



Julian Garcia Walther

Version 2



Collaboration Policy



Contents

1. Introduction 3

2. Collaborating Parties 4

3.0 Motus Registration 5

- 3.1 Motus Projects 5
- 3.2 Tag registration 5
- 3.3 Receiver registration 5
- 3.4 Collaborator Metadata Obligation 6
- 3.5 Motus Data Services Fees 6
- 3.6 Communications 6
- 3.7 Termination 6

4. Data Stewardship 7

- 4.1 Data Access Framework 8
- 4.2 Data Access 8
- 4.3 Tracking Data Access 8
- 4.4 Collective Initiatives, Augmented Data Products and Data Requests 9
- 4.5 Exceptions and Private Projects 9

5. Project Citation and Acknowledgment 10

- 5.1 Project Acknowledgement and Citation 10
- 5.2 Program Acknowledgment 10

Appendix 1. Detailed descriptions of Motus data types 11

Translations:

Cette version est une ébauche. Une fois le document finalisé, il sera traduit et disponible en français.

Esta versión es un borrador. Una vez que el documento esté finalizado, será traducido y disponible en Español.

Version History:

Version 1 – January 2016

Version 2 – October 2022

1. Introduction

The Motus Wildlife Tracking System (hereafter Motus) is a collaborative global research network that uses automated radio telemetry to track small flying organisms (birds, bats, and insects). Motus helps to answer fundamental research questions underpinning conservation, animal movement and behaviour, from local to global scales. Motus is a program of Birds Canada in close collaboration with a diverse network of organizations, businesses and individuals.

Three core principles underpin Motus:

1. collaboration harnesses the collective power of individuals to expand the scale and amplify the impact of our work
2. an open data framework is a powerful tool to minimize barriers to data access, maximize data value, and ensure appropriate data permissions and collaborator recognition
3. equity in research and development is promoted by lowering financial barriers to using technology, and encouraging companies and individuals to contribute to system improvements for all

Motus uses digitally-coded radio transmitters (tags) that emit signals on shared frequencies, detectable by an open-source network of receiving stations where all data is centrally processed and returned to the collaborating project. Collaborators in the network set up receivers and deploy registered tags for their own purposes, and in doing so leverage the time and effort of other collaborators, with mutually reciprocal benefits. The value of the Motus network grows as the spatial coverage of stations and number of partners and collaborators increases. With continued expansion and support, Motus provides a framework for coordinated global collaboration that works to solve some of the most complex problems in movement biology and ecology.

This document outlines the expectations and responsibilities of the collaborating individuals and organizations that comprise Motus.



Monarch Butterfly, Grace Pitman



Swainson's Thrush, Stu Mackenzie



Tiana Burke

2. Collaborating Parties



Motus Central is responsible for data management, system operation and development, and providing general coordination and support to the network.

Motus Central is composed of Birds Canada staff, specialist contractors, and leadership staff from close partners. Motus Central works closely with the groups below to ensure the interests and expectations of the Motus community as a whole are met.

Technology Partners are responsible for the research, development, production, sale and support of radio telemetry technologies upon which the system is based, as well as some data management and registration of tags and receivers where appropriate in coordination with Motus Central. By registering tags and/or receivers with the Motus network, these partners also agree to adhere to the policy.

Motus collaborators have many roles, but are generally responsible for the development and support of Motus projects, deployment of tags, and/or setup and maintenance of Motus stations within

the scope of their project(s), maintenance of their associated metadata, and analysis and publishing of their results. Groups of collaborators often come together to form Motus Working Groups.

Motus Working Groups are generally informal or formal collaborations of like-minded researchers and practitioners from academia, non-profit, government or private organizations focused on a specific region, species group, or project with their own funding, staff, and leadership hierarchies. Responsibilities of working groups are generally the same as collaborators, but often at a larger scale, working groups assume leadership in their region or project(s) of interest.



Data users and practitioners generally include third parties (individuals and organizations) that make use of Motus data for research, education, conservation projects, or other land, water, resource, or wildlife management applications.

From this point forward all of these groups are collectively referred to as collaborators.



