

## Ideas from Nature

### Bat: Hearing

Bats can find their way by listening to reflected sound. Device has been made on this principle to aid blind people find their way.

### Pig: Taste

Pigs have far better sense of taste than normal human. Some human, however, have 5 times better sense of taste than others.

### Dog: Smell

Dogs are long known for their sense of smell – they have 23 square inches of highly sensitive sensors compared to 2 square inches of human. A dog has been trained to detect cancer cells and it was successful to correctly identify cancer cell on 4 out of 5 patients.

### Elephant: Infra Sound

Elephants produce infra sound that is not reflected by normal objects – so it can transmit longer distance. Elephants can sense vibration with their feet.

### Dolphin: Ultra Sound

Dolphins produce ultra sound that we cannot hear. When the transmitted sound is reflected, they can process it to create a 3D image of the reflection. They can sense a fish 3 feet beneath ground with this technology.

### Snake: Infra red sensor

Snakes are equipped with infra red sensors using which they can visualize their prey with the heat generated by them.

### Shrimp: Vision

Certain families of Shrimps have eyes with 16 color primaries compared to 3 primaries of human. They have small brain, so image processing is done within their big eyes.

### Shark: Sixth Sense

Shark can hear the sound of a plate being put on table from 1 mile away and smell food from half a mile away. Most amazingly, they can sense half a billionth of a volt – even being able to sense the impulse generated by muscle movement.

## Natural Sensors in Action:

### Wasps and Bees:

A small British bio-technology firm called inscentinel is employing the finely tuned olfactory system of bees to sniff for explosives.

Why: One bomb-sniffing dog can cost upward of \$15,000 to train. A bee system is just as accurate and costs pennies per bee.

How: When bees detect the target odor, they extend their proboscises. A camera records the positive response, and a computer alerts an operator.

Deployment: British biotech firm Inscentinel hopes to commercialize its system by next year (2008)

Drawbacks: Although the bees are sealed in a container, inviting them into an airport could make travelers a bit nervous.

### Bluegill Fish:

New York, California and Maryland are exploiting the highly sensitive nervous system of bluegill fish to test for toxins in municipal water supplies.

Why: Waterborne parasites sicken some 900,000 Americans every year, and public reservoirs are highly vulnerable to terrorist attack.

How: Slight impurities drive big changes in blue-gills' vitals. Sensors in the tank monitor the fish and sound an alarm when things get out of whack.

Deployment: The fish stand guard at reservoirs in New York, California and Maryland, where they've detected pesticides and a diesel spill.

Drawbacks: Bluegills respond indiscriminately to a broad range of contaminants, so technicians must follow up with other tests to pinpoint specific hazards.