

An aerial photograph of a dense tropical rainforest. The sun is setting on the horizon, creating a bright orange and yellow glow that illuminates the sky and the tops of the trees. The forest is a mix of dark green and lighter green, with many tall, thin trees visible. The sky is filled with large, dark clouds, some of which are lit up by the setting sun. The overall scene is a beautiful and dramatic landscape.

Los Amigos Conservation Technology Consortium

A test-bed for understanding tropical wilderness – Dr Andrew Whitworth @AndyRainforest



THE
UNIVERSITY OF
BRITISH
COLUMBIA



Institute of
Biodiversity,
Animal Health
& Comparative
Medicine

MAX PLANCK INSTITUTE
FOR INTELLIGENT SYSTEMS

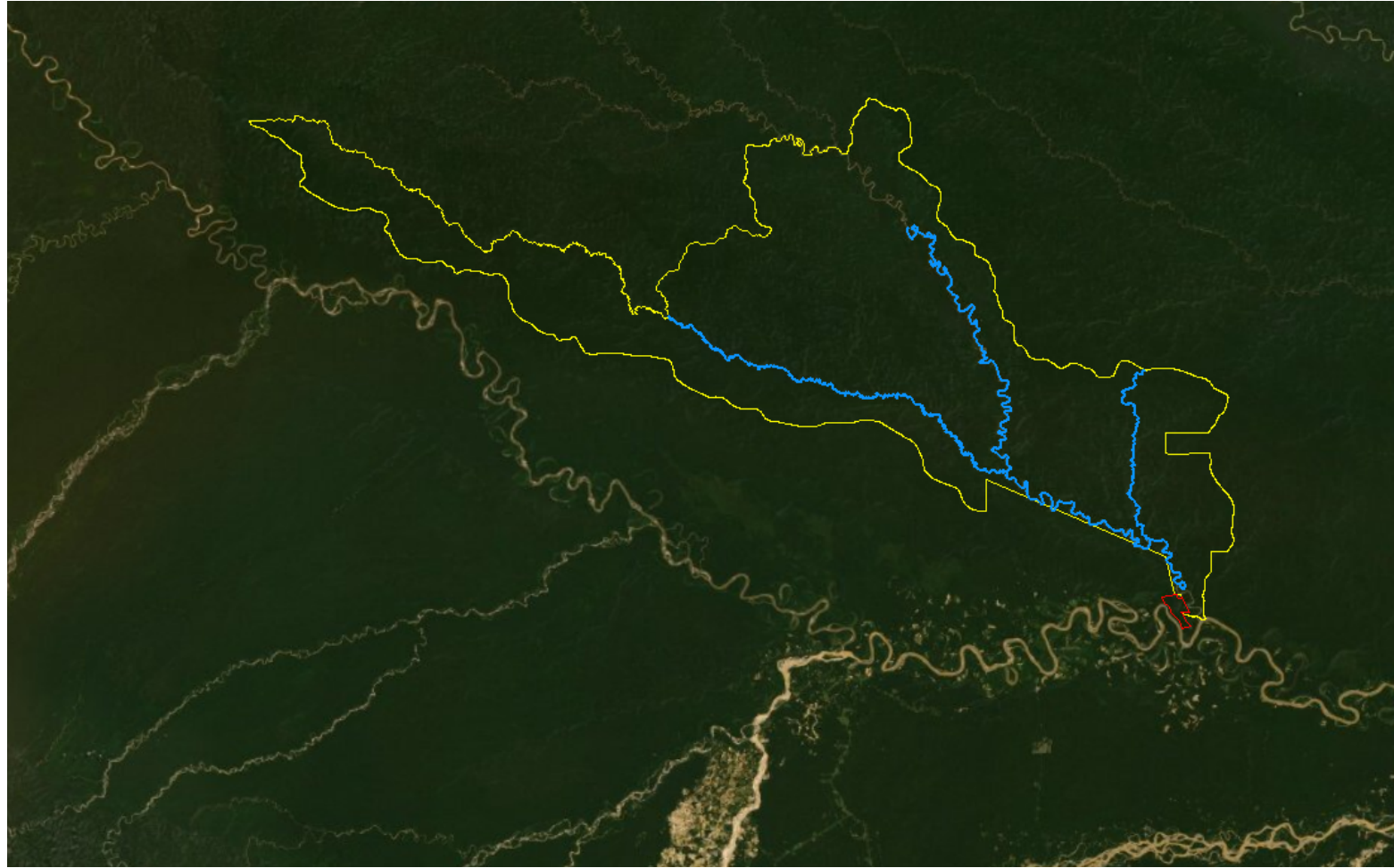


WAKE FOREST
UNIVERSITY

LA - 140,000
hectares.

But how much do
we really know
about it?

Or any other
tropical Amazonian
wilderness National
Park?



Discovery



Monitoring



Protection



What's involved?

- Advanced wildlife tracking-telemetry
- Landscape scale camera networks
- Testing near real time data pipelines
- Advanced iDNA discovery
- New tech tools – worlds smallest camera traps and SENTINEL
- Aerial surveillance - through thermal-RGB-Lidar technology
- Utilizing tower infrastructure to build the Internet Of Animals (IOA) and atmospheric monitoring
- Real-time, long-term acoustic data gathering

A couple of examples...

NEXT-GEN ANIMAL TRACKING: WHAT?

- › Near real time
- › Multiple species simultaneously
- › High resolution GPS
- › Integrated with remote sensing
- › Multiple sensors on tag





NEXT-GEN ANIMAL TRACKING: WHY?

