



**NEANIAS**  
**Novel EOSC services for Emerging Atmosphere,  
Underwater and Space Challenges**

**Deliverable Report**

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**Deliverable: D9.1 Exploitation plan, report on plan for refined exploitation targets and activities to be performed by the project and its members**

**31/03/2020**



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D9.1 Exploitation plan, report on plan for refined exploitation targets and activities to be performed by the project and its members

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## Disclaimer

NEANIAS is a Research and Innovation Action funded by European Union under Horizon 2020 research and innovation programme, via grant agreement No. 863448.

NEANIAS is project that comprehensively addresses the 'Prototyping New Innovative Services' challenge set out in the 'Roadmap for EOSC' foreseen actions. It drives the co-design, delivery, and integration into EOSC of innovative thematic services, derived from state-of-the-art research assets and practices in three major sectors: underwater research, atmospheric research and space research. In each sector it engages a diverse set of research and business groups, practices, and technologies and will not only address its community-specific needs but will also enable the transition of the respective community to the EOSC concept and Open Science principles. NEANIAS provides its communities with plentiful resource access, collaboration instruments, and interdisciplinary research mechanisms, which will amplify and broaden each community's research and knowledge generation activities. NEANIAS delivers a rich set of services, designed to be flexible and extensible, able to accommodate the needs of communities beyond their original definition and to adapt to neighbouring cases, fostering reproducibility and re-usability. NEANIAS identifies promising, cutting-edge business cases across several user communities and lays out several concrete exploitation opportunities.



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## Abstract

The exploitation plan aims to define the targets and foreseeable activities of exploiting the services created in the frame of NEANIAS, as well as the general results and synergies of the NEANIAS project. These targets are set per the main groups, as SMEs and industry partners in ICT field, ICT service providers and Research / Academic partners.

NEANIAS aims with this plan to align the main steps to the aims and specific requirement of these target groups. The NEANIAS project foresees three major ways of exploitation, namely:

- Exploitation through open calls and business
- Exploitation in the EOSC and European Infrastructures ecosystem
- Academic and research-oriented exploitation

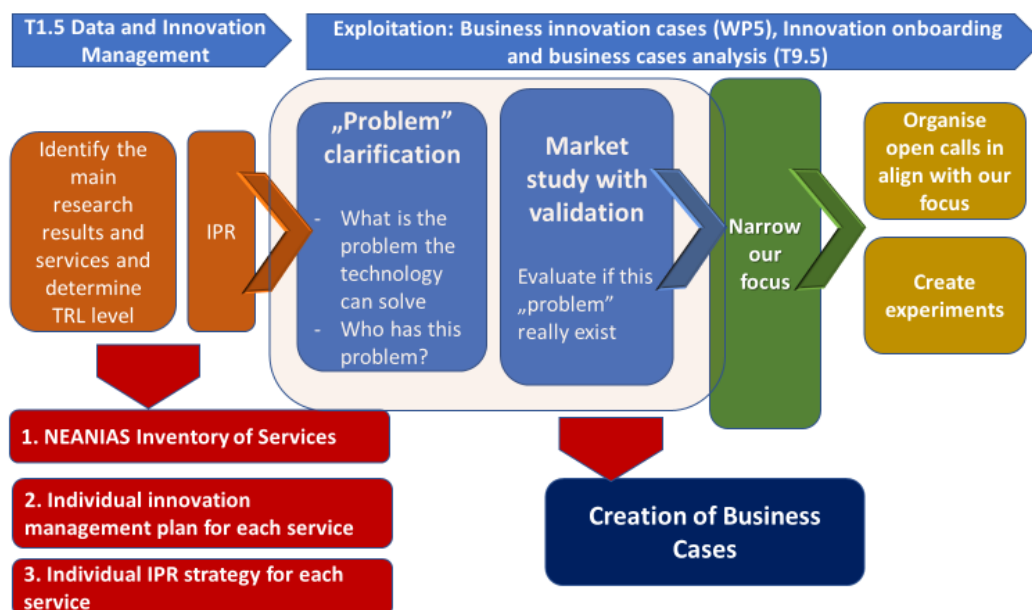
All three ways of exploitation are relevant for the NEANIAS partners, its details are described by each target group. Additionally, the project partners might receive added value of NEANIAS by exploiting the related services created in the frame of this project. This document structures these possible added values per partner, and also per services, to show their potential for individual and for joint exploitation over the long term.



## 1. Introduction and methodology of exploitation

NEANIAS aims to foster innovation management and exploitation of services created in the frame of the NEANIAS project, in all three thematic areas, Underwater, Atmosphere and Space environment as well as generic systematic services resulting from NEANIAS core services. All three research areas are developing services from TRL6, with the aim to reach TRL8 or above. These services – 3 in each thematic area – are designed for the utilisation in terms of business, academic and also through the EOSC platform. The exploitation of services is a complex process, where the specifications of services, the main developer of the service and also the possible stakeholders are taken into consideration when creating and exploitation strategy. The goal of exploitation within NEANIAS is the identification of the main ways to utilise the services of NEANIAS and exploit them on a long run.

Under exploitation we differentiate 3 main ways, Exploitation through open calls and business, Exploitation through EOSC and Academic exploitation. In order to utilise the NEANIAS services, the NEANIAS Consortium is taking into account the main perspectives of open innovation, to use external knowledge in the development process of products and services, which could not be available in-house otherwise. Besides external knowledge, it is also a key element in open innovation, to utilize internal knowledge by other actors.



1. Figure: Organising external and internal knowledge in NEANIAS

As you can see on the figure above, the actions and procedure of exploitation within NEANIAS will be divided into 2 parts. The first part is preparing exploitation activities by the actions of

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innovation management, on exchanging and handling the essential information related to the developments coming from all 3 sectors.

The second part of actions and procedures are following the principles of open innovation, where we intend to use external knowledge in managing and validating the new developments.

The exploitation starts with organising and structuring information, then based on this structured information and research results, the ways of exploitation will be determined, and joint exploitation plans created, depending on the type of exploitation, either it is business or academic related.

Each NEANIAS partner already described its expectation in terms of exploiting the research results of NEANIAS, and also the specific research areas in which they are involved. The exploitation of research results might therefore happen in individual/institutional ways. After evaluating the individual exploitation of project partners, joint exploitation plans will be created (details are in section 6) in align with the specifications of the services and the individual motivation of NEANIAS partners.

The basic elements of the services are collected and detailed in paragraph 5, and also the main service elements will be analysed in order to exploit its added values by the possible ways.

This exploitation plan details the possible added value of NEANIAS for each stakeholder, therefore their motivation in utilising NEANIAS services jointly or individually.

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## 2. Analysis of NEANIAS stakeholders

NEANIAS provide added value to the relevant stakeholders, partners of the project. Actors and stakeholders have to be engaged, and motivated to participate in NEANIAS, in order to share their experience and also to utilise the added values. The main stakeholders with project benefits are described in the following table:

*1. Table: Stakeholder benefits of NEANIAS*

| Stakeholder                | Need and relevance  | Project benefits  |
|----------------------------|---|---|
| <b>Researchers</b>         | Individual researchers are easier to be mobilized on a personal basis tempted by the offerings of the project, support penetration into scientific communities and provide valuable feedback. They also provide gateways to larger groups and other disciplines.                                    | Broadening user base; indirect raising of awareness; enabling of new (interdisciplinary) research opportunities.  |
| <b>Research groups</b>     | Research groups are the intended main target group of the project, for reusing and interweaving the service and data offerings to be generated. They are major providers to validate information and provide feedback. They are also drivers of interdisciplinary research targeted by the project. | Broadening user base; indirect raising of awareness; provisioning of structured feedback; identification and enabling of new (inter-disciplinary) research opportunities. |
| <b>Academic institutes</b> | Academic institutes can form an application space where thematic services can be utilized in the direction of education, in labs and lesson courses.  | Broadening user base, expanding business opportunities  |
| <b>Data providers</b>      | Data providers can greatly enrich the offering of the project especially regarding data intensive services adding to the value chain and also business and sustainability opportunities.  | Increase of data enabled service offerings; new opportunities for research; resolution of data outage/access restriction/data quality issues                              |

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|   |  |  |
|---|--|--|
| <b>Service Providers</b>                              | Service providers can be either consumers or suppliers of elements for the project service stack, adding to the value chain and also business and sustainability opportunities.  | Increase of service-based value chain; reuse of existing systems; new business opportunities; Empowering of sustainability.  |
| <b>Open Access/Open Science Initiatives</b>           | Open access/Open Science initiatives provide guidance, support, validation and assets that can be reused in the context of the Project   | Project awareness support, Validation and feedback acquisition; Embracing open science; Validation and feedback acquisition  |
| <b>Business SMEs</b>                                  | SMEs offering business services on top of research data and services are one of the best options for creating revenue generating value chains on top of project offerings and essential part of sustainability targets | Empowering of sustainability options; new business opportunities;  |
| <b>eInfrastructure, EOSC (hub) satellite projects</b> | NEANIAS aims to enforce the EUSC spectrum and the relevant projects for reuse of data, services and know-how, and needs to be closely monitored, contacted and informed about the activities of the project.           | Service reuse and common challenge confronting for effort optimisation; amplification of outreach; identification of new (inter-disciplinary) research opportunities and service value chains; |
| <b>Digital) Innovation Hubs / Business Clusters</b>   | Aggregators of business and innovation is a source of potential adopters and up-takers as well as of ideas for new business cases not initially considered.  | Empowering of sustainability options; new business opportunities; expanding adoption base  |
| <b>Governance &amp; Policy Makers</b>                 | Governance and policy making is essential target group of the project, and substantially adds to the sustainability outlook  | Expansion to new business cases; widening of sustainability options  |
| <b>Funders</b>  | Funders awareness is focusing on validation, to prove the usability of the service.  | Validation and feedback; amplification of outreach; supporting/validating sustainability   |
| <b>General Public</b>                                 | Raise awareness on Participants, Project, Open Science and Funder activities to citizens / taxpayers,  | Increase the value of the project and individual partners  |

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|  |  |
|--|--|
|  | policy makers and other stakeholders not directly addressed by other activities. |
|--|--|

The exploitation of NEANIAS services are different per each stakeholder group:

| Partner profile                         | Main partners  | Exploitation areas   |
|---|--|--|
| SMEs and industry partners in ICT field | CITE, MEEU, UBIWHERE, ALTEC, CORONIS, INNOMINE, INCITES  | <ul style="list-style-type: none"> <li>- Identifying road to financially sustainable services</li> <li>- Evaluation of opportunities and possibilities for future services</li> </ul>  |
| All industry and SME partners           | CITE, MEEU, UBIWHERE, ALTEC, CORONIS, INNOMINE, INCITES, RICOH, EUNICE                             | <ul style="list-style-type: none"> <li>- Strengthen R&amp;I profiles</li> <li>- Building HR competences</li> <li>- Build synergies with other companies and increase awareness</li> <li>- Investigate opportunities for provisioning additional services</li> </ul>                |
| ICT service providers                   | NKUA, INAF, UBREMEN, CORONIS, ATHENA, UBIWHERE, CITE, MEEU, SZTAKI, GARR, JACOBSUNI, UNIMIB, ALTEC | <ul style="list-style-type: none"> <li>- Increasing their asset portfolio with new/improved reusable components and systems</li> <li>- Developing new products, and conduct further researches</li> </ul>  |
| Research / Academic partners            | INAF, NKUA, UBREMEN, UOP, ATHENA, AMU, SZTAKI, JACOBSUNI   | <ul style="list-style-type: none"> <li>- Enhance research profile</li> <li>- Exploit enhanced tools and data sets in the production of new scientific knowledge as well as the continuation of the developed research</li> <li>- Develop relevant educational processes</li> </ul> |
| Research sector entities                | INAF, AMU, ATHENA, NKUA, JACOBSUNI   | <ul style="list-style-type: none"> <li>- Enhancing line of business</li> <li>- Possible introduction of new start-ups, spinoffs</li> <li>- European and International network of excellence</li> <li>- Develop internal processes</li> </ul>                                       |

Overall, stakeholders, policy makers and project partners aim to utilize the services of NEANIAS, especially the market opportunities, which might lead to promising business models and plans, as well as joint exploitation opportunities. In the following chapters the exploitation

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plan, vision of partners is described, focusing on each service in the Underwater, Atmospheric and Space research area. Besides the services, individual expectations of the partners are also collected and analysed.

