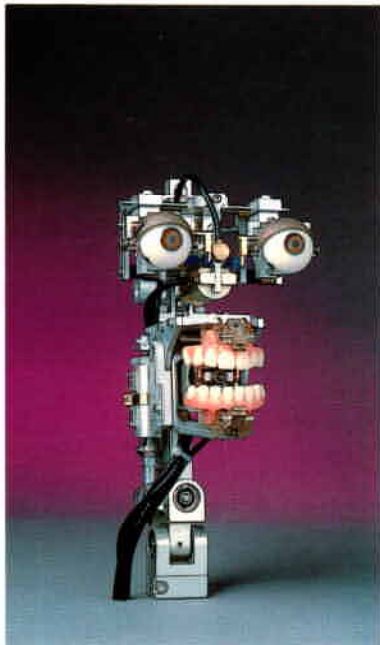


ODETICS



MASTER

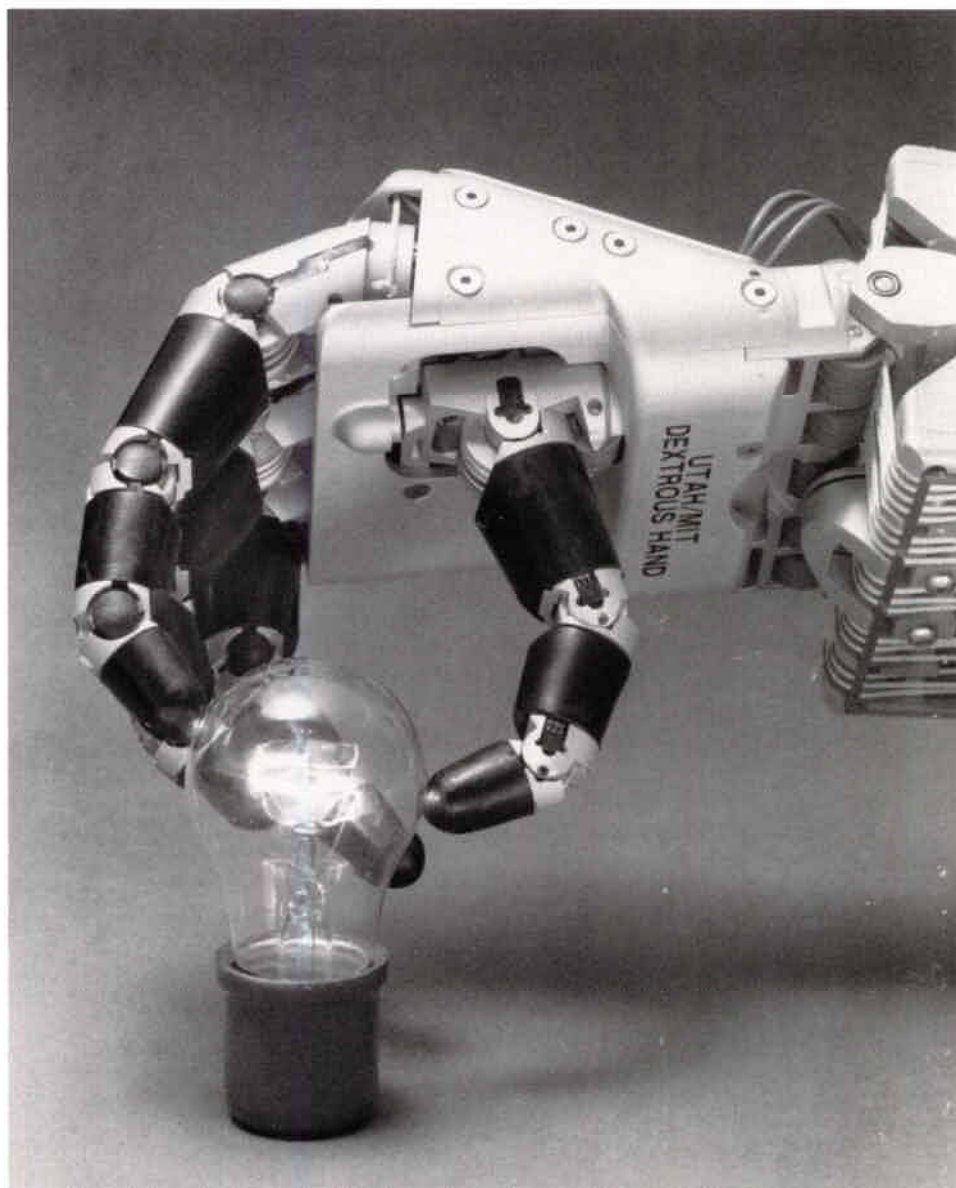
SLAVE

Animate Systems Incorporated

SARGAS
IN
UTAH

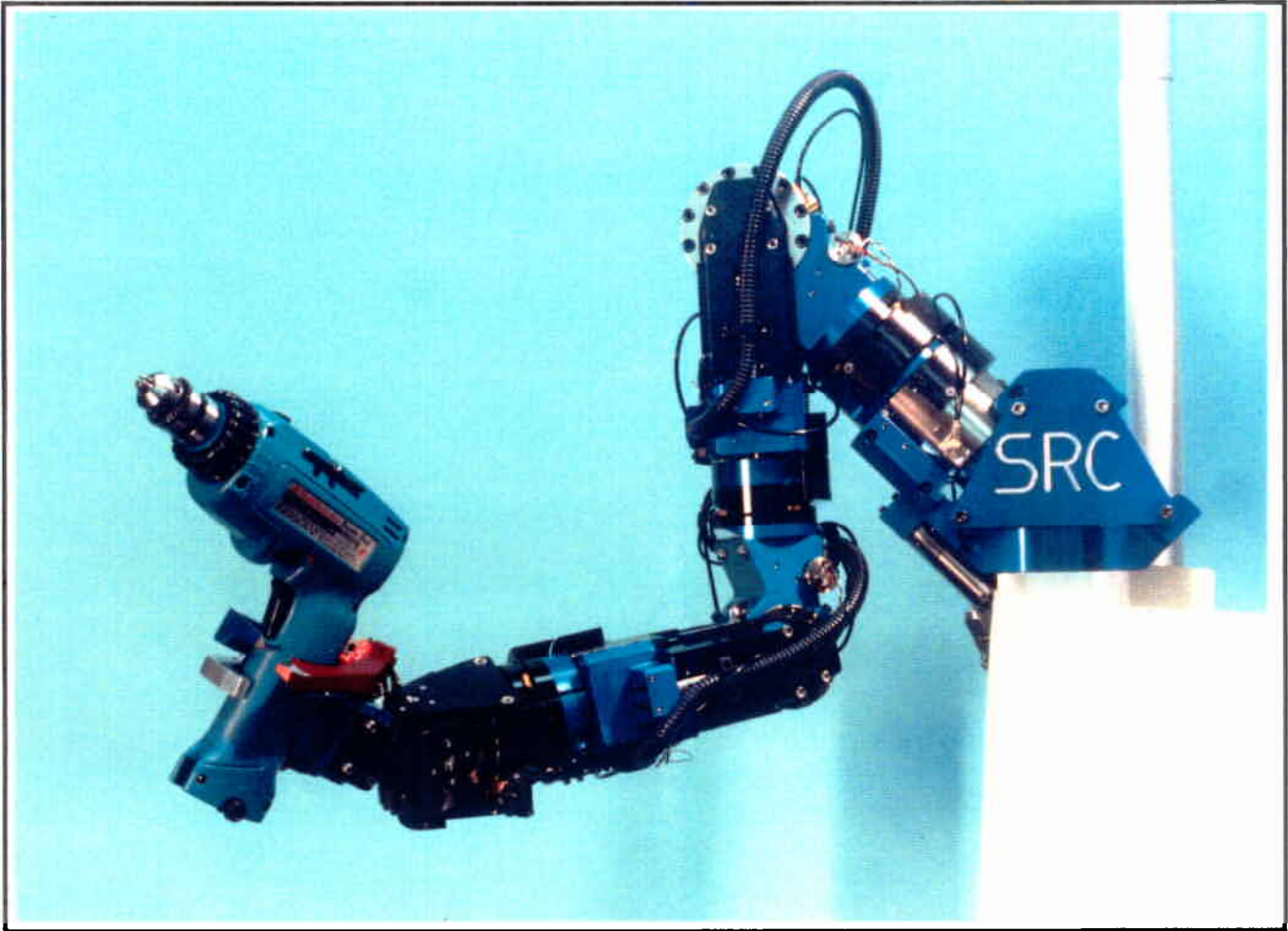
Utah/MIT Dextrous Hand

The Utah/MIT Dextrous Hand is a tendon-operated, multi-degree-of-freedom dextrous hand with multichannel touch sensing capability. The goal of the hand project has been to design and fabricate a high-performance, yet well-behaved, system that is fast, stable, and exhibits considerable operational flexibility for use as a research tool. It is used in research in machine-based dexterity at Bell Labs, Wright Patterson Air Force Base, Columbia University, NASA, MIT, and the University of Utah. The Utah/MIT Dextrous Hand is still evolving with current work centering on the Condor Controller System and touch sensing.



