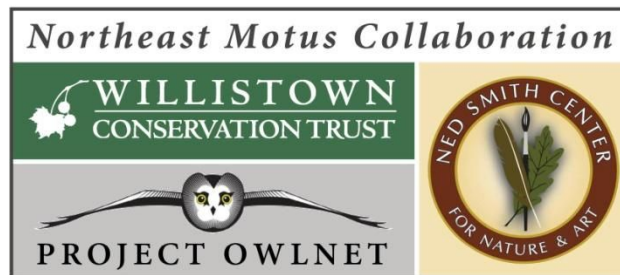


Northeast Motus Collaboration

northeastmotus.com

Motus Receiver Station Information and Installations



Motus Wildlife Tracking System

Purpose:

- facilitate landscape-scale research and education on the ecology and conservation of migratory animals
- When infrastructure is in place, each tower increases the value of every tag deployed
- Aides in one of the largest barriers to effective conservation; the importance of various types of landscape and their utilization throughout the annual lifecycle of a migratory animal

Site Selection:

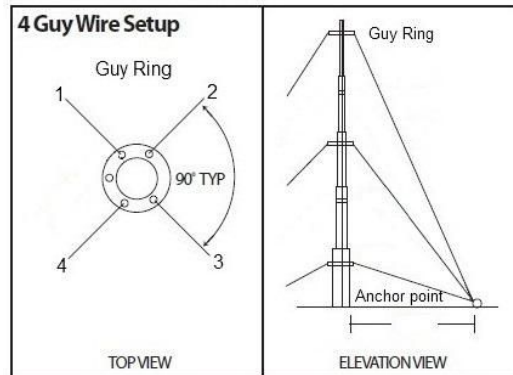
- Identify possible partners with research or educational focus AND/OR
- Identify target areas that would be ideal for bird migration such as ridge tops or flyways
- Identify public lands for use
- Examine the topography of the intended area using tools such as [ArcGIS online](#) or Google Earth
- Look for areas that are geographically high and clear of trees. An area with a clear-line-of sight for 15 km is ideal.
- A site with a 15 km clear line of site over adjacent ridges, even if only in one direction, is better than a site that is clear but lower than the surrounding topography.
- Need vehicle access, and southern exposure for solar if needed.
- Need to have a person able to visit the site 4 times per year.
- An area with low visitation by people, to avoid vandalism.
- Can co-locate on structures that can support 4, 10 lbs. yagi antennas.
- Fire towers, abandoned telephone poles, radio towers all good sources for co-locations. Rooftops have been used as well. Flat roofs with sturdy railings or retaining wall are ideal for anchoring the mast.
- Antennas are typically attached to a steel pole with u-bolts. The steel pole acts as the mast and can be fixed to existing structures.
- Can test for radio interference using one yagi antenna and a sensorgnome.

Receiver Stations:

- 166.380 dedicated and approved frequency
- SensorGnome Receiver – www.SensorGnome.org
- 4, 9-element yagi – 15 km range each
- Power source: Solar panel or 120/240V standard electric supply
- When receiver has wired or wireless connectivity, data will stream automatically to Motus server. Otherwise, manual download necessary

Free-standing Towers:

- 20-30' pop-up tower, 2-4 9' yagi antennae
- Tower tripod footprint, power supply and computer box = 3'x3'
- Guy-lines extend from minimum of 14' to max. of 20' from tripod. Covers ground area of 98-220 sq.ft.
 - 3/16" stainless steel wire rope
 - Duckbill earth anchors for rocky earth!
[forestry suppliers](#)



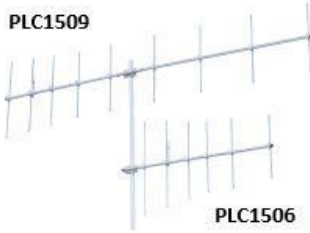
SensorGnome:

- Open source system for moderate-bandwidth data acquisition, processing and sharing
- Automated VHF telemetry
 - Equipped with FUNcube Dongle radio receiver can detect pulses from Lotek coded transmitters.
 - Simultaneous scanning of multiple antennae
 - Dual power source
 - Built-in GPS
 - Stores a complete record of all detections for later processing
 - Stores information on running noise and signal strength
- Power usage
 - Draws approximately 10 watts consistently. Based on an average of \$0.12 per kwh, the cost to operate a Motus receiver station is approximately \$10 per year.

Interference:

- Sources known to create high levels of interference:
 - Cellular towers
 - Moderate-high band width radio communications towers
 - Turbines and transformers sometimes
- Testing interference before tower installation
 - Take a sensorgnome and antenna – look for # hits per minute to get an idea
 - Apply band pass filters if needed (\$50-60):
http://www.scannermaster.com/BPF_VHF_Band_Pass_Filter_p/24-531041.htm

Yagi antennae – 9 feet long, 10 lbs.



