

LPC Loon Cam

A photograph of a loon in a pond. The loon is on the left, partially submerged, with its head and back visible. To its right is a camera rig consisting of a vertical pole with a camera mounted on top, also partially submerged. The background is a dense forest of green trees and bushes. The water is calm, reflecting the greenery. A yellow buoy is visible in the water on the right side.

Bill Gassman
Loon Cam Operator
July 2020

Overview

- Live 24x7 broadcast of loon nests
 - Research, outreach and education
 - Operates early May until mid July
 - Ongoing since 2014
- Lively online chat community
- On-demand clip library
- Links with other LPC outreach programs



Loon.org/looncam Web site

- News
- Live Cam
- Biff's Blog
- Lots of information

[Our Work](#) [Counting Loons](#) [Nest Rafts](#) [Signs](#) [Lead](#) [Rescues](#) [Outreach](#) [Research](#) [Loon Cam](#) [Recovery Initiative](#) [Squam Lake Loon Initiative](#)

LIVE LOON CAM

Loon Nest Live from the Lakes Region of New Hampshire

News Headlines (scroll down for Biff's Blog):

Looncam 1

- Nesting is complete. Two chicks hatched and were seen doing well in brooding area.

Looncam 2

- Two eggs are being incubated. One laid 6/11, the other on 6/13.
- Hatch expected around July 8 to 10
- The loons can be identified by their leg bands. The male's bands are: white on the left leg, silver over red with a white dot on the right leg. The female's bands are: white with a black stripe over blue on the left leg and silver over yellow with a black stripe on the right leg.
- Direct YouTube link is <https://youtu.be/UlA3pms0NoI>



2020-06-14 16:20:53

[To help fund the 2020 Loon Cam, *Click here*](#)

For best quality, set your YouTube resolution to 1080p and click the "live" button. You can rewind the stream up to 12 hours with the red dot at the bottom of the YouTube stream. To visit the chat room, go to YouTube directly in your browser or phone app.

2020 Loon Cam Biff's Blog



LOON CAM 2 PAIR AND TERRITORY

Become a LPC Member or Donate

Please support the Loon Preservation Committee's mission.

Since 2014, LPC has streamed live footage of nesting loons to the public. Viewers are able to witness the entire nesting process, including nest site selection, egg laying, incubation, and (in most years) the hatching of chicks. Much of the time, the scene is the same: a loon sitting in a nest. Occasionally (often several times per hour) the loon will move around or stand up and turn the eggs. The male and female loons take turns incubating, and nest exchanges happen several times each day and can last minutes or much longer. Sometimes, the loons communicate quietly with each other, and they will occasionally will show agitation when the sitting loon isn't ready to leave the nest. Watching a hatch and the chick learning to swim are must see events. While the loons on our webcam have historically experienced high levels of nesting success, this is not always the case. We can't control nature, and nesting loons face many challenges. Eggs and chicks can be lost due to predation, sibling rivalry, or water level changes. Nothing is guaranteed. The loon cam can be fascinating to watch and to some, addictive.

Sound is included in the stream, letting us listen in on quiet conversations between the pair. Current LPC biologists, former LPC biologists, and our Loon Cam operator will periodically post to our looncam blog. The blog can be found at the bottom of this page this page, and entries provide providing insight and perspective. Because camera technology sufficient to continuously monitor loon nests is a relatively new development, footage captured by the loon cam may raise new questions about loon behavior. Our bloggers strive to provide insight or hypotheses into these questions.

Along with the streaming broadcast, the YouTube chat window is open for loon lovers to chat about what they are seeing. LPC biologists will occasionally join the chat for Q&A sessions.

The live stream has a replay feature, so viewers are able to rewind up to 12 hours to watch an egg turning, nest exchange, or other interesting events. LPC maintains a video archive, so if you miss an event of interest, we may be able to go back and make a clip of it. Over the years, well over 100 video clips have been saved. Many are available on LPC's YouTube channel.

Please visit [LPC's YouTube Channel](#) to see the video clip archive. Watch a chick returning to a nest and much more.

YouTube Live

- Easy to use
- Adapts to user's device and network speed
- 12 Hour Rewind
- Chat
- Viewer Statistics
- “Just works”
- Free



2020-06-24 16:23:32

NEW HAMPSHIRE
LPC Loon Cam 2 - Live Broadcast

58 watching now • Started streaming on Jun 13, 2020

298 3 SHARE SAVE ...

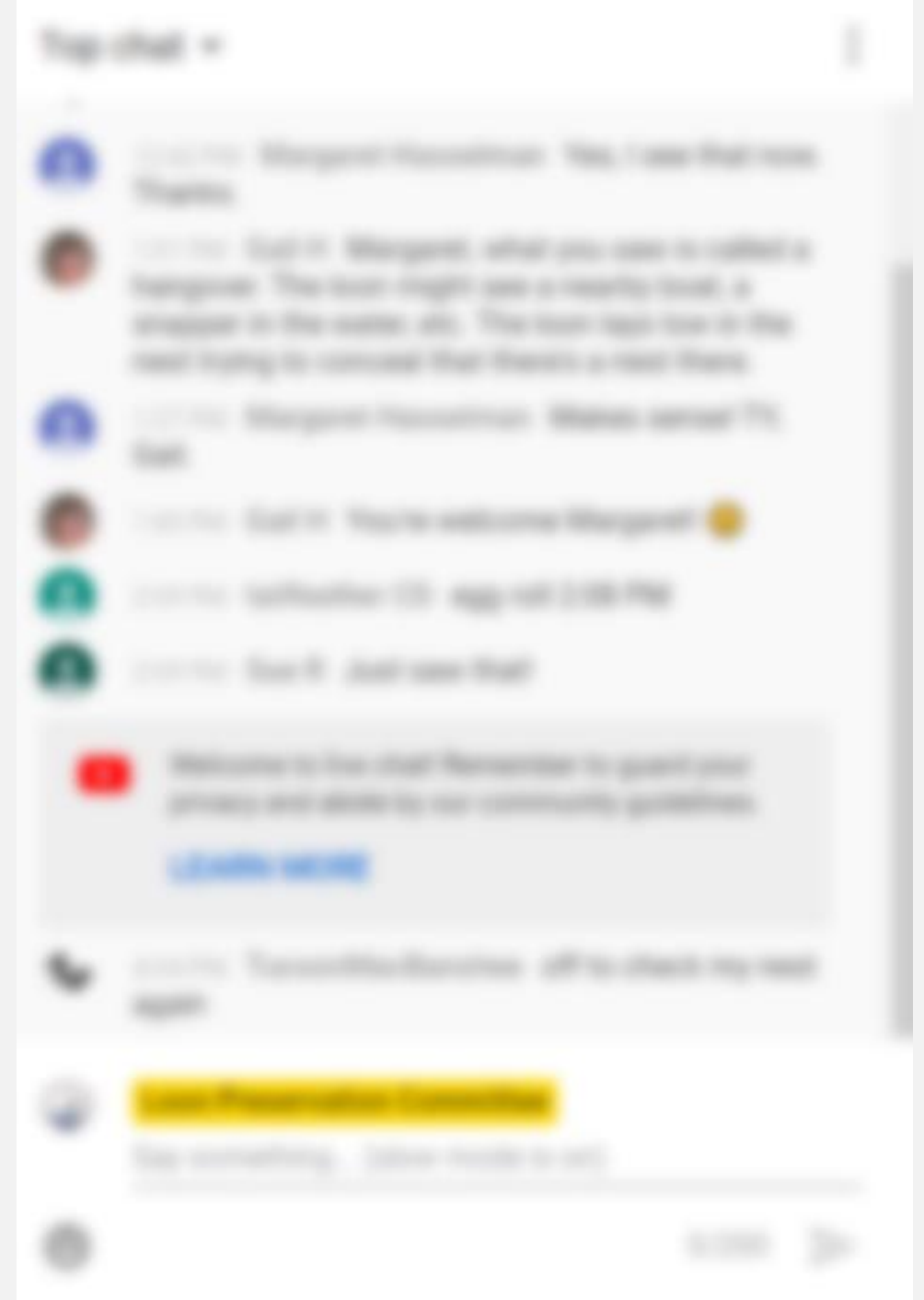
 Loon Preservation Committee
3.03K subscribers

ANALYTICS EDIT VIDEO

Welcome to the Loon Preservation Committee's Second Loon Cam of the 2020 Season.

