Airborne Observation Platform (AOP)

NEON Research Support Services (NRSS) Request Form

The NEON AOPs are light aircrafts outfitted with a high-fidelity hyperspectral imaging spectrometer, discrete and waveform LiDAR, and a high-resolution digital camera to collect remote sensing data. Researchers may request the following: 1) flights for data collection over NEON field sites at times other than NEON operations flights; 2) flights for data collection over other non-NEON areas; and 3) other routine AOP functions such as algorithm development and field validation. Our goal is to provide you with the services you need to complete your project from start to finish.

NEON does not own the property on which NEON infrastructure and observational plots are located. Site hosts and landowners grant access to researchers for sampling at NEON sites. Battelle can help coordinate permission in some cases; however, it is primarily the responsibility of the researcher to gain access permission, and all required local, state, and federal permits.

Science activities using the NEON AOP must not compromise NEON measurements or impair Battelle relationships with site hosts. We are committed to the long-term study of these sampling locations, thus sample site integrity and our working relationships with site hosts are imperative. We evaluate research support requests based on the feasibility for NEON support and we carefully consider how non-destructive or destructive sampling activities impact site integrity and NEON data.

Completion of this request form will facilitate the evaluation and pricing estimate of this AOP NEON Research Support Services Request and should be completed for projects seeking funding and those with funding already secured.

Before creating your request, thoroughly review the [NEON Research Support Services User Guide](https://www.neonscience.org/sites/default/files/NEON%20Research%20Support%20Servicess%20User%20Guide%20v20240710.pdf). Complete all parts of this Request Form. Additional information deemed relevant by the PI to the request may also be provided, as appropriate.

For projects seeking funding, submit this request form at least 6 weeks prior to any institution or funding agency deadlines. For funded projects, submit this request form at least 8 weeks prior to the start of data collection. For target of opportunity requests, submit as soon as possible and efforts will be made to conduct a quick evaluation and pricing of the request.

**Submit this request and any questions to** ResearchSupport@BattelleEcology.org

# Section 1: Contact Information

* List all investigators, their roles, affiliations, emails and phone numbers.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Investigators | Role | Affiliation | Email | Phone |
|  | PI |  |  |  |
|  | Co-I |  |  |  |
|  | Co-I |  |  |  |
|  | Co-I |  |  |  |

* Who should be the Primary Contact for this request?

# Section 2: Project Overview

## 2.1 Type of Request

* Is this a Standard Request or Target of Opportunity Request?

|  |  |
| --- | --- |
| [ ]  Standard | [ ]  Target of Opportunity (expedited review) |
|  |  |

* What date do you need the budget, and/or Letter of Support/Collaboration from NEON?
	+ This date should be the date your institution needs this information (which may be sooner than the proposal deadline).

## 2.2 Funding

* Funding Status: Funding Secured or Seeking Funding

|  |  |
| --- | --- |
| [ ]  Funding Secured | [ ]  Seeking Funding |

## 2.3 Funding Agency and Program

|  |  |  |
| --- | --- | --- |
| Funding Agency | Program | Solicitation Website |
|  |  |  |

* What is the proposal submittal deadline? (mm/dd/yyyy)
* What is the expected funding notification date? (mm/dd/yyyy)
*

What is the intended contractual role of Battelle, if known (e.g., sub-contract, sub-awardee, sub-recipient)?

## 2.4 Project Title

* For proposals that are seeking funding, this title should match the grant proposal title. Title will be used in the Letter of Collaboration/Support. Draft titles are acceptable, however, you need to provide notification of the final title prior to the Letter being provided.

## 2.5 Project Summary

* Provide a quick overview of the proposed research project (one sentence to one paragraph).

## 2.6 Proposed use/role of NEON:

* Describe the research activity and why it requires the use of AOP.

## 2.7 TIMING OF PROJECT:

* What are your planned start and end dates of your project’s interaction with Battelle & the NEON program? Start and end dates will be used to encompass the entirety of the collaboration with Battelle, as needed for contracting purposes. If applicable, be sure to include sufficient time to receive final invoices for work completed prior to your funding ending.
* How much flexibility is there in the PI schedule to accommodate other NEON AOP flight commitments (i.e., is the proposed PI flight activity strictly linked to other external activities or ecological phenomena)?

## 2.8 PROPOSED LOCATION:

* What geographic area or landscape ecological features does the PI wish to acquire, including NEON domains/sites as appropriate? (Please provide KML or shapefile polygon(s), or describe requirements in detail).

## 2.9 Use of AOP OVER NEON Sites ([Site list link](https://www.neonscience.org/field-sites/field-sites-map/list))

* If applicable, at which NEON site(s) do you propose to conduct the research?

##  2.10 Use of AOP OVER NON-NEON Sites

* What organization owns or manages the non-NEON site at which the AOP will be deployed?
* Has permission been sought or granted to work and deploy an AOP over the site?
* Are any special authorizations required to work or deploy an AOP over the site, and have these been sought or granted?
* Are there any known safety issues that could be encountered in deploying an AOP?

