

Satellite Communications and I

Fujitsu Advanced Solutions Ltd. Hiroko Aoki

My work

Although a text will be written in the title "satellite communication", in fact, I am an amateur about "communication." My work is related with the ground system of a satellite, and the orbital dynamics system, which treats the orbital determination and orbit control of a satellite also in it. An orbital dynamics system is one of the technical fields, which FUJITSU lasted as long as 30 years or more, and has cultivated focusing on NASDA (JAXA's past name), and ISAS. An individual's specialty is a part of so-called employment design of it being called employment analysis and deciding upon employment of a satellite and a ground system based on orbital dynamics-related knowledge. Therefore, although it will think that it will become the contents of "a satellite and me" if it says which it is, it will write focusing on the work with which I have been concerned until now.

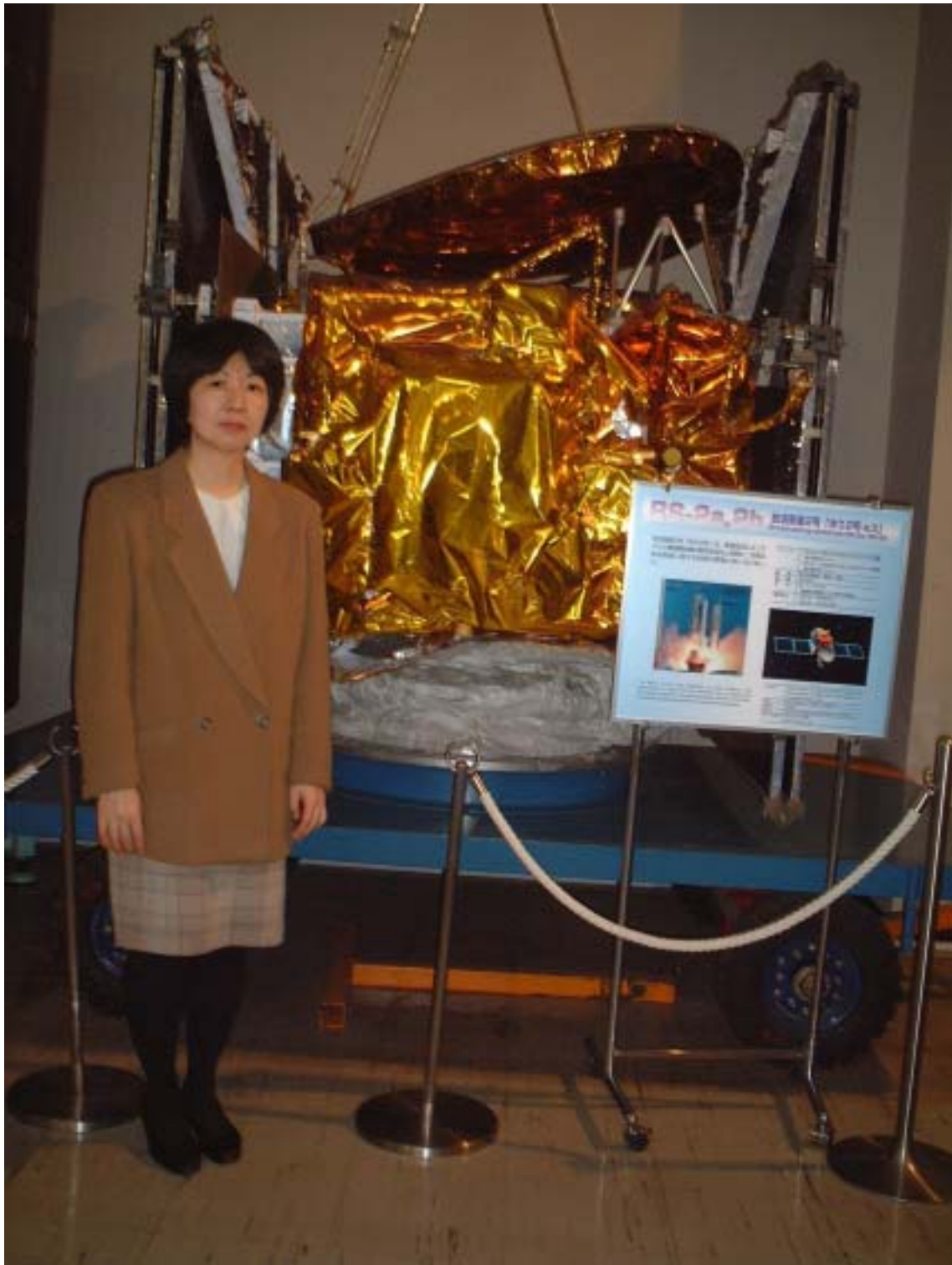
Until it begins work of the universe

I am the generation who was looking while it was born in 1956 and was exciting in the "Astro Boy" and the "Thunderbird", and the generation who grew up with the image "science, the space = future, and a dream." In the science girl something, although there was completely nothing, it was elementary school 4 age, or has memorized the space-related talk having appeared in the magazine of Shogakukan and having written it as "the dream engine, ion engine" (ion engine will be again met by ETS- behind). It did not progress to the department of science department physics at a university because it was mortifying to have taken the bad point by the test of the physics of a high school, and it was not necessarily interested in especially the universe. At the graduate school, magnetic properties in rare earth was done at the physical-properties theoretical laboratory. I was joined FUJITSU LTD. in 1984. If a private enterprise which was the time which an employment equal method did not have, either and employs doctor woman was restricted and could adopt anyhow when it was called 1984, ... was the reason of entrance into a company.

The first work

Those days, the system headquarters (SE unit) of FUJITSU had a space systems development department, and it was that the group, which was taking charge of NASDA's pursuit control system in it, was assigned. The given work was "optimization

of AEF with liquid apogee engine", and "employment analysis." "Optimization of AEF" was ETS- . Since it came out and liquid apogee engine was adopted for the first time as a domestic satellite, it was what performs system examination of optimal control planned planning of the transfer orbital geostationary orbit conversion by thrust injection a divided type and for a long time. BS-2b of employment analysis was the beginning.



