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Type of action:
Innovation Action

Intelligent data-driven pipeline for the manufacturing of certified metal parts through Direct Energy Deposition processes

integradde

GUIDE FOR APPLICANTS

Expression of Interest

Submission of applications starts on 1 June 2021, at 00:00 Brussels time

Submission deadline: 2 November 2021, 17:00 Brussels time

Version 30/09/2021

Document Revision History

Version	Date	Modification Reason
V0	13.5.2021	Initial version
V1	19.5.2021	Internal review
V2	26.5.2021	Internal review
V3	28.5.2021	Internal review
V4	01.07.2021	Update of services offered
V Final	30.09.2021	EOI extension

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1. Basic Info about INTEGRADDE

INTEGRADDE[1] aims to open Additive Manufacturing (AM) processes based on DED technologies [i.e. Laser Metal Deposition (LMD) for manufacturing of complex geometries in medium-sized components with higher accuracy, and Wire-Arc Additive Manufacturing (WAAM) for simpler geometries with higher deposition rates] to potential adopters by providing services and demonstration activities as a proof-of-concept and technology adoption de-risking postponing the need of large investments on infrastructure and capacities to latter stages and, thus, fostering the uptake of AM in EU industry ecosystem.

The INTEGRADDE consortium integrates a mix of twenty-six Universities, Research Technology Centres, SMEs and large European key players from eleven countries.

This Expression of Interest is addressed to European Manufacturing **SMEs and Midcaps willing to assess the implementation of Metal Additive Manufacturing in their production process.** For this, a series of **supporting services**, related to feasibility manufacturing assessment, interoperability validation of external technology (see section "What do we offer?"), and **valued each in an average of 20.000 €, will be offered for free for the 5 selected applicants**, which will be those that not only meet the requirements but that best align with the project scope, fit its main goals and maximise the impact potential.

This Guide for Applicants contains relevant information to understand how to successfully take part in the Expression of Interest of INTEGRADDE. If you have any questions while reading this document, go to the "Contact us" section. Additionally, other useful sources of information are the INTEGRADDE website and the Spaces helpdesk.

2. What do we offer?

This Expression of Interest (EoI) will **select 5 Manufacturing European SMEs and Midcaps willing to implement Metal Additive Manufacturing solutions in their production processes by receiving the INTEGRADDE services**. The services will be provided by the INTEGRADDE Open Pilot Lines Network, as a way for the Network to validate its operation and demonstrate the market acceptance of the services.

This Network is composed by 4 Research and Technology Organisations (AIMEN, IREPA, WEST, CEA) which host 4 manufacturing Open Pilot Lines integrating the INTEGRADDE manufacturing methodology (i.e. digital infrastructure, tools and solutions) for DED technologies, (Laser Metal Deposition (LMD) or Wire Arc Additive Manufacturing (WAAM)), offering R&D and technological services as well as supporting in process validation, implementation and proof-of-concept of DED technologies for potential adopters, smoothing the process.

[1] INTEGRADDE - Intelligent data-driven pipeline for the manufacturing of certified metal parts through Direct Energy Deposition processes. Innovation Action funded by Horizon 2020 and running from October 2018 to March 2023.

