PRODEX OFFICE

Noordwijk, 1 July 2020

Mr. Lukáš Steiger
Institute of Plasma Physics AS CR, v.v.i.
Dept. Centre TOPTEC
Za Slovankou 1782/3
182 00 Praha 8
Czech Republic

Exchange of Letters - PRODEX Experiment Arrangement.

Dear Sir,

With reference to the Institute Agreement signed by ESA on 6 September 2013 and by the Institute on 17 September 2013 we hereby send you the conditions of the PRODEX Experiment Arrangement between ESA and your Institute:

IPP AS CR
Phone: +420487953901
Email: steiger@ipp.cas.cz

related to C4000131428 “Manufacturing and testing of the ARIEL optical and opto-mechanical common optics”. The ESA representative for all administrative and contractual matters is Ms V. Dowson and for technical/scientific matters it is Mr Jean-Philippe Halain.

The total price of the present arrangement amounts to € 1,445,717 euro. All invoices should mention the European standard “IBAN” and “BIC” as bank account identifiers; failing to do so will block the settlement of the payment.

The term of the project shall be the time period 4 January 2021 through 31 March 2025.

I would appreciate if you could sign and approve the present letters and return one original to me at your earliest convenience.

I am looking forward to a fruitful co-operation,

Sincerely Yours,

VD

M. Lazerges
Head of the PRODEX Office

Michel Lazerges Digitally signed by Michel Lazerges
Date: 2020.07.15 15:35:21 +02'00'

Received, accepted and signed by Institute: Place / date:

……..

PRODEX EXPERIMENT ARRANGEMENT

ARTICLE 1: DEFINITIONS - PURPOSE OF THE ARRANGEMENT - APPENDICES

1 Throughout the present Arrangement, the terms laid down in the left column shall have the meaning set out opposite:

"Funds":	Maximum budget for the present Arrangement, as defined in Article 2
"Project":	Institute's project specified in Appendix 1, certified by the Agency's PRODEX Office as eligible for financial support according to the Financial Plan (Appendix 2) approved by the relevant Participating State
"Costs":	Allowable cost of these categories, incurred by the Institute in execution of the Project: - Labour cost - Operational costs as defined in Appendix 2 - Travel expenses - ….

2 By entering into the PRODEX Experiment Arrangement, hereinafter referred to as Arrangement or P.E.A., the Agency undertakes to reimburse the Institute certain costs incurred in the execution of the Project. The purpose of this arrangement is the detailed implementation of the said undertaking.

Any other arrangement or agreement by which the Institute undertakes to carry out the Project remains unaffected by the present arrangement, save that the Agency acquires hereunder the rights to access, to audit, and to obtain certain licenses in intellectual property rights; details are specified in Article 4.

3 The Institute may claim the Funds subject to the provisions set forth in Articles 2 through 4 below.

4 The Institute shall utilise the Funds and any part thereof exclusively for defraying, in due time, the Cost incurred during the term of the Project defined in Article 3.1 below.

5 Appendix 1 (Work Description) and Appendix 2 (Financial Plan) address the programme of work, schedule, deliverables and financial plan of the Project.

Appendix 1, Appendix 2 and Appendix 3 (PRODEX Experiment Arrangement Change Notice) shall form an integral part of this Arrangement.

ARTICLE 2: FUNDS AND PAYMENT

2.1 Funds

1. The Funds available for the present Arrangement amount to …….. (see cover letter).

2. The above amount is stated to be a limit of liability in the sense defined in sections 4 and 5 of Annex II to the ESA "General Conditions", referred to in Article 4.

3. The above amount excludes profit for the Institute (not allowed) and value added tax on the costs charged to the Agency (so far as the Agency is exempted from VAT applied by the Agency's Member States).

4. The above amount is broken down into subtotals per cost category and/or per year as specified in Appendix 2 hereto.

2.2 Payments

1. Payments shall be made by the Agency in EURO to the account specified by the Institute. Such account information shall clearly indicate the IBAN (International Bank Account Number) and BIC/SWIFT (Bank Identification Code).

2. The Institute undertakes to provide further supporting documentation as required by the Contract, together with the electronic invoices and confirmations supporting the claims.

3. Any special charges related to the execution of payments will be borne by the Institute.

4. The Institute shall ensure that all invoices and confirmations are submitted for payment exclusively through the Agency's ESA-P system.

5. The Institute undertakes to adhere strictly to the instructions contained in ESA-P (including those for billing taxes and duties, where applicable) when submitting invoices and confirmations through the ESA-P system.

6. The Agency reserves the right to visit the Institute's premises and ascertain the progress of the work being performed under the Contract, prior to making the payment concerned.

7. ESA-P Information can be found at http://esa-p-help.sso.esa.int/. Any questions concerning the operation or operating status of ESA-P shall be addressed to the ESA Helpdesk (esait.service.desk@esa.int). Any questions concerning the latest status of due invoices can be addressed to the ESA Payment Officer (esa.payment.officer@esa.int).

ARTICLE 3: TERM OF THE PROJECT

1. Term of the Project shall be the time period stated in the cover letter.

2. Cost incurred outside said term shall not entitle the Institute any payment under this Arrangement.

ARTICLE 4: OTHER CONDITIONS

The ESA "General Conditions" (General Clauses and Conditions to ESA Contracts-GCCs), available from emits.esa.int, shall apply, with the amendments or replacements set forth in the **Articles** of the Arrangement. The applicable General Conditions shall be construed and interpreted with due regard to the specific nature of this Arrangement and its Article 1 in particular. The Institute signatory of the Arrangement (P.E.A.) shall be deemed the "Contractor" wherever mentioned in those General Conditions and in the rest of this document.

CLAUSE 1: APPLICABILITY OF CLAUSES AND CONDITIONS

The present General Clauses and Conditions to ESA Contracts (GCC) shall apply to Contracts placed by the Agency insofar as not stated otherwise in the relevant Contract. Furthermore, specific clauses and conditions may be set out or invoked in a Contract and its annexes and/or appendices. The annexes and/or appendices form an integral part of the Contract. **PART 1 of GCC is applicable with the following amendments.**

CLAUSE 2: APPROVAL AND ENTRY INTO FORCE

Offers and acceptances with regard to arrangements are not binding on the Agency unless approved in writing by its Director General or his authorised representative. For the purpose of this arrangement the authorised representative of the Agency's Director General is:

Dr. M. Lazerges,
Head of the PRODEX Office.
He is authorised by the Agency to sign the present arrangement on his behalf.

CLAUSE 5: THE PARTIES REPRESENTATIVES

The Agency shall have the right to check the performance of the Project, and for this purpose, the Agency nominates its representatives identified here below.

The Institute shall in this respect and in accordance with any relevant security regulations, give the representatives of the Agency access to its premises and shall give all other necessary assistance in order that they may fulfil their task.

All correspondence for either party shall be sent to the address and the representative in charge identified herein below, with a copy to the other representative(s) where any mixed nature of the matter so requires:

For the Agency to:	For the Institute to:
ESTEC P.O. Box 299 NL-2200 AG Noordwijk	The Institute's representative(s) is (are) as stated in the cover letter.
See cover letter.	See cover letter.

CLAUSE 17: N/A.

CLAUSE 28: PAYMENT

28.1 The following is added to clause 28.1 of the GCCs.
Within the limits specified in Article 2, the Institute may claim in arrears payment of the Cost incurred. The Agency shall effect such payment after receipt of the respective invoice, which must identify the cost category/ies concerned and bear a statement by the Institute's financial controller that the invoiced costs are fair and reasonable, do not include profit and have been incurred exclusively in execution of the Project as defined in Article 1 and during the term specified in Article 3.
Any payment which is not the final payment of the contract is called "progress payment".

28.3 N/A

28.4.1 N/A

CLAUSE 30: (TERMINATION) GENERAL RULE

The following is added to clause 30, before the text in the GCC.

Notwithstanding any other provision of this Arrangement, the Agency shall have the right to terminate a Contract either wholly or in part by giving written notice by registered mail. This may include the case where the Participating State representatives having approved Appendix 2 demand the termination of the activities in writing.

CLAUSE 33: TERMINATION IN SPECIAL CASES

The following is added to clause 33, before 33.1

Notwithstanding any other provision of this Arrangement, the Agency may:

i) Cease to effect any payments not already fallen due under this arrangement in case of unsatisfactory progress within the Project, provided the Participating State representatives having approved Appendix 2 demand cessation of payments in writing;

ii) Cease to effect any payments in any of the following cases:
- a situation as per Clause 33.1 lit. a) of the General Conditions occurs;
- a situation as specified in Paragraph iv) below occurs.

iii) The Agency may require the Institute to return to the Agency payments effected under this arrangement if and to the extent an audit carried out by the Agency or by the relevant national audit authority reveals any incorrectness of invoices or unauthorised use of Funds.

iv) The Agency may require the Institute to return to the Agency all payments effected under this arrangement in case a situation as per Clause 33.1 lit. b) of the General Conditions occurs.

CLAUSE 34: APPLICABLE LAW

The arrangement shall be governed by the laws of the country of residence of the Institute.

CLAUSE 35: DISPUTE RESOLUTION

The arbitration proceedings referred to in Clause 35.2 shall take place in the capital city of the country of residence of the Institute.

PART II OPTION A of the GCC is applicable with the following amendments:

CLAUSE 37.1: Deliverables are identified in the specific section of Appendix 1 (Deliverables).

CLAUSE 39: Clause 39.2 lit. a) is not applicable.

CLAUSE 40: Clauses 40.4 to 40.6 are not applicable.

CLAUSE 41: Cancelled and replaced by the following.

CLAUSE 41: USE OF INTELLECTUAL PROPERTY RIGHTS

Use/Licensing

41.1 All Intellectual Property Rights arising from work performed under the Agency Contract shall be available to:

a) The Agency to use on a free, worldwide licence for the Agency's Own Requirements (such licence to be granted by the Contractor as set out in the standard licence which the licensee shall be entered into if required);

b) Participating States and Persons and Bodies to use on Financial Conditions for the Agency's Own Requirements (such licence to be granted by the Contractor as set out in the standard licence which the licensee shall enter into if required);

c) Any Third Party on Market Conditions to use for purposes other than the Agency's Own Requirements providing the Contractor agrees such use is not contrary to its Legitimate Commercial Interests.

41.2 For the avoidance of doubt the term "use" for the purposes of software includes use to operate, integrate, validate, maintain and modify software developed under the Agency Contract.

41.3 Where the Contractor relies on its Legitimate Commercial Interests, unless specified in the Contract it shall demonstrate those interests continue to apply every 3 years or within any other timeframe specified in the Contract.

CLAUSE 45: N/A unless specified in Appendix 1 under "Evaluation of Technology".

CLAUSE 46: Fees – cancelled. Replaced by the following.

"The Contractor shall not be required to pay a fee to the Agency if it sells a product, application, or result developed under the Agency Contract or if it licenses or assigns Intellectual Property Rights arising from work performed under the Agency Contract".

CLAUSE 47.9: N/A

Personal Data "Controller to Controller" Annex (the "PDCC") of the European Space Agency ("ESA" or the "Agency")

This "Controller to Controller" Annex governs the processing of Personal Data exchanged by the Parties, acting as separate Controllers, in the frame of the Contract. Such Annex forms an integral part of the Contract. In case of conflict between the terms and conditions of the Contract and the terms and conditions of this Annex, the terms and conditions of this Annex shall prevail.
This Annex survives the expiration or termination of the Contract for as long as the Personal Data are protected by the Data Privacy Regulations.

1. DEFINITIONS

The following specific definitions apply:

(i) "Agreed Territory" (of Processing) means:
- a) ESA Member States, as they are listed in the ESA website at URL: http://www.esa.int/About_Us/Welcome_to_ESA/New_Member_States;
- b) European Union;
- c) countries recognized by the European Commission as ensuring an Adequate Level of Protection of Personal Data under the European Union's legal framework.

