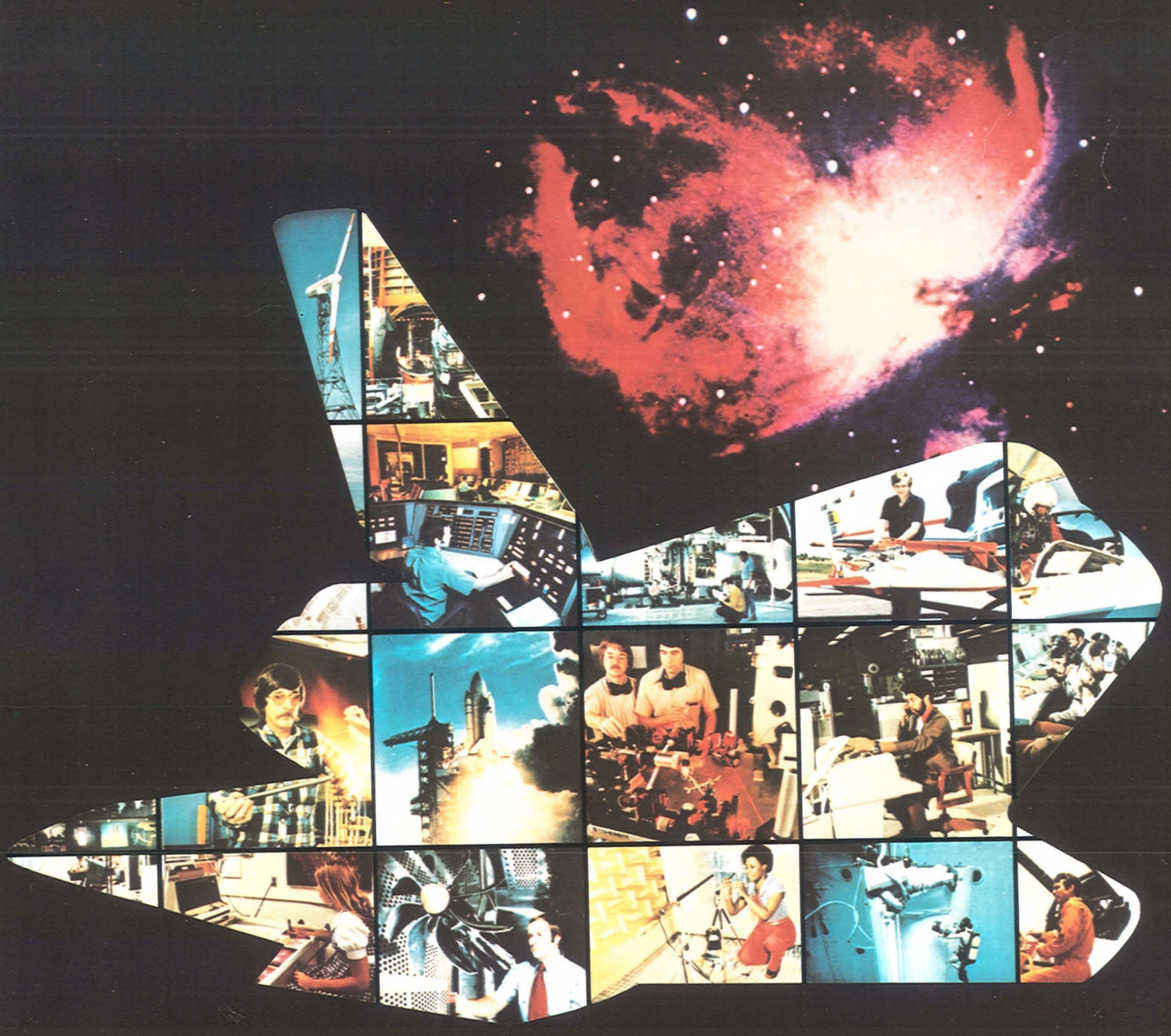
Aerospace TECHNICIANS

We're Tomorrow-Minded People



National
Aeronautics and
Space
Administration

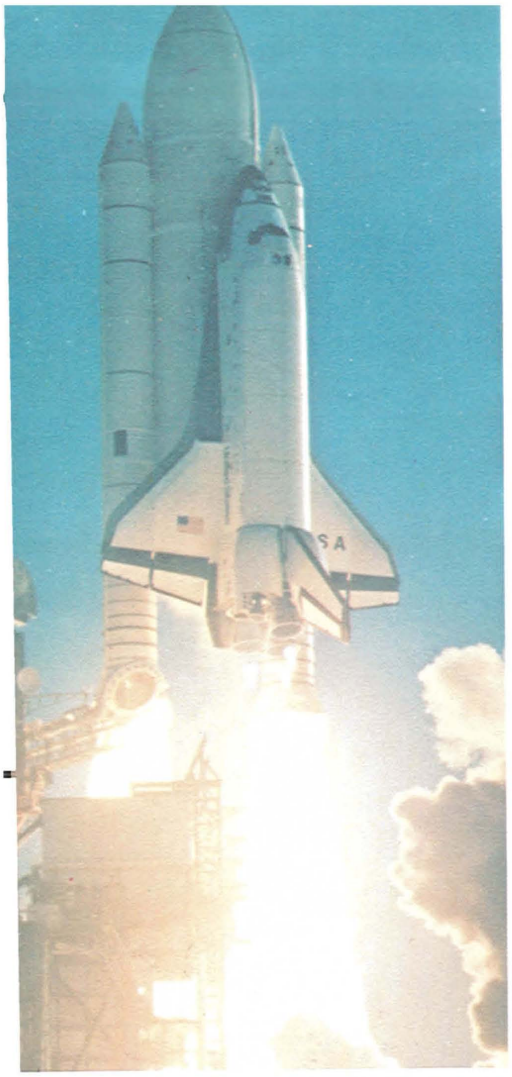
Thousands of people with different talents and interests have found rewarding careers as technicians in the aerospace industry. Many of them began preparing for their careers in much the same way as you -- by reading pamphlets like this one.

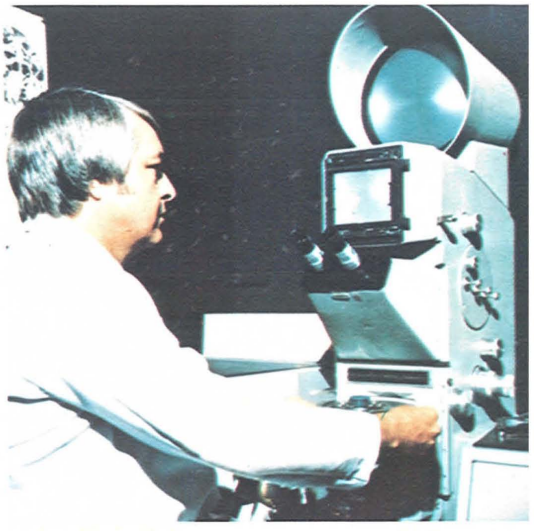
On the following pages, you'll meet some of these individuals. They'll share some ideas and suggestions