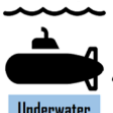
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### 3. Exploitation of NEANIAS services

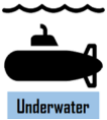
This paragraph summarises the main, basic elements of each service developed in the frame of NEANIAS, in terms of exploitation. As a first step, it is identified and detailed, what the technology/service is designed for, what the problem is, that the service solves, and if the service developers have any idea for standardisation. These are the first, necessary elements to determine the possible ways of exploitation and try to identify synergies already at the beginning. *Based on these inputs, the evaluation can start considering individual, as well as joint exploitation.* The plans of individual exploitation are described by partners, with the main related steps in paragraph 5.

In the following tables the main inputs to exploitation are described with a special focus on utilising business opportunities.

#### 3.1. Underwater Research Services

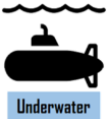
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|---|--|
|  <p><b>Service U1</b></p>   | <p><b><i>The Bathymetry Mapping from Acoustic Data service will deliver an advanced user-friendly, cloud-based version of the popular open source MB-System software for post-processing bathymetry through Jupyter notebooks with additional functionalities.</i></b></p>   |
| <p><b>What is U1 designed for?</b><br/><i>(What is the aim of the service in brief?<br/>Who are the potential users, and in which industries can it be used?)</i></p>       | <p>The U1 service targets bathymetry mapping from acoustic data, and will engage specific user-communities through the foreseen demonstrations in several underwater datasets addressing current needs of marine scientists, archaeologists, marine geohazards, energy power cabling planners and/or oil &amp; gas engineers.</p>  |
| <p><b>What is the TRL level of the service?</b></p>   | <p>Currently the service is in TRL6 and aims to reach TRL8</p>   |
| <p><b>What is the “problem”, that the service solves?</b><br/><i>(“Problem” means: the “need” of the potential users, for which this service provide the solution?)</i></p> | <p>U1 will solve the problem of mapping efficiently the seafloor providing a trustworthy end-product under the compliance of the International Hydrographic Organization (IHO). U1 will provide fast, efficient and user-friendly services to process bathymetric data and could also serve as a near-real time tool to assess the acquisition parameters while surveying.</p> |
| <p><b>Plans for standardisation and Open Source Contributions (if any)</b></p>  | <p>The delivered software will use open standards and will be compliant with tools and services from the International Hydrographic Organization (IHO), the Open Navigation Surface (ONS) group and the Open Geospatial Consortium (OGC) ensuring interoperability.</p>  |

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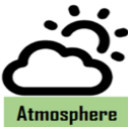
|   |   |
|---|---|
|  <p><b>Service U2</b></p>  | <p><i>The Seafloor Mosaicing from Optical Data service aims to provide an operational solution for large area representation (in the order of tens of thousands of images) of the, predominantly flat, seafloor addressing also visibility limitations from the underwater medium.</i></p>  |
| <p><b>What is U1 designed for?</b><br/> <i>(What is the aim of the service in brief?<br/>         Who are the potential users, and in which industries can it be used?)</i></p> | <p>The U2 service is aimed for seafloor 2D mosaicing and 3D reconstruction using optical data (images). The main potential users are Geologists, Biologists and Archaeologists. Main potential stakeholders are Industries and agencies involved in Underwater missions and related technologies addressing underwater activities such as inspection, maintenance and repair of manmade structures.</p>   |
| <p><b>What is the TRL level of the service?</b></p>   | <p>Currently the service is in TR6 and aims to reach TRL8</p>   |
| <p><b>What is the “problem”, that the service solves?</b><br/> <i>(“Problem” means: the “need” of the potential users, for which this service provide the solution?)</i></p>    | <p>U2 will solve the problem of creating 2D and 3D representations of the seafloor from underwater images, and optional navigation data.</p>  |
| <p><b>Plans for standardisation and Open Source Contributions (if any)</b></p>  | <ol style="list-style-type: none"> <li>1. Standards for web-based visualization of large-scale image maps such as the Tile-Map Service (TMS) or the Web Map Tile Service (WMTS) will be studied and implemented in order to deliver the mosaics resulting from the U2 service in a way that, on the one hand, eases its visualization and manipulation on the user side and, on the other hand, goes in line with maintaining these maps on the cloud.</li> <li>2. Due to the lack of standardization for representing relevant prior information for the reconstruction process, such as camera calibration or navigation information, a format will be defined, that allows to provide this information to the service, and/or retrieve it as an additional output. While there is no precise standardization on calibration information, we will provide means to import this type of data from OpenCV-compliant files.</li> </ol> |



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|  <p><b>Service 3</b></p>   | <p><b><i>The Seabed Classification from Multispectral, Multibeam Data service will deliver a user-friendly cloud-based solution integrating cutting-edge machine learning frameworks for mapping several seabed classes, validated for archeological, geo-hazards, energy, and other applications.</i></b></p>  |
| <p><b>What is U1 designed for?</b><br/><i>(What is the aim of the service in brief? Who are the potential users, and in which industries can it be used?)</i></p>           | <p>The U3 service targets seabed classification from multispectral multibeam data and will engage specific user-communities through the foreseen demonstrations in several underwater datasets addressing current needs of marine scientists, archaeologists, submarine volcano/geohazards, energy power cabling planners and/or oil &amp; gas engineers.</p> |
| <p><b>What is the TRL level of the service?</b></p>   | <p>Currently the service is in TRL6 and aims to reach TRL8</p>  |
| <p><b>What is the “problem”, that the service solves?</b><br/><i>(“Problem” means: the “need” of the potential users, for which this service provide the solution?)</i></p> | <p>U3 will solve the problem of mapping efficiently the seafloor into a number of seabed classes which is important for several underwater and marine studies and applications.</p>   |
| <p><b>Plans for standardisation and Open Source Contributions (if any)</b></p>  | <p>The delivered software will use open standards and will be compliant with tools and services from the Open Geospatial Consortium (OGC) ensuring interoperability.</p>  |

### 3.2. Atmospheric Research Services


|   |  |
|---|--|
|  <p><b>Service A1</b></p>  | <p><b><i>The Greenhouse Gases Flux Density Monitoring service will deliver an operational workflow for estimating flux density and fluxes of gases, aerosol, energy from data obtained from specifically set meteorological stations, validated towards standardized, regularized processes.</i></b></p> |
| <p><b>What is U1 designed for?</b><br/><i>(What is the aim of the service in brief? Who are the potential users, and in which industries can it be used?)</i></p> | <p>Fine tuning of expertise of our chosen subject, i.e. the algorithms of determination of flux densities of Greenhouse Gases, momentum and energies. It is a fine opportunity to improve these algorithms and prove that these improvements can be used and accepted by the scientific community.</p>   |
| <p><b>What is the TRL level of the service?</b></p>   | <p>Approx. TL-6 progressing to TL-8</p>  |

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| <p><b>What is the “problem”, that the service solves?</b><br/> <i>("Problem" means: the "need" of the potential users, for which this service provide the solution?)</i></p> | <p>If and when the improvements are accepted by the scientific community, ATHENA will be able to put its name on the "map" of leading institutions in this field.</p> |
| <p><b>Plans for standardisation and Open Source Contributions (if any)</b></p>   | <p>Yet to be defined</p>  |

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|  <p>Service A2</p>  | <p><b><i>The Atmospheric Perturbations and Components Monitoring service will perform all required analytics of atmospheric and meteorological data in order to estimate possible correlations of gaseous and particulate components of the atmosphere with earthquake and volcanic processes</i></b></p>  |
| <p><b>What is U1 designed for?</b><br/> <i>(What is the aim of the service in brief?<br/>         Who are the potential users, and in which industries can it be used?)</i></p> | <p>Fine tuning of expertise in the atmospheric perturbations originating from tectonic activities. Data collection, recording, processing and publishing in order to develop and publish a time series. It is a fine opportunity to improve the possible prediction of tectonic events if peaks in atmospheric perturbations are associated with these events. A nudge to the tectonic community to start recording atmospheric perturbations, systematically.</p> |
| <p><b>What is the TRL level of the service?</b></p>   | <p>Approx. TL-6 progressing to TL-8</p>  |
| <p><b>What is the “problem”, that the service solves?</b><br/> <i>("Problem" means: the "need" of the potential users, for which this service provide the solution?)</i></p>    | <p>Proof of the concept will be the correlation of the atmospheric perturbation with a tectonic event.</p>   |
| <p><b>Plans for standardisation and Open Source Contributions (if any)</b></p>  | <p>The above sentence indicates that it may be possible to establish a standard procedure for correlating atmospheric perturbations with tectonic events.</p>  |

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|  <p><b>Service A3</b></p> <p>Atmosphere</p>   | <p><i>The Air Quality Estimation, Monitoring and Forecasting service will deliver a novel cloud-based solution providing crucial information and products to a variety of stakeholder in agriculture, urban/ city authorities, health, insurance agencies and relative governmental authorities.</i></p>                              |
| <p><b>What is U1 designed for?</b><br/> <i>(What is the aim of the service in brief? Who are the potential users, and in which industries can it be used?)</i></p>           | <p>Fine tuning of expertise of the chosen subject, i.e. the algorithms of determination of flux densities of Greenhouse Gases, momentum and energies. It is a fine opportunity to improve these algorithms and prove to the developing institution, that these improvements can be used and accepted by the scientific community.</p> |
| <p><b>What is the TRL level of the service?</b></p>  | <p>TL6 (expected to reach TRL7/8)</p>   |
| <p><b>What is the “problem”, that the service solves?</b><br/> <i>(“Problem” means: the “need” of the potential users, for which this service provide the solution?)</i></p> | <p>If and when the improvements are accepted by the scientific community, ATHENA will be able to put its name on the "map" of leading institutions in this field.</p>   |
| <p><b>Plans for standardisation and Open Source Contributions (if any)</b></p>   | <p>No plans yet.</p>  |

### 3.3. Exploitation of Space Research Services


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|  <p><b>Service S1</b></p> <p>Space</p>  | <p><i>The FAIR Data Management and Visualization service will provide an advanced operational solution for data management and visualization service for space FAIR data based on widespread and popular tools like VisIVO, ADN and PlanetServer.</i></p>  |
| <p><b>What is S1 designed for?</b><br/> <i>(What is the aim of the service in brief? Who are the potential users, and in which industries can it be used?)</i></p> | <p>The S1 service is aimed for data management and visualization of astrophysics and planetary data. The main potential users are Astrophysics and Planetary scientists. Main potential stakeholders are Industries and agencies involved in Space missions and related technologies addressing space activities such as planetary mining engineering, planetary robotics,</p> |