(ii) "Data Privacy Regulations" means respectively:
- a) ESA PDP Framework, i.e. the Personal Data Protection Framework applicable to ESA and available on ESA website at URL: http://www.esa.int/About_Us/Law_at_ESA/Highlights_of_ESA_rules_and_regulations
- b) the Personal Data protection laws and regulations applicable to the Contractor in the Agreed Territory of Processing which provide an Adequate Level of Protection under the ESA PDP Framework (e.g EU Regulations in the field of personal data protection, including but not limited to Regulation (EU) nr. 2016/679).

(iii) "Personnel" means:
- a) with respect to the Contractor: any employee, agent or representative acting under the responsibility of the Contractor or, if subcontracting is permitted, of Contractor's subcontractors;
- b) with respect to ESA: any employee, agent or representative acting under the responsibility of ESA (e.g. staff members and seconded agents, consultants experts or employees of third parties).

With respect to terms used with capitals in this Annex (e.g. "Controller", "Personal Data" etc.) but not defined above, reference is made to the definitions set forth in the Data Privacy Regulations applicable according to Article 2 below.

2. GENERAL

2.1 Each Party is individually and separately responsible for complying with the level of protection resulting from its Data Privacy Regulations in relation to Personal Data, being recognised that:

a) the Contractor is governed by the Personal Data protection laws and regulations applicable to the Contractor in the Agreed Territory of Processing, which provide an Adequate Level of Protection

under the ESA PDP Framework (e.g. EU Regulations in the field of personal data protection, including but not limited to Regulation (EU) nr. 2016/679).

b) ESA is governed by PDP Framework, i.e. the Personal Data Protection Framework applicable to ESA and available on ESA website at the URL: http://www.esa.int/About_Us/Law_at_ESA/Highlights_of_ESA_rules_and_regulations

2.2. The Parties are considered separate Data Controllers of the Personal Data, with each Party being able to determine the purpose and means of Processing the Personal Data under its control in accordance with its privacy statement.

2.3 The Personal Data exchanged by the Parties in the frame of this Contract will only be processed for:

a) the performance of the Contract, including implementation, management, monitoring, audits and the fulfilment of the obligations set out in this Annex;
b) the management of the relationship of the Parties in relation to the Contract, notably for administrative, financial, audit or for communication purposes;
c) the compliance with any legal or regulatory obligation to which a Party is subject;
d) the compliance, in case the performance of the Contract requires access to the Parties' premises, with the health, safety and security requirements, legal or regulatory obligations applicable to the respective Party in such matters.

3. PERSONAL DATA EXCHANGED BY THE PARTIES

In the performance of this Contract each Party may disclose to the other Party data which may qualify as "Personal Data" under its Data Privacy Regulations as follows:

a) the Agency shall communicate to the Contractor only the Personal Data concerning ESA representatives/contact persons including name, work address, email and telephone numbers;
b) the Contractor shall communicate to the Agency only:
   (i) Personal Data concerning the Contractor's representatives/contact persons including name, work address, email and telephone numbers;
   (ii) Personal Data concerning the Contractor's key Personnel, including title, name, work address, email, telephone numbers, education, professional experience, description of the person's job and responsibilities and the precise assignment of the person to the activity under the Contract.

4. PARTY'S OBLIGATIONS

4.1 Each Party is individually and separately responsible for complying with the level of protection resulting from its Data Privacy Regulations in relation to Personal Data, including the collection and update of the Personal Data that it communicates to the other Party, the lawfulness and the quality of such Personal Data and for the means by which they were collected. Should the legal basis for the collection of the Personal Data cease to exist or the quality of the Personal Data be affected, the Party will inform the other Party without undue delay.

4.2 The Parties shall preserve the rights and legal remedies of the Data Subject as recognised and protected in the Data Privacy Regulations applicable respectively to each Party. In particular, the Data Controller which disclosed the Personal Data to the other Party will respond to enquiries from Data Subjects and, as the case may be, from any competent authority concerning the data processing of the relevant Personal Data.

4.3 In case the Parties engage Processors to support their internal operations, including the Processing of the Personal Data exchanged, it is the responsibility of that Party to ensure that its Processors assume obligations consistent with the Data Privacy Regulations applicable to the respective Party, in order to guarantee an adequate level of protection of Personal Data.

4.4 The Party having received the other Party's Personal Data under the Contract shall Process such Personal Data only in the Agreed Territory of Processing.

5. DATA RETENTION

5.1 The Parties shall not retain or process the Personal Data exchanged longer than is necessary to carry out the purpose described in Article 2.3 herein, unless required otherwise:

a) under the Data Privacy Regulations, (e.g. in the frame of audits, inspections and incidents) or
b) under the Party's statutory obligations.

5.2 The retention period shall be defined in the privacy notices of the Parties.

5.3 All Personal Data must be, effectively destroyed/deleted upon expiration of the retention period, unless conservation of such data is required for compliance with any legal or regulatory obligation to which the Party having received the Personal Data from the other Party is subject.

6. CONFIDENTIALITY

The Parties shall ensure the confidentiality of the Personal Data processed by protecting them against unauthorized or unlawful access, acquisition, use and disclosure, in particular by:

a) limiting access to the Personal Data of the other Party only to their Personnel, that:
   - are required or authorized to access such Personal Data;
   - have committed themselves to confidentiality or are under a statutory obligation of confidentiality;
   - have received the appropriate Personal Data protection training.
b) taking into consideration, in terms of IT tools, product, applications, the principles of personal data protection by design and by default.

7. SECURITY

The Parties shall adopt appropriate technical and organisational security measures, giving due regard to the risks inherent in the Processing and to the nature, scope, context and purpose of the Processing, in order to ensure the following as appropriate:

a) the on-going confidentiality, integrity, availability and resilience of Processing systems and services;
b) measures to protect Personal Data from accidental, unlawful or unauthorized access, use, destruction, loss, modification or transfer.

8. DATA PROTECTION OFFICER/CONTACT POINT

For any Personal Data protection matters, the Parties shall involve their specific contact points identified in the Contract.

9. TRANSFER

The Party having received the other Party's Personal Data under the Contract shall Process (and have processed by its authorised subcontractors or sub-processors) such Personal Data only in the Agreed Territory of Processing. No transfer of Personal Data outside the Agreed Territory is allowed without prior written approval of the other Party.

10. SUB-CONTRACTORS

10.1 The Contractor is authorised to disclose Personal Data received from the Agency to its Sub-contractors provided that:

a) sub-contracting is specifically authorised by Contract and the Sub-contractors are indicated in the Contract;
b) all the general conditions set forth in this Annex are fulfilled; in particular the Processing of the Personal Data by the Sub-contractors is performed for the purpose described in Article 2.3 herein and the Personal Data are not transferred outside the Agreed Territory.

10.2 Disclosure of the Agency's Personal Data to other third Parties requires prior approval of the Agency.

11. PERSONAL DATA BREACHES

11.1 After becoming aware of a Personal Data Protection Breach falling in its area of responsibility, and affecting the Personal Data communicated by the other Party, the Party shall notify the other Party within 48 hours.

11.2 The Parties will provide each other reasonable assistance to facilitate the handling of the Personal Data Breach and accurate information about the breach, in particular (but not only) in case a complaint is, or likely to be, lodged by a Data Subject in relation to the Breach.

12. LAW – DISPUTE RESOLUTION

Concerning Personal Data protection matters, notwithstanding any other provisions on the governing law set forth elsewhere in the Contract, the provisions set forth in the Data Privacy Regulations, as defined herein, will apply as mentioned in Article 2 herein and will prevail in case of conflict. Without prejudice to the foregoing, disputes between the Parties on Personal Data protection matters shall be settled in accordance with Clause 35 of the Contract.

Appendix 1

PRODEX Experiment Arrangement

Guidelines for the preparation of Appendix 1 (Work Description) and Appendix 2 (Financial Plan)

Part I – Appendix 1

1. Work Description

The Work Description shall identify the Project, i.e. the work in execution of which reimbursable cost will be incurred by the Institute during the term of the Arrangement.
Length: One page should be sufficient but in no way be regarded as a firm limit.

2. Distinctions as to 'who' and 'when'

The work to be carried out by the Institute and to be paid for by ESA under the PRODEX Experiment Arrangement (the Project) is to be clearly separated from the work to be carried out by other parties (if the latter is mentioned at all).
The work to be carried out during the term specified in the PRODEX Experiment Arrangement must be clearly separated from the work planned outside said term (if the latter is mentioned at all).

3. Compatibility with other Applicable Documents

Subject to sections 1) and 2) above, the Work Description must correspond to the work description submitted to the relevant national authority in support of the Financial Plan, and is covered by the Institute Agreement.

4. Conventions

- In this contract, the term “Contractor” means the Institute or University signatory of the present PRODEX Experiment Arrangement (PEA) or its Change Notices (CN)
- The present PRODEX Experiment Arrangement is here after designated as “the Contract”
- The term “Project” means the activity covered by the Contract.

Part II – Appendix 2

1. Content

The Financial Plan's minimum content will encompass:

a) Title of the Project and identification of the Institute
b) Cost categories such as:
   - Salaries [please specify employee(s) name(s)]
   - Travel
   - Miscellaneous
   - Overheads: Please note that for Belgium, overheads can only be charged for a **maximum of 5%.**
   - Equipment purchased directly by Institute/University
   - etc.
c) Amounts: all figures should be mentioned in Euro and should be exclusive of VAT in the Agency's Member States.
d) Project Term (Project time periods).

2. Procurement of VAT exempt equipment, services, or other items

This category should not be integrated into the Financial Plan, but should be listed separately, e.g. in table 2 of Appendix 2, clearly separated from the Financial Plan (i.e. Table 1 of Appendix 2 and its exhibits). The procurements listed in Table 2 of Appendix 2 can be established via the PRODEX Office by means of a Purchase Order placed by the Agency, or by equivalent means (for purchases above 5 000 Euro). This approach has the advantage of ensuring that the goods or services purchased for the purpose of the Project are exempt from VAT.

Appendix 1

Work Description

Manufacturing and testing of the ARIEL optical and opto-mechanical common optics

1. PROJECT DESCRIPTION

1.1. General description – Objectives of the project

The ARIEL Instrument will observe a large number (~1000) of transiting planets, including gas giants, Neptunes, super-Earths and Earth-sized planets around a range of host star types using transit spectroscopy in the 1.25-7.8 μm spectral range and multiple narrow-band photometry in the optical range of spectra.

Czech Republic is a part of the Ariel consortium since phase B1 kick-off. Namely, the country is represented by Dr. Martin Ferus (J. Heyrovsky Institute of Physical Chemistry, i.e. UFCH JH), the Co-PI board of the consortium and PI of this project.

The technical role of the applicant is the realisation and coordination of manufacturing of three common optics mirrors M5, M6 and M7 for the Ariel satellite; furthermore, the mirror and dichroic filters support construction design, fabrication and tests.
All the parts of the Instrument must tested in working conditions, where the Instrument will operate at cryogenic temperatures. For this reason, the second part of the project is design and realization of a cryogenic testing chamber for testing at 77 K. Final testing, carried out at 40 K, might be performed (upon request) by other institution, that is specialized in testing in such specific environment.

1.2. Hardware Description

The telescope is a Cassegrain design (parabolic primary M1 mirror and hyperbolic secondary M2 mirror) with a third mirror M3 used to re-collimate the beam. A fourth mirror M4 directs the collimated beam onto the optical bench. Figure 1 shows the telescope optical layout also including the first common optics mirror, M5. M4 is positioned to put the output collimated beam, 275 mm from the optical surface of the primary mirror. After the Cassegrain focus, the beam is re-collimated by M3. The baseline design results in a recollimated beam of size 20 mm x 13.3 mm, which is directed onto mirror M4, used to direct the beam onto the optical bench. Figure 4.3 shows the telescope and common optics. Figure 2 shows the common optics viewed in the plane of the optical bench. The optical bench is positioned so that the chief ray at the centre of the field is at 40 mm height from the optical bench.

