Clay Community Parks Association

Team # 13

Team Members: Nicholas Burkett, Jackson Benner, Levi Priest, Andrew Potter, Justin Won, Nick Ozden, Bryce Hendricks
Mentors: Milton Aguirre

PURDUE UNIVERSITY

Customer Background

The Clay Community Parks Association is responsible for 13 recreational parks in western Indiana. Their mission is to raise community awareness of the safe and enjoyable facilities at Clay County Parks.

With a variety of parks ranging from an acre playground to five acre multi-use outdoor spaces, residents enjoy their local parks. The community leaders have requested assistance with improving the security and safety of their facilities

Problem / Scope of Work

The Clay Community Parks Association needs security measures to document and deter vandalism in public parks within Clay County, IN.

Scope of Work is to test and recommend a model of security camera that meets customer requirements while being easily accessible and low-cost.

Requirements

Requirement	Description	Test to Verify
Recording devices must be innocuous and hidden from prying eyes	The cameras are required to be as hidden as possible. Vandals will go out of their way to destroy the cameras if it is easily accessible.	Identify locations of cameras (during in-field observation) and determine if the cameras would be hidden enough.
The system needs to be easily and inexpensively maintained.	The system must be complex enough to complete its purpose while being simple enough where maintenance can be done by anyone with a small technical background and some training.	A test could be training a chosen person on the system for a predetermined amount of time. After this training period if they are able to do the desired maintenance in a set amount of time then the requirement is met.
Recording devices must be "secure and tamper-proof".	The cameras need to be secure and be able to withstand damage from many different sources	We can test cameras by trying to break or disassemble them.
The system must be purchased AND installed for less than about $1,000 per park.	The budget is capped at $1,000 per park for purchasing and installing.	upFrontCost+rentalPricePerYear+installationPrice+maintenancePrice >= $1,000
Systems must be able to record a 1-acre area, with 2 parks being 5 acres.	The smallest park is about 1-acre.	We can measure how much area is covered through the total coverage of the system.
The system needs to be active 24/7.	This system needs to be on for every hour of every day.	This can be tested by seeing if it ever turns off and if it does then it is not going to work.

Experimentation and Design Concepts

Secondary Concepts

Portable Security System

Added mobility to cameras - move system to fit needs

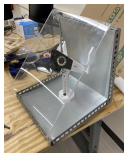
Out-of-Box Ideas

Glitter boxes, fake cameras, decoys, increasing legitimate activity in parks

Reolink Go PT

Strengths:
- Compact
- 355° pan - 140° tilt
- Solar Power Capability

Weaknesses:
-Nonremovable battery
- LTE only



Camera cage, metal protection, vandalism proof

Down Selection and Benchmark

Vikeri E2 Trail Camera

Strengths:
- Discrete
- 80 ft detection distance

Weaknesses:
-Photos only
- AA Battery Powe
- No Remote Accessibility

vs.

Reolink Duo

Strengths:
- Dual-lense
- Color night vision
- 150° viewing angle
- IP66 Waterproof
- LTE or Wifi connection
- Solar Power Capability

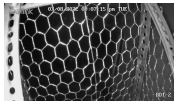
Weaknesses:
- Large Size

Concept	Weighted Score (1-10)
Reolink Duo	**8.8**
Reolink Go PT	5.95
Vikeri E2 Trail	5.8
Portable	5.15
OutOfBox	3.75

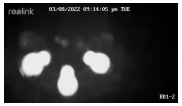
Testing

Spotlight | Camera Distance (Night) | IR sensor

Protection Enhancement



Chicken Wire (IR)



Acrylic Sheet (IR)

No Protection (IR)

Night Time Caution

The trail camera was not utilized because there is no manual control over the IR sensor. For the trail camera, the IR sensor is always activated, which can have some significant downsides when capturing certain objects at night. Night time image capture is difficult with both an IR sensor and a spotlight, as objects such as license plates and trash cans are excessively reflective. This has been noted in our FMEA and there are controls that can be taken to minimize the effects of this issue.

Recommendation

Our final recommendation is to purchase the **Reolink Duo,** in either the Wifi or LTE option. This was the superior camera model due to its:
- Dual lens w/ spotlight upon motion
- Color night vision
- Remote accessibility from up to 2 miles
- Superior price-quality ratio
- Significantly higher weighted score