that can help you prepare for an enjoyable and satisfying career as a technician. With the proper preparation and training, you, too, can enjoy an exciting and successful career.

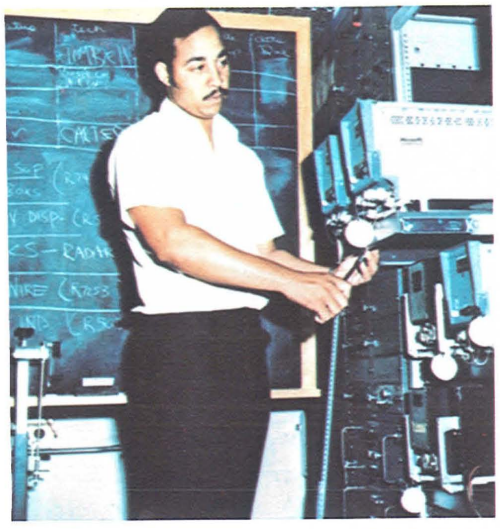
Mary H. Lewis
Guidance Counselor
Hampton City Schools
Hampton, Virginia

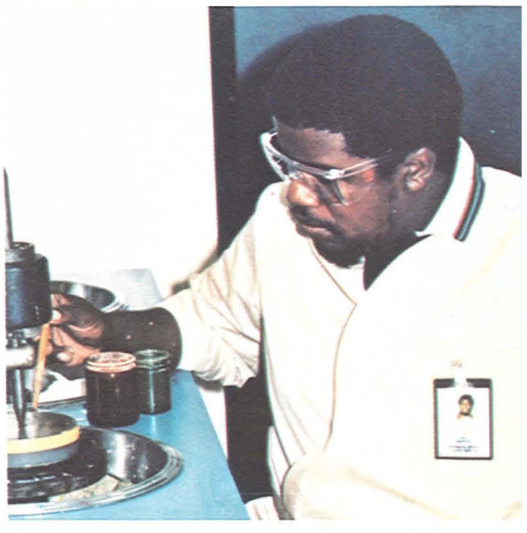
While on assignment with
NASA, Langley Research Center
Hampton, Virginia

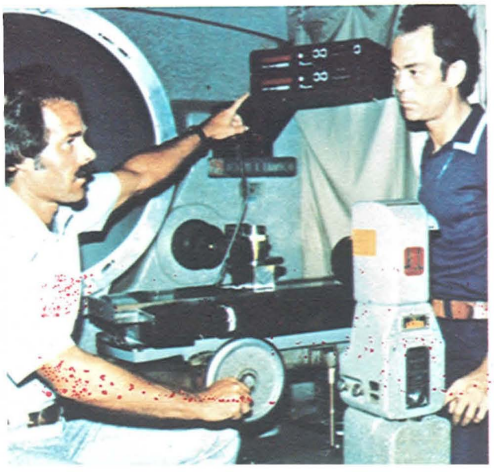
Education Services Branch
Academic Affairs Division
National Aeronautics and
Space Administration
Washington, D. C. 1981