Community Chat

- Live interaction
- Many regulars
 - Local, national and global
 - Questions are answered
- Make note of event time stamps
 - Nest swaps
 - Egg turns
 - Notable things
- Fund raising



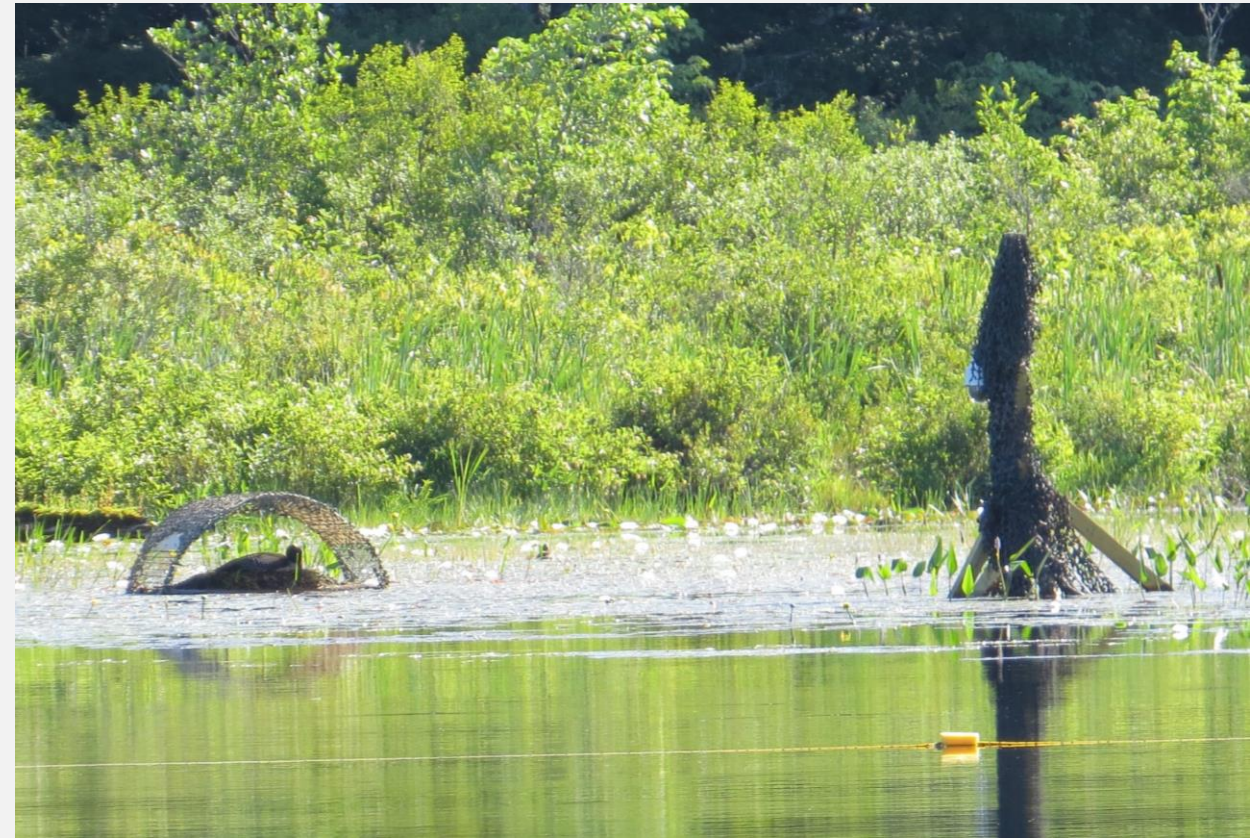
What We See

- Cycle of reproduction
- Challenges to a successful hatch
- Anthropomorphic personalities
- Unexpected behavior
- Other forms of nature
- Drama (territory, lost mother, lost egg)
- Tragic events
- Loon chicks



How Does it Work?

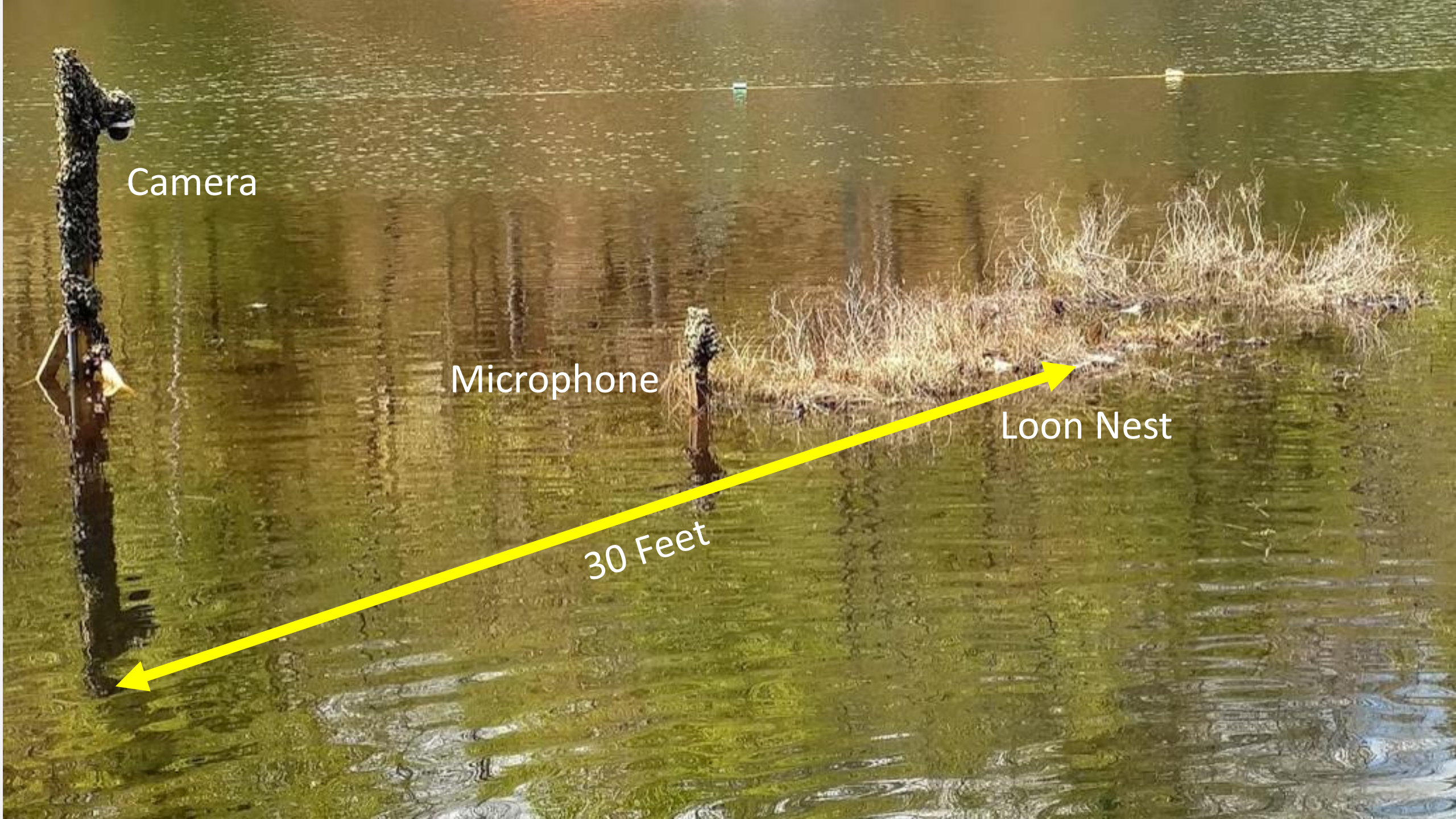
- Basic design
 - Pan-Tilt-Zoom camera
 - Stream to YouTube Live
 - Internet connection (35 Mbps upload speed)
 - Video archive (seven days)
 - Time-lapse snapshots (once/minute)
 - Remote power switch
 - Weather station
- Loon Cam 2 - Off-grid design
 - Batteries – 2 six volt – total of 220 amp/hour
 - Solar panels – two 100 watt
 - DC/AC Inverter
 - Radio link to mainland – WiFi frequency





Camera post in pond
Burial grade data and
power over Ethernet
Cable to land



A photograph of a loon nest in a body of water. The nest is a small island of dry grass and twigs. A yellow arrow points from the nest to a vertical post on the left, which has a camera and microphone attached. The text '30 Feet' is written along the arrow. The water is greenish-brown and reflects the sky. A yellow line with floats is visible in the background.