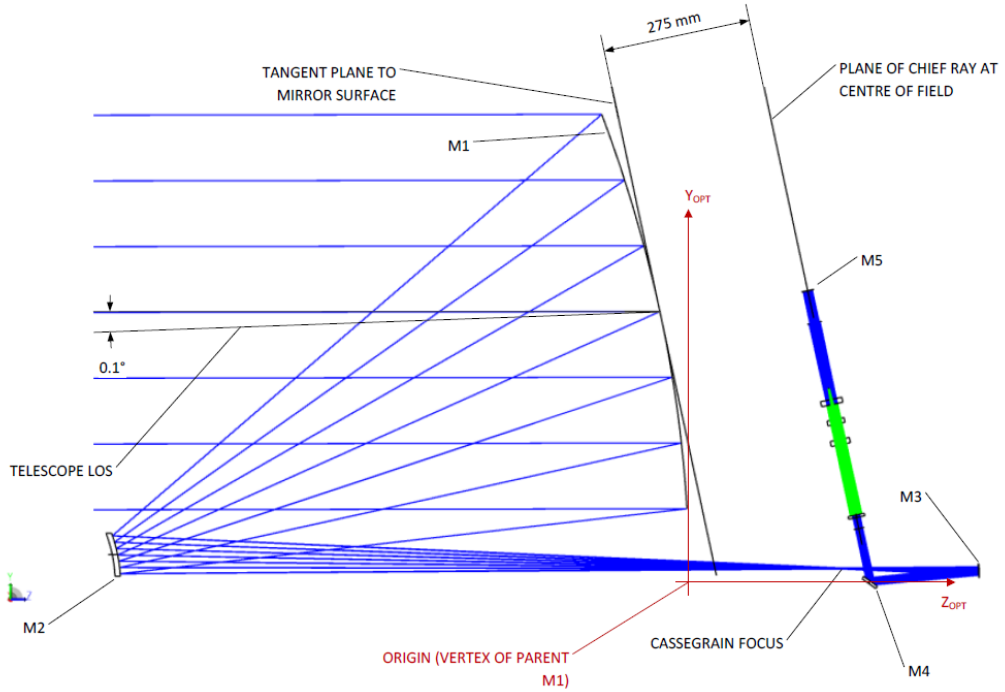

Figure 1: Drawing of the telescope – view in YOPT-ZOPT plane. The 0.1° offset is exaggerated for clarity.

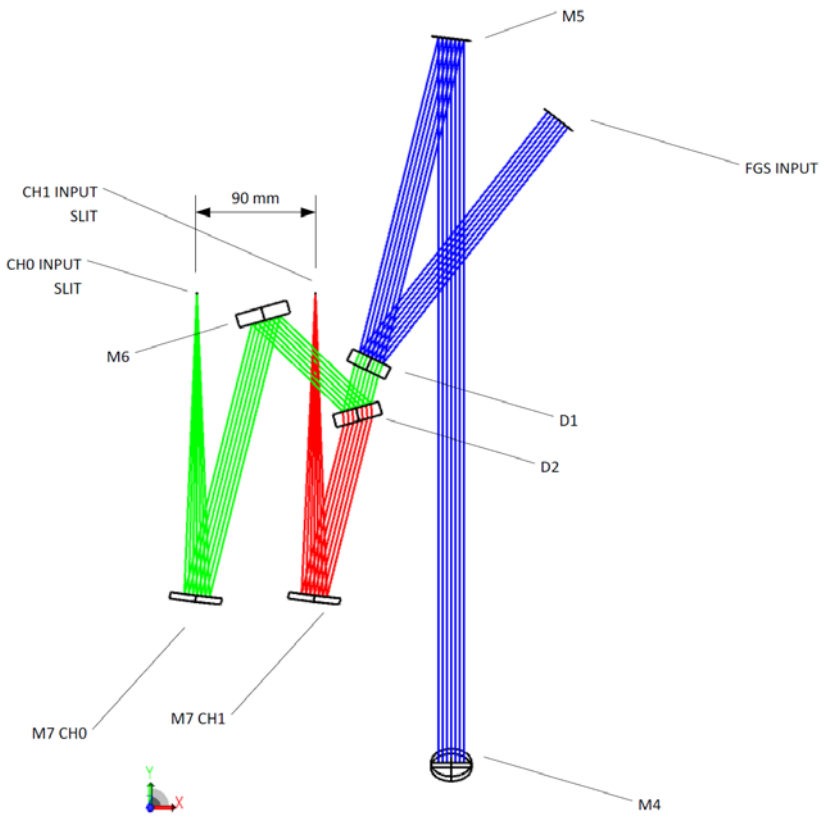

Figure 2: Common optics as viewed in the plane of the optical bench.

The optical design can be divided into a number of modules, as indicated in the previous figures, i.e. primary mirror plus M4, the common optics, the FGS and AIRS. This division enables clear interfaces between each module. The telescope comprises all of the optics from the entrance aperture of the telescope up to, and including, the M4 mirror. The common optics comprise the M5 and M6 mirrors, the dichroics (D1, D2) that split the beams for the FGS and AIRS Ch0/Ch1, and the fore-optics (M7 Ch0 & Ch1) that produce a focused spot as an input for AIRS. The FGS comprises all of the optics following on from the collimated, reflected beam from D1. AIRS comprises all of the optics following on from the focused input beam delivered by the fore-optics M7.

The function of the common optics is to:

- split the incoming light beam into three channels (FGS; AIRS Ch0 and AIRS Ch1);
- deliver the collimated beam to the FGS;
- deliver focused beams, of the correct f/number, at the AIRS input slits.

The spectrometer input optics is based on the use of a pair of identical off-axis paraboloid mirrors to bring the collimated beam to a focus at each of the spectrometer slits. Two identical mirrors M7Ch0 and M7Ch1 are used to deliver a beam with a focal ratio of f/12 (elliptical pupil major axis) and f/18 (minor axis). Having the elliptical collimated beam of 20 mm x 13.3 mm requires a focal length of 240 mm. The nominal image quality of the telescope and common optics combination is limited by the aberrations of the off-axis parabola, which are determined by the combination of mirror focal length and off-axis distance. After some iteration of the layout an off-axis distance of 55 mm was chosen. The nominal design aberration of the telescope and common optics is insignificant in the context of a requirement to have a diffraction limited telescope at 3 μm (RMS WFE ~$\lambda/14$).

Technical part of the project will comprise of the design, development and manufacturing of mirrors (including coatings) M5, M6, M7, its holders and adjustment systems; and of dichroic filters adjustment system; all with respect to the requirements and specifications provided by the consortium [AD 01-07]. These will be part of the ARIEL Payload as part of the common optics module.

The proposal covers delivery of three functional modules – STM, AVM (or equivalent QM) and FM [AD 08]. Project related activities also include verification of manufacturing processes, qualification of mirror coatings, cleanliness and contamination control, bake-out process within cleanroom environment, stress load tests, tests at cryogenic temperatures, radiation tests and development and production of thermal vacuum chamber (depending on project time, test would be outsourced id chamber is not ready on time) to verify the project thermal requirements (down to liquid nitrogen boiling temperature), i.e. to perform themal tests of the common optics and dichroics (mounts). Some of the activities will be outsourced to external (still Czech) facilities, e.g. bake-out process (Frentech), stress load tests (VZLU), radiation tests (Proton tests at CAS, Gamma tests at CAS or else), thermal vacuum tests (partially) by TOPTEC.

TOPTEC is well experienced in the custom optical production; still the main challenging factor of the project is the thermal performance requirement: ‘The mounts shall be designed so that all project requirements are met at the operating temperature set to 77 Kelvin.’ It is important to state, that we have not been able to identify a facility within Czech Republic until the date of proposal submission that possess a fitting thermal vacuum chamber that would be able to reach 77 Kelvin. As a result, we plan to develop such chamber in the framework of concurrent engineering with a Czech company that is focused on high vacuum systems (VAKUUM PRAHA spol. s r.o.) An alternative solution is to upgrade vacuum test chamber that is currently in operation within another Czech facility – VZLU Praha. The possibility to test optical (but also other) materials and systems under cryogenic temperatures would strongly increase the chance of Czech companies and institutions for participation in the space segment/projects.

2. PROJECT ORGANISATION AND INTERFACES

On the consortium level, the Czech team is represented by Dr. Martin Ferus, head of the Department of Spectroscopy of the J. Heyrovský Institute of Physical Chemistry. Dr. Ferus serves as the PI of the Czech project and the main representative of the Czech team in the Ariel consortium (under different PEA contract). The main task of Dr. Ferus is the management of the project, communication with the Ariel Consortium and leadership of the Czech team. The second Co-PI from the Czech side is Prof. Svatopluk Civiš. Prof. Svatopluk Civiš is responsible for scientific issues and working on spectral library for the consortium. The technological control and scientific work will be carried out at the J. Heyrovský Institute of Physical Chemistry.
The part of development and manufacturing of the optics, i.e., design, test and manufacturing of mirrors (M5, M6, M7) its mounts and mounts for dichroic filter; and design and production/procurement of the thermal chamber, is managed by the Institute of Plasma Physics - TOPTEC Department. Dr. Lukáš Steiger carries out project management on the TOPTEC side.
Both institutes are a part of the Czech Academy of Sciences.

Institute of Plasma Physics of the Academy of the Sciences of the Czech Republic (IPP), legal form of public research institution, has 6 scientific departments: Tokamak, Pulse Plasma Systems, Thermal Plasma, Materials Engineering, Laser Plasma and TOPTEC (Centre for special optics, opto-electronical systems and optical diagnostics).

TOPTEC department is specialized in research and development of precise optics in the fields of classical optics, crystal optics, x-ray optics, thin layer chromatography and plastic optics. TOPTEC is located in Turnov. The beginning of TOPTEC predecessor dates back to 1965 when a development laboratory for the AIAS (Astronomical Institute of Academy of the Sciences) was established. The laboratory worked on the internal needs of the Academy of the Sciences of the Czech Republic and also on Intercosmos Vega and Phobos projects. From 1991 it was an independent institution of the Academy of the Sciences of the Czech Republic, and 1st January 2006 it became a part of the IPP.

TOPTEC disposes with research and development laboratories equipped with all necessary devices for a developing and manufacturing of unique optics and precise mechanics. Many projects and contracts are focused on design, production and measurement of highly precise components.

Currently, TOPTEC is mainly dealing with the following projects:

- The design, manufacturing and testing of Relay Optics Assembly to ASPIICS coronagraph on board Proba 3 mission of ESA. Finished phase B, ongoing phase C/D.
- The manufacturing and tests of the telescope for the FLEX FLORIIS project. Finished phase B, ongoing phase C/D.
- The development of the conceptual design of a view-finder for the European Solar Telescope (EST) within the 7th EU framework program
- The design and development of a narrow-bandwidth birefringent filter for solar chromospheres observation. The filter is being created for needs of AIAS and will be placed in German telescope GREGOR located on the Canary Islands
- The development of three special lenses for hot plasma observation in the COMPASS tokamak
- Cooperation with Rigaku Innovative Technologies Europe s.r.o. in development of special x-ray lenses for lithography and medical applications
- HDES – Hyper-spectral imaging system for IR wavelength range of life-hazardous substances

On the following figure you can see the organisation chart of the IPP and the relation with TOPTEC Centre.