- Learn about animals
 - Habitat requirements, space needs
 - Comparative approach
- Learn about ecosystems: interactions
- Planetary health: animals as sentinels





Timeline: 6/29/2021 11:00 am - 7/6/2021 10:00 am
6/29/2021 7/6/2021



Image © 2021 Maxar Technologies
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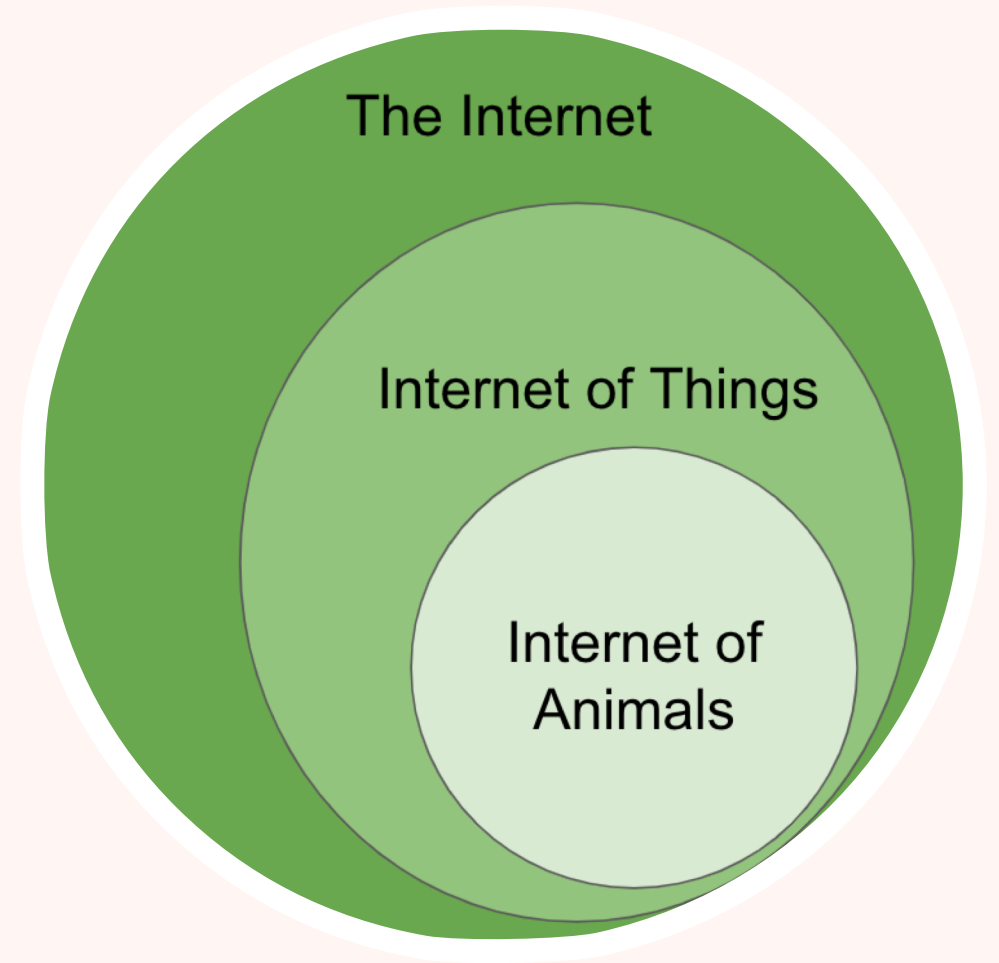
Google Earth