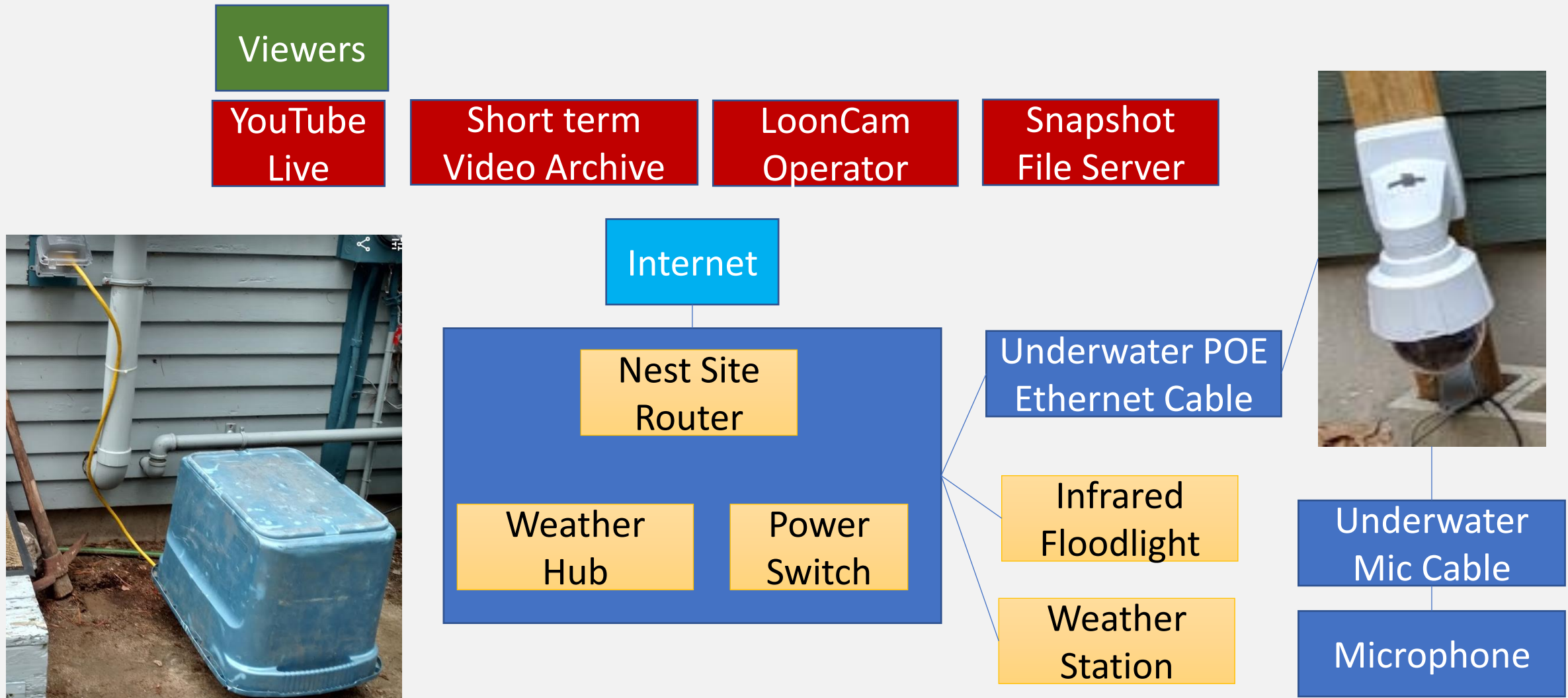
Camera

Microphone

Loon Nest

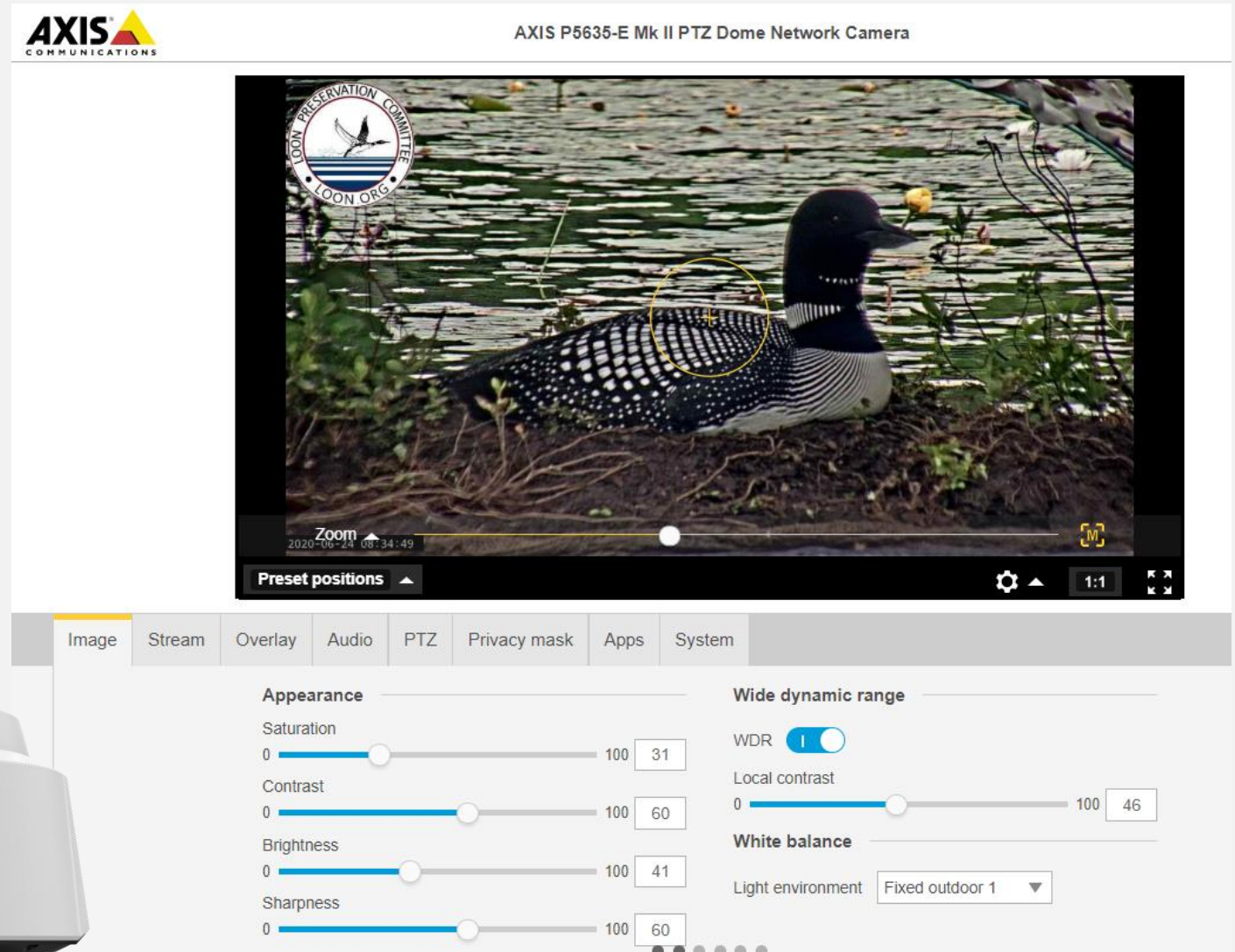
30 Feet

Web Cam Design



Camera

- Axis P5635-E MKII
- Pan 360° Tilt 180°
- 30X optical zoom
- 1080p with audio
- Real time control
- Laptop or mobile



Infrared Lights

- Axton AT6-NE, IR Lamp
- Spotlight at infrared wavelength
- Operates during night
- Controlled by remote power switch
- Works with infrared filter on camera



Internet Power Switch

- MSNSwitch Model UIS522b
- Remote control of power
- Used for Camera and IR lights
- Timer schedule for Infrared Lights
- Saves a trip to the site

