

A radar transmitter sends out a very powerful burst of electronic microwave energy. This burst of energy, called a pulse, travels through an enclosed conduit, called a waveguide, to a reflector. The reflector shapes the pulse into a very narrow beam, which is then directed outward, away from the radar site. If this pulsed beam of directed energy strikes a suitably reflective object, it then returns back to the reflector, which is now acting as a collector, down the waveguide to a receiver, and displayed on a radar scope.

We usually think of the rotating reflector as an antenna, but the actual antenna is located at the point where the waveguide joins to the transmitter, sometimes hundreds of feet away. (This antenna is usually very small, about the size of a short piece of larger pencil lead) The waveguide keeps the transmitted signal from radiating out into the air until it reaches the reflector. The most common reflectors, those that we are used to seeing, are the ones that look like a large slice of "orange peel" laid on a horizontal axis, and rotates in a continuous 360 degree circle. This type of reflector shapes the pulsed energy into a narrow vertical beam that extends from the ground up to a very high altitude (usually 50 - 100 thousand feet).

[Note: Bear in mind that we are referring to the radar used to detect aircraft. Other radar units, such as those used on boats, and weather radar, work on this same principle, except that the pulsed beams are shaped differently, and/or setup to detect other than solid objects (such as moisture in the air.)]

As the vertical pulsed beam is rotated in a circle, portions of it may bounce off aircraft and back towards the radar site. The radar scope that is attached to the receiving unit has an electronic "line" that moves around in a circle, in the same manner as a hand of a clock. The line corresponds to the direction that the radar reflector is presently pointing. This gives the radar operator the bearing, or direction, of the aircraft from the radar site. The range, or distance, is determined by the time that the pulse takes to travel outward from the transmitter and be reflected back to the receiver. This type of radar is referred to as search radar.

With this simplified concept of radar in mind, let's look at some common misconceptions we may have concerning radar reports of UFOs:

One of several things that determines the maximum distance at which objects can be "seen" with radar, is the speed at which the radar reflector turns. If it turns too fast the reflector will have moved too far to properly focus the returning weak pulses from the most distant objects back into the waveguide, and to the receiver. Think of the reflector as making a complete circle about once every 30 seconds or so.

Once the narrow vertical beam intersects with an airborne object, the reflected pulse travels back to the receiver and is displayed on the radar screen as a small dot, called a blip. The radar does not display another blip until the reflector rotates completely around and intersects the object again. The speed can then be determined by comparing the distance that the object traveled between blips. The radar has no idea at all as to what the object did in between blips.

In other words, this type of radar cannot determine if the object is making right-angle turns, or even minor maneuvers. It can only detect where the object is during the brief instant that the rotating beam reflects off of it. Only a rough guess of the light path can be made by plotting out the position of several blips.

Search radar also cannot show the altitude of an object. To determine altitude you would need a height-finder radar. But how, you ask, is the altitude of aircraft normally determined? Mounted on top of the reflector is a narrow horizontal antenna that sends out a coded radio signal, also in a beam similar to the radar pattern. Whenever the radar detects an airborne object, it also sends out the coded radio transmission, which is picked up by a special receiver on the aircraft, which then sends coded information back to the radar's radio antenna. The receiver/transmitter unit on the aircraft is called a transponder.

The transponder is connected to the aircraft's altimeter, and sends this information back to the radar site. The transponder also contains information about the aircraft's flight plan, what type of aircraft (military, commercial, private, other...), and other useful data. But, the transponder data is not displayed on the radar scope. It's part of a separate transmitting and receiving system. So how do radar operators manage to keep track of all this input? This is where radar gets interesting.

NOBODY IS LOOKING AT THE ACTUAL RADAR RETURNS, and haven't been since the 1960s. It's all handled by computers. There is an actual radar scope at the receiving site, but it is only used for maintenance and testing. Someone could be looking at this scope, but trust me, this gets very boring after a while, and anyone at the site soon learns to ignore this scope. The actual radar operators are often some distance away, and don't have access to an actual radar scope. What they are looking at is a computer generated simulation of a combination of the radar and transponders returns. More on this later. First, let's return to the radar site where I was stationed in North Charleston.

The UFO report stated that the radar site had been contacted, and that the UFO had been confirmed by radar. This couldn't be true, since anyone rarely ever looked at the actual radar scope. Even if they were, they wouldn't be aware that a UFO was being displayed among the many blips being displayed on the scope. (This site was located next to the Charleston Airport and Charleston AFB, a very busy MAC base during that time period)

The North Charleston Radar site was an Aerospace Defense Command site that collected and passed along East Coast radar and flight data to NORAD. If someone had managed to find a correct telephone number to contact the site, they wouldn't have been given any sensitive information, even though there wasn't any information to give. The radar and transponder information were automatically fed into a computer, which processed the signals and passed them along to NORAD via a network that was the forerunner of today's internet.

[Note: this is where the internet actually started. The Military had to have a reliable method of getting this sensitive data across the country from various radar and information gathering sites via several different pathways. Research facilities and certain universities were later added to this Government/Military network, where their employees began using the network for business and personal applications. As other institutions were added, this network eventually got out of control of the Government, resulting in today's World Wide Web.

There are stories that this was all planned by the Shadow Government as a means of monitoring and controlling future civilian communications and transactions. One of the stories states that all e-mail goes through the Pentagon, and is monitored by special computers for content.]

Let's go back now to how radar data is monitored. After being processed by computers, the radar and transponder signals are then displayed on special screens, to be used by radar operators, now called air traffic controllers. Instead of blips, a different symbol is displayed on the screen for various types of aircraft. A military aircraft, for example, would be represented by a star. Next to the symbol is displayed an aircraft's ID number and the altitude.

Any airborne object not sending back a transponder signal would automatically be considered unknown by the computer and would immediately issue an alert to NORAD. An interceptor aircraft would then be dispatched to make a visual sighting. Most of these intercepts turn out to aircraft with malfunctioning transponders, but some of the rest are now part of UFO history.

Another benefit of having computers control radar data is that the computer program can be controlled so as to ignore certain aircraft. Black Project crafts could fly around at night without lights and not be "seen" by any air traffic controllers. (How many times have mysterious craft been seen by civilian and commercial pilots and not be confirmed by airport radar?) Aircraft could also be displayed that are not really there. The president could leave for a claimed destination, only to divert to another secret location, with air traffic controllers "seeing" his plane continue on to the original destination. If duplicate

To find this message again in the future...
Link it to the appropriate [Ufologist](#) or [UFO Topic](#) page.

Archived as a public service by [Area 51 Research Center](#) which is not responsible for content.
Software by Glenn Campbell. Technical contact: webmaster@ufomind.com

Financial support for this web server is provided by the [Research Center Catalog](#).