NASA Satellite Project: The Boss Is a Woman

Marjorie Rhodes Townsend has a history of precocity. She entered college at the age of 15, married at 18, and became the first woman to receive an engineering degree from George Washington University in Washington, D.C. She is one of the few women at the National Aeronautics and Space Administration (NASA) holding a GS-15 job and now, at 42, is the only woman "in the whole free world" who is project manager for a satellite program. Since 1966 Townsend has been project manager for NASA's Small Astronomy Satellite (SAS) project, with headquarters at the Goddard Space Flight Center at Greenbelt, Maryland.

The SAS program is a joint Italian-American venture which involves the launching, over a 5-year period, of three satellites designed to locate and map sources of x-rays and gamma rays in this and other galaxies. X-ray astronomy has discovered objects unidentifiable by radio or optical astronomy, and furnishes new information on objects such as pulsars and black holes.

NASA designs the experiments and supplies the satellites. The Italians supply the launch facilities and personnel at San Marco, a platform built in the Indian Ocean off the coast of Kenya.

The first two satellites have already been successfully launched. SAS-A, better known as Uhuru, was the world's first x-ray astronomy satellite. Propelled into orbit in December 1970, it has supplied scientists with a wealth of new and unexpected data on x-ray sources and has, according to project scientist Carl Fichtel, "opened up the whole field of high energy astronomy." It also brought honors to Marjorie Townsend, who last year was awarded NASA's Exceptional Service medal for her "outstanding technical and managerial leadership" of the SAS program. (She wryly acknowledges that had the satellite fizzled, that very same managerial ability undoubtedly would have gone unrewarded.)

Townsend recently returned from Kenya where she supervised the successful launching of SAS-B, which is supposed to detect gamma rays—which have energy frequencies 1000 times greater than x-rays—with unprecedented sensitivity and precision. She is now at work planning for the last of the series, which is scheduled to continue x-ray surveys when it is launched in 1975. All the satellites are boosted into equatorial orbits to avoid interference from the radiation belts.

Townsend is not an astronomer, but an electrical engineer and manager. She is responsible for the inception, design, construction, and testing of the satellites as well as the launches themselves. She has to see to it that the design of the craft carries out the concept of the experiment and that the whole thing will fly. While her project is embedded in NASA structure—her immediate superior is the chief of the Explorer Projects Office—she has considerable authority. Only John Clark, director of Goddard, can veto a project manager's design.

Marjorie Townsend has an open, somewhat girlish appearance and manner which does not detract from the obvious fact that she is a woman who knows what she's doing. She exudes buoyant spirits and firm self-confidence. No one gets to walk on her ("Cigarette smoking is hazardous to MY health," warns a sign in her office, which is filled with citations, photographs, and satellite models).

Getting into a career in engineering was a natural course for the young Marjorie. She was one of those lucky girls who grew up taking it for granted that being a female imposed no restrictions on her. This was largely due to the attitude of her father, who "expected me to do great things"—an expectation probobly enhanced by the fact that she was an only child. Her father was a mechanical engineer in the sales and service department of a heating company in Washington, as well as an inventor of sorts who held several patents on humidity control devices for railroad heating and cooling systems. Her father encouraged her to study engineering—which even now probably has the smallest proportion of women of any technical field—and she herself found it attractive because it offered "a nice combination of both science and mathematics" and no history, to which she had a "personal aversion."

In 1948, during her junior year at George Washington, she met and married Charles Townsend, then a medical student and now a Washington obstetrician. She quit her full-time studies for a job at the National Bureau of Standards and worked her husband's way through medical school. Meanwhile she attended night school. When they both received their degrees, in 1951, she went to work at the Naval Research Laboratory (NRL) in Washington. During her 8 years there she worked her way up from a GS-5 (junior engineer) to one of the ten youngest GS-12's there (senior engineer in the Airborne Sonar Branch of the sound division). She also found time to bear four sons. Working with a woman who could have four babies without ever having to take a leave without pay was quite an education for her bosses. The first two times, she says, they assumed she wouldn't be coming back. The third time "they began to believe it," and the fourth time "they kept giving me more work up to the time I actually had to go to the hospital."

Townsend, ever hungry for more responsibility, went to work for NASA in 1959, where she directed the design of the ground data-processing system for the Tyros II weather satellite. "For anyone looking for greener pastures NASA was the logical place to transfer," she says, since NRL was the birthplace of NASA. She gradually shifted from working with hardware to management, and eventually became technical assistant to the chief of Goddard's Systems Division. This job, however, was "not sufficiently challenging," so when the SAS project manager job opened up she applied for it. She was selected because of her broad background in spacecraft requirements and spacecraft telemetry systems, as well as her ability, as she says, to "get the job done."

Townsend is not modest about her achievements, which range from being coinventor of a digital telemetry system to being a merit badge counselor for the Boy Scouts. She doesn't drink and is a member of the Daughters of the American Revolution.