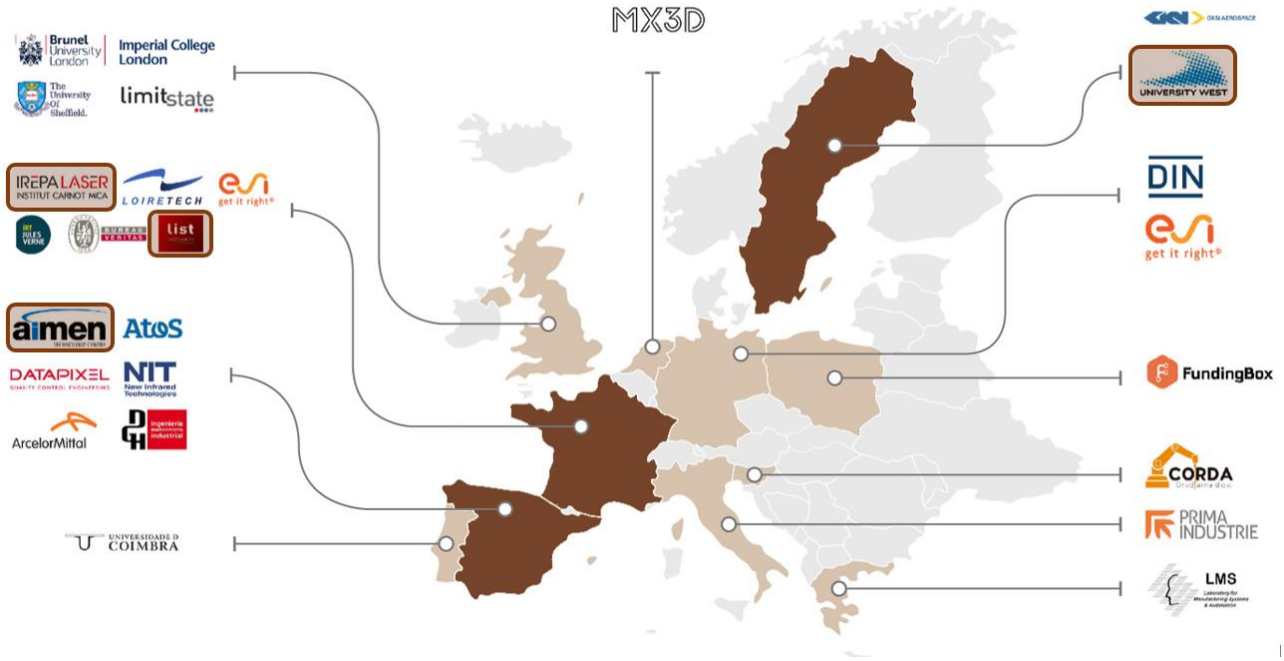

Figure 1. Open Pilot Lines Network geographical distribution

Beyond the OPLN, the fifth selected company will receive these services from MX3D, innovation leader in 3D metal printing and INTEGRADDE partner, as a private company also providing proof-of-concept/prototyping services based on INTEGRADDE methodology.

The services offered by the Network and MX3D can be summarised in the following packages:

Service Type	Service Name	Service Description
SERVICE PACKAGE – Host institution: AIMEN		
Consultancy	**SERVICE 1 -** Expert on DED MAM advise	3 sessions of 2 hours meeting with the INTEGRADDE expert to assess on DED AM adoption issues. The sessions will be scheduled along a 3-month period.
Process Development	**SERVICE 2 -** Feasibility manufacturing assessment	Part/component geometry validation. End-user profile. This service will consist on the manufacturing of a piece/part component manufacturing using INTEGRADDE pilot line. These services consist on up to 250h of expert technician from design to slicing, path planning, CAM (offline-programming) and the final manufacturing. The INTEGRADDE service provided by AIMEN will only include LMD-powder DED AM based on robot manufacturing process. As an outcome of this service the final piece/component provided will be validated based on disparity map and geometry dimensional validation.
	SERVICE 3 - Interoperability validation of external technology	Technology developer profile. Integration of provided external monitoring technology within AIMEN´s INTEGRADDE pilot line, data-driven compliance validation and performing of the digital twin from the monitoring signal. These services consist on up to 250h of expert technician. The INTEGRADDE service provided by AIMEN will only include LMD-powder DED AM based on

Service Type	Service Name	Service Description
		robot manufacturing process. As an outcome of this service the final validation will include the digital twin from acquired monitoring signals (cross-correlation with already existing image-based monitoring solutions would be performed, if it is feasible to arrange this multimodal monitoring system). The validated technology will be incorporated to the INTEGRADDE solutions portfolio (being potentially prescribed by INTEGRADDE Network Nodes to potential adopters/customers) and be promoted through the project dissemination tools, gaining visibility through an EU H2020 flagship project.
SERVICE PACKAGE – Host institution: WEST		
Consultancy	**SERVICE 4 -** Expert on WAAM AM advise	3 sessions of 2 hours meeting with the INTEGRADDE expert to assess on WAAM AM adoption issues. The sessions will be scheduled along a 3-month period.
Process Development	**SERVICE 5 -** Feasibility manufacturing assessment	Material integrity validation. This service will consist of manufacturing of simple components for integrity validation using the INTEGRADDE open pilot line for WAAM. These services consist of up to 120h of expert technician from design to slicing, path planning, CAM (offline-programming) and the final manufacturing. The INTEGRADDE service provided by WEST will only include the WAAM AM based on robot manufacturing process.
	SERVICE 6 - Interoperability validation of external technology	Integration of provided external monitoring technology within WEST INTEGRADDE WAAM open pilot line, data-driven compliance validation and performing of the digital twin from the monitoring signal. These services consist on up to 130 h of expert technician. The INTEGRADDE service provided by WEST will only include WAAM and welding wire for a robot manufacturing process. As an outcome of this service the final validation will include the digital twin from acquired monitoring signals (cross-correlation with already existing image-based monitoring solutions would be performed, if it is feasible to arrange this multimodal monitoring system). As an outcome of this service the final component provided will be validated with respect to structural integrity. This will be done through microstructural analysis and Mechanical testing.
SERVICE PACKAGE – Host institution: CEA		
Consultancy	**SERVICE 7 -** Expert on controllability advise	For the applicant who already has identified an AM parts (new parts or parts already manufactured under "short-runs" category), possibilities of non-destructive testing will be evaluated by simulation using CIVA software. CIVA allows to simulate controls using different techniques (UT, RT, CT, IRT, ET). An expert of this software will assess different possibilities among these techniques taking into account issues related to the material and geometry of the part, as well as DED environment. This consultancy will allow to recommend the method of inspection to be used as well as the inspection plan.
Process development	**SERVICE 8 -** X-ray tomography characterization	DED processes offer a very large number of possible manufacturing parameters. Depending on the desired characteristics of the part (material, geometry...), it is often useful during the development phase to produce

