

---

**CONTRACT FOR THE OPEN ACCESS TO THE FLIS  
INFRASTRUCTURE  
2305**

---

**USER**

Name **Forschungszentrum JÜLICH GmbH**

Registered office Wilhelm-Johnen-Straße, 52428 Jülich

VAT No. DE122 624 631

Represented by its Board of Directors  
for: IBG-2

**AND****PROVIDER**

Name **Ústav výzkumu globální změny AV ČR, v. v. i. (Global Change Research Institute, public research institute)**

Registered office Bělidla 986/4a, 603 00 Brno

ID No. 86652079 VAT No. CZ86652079

Registered in Register of Public Research Institutes

Represented by Prof. RNDr. Ing. Michal V. Marek, DrSc., dr. h. c., Director

conclude a contract as follows:

**PREAMBLE**

1. The Provider has obtained funds from the Operational Programme of Research and Development for Innovations (hereinafter only as the “OP RDI”), Priority Axis 1 – European Centres of Excellence for Project Implementation CZ.1.05/1.1.00/02.0073, CzechGlobe – Centre for the Study of Global Climate Impact (hereinafter only as the “CG Project”).
2. Using the funds of the OP RDI, the Provider, among other things, has purchased elements of specialised infrastructure. One element is FLIS – Flying laboratory of imaging systems (hereinafter only as the “FLIS”).
3. The FLIS includes the following equipment: hyperspectral imaging spectroradiometers CASI 1500, SASI 600 and TASI 600, laser scanner Riegl Q780 (hereinafter the “FLIS Sensors”), air carrier Cessna C208B, and additional equipment required for data collection and processing (IMU/GNSS units, gyrostabilization platform, navigation system, etc.).

4. According to Chapter 5.3 of the technical description of the CzechGlobe Project, the specialised infrastructure may be used at three basic levels: a) Open access, b) Project cooperation, and c) Cooperation in contractual research.
5. The Provider has published an Open Access Call for Submitting Projects on its website. The User has submitted the project entitled "HyPlant Data Acquisition 2023 - FZJ" (hereinafter the "Project") to the Provider. The Project forms an annex to this Contract. The User will provide a sensor (via a third party) for the Project (hereinafter the "HyPlant Sensor").
6. Due to the nature of the Provider (a legal entity governed by public law whose main purpose is research) and the User (a legal entity governed by public law whose main purpose is research and dissemination of knowledge) and due to the research nature of the Project, the Provider has decided to make the FLIS available for the Project purposes.
7. CzechGlobe performs regular maintenance and repairs of the FLIS according to plans, conditions of the manufacturers of infrastructure elements, and as needed.

#### **I. PURPOSE AND THE FACILITY OF THE CONTRACT**

1. The purpose of the Contract is to use the FLIS for Open Access science and research needs.
2. The facility of this Contract is the Provider's obligation to provide access to the FLIS infrastructure, including its service. The facility of this Contract is the User's obligation to support the Provider (e.g. in obtaining the necessary permits, etc.) and to comply with the conditions for handling the access outputs specified in this Contract.
3. Under this Contract, flights of a total duration exceeding 20 hours may not be conducted.
4. Under this contract, total duration of campaign (data acquisition for project purposes) exceeding 14 days may not be conducted.

#### **II. FINANCIAL ARRANGEMENTS ON THE ACCESS COSTS**

1. No price or remuneration shall be paid in return for the access to the infrastructure. The User shall pay only the direct costs of the access to the infrastructure according to the actual scope of access on the basis of the calculation units specified in Annex No. 1 hereto.
2. The direct costs will be paid on the basis of an invoice.
3. VAT at statutory rate will be added to the direct costs.
4. Bank fees related to payments shall be paid by the User.
5. The invoice shall comply with the requirements of a tax document; the maturity will be 30 days from the date of issuing the invoice.

#### **III. ACCESS TO THE INFRASTRUCTURE**

1. The data will be collected between 01/06/2023 and 30/09/2023.
2. The outcomes shall be accessible to both Parties by 30/12/2023 at the latest.
3. The outcome means raw non-georeferenced data captured with the FLIS Sensors listed in paragraph 3 of the Preamble over the User's interest area defined in the Project. The outcome does not include data acquired with the HyPlant Sensor (hereinafter "HyPlant Data"). HyPlant Data shall be owned by the User and its use by the User shall not be affected by this Agreement.
4. The intended scope of the outcomes is determined in the Project.
5. The minimum accuracy of the outcomes necessary to fulfil the purpose of this Contract is specified in the Project.