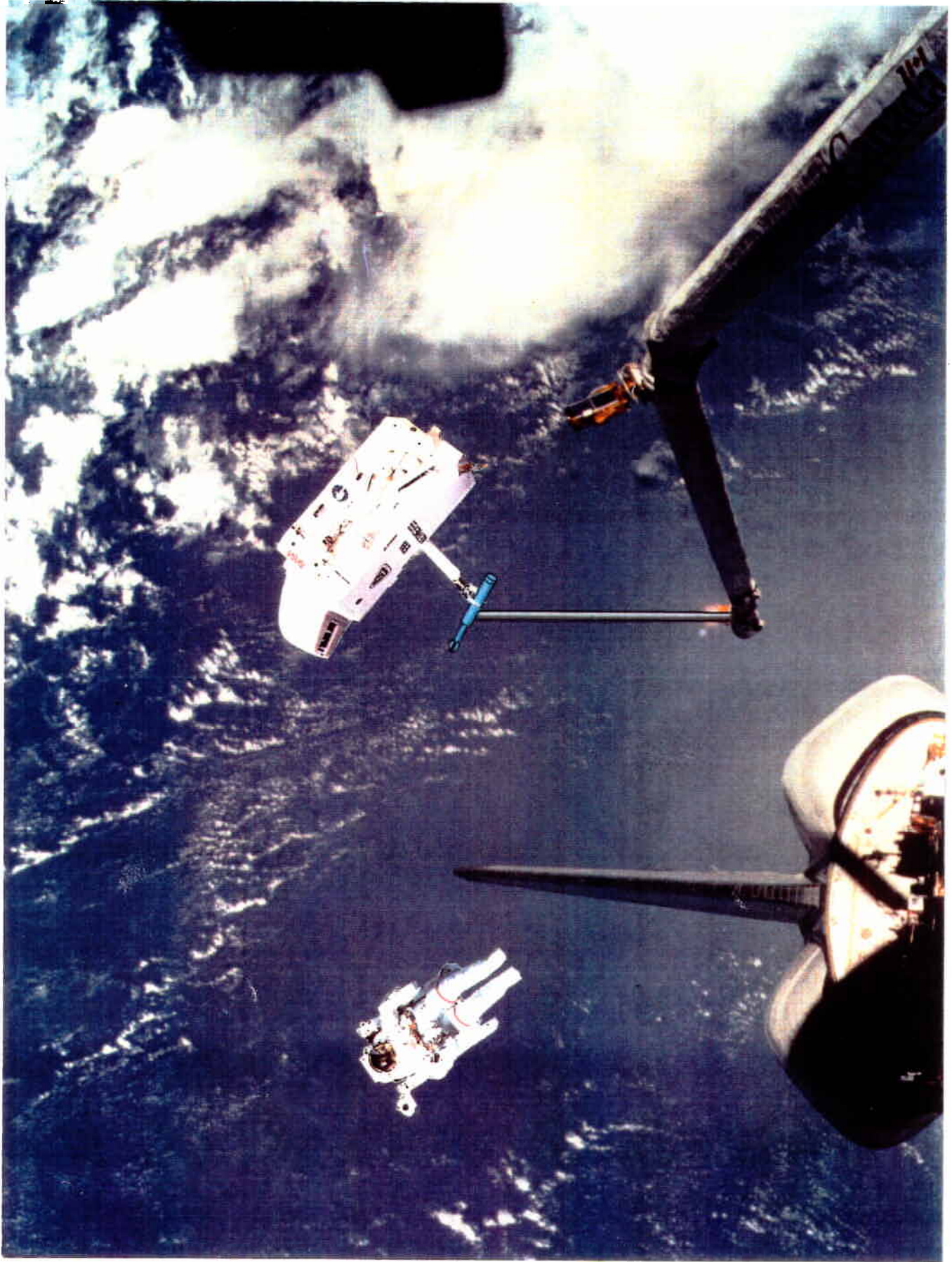
UTAH

THE SARCOS DEXTROUS ARM



- o Highest performance robotic manipulator in the world
- o Equipped with a revolutionary, high dexterity end effector
- o Can use standard human tools
- o Can manipulate conventional industrial and laboratory objects without extra fixtures
- o Ergonomic man-machine interface permits extended use without operator fatigue
- o Force reflective exoskeletal master is transparent to the user
- o Exceeds human range of motion
- o Exceptionally high force and position resolution.

