



Top Dog Technologies

Territory Tracking and Restriction System

Christopher "Jester" Wesp

Denise "Merlin" Cuppett

John "Viper" Kaczmarek

Michael "Ice Man" Stewart

Contents

- ◆ Problem and Goal
- ◆ Problem Research
- ◆ Design
- ◆ Analyze Design
- ◆ Project Management

Problem Background

- ◆ Track and control pet whereabouts when humans are absent
- ◆ Protecting indoor furniture and belongings

Needs Statement

There is a need to have a pet deterrent system that tracks pet movement throughout the house 24/7 by monitoring and documenting when a pet enters off-limit areas and deters the pet when needed.

Goal

Create a network of receivers and transmitters that can record the general location of a pet and deter it from the off-limit areas.

Objectives

- ◆ The system must cost less than \$500 to be competitively priced based on the quality level it provides to the consumer.
- ◆ The system must use a power source accessible to the public, such as a battery, and the power source must last at least 1 month without being replaced.
- ◆ The system must not harm animals or people.
- ◆ The system must function well in a typical indoor environment.

Objectives

- ◆ The collars should be light, less than 1 pound, and comfortable for the pet.
- ◆ The system must be easy for the user to set up which is defined as the set up time taking less than 30 minutes.
- ◆ The system must be easy to use and adjust, any adult with basic computer knowledge should be efficient with the system after 1 week.

Objectives

- ◆ The system should have a variable range that covers an area with a 3 foot radius to an area with a 20 foot radius.
- ◆ The system should document the zone and time when a pet violates a restricted location.
- ◆ The recorded information should be displayed to the user in an organized and understandable fashion.

Literature Review

- ◆ Indoor Positioning Systems
- ◆ PetSafe Electronic Indoor Pet Deterrent Systems
- ◆ Spring 2007 Pet Deterrent Project
- ◆ Contech ScatMat
- ◆ Range Modification for RFID Systems

Design Constraints and Feasibility

- ◆ System cost
- ◆ Available power source
- ◆ Power source cost
- ◆ Hindrance caused by collars
- ◆ Easy to set up, use and adjust
- ◆ Safety
- ◆ Functions in indoor environment

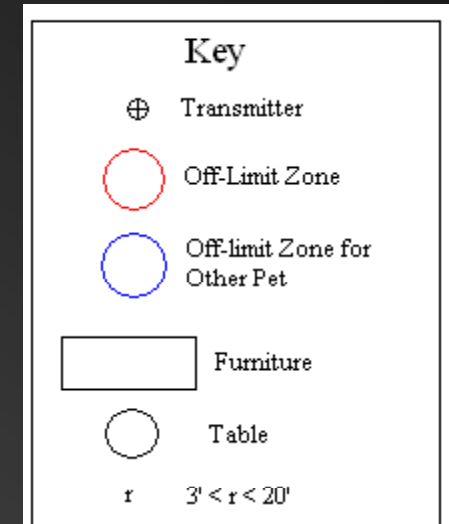
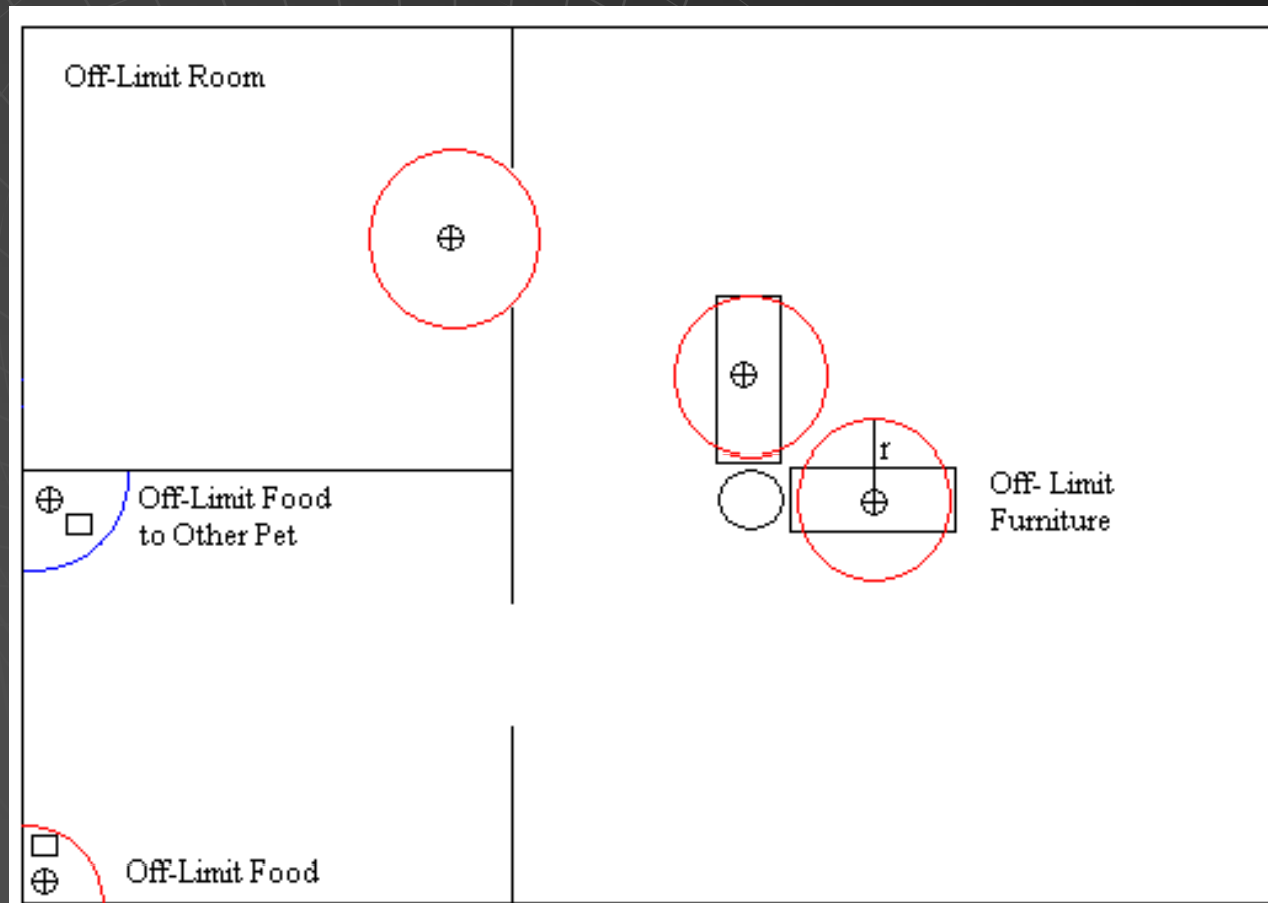
Alternative Solutions

