MOTUS CENTRAL AMERICA REPORT 2021

Elaborated by
María de la Paz Angulo Irola
Ernesto M. Carman
## Work overview

<table>
<thead>
<tr>
<th>Organizations in charge</th>
<th>Costa Rica</th>
<th>Panama</th>
<th>Guatemala</th>
<th>Nicaragua</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><img src="image1" alt="Motus" /></td>
<td><img src="image2" alt="Café Cristina" /></td>
<td><img src="image3" alt="FUNDACO" /></td>
<td><img src="image4" alt="Quetzalli" /></td>
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<tr>
<td></td>
<td><img src="image5" alt="SELVA" /></td>
<td><img src="image6" alt="OSA Conservation" /></td>
<td><img src="image7" alt="Smithsonian Tropical Research Institute" /></td>
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</tr>
</tbody>
</table>
Review by country

COSTA RICA
Since Motus started in Costa Rica in 2019, eight new stations were installed in 2021 having a total of nine. One more station is pending installation for Osa Conservation due to a faulty Sensorstation, so the remaining Raspberry Pi from Panama will be repurposed here for the meantime.

Three stations funded by the Missouri Department of Conservation are still to be installed prior to spring migration.

Another station is confirmed and awaiting installation at the Reserva Santa Elena, Monteverde (10.341821, -84.793230). We visited several sites in the area and concluded that the observation tower at this reserve would be the most convenient site with 360° visibility and we met with the directors of the reserve to present to them what the Motus WTS is and to answer any questions they had about the equipment and installation.

However, since this reserve is visited frequently by tourists and the lightning rod at the site would end up being lower than the antennas, but the rod was raised in December 2021. We plan on helping with this installation prior to spring migration 2022.
Finca Cántaros station.

Finca Cristina station.

Lomas del Sierpe station.
Puerto Jiménez station.

Veragua Rainforest station.

Pitilla station.
Paraíso Quetzal station.

Maritza station.
Review by country
Three of the existing stations in the Canal Zone were upgraded and the old equipment was repurposed (Paraíso Quetzal, Costa Rica and Selva Negra, Nicaragua).

The station on Barro Colorado Island was not changed due to logistical difficulties.
Panama Sewage Plant station.

Canopy Tower station.

From left to right: Christian Torres, Óscar López (from Audubon Panama), Paz Angulo and Ernesto Carman at Galeta station.
Review by country
The station at Selva Negra was installed using a combination of equipment from the old Panama stations and antennas new antennas from Birds Canada. It was installed by the members of Quetzallí who took part in the workshop at Las Brisas in August-September 2021.
Review by country
Four stations were installed through work with American Bird Conservancy, FUNDAECO and Finca La Gracia.

Sierra Caral station.
Sarstún station.

Punta de Manabique station.

La Gracia station.
<table>
<thead>
<tr>
<th>Country</th>
<th>Station</th>
<th>Deployment date</th>
<th>Station location</th>
<th>No. of antennas</th>
<th>Receiver type</th>
<th>Data upload method</th>
<th>Organization in charge</th>
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</thead>
<tbody>
<tr>
<td>Costa Rica</td>
<td>Finca Cántaros</td>
<td>25-Apr</td>
<td>San Vito de Coto Brus, Puntarenas</td>
<td>3 2</td>
<td>Sensor Station</td>
<td>Internet</td>
<td>Finca Cántaros Environmental Association and Proyecto Cerúlea</td>
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<td></td>
<td>Finca Cristina</td>
<td>16-Jul</td>
<td>Paraíso, Cartago</td>
<td>2 0</td>
<td>Sensor Gnome</td>
<td>Internet</td>
<td>Proyecto Cerúlea</td>
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<td>Lomas del Sierpre</td>
<td>28-Jul</td>
<td>Osa, Puntarenas</td>
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<td>Manual</td>
<td>Osa Conservation</td>
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<td>Puerto Jiménez</td>
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<td>Puerto Jiménez, Puntarenas</td>
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<td>Pitilla</td>
<td>16-Oct</td>
<td>Santa Cecilia, Guanacaste</td>
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<td>Veragua Rainforest</td>
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<td>Liverpool, Limón</td>
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<td>Internet</td>
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<td>Paraíso Quetzal</td>
<td>08-Nov</td>
<td>Salsipuedes de Dota, San José</td>
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<td>Sensor Gnome (BB)</td>
<td>Internet</td>
<td>Proyecto Cerúlea</td>
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<td>Maritza</td>
<td>26-Nov</td>
<td>La Cruz, Guanacaste</td>
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<td>Cellular data</td>
<td>Guanacaste Dry Forest Conservation Fund, ACG</td>
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<td>Panama</td>
<td>Canopy Tower</td>
<td>11-Apr</td>
<td>Gamboa</td>
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<td>Internet</td>
<td>Birds Canada</td>
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<td>Panama Sewage Plant</td>
<td>13-Apr</td>
<td>Panama City</td>
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<td>Sensor Station</td>
<td>Cellular data</td>
<td>Birds Canada</td>
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<td>Galeta</td>
<td>15-Apr</td>
<td>Colón</td>
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<td>Sensor Station</td>
<td>Internet</td>
<td>Birds Canada</td>
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<td>Nicaragua</td>
<td>Selva Negra</td>
<td>25-Sep</td>
<td>Matagalpa</td>
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<td>Sensor Gnome (BB)</td>
<td>Internet</td>
<td>Selva and Quetzallí</td>
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<td>Sierra Caral</td>
<td>17-Jun</td>
<td>Izabal</td>
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<td>Fundaeco</td>
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<td>Sarstún</td>
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<td>SarstúnSarstún, Izabal</td>
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<td>Punta de Manabique</td>
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<td>Punta de Manabique, Puerto Barrios</td>
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<td>Finca La Gracia</td>
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<td>Escuintla</td>
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<td>Cellular data</td>
<td>Fundaeco and Finca La Gracia</td>
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**Virtual Presentations**