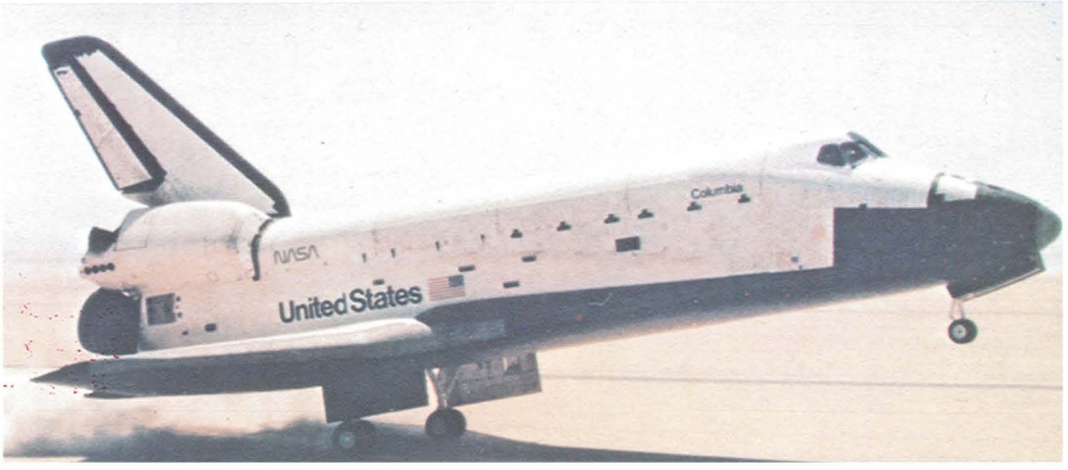











NASA
United States
Columbia

My career proves that hard work pays off.

A dream is only the beginning; pursuing it with determination is the means to its successful achievement. My dream to become an electrical technician became a reality when I accepted a job as an apprentice electrical technician for NASA. It seemed incredible that I could be working for such a famous agency.

My career as a technician is a non-stop learning process. I rarely repeat the same job, so I'm continuously learning something new.

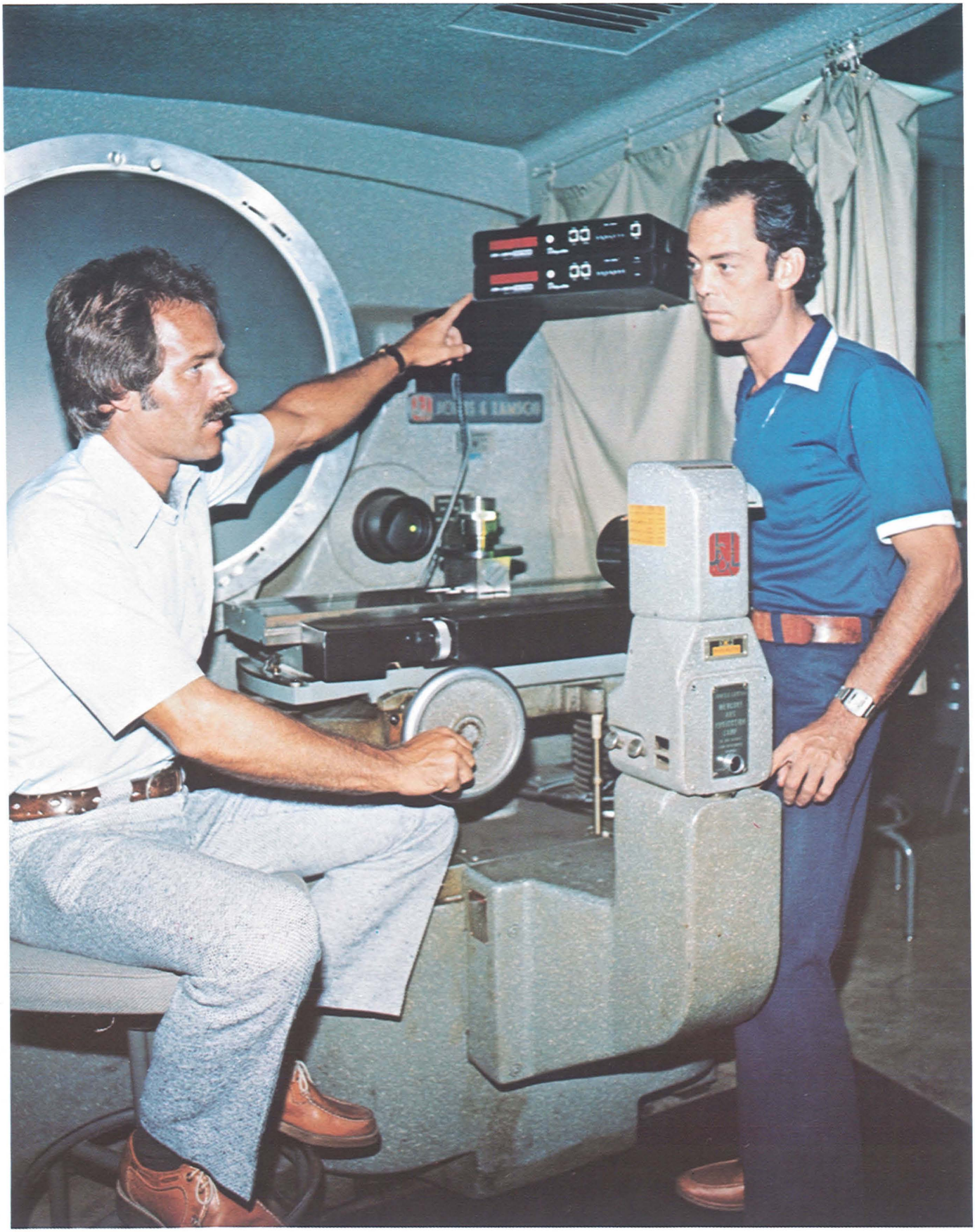
I've assisted engineers on an acoustics project which is designed to study aircraft passengers' reactions to the noise produced by propellers. I set up the test equipment, calibrate it, make it operational, assist in data collection, and sometimes interpret the data. The test equipment includes tape recorders, microphones, cameras, voltage meters, amplifiers, and oscilloscopes. I watch a TV screen to observe the reactions of "passengers" as they are exposed to different noise levels while sitting inside the test chamber.

