**AmMendment No 1**

**to Purchase contract**

concluded on October 24th 2019, Client No S19/207E, on the delivery of large optomechanical mounts for L4 compressor, by and between:

1. **Institute of Physics of the Academy of Sciences of the Czech Republic, public research institution**

with its registered office at: Na Slovance 2, Praha 8, PSČ: 182 21

registration No.: 68378271

registered in the Registry of public research institutions kept by the Ministry of education, youth and sports

represented by: RNDr. Michael Prouza, PhD. – director

(“**Client**”), and

1. **DELONG INSTRUMENTS a.s.**

with its registered office at: Palackého třída 3019/153b, Královo Pole, 612 00 Brno

registration No.: 46903879

registered in the commercial register kept by Regional court Brno, section B, file 3738

represented by: Ing. Tomáš Papírek, member of the board

(“**Supplier**”),

(hereinafter the “**Amendment**”, the “**Contract**” and the Client and the Supplier jointly as the “**Parties**” and individually as a “**Party**”).

# modifications of the contract

## The Supplier shall under the terms and conditions hereof carry out extra works and deliver additional supplies as stipulated in Annex No 1 hereto (hereinafter the “**Extra Works**”).

## The terms and conditions of the Contract that apply on the Object of Purchase similarly apply also on execution of the Extra Works and their results (but excluding penalties under Art. 13 of the Contract).

The Extra Works shall be carried out by the Supplier within deadlines stipulated in the amended Summary of Deliverables, Time Schedule and Payments attached hereto as Annex No 2.

## The price of the Extra Works excluding VAT is **1 897 100 CZK** (hereinafter the “**Extra Costs**”). Extra Costs shall be provided to the Supplier in line with the amended Summary of Deliverables, Time Schedule and Payments attached hereto as Annex No 2.

## The terms/ deadlines for completion of the Deliverables D3 – D6 of the Contract and of the Option 1 are hereby modified as shown in the amended Summary of Deliverables, Time Schedule and Payments attached hereto as Annex No 2. The amended Summary of Deliverables, Time Schedule and Payments attached hereto as Annex No 2 replaces the Summary of Deliverables, Time Schedule and Payments in the Annex No 1 of the Contract.

# FINAl PROVISIONS

## The following annexes form integral part of this amendment:

1. Extra Works description

2. Amended Summary of Deliverables, Time Schedule and Payments

## This Amendment becomes valid on the date of its signature by the authorized representatives of the Parties.

## All expressions used herein starting with a capital letter shall have the same meaning as defined here or in the Contract. All terms and conditions of the Contract untouched by this Amendment remain valid.

## This Amendment was made out in electronic form only.

## By attaching their signature hereto, the Parties express their consent with the content hereof in its entirety.

**in witness whereof** attach Parties their signatures:

**Client**

Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Name: RNDr. Michael Prouza, PhD

Position: Director

**Supplier**

Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Name: Ing. Tomáš Papírek

Position: Member of the board

**Annex 1 – Extra Works description**

The subject of the Extra Works is the manufacture of small optomechanical mounts which will support and accurately position optical elements serving for alignment of the compressor diffraction gratings. These small optomechanical mounts include (the mount’s numbers refer to the corresponding diffraction grating; gratings 2 and 3 comprising a phased mirror require specific phasing alignment devices):

APA (Alignment Prism Assembly): APA1, APA2, APA3, APA4

PMM (Phasing Mirror Mount) PMM2, PMM3

PFM (Phasing Flat Mount) PFM2, PFM3

The Supplier is specifically required to:

A. Develop final production design of eight small optomechanical mounts APA1, APA2, APA3, APA4, PMM2, PMM3, PFM2 and PFM3, based on the detailed conceptual design provided by the Contractual Authority (CA).

B. Manufacture of the optomechanical mounts APA1, APA2, APA3, APA4, PMM2, PMM3, PFM2 and PFM3. The piezo actuators including built-in position encoders and stepper actuators for vertical translation will be provided by CA.

C. Design and supply of all vacuum cabling and of the vacuum connector arrays, according to the conceptual scheme developed by CA, design and supply of vacuum cable management, and design of the vacuum feedthroughs and flanges for all electrical components of the supplied mounts, plus cabling for other compressor small mounts ABI, PHM and TDM according to the scheme provided by CA. The vacuum cabling and its shielding must be of the same type as that employed for the optomechanical mounts OM7, OM8, OM9, SPM1 and OOM1.

D. Final cleaning for ISO5 cleanliness environment, assembly and functional testing of each optomechanical mount, at the supplier’s works.

E. Packaging (compatible with ISO5 cleanliness environment) for transport and delivery of all the mounts to the ELI-Beamlines facility.

