‘Connecting Innovators’

Call for proposals

Mastering Complexity (MasCot)
Richtlijnen voor het aanvragen van financiering voor wetenschappelijk onderzoek in het kader van het ESI partnership programma

Guidelines for funding proposals for research under the ESI partnership programme

Deadline for submission of pre-proposals: 26 February 2019 14:00 CET
Deadline for submission of full proposals: 7 May 2019 14:00 CEST

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Utrecht, 20 December 2018
Nederlandse Organisatie voor Wetenschappelijk Onderzoek
NWO-domein Toegepaste en Technische Wetenschappen

Utrecht, 20 December 2018
Netherlands Organisation for Scientific Research
NWO domain Applied and Engineering Sciences
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1. Mastering Complexity programme description

Introduction

This brochure explains the objectives and working methods of NWO domain Applied and Engineering Sciences; further referred to as NWO domain AES (In Dutch: NWO-domein Toegepaste en Technische Wetenschappen, TTW). It details the conditions governing proposals submitted to NWO domain AES for the funding of scientific research under the partnership 'Mastering Complexity'.

NWO domain AES is part of the Netherlands Organisation for Scientific Research (NWO; see also www.nwo.nl). As such, NWO domain AES provides indirect government funding.

Before submitting your application electronically via ISAAC, NWO domain AES recommends that you visit its website (www.ttw.nwo.nl) to check that you have the latest version of this brochure, and that you read the guidelines carefully. Moreover, please familiarize yourself with ISAAC (www.isaac.nwo.nl) before you start the submission of your proposal.

Background

The NWO domain Applied and Engineering Sciences (AES) connects people and resources to develop technology with added economic value that contributes to solving societal issues, and with Partnership programs the collaboration between academic and industrial researchers is fostered. NWO domain AES is proud to announce that it has found a partner in the ESI Joint Innovation Centre. We invite academic researchers to submit pre-proposals for research projects that may give answers to the scientific and technological challenges described in this call.

NWO domain AES’s mission is to realise knowledge transfer between technical sciences and users. NWO domain AES does so:

- by bringing scientific researchers and potential users together;
- by funding excellent research in the technical and applied sciences.

ESI (in full Embedded Systems Innovation) is a so-called Joint Innovation Centre within TNO, steered by a partner board consisting of industries ASML, Océ, Philips, Thales, Thermo-Fisher Scientific, academics TU Eindhoven, TU Delft, Radboud University Nijmegen, University of Twente and knowledge institute TNO.

ESI translates basic, mono-disciplinary academic concepts into cross-disciplinary methodologies (i.e. formalisms, methods, and tools) that address concrete industrial problems in managing the increasing complexity in high-tech systems. This requires a continuous intimate connection between academic research and applied research in the ESI research program.

Complexity of cyber-physical systems and its industrial relevance

Cyber-physical systems are all around us and the complexity is getting out of hand. This is driven by a number of trends, which are described first.

Trends in cyber physical systems

Firstly, the number of dependent hardware and software components in systems is increasing to realize a wider range of functionality. While a larger number of dependent components increases complexity on its own, another complexity driver is that systems are largely built from components from previous generations and new components are often only developed for new distinguishing features. Over time, increasingly complex systems result in a growing legacy of components that must be continuously maintained and restructured to keep up with new technologies and enable reuse of proven components in new systems, while preserving the correctness of the implementation. This increasing evolvability
burden now consumes a considerable part of the engineering budget without adding new features to the systems.

Secondly, systems are getting increasingly diverse and dynamic, both in terms of hardware and software configuration and the resulting functional and non-functional behaviour. The increasing diversity happens partly at development time and is a result of recent customer and market trends towards customization of systems, which increasingly create situations where every manufactured system has a unique set of features and hardware configurations. This situation is further exacerbated, since systems evolve over time and software and hardware components change after the system has been deployed. Together, these aspects of system diversity make verification and validation very challenging, which negatively impacts quality.

In contrast to diversity, dynamism is a run-time characteristic and is increasing in complex systems for at least four reasons: 1) behaviour of system components get more and more stateful, e.g. due to a growing number of operating modes in both hardware and software components, 2) dependent tasks cause complex interactions and emergent dynamic behaviour, 3) increasing dependency on, or awareness of, the system context and environment, and 4) systems evolve as software and hardware components are added and removed at run-time after the system has been deployed, creating uncertainty about the presence and performance of components in the system. Combined, these trends make it increasingly hard to guarantee that functional and non-functional requirements are always satisfied.

**Dealing with complexity**

This ever increasing complexity cannot be dealt with by current state-of-practice engineering methodologies, which are often informal and mono-disciplinary and therefore ineffective in addressing the increasing size, diversity and dynamism of high-tech systems. The consequences are visible in daily practice in which industry experiences major setbacks in their attempts to efficiently and effectively develop well-performing cyber-physical systems. Over time, increasing complexity results in reduced quality and increased development and maintenance costs, making it harder for Dutch industry to compete in the world market. This calls for alternative system engineering methodologies, especially those addressing the multi-disciplinary aspects of system design.

The goal of this program is to investigate and deliver the next generation of engineering methodologies, integrating a number of formalisms, techniques, methods, and tools, that help managing the increasing system complexity. Achieving this goal helps improve quality and reduce development costs for future generations of cyber-physical systems, thereby providing the Dutch industry a competitive advantage.

The next sections in this brochure elaborate on this.

**Focus, objectives and applications**

**ESI applied research programme**

This section briefly introduces the main ESI expertise areas and its applied research program as context for this call. A listing of the expertise areas and a grouping based on their purpose is shown in Figure 1. The highlighted areas indicate the focus of this call, which has been decided on basis on discussions with ESIs industrial partners. Figure 2 then shows how the ESI expertise areas map onto the ESI applied research program. This figure illustrates the coherency of the program and the interdisciplinary nature of the work.

<table>
<thead>
<tr>
<th>System Overview</th>
<th>Architected Architecture</th>
<th>Architecting process</th>
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<td>Model languages</td>
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<td>Model management</td>
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Figure 1: ESI expertise areas and focus of this partnership (the latter being indicated by the highlighted aspects).
Project submissions will need to align to both the HTSM Embedded Systems roadmap (available on-line) and the selected areas of the ESI applied research program (as described in this brochure).

![Diagram of ESI applied research program]

Figure 2: Overview of the ESI applied research program; the individual projects, indicated by the vertical lines are grouped according to the five program lines, while the dots indicate to which ESI expertise areas and complexity drivers they are linked.

ESI performs its applied research at technological readiness level (TRL) 4-7 in long-term public-private partnership (PPP) programmes with its industrial partners and other Dutch high-tech industries. The basis is the ESI knowledge roadmap, which is closely aligned to the Dutch HTSM-ES roadmap. The ESI applied research program consists of five market-oriented program lines that are derived from key trends and challenges in the high-tech industry. Within these program lines, individual ESI PPP projects are executed in collaboration with an industry partner, typically at the industry location. This intimate collaboration with industry, known as Industry-as-a-Lab, benefits from relevant expertise and equipment from the industrial partners, and provides a unique possibility of clear problem understanding and immediate valorisation of results. Every ESI research project addresses one or more trends in high-tech system complexity and links to several expertise areas in ESI by both using existing expertise and adding further competence and knowledge.

The ESI knowledge roadmap calls for more fundamental research at TRL 1-3 in each of the expertise areas to secure sustainable, long-term success in fulfilling the ESI mission. The objective of the partnership program in this call is to provide a strong academic basis at these TR levels for the ESI core research program, as described above, with a similar coherency and focus on the needs of high-tech industry as the ESI core research program.
**Goal and Focus**

The goal of this program is to investigate and deliver the next generation of engineering methodologies, integrating a number of formalisms, techniques, methods, and tools, that help managing the increasing system complexity. Achieving this goal helps improve quality and reduce development costs for future generations of cyber-physical systems, thereby providing the Dutch industry a competitive advantage.

The definitions of formalisms, techniques, methods, and tools in the context of this call are:

- **Formalisms** are languages / syntax used for system modelling. Formalisms exist for modelling behaviour, but also to formalize system requirements. Instances of formalisms are called models. Examples of formalisms are differential equations, (timed and hybrid) automata, finite state machines, temporal logic and queuing formalisms.

- **Techniques** are used to retrieve information from models or to transform models. Examples of analysis techniques are model checking, performance analysis and program analysis techniques. Examples of transformation techniques are high-level synthesis and software compilation.

- **Methods** provide guidelines and can be seen as a recipe for how and in which order to apply certain formalisms, techniques, and tools to solve a particular design problem. Methods are ways to capture design and reasoning knowledge of experienced modellers and designers. A method indicates, for instance, decomposition in steps (possibly techniques) and an order in which the steps should be performed.

- **Software Tools** support the efficient application of formalism, and techniques.

The focus of the program is on Model-based Engineering (MBE) methodologies building on formal methods and supported by tools providing guidance, decision support, or full automation; and all scalable to handle the size of future complex industrial systems. This is explained more in the scientific challenges.

**Objectives**

The objectives of this program are to manage the complexity of cyber-physical systems and enable future industrial systems to be quickly developed at low cost, while having high quality. These objectives will be achieved by means of the following deliverables:

1. **New formalisms, techniques or methods** addressing one or more of the scientific challenges in this call.
2. **Tools** that implement and (partially) automate design formalisms, techniques, or methods related to the scientific challenges of this call, or support their use, to help make the step from theory to industrialization.
3. **New generic model-based engineering methodologies** that combine two or more formalisms, techniques, methods or tools related to the scientific challenges in this call in a structured way to enable efficient design of complex systems.
4. **Proof-of-concept demonstrators** at TRL 3 that show the feasibility of methods, formalisms, tools, and methodologies related to the scientific challenges of this call.

**Applications**

The methodologies required to cope with increasing complexity should to a significant extent be industry and application independent and are thus expected to be applicable to a wide range of cyber-physical systems in different domains, including, but not limited to:

- Healthcare, e.g. interventional X-ray machines;
- Semiconductors, e.g. lithography machines;
- Defence, e.g. radar systems;
- Science, e.g. electron microscopes;
- Digital imaging, e.g. printing systems.
Major research areas and themes
As explained in the first part of this section, the trend in cyber physical systems is one of increasing complexity; this program is about new methodologies that help managing the increasing system complexity.

Main Research themes in this program
This program focuses on new MBE methodologies integrating formalisms, techniques, methods, and tools to combat increasing system complexity through coherent abstractions and automation, with a focus on four main research themes. These four themes are directly related to four of ESI’s research expertise areas, previously highlighted in Figure 1:

A. **Model Inference (Model Forming)**: investigates how to support or automate the process of modelling complex systems, i.e. creating coherent abstractions that are fit for purpose in a time-efficient manner

B. **Run-time Scheduling of Diverse and Dynamic Systems (Performance)**: studies customization and design of run-time schedulers capable of responding to dynamic behaviour while guaranteeing non-functional requirements, such as performance

C. **Model-based Restructuring of Legacy Systems (Dealing with Legacy)**: considers how to reduce the maintenance burden of legacy systems using models

D. **Verification and Validation of Diverse and Evolving Non-deterministic Systems (Quality Assurance and Testing)**: investigates how to increase software quality of mass-customized evolving non-deterministic systems using models and data

This particular selection of expertise areas capture two essential parts of model-based approaches, namely obtaining models, and then using them to solve particular problems. This program calls for project proposals addressing one or more of these themes. Next, the four themes and their associated scientific challenges are described in more detail. Later, cross-cutting scientific challenges that span all research themes are presented.