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|  | computer vision, mobile telecommunications and space weather.  |
| <b>What is the TRL level of the service?</b>   | Currently the service is in TR6 and aims to reach TRL8   |
| <b>What is the “problem”, that the service solves?</b> ( <i>“Problem” means: the “need” of the potential users, for which this service provide the solution?</i> ) | 2D and 3D visualization of astrophysics and planetary data including multiwavelength surveys of the Milky Way and multispectral topographic data of Solar System bodies. |
| <b>Plans for standardisation and Open Source Contributions (if any)</b>  | Plan to use open standards from the International Virtual Observatory Alliance (IVOA), the Open Geospatial Consortium (OGC) and the World Wide Web Consortium (W3C)      |

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|  <b>Service S2</b>  | <b><i>The Map Making and Mosaicing of Multidimensional Space Images service will deliver a user-friendly cloud-based version of the already existing workflow for map making and mosaicing of multidimensional map images based on open source software such as Unimap and Montage.</i></b>   |
| <b>What is S2 designed for?</b><br><i>(What is the aim of the service in brief?<br/>         Who are the potential users, and in which industries can it be used?)</i> | The S2 service is aimed for map making and mosaicing of multidimensional astrophysics and planetary images. The main potential users are Astrophysics and Planetary scientists. Main potential stakeholders are Industries and agencies involved in Space missions and related technologies addressing space activities such as planetary mining engineering, planetary robotics, image processing, computer vision, mobile telecommunications and space weather. |
| <b>What is the TRL level of the service?</b>   | Currently the service is in TR6 and aims to reach TRL8  |
| <b>What is the “problem”, that the service solves?</b> ( <i>“Problem” means: the “need” of the potential users, for which this service provide the solution?</i> )     | Map making and mosaicing of astrophysics and planetary images including multiwavelength surveys of the Milky Way and multispectral topographic data of Solar System bodies.   |
| <b>Plans for standardisation and Open Source Contributions (if any)</b>  | Plan to use open standards from the International Virtual Observatory Alliance (IVOA), the Open Geospatial Consortium (OGC) and the World Wide Web Consortium (W3C)   |

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|  <p><b>Service S3</b></p>  | <p>The <b>Structure Detection on Large Scale Maps with Machine Learning service</b> will deliver a user-friendly cloud-based solution for innovative structure detection (e.g. compact/extended sources, filaments), extended the popular CAESAR/ CuTEx tools with machine learning frameworks</p>   |
| <p><b>What is S3 designed for?</b><br/> <i>(What is the aim of the service in brief?<br/>         Who are the potential users, and in which industries can it be used?)</i></p> | <p>The S3 service is aimed for the identification and classification of astronomical sources from large surveys and surface regions from planetary maps. The main potential users are Astrophysics and Planetary scientists. Main potential stakeholders are Industries and agencies involved in Space missions and related technologies addressing space activities such as planetary mining engineering, planetary robotics, image processing, machine/deep learning, mobile telecommunications and space weather.</p> |
| <p><b>What is the TRL level of the service?</b></p>   | <p>Currently the service is in TR6 and aims to reach TRL8</p>  |
| <p><b>What is the “problem”, that the service solves?</b> <i>(“Problem” means: the “need” of the potential users, for which this service provide the solution?)</i></p>         | <p>Structure detection, aided with machine learning, on large scale maps from astrophysics and planetary data to characterize sources and star forming regions present in astronomical maps and to identify regions of interest in planetary surfaces.</p>   |
| <p><b>Plans for standardisation and Open Source Contributions (if any)</b></p>  | <p>Plan to use open standards from the International Virtual Observatory Alliance (IVOA), the Open Geospatial Consortium (OGC) and the World Wide Web Consortium (W3C)</p>   |

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## 4. Categories of exploitation

Exploitation of NEANIAS services can be implemented in the following ways:

**Onboarding to the EOSC Ecosystem:** The ambition of NEANIAS project regarding the exploitation of its services within the EOSC ecosystem is multi-fold. First, as EOSC forms a rich ecosystem of researchers, funders and organizations, NEANIAS aims to make available in TRL8 all thematic services and moreover publish them in the EOSC catalogue of services. Onboarding into EOSC will make NEANIAS services discoverable and accessible and this way reach out and attract new users not only from these 3 communities but also from other disciplines as well. Moreover, EOSC onboarding will offer NEANIAS the ability of empowering and advancing current NEANIAS service capabilities and offering with new features and functionality offered by EOSC Federated Core services.

In addition, innovation potential will be fostered by the participation of NEANIAS into EOSC. NEANIAS opens up EOSC ecosystem for several new actors from several disciplines and domains, largely not present in EOSC at its current form, engaging them in innovation processes that will not only bring to EOSC new services but will also engage existing ones in new flows of data/information/knowledge and revenue generation. Research, industry, education, non-profit, consultants and business developers, governance and policy makers are all present in the workplan of NEANIAS to empower innovation and EOSC will be a most most fertile ground for this.

**Academic exploitation:** the exploitation of NEANIAS services in the academic sphere is relevant. Possible ways of exploitation:

- include the research results into a university curriculum
- organise joint curriculums between the project partners
- organise master programs in a definite topic
- develop the service further in the frame of a PhD program
- the researches can be utilised on relevant fields, including the 3 thematic areas plus from core services technology

**Licensing:** once IP issues are cleared; it is an opportunity for the consortium members to licence the technology for an other institution, outside the consortium. NEANIAS project partners are collaborating to identify the possible partners of licensing, and the possible services for out-licensing.

**Reaching out to SMEs to utilise the services:** SMEs can be reached by open calls, which is supported by an intense communication campaign of NEANIAS.

**Collaborating with other EU projects:** NEANIAS aims to identify collaboration opportunities with other EU projects in order to utilise synergies and establish mechanisms of sustainability on a long run.

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In order to create these main ways of exploitation, the NEANIAS consortium is organising and structuring the knowledge gained from the following external sources and methods:

- **licensing:** in case NEANIAS researchers will identify knowledge gaps, or developing a required competence would not worth otherwise, it is advisable to use licenses, therefore the services can be developed on a higher quality.
- **external experts:** validation of the services will be done by external expert interviews.
- **end-users:** validation of the services will be done by potential users of the service in the frame of interviews, as well as by involving them in the development process already at the early stages.
- **other research institutes, experts:** NEANIAS is intended to collaborate with external experts, representing other research institutes, universities in case it is relevant

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## 5. Joint exploitation plan

The joint exploitation plan of NEANIAS is prepared to utilise the services and the competences of each partner jointly, as a result of setting up collaboration models between the partners. The possibilities for exploiting the NEANIAS services jointly:

### 5.1. Open calls

Spotting and powering new business opportunities, utilize external sources of knowledge will go through Open Innovation Calls, Datathons and Hackathons, that will support external experts, innovators to share their idea with NEANIAS. These ways of channelizing external knowledge will build on links with Digital Innovation Hubs (EIT Climate-KIC Acceleration Program, Athena Research Center Digital Innovation Hub) and Industry clusters (si-Cluster, Corallia). The methodology of open innovation calls, Datathons and Hackathons is detailed in WP5.

The projects selected in the frame of open calls and developed in the frame of datathons and hackathons will use the services of NEANIAS, and experiments will be created for this purpose. During the experiments the added value of NEANIAS services will be used and tailored to individual needs.

### 5.2. Creating start-ups or spin-offs

Each one of the innovation cases will be assessed evaluated from *user, business, and technical perspective*. In analysing the business and user perspective, the analysis takes into consideration the context of each business innovation case, and the process consists of the following elements:

#### 5.2.1. Validation and co-creation with the end-users

The major part of NEANIAS approach is validation, with the end-users (or lead users) of the technology, therefore the social dimension of developments is also taken into account. As a result, the acceptance of the society on novel technologies, solutions can be achieved, which is a key element in the commercialisation of technologies. Especially for NEANIAS, the acceptance of the society on the novel technologies is key on all three thematic areas.

Co-creating with the end-users therefore include the following main steps:

1. Identify the main elements of the product, service under development
2. Identify core competences and decides about the information and elements that can be given away and kept in-house
3. Identify lead users and relevant user groups for validation and testing
4. Identify other experts, stakeholders for collaboration
5. Channelize the feedback coming from end-users



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Validation with the end-users can be made by expert interviews, workshops, where the representative of a major user-group is asked about:

- the usability of the technology
- user-friendliness
- how to integrate the technology into the existing infrastructure of the user
- the specific requirements of integration, and necessary steps to be made
- the major industries, where the technology could be used

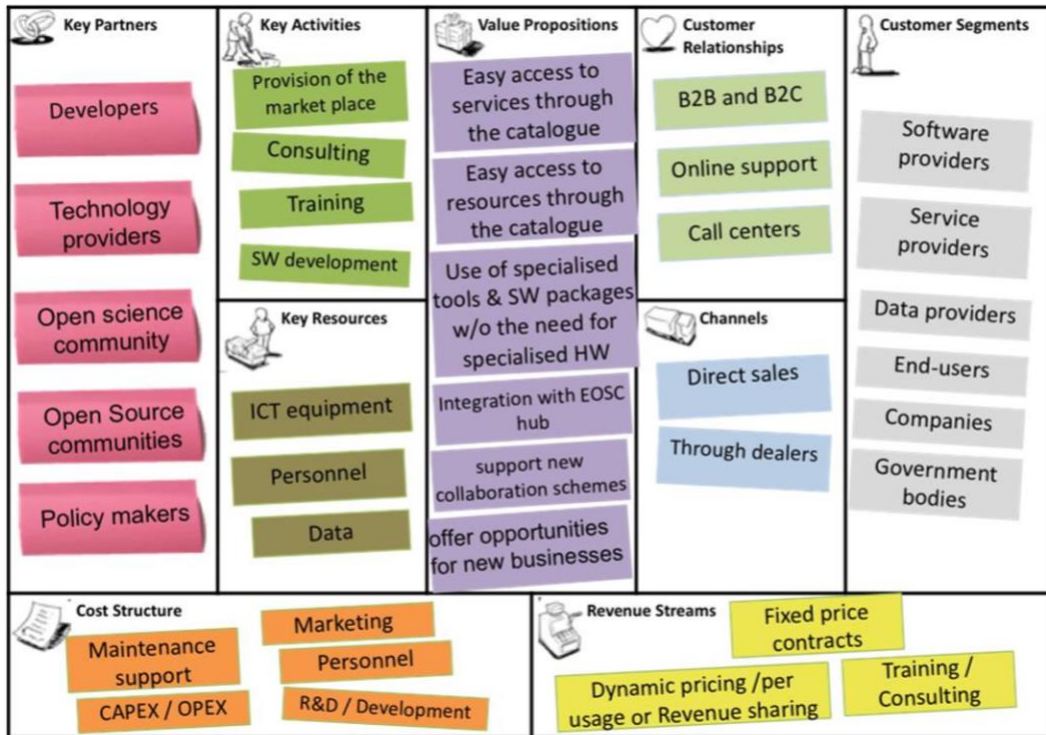
Besides these main elements, the technology (NEANIAS services) can be tested with the end-user, in its normal, everyday environment, where the technology will be used later on. The user perception of the result will be collected via (semi)structured and unstructured processes (questionnaires, expert reviews etc) and evaluated to comprehend this important aspect too. The implementation of business case pilots will be monitored not only to ensure their proper implementation, but also to collect information about the performance and accessibility to the NEANIAS services.