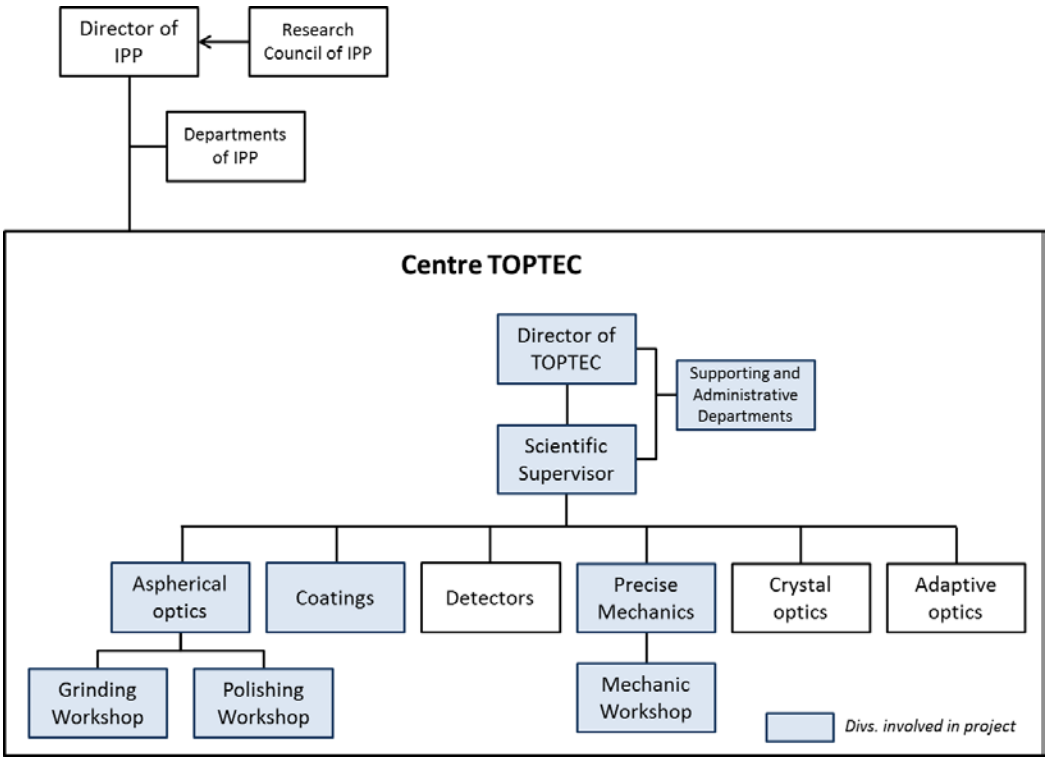

Figure 3: TOPTEC (IPP) organisation chart

Organisation for the Study, within our company (study team organigram, role of project manager, design and support engineers, reporting principles, support from other divisions / departments, etc.),

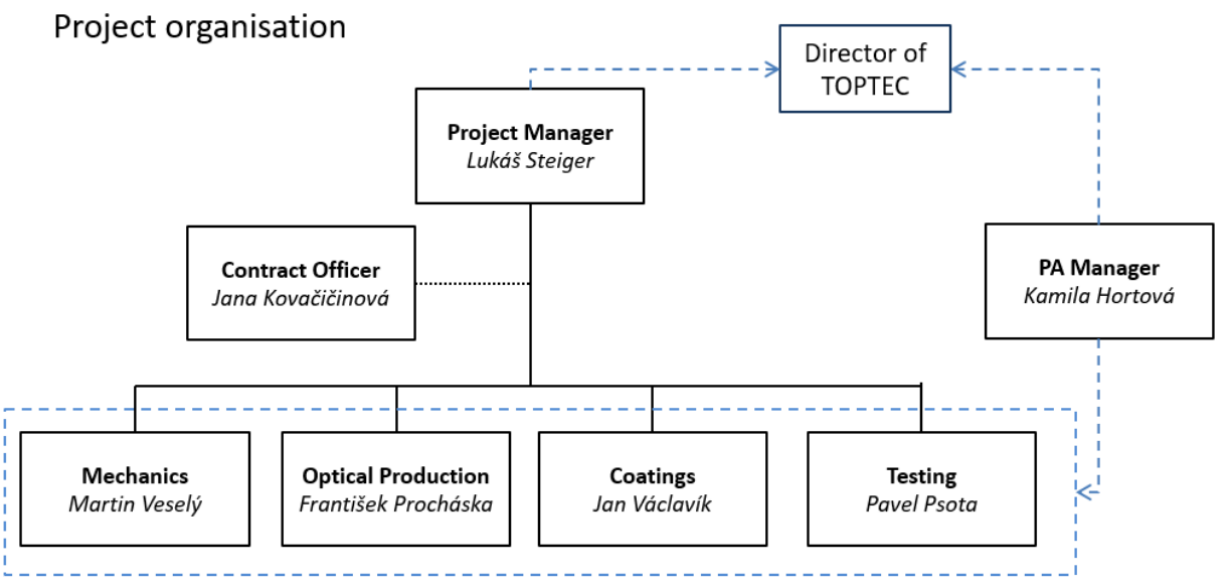

Figure 4: Project Organisation chart within TOPTEC

2.1. Contact information

- Investigator title and full name: Ing Lukáš Steiger, Ph.D.
- Institute/University: Institute of Plasma Physics, Czech Academy of Sciences, v.v.i.
- Department: Department TOPTEC
- Address: Sobotecka 1660, 511 01 Turnov, Czech Republic.
- Phone, e-mail: +420730874573, steiger@ipp.cas.cz.
- Head of IPP CAS CZ Institute endorsing the Project (name, function, e-mail): RNDr. Radomír Pánek, Ph.D., Director of the Institute, panek@ipp.cas.cz
- Head of IPP CAS CZ - TOPTEC Department endorsing the Project (name, function, e-mail): Mr. Vít Lédl, TOPTEC Managing Director, ledl@ipp.cas.cz

2.2. Team members role in the Project

Within TOPTEC project organisation (Figure 4), this project will be performed as part of TOPTEC Research Programme, managed by L. Steiger with a support of the rest of TOPTEC employees containing optical and mechanical experts.

Lukáš Steiger is nominated as Project Manager. He is currently responsible for a space program of the TOPTEC centre. In the past he was responsible for image acquisition and processing and has experience with the non-sequential optical designing. He has management experiences from several national and international projects. The project management will be achieved in the most cost-effective way by managing the available resources and personnel within the allocated budget, and by coordinating in an integrated effort the programme management activities with the functions of engineering and product assurance. He is responsible also for design and manufacturing of optical parts and for optical experiments.

Kamila Hortová is nominated as PA manager. She is currently responsible for the PA activities of the TOPTEC centre. She verifies that documents and products corresponds to ESA requirements and identifies all critical activities.

Pavel Psota is nominated as Metrology engineer responsible for mechanical and optical testing.

Martin Veselý is nominated as Mechanical design engineer responsible for mechanical parts design and manufacturing, FEM simulations and is responsible for proper assembling of collimator.

Jana Kovačičinová is nominated as Contract Officer responsible for contract administration.

Jan Václavík is responsible for coating of coating design and realization of the coating of Ariel M5, M6, M7 mirrors.

Table 1: Key personnel details

Function	Name	Affiliation	Telephone	E-mail
Project Manager	Lukáš Steiger	TOPTEC	+ 420 730 874 573	steiger@ipp.cas.cz
PA Manager	Kamila Hortová	TOPTEC	+420 487 953 918	hortova@ipp.cas.cz
Mechanical Engineer	Martin Veselý	TOPTEC	+420 487 953 901	vesely@ipp.cas.cz
Metrology Engineer	Pavel Psota	TOPTEC	+420 487 953 901	psota@ipp.cas.cz
Coating Engineer	Jan Václavík	TOPTEC	+420 487 953 901	vaclavik@ipp.cas.cz
Contract officer	Jana Kovačičinová	TOPTEC	+420 487 953 915	kovacicinova@ipp.cas.cz

3. PROJECT TERM COVERED BY THE PRODEX EXPERIMENT ARRANGEMENT

The project commences as of T0 on 01 Apr 2020 and terminates March 2023 (delivery of the flight model and qualification test results).

4. APPLICABLE (AD) AND REFERENCE (RD) DOCUMENTS

4.1. Applicable Documents

The following documents are applicable to the Contract.

[AD 01]	ARIEL-RAL-PL-RS-003_ARIEL Common Optics (Mirrors) Requirements Document_Iss 0.1
[AD 02]	Calibration Requirements Document, ARIEL-RAL-PL-RS-003
[AD 03]	ARIEL Payload Interface Document - Part A - PID-A, ESA-ARIEL-EST-PL-IF-001
[AD 04]	ARIEL-RAL-PL-DD-001_ARIEL Payload Design Description
[AD 05]	ARIEL-RAL-PL-PL-001_ARIEL Payload Consortium Management Plan
[AD 06]	ARIEL-RAL-PL-PL-002_ARIEL Design, Development, Engineering and Verification Plan
[AD 07]	ARIEL-RAL-PL-RS-001_ARIEL Payload Requirements Document
[AD 08]	ESA-ARIEL-EST-PL-IF-001

4.2. Reference Documents

The following documents can be used as a reference to the Contract.

[RD 1]	None

5. WORK BREAKDOWN STRUCTURE (WBS)

The WBS for the present activity is summarised in next table and in next figure.

Table 2: List of project Work packages

WP Title	WP REF
ARIEL Common Optics and dichroics - Concept Consolidation and Analysis	1110
Project management @ TOPTEC	1120
Detailed Opto-Mechanical Design and Tolerance Analysis	2110
Design of the Thermal Vacuum Chamber	2120
Consolidation Reviews	3100
Manufacturing and Test of the Optics and Dichroics (mounts) – STM	3110
Manufacturing and Test of the Optics and Dichroics (mounts) – AVM / QM	3120
Manufacturing and Test of the Optics and Dichroics (mounts) – FM	3130
Manufacturing of the Thermal Vacuum Chamber	3140
Qualification activities	9110

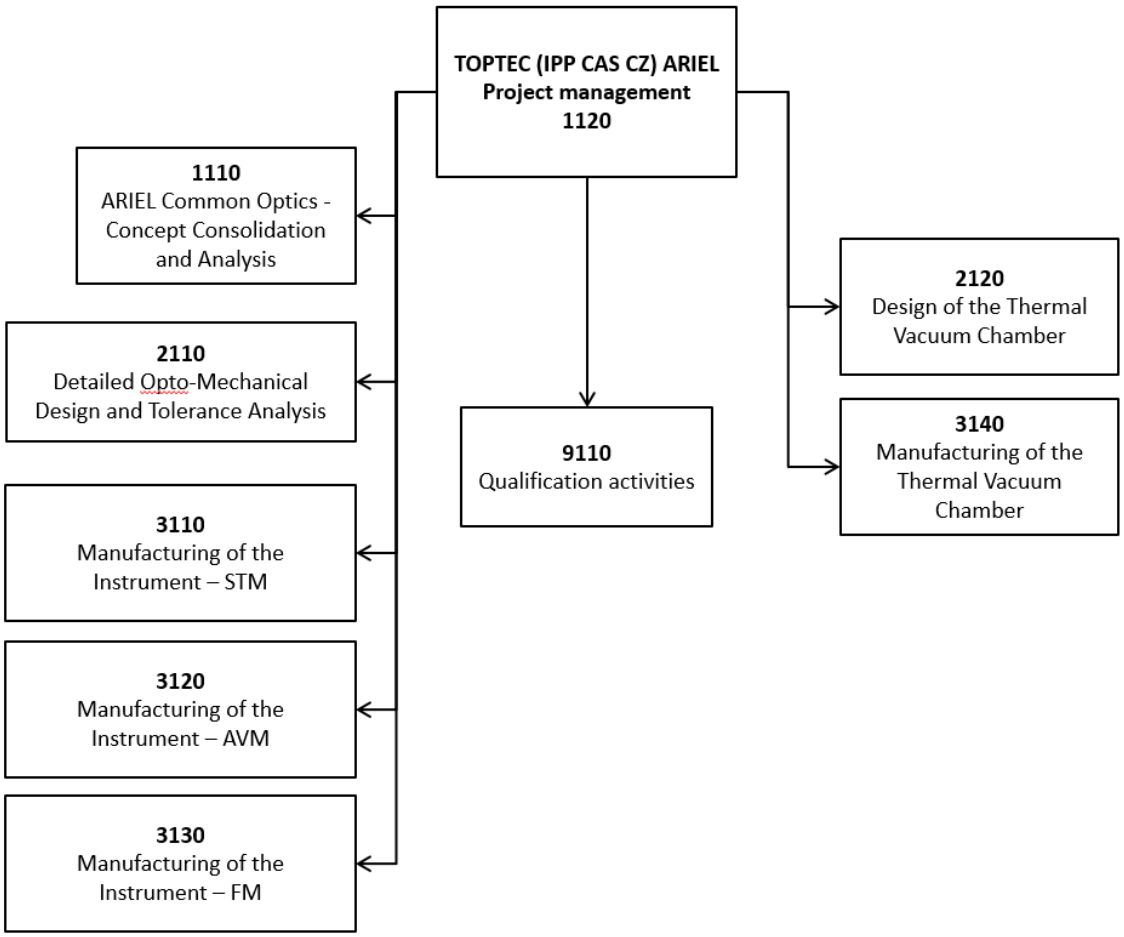

Figure 5: Project WBS structure, where ‚instrument‘ stands for Common Optics Mirrors (M5, M6, M7a & M7b), its mounts and mounts for Dichroics.