Throughout her career Townsend has impressed colleagues with her

energy and devotion to her job. "Any doubts we had about females were rapidly dispelled," says her first supervisor at NRL. She is described as methodical, well-organized, highly intelligent, and a top-notch engineer. Her natural and outgoing manner have also made her well liked, despite the fact that she has inevitably had to step on some toes on her way up. Her first boss at NASA says emphatically: "She likes to be considered one of the boys." At the same time, says another colleague, she brings to the job "the feminine qualities of engineering"—for example, some of the sloppy men in her office at NRL were awed by the foresightedness and precision she brought to the process of packing for field trips.

Townsend, perhaps because of her extensive experience with obstetricians, seems to have a sort of maternal approach toward her satellites. She has several times remarked that "the chances of launching a perfect satellite are about equivalent to the chances of having a perfect baby." That is, "It's a miracle because of all the things that can go wrong." (Her husband does not, in turn, tell prospective mothers their chances of having normal babies are about the same as having a successful SAS launch. As Townsend admits, human nature is more likely to foul up than nature itself, so the comparison is not statistically valid.)

Townsend says that budget shrinkage at NASA has reduced the margin of error to practically nothing (the SAS program annual budget has vacillated between $5 million and $9 million; a cutback this year has meant delays in the fabrication of SAS-C). Nonetheless, "results have been spectacular so far."

The Italians are evidently happy with the way the cooperation is going. In October, in a ceremony in Rome, they bestowed upon her the Knight of the Italian Republic Order. One suspects that the honor is as much inspired by her ability to relate to people as well as to manage them. The Italian crew at San Marco took it upon themselves to build her a little house at the base camp so that she could be on hand at all times during launch preparations, and one official told her that she was the first NASA person they had met who had taken the trouble to learn some Italian. Townsend says she has no ear for languages, but she struggled bravely through an acceptance speech in Italian upon receiving her prize.

Marjorie Townsend and Carl Fichtel

Townsend, unlike some successful women who think women's lib is the product of a bunch of malcontents, believes there is room for improvement in male attitudes toward professional women. She herself believes she has been "very lucky, very much more fortunate than most women." Asked if colleagues looked askance at her infiltration of NASA, virtually a stag outfit at the upper levels, she says "not askance so much as amazed most of the time." She is distinctly unparanoid about masculine attitudes. "It has to hit me over the head that a person is prejudiced." She says she does run into a certain amount of stereotyping. As an example, she said that when a woman renders a judgment about something men call it "female intuition," whereas if the pronouncement comes from a man it is an "educated guess." But, she adds, "I don't get that from the troops that work for me." Her staff includes a secretary, a spacecraft manager, a project operations director, an experiment manager, and a coordinator. All but the secretary are male and she says that unfortunately they do get a "certain amount of kidding for having a female boss."

Townsend thinks the reason so few women go into engineering is quite simply that "engineering is not socially acceptable" for girls. She recalled that 10 years ago one of her sons asked her to give a talk to his fifth-grade class on the meteorological satellite program. She brought a model and gave a lecture, followed by a question and answer period that lasted 45 minutes. Boys and girls were equally curious. But some time later, she says she gave a talk at a junior high school. No girls were present. Townsend thinks that technical interests show up at a very young age, and the reason the girls don't carry through is because the primary concern of the teen-aged female is making herself interesting to boys. This includes, "Don't be smarter than the boy is." It is all right for a girl to display knowledgeable interest in masculine games such as baseball, but when she starts advising him about what's wrong with his car she scares him off.

Townsend herself didn't get trapped in that syndrome. In high school she was too young for her male classmates to seriously regard her as a "girl," and when she got to college she encountered returning war veterans who tended to have more mature views about females. Also, as an only child, she had long been accustomed to judging herself by the standards of adults.

But Townsend thinks the day will not be long in coming when sex barriers to female professional achievement will be totally erased. She acknowledges a generally pleased attitude about life and says "having a happy marriage has a lot to do with it." Her career has not prevented her from leading an active and varied family life. The Townsends have a commercial printing company in their basement, and they recently acquired an orange grove in Florida, for which she acts as accountant. They bought a mobile home for vacations and plan to spend a week at Disneyland in March and take a trip to Italy in the fall.

Their four sons, aged 14, 18, 19, and 20, appear to be inclined toward following the family traditions. One has flirted with engineering and is thinking of going into citriculture so he can manage the family grove; two others are headed, respectively, toward pediatrics and internal medicine. The 14-year-old hasn't yet mapped out his future.

Townsend, meanwhile, is now plotting how the SAS program can be kept alive after SAS-C is launched in 1975. She believes the SAS craft is the perfect satellite to do an infrared survey of the sky—the first of its kind. If the creativity, self-confidence, and determination that have marked her career have anything to do with it, the SAS program very likely has a lively future.—CONSTANCE HOLDEN