Service Type	Service Name	Service Description
	during the design phase	several trials with different sets of parameters and then to identify the best one by characterization the corresponding samples. One of the most relevant ways to do this characterization is to perform X-ray tomography (CT-scan). For this purpose, the applicant will provide a set of parts (~10 to 15) of simple geometry (ex: wall) to the CEA that will perform CT-scans and associated analysis. It will then be possible to know for each part, and therefore for each set of AM parameters, the quantity of defects, their nature (porosity, cracks, lack of fusion…), their size and their position. The best solution can then be identified.
	SERVICE 9 - Experimental NDT evaluation and recommendations	AM parts inspection can present specificities inherent to DED technologies. In addition to the geometrical complexity of the parts, which can represent a difficulty for inspection, their surface condition is often a constraint for conventional methods of inspection such as UT. In addition to the simulation study with CIVA described above, CEA OPL will carry out an experimental evaluation of the method of inspection previously identified on a finished part supplied by the candidate. This evaluation will estimate the performance limits considering the different types of defects, and it will also assess the opportunities for early inspection just after AM process on a rough surface condition or otherwise after final machining. CEA OPL will also provide recommendations on equipment to set up, with both functional specifications and examples of suitable devices, as well as the level of qualification required and/or the automation possibilities to perform this inspection.
SERVICE PACKAGE – Host institution: MX3D		
Consultancy	**SERVICE 10 -** Introduction in and review of suitability of WAAM for applicant	2 sessions of 2 hours meeting with the MX3D INTEGRADDE expert to assess the feasibility of the adoption of WAAM. The sessions will be scheduled during a 3-week period.
Process development	**SERVICE 11 -** Technical and Business case review of promising applications	Identify the best parts for WAAM. Understand the potential business potential. Review which technical barriers are most critical to success. 4 sessions of 2 hours meeting with the MX3D INTEGRADDE expert to assess the feasibility of the part(s). The sessions will be scheduled during a 2-month period.
	SERVICE 12 - Prototype print	If Phase II reveals an interesting part that is printable the best way to review the feasibility of introducing WAAM is to print a sample, including one test plate. A maximum of 5 printing days is included in the service. Larger prints are possible, but require a mutual agreement. Includes a closing review session in which the technical barriers are reassessed based on the sample print experience.
SERVICE PACKAGE – Host institution: IREPA		

Service Type	Service Name	Service Description
Consultancy	**SERVICE 13 -** Laser DED AM expert advice	2 sessions of 2 hours meeting with the INTEGRADDE expert to assess on DED AM adoption issues. The sessions will be scheduled along a 1-month period.
Process Development	**SERVICE 14 -** Feasibility manufacturing assessment	This service will consist in the manufacturing of a piece/part component manufacturing using INTEGRADDE pilot line. These services consist in: - Part/component geometry validation. - Understand and assess the potential business of the parts. - Design to slicing, path planning, CAM (offline programming) - Sample manufacturing and metallurgical assessment - Specific tooling design - Manufacturing of 1 Final part or scaled part (maximum deposited volume of 2000 cm3). The INTEGRADDE service provided by IREPA LASER will include LMD-powder or LMD-wire DED AM based on robot or CNC manufacturing process. Titanium parts needing controlled atmospheric environment may be addressed
Training	**SERVICE 15 -** DED Additive Manufacturing training	1 session of 2 days training on DED additive manufacturing technologies with a special focus on laser-based technologies: - Introduction to process principles - Design rules - Metallurgical approach of DED process. - Introduction to process thermomechanical simulation Demonstration on machines.