IOT



INTERNET OF ANIMALS

Digitally monitoring animals to learn more about them
and our planet



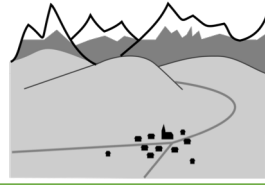
Need Multiple Networks

Tradeoffs: power (=size), cost, bandwidth

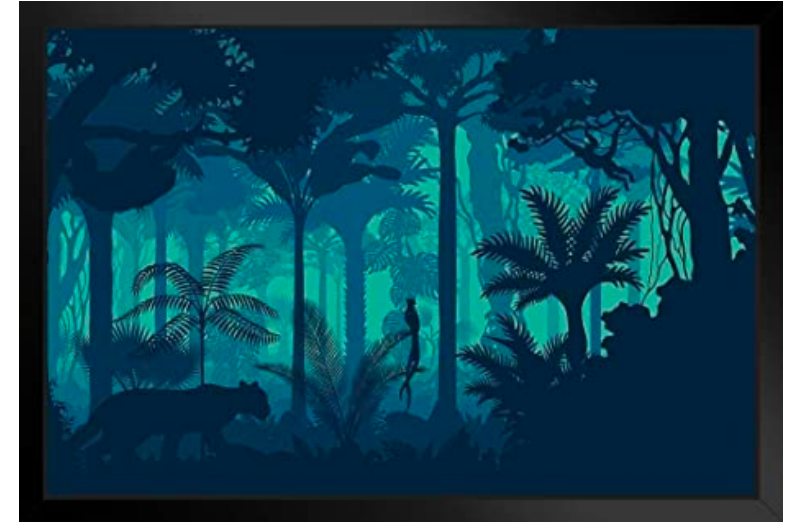
Global Scale
Satellite



Regional Scale
Phone Networks

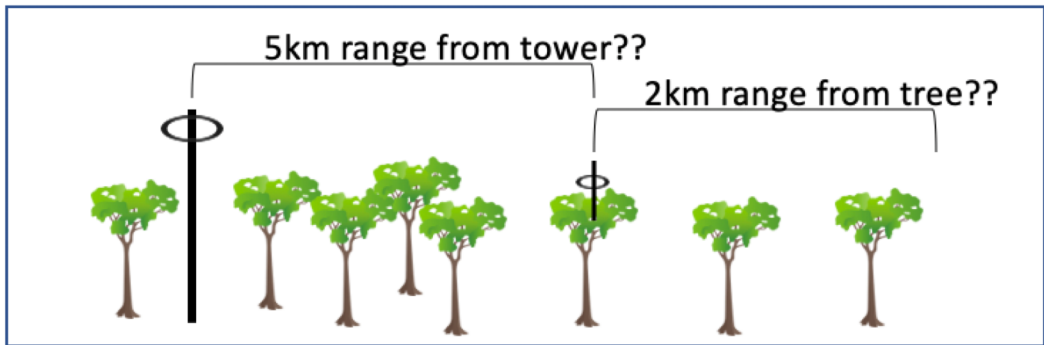


City/Forest Scale
IoT Networks



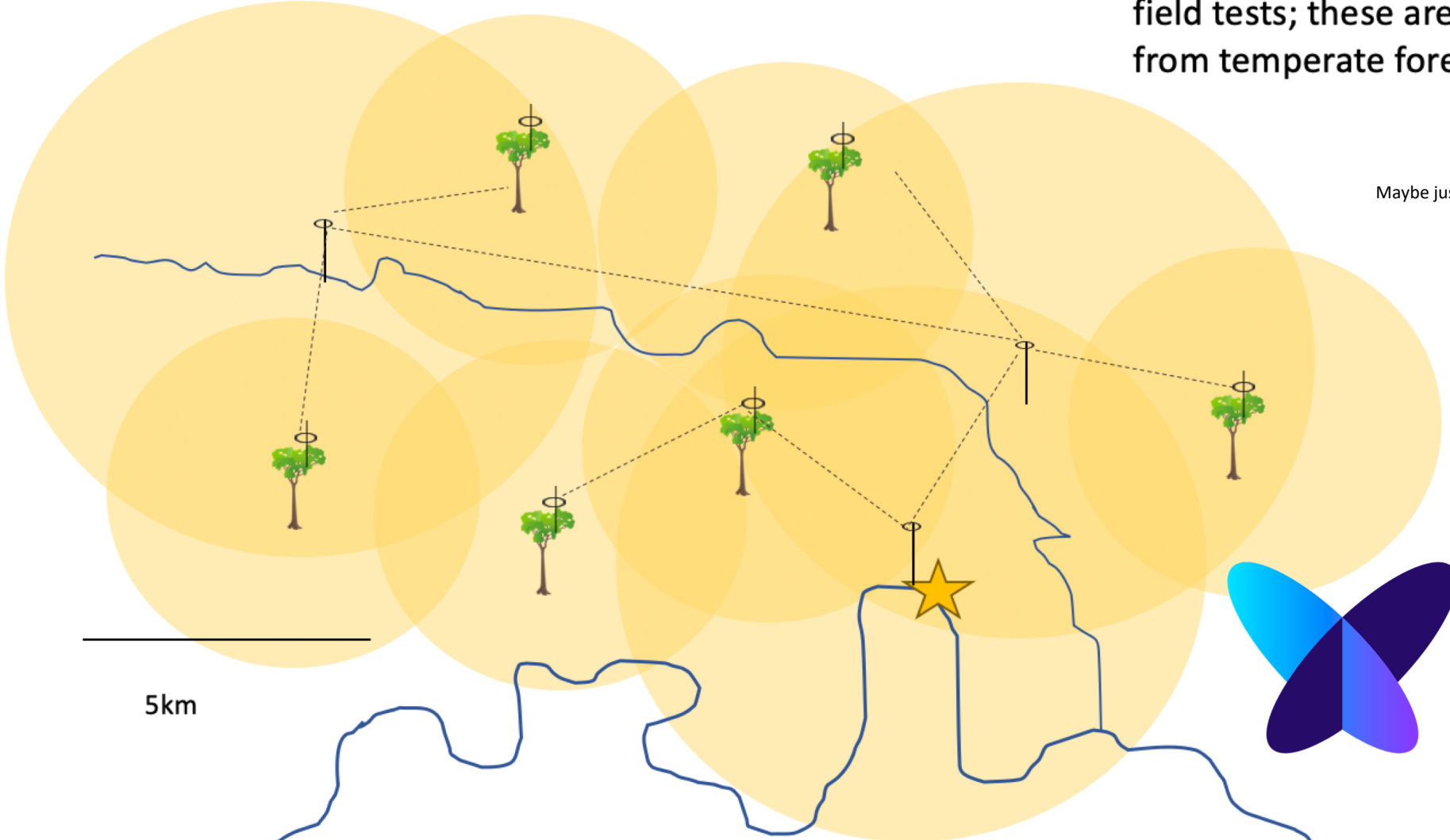
Room Scale
WiFi, Bluetooth





IoT network for Los Amigos

Antenna on over-canopy towers will have a larger range than in-canopy antenna. Actual ranges will need to be established in field tests; these are just ballpark guesses from temperate forests.

