

A Hayden Island Live Cat Tracking Proposal

INTRODUCTION

This paper proposes a live cat tracking project for Hayden Island. It would provide 24/7 tracking of feral cats, using cat cameras, live GPS-like tracking, and automated twitter feeds, involving public engagement.



PURPOSE

This paper simply outlines a few approaches to tracking feral cats “live” using recent technology. The goal is to showcase the work of the Audubon Society while enabling a new level of utility and cost/effectiveness for animal monitoring.

Because the capture of feral cats is challenging, tagging feral cats with Bluetooth 5 or NFC tags may provide the option of tracking with no monthly cellular fees.

The current effort to capture additional feral cats for the Hayden Island Feral Cat Project could be enhanced by enabling live animal cameras, automated tweeting and popular social engagement activities.

Recent technology for smartphones can be applied to pet tracking. They include Bluetooth 5, tiny drone cameras, cloud services and social media.

Implemented within Hayden Island, this proposal would collaborate with businesses and organization who may explore commercial opportunities such as tracking household pets, boats, bikes or other applications. The Hayden Island Cat Tracking Project would be a 12-18 month pilot, utilizing Portland based companies to empower community groups. Pet-tracking networks, using low-cost Bluetooth 5 tags and inexpensive hubs, may interconnect for city-wide coverage.



CONCEPTUAL MODEL

This proposal is modeled on a project initiated by the BBC. They followed 100 cats in three different environments, using miniature collar-cams and GPS trackers. The BBC documentary, called "The Secret Life of The Cat", mapped cats' activities at night and was one of the most popular episodes of the BBC's science series, Horizon. Some of the world's top cat experts participated in this groundbreaking scientific study.

THE BBC CAT TRACKING PROGRAM

The BBC produced an interesting documentary on a cat tracking project.

<https://vimeo.com/84794829>

<http://www.bbc.co.uk/programmes/b04lcqvq>

<http://www.bbc.com/news/science-environment-22821639>

<https://twitter.com/BBCcats>

Meet Ginger, Chip, Sooty, Orlando, Hermie, Phoebe, Deebee, Kato, Coco and Rosie. They are 10 of the 50 cats studied in the village of Shamley Green, Surrey, for Horizon's programme The Secret Life of the Cat. As part of one of the largest ever research projects into domestic cat behaviour, the Horizon team - aided by the Royal Veterinary College and Lincoln and Bristol Universities - tracked dozens of cats over several 24-hour periods using specially-designed collar GPS devices and tiny "cat cams".

The result? Scientists discovered the cats appeared to timeshare territory to avoid confrontation with neighbouring felines and visit each others houses. However, the cat cam footage also revealed squabbles over territory remained. There was also an incident with a fox and with a nest of fledglings.

In 2014, the BBC used a \$50 Raspberry Pi single-board computer, about the size of a credit card, pointed at a cat door. Today, however, Amazon has literally 5,000+ internet cameras that cost from \$30-\$50 that could be utilized. They connect to the internet using WiFi and can be programmed to trigger a twitter alert by movement at chock points or feeding spots. Live footage can be archived for a day or a month inexpensively.

<http://a.co/341rfVv>

<https://github.com/bbc/catflap-camera>

INNOVATION

This project aims for similar objectives of the BBC cat tracking project . It differs it that it uses smaller, more cost-effective technology for tracking, photography, and data analysis. These innovative elements include:

- **GPS trackers, using Narrowband LTE** (available in 2018), promises to increase battery life 10 times while lowering data costs.
- **Bluetooth 5 pet trackers.** Bluetooth 5, using the "free" WiFi band, increases range to a phone from 100 ft to 400 ft.
- **Bluetooth 5 neighborhood hubs** (\$99 each) pick up nearby tracking signals and post movement on a map.

- **Amazon's facial-recognition camera** (\$250) could be trained to “recognize” a variety of cats (or other animals) and send twitter alerts from multiple chokepoints or feeding spots.
- **Social Media.** Each animal would have their own Facebook page and twitter feed. The general public may be assigned to be a “persona” of an animal, posting updates throughout the week.
- **Data analysis.** Daily, weekly and monthly graphs and charts would be created for each animal, illustrating their activity, movements and fitness.

