

Charles University, Faculty of Science

Place of business: Albertov 6, 128 00 Praha 2

IC: 00216208, DIC : CZ00216208,

Represented by: prof. RNDr. Jiří Zima, CSc., dean of the faculty

IBAN: ˇ

hereinafter referred to as the Buyer

VZ/19/546

SELLER	DITABIS AG		
Represented by		Position	CEO
Place of business	Pforzheim	ID/	HRB 504365
Mailing address	Freiburger Str. 3, 75179 Pforzheim, Germany	Tax N.	DE 812 426914
Registered in	Mannheim, Germany	Account number	

THE PURCHASE AGREEMENT

Seller's contract number

Buyer's contract number¹**A. SPECIAL PART**

Department of Buyer	Laboratory of Confocal and Fluorescence Microscopy		
Subject of the contract	by the Seller Transfer of ownership of the goods to the Buyer Delivery to the place of delivery The supplier will setup and install the server onsite. During the warranty period, the provider will help to implement custom modifications and adaptations. Free software updates and upgrades during warranty period. Providing necessary training with acquired goods to 1 person (minimum one working day) Removal of packing material Handover of documents		
	by the Buyer Receipt of the goods at the point of delivery Payment of the purchase price		
Description of goods	New and unused HIVE System Further definition of the goods specified in the Annex 1 and 2.		
Delivery date	Not later than 4 weeks	Place of delivery	Viničná 7, Prague 2, 128 00, room S39
Purchase price without VAT (in €)	91 905,35		
Payment of invoices	30 days after delivery	Basic terms of payment	- Advance is not provided - Payment after delivery / installation of goods - Number of this contract must be on the invoice - The Price is reimbursed from EU funds and on the invoice must be this article: <i>CZ.02.2.67/0.0/0.0/16_016/0002266</i>
The warranty period	Overall warranty at least 2 years except components with longer warranty (need to be listed). Hard disks: 3 years	removal of defects warranty	On-site service at the latest in 72 hours and other defects within 25 working days from notification
Contact for support			
Place of removal of defects	Onsite or Heidelberg, dependent on severeness	Contact for notification of warranty defects	
Terms of sanctions	- For delay with payment of financial performance. Interest on late payment 0,05 % of the owed amount for each day of delay - For delay in delivery of goods a penalty of 0.05% of the price for each day of delay - For delay in removing reported warranty defects 0.01% of the price for each failure to cure the defect and the warranty day delay - For non-delivery of goods with parameters specified in Annex No. 1 and / or 2 in the amount of 15% of the purchase price - For delay in remedying the defect stated in the handover protocol 0,5% of the purchase price for each day of delay and each defect		
Action name	Server with high storage capacity		

¹To be added manually by the buyer before signing the contract

B. GENERAL PART

This part regulates detailed conditions of the purchase contract. The Part A defines basic conditions of Contract. In the event of any conflict between the Part A and the Part B of this Contract, the Part A has precedence.

I. Introductory provisions

- 1) The seller must deliver the new and unused goods and provide services associated with the delivered goods. If the Contract is concluded on the basis of a selection or an award procedure the goods must have product properties and parameters required by the buyer in the tender conditions. Goods must fulfil the stated purpose. If the purpose is not expressly stated, it must fulfil the purpose which is determined by the way the goods are generally used.
- 2) The goods delivered contrary to the paragraph 1 of this Article shall be deemed defective.

II. Invoicing and payment terms

- 1) The purchase price includes all costs and profit of the seller. The purchase price includes, in particular customs, taxation, banking and other fees, transport and installation of the goods, putting into a permanent operation, removal of packing material, an operator training and the buyer's costs for warranty service including free software updates and upgrades during warranty period. The purchase price is fixed and complete and includes complete delivery.
- 2) The buyer shall pay the purchase price after receiving the goods and documents necessary for the operation of a device and the signature of the protocol of delivery and acceptance of goods, and its installation, on the basis of an invoice (the "Invoice") with a maturity specified in the Part A of this Contract.
- 3) The invoice must be in accordance with the generally binding legal regulations and according to the Part A of this Contract; and its annexes must contain a copy of the installation protocol signed by both parties. If the invoice is incorrect or incomplete, the buyer is entitled to return it to the seller for a revision or an amendment. In this case, a new maturity period runs from the date of receipt of the corrected invoice by the buyer.