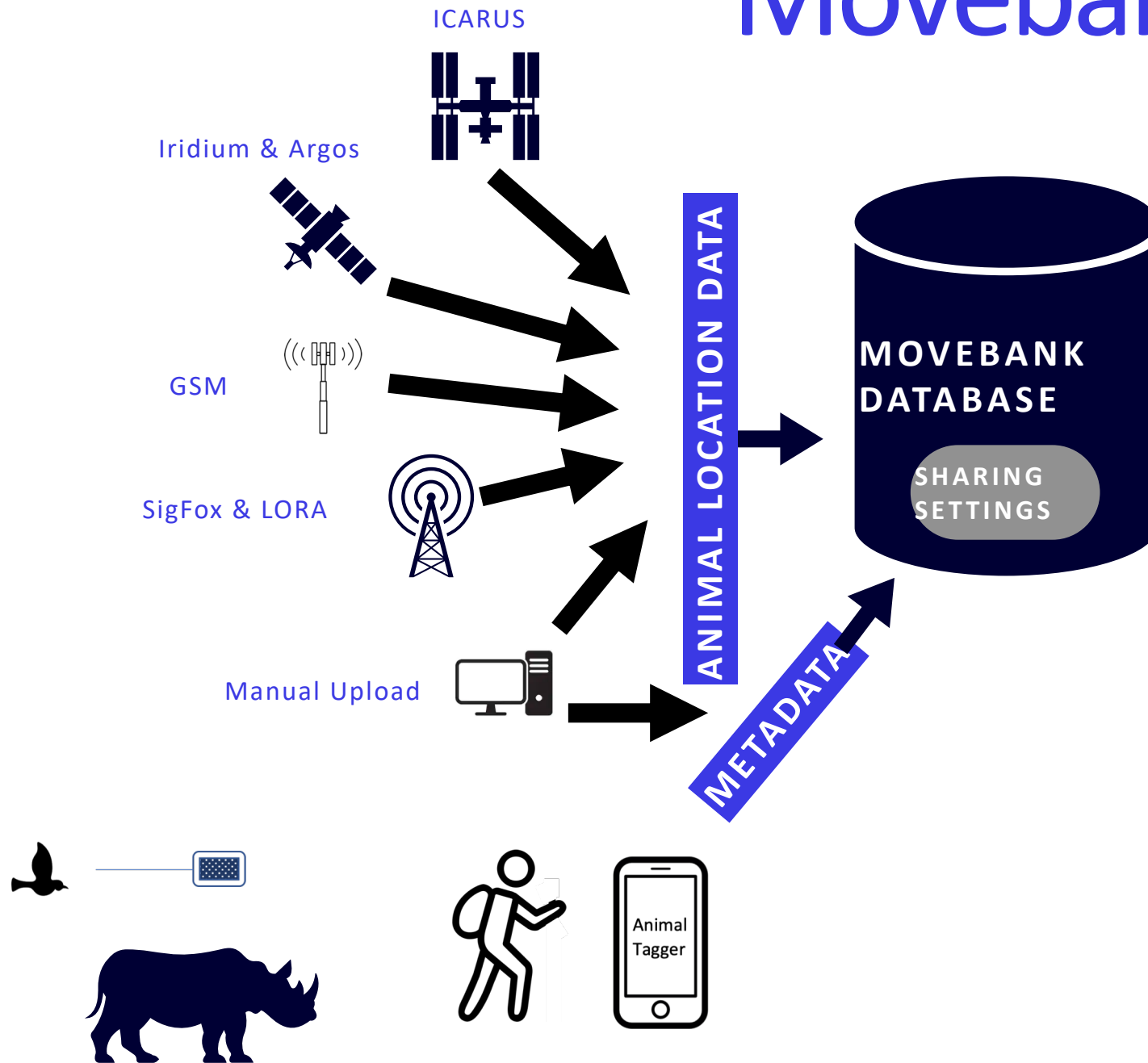


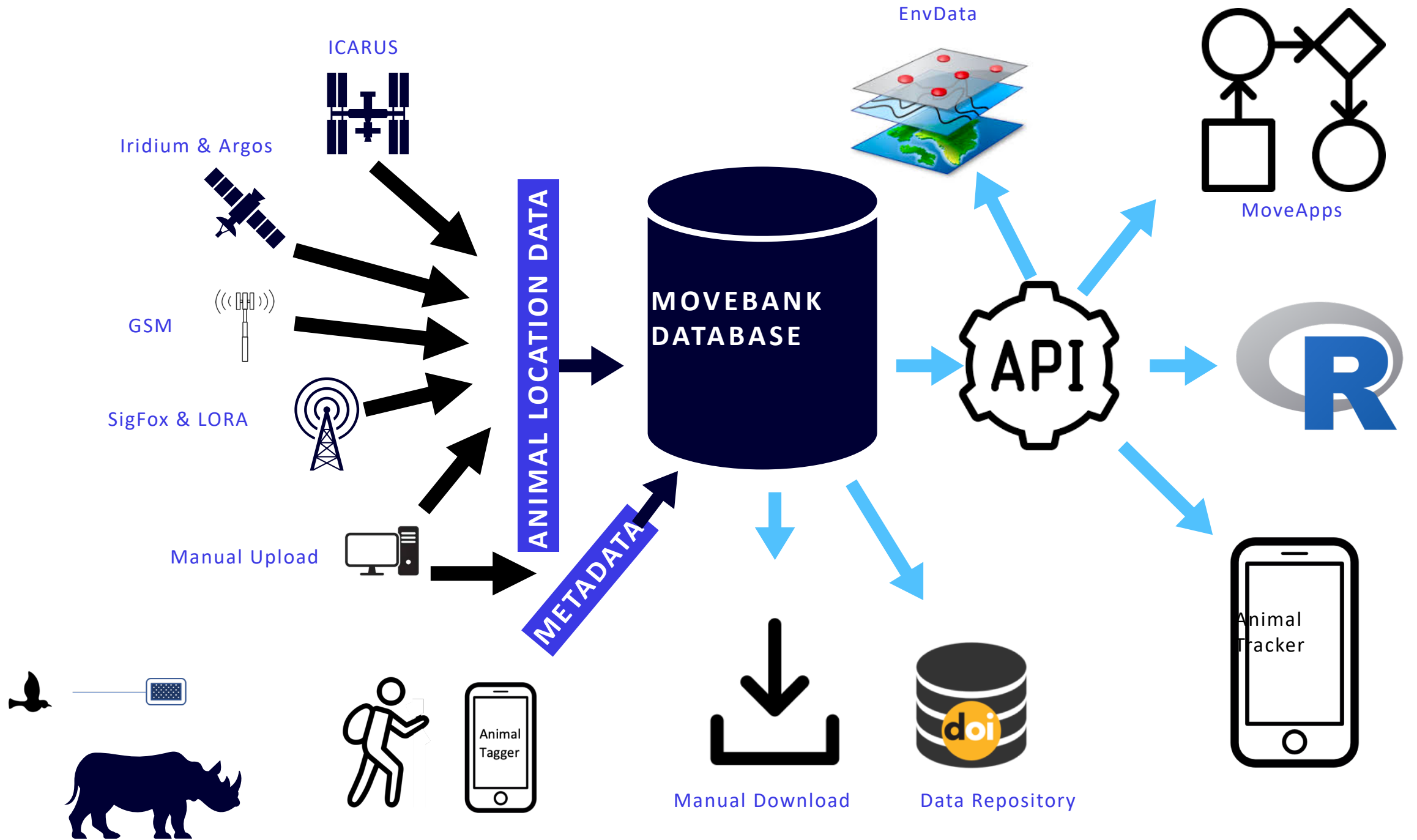
Maybe just need one Sixfox tower?



