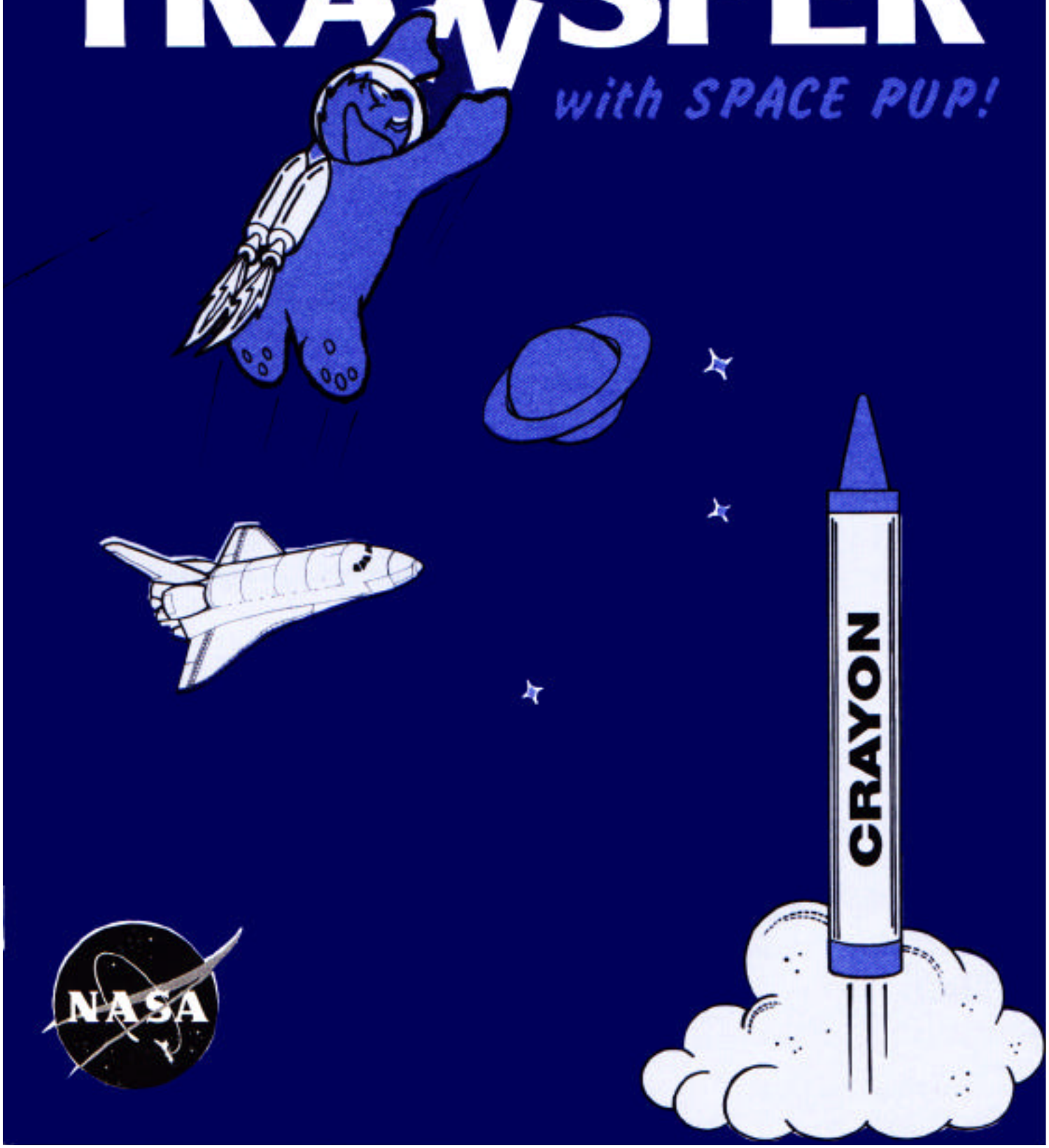
TECHNOLOGY TRANSFER

with SPACE PUP!



NASA

TECHNOLOGY TRANSFER

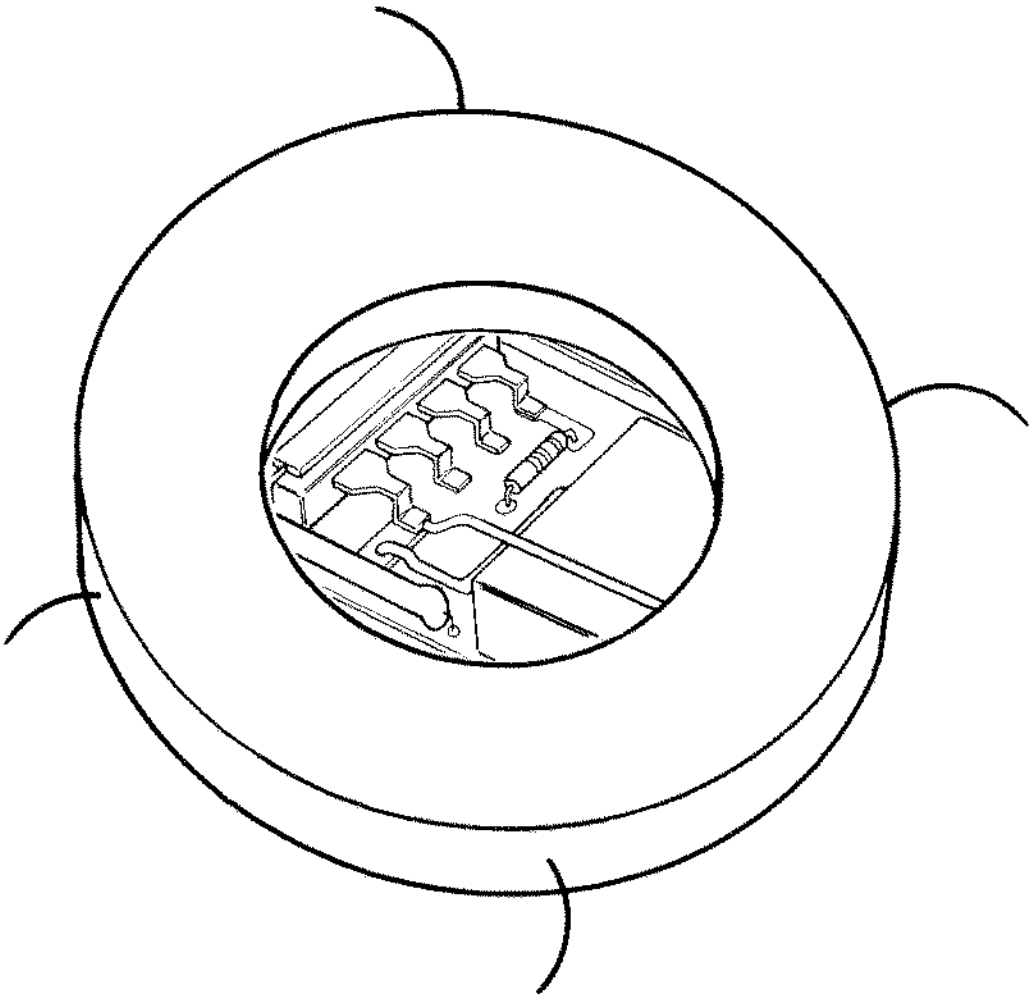
Using Science and Technology to Help Life on Earth

Goddard Space Flight Center is one of nine NASA Field Centers in the United States. Along with exploring space, the Field Centers look for new ways to use space technology. Space technology can be used in Earth technology to fix problems and to make life easier here on Earth. This is called "technology transfer."

With the help of Goddard's Technology Transfer Space Pup, the following pages will show and tell how some Goddard space technologies help us here on Earth.

Technology (tek-NOL-e-jee) finding ways to use science to solve problems.

Programmable Implantable Medication System (PIMS)



Use for NASA. The engineers at Goddard use telemetry systems to send information and to receive information from spacecraft and satellites. The PIMS is made up of a telemetry system and very tiny electronic circuits. The PIMS is small—about the size of a hockey puck.

Engineer *(EN-ja-NEER) a person who uses science to plan and design useful things.*

Spacecraft *(SPAYS-kraft) a vehicle that travels outside the Earth's atmosphere.*

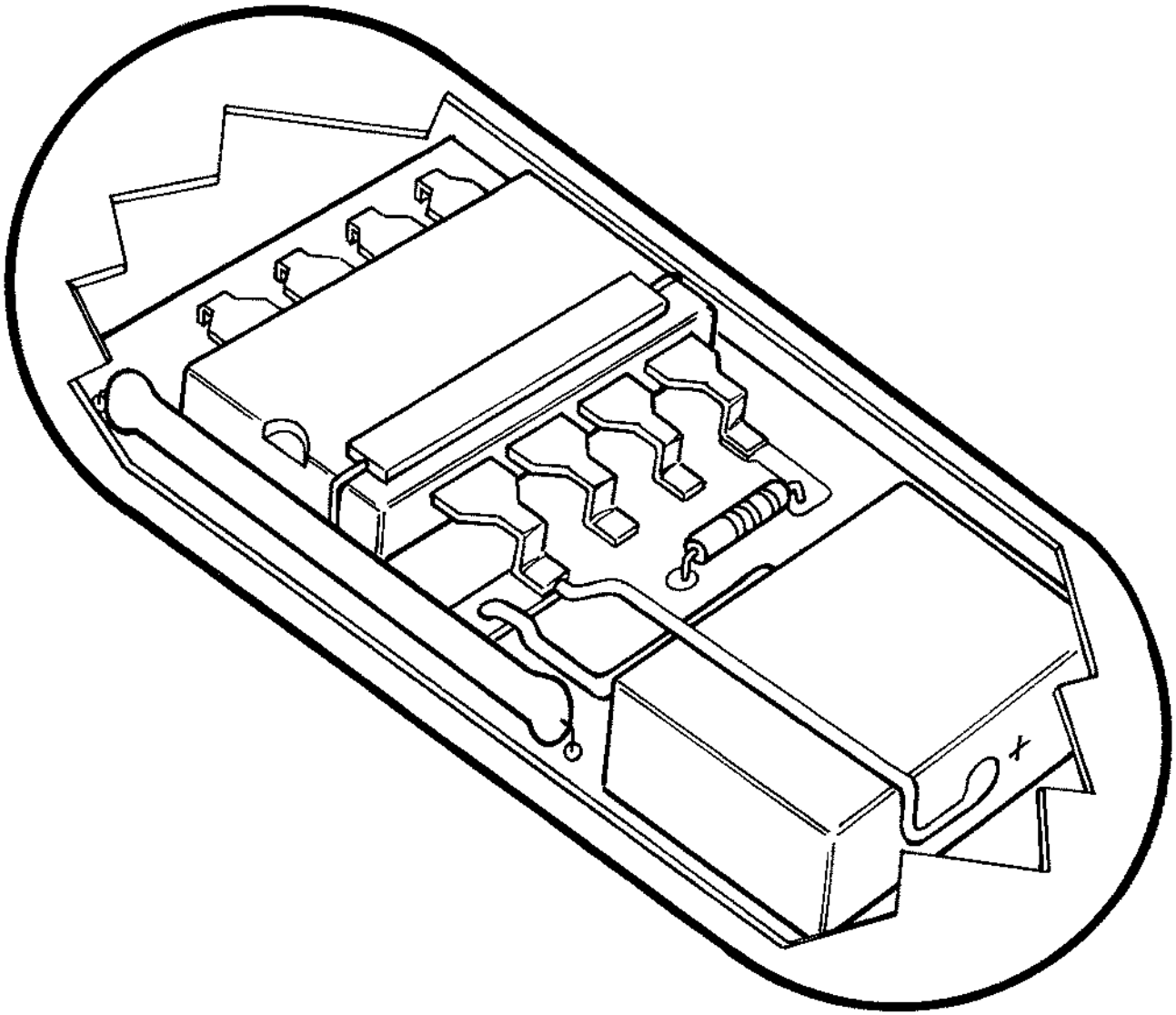
System *(SIS-tem) different parts working together to do something.*

Telemetry *(te-LEM-e-tree) measurement of the spacecraft's health which is sent by radio to Earth.*

Medical Use on Earth. Some people with diabetes need to give themselves shots with medicine every day. Space Pup doesn't need a shot every day because the doctor put the PIMS in his body. The PIMS gives Space Pup the right amount of medicine when he needs it.