#### **5.2.2. Analyzing business perspectives and creating business models**

Validation with the users include workshops, interviews with the lead users, stakeholders, experts in the field, which might provide added value in further developing the technology. Besides validation, business perspectives will be analysed in the frame of NEANIAS, building on the knowledge, that already exist in the consortium about the thematic services. This knowledge should be extended by additional research about the market and analysing the business opportunities in the frame of business cases. The evaluation of business prospects and opportunities within the NEANIAS project is crucial to be competitive commercially on the market, as well as to provide feedback for the service owners on further developing their service, in align with the needs of the users. The aim of business modelling and planning is to provide a support for the service owners on creating further pilots and joint exploitation activities. Business cases will be analysed by NEANIAS partners with the aim to explore the *features, viability, sustainability and scalability* of the possible models. They can decide about exploiting the services by themselves (the NEANIAS partners) individually, or jointly, or they create a new venture in the form of a spin-off or a start-up, which is owned by one or more project partners. Business plans, created in the frame of the project will elaborate on each of this scenario, and provide feedback for the project partners on the outcome of these ways of exploitation. NEANIAS services are going to receive complex business support in terms of elaborating the main aspects of utilisation, and based on that building business models and business plans. The initial elements of analysing business cases: novelty, reachable customer segments, size of the market, sustainable competitive advantage, the competences within the team. Then in order to create business cases, NEANIAS partners will work on identifying potential stakeholders, partners, channels of commercialisation and dissemination, customer segments, target markets and possible business models. This analysis provide support in developing, fine-tuning the services and aligning them to the market needs; as a result, reach a successful introduction on the market.

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NEANIAS business models will follow the structure of the Business Model Canvas, presented in Figure 2.



2. Figure: Business Model Canvas in NEANIAS

### 5.2.3. Creating business models and assess the technical perspectives

Different instruments and processes will be employed, as cases may differ substantially in terms of requirements and expectations. Each innovation case will be assessed by its business model, including technical excellence, team commitment and complementarity, business viability and commercial potential, maturity, business scalability necessary to attract equity financing, investment readiness.

After analysing each business case, and the possible business models, business plans will be elaborated. The main elements of a business plan:

**Step 1 – Vision Statement:** NEANIAS will deliver powerful thematic services, derived from existing assets and researcher needs in three major sectors: underwater research, atmospheric research and space research enabling their transition to the European Open Science Cloud (EOSC) concept and Open Science principles. Software providers, service providers, data providers, resource providers, end-users, companies, government bodies are the main targets of NEANIAS.

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**Step 2 – Industry Overview – Market and Competitive Analysis:** During the project, the overall nature of the industry, including sales, targeted market and competitor’s information and other statistics will be investigated and described. This will help us to outline NEANIAS’ competitive advantage.

**Step 3 – Product/Services description:** Advanced and innovative services will be built supporting the three sectors under investigation. The use of these services will be expanded to other sectors too. NEANIAS will also build a resource and service catalogue integrating its services with EOSC portal and EOSC hub.

**Step 4 – Marketing plan:** A detailed explanation of the sales strategy, pricing plan, proposed advertising and promotion activities will be provided.

**Step 5 – Management plan:** NEANIAS consortium consists of experienced partners with management skills able to contribute towards this direction. Such issues will be investigated in T9.4

**Step 6 – Operating plan:** Business's physical location, facilities and equipment, kinds of employees needed and any other applicable operating details will be provided. New entity’s staff will come from the personnel of consortium’s companies ensuring high quality human assets.

**Step 7 – Financial plan:** After completing the market analysis and set goals for the new entity, the viability of the business idea will be assessed by performing a technoeconomic analysis (T9.3 – led by INC). This will lead to a cash flow projection revealing business evolution and funding needs.

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## 6. Interoperability, standardisation and FOSS initiatives

The delivered software/services will be following best practices and paradigms that promote openness, extensibility reuse and interoperability. In this direction, NEANIAS will one hand closely follow the works of initiatives acting towards standardisation, interoperability, free and open source software and open access while, on the other, through its *innovation management* and *technical coordination* activities, will diffuse knowledge and opportunities to all technical and scientific groups of the project for adoption, refinement and extension.

Developing on common approaches and standards strongly enhances the opportunities of software to be reused in integration scenarios versus stand-alone technology deployments where a single technology is summoned to cover a complete use case. Additionally, developing reference open source technologies for emerging standards that confront modern challenges is another instrument for strengthening sustainability.

To name some initiatives that NEANIAS will engage with, the following are of utter significance for NEANIAS:

- **EOSC** (European Open Science Cloud): EOSC is shaping a number of approaches for interoperability among services, which span more than the technical specifications underlying those. The project will formally participate the relevant boards and working groups in order to bring the developments of the initiative with respect to Open Science and its enabling paradigms to the project and escalate project's needs to EOSC bodies.
- **RDA** (Research Data Alliance): The world-wide alliance raises awareness and brings specific developments regarding data and their models for a number of research sectors. NEANIAS will closely follow specific working groups that related to its activities via its individual members' participation to those. In those working groups NEANIAS will bring the perspective of project's thematic sectors' and core services' needs and findings while will forward the practices suggested to its technical teams for evaluation and adoption.

Those although primary are not the only ones. Other significant taskforces that NEANIAS will seek to liaise with via its members are:

- **AIOTI** (Alliance for Internet of Things Innovation): acting largely on data coming from remote sensing and IOT infrastructures, NEANIAS is interested in the developments of the sector w.r.t. to data standards and service specifications.
- **oneM2M**: similarly to AIOT a cross-standardisation-body initiative with notable partners around the world that acts towards interoperability of IOT infrastructures and devices. Its members represent ETSI, TIA, ATT and other large bodies.
- **BDVA** (Big Data Value Association): an European alliance for big data and services building on those as driving forces for the next generation of digital economies, those based on data complements the scientific data landscape with data driven business economy (to be renamed as AI-PPP), an area where NEANIAS attempts to bridge through its business innovation promoting actions.
- **IHO** (International Hydrographic Organization): An organisation that acts on the choice standards and promotion practices governing surveillance and charting of all

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world's seas, oceans and navigable waters contributing in marine safety and protection. Underwater services sector is strongly interested in activities and specifications of IHO, which will be promoted in project's Technical Board for consideration.

- **IVOA** (International Virtual Observatory Alliance): an initiative that works on the interoperability of datasets, instruments and services acting in space exploration. Apart from standards it promotes practices for the whole stack of services acting space observation. NEANIAS Space Thematic sector engages partners strongly connected to IVOA activities and those will be mobilized for a bidirectional flow of knowledge.

Regarding standardisation bodies and their works, NEANIAS will follow developments and where appropriate adopt practices and standards coming from:

- **OGC** (Open Geospatial Consortium): with many of its research sector services acting largely on spatiotemporal data, standards coming from OGC are mostly relevant to NEANIAS and will be strongly adopted
- **W3C** (World Wide Web Consortium): driving several web and services standards, W3C establishes the basis for sustainable, long term web technologies development and will be strongly followed by NEANIAS in all areas of relevance, e.g. user interface technologies, protocols, service paradigms etc
- **ETSI** (European Telecommunications Standards Institute): acting among others in areas such IOT, Augmented Reality, Smart Cities, security etc is a body whose recommendations and specifications will be respected in areas of applicability.
- **ISO** (International Standardisation Organisation): registering worldwide standards for adoption ISO recommendations and specifications will be primary candidates for adoption in NEANIAS. It must be noted though that is often the case that ISO standards are elevated specifications of thematic bodies, such as OGC in our case.

Furthermore NEANIAS, who is primarily building on Open Source software will seek promotion of its outcomes to relevant bodies and initiatives. To name some

- **OSGeo** (Open Source Geospatial Foundation) with its notable FOSS4G conference will be among primary targets of software releases and reuse.
- National FOSS initiatives such as **ΕΛ/ΛΑΚ** (<https://ellak.gr/>) promoting open source at home, research, education, public administration and business.

Similarly software catalogues of IVOA and other initiatives already mentioned, as well the OpenAIRE's Open Science Observatory (<https://oso.madgik.di.uoa.gr/>) will be targeted for registration of software published by NEANIAS, that will allow its discovery by interested stakeholders.

Datasets coming from NEANIAS will be registered in thematic and generic data catalogues, such as OpenAIREs (through harvesting NEANIAS data catalogue), European Data Portal (<https://www.europeandataportal.eu/>) etc

Indicative standards of high relevance and importance for NEANIAS are the following:

- Spatiotemporal data and services: Web Coverage Service (WCS), Web Processing Service (WPS), NetCDF, GeoTIFF, Tile-Map Service (TMS), Web Map Tile Service (WMTS), Web Mapping Service (WMS), Web Feature Service (WFS)

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- Security: OAuth2, OpenID
- Web: HTML5/JS/CSS3, JSON, XML, HTTP(S), FTP
- Metadata handling: OAI-PMH, Dublin Core, ISO 19115:2003
- Media formats: JPEG, H.264 (loyalty free videos)

and many more that will be pointed out in technical deliverables of WP2 through WP8.

The following paradigms, are of utter importance for the sustainability and success of the project:

- **FAIR** data (<https://www.go-fair.org/>): Findable Accessible Interoperable and Reusable data principles and best practices.
- **RESTfull** Web Services paradigm for interoperable services.

Service developers will be monitoring and extending the related standards and will consider the requirements and expectations of those in developing their software. The related findings will be presented in deliverables issued by the technical workpackages, primarily D6.1, in WP6 but also by all thematic and business sectors' ones, that are issued in this period of the project and will be updated as needed.

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## 7. Exploitation per project members

Besides the service level exploitation, we give attention to institutional level aims and expectations. Then the individual expectations can be structured into joint exploitation plans, later in the project lifetime. The exploitation steps and long-term institutional level benefits:

### 7.1. National and Kapodistrian University of Athens – Greece

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| <p><b>Expected long-term benefit, and added value of NEANIAS for the organisation</b></p>  | <p>NKUA expects specific long-term benefits from the participation in NEANIAS. Both NKUA institutes will <i>strengthen their research</i> profile and <i>establish fruitful links</i> with other research groups, projects, research Infrastructures and the EOSC end-user communities seeking open science solutions. Regarding the specific NEANIAS thematic services, NKUA will also benefit by <i>supporting innovative research results</i> in e.g., seafloor mapping and photomosaicing for international project and mapping initiatives. In addition, marine and atmospheric scientists will be able to evaluate and process their research datasets with cutting-edge tools and forefront technologies. Long-time benefits also include the usage and exploitation of state of the art tools for project management, ticketing, team and partners collaboration and management.</p> |
| <p><b>Expected ways of exploiting the results of NEANIAS on institutional level. Short and long-term actions, strategies, plans.</b></p> | <ol style="list-style-type: none"> <li>1. <i>Increase NKUA asset portfolio</i> with new/improved reusable components and systems, that can be used for further research.</li> <li>2. Exploitation of NEANIAS results in the <i>educational processes</i> (classes and labs) for both undergraduate and graduate levels, and also for the organization and co - organisation of hackathons and datathons. The new services will be adopted and employed at institutional level by both NKUA experts and students.</li> <li>3. Maximise productivity in <i>scientific research</i> (both ICT and marine geology/geomorphology) with novel cutting-edge cloud-based services.</li> <li>4. <i>Expand the R&amp;D portfolio</i> with applications for Underwater Archeology and Antiquities by exploiting</li> </ol>  |