PLC1509

PLC1506

HEAVY-DUTY PLC SERIES 7.1 OR 11.1 dBi GAIN

Laird's PLC Yagis are heavy-duty point-to-point antennas, commonly used in data transmission and control station applications. With a frequency range of 30-75 MHz and 129-174 MHz they feature a preset Reddi-Match and can be quickly and easily assembled at the installation site. Precisely machined boom-to-element blocks prevent corrosion and noise buildup. Outstanding performance and mechanical integrity make these antennas an excellent value.

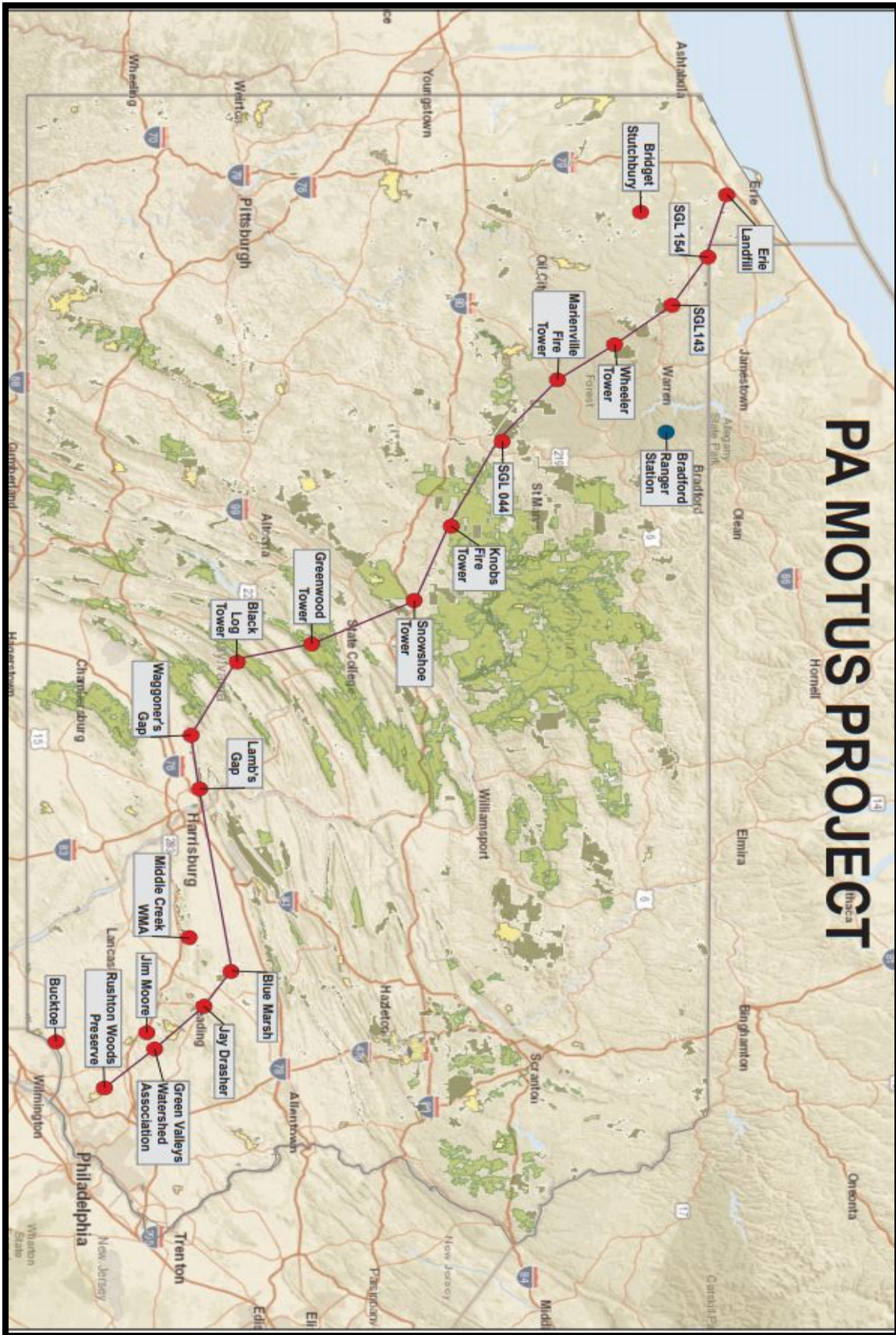
VHF YAGI SELECTOR GUIDE

MODEL	FREQ. MHz	GAIN dBi	NO. ELEM	F to B dB	-3dB BEAMWIDTH E-PLANE°	H-PLANE°	CONNECTOR TYPE	W/ SURFACE AREA ft² (m²)	W/ SURV. mph (kph)	W/ 1/2" ICE	LENGTH in (cm)	WT. lb (kg)
PLC-1346	134-142	7.1	6	20	53	74	UHF	1.49 (0.138)	125 (200)	100 (161)	72 (182.9)	7.2 (3.2)
PLC-1426	142-150	7.1	6	20	53	74	UHF	1.44 (0.133)	125 (200)	100 (161)	70 (177.8)	7.2 (3.2)