Implantable (im-PLAN-ta-bal) able to be put into a body by surgery.

Ingestible Temperature Monitoring System (Temperature Pill)

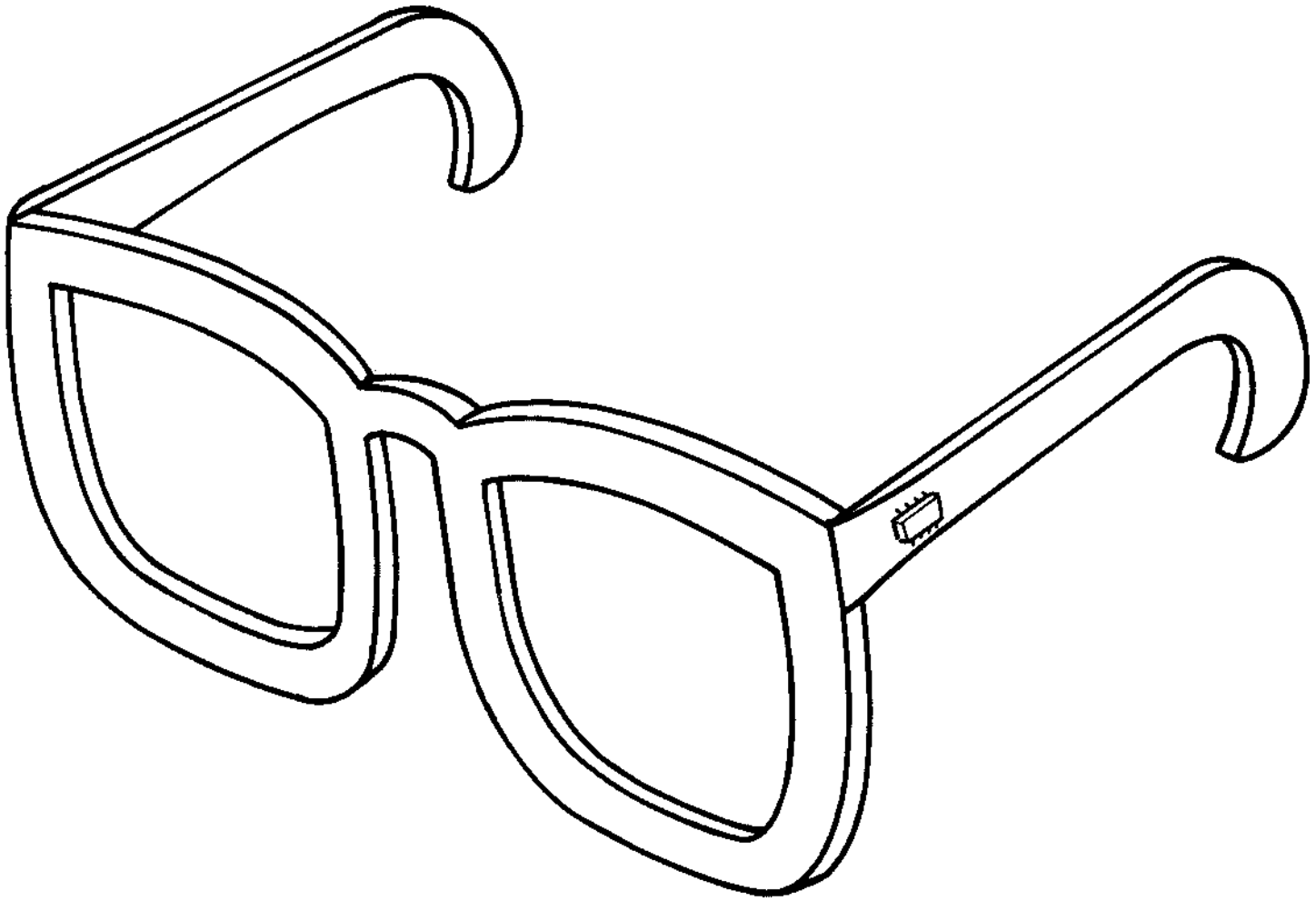


Use for NASA. A telemetry system allows communication between satellites or spacecraft with scientists and engineers on Earth. Engineers at Goddard used a telemetry system with very tiny electronic chips to make the temperature pill.

Circuit *(SUR-kit) path of electricity.*

Medical Use on Earth. Space Pup swallows the temperature pill. The pill tells the doctor how high his temperature is and how fast his heart is beating.

Directional Discriminating Hearing Aid

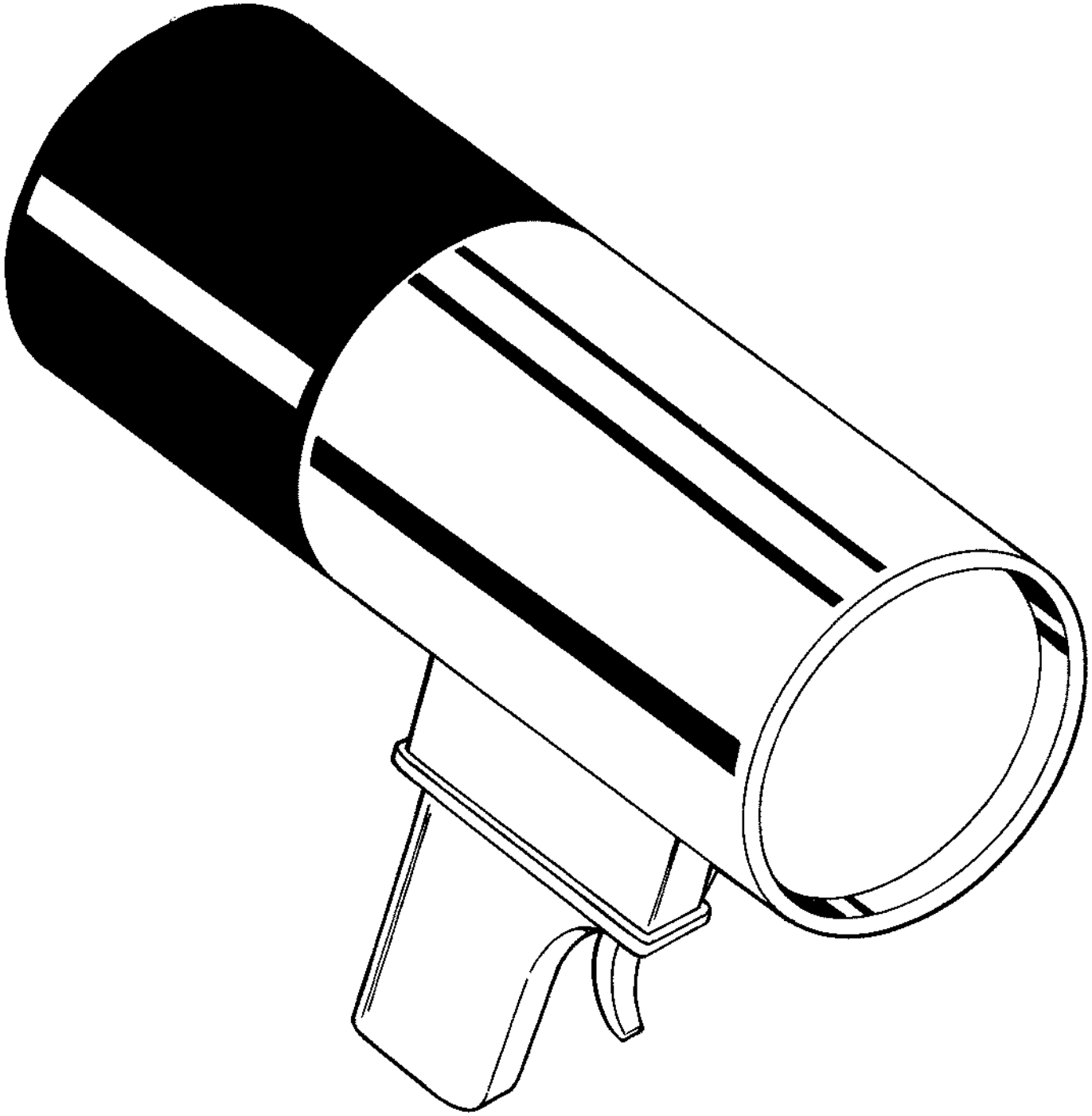


Use for NASA. Goddard engineers made a very tiny electronic chip. These glasses use the chip. The electronic chip helps a tiny set of lights inside the frame of the glasses to work. The lights show where sound comes from.

Electronic *(i-LEK-tron-ik) technology that makes things like radios, TVs, video games, and computers.*

Medical Use on Earth. Space Pup tries on the cool sunglasses. The tiny set of lights in the frame tells him where a sound is coming from.

Low-Intensity X-ray Imaging Scope (Lixiscope)



Use for NASA. The lixiscope is a portable x-ray machine. Engineers put together x-ray technology and tiny electronic technology to make the lixiscope. The lixiscope can see inside solid things, like metal or even skin.

