



PURCHASE CONTRACT
AERIAL HYPERSPECTRAL IMAGE SYSTEM

SELLER

Name **ITRES RESEARCH LIMITED**
Registered office Unit 90, 2175 – 29 Street NE
Calgary, Alberta, Canada T1Y 7H8
Comp. No (IČO) 202196473 VAT No (DIČ) Not Applicable (NA)
Incorporated in Alberta, Canada court in (NA) section NA record NA
Represented by Steven Mah, President and Chief Executive Officer

AND

BUYER

Name **Ústav výzkumu globální změny AV ČR, v. v. i.
(Global Change Research Institute CAS)**
Registered office Bělidla 986/4a, 603 00 Brno, Czech Republic
Comp. No (IČO) 86652079 DIČ CZ86652079
Incorporated in Register of public research institutes
Represented by prof. RNDr. Ing. Michal V. Marek, DrSc., dr. h. c., Director

According to section 2079 of Civil Code, the above parties conclude the following contract:

I. SUBJECT MATTER OF CONTRACT

1. The seller undertakes that it will hand over to the buyer the subject matter of purchase and perform servicing and maintenance of the subject matter of purchase. The seller undertakes that it will enable the buyer to acquire the ownership rights for the subject matter of purchase and the buyer undertakes to take over the subject matter of purchase and pay the purchase price for it to the seller.
2. The seller also undertakes to hand over the documents concerning the subject matter of contract.
3. The subject matter of purchase is financed from the project CzeCOS-BOOST – Modernisation and Boosting of LRI CzeCOS, project registration number: CZ.02.01.01/00/23_015/0008207.

II. SUBJECT MATTER OF PURCHASE

1. The subject matter of purchase is Aerial Hyperspectral Image System that consists of the following parts:
 - 1.1. Aerial Hyperspectral VSWIR System (Hyperspectral Sensor + IMU GNSS Unit) (1 pc)
 - 1.2. Flight Management System (1 pc)
2. The seller declares that the subject matter of purchase is possible to be installed in the airplane Cessna Grand Caravan C208B that the buyer already owns and is fully compatible with his the on-board electrical network.
3. The seller declares that the subject matter of purchase is fully compatible with the Somag AG Jena Gyrostabilisation platform, type GSM3000 that the buyer already owns.
4. The subject matter of purchase is specified in more details in Annex No. 1 to this contract.
5. The part and accessories of the subject matter of purchase are specified in more detail in Annex No. 1 of this contract.
6. The subject matter of purchase will be handed over in compliance with the following documents (ordered according to the degree in which they are binding):
 - a) This contract.
 - b) Written instructions from the buyer.
 - c) Technical standards concerning the materials and activities performed on the basis of this contract
7. Together with the subject matter of purchase, the seller will hand over to the buyer the documents necessary for the handover and use of the subject matter of purchase. These documents include mainly the following:
 - a) Certificates and declarations of conformity for materials and products used.
 - b) Detailed instructions or manuals for use of the subject matter of purchase.
 - c) Detailed instructions or manuals for maintenance of the subject matter of purchase.The documents will be prepared in Czech, Slovak or English language.
8. The seller undertakes to perform servicing of the subject matter of purchase for the time of duration of the guarantee period.
9. The seller undertakes to carry out training in maintenance and operation of the subject matter of purchase for at least five days (5 hours each) of training. The seller undertakes to carry out training in the maintenance and operation of the subject matter of purchase no later than two months from the submission of the subject matter of purchase by prior arrangement. The training will take place at the airport in Brno (BRQ), where is buyers airplane. The training will be conducted in Czech, Slovak or English.

III. HANDOVER OF THE SUBJECT MATTER OF PURCHASE

1. The complete and faultless subject matter of purchase will be handed over latest **within 12 months from the signature of this contract**.
2. Earlier fulfilment is allowed but not earlier than in 08/2025.
3. The subject matter of purchase will be handed over at the workplace of the buyer at **Bělidla 986/4a, 603 00 Brno, Czech Republic**, unless the parties agree otherwise.

Aerial Hyperspectral Image System

4. If the seller supplies more items than agreed, the purchase contract is also concluded for the excessive amount and the price of the excessive amount is included in the total purchase price.
5. The seller undertakes to hand over the subject matter of purchase unused and without any legal or material defects.
6. The seller undertakes to hand over the subject matter of purchase new (not prototype), unused and without any legal or material defects.
7. The fulfilment cannot be refused, even if the conditions of section 1912 (1) of Civil Code are met (mutual fulfilment).