FIXED TARGET RETRIEVAL TEST



NASA
EVA ASSEMBLER

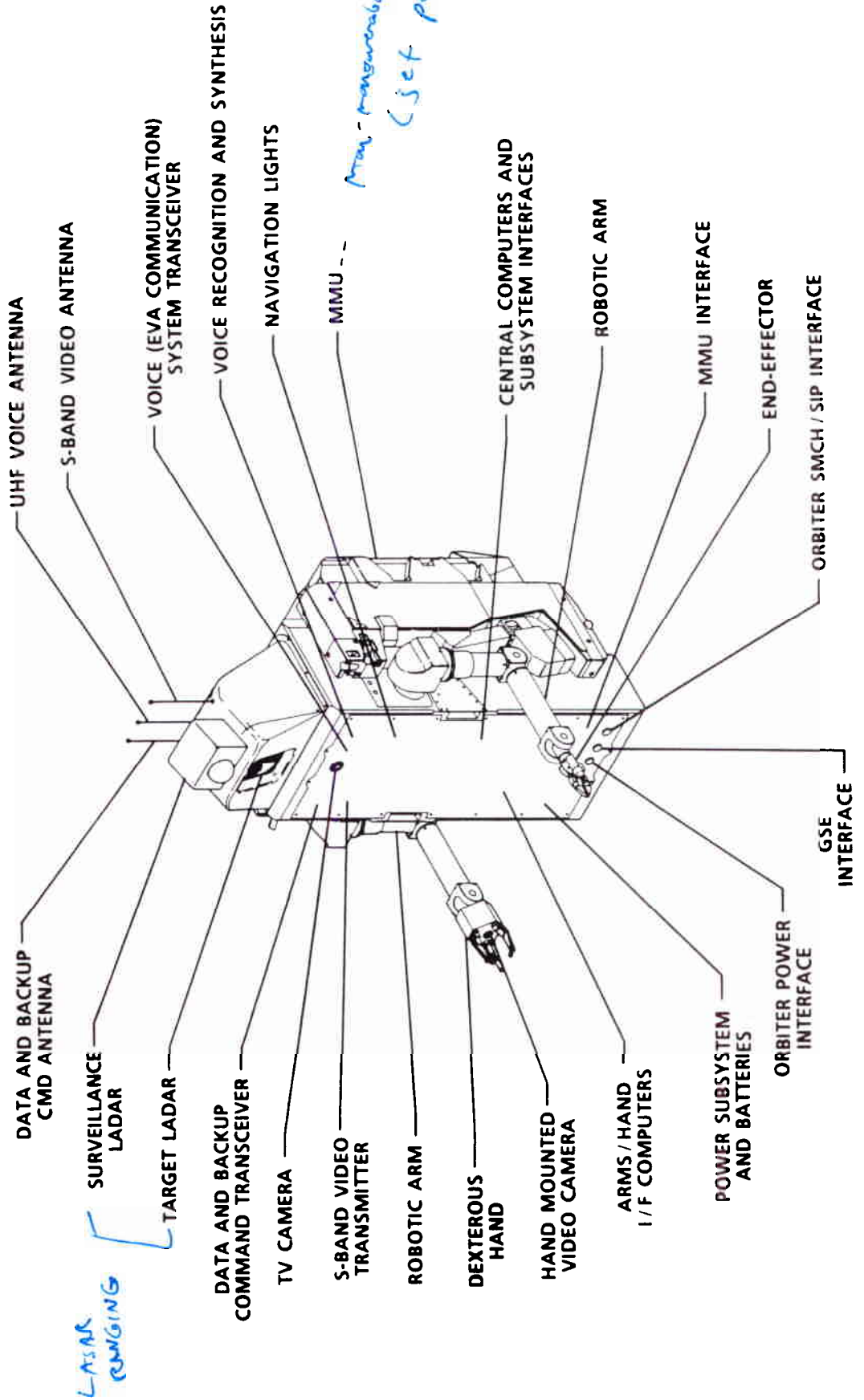
Johnson Space Center - Houston, Texas