sigfox

Movebank Ecosystem

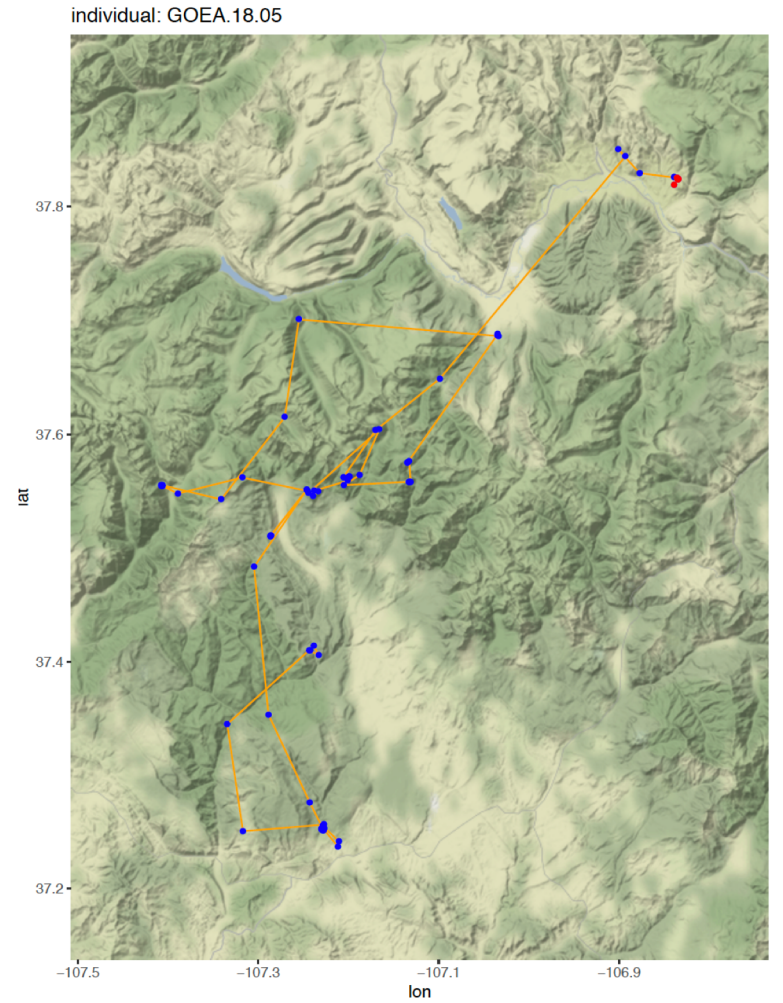
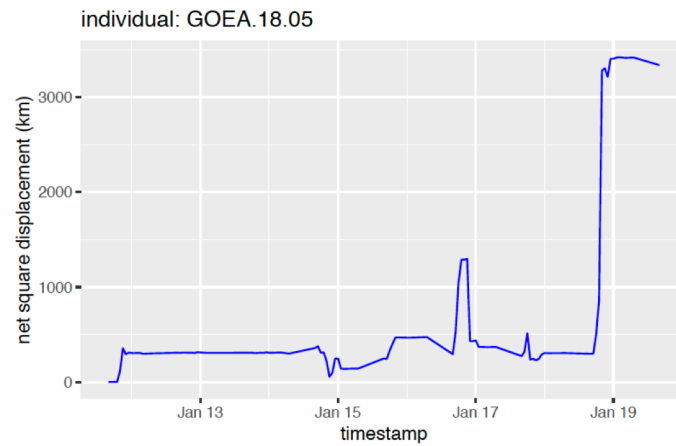
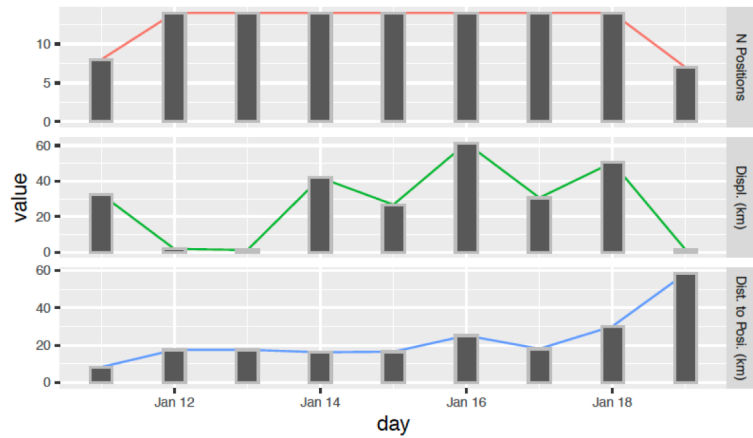