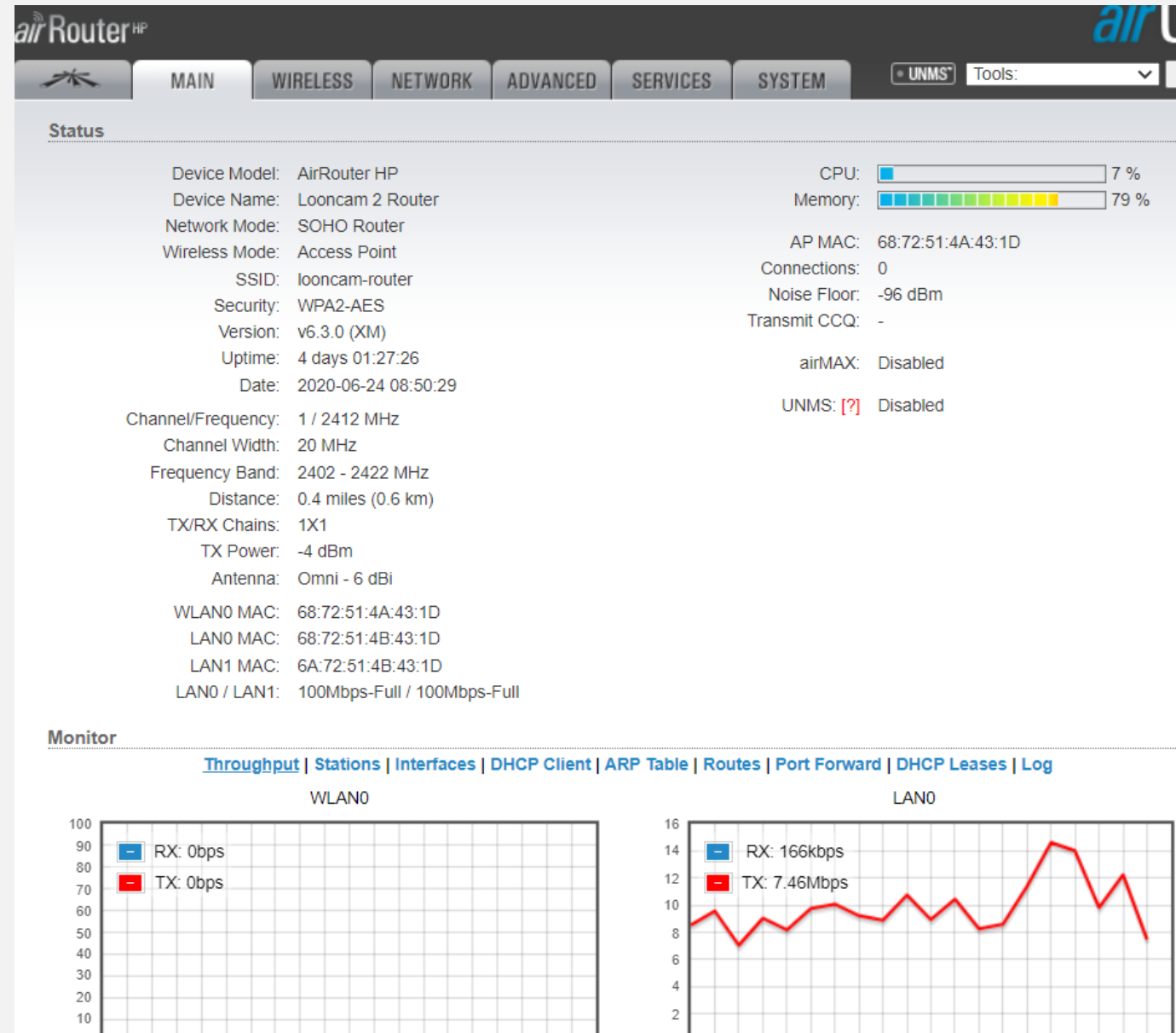


Status and Control		
Outlet Name	Status	
Camera	On	
IR Lights	Off	
 Outlet On  Outlet Off  Outlet is On, I		

Schedule List (max 20)						
No.	Enable	Date	Time	Select	Action	
1		Every Day	21:00	IR Lights	On	 
2		Every Day	04:50	IR Lights	Off	 

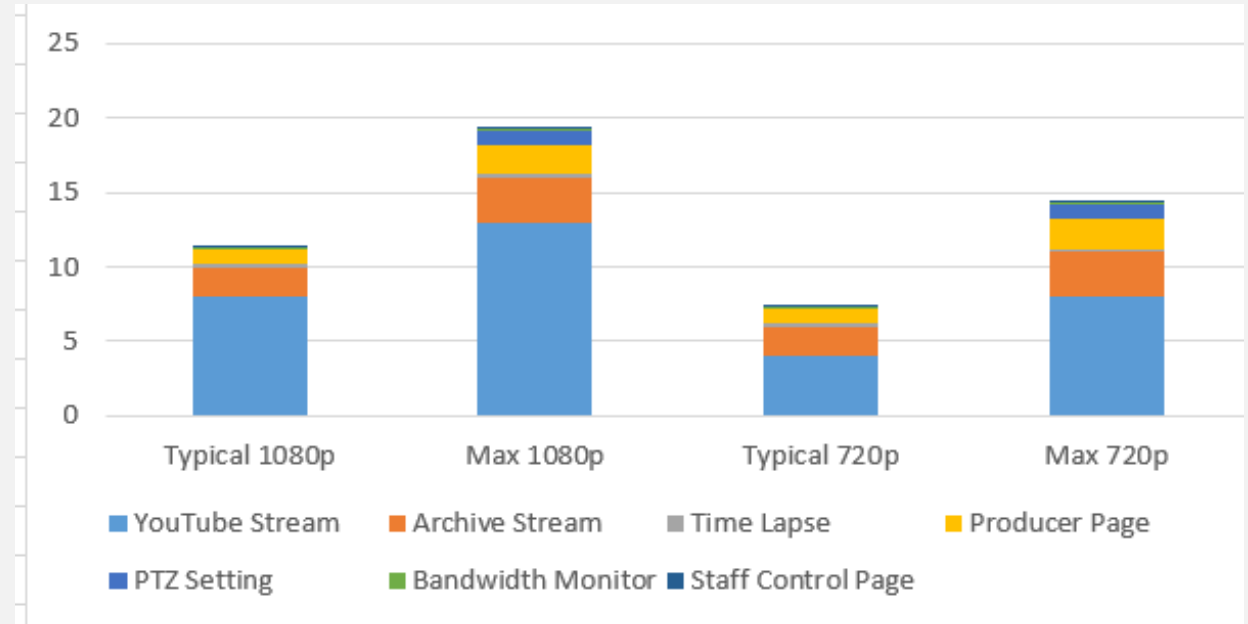
Internet Router

- Ubiquiti AirRouter
- Firewall camera from internet
- Provides remote access
- Real-time bandwidth monitoring
- Local access to equipment