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|   | NEANIAS solution for on-shore and off-shore projects focused on the identification of marine geohazards.   |
| <b>Plans for standardisation and Open Source Contributions (if any)</b>                             | Most of the foreseen research <i>publications will be compliant to Open Access rules</i> . Moreover, NEANIAS are designed to <i>provide standarized pipeline</i> for processing underwater data at international level through the involvement at Seabed 2030, GEBCO and EMODNET projects.   |
| <b>Other (e.g. main partners in exploitation, main users, main competences of the institutions)</b> | <ol style="list-style-type: none"> <li>1. Universities with relevant departments in national and European level, research institutes and research centers, young scientists and students. R&amp;D communities including marine geologists, geomorphologists, archaeologists from European and International Universities and Institutes.</li> <li>2. Governmental organizations, municipalities, prefectures, various stakeholders.</li> </ol> |

## 7.2. Athena - Research and Innovation Center - Greece

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| <b>Expected long-term benefit, and added value of NEANIAS for the organisation</b>  | <p><i>Fine tuning of expertise of the chosen subject</i>, i.e. the algorithms of determination of flux densities of Greenhouse Gases, momentum and energies. It is a fine opportunity to improve these algorithms and prove to ourselves that these improvements can be used, and accepted by the scientific community.</p> <p>Also, ATHENA has an active involvement in several projects of the European Open Science Cloud; Neanias will further assist ARC to <i>strengthen its engagement and participation</i> in the strategy and technical developments of EOSC.</p> |
| <b>Expected ways of exploiting the results of NEANIAS on institutional level. Short and long-term actions, strategies, plans.</b> | If and when the improvements are accepted by the scientific community, ATHENA will be able to put its name on the "map" of leading institutions in this field.  |



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| <p><b>Plans for standardisation and Open Source Contributions (if any)</b></p> | <p>ATHENA expect, that standardisation will become a norm after the scientific community has approved its practices and algorithms. These will be also available as open source.</p> |
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### 7.3. Istituto Nazionale di Astrofisica - Italy

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| <p><b>Expected long-term benefit, and added value of NEANIAS for the organisation</b></p>   | <p>INAF is developing in NEANIAS several tools and services for handling multiwavelength surveys and catalogues and other complex multidimensional astrophysical data on the cloud infrastructure. These services will handle the full data life-cycle, from the management phase up to the analysis and production of final scientific products using novel methodologies from artificial intelligence. These activities are crucial for the <i>exploitation of data coming from next-generation telescopes</i>, such as the Square Kilometre Array, that will generate enormous volumes of data. Current analysis techniques are inadequate to cope with these data volumes so software and skills developed in NEANIAS will give a long-term benefit for INAF in the growth of the expected new generation of software tools and technologies.</p>   |
| <p><b>Expected ways of exploiting the results of NEANIAS on institutional level. Short and long-term actions, strategies, plans</b></p> | <p>In the last ten years, Italy is playing a high level role as international excellence in many IT sectors thanks to the research institutes, among which there is INAF: INAF is promoting and participating in numerous technological research projects in the field of data discovery services and complex data archives, cloud computing, high performance computing, high throughput computing and big data. In the field of Data Exploration INAF is developing in NEANIAS services and tools for Visual Analytic (VA) and Machine Learning (ML) with a wide range of applications expanding the work of previous EU funded projects such as ViaLactea and EOSCPilot. INAF is also highly involved in Exascale projects (Exanest and EuroExa) where plays a fundamental role in co-design and services porting on innovative platforms and NEANIAS software and tools may benefit from this new <i>exascale technologies</i> especially for ML. Moreover INAF is involved in several projects for the usage of Virtual Reality (VR) techniques in other field (such as for the geo-hazard community), i.e. Erasmus+</p> |

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|  | <p>3DTeLC project and other specific projects funded by the Italian Ministry of Research, where VR is used to create complex data models and to study geo-hazard zones. NEANIAS VR and VA techniques will probably be exploited in other communities.</p>   |
| <p><b>Plans for standardisation and Open Source Contributions (if any)</b></p>                             | <p>Astrophysics, and in particular INAF, has a long tradition linked to standardisation and Open Data thanks to the Virtual Observatory and the participation in the International Virtual Observatory Alliance (IVOA) since its foundation in 2001. The experience that INAF is leading to European projects such as NEANIAS is essential for <i>open and interoperable scientific data, codes and pipelines to be the basis for scientific development without frontiers</i>.</p>   |
| <p><b>Other (e.g. main partners in exploitation, main users, main competences of the institutions)</b></p> | <p>INAF (National Institute for Astrophysics) is the Italian Research Institution that realizes and coordinates research in the specific fields of Astronomy, Radio-Astronomy, Spatial research and Cosmology in collaboration with Universities and other research Institutions. More than 1,200 people are involved in the institution. INAF has twenty research institutes in Italy and two National facilities: “Telescopio Nazionale Galileo (TNG)” in La Palma, Canary Islands and the Large Binocular Telescope (LBT) in Mount Graham, Arizona. The main research activities of INAF are in the following areas: Solar Physics, Stellar Physics, Galactic and Extragalactic Astronomy and Cosmology, High Energy Physics, Astroparticles, Virtual Observatory, HPC and HTC technologies.</p> <p>For astrophysics roadmap, ESFRI indicates that the absolute priority for the next decade are the following ground-based infrastructures: E-ELT (European Extremely Large Telescope), SKA (Square Kilometer Array), CTA (Cherenkov Telescope Array), and KM3NeT (Cubic Kilometer Neutrino Telescope). Regarding the science from space, Astronet competes with the priorities identified in the ESA Cosmic Vision document: IXO, Europa Jupiter System Mission / Laplace Missions LISA, EUCLID, PLATO, Solar Orbiter, GAIA.</p> |

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#### 7.4. Magyar Tudományos Akadémia Számít. és Automatizálási Kutatóintézet – Hungary

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| <p><b>Expected long-term benefit, and added value of NEANIAS for the organisation</b></p>  | <p>NEANIAS partners will strengthen the <i>connection of SZTAKI with several scientific communities</i> from various fields of natural sciences with special focus on applied computer science, including cloud computing and machine learning. The gathered requirements will drive SZTAKI's cloud, AI-related research and development activities, and provide valuable feedback concerning the technical achievements.</p>   |
| <p><b>Expected ways of exploiting the results of NEANIAS on institutional level. Short and long-term actions, strategies, plans.</b></p> | <p>SZTAKI has started contributing to EOSC-hub, but NEANIAS will allow SZTAKI to be <i>involved in the EOSC ecosystem</i> much more intensively, and to <i>become a widely accepted service provider</i> for the broader EOSC user community in long-term. Moreover, as a part of its strategic plan, SZTAKI is to led the new AI National Laboratory in Hungary. As the leader of AI core services activities in NEANIAS, they plan to exploit the NEANIAS-related results in this new national lab as well, targeting the universities, research labs, industrial partners and other stakeholders in Hungary. This knowledge and technology transfer will be fully supported by SZTAKI.</p> |
| <p><b>Plans for standardisation and Open Source Contributions (if any)</b></p>   | <p>All contributions (e.g. Occopus and the reference architectures) from SZTAKI are intended to be released under Open Source (Apache V2) license to enable the easiest taking up of the joint results. This will allow not only the <i>efficient exploitation by the academic sector</i>, but this type of licence is preferred by most of the companies as well.</p>  |
| <p><b>Other (e.g. main partners in exploitation, main users, main competences of the institutions)</b></p>                               | <p>According to the current plans, a partnership with Innomine will help purse SZTAKI's exploitation plans. The user community will be (among others) <i>the end-users and technical experts of the MTA Cloud</i>, a federated cloud dedicated for the Hungarian academic research community.</p>   |

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### 7.5. Coronis Computing SL - Spain

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| <p><b>Expected long-term benefit, and added value of NEANIAS for the organisation</b></p>   | <p>1. Specific CORONIS's <i>components will be reimplemented in a more standardized way</i>, allowing users from multiple disciplines to use them.</p> <p>2. NEANIAS gives CORONIS the opportunity to gain experience in <i>cloud computing</i>.</p>  |
| <p><b>Expected ways of exploiting the results of NEANIAS on institutional level. Short and long-term actions, strategies, plans</b></p> | <p>1. CORONIS expects that NEANIAS will enable <i>collaborations with active research communities</i>, in the open science sector, and more specifically in the underwater sector.</p> <p>2. NEANIAS brings <i>CORONIS key research personnel</i> in close contact with EOSC concepts and cloud computing</p> <p>3. NEANIAS is aimed at <i>delivering high-quality results</i>, and <i>deploying practical instruments supporting several worldwide research groups</i>. This will bring recognition to its members, both in terms of high impact publications, as well as opportunities for additional funded applied research opportunities to further develop this form of collaboration.</p>  |
| <p><b>Plans for standardisation and Open Source Contributions (if any)</b></p>  | <p>1. Standards for web-based visualization of large-scale image maps such as the Tile-Map Service (TMS) or the Web Map Tile Service (WMTS) will be studied and implemented in order to deliver the mosaics resulting from the U2 service in a way that, on the one hand, <i>eases its visualization and manipulation on the user side and, on the other hand, goes in line with maintaining these maps on the cloud</i>.</p> <p>2. Due to the lack of standardization for representing relevant prior information for the reconstruction process, such as camera calibration or navigation information, they will <i>define a file format</i> that allows to provide this information to the service, and/or retrieve it as an additional output. While there is no precise standardization on calibration information, we will provide means to import this type of data from OpenCV-compliant files.</p> |
| <p><b>Other (e.g. main partners in exploitation, main users, main competences of the institutions)</b></p>                              | <p>CORONIS is an SME company that provides computer vision software and hardware solutions.</p>   |

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## 7.6. Ubiwhere LDA - Portugal

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| <p><b>Expected long-term benefit, and added value of NEANIAS for the organisation</b></p>   | <p>The long- term benefit for Ubiwhere will be the <i>strengthening of its positioning in the Smart Cities market, leveraging the innovation of EOSC Hub services</i> (atmospheric and space) as new features and data in its solutions, namely the Urban Platform (<a href="https://urbanplatform.city">https://urbanplatform.city</a>). The involvement in the project and EOSC community will allow for further R&amp;D activities and will allow <i>new partnerships and projects</i> with research centres, universities and other innovation units expert in the area.</p>  |
| <p><b>Expected ways of exploiting the results of NEANIAS on institutional level. Short and long-term actions, strategies, plans</b></p> | <p>Ubiwhere aims at <i>ensuring accurate and relevant estimation and forecasting services</i> for user communities such as industry, transport, health, and urban environment, and will <i>exploit the Atmospheric service results in its Urban Platform solution for Smart Cities</i> (<a href="https://urbanplatform.city">https://urbanplatform.city</a>) to stand out from the competition and tackle new business opportunities, <i>leveraging state-of-the-art air quality observations from satellite and in-situ stations</i>. This exploitation is aligned with the SME's strategic vision of becoming an international reference in Smart Cities. At the research side, Ubiwhere aims at <i>engaging the EOSC community and find new opportunities for collaboration through partnerships in EU R&amp;D projects</i>.</p> |
| <p><b>Plans for standardisation and Open Source Contributions (if any)</b></p>  | <p>Ubiwhere is an active member of standardisation communities, such as ETSI, AIOTI and BDVA (to be renamed as AI-PPP), concretely the Working Groups investing in IoT, Data, Interoperability (cross-cutting Context Information Management, AI on top of open standards like oneM2M, standards for citizens) and network technology for 5G Networks (Network Functions Virtualization, NFV Security, Multi-Access Edge Computing). The SME will bring best practices from the standardization groups and PPPs, while contributing back with the feedback and experience from the EOSC and research community to the open standards activities.</p>  |
| <p><b>Other (e.g. main partners in exploitation, main users, main competences of the institutions)</b></p>                              | <p>Main partners are <i>atmospheric and space</i> researchers to help us <i>leverage on satellite information and services for atmospheric assessment</i>. The main users are smart cities; decision-makers, environmental units and city service providers concerned with pollution and sustainability as</p>  |