PLC-1506	150-158	7.1	6	20	53	74	UHF	1.39 (0.129)	125 (200)	100 (161)	66 (167.6)	7.2 (3.2)
PLC-1586	158-166	7.1	6	20	53	74	UHF	1.34 (0.124)	125 (200)	100 (161)	64 (162.6)	7.1 (3.2)
PLC-1666	166-174	7.1	6	20	53	74	UHF	1.29 (0.120)	125 (200)	100 (161)	64 (162.6)	7.0 (3.15)
PLC-1369	136-142	11.1	9	20	35	45	UHF	2.77 (0.256)	125 (200)	100 (161)	161 (408.9)	11.1 (5.0)
PLC-1509	150-158	11.1	9	20	35	45	UHF	2.42 (0.224)	125 (200)	100 (161)	144 (365.7)	10.3 (4.6)
PLC-1589	158-166	11.1	9	20	35	45	UHF	2.32 (0.214)	125 (200)	100 (161)	137 (347.0)	10.4 (4.7)
PLC-1669	166-174	11.1	9	20	35	45	UHF	2.25 (0.208)	125 (200)	100 (161)	131 (332.7)	10.0 (4.5)

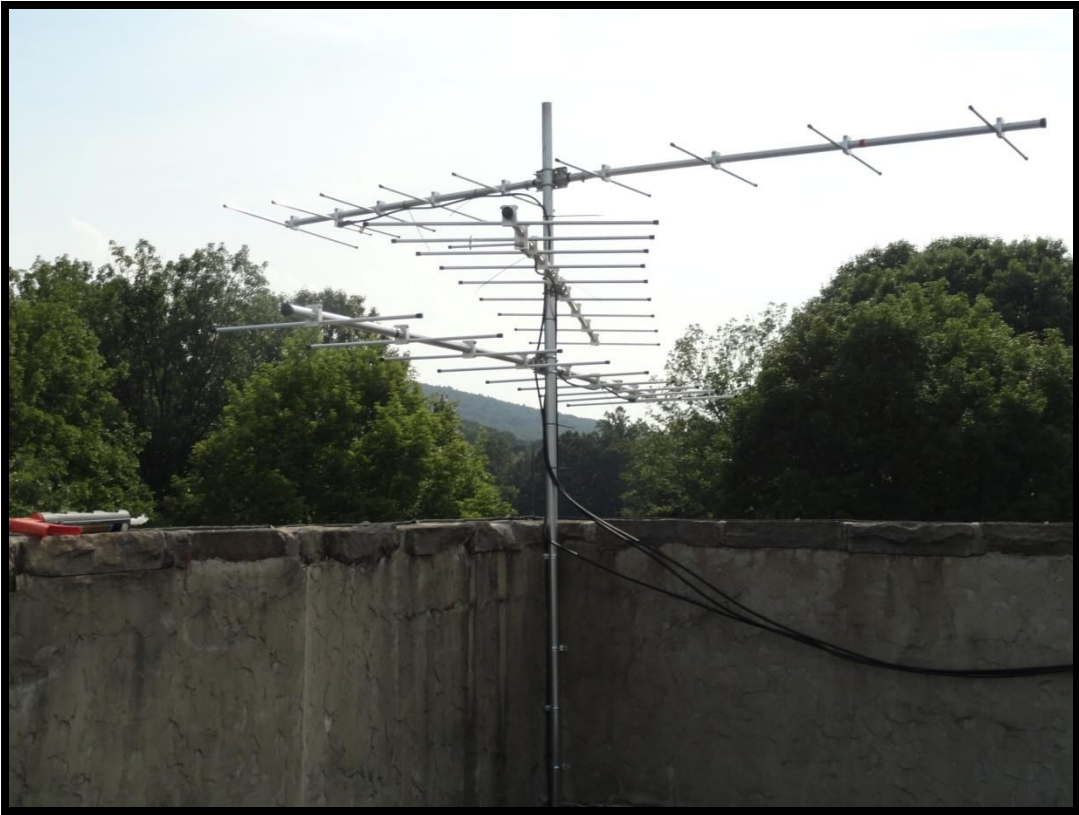
Common specifications: Power handling - 400 Watts; Element material - 1/2 in (1.3 cm) 6063-T832 aluminum tube;
 Boom material: 1-1/8 in (2.9 cm) 6063-T832 aluminum tube; Maximum mast diameter: 2-1/8 in (5.4 cm); Mounting style; U-bolts and plate.