The supply of the mirrors and other optical components is not part of the scope of supply.

Placement of the individual small mounts on the L4 compressor chassis is indicated in Figure 1.

 

**Figure 1**: Location of the APA1, APA2, APA3, APA4, PMM2, PMM3, PFM2 and PFM3 alignment mounts on the south (left) and north (right) L4 10 PW compressor chassis.

Table 1 provides a summary of functional requirements for all the required mounts.

Table : Required parameters of small optomechanical mounts for L4 compressor alignment

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Alignment mount** | **Range** | **Resolution 1** | **Accuracy 2** | **Actuator type** |
| **APA** |  |  |  |  |
| Prism 1 roll | 180° | 0.1 µrad | 1 µrad. | Piezo |
| Prism 2 roll | 180° | 0.1 µrad | 1 µrad | Piezo |
| Yaw rotation assembly | ±1° | 0.5 µrad | N.A. | Piezo |
| Pitch assembly | ±0.5° | 1 µrad | N.A. | Piezo |
| Roll assembly | ±0.5° | 1 µrad | N.A. | Piezo |
| Horizontal translation | 100 mm | 10 µm | 20 µm | Piezo |
| Vertical (APA1 and 4) or oblique  (APA2 and 3) translation / insertion | 250 mm | 5 µm | 10 µm | Stepper+ encoder |
| **PMM** |  |  |  |  |
| Yaw | ±0.5° | 1 µrad | 2 µrad | Piezo |
| Pitch Assembly | ±0.5° | 1 µrad | 2 µrad | Piezo |
| Horizontal translation | 100 mm | 5 µm | 10 µm | Piezo |
| **PFM** |  |  |  |  |
| Yaw | ±0.5° | 1 µrad | 2 µrad | Piezo |
| Pitch | ±0.5° | 1 µrad | 2 µrad | Piezo |

*1 One incremental step of motorized actuator without microstepping; one graduation of fine adjustment scale for micrometric screw*

*2 Absolute position knowledge by encoder readout, bidirectional repeatability for motions without encoder*

**Yaw**: rotation around the vertical axis

**Pitch**: rotation around the horizontal axis parallel to the mirror surface

**Roll**: rotation around the horizontal axis perpendicular to the mirror surface

Figure 2 and Figure 3 show the top-level architecture of the motion control system of the alignment mounts and detailed wiring diagram for the piezo actuators.

Drawings with the conceptual design of mounts APA1/2/3/4, PMM2/3 and PFM 2/3 are in Figure 4, Figure 5, and Figure 6.

[obrázky 2 až 6 vypuštěny]

**Annex 2 - Amended Summary of Deliverables, Time Schedule and Payments**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Deliverable** | **Description** | **Completion** | | **Payment** |
| **Original date** | **Modified date** |
|  | Commencement day (CD) = Contract signature + 7 calendar days | 1. 11. 2019 | - |  |
| D1 | Detailed schedule of project activities and all corresponding Quality and Verification Plans, and of work procedures | 1 month from CD  1. 12. 2019 | completed | 10% |
| D2 | Detailed engineering design and resonance frequency analysis of OM7, OM7.5, OM8, OM9 and SPM1, detailed design of the motion control system (MCTR) | 3 months from CD  1. 2. 2020 | completed | 30% |
| D3 | Manufacture, assembly and factory testing of OM7, OM8 OM9 and SPM1, assembling and factory testing of the motion control system (MCTR) | 8 months from CD  1. 7. 2020 | 10.5 months from CD  16. 9. 2020 | 20% |
| Detailed engineering design and resonance frequency analysis of OOM1 |
| D4 | Delivery of OM7, OM8, OM9 and SPM1 to ELI-Beamlines, delivery and installation of the motion control system (MCTR) at ELI-Beamlines | 9 months from CD 1. 8. 2020 | 11.5 months from CD  16. 10. 2020 | 10% |
| D5 | Manufacture, assembly and factory testing of OOM1 | 12 months from CD  1. 11. 2020 | 14.5 months from CD  16. 1. 2021 | 20% |
| Manufacture, assembly and factory testing of small optomechanical mounts of Annex 1 | - | 50% Extra Costs |
| D6 | Delivery of OOM1 to ELI-Beamlines | 14 months from CD  1. 1. 2021 | 16.5 months from CD  16. 3. 2021 | 10% |
| Delivery to ELI-Beamlines of small optomechanical mounts of Annex 1 | - | 50% Extra Costs |
|  |  |  |  |  |
| Option 1 | Manufacture, assembly and factory testing of OM7.5, delivery of OM7.5 to ELI-Beamlines | 6 months from activation  6. 8. 2020 | 8.5 months from activation  21. 10. 2020 | Price of the Option |