6. The User shall receive the data in the form and quality in which they will be collected.

#### **IV. HANDLING THE OUTCOMES**

1. The outcomes may only be used for scientific and teaching purposes. Under no circumstances may the outcomes be used for commercial use. Under no circumstances may the outcomes be used for the User's economic activity.
2. The outcomes may be further processed using any method.
3. The User shall not publish the outcomes in a form allowing further processing. Results derived from further processing of the outcomes by the User can be published so that open access publishing following FAIR principles is possible.
4. The User may transmit the outcomes to a third party within the scope of the licence referred to in paragraph 1 of this Article.
5. If the User publishes the outputs, the User shall indicate that the outcomes were made owing to the Provider.
6. Both the User and the Provider shall receive the outcomes.
7. For avoidance of doubt, outcomes does not include HyPlant Data.

#### **V. REPRESENTATIVES OF THE PARTIES**

1. The Provider's representative is [REDACTED]. This Provider's representative may act on behalf of the Provider in association with this Contract, but may not modify or terminate the Contract.
2. The User's representative is [REDACTED]. This User's representative may act on behalf of the User in association with this Contract, but may not modify or terminate the Contract.

#### **VI. CONTRACTUAL PENALTIES AND LIABILITY FOR DAMAGE**

1. Neither of the Parties gives any warranties concerning the accuracy and completeness of information disclosed and of objects transferred or concerning the non-existence of rights of third parties. The Parties mutually waive any claims, to the extent permitted by law, for themselves and their staff members in respect of any damage resulting from the performance of the Project. The respective liability for their interactions with third parties shall not be affected by this waiver.
2. The limitations of liability defined herein shall not apply when the damage is caused wilfully or by gross negligence.

#### **VII. CONTRACT TERMINATION**

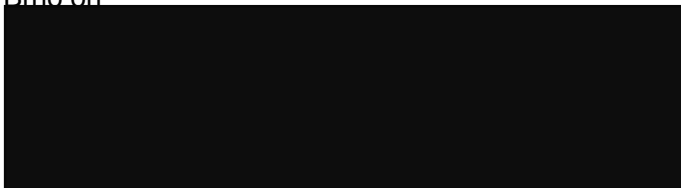
1. The Contract may be terminated by mutual written agreement.
2. If the data are not collected by 30/09/2023 due to the unfavourable weather conditions, due to safety reasons, due to the aircraft failure, or failure to obtain the required permits, the Contract shall automatically be terminated in its entirety.
- 2.1. The Contract may be terminated by withdrawal from the Contract. The withdrawal shall be made in writing and efficiently served onto the other party. The Provider may withdraw from the Contract in cases stipulated by law and in the case of breach of the terms of this Contract by User.
- 2.2. The User may withdraw from the Contract in cases stipulated by law.

### VIII. COMMON AND FINAL PROVISIONS

1. Neither Party may assign a claim or debt from this Contract or this Contract to a third party without the written consent of the other Party.
2. Should any individual provisions of this Contract be or become legally ineffective, this shall not affect the validity of the Contract as a whole. The Parties shall rather retrospectively replace the ineffective provisions by effective provisions as close as possible to the meaning of the ineffective provisions and the purpose of the Contract. This shall apply analogously in the event of a gap mutually recognised as unintentional.
3. This Contract shall be governed by German law, with the exception of conflict of laws. All discussions about the Work and its performance shall take place in English.
4. This Contract may only be amended in writing, by means of a mutually signed numbered amendment to this Contract.
5. The following annexes form an integral part of this Contract:
  - a) Annex No. 1: Calculation Units for the Quantification of Direct Costs
  - b) Annex No. 2: Project of "HyPlant Data Acquisition 2023 - FZJ"
6. This Contract has been drawn up in 4 copies, out of which each Party shall receive 2 copies.
7. The Parties agree unconditionally to the publication of the full wording of the Contract so that this Contract may be the subject of the information provided in accordance with Act No. 106/1999 Coll., on Free Access to Information, as amended, and Act No. 340/2015 Coll., on Special Conditions for the Effectiveness of Certain Contracts, Publication of these Contracts and on the Register of Contracts (Act on Register of Contracts), as amended
8. The Parties hereby declare that prior to its signature, they have read the Contract and agree with its content without reservation. The Contract is an expression of their true, actual, free and serious will, in witness whereof the authorised representatives of the Parties attach their own signatures.
9. This Contract becomes effective commencing on the date that it is executed by both Parties.

for Ústav výzkumu globální změny AV ČR, v. v. i.

