



**GUINNESS<sup>®</sup>**  
**WORLD RECORDS**  
**2000**

**MILLENNIUM EDITION**

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British Library cataloging-in-Publication Data

A catalog record for this book is available from the British Library

ISBN 1-892051-00-1

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# robots & artificial intelligence

## **BIGGEST ROBOT**

In 1993, US company Amblin Entertainment, which is owned by Steven Spielberg, created an 18-ft.-tall, 46-ft.-long, 9,000-lb. robotic *Tyrannosaurus rex* for the film *Jurassic Park*. Made of latex, foam rubber, and urethane, it was the same size as the original dinosaur and the biggest robot ever made for a motion picture.

## **SMALLEST ROBOT**

The light-sensitive Monsieur microbot, developed by the Seiko Epson Corporation in Japan in 1992, measures less than  $\frac{3}{50}$  in.<sup>3</sup> and weighs  $\frac{1}{20}$  oz. Made from 97 separate watch parts, it can move at a speed of  $\frac{2}{5}$  in. per sec. for about five minutes when charged.

## **TOUGHEST ROBOT**

A robot named Commander Manipulator has been developed by British Nuclear Fuels Ltd. to help with the cleanup of contamination at Windscale Pile 1 (now called Sellafield) in Cumbria, England — the scene of one of the world's worst nuclear accidents. The technology available at the time of the accident in 1957 was unable to cope with the extreme conditions in the plant's defective reactor, so the 14 tons of uranium fuel inside it were simply buried under several yards of concrete. The robot is largely resistant to the effects of radiation, and its hydraulically powered five-jointed arm can shift weights of up to 280 lb.

## **CHEAPEST ROBOT**

Walkman, a 5-in.-tall robot, was built from the remains of a Sony Walkman for \$1.75 at the Los Alamos National Laboratory in New Mexico in 1996. In tests, it struggled to get free when its legs were held without being programmed to do so and without making the same movement twice.

## **MOST USED INDUSTRIAL ROBOT**

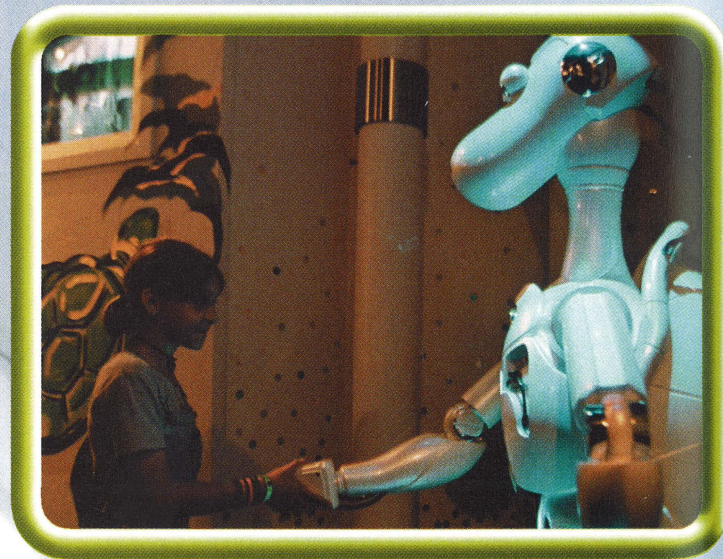
Puma (Programmable Universal Machine for Assembly), designed by Vic Schienman in the 1970s and manufactured by Swiss company Staubli Unimation, is the most commonly used robot both on assembly lines and in university laboratories.

## **FASTEST INDUSTRIAL ROBOT**

In July 1997, Japanese company Fanuc developed the LR Mate 100L high-speed conveyance robot, the axis speed of which is estimated to be 79% faster than previous models. The robot can carry objects for up to 1 mile 1,513 yd. and can move up and down 1 in. and back and forth 12 in. in a time of 0.58 seconds — 60% faster than previous models and an industry record.

## **MOST HUMANOID ROBOT**

In 1997, Japanese company Honda launched the 5-ft.-3-in.-tall P3 robot. The robot, which has three-dimensional sight, can turn its head, step over obstacles, change direction, and correct its balance if



## **BIGGEST VIRTUAL REALITY MARINE SIMULATION**

A girl shakes hands with a turtle-shaped robot at Expo 98, held in Lisbon, Portugal. The exhibition was the setting for the world's biggest virtual reality marine simulation ever. Visiting "divers" could explore the Atlantic, Pacific, Indian, and Antarctic Oceans by means of a VR headset and an Onyx 2 supercomputer.

pushed. Developed by 150 engineers over 11 years at a total cost of \$80 million, it is intended for use in nursing and for tasks that are too dangerous or strenuous for humans.