# Section 3: Technical and Logistical Requirements

For NEON Operations data collection, AOP typically flies north/south flight lines (minimizing BRDF effects in the optical imagery) at 1000m AGL with 37% overlap between flight line swaths, with flight duration (including FBO-site transit) topping out at a maximum of between 4-4.5 hours per flight, with flights occurring 2 hours before/after solar noon. This flight protocol results in 1m resolution spectrometer data, 6.5cm resolution for photography, and a minimum of 2-4 pulses per m2 lidar data.

The hyperspectral imager requires cloud-free sky conditions to produce consistent, high-quality reflectance products, so AOP models historical cloud-patterns at each site to determine the number of days needed to achieve >60% probability of collecting cloud-free data during the month the surveys are scheduled to occur.

AOP is frequently able to modify the standard flight parameters; therefore, please complete the following questions to ensure that PI science needs are addressed.

## 3.1 Data Collection & processing

* What data collection are you requesting? All data are collected at the same time. (check all that apply)

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| --- | --- | --- | --- |
| ☐ Discrete Lidar | ☐ Waveform Lidar | ☐ Hyperspectral Data | ☐ RBG Camera |

* What higher level data products are you requesting? (please specify; see <https://data.neonscience.org/browse-data> for list of existing data products).
* Would you like AOP to provide data products outside of the standard NEON AOP data products (please specify)?

## 3.2 Resolution

* If the spatial resolutions produced by the AOP standard flight parameters do not meet your requirements, what is the spatial resolution of the spectrometer data required (please note that FAA airspace regulations or laser safety limitations may restrict data collection at certain spatial resolutions)?
* What is the spatial resolution / point density of the lidar data required?
* What is the spatial resolution of the camera data required?
* Which instrument takes precedent in terms of spatial resolution?

## 3.3 Observation and sampling timelines

* Will the nature of the activity (e.g., location, types of data collected, etc.) change in any way over the course of the research?  If so, please describe.
* Are there associated ground activities that will require coordination with the airborne surveys? And do you anticipate that AOP will need to provide field support (e.g., ASD spectral measurements)?
* When during the year would the research activity occur (e.g., during leaf-off, during peak greenness, during minimum/maximum flood stage, etc.)?
* Is there a specific time during the day that the activity would need to occur?

## 3.4 NEON site visits by PI research personnel

Some NEON field sites allow for PI research personnel to directly visit and work at a site. If you propose to do work within the permitted bounds of a NEON field site concurrent with the AOP flight, please complete the following questions. If the concurrent work is part of a separate Observational Sampling Infrastructure (OSI) or Sensor Infrastructure (SI) Research Support Services request, this section can be skipped.

* If an AOP will be deployed over a NEON site (e.g., during winter) in conjunction with PI field-based data collection, has permission been sought from the landowner/manager to work at the site?
* When during the year would the site visits occur?
* When during the day would site visits occur?
* How frequently would PI research personnel visit each sampling location at a field site, i.e., number of times per day, per week, per month?
* Will visits be at regular and pre-planned intervals, or irregular and unpredictable?
* How frequently would PI research personnel visit each location, i.e., number of times per day, per week, per month? (Note, not all sites will allow for PI research personnel to visit).
* How many individuals would normally visit at any one time?
* How many different individuals are likely to visit during a season or year?
* Do you anticipate work in close proximity of in-situ sensors (tower, soil or aquatic sensors)?
* Do you anticipate work in close proximity of other NEON sampling locations?
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## 3.5 Addition of non-NEON instruments or other equipment

*Addition of sensors, instruments or other equipment to an AOP is not possible at this time.This capability may be available in the future.*

# Section 4: DATA management

Requesters are required to abide by [NEON’s Data Policy](http://www.neonscience.org/assignable-assets).

* Describe how data and/or metadata will be ideally be obtained from NEON and then stored by the PI.
* Describe how and when data will be made publicly available.

# SECTION 5: SAFETY and training

* If your research personnel will be at the site whenever an AOP is deployed, please describe your plans for training your research personnel to ensure that they operate in a safe and environmentally compliant manner, and that they understand any guidelines and restrictions pertaining to conducting the research at NEON sites.
*

# section 6: permitting

**NEON does not own the property on which NEON infrastructure and observational plots are located.**

Check the Field Site Coordination (FSC) website below for a link to the NEON Research Support Services Site Access Information spreadsheet. The spreadsheet provides contact information for obtaining appropriate permissions and permits as well as additional information about which NEON field sites are open to additional non-NEON research activities.

NEON Field Site Coordination website:

<https://www.neonscience.org/resources/research-support/field-site-coordination>

Researchers are required to obtain access and use permits from the site host and any applicable local, state, and federal agencies. In some situations, NEON can assist with this. Also, in a small number of situations NEON permits will suffice if NEON staff are completing the activity.

Thank you for completing this application.