BS-2b which took charge of employment analysis first (in JAXA Tsukuba Space Center)

Henceforth, although it moved to FUJITSU social systems engineering (past of FUJITSU advanced solutions) and has continued till 1991 soon, the contents of work do not change all the time, but the orbital dynamics system centering on employment analysis serves as my lifework. I would think in the 1980s that it was the vigor and time in Japan's whole space development. I was allowed to study very well 2 or 3 years after entrance into FUJITSU, which would have a surplus in the company itself. Although study is required however old it may become, I think that having studied in the beginning three years, an optimization problem, presumed theory, posture determination theory, etc. were helpful as a base of the future. If it is called the memory for several years after entrance into a company -- me -- in the 3 year after I entered this company, it gave birth to the eldest son. For an individual, work and child-rearing coexistence were big problems

ETS- Satellite which was not forgotten

As for the pursuit control system of ETS- the preliminary design started in 1988. Although FUJITSU took charge of the satellite data-processing system (off-line) and the orbital dynamics system in this, I will take charge of a project from the circumstances which were doing optimization of AEF. Although it was the start in the first development project and the going-right-and-left state carrying-out-reserve what was preliminary design?, for me. Since it was blessed with the excellent development member, it finished not writing with what till the completion of development test. It is for development of H- rocket which launches ETS- to have run into difficulties on the other hand, and to have reached a launch at last in August, 1994. Since the 2nd child anyway born to the fiscal year from which the preliminary design began had become 5 years old, I saw growth of my child and thought thoroughly that it was long. Although the NASDA Tsukuba Space Center was stuffed at the time of a launch of ETS- , the apogee engine fuel leak accident became the situation where an antenna forecast value had to be created as anything and a satellite had to be caught as an orbital dynamics system in the state where generating and orbital determination are not made. In a hurry, ETS- . It was completely happy to have created the antenna forecast value and to have escaped the worst situation of capture tailing failure somehow using the program which carries out the simulation of the thrust injection developed to turn. ETS- became the satellite which is what experienced contingency operation which was drawn on the picture, and they developed, means that adaptable correspondence was completed, and it not only calls it the development project with which it dealt first, but was not completely forgotten for me.