6. WORK PACKAGES

Table 3: WP1110

PROJECT : Ariel	Phase N/A	WP REF: 1110
TITLE: ARIEL Common Optics and dichroics - Concept Consolidation and Analysis **SUPPLIER:** IPP AS CR, v.v.i., TOPTEC department **MAJOR CONSTITUENT:** **START DATE :** T0 **ENDDATE:** T0+6 **WP MANAGER:** Lukáš Steiger		**SHEET 1 of 1** **ISSUE REF :** 01 **ISSUE DATE :** February 2020

INPUTS:

- ARIEL common optics specifications

DESCRIPTION :

- Critically review the proposed common optics concept and design of the ARIEL instrument. The feasibility of the concept and shall be reviewed by appropriate analysis and simulation activities.
- Elaborate the design of the mechanical and optical chain. In particular, establish the detailed mechanical design with performances and sensitivity analysis of the optical system.
- Provide inputs for the polarisation analysis in terms of optics coatings characteristics.
- Derive a preliminary Design Development and Verification (DDV) plan for the TOPTEC part of the project, defining the methodology for the verification and qualification in view of demonstrating the common optics and dichroics representability with regard to the flight hardware environment (mechanical & thermal), and identifying the facilities and equipment required.
- Provide input to ARIEL PDR.

TASK SPECIFICALLY EXCLUDED : None

OUTPUTS :

- Instrument preliminary analysis
- Risk analysis
- Common optics and dichroics DDV and On-Ground Calibration Plan
- Instrument Optical Design Model
- First version of Instrument Mechanical Design Model

Table 4: WP1120

PROJECT : Ariel	Phase N/A	WP REF: 1120
TITLE: Project management an PA tasks @ TOPTEC **SUPPLIER:** IPP AS CR, v.v.i., TOPTEC department **MAJOR CONSTITUENT:** **START DATE :** T0 **ENDDATE:** End of the project **WP MANAGER:** Lukáš Steiger		**SHEET 1 of 1** **ISSUE REF :** 01 **ISSUE DATE :** February 2020

INPUTS:

- Generic and Specific Statements of Work
- Signed Contract or ATP
- Agreed Requirements Documentation
- Management Requirements Document
- PA related activities

DESCRIPTION :

- Coordination and Management of the TOPTEC activities
- Administration
- Legal and contractual management
- Administration of the subcontractors and suppliers
- Project Control (Progress, cost & schedule)
- Risk Management
- Contract Change Notice
- Project Operation & Logistics, including procurement of transport containers
- Participation to the ARIEL PDR and CDR meetings

TASK SPECIFICALLY EXCLUDED : None

OUTPUTS :

- Project Management Plan related to TOPTEC cope of work
- Inputs to Project Schedule
- Milestone Payment Plan
- Risk Register
- Inputs to Compliance Matrix
- Risk analysis

Table 5: WP2110

PROJECT : ARIEL	Phase N/A	WP REF: 2110
TITLE: Detailed Opto-Mechanical Design and Tolerance Analysis **SUPPLIER:** IPP AS CR, v.v.i., TOPTEC department **MAJOR CONSTITUENT:** **START DATE :** T0+6 **ENDDATE:** T0+14 **WP MANAGER:** Lukáš Steiger		**SHEET 1 of 1** **ISSUE REF :** 01 **ISSUE DATE :** February 2020

INPUTS:

- Instrument Requirement Specification
- Outputs of WP1110

DESCRIPTION :

- Perform the detailed opto-mechanical design and analyse the design performance including optics housing, internal baffles. Define the mounting, alignment and integration concept (see note 4)
- Perform structural and thermoelastic analysis (see note 1)
- Verification engineering.
- Perform the mounting design of all optical components
- Assess optical performances.
- All performed analyses, mathematical formulas and assumptions adopted in the aforementioned analyses shall be detailed in the technical documentation delivered.
- It is stressed that all analyses shall rely as far as practicable on measured input data of all components involved. If such data are not available at this stage, then best estimates shall be adopted as far as adequate justification can be provided. Later in the activity and as soon as more representative data become available the current end to end analysis shall be updated.
- Define the materials used and issue the materials list (see note 4). Identify the processes and issue the process list (see note 4)
- Define verification and qualification approach in order to demonstrate representability of camera design with regard to flight hardware environment.
- Provide inputs to ARIEL PDR and CDR.

Note 1: Structural analysis shall be performed to demonstrate compliance to the loads to be agreed during the course of the study.

Note 2: The Supplier shall perform the thermal analysis of the EBB to demonstrate the maturity and compliance of the design against the specified environment and demonstrate coherence with the relevant performance predictions (geometric, radiometric, spectral, etc.).

Note 3: Thermo-elastic analysis shall also be performed to verify the optical alignment within the specified operational temperature range and the predicted temperature gradients. The performance degradations shall stay within the budgeted allocations.

Note 4: The used materials and processes shall be in line with the requirements for low outgassing and contamination for optical instruments. The selected materials and mounting concept shall consider the environmental thermal loads, in particular the operational and non-operational temperature ranges.

TASK SPECIFICALLY EXCLUDED : None

OUTPUTS :

- Instrument Opto-Mechanical Design and Analysis Report, incl. Budgets
- Instrument Structural and Thermoelastic Analysis report
- Instrument DML, DPL
- Instrument Structural and Thermoelastic Model
- Instrument CAD model
- Cleanliness and Contamination control plan
- GSEs description

Note1: Instrument stands for Common Optics Mirrors (M5, M6, M7a & M7b), its mounts and mounts for Dichroics

Table 6: WP2120

PROJECT : ARIEL	**Phase N/A**	**WP REF: 2120**
TITLE: Design of the Thermal Vacuum Chamber **SUPPLIER:** IPP AS CR, v.v.i., TOPTEC department **MAJOR CONSTITUENT:** **START DATE :** T0+6 **ENDDATE:** T0+14 **WP MANAGER:** Lukáš Steiger		**SHEET 1 of 1** **ISSUE REF :** 01 **ISSUE DATE :** February 2020

INPUTS:

- Instrument Requirement Specification
- Outputs of WP1110

DESCRIPTION :

- Perform the detailed mechanical design and analyse the design performance.
- Perform the manufacturing verifications with possible suppliers (preferably within Czech republic).
- Assess vacuum and thermal performances.
- Provide inputs to ARIEL PDR and CDR.

TASK SPECIFICALLY EXCLUDED : None

OUTPUTS :

- Consolidated Vacuum Thermal Chamber design
- Vacuum Thermal Chamber CAD model

Table 7: WP3100

PROJECT : Ariel	Phase N/A	WP REF: 3100
TITLE: ARIEL Common Optics - Consolidation of the requirements applicable to the CZ Mirrors and dichroic mount holders, including test requirements **SUPPLIER:** IPP AS CR, v.v.i., TOPTEC department **MAJOR CONSTITUENT:** **START DATE :** T1 **ENDDATE:** T1+22 **WP MANAGER:** Lukáš Steiger		**SHEET 1 of 1** **ISSUE REF :** 01 **ISSUE DATE :** February 2020

INPUTS:

- ARIEL common optics specifications
- Outputs of WP2110
- Instrument Requirement Specification
- Authorisation to Proceed

DESCRIPTION :

- Critically review the proposed common optics concept and design of the ARIEL instrument with respect to the Consortia requirements.
- Implementation of Project reviews
- Preparation of manufacturing and testing of common optics and dichroics (for each batch of models)
- Assessment of common optics and dichroics coating qualification level
- Provide inputs to ARIEL CDR.

TASK SPECIFICALLY EXCLUDED : None

OUTPUTS :

- Requirements consolidation review
- Common optics and dichroics design review
- Manufacturing readiness review of common optics and dichroics (mounts) (for each batch of models)
- Common optics and dichroics Coatings Qualification Status Review

Table 8: WP3110

PROJECT : ARIEL	Phase N/A	WP REF: 3110
TITLE: Manufacturing and test of the common optics and dichroics – STM **SUPPLIER:** IPP AS CR, v.v.i., TOPTEC department **MAJOR CONSTITUENT:** **START DATE :** T1+0 **ENDDATE:** T1+7 **WP MANAGER:** Lukáš Steiger		**SHEET 1 of 1** **ISSUE REF :** 01 **ISSUE DATE :** February 2020

INPUTS:

- Instrument Requirement Specification
- Outputs of WP2110
- Authorisation to Proceed

DESCRIPTION :

- Procurement of material
- Allocation of resources – people and technology
- Establish Manufacturing procedures
- Manufacturing of the common optics and dichroics mounts, including coatings
- Manufacturing of the mounts
- Perform MIP/KIP
- Integrate mounts
- Test the STM common optics and dichroics mounts (Test includes stress load tests and thermal tests, integration and handling test)
- Pack for transportation
- Note 1: Manufacturing includes also cleanliness and contamination control during production, bake-out of the final product and final measurement reports of all the manufactured parts.

TASK SPECIFICALLY EXCLUDED : None

OUTPUTS :

- STM common optics and dichroics Test reports
- STM model integrated
- STM manufacturing and Integration Procedures revised
- STM assembly
- Test readiness review of common optics and dichroics (mounts)
- Test acceptance review of common optics and dichroics (mounts)

Table 9: WP3120

PROJECT : ARIEL	Phase N/A	WP REF: 3120
TITLE: Manufacturing and test of the common optics and dichroics – AVM / QM **SUPPLIER:** IPP AS CR, v.v.i., TOPTEC department **MAJOR CONSTITUENT:** **START DATE :** T1+8 **ENDDATE:** T1+15 **WP MANAGER:** Lukáš Steiger		**SHEET 1 of 1** **ISSUE REF :** 01 **ISSUE DATE :** February 2020

INPUTS:

- Instrument Requirement Specification
- Outputs of WP3110, WP2110
- Authorisation to Proceed

DESCRIPTION :

- Procurement of material
- Allocation of resources – people and technology
- Reassess Manufacturing procedures
- Manufacturing of the common optics and dichroics mounts, including coatings
- Manufacturing of the mounts
- Perform MIP/KIP
- Integrate mounts
- Test the AVM common optics and dichroics mounts (Test includes functional, integration test and thermal (TBD))
- Pack for transportation
- Note 1: Manufacturing includes also cleanliness and contamination control during production, bake-out of the final product and final measurement reports of all the manufactured parts.