III. Terms of delivery and transfer of title

- 1) The buyer reserves the right in a case of late delivery of the goods or incomplete deliveries, at its sole discretion either accept the goods or to reject them and by that withdraw from the Contract.
- 2) The seller delivers the goods with proper accessories. Accessories especially means (installation material, assembly jigs, connectors, jumper cables, user codes, passwords, etc..).
- 3) A protocol about delivery and acceptance of the goods (the "acceptance protocol") shall be drawn up and signed after the delivery and acceptance of the goods. The acceptance Protocol must include, among other things, information about the frequency and method of revisions. If there is a seller's responsibility to install the product, there shall be drawn up and signed an installation protocol by both parties about the installation of goods, commissioning and testing.
- 4) The buyer is obliged to accept the goods only if it is free of defects. The buyer is entitled to refuse defective goods.
- 5) The seller agrees to deliver to the buyer the documents necessary for the proper use of the goods, for example appropriate approval certificates, declarations of conformity, instructions for usage and operation, assembly and installation instructions.
- 6) The buyer shall acquire right of ownership to the goods at the time of signing installation protocol by both parties. If there is not an obligation of the seller to install the goods, right of ownership to the goods passes to the buyer upon signing the acceptance protocol.
- 7) Risk of damage to the goods passes to the buyer upon signing the installation protocol. If there is not an obligation of the seller to install the goods, risk of damage passes to the buyer upon signing the acceptance protocol.
- 8) If the seller is required to install the product, the installation shall be completed immediately after the delivery of goods and without undue delay. The seller is obliged to perform the installation with professional care and warn the buyer about risks associated with the placement of goods. The seller is obliged to refuse an installation of the goods if the conditions specified by the manufacturer or by generally binding legal regulations for its implementation are not met.
- 9) If the seller is obliged to train operators, he must do so upon delivery, unless the parties agreed otherwise. The seller is obliged to provide the buyer with the necessary cooperation, in particular to determine the persons whom shall participate in the training and ensure their participation in the training.

IV. Guarantee of quality (warranty)

- 1) The seller provides the buyer a guarantee of quality (warranty) for the period specified in the Part A of this Contract. The guarantee (warranty) begins on the installation of the goods, unless the seller is obliged to perform, then it begins after the signing of acceptance protocol.
- 2) The seller guarantees that the product will have the usual characteristics or properties stated by the Contract during the guarantee period.
- 3) Warranty service is provided free of charge by the seller and includes all costs associated with the warranty service, especially the costs of spare parts, travel and labour services of a technician.
- 4) In the event that the goods are a medical device according to the law No. 268/2014 Sb., the seller is obliged to do free periodic safety technical inspections of goods in accordance with the law No. 268/2014 Sb. and its implementing regulations.
- 5) The buyer announces warranty defects to the Contract for notification of warranty defects or seller's Authorized person referred to in the Part A of this Contract. Seller shall start examining and working on the removal of the claimed defects after the receipt of the notice of defects without undue delay. If the seller will not be able to remove the defects within the period of time provided for removal of warranty defects set out in the Part A of this Contract, the seller will provide and deliver an adequate replacement device or devices that functionally replace the defective goods, until the defective goods are repaired and put into operation.
- 6) If the warranty defects are removed by the seller according to the Part A of this Contract, the buyer sends notice along with the goods.
- 7) The warranty period does not run as long as the buyer cannot use the goods for its defects, for which is the seller accountable for.
- 8) The warranty does not cover damage to the goods caused by an incorrect operation contrary to the instructions given in the operating instructions, or an inadequate storage contrary to its technical characteristics.