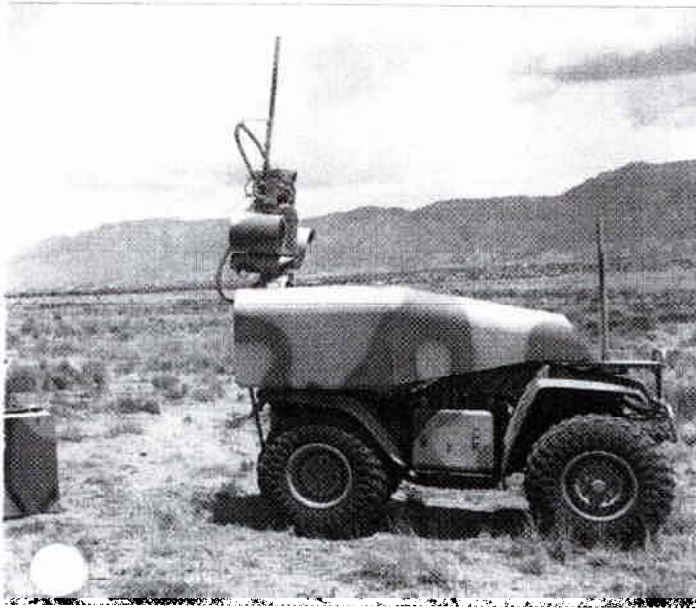
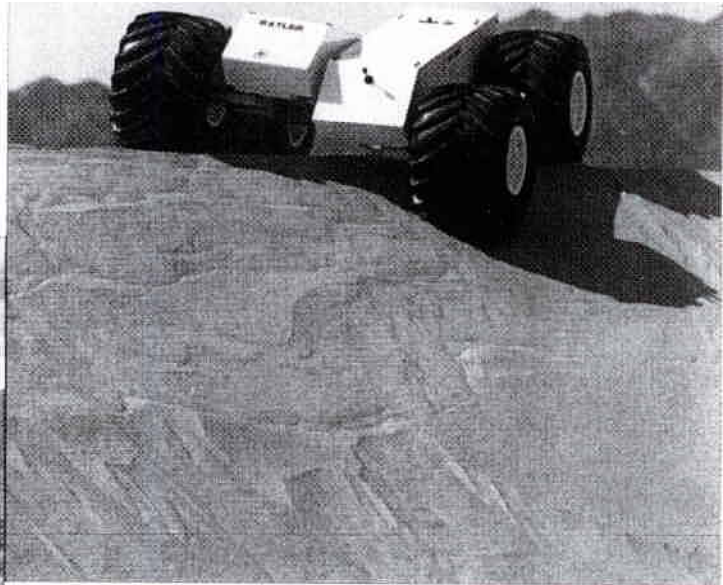
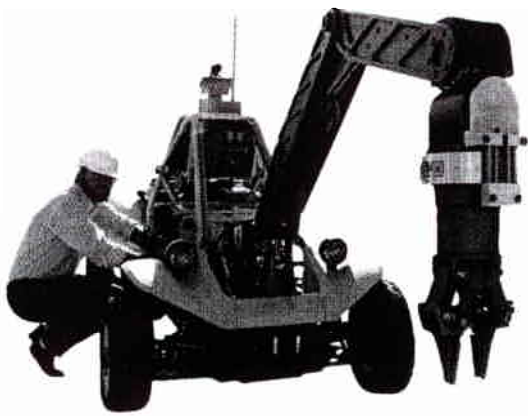


