

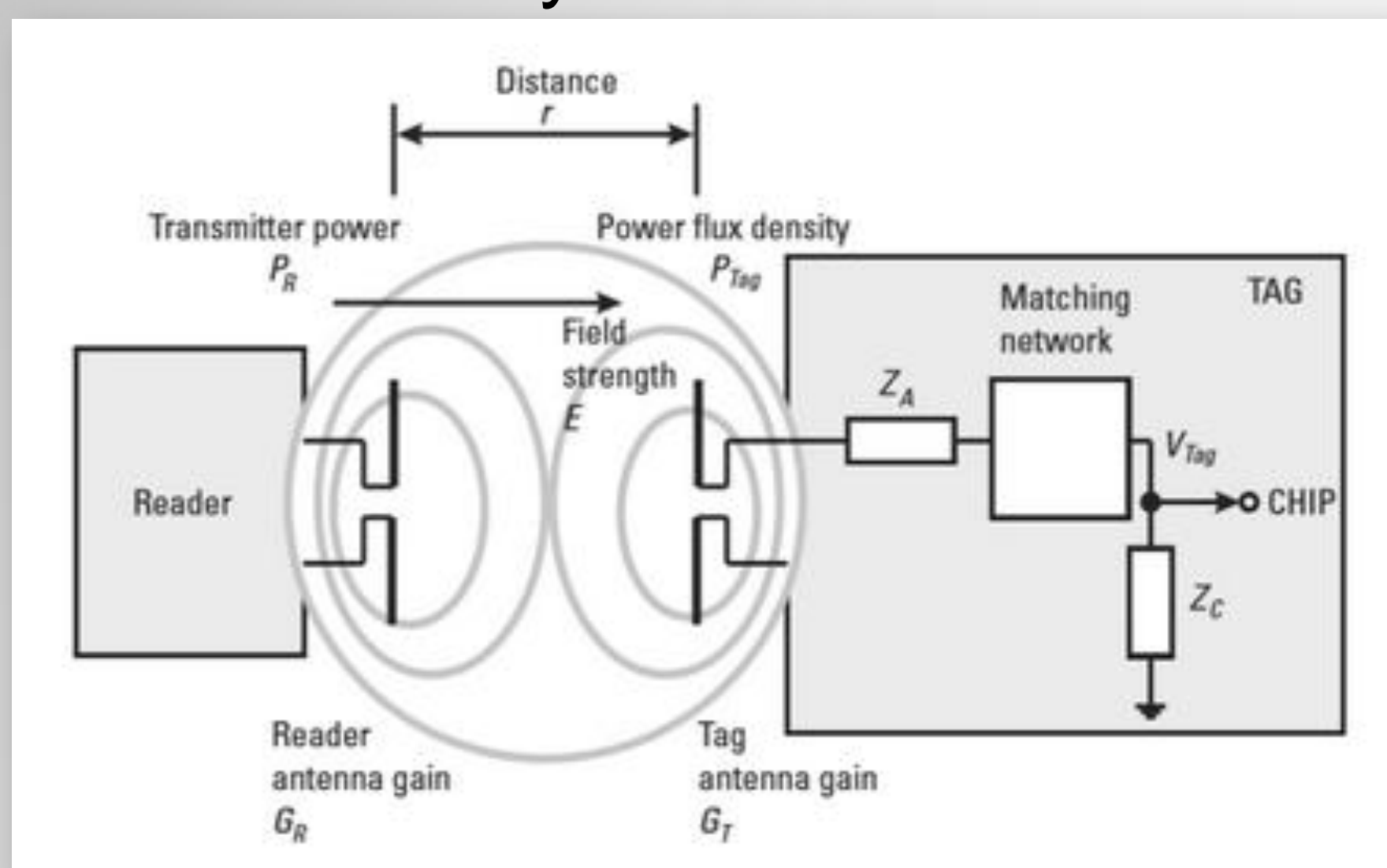
# Detecting Corrosion Utilizing A Passive RFID Tag

*Emily Layden, Physics Department/UAH*

## Introduction

There is not a remote accessed early onset detector of corrosion. This research will show that a radio frequency identification tag can be modified to detect corrosion. Attaching a corrosion susceptible material to part of the antenna will become corroded and act like a canary in the mine.