In addition to the above information, we may be able to assist:

* Evaluating the potential impact of proposed activities on NEON measurements and observations.
* Selecting optimal locations for your research objectives ensuring efficient use of resources and high-quality data.
* Contacting site hosts to coordinate field sampling at NEON sites.
* Finding additional information about field sites, permitting or other questions.

**Submit this request and any questions to** ResearchSupport@BattelleEcology.org

# NEON Sites

|  |  |
| --- | --- |
| **Terrestrial** | **Aquatic** |
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| **Domain #** | **Site ID** | **Site Name** |
| D01 | BART | Bartlett Experimental Forest |
| D01 | HARV | Harvard Forest |
| D02 | BLAN | Blandy Experimental Farm |
| D02 | SERC | Smithsonian Environmental Research Center |
| D02 | SCBI | Smithsonian Conservation Biology Institute |
| D03 | OSBS | Ordway-Swisher Biological Station |
| D03 | DSNY | Disney Wilderness Preserve |
| D03 | JERC | Jones Ecological Research Center |
| D04 | LAJA | Lajas Experimental Station |
| D04 | GUAN | Guanica Forest |
| D05 | TREE | Treehaven |
| D05 | UNDE | UNDERC |
| D05 | STEI | Steigerwaldt Land Services |
| D06 | KONA | Konza Prairie Biological Station - Relocatable |
| D06 | KONZ | Konza Prairie Biological Station |
| D06 | UKFS | The University of Kansas Field Station |
| D07 | ORNL | Oak Ridge |
| D07 | MLBS | Mountain Lake Biological Station |
| D07 | GRSM | Great Smoky Mountains National Park, Twin Creeks |
| D08 | LENO | Lenoir Landing |
| D08 | TALL | Talladega National Forest |
| D08 | DELA | Dead Lake |
| D09 | WOOD | Woodworth |
| D09 | NOGP | Northern Great Plains Research Laboratory |
| D09 | DCFS | Dakota Coteau Field School |
| D10 | CPER | Central Plains Experimental Range |
| D10 | STER | North Sterling, CO |
| D10 | RMNP | Rocky Mountain National Park, CASTNET |
| D11 | CLBJ | LBJ National Grassland  |
| D11 | OAES | Klemme Range Research Station |
| D12 | YELL | Yellowstone Northern Range (Frog Rock) |
| D13 | NIWO | Niwot Ridge Mountain Research Station |
| D13 | MOAB | Moab |
| D14 | SRER | Santa Rita Experimental Range |
| D14 | JORN | Jornada LTER |
| D15 | ONAQ | Onaqui |
| D16 | WREF | Wind River Experimental Forest |
| D16 | ABBY | Abby Road |
| D17 | TEAK | Lower Teakettle |
| D17 | SOAP | Soaproot Saddle |
| D17 | SJER | San Joaquin Experimental Range |
| D18 | TOOL | Toolik |
| D18 | BARR | Barrow Environmental Observatory |
| D19 | BONA | Caribou-Poker Creeks Research Watershed |
| D19 | DEJU | Delta Junction |
| D19 | HEAL | Healy |
| D20 | PUUM | Pu'u Maka'ala Natural Area Reserve |

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| **Domain #** | **Site ID** | **Site Name** |
| D01 | HOPB | Lower Hop Brook |
| D02 | LEWI | Lewis Run |
| D02 | POSE | Posey Creek |
| D03 | FLNT | Flint River |
| D03 | SUGG | Ordway-Swisher Biological Station - Suggs Lake |
| D03 | BARC | Ordway-Swisher Biological Station - Barco Lake |
| D04 | GUIL | Rio Guilarte |
| D04 | CUPE | Rio Cupeyes |
| D05 | LIRO | Little Rock Lake |
| D05 | CRAM | Crampton Lake |
| D06 | MCDI | McDiffett Creek |
| D06 | KING | Kings Creek |
| D07 | WALK | Walker Branch |
| D07 | LECO | LeConte Creek |
| D08 | MAYF | Mayfield Creek |
| D08 | TOMB | Lower Tombigbee River at Choctaw Refuge |
| D08 | BLWA | Black Warrior River near Dead Lake |
| D09 | PRPO | Prairie Pothole  |
| D09 | PRLA | Prairie Lake at Dakota Coteau Field School |
| D10 | ARIK | Arikaree River |
| D11 | BLUE | Blue River |
| D11 | PRIN | Pringle Creek |
| D12 | BLDE | Blacktail Deer Creek |
| D13 | WLOU | West St Louis Creek |
| D13 | COMO | Como Creek |
| D14 | SYCA | Sycamore Creek |
| D15 | REDB | Red Butte Creek |
| D16 | MART | Martha Creek |
| D16 | MCRA | McRae Creek |
| D17 | TECR | Teakettle 2 Creek |
| D17 | BIGC | Upper Big Creek |
| D18 | TOOK | Toolik Lake |
| D18 | OKSR | Oksrukuyik Creek |
| D19 | CARI | Caribou Creek, Caribou-Poker Creeks ResearchWatershed |

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