EXTRAVEHICULAR ACTIVITY RETRIEVER FLIGHT EXPERIMENT PROPOSAL

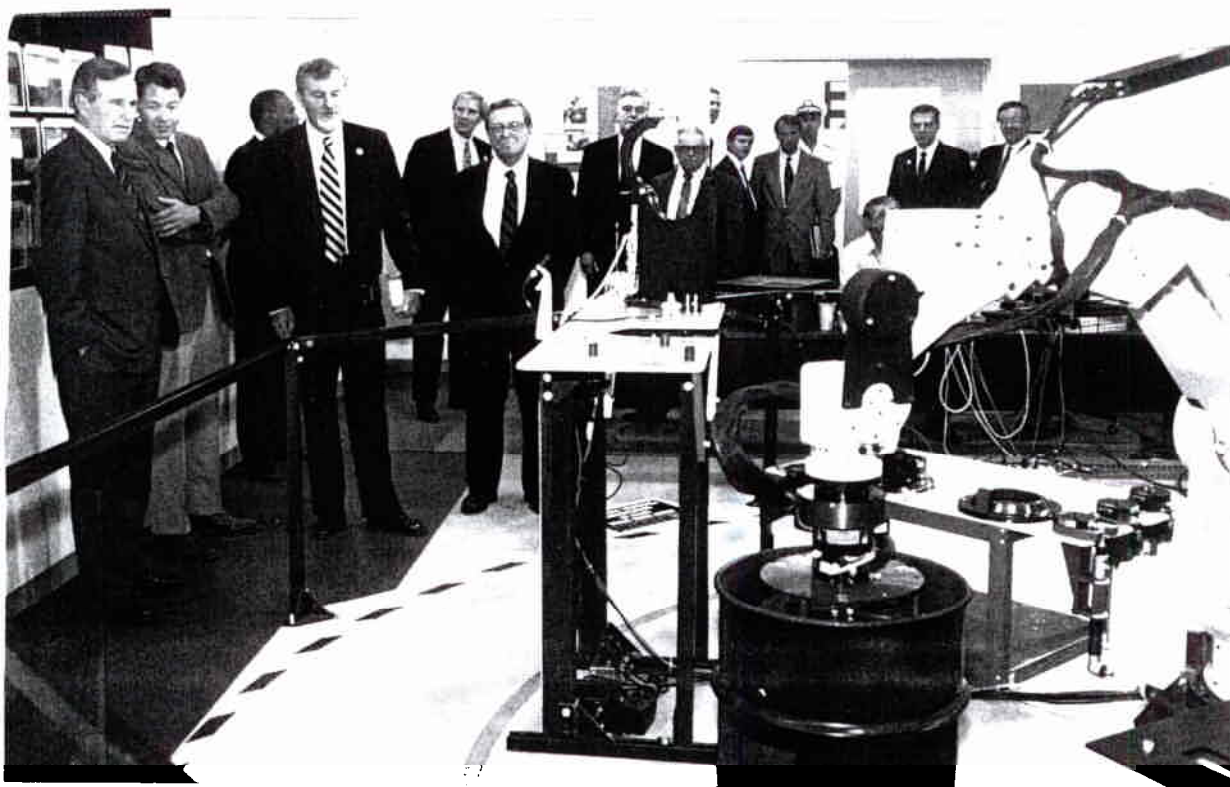
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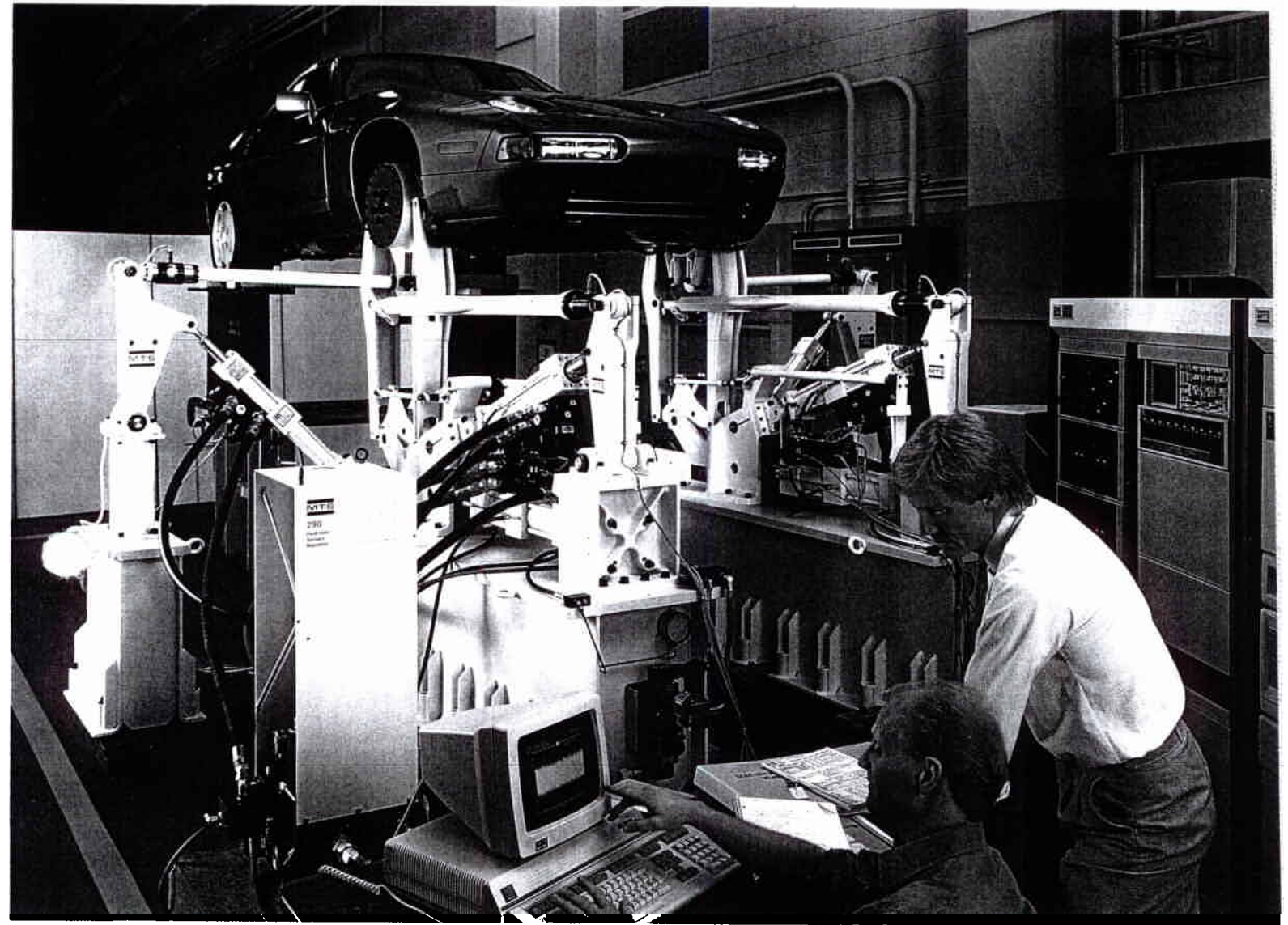




Sandia has designed many robotic systems that handle a variety of dangerous jobs. The Telemanaged Mobile Security System (TMSS, left) can be sent to remote, potentially dangerous sites, such as perimeter fences, to evaluate a breach or halt intruders. RETRVIR (above left) can go to dangerous areas and use its 6-foot robotic arm to dig up and remove hazardous waste. RATLER (above right) is a rugged, lightweight vehicle with a unique chassis that makes it effective for exploring inhospitable terrain such as that on Mars or the moon.