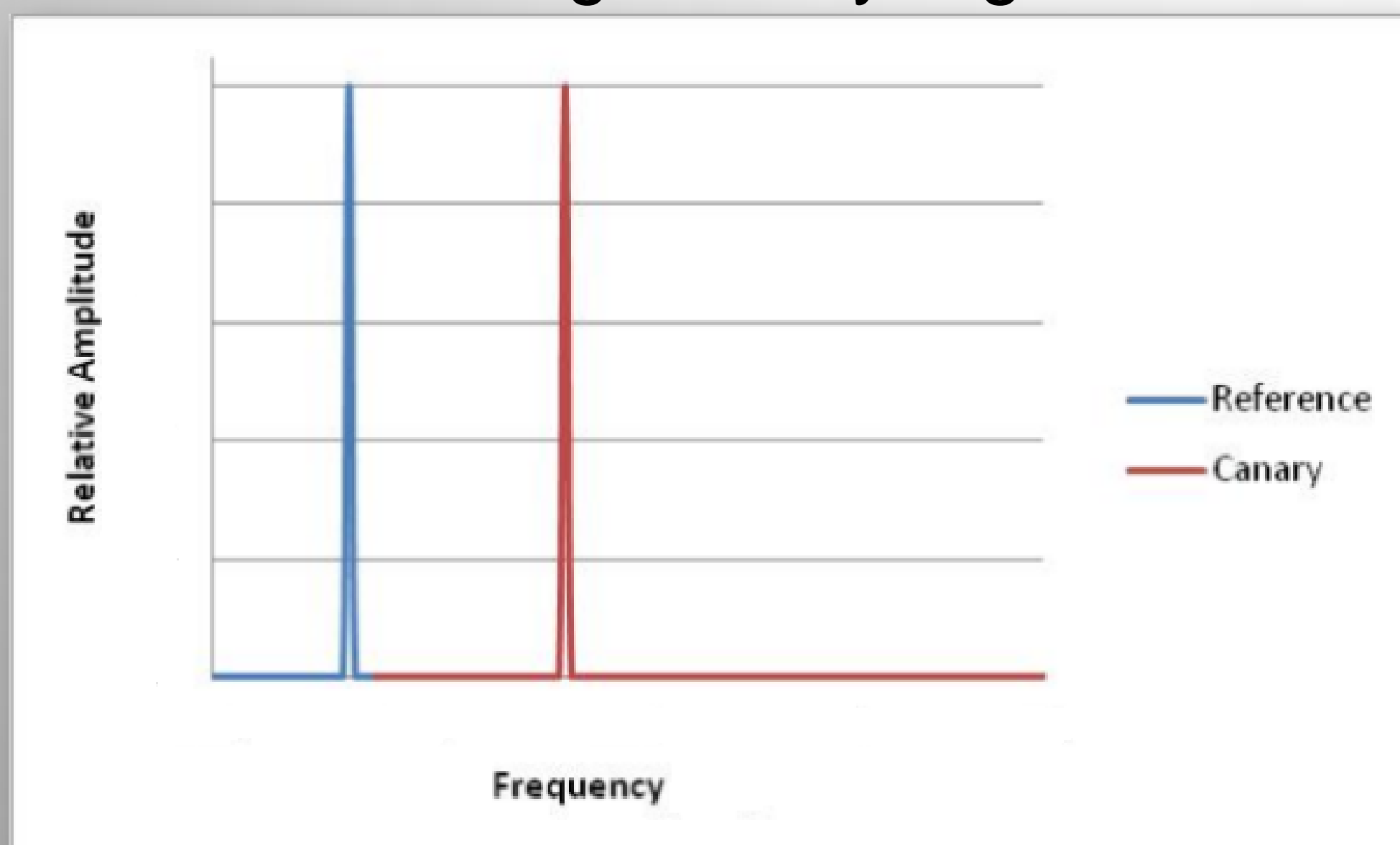
## RFID System Schematic



## Expected Results

When no corrosion is present, we expect to see two peaks as the canary material will shift the central resonance frequency of the tag. The control tag verifies interrogation and prevents false positives.