IV. PURCHASE PRICE

1. The purchase price for fulfilment according to this contract was agreed:

Item	Quantity	Price for 1 piece in USD excl. VAT	Sum price in USD excl. VAT
1. Aerial Hyperspectral VSWIR System	1 pc	1,111,354.00	1,111,354.00
2. Flight Management System	1 pc	28,215.00	28,215.00
TOTAL price USD excl. VAT			1,139,569.00

2. The price is agreed for the basis of unit prices as the sum priced items.
3. The price is agreed as the highest permissible price including all the costs of the seller for fulfilment of this contract and price influences in the course of fulfilment of this contract.
4. VAT of the statutory rate will be added to the price excluding VAT.

V. PAYMENT TERMS

1. The price for the delivery of the subject matter of purchase and service performed will be paid based on one invoice, unless specified otherwise by the buyer. An annex of the invoice will be a copy of the handover of the subject matter of purchase.
2. The seller is entitled to require an advance payment of up to **30 %** of the purchase price based on an issued advance invoice which can be delivered to the buyer latest within **30 days** after this contract is concluded.
3. All the invoices shall include the particulars of a tax document and the name and registration number of the project in the form of: CzeCOS-BOOST – Modernisation and Boosting of LRI CzeCOS, project registration number: CZ.02.01.01/00/23_015/0008207.
4. The due date of all the invoices is 25 days from the day on which the invoice is issued.
5. The buyer is entitled to return an invoice with defects within the due date period. The seller is obliged to submit a new invoice or a corrected invoice with a new due date specified.
6. The seller is obliged to deliver the invoice to the address of the registered office of the buyer latest within 5 working days from the day on which the confirmation of the subject matter of purchase handover.
7. An invoice is paid on the day when the corresponding amount is written off the buyer's account.

VI. GUARANTEE OF QUALITY AND COMPLAINTS

1. The seller provides a guarantee for quality of the subject matter of purchase. For the whole duration of the guarantee period, the subject matter of purchase:
 - a) will be fit for use for the purpose stipulated in this contract.
 - b) will be fit for use for the usual purpose.
 - c) will keep its usual properties.
2. The seller provides a **guarantee for quality** for a period from **12 months**.
3. The guarantee period starts to run on the day when the subject matter handover is confirmed. The guarantee period is extended by the time starting from the day when a complaint is made and ending on the day when the defect is rectified.
4. The buyer is not in delay with claiming a defect if the right for the defect which the subject matter of purchase has at the moment of its handover is claimed in writing within 30 days from the day on which the buyer learns about the defect.
5. The Seller is not in delay with rectification of a defect if the seller starts to perform activities aiming at the defect rectification without any unnecessary delay after the defect is claimed; continues this activity duly and **latest within 30 workdays from the moment when the defect is claimed** it rectifies the defect or replaces the subject matter of purchase with a defect-free one.

VII. INTERESTS ON OVERDUE PAYMENTS AND CONTRACTUAL PENALTIES

1. The party which is in delay with payment of a debt can be asked by the other party, if it fulfils duly its contractual and statutory obligations, to pay an interest on overdue payment, with the exception of the cases when the party which is in delay is not responsible for the delay. The parties agree on an **interest on overdue payment** at the amount of **0.04 % from the due amount per day**.
2. The buyer will charge a **contractual penalty** of **USD 2.300 per day** in the following cases:
 - a) Delay of the seller with handover of the subject matter of purchase.
 - b) Delay with rectification of a defect on the subject matter of purchase at the moment of its handover.
 - c) Delay with rectification of a guarantee defect.
3. A separate invoice will be issued for the contractual penalty with the due date of 30 days. The day of taxable supplies is considered to be the day on which the invoice is issued.
4. The parties agree that the obligation to pay a contractual penalty does not affect the right for damage compensation at the amount at which it exceeds the contractual penalty. If a contractual penalty is decreased by the court, the right for damage compensation remains at the amount at which the damage exceeds the amount determined by the court as adequate, without any other limitations.

