

A Flock of Robots

Programming and Modeling Teams of Robots to Work Together



Dayton, OH (Wright-Patterson Air Force Base) -- Engineers program robots to communicate wirelessly and perform complex operations. They create computer models and physical models of the robots. The physical models may seem like toys, but as part of the Air Force, the engineers are intensely interested in such things as eventually programming robots to fly planes.

"We're trying to be very very realistic. Very close to the real world." **Juan Carbonell, electrical engineer**

Framework	Standards
Middle School	NSES - B.iii.4 ➤ Electrical circuits transfer energy. STL - 2.M ➤ Technological systems include feedback. STL - 3.E ➤ Developments can be applied from one setting to another. STL - 9.H ➤ Modeling and testing are used. STL - 17.H ➤ Communication transfer systems transfer information from machine to machine.

Content Illustrated

- Sensors are instruments that measure light, temperature, motion, pressure, and electricity.



Content



Technology

- Computer programs simulate communication and operation of virtual robots. Computer programs allow for testing of hundreds of scenarios before operation with real robots.
- The computer software is programmed much like a video game.
- Sensors are devices that detect sound, light, position, pressure, and electricity, among other things. In the home, thermostats sense temperature, and burglar alarms detect motion. Sensors receive information that can be turned into electrical signals, allowing people or computers to respond to the information.

Engineering

- Engineers try to program the robots to communicate with each other in order to achieve a particular goal. Each robot can perform a select number of tasks, but together they can do more complex things. The team of robots works together to solve a problem, each robot with its own complex behaviors.

Guiding Questions

To think about as you watch:

- What technology is needed to enable robots to sense their surroundings and communicate with other robots?

Suggested Activities

- Program educational robots to work together to solve a complex problem.
- Write about a scenario in which it would be better to have many small robots communicating to get something done rather than one large robot doing the work.

Keywords

bumper sensor
computer modeling
programming radio
waves
robot
router
sensor
transmitter
virtual computer

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