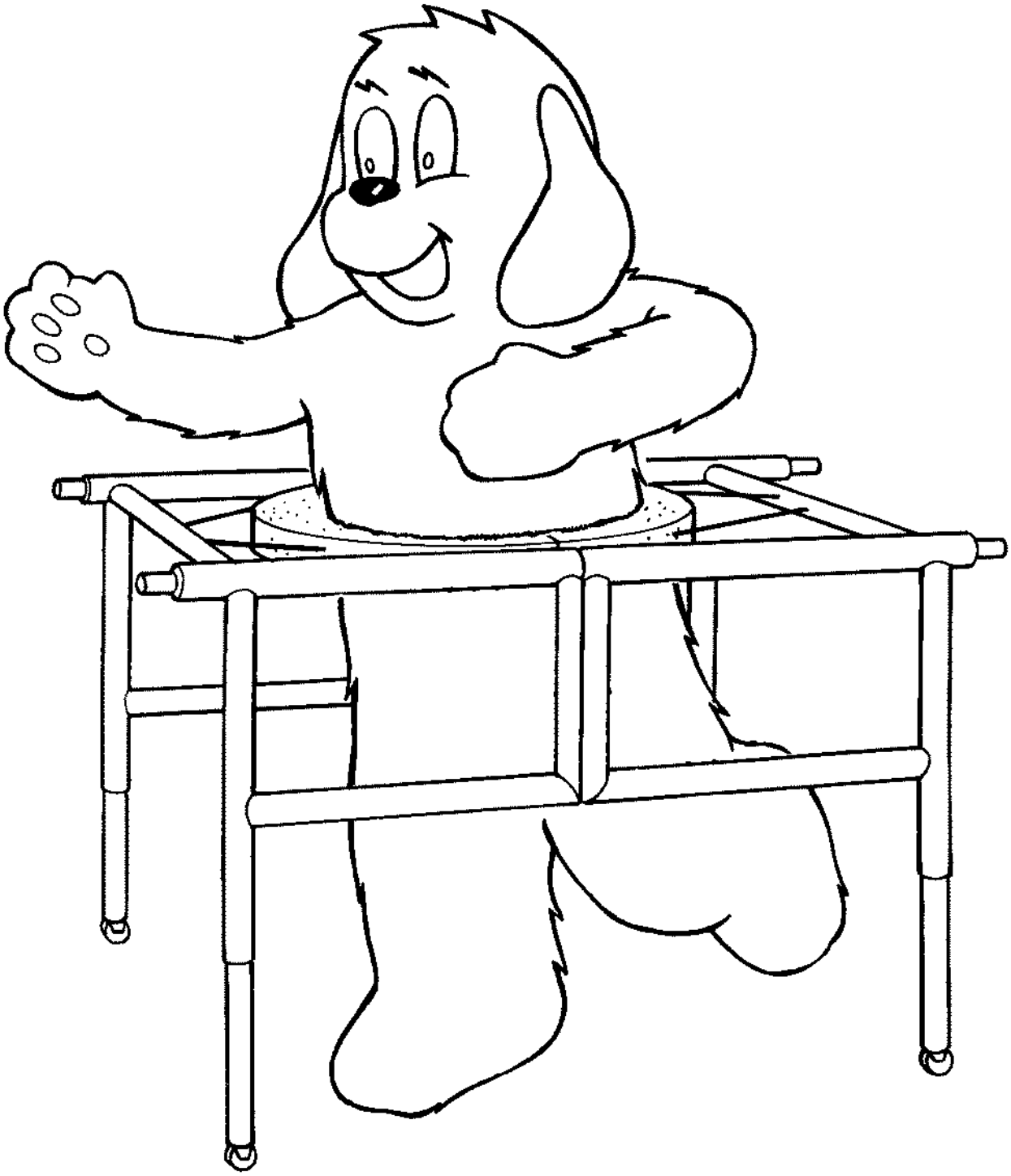
Medical Use on Earth. Space Pup tries the lixiscope. A team doctor could bring a lixiscope to a football game. If the quarterback hurts his leg, the doctor can use the lixiscope to see if any bones are broken.

Walker

Use for NASA. Spacecraft and other machines used in space need very strong and very flexible cables to control motion while in flight. The walker uses the same kind of cables to help people walk.

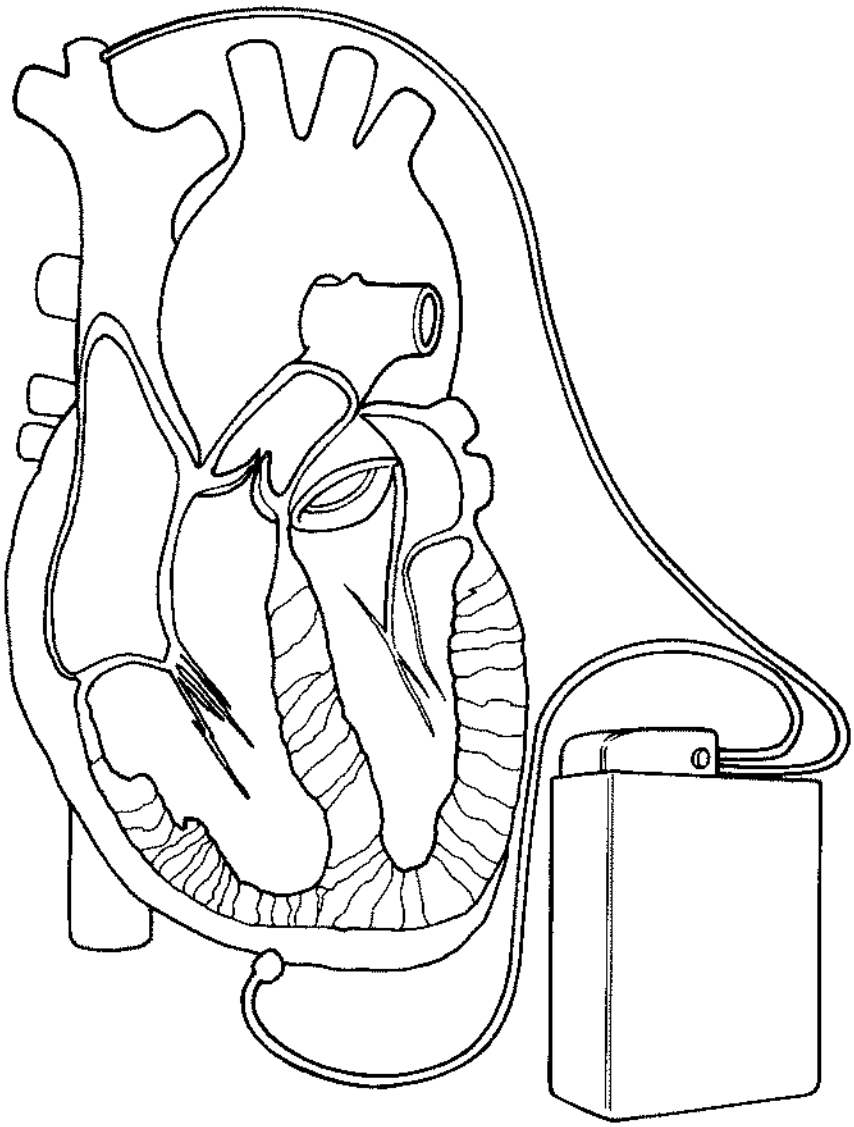
Cables *(KAY-bals) strong, thick ropes made of wires twisted together.*

Flexible *(FLEK-se-bal) able to bend without breaking.*



Medical Use on Earth. Space Pup tries out the walker. Look! No hands! Space Pup can wave at the engineers and keep walking. Older people and other people who have trouble walking can use the walker instead of crutches, canes, or wheelchairs.

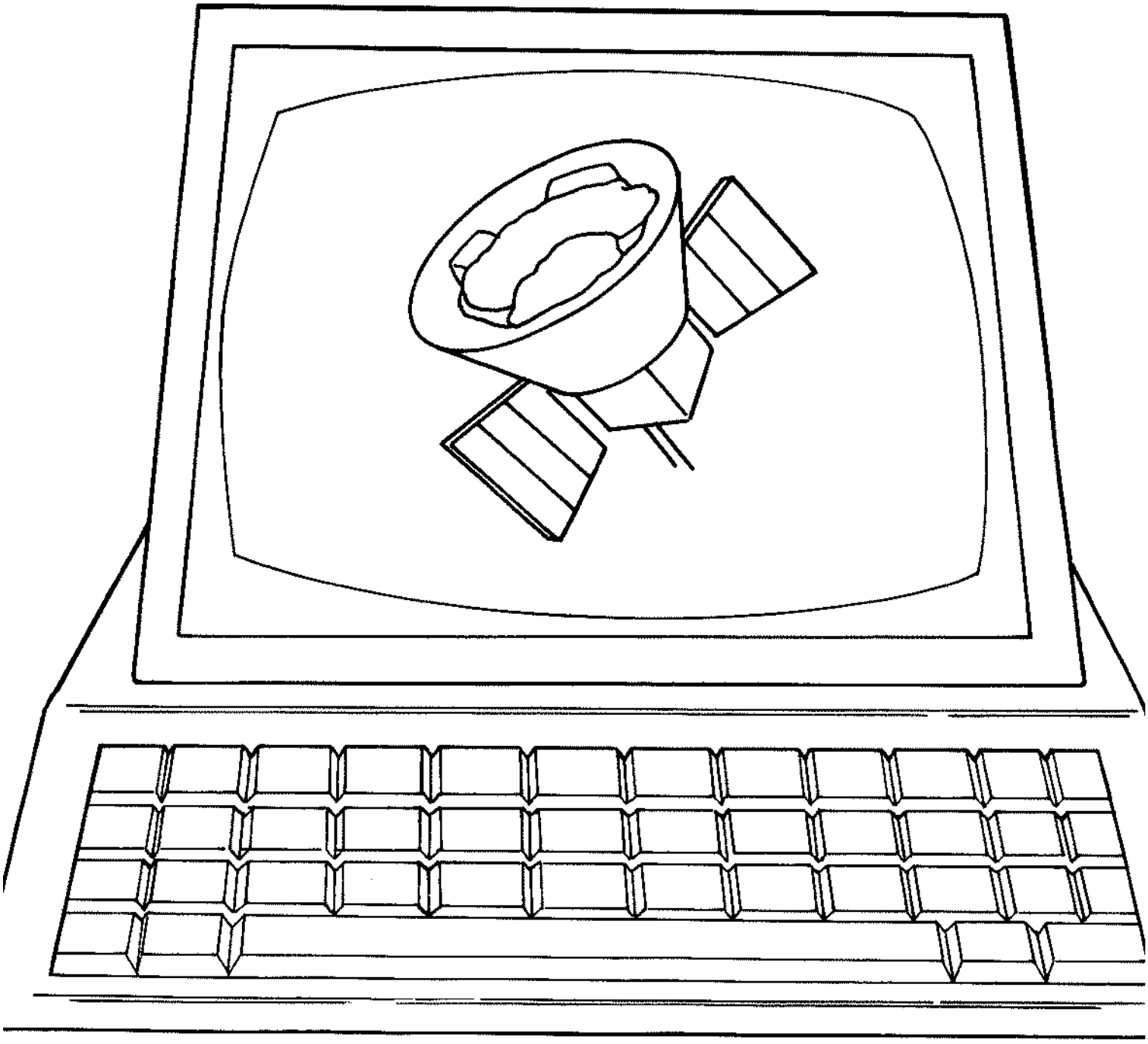
Automatic Implantable Defibrillator (AID)



Use for NASA. Goddard engineers took very tiny electronic circuits to make the AID. The very tiny electronic circuits allow the AID to be about the size of a deck of cards. The AID is safe to put in a person's body.