Figure 2. Matrix of services

The applicants will be able to **choose one of the 15 proposed services[2]:**

- **Service Package – Host institution: AIMEN**
  - SERVICE 1 - Expert on DED MAM advise
  - SERVICE 2 - Feasibility manufacturing assessment
  - SERVICE 3 - Interoperability validation of external technology
- **Service Package – Host institution: WEST**
  - SERVICE 4 - Expert on WAAM AM advise
  - SERVICE 5 - Feasibility manufacturing assessment
  - SERVICE 6 - Interoperability validation of external technology
- **Service Package – Host institution: CEA**
  - SERVICE 7 - Expert on controllability advise
  - SERVICE 8 - X-ray tomography characterization during the design phase
  - SERVICE 9 - Experimental NDT evaluation and recommendations
- **Service Package – Host institution: MX3D**
  - SERVICE 10 - Introduction in and review of suitability of WAAM for applicant
  - SERVICE 11 - Technical and Business case review of promising applications

[2] The applicants will be asked to prioritize their preferred services, and although the evaluators will try to respect these preferences, they could assign another service in case they find it a better match for the SME/Midcap needs and challenges.

SERVICE 12 - Prototype print

- **Service Package – Host institution: IREPA**
  SERVICE 13 - Laser DED AM expert advice
  SERVICE 14 - Feasibility manufacturing assessment
  SERVICE 15 - DED Additive Manufacturing training

The **5 applicants selected in this Expression of Interest will receive tailored services** from the INTEGRADDE host entity assigned, consisting in the services prioritized by the applicant, which in general will benefit from:

- Support for process development and validation from experts in top-tier organisations of the manufacturing industry part of the Consortium, which will enable the selected applicants to make an informed assessment on the applicability of alternative laser procedures. An **expert will be assigned** to each applicant selected to **mentor their participation in the Programme**.
- State of the art facilities for the prototyping of components and small production runs, where the use of specialized equipment is required.

The Expression of Interest call will be open from 1 June 2021, at 00:00 Brussels time until 2 November 2021, 17:00 Brussels time. Access the application form here: https://expression-of-interest-integradde.fundingbox.com/

3. Eligibility Criteria

3.1 Who are we looking for?

We are looking for **manufacturing SMEs[3] and Midcaps[4] registered in**:

- The Member States of the European Union and its Overseas Countries and Territories (OCT) or
- Associated Countries to H2020.
- The United Kingdom

3.2 Ideal Project

Several examples of potential applicants that could be selected under this Expression of Interest could be:

- ***Complete newcomer***:

  An EU SME or Midcap company providing traditional metal manufacturing services for their customers aims to assess the potential of Metal Additive Manufacturing (MAM) processes to

[3] An **SME** will be considered as such if it complies with the European Commission's Recommendation 2003/361/EC. As a summary, the criteria defining an SME are:
• Headcount in Annual Work Unit (AWU) less than 250;
• Annual turnover less or equal to €50 million OR annual balance sheet total less or equal to €43 million.
Note that the figures of partners and linked enterprises should also be considered as stated in the SME user guide. For detailed information check EU recommendation: https://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition_en

[4] Middle-capitalization company' or '**Midcap'** means an enterprise that is not a SME and that has up to 3 000 employees, knowing that the staff headcount is calculated in accordance with Articles 3 to 6 of the Annex to Commission Recommendation 2003/361/EC:
https://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:124:0036:0041:EN:PDF

replace their current traditional machining process for manufacturing a metal part/component (e.g., tooling for aeronautics with INVAR-series material).

They would like to have expert consultancy about specific adoption issues (investment needed, infrastructure needs, skills gaps, interoperability with existing systems, etc.), smoothing the process through an adoption technology de-risking mechanism and, better identify potential benefits and risk to take and informed-decision.

- ***Experienced user***:

  An EU SME or Midcap already using/assessing AM within their processes but facing specific issues on geometry, quality, efficiency, yield, etc limiting the adoption of MAM for a specific part/component.

  This company needs access to INTEGRADDE knowledge-basis and manufacturing approach to assess the potential of the MAM technology to provide a valid manufacturing route for the envisaged component/part. INTEGRADDE will work towards developing a valid and efficient process for the targeted application, geometry, materials, etc.