Research themes described in more detail
**Model Inference (Model Forming)**
Obtaining a set of coherent models that capture relevant aspects of a complex system is far from easy. This process involves determining what to include in models to make them fit-for-purpose, and how they can be related to other models with different purposes and at different levels of abstraction. Once it is clear what and how to model, the next challenge is actually creating the models. For small systems, it may be possible to create models manually. However, scaling up the manual modelling effort quickly becomes time-consuming and error-prone, which may prevent methodologies based on MBE from being adopted and applied cost-effectively on future complex systems.

To address this issue, this program calls for new methodologies that tackle the modelling bottleneck through automation by inferring models of (legacy) components in an automatic or semi-automatic way. Model inference can be done in two different ways: 1) statically, from artefacts, such as documents and source code, enabling industry to capitalize on a wealth of knowledge already at their disposal, and dynamically, by studying the behaviour exposed by the system, based on potentially large data streams of e.g. execution traces or measurements. The main scientific challenges in this area are:

A1. **Algorithms combining static and dynamic model inference** to leverage their respective strengths.

A2. **Techniques and methods for creating or enhancing models using real-time selection, filtering, structuring and processing of incomplete, heterogeneous and possibly non-persistent data, generated at very high speeds**. This data may further be produced by different users and in different operational contexts that change over time.
Run-time Adaptive Scheduling of Dynamic Systems (Performance)

Systems have many dependent software and hardware components that are carefully orchestrated by schedulers that have to guarantee a range of non-functional requirements on latency, throughput, jitter, or stability of the schedule. Trends towards high system diversity through mass customization imply that schedulers need to be designed and validated for different system variants, which becomes very time-consuming as the number of variants increases. This problem is exacerbated by the tight coupling between scheduling performance, the mechanical design of a system and physical processes in the system or its environment, effectively turning scheduling into a multi-disciplinary co-design problem.

Increasing system dynamism creates a lot of uncertainty about the system and its operating environment. This implies that scheduling must happen at run-time when the availability of components and their performance, the operating environment, and the user context, are known or can be continuously monitored. Considering all these factors, generating schedules that always satisfy non-functional requirements in real-time remains extremely challenging.

To address this issue, this program calls for new methodologies for run-time scheduling that guarantee non-functional requirements in diverse and dynamic systems. The main scientific challenges in this area are:

B1. Customization of run-time schedulers addressing diversity within a product family at design time. Relevant directions include multi-disciplinary co-design methods considering scheduling, mechanical aspects and physical processes, composing run-time schedulers from modular scheduler components, learning schedules or scheduler settings from empirical data, or parametric schedulers that are optimized based on the configuration of a particular system variant.

B2. Adaptive scheduling techniques for dynamic systems with non-functional requirements, such as latency, throughput, jitter, or stability of the schedule. This considers run-time adaptation techniques, such as online distributed scheduling, system reconfiguration techniques aiming to improve schedule performance, or using data from the system or its environment to learn or evolve scheduler or system parameters.

Model-based Restructuring of Legacy Systems (Dealing with Legacy)

To reduce the increasing maintenance cost of legacy systems, it is essential to be able to efficiently restructure code to reduce accidental complexity, improve human understanding, comply with changing coding standards, or adapt it to fit with new or changing software libraries. Modern development environments, such as Eclipse or Visual Studio, contain tool support for general restructuring needs, such as renaming entities, extracting methods/variables/interfaces, and moving methods up and down the class hierarchy. However, they do not provide facilities for specifying custom domain-specific restructurings. Since compiler technology is not accessible to most general software developers, most restructurings are in the end done manually, which is difficult, time-consuming, and error-prone. The challenge is hence to enable software developers to define and execute their own custom restructurings, including pragmatic techniques to validate the correctness in their restricted application domain.

To address this issue, this program calls for new (semi-)automatic methodologies to specify, and execute domain-specific restructurings. There main scientific challenges in this area are:

C1. Defining a quick, concise and formal way to unambiguously specify domain-specific restructurings. A promising direction may be to define domain-specific languages or other model-based formalisms that provide abstraction and enable industrial software developers to specify and execute custom restructurings without deep understanding of compiler technology.

C2. Ensuring correctness of domain-specific restructurings. This involves both asserting that the specified restructurings are not conflicting with each other before starting execution, but also validating the correctness of the restructured code afterwards.
Verification and Validation of Diverse and Evolving Non-deterministic Systems (Quality Assurance and Testing)

Recent trends towards customization and evolving systems imply there are always multiple versions of a system with different features and various configurations. Moreover, the installed base keeps changing as systems evolve after they have been deployed. This combination of diversity and evolution makes verification and validation very challenging, as it is infeasible to test all relevant behaviours for all possible different versions of a system. This problem is exacerbated as cyber-physical systems are often practically non-deterministic, e.g. because of concurrency or emergent behaviour due to integration in larger systems-of-systems. This complicates validation as many different outputs are possible for a given input.

This program calls for new model-based methodologies that reduce the time and cost associated with verification and validation of diverse and evolving non-deterministic systems. The scientific challenges in this area are:

D1. **Modelling system variants or changes to a system and use these models to improve the testing process**, e.g. by determining the impact of changes on verification of the system, or automatically generating or selecting tests.

D2. **Efficiently covering the vast version space**, e.g. by focusing on testing the differences between systems (delta-testing).

D3. **Data-driven testing**, e.g. using execution logs and previous test data, to generate, select, modify or order tests to maximize their relevance for a particular system, or to reach a particular coverage.

D4. **Validation of non-deterministic systems**, e.g. modelling of non-deterministic systems, or techniques to determine the boundaries of correct behaviours.

Cross-cutting Scientific challenges

In addition to the scientific challenges of the four research themes, there are also cross-cutting scientific challenges that are relevant for all themes:

E1. **Scalability of methods and tools** to deal with the future complex cyber-physical systems with many configurations and dependent components.

E2. **Understanding of scope and limitations** of proposed formalisms, methods, techniques, and tools to determine the boundary conditions for their industrial application. What are the classes of problems they can be applied to and, just as important, what are the classes they cannot be applied to?

Utilisation goals

This program focuses on lower TRL research feeding into the mid-range cross-disciplinary TRL research performed in the ESI PPP program in a coherent and managed way. It is essential to the success of the program that the results can be utilized by ESI and its industrial partners to address the complexity challenge and bridge the gap in terms of TRL between academic research (TRL 1-3) and industrial practice (TRL 7-9). The aim for ESI is to create a continuous, gap-less pipeline from academic research to utilization in industry. This typically requires additional research to further mature results and successfully apply them in industry.

ESI works at TRL 4-7 and has the role of bridging the gap between academia and industry. To maximize utilization of results, this program aims to capitalize on this role by encouraging active collaboration between accepted projects and ESIs industry-as-lab projects. Such collaborations help put the research in context, transfer knowledge, and mature results towards higher TRL, which increases the chance of successful utilisation in industry.

Utilisation goals that the programme wants to address and (partly) get solved are:

U1. Project results are shown to be applicable in principle in the high-tech industry.
U2. Project results will be included in the ESI knowledge base to facilitate further maturation in the ESI research program to ascertain applicability in reality in the high-tech industry.

To achieve these goals, it is of particular importance that:

- The user committee is composed such that it can provide reasonable input on industrial applicability and connection to the ESI knowledge base.
- The project proposal clarifies how the research addresses a real industrial need.
- Project results are validated and demonstrated on a relevant industrial use-case in a proof-of-concept demonstrator.

**Fit of research proposals into the programme; project-specific requirements**

Project proposals must meet at least the following fit-to-the-programme criteria:

- Project ideas must be discussed with ESI in order to ensure the proposals fit in the scope of the Partnership programme plan.
- Utilization of project results should be in the context of the activities of ESI and their industrial partners.
- Proposals are encouraged to include one or more research groups from different universities.
- Proposals should clearly indicate which research themes and challenges they target and how.
- Proposals should address two or more scientific challenges, at least one them related to the research themes, as described on pages 9-11.
- Proposals should clearly indicate in which categories of objectives mentioned on page 8 their deliverables fit into and how.
- Proposals covering the largest number of categories of objectives mentioned on page 8 will have the highest priority.
- On-site collaboration of research personnel at the locations of the industrial partners within the maximum limitations of NWO is strongly encouraged.

**Unique character of the programme**

This program has four unique characteristics:

1. The *combination of topics and disciplines* that will be brought into a single program is unique. The program will advance the state-of-the-art in topics ranging from creating models using different techniques to using and deploying them to increase the quality of complex systems, while reducing design time and cost. This is achieved through a variety of means, but in a coherent and consistent way, all aiming at the same, higher goal of mastering the complexity of cyber-physical systems.

2. The program aims at facilitating a *seamless flow of academic research* in a wide variety of disciplines, through the integrating, multi-disciplinary role of ESI, into the leading Dutch high-tech multi-nationals.

3. Because of its alignment with the HTSM-Embedded Systems roadmap as well as the roadmap of ESI and its industrial eco-system, and because the program will be closely tied to the running ESI research programs that are operating at higher TRL levels, there are optimal conditions that the academic results will optimally be put to use in industry.

4. It addresses the fundamental common issues arising from complexity of cyber-physical systems from a broad range of industrial application domains. Because of this fundamental and generic nature of the problems, the results of the program will benefit not just the partners involved, but a much wider range of Dutch industries.
2. Proposals and selection

The submission and evaluation process is broken down in two separate, subsequent stages: a call for pre-proposals followed by a call for full proposals. The STW board will decide on the funding of the full proposals.

Please note: only applicants who have submitted a pre-proposal are allowed to submit a full proposal.

Programme budget

The programme budget available for this Partnership programme amounts to a maximum of 2,85 million euro (inclusive of Dutch VAT), funded 50/50 between NWO domain AES and ESI Joint Innovation Centre within TNO¹.

ESI is being funded by its partner board consisting of industries ASML, Océ, Philips, Thales, Thermo-Fisher Scientific and academics TU Eindhoven, TU Delft, Radboud University Nijmegen, University of Twente and TNO.

NWO domain AES is financed by the Ministry of Education, Culture and Science - via the NWO-budget and the Ministry of Economic Affairs and Climate Policy.

Project budget

The maximum NWO domain AES contribution is 750,000 euro (inclusive of Dutch VAT) per project.