Novelty non-human twitter accounts began with Sockington, a Boston-area housecat, in March 2007, with 1.4 million followers. <https://twitter.com/sockington?lang=en>
Oregon's Wild Wolf 7 was one of the best known animal twitter feeds:
https://twitter.com/wolf_or7

Other animal tweets include:

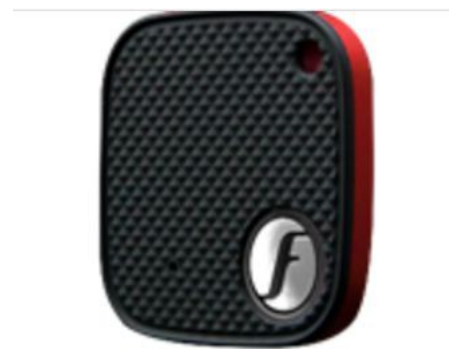
<http://www.cnn.com/2012/08/03/tech/social-media/nonhuman-twitter-feeds/index.html>
<https://twitter.com/RealGrumpyCat>
<https://twitter.com/CatFoodBreath>
<https://twitter.com/WeirdHorse>
<https://twitter.com/bronxzooscobra>

TRACKING MADE CHEAP

1. Bluetooth 5 enables pet tracking without GPS.

Key updates to Bluetooth 5 include longer range, faster speed, and larger broadcast message capacity, as well as improved interoperability and coexistence with other wireless technologies.

<https://twitter.com/BluetoothSIG>
<https://www.bluetooth.com>



Bluetooth 5 pet trackers include TracMo and Fobo:

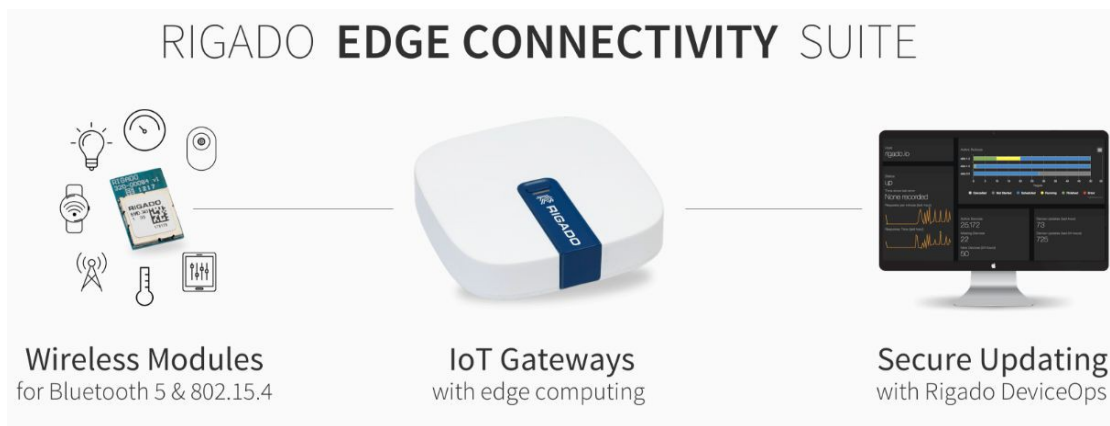
<https://www.indiegogo.com/projects/tracmo-the-world-s-1st-bluetooth-5-tracker#/>
<https://www.indiegogo.com/projects/fobo-tag-world-s-1st-patented-bluetooth-5-tracker-smart#/>

\$29 USD + Shipping ~~\$35~~ (17% Off)

Get (1) FOBO TAG

LIMITED TIME PRE-ORDER SPECIAL: Get 1 FOBO TAG trackers in your choice of color. STOP LOSS and RETRIEVE with the World's first patented Bluetooth 5 tracker.

While only a few phones currently offer Bluetooth 5, neighborhood hubs, such as the ones available through Portland-based Rigado, can pick up a pet's \$25 Bluetooth5 tag from blocks away, then post it on the internet. An animals location can be tracked live.



2. The Tile Community.

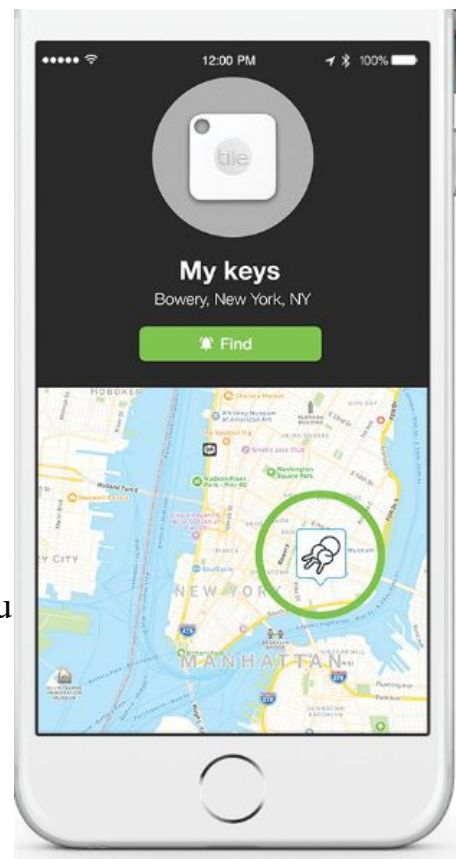
Tile was one of the first bluetooth trackers. The \$25 tag help you find just about anything. Just stick it on your phone or click it on your cat. Tile will likely announce a Bluetooth 5 tag in 2018.