3.0 Motus Registration

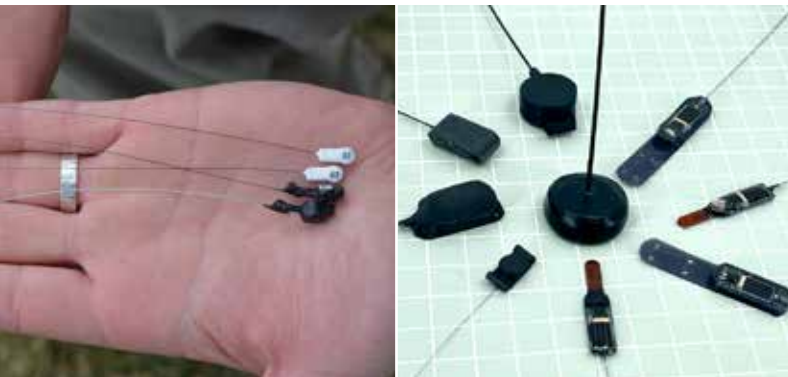
A Motus account is required to gain access to project management tools, and detailed Motus data. Opening a Motus account is free, simple and available to anyone.

By setting up an account, or registering a receiver or tag with Motus, collaborators agree to the terms and conditions of this policy, and must approve the most recent version of the policy in order to access, manage, or download data

3.1 Motus Projects

A Motus Project is an organization tool to manage tags and station metadata, upload and download data, view basic summary plots and visualizations, control open data outputs, and manage additional information (e.g., members, landowners).

Any collaborator with a Motus account can create a project, and assign other collaborators to that project. For existing projects, new collaborators need to be added by an existing collaborator with the authority to do so.



3.2 Tag registration

Motus currently supports two types of uniquely coded radio transmitters: NanoTags™ manufactured by [Lotek](#), operating on frequencies 166.380 MHz (Western Hemisphere), 150.100 MHz (Europe), and

151.500 MHz (Australia), and LifeTag™, HybridTag™ and PowerTags™ manufactured by [Cellular Tracking Technologies](#) (CTT) operating on 434 MHz globally.

Manufacturers will automatically register tags with a collaborator's Motus project before they are shipped to the collaborator. Prior to ordering tags, collaborators are required to have registered with Motus and provide a Project ID to the manufacturer. Further instructions on selecting, purchasing and deployment of tags is available [here](#).



3.3 Receiver registration

Motus currently supports four receiver types: [Sensorgnomes](#), [Lotek](#) DL and SRX-series receivers, and [Cellular Tracking Technologies](#) SensorStations. SensorGnomes and CTT SensorStations can detect both CTT and Lotek tags. Receivers are registered by collaborators and assigned to a specific project within the Motus project management tools. Receiver serial numbers are required for registration. More information about Motus receivers is available [here](#).

3.4 Collaborator Metadata Obligation

Tag, receiver, and station metadata (particularly information regarding deployments) are a critical component of the Motus operation. Collaborators are required to maintain [accurate metadata](#) for their projects, tags, and receivers following deployment and subsequent changes to deployments. Station deployments will automatically be terminated if new data has not been received in 3 years. Data is only available to collaborators in summary or complete formats ([see Section 4.1](#), Data Access Framework, for definitions) from projects, tags, or receivers with all required metadata fields completed. Any missing metadata is highlighted in the Notification Centre found within project management tools. *Automated email notifications to project collaborators regarding incomplete metadata may be implemented in the future.* This ensures accurate data for all projects using the network and for the completeness of the dataset for permanent archive and future use. Similarly, it is highly recommended that any changes to metadata are addressed in a timely manner.

3.5 Motus Data Services Fees

Details of this fee policy and process will be finalized and implemented for the 2023 season. A fee of \$25/tag CAD applies to every registered tag in the network that will be charged at the time of tag purchase. This fee covers some of the costs of data curation, storage/archive, and dissemination; the remaining costs are raised by Motus Central from grants, contributions, and contracts. The fee is an important investment by collaborators toward the overall sustainability and productivity of the network. There is [no fee](#) for registering as a collaborator, creating a project, or registering a receiver. Test tags (those not deployed on animals) are exempt from fees, but they must be assigned at time of purchase and use approved test tag IDs and burst rates from the manufacturer. If fees pose a viability issue for a project, contact [Motus Central](#) to explore whether alternative options may be possible.