In Brno on



Prof. RNDr. Ing. Michal V. Marek, DrSc., dr. h. c.

Director

Global Change Research Institute AS CR, public  
research institute

for Forschungszentrum Jülich GmbH

In Jülich on



i.V. Prof. Dr. Ulrich Schurr

Head of the Institute of Bio- and Geosciences, Plant  
Sciences (IBG-2)

---

**ANNEX No. 1:      CALCULATION UNITS FOR THE QUANTIFICATION OF DIRECT COSTS**

---

	Unit price	Estimated number of units per OA	Estimated price per OA (excl. VAT)
<b>Aircraft lease and operation</b>			
FLIS lease	0 EUR	10	0 EUR
<b>Direct operational costs</b>			
Direct operational costs of the aircraft per 1 hour of flight	1 800 EUR	20	36 000 EUR
Direct operational costs of the aircraft crew per 1 day standby	200 EUR	15	3 000 EUR
<b>Total estimated costs of Open Access</b>			<b>39 000 EUR</b>

---

**ANNEX NO. 2: PROJECT OF “HYPLANT DATA ACQUISITION 2023-FZJ”**

---

**Application Form for Flying Laboratory of Imaging Systems (FLIS)****Part 1 : General Information**

<b>Project title</b> (characterising the scope of application)	<b><i>HyPlant Data Acquisition 2023 - FZJ</i></b>
<b>Project acronym</b> (optional)	<b><i>HyPlant FZJ</i></b>
<b>Start date</b> (expected)	<b>01.06.2023</b>
<b>End date</b> (expected)	<b>31.08.2023</b>

**Project leader**

<b>Title</b>	
<b>First name</b>	
<b>Last name</b>	
<b>Job title</b>	
<b>Organisation name</b>	Forschungszentrum Jülich GmbH
<b>Department</b>	IBG-2: Plant Sciences
<b>E-mail</b>	
<b>Phone number</b>	
<b>Address</b>	Wilhelm-Johnen-Strasse 1
<b>City</b>	Jülich
<b>Postal code</b>	52428
<b>Country</b>	Germany
<b>WWW</b>	<a href="https://www.fz-juelich.de/ibg/ibg-2/EN/Research/ResearchGroups/shoot_dynamics/shoot_dynamics_node.html">https://www.fz-juelich.de/ibg/ibg-2/EN/Research/ResearchGroups/shoot_dynamics/shoot_dynamics_node.html</a>

**Contact person for all correspondence (if different)**

<b>Title</b>	
<b>First name</b>	
<b>Last name</b>	
<b>Job title</b>	
<b>Organisation name</b>	
<b>Department</b>	
<b>E-mail</b>	
<b>Phone number</b>	
<b>Address</b>	
<b>City</b>	
<b>Postal code</b>	
<b>Country</b>	
<b>WWW</b>	

**Collaborators (if different)**

<b>Title</b>	
<b>First name</b>	
<b>Last name</b>	
<b>Job title</b>	
<b>Organisation name</b>	
<b>Department</b>	
<b>E-mail</b>	
<b>Phone number</b>	
<b>Address</b>	
<b>City</b>	
<b>Postal code</b>	
<b>Country</b>	
<b>WWW</b>	



## **Part 2: Instrument**

### **1) What type of instrument would you like to use for data acquisition?**

(In case of more types of instruments please copy the following paragraph)

Specify the instrument: Cessna 208B

TASI hyperthermal sensor

Riegel LiDAR system

### **2) What kind of assistance by technical staff of CzechGlobe or related services (e.g. additional corrections) is needed? Data are not georeferenced and pre-processed to level of at-sensor radiance (L1).** (Please specify not only technical features but outline also the financial aspects).