NWO Grant Rules 2017, Partnership agreement and Intellectual property (IP) policy

The NWO Grant Rules 2017 and the Guidelines Users’ Committee NWO domain TTW 2017 (see the brochures on www.ttw.nwo.nl) are applicable to this programme (see also ‘Notes on Intellectual Property Policy & Publication arrangements’ later in this brochure). For the arrangements on Intellectual Property and Publication (‘IP&P’) a choice is made for this programme that in all project submissions, NWO domain AES takes the lead in making the arrangements.

The Partnership programme is a cooperation between NWO domain AES and TNO. A Partnership agreement has been signed between NWO and TNO. For any issues that might arise during the course of the project, the project leader can consult NWO domain AES for advice. In legal matters the text of the Partnership contract prevails above the text of this call and above the general funding conditions of NWO domain AES.

After granting, the applicant obtains a Partnership project agreement in which the legal and financial conditions are stated (Appendix 7). The grant is available only after this agreement has been signed and returned to the NWO domain AES office.

The partner within this Partnership programme, TNO, obtains royalty-free non-exclusive rights to use and commercialize the results (all inventions, know-how, materials, methods, processes, products, programmes, software, findings and discoveries and any IP rights pertaining thereto), with the option to obtain exclusive rights against a market price to be agreed upon. These conditions will be part of the Partnership project agreement (also see section 9 and appendix 7).

¹ TNO guarantees that the ESI funds put in this programme originate from the private sector and no governmental subsidy is or shall be used to fulfil the contribution. NWO acknowledges that the TNO contribution to the Partnership Programme is considered to be private co-funding.
Sounding board and matchmaking

Parties interested to submit a pre-proposal are requested to discuss their project ideas with representatives of TNO ESI to assess the fit of the project ideas in the context of the programme plan. This sounding board will organise a matchmaking event on 24 January 2019 to provide an opportunity to discuss project ideas with ESI.

Multidisciplinarity

Proposals are encouraged to include one or more research groups from different universities. Joint research proposals may be submitted by researchers who are employed by different public research institutes that are eligible for NWO funding. The NWO domain AES office considers the main applicant to be the project leader and the contact person throughout the procedure.

Involvement in multiple projects

Within this Partnership call, a researcher may associate his/her name an applicant or co-applicant with only two research proposals.

Duration of the programme

The programme has a maximum duration of six years.

Resubmitting research proposals

Research proposals that were rejected in a previous STW or NWO domain AES evaluation procedure cannot be resubmitted automatically. When a research proposal is resubmitted, the scientific description (Section 4 of the application form) and/or the utilisation plan (Section 5 of the application form) must have been significantly revised. NWO domain AES will be the judge of this. The earlier referees’ comments may be used as a guideline in revising the proposal. When submitting the research proposal, the applicant should attach a statement in English explaining the revisions. If the research proposal has not been revised sufficiently, it will not be considered.

In addition, if identical or very similar research proposals are or will be submitted to NWO or other funding bodies, this must be stated in the proposal. For the duration of the assessment procedure of relevant calls, the submission of identical or very similar proposals (this at NWO domain AES’s judgement) to more than one of the following calls is not permitted: HTSM, OTP

Datamanagement

Responsible data management is part of good research. NWO wants research data that emerge from publicly funded research to become freely and sustainably available, as much as possible, for reuse by other researchers. Furthermore NWO wants to raise awareness among researchers about the importance of responsible data management. Proposals should therefore satisfy the data management protocol of NWO. This protocol consists of two steps:

1. Data management section
   The data management section is part of the research proposal. Researchers should answer four questions about data management within their intended research project. Therefore before the research starts the researcher will be asked to think about how the data collected must be ordered and categorised so that it can be made freely available. Measures will often need to be taken during the production and analysis of the data to make their later storage and dissemination possible. Researchers can state which research data they consider to be relevant for storage and reuse.
2. Data management plan
After a proposal has been awarded funding the researcher should elaborate the data management section into a data management plan. The plan should be submitted to NWO via ISAAC within a maximum of 4 months after the proposal has been awarded funding. NWO domain AES will approve the plan as quickly as possible. Approval of the data management plan by NWO domain AES is a condition for disbursement of the funding. The plan can be adjusted during the research.

Further information about the data management protocol of NWO can be found at www.nwo.nl/datamanagement.

Nagoya Protocol
The Nagoya Protocol became effective on 12 October 2014 and ensures an honest and reasonable distribution of benefits emerging from the use of genetic resources (Access and Benefit Sharing; ABS). Researchers who make use of genetic sources from the Netherlands or abroad for their research should familiarise themselves with the Nagoya Protocol (www.absfocalpoint.nl). NWO assumes that researchers will take all necessary actions with respect to the Nagoya Protocol.

3. Assessment procedure
The submission in the ‘Mastering Complexity’ call is a two-step procedure, with a pre-proposal and a full proposal phase. It is of crucial importance that submissions respect the ‘Fit of research proposals into the programme; project-specific requirements’, as mentioned on page 12.

Pre-proposals

Check of the pre-proposal by NWO domain AES
The NWO domain AES office confirms the receipt of every pre-proposal. A check is performed whether or not the pre-proposal satisfies all requirements as mentioned in this brochure. If necessary NWO domain AES will contact the applicant and may ask for a revised version.

Selection of pre-proposals; Assessment of relevance
The advice for admission to the next stage of the procedure depends on how well the proposal fits into the themes of the ‘Mastering Complexity’ call. The pre-proposal needs to be submitted together with an explanation of the way in which the project proposal provides an explicit contribution to one or more of the call’s objectives and research themes. One representative from ESI and three independent experts from Dutch industries will assess the strategic fit of the pre-proposals within the Partnership programme, its objectives, themes and research challenges. Generally, the more categories of objectives the proposal covers, the better the project may fit into the programme. See page 8-12 for details.

On the basis of individual assessments an advice to the applicants will be formulated in a plenary session. The advice whether to submit a full proposal can be accompanied by (required or suggested) amendments to the proposal. Cooperation with other applicants may be proposed for instance if the focus of the projects largely overlap or if better coverage of research themes will be gained. Proposals whose suitability is either not substantiated or insufficiently so or for which the above mentioned (ESI + industrial) representatives have given a negative assessment about the fit are strongly advised not to submit a full proposal.
Full proposals

Please note: only applicants who have submitted a pre-proposal that fits the call themes are encouraged to submit a full proposal.

Check of the full proposal by NWO domain AES
NWO domain AES confirms the receipt of the research proposal. NWO domain AES then evaluates whether the research proposal will be considered on the basis of the formal requirements. The main applicant is informed within 5-10 working days after the project registration as to whether the research proposal will be taken into consideration. If the conditions set are not met (see the section on "Guidelines for applicants") or if the requested information is incomplete, the research proposal will not be considered. In that case, the primary applicant will be given 10 working days - calculated from the date of notification - to submit a revised version. If the requested information is incomplete or is not submitted within the deadline, the research proposal will be recorded as having been withdrawn.

Pre-selection of full proposals
If at least four times more proposals are submitted than can be funded, NWO domain AES retains the right to perform a preselection.

Peer review
NWO domain AES submits the research proposal to a number of national and international experts in the particular discipline (‘peer review’). These referees come from the scientific community, large research institutes and industry. Referees remain anonymous. They assess the proposal on the basis of specific questions about its scientific quality, its utilisation and the fit to the themes of the programme. The questions presented to the referees are given in Appendix 1. NWO domain AES recommends that applicants anticipate these questions in their research proposals. NWO domain AES will try to have the research proposals evaluated by 3-5 referees.

NWO domain AES gives applicants the opportunity to provide suggestions for referees. For this, when submitting via ISAAC, please add a list of the names and contact information for a maximum of five independent referees with relevant expertise. NWO domain AES does not use a 'non-referees list' by which certain referees may be excluded beforehand. It is possible for applicants to request that the NWO domain AES office disallow a maximum of two people or organisations from acting as referees. NWO domain AES shall only agree to this if the submission of information in the research proposal to that referee could hinder utilisation.

Applicants’ rebuttal
In ISAAC the individual referees’ reports, anonymised and if necessary paraphrased, are combined. NWO domain AES requests the main applicant to respond in ISAAC to the referees’ comments (rebuttal). The combined referees’ reports and the rebuttal from the applicant(s) are used by the assessment committee members in arriving at their assessment.

Assessment committee and decision-making
An assessment committee (AC), consisting of four independent industrial representatives and four independent scientific experts in the field, will rank the full proposals. The four scientific AC members will separately give ratings on a scale from 1 to 9 (see scale definition in Appendix 2) for the scientific quality and fit to the themes of the programme and the four industrial AC members for utilisation and fit in the programme. Thereafter a preliminary ranking is made. The AC will then define the final ranking based on the average grades given by the AC members individually, the cohesion between the project proposals and (if necessary) other strategic arguments. The AC finalises a ranking of the proposals including an
argumentation in case it wishes to deviate from the ranking obtained by averaged scores. In calculation the average score, the three evaluation criteria have equal weight. The data management section in the application is not evaluated and hence not included in the decision about whether or not to award funding. However both the referees and the committee can issue advice with respect to the data management section.

The decision of the NWO domain AES board will be based on the ranking of the proposals by the AC. The NWO domain AES board can decide not to spend the maximum available budget for this call. Proposals that do not satisfy the quality requirement described below will not be eligible for funding.

**Quality requirement**

The quality requirement is as follows: proposals will qualify for funding only if they do not score higher than 4.0 for each of the criteria "scientific quality" and "utilisation" and "fit to theme", and such that the sum of these grades may not be higher than 10.5. An explanation of the meaning of the quality scores can be found in Appendix 2.

**NWO Code of Conduct on Conflicts of Interest**

NWO domain AES asks active researchers from research institutes and specialists from other knowledge-intensive organisations to participate in assessment procedures. These people are themselves involved in ongoing or new research and often belong to large organisational associations and research networks. Therefore, any conflict of interests, or anything that remotely resembles this, must be avoided in the assessment of research proposals.

To ensure a fair assessment and transparency for applicants, NWO domain AES uses the NWO Code of Conduct on Conflicts of Interest. This code identifies possible forms of conflicts of interest and indicates the steps to be taken to avoid conflicts of interest. Parties subject to the code of conduct are: referees, jury members, committee members, members of decision-making bodies and NWO officers. The full text of the NWO Code of Conduct on Conflicts of Interest is available at: [http://www.nwo.nl/en/documents/nwo/legal/nwo-code-of-conduct-on-conflicts-of-interest](http://www.nwo.nl/en/documents/nwo/legal/nwo-code-of-conduct-on-conflicts-of-interest).

4. **After award**

(see also the NWO Grant Rules 2017 at [www.ttw.nwo.nl](http://www.ttw.nwo.nl))

**After awarding**

The main applicant becomes the project leader. In projects with various knowledge institutions as applicants, subproject leaders need to be appointed for the various parts of the project. The knowledge institution of the main applicant is the main beneficiary and the official secretary. The knowledge institution of the main applicant concludes a financial agreement with NWO. If the proposal is awarded funding then the main applicant’s knowledge institution receives an award letter with appendices. This sets out the legal and financial conditions of funding and should be signed for approval by the knowledge institution. The (sub)project leaders and beneficiaries are jointly responsible for the realisation of the entire project.