## RFID Tag Healthy Signal



## Impact

This research will create a low cost detector that can monitor corrosion in cars to detect battery corrosion, by the DoD, by the oil and gas industry, and by the military. It will change the way society deals with corrosion.

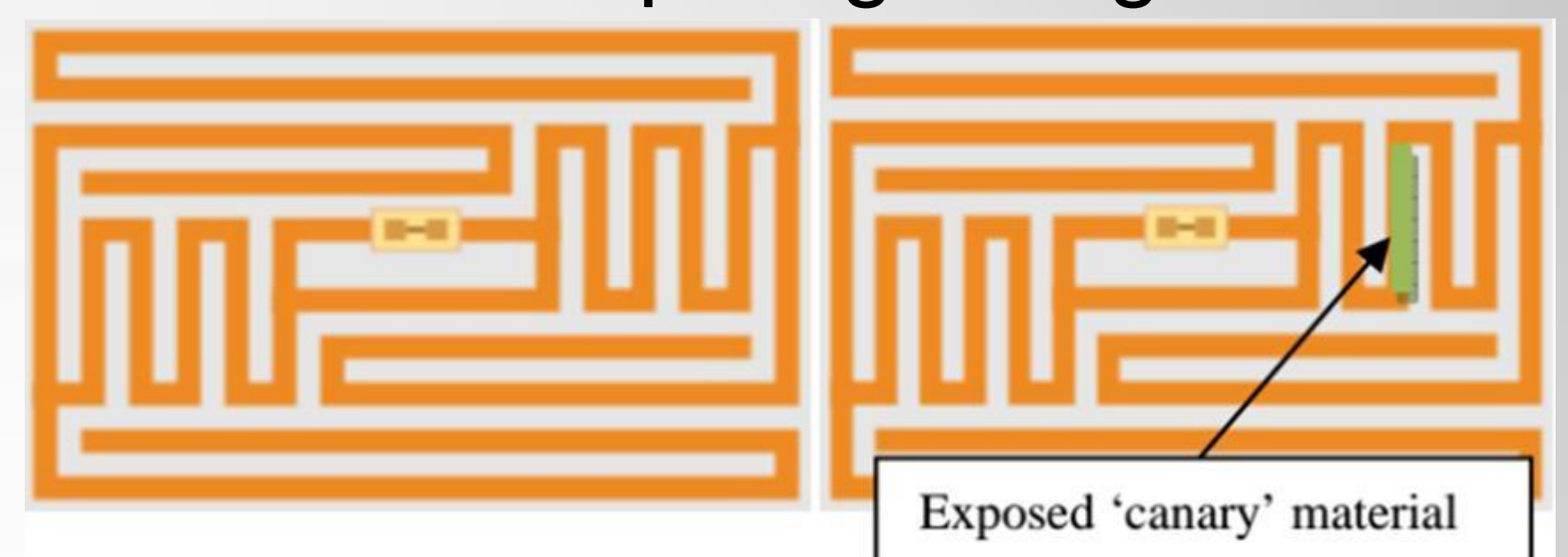
## Acknowledgements

Dr. Don Gregory, UAH  
Dr. Valentin Korman, K Sciences  
Dr. Ray Vaughn, UAH Vice President for Research