*Processing of TASI and LiDAR data to surface temperature and 3-D surface and elevation model. The precision of this processing will be discussed bilaterally between the group and will be arranged with scientist on Czech Globe.*

## **Part 3: Access to Data**

**If you need any CzechGlobe data acquired previously by FLIS, please specify** (e.g. area, type of data). Basic information about already acquired data is available on <http://mapserver.czechglobe.cz/>.

None

## **Part 4: Project description (narrative)**

### **4.1 Abstract of the project:** *If the project is accepted, it will be published on the CzechGlobe website. Please make this summary understandable to a general and non-scientific audience. (max. 400 words)*

In the shoot group at Forschungszentrum Jülich, we aim to improve our scientific (biological) understanding of plant shoot functioning and dynamic shoot traits from the leaf to the canopy, which will provide the basis to optimize plant production. Our special focus is on understanding of the regulatory properties of photosynthesis, the mechanisms of leaf and canopy water content and transpiration as well as the dynamics in shoot architecture in crops. To study the dynamics of photosynthesis, the *HyPlant* airborne imaging spectrometer was developed 2012 and operated for the first time. This sensor retrieves the sun-induced fluorescence spectrum from plant leaves that could be used for an estimation of the photosynthetic rate of plants. Within the project “*HyPlant* Data Acquisition 2023 - FZJ”, the *HyPlant* airborne sensor shall record high-performance imaging spectroscopy data from selected sites in Germany. These acquired data will be processed in order to calculate high quality fluorescence maps and complement existing time-series of the German study sites.

### **4.2 Description of the project** (aims, methodology, outcomes; max. 1000 words):

The “*HyPlant* Data Acquisition 2023 – FZJ” aims at the acquisition of high-performance imaging spectroscopy data with the *HyPlant* sensor over selected sites in Germany. Data will be processed to calculate high-quality fluorescence maps. One site in Germany is the highly instrumented long-term observation site Selhausen that was established in 2006. The site covers an area of approximately 100 km x 40 km and consists of different ecosystems that include intensive agricultural fields, managed pine and mixed forest, natural grasslands, and swamp areas. The

second site is Campus Klein-Altendorf (CKA), where Forschungszentrum Jülich operates a network of modern, non-invasive field phenotyping sensors and positioning system. The agricultural research CKA near Bonn comprises 181 ha for field trials and approximately 4,800 m<sup>2</sup> for Greenhouse trials. On CKA, research can be conducted with all kinds of plants and crops, ranging from small plants or herbs to large crops like maize, from annual crops like vegetables to perennial plants like Miscanthus or fruit trees. The third site are fields in proximity to Jülich, where in the frame of the 'Regionale Strukturwandel' new field sites are currently being set-up. This sites are th APV field next to Morschenich and the Marginal Field within the Tagebau Hambach. This field site shall allow farmers, experts from industry and scientists to test new technologies for managing crops and plants. Last but not least the field sites of ZALF next to Müncheberg, the Kranzberger Forst next to München, and the Phynwald in Switzerland shall be recorded to prepare future collaborations.

In addition to *HyPlant* data, LiDAR and TASI data shall be acquired as well. On each site, there will be FloX measurements available. To complement the data set, in situ measurements of plant traits will take place on the days of the overflights. *HyPlant* imaging spectroscopy data will be processed in-house from at-sensor radiance to level-2 products (Top-of-canopy radiance/ -reflectance and fluorescence ( $F_{687}$ ,  $F_{760}$ ) maps) with SFM, SVD and iFLD. The outcome of the project is to complement existing time-series of *HyPlant*, LiDAR and TASI data that were acquired during the last couple of years over the two sites in Germany. This overall unique data set will allow us to (i) further explore the correlation of sun-induced fluorescence to photosynthesis performance, (ii) investigate the data products across spatial scales, and (iii) evaluate different retrieval methods.

**4.3 Is the project connected with / (co-)financed from a grant (e.g. EU grant, public subsidy)?**

Yes / No

**4.3.1. Name of the grant and funding body:** *German Ministry of education and Research (BMBF) – Strukturwandel Rheinisches Revier.*

**4.4 Do you see a potential for financing this proposed research cooperation from any research or similar funding and would you be interested in this kind of project cooperation with CzechGlobe?**

Yes / No

**4.4.1 If yes, please specify:**

**4.5 Is any part of the project covered by confidentiality?**

Yes / No

**4.5.1 If yes, please specify and give the reasons for confidentiality:**