- ◆ Triangulation based on UWB technology
- ◆ Triangulation based on RF technology
- ◆ Triangulation based on RF, GPS and Ultrasonic technology
- ◆ Landmark system design
- ◆ Pet position determined by passive RFID

Proposed Design

- ◆ Transmitters with variable ranges and unique IDs placed to create circular zones
- ◆ Collar contains receiver and PIC that records, and deters if needed, when pet enters a zone
- ◆ Information from collar can be transferred to computer via USB
- ◆ Software suite displays information and adjusts zone names and determent options

Proposed Design



Design Validation Approach

- ◆ Test at various stages of development
- ◆ Test transmitter and receiver for range and reliability in an indoor environment
- ◆ Test the battery power after usage
- ◆ Test the information being uploaded to the computer for accuracy
- ◆ Test the software
- ◆ Test that the product is easy to set up, use and adjust

Economic Analysis and Budget

- ◆ The cost must be kept to a minimum to keep the product competitive on the market

- ◆ Budget:

• (4) Ti TRF7960 Transceivers	4x4.86
• (2) Pet Collar	2x3.00
• PIC18F2455 Microcontroller	2x7.90
• Project Enclosures	2x <u>2.79</u>
	46.82

*Budge does not include undetermined costs of various components

Task Schedule

Tasks	Weeks	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Perfect Collar Receiver and Deterrent Signal								Blue	Blue							
Perfect Collar Storage System									Red	Red						
Add Functionality to Software									Green	Green						
Test Transmitter and Receiver Pair									Purple	Purple						
Test Storage System and Software Compatibility										Purple	Purple					
Focus on Parts of the Project that Failed Testing											Dark Red	Dark Red	Dark Red			
Test and Correct all Aspects of the Project													Dark Red	Dark Red	Dark Red	
Develop Final Report														Dark Red	Dark Red	Dark Red
Develop Final Presentation															Dark Red	Dark Red

Project Management

- ◆ Michael Team Leader, Head of Finances and Purchases
- ◆ Chris Head of Software Design, Head of Technical Reports
- ◆ John Head of Systems Design, Head of Documentation
- ◆ Denise Head of Hardware Design,

Teamwork

- ◆ Individual progress recorded in journals
- ◆ Semiweekly meetings to discuss progress and plan next step
- ◆ Meetings include holding members accountable and team bonding
- ◆ Brainstorming sessions occur during and outside of meetings
- ◆ Open communication during meetings and through email

Societal, Safety and Environmental Analysis

- ◆ Society Analysis:
 - Product is used by choice
 - Product can make life easier
- ◆ Safety Analysis:
 - This project is not focusing on the deterrent method
 - Our project follows safety guidelines for RF technology and power supplies
 - Size and weight of collar must not hinder pet
- ◆ Environmental Analysis:
 - Projects frequency will not interfere with off limit ranges

Overview

- ◆ Problem and Goal
- ◆ Problem Research
- ◆ Design
- ◆ Analyze Design
- ◆ Project Management

Any Questions?