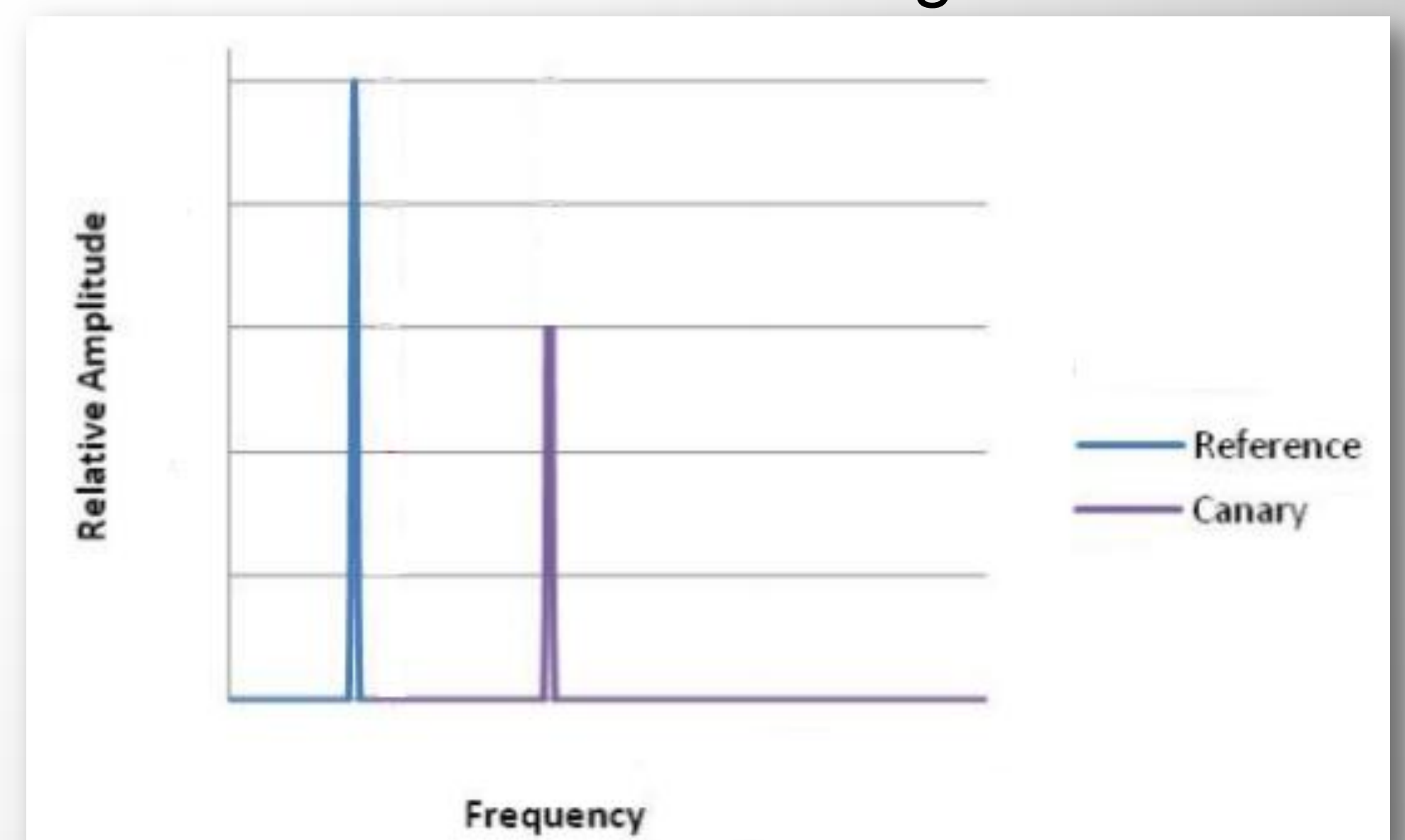
## Method

To begin, a host material will be connected in a circuit with an antenna to verifying a change in frequency/amplitude by measuring the initial signal, corroding, and measuring the altered signal. Then, host materials like Copper, Aluminum, polycarbonate board, and plastic will be attached to the tag antennas. Then corrosion will be introduced.

