Messages from Modern Inventors to the Next Generation

11. *Image Stabilizer on Cameras* - Dr. Mitsuaki Oshima, Panasonic Corporation

“Image stabilization (IS)” is a family of techniques used to detect camera shake and thereby compensate for image blurring, which results in blur-free, clear image quality from a digital still or video camera.

Dr. Oshima invented a basic technology for image stabilization in 1983, and five years later successfully commercialized the world’s first video camera to feature the technology. This accomplishment earned him a number of prizes at home and abroad. In addition, he has also developed many important inventions in other technical fields, including digital communication and optical discs; i.e., CDs and DVDs written and read by a laser beam.

What inspired you to become an inventor/researcher?

As early as elementary school, I was just fond of science and always looking forward to science class. As I read Edison’s biography and science fiction novels written by Jules Verne, I used to enjoy creating fantasy worlds; imagining that I was going to fly a rocket into space from my backyard. I chose to become an engineer because in my childhood, I saw with my own eyes new electric appliances, such as televisions and washing machines, being developed one after another and dramatically improving our daily lives. I came to think that I too would one day invent something to help people. I then studied science in university before starting my professional career at an electronics company to

pursue that dream, which has since resulted in an exciting life.

What specific ideas and difficulties have you faced as an inventor/researcher?

In 1980, with the aim of improving our car navigation systems, I started research on vibrating structure gyroscopes*. These are used to measure the rate of rotation of an object, though attracted very little attention at that time. However, the research did not provide the desired performance, resulting in suspension of the project after a short period of time.

It was about that time that I took a trip to Hawaii, where a friend of mine was struggling to keep his video camera from blurring as he filmed the scenery from the window of our car when we went for a drive. Watching him carefully, I noticed that he was rotating at the waist and realized that image blur may be caused by a slight rotation of a camera.

“Camera-motion image-blur results from rotation,” I realized. A moment later, I made the mental connection between this camera jitter and our vibrating gyroscopes; that is, it occurred to me that image blur could be eliminated by measuring the rotation angle of a camera with a vibrating gyro, and correcting the image accordingly.”

I immediately started to research this idea. “Blur” was less of a problem at this time because a camera body itself was still heavy, so I started with basic research; i.e. analyzing exactly what was considered as an annoying blur. After a year of efforts, I could not conclude that my invention would enable image stabilization, so the development of a prototype also ended up being terminated.

Being unwilling to let it go, however, I continued to work on the project on my own at night after work. Then one day at an exhibition, I happened to see a laser display (using visible lasers that use the three primary colors of light (red-green-blue) to display characters and graphics), and I noticed that a certain part of the display could be used for image stabilization. Later, using the part of that laser display I had seen, I finally finished my long-sought prototype for image stabilization. I remember the moment when I first turned on the prototype camera with nervous excitement. Even with a shake of the camera, the image did not blur at all. It was too good to be true! That was the most wonderful moment in my life.

