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Profile of Marjorie Rhodes Townsend

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Marjorie Rhodes Townsend is consultant whose professional experience includes: Spacecraft systems design and management considerations for a proposal for a major ESA satellite and for a proposal for a scientific X-ray satellite, including cost estimates; Design of a space and ground network for an earth resources satellite, including writing requests for proposals for the spacecraft and instrument, writing the launch vehicle; interface, and developing the requirements for the ground segment; Advice to Agusta for entering the space program in Italy, including spacecraft design and costing; Design considerations for a space-based radar system, and for the servicing of free-flyers and platforms from the Space Shuttle and Space Station; Technical and cost evaluations for the Tethered Satellite Program and considerations for space robotics systems; Assistance with a proposal for a monopropellant hydrazine system for the Columbus space platform; Help to the American Institute of Aeronautics and Astronautics (AIAA) to form technical groups at the local Section level.

Ms. Townsend has a Bachelor of Electrical Engineering (B.E.E.)(Communications Option) from the George Washington University in Washington, D.C. She also has a patent: Digital Telemetry System, Patent No. 3,380,042, dated April 23, 1968.

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1) How did you get started in the satellite business?

I was working at the Naval Research Laboratory in anti-submarine warfare when two things happened. I was bumping my head against the ceiling - not a glass one, but a real pyramid structure - and NASA's Goddard Space Flight Center was taking root there at NRL in my "backyard." At the time, I was one of the 10 youngest GS-12's at NRL and my supervisor had submitted my paperwork for a GS-13. I knew the effort would be not be successful, because it was a group that hardly anyone ever left and all the GS-13 slots were filled. With GSFC just forming and having interviews right on the "campus," it was an ideal spot to go job-hunting. I don't remember whether they called me or I found them, but I interviewed and was offered a position to come and work on the ground station for the Television Infra-Red Observation Satellite (TIROS) - the first weather satellite to be launched. Much more sophisticated TIROS satellites are still being built for and operated by the National Oceanic and Atmospheric Administration.

2) How have you been involved in changes brought about in or by this business (innovations, technologies, services)?

I do have a shared patent for a digital telemetry system that flew on the Nimbus satellite. Nimbus was to have been the next operational weather satellite, but it remained a research satellite and various new instruments were tested there and finally ended up on the later TIROS spacecraft. At NRL, I designed an analog computer designed to differentiate submarines from schools of fish, whales, etc. This equipment was packaged for shipboard and submarine use and ended up as operational equipment in the fleet.

3) What do you think was the greatest event/situation/opportunity you experienced?

It is tempting to say that it was the first time I had a supervisor who decided I was capable of more difficult work than I had been given previously. However, in actuality, it was probably the project that came my way. This was a small satellite that had a Principal Investigator who was someone other than a NASA employee or a university professor. He had a reputation that made him someone none of the existing project managers at GSFC wished to work with. The basic spacecraft design and its integration with the experiment had been contracted to the Applied Physics Laboratory of the Johns Hopkins University through an existing Navy contract. They, also, had a reputation of not being easy to work with, although they did an excellent job and had considerable experience in spacecraft design. Thus there was no existing project manager willing to take on the combination and they had to look outside the Projects Directorate. By this time, I had been at GSFC for 7 years and had both line and staff experience, as well as having acquired a considerable amount of knowledge as to what a spacecraft required in both design and testing. In short, I was selected for the position - NASA's first female Project Manager for an entire spacecraft. Two more spacecraft followed for a total of three Small Astronomy Satellites. They had a few other unique features: they were the first U.S. satellites launched outside of the United States (from the San Marco platform three miles east of the coast of Kenya in the Indians Ocean) and the first launched for the United States by a foreign government (Italy, whose platform it was).

4) What was the greatest obstacle?

The greatest obstacle when I was in the business (I retired from GSFC in 1980 and consulted thereafter for a number of years) was probably the prevailing thought that men won't work for a woman. Although I disproved this over and over, the thought still existed. I had people standing in line to get into the last group for which I was responsible at GSFC, which was to do all the advanced system design for new spacecraft programs. This group accepted experiment ideas and designed the entire system for each of them, both what processing should be done in space and what on the ground after the data were returned. In this way, we could make tradeoffs for the most efficient and economical design.

5) What do you see happening in the next five years in this industry?

We can already see it happening, especially in manned space. Several commercial companies are seriously starting to make access to space less expensive and, consequently, more available, just as the aircraft industry has done. It is certainly possible to anticipate that they can also fly autonomous experiments for release or for taking data on board their returnable vehicles. While I am a big believer in burning-in components (running them under power for a week or two to see if they will fail) prior to launch, if the experiments are returnable, that may not be as necessary. It is like that more use can be made of existing components, which will cut costs. There really is no reason why the hardware can't be operated for a longer period of time before flight to get rid of the earlier failures, thus making them more reliable. In short, working and living in space will become more routine and autonomous spacecraft can also be produced less expensively, so we all get more bang for our buck!

6) What advice do you have for women interested in entering the industry?

The best kind of job to have is one that makes you want to jump out of bed every morning because you can't wait to go into work. In my opinion, the space business is still the most likely place to find that kind of job. I also believe that engineering is the place to be, because it is engineers that make things happen and get things done, leaving one with a feeling of accomplishment. Scientists can have great ideas, but not all of them are able to actually build experiments and make them work. That is the job of the engineers. In the space business, this takes experts in mechanical, electrical, thermal, telemetry, power and communications engineering. My career has been a lot of fun and yours can be too.