**Data management plan**

After a proposal has been awarded funding the project leader should elaborate the data management section into a data management plan. Project leaders can make use of the advice from the referees and committee when they write the data management plan. The plan should be submitted to NWO via ISAAC within a maximum of 4 months after the proposal has been awarded funding. NWO domain AES will approve the plan as quickly as possible. Approval of the data management plan by NWO domain AES is a condition for disbursement of the funding. The plan can be adjusted during the research.
Start and starting date of the project

The credits allocated do not become available until after the necessary documents have been signed and received by NWO domain AES and all relevant award conditions have been fulfilled. If the latter is not yet the case, for example due to continuing negotiations about intellectual property, written permission to start the project can be requested from NWO domain AES. Without such written permission, potential financial risks are borne by the applicant(s). The starting date / commencement date of the project is the date on which an initial expenditure of allocated funds is undertaken. This is generally not the date of award. It usually relates to the appointment of the first staff member at the project’s expense. The project should start within 12 months of being awarded funding.

Changes to project plan and/or budget

Each substantial deviation from and/or change to the project plan awarded funding by NWO requires NWO’s prior consent. This also applies to changes in the composition of the personnel detailed in the project plan and/or hours for which the personnel are deployed on the project and/or a change of project leader. The separate budget categories in the funding/granting decision and/or the approved budgets, are maximum amounts (see NWO Regulation on Grants 2017 for further details).

User committees

NWO domain AES ensures that the knowledge generated by the research is practically and effectively transferred to users by consulting with the project leader of each research project to set up a user committee on the basis of the users proposed in the project plan. The members of the user committee are formally invited by NWO domain AES to sit on the user committee. Those participating in the user committee commit themselves to the conditions included in the Guidelines Users’ Committee NWO domain AES. See the ‘Notes on Users, co-funding and letters of support’ later in this brochure and the brochure ‘Guidelines Users’ Committee NWO domain TTW’ on www.ttw.nwo.nl.

Reporting

The project leader reports on the progress of the project at least once a year, in writing, and the user committee then meets to discuss the progress made. As an exception – to be decided by NWO domain AES – the user committee may meet less frequently. Utilisation of the research results is always on the meeting agenda. It covers collaboration with (potential) users and the protection and commercialisation of the knowledge generated.

MasCot day

All participants in the MasCot program will come together at least once a year in the MasCot day that will be organised by the program committee. The purpose of this day is to encourage cross-disciplinary exchange across the individual projects and interaction with ESI staff and representatives from industry partners and the agenda will be defined accordingly. Participation by all personnel appointed to the projects is required.

Programme committee

For the overall direction, management and evaluation of the ESI programme a Programme Committee (PC) will be established. The PC will consist of a minimum of 4 persons, to be appointed by NWO domain AES and ESI. Also the project leaders will be invited to become members of the PC.

Publication and Confidentiality

The results of the project are confidential until NWO domain AES has given permission for publication.
Arrangements made between the project partners in terms of IP and publication (for further information, see under ‘Notes on Intellectual Property & publication arrangements’) will be upheld provided that they have been approved by NWO domain AES.

A publication is the disclosure of results by any means, with the exception of disclosure resulting from a patent or patent application.

**Open Access**

All scientific publications resulting from research that is funded by grants derived from this call for proposals and approved by the user committee are to be immediately (at the time of publication) freely accessible worldwide (Open Access). There are several ways for researchers to publish Open Access. A detailed explanation regarding Open Access can be found on www.nwo.nl/openscience-en.

**Extension**

An extension after the end of a project is possible only in very limited cases. The prospects in terms of utilisation are crucial in this respect. From the utilisation perspective, funds remaining on the project can be used to extend one staff position (1 fte) for a period of up to three months. If the extension requires an increase in the budget, co-funding by (one of the) users is a prerequisite. This co-funding is subject to the same criteria as co-funding on submission of a research proposal. The NWO domain AES contribution is inclusive of the funds remaining on the project and is subject to an upper limit of 50% of the total costs for the extension of the project.

**Termination and termination date**

The termination date of a project is the date on which the last temporary appointment is terminated. The project leader then receives two final forms from NWO domain AES to round off the project in terms of both content and funding. Unallocated credits cease to be valid after the end of the project. The summaries requested in the final form are used for the purpose of publication in NWO domain AES’s utilisation report. NWO domain AES publishes an annual utilisation report giving progress updates 5 and 10 years after the start of a project.

**Discontinuation**

NWO may discontinue a project before the official termination date if the obligations and/or NWO Grant Rules 2017 are not or are no longer fulfilled, or if the scientific quality of the research and/or utilisation of the results of the research are inadequate.

### 5. Drawing up and submitting the research proposal

**Please note:** only applicants who have submitted a pre-proposal that fits the call themes are encouraged to submit a full proposal.

**Submitting pre-proposals**

The pre-proposal needs to be submitted together with an explanation of the way in which the project proposal provides an explicit contribution to one or more of the call’s objectives and research themes. The pre-proposal and elaboration of the fit must be submitted to NWO domain AES no later than **Tuesday, 26 February at 14:00h CET**. The relevant form can be downloaded from the NWO domain AES website. The explanation must be mailed to ESI-AES-PPP@nwo.nl.
Submitting full proposals in ISAAC

An application can only be submitted to NWO domain AES via the online application system ISAAC. **Applications not submitted via ISAAC will not be considered.** A principal applicant must submit his/her application via his/her own ISAAC account. If the principal applicant does not have an ISAAC account yet, then this should be created at least one day before the application is submitted to ensure that any registration problems can be resolved on time. If the principal applicant already has an NWO-account, then he/she does not need to create a new account to submit an application.

**Submitting an application consists of two steps:**
1. Entering several additional details online in ISAAC.
   **Make sure you allow enough time for this!**
2. Submitting the application form
   a. Download the application form from the electronic application system ISAAC or from NWO domain AES’s website (on the grant page for this programme).
   b. Complete the application form.
   c. Save the application form as a pdf file and upload it in ISAAC.

**Appendices**
Accompanying appendices should be submitted separately in PDF format (without protection). The application form together with appendices is regarded as the research proposal.

**Required appendices:**
- Form ‘Financial planning’
- Form ‘Declaration and signing by the applicant’
- Form ‘Data management section’
- Letters of support (confirmation of active user-role regardless whether or not additional co-funding is given; as 1 combined PDF)
- Written confirmation of tenure track position of an applicant, if applicable

**Technical questions about the use of ISAAC**
For technical questions about the use of ISAAC please contact the ISAAC helpdesk, see section ‘Further Information’.

**Format of full proposals**

**Use of the Partnership application form for full proposals is mandatory.**

The proposal should not exceed twelve pages in A4 format (minimum Verdana 8.5 point or similar font), excluding references and required appendices. Additional supplementary information is not allowed. If there is more than one participating research institute, the limit is fifteen pages. The application should be in English. In Section 4.1 of the application form, additional sub-chapters may be added.

The information entered should be complete and correct. Incomplete forms or forms that exceed the maximum permitted length may lead to your application not being considered.
6. Who can apply?

**Main and co-applicants**

On approval of the project, the main applicant becomes the project leader and bears ultimate responsibility for the realisation of the research including the utilisation plan. Co-applicants must play an active role (associate supervisor and/or daily supervision of researchers appointed to the project) in the realisation of the project and may be designated as sub-project leaders in the event of several participating research institutes.

**Who can act as main and co-applicants?**

- Assistant, associate and full professors (or with comparable positions) with a tenured position at:
  - Dutch universities
  - University Medical Centres
  - Prinses Máxima Centre
  - KNAW and NWO-institutes
  - the Netherlands Cancer Institute (NKI)
  - the Max Planck Institute for Psycholinguistics in Nijmegen
  - Dubble beamline at the ESFR in Grenoble
  - NCB Naturalis
  - Advanced Research Centre for NanoLithography (ARCNL)

- Researchers with a tenure track appointment. NWO domain AES defines a tenure track appointment as an appointment for experienced scientific researchers with prospects of permanent employment and a professorship in due course. The tenure track appointment must be confirmed in writing by an official letter from the university and funded from structural resources. NWO domain AES will verify that the appointment meets these conditions.

**Main and co-applicants with a part-time appointment**

- Main applicants and co-applicants employed on a part-time basis should in any case have access to sufficient university facilities and budget to carry out the project properly.
- Main applicants and co-applicants should carry out NWO domain AES research while they are working for the research institute. If this is not the case, the other employer should sign a waiver so as to guarantee knowledge ownership by NWO and the research institute(s).

**Who cannot apply? (Applies to main and co-applicants)**

- Personnel with a zero-hour appointment
- Personnel with a temporary employment contract (e.g. postdocs)
- Emeritus professors
- Personnel of institutes with an applied or technological objective, such as TNO, the Large Technological Institutes (GTIs) and the non-university part of the Wageningen University and Research Centre (WUR)
- Personnel of a research institute funded by a public-private targeted grant
- Personnel of foreign research institutes
- Personnel of private parties
7. What can be applied?

Project-specific costs

NWO domain AES funds project-specific costs of:
1. personnel temporarily appointed to the project at the research institute,
2. materials (consumables, small instruments and aids, and domestic travel expenses),
3. foreign travel,
4. equipment (durable scientific equipment in respect of which economic value is depreciated).

The research institute is responsible for co-funding from direct government funding and hence for the necessary infrastructure and the supervision of project workers.

If an applicant/co-applicant cooperates with other institutes not eligible for NWO domain AES funding, such as TNO or a foreign university, the non-eligible institutes are responsible for their own costs.

Notes on costs of personnel temporarily appointed to the project at the research institute

Temporary personnel positions can be requested for:
- PhD student
- postdoc (PD)
- PDEng trainee
- other SP (scientific personnel, including additional researcher, holders of a masters degree, medical graduates)
- NSP (non-scientific personnel, including technical assistant)
- Casimir candidate

Notes on temporary personnel positions

Temporary personnel positions can be requested for up to four years in the case of a full-time appointment. State the job group, the length of the appointment, the part-time percentage and the associated amount. For each position, NWO domain AES uses a predetermined fixed maximum rate per year of appointment (see www.ttw.nwo.nl). In determining these rates, NWO domain AES adopts the rates laid down in the most recent 'akkoord overlaten werkgeverschap NWO/VSNU’, with no supplement for the risk of unemployment. Under this agreement, the personnel rates for the positions are determined annually after agreement on the long-range forecast for personnel rates. The rates which apply at the time of award are maintained for the duration of the NWO domain AES project. If the personnel rates are changed during the evaluation procedure, NWO domain AES will apply the new rates at the time of award. This does not affect the level of the compulsory contribution from users.

Personnel appointed to additional personnel positions during the course of the project (e.g. in the event of continuation or extension) are subject to the rates which apply at that time.