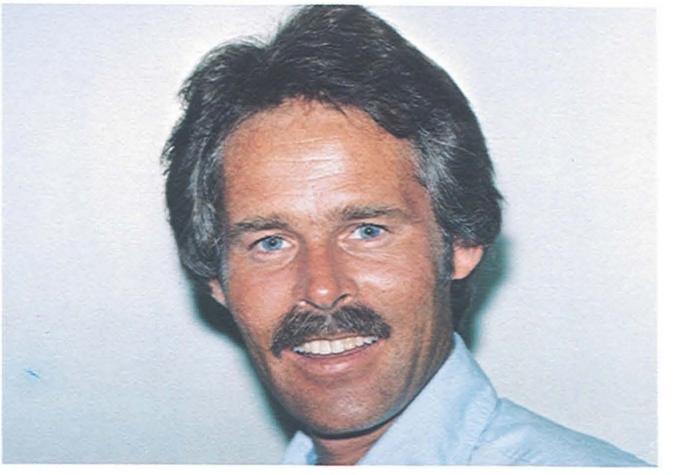
As an apprentice technician, I make calculations based partly on my high school mathematics and chemistry courses. I'm glad I studied these courses because I'm able to do my work without stopping to ask engineers annoying questions about simple, basic calculations. I feel more confident about my job when I can work on my own. Of course, there are times when the engineers assist me.

Following graduation from high school, I wasn't sure if I wanted to attend college, so I worked in a TV repair shop. The salary wasn't great, but the experience helped me decide about a career. I decided to apply to college to study electronic technology. I needed financial assistance so I applied for aid at the same time I applied for admission. I was fortunate to participate in a work study program. I worked in the library two hours a day, and the salary was applied to my tuition costs.

I discovered that college life is quite different from high school. There are so many things you'd rather do than study. I sacrificed the "good life" of parties, dances and movies for a while and studied hard, keeping in mind my purpose for being there. My career with NASA is proof that hard work pays off.

Vernet Boone
Apprentice Electrical Technician





If you're excited about the possibility of a career as an aerospace technician, "go for it" as hard as you can.

The surf was three feet and glassy at the Cape Canaveral Pier, and we were all catching our share of waves. Suddenly, one of my friends shouted, "Hey, look south around Patrick!" We stopped surfing long enough to watch the Space Shuttle Columbia flying piggyback on top of a 747, traveling up the coast to land at the Kennedy Space Center. At that moment I was really proud because my work as a quality inspection specialist contributes to the missions of NASA's Space Shuttle.

As an inspector, I examine all sorts of items from nuts and bolts to the diving gear that is used when the Solid Rocket Boosters are recovered after launch. I inspect products to insure that they comply with contract specifications. I search for defects such as shipping damage, dirt and corrosion, and incorrect weights and measurements. My work is critical because a defective component which costs less than a dollar could cause the failure of a million dollar mission.