- 9) The buyer is entitled to withdraw from the Contract if he cannot deliver the notice of defects to the seller.
- 10) If the seller is in default with the removal of warranty defects, the buyer has the right to withdraw from the Contract after providing an additional reasonable time for removal of defects.
- 11) In the event that the warranty defect is not repairable defect, the buyer is entitled to withdraw from the Contract or to request delivery of new goods.
- 12) In the case of an unjustified notice of defects the buyer pays the costs of removing defects.
- 13) The buyer has the right for the removal of defects even if the defects were knowable during the Contract closure.

V. Final negotiations

- 1) Contract's penalties are set out in the Part A of this Contract.
- 2) If the goods or its part meet the criteria of a copyrighted work, the seller transfer to the buyer even the non-exclusive license to all types of usage of such work without the restrictions of time or spatial constraints. The buyer is not obligated to use the work. The price of the license is included in the purchase price.
- 3) Individuals who enter into this Contract on behalf of each party signature the Contract claim that they are entitled to make a valid contract.
- 4) The seller is not entitled without the prior written consent of the buyer to assign any rights or duties arising from this Contract to a third party.
- 5) The seller agrees to cooperate with the European Research Council Executive Agency, European Commission, the European Court by checks, reviews, audits and investigations and by extension of findings as referred to in Articles 22 and 23 of the Grant Agreement between the Buyer and the European Research Council Executive Agency. The Grant Agreement was annexed to the invitation to tender.
- 6) If the Contract follows the selection or procurement procedure, then this contractual relationship governed by these documents are of descending importance:
 - a) Annexes to this Contract,
 - b) the tender documentation,
 - c) offer of the seller.
- 7) This Contract can only be modified by numbered amendments in writing signed by both parties.
- 8) The Contracting Parties agree that the rights and obligations of this agreement shall be governed by the Civil Code of the Czech Republic.
- 9) The seller acknowledges that the buyer is obliged to publish all contracts including its annexes and any amendments if the price of performance is greater than 50 000 CZK without VAT. The seller agrees that the buyer discloses the Contract pursuant to the Act No. 340/2015 Sb. or/and also according to the Act No. 134/2016 Sb. as a whole, because there is no information in the contract which disclosure would be an unlawful interference with the rights and obligations of the seller or its employees. The seller agrees that the contract will be disclosed, including manual signatures of representatives of the parties.
- 10) The Contracting Authority assumes that this Contract will be signed electronically. If this Contract is in paper form, it will be written in two counterparts. Each of the Contracting Parties shall receive one counterpart.
- 11) This Contract shall enter into force upon a signature by both parties. This Contract shall enter into effect upon publication of the Contract pursuant to the Act No. 340/2015 Sb.
- 12) The Contracting Parties declare that they have read this Agreement, and that it was made after mutual negotiation using their free, serious, determinate and comprehensible will, not in distress or grossly disadvantageous conditions.

In Prague on

In Pforzheim on

Buyer:

prof.

RNDr. Jiří

Zima, CSc.

Zima, CSc.

Digitálně podepsal

prof. RNDr. Jiří

Zima, CSc.

Datum: 2019.11.29

11:04:27 +01'00'

Charles University, Faculty of Science

prof. RNDr. Jiří Zima, CSc., Dean of the faculty

Seller:

DITABIS AG

Ralf Mulflur

CEO

Absolute (minimum) technical requirements

The following table was provided by the tender documentation:

Absolute (minimum) technical requirements Server with high storage capacity			
	Name of the technical parameter including the required upper / lower limits	Met by the Supplier YES/NO	Possible specification of the offered product
1.	Application <ul style="list-style-type: none"> • Data recording from up to 13 microscopes guaranteed • Optimized CPU, GPU and RAM tested configuration according to requirements of listed software (SW will be supplied by the Contracting Authority): <ul style="list-style-type: none"> a. FIJI, ImageJ b. Zeiss ZEN black and blue c. Zeiss ZEN browser d. Leica LAS X e. NIS elements f. Olympus scanR analysis software g. ARIVIS software h. IMARIS software i. Matlab with image analysis bundles j. R statistical software k. SVI Huygens l. OMERO server (in virtual machine) m. other image analysis and processing software, at least 3 of this KNIME, CellProfiler, Vision4D, Vaa3D, Amira, Microvolution, ICY, CSBDeep n. hardware and software virtualization support o. other Python and JAVA based applications for scientific computation and AI 	YES	see Appendix 2 Part 1