2017 Sites



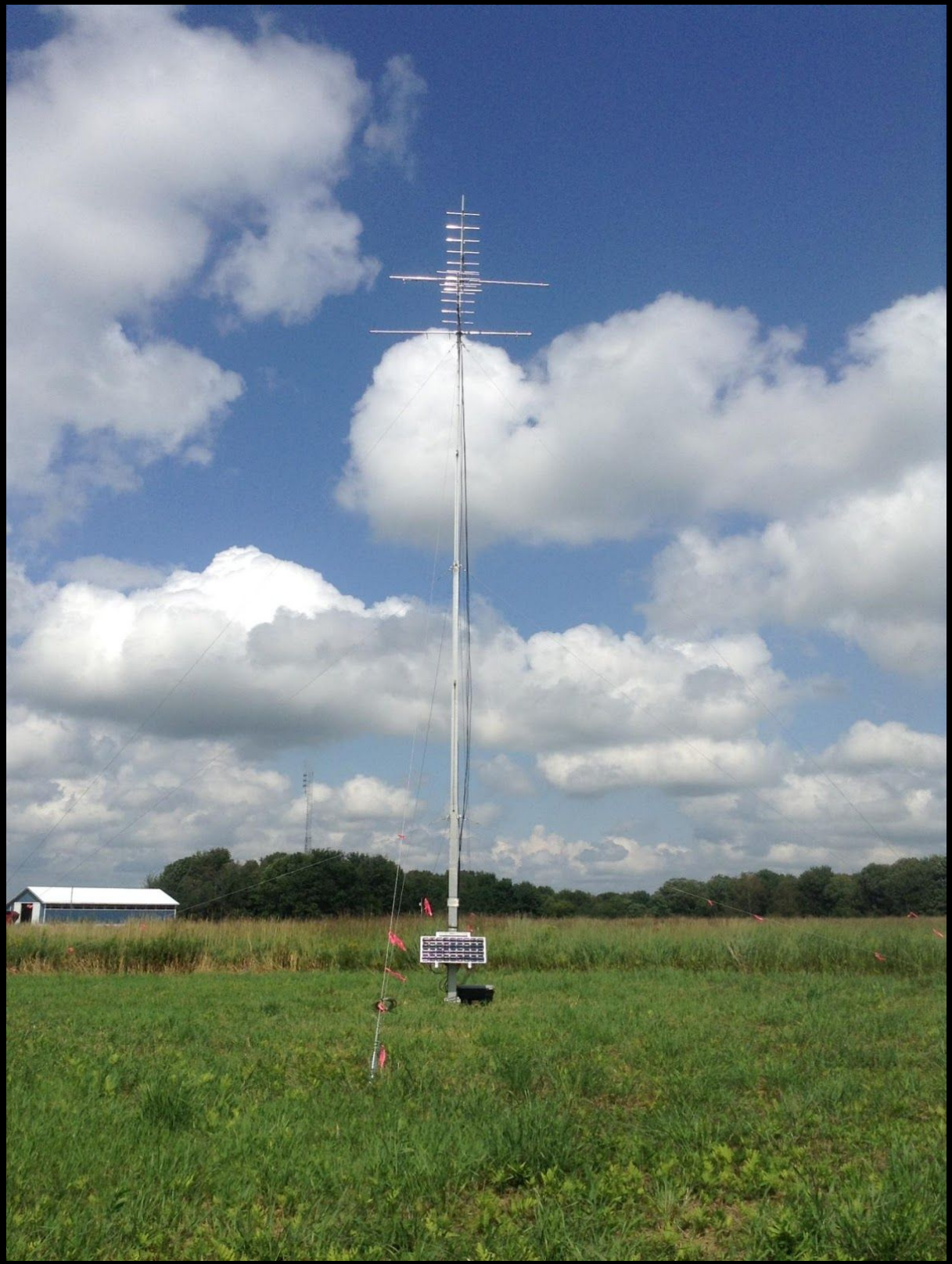
Rooftop Installation



Communication tower co-location



Free-standing Solar Installation





Fire Tower Co-location



Abandoned Utility Pole Co-location





Small tower co-location



The Sensorgnome and Action Packer