## **MOST ADVANCED ROBOT TOY**

In January 1998, the Danish toy company Lego unveiled MindStorms,

"intelligent" plastic building blocks that can be made into "thinking" robots and brought to life through a home computer. Developed over more than 10 years by Professor Papert of Massachusetts Institute of Technology (MIT) in Cambridge, Massachusetts, the bricks contain a microchip and sensors.

## **FASTEST-SELLING ROBOT PET**

Aibo (Japanese for "partner") is Sony's robot dog, which retails for \$2,066. When Aibo made its first appearance on Sony's Web site on May 31, 1999, 3,000 were sold within 20 minutes. The 11-in.-tall Aibo can recognize its surroundings with a built-in sensor. It can play independently or be programmed to do tricks. When another 2,000 Aibos went on sale on the Internet in the US on June 1, 1999, the initial rush to buy the pet caused Web servers to crash.

## **MOST ADVANCED ROBOTIC ARM**

In 1997, the US company Barret Technology developed a \$250,000 robotic arm that has cables that act like tendons and that can hold weights of 11 lb. in any position. The arm has a total of seven gearless joints, driven by brushless motors. It can throw a ball

## **MOST SOPHISTICATED SURGICAL APPLICATION**

Dr. Robert Lazzara of Seattle, Washington, is seen practicing a coronary artery bypass on a model thorax using Computer Motion Inc.'s Zeus robot. Zeus, which was released in February 1998, allows surgeons to perform heart bypasses through three incisions the width of pencils, using thin instruments that fit inside tubes in the patient's body. Computer Motion Inc. is currently planning to produce a new version of the robot that allows surgeons to operate over a high-speed telephone line.







and could also be developed for cleaning, assisting people in and out of the bathtub, opening doors, and preparing meals.

#### **MOST ADVANCED FORM OF ARTIFICIAL INTELLIGENCE**

*Deep Blue*, IBM's RS/6000 SP chess-playing parallel supercomputer, beat world chess champion Garry Kasparov by 3½ games to 2½ in 1997. Equipped with chess-specific coprocessors, *Deep Blue* can examine 200 million moves a second, which translates into 50 billion possible moves in three minutes (the time normally allowed for a single move in chess competitions). This astonishing amount of processing power allows *Deep Blue* to be, in Kasparov's words, "brilliantly subtle."

#### **BIGGEST ROBOTIC TELESCOPE**

The world's largest robotic telescope, situated at La Palma in the Canary Islands, has been built as a joint project between the Royal Observatory in Greenwich, London, and the astrophysics department at Liverpool's John Moores University, both in England. Controlled remotely from an office at the university's astronomy department, the telescope has a 6-ft.-7-in. aperture that will allow researchers to study black holes, red giants, and distant galaxies.

#### **BIGGEST PRODUCER OF COMMERCIAL ROBOTS**

Formed in 1982, Japanese robot manufacturer Fanuc is the largest producer of commercial robots. Fanuc Robotics in the US has more than 1,100 employees and 21,000 robots in service.

#### **COUNTRY WITH THE MOST INDUSTRIAL ROBOTS**

Since 1991, approximately 325,000 robots have been installed in Japan — more than half of the 580,000 installed worldwide. For every 10,000 people that are employed in the Japanese manufacturing industry, there are now 265 robots in use.

#### **MOST AUTOMATED FACILITY**

In March 1997, the Fanuc assembly plant in Yamanashi, Japan, became the most automated facility in the world when a number of two-armed intelligent robots began to assemble mini-robots, resulting in a completely automated manufacturing system.

