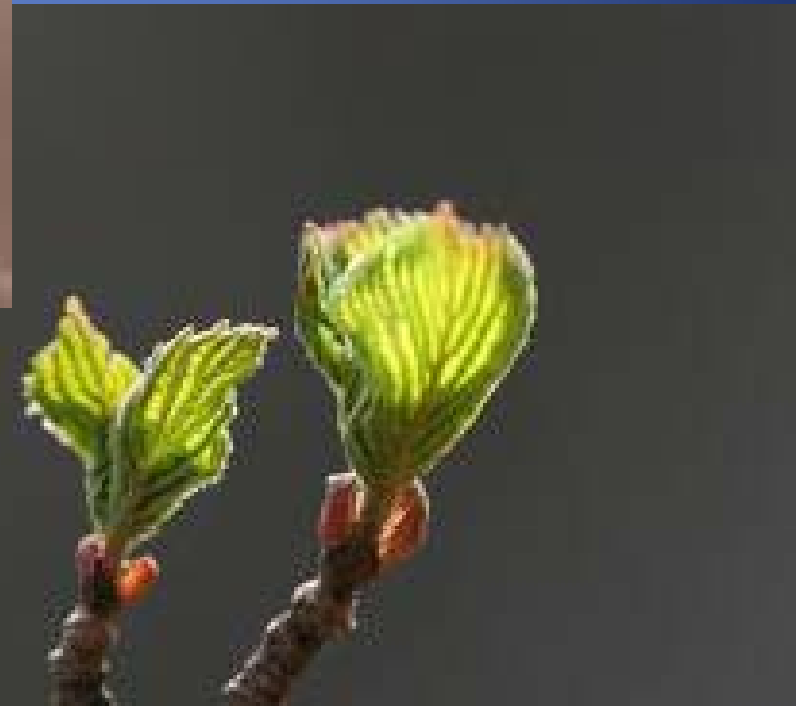
For example

# Flowers,

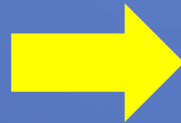


the leaf of a tree,

bud development



a beetle,





# Mona Lisa,



# the diamond pattern



Hello, everyone. I'm Hiromasa Suzuki, a lower-secondary school science teacher, associated with Chiba University.

Today, I'm going to show you MIURA-ORI.

Well, first, please look at your square piece of paper.

We call it ORIGAMI.

ORIGAMI is still handed down from generation to generation as traditional Japanese culture.

Everyone who is Japanese has played with it.

ORIGAMI is a unique Japanese art in which various forms such as animals and flowers are created not with glue and scissors but instead by folding square pieces of paper.

Today let me introduce some origami to you.

The first is a crane. Please pick it up.

Now, expand the two wings of the crane.

Next, place your mouth on the belly of the crane and blow into it.

Making a three-dimensional shape by folding a flat piece of paper is a feature of ORIGAMI.

The second is a popgun.

Today newspaper is available in Japan.

In Japan, this is called KAMI-TEPPOU

KAMI means a sheet or a piece of paper.

TEPPOU means a gun.

When I wave the end of the paper like this, I can make a clapping noise.

First, I'll try. 3, 2, 1.

OK. Now it's your turn.

Cranes and popguns are what have been handed down from the past. The third type is a more recent variety of origami.

This is one of them. Everyone knows it well: a space shuttle.

As you can see, we have produced many things by folding paper.

The ORIGAMI culture has taken root in Japan.

They are souvenirs for you.

By the way, does everyone know what IKAROS is?

IKAROS is JAXA's small solar power sail demonstrator.

The primary objective of the IKAROS mission is demonstrate the solar sail, which may simply be described as a "space yacht."

Another objective of the IKAROS mission is power generation using thin-film solar cells.

This is an origami idea.

IKAROS generates power by spreading a very large solar sail in space.

However, a sail of such large area would make IKAROS too heavy.

While ensuring a large area, we needed to keep it as light as possible.

In addition, we had to store it within the limited size of the rocket.

There were many problems.

At the end of the study came Japanese ORIGAMI.

Watch this movie please. (PPT)

The folding device of those solar sails led to the success of IKAROS.

The folding method of IKAROS' sail originated with origami.

It was invented by Professor Miura of The University of Tokyo in Japan.

Take a look at this. This is MIURA-ORI.

Let's expand it. 3, 2, 1. I can spread it out easily.

Next, let's fold it. 3, 2, 1.

A feature of MIURA-ORI is that I can spread it out and store it simply by pushing or pulling the diagonal part of the paper.

It is also hard to break.

The folding method of IKAROS' sails applies MIURA-ORI.

I've brought models of IKAROS' sails.

Please look at this one. It's so small.

However, I can spread it out and now it's so big.

This time, let's fold it. 3, 2, 1.

Being able to fold it small and load it into a rocket is very beneficial.

I am moved that Japanese traditional culture is used to support JAXA.

Please try MIURA-ORI.

## HOW TO FOLD MIURA-ORI

Look at this piece of paper.

I'll explain how to fold it.

A mountain fold is made like this

A valley fold is made like this.

OK?

First, as shown by ①, place the paper like this.

Make a valley fold, as shown by ②.

③, make the mountain fold as below.

Then, please repeat the mountain folds and valley folds as shown.

This is Step 10

It is important to crease the folds firmly.

Please open it.

You open the paper, I think that is attached to the crease ⑪.

Then, you make mountain folds in zigzag lines.

Turn over the paper and make more mountains folds.

We will gradually shrink it to match ⑫. Shrink it more.

If you are unsure, please ask the staff.

Open your paper. Now, please close it.

This is MIURA-ORI.

This is also a souvenir, of course.

I always have it with me.

My daughter and my wife.

In fact, you have seen MIURA-ORI before.

For example,

Please guess what this is. And this one?

What animals do see next? And this one? Please guess.

MIURA-ORI also found that there is a similar structure.

Having this perspective when learning about plants and animals, I think, would be very

interesting.

I believe it is important to point out the mystery and wonder of nature to students.

Finally, look at this picture.

This is Leonardo da Vinci's Mona Lisa.

I can see MIURA-ORI in this picture.

Do you know where it is? Here.

This is called a diamond pattern.

It is similar to MIURA-ORI.

I guess Da Vinci observed it well.

Well, that's all. Thank you.