- ***Technology provider***:

  An EU SME or Midcap developing technology in the field of sensing solutions aims to validate its new solution for the MAM sector in the "real-field" and, therefore, they would like to test it through the INTEGRADDE pilot lines and within the INTEGRADDE digital manufacturing approach.

  This company will provide its technology to be integrated within the INTEGRADDE pilot line and the data-driven compliance validation will be checked (through the provision of the digital twin from the captured monitoring signal). The validated technology will be incorporated to the INTEGRADDE solutions portfolio (being potentially prescribed by INTEGRADDE Network Nodes to potential adopters/customers) and be promoted through the project dissemination tools, gaining visibility through an EU H2020 flagship project.

Any of the profiles above could be selected, but they should be in line with the specific capabilities of the hosts (see Annex I of this Guide for Applicants):

- AIMEN – SMEs or Midcaps process-based for LMD-powder (LMD-p).
- CEA - SMEs or Midcaps process-based for WAAM and different equipment for inspection of AM components.
- IREPA – SMEs or Midcaps process-based for CNC, LMD-p and LMD-w with capability to process Titanium.
- MX3D & WEST – SMEs or Midcaps process-based for WAAM and LMD-powder (LMD-p).

3.3 How to apply?

When applying to INTEGRADDE Expression of Interest, please also note that:

- We will evaluate only **proposals submitted through the online form within the deadline 2 November 2021, 17:00 Brussels time**. Upon receipt of each proposal, the system will send you a confirmation of your submission.
- The information requested through this online form (1-2 pages) is mainly related to the basic contact data and background of the applicant, the product and process proposed, background, the envisaged results and their impact, as well as the main challenges.

- Applicants will have to verify the completeness of the form, as it won't be possible to add any further information after its submission.
- Only one proposal per entity is admitted in this INTEGRADDE EoI. If more than one application is identified, only the last application which has been submitted in order of time will be evaluated.
- All applications must be written in English in all mandatory parts in order to be eligible. Only parts written in English will be evaluated.
- All mandatory sections of the application must be completed. The data provided should be actual, true, complete and should allow assessment of the proposal.
- Additional material, not specifically requested in the online application form, will not be considered for the evaluation. We will check all the information provided in your application during the evaluation phase and Agreement preparation phase.
- We will take into consideration the existence of potential conflict of interest among you and one or more consortium partners. Consortium partners, their affiliated entities, employees and permanent collaborators cannot take part in the INTEGRADDE EoI. All cases of potential conflict of interest will be assessed case by case.

The proposal submission and selection procedure will be done through the 'FundingBox Platform'.

INTEGRADDE plans an online webinar about this Expression of Interest. It will be announced at the INTEGRADDE Community.

4. How will we evaluate your proposal?

Our evaluation process is transparent, fair and equal to all our participants. For this Expression of Interest, we are looking for the best fit for our project and since we are much more concerned with quality than quantity, we suggest that you put effort into how you present your project in the best possible way, providing as much detail as you can, to support us while evaluating your application and identify the main key points and how it fits with the overall INTEGRADDE scope.

The evaluation of the proposals will be done in the following steps, which are explained in detail in the following sections:

- Eligibility check: Proposals which do not comply with the 'eligibility criteria' will be excluded from shortlisting at 'Eligible Applicants List'.
- Evaluation: individual evaluations of submitted proposals, resulting in the 'Ranking List'
- Consensus meeting: The 'Evaluation Committee' will check then the best proposals scored in the previous phase, and select the 5 winners.

After the Consensus meeting, once validations have been done, and before starting any activity, each selected applicant will sign an Agreement.

4.1 Eligibility Check

The eligibility check will be done on all proposals submitted before the deadline. All criteria (European Manufacturing SME or Mid-Cap) are listed in Section 3 in this Guide for Applicants. The projects that do not comply with those criteria will be excluded and marked as ineligible.
We will inform you about the results of the eligibility check.

4.2 Evaluation

In this phase, all projects will be evaluated by the 'Evaluation Committee', composed by experts in the manufacturing field from the participating host organisations (AIMEN, CEA, WEST, IREPA LASER and MX3D).

Each proposal will be evaluated by 2 experts, each from one of the 5 host organisations.

Your project will be evaluated within the following awarding criteria:

PRODUCT IDEA:

- Description of the product and process to be manufactured through Metal Additive Manufacturing.
- Applicant´s background and ambition relating to Metal Additive Manufacturing.