NUCLEAR
WASTE
CONTAINMENT
FOR
SALT
DOME
STORAGE



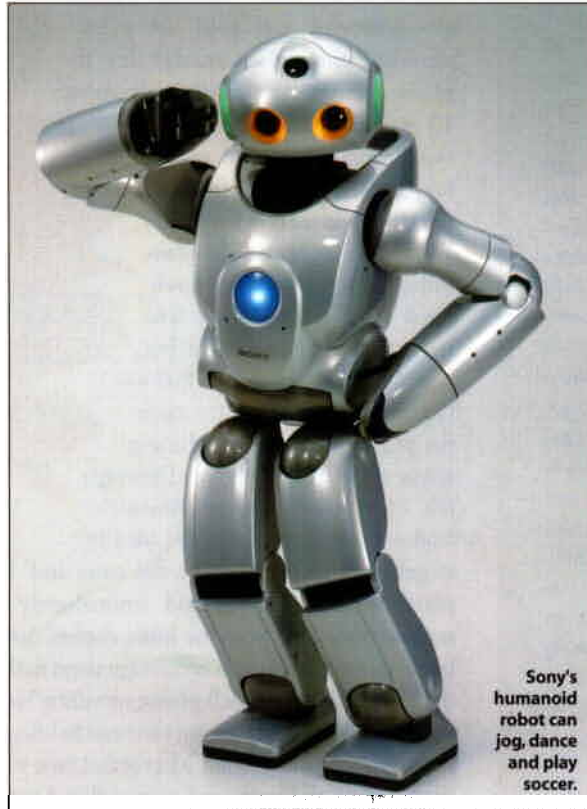
briefings

INSIDE: FLOWER POWER ► BIG BYTE ► FISTICUFFS

ifbot can help care for the elderly.



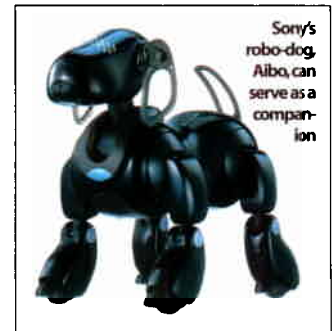
Toyota's robot can play the trumpet.



Sony's humanoid robot can jog, dance and play soccer.



Honda's robot, Asimo, can recognize voices and distinguish specific human faces.



Sony's robo-dog, Aibo, can serve as a companion.

TECHNOLOGY

ROBOTS WHO CAN SCHMOOZE

TOKYO—The antidote to becoming the world's fastest graying society? In Japan, the solution is obvious. Recruit intelligent machines to help care for, entertain, and comfort the elderly. Humanoids have long been a staple of Japanese robot research. A slew of friendly bots designed for therapeutic use have been the focus of study in recent years and, today, Japanese humanoid research has started to leave the lab and enter the home, thanks to software advances that drastically lower

costs while boosting functionality.

One of the latest incarnations is a chatty 18-inch model, named ifbot, that has attracted strong advance orders despite a hefty price tag of nearly \$6,000. Programmed to comprehend and assemble millions of phrases, this bot is geared to serve as a companion and senility-prevention device for the elderly. A menu of 15 programs enables it to discuss the news, quiz its owner, and even prompt a round of karaoke.

Scientists are also perfecting

robotic pets for nursing homes and children's hospital wards. They anticipate that these soft, furry bots can achieve some of the same results as flesh-and-blood pets. Indeed, in such environments, bots may be preferable to real animals: They're more sanitary and safe for patients with allergies. And, of course, there's no need to groom, feed, or walk them.

Humanoid bots—including entertainment bots, bipedal models, and handicapped assistants—are set to hold center stage at the upcoming 2005 World Exposition in Aichi, central Japan, this March. —LUCY CRAFT