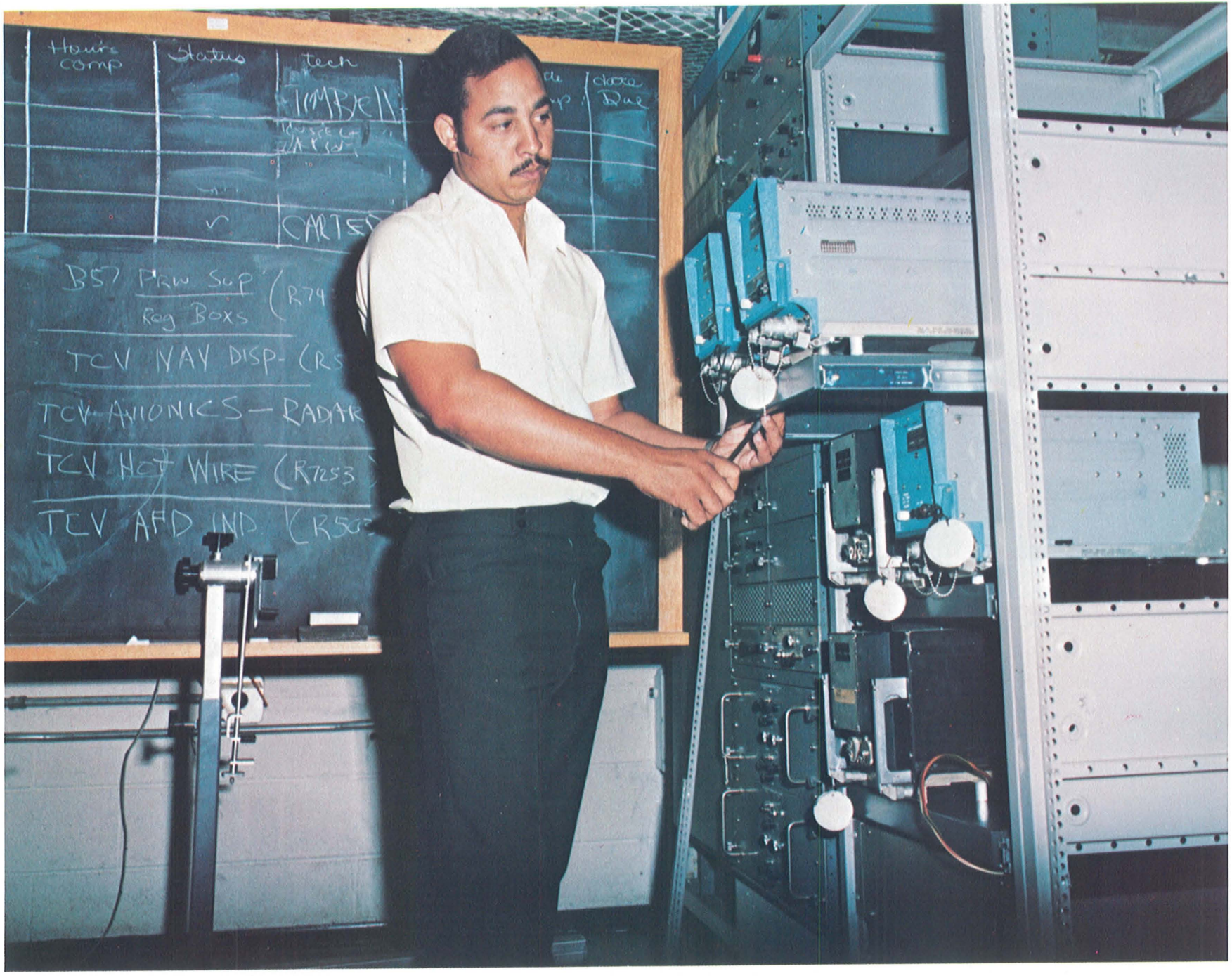
I operate some pretty fancy equipment in order to inspect items. For example, in order to make sure that an item is a precise size and shape, I use a contour projector. I place the product in front of the projector, and with a flip of a switch, a light projects onto the object and casts a shadow onto a screen. I measure the outline of the shadow with a digital meter, which is accurate to within 1/10,000 of an inch.

I wanted to go to work in the aerospace industry right after high school graduation but found that I didn't have the correct experience or education. I worked my way through two years of accounting school and found it wasn't for me. Luckily, a friend offered me a job as a service advisor at a car dealership. I liked talking to people about their cars and advising them about how to maintain them.

After several years in the auto industry, I was drafted into the Army. My time in the service helped me when I applied for a job with NASA, and soon I was on a "walkdown" of the Vehicle Assembly Building.

If you're interested in a career as an aerospace technician, take your studies seriously. Try courses like drafting, advanced math, and computer programming. Once you find a field you really enjoy, "go for it!"

John R. Rosenberry
Quality Inspection Specialist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My choice of a career changed my life.

I'm a Lumbee Indian, whose ancestors have always been farmers. Quite naturally, my father and grandfather expected me to continue this tradition. Even as I frolicked through the fields as a small boy, I knew that I didn't want to follow in their footsteps. I realized that I wouldn't have much chance of getting a college education if I stayed home on the farm. After graduation from high school, I joined the Army with the hope of obtaining some technical training that I could later apply in my career. Once my tour of duty was completed, I enrolled in college courses taught at a technical college in my hometown. I paid for these courses with money from my veteran's benefits. I'd always dreamed of being an electrician, and I planned to apply for a contractor's license once I had completed the technical program in electrical installation.

During the time I was attending classes, recruiting representatives from NASA visited the college, and I arranged an appointment to discuss my career plans with them. They described NASA's Apprentice Program and reviewed my academic records and work experiences. Before they left our town, they offered me an opportunity to apply to the Apprentice Program. I gave this career choice some careful thought and came to the conclusion that we're definitely in the "age of electronics," and I wanted to work in this field of technology. The decision to work for NASA altered my plans somewhat, because I had to move to a new location and establish a new home for myself. I'm now enrolled in the Apprentice Program and plan to graduate as an electronics technician.