ENVISAGED RESULTS AND THEIR IMPACT:

- Sector or sectors addressed
- Initial business plan
- Envisaged markets (national/EU)

OBJECTIVES AND APPROACH OF THE SME / MIDCAP TO THE INTEGRADDE:

- Challenges towards the implementation of the MAM processes related to the product idea
- TRL of your product idea

The evaluators will score each award criterion on a scale from 0 to 5:

0 = Proposal fails to address the criterion or cannot be assessed due to missing or incomplete information
1 = Poor – criterion is inadequately addressed or there are serious inherent weaknesses
2 = Fair – proposal broadly addresses the criterion, but there are significant weaknesses
3 = Good – proposal addresses the criterion well, but a number of shortcomings are present
4 = Very good – proposal addresses the criterion very well, but a small number of shortcomings are present
5 = Excellent – proposal successfully addresses all relevant aspects of the criterion. Any shortcomings are minor.

Each evaluator will produce an Individual Evaluation Report. The final score will be calculated as an average of the individual assessments provided by the Evaluators.

For each section, the minimum threshold is 3 out of 5 points. The total maximum score will be 15 points, with a minimum total threshold of 10 points.

In case the scores of the evaluators differ by (or more than) 2 points in at least 2 of the award criteria, this difference will be solved by involving a third evaluator in the process.

In case of ties, the following criteria will be used to rank the projects, in order:

- SME status will be prioritised,
- Product score,
- Impact score,
- and Approach score

A 'Ranking List' will be elaborated as a result of this phase.

All proposals obtaining a score above the threshold, will pass to the next phase. Please note that we need time to process through all the proposals in this phase, so you probably won't hear back for a while.

4.3 Consensus Meeting

The 'Evaluation Committee' formed by one expert from each participating host organisation (AIMEN, CEA, WEST, IREPA LASER and MX3D) will decide by Consensus (or ⅔ majority votes) the 'List of finalists' to pass to the next phase and the 'Reserve List'. The discussion will be based on the ranking obtained as a result of the Evaluation.

Whilst normally the highest ranked proposals will be selected, the Evaluation Committee might have fair reasons for objecting to a specific applicant, like the alignment with INTEGRADDE goals and scope, the ability to achieve the highest impact possible, commercial competition, as well as the existence of significant ethical concerns or a potential conflict of interest. In this case, the choice may pass to the next-ranked proposal.

The exact number of proposals approved will be decided based on the overall **quality** of the proposals. After the Consensus Meeting, we will communicate the results to the applicants.

4.4 What's next? Agreement Preparation and Signature

Before any services are delivered, we will ask you to sign an Agreement with the INTEGRADDE Consortium. To do so, we will ask you to provide documents to prove your eligibility. Please do it within the deadlines that will be communicated to you. If you fail to deliver the requested documents on time, without clear and reasonable justification, we will exclude you from the further formal assessment and you will be replaced by a company from the Reserve list.

5. When will the services be provided?

The selected applicants will receive a package of services based on the host organisation chosen and the needs/services prioritised in their application form. The planned period for the reception of the services will be between **January 2022 and March 2022**[5].

<table>
<tr><th colspan="7">2021</th><th colspan="3">2022</th></tr>
<tr><td>June</td><td>July</td><td>August</td><td>September</td><td>October</td><td>November</td><td>December</td><td>January</td><td>February</td><td>March</td></tr>
<tr><td colspan="5">Expression of Interest Application Period

(Deadline: 2 November 2021, 17:00 Brussels time)</td><td colspan="2">Evaluation, Communication & Agreements Signature</td><td colspan="3">Reception of Services

(Approx. 12 weeks)</td></tr>
</table>

Figure 3. INTEGRADDE EOI and services implementation calendar

6. Contact us

If you have any questions regarding our Expression of Interest process you can post your questions at the Helpdesk space or you can send us a message to **Integradde.helpdesk@fundingbox.com**

In case of any technical issues or problems, please include the following information in your message:

- your username, telephone number and your email address,
- details of the specific problem (error messages you encountered, bugs descriptions, i.e. if a dropdown list is not working, etc.),
- screenshots of the problem.

If you have any doubts regarding the technology, or more tech aspect of the project, get in touch with our Technological Contact points Félix Vidal , Philippe BREDIF, Thomas Hansson or Vincent Pesquet, through the INTEGRADDE community.