It launches H- rocket of No. 1 (ETS- was launched by No. 2).

Fun of missions analysis OICETS

It is my theory that the true fun of work is what is understood while doing. Therefore, I think that the work done until now was interesting each of as it is. If the example of one is given in it, there is mission analysis of OICETS as a thing about a communications satellite. This was the analysis aiming at the missions formation nature check about the optical-communications experiment of OICETS. ... which has various conditions for conducting an optical-communications experiment anyway -- various indispensable requirements and the requirements for prevention, such as circuit restrictions, when carrying out the down link of the drive restrictions of LUCE whose specific fixed star must be seen, the power restrictions of a satellite, and the experiment data arrange at the time of the calibration which must not have the sun / moon interference, and it investigated the thing in which what the number of times of an experiment is possible. Unlike the employment analysis of the pursuit side which I was doing till then, effect arranged various information, this analysis performed examination from the place referred to as carrying out what analysis first just for a moment, and it was work very interesting as problem solution type analysis. Moreover, I think that there was what has the meaningful cause that considers the added value of work of analysis.



With the president Hironisi of Fujitsu Advanced Solutions Ltd.

My "Project X" downsizing

It was began in 1994, the NASDA's project that NASDA's pursuit control system from the large-sized computer to EWS. I did adjustment of an orbital dynamics system. This project had trouble with various fields. The first risk will be having been development in the state where there is not yet a UNIX-related engineer fully. At the examination process, the work of past midnight continued every day in Tsukuba. Since I was refraining from the 3rd person's born. The load was a big "It is not unsavory that the pregnant woman is loitering till at midnight 2:00 or 3:00" being said, it says that it had only by the decision to move by time for delivery anyhow, and is not an overstatement. In this project, the good point and the bad point obtained much teaching. It may be the "Project X" for me.

To DRTS, WINDS, and QZS

DRTS was launched and it was safely supplied to the geostationary orbit in September 2002. It seemed to be the launch employment, which does not have a big trouble, either

and settled down especially. There was a thing filled with deep emotion for me. COMETS also fails in an orbital injection following failure of ETS- . The geostationary orbit injection with Japanese liquid apogee engine is the reason realized gradually, 20 years after precedence research starts in 1983. Moreover, it means also realizing a Japanese version data relay satellite through 20 odd years from a design. Now, the communications satellite of Japan is moving toward WINDS and the Quasi-zenithal satellite. Although my corporate life remains and it is about ten years, what satellite comes out after these?

Small gear of space development

Since it thought for the time being that it would do ten years when I joined to FUJITSU and space-related work was assigned, 20 years have passed unawares. When the satellite concerned in a certain form also counted employment analysis, systems development, etc. until now, there were 20 satellites. In 20 years, the situation of space development of Japan also had big changes. I think that the application satellite liberalization by Super 301 was one big corner of a street too. Moreover, there was a big motion called space 3-organization integration last year. If it sees about an I individual, three children born in the meantime will be the seniority of quantity 2, inside 3, and a nursery. three persons were uninteresting for the universe (it seems that the 3rd child thought, "mother went to ride on a rocket" when I went out for supporting the launching) However, for me, growth of each children and memory of various projects overlap. Although it became about ten years ago, there was a document of the return rescue strategy of Apollo 13 in TV program. Since it was after failure of ETS- , it saw very interestingly. When the persons who participated in this rescue strategy, NASA and the army persons concerned, its subcontract company, etc. were counted in the program, there was a talk of exceeding 20,000 people. It had some to which are deeply convinced, when I was probably the thing with that really right which exaggeration did not have anything, either I thought that space development was such a thing. Many persons' power concentrates, a rocket and a satellite are made, and every person's power is employed, even when it is feeble. It may pass over us only on the small, small gear of a big project. However, even if small, I think that he wants to be "a helpful required gear." Moreover, it is these days it is considered that want to bring up young persons so that it may become such "gear."