Electronics is an important field because most people would find it difficult to get through the day without using some type of electronics device: telephones, radios, and televisions are certainly part of most of our daily lives.

I like designing circuits, putting them together, and testing the finished products. While working for NASA, I've assisted senior technicians on some rather complex aerospace projects, like the F-106 fighter planes, which are the first planes out in the event of an attack on the U.S. East Coast. My work contributes to the safe operation of planes like these, and while I'm making the hardware I keep the welfare of people in mind.

My job as an electronics technician isn't directly related to the work I did on our farm or to my blue-collar work in the tennis shoe factory back home, but I'm glad I had these experiences because they help me appreciate the work I do in electronics for NASA. Now my work gives me a real sense of accomplishment.

Like many of you, when I was in high school, I really hadn't decided what career I was going to pursue, nor did I realize how important courses like English, social studies, mathematics, and science were to my future. Now I see what a big part they play in my everyday job.

Lonnie D. Hammonds
Apprentice Electronics Technician


1923

As a technician, I bring engineers' ideas to life.

If you've ever taken a transistor radio apart, you've seen a printed circuit board. I design the art work layout for the manufacture of printed circuit boards, some of which contain between 100 and 200 electronic parts. One of the electronic circuit boards which I designed and assembled was used to control the opening and closing of vacuum bottles placed in the engine bay of the Shuttle Orbiter during the first launch. During the two seconds while the bottles were open, they sucked in samples of gases which were present in the engine bay. These samples were carefully examined after the flight.

When I was in high school, I especially enjoyed my classes in drafting, electronics, machine shop, and metal shop. I concentrated on shop and vocational courses.

Operating amateur radios has been one of my hobbies since I was 13. In order to pass the exam for my amateur radio license, I had to learn and apply some knowledge of electronics. My interest in radios, combined with my knowledge of electronics, helped me decide about my career goals. When I enlisted in the Navy at the age of 17, I knew I wanted training to become a radioman. Today my hobby serves a useful purpose. I'm a radio operator for a Civil Defense team in my community, which is subject to flooding by the heavy rains of hurricanes.

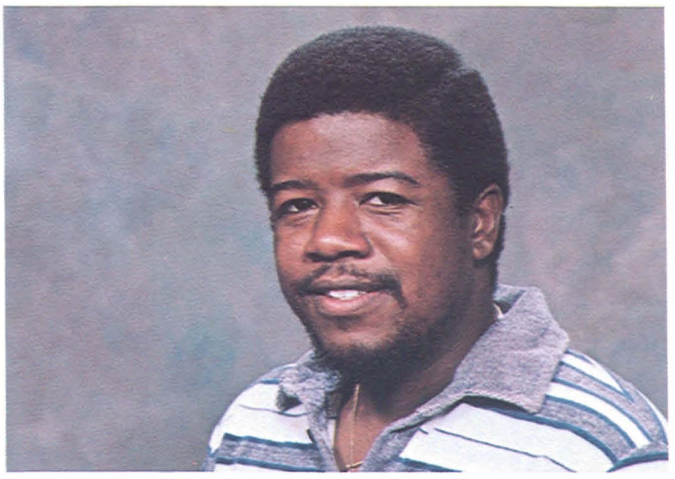
In preparing for your first permanent job after high school, don't be disappointed if you're not hired by the first company that interviews you. Your starting salary may not be as much as you expect, either. After you're hired, continue your education through part-time college courses. This will improve your opportunities for advancement to a better job.

Technicians work closely with engineers to bring ideas to life. Your work will bring you together with many people from different cultures and with different attitudes. I enjoy working with others. I especially enjoy the construction aspects of the electronics field, such as designing printed circuit board layouts from diagrams. I also manufacture the printed circuit boards and assemble various pieces of electronic equipment into one unit for the final product.

The most exciting thing about working for NASA is, quite simply, working for NASA. As far as I'm concerned, the space program is definitely "where it's at!"

Dale L. Martin
Electronics Technician


NATIONAL AERONAUTICS
AND
GODDARD SPACE
FLIGHT CENTER



My work must be excellent so engineers can trust me to manufacture products according to their specifications.

When I was very young, I read science fiction books and watched space programs on TV. Since then, I've always wanted to work in the aerospace industry. My goal became a reality when I was hired as an apprentice optical technician.

As an apprentice technician in the optical fabrication field, part of my job is manufacturing lenses for telescopes and windows for spacecraft. Academic courses and on-the-job training are helping me become an expert in the fabrication and testing of optical components such as mirrors, lenses, prisms, and optical systems for laboratory and space flight use. I'm also gaining experience in operating high vacuum systems for the evaporation of thin metallic coatings (gold, silver, chrome) on a variety of glass and metal materials.