	<ul style="list-style-type: none"> • Dongle server functionality for at least 10 USB hardware dongles. Could be separate HW connected to the server or network. • Permanent streaming and data saving of at least two sCMOS camera systems (2048x2048 pixel, full frame, 100 fps, cca 420MB per second) • 3D RDP functionality for ARIVIS and IMARIS 		
2.	Service and maintenance <ul style="list-style-type: none"> • System control software to display systems status in single software • Possibility to configure user authentication via Perun/CAS system • Limit user accounts in time (expire) • Limit user projects in time (expire) • E-Mail notification for creating users, projects and passwords • E-Mail notification in case of hardware errors, overheating, volume limitations • E-Mail notifications when project responsible person changed • On site installation • On site and remote support to connect local microscopes 	YES	Appendix 2 Part 2
3.	Technical <ul style="list-style-type: none"> • Easy and modular storage expansion from 10 TB to 1 PB • Designed for working in not air-conditioned rooms • Less than 35 Ws/TFLPOP (single precision) • Multi user server operating system preinstalled and configured for applications • Noise level according VDI Guideline 2058 suitable for Office Environments, ~50 db under heavy load 	YES	See Appendix 2 Part 3

	<ul style="list-style-type: none"> Size of all server modules / components together must not exceed 61x64x81 cm (width x depth x height) so it can easily fit under the office table. Total amount of RAM 1TB or more, DDR4-2666 or better min. 2xCPU with at least of 10 cores with base frequency min. 2,2 GHz, cache at least L3 13 MB/min. min. 2x graphic card with GPU with min. 3000 parallel processing cores, min. 384 Tensor cores, min. 48 RT cores, GPU memory min. 16 GB GDDR6 UPS uninterruptible power supply: <ul style="list-style-type: none"> capacity of min. 1500 VA / 1500 Watts output voltage: $220 \pm 5\%$ / $230 \pm 5\%$ / $240 \pm 5\%$ Battery Wave Form: Pure Sine Wave min. 10 outlets runtime at half load min. 18,6 minutes runtime at full load min. 6 minutes recharge time max. 3 hours. Active PFC Compatibility PS Topology: Line-interactive Networking module with at least 3 optical connectors for two streaming cameras and one outside network connection to the first router. It have to maintain at least 11 other 10 Gbit LAN connectors and one at least 1 Gbit connection for outside communication. It needs to be protected by HW firewall which can be optionally setup as router and DHCP server. <p>Specifications:</p> <ul style="list-style-type: none"> WAN port 2x GbE RJ-45 LAN port 4x GbE RJ-45 NAT Throughput 900 Mbps 		
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	<ul style="list-style-type: none"> • IPsec VPN performance 600 Mbps (AES 256 bits) • SSL VPN performance 90 Mbps • NAT sessions 80 000 • Max. concurrent VPN Tunnels 200 • Max. Concurrent OpenVPN+SSL VPN 50 • internet connection IPv4: PPPoE, DHCP, Static IP, PPTP/L2TP • internet connection IPv6: Link Local, Static PPP, DHCP IA NA, DHCP IA PD • Outbound load balancing: IP-based, Session-based • DHCP Server: Multiple IP Subnet, Custom DHCP Options, Bind-IP-to-MAC • Static routing: IPv4 Static Routing, IPv6 Static Routing, Inter-VLAN Routing • Dynamic Routing: RIPv2, OSPFv2, BGP • Policy-based Routing: Protocol, IP Address, Port, Domain, Country • High availability: Active-standby, Hot-standby • DNS Security (DNSSEC) • GVRP • Proxy: IGMP, LAN ARP, WAN ARP • SMB File Sharing support • NAT: Port Redirection, Open Ports, Port Triggering, DMZ Host, UpnP • ALG (Application Layer Gateway): SIP, RTSP, FTP, H.323 • VPN Pass-Through: PPTP, L2TP, Ipsec • IP-based Firewall Policy • Content Filtering: Application, URL, DNS Keyword, Web Features, Web Category, QQ Filter • DoS Attack Defense • VPN based Remote Access (VPN/RDP/VNC) 		
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	<ul style="list-style-type: none"> • OS and Filesystem optimized for handling data in typically sizes of 8 MB or 12 MB with at least 800 MB/s over network • Expandable up to 12 double sized GPUs • Hardware RAID 6 with up to 8 GB Cache (6 GB/s) in total volume at least 100 TB and at least one spare HDD for quick exchange on failure. • Hardware SSD RAID 5 in total volume at least of 10 TB serving for page file and temporal storage • IP67 certificated industrial Fans for long term duty to reach minimal noise level and operability in common office room temperature. • Additional PCIe optical LAN card for connection between server and computer which operates cameras on lightsheet microscope. 		
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Appendix 2