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|  | well as research departments and universities that require multimodal data to perform data analysis and forecasting. |
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### 7.7. Communication & Information Technologies Experts S.A. - Greece

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| <b>Expected long-term benefit, and added value of NEANIAS for the organisation</b>  | <p>1. Specific CITE's components that will be used in the context of NEANIAS will be <i>tested in a demanding environment improving both their specifications w.r.t. functionality as well as their performance and compliance</i> with common paradigms. This will <i>improve the software arsenal</i> of the company in several domains.</p> <p>2. NEANIAS brings CITE into the Open Science landscape, which is a fitting case for CITE in several direction: <i>mentality</i> (free and open source code, in research activities), <i>capacity</i> (strongly research oriented man power) and <i>expectations</i> (key personnel with long past and outlook in Open Science, worldwide).</p> <p>3. Research projects of NEANIAS scale, acting in alignment with even larger groups outside the project (i.e. EOSC and research communities) are huge think tanks and expertise amplifiers that help SMEs <i>improve the capabilities of their personnel in communication, collaboration and problem solving</i>.</p>   |
| <b>Expected ways of exploiting the results of NEANIAS on institutional level. Short and long-term actions, strategies, plans.</b> | <p>1. CITE expects that NEANIAS will establish <i>strong collaborations with active research communities</i>. This may drive sustainable long-term relationships in servicing, both on services implemented in the context of NEANIAS as well as beyond. To achieve that <i>CITE will look to support with essential and high-quality services NEANIAS communities</i> relieving those from software and infrastructure technicalities that are not their primary concern.</p> <p>2. NEANIAS brings CITE's key research personnel in close contact with EOSC concepts and stakeholders. As such it opens room for collaborations, projects and, what is also very important, new innovative products. To support that CITE will participate EOSC working groups via its key personnel and closely monitor EOSC shapping and service offerings to identify gaps and opportunities.</p> <p>3. NEANIAS delivers new services in particular domains that are of great interest in other businesses. To name some, mosaicing services in deep waters, AI services and</p> |

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|  | <p>virtual globe and advanced 3D visualisation are a few of the components to be delivered by NEANIAS that CITE believes fit several commercial domains to drive innovative services in the future. Through NEANIAS CITE will build expertise and synergies in order to grab such business opportunities in the future, while outside NEANIAS will look for new projects and applications of those technologies. Actively supporting the exploitation and business planning of the project is also part of CITE's engagement towards this direction.</p> <p>4. NEANIAS has a great outlook for delivering high quality results and new instruments to a number of research groups. This will bring recognition to its members. CITE will motivate dissemination in areas where it has reach, mainly at national level, which will drive benefits for all parties, i.e. the project, research communities outside it, other stakeholders and the company. itself.</p>  |
| <p><b>Plans for standardisation and Open Source Contributions (if any)</b></p>                             | <p>CITE plans to offer its software under a FOSS license. The license will be decided in due time. The decision will be taken on reused component / dependencies, licensing. CITE plans to pursue driving new standards and/or improvements of existing ones in specific areas of interest, such as AuthN/AuthZ, Accounting, and resource management. The extent those can be standardised will be shown at later stages of the project.</p>  |
| <p><b>Other (e.g. main partners in exploitation, main users, main competences of the institutions)</b></p> | <p>CITE is a software house that, among others, offers highly <i>specialized outsourcing services</i> to its clients. Developing expertise in delivering software in research domains has proven to bring innovation to solutions offered to customers, for a multitude of reasons, one of those is the opportunity to work with next generation technologies. To empower exploitation CITE plans to work closely with (a) research communities both in thematic and in computer science sectors, offering them applicable solutions to challenges they will face in NEANIAS and getting in close contact with their innovative service offerings, building synergies for further exploitation of them, (b) EOSC engaged partners for acquiring knowledge of gaps and opportunities for new solutions, (c) all business innovation cases partners for exploring options for cross fertilisation of results in other business areas and last but not least (d) outreach partners supporting their work and utilizing their results on bringing the project</p> |



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|  | results closer to stakeholders, funders, researchers and the general public. |
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## 7.8. University of Portsmouth Higher Education Corporation - UK

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| <b>Expected long-term benefit, and added value of NEANIAS for the organisation</b>   | UoP expects several long-term benefits from its participation in NEANIAS to underpin added value for the University towards its key strategic ambitions from its recently published ten-year vision. Both UoP schools will strengthen their research profile and establish fruitful links with other research groups, projects, cutting edge research infrastructures and EOSC end-user communities. The University strategy for implementing its research & innovation vision is based around a range of highly interdisciplinary themes. Its participation in NEANIAS is directly aligned with several of these themes. UoP also links (internally and externally) with several user communities pursuing open science solutions, e.g. within the South Coast Centre of Excellence in Satellite Applications funded by the Satellite Applications Catapult and the UK Space Agency. |
| <b>Expected ways of exploiting the results of NEANIAS on institutional level. Short and long-term actions, strategies, plans</b> | Reaching the user communities linked to the University research themes (locally, nationally and internationally) aligned with the NEANIAS sectors and beyond, through exploitation of its infrastructures (dedicated HPC facility and Visualisation Server - please see main proposal for further info.) and EOSC-services in experiences gained within NEANIAS.  |
| <b>Plans for standardisation and Open Source Contributions (if any)</b>  | UoP has previously worked together with other NEANIAS partners in producing standardised and open-source contributions for a range of different user communities e.g. complying with virtual observatory guidelines. Such contributions are expected to continue alongside the activity of UoP in NEANIAS, for underpinning interoperable processing pipelines for big astronomical datasets, or building cross-reality assets (and protocols for validating them) from standardised workflows based on drone datasets in geosciences. UoP's future developments are focused on addressing emerging challenges for interactive 3D visualisation mechanisms (especially on particle visualisation) and how these can   |



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|   | augment the workflow of end-users in virtual observatories.       |
| <b>Other (e.g. main partners in exploitation, main users, main competences of the institutions)</b> | Please see description for partner UoP in main proposal document. |

### 7.9. Aix-Marseille University - France

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| <b>Expected long-term benefit, and added value of NEANIAS for the organisation</b> | <p>Aix-Marseille University participates in the Neanias project as the responsible of underwater archaeology sector via the CNRS Laboratory Centre Camille Jullian and the team of the Master of Maritime and Coastal Archaeology (MoMArch). Therefore, the benefits of the results and services developed in the framework of this European Project are expected to be of high added value for our institution. Our CNRS Laboratory, a leader of underwater archaeology in the Mediterranean since the 1950s, has a technical unit of specialists in underwater photogrammetry. Meanwhile, CNRS researchers and underwater archaeologists are conducting underwater archaeological surveys and excavations and maritime surveys all over the Mediterranean individually and/or in cooperation with other research Institutes (France, Italy, Croatia, Tunisia, Algeria, Greece, Spain, among others) and the Atlantic Ocean (French and Spanish coast). All these projects are often interdisciplinary and international, involving a high number of collaborations (official agreements of cooperation, etc). Therefore, the university expects that through the use of the new services NEANIAS will provide, it will boost and maximise its research results in interdisciplinary level. Moreover, more scientists will be able to enter and exploit their research data through the new services with added value for all of the collaborative research projects.</p> |
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| <p><b>Expected ways of exploiting the results of NEANIAS on institutional level. Short and long-term actions, strategies, plans</b></p> | <p>In the short term, in the framework of Neanias project, the university expect the development of powerful tools that we will practically substitute the now used services, in an open-access and friendly-use way in order to maximise productivity in scientific research in underwater archaeology, as far as systematic documentation is concerned. The services will be used and adapted immediately in institutional level by its specialist’s teams as well as by the students. Therefore, the provided services will be used at the international maritime projects they are conducting around the Mediterranean, as the main services for documentation and analysis concerning underwater photomosaicing, 3D modelling and bathymetric mapping. The long-term benefit is expected on research and on educational level, especially concerning the new generation of maritime archaeologists they are now training. The students of the university at the Master MoMArch are active users of services and softwares related to underwater photomosaic and bathymetric analysis. After their Master degree, they often set up their own projects in maritime archaeology. New services will be directly tested and used by them, hopefully also improved and enhanced in the future in the EOSC by their own experience and new fieldwork data. Moreover, the exploitation plan is more extended than only on institutional level. We are working in close collaboration with the Department of Underwater Archaeological Research (DRASSM) of the French Ministry of Culture, the only other actor in underwater archaeology and one of the most active in the world. Together they are co-directing the Master MoMArch and are also holding the UNESCO Chair in Maritime and Coastal Archaeology, the only one attributed in this subject until today. We are also a full member of the UNESCO Unitwin network of Underwater archaeology. Therefore, Neanias services will be used in a more inclusive and broad way between institutions and colleagues in international level in order to exploit interdisciplinary databases and results maximising the gain in research level. This practically means that interdisciplinary databases will be exploited for different levels of results and analysis through Neanias new innovative services. In addition, they are working in cooperation with the</p> |
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|  | <p>INRAP (French Ministry of Culture) responsible of emergency maritime archaeology and thus in contact will all small and medium companies, with projects on-shore and off-shore. Therefore, one of the end-users of the project is for example, the EDF (Electricity of France), the largest provider of electric power of France and responsible for Aeolian parks in the Atlantic coast, etc. All the databases that are produced during the geological and archaeological research pre-dating the implementation of the project, will be treated in the Neanias services in order to extract different levels of results, a huge gain for the scientific European community towards scientific excellence.</p>   |
| <p><b>Plans for standardisation and Open Source Contributions (if any)</b></p>                             | <p>From the end-users point of view, we are certain that the wide use of the new innovative services from us, our partners, our UNESCO Unitwin and in the framework of our international collaborations, will help towards constant improvement and enhancement of the services, especially by the students, the future generation of maritime archaeologists and coastal management responsible.</p>   |
| <p><b>Other (e.g. main partners in exploitation, main users, main competences of the institutions)</b></p> | <p>As already mentioned, we are in close cooperation with all actors in France and a number of international institutions and Universities. They would like to add, that in the framework of the UNESCO Chair Project they are currently running, one of our main responsibilities is capacity building in international level. However, as Aix-Marseille is the first Euro-Mediterranean University, they are mainly focusing their efforts in the Mediterranean region and Atlantic Ocean. Practically, technical know-how and capacity building is achieved through intensive training, educational programs and hands-on activities and active fieldwork in underwater and coastal archaeology, where the new services of Neanias will be immediately introduced and used by these new end-users.</p> |

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### 7.10. Universitaet Bremen - Germany