Eventually I'll be assisting engineers even more with laboratory experiments. Engineers will give me specifications for optical components, instruments, and systems, like the ones I mentioned earlier. Then I'll turn these blueprint specifications into optical products. I feel good knowing that I contribute as a member of a team of engineers and other technicians. I know that my work must be excellent so that the engineers will trust me to manufacture products according to their directions. I'd say that following directions and thinking for myself when the need arises are mandatory characteristics for people in my profession. Being responsible and reliable are also required.

As an apprentice technician, I take academic courses like chemistry, physics, mathematics, blueprint reading, drafting, and machine shop practice. My high school background in some of these areas has helped me understand the more advanced information I'm now expected to learn. The high school course I most enjoyed was the machine shop trade class because I could work with my hands and move about the shop as I used different pieces of machinery.

During high school, I developed an interest in photography. As you might guess, my work in the optical field adds to my enjoyment and knowledge of photography.

If you enjoy working with your hands and machinery and if you're willing to learn science, mathematics, and technical subjects, a career as a technician could be just right for you.

Sterling Edwards
Apprentice Optical Technician


BRANCH ELECTRIC
B
SUPPLY COMPANY

As an apprentice machinist, my work is physically and mentally challenging.

Most careers in aerospace are highly technical, requiring advanced levels of high school mathematics and science. If you're seriously interested in an aerospace career, I'd suggest that you study pre-college-level high school courses, especially mathematics, science, and technical subjects.

I'm an apprentice machinist technician. A machinist technician turns engineering drawings into fully functioning mechanical assemblies made from a variety of materials, such as aluminums, steels, and plastics. Learning to become a machinist requires special academic training which takes place in traditional classrooms and in on-the-job technical training. The academic classes are usually quite difficult, and when I've successfully completed them, I feel exhilarated. I enjoy these classes much more than I ever enjoyed high school courses. I enjoy my work because it's challenging, both mentally and physically.

I often manufacture and help assemble a variety of parts for satellites and spacecraft instruments. I'm proud of my work and the fact that some of my products contribute to very important aerospace programs.

I didn't always plan to become a machinist. In fact, ever since I can remember, I wanted to become a nurse. In my senior year of high school, however, I realized that I was tired of school and decided not to attend college or nursing school. I worked a year after high school graduation and tried to decide what I really wanted to do for a career. During that year, I took the Civil Service Examination. As a result of my score, my name was placed on the list of eligible candidates for jobs as technicians and engineering aides. Fortunately, I was offered a job at a local NASA Center.

My best high school subjects were United States history and woodworking. Woodworking was also one of my hobbies. Today my job as an apprentice machinist ties together these two areas of interest. I'm contributing to the history-making exploration and utilization of space while using skills similar to those required in my woodworking classes, except more precise and challenging.

Kathleen M. Gray
Apprentice Machinist Technician

I work with some of the most highly skilled and educated people in the world.

When I was a little boy, I was mystified by the thought of circling the Earth in a spaceship. As I grew older, my interest in science and technology grew stronger, and the day I watched the first man step onto the Moon's crater-scarred surface was an emotional one for me. I felt a deep sense of pride for my country and its space program. I thought to myself that perhaps one day I could become a part of the team which sends humans into space, or perhaps I could travel in a spaceship myself.

I decided to prepare to enter a science-oriented world by taking the mathematics and science courses that were available in my high school. I also took college preparatory English courses so I would be able to communicate logically and effectively.

Upon graduation from high school, I was anxious to continue to increase my knowledge of science and mathematics by taking courses at a community college. After completing a few courses, I applied to enroll in a technical cooperative education program which existed between my college and a local NASA Center. This was a big decision for me because it was a basic step in my dream to become a part of aerospace research and technology, and it represented a major job decision in my life. I felt happy about being accepted into the program, and I was quite proud to be working for NASA. The Co-Op program was a good experience for me because it gave me a chance to apply the knowledge I learned at school while earning a salary. After graduating with a two-year degree, I was hired by the Center as a permanent-employee in an Apprentice Program.

As an apprentice technician, I've been exposed to a variety of jobs, ranging from testing materials and structures for strength, fatigue life, and vibrational effects to small-scale wind tunnel testing. I find the work fascinating and rewarding because I've been able to apply my education and skills productively for the benefit of the aerospace program.

I like my job very much because I've learned many mechanical skills as well as how to operate different types of equipment and electronic devices used in testing and obtaining test data. I'm also fortunate because I have an opportunity to work with some of the most highly skilled and educated people in the world.

If you're interested in a career as an aerospace technician, make sure you plan ahead. Seek advice about planning a science and mathematics-based curriculum which will help you enter a post-high school program that is best suited for your plans. Your guidance counselor, teachers, and people employed in the field will be glad to answer your questions. Find out which colleges or universities offer cooperative education programs and determine the requirements to enter these programs. Most importantly, prepare yourself for a world which is becoming more and more sophisticated as a result of advancements made in science and technology.

Phillip L. Brown
Apprentice Mechanical Technician


RESEARCH METALLOGRAPH

My work affects the success of vehicle launches and scientific experiments.