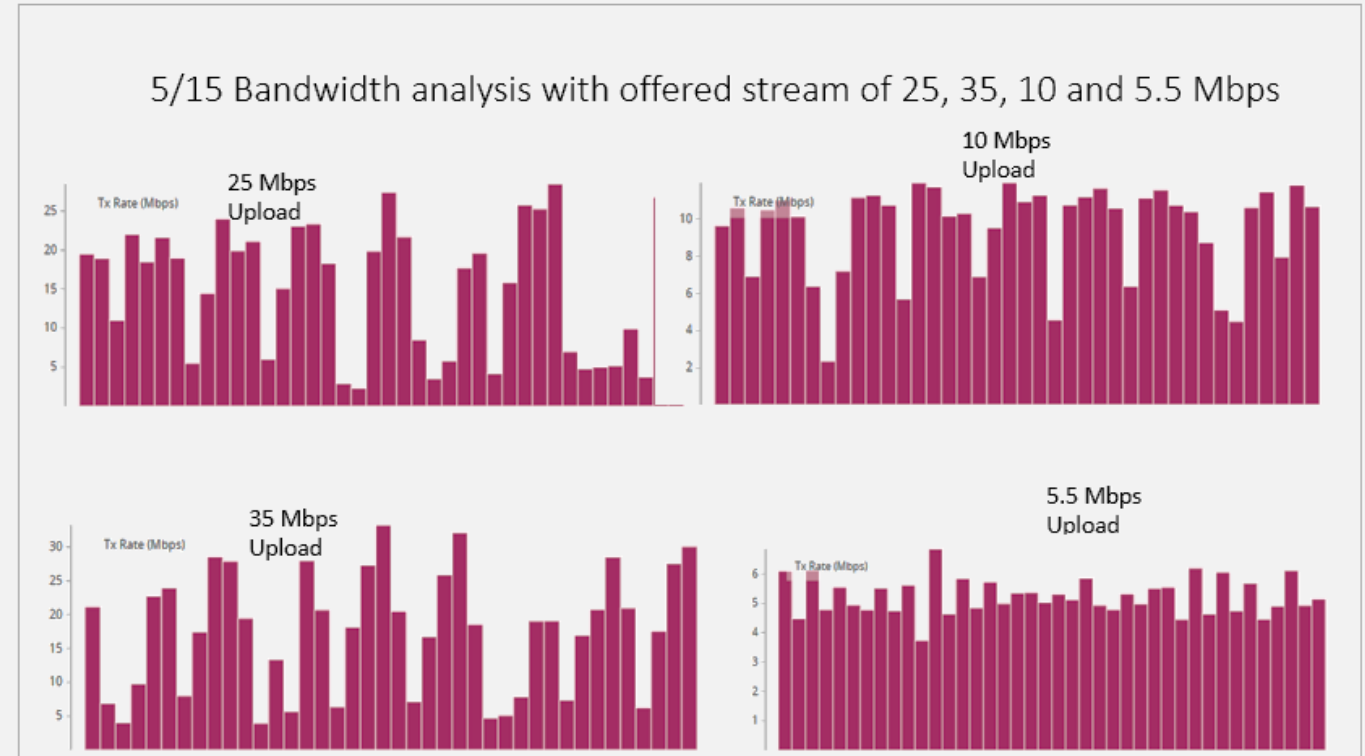
Bandwidth Budget

- Many streams to share capacity
 - YouTube
 - AngelCam archive
 - Loon Cam Operator)
 - Still time-lapse
- 35 megabits/second purchased
 - Reality varies from 5-42 Mbps
 - Camera's limit is 50 Mbps
- Data volume increases with movement
- Stream quality degrades when capacity is exceeded



Internet Connection

- Spectrum Business 600/35 megabits per second
- Packet loss causes stream to be jumpy (jitter)
- Camera is throttled back to match “true” capacity
- Future plan is to use two circuits and split the load





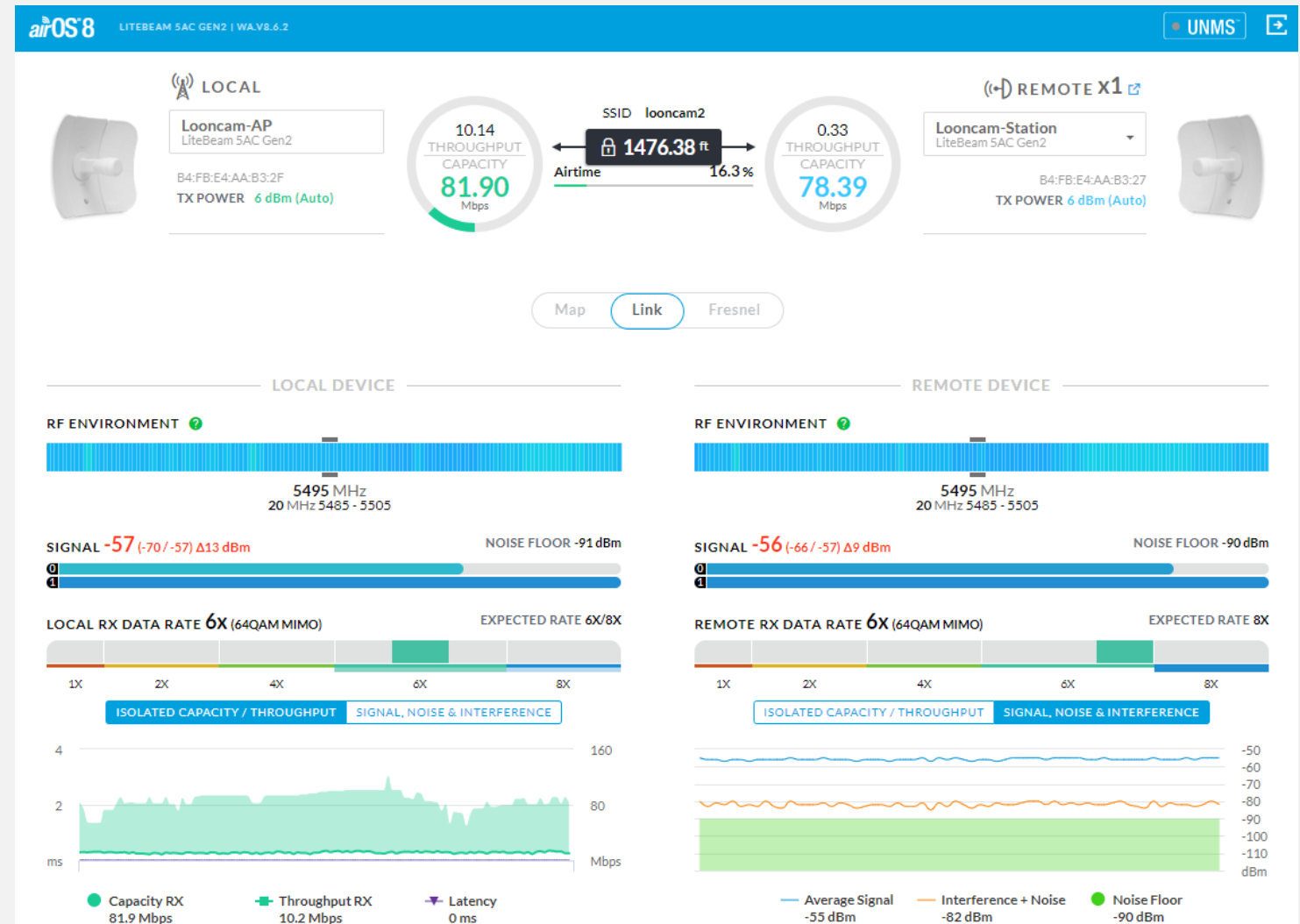
Remote End:
Camera and Infrared Lamp
Solar Panels, Controller, Battery
DC/AC Inverter and meters
Weather Station
Power Switch
Ethernet Hub
Radio Bridge (1/4 mile)