For updates and project news, please visit the INTEGRADDE website.

Complaints:

If, after receiving the results of one of the evaluation phases, you consider that a mistake has been made, resulting in the rejection of your application, you have the right to send us a complaint. You can email us in English to **Integradde.helpdesk@fundingbox.com** including the following information:

- your contact details (including email address),
- the subject of the complaint,
- information and evidence regarding the alleged breach.

[5] The starting dates of each phase could change slightly due to unforeseen circumstances and/or needs of the process, although the basic duration (three months for reception of services) will remain unchanged.

Important note:

You have **3 calendar days** to submit your complaint starting from the day of becoming aware of the grounds for the rejection. We will review your complaint within no more than seven calendar days from its reception. If we need more time to assess your complaint, we will inform you by email about the extension.

We will not review anonymous complaints as well as complaints with incomplete information.

Please take into account that the evaluation is run by experts in the additive manufacturing field, and we do not interfere with their assessment, therefore we will not evaluate complaints related to the results of the evaluation other than related to the mistakes in the evaluation of the eligibility criteria.

7. Last but not least - final provisions

Any matters not covered by this Guide will be governed by Belgian law and rules related to the H2020 and EU grants.

Please take into account that we make our best effort to keep all provided data confidential; however, for the avoidance of doubt, you are solely responsible to indicate your confidential information as such.

The use of the technology provided within the framework of this EOI (and for the period specified in Section 5) doesn't give the selected applicants rights over the IP of the INTEGRADDE consortium.

For the selected applicants, the agreement signed will include the set of obligations towards the European Commission (for example: promoting the project and giving visibility to the EU funding, maintaining confidentiality, understanding potential controls by the EC/ECA and OLAF).

The INTEGRADDE Consortium might cancel the Expression on Interest at any time, change its provisions or extend it. In such a case we will inform all applicants about such change. Signature of the agreement is an initial condition to establish any obligations among applicants and any Consortium partners (with respect to the obligation of confidentiality of the application).

8. Extra hints before you submit your proposal

This final section highlights a few things that you should double check before submitting your proposal:

- Is your project in line with what INTEGRADDE is looking for? You are not sure? You can consult this section.
- Did you present your project in a way that will convince evaluators? Not sure if you did? Go back to this section.
- Is your project fulfilling all eligibility requirements described in the Guide? Not sure? Check again this section.
- Are you sure you are able to cope with our process of the agreement signature for selected proposals? You may want to go over this section.
- Do you need extra help? Contact us.

Annex 1: Technical capabilities

Specific infrastructure and technological capabilities of the host entities:

AIMEN Open Pilot Line - Lighthouse in robot-based LMD-powder

AIMEN Technology Centre has a largest laser industrial applications centre in Spain, constituting the national reference centre for this technology. In this regard, AIMEN owns the following **technological capabilities**:

- Several Laser Sources (diode lasers, fibre lasers and disk lasers up to 16kW) mounted on different robot and CNC manipulators from ABB, KUKA, SIEMENS and REIS providing up to 6m long working areas for laser processing.
    - Disk Laser Trumpf TruDisk 16002 (16 kW)
    - Diode Laser LASERLINE LDF 6000-40 (6kW)
    - CO2 Laser Rofin DC035 (3,5kW)
    - Fibre Laser ROFIN FL15C (1,5 KW) and
    - Fibre Laser Trumpf TruFiber400 (400W)
    - Robotized LMD:
        - ABB: IRB 140, IRB 1400, IRB 4400, IRB 600
    - CNC LMD:
        - 5 axis CNC machine
        - REIS 9 axis gantry with work range of 5m*2m*1m
- Testing Laboratories: Mechanical testing, microstructural characterization, Corrosion, Chemical-physical testing, Non-destructive testing (Radigraphic, Ultrasonic, LP, MP…), Metrology, Environmental analysis.
- Material feeding equipment: Wire Feeding Systems (Fronius TSP500, wire feeding torch coupled on a laserhead) and Powder Feeding Systems (Powder feeder Medicoat, Powder injection nozzle COAX8, Powder feeder GTV).

WEST Open Pilot Line- Lighthouse for robot-based WAAM

University West works on the development of production processes in the manufacturing industry. The focus is in welding, machining, Additive Manufacturing in metals, surface treatment, automation, inspection and control. This research center has advanced equipment and everything needed to develop new, smart production methods to strengthen the competitiveness of technological companies. In this regard, WEST owns the following **technological capabilities:**

- Several Welding Sources (MIG/MAG, TIG, Plasma) mounted on a robot from ABB providing up to 2.5 m long working areas for arc welding or AM.