Detailed Technical Description

In this chapter you will find specific system specifications. We structure this to comply with the table “Absolute (minimum) technical requirements” from the tender documentation.

Part 1 Application

Amount of connections

The offered HIVE system is equipped with 13 free network ports. On each of these network ports a microscope control computer can be connected. Additional ports are available as an option.

Software optimization

The whole configuration (see 0 Technical) is optimized and tested for optimal performance of processing of imaging data. The following software packages are tested:

- FIJI, ImageJ
- Zeiss ZEN black and blue
- Zeiss ZEN browser
- Leica LAS X
- NIS elements
- Olympus scanR analysis software
- ARIVIS software
- IMARIS software
- Matlab with image analysis bundles
- R statistical software
- SVI Huygens
- OMERO server (in virtual machine)
- KNIME, CellProfiler, Vision4D, Vaa3D, Amira, Microvolution, ICY, CSBDeep
- other Python and JAVA based applications for scientific computation and AI

The system supports virtualization (via software and hardware).

USB Dongle Server

The system comes with a 20 port dongle server. The dongle server can be connected to the network and provides access to up to 20 USB dongles.

Data Streaming Performance

The offered configuration allows permanent streaming of 800 MB/s. This outperforms the required specification nearly by a factor of 2. The system can be upgraded to allow 1,6 GB/s of permanent streaming.

3D RDP

The system is equipped with a GPU that allows 3D RDP over the network.

Part 2 Service and Maintenance

Dashboard Software

The provided system management software gives an overview of the following health parameters:

- RAID 5 and RAID 6 status
- Fan status
- Temperature status
- UPS status

The dashboard provides additional user management functionality:

- Create / delete users
- Create / delete projects
- Limit users accounts and projects in time (refuse access after a given time, expire)
- Email functionality: inform relevant users on the following scenarios
 - Creating users, projects and passwords
 - Hardware errors, overheating or volume limitations
 - Notification on project assignments
 -

Perun / CAS

We provide support to integrate the system into the local Perun / CAS authentication systems.

Installation and support

The system will be installed by one of our service engineers. We integrate the system into the existing microscope environment and connect them to the system. We guarantee remote support for later integration.

Part 3 Technical

The complete HIVE system consists out of 3 major modules HIVE CORE, HIVE DATA and HIVE NET. Additional modules (especially HIVE DATA) can be added at any time. By this the system can e.g. be extended up to 1 PB.

General specifications for the whole system:

The system is designed to work in non-air-conditioned rooms and has a noise level of ~50 db under heavy computation load (in accordance with VDI Guideline 2058 suitable for Office Environments).

The fans for cooling are IP67 certified and selected for long term duty and minimum noise.