TASK SPECIFICALLY EXCLUDED : None

OUTPUTS :

- Instrument Test reports
- AVM model integrated
- AVM manufacturing and Integration Procedures revised
- AVM assembly
- Test readiness review of common optics and dichroics (mounts)
- Test acceptance review of common optics and dichroics (mounts)

Table 10: WP3130

PROJECT : ARIEL	Phase N/A	WP REF: 3130
TITLE: Manufacturing and test of the common optics and dichroics – FM **SUPPLIER:** IPP AS CR, v.v.i., TOPTEC department **MAJOR CONSTITUENT:** **START DATE :** T1+16 **ENDDATE:** T1+23 **WP MANAGER:** Lukáš Steiger		**SHEET 1 of 1** **ISSUE REF :** 01 **ISSUE DATE :** February 2020

INPUTS:

- Instrument Requirement Specification
- Outputs of WP3110, WP3120, WP2110
- Authorisation to Proceed

DESCRIPTION :

- Procurement of material
- Review of the manufacturing design and its possible update with respect to the lessons learnt based on WP3110, WP3120, WP2110
- Allocation of resources – people and technology
- Reassess Manufacturing procedures
- Manufacturing of the common optics including coatings
- Manufacturing of the mounts
- Perform MIP/KIP
- Integrate mounts
- Test the FM common optics and dichroics mounts (Test includes functional and integration test)
- Pack for transportation
- Note 1: Manufacturing includes also cleanliness and contamination control during production, bake-out of the final product and final measurement reports of all the manufactured parts.

TASK SPECIFICALLY EXCLUDED : None

OUTPUTS :

- Instrument Test reports
- FM model integrated
- FM assembly
- Test readiness review of common optics and dichroics (mounts)
- Test acceptance review of common optics and dichroics (mounts)

Table 11: WP3140

PROJECT : ARIEL	Phase N/A	WP REF: 3140
TITLE: Manufacturing of the Thermal Vacuum Chamber **SUPPLIER:** IPP AS CR, v.v.i., TOPTEC department **MAJOR CONSTITUENT:** **START DATE :** T0+16 **ENDDATE:** T0+28 **WP MANAGER:** Lukáš Steiger		**SHEET 1 of 1** **ISSUE REF :** 01 **ISSUE DATE :** February 2020

INPUTS:

- Instrument Requirement Specification
- Outputs of WP2120, WP2110
- Authorisation to Proceed

DESCRIPTION :

- Procurement of material
- Allocation of resources – people and technology
- Manufacturing of the Thermal Vacuum Chamber
- Integration and assembly of the Thermal Vacuum Chamber
- Tests of the Thermal Vacuum Chamber

TASK SPECIFICALLY EXCLUDED : None

OUTPUTS :

- Chamber validation test reports
- Thermal Vacuum Chamber facility available for test of common optics and dichroics

Table 12: WP9110

PROJECT : ARIEL	Phase N/A	WP REF: 9110
TITLE: Qualification activities **SUPPLIER:** IPP AS CR, v.v.i., TOPTEC department **MAJOR CONSTITUENT:** **START DATE :** T1+3 **ENDDATE:** T1+16 **WP MANAGER:** Lukáš Steiger		**SHEET 1 of 1** **ISSUE REF :** 01 **ISSUE DATE :** February 2020

INPUTS:

- Instrument Requirement Specification
- Qualification plans
- Outputs of WP2120, WP2110
- Authorisation to Proceed
- (Ideally, if available) New vacuum chamber

DESCRIPTION :

- Procurement of material
- Allocation of resources – people and technology
- Qualification activities of optical coatings (Thermal, Radiation)
- Shock, vibrational tests of mirror mounts

TASK SPECIFICALLY EXCLUDED : None

OUTPUTS :

- Qualification Test reports

7. STANDARD MANAGEMENT REQUIREMENTS

7.1. Conditions for Employment

All personnel allocated to the Project shall be employed by the Contractor (Institute/University signatory of the Contract).

7.2. Communications

All communications to the Agency shall be addressed to the Agency's representatives identified in the Cover Letter.
Communications on technical and programmatic matters shall in addition be addressed to the entities identified here after:

For contractual matters:
Mrs. Jana Kovačičinová
(kovacicinova@ipp.cas.cz)
Tel. +420487953901
With copy to Mr. Lukáš Steiger
(steiger@ipp.cas.cz)

For technical matters:
Mr. Lukáš Steiger
(steiger@ipp.cas.cz)
Tel. +420487953901
With copy to Radek Melich
(melichr@ipp.cas.cz)
Tel. +420487953901

Legal Representative :
RNDr. Radomír Pánek, Ph.D.
Director of the Institute
email. panek@ipp.cas.cz

TOPTEC Manager :
Mr. Vít Lédl
TOPTEC Managing Director
email. ledl@ipp.cas.cz

Bidder Details
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182 00 Praha 8, Czech Republic
Phone Nr: +420 487 953 901
Fax Nr: +420 286 890 448
VAT Nr: CZ61389021
electronic mail: toptec@ipp.cas.cz
business web page: www.toptec.eu
ESA Bidder Code: 58035
ESA Supplier Code :
ESA-p Bidder Code:6000009372
ESA-p Vendor Code: 1000013073
Business Partner Name: Institute of Plasma Physics AS CR, v.v.i.

7.3. Management requirements

The management requirements listed here after are the ESA "Standard requirements for management, reporting, meetings and deliverables", Annex 3 to ESA contracts, rev. 5: 2018-10. They are tailored to the present contract and retain the same numbering as in the original text.

The parameters of section 7.3 that are specific to the present contract (item 2.6: Frequency of progress reports, item 3 lit. b: Frequency of progress meetings, item 4: Deliverables) are defined in section 8.

1. MANAGEMENT

1.1. General

The Contractor shall implement effective and economical management for the Project. Its nominated Project Manager shall be responsible for the management and execution of the work to be performed and, when applicable, for the coordination and control of the team's work.

Decisions reached during the present contract having technical baseline, cost or planning consequences, shall require formal Agency approval before implementation.

1.2. Access

a) During the course of the Contract the Agency shall be afforded free access to any plan, procedure, specification or other documentation relevant to the programme of work. Areas and equipment used during the development/testing activities associated with the Contract shall also be available for inspection and audit.

b) The Contractor shall notify the Agency at least three (3) weeks before the start of any test programme, or as mutually agreed, in order to enable the Agency to select those tests that it wishes to witness. The Agency shall notify the Contractor of its visit at least one (1) week in advance.

2. REPORTING

2.1. Minutes of meeting

a) The Contractor is responsible for the preparation and distribution of minutes of meetings (see ECSS-M-ST-10C Rev. 1 section 5.2.2 for more details) held in connection with the Contract. Electronic version shall be issued and distributed to all participants, not later than ten (10) days after the meeting concerned.
b) The minutes shall clearly identify all agreements made and actions accepted at the meeting together with an update of the Action Item List (AIL) and the Document List. The minutes shall be signed.

Note: This clause may be restricted to progress meetings if specifically expressed.

2.2. Documents List

The Contractor shall create and maintain a Document List, recording all the documents produced during the work, including reports, specifications, plans and minutes. The list shall indicate the document

reference (with unique identifier), type of document, date of issue, status (draft or approved by the Agency), confidentiality level and distribution. This list shall be maintained under configuration control.

2.3. Action Item List (AIL)

The Contractor shall maintain an Action Item List (AIL, see ECSS-M-ST-10C rev. 1, section 5.2.2.1 for more details), recording all actions agreed with the Agency. Each item shall be uniquely identified with reference to the minutes of the meeting at which the action was agreed and will record generation date, due date, originator and the person instructed to take action. The AIL shall be reviewed at each progress meeting.

2.4. Bar-Chart Schedule

a) The Contractor shall be responsible for maintaining the bar-chart for work carried out under the Contract, as agreed with the Agency.
b) The Contractor shall present an up-to-date chart for review at all consequent meetings, indicating the current status of the Contract activity (WP's completed, documents delivered, etc.).
c) Modifications of the schedule shall be contractually binding only if approved in writing by the Agency's representative for contractual and administrative matters.

2.5. Risk Register

a) The Contractor shall be responsible for maintaining a risk register, agreed at the kick-off meeting. This register shall identify potential risks, their likelihood and severity, and propose meaningful mitigation measures (one can refer to ECSS-M-ST-80C for more details).
b) The Contractor shall present an up-to-date risk register in its progress reports for review at progress meetings.

2.6. Progress Reports

Every three months (see section 8.2.1 - Documentation), the Contractor shall provide a Progress Report to the Agency's representatives, covering the activities carried out under the Contract (on can refer to ECSS-M-ST-10C Rev.1 section 5.2.2.2 for more details). This report shall refer to the current activities shown on the latest issued bar-chart and shall include the following topics:

.1 action items completed during the reporting period

.2 a status report on all long lead or critical delivery items

.3 a description of the progress of the work: actual progress vs. planned schedule, milestones and events accomplished

.4 reasons for slippages and/or problem areas, if any, and corrective actions planned and/or taken, with revised completion date per task

.5 events anticipated during the next reporting period (e.g. milestones reached)

.6 expected date for major schedule items

.7 milestone payment status

.8 status of the risks.

2.7. Fixed assets N/A

2.8. Problem Notification

The Contractor shall notify the Agency's representatives (Technical Officer and Contracts Officer) of any problem likely to have a major effect on the time schedule of the work or to significantly impact the scope of the work to be performed (due to e.g. procurement problems, unavailability of facilities or resources, etc.).

2.9. Technical Documentation

a) As they become available and not later than the dates in the delivery plan, the Contractor shall submit, for the Agency's approval, technical notes, engineering drawings, manufacturing plans, test plans, test procedures, specifications and Task/WP reports.
b) Technical documentation to be discussed at a meeting with the Agency shall be submitted two (2) weeks prior to the meeting.
c) Technical documents from Subcontractors shall be submitted to the Agency only after review and acceptance by the Contractor and shall be passed to the Agency via the Contractor's formal interface to the Agency.
d) Tests carried out under the Contract shall be performed according to test plans and test procedures approved by the Agency's Technical Officer (see ECSS-E—ST-10-02C and ECSS-Q-20C Rev.1 for more details).

3. MEETINGS

a) N/A
b) Progress Meetings shall be held every three months (see section 8.1 - Frequency of Progress meetings), either by teleconference or in person if deemed necessary by the Agency.
c) N/A
d) Additional meetings may be requested either by the Agency or by the Contractor.
e) The Contractor shall give to the Agency prior notice of any meetings with Third Party(ies) to be held in connection with the Contract. The Agency reserves the right of participation in such meetings.
f) With due notice to the Contractor, the Agency reserves the right to invite Third Parties to meetings, in order to facilitate information exchange.
g) For all meetings with the Agency, the Contractor shall ensure that proper notice is given at least two (2) weeks in advance. For all other meetings, the Contractor shall inform the Agency, which reserves the right to participate. The Contractor is responsible for ensuring the participation of its personnel and those of the Subcontractor(s), as needed.
h) For each meeting, the Contractor shall propose an agenda in electronic form and shall compile and distribute hand-outs of any presentation given at the meeting.

4. DELIVERABLES

4.1. Documentation

The Contractor shall submit to the Agency the documentation listed here below, for Agency review and, where required, approval. Documentation shall be submitted as per the milestones listed here below.

Documentation deliverables are listed in section 8.2.1 - Documentation. The following provisions apply:

a) All documentation deliverables (including all their constituent parts) shall also be delivered in electronic form in a format agreed by the Agency (searchable PDF format and the native format, and in other exchange formats, to be agreed with the Agency, where relevant, e.g. in case of CAD, drawings, models, databases).

b) All the documentation shall be delivered on computer readable media, as agreed with the Agency.

c) The draft version of the documentation shall be sent to the Technical Officer in electronic format not later than two (2) weeks before the documentation is to be presented. The final version shall be provided in a number of copies specified in the Statement of Work.

d) All documents shall bear the appropriate copyright notice. In all cases, this shall include the title, ESA Contract number, deliverable number, date, status (draft), version and/or revision number. This information shall be repeated consistently in the header or footer of every page.