- Fronius XXX CMT
- Robotized WAAM:
  - ABB: IRB 4400

- Process monitoring equipment: Spectrometers (UV-VIS-IR), IR-pyrometers, VIS-cameras, IR-cameras, HSI-camera, I/O:s for thermocouples, arc voltage and welding current, Robot communication including logging of motion.
- Testing Laboratories: Mechanical testing, microstructural characterization, Non-destructive testing (Radiographic, Ultrasonic,) Metrology, Environmental analysis.

IREPA Open Pilot Line - Solution provider for DED-powder and DED-wire Additive Manufacturing

IREPA LASER is a Centre of Technology Transfer specialised in the field of materials treatment by laser, mainly for micro-machining, laser welding and additive manufacturing. IREPA LASER is equipped with the following **technological capabilities:**

- Several Laser Sources (diode lasers and fibre lasers up to 10kW) integrated on various robot and CNC workstations.
  - Diode Laser IPG DLR 2000 (2kW – 600µm)
  - Fibre Lasers IPG YLR200, YLR500, YLS600QCW, YLR750, YLR6000, YLR10000
  - Femtosecond lasers AMPLITUDE 30W/150µJ, 20W/40µJ
  - Fibre Laser IPG MOPA 30W and Fibre Laser SPI MOPA 20W
  - Diode pumped YAG laser TRUMPF 532nm 7W
  - Robots for 3D-DED application: ABB4400 and 2xCOMAU NJ (to come)
  - CNC workstation for LMD-P and LMD-w applications:
    - 2 machines 5 axis CNC and 2 machines 3 axis CNC
    - Optical systems: welding scanners for high power laser beams
  - Machine for 3D texturing and micro-machining: Georg Fischer FGMS400
  - New machine for WAAM application with 2 robots COMAU. Workspace 6x3x3m3
- Testing Laboratories: Microstructural characterization, surface analysis, laser beam characteristics measurements.
- Material feeding equipment: DED-CoaxPrinter from PRECITEC, Wire Feeding Systems and TIG welding machines, and Powder Feeding Systems (Powder feeder Medicoat, PlasmaTechnic) coupled with in-house coaxial DED-CLAD® nozzles.

CEA Open Pilot Line - Lighthouse in NDT and Data Analytics software on a WAAM process

Commissariat à l'Energie Atomique et aux Energies alternatives (CEA) is a French public body which is active in research, development and innovation. The CEA LIST (Laboratoire d'Intégration des Systèmes et des Technologies), part of the Division of technological research (DRT or CEA Tech), is a research Institute

which carries out research on intelligent digital systems with societal and economic implications. In this regard, CEA can provide the following **technological capabilities**:

- Wire Arc Additive Manufacturing (WAAM) facilities within the AFH platform This WAAM set-up is based on Commercy-Robotique in the framework of the Additive Factory Hub (AFH) program. AFH integrates, develops and innovates the Additive Manufacturing technologies by federating in the same place competences and state-of-the-art means. Welding means available on the WAAM process:
    - MIG-MAG CMT with a Fronius TPSi
    - TIG Fronius – 150A with filler metal
    - Plasma 150A with filler metal
- Non-Destructive Testing (NDT) facilities: CEA List covers major inspection techniques: Ultrasounds and guided waves, Laser Ultrasound, Eddy Current, Radiography and Tomography. CIVA platform simulation: CIVA is a multi-technique (Ultrasound, Eddy Current, Radiography...) software platform developed by the CEA LIST and its partners. This software provides simulation tools for these different techniques, but also other functionalities through different modules such as the analysis of UT acquisition data or Computed Tomography.

MX3D - Lighthouse in WAAM application printing

MX3D is a Dutch company specialized in WAAM 3D-printing, developing ground-breaking robotic additive manufacturing technology equipped with the following **technological capabilities:**

- Wire Arc Additive Manufacturing (WAAM) facility. Our 9 WAAM set-ups:
    - MIG with Oerlikon Citowave III
    - CMT with Fronius
    - ABB / KUKA (various sizes and types of manipulators)
    - MetalXL: a full WAAM workflow
    - Control System: a custom control system measuring Arc, Voltage, Stickout, Temperature
    - Strong network of finishing, mechanical and material specialists
    - Experience in (stainless) steel, duplex, aluminum and bronze alloys