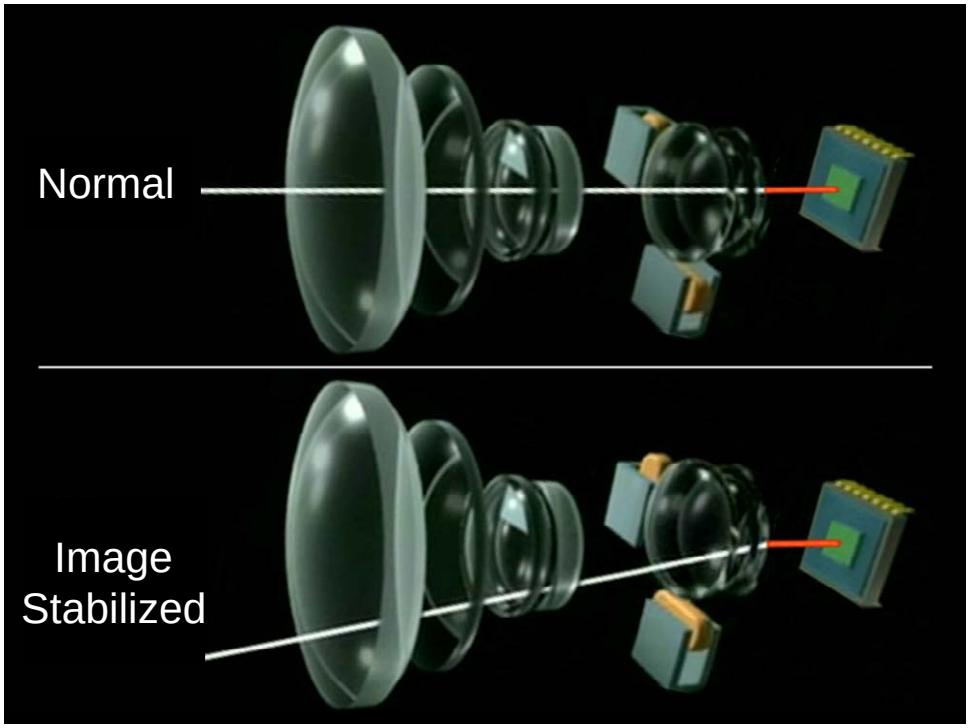
Nevertheless, obstacles to success remained. My colleagues responded by saying “Is it really needed?” or “Will it be a big seller?” They were reluctant to acknowledge the significance of image stabilization. So I loaded the prototype camera onto a helicopter and took pictures of Osaka Castle from the air. The prototype enabled such clear pictures to be taken that even the faces of the people in the castle tower could be recognized. These new images were quite obviously different from those significantly blurred images taken with other cameras. I was therefore finally given a green light to develop IS-related products.

What gives you joy as an inventor/researcher?

It was in 1988 that my new invention was used to launch the first video camera products featuring an IS function. Vibrating gyroscopes* had been rather unstable, but we improved their structure to the point that we could mass produce them for the first time anywhere in the world. After that, the invention immediately spread worldwide, and consequently, my invention is now employed in all digital camera image stabilizers. Every time I see beginners taking professional-level clear pictures or videos with no image blur, I feel really glad to have brought such a helpful invention to the public. And also, much to my unexpected delight, the vibrating gyro that we invented was also modified to be widely used for car navigation systems and stable vehicle travel.

When I look back at this now, I never felt distressed even when encountering any of the many technological hurdles, or when people didn’t understand my invention and refused to use it in our products. The reason was that the feeling of excitement of doing what no-one had ever done was much more powerful.

*A gyroscope is capable of precisely measuring the slightly rotated angle of an object in the air (e.g., an airplane) and is commonly used to determine the attitude of an airplane. The micro-miniature version of a gyro is a vibrating gyro.



Mechanism of image stabilization
Above: Clear image
Below: Blurred image stabilized to produce a clear image
(Light is bent to the extent required to produce a clear image.)

The world's first video camera equipped with an image stabilizer (1988 model)
Modern digital camera with an image stabilizer (2010 model)

What message would you like to give to the next generation?

For the purpose of creative work like developing something new, it is crucial to develop and refine “a sense of inspiration.” Inspiration is, in my understanding, a phenomenon in which one idea in the brain is stimulated to be unexpectedly associated with, and link to, a totally different idea. I think that what underlies inspiration is curiosity and sensitivity. I mean, curiosity is just a simple feeling that everyone experiences in childhood; e.g., asking questions about everything - “How come?” Curiosity, like muscles, however, withers away as one gets older unless we continue to train it. At the same time, building up knowledge is also important. So I would advise you to learn basic knowledge steadily until high school. Without knowledge, such links of inspiration will never occur.

When one reaches a certain age (e.g., the age of a university student), there develops a balance between sensitivity and knowledge, and one may be able to exercise a sense of inspiration properly. In my case, I have made it a rule to write in an invention notebook any idea that occurs to me. This practice has allowed me to acquire the habit of thinking about the useful possibilities of whatever I see, which I believe has led to my inventions. In addition to inventing new products, you will definitely have an opportunity to challenge yourselves in major businesses once you go out into the world. I would say that only those who have thus developed their ability to be inspired can take full advantages of the opportunities in life.

I hope that you will also enjoy a feeling of excitement, which is exactly what I have fully enjoyed, as you strive to achieve what no-one else has ever done.