4.1.1. N/A

4.1.2. Technical Data package:

The Technical Data Package consists of the final versions of all approved technical documents, delivered during the execution of the Project (See section 4.1).

4.1.3. Summary Report

For each (design and development) Contract, one Summary Report shall be produced. It shall summarise the findings of the Contract concisely and informatively. The Summary Report shall be approximately twenty (20) pages or six thousand (6000) words and shall be self-standing, i.e. it shall not rely on references to other documents to be understood. This document shall not contain confidential information as it is releasable to the public.

4.1.4. to 4.1.8. N/A

4.2. Hardware

Hardware (including test equipment and control electronics) built or purchased under the Contract, together with an Operation Manual, shall be a deliverable item after completion of the associated activities at the Contractor's premises, unless otherwise agreed in writing by the Agency.
The Contractor will deliver the following hardware listed here after as part of the Project:
The hardware elements to be delivered as part of the present project are listed under section 8.2.2 - Hardware

4.3. Computer Programs and Models

Computer programmes, mathematical models of any type (e.g. closed-form, worksheets, XML, CAD/CAE) and HDL models developed or procured under the Contract shall be a deliverable, unless the Agency agrees otherwise in writing. Re-used or proprietary software embedded in the deliverable product and required for its correct functioning shall also be deliverable.

The Contractor will deliver the following Computer Programs or Models as part of the Project.
The computer programmes, mathematical models, or other software elements to be delivered as part of the present project are listed under section 8.2.3 - Computer Programs and Models.

Ownership of Hardware and Software deliverables:

As a rule, the Agency, acting on behalf of the participating States, shall be the owner of the hardware and software identified under the Contract and its CN, and accepted by the Agency, for a period of 5 years following their respective delivery.

4.4 Project Web Page: N/A

5. Commercial evaluation: N/A

End of "Standard requirements for management, reporting, meetings and deliverables". Sequential Numbering resumed.

8. PARAMETERS OF SECTION 7.3 "MANAGEMENT REQUIREMENTS"

8.1. Frequency of Progress meetings

Refers to section 7.3, point 3 lit. b): Progress Meetings shall be held once per three months, either by teleconference or in person if deemed necessary by the Agency.

The provisions of section 7.3 "Management requirements", apply.

8.2. Deliverables

8.2.1. Documentation

Refers to section 7.3, point 2.6 (Progress reports) and point 4.1 (Documentation): The documentation listed hereafter is a deliverable of the present Contract. The provisions of section 7.3 "Management requirements" apply.

Table 13: Deliverable Documentation

	WPs								
	WP1110	WP1120	WP2110	WP2120	WP3110	WP3120	WP3130	WP3140	WP9110
Management									
Progress report	Monthly								
Schedule	Monthly								
Action Items List	Monthly								
Deliverable Items List		x	x		x	x	x	x	x
Summary report	x		x	x	x	x	x	x	x
Technical									
(**)									
PA									
DCLs, LLI lists	x (*)	x (*)	x (*)	x (*)	x (*)	x (*)	x (*)	x (*)	x (*)
Non-Conformance Report(s)		x (*)	x (*)	x (*)	x (*)	x (*)	x (*)	x (*)	
NCR Status list		x (*)	x (*)	x (*)	x (*)	x (*)	x (*)	x (*)	
Request for Waiver	x (*)	x (*)	x (*)	x (*)	x (*)	x (*)	x (*)	x (*)	
Request for Deviation	x (*)	x (*)	x (*)	x (*)	x (*)	x (*)	x (*)	x (*)	
Change Requests	x (*)	x (*)	x (*)	x (*)	x (*)	x (*)	x (*)	x (*)	

(**) The technical documents shall be delivered as part of delivered documents by the consortium defined in ARIEL-RAL-PL-RS-001 ARIEL Payload Requirements Documents Iss. 1.8. These are namely R-PRD-0030 Common Optics, R-PRD-0580 Common Optics Throughput/PoM. These shall be prepared in accord with all the other documents mentioned in this list of documents, namely Optical Requirements (line 223, Optical Design and Interface Requirements (line 224), Optical Quality Requirements (line 235), R-PRD-4200 Metallic Coatings and Thermal Requirements (line 378). These technical document also include all the outputs of the present Work Packages (§6).

8.2.2. Hardware

Section 7.3, point 4.2 (Hardware): The Hardware elements listed hereafter are a deliverable of the present Contract. The provisions of section 7.3 “Management requirements”, apply.

HW-1: M5 mirror including its adjustment mechanism

HW-2: M6 mirror including its adjustment mechanism

HW-3: M7 mirror including its adjustment mechanism

HW-4: Adjustment mechanism for dichroic filters

8.2.3. Computer Programs and Models

Section 7.3, point 4.3 (Computer Programs and Models): The Computer Programs and Models listed hereafter are a deliverable of the present Contract. The provisions of section 7.3 “Management requirements”, apply.

- No software delivered.

9. INTERFACES

The Contractor acknowledges that changes to the ICDs (IRDs) or more generally to any document listed under the “Applicable Documents” section may be proposed upon the initiative of each Interface Responsible (i.e. the party responsible of each side of the interface). Interface changes shall be processed and change requests raised when necessary, as per the Product Assurance requirements applicable to the Project.

Approval of changes to the Applicable Documents (including changes to IRDs or ICDs):

Although PRODEX approves the contractual documentation, PRODEX will request a visa from the higher-level Interface Responsible(s) before approving any Change Requests to the ICDs or to other Applicable Documents to the Contract.

10. AVAILABILITY OF DOCUMENTATION FOR FUTURE PHASES

The Contractor acknowledges that documentation not labelled “confidential”, deliverable to the Agency in the frame of the Project, may be used by the Agency for instance in preparation of future Invitation To Tenders or for any other Agency activity.

11. SCHEDULE

The following planning shows the work flow and sequencing of the activity with respect to the ARIEL schedule[Figure 6, ARIEL-RAL-PL-SC-001-v3.1-26May.pdf].

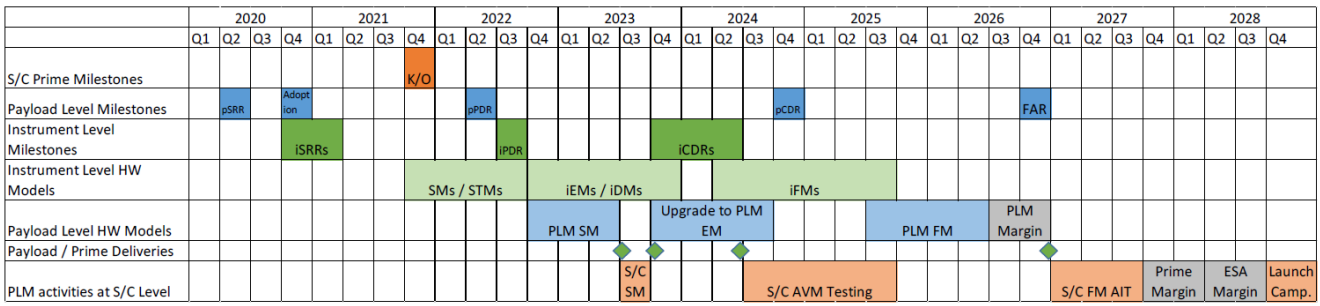

Figure 6: ARIEL realization schedule

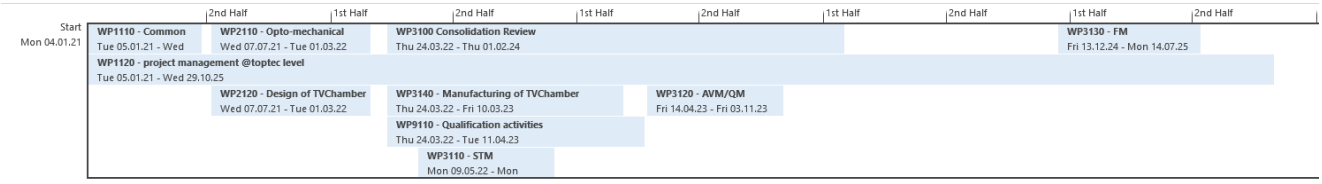

Figure 7: Timeline of the project at TOPTEC side with respect to the ARIEL design review dates and estimated ARIEL need dates.

12. INVOICING

The Contractor will be asked to submit invoices when the corresponding costs are accrued and the following conditions are met.

- The last invoice of the year will be paid only when the deliverables planned for that year - as defined in section 8.2 here above, or in a Change Notice (CN) signed by both parties (Contractor and ESA) - have been accepted by ESA.
- The final invoice will be paid upon acceptance by ESA of all the deliverables of the activity - as defined in section 8.2 here above, or in a Change Notice (CN) signed by both parties (Contractor and ESA) - have been accepted by ESA.

13. PROJECT CHECK POINTS

Project progress and deliverables will be checked according to Table 3.

Table 14: Check points for deliverables readiness.

Check-Point number	Planned date	Description
1	T0+6 (Input to PDR)	WP1110 - Concept Consolidation and Analysis
2	T0+14 (Input to PDR, CDR)	WP2110 - Detailed Opto-Mechanical Design and Tolerance Analysis
3	T0+14 (Input to PDR, CDR)	WP2120 - Design of the Thermal Vacuum Chamber
4	T1+22 ((Input to PDR, CDR))	WP300 - Consolidation of the requirements applicable to the CZ Mirrors and dichroic mount holders
5	T1+0	WP3110 – STM MRR
6	T1+7	WP3110 – STM delivery
7	T1+8	WP3120 – AVM MRR
8	T1+15	WP3120 – AVM delivery
9	T1+16	WP3130 – FM MRR
10	T1+23	WP3130 – FM delivery
11	T0+28	WP3140 – Chamber validation test reports
12	T1+3	WP9110 – Request for qualification plan approval
13	T1+16	WP9110 – Qualification test report

14. EXPORT CONTROL

N/A.

15. BACKGROUND INTELLECTUAL PROPERTY RIGHTS

N/A.

16. CUSTOMER FURNISHED ITEMS (CFIS)

See General Clauses and Conditions (GCCs) for ESA Contracts, Clause 11. List here any CFI that may be used in the Project and state their need dates. If CFIs are used, then ESA GCC Clause 11 is applicable.

N/A.

17. ITEMS MADE AVAILABLE BY THE AGENCY

See General Clauses and Conditions (GCCs) for ESA Contracts, Clause 12. List here any “items made available by the Agency” that may be used in the Project and state their need dates. If “items made available by the Agency” are used, then ESA GCC Clause 12 is applicable.

N/A.

