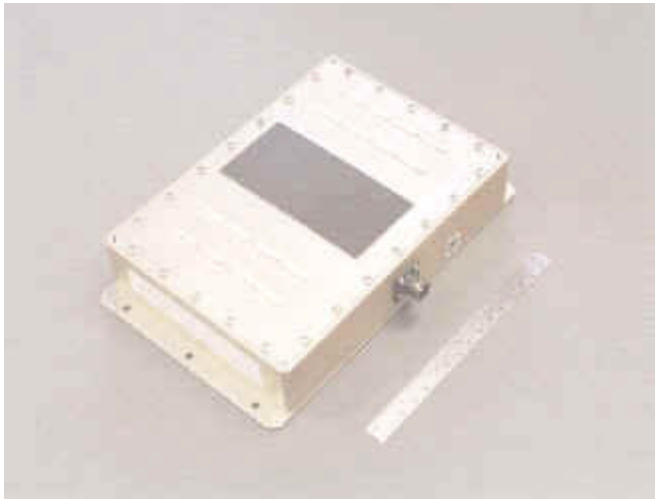
RF Tag Devices

Contents



Technology Thrust Overview

A large and rapidly growing market exists for RF Identification (RFID) technology, ranging from simple theft-control tags at the low end to remote intelligent read/write devices such as production tracking tags and automatic toll collection systems at the high end. Most RFID devices currently in use operate at relatively short distances, from a few inches to a few feet. S*R's RF tags are designed to operate from hundereds of feet to miles.

Spectra Research (S*R) Long Range RF Tag technology was developed for combat identification requirements arising from the experiences of the Gulf War. S*R RF tags are passive devices operating in the microwave region, with a radar system serving as the interrogator. S*R has demonstrated tags operating in X band (10 GHz) and K band (24 GHz) with radars ranging from hand held police speed radars to airborn radars.

S*R Long Range RF Tag technology offers several unique advantages:

- Combines the ability of radar to **detect and locate objects** with the ability of the tag to **provide identification** information to the interrogator.
- With a suitable choice of operating frequency, radar **penetrates visual barriers** such as fog, rain, foliage, and some buildings.
- **Some can respond to simultaneous interrogation by multiple radars**. This is not possible with active transponders.

Technology Description

S*R Long Range RF Tags are passive retroreflectors which reflect radiation back in the direction from which it came. Because of retroreflective gain (the same principle exhibited by road signs and bicycle reflectors) the radar return is quite large for the size of the tag. Typical operating ranges are on the order of 100 - 1,000 meters for tags illuminated by a hand-held radar to ranges exceeding miles for tags illuminated by an airborne radar. Tag modulation is matched to the signal processing capabilities of the interrogating radar.

Technology Application

- Positive combat identification of vehicles
- Location and identification of vehicles and shipping containers in storage areas
- Location and identification of assets such as shipping containers, semitrailers, railroad cars, and barges
- Location and tracking of personnel in hazardous areas such as firefighters, search and rescue personnel, and police.

S*R Expertise

S*R expertise in this field originated more than six years ago with specialists in the areas of antennas and radar cross section (RCS) . Our first RF tag, intended for individual identification, was demonstrated in 1993. Since that time, a number of S*R tag developments have concentrated on planar microstrip configurations.

Product Under Development

S*R is currently developing an IO Tag for use with existing radars operating in the 10 GHz band. The brassboard tag has been successfully demonstrated with several airborne and handheld radars. ID Modulation is provided by a microprocessor-based programmable waveform generator.

Partner Opportunities

Spectra Research is willing to partner with other companies, government agencies, universities, and individuals to apply S*R Long Range RF ID technology to emerging markets. Specific applications include:

- Combat identification in conjunction with existing military radars

- Personnel tracking, identification, and status reporting for fire fighters and rescue workers
- Asset tracking for shipping containers, semitrailers, railroad cars, barges, etc.

Information Sheet Downloads

- Long Range RF Identification Tag Flyer -
  - Word 97 Version (.doc)
  - Rich Text Format (.rtf)
  - Acrobat Reader Version (.pdf)