Fees



Register a tag: **\$25/tag**



Register as a collaborator: **no fee**



Create a project: **no fee**



Register a receiver: **no fee**

3.6 Communications

Primary correspondence from Motus Central to collaborators about system developments, maintenance, or other updates will occur through the [Motus google group](#). New registrants will automatically be invited to join this group, but assume responsibility for joining, or regularly checking in. Collaborators are strongly encouraged to join upon registration and to post to this group with any updates or questions.

To contact Motus Central, email motus@birdscanada.org, or phone 519-586-3531 | 888-448-BIRD X 117.

3.7 Termination

Birds Canada reserves the right to terminate access to collaborators who do not abide by the terms of the policy, or for any other reasonable reason. Collaborators wishing to voluntarily terminate their registration can also contact [Motus Central](#). In case of termination, Birds Canada will anonymize the collaborator profile, including their name and contact information, and other data and metadata will be treated in accordance with the data policy ([see Section 4](#), Data Stewardship).

4. Data Stewardship



The Motus database (via <https://motus.org>) is the central repository for all Motus data. The primary goal of Motus is to maximize the efficacy of everyone's data for use in

science, conservation and wildlife management through scientific publications, interpretation, visualization and increased public engagement. Critical to this goal is a [FAIR \(Findable, Accessible, Interoperable, and Reusable\) open data framework](#) that facilitates data sharing and collaboration among researchers while ensuring appropriate permissions and acknowledgement to project collaborators and participants. The model framework is largely analogous to eBird, or bird banding/ringing programs, where all data are submitted to and coordinated by a central repository that is open and freely available to all.



Green Darner, Grace Pitman

The policy ensures that Motus collaborators who deploy tags receive all detection data from their tags from across the network, regardless of the station where tags are detected. Likewise, Motus collaborators that manage stations can get all data collected from their station, regardless of where the tag was deployed, or who deployed it.

The policy also recognizes the existence of certain

constraints or sensitivities that may limit the desired availability of data such as the priority of researchers to publish their work, protection of sensitive species or places. Requests for hiding, delaying release, or blurring sensitive data can be made to [Motus Central](#).

Within the spirit of this policy, the proper operation of Motus requires Birds Canada to have the autonomy and flexibility to freely manage the Motus database and content. Motus content includes, but is not limited to the Motus database in its entirety, any other data received from any means such as tag or receiver registrations and data streams from receivers and manufacturers, data entered or files transferred or uploaded through the research platform. Collaborators grant Birds Canada a royalty-free, perpetual, irrevocable, non-exclusive, transferable license to use, reproduce, modify, adapt, publish, translate, create derivative works from, distribute, perform, and display content (in whole or part) worldwide and/or to incorporate it in other works in any form, media, software or technology now known or later developed, all subject to the terms of any applicable license.

Limitation of liability

Birds Canada endeavours to make data available to collaborators in a reasonable time-frame, and to preserve data for a reasonable period of time, but collaborators accept that, for reasons beyond Birds Canada's control or otherwise, data may be lost, or their access may be delayed. Collaborators also recognize that technology may be subject to certain inaccuracies that can create errors such as false positive or missing detections. It is the collaborators' responsibility to conduct their own research about the system, technologies, and to apply the appropriate processes and methods to ensure the success of their projects. For more details see [Motus Guides](#). Collaborators will not hold Birds Canada responsible for any data loss or inaccuracies, bodily injuries, financial loss or other harms related to their projects.

4.1 Data Access Framework

Motus data fit into three categories; Summary, Complete and Restricted ([see Appendix 1](#) for more details).

Summary Data consist of information about a project, basic deployment metadata from tags and stations, as well as daily summaries of tag detections (not individual detections - see Complete data). By default, Summary Data is publicly available for all Motus projects. Summary data is visible to the public through Motus and other collaborating platforms and products (see 4.4), and accessible in a variety of forms through the Motus platform (see 4.2).

Complete Data include tag detection data captured by receivers including detailed properties, such as signal strength, antenna number, exact date and time stamps, and expanded tag metadata fields. By default, Complete Data is only available to collaborators assigned to a given project, but it can be made open at any time in the Motus project management tools. Complete Data from all projects will become Open after 5 years from tag deployment unless otherwise exempt (see 4.5). Open data is only available to registered collaborators and all data access and downloads are tracked and available to projects. *Automated email notifications to project PI's about data access will be implemented in the future.* Any collaborator accessing Open Motus data must attempt to contact and collaborate with project PI's (see 4.3).