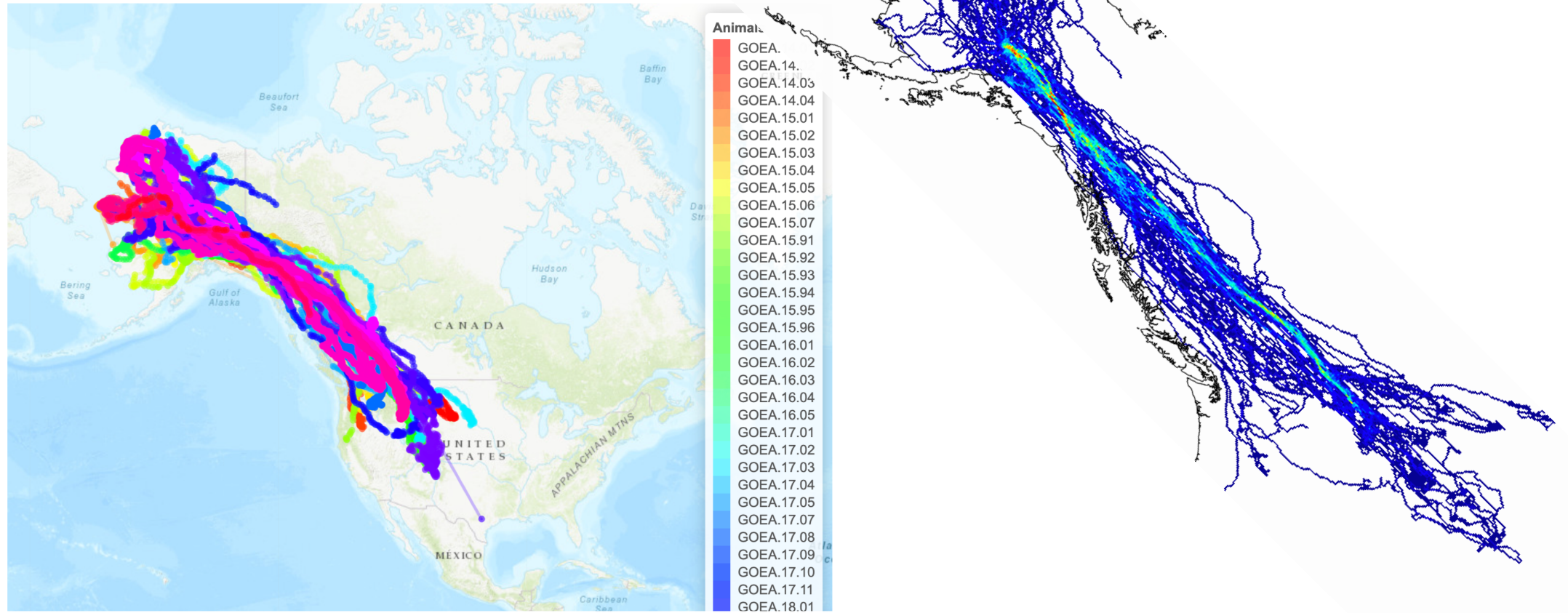
Morning Report

PDF generated every day/week/month

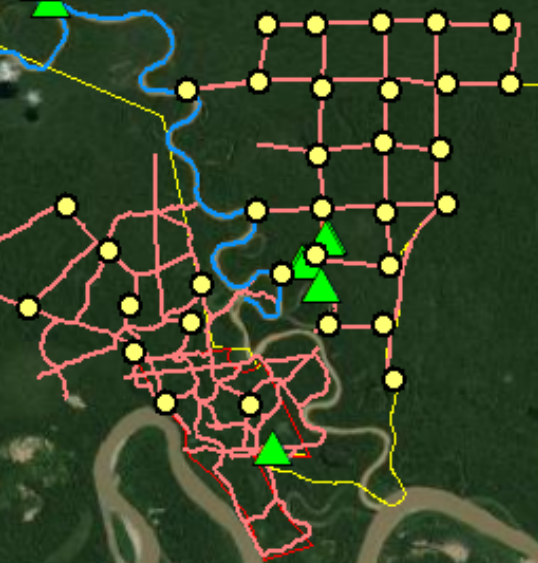
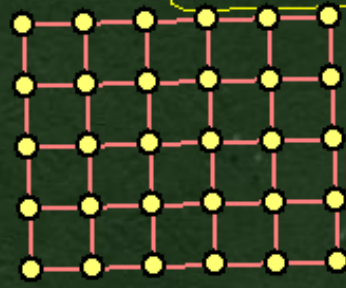
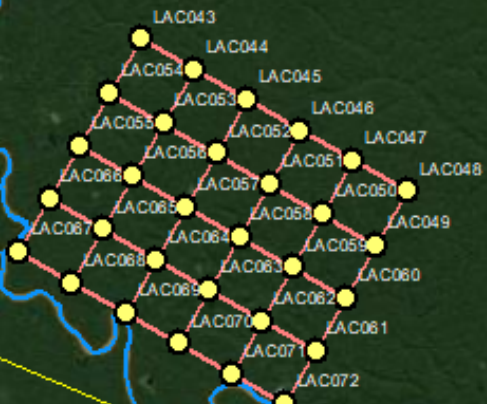
	Animal	Tag	First timestamp	Last timestamp	Last timestamp local tz	Tag voltage	N posi. 24h	N posi. 7d	Moved dist. 24h	Moved dist. 7d	Event 7d
7	GOEA.15.02	1.17391e+05	2020-02-21 01:00:00	2020-10-11 23:00:00	2020-10-11 15:00:00	NA	0	0	NA	NA	no data
2	GOEA.15.05	1.33813e+05	2020-02-13 22:00:00	2020-11-05 16:00:00	2020-11-05 09:00:00	NA	0	0	NA	NA	no data
3	GOEA.15.94	1.17396e+05	2020-01-23 23:00:00	2020-07-31 03:00:00	2020-07-30 19:00:00	NA	0	0	NA	NA	no data
4	GOEA.17.05	1.33821e+05	2020-02-10 20:00:00	2020-10-31 01:00:00	2020-10-30 19:00:00	NA	0	0	NA	NA	no data
5	GOEA.17.08	8.94608e+19	2020-01-20 08:02:32	2020-01-20 15:02:36	2020-01-20 07:02:36	NA	0	0	NA	NA	no data
6	GOEA.18.02	1.65070e+05	2020-01-20 02:00:00	2021-01-19 01:00:00	2021-01-18 18:00:00	NA	0	40	NA	37.793 km	-
7	GOEA.18.04	1.65071e+05	2020-01-20 04:00:00	2021-01-19 04:00:00	2021-01-18 21:00:00	NA	0	65	NA	102.953 km	-
8	GOEA.18.05	1.65072e+05	2020-01-20 02:00:00	2021-01-19 16:00:00	2021-01-19 09:00:00	NA	0	71	NA	209.691 km	-
9	GOEA.18.06	1.65073e+05	2020-01-21 22:00:00	2020-10-31 04:00:00	2020-10-30 20:00:00	NA	0	0	NA	NA	no data
10	GOEA.18.11	8.94608e+19	2020-01-20 14:28:33	2021-01-19 18:46:08	2021-01-19 10:46:08	NA	0	243	NA	31.928 km	-
11	GOEA.19.01	1.40082e+05	2020-03-01 01:00:00	2020-10-07 01:00:00	2020-10-06 17:00:00	NA	0	0	NA	NA	no data
12	GOEA.19.03	1.40081e+05	2020-03-04 21:00:00	2020-03-08 01:00:00	2020-03-07 16:00:00	NA	0	0	NA	NA	no data



Migration Mapper



400
camera
traps!



[Manage](#)

[Help](#) [Taxonomy request](#) [Feature request](#) [Report a bug](#)

1

Create

All of your photos are part of a project, which in turn is part of an organization. Get started by creating them.

Create...

2

Upload

By uploading your photos, you'll get suggestions from the Computer Vision and you'll get help from your collaborators.

Upload photos

3

Identify

Accept suggestions or manually tag the animals in the photos. You can search by family, genus or species.

Identify images

4

Analyze

Get insights about where species are located, when are they seen and how much this changes over time.