The main advantage of the Tile Bluetooth tag is that they have the largest lost and found community.

Every app updates the location of each Tile device it detects. With more than 10 million Tiles sold and over 2 million items located every day, their network is the largest, fastest and most powerful lost and found community in the world.

The effectiveness of the tile network depends on people near your lost item running the tile app in the background. They don't know their app has spotted your item. Only you do.

We think the Tile Network, using the 200 ft range Tile Sport tag would be a good initial test of the concept since it involves very little infrastructure expense. A later iteration could add full blown Bluetooth 5 tags with neighborhood nodes picking up signals from several blocks away.



3. Narrowband LTE.

Narrowband LTE, a new cellular technology, enables trackers to use far less battery power and cost less to operate. It should be available in Portland in 2018. NB-LTE enabled China's Mobike and Ofo to become the world's largest bike sharing services. That's because NB-LTE trackers cost less to operate and use much less battery power.

[https://en.wikipedia.org/wiki/Ofo_\(bike_sharing\)](https://en.wikipedia.org/wiki/Ofo_(bike_sharing))

<https://en.wikipedia.org/wiki/Mobike>

4. Image recognition.

Amazon Rekognition makes it easy to add image and video analysis to your applications. You just provide an image or video to the Rekognition API, and the service can identify the objects, people, text, scenes, and activities.

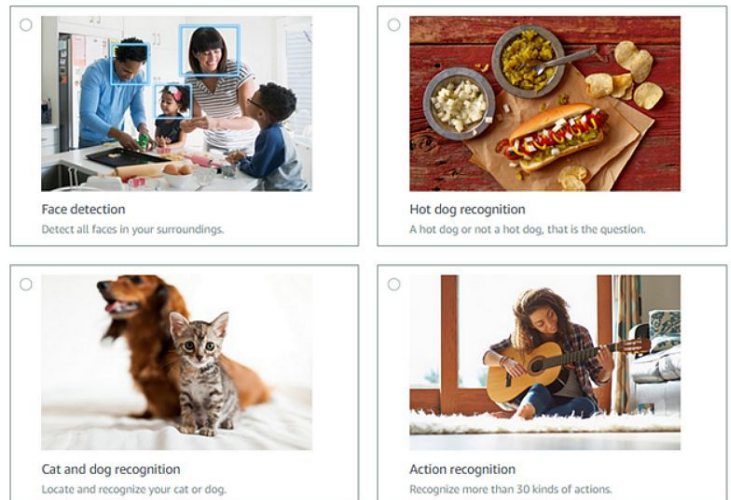
The service is continually trained on new data to expand its ability to recognize objects, scenes, and activities.

<https://aws.amazon.com/rekognition>

<http://a.co/2b3nyF1>

Amazon has announced AWS DeepLens, a new video camera that runs deep learning models right on the device. The DeepLens has a 4 megapixel camera that can capture 1080P video, along with a 2D microphone array. The DeepLens camera has WiFi, USB and micro HDMI ports, and 8 gigabytes of memory to run all that code on, too. It can connect to Amazon Web Services, too.

5.



Database Integration.

By combining Bluetooth location tracking, camera recognition of identity and activity and social engagement by Facebook and Twitter, we believe the island population of Hayden Island could be a good test bed for the next dimension in feral cat tracking. It is expected to enable more cost-effective monitoring and data retrieval of the cat population along with potential commercial spin-offs such as tracking of domestic pets as well as boats and bikes.

Portland-based companies such as Amazon, Rigado.com, kimera.ai, dadolabs, tallyyourworld.com, among others may provide support and assistance.

INFRASTRUCTURE

Feral cat tracking might be accomplished in many ways. But Bluetooth 5 tags may be the most cost-effective. Since the range of these tags is relatively short, it's anticipated that outdoor neighborhood nodes, with a high gain WiFi antenna might be dotted around the island. We think perhaps 12 neighborhood nodes (\$100 each), each connected to their host via WiFi, might be the best approach to maximize range (estimated up to 1000-2000 feet).



The nodes would be installed in residential areas where the cats roam. Bluetooth 5 tags (\$25 each) would be attached to the cat's collar. The cat's live position, latest instagram shots, and twitter feeds would then be available to the public on a dedicated website.