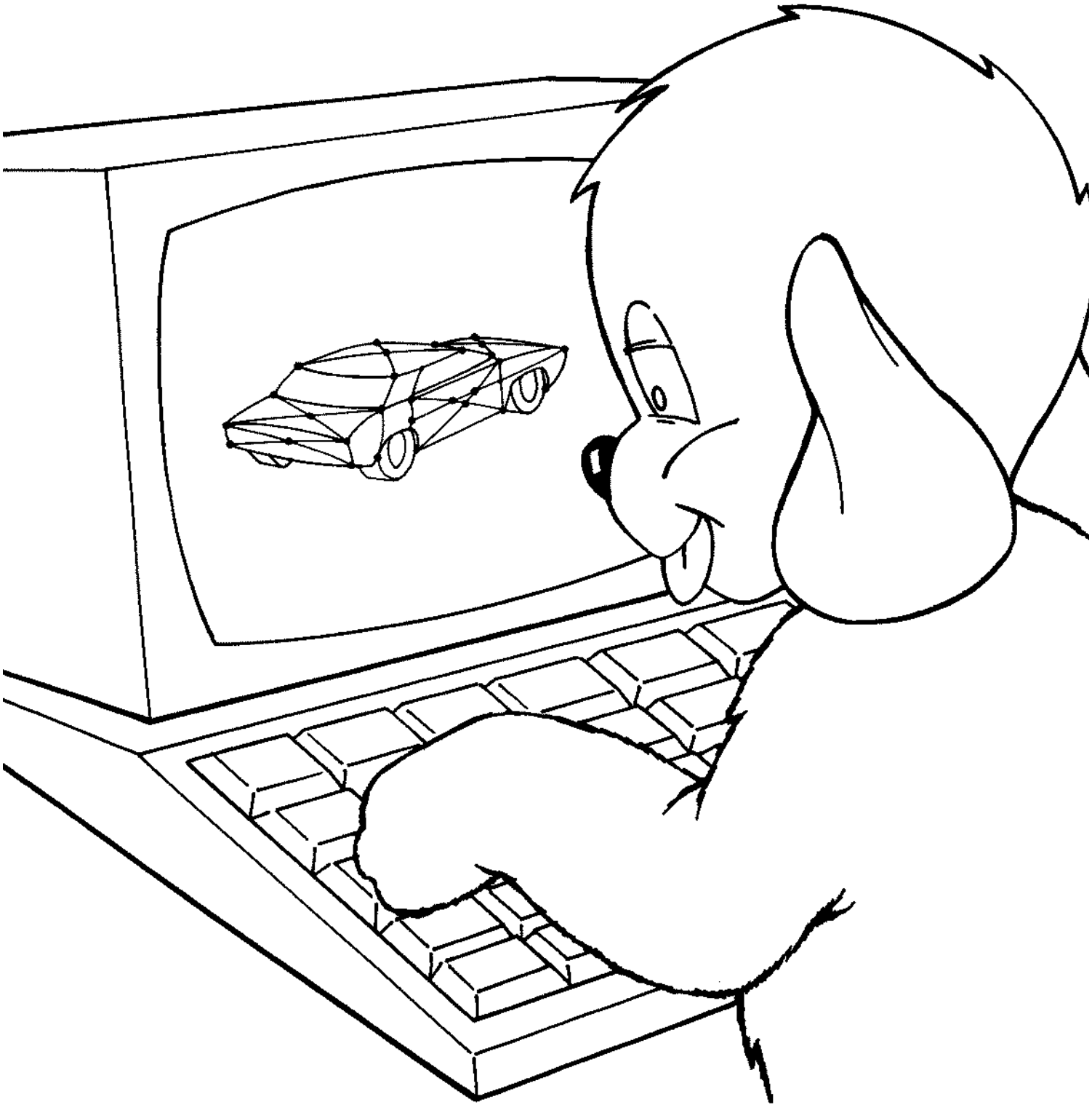
Medical Use on Earth. The AID is also called a "pacemaker" because it helps the heart keep the right pace or rhythm. Doctors put the AID in peoples' hearts to keep them from having heart attacks. Space Pup tried the AID on to see how it worked.

NASA Structural Analysis Program (NASTRAN)



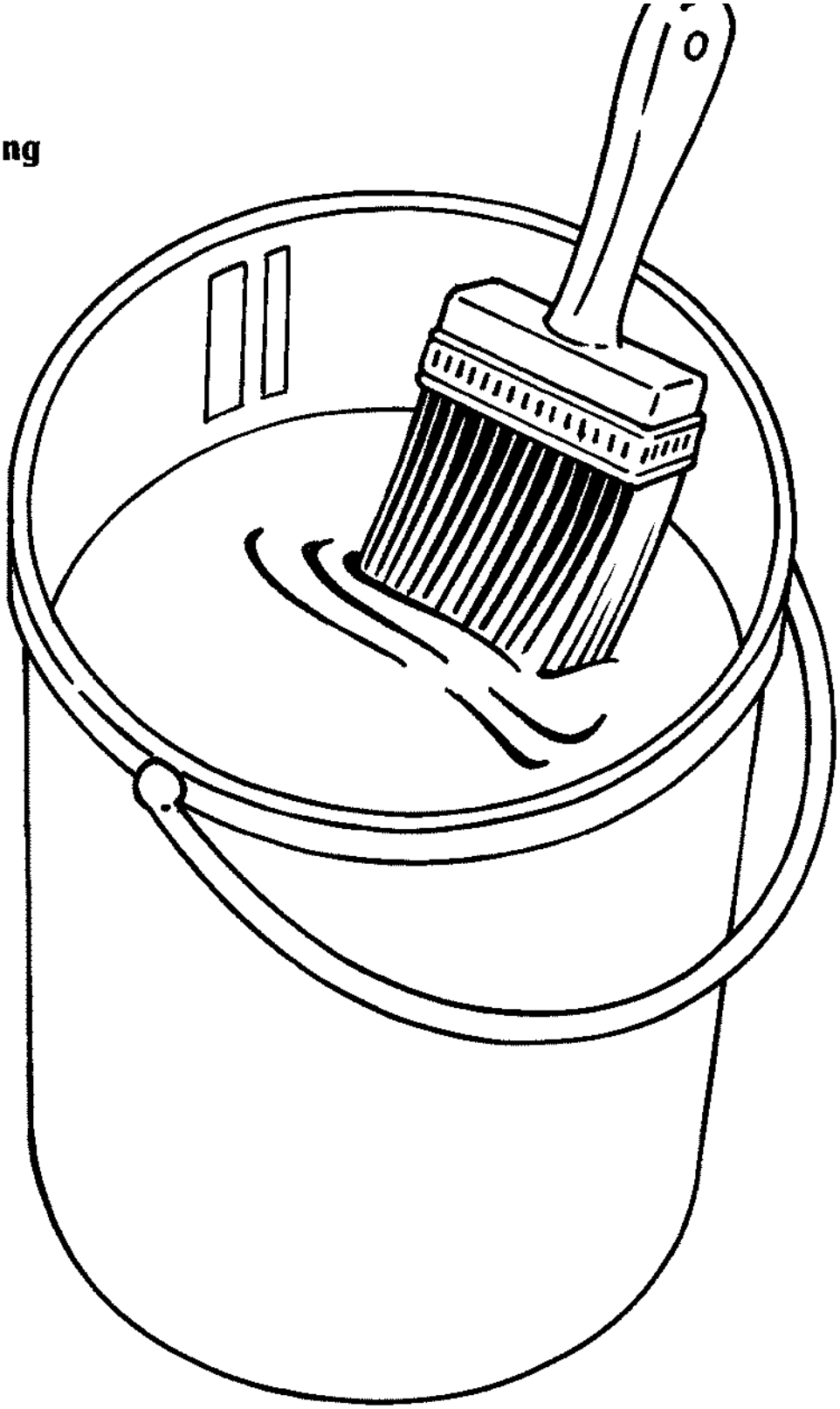
Use for NASA. Engineers made NASTRAN to help them plan to build instruments and spacecraft. This computer program helps them see how well the spacecraft and instruments will do during flight.

Instrument *(IN-stra-mint) an electrical or mechanical tool used in airplanes or spacecraft.*



Industrial Use on Earth. Space Pup is using NASTRAN to plan how to build a new car. Other people use NASTRAN to help them build better cars, planes, ships, bridges, and buildings.

IC531 Coating



Use for NASA. The scientific and technical workers at Goddard made up a new coating called IC531. The frames used to hold and launch rockets and the space shuttle can get worn down with rust and very hot smoke. The IC531 Coating protects the equipment so it lasts longer.

Scientific *(SIY-en-tif-ik) related to things in nature and in the universe.*

Technical *(TEK-ni-k'l) related to finding ways to use science to solve problems.*

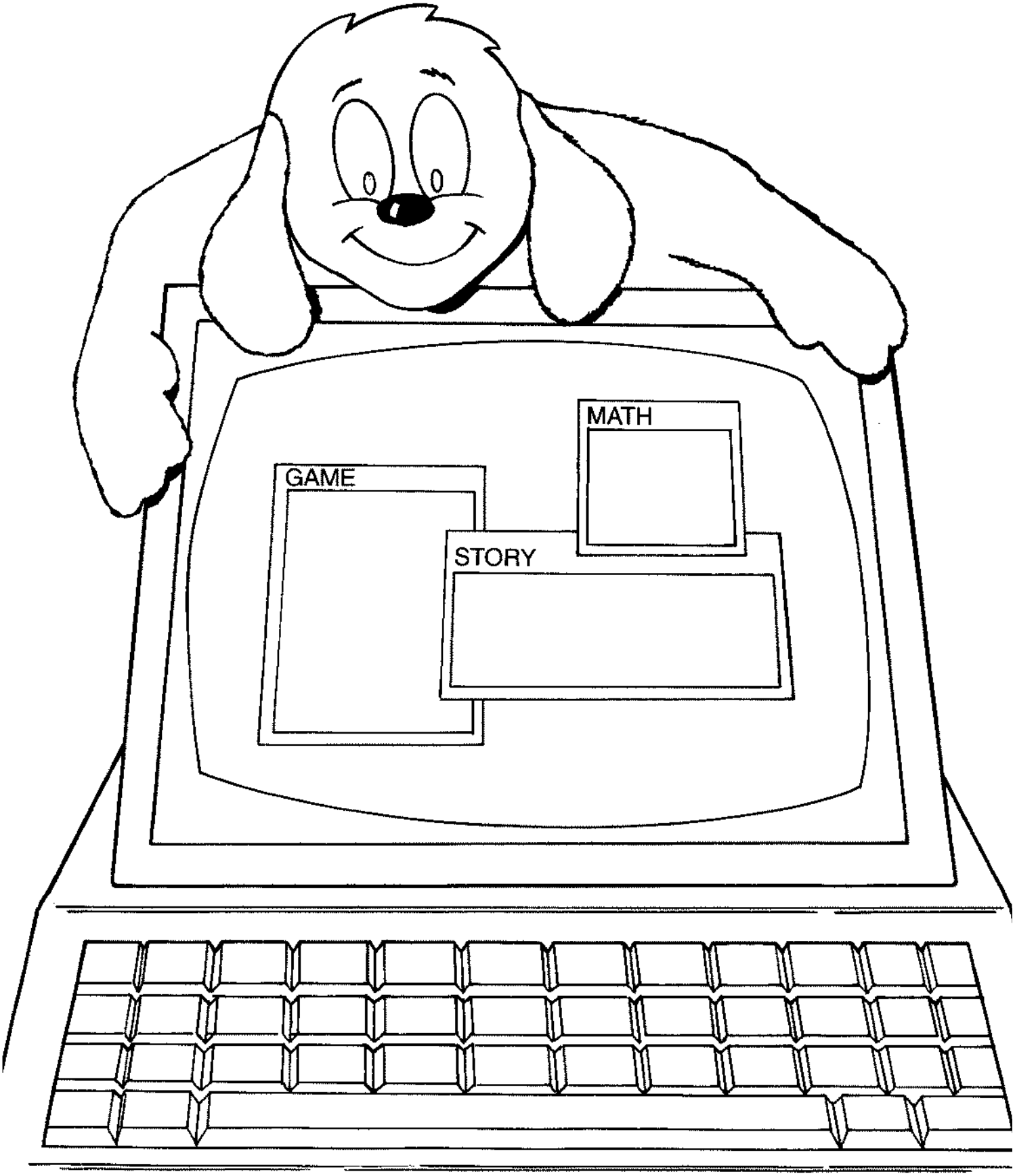
Industrial Use on Earth. Space Pup helps paint the Statue of Liberty with IC531 Coating. This coating will protect the statue from rust and pollution.