Analyze

Your projects

Search a project

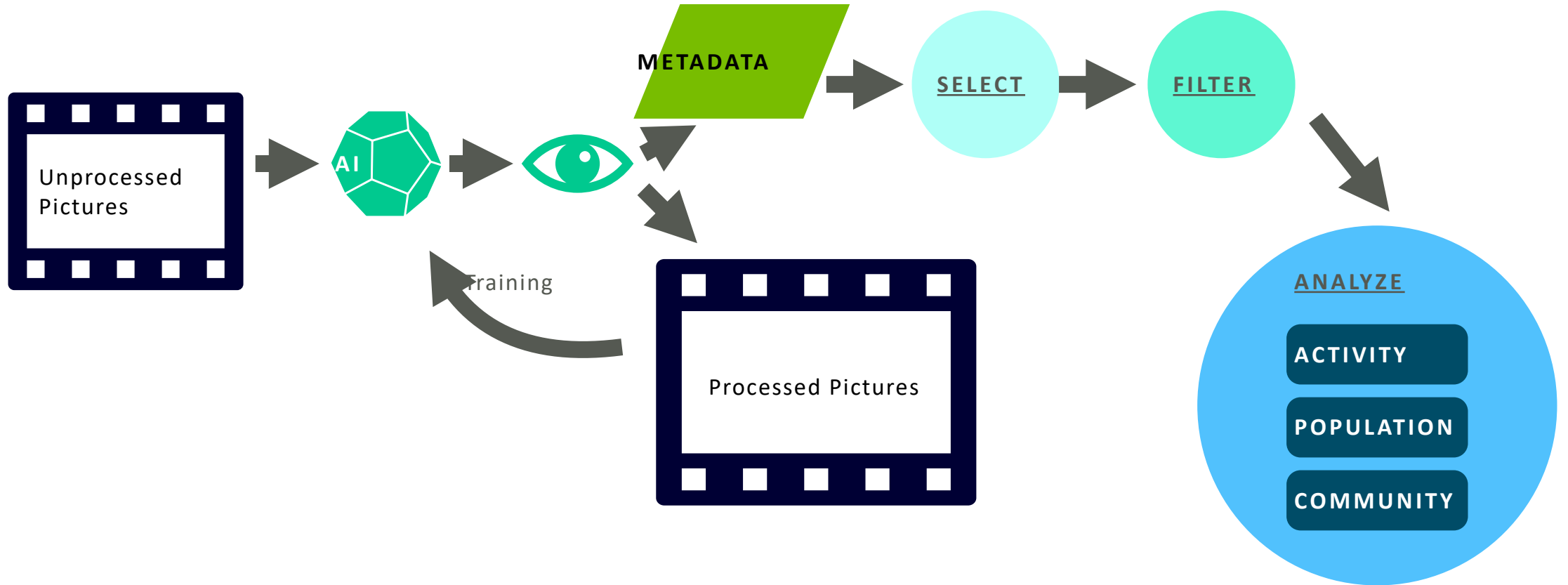


Osa_Conservation i



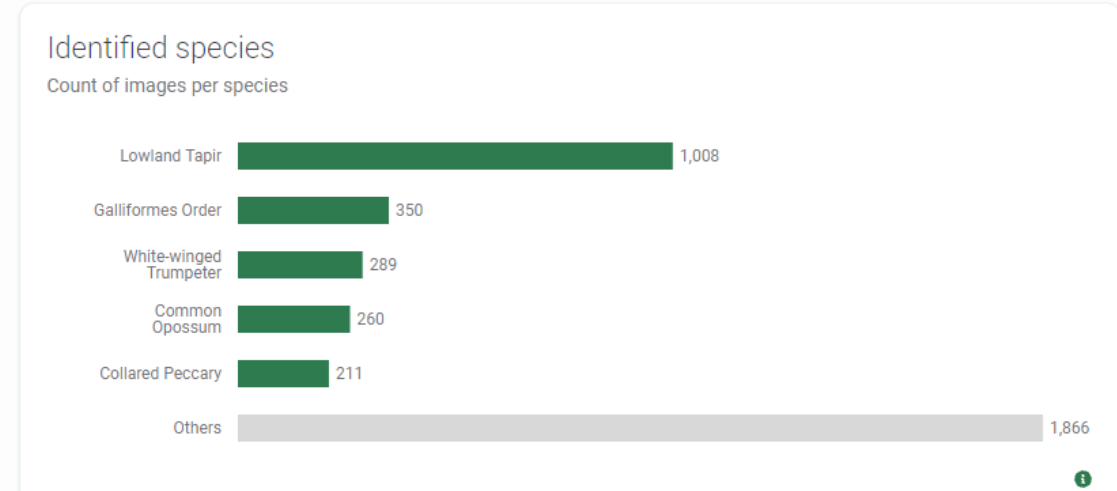
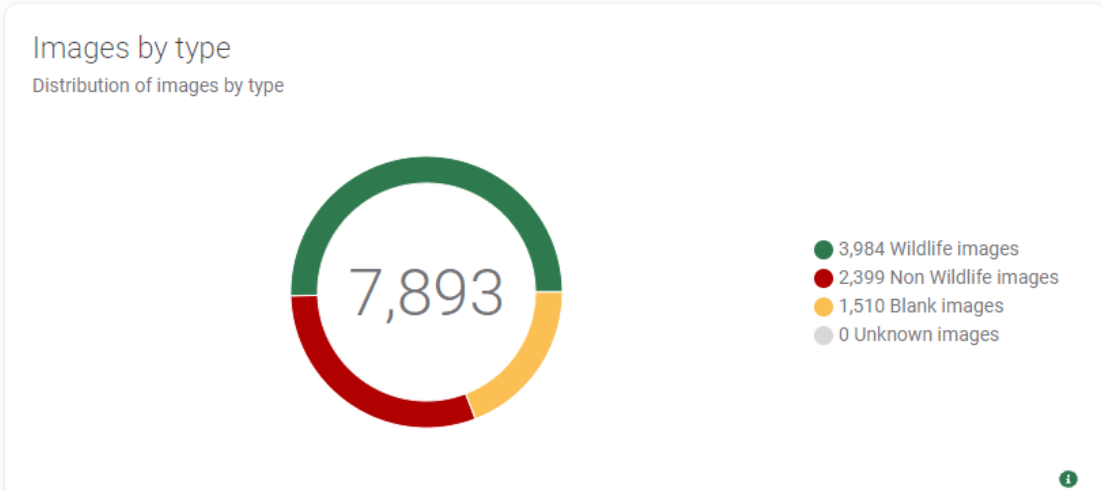
Los Amigos