The HIVE system is environmentally friendly with a very low power consumption (35Ws/TFLOP, single precision float point operations). Windows Server 2019 is preinstalled and configured as a multi user system and optimized for the applications above (e.g. 3D RDP). Operating system and file system are optimized for handling data in typically sizes of 8 or 12 MB with at least 800 MB/s over network.

The size of the combination of HIVE CORE, HIVE DATA and HIVE NET is 609 x 631 x 81 mm.

HIVE CORE

The HIVE CORE has Windows 2019 Server as multi user operating system installed.

The HIVE CORE is the processing unit and has the following specifications:

- 2x XEON Silver 4114 (10 Core, 2.2GHz, 13.75 MB, Socket 3647)
- 1 TB RAM, DDR4-2666

- 2x NVIDIA Quadro RTX 5000, each has 3072 CUDA cores, 384 Tensor cores, 48 RT cores, 16 GB GDDR6
- Extendable to up to 12 doubled sized GPUs with HIVE GPU module
- 10 TB SSD RAID 5 storage as temporary storage (hardware RAID)
- 2x 10 Gbit RJ45 ethernet copper to connect to HIVE NET
- VPN based remote access for RDP, SMB or VNC
- Additional optical LAN connection for SFP+ (optical fiber connection to connect to light sheet microscopes)

HIVE DATA 104 TB

The HIVE DATA is the storage unit and has the following specifications:

- Hardware RAID 6
- 104 TB (15x8 GB disks, 2 disks redundancy)
- 1x 8 GB spare disk
- 8 GB Cache (6 GB/s)
- Modular and easy extendible (up to 1 PB)

HIVE NET

The HIVE NET is the networking and power unit and provides the following features:

- VPN based remote access for RDP, SMB or VNC
- Uninterruptible power supply (UPS):
 - capacity 1500 VA, 1500 Watts (according to manufacturer)
 - output voltage: $220 \pm 5\%$, $230 \pm 5\%$, $240 \pm 5\%$
 - wave form: pure sine wave
 - 10 outlets (5 critical, 5 non-critical)
 - runtime at half load: 18,6 minutes
 - runtime at full load: 6 minutes
 - recharge time: 3 hours
 - Active PFC compatibility : YES
 - UPS Topology: Line-interactive
- Hardware firewall and router / DHCP server with the following specifications:
 - 2x 1 Gbit RJ-45 for WAN (outside communication)
 - 4x 1 Gbit RJ45 for LAN (inside communication)
 - 13 free 10 Gbit RJ45 LAN (inside communication) (2 optical SFP+ possible, then only 11 RJ-45 are useable)
 - 3rd and 4th optical connector in HIVE CORE module

- NAT throughput 900 Mbps
- IPsec VPN performance 600 Mbps (AES 256 bits)
- SSL VPN performance 90 Mbps
- NAT sessions: 80 000
- concurrent VPN Tunnels: 200
- concurrent OpenVPN+SSL VPN: 50
- internet connection IPv4: PPPoE, DHCP, static IP, PPTP/L2TP
- internet connection IPv6: Link Local, static PPP, DHCP IA NA, DHCP IA PD
- outbound load balancing: IP-based, session-based
- DHCP Server: multiple IP subnet, custom DHCP options, bind-IP-to-MAC
- static routing: IPv4 static routing, IPv6 static routing, inter-VLAN routing
- dynamic routing: RIPv2, OSPFv2, BGP
- policy-based routing: protocol, IP address, port, domain, country
- high availability: active standby, hot standby
- DNS security: DNSSEC
- GVRP
- proxy: IGMP, LAN ARP, WAN ARP
- SMB file sharing support
- NAT: port redirection, open ports, port triggering, DMZ host, UPnP
- ALG (application layer gateway): SIP, RTSP, FTP, H.323
- VPN pass through: PPTP, L2TP, IPsec
- IP based firewall policy
- content filtering: application, URL, DNS keyword, web features, web category, QQ filter
- DoS attack defense