Pollution *(pa-LOO-shen) something that makes the air, water, or soil dirty.*

Transportable Application Executive Plus (TAE+)

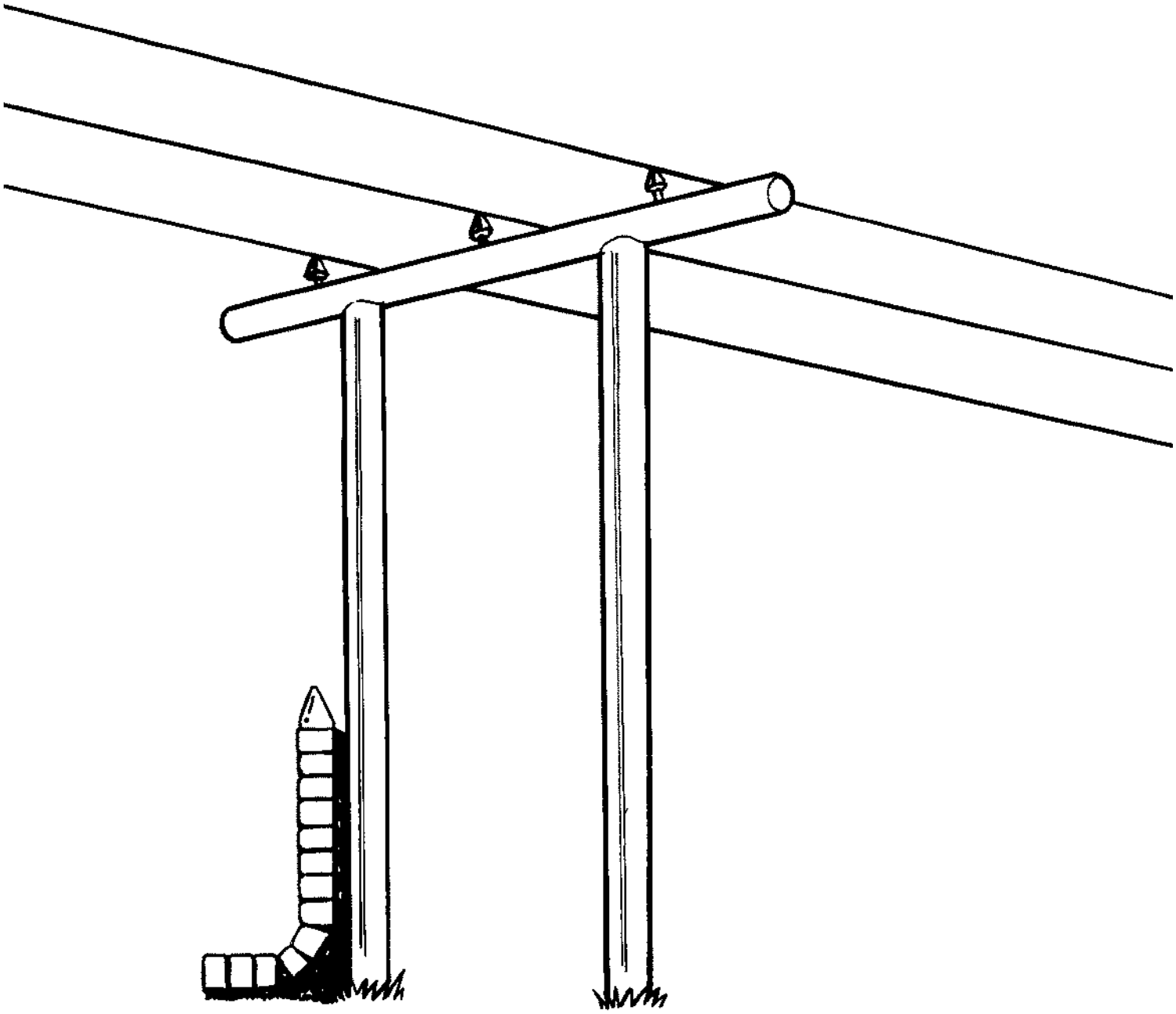
Use for NASA. To do their jobs, NASA astronauts, engineers, and scientists must run many computer programs at once. TAE+ is a computer program that allows them to work with many people and many computer programs at the same time.

Astronaut *(AST-roh-not) space explorer.*



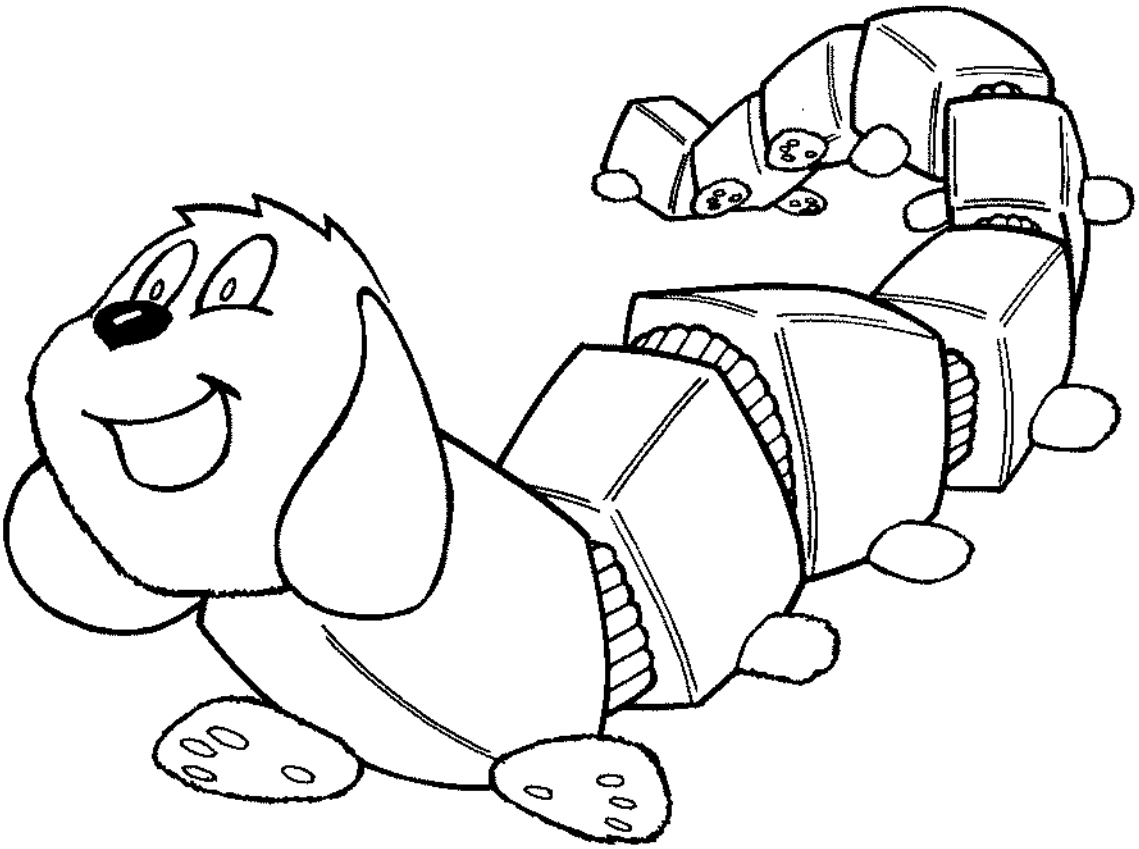
Industrial Use on Earth. Space Pup uses the TAE+ to play a game, write a story, and check his math homework—all at the same time.

Caterpillar Robot



Use for NASA. The engineers at Goddard find many uses for cables when they build spacecraft and other machines used in space. The cable must be very strong and very flexible. The engineers used the cable to make a robot that can crawl and climb like a caterpillar.

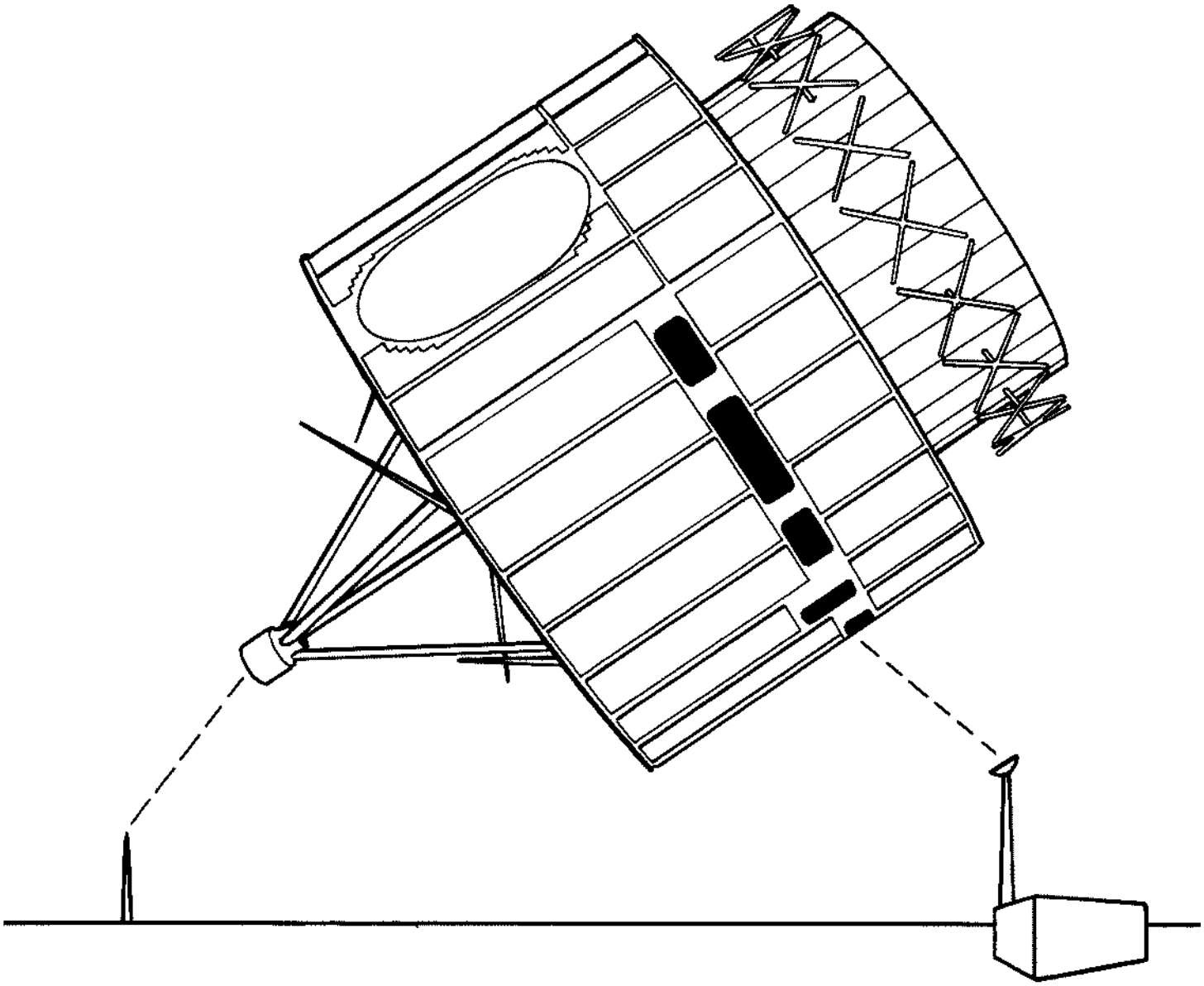
Robot *(ROH-bot) machine that can do some of the things that a human being can do.*



Industrial Use on Earth. The caterpillar robot can get into places where humans could not work and do things safely. It can climb electrical wires, crawl inside air ducts, and inspect pipes. Space Pup enjoys pretending that he is a caterpillar robot.