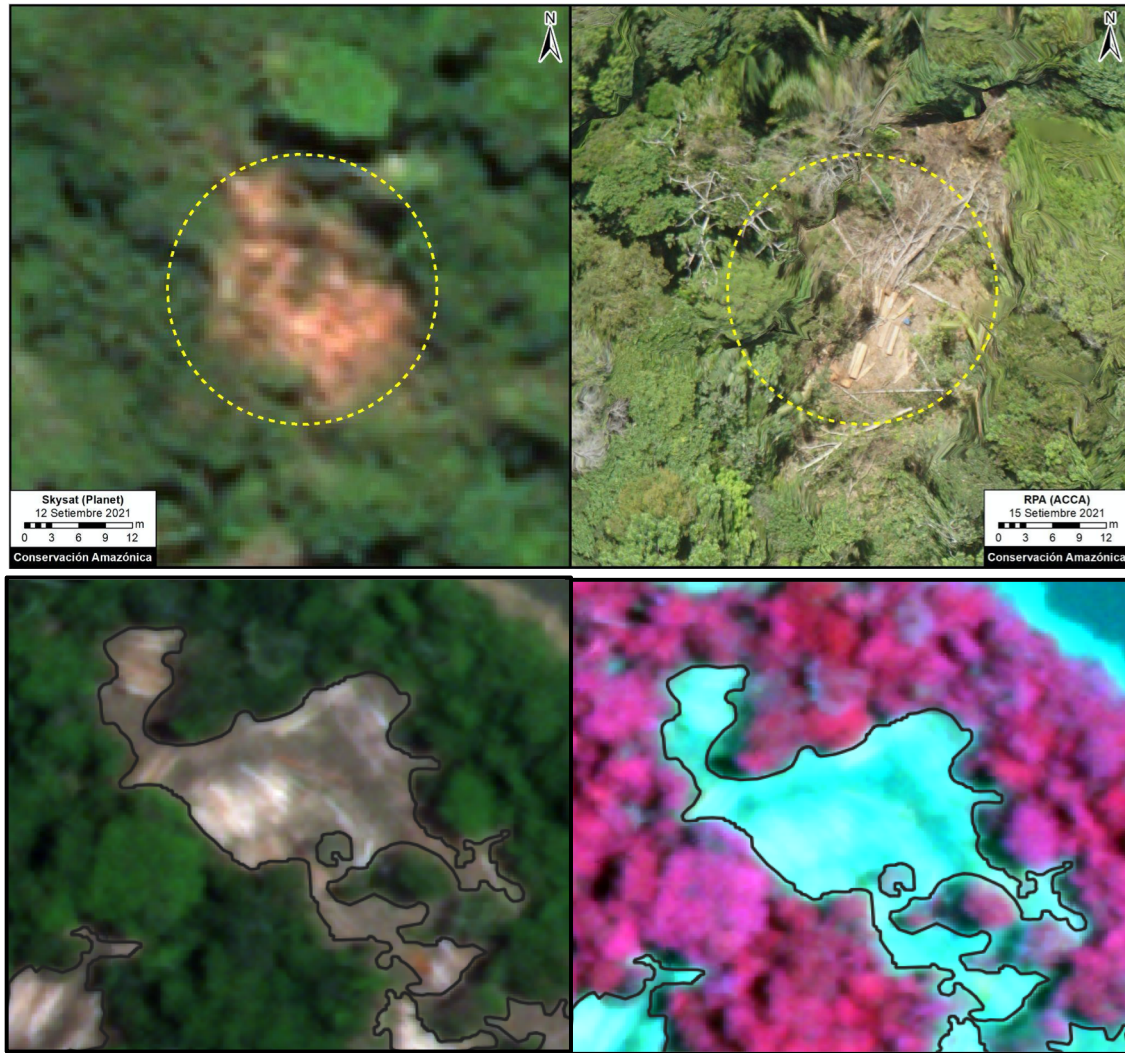


Projects list

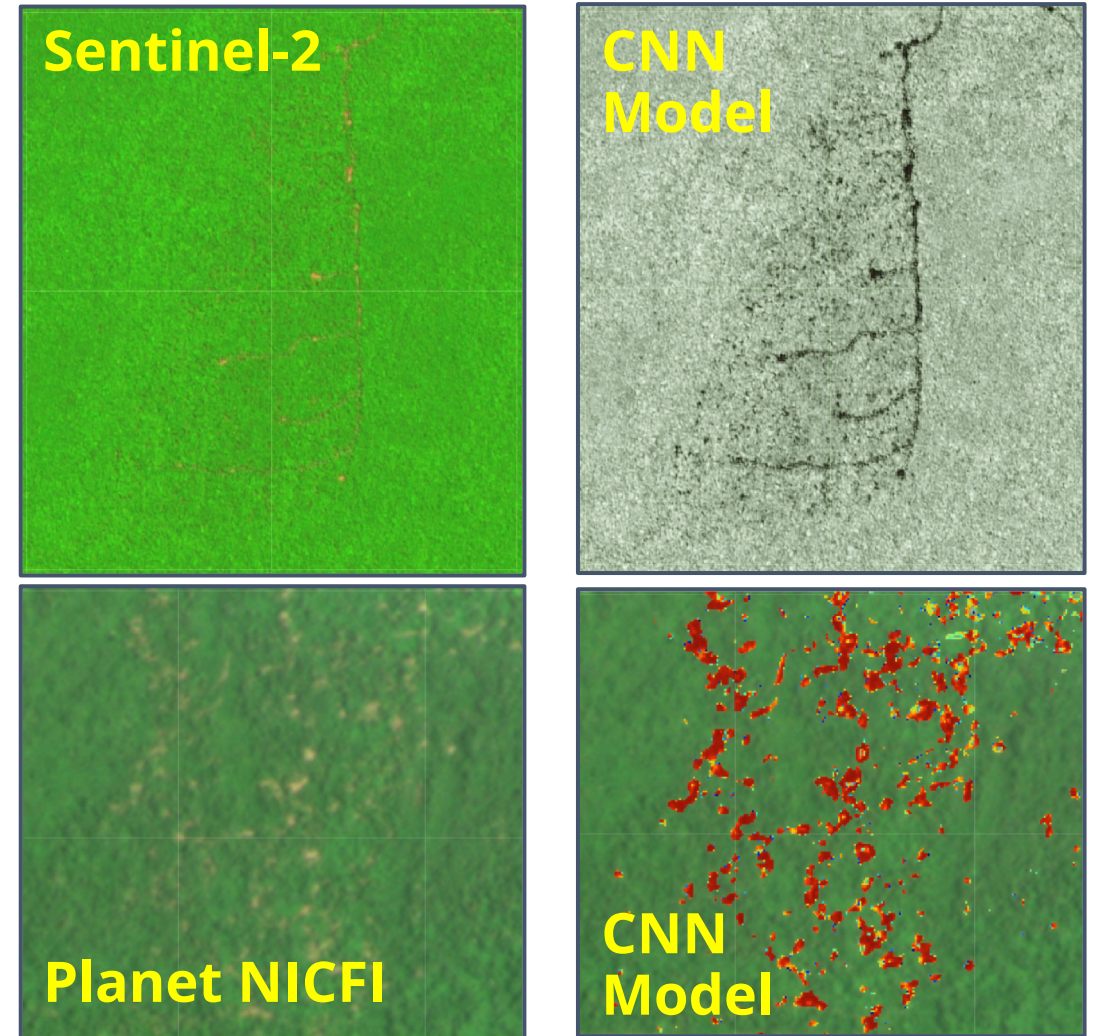
71 Species	7,893 Total images	3,984 Wildlife images
34 Locations	45 Camera deployments	42 Cameras
2021-08-25 First survey date	2021-09-12 Last survey date	468 Sampling days
175 Images per deployment (average)	1 Projects	



A) Benchmarking Dataset



B) Testing Models





Thank you

GORDON AND BETTY
MOORE
FOUNDATION

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