Mainland:
Radio Bridge
Router
Cable Modem
Link to Internet



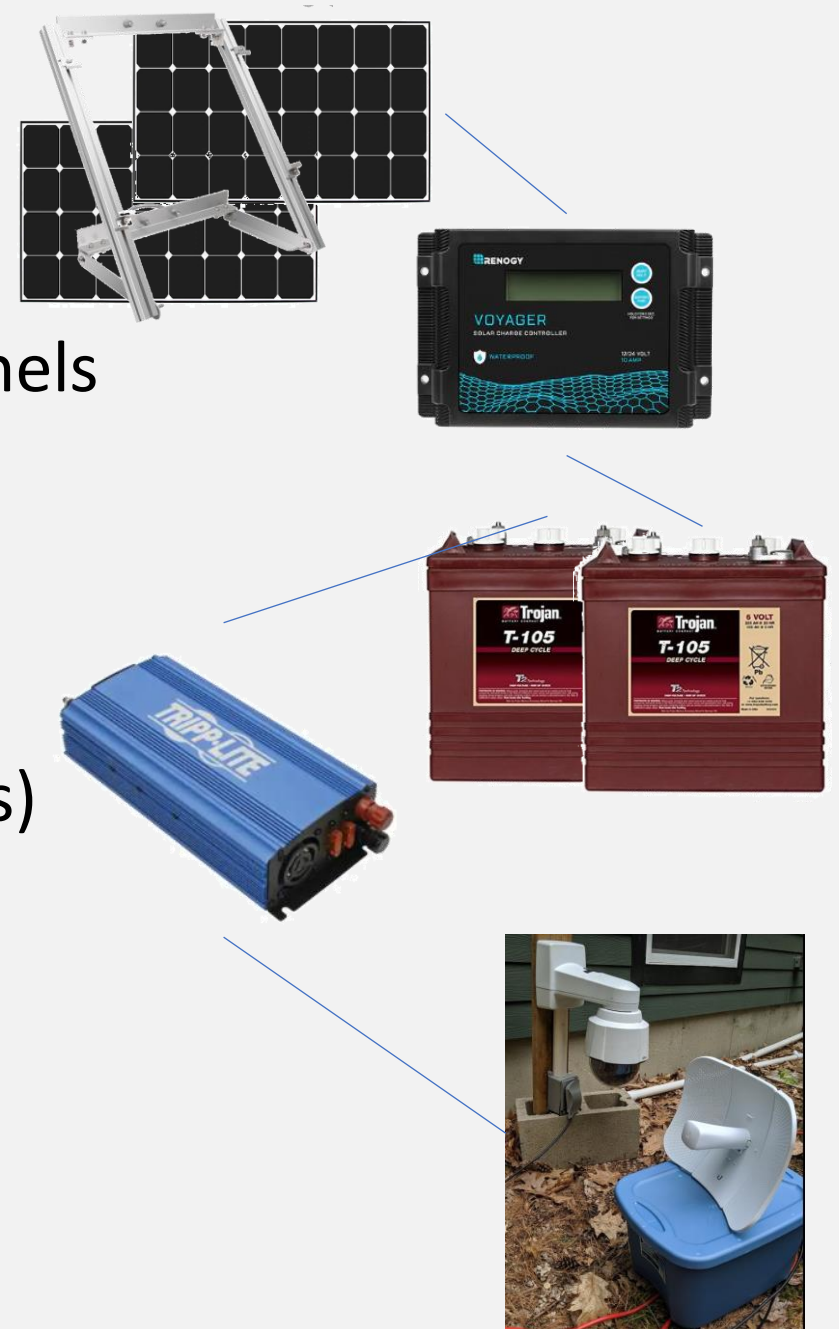
Island to Mainland Radio Bridge

- Ubiquiti LiteBeam
- Spec is 400 Mbps or 3 miles
- Real-time monitoring
- Automatic optimization
- Reliable – even in rain



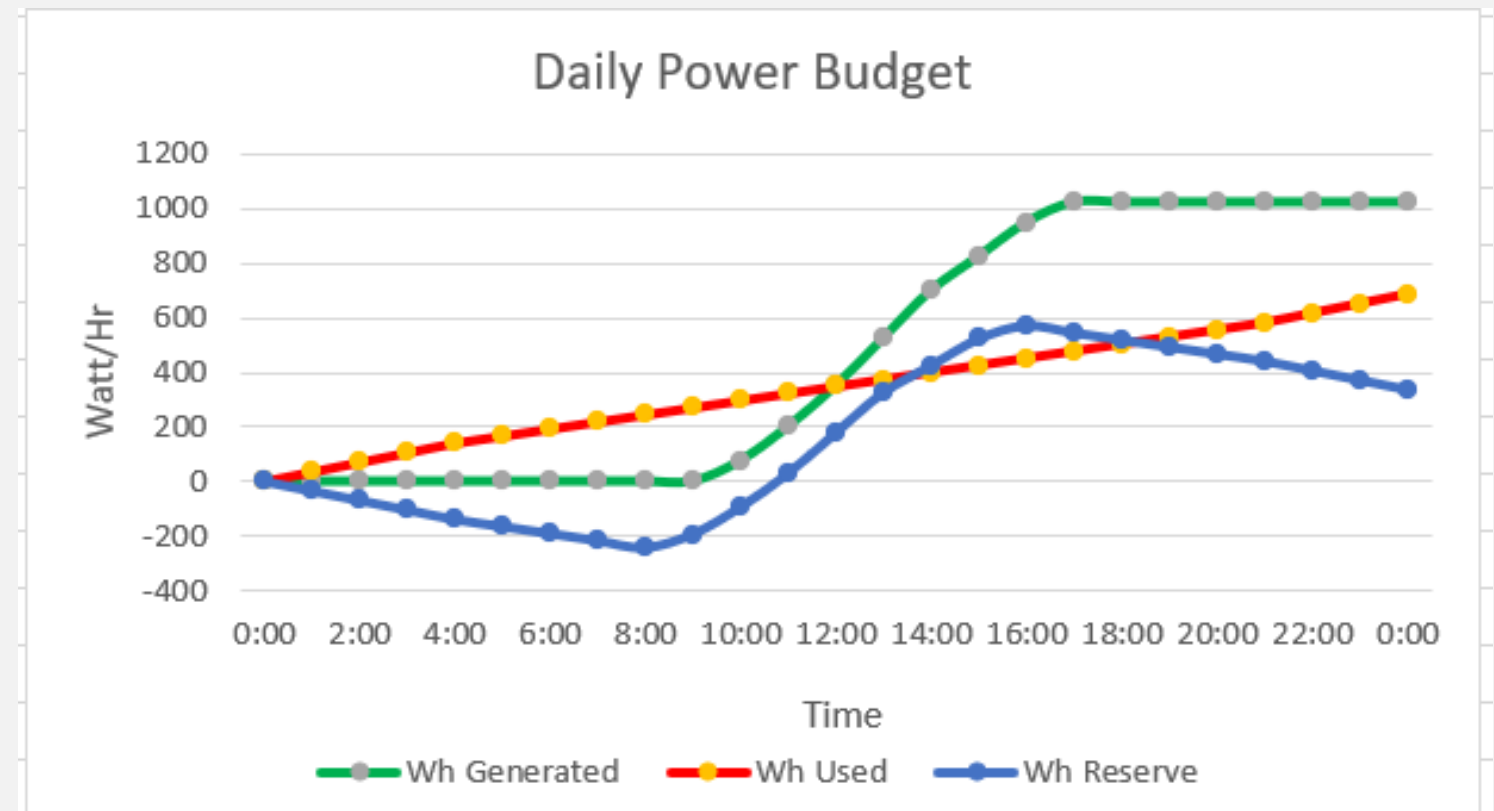
Solar Parts

- 2 x 100 Watt 12 Volt Monocrystalline solar panels
- Pole mounts for panels
- 20 AMP MPPT Charge Controller with monitor
- Cables, junctions and fuses
- 2 X 6 volt deep-cycle batteries (200 amp/hours)
- Inverter
- Box for batteries and another for electronics