VIII. CONTRACT TERMINATION

1. The contract can be terminated by a written agreement.
2. The buyer can withdraw from the contract in case of its significant breach by the seller. A significant breach of the contract is considered to be among others:
 - a) Delay of the seller with handover of the subject matter of purchase by more than 30 days.
 - b) Commencement of bankruptcy proceedings in which the seller is in the position of the debtor.

- c) If it is established that untrue data were included in the bid from the seller in connection with the public contract.
- d) Violation of paragraph 2 and 3 of Article II. of this contract.
- 3. The seller can withdraw from the contract in case of its significant breach by the buyer. A significant breach of the contract is considered to be among others:
 - a) Commencement of bankruptcy proceedings in which the buyer is in the position of the debtor.
 - b) Delay of the buyer with settlement of an invoice by more than 30 days.
- 4. Withdrawal must be made in writing and it becomes valid when delivered to the other party.
- 5. Withdrawal from the contract does not cancel the mutual vindicatory liability of the parties.

IX. RESPONSIBLE PERSONS OF THE PARTIES

- 1. The representative of the buyer is Ing. Jan Hanuš, Ph.D., hanus.j@czechglobe.cz. This representative of the buyer can act on behalf of the buyer in connection with this contract in any respect, but he is not allowed to change or terminate this contract.
- 2. The representative of the seller is Mr. Steven Mah, s.mah@itres.com. This representative of the seller can act on behalf of the seller in connection with this contract in any respect, but he is not allowed to change or terminate this contract.

X. JOINT PROVISIONS

- 1. The right of ownership for the subject matter of purchase is transferred at the moment when the subject matter of purchase is handed over to the buyer.
- 2. None of the parties is allowed to transfer a receivable or liability arising from this contract to a third party.
- 3. Each of the parties accepts the risk of a change of circumstances pursuant to section 1765 of Civil Code for its debts arising on the basis of this contract.
- 4. No rights and obligations can be inferred from practices introduced by the parties or customs observed as a standard, both generally and in the particular field, concerning the subject matter of fulfilment of this contract.
- 5. If any of the provisions of this contracts becomes imaginary (petty), the impact of this defect on the other provisions of this contract will be assessed similarly according to section 576 of Civil Code.
- 6. The parties exclude application of the following provisions of Civil Code to this contract: section 557 (contra proferentem rule).
- 7. The seller is aware of the fact that it is a person obliged to cooperate during financial inspection. The seller is obliged to bind all its subcontractors to cooperate during a financial inspection.
- 8. The parties agree that the court competent to negotiate and decide all the potential disputes arising between the buyer and the seller pursuant to this contract or in connection with it is the general court of the buyer.
- 9. For the entire duration of the contract, the Seller shall ensure:
 - a) decent working conditions, fulfillment of obligations arising in particular from labor law, employment and occupational health and safety regulations, towards all persons who will participate in the performance of the contract, while the fulfillment of these obligations will be ensured by the seller and his subcontractors,

- b) proper and timely fulfillment of financial obligations to its subcontractors under the conditions arising from this contract,
- c) elimination of environmental impacts in the pursuit of sustainable development.

XI. FINAL PROVISIONS

1. This contract is governed by Czech legal regulations with the exception of colliding provisions. All the connected negotiations are held in Czech, Slovak or English language.
2. This contract does not depend on any other contract. No other contract depends on this contract.
3. This contract contains full agreement concerning the subject matter of the contract and all the particulars the parties were supposed to and wanted to agree in the contract and which they consider important for binding character of this contract. No statement of the parties made during negotiations concerning this contract may be interpreted in contradiction with the explicit provisions of this contract and it does not establish an obligation of any of the parties.
4. This contract can only be changed in writing in the form of numbered supplements to this contract. The parties can object invalidity of the contract or its supplement anytime due to the failure to observe the form, even if the fulfilment has already started.
5. The parties are aware that this contract meets the requirements specified in Act No 340/2015 Coll. and therefore it is subject to the obligation to be published in the register of contracts. The buyer undertakes to enter the contract in the register of contracts within the statutory period and send a confirmation that the contract was published to the seller upon its request.
6. This contract is prepared in two counterparts and each party will obtain one of them.
7. The following annexes are an integral part of this contract:
 - a) Annex No 1: Technical specification of the subject matter of purchase
8. This contract comes into force at the moment when it is published in the register of contracts.