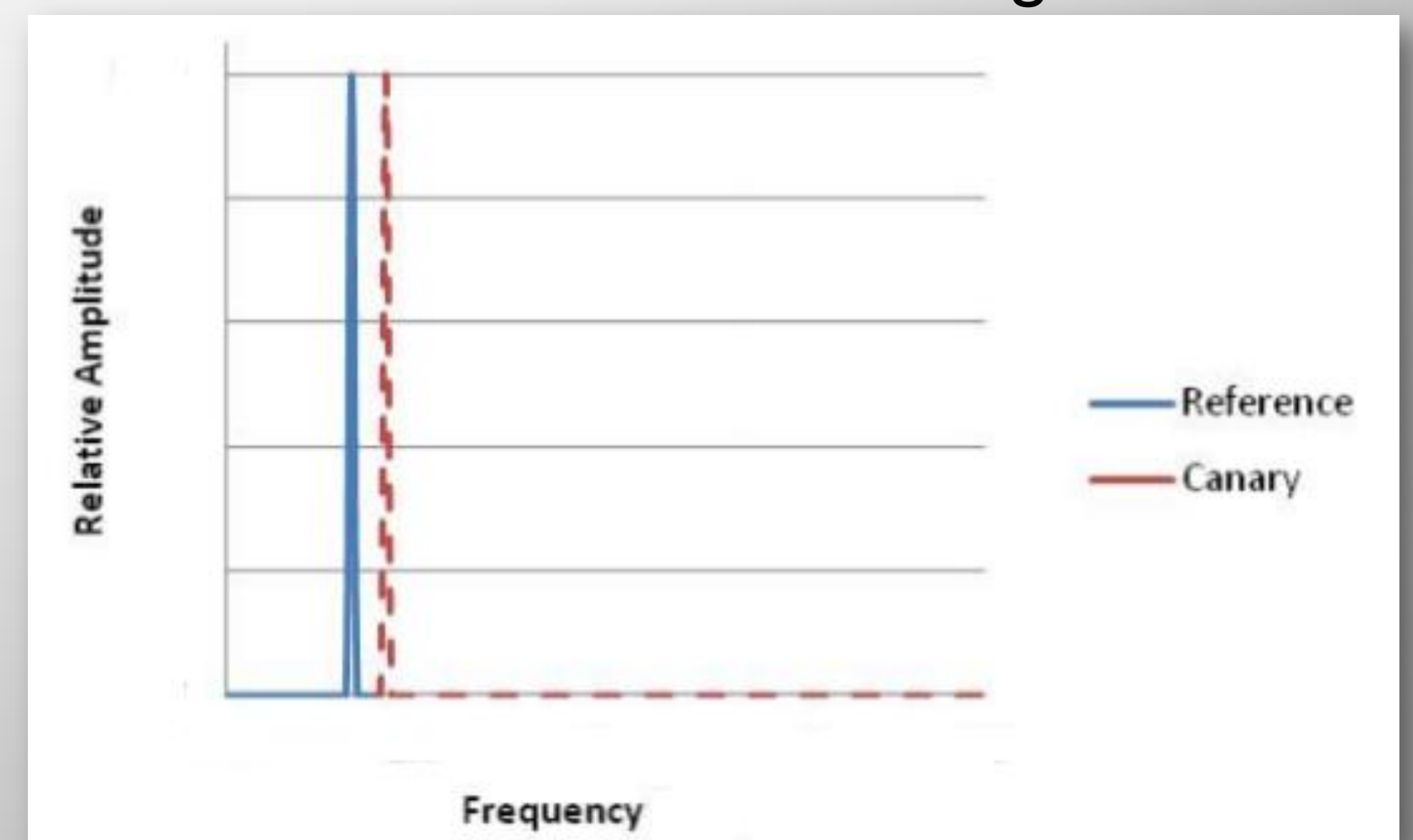
## Concept Tag Design



## Corroded Metal Signal



## Corroded Dielectric Signal



## Explanation

This detector can be used on different places at the Kennedy Space Center such as the launch pad gantry, and at the elevated water tanks. The RFID corrosion detector could also be placed on payloads or rockets in storage awaiting launch.