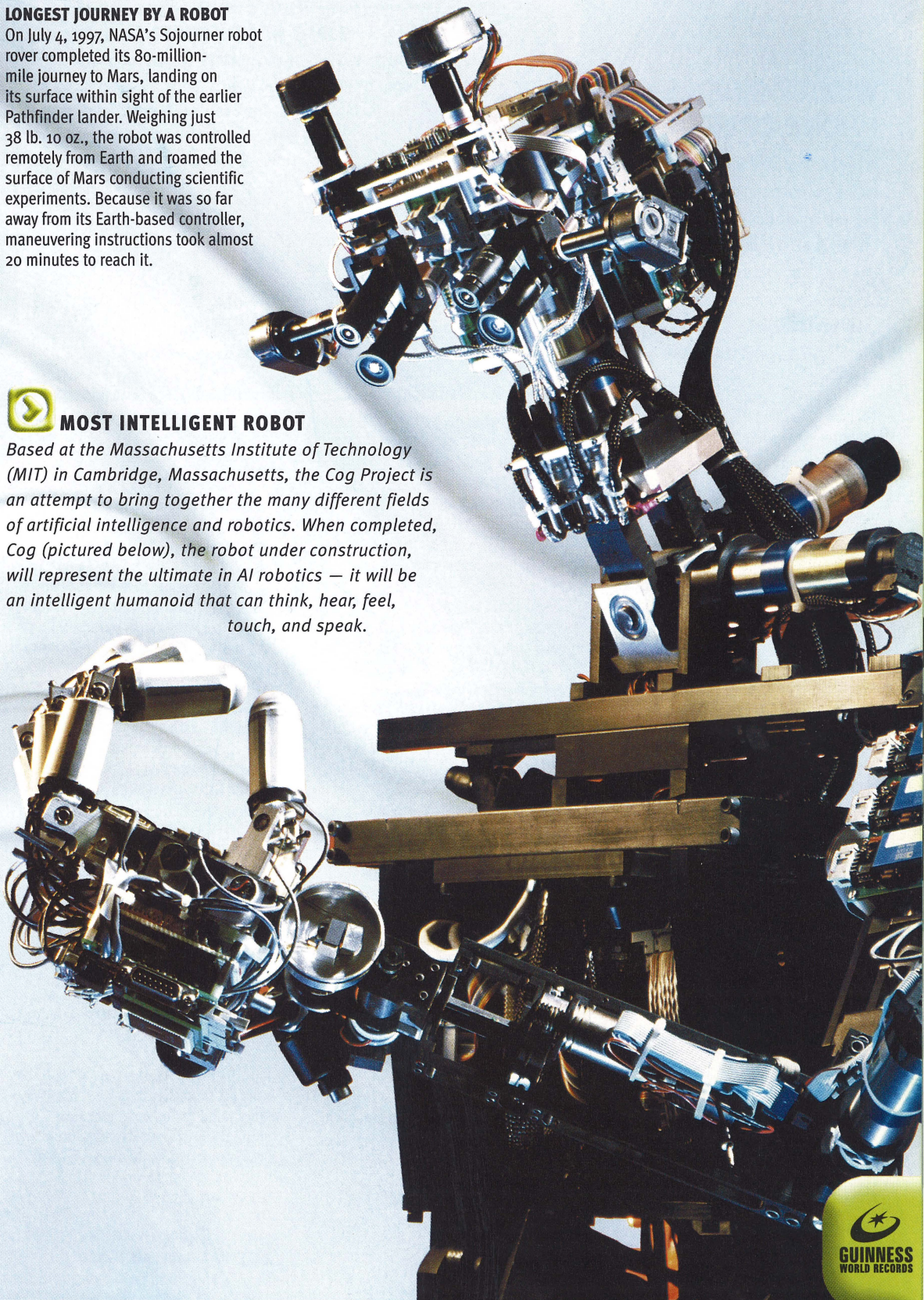
#### **LONGEST JOURNEY BY A ROBOT**

On July 4, 1997, NASA's Sojourner robot rover completed its 80-million-mile journey to Mars, landing on its surface within sight of the earlier Pathfinder lander. Weighing just 38 lb. 10 oz., the robot was controlled remotely from Earth and roamed the surface of Mars conducting scientific experiments. Because it was so far away from its Earth-based controller, maneuvering instructions took almost 20 minutes to reach it.



#### **MOST INTELLIGENT ROBOT**

Based at the Massachusetts Institute of Technology (MIT) in Cambridge, Massachusetts, the Cog Project is an attempt to bring together the many different fields of artificial intelligence and robotics. When completed, Cog (pictured below), the robot under construction, will represent the ultimate in AI robotics — it will be an intelligent humanoid that can think, hear, feel, touch, and speak.





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