Calgary, on this day 07 January 2025

Brno, on this day

Steven Mah
President and CEO
ITRES Research Limited

prof. RNDr. Ing. Michal V. Marek, DrSc., dr. h. c.
Director
Ústav výzkumu globální změny AV ČR, v. v. i.
(Global Change Research Institute CAS)

ANNEX NO 1: TECHNICAL SPECIFICATION OF THE SUBJECT MATTER OF PURCHASE

Subject matter of purchase will fulfil all followed technical parameters:

Aerial Hyperspectral Image System will be used for the needs of remote sensing (RS).

Aerial Hyperspectral Image System will fulfil the following general requirements:

1. Hyperspectral pushbroom system will be new, unused.
2. Hyperspectral system will be designed for use in aircraft.
3. Hyperspectral system will meet the detailed technical parameters.
4. Sensor will cover the visible, near infrared and mid infrared regions of the spectrum.
5. A sensor is defined as a device with a single input lens whose output is a hyperspectral data cube. The sensor shall be capable of acquisition the full spectral range of the hyperspectral data cube by a single optical path on a single Focal Plane Array.
6. Possibility to mount the sensor on Somag AG Jena gyrostabilisation platforms (type GSM3000 and GSM4000).
7. The sensor will be equipped with an external IMU unit that can be removed for use on another sensor.
8. Together with the sensor, the accessories necessary for the installation of the hyperspectral system onboard the aircraft and its operation (monitor, cabling, software, etc.) will be delivered. The accessories necessary for the operating of the sensor in the laboratory will also be delivered.
9. Hyperspectral systems will be powered via the on-board electrical network- voltage 28 V.
10. The data logger will be equipped with "solid state" disks. The power consumption of the hyperspectral system, including accessories, shall not exceed 1000 W at any one time when switched on.
11. The sensor will be supplied with radiometric and geometric correction software whose outputs will be compatible with the ENVI software. The output of the supplied software will be georeferenced (including orthorectification) hyperspectral data cube in radiance values.
12. The sensor will be delivered with spectral, radiometric and geometric calibration including calibration documentation.
13. The hyperspectral system will enable precise time synchronization of image data and IMU/GNSS data.
14. The hyperspectral system will be delivered including all accessories necessary for direct georeferencing of image data (IMU/GNSS, software, etc.). The functionality of all systems and software will be verified by a test flight and subsequent processing of the acquired data.
15. The bad pixels of the sensor matrix will be replaced by interpolated values during the calibration process. The defective pixel gives values that differ by at least 10 % from the average values measured for the spectral band during radiometric calibration using the integration sphere.
16. The delivery will include calibration equipment (integration sphere, spectral lamps, etc.) for laboratory radiometric and spectral calibration of the supplied sensor. The calibration equipment shall enable the sensor to be calibrated to the required accuracy. The delivery will include everything necessary to create radiometric calibration files and perform radiometric data corrections (software, etc.).

17. The hyperspectral system will enable data acquisition up to a flight altitude of 4,500 m.a.s.l. in an aircraft without a pressurized cabin.
18. Real-time display of acquired data on the control computer screen.
19. Real-time monitoring of the sensor health status.

I.
Individual parameters for
Aerial Hyperspectral VSWIR System
(Hyperspectral Sensor)

Manufacturer: ITRES Research Limited

Type: SAVI1000

The offered system must meet all of the requirements for functionality and instrumentation stated below

Specifications of the requirements	Buyer's requirements	Specifications of the seller (to be filled in/edited by the seller)
Minimum spectral range of the sensor	450-2450 nm	400 – 2,500 nm ± 10 nm
Maximum spectral step of individual bands (spectral sampling)	12 nm	< 9.0 nm
Minimum spectral resolution of FWHM (Full Width Half Maximum) of one band	12 nm	< 12 nm
Viewing angle of the sensor must be in range 35 to 45 degrees	Yes	Yes 40°
Minimum number of image (spatial) pixels	950 pixels	1000 $\pm 2\%$ PIXELS
Minimum image coding (digitalized output)	14 bits	16 bits
Maximum spectral smile effect of the hyperspectral system	0,3 pixels	<0.2 pixels
Maximal spatial distortion "keystone effect" of the hyperspectral system	0,3 pixels	<0.2 pixels
Minimum "Full Well" capacity of one detector	900 000 e ⁻	$\geq 1.000.000^*$ electrons per pixel across all wavelengths