**Date:** April, 30th  
**Where:** Facebook  
**Presentation title:** Aplicaciones del sistema Motus para la conservación  
**Speakers:** Ernesto Carman y Paz Angulo  
**Sponsor:** Finca Cántaros (Costa Rica)  
**Link:**  
[https://www.facebook.com/FincaCantaros/videos/318753482930020](https://www.facebook.com/FincaCantaros/videos/318753482930020)

**Date:** May, 12th  
**Where:** Facebook  
**Presentation title:** Introducción a la red Motus en Centroamérica  
**Speakers:** Ernesto Carman y Paz Angulo  
**Sponsor:** Audubon Panama (Panama)  
**Link:**  

**Date:** September, 21st  
**Where:** Facebook  
**Presentation title:** Primeros transmisores Motus en Costa Rica: resultados preliminares  
**Speakers:** Ernesto Carman y Paz Angulo  
**Sponsor:** Finca Cántaros (Costa Rica)  
**Link:**  
[https://www.facebook.com/FincaCantaros/videos/1023271168422205](https://www.facebook.com/FincaCantaros/videos/1023271168422205)
Virtual Presentations

Date: October, 28th  
Where: Facebook  
Presentation title: La red Motus en Costa Rica  
Speakers: Ernesto Carman y Paz Angulo  
Sponsor: Costa Rica Ornithological Association (Costa Rica)  
Link: https://www.youtube.com/watch?v=wzrIMHyT-YE&t=1001s

Date: December, 7th  
Where: Facebook  
Presentation title: The Motus Wildlife Tracking System in Costa Rica (in English)  
Speakers: Ernesto Carman, Paz Angulo and Lilly Briggs  
Sponsor: Finca Cántaros (Costa Rica)  
Link: https://www.facebook.com/watch/live/?ref=search&v=1983048958568746

Video

In order to make Motus known in Costa Rica, we made an introductory video in Spanish as an interview that answers questions such as what is Motus? What is it for? How does it work? etc.

Date: March, 24th  
Where: YouTube  
Presentation title: Motus Costa Rica: el inicio  
Sponsor: Proyecto Cerúlea  
Link: https://www.youtube.com/watch?v=mmq5EC9u7pk
**Workshop**

**Date:** August, 27th- September, 5th  
**Where:** Las Brisas Nature Reserve, Limón, CR  
**Presentation title:** Advanced techniques for studying migratory birds  
**Sponsor:** Selva and Proyecto Cerúlea  

**Signage**

We are currently working with Motus central designing a template for an informative sign for hosts to place at their stations in both English and Spanish. The following is a draft that includes a Resplendent Quetzal to promote Motus research involving resident species:
Recommendations

Develop a strategy to inform station hosts about detections. We did so personally in Costa Rica and this has spiked the interest in the actors involved creating a genuine interest in maintaining and caring for the equipment. This is lacking in Panama, for example, and we have found communication through Panama Audubon to be an obstacle. Hence, we have created our own channels of communication with Canopy Tower and Galeta (Smithsonian Institute) to solve issues.

Panama:
1. Visit Barro Colorado Island to retrieve the equipment from station #3028 and find a new site to fill the gap between Canopy Tower #7699 and Galeta #7701.
2. Communicate with the people in charge at the PTAR (Planta de Tratamiento de Aguas Residuales, #7700) to know when the new Education Center is completed at their site, as it is their intention to move the antennas to this new building and include Motus as part of their outreach curriculum.
3. Find new partners and collaborators to further develop Motus in Panama.

Costa Rica:
1. Acquire CTT adapters for the Sensorgnomes at Las Brisas (#5739), Finca Cristina (#7970), Veragua Rainforest (#8279) and Paraíso Quetzal (#8291) to make all the stations dual mode.
2. The antennas at Las Brisas should be raised on a higher structure above the roof which will require longer coaxial cables.
3. One station is pending installation on the Osa Peninsula for Osa Conservation due to a faulty V1 Sensorstation.
Persons of interest involved by station

**Costa Rica**
Finca Cántaros: Lilly Briggs, David Rodríguez (Finca Cántaros Environmental Association).
Lomas del Sierpre and Puerto Jiménez: Andrés Santana (Osa Conservation).
Paraíso Quetzal: Jorge Serrano and Erick Granados (Paraíso Quetzal Lodge and Proyecto Kabek).
Veragua Rainforest: Daniel Torres and Allan Alemán (Veragua Rainforest Adventure Park).
Monteverde: Luisa Moreno (Instituto Monteverde).
Pitilla: Calixto Moraga, Petrona Ríos, Manuel Ríos, Freddy Quesada and Natalie Sánchez (Guanacaste Dry Forest Conservation Fund).
Maritza: Rafael Morales (Guanacaste Dry Forest Conservation Fund).

**Panama**
Canopy Tower: Adriano Alveo and Carlos Bethancourt (Canopy Tower).
Panama Sewage Plant and Galeta: Christian Torres and Óscar López (Audubon Panama).
For all stations: Rosabel Miró (Audubon Panama).

**Nicaragua**
Selva Negra: Salvador Morales, Yoleidy Mejía and Danny Munguía (Quetzallí).

**Guatemala**
Sierra Caral, Sarstún and Punta de Manabique: Alexis Cerezo and Miguel Ramírez (Fundaeco).
La Gracia: Heidi Pasch de Vitteri (Finca La Gracia and Lost Tinamou) and Josué de León Lux (Lost Tinamou).