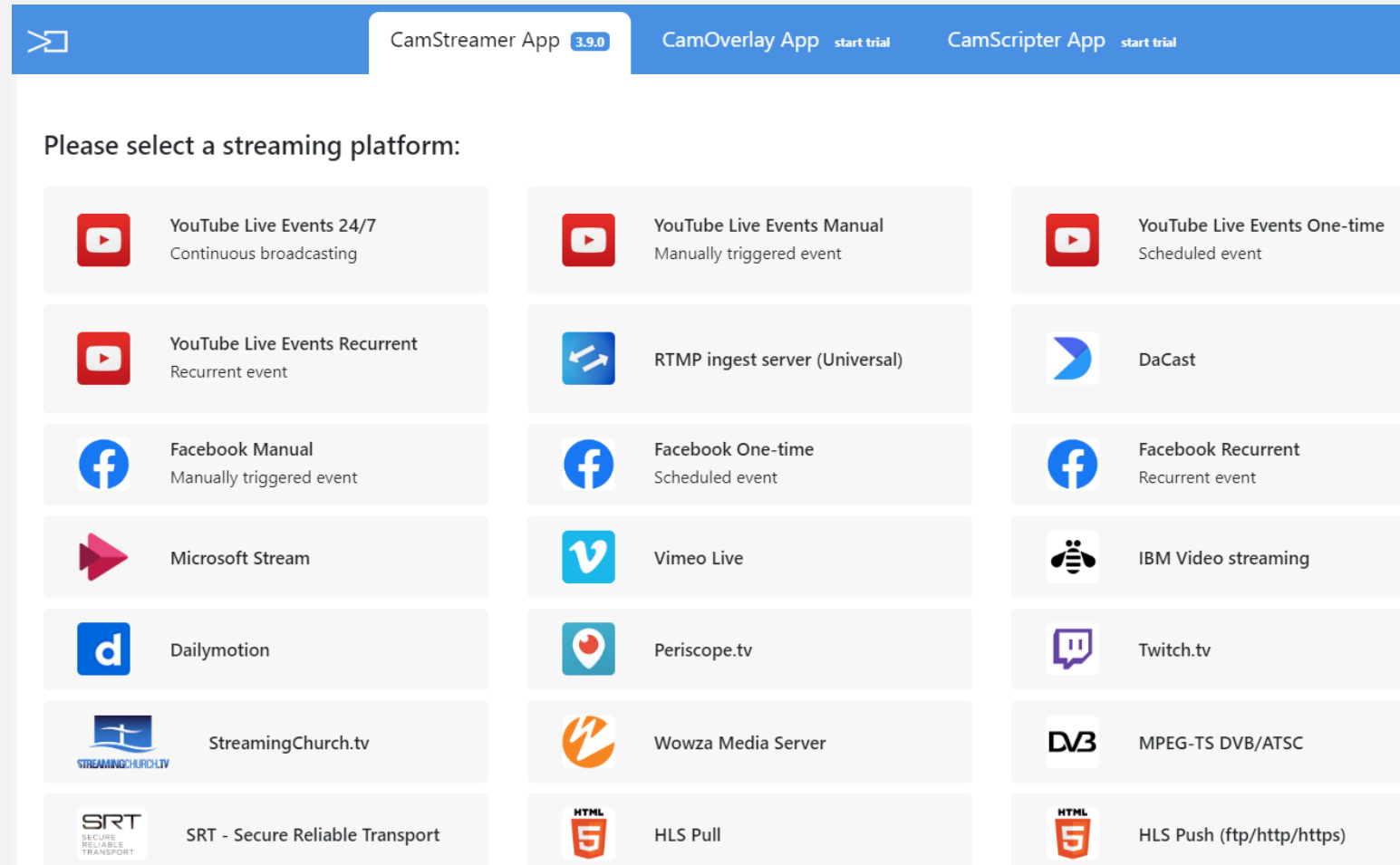
Solar Budget

- Battery has 1250 Watt-Hour capacity
- Solar generates 150-1000 WH per day
- Use 750 WH per day
- $3 \pm$ day cloudy day reserve



CamStreamer

- Required to make Axis cameras work
- Sets up live streaming to YouTube or Facebook
- Software runs in camera



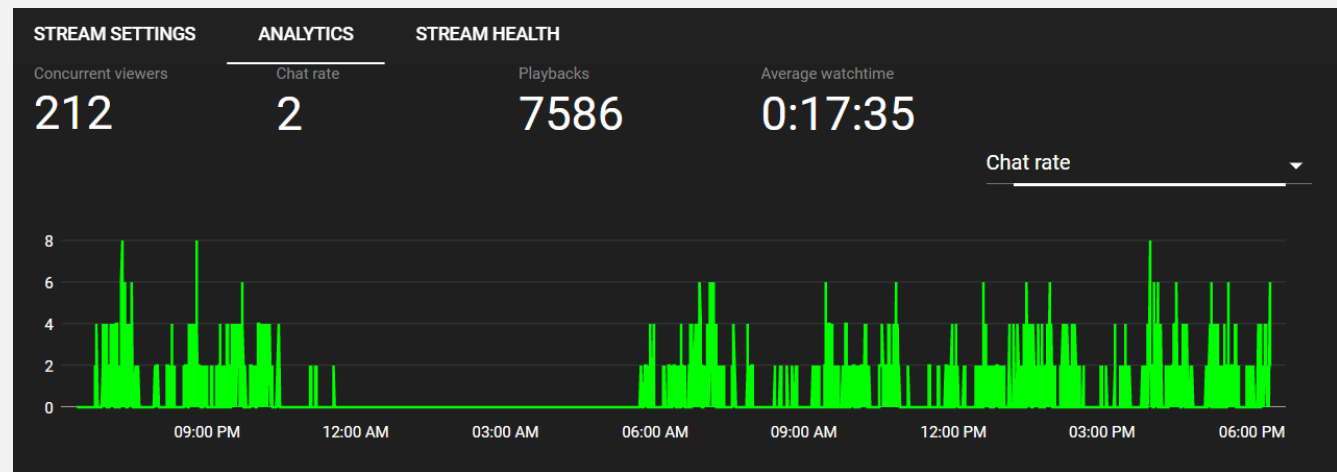
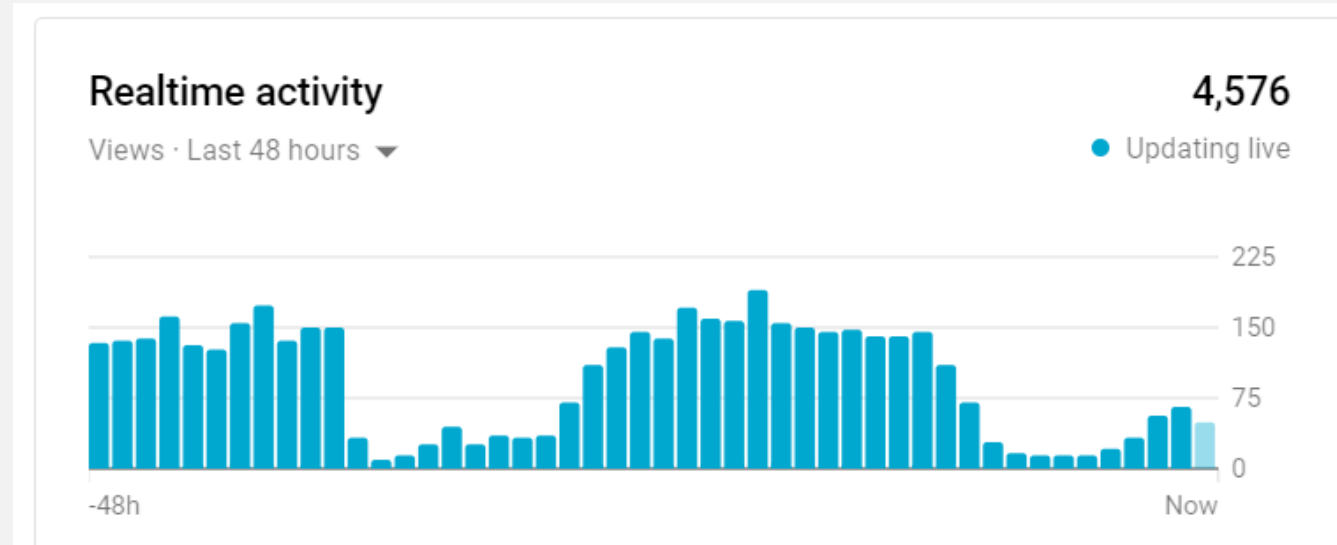
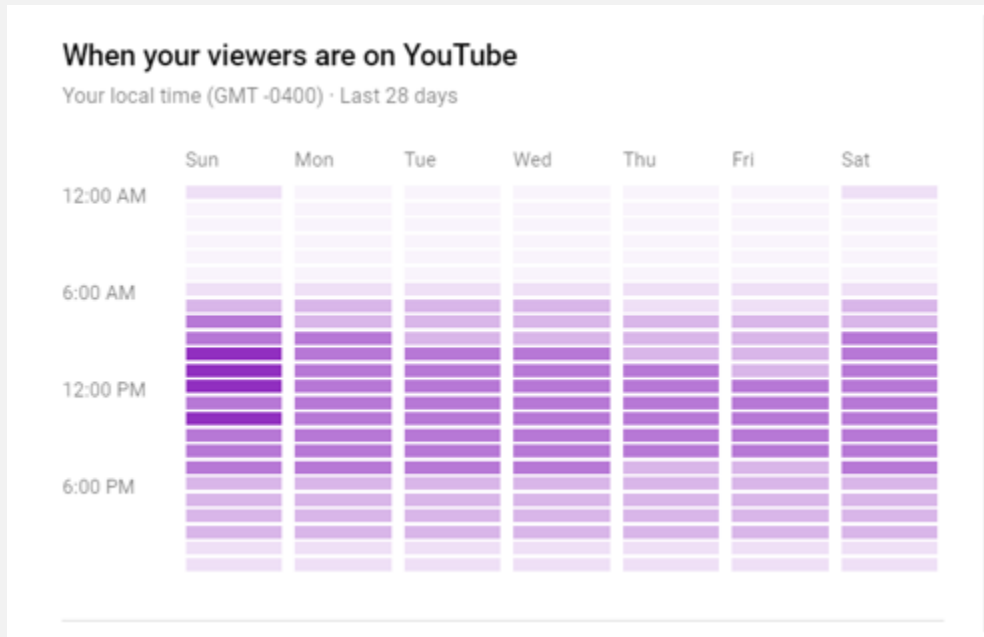
YouTube Video Library

- 100+ on-demand videos
- Sourced from the 7 day archive
- Created with Movavi Video Editor
- Uploaded to YouTube
- Subscribers are notified

