"Invisible" Aircraft

To be stealthy is to move about in ways that go undetected. Skillful spies are stealthy. So is the F-117 stealth fighter plane. It's all but invisible to radar.

Radar antennae send out bursts of radio waves that are reflected back by the objects they hit. The antenna measures the time it takes for the reflection to return. That tells how far away the object is and how big it is. In wartime, that information could get a plane and its pilot shot down.

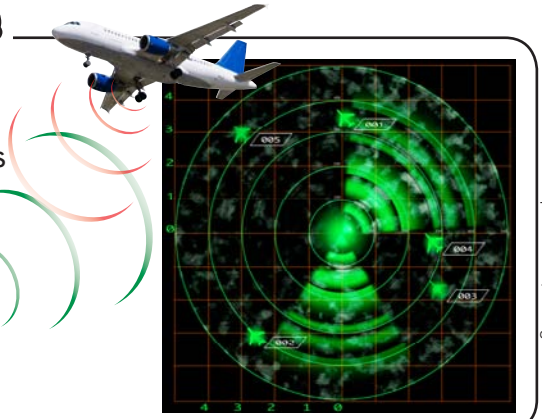
Two factors make the F-117 stealthy. One is shape. Most aircraft have a rounded profile that radar can easily detect. But the F-117 has flat surfaces and sharp edges that bounce radar waves out and away at sharp angles.

The other factor is covering. Most planes are made of metals that reflect radio waves. But the F-117 is covered in a material that absorbs radio waves instead of reflecting them. Together, the F-117's shape and covering only reflect about as much radar as a hummingbird.

Word Wise

Radar is an acronym, a word formed from the first letter or letters of several words.

Radar =
RAdio
Detection
And
Ranging



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THE CLOAK OF INVISIBILITY

By Ron Fridell

In the Harry Potter® books, Harry covers himself with a magic cloak that makes him disappear when he needs to get out of a tricky situation. Wouldn't it be fun to be able to choose when to be visible?

Illustration by Judy Martin

Only a fictional character like Harry can do it, for now. But that may soon change! Scientists at two U.S. universities have engineered coverings that make small objects seem to disappear.

How did they accomplish this astonishing feat? The key is light waves. We see things because they reflect and absorb visible light, which travels in waves that can bend. That's why a straw in a glass of water appears to zigzag; the light waves bend as they pass from the air to the water.

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The scientists wanted to bend visible light away and route it around an object the way water in a stream flows around a stone. Then the object would neither absorb nor reflect light. It would not cast a shadow either. The object would be invisible to human eyes.

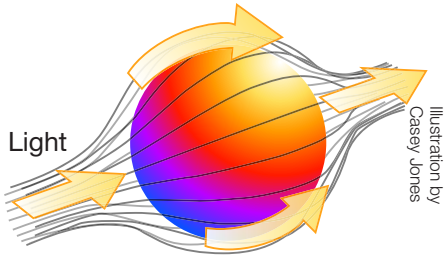


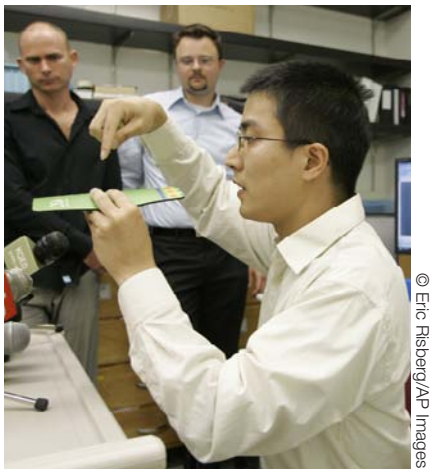
Illustration by Casey Jones

With the new covering, light bends around an object like water around a rock in a stream.

To reach their goal, they engineered microscopic metal strands that bend light waves away, then wove them into coverings that look like nets. When they place one of these coverings over a small object, the object vanishes from sight. Observers can see only what's behind the object, as if they were looking right through it.

So far, these scientists have managed to weave together only very small coverings. What do they want to do now? Their next goal is to produce coverings big enough to cloak a person—just like Harry Potter's cloak of invisibility.

This coat uses a camera to project the image behind it onto the front. But an invisibility cloak could look like this.



Scientist Jie Yao demonstrates the invisibility material.

Write About This!

Suppose we had unlimited supplies of coverings that make things invisible. Let's say the coverings could be made of cloth, paper, or paint. What practical uses could they be put to? One scientist thought of coating an ugly factory building that blocked a beautiful view of distant mountains. Think of three or more uses and make a list. Then put your thoughts into writing.

JOKE

Nurse: Doctor, an invisible man is here to see you.

Doctor: I can't see him now. Bring in the next patient.