Restricted Data includes personal contact information of collaborators and landowners, as well as other landowner information. Restricted data is not shared with the public, except with registered collaborators to whom the PI has granted access to their project.

Through participation in Motus, collaborators agree to having Summary Data open for visualization, download and limited use by other collaborators

4.2 Data Access

Motus data are available in four ways:

1. Public data visualizations, plots, summaries, maps and animations through motus.org, or collaborating platforms and products (*Summary Data only*).
2. Downloads of data summaries from project, station, or species-specific queries from motus.org (*Summary Data only*).
3. Downloads from specific stations, tags or projects via the Motus R Package, or API (future feature) for project collaborators (*Summary and Complete Data*).
4. Custom requests for data to [Motus Central](#) (*Summary and Complete Data*).

4.3 Tracking Data Access

Motus Central maintains a record of all Complete Data accessed through the Motus R Package which can be viewed for each project through the Motus project management tools. It is the responsibility of all collaborators accessing Open Complete Data to correspond and collaborate with project PI's including co-authorship where appropriate, and to ensure that each project and collaborator is properly acknowledged and cited. PI's are responsible for monitoring access to their data and responding to requests for collaboration as they wish to do so. *Automated email notifications to project PI's summarizing data access will be implemented in the future.*

[See Section 5.1, Project Acknowledgment and Citation.](#)

4.4 Collective Initiatives, Augmented Data Products and Data Requests

Collaborative research or conservation initiatives often require data spanning multiple projects, regions, or species. Motus provides a unique opportunity for collaboration by facilitating access to data for these types of meta-analyses. By enabling access to Motus data we are increasing every collaborator's return on investment, and our collective impact for conservation science. Examples of collective initiatives partnering with Birds Canada include [Movebank](#), [Bird Migration Explorer](#), [Atlas of Migratory Connectivity](#), [Shorebird Science and Conservation Collective](#), [Atlantic Offshore Wind Collaborative](#).

Currently, requests to access data across multiple projects, custom summaries, or augmented data products (e.g. filtered or otherwise cleaned or analyzed data), can be made to [Motus Central](#). Motus Central will review requests for data, help to coordinate communication with collaborators involved, and organize the data required on a case by case basis. When appropriate, data sharing agreements, or memoranda of understanding with lead organizations may be established on behalf of all projects involved. Agreements will outline the nature of the data use and ensure proper acknowledgement of Motus projects, collaborators, and publications. In the event that data requested is not yet open, requests will be directed to the PI(s) for the project(s) in question. All individuals and organizations requesting or using Motus data must be registered Motus collaborators and abide by this policy.

Motus collaborators authorize Motus Central to act on behalf of the network, projects and collaborators to manage, organize, and disseminate Motus data that has been specified as open (Summary data or Open Complete data) to facilitate the use of data for collective initiatives, or other uses in science, conservation, wildlife management, scientific publications, interpretation, visualization and public engagement. This process may change as new data access and communication tools are developed.

4.5 Exceptions and Private Projects

In certain circumstances, such as the protection of sensitive species or places, strict publication timelines, guidelines or embargos, or matters regarding Indigenous data sovereignty, restrictions can be implemented on aspects of the visibility and availability of data.

Requests for hiding, delaying release, or blurring sensitive location data can be made to [Motus Central](#) for consideration prior to deploying the relevant stations or tags. Each request should provide a rationale for the restriction and whether it should be permanent or for a fixed duration only (e.g. data release is delayed 3 months, or station location hidden or blurred to 0.5 km). Data from species at risk alone is not justification for exemption unless a case can be made for its sensitivity.

Collaborators should keep in mind that in most cases, the temporal and spatial resolution of publicly available data will usually not be detailed enough to represent a conservation concern, or be useful to compete with any research or publications interests of the investigators.