For postdoc, scientific personnel and non-scientific personnel positions, NWO domain AES does not accept liability under the Dutch Unemployment Insurance Act if the term of appointment is less than 12 months and/or the candidate has more than 1 year’s relevant work experience in a previous, similar appointment.

The research institute appoints the personnel and bears the customary responsibilities of an employer.

Notes on permanent staff

The salary or allowance paid to the applicant/co-applicant and the salary or allowance paid to others person with a permanent appointment or other permanent association with the institute where the
research is to take place are not eligible for reimbursement. Exceptions to this are the temporary appointment to a project of 1) a technical assistant (NSP) or 2) a scientist with an 'appointment on a project basis'. An NSP with an existing employment contract at the research institute can temporarily be appointed against the standard NSP rates at the expense of a NWO domain AES project, if this NSP has a specific special expertise that is necessary for realising the research proposed. A scientist with an 'appointment on a project basis' at the research institute can temporarily be appointed against the standard scientific personnel rates at the expense of a NWO domain AES project. The scientist concerned may not be registered as an applicant or co-applicant at NWO domain AES. NWO domain AES accepts no liability under the Dutch Unemployment Insurance Act in this case.

**Notes on secondment**
Temporary researchers are appointed to the research institute where the research is to be realised. Because NWO domain AES imposes the condition that the majority of knowledge development must take place at the research institute, the secondment of university researchers to a company or other research institute is permitted only for a limited period, i.e. up to 50% of the extent of the appointment. This requires written permission from NWO domain AES in advance. A secondment agreement shall be concluded.

Where the need arises, an applicant can submit a reasoned request to the NWO domain AES office to grant leniency with regard to the 50% limit. Criteria for this are 1) there must be a need to use the infrastructure of the external party, 2) there must be a sufficient academic environment present at the external party for interaction with and supervision of the researcher and 3) the project leader and/or supervisor of the researcher must also be present at the external location concerned for some of their time.

**Notes on PDEng trainee**
A temporary personnel position can be requested for a PDEng trainee (certified training Professional Doctorate in Engineering). This position should be applied for within a larger research context (1 or more other scientific personnel positions). The PDEng trainee is employed by the institute submitting the application and for a fixed period of time can perform certain tasks within the research project at an industrial partner (on a secondment basis).

The PDEng position is subject to the following conditions:
- In the research plan and the utilisation section the embedding of the PDEng position should be described and/or the underlying Technological Designer Programme.
- Assuming a full-time appointment, a maximum duration of 2 years applies.
- The personnel rate for a PhD (first 24 months) applies to a PDEng position. The personnel costs are included in the personnel credit.
- For the PDEng position, material and/or travel credit can be applied for as part of the standard credit.
- The contribution of the industrial partner(s) involved to the PDEng position can be entered as co-financing; to be settled in cash with NWO domain AES or in kind if the amount is settled via the institution.
- If the project is funded then a secondment agreement must be signed with the industrial partner concerned.

**Notes on Casimir candidate**
One SP position can be filled by an academically trained R&D worker from a Dutch company or a company with a Dutch branch where R&D activities are carried out (100% private sector). The following conditions apply:
- Based on a full-time secondment, a 2-year time limit applies. The limit for PhD students is 3 years. Part-time secondment (at least 50%) is possible.
- The proposed candidate should have been working for the above-mentioned private sector employer for at least 1 year (tenured or temporary appointment).
• The application should contain a brief description of the proposed candidate's work experience and expertise. On the basis of the necessary work experience of the relevant candidate, PhD work should be able to be completed within 3 man-years.
• In addition to the Casimir position, at least 1 other SP position must be requested with at least the same extent of appointment.
• The Casimir candidate should have access to the university infrastructure and the Casimir position should be an integral and necessary part of the proposed university research and serves the realisation of the project aims and utilisation. This should be described in the research plan.
• In relation to personnel costs for the Casimir position, the university can declare to NWO domain AES the secondment costs actually paid to the company, up to the personnel rate for a postdoc position which applies for the relevant extent of appointment. These costs should be charged to the material credit for the project. NWO domain AES accepts no liability under the Dutch Unemployment Insurance Act for the Casimir candidate.
• Material and/or travel credit can be requested for the Casimir candidate as part of the regular credit to be requested.
• If the project is funded then a secondment agreement must be signed with the company concerned.

Notes on costs of materials and domestic travel

NWO domain AES funds consumables, small instruments and aids, and domestic travel expenses. The amounts entered in the budget are inclusive of Dutch VAT.

Notes on Material credit

Costs which **CAN** be charged to material credit:

• Materials which no longer have an economic value after use. This concerns consumables, small instruments and aids.
• Specified compound items. Fixed instalments or rates in particular (e.g. bench fees and fees for standard analyses) must be substantiated. Within the rates accepted by NWO domain AES, only the consumables costs can be charged to NWO domain AES.
• Personnel costs for Casimir position (see point 8.1 for notes).
• Costs of domestic travel.
• Costs of project-specific courses for NWO domain AES researchers which are necessary for the conduct of the research.
• Posters for disseminating knowledge at conferences and symposia.
• Pre-clinical trials. A condition in this respect is that the project workers themselves are responsible for the majority of the work (e.g. sampling, analyses).
• Costs for the use of cleanrooms insofar as these fall under the cleanroom regulation (see www.ttw.nwo.nl).
• Costs for research activities executed by dedicated specialists employed at research institutions not eligible for NWO funding can be limitedly reimbursed. Please contact the NWO domain AES office.

Costs which **CANNOT** be charged to material credit:

• ‘Miscellaneous’ or ‘unforeseen’ items, unspecified bench fees.
• Patent costs. Where appropriate, NWO domain AES will consider the extent to which it will bear such costs.
• Costs of publications or costs of purchasing books and/or journals.
• Costs of publications or books.
• Costs of printing a thesis. A separate reimbursement scheme exists for this (see www.ttw.nwo.nl).
• Costs of general courses which form part of researchers’ generic education and the generic education of a PhD student (e.g. English, presentation skills, literature searching, laboratory animal science, use of isotopes).
• Costs of desktop computer, laptops, notebooks or similar for administrative purposes (text and data processing) and costs for computer use.
• Generic software. NWO domain AES assumes that generic software is available via campus licences.
• Costs associated with the use of computing facilities at SURFsara. If necessary, these costs can be requested from the Netherlands eScience Center (NLeSC) in Amsterdam.
• Costs of using existing infrastructure (depreciation charges), salary costs of permanent personnel, accommodation costs, overheads and administrative and technical support, where these are part of the research institute’s customary package of facilities.
• Costs (excluding material costs and cleanroom regulation) of university facilities (e.g. glasshouse space, laboratory animal facilities, specialist research facilities).
• Clinical trials.

Notes on costs of foreign travel
The foreign travel credit is intended to cover costs associated with participation in conferences and symposia in other countries. Extended visits may also be applied for.

Notes on short travel abroad
For temporary project workers (requested personnel positions) NWO domain AES applies a maximum standard amount (2000 euro/year/fte; based on economy class) which can be claimed as short travel abroad. Foreign travel costs of applicants and co-applicants can also be claimed up to a joint maximum of 6000 euro per project, provided those costs are directly related to the conduct of the proposed research. In principle, travel costs cannot be claimed for non-scientific personnel (NSP). If the sum claimed exceeds the maximum standard amount per year it cannot be accepted unless clear arguments are put forward on which NWO domain AES and the referees can base their verdict.

Notes on exchange visits
Temporarily appointed project workers may carry out research at a foreign research institute for a limited period (up to six months) in the context of a NWO domain AES project. A foreign researcher may also be temporarily appointed to a NWO domain AES project; he or she visits the research institute and participates actively in the conduct of the project.

Conditions relating to foreign travel of up to six months’ duration:
• NWO domain AES must be aware of this type of foreign travel when considering the application, and it must form part of the research planning so that referees can include it in their review.
• A condition for an exchange is that the knowledge acquired as a result of the visit is not present, or is not sufficiently available, at the research institute where the research is being conducted. In the event of acceptance, NWO domain AES verifies whether this actually results in a strengthening of the knowledge base for the project.
• NWO domain AES reimburses the travel expenses (based on economy class), research costs and a standard amount for accommodation expenses. No (additional) salary costs are reimbursed.
• Any intellectual property matters are covered by a separate agreement (waiver/confidentiality) before travel takes place.

Notes on costs of investments
Investments are defined as the use of durable scientific equipment in respect of which economic value is depreciated. Investment costs are entered in the budget inclusive of Dutch VAT.

Notes on investments
• NWO domain AES assumes that the research institute applies a tendering procedure for the purchase of durable equipment and takes account of government procurement guidelines.
• If second-hand equipment is purchased, the original bill must be submitted.
• NWO domain AES may be asked to co-fund an item of equipment in proportion to its use. This should be put down in writing after the award.
• The research institute is responsible for the connection, operating costs and maintenance of the equipment purchased (service charges and repairs).
• NWO domain AES distinguishes between operation of existing facilities within the research institute and investment in new facilities specifically for the purposes of a NWO domain AES project. In the case of operating costs and small-scale investments, NWO domain AES pays only the costs of consumables. These costs can be claimed as material credit. NWO domain AES will however pay the full cost of capital goods supplied by internal services in those cases where a disproportionate burden is placed on the service in question, provided that a convincing argument is put forward in this respect. NWO domain AES will be the judge of this.

• Computers belonging to scientific equipment and specific software used exclusively for the project may be claimed as investment.

• Computing capacity which demonstrably exceeds the normal capacity required for the research in question can be claimed as investment.

• If, in the course of time, it emerges that the costs of the investments described in the proposal are lower than estimated, the remaining funds will revert to NWO domain AES.

• NWO domain AES may refuse expenditure not estimated in advance.

8. Notes on Users, co-funding and letters of support

Users

Users of research are defined as natural or legal persons (at national or international level) who are able to apply the results of the research. A distinction is sometimes drawn between direct users of the knowledge generated, usually companies, and end users, who buy the products from those companies. Both have a role to play in the innovation chain and must be referred to in the utilisation plan. It is NWO domain AES’s explicit intention that potential technology users and end users outside the immediate circle and outside the research field of the researchers submitting the proposal should be involved in the project from beginning to end. Users should be able to apply the knowledge generated by the research in the medium to long term. (Potential) users should be indicated in the utilisation section of the research proposal.

After the research proposal has been awarded, a minimum of four users should sit on the user committee and at least 50% of the users should be from industry. Research proposals from a medical faculty or university medical centre should have potential users, just like other proposals. At least one of the users should be a company. It is not sufficient in this case to state merely ‘the patient’ or ‘a clinic’. The final composition of the user committee is subject to the same conditions as other NWO domain AES projects.

Co-funding

Co-funding is not obligatory for the ‘Mastering Complexity’ Partnership programme. However (third) parties are allowed to support research projects. Options for co-operation with (third) parties should be discussed with ESI first.