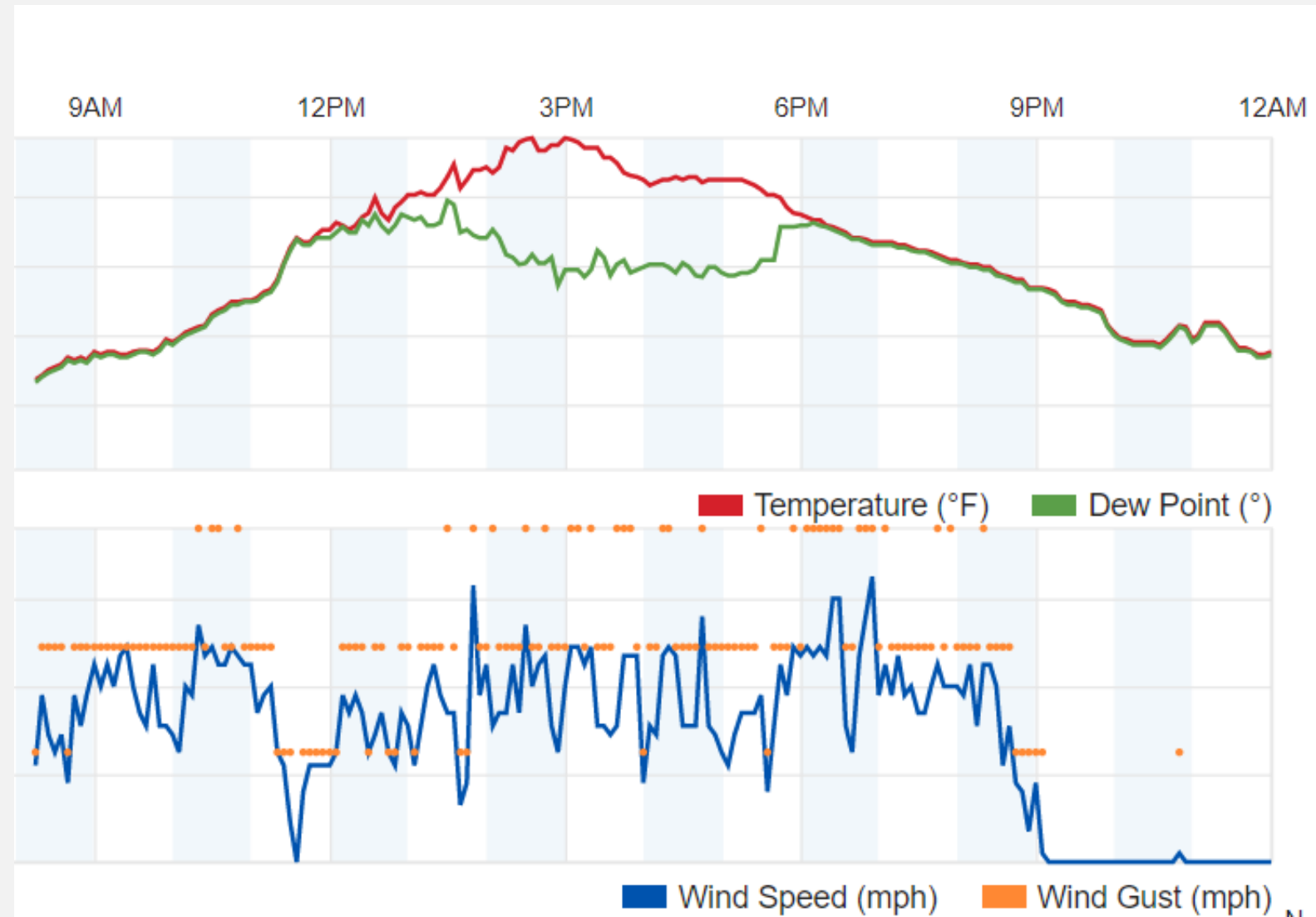
Channel videos								
Uploads Live								
Filter								
☐	Video	Visibility	Restrictions	Date	Views ↓	Comments	Likes (vs. dislikes)	
☐	 Eagle Attacks Loon Chick Warning: Disturbing to some people. Within hours of hatching, and several days after being attacke...	 Public	None	Jun 23, 2019 Published	23,490	25	83.6% 46 likes	
☐	 Big Turtle Visits the Loon - June 4, 2017 A large turtle climbed up the backside and past of the loon's nest, then settled on the bottom for a...	 Public	None	Jun 4, 2017 Published	12,841	18	98.4% 127 likes	
☐	 Loon Nest Exchange - Looncam Two The second looncam of the season is running. Here, the pair do a nest exchange. The two eggs...	 Public	None	Jun 23, 2017 Published	10,988	11	96.4% 81 likes	
☐	 Loon Egg is Hatching! After seeing the first pip on the egg around 3PM on Friday, the female sat on nest, without turning...	 Public	None	Jun 17, 2017 Published	9,523	7	98.5% 67 likes	
☐	 Eagle attacks Loon Egg We've answered the question, do eagles like loon eggs. Spoiler alert, the egg is safe, but are some...	 Public	None	Jun 21, 2019 Published	7,133	15	96.0% 48 likes	

YouTube Stream Reports

- Extensive aggregate reports
- Real-time and long-term

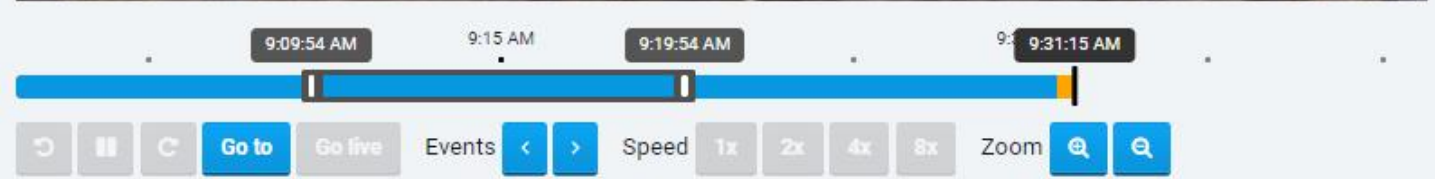


Weather Station



Video Archive

- AngelCam 7 Day DVR
- Second stream
- Lower resolution and frame rate
- Easy to make clips to 3 hours
- Download clips for editing



Clip name

LoonCam2 2020-06-24 09:09:54

Clip start 2020-06-24 09:09:54 Clip end 2020-06-24 09:19:54

Create clip Cancel

Cloud recording ☒ On

Recording mode Continuous recording

Retention 7 days

[Manage recording service](#)

Connection quality ★★★★★ (100 %) [How to optimize your stream?](#)

Stream type h264

Resolution 1280 x 720

Bitrate 206 kbps

Audio Yes

Archive Library

Clips from camera LoonCam2

+ Create new clip

LoonCam2 2020-06-22 16:12:04



6/22/2020, 4:12:04 PM (17 minutes, 5 seconds)   

Heron-Hoots



6/19/2020, 8:17:00 PM (2 minutes)   

LoonCam2 2020-06-18 18:35:12



6/18/2020, 6:35:12 PM (12 minutes, 42 seconds)   

Flush-June18



6/18/2020, 6:29:17 PM (54 seconds)   

Time Lapse Archive

- Scheduled periodic HD snapshots
- Transmitted to a remote file server
- Timestamped file name
- Useful to find events like nest exchange or predation
- Time-lapse movies (GoPro Studio)
- Archive for future research (AI?)
- Produces gigabytes of data



Name

- image20-06-18_02-37-48-46.jpg
- image20-06-18_02-42-48-49.jpg
- image20-06-18_02-47-48-48.jpg
- image20-06-18_02-52-48-48.jpg
- image20-06-18_02-57-48-48.jpg
- image20-06-18_03-02-48-47.jpg
- image20-06-18_03-07-48-47.jpg
- image20-06-18_03-12-48-47.jpg
- image20-06-18_03-17-48-46.jpg
- image20-06-18_03-22-48-46.jpg
- image20-06-18_03-27-48-46.jpg

LCO Lessons Learned



- Minimize human sound and on-camera moments
- Focus on the loon – to avoid missing something
- Keep chat on topic –
 - Can get boring over 28 days
- Quality and reliability can always be better
- Learn new IP address change from time-lapse NAS logs
- Reduce image “sharpness” is quick fix when running out of bandwidth
- Loons are amazing to watch



Hatch Day Operations