Wire *(WIYR) thin metal thread or a bunch of metal threads.*

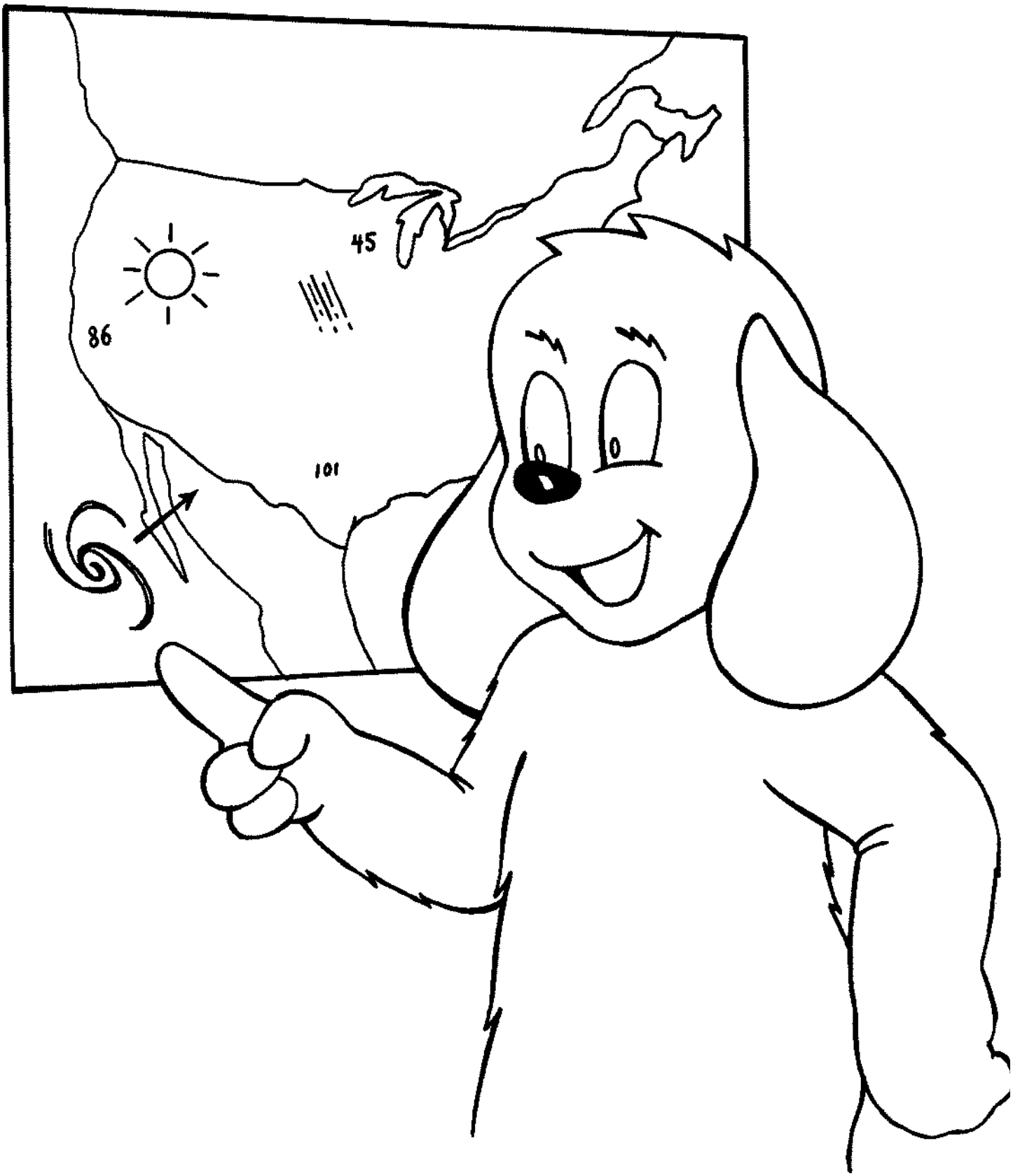
Direct Readout Data Satellite System



Use for NASA. Goddard scientists and engineers helped plan and build this system to keep track of storms, like hurricanes. Weather satellites, satellite antennas on the ground, and computer programs make up the system.

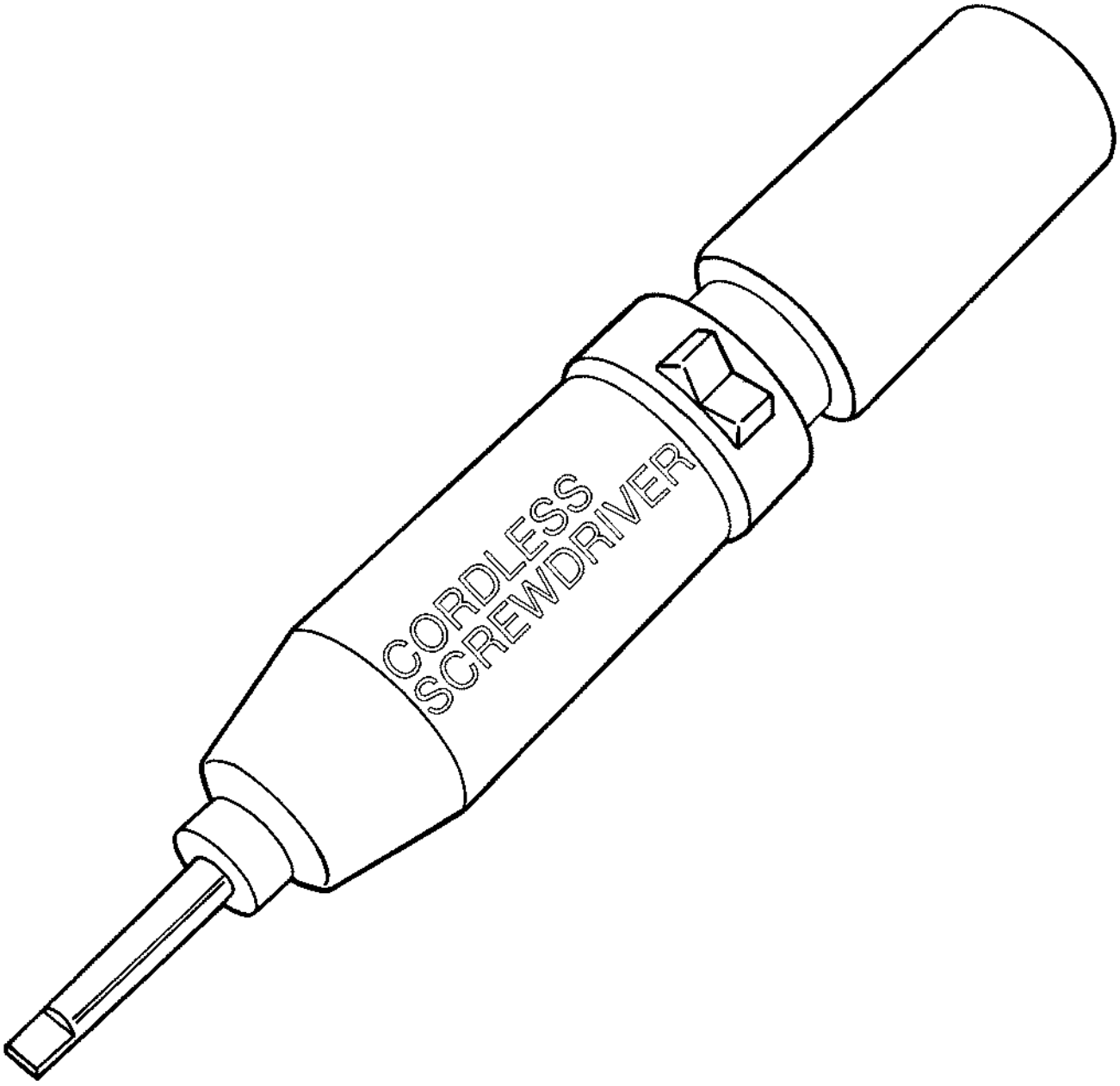
Antennas *(an-TEN-as) objects made of metal that are used to send or receive radio or television signals.*

Satellite *(SAT-e-LIYT) spacecraft that moves in an orbit around the Earth, the Moon, or other bodies in space.*



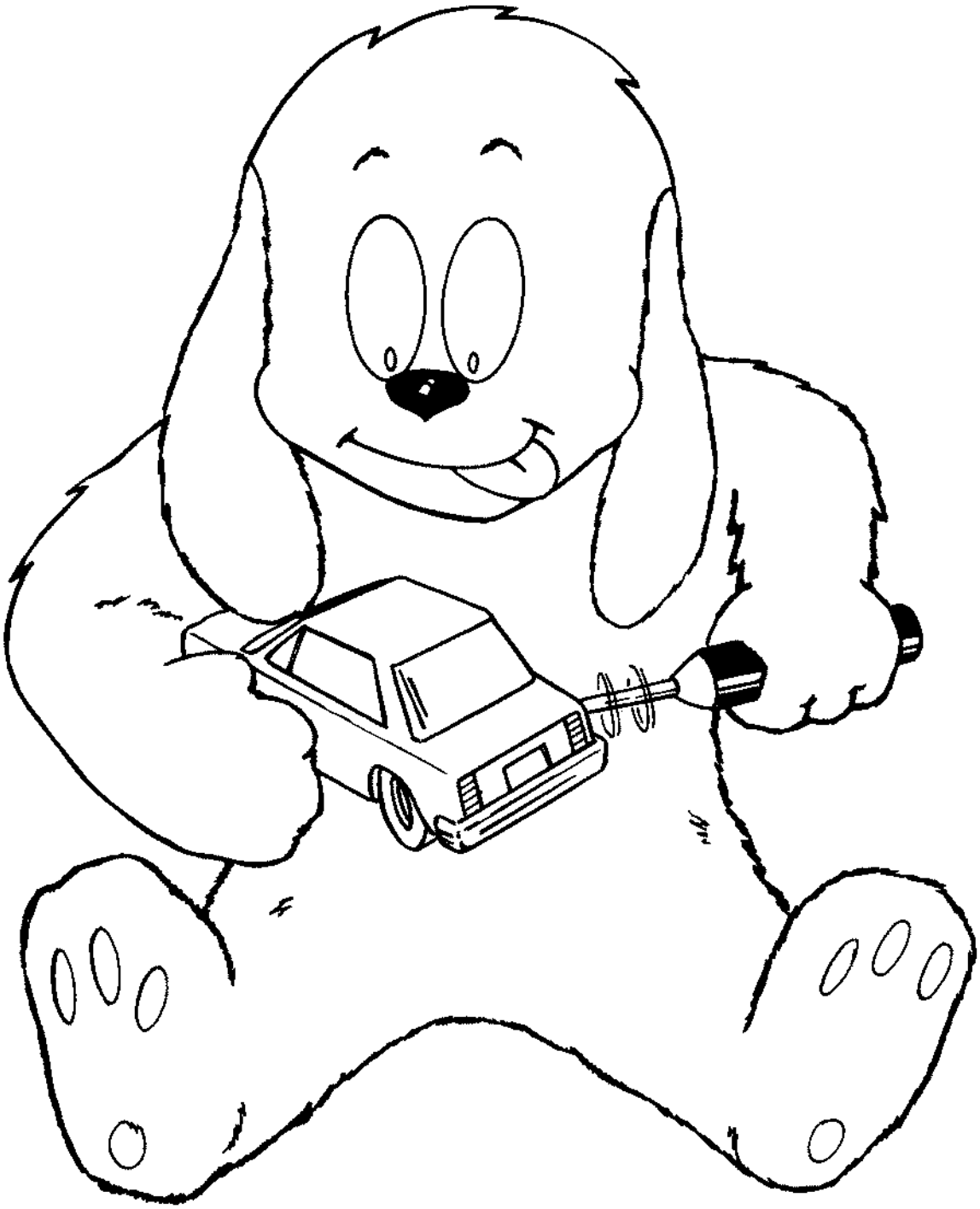
Industrial Use on Earth. Space Pup pretends to give the weather report on the evening news. Weather reporters use pictures from the Direct Readout Data Satellite System to help them show the weather that is coming your way.