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| <p><b>Expected long-term benefit, and added value of NEANIAS for the organisation</b></p>  | <p>Their expectation lies within several topics. Education - distribution of the tool for larger student classes; Sustainability - research assistants and researchers will have a rather easy way to document what have been done with/on the vendor's raw datasets in terms of post processing; Adaptation of workflows for specific processing e.g. of different vendor or platform (vessel, AUV/ROV) datasets; Flexibility - less hardware dependencies; Utilizing cloud computing power - performance enhancement due to scalability and parallelization.</p>  |
| <p><b>Expected ways of exploiting the results of NEANIAS on institutional level. Short and long-term actions, strategies, plans.</b></p> | <p>The hydroacoustic community is a worldwide active and powerful driven community due to blue economy and environmental and basic research. One of the main backbones of their network is the MB-System User's Discussion List:<br/> <a href="http://listserver.mbari.org/sympa/subscribe/mbsystem">http://listserver.mbari.org/sympa/subscribe/mbsystem</a>. Besides this, exploitation through the Seabed 2030 community, the EMODnet community, Education is expected.</p>  |
| <p><b>Plans for standardisation and Open Source Contributions (if any)</b></p>   | <p>The MB-System desktop package is currently under GNU lic v3 beside some source code derived from packages that are distributed separately and have been authored by programmers other than the MB-System team. This includes:</p> <ul style="list-style-type: none"> <li>- The Generic Sensor Format (GSF) library source located in mbsystem/src/gsf. The GSF package is maintained and distributed by Leidos Corporation under contract to the United States Naval Oceanographic Office. The current GSF source distribution is made available by Leidos at <a href="https://www.leidos.com/products/ocean-marine#gsf">https://www.leidos.com/products/ocean-marine#gsf</a> using the LGPLv2.1 license.</li> <li>- The SURF API (SAPI) library source located in mbsystem/src/surf. The SAPI package was released under the GNU General Public License by Atlas Hydrographic in 2001.</li> <li>- The MR1PR library source located in mbsystem/src/mr1pr. This package was openly released by primary author Roger Davis of the Hawaii Mapping Research Group in 2000.</li> </ul> |

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|  | <ul style="list-style-type: none"> <li>- The <code>mb_mergesort()</code> function found in <code>mbsystem/src/mbio/mb_esf.c</code> derives from the GNU-Darwin Distribution. This code is released under both the Apple Public Source License Version 1.1 and the BSD license, with original copyright by the Regents of the University of California.</li> <li>- Development around "MB-System in the cloud" should remain open source but is maybe depending on other NEANIAS services which might not be distributed this way.</li> <li>- Development around "MB-System in the cloud" should remain open source but is maybe depending on other NEANIAS services which might not be distributed this way.</li> </ul> |
| <p><b>Other (e.g. main partners in exploitation, main users, main competences of the institutions)</b></p> | <p>N/A</p>  |

### 7.11. Università Degli Studi di Milano Bicocca - Italy

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| <p><b>Expected long-term benefit, and added value of NEANIAS for the organisation</b></p> | <ol style="list-style-type: none"> <li>1. NEANIAS represents a practical opportunity to further develop UNIMIB's participating group into the Open Science landscape, with specific interdisciplinary collaborations characterised by a modern and farsighted perspective (adoption of FAIR principles, development of free and open source software, international collaboration outlook).</li> <li>2. NEANIAS represents an important opportunity, especially for the group of researchers of DISCO of the UNIMIB research unit, to develop specific competences in cloud environments and get in touch with EOSC, that seems a very relevant initiative also for additional AI research initiatives, which are starting to be developed and that seem to have little connection with EOSC and that might instead leverage on the body of experiences, practices, and developed results.</li> <li>3. Participating research projects like NEANIAS, that, in turn, allows connecting to groups outside the project (i.e. EOSC and research communities), represents a growth opportunity for the involved personnel, both in terms of practical competences related to the technical</li> </ol> |
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|   | <p>problems that are being tackled, as well as on soft skills (communication and collaboration in an international and interdisciplinary framework).</p>  |
| <p><b>Expected ways of exploiting the results of NEANIAS on institutional level. Short and long-term actions, strategies, plans</b></p> | <ol style="list-style-type: none"> <li>1. UNIMIB expects that NEANIAS will enable / strengthen collaborations with active research communities, in the open science sector. In particular, through the group of researchers of DISCO, UNIMIB will exploit competences in AI to develop innovative applications, opening further possible interdisciplinary collaborations.</li> <li>2. NEANIAS brings UNIMIB key research personnel in close contact with EOSC concepts, developed solutions, practices and stakeholders. EOSC represents a significant experience, that should probably be put in touch with innovative initiatives related to AI, in which cloud platforms are central enabling technologies.</li> <li>3. NEANIAS is aimed at delivering high-quality results, and deploying practical instruments supporting several worldwide research groups. This will bring recognition to its members, both in terms of high impact publications, as well as opportunities for additional funded applied research opportunities to further develop this form of collaboration.</li> </ol> |
| <p><b>Plans for standardisation and Open Source Contributions (if any)</b></p>  | <p>UNIMIB will collaborate in further developments of atmospheric and space services that are already implemented in terms of open source projects, within WP3 and WP4.</p>   |
| <p><b>Other (e.g. main partners in exploitation, main users, main competences of the institutions)</b></p>                              | <p>UNIMIB is a university, active in three missions: teaching, research, and the so-called third mission (engaging with societal needs and market demands by linking its activity with its own socio-economic context). To empower exploitation UNIMIB plans to work in different directions (a) by connecting to research communities both in thematic and in computer science sectors, proposing methodological and practical solutions to challenges faced in NEANIAS, (b) by connecting to EOSC engaged partners for acquiring knowledge of potential opportunities for new solutions, (c) by connecting to all business innovation cases partners for exploring opportunities for cross fertilisation of results, and for planning ways to further extend the collaboration beyond NEANIAS, (d) by supporting outreach partners, and utilizing their results</p>   |

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|  | on bringing the project results closer to stakeholders, funders, researchers and the general public. |
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### 7.12. Ricoh Spain IT Services SLU - Spain

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| <b>Expected long-term benefit, and added value of NEANIAS for the organisation</b>   | The long-term benefit for Ricoh is the expansion of knowledge in innovation environments and the strengthening of its positioning in cloud-based services, to help its clients, stakeholders and partners improve their operations through digitalization and the application of ICT at European level. Cloud, bigdata, digital services and digital transformation are strategic lines for them. In addition, Ricoh has some frameworks and lines of collaboration with research centers, universities and innovation departments, as well as the objective of helping public administrations in many fields (smart cities, sustainability, green economy, mobility, electronic government), which could benefit from the knowledge and achievements of the project. |
| <b>Expected ways of exploiting the results of NEANIAS on institutional level. Short and long-term actions, strategies, plans</b> | At short-term is not expected an exploit of the results, considering a thematic perspective. The methodology developed will be an asset for future advisory activities for innovation services.   |
| <b>Plans for standardisation and Open Source Contributions (if any)</b>  | N/A   |
| <b>Other (e.g. main partners in exploitation, main users, main competences of the institutions)</b>                              | Ricoh is a leading innovation company worldwide in ICT field. The activity also includes advisory services to public administrations, SME and LE in smart economy, digital transformation and applied innovation, including the fulfilment of sustainable development goals stated by United Nations.   |

D9.1 Exploitation plan, report on plan for refined exploitation targets and activities to be performed by the project and its members

### 7.13. Jacobs University Bremen GGMBH - Germany

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| <p><b>Expected long-term benefit, and added value of NEANIAS for the organisation</b></p>  | <p>EOSC is pivotal for Planetary Science and liaison of the Planetary Research infrastructure with the work and results of NEANIAS is expected. The services of NEANIAS will be readily used in the GMAP activity and WP group in the EuroPlanet research infrastructure, as well as in other running and future projects where Jacobs University is engaged.</p>   |
| <p><b>Expected ways of exploiting the results of NEANIAS on institutional level. Short and long-term actions, strategies, plans.</b></p> | <p>Jacobs University Bremen GGMBH can exploit the results of NEANIAS in short term to advance other research projects that are currently ongoing, as well as to increase and augment their scientific exploitation with access to the data and tools provided. On the mid- and long-term, the institution will be able to use the results and tools produced by NEANIAS for both undergraduate and graduate education and research.</p> |
| <p><b>Plans for standardisation and Open Source Contributions (if any)</b></p>   | <p>They plan - as in previous H2020 projects to release all code they produce as institution as Open Source (e.g. GPL3). They plan to use as much as possible existing standard (e.g. OGC) for the mapping services as well as the IVOA ones for the Virtual Observatory access to planetary data within NEANIAS</p>  |
| <p><b>Other (e.g. main partners in exploitation, main users, main competences of the institutions)</b></p>                               | <p>Our main partners in exploration will be both beneficiaries from other current and future projects, the planetary community at large, which will also contribute to their user base.</p>   |

### 7.14. inCITES Consulting SARL - Luxembourg

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| <p><b>Expected long-term benefit, and added value of NEANIAS for the organisation</b></p> | <p>NEANIAS will increase INCITES's knowledge of the EOSC platform and contribute to understanding the main factors that can lead to financially sustainable services. It will also help INCITES to strengthen its profile, to increase the awareness about its activities and help build synergies for future collaborations. Furthermore, it will assist in increasing its portfolio of products and services.</p> |
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| <p><b>Expected ways of exploiting the results of NEANIAS on institutional level. Short and long-term actions, strategies, plans.</b></p> | <p>By developing the methodology to assess the business perspectives and the sustainability of both the services developed within NEANIAS and the invited innovation cases, INCITES will have a powerful tool that can be used to provide consulting services to its clients. Also, they expect to be able to present these methodologies to more research groups that are involved in Open Science and EOSC activities. INCITES personnel will be in close collaboration with other EOSC stakeholders increasing the probabilities for future collaborations.</p> |
| <p><b>Plans for standardisation and Open Source Contributions (if any)</b></p>   | <p>N/A</p>   |
| <p><b>Other (e.g. main partners in exploitation, main users, main competences of the institutions)</b></p>                               | <p>INCITES will work closely with the research communities in all three thematic areas of NEANIAS in order to help them assess the business potential of the services they develop.</p>  |

### 7.15. Innomine Group KFT - Hungary

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| <p><b>Expected long-term benefit, and added value of NEANIAS for the organisation</b></p>  | <p>innomine, a consultant company with experience in commercialising R&amp;D results, innovation management and business development intend to utilise and widen its expertise on making business out of research results, and provide innovation management support to develop services to TRL8, starting from TRL6.</p> <p>innomine, possessing a wide network in the CEE region, intends to expand its network through supporting the development and exploitation of NEANIAS services.</p>  |
| <p><b>Expected ways of exploiting the results of NEANIAS on institutional level. Short and long-term actions, strategies, plans.</b></p> | <p>innomine, with supporting exploitation of services might participate in establishing start-ups and spin-offs in the form of fostering joint exploitation. Other than that, innomine intends to extend its service portfolio, building on the experience gained in NEANIAS, especially supporting innovation management and exploitation in the underwater, atmospheric and space research sector.</p> <p>innomine, actively participating in organising open calls, datathons and hackathons will provide the possibility to organise experiments in the field, providing further references for innomine.</p> |

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| <b>Plans for standardisation and Open Source Contributions (if any)</b>                             | N/A  |
| <b>Other (e.g. main partners in exploitation, main users, main competences of the institutions)</b> | innomine, operating also as a Digital Innovation Hub in CEE can reach out to a high number of SMEs, start-ups in the field, to establish cooperation and motivate them to participate in open calls. |

### 7.16. Eunice Energy Technologies GMBH & CO. KG - Germany

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| <b>Expected long-term benefit, and added value of NEANIAS for the organisation</b>  | <p>a) NEANIAS offers a constructive opportunity for Eunice's group of engineers to connect with EOSC and make good use of its demonstrated results applying the latter to future projects (tbc)</p> <p>b) Eunice expects its participation to research projects and activities similar to NEANIAS will promote the interaction of groups of diverse fields of expertise and effective exchange of ideas demonstrating thus, a great opportunity for the involved group of engineers to further their practical experience as well as soft skills.</p>  |
| <b>Expected ways of exploiting the results of NEANIAS on institutional level. Short and long-term actions, strategies, plans.</b> | <p>a) Eunice foresees from NENANIAS the creation of forceful synergies with research institutions and communities leading thus to sustainable partnerships in the future within or out of the limits of services directed and implemented by NEANIAS.</p> <p>b) Through its involvement with NEANIAS and the familiarization with the EOSC services, Eunice expects further collaborations and projects to take place for subsequent generation of new and innovative products and services.</p> <p>c) NEANNIAS's services in connection to future projects of Eunice similar to the AIGAI0 project or other (tbc) Business opportunities triggered by NEANIAS within or out the field it directs (tbc)</p> <p>d) Dissemination activities by Eunice (tbc)</p> |
| <b>Plans for standardisation and Open Source Contributions (if any)</b>   | N/A  |