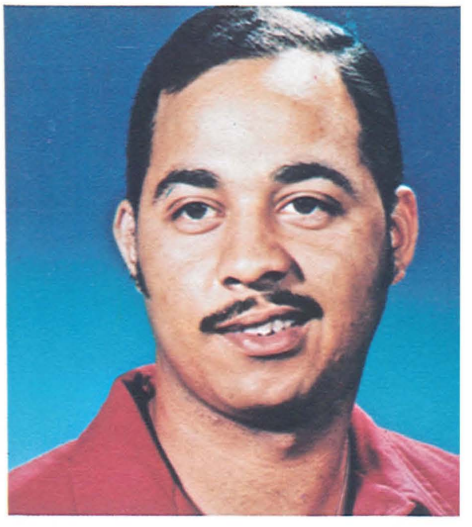
I'm a space-age detective! My tools are microscopes, X-rays, hardness detection devices and dye penetrant solutions. The criminals are stress, corrosion, temperature, moisture, vibration and fatigue. The victims are pieces of fractured metal. When metallic components on an aerospace vehicle fail, I'm the person who conducts an analysis of the failure in order to explain why the particular part failed. If we can understand what factors caused a fracture or other failure, then we can attempt to prevent the same type of a failure in the future.

In order to perform a failure analysis, I begin by examining the fractured surface under a low-powered microscope to determine the exact point where the fracture began -- the initiation point. Then I cut a sample from a cross-section of the metal surface by using a rotary-type saw with a blade impregnated, or strengthened, with diamonds. The sample is then mounted in a press and covered with a powdery substance which hardens when heated. The mounted sample is polished repeatedly with different grades of emory paper. I complete the manual polishing with a diamond paste and a rotating wheel. Final polishing is done with a rotating wheel, a microcloth, and an aluminum oxide solution. The grain structure of the material is then revealed by using the appropriate acid etchant. Once the sample has been properly etched, the grain structure can be examined for clues which help explain the failure. I search for clues such as secondary cracks by using a metallograph -- a special type of microscope designed to magnify the grain structure of metal surfaces.

My career as a technician began soon after graduation from high school. I really wasn't sure what type of job I wanted. Luckily, a local engineering firm contacted my high school principal and asked him to recommend a senior who had completed algebra, geometry, trigonometry, and physics and who did not plan to attend college. I was recommended for the job, and I was hired. I received on-the-job training which was helpful when I transferred to NASA.

My job is important because my documentation of failure analysis and my metallographic evaluation of material directly affect the success of vehicle launches and scientific experiments. I enjoy my detective work, and I enjoy working with new materials like those used in the construction of the reusable Space Shuttle. A person could work in failure analysis for many years and still learn something new every day about metallography.

Wendell R. DeWeese
Metallographic Technician



While you're in high school,

there are many steps you can take to prepare yourself for a career as a technician in the aerospace industry.

Discuss your career plans with your guidance counselor and teachers. They can tell you about the many different kinds of occupations available in this diverse industry. They can recommend special tests designed to help you determine your interests, abilities, and aptitudes. Be sure to plan your high school courses with their help.

As you plan your high school curriculum, there is a wide range of courses that will be helpful to your future career. Good grades in mathematics and science courses are a must. In addition to these courses, a well-rounded high school curriculum includes courses in English, social studies, and foreign language(s), as well as technical subjects like mechanical drawing. By studying a wide range of subjects, you'll be prepared to respond to unexpected opportunities. Participation in extracurricular activities and hobbies will expand your high school experiences and prepare you for the years ahead.

Be sure to seek the advice of people actually working in jobs of interest to you, and visit their work sites. Your friends, neighbors, and relatives can help as you consider various career choices.

Visit your school and public libraries for additional information about the thousands of different types of careers. Ask the librarians for the names of professional associations which you can contact for more information about specific careers in aerospace.

Part-time and volunteer jobs will expose you to daily work activities and responsibilities.

These suggestions are aimed at helping you prepare for a career as a tomorrow-minded technician.

At this point if you'd like additional information about careers in aerospace, contact the Educational Programs Officer at the NASA Center serving your state. See below:

NASA Ames Research Center
Moffett Field, California 94035

serving: Alaska, Arizona, California, Hawaii, Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming

NASA Goddard Space Flight Center
Greenbelt, Maryland 20771

serving: Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont

NASA Johnson Space Center
Houston, Texas 77058

serving: Colorado, Kansas, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, and Texas

NASA Kennedy Space Center
Kennedy Space Center, Florida 32809

serving: Florida, Georgia, Puerto Rico, and Virgin Islands

NASA Langley Research Center
Hampton, Virginia 23665

serving: Kentucky, North Carolina, South Carolina, Virginia, and West Virginia

NASA Lewis Research Center
21000 Brookpark Road, Cleveland, Ohio 44135

serving: Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin

NASA Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

serving: Alabama, Arkansas, Iowa, Louisiana, Mississippi, Missouri, and Tennessee

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NASA

National Aeronautics and
Space Administration

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