Cordless Tools

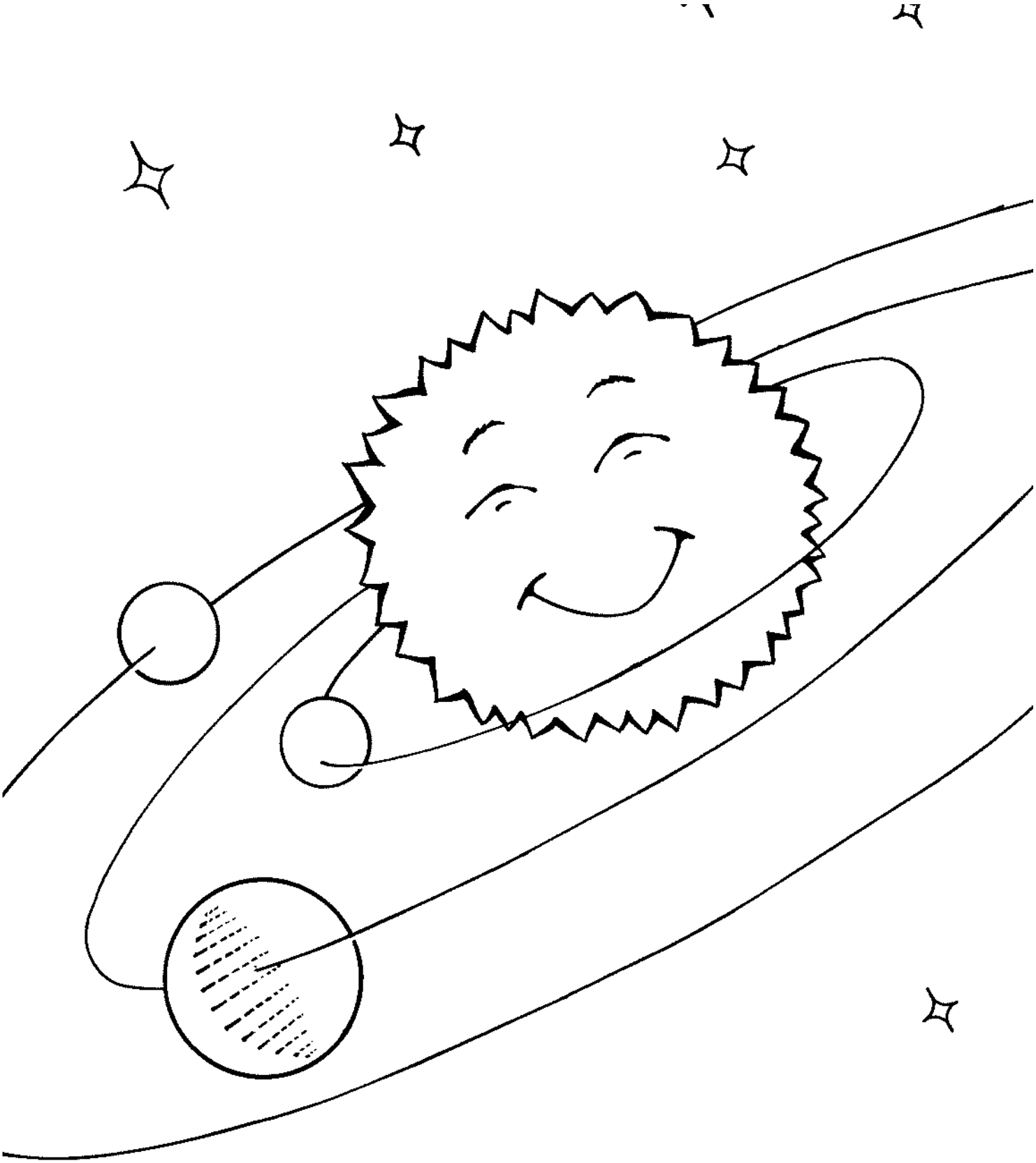


Use for NASA. Goddard engineers made cordless tools for use on the Moon and in space. Did you every try to find an electrical outlet on the Moon?