Notes on Criteria relating to co-funding

• NWO domain AES uses the financial co-funding to cover part of the project costs. After a project is approved, NWO domain AES sends an invoice to users who have pledged a financial contribution. Once the funds have been received, they are allocated to the project. The cash contribution stated in the letter of support is exclusive of Dutch VAT and paid to NWO domain AES plus Dutch VAT (21%).

• NWO domain AES accepts personnel input and material contributions as co-funding on the condition that these are capitalised and that they form an integral part of the project. This should be made clear in the description and planning/phasing of the research.
- NWO domain AES is the main funder of the projects. Project applications where the co-funding from users exceeds the amount to be borne by NWO domain AES will not be considered.
- NWO domain AES assumes that providers of co-funding have an interest as users and therefore as applicators of the research results outside science. Co-funders always participate in the user committee.
- Government agencies can play various roles in NWO domain AES projects, namely: (1) as a research partner (without entitlement to NWO domain AES funding), (2) as a subcontractor of a specific assignment (at market rate) or (3) as a user. Government agencies may act as users under the same conditions as private users.
- The active participation of users - with or without additional co-funding provided by the users - must be confirmed in a letter of support. These letters must explicitly state: 1) the importance of the research proposal for the organisation, 2) the importance of the utilisation plan for the organisation’s operations, 3) the pledged role in the project and if applicable the financial and/or the specified capitalised material and/or personnel contribution(s), and 4) that the user agrees with the IP arrangements as set out in the partnership project agreement. See also the requirements under ‘Letters of support’, the 'Notes on Intellectual Property & Publication arrangements' later in this brochure and see Appendix 7.

Notes on Criteria relating to in-kind co-funding
- Part of the research may be conducted by third parties. A condition is that the expertise provided in the form of man-hours is not already available at the research institute(s) and is used specifically for the NWO domain AES project. For personnel support by third parties, NWO domain AES applies fixed rates in order to capitalise the number of man-hours used (up to 1400 direct hours/year/fte) for a senior or junior researcher. For the current rates, see www.ttw.nwo.nl.
- For pledges of material resources, charge the cost price. Commercial rates are not accepted. For pledges of equipment, take previous depreciation and intensity of use into account.
- Pledges in the form of supplies of services are possible only if the service can be itemised as an identifiable new endeavour. The service should not already be available at the research institute(s) realising the research. Applicants may wish to claim services already supplied (such as a database, software or plant lines) as in-kind co-funding. Acceptance is not automatic in such cases. Contact NWO domain AES about this. Further consultations will take place to decide whether a specific value can be determined for this supply of services.

NOT permissible as the co-funding
- NWO domain AES guards against the improper mixing of funding sources: co-funding can never come from direct or indirect (NWO, KNAW) government funding. As a result, co-funding can also never come from the research institute of the (co-) applicant(s) or from institutes which are themselves eligible to apply to NWO domain AES.
- Discounts on (commercial) rates for materials, equipment and/or services, for example.
- Costs relating to overheads, supervision, consultancy and/or participation in the user committee.
- Costs of services that are conditional. No conditions may be imposed on the provision of co-funding. Nor may the provision of co-funding be contingent upon reaching a certain stage in the research plan (e.g. go/no-go moment).
- Costs which are not paid by NWO domain AES (e.g. clinical trials, costs relating to the exploitation of the research results, service costs equipment).
- Costs of equipment if one of the (main) aims of the research proposal is to improve this equipment or to create added value for it.

Letters of support
A letter of support is obligatory for all users that are taking part in the project, regardless if co-funding is or isn’t provided. NWO domain AES advises applicants to ensure that the users pay particular attention to endorsing the importance of the utilisation plan for their operations. The letter of support should satisfy the following requirements.
General requirements

- Letters of support must be printed on the letter paper of the co-funder.
- Letters of support are addressed to the project leader.
- Letters of support must be written in English.
- The address on the letter is complete and correct.
- Letters of support must be signed by an authorised signatory.
- The cash contribution stated in the letter is exclusive of Dutch VAT and paid to NWO domain AES plus Dutch VAT (21%).

Specific requirements

- Brief description of the company and the core business (type of company, size, which service, products).
- A statement that the company is interested in and will commit itself to the research.
- An explanation as to why the answering of the research question is important to the company. How does this solution fit in their strategy?
- A brief explanation as to why this particular research group and research proposal are receiving support.
- What the company will contribute in concrete terms (incl. capitalisation) and why this fits in the research proposal/planning.
- Further specification of the in-kind support, both hours (number and/or tariff applied) and materials (numbers; cost price; tariff; percentage that can be attributed to the project, etc.).
- The company provides the contribution described without additional conditions.

Declaration and signing by the User

- The company states that it has read the proposal and signs for this.
- The company states that it will actively participate in the User Committee (UC) and signs for this.
- The company states that it agrees to the Guidelines Users’ Committee NWO domain AES and signs for this (see the brochure on www.ttw.nwo.nl)
- The company states that it agrees to the IP arrangements as set out in the partnership project agreement, described in the template in Appendix 7, and signs for this.

A template for a support letter can be found on NWO domain AES’s website (www.ttw.nwo.nl).

Letters of support are unconditional and do not contain any opt-out clauses!

The amounts stated in the letters of support must correspond with the amounts stated in the budget presented.
A copy or scan of the letter will suffice for the submission of a research proposal.
NWO domain AES will not approach persons or organisations who have signed letters of support to act as referees (code of conduct on conflicts of interest).

After project awarding, NWO, Knowledge institutions, the Partner and Industry Parties represented in the User Committee are required to sign the project agreement (see appendix 7 for the template). Also, where applicable, after the research proposal has been awarded, funding NWO domain AES will request a confirmation of the co-funding (“confirmation obligation third parties”) and in relevant cases will record any further arrangements in an agreement.

NWO domain AES facilitates the transfer of knowledge between the technical sciences and users. In this process it is important that a responsible approach is taken with regard to research results in general, and patentable inventions and discoveries in particular. NWO domain AES’s aim is firstly to exploit and publish the results of research as widely as possible, whilst retaining the possibility to establish IP rights and to subsequently transfer these rights to user(s) or grant a licence to user(s) for these and, secondly, to stimulate collaboration between researchers and various external companies.

NWO domain AES adheres to a set of rules concerning Intellectual Property (IP) that support NWO domain AES’s mission and are covered by NWO’s IP policy. The NWO IP policy can be found in chapter 4 of the NWO Grant Rules 2017.

After project awarding, NWO, Knowledge institutions, the Partner and Industry Parties represented in the User Committee are required to sign the project agreement (see appendix 7 for the template). The project agreement has to be signed within three (3) months of receiving NWO domain AES’s approval for the project. The arrangements regarding ownership of results and licensing agreements are described in the project agreement template.

Specific conditions apply to this call with regards to the use rights for TNO including the ESI Industry Partners.

TNO is willing to come to additional agreement with User Committee members, if in line with the law and rules, particularly when the project(s) will be using specific background knowledge and/or confidential information of those User Committee members, balancing the interests with the ESI Industry Partners.

10. Notes relating to the application form

1. Details application

1.1. Further details main applicant
The name and address of the main applicant in both Dutch and English. State the additional information, including English name of the organisation/division of the organisation, percentage of full-time appointment, IBAN of the knowledge institute, and confirmation of permanent employment.

1.2. Further details co-applicants
State the name and address of the co-applicants, giving both the Dutch and English names. Also state the additional information, including % of full-time appointment and confirmation of permanent employment.

1.3. Title
State the title of the project and an abbreviated title, if any.

1.4. Key words
State the specific keywords for the research and specialist area, including popular scientific terms.

2. Summaries
Summaries should be clear to potential reviewers and non-specialists, such as jury members. Jury members will base their verdict primarily on the opinion of the experts as laid down in the protocol,
summaries and utilisation section. It is therefore vital that these sections are worded clearly and concisely, so as to be convincing to jury members.

In addition, these sections may be used by NWO domain AES for publication purposes; the confidentiality of the data will be taken into account at all times.

2.1. Research summary
On a half page of A4, describe the research question, the research and the anticipated results.

2.2. Utilisation summary
On a half page of A4, describe the utilisation. State what the jury needs to know about utilisation, the approach taken to it and the likelihood of it being achieved.

2.3. Summary NWO domain AES’s website and online in ISAAC
Add a general summary in English for NWO domain AES’s website (10 lines with a number of keywords; be aware of risks with respect to intellectual property). Use this summary online in ISAAC.

3. Current composition of the research group
State the composition of the team which will realise the research and the distribution of tasks and responsibilities.

- If more than one research institute is participating in a project, indicate the intended sub-project leaders in addition to the project leader.
- If more than one research institute and/or research group is involved in the project then also indicate which of the co-applicants per research institute and/or research group is the research leader and who is responsible for supervising the researchers.
- If PhD students are among requested personnel please indicate (co-)promotors.
- In the case of a part-time appointment of a (co-)applicant which is less than 0.4 fte, the proposal should indicate which of the permanent staff is responsible for the day-to-day supervision of the project workers.
- The project leader is responsible in all cases for coordination and communication between the participating institutes/research groups/ researchers.

4. Scientific description
This section should contain sufficient information to enable an expert reviewer to assess the quality of the research proposal.

4.1. Research contents/Introduction
Describe the underlying scientific basis and the content of the project. Indicate the methods and techniques to be used to tackle the problem, the knowledge already available, the state of the art, what has still to be developed and the instruments or models to be used to that end. It is not sufficient to state only the scientific question.

4.2. Existing infrastructure
Specify the research institute(s)/department(s)/ research group(s) where the research will physically take place. This information is used to determine whether the research can be realised at the research institute(s) mentioned.

The available infrastructure includes furnished laboratory space and necessary equipment.

4.3. Time plan and division of tasks
Describe the proposed research planning over the years. For each line of research, indicate the phasing and give a clear description of the step-by-step plan (subsidiary aims and/or ultimate aims) and the intended results. If different lines of research are dependent on each other, indicate this. A schematic representation of the research planning is compulsory. The overall duration of the research plan may not exceed six years.
5. **Utilisation plan**

The utilisation plan must be clear to people without specific prior knowledge. Give sufficient details to enable referees and jury members to assess at what point any potential application outside science may be possible.

5.1. **The problem and the proposed solution**

- Describe the problem that you propose to solve and indicate for whom it is a problem. Indicate the social and economic consequences while the problem remains unresolved.
- Describe how the intended research results contribute towards solving the problem.
- Indicate whether the research results can be incorporated into standards or norms. If so, describe.
- Indicate how long after the start of the research it will be before the intended research results lead to an entirely new method or new product, process or service. Describe the market for this. This relates to non-scientific applications.
- Describe if and how the research devotes attention to societal embedding and acceptance.
- NWO domain AES regards the development of open-source software code as publication. It may benefit utilisation in certain cases. The utilisation plan should indicate how the promotion of utilisation can be achieved.

5.2. **Potential users**

State the contact details (name of organisation/company and person to contact, address, telephone number, e-mail address) of companies and institutes wishing to participate in the user committee.