Cerulean Warbler, Jose Pablo Castillo

5. Project Citation and Acknowledgment

5.1 Project Acknowledgement and Citation

All Motus collaborators are expected to exhibit professional courtesy and the highest scientific integrity. Whenever Motus data is used for purposes outside of the Motus platform, projects, collaborators and organizations must be properly acknowledged. Individuals accessing open data are expected to correspond and collaborate with the project PI's and other collaborators where appropriate, and to ensure at a minimum that projects and contributing collaborators are properly acknowledged and cited.

To facilitate acknowledgments, each Motus project is given a citation based on the project information available on Motus project exploration and management pages. Collaborators can customize project citations to acknowledge partner institutions or individuals, and set the order in which they appear. Project citations should be used anytime Motus data is used or displayed outside of the Motus platform. Collaborators are identified through project profiles on the Motus website, and their contact information may be shared between collaborators requesting or providing data, but only to other registered Motus collaborators and will not be made publicly available.

Project citation format:

[Institution | Collaborators]. [Project Name and Number]. [Years of project activity]. Data accessed from Motus Wildlife Tracking System, Birds Canada. Available: <https://motus.org/>. Accessed: [Date].

5.2 Program Acknowledgment

Motus is a collaborative enterprise that is made stronger by the individual and collective success of all its collaborators and projects. To this end, collaborators are encouraged to acknowledge Motus in any written work, popular or peer-reviewed publications, oral presentations, social media, or websites. Collaborators are also encouraged to acknowledge Motus as a program of Birds Canada in close collaboration with a diverse network of organizations, businesses and individuals. Official Motus and Birds Canada logos and guidelines for their use are available in [Motus Resources](#).

If Motus tools (e.g. Motus website, RBook, visualizations, output tables) are used in your analysis or communications, the citation should be as follows:

Motus Wildlife Tracking System. 2022. Birds Canada, Port Rowan, Ontario. Available: <https://motus.org/>. Accessed: [Date].

Motus RBook citation

Birds Canada (2022). motus: Fetch and use data from the Motus Wildlife Tracking System. <https://motusWTS.github.io/motus>.

Appendix 1. Detailed descriptions of Motus data types

† denotes required metadata. ‡ denotes restricted data.

SUMMARY DATA	
<p><i>Station metadata:</i> information about station location, receiver and antenna configuration, deployment dates, station performance metrics, etc.</p> <p><i>Tag metadata:</i> information about the animal to which the tag was attached (e.g. species, age, and measurements), release location, time, date, type/model/size of tag, etc.</p> <p><i>Summary of tag detection data:</i> summarized runs of detections daily.</p>	
Project Metadata*	
Description	
General project information: Long and short project descriptions, institution/organization name, project citation, and project ID.†	
Principal Investigator and Collaborator names and contact information. Provided and defined by collaborators. †‡	
Station metadata	
Description	
Unique identifier assigned and basic deployments information: Unique receiver ID (serial number), station name, and deployment identifiers†	
Location and operational dates of each receiver deployment.†	
Detailed information about station configuration: Antenna type/size/frequency, port numbers, direction/bearings, height, and other equipment details.	
Station land owner and contact information. ‡	
Deployment name and comments	
Station performance metrics: Antenna noise and activity plots, GPS fixes, battery voltage, up-time vs. down-time, etc.	
Tag Metadata	
Description	
Tag properties: Manufacturer, program, size, identifier, frequency and burst rate. Some properties may be private to protect proprietary information. Automatically provided by the manufacturer.†	

Exact location and release date/time of the tag deployment†
Required tag deployment properties: Species identity, and Band or Ring Number† †
Summarized Tag Detection Data
Description <p>Daily summaries of detection data from each station. This is generally the information available for public data exploration, coarse mapping, project and station reports, and for download.</p>
COMPLETE DATA
Complete Detection Data
Description <p>Includes all Summary data as well as Detailed detection data: Individual tag detections, including signal properties (e.g. signal strength), precise time stamps of each detection, as well as tag, receiver and antenna identifiers.</p>
Complete Tag Metadata
Custom tag deployment properties: Age, sex, measurements, condition, other auxilliary markers or information about the tagged animal.



Red Knot, Julian Garcia Walther

Motus Wildlife Tracking System

Birds Canada | PO Box 160, 115 Front Rd. Port Rowan, Ontario, Canada. N0E 1M0
519-586-3531 x 117 | motus@birdscanada.org | <https://motus.org>