Electrical *(i-LEK-tri-kel) having to do with electricity.*

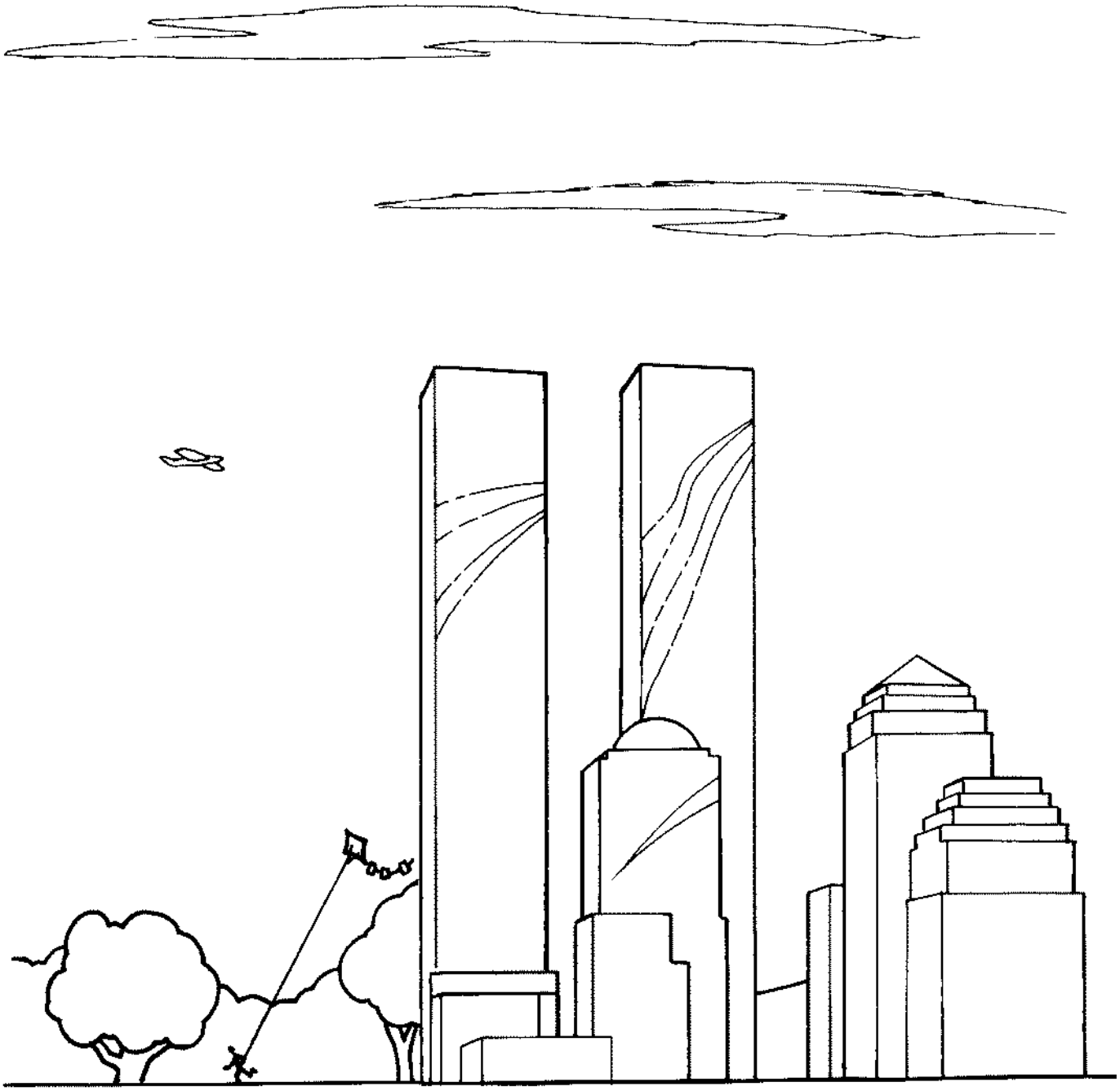


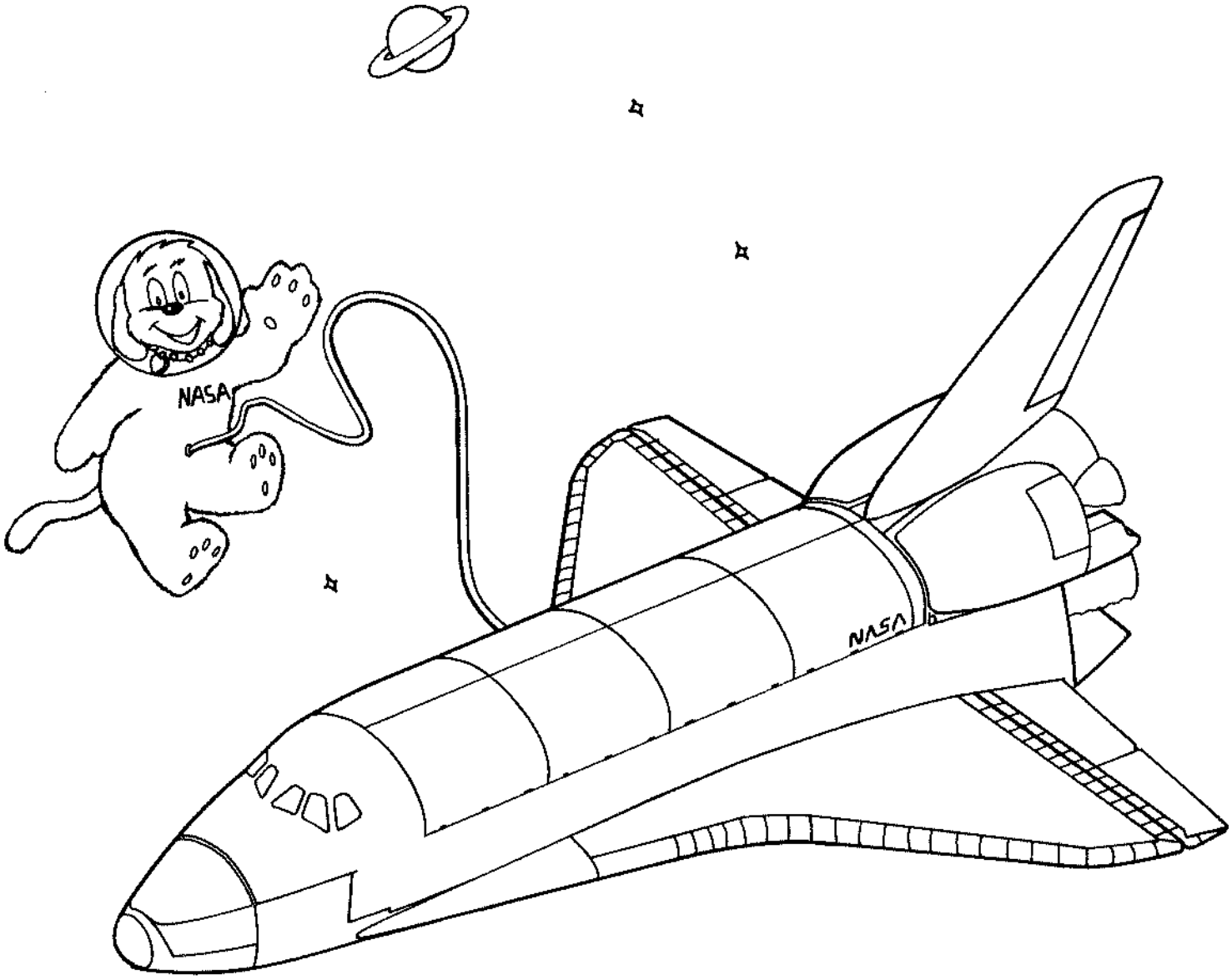
Industrial Use on Earth. Space Pup is using a cordless screwdriver to fix his toy car.



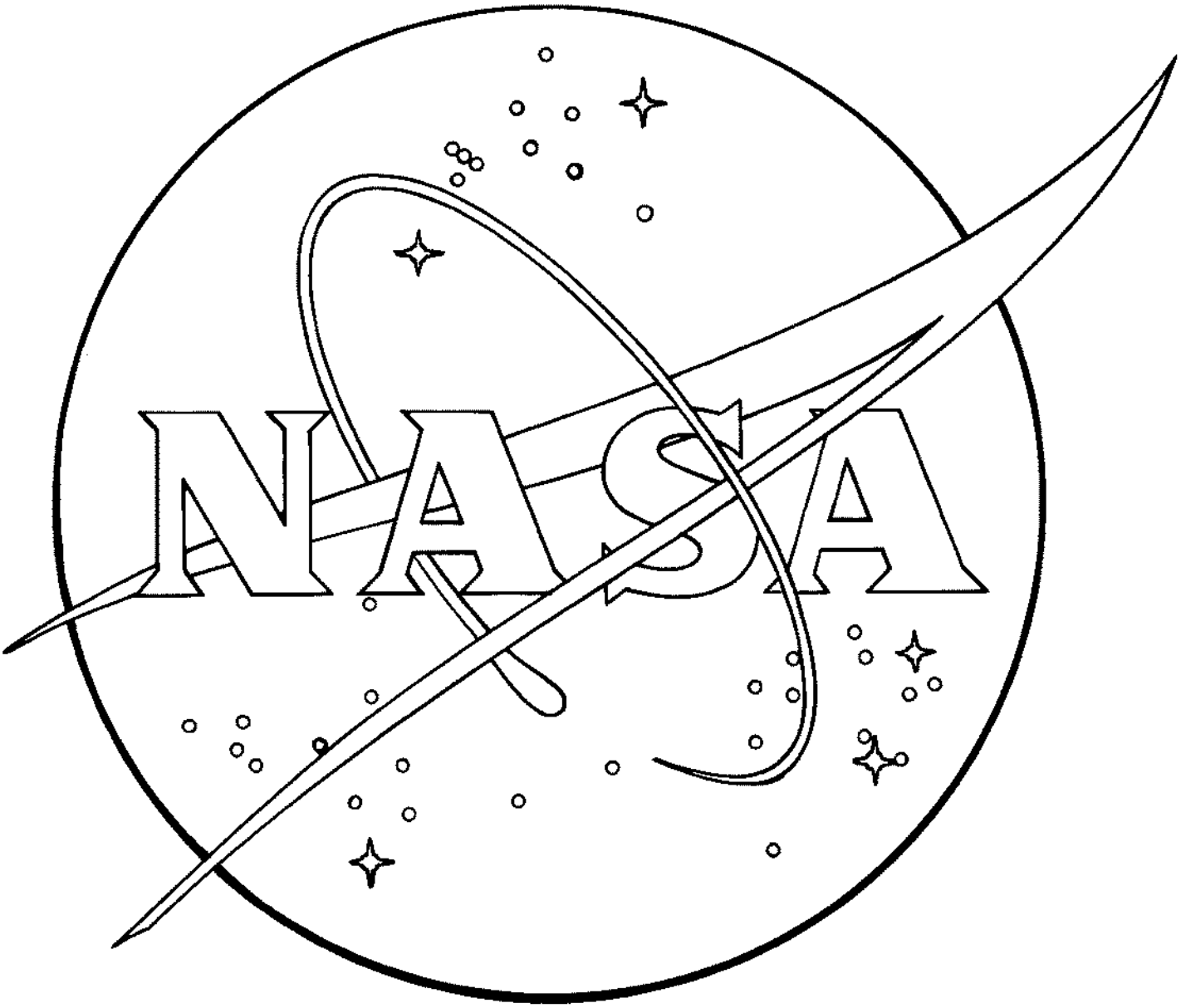
The solar system is the Sun and all the objects that orbit it. The Earth is one of those objects.

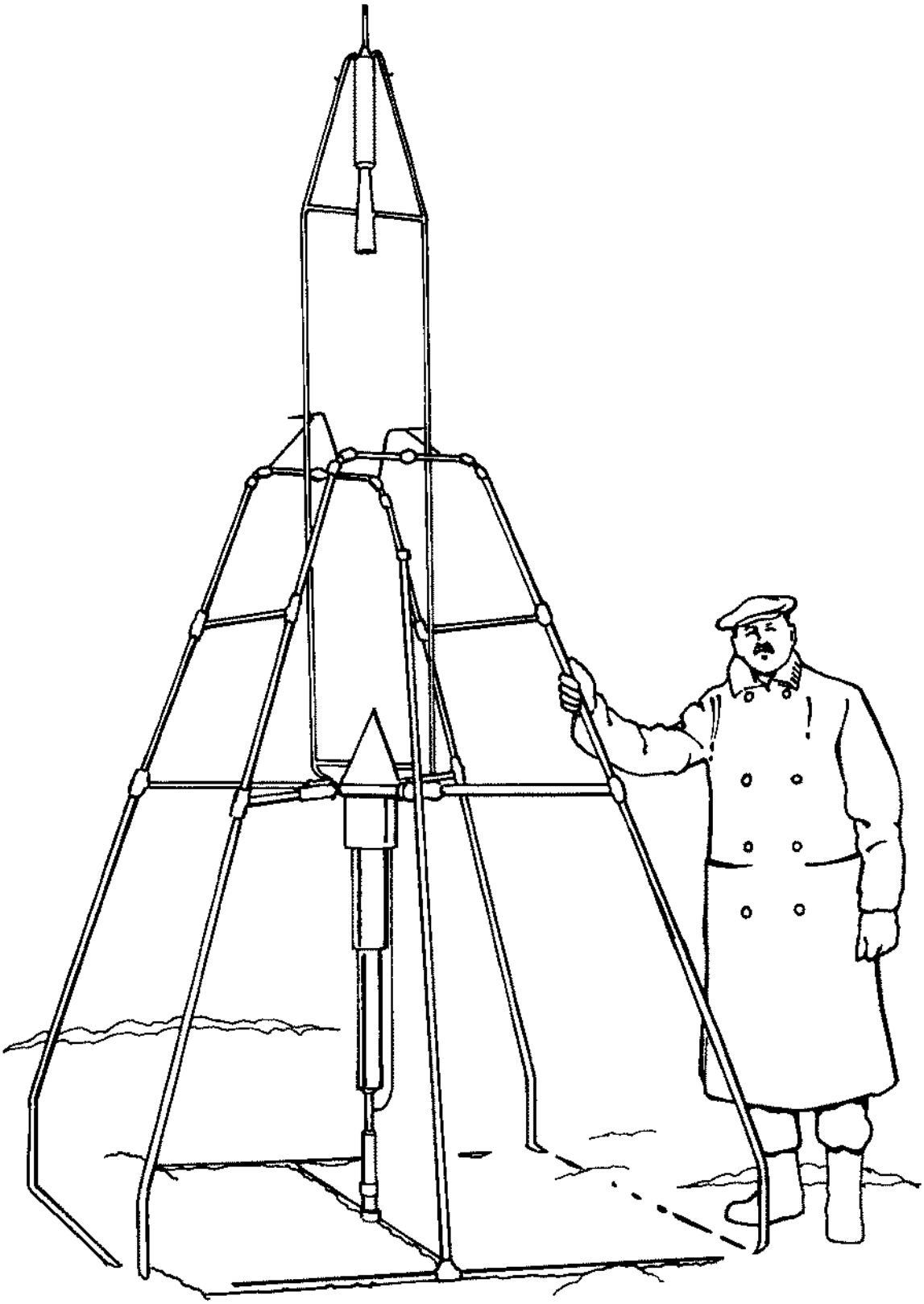
The Earth is the planet on which we live. The Moon orbits the Earth.





The space shuttle carries astronauts in an orbit around the Earth. The astronauts perform science experiments and help launch new satellites.


NASA



Goddard Space Flight Center is named after Dr. Robert H. Goddard. Dr. Goddard invented rockets and helped move us toward exploring space.

WORD FIND

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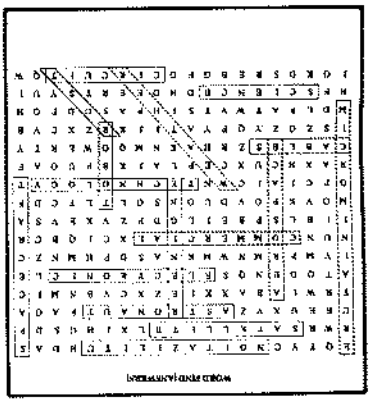
Help Space Pup find the following words.

ASTRONAUT	SATELLITE
CABLES	SCIENCE
CIRCUIT	SPACECRAFT
ELECTRONIC	TECHNOLOGY
ENGINEER	UTILIZATION
ROBOT	WEATHER

See if you can find four bonus words.



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