Indicate the step-by-step plan you intend to use to ensure that the results of the research are effectively applied by users. If third parties are necessary in the course of the project, it is important that they have pledged their cooperation.

Also state whether users have already undertaken to accept an invitation to join the user committee or to cooperate in another way. If users have pledged a contribution to the project, give a brief description here. The co-funding with respect to the budget is substantiated below in point 8.5.

5.3. **Past performance**

Indicate whether the research team has achieved successful utilisation in the past. Indicate whether scientific results have been commercially utilised. Indicate whether the applications were achieved in a NWO domain AES context or otherwise. Design and construction disciplines can also include the strength of their design portfolio, prizes, awards, prize questions won and relevant advisory positions.

6. **Fit within the research topics of the programme**

Describe in half a page explicitly the fit of the proposal in the programme, its objectives, themes and research topics. These topics are described on pages 8-11 of this brochure. The peer reviewers and the assessment committee will use this section particularly for the evaluation of the fit in the programme.

**Connections with other research**

Mention similar research that is performed elsewhere, either in the Netherlands or in the rest of the world. Describe the relation with your own research and the contacts with these groups (or the plans to establish them).

7. **Intellectual property**

State all information relevant to the research proposal in relation to NWO domain AES’s IP policy. Providing the requested information is compulsory.

7.1. **Contracts**

State whether there are any existing contracts (including material transfer agreements, licences, cooperation agreements) with third parties in relation to the subject of the research.
7.2. Patents
1) Give a summary of patents held and/or patent applications made by intended parties to the project in
the field of the research proposal. Indicate whether the patents and/or patent applications are in the
name of the research institute(s) involved or in the name of third parties. If the research institutes
involved have relevant patents, indicate whether agreements have been reached in this respect with
third parties.
2) Indicate whether there are any patents and/or patent applications which obstruct the utilisation of the
intended research results. If such an obstacle exists, explain whether there is still sufficient likelihood of
protecting the intended research results by means of a patent.
3) If the patenting of research results is not expedient, explain why not.

8. Positioning of the project proposal
Describe the extent to which the research proposal differs from ongoing research initiatives. Consider
both the national and the international context. Also state the relevant collaborations with other national
or international research groups.

8.1. Uniqueness of the proposed project
Indicate what it is that makes the research proposal original and innovative.

8.2. Embedding of the proposed project
Provide further information on the embedding of the research plan described here within ongoing
initiatives of the research group and/or section.
Indicate whether the research proposal is part of or related to a research programme in which the
applicant or applicants’ research institute is participating. If so, indicate the research programme in
question.

8.3. Request for support elsewhere
State whether funding has been requested elsewhere for this research proposal or parts thereof. If so,
indicate the grant provider(s) in question and the status of that application or those applications at the
time of submission to NWO domain AES.

9. Financial planning
Justify the need for both the personnel credits requested and the necessary materials and investments in
equipment.

9.1. Personnel positions
State the necessary temporary personnel positions. Temporary personnel positions can be requested for:
• PhD student
• postdoc (PD)
• PDEng trainee
• other SP (scientific personnel, including additional researcher, holders of a masters degree, medical
  graduates)
• NSP (non-scientific personnel, including technical assistant)
• Casimir candidate

9.2. Consumables
In accordance with the standards that apply within your research institute, specify the costs of
consumables, small instruments and aids, and domestic travel expenses. The amounts entered in the
budget are inclusive of Dutch VAT.

9.3. Travel abroad
State the costs of foreign travel. The foreign travel credit is intended to cover costs associated with
participation in conferences and symposia in other countries. Extended visits may also be applied for.

9.4. Investments
Specify the investment costs and give a detailed summary of the equipment required. Investments are
defined as the use of durable scientific equipment in respect of which economic value is depreciated.
Investment costs are entered in the budget inclusive of Dutch VAT.
9.5. Contribution from users
State the financial, personnel and/or material co-funding made available by users for the purposes of the project. Information on the calculation of (compulsory) co-funding can be found in Appendix 2.

9.6. Letters of Support
As confirmation of the co-funding to be provided, submit the letters of support (in English) with the application form as separate appendix (one combined PDF format).

9.7. Cost Breakdown
Complete the Financial Planning (FP) form available at www.ttw.nwo.nl, stating any financial contribution(s) and/or capitalised contribution(s).
- Make sure that the capitalised contributions in the budget and the letters of support agree.
- If a project is to be realised at more than one research institute, give a breakdown of the budget for each research institute.
- Notes for the completion of the form can be found in Appendix 2. The form should be submitted together with the factsheet, as a separate appendix in PDF format.
- The main applicant’s research institute concludes a funding agreement with NWO.
- A research proposal with a budget which does not comply with the necessary co-funding will not be considered.

10. References

10.1. Selection of key publications research group
State the key publications of the research group(s) in relation to the proposal. Also state any relevant published patents. Design and construction disciplines can, if so wished, provide an overview of designs realised (selected works).

10.2. List of publications cited
State the publications cited. Identify those in which members of the research group(s) submitting the application are involved, by the use of a bold font. Design and construction disciplines can, if so wished, include a list of publications from other people about their designs (Avery Index to Architectural Periodicals, Columbia University, New York).

11. Abbreviations and acronyms
It is important that both experts and jury members are able to read the proposal easily. Abbreviations and acronyms should therefore be explained at least once. This can be done in the text itself or in a separate list. Keep the use of abbreviations in summaries to a minimum.

Declaration and signing by the applicant

After completing the information requested (see Appendix 3) on the form ‘Declaration and signing by the applicant’, available at www.ttw.nwo.nl, please sign the application as truthfully completed, on your own behalf and on that of the co-applicant(s). This form is a compulsory element of the application and should be submitted with the application form as a separate appendix in PDF format.

Finally

In the event of uncertainties or costs to be claimed which are not mentioned in this brochure, NWO domain AES recommends that you contact the NWO domain AES office before submitting the application.
11. Appendix 1: Evaluation items

1. Scientific quality

1.1. To what extent is the proposed research original and how would you rate the innovative elements?
1.2. What is your assessment of the design of the project, including the goals, hypotheses, research methods, and scientific feasibility?
1.3. What is your assessment of the coherence and time schedule of the proposed lines of research?
1.4. Is the research group competent enough to carry out the research? Does the group have a relevant position in the international scientific community? Is the available infrastructure adequate?
1.5. Are the number and category of requested personnel, budget for materials, investments, and foreign travel adequate?
1.6. What are the strong and weak points of the scientific part of the proposal?

2. Utilisation potential (the application of the results of the research by third-parties)

2.1. What is your assessment of the description of the commercial and/or societal potential impacts of the research given in the proposal?
2.2. What is your assessment of the contribution and commitment of the users and the proposed composition of the user committee?
2.3. Do you expect the application of results to be hampered by commercial propositions, existing patents, eligibility or societal acceptance?
2.4. What are the prospects for collaboration with the industry and knowledge transfer, assuming the project is successful? Please address both aspects.
2.5. What is your assessment of the research group’s competence regarding the transfer and application of research results?
2.6. What are the strong and weak points of the utilisation plan?

3. Fit to the themes of the programme

3.1. What is your opinion regarding the strategic contribution of this project to the aims of the Programme (see programme description)?

Data management

The data management section is a compulsory part of the application but it will not be an assessment criterion for obtaining funding. It will not be included in the decision of a committee/jury as to whether or not a proposal should be awarded funding. However for the data management section of this proposal, you can make suggestions and give advice that could be helpful for the researcher in drawing up the data management plan to be submitted after funding is awarded.
12. Appendix 2: Evaluation scales

Scientific quality
1. Excellent
   • An excellent researcher or outstanding research team.
   • A well-chosen problem.
   • The method is especially/pre-eminently effective and original.
   • Very urgent.
2. Excellent to very good
3. Very good
   • A competent researcher or competent research team.
   • A significant problem.
   • The method is original and effective.
   • An urgent approach is important.
4. Very good to good
5. Good
   • An average researcher or average research team.
   • A routine problem.
   • With the method, which has some original details, the project can be addressed, although other possibilities are conceivable.
6. Good to moderate
7. Moderate
   • It is far from certain that this work is within the capacity of the researcher and / or the research team: the proposal itself contains no obvious errors.
   • The problem is moderately interesting.
   • Whether the project can be successfully tackled with this standard method, is questionable.
   • The project may well be postponed.
8. Moderate to poor
9. Poor
   • The competence of the investigator or research team is inadequate.
   • The proposal contains serious errors or mistakes.
   • This old method is not good for this project.
   • Not to be executed, even if there is money left.

Utilisation
1. Excellent
   • This will certainly lead to important new techniques or to very important applications in industry, society and other sciences.
   • This research is urgently needed to make an estimate of the consequences of the use of this technology or technique.
   • The utilisation is very well thought out and the approach ensures the greatest likelihood of an effective use of the results.
2. Excellent to very good
3. Very good
   • This research will likely lead to important new techniques or to important applications in industry, society, or in other sciences.
   • This research is highly desirable to make an estimate of the consequences of the use of this technology or technique.
   • The utilisation is well thought out and the approach makes it plausible that the results of this work will be used well.
4. Very good to good
5. Good
• This work will possibly lead to new technologies or applications that might be useful for industry, society, or other sciences.
• This research will be needed to make an estimate of the impact of this technology or technique.
• The utilisation is sufficiently thought through, it can probably be improved during the execution of the work. The results of this work will probably be used.

6. Good to moderate
7. Moderate
• Technically this work could possibly be useful at some time or it is conceivable that in due course another science, industry or society or of the results could make use of it.
• The results of this research are not exactly awaited, but they may be useful in the future if an evaluation is made of the consequences of using this technology or technique.
• The utilisation is very unsatisfactory. This should certainly be improved, otherwise it is likely that the results of this work will not be used.

8. Moderate to poor
9. Poor
• Technically the work is bad and redundant, i.e. different, better or similar techniques, which are cheaper are already available.
• This study does not evaluate the consequences of using this technology or technique, moreover, it increases the confusion.
• The utilisation is completely wrong.

Fit to the themes of the programme
1. Excellent
• The project fits the call exactly.
• It is in the heart of one or more of the themes of the call.
• This is a key project for the topic of the call.
2. Excellent to very good
3. Very good
• The project fits the call very well.
• It is a very good elaboration of one or more themes of the call.
• This is very important project for the topic of the call.
4. Very good to good
5. Good
• The project fits the call.
• It is a good elaboration of one or more themes, but some parts are outside the scope of the call.
• This project could give an important contribution to the topic of the call. For this, it is important to focus it on the themes of the call during its execution.
6. Good to moderate
7. Moderate
• The project partly fits the call.
• The described work has some relation with the themes of the call, but the main activities are outside scope.
• This project can only have a minor, indirect contribution to the topic of the call. Its main focus is on a different topic or it focuses on a minor and/or insignificant part of the themes.
8. Moderate to poor
9. Poor
• The project does not fit the call.
• The described work is not in any of the themes of the call.
• The vocabulary of the call is used but in the wrong context or without substantiation in the research activities.
• This project will have no contribution to the topic of the call.
13. Appendix 3: Notes for the completion of an FP form

The FP form (Financial Planning; Excel file) should be submitted with the application form, as a separate appendix in PDF format.