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| <b>Other (e.g. main partners in exploitation, main users, main competences of the institutions)</b> | N/A |
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### 7.17. Meteorological Environmental Earth Observation S.r.l. - Italy

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| <b>Expected long-term benefit, and added value of NEANIAS for the organisation</b>  | <p>MEEO has a consolidated experience on the full data cycle management: data discovery, access and processing services for geospatial data at scale. In the framework of NEANIAS as contributor to Atmospheric Service and Space Service, the main expectations are:</p> <ul style="list-style-type: none"> <li>a) to transfer in to operation services for the EOSC community</li> <li>b) to consolidate the role of MEEO as service integrator and operator for the research community</li> <li>c) to extend the partners/customers network</li> <li>d) to trigger new business opportunities</li> </ul> |
| <b>Expected ways of exploiting the results of NEANIAS on institutional level. Short and long-term actions, strategies, plans.</b> | <p>MEEO is a consolidated partner of the European Space Agency and an Associated Partner of Climate-KIC. Results of NEANIAS will be:</p> <ul style="list-style-type: none"> <li>a) presented during dissemination events as relevant showcases of how the MEEO products and services support the EOSC community;</li> <li>b) exploited to extend and improve the existing products and services.</li> </ul>   |
| <b>Plans for standardisation and Open Source Contributions (if any)</b>   | <p>Being an OGC Associate Membership Small Company, the plans for standardization are:</p> <ul style="list-style-type: none"> <li>a) use existing OGC standard interfaces and services;</li> <li>b) propose extensions of the OGC services;</li> <li>c) design and implement software components using OpenAPI specifications.</li> </ul>   |
| <b>Other (e.g. main partners in exploitation, main users, main competences of the institutions)</b>                               | MEEO proposes to iterate with EOSC-hub and Copernicus initiatives   |

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### 7.18. Consortium GARR – Italy

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| <p><b>Expected long-term benefit, and added value of NEANIAS for the organisation</b></p>  | <p>GARR provides high capacity network and ICT services for the Research &amp; Education community in Italy. Furthermore, it animates the National Open Science and Data initiative, ICDI, and takes part in several EOSC-related projects in order to represent the community and work on services that are useful to them. The participation to NEANIAS stems from this mission. The services developed in the project are intended to directly benefit GARR user community and provide them added value. As a secondary benefit, GARR expects to improve its know-how in the development of production-level services for specific communities. Such know-how can be then used to support others and increase the NREN/national initiative's portfolio.</p>  |
| <p><b>Expected ways of exploiting the results of NEANIAS on institutional level. Short and long-term actions, strategies, plans.</b></p> | <p>1) GARR can propose the services to its community, exploiting its institutional contacts<br/>                 2) synergies with the EOSC-Pillar project and its sister projects in call INFRAEOSC05 can be explored for the further exploitation of the results<br/>                 3) through the participation in ICDI, the results can be exploited, extended to other communities, and brought forward by other initiatives at the national level</p>   |
| <p><b>Plans for standardisation and Open Source Contributions (if any)</b></p>   | <p>Within NEANIAS, GARR will work at the integration of services into IaaS cloud, container platform and EOSC ecosystem. The software which will be developed will have open source license "whenever possible", meaning that:</p> <ul style="list-style-type: none"> <li>- software which will be part of each individual software application, may have to follow the relevant licensing</li> <li>- other software independent (or very loosely dependent) from applications, for example code used for monitoring purposes, will be released with open-source license</li> </ul> <p>For software modifying/extending functionalities of open source tools (for example, of OpenStack projects or EOSC services), GARR commits to try and contribute the code upstream, whenever the proposed changes are considered generic enough to be useful also outside the specific NEANIAS use-case.</p> <p>As for standardisation, over the lifetime of NEANIAS it is probably not realistic to envisage a direct contribution to standardization. However, software development will, whenever possible, duly consider adoption of existing</p> |

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|   | standards (for example, SAML/OIDC for authentication mechanisms).  |
| <b>Other (e.g. main partners in exploitation, main users, main competences of the institutions)</b> | GARR can work in synergy with INAF, which is part of its stakeholder's community. Its users are mainly those coming from the national Research & Education community. They have Network & ICT competences. The team involved in this project comes from the Cloud computing department and main competences deployed in this project are related to Cloud provision and support. However, in the exploitation action GARR will be also able to deploy staff with extensive experience in relations with and support to the user community. |

### 7.19. Aerospace Logistics Technology Engineering Company SPA - Italy

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| <b>Expected long-term benefit, and added value of NEANIAS for the organisation</b> | <p>Taking advantage of the innovation ecosystem of EOSC Hub services, the long-term benefit for ALTEC will be the <i>strengthening of its position</i> in the field of complex data archives, cloud computing, HPC, big data and virtual/augmented reality. A big project like NEANIAS, developed by a big Consortium, is a chance for ALTEC team <i>to enrich skills and competences</i> and establish significant collaboration with partners from universities and industries, and new opportunities beyond NEANIAS.</p> <p>The involvement in the project NEANIAS and EOSC Community will allow ALTEC for <i>further R&amp;D activities, the evaluation of business opportunities for future services</i> and to create synergies for future work through new partnerships/projects with research centres, universities and other innovation centres.</p> <p>The utilization of innovative approaches developed within the NEANIAS project will permit the optimization of the processes currently in use to support the scientific communities to which ALTEC provide services in the realm of the data management and processing. Such an optimization will permit the elaboration of <i>more competitive portfolio of services to both</i> the institutional and commercial market while maintaining the present high-quality level.</p> |
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| <p><b>Expected ways of exploiting the results of NEANIAS on institutional level. Short and long-term actions, strategies, plans.</b></p> | <p>Expecting an improvement, in terms of <i>performance and standardization</i>, of ALTEC components to be used in the context of NEANIAS: the Astronomical Data Navigator (ADN) VR, the Cloud Platform, the Data Processing, the Data Analysis, the Data Management.</p> <p><u>Short Term</u></p> <p>As for the <i>ADN</i>, ALTEC aims to enrich VR application competences and acquire skills to use VR devices and framework at the state-of-the-art. The cloud model of <i>ALTEC Cloud Platform</i> in NEANIAS will migrate from private to hybrid.</p> <p><u>Medium Term</u></p> <p>For the <i>Data Processing</i>, it will be consolidated the usage of Container technologies (e.g. Kubernetes) and strengthen skills in open source technologies needed for processing environment. For the <i>Data Analysis</i>, the objective is to consolidate the usage of open source software framework and libraries at the state-of-art for ML/DL application development and strengthen skills to support scientific community to use ML/DL technologies.</p> <p><u>Long Term</u></p> <p>The <i>Data Management</i> will improve through the implementation of a cloud data access layer as integration of several data stores, the transition from Oracle to open source technologies and strengthening the skill in data cube systems and VO protocols.</p> <p>AS for what concern the ALTEC strategies it must be underlined that the current participation to NEANIAS project is in itself the implementation of a development action foreseen in the company's strategies to strength the competitive position within the institutional and commercial markets of the integrated applied services based on the development of application based on the exploitation of big data.</p> |
| <p><b>Plans for standardisation and Open Source Contributions (if any)</b></p>   | <p>N/A</p>   |
| <p><b>Other (e.g. main partners in exploitation, main users, main competences of the institutions)</b></p>                               | <p>As per the institutional part, ALTEC's main partners are scientific teams of INAF, in particular teams from OATo, OACt and OATs for the development of the national scientific data processing centres of Gaia and Euclid space missions. Their</p>   |

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|  | <p>principal scientific programmes are funded by ASI (Italian Space Agency) and ESA (European Space Agency).</p> <p>Concerning the current development commercial market for the big data exploitation, ALTEC is currently operating with some start-ups from Italian universities and polytechnics, capable to offer extraordinary level of competences in the advanced field of Machine Learning and Artificial Intelligence, and in cooperation with final users interested in the realization of pilot projects finalized to verify in the field the new approaches in study. These users are nations or European leaders in the energy and earth observation domains.</p> |
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## 7.20. National Observatory of Athens – Greece

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| <p><b>Expected long-term benefit, and added value of NEANIAS for the organisation</b></p>  | <p>NEANIAS project links organizations that produce and maintain Data and Data Services with organizations/companies that exploit these by offering APIs and other webservice to the public. NOA is the main nationwide organization that produces Geodynamic, Environmental and Space Data and Data Services to the scientific community. Joining forces with the other NEANIAS partners, NOA will strengthen in public exploitation techniques and penetrate more in the European Open Science Cloud community.</p>  |
| <p><b>Expected ways of exploiting the results of NEANIAS on institutional level. Short and long-term actions, strategies, plans.</b></p> | <p>NOA is operating the National and Regional EIDA node. The European Integrated Data Archive (EIDA), is a federated European data center, that archives and provides access to seismic waveforms and their related metadata including station inventory, and seismic waveforms' quality parameters from the European research infrastructures. The distributed EIDA nodes contribute data from specific regions and have committed resources for the support, operation and development of EIDA. Waveform data from seismic stations located in Greece and the south-eastern Mediterranean are included to the new regional EIDA node (NOA) hosted by the Institute of Geodynamics of the National Observatory of Athens. Up to now EIDA webservice are offered through two dedicated physical places in Athens. Through EOSC-hub project all EIDA@NOA data have been loaded to the GRNET Cloud and soon a third service will be offered from there. NEANIAS results and new/improved</p> |

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|   | components and systems will be exploited by NOA researchers and students. Productivity in earthquake scientific research will increase with new innovative cloud-based services.  |
| <b>Plans for standardisation and Open Source Contributions (if any)</b>                             | N/A   |
| <b>Other (e.g. main partners in exploitation, main users, main competences of the institutions)</b> | In national and European level Seismological Agencies and Observatories, Universities, research institutes and research centers, scientists and students. Research Communities and companies from seismology, geophysics, volcanology. Governmental organizations, Civil defence agencies, municipalities, prefectures, various stakeholders. |



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## 8. Conclusions

The exploitation plan detailed the process and methodology of utilising the services created in the frame of NEANIAS.

It highlighted on the main ways of exploitation, which can be categorised into exploitation through utilising business opportunities, academic, and exploitation through onboarding to the EOSC platform.

In order to create the basis for business exploitation, the main attributes of services are collected, including their added value for business utilisation, the industries, specific fields, they can be utilised. The expectations of institutions are also detailed in this plan, including the added value they expect from NEANIAS, and also the standards they use on institutional level.

Detailing and sharing this information create for the NEANIAS partners a stable base to establish connections and collaborations between the service developers, which can be used in joint exploitation.

This plan will be regularly updated in case:

- there is a significant achievement in the development of services and/or the developers identified a new field of utilising the services;
- the partners have to take into consideration new opportunities of joint exploitation;
- there are joint exploitation opportunities utilised by some partners, but the details of joint exploitation should be established;
- in case the implementation of the NEANIAS project – for any other reason - requires the update of the exploitation plan.