Aerial Hyperspectral Image System

Optical spot size/diameter in all wave lengths	Less than or equal to 1.5 pixels	≤ 1.5 pixels across all wavelengths
Minimum spatial resolution that the sensor must be able to achieve at a speed of 110 knots (square pixel)	1.0 m	0.6 m (frame time fixed to 100 Hz)
Minimum accuracy with which it is possible to calibrate the sensor radiometrically using the equipment supplied for its calibration and also maximum difference between two calibrations performed before and after the flight.	3%	< 3% against a NIST-traceable standard
Minimum accuracy of synchronization marks between image and IMU/GNSS data	Max 1 ms	Max 1ms
Maximum number of unsaved scan lines per 10 000 scanned lines	1	1
Minimum temperature range in which the system can operate	5 - 40°C	-10 to + 40°C
Minimum recording capacity	1000 GB	2000 GB
Option to change operative data disks for empty ones during the flight	Yes	Yes
Maximum number of bad pixels	1 %	1 %
Maximum dimensions of the sensor	60 x 100 x 60 cm	49 cm (diameter) x 90 cm
Maximum weight of the sensor	50 kg	49.5 kg (SAVI-SM with IMU and AP50 boardset removed)
Maximum weight of the control unit and recording equipment	20 kg	0 kg No Control Unit and Recording equipment (use of laptop / mission manager with acquisition SW installed), data recording unit integrated in the Sensor
Minimum spectral calibration accuracy.	1 nm	1 nm

**Individual parameters for
Aerial Hyperspectral VSWIR System
(IMU GNSS Unit)**

Manufacturer: ITRES Research Limited (TRIMBLE Applanix OEM)

Type: iNAV50 (based on the Applanix AP50).

The delivered system must meet all the requirements for functionality and instrumentation stated below.

Accuracy requirements are given for post-processed parameters (root mean square error - RMS).

The delivery of the hyperspectral system will include a new airborne IMU (Inertial Measurement Unit) including a GNSS (Global Navigation Positioning System) unit for determining the position and orientation of the sensor in space, including a program for processing data from the units. The GNSS shall allow for post-processing position calculation using reference station data with centimetres accuracy under optimum atmospheric and geometric conditions.

Specifications of the requirements	Buyer's requirements	Specifications of the seller (to be filled in/edited by the seller)
Accuracy of determination of position	0,02 m	0,02 m
Accuracy of determination of altitude	0,05 m	0,05 M
Accuracy of the determination of pitch and roll	0,005 °	0,005
Accuracy of the determination of heading	0,010 °	0,010
Frequency of sensing position and orientation in space	Min. 150 Hz	Min.200 Hz
Software for post-processing	Yes	Yes
IMU must not be subject to ITAR regulations	Yes	Yes (not subject to ITAR regulations)

- The IMU/GNSS unit will be supplied so that it can be mounted separately on the sensor mount, but with an already developed interface containing everything needed for electronic synchronization with the sensor

II.
Individual parameters for
Flight Management System

Manufacturer: ITRES Research Limited (TopoFlight OEM)
Type: iFMS (based on Topoflight's Flight Navigator and Mission Planner)

The delivered system must meet all the requirements for functionality and instrumentation stated below.

Specifications of the requirements	Buyer's requirements	Specifications of the seller (to be edited by the seller)
Flight planning software that will enable, among other things: -planning of the optimal or specified across track overlay of the flight lines using a digital terrain model with respect to the selected sensor angle of view -automatic calculation of the overlay of the neighbouring lines - possibility of using underlying raster actual data from GeoTiff and WMS data from the area of interest -planning in UTM/WGS-84 or other national coordinate systems	Yes	Yes
Ability to automatically start and stop sensors to acquire data according to planned flight lines	Yes	Yes
Gyrostabilisation platform control (GSM3000 and GSM4000) based on IMU/GNSS data and control system	Yes	Yes
Pilot navigation on arrival at, during and after leaving the selected flight line	Yes	Yes
Touch screen colour display for pilot to control the system	Yes	Yes
The system will support the integration of the Riegl LMS-Q780 laser scanner, that buyer already owns	Yes	Yes
The hyperspectral sensor will be integrated into the flight management system	Yes	Yes