Appendix 2

FINANCIAL PLAN

Project Name: Manufacturing and testing of the ARIEL optical and opto-mechanical common optics

Institute of Plasma Physics AS CR, v.v.i., Lukáš Steiger

Starting date: 04/01/2021 Ending date: 03/2025

Table 1: Institute Costs in Euro

	2021		**2022**		**2023**	
	FTE	Costs	FTE	Costs	FTE	Costs
INSTITUTE COSTS	Salaries. For each personnel paid from this Prodex Experiment Arrangement, state name, Full Time Equivalent allocation per year, and corresponding cost.					
Senior Researcher	2,04	75681	2,5	92467	1,27	47122
Junior Researcher	1,7	49976	2,84	83587	1,42	41890
Supporting staff – manufacturing	0,8	19646	1,16	28348	0,34	8429
Supporting staff - administration	0,3	8161	0,4	10758	0,26	7077
Total Manpower	**153464**		**215160**		**104518**	
Travel cost *(* Exhibit A to Table 1*)	2160		4560		5760	
Cost of items directly purchased by the Institute, funded from the PEA *(** Exhibit B*)	63033		63033		63033	
Miscellaneous costs *(*** Exhibit C)*	122122		202915		92745	
Overheads (when applicable – state which categories they apply to)	44017		20958		6625	
Grand Total	**384796**		**506626**		**272681**	

	2024		2025		Total (2021-2025)
	FTE	Costs	FTE	Costs	
INSTITUTE COSTS					
Senior Researcher	0,47	17238	0,75	27749	
Junior Researcher	0,39	11352	0,67	19749	
Supporting staff – manufacturing					
Supporting staff - administration	0,14	3879	0,19	5139	
Total Manpower	32469		52638		558249
Travel cost *(* Exhibit A to Table 1*)	3360		4560		20400
Cost of items directly purchased by the Institute, funded from the PEA *(** Exhibit B*)	63033		63033		315165
Miscellaneous costs *(*** Exhibit C)*	16521		36923		471226
Overheads (when applicable – state which categories they apply to)	3049		6029		80678
Grand Total	**118432**		**163182**		**1445717**

** Travel plan to be provided in Exhibit A*
*** Items purchased by Institute to be listed in Exhibit B*
**** Miscellaneous costs to be detailed in Exhibit C*

Exhibit A to Table 1: Travel plan

PURPOSE OF TRIP	POINT OF DEPARTURE	DESTINATION	MEANS OF TRANSPORT	NUMBER OF TRIP(S)	NUMBER OF MEN	TRAVEL COST per TRIP (EURO)	TOTAL TRAVEL COST (EURO)
Progress/consortium meeting	Turnov	TBC	A+C	2/year	3	1800	10800
WP reviews	Turnov	TBC	A+C	8	2	1200	9600

Exhibit B to Table 1 - Items purchased by the Institute.

Year	*Tabe*	*Unit price*	*Number of units*	*Total Price (EURO)*
2022-2025	Vacuum system (Vakuum Praha, Czech Republic)	66946	1	66946
2022-2025	Aluminium (Czech Republic)	6248	1	6248
2022-2025	Stainless steel (Czech Republic)	2544	1	2544
2022-2025	Fasteners (Czech Republic)	1384	1	1384
2022-2025	Coating qualification (VUTS, VZLU,Czech Republic)	86110	1	86110
2022-2025	Thermal tests (VZLU, Internal, Czech Republic)	91849	1	91849
2022-2025	Polishing agents, abrasives, technical fluids (Czech Republic)	2677	1	2677
2022-2025	Thermal chamber sensors, pipes, control unit (Czech Republic)	57407	1	57407

(*) Type of item may be specified when needed: e.g. equipment, parts, components, services…
A table per type of procurement may be provided (e.g. equipment, services, parts, components, etc). In that case, label the tables as “Exhibit B1 to table 1”, “Exhibit B2 to table 1” etc. Itemised lists may be required, to be addressed on a case-by-case basis.

(**) Proposed country of purchase: if a single supplier is identified (single source).

Exhibit C to Table 1 – Miscellaneous costs.

Year	*Miscellaneous cost, designation*	*Total Price (EURO)*
2021-2025	Office equipment	1750
2021-2025	Internal Special Facilities	469476

Table 2: Items to be purchased via ESA (above 5 000 Euro)

Year	*Item (*), supplier and proposed country of purchase (**), planned month/year of procurement (***)*	Total Price (EURO)
	N/A	

(*) Type of item may be specified when needed: e.g. equipment, parts, components, services… A table per type of procurement may be provided (e.g. for equipment, services, parts, components, etc). In that case, label the tables as “Table 2.1”, “Table 2.2”, etc. Itemised lists may be required, to be addressed on a case-by-case basis.

(**) Proposed country of purchase: if a single supplier is identified (single source).
(***) Specify when the procurement should be started, considering the potential long lead times.

PSS forms can be added here (if required; need for PSS forms to be addressed with the ESA Technical Officer).

Table 15: ***Institute Labour Costs in Euro***

COMPANY COST ELEMENT DATA SHEET	FORM No. PSS A1 Issue 01	Page no. 1 of 1
RFQ/ITT no.:	ARIEL - TOPTEC - Common optics	COMPANY NAME: Institute of Plasma Physics of the CAS
PROPOSAL no.:		Name and title: RNDr. Radomír, Pánek, Ph.D.
NATIONAL CURRENCY *:	CZK	Signature:
Period for which agreed rates and overheads are valid : From	01.01.2018 To 31.12.2018	
ECONOMIC CONDITIONS:	2018	

1. LABOUR Direct labour cost centres or categories	Basic Labour hourly rate (NC)	Labour OH%	GROSS HOURLY RATE NC	Agreed by / Status (x when appl.)
Senior researcher	565	40%	791	
Junior researcher	382	40%	535	
Supporting staff - manufacturing	301	40%	421	
Supporting staff - administration	301	40%	421	
Basic Labour = Gross salary + Social and health insurance				

2. INTERNAL SPECIAL FACILITIES	Type of Unit	UNIT RATE (NC)
CAD Software	hour	600
FEM Software	hour	1100
Optical design software	hour	400
Milling machine	hour	1600
OptoTech MCP 250 CNC (polishing)	hour	1400
Zeeko IRP 100 polishing	hour	1400
ASI - QED - aspherical interferometer	hour	2600
Mitutoyo LEGEX 774 - shape measurement	hour	1200
Shape generator SPM 60 SatisLoh	hour	900
Plano polishing	hour	810
microughness - WLI Zigo	hour	1200
SPDT - Moore Nanotech	hour	2800
Lathe	hour	700
PVD machine	hour	2700
Spectrometer	hour	1200
Elipsometer	hour	1200

3. OTHER COST ELEMENTS According to ESA type		According to normal company type	OVERHEADS %
3.1	Raw materials		15.00%
3.2	Mechanical parts		15.00%
3.3	Semi-finished products		
3.4	Electric & electronic components		
3.5	Hirel parts		
	a) procured by company		
	b) procured by 3rd party		
3.6	External major products		5.00%
3.7	External services		5.00%
3.8	Transport, Insurance		15.00%
3.9	Travels		15.00%
3.1	Miscellaneous	Consumables (CZE: Spotřební materiál)	0.00%
3.11	Subcontracts		

GENERAL EXPENSES According to ESA type	According to normal company type	Applicable on cost element no.	OVERHEADS %
5. General & Admin. expenses			
6. Research & Developm. expenses			
7. Other (specify)			
12. COST WITHOUT ADDITIONAL CHARGE			

* No mention of the EURO is required unless the cost accounting system is in EURO in which case the EURO shall be used as the N.C.

Table 16: PSSA8+ExA-TOPTEC-Price summary (Inserted PDF)

Manpower and Price Summary 1

Subject: Institute of Plasma Physics of the CAS - TOPTEC | ARIEL - TOPTEC - Common optics

(*) National Currency (NC) : CZK | 2018

Company		IPP	IPP	IPP	IPP	IPP	IPP	IPP	IPP	IPP	
WP Title		Concept Analysis	Project Management and PA activities	Detailed Opto-Mechanical analysis	Design of Thermal Vacuum Chamber	STM	AVM	FM	Manufacturing of Thermal Vacuum Chamber	Qualification activities	
WP Number		1110	1120	2110	2120	3110	3120	3130	3140	9110	
											Total WBS-Level
Labour hours as per PSS A2 (*)											
Senior researcher		672	2880	896	1280	560	560	560	1920	576	11337.6
Junior researcher		480	2304	640	1280	560	560	560	1536	1920	11273.6
Supporting staff - manufacturing		0	0	384	1280	0	0	0	960	960	3584
Supporting staff - administration		96	1152	128	128	112	112	112	192	192	2552
											0
Total Labour Hours		1248	6336	2048	3968	1232	1232	1232	4608	3648	28747.2
1. Total Labour Cost		752352	3657600	1158656	2126720	726320	726320	726320	2593920	1892736	16237041.6
2. Internal Special Facilities		577152	1555200	743605	2248942	722921	734740	734740	2314545	2445420	14416590
3.1-3.4 Material Costs		0	0	0	0	228000	228000	228000	1286250	150000	3134250
3.5 High Rel Parts Costs											0
3.6 External major products Cost											0
3.7 External Services Cost									1 500 000.00	3 987 375.00	5642426.45
3.8 Transport/Insurance Cost		0.00	0.00	0	0	100000	100000	100000	100000	100 000.00	720000
3.9 Travel and Subsistance Cost		0	0	0	0	0	0	0	0	0	524790
3.10 Miscellaneous Cost		0	45 000.00	0	0	0	0	0	0	0	45000
3. Total Other Costs		0	45000	0	0	328000	328000	328000	2886250	4237375	9541676
4. Subtotal Cost		1329504	5257800	1902261	4375662	1777241	1789060	1789060	7794715	8575531	40195308
5.- 7. General expenses											
8. Total Cost of WPs		1329504	5257800	1902261	4375662	1777241	1789060	1789060	7794715	8575531	40195308
11. Profit		79770	315468	114136	262540	106634	107344	107344	467683	514532	2411718
12. Cost without additional charge											
14. Total	NC	1409274	5573268	2016396	4638202	1883876	1896404	1896404	8262398	9090062	33516964
	EUROs	54782	216648	78383	180299	73231	73718	73718	321182	353355	1302895
16. Total Price	NC	1409274	5573268	2016396	4638202	1883876	1896404	1896404	8262398	9090062	43131816
	EUROs	54 782.28 €	216 647.93 €	78 382.75 €	180 299.40 €	73 231.33 €	73 718.31 €	73 718.31 €	321 181.66 €	353 355.19 €	1 656 249.81 €

(*) for PSS A8 of a single company. (**) The EURO is to be used as the NC where the cost accounting system is in EURO

Appendix 3

GUIDELINES for the preparation of Appendix 3 (CHANGE PROCEDURE)

A PRODEX Experiment Arrangement Change Procedure shall apply at least to any modifications of the Agency's financial commitment (Articles 2 of the Arrangement) and of the Term (Article 3 of the Arrangement).

1. Introduction of a Change

For all changes, whether requested by the Agency or initiated by the Institute, the latter shall submit a proposal for a PRODEX Experiment Arrangement Change Notice (CN) on the form (Appendix 3) attached hereto. The CN shall be filled in completely, and boxes or lines which are not applicable shall be so designated by use of the letters "N/A". The form shall be signed by the Institute's authorised representative(s) and be submitted to the Agency's representative for contractual and administrative matters.

The Institute shall ensure that each change proposal is fully co-ordinated with Appendices 1 and 2 to the arrangement and that all reasonably foreseeable implications of the change have been considered. If the space on the form is not sufficient to describe the change and its consequences, the additional information shall be annexed to the form. The Institute shall, on request of the Agency, provide additional documentary evidence.

2. Approval or Rejection of the Arrangement Change Notice

Upon receipt of a CN signed by the Institute, the Agency shall consider it as regards its acceptability. Should the CN be approved, it will be signed by the ESA PRODEX Office's authorised representative and a copy be returned to the Institute. Should a CN be rejected for any reason, the Institute shall be informed accordingly, together with the reasons for the rejection.

3. Implementation and Status of Approved Arrangement Change Notices

Upon signature of a CN by both parties, the CN has immediate effect and constitutes a binding contractual agreement for which the contractual clauses of the main contract which are not modified by the approved CN, remain applicable.

Appendix 3

PRODEX EXPERIMENT ARRANGEMENT CHANGE NOTICE	
PEA: Institute: Project:	CN No:
Title of area affected	Article(s) of the Arrangement: Initiator of change:
Description of change:	
Reason for change	
Funds *in addition to / in deduction of / in replacement of* those stipulated in Article 2.1 (write "Cost Neutral" if cost neutral CN): EURO: See updated Financial Plan in annex. Total amount LoL including present CN:	
Effect on other Arrangement provisions: N/A	Commencement of Term: End of Term:
Institute	
Institute's representative(s):	Date
ESA	
PRODEX Office representative(s):	Date