Notes

- Personnel credits are entered per establishment post. For each person, enter a training place number, a personnel category, the extent of the appointment, the number of months and the accompanying rate (page 3). Check that you have the most recent personnel rates. The rates are set as from 1 July each year but may be adjusted in the interim.
  When calculating the amount, take into account the extent of the appointment (the personnel rates are based on 1 fte) and the year of appointment (start in month 13 is rate from month 13).
  NB: In view of their salary structure, PhD students are always appointed at the rate from month 1.
- Material credit and investment credit are entered inclusive of Dutch VAT.
- Material credit, foreign travel credit and investment credit are entered as a total.
- The personnel credit, material credit, foreign travel credit and investment credit combined, constitute the total necessary financial resources.
- In the case of co-finding in kind, enter the official name of the co-funder, a brief description of the material and/or personnel contribution and the capitalised amount. This co-funding is not included in the four credits mentioned above, but does count towards the total project costs.
- In the case of co-funding in cash, enter the official name of the co-funder and the amount pledged by the co-funder. This amount should be entered as a negative amount.
  These financial contributions are used by NWO domain AES to cover part of the project costs. NWO domain AES collects the financial contribution and then allocates it to the project.
  The cash contribution stated in the letter of support is exclusive of Dutch VAT and paid to NWO domain AES plus Dutch VAT (21%).
- All co-funding requires a letter of support in English from the co-funder, stating the amount pledged.
- Research proposals with budgets that do not meet the compulsory co-funding requirement (graduated scale) are not considered.
- Unallocated credits cease to apply at the end of the project.
14. Appendix 4: Specimen form ‘Declaration and signing by the applicant’

This form should be submitted with the application form as a separate appendix in PDF format.

Declaration and signing by the applicant:

☐ All applicants and co-applicants satisfy the criteria relating to ‘Who can act as main or co-applicant?’
☐ All compulsory letters of support (confirmation of co-funding) are attached (as 1 combined appendix in PDF format).
☐ The ‘Financial Planning’ form is attached (separate appendix in PDF format).
☐ The ‘Data management section’ form is attached (separate appendix in PDF format).
☐ By submitting this document I declare that I satisfy the nationally and internationally accepted standards for scientific conduct as stated in the Netherlands Code of Conduct for Scientific Practice 2012 (Association of Universities in the Netherlands).
☐ Where applicable: Funding has been requested for (parts of) this research proposal from another funding provider (other than indicated potential users) or from another NWO Call for proposals.
☐ Where applicable: I agree to comply with the Code on Openness in Animal Testing\(^2\).
☐ Where applicable: I agree to comply with the Nagoya Protocol (see Links).

I hereby declare that I have truthfully and completed and signed the application, including the answers to the following questions, and that I have also done this on behalf of the co-applicants.

Surname and initials:
Place:
Date:
Signature:

In relation to NWO domain AES’s Intellectual Property Policy, please answer the following questions. Please provide a brief explanation where necessary.

1. Are there any applicants or co-applicants who are involved in one of the indicated users or in parties to which paid or unpaid work is to be tendered? yes/no If so, state the nature of the involvement (appointment, advisor, member of (governing) board, etc.).
2. Are there any users who indirectly (e.g. via material or investment credit) receive NWO domain AES finances? yes/no If so, this should be stated in the research proposal (8.5).
3. Projects need to follow the project agreement template – see appendix 7 – and sign the agreement within three months after the granting date. Please notify your TTO of this before you submit your proposal.
4. The knowledge generated in the project will be jointly owned by the research institute(s) and NWO. Are the intended user committee members who shall provide co-funding aware of this? yes/no
5. Are the users aware of the final version of the research proposal, of each other’s involvement and any positions with regard to intellectual property? yes/no
6. Are there already any verbal or contractual agreements between (one of the) users and the research institute(s) submitting the application? yes/no
7. Are there any users who wish to enter into contractual agreements at the time when the project is awarded? For example, a joint expression of the wish to use the right to an option. yes/no

\(^2\) If the project involves animal experimentation, the applicants declare that they agree to comply with the ‘Code on Openness in Animal Testing’, as drawn up by the KNAW, VSNU and NFU (April 2008).
8. Are any materials or methods/technologies/software of third parties (including users) used which are subject to restrictions or commercial secrecy? yes/no

9. Are any materials or methods/technologies/software of third parties (including users) used which were obtained through the signing of a material transfer agreement? yes/no If so, which conditions are imposed on their use?

10. Are there any relevant patents/patent applications on the part of the research groups involved and/or potential users? yes/no

11. Are there any relevant patents on the part of parties not involved in the project application which might obstruct the utilisation? yes/no

Initials:

Other:
- The research described in the proposal falls within the top sector(s): (see selection list)
- The research described in the proposal falls within the scientific disciplines: (see selection list)

**Please note:** It is **obligatory** to fill in this main discipline in ISAAC (tab “General Information” section “Research fields”) before submitting the proposal.
15. Appendix 5: Data management section

Notes on Data management section
NWO wants to contribute to the development of good data management by asking researchers to make all relevant data sustainably available for reuse. Therefore in the data management section, researchers will be asked before their research starts to think about how the data collected should be ordered and categorised such that it can be made freely available. Researchers will often need to take measures to this effect during the production and analysis of the data.

NWO understands ‘data’ to include collected, unprocessed data as well as analysed, generated data. This includes all conceivable forms of digital and non-digital data (such as samples, completed questionnaires, sound recordings, etc.).

**NWO only requires the storage of data that are relevant for reuse.** NWO assumes that within disciplines there are widely held opinions about which data are relevant for storage and reuse. Research Data Netherlands offers a checklist for the selection of data that can be eligible for archiving.

Research results should be stored in such a way that they can be retrieved and reused in the long term, also by researchers in disciplines and organisations other than those in which the research took place. The operating principle is that all stored data are, in principle, freely accessible and that access is only limited if aspects such as privacy, public security, ethical limitations, property rights and commercial interests require that.

The costs of data management are eligible for funding and should be included in the project budget. Important factors that determine the costs are:

- the type of data;
- the capacity needed for storage and backup;
- the amount of manual work needed to allocate metadata and the compilation of other documentation such as codebooks and the queries used in the statistical package;
- the extent to which the data needs to be protected;
- the hiring in of external data management expertise or other expertise.

With the data management section NWO mainly wants to raise awareness about the importance of responsible data management. The section is therefore not included in a committee's decision about whether a proposal should be awarded funding or not. NWO domain AES does, however, submit this section to the committee and referees for advice. After a proposal has been awarded funding the researcher should elaborate the section into a data management plan. For this, applicants can make use of the advice they have received.

Questions Data management section
1. Will data be collected or generated that are suitable for reuse?
   **Yes:** Then answer questions 2 to 4
   **No:** Then explain why the research will not result in reusable data or in data that cannot be stored or data that for other reasons are not relevant for reuse

2. Where will the data be stored during the research?
3. After the project has been completed, how will the data be stored for the long-term and made available for the use by third parties? To whom will the data be accessible?
4. Which facilities (ICT, (secure) archive, refrigerators or legal expertise) do you expect will be needed for the storage of data during the research and after the research? Are these available?*

*ICT facilities for data storage are considered to be resources such as data storage capacity, bandwidth for data transport and calculating power for data processing.
### 16. Appendix 6 Timeframe

<table>
<thead>
<tr>
<th><strong>Pre-proposals</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Publication call for proposals</td>
<td>8 January 2019</td>
</tr>
<tr>
<td>Matchmaking event</td>
<td>24 January 2019</td>
</tr>
<tr>
<td>Deadline submission pre-proposals; mail to <a href="mailto:ESI-AES-PPP@nwo.nl">ESI-AES-PPP@nwo.nl</a></td>
<td>26 February 2019 14:00 CET</td>
</tr>
<tr>
<td>Advise to applicants</td>
<td>Mid of March 2019</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Full proposals</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Deadline submission full proposals via <a href="https://www.isaac.nwo.nl">https://www.isaac.nwo.nl</a></td>
<td>7 May 2019 14:00 CEST</td>
</tr>
<tr>
<td>Peer review</td>
<td>From end of May till July 2019</td>
</tr>
<tr>
<td>Primary applicants' rebuttal to referee comments</td>
<td>Medio August 2019</td>
</tr>
<tr>
<td>Advice assessment committee to STW board</td>
<td>Medio October 2019</td>
</tr>
<tr>
<td>Decision by TTW board</td>
<td>6 December 2019</td>
</tr>
</tbody>
</table>
17. Appendix 7 Partnership project agreement template

PARTNERSHIP PROJECT AGREEMENT
Regarding the Partnership Programme:
‘Title’

This PARTNERSHIP PROJECT AGREEMENT is entered into on the Effective Date by and between:

1. NWO Domain Applied and Engineering Sciences, an organization existing and organized under the laws of the Netherlands, with registered office at Van Vollenhovenlaan 661, 3527 JP Utrecht, the Netherlands, hereinafter to be referred to as “NWO-AES”, in this matter duly represented by its Director Dr.ir. H.H. Nijhuis; and

2. Nederlandse Organisatie voor toegepast-natuurwetenschappelijk onderzoek TNO, with registered office at <address>, hereinafter to be referred to as “TNO”, in this matter duly represented by <Name>; and

3. <Name>, a research institute existing and organized under the laws of the Netherlands, with registered office at <address>, hereinafter to be referred to as “Institute”, in this matter duly represented by [name] [Please note If more than one Institute is involved the text needs to be adjusted in this respect]; and

4. <Contributing ESI Industry Partner>, a company with registered office at [address], hereinafter to be referred to as “Contributing ESI Industry Partner”, in this matter duly represented by <Name>; and

5. OPTIONEEL <Industrial Party>, a company with registered office at [address], hereinafter to be referred to as “Industrial Party”, in this matter duly represented by <Name>;

hereinafter together and individually to be referred as “Parties” respectively “Party”.

WHEREAS:

A. NWO-AES funds excellent, application oriented technology research at Dutch universities and selected Institutes with public funding and promotes the application of the results thereof.

B. NWO-AES and TNO have concluded a partnership agreement, on the basis of which they invite Dutch universities and research institutes to submit project proposals in the field of engineering methodologies that help managing the increasing system complexity and help improve quality and reduce development costs for future generations of cyber-physical systems with the intention to jointly fund the project proposals that are approved.

C. The Institute has submitted the project proposal, entitled: “[title]”, attached as Annex 1 to this Agreement (“Project Proposal”). The Project Proposal has been approved by decision of [date] (the “Grant Letter”, attached to this Agreement as Annex 2).
D. Performing the research activities, described in the Project Proposal, for which it is the explicit aim that it will lead to Results, that can be used by TNO and ESI Industry Partners.

E. The Parties now wish to lay down in writing the terms and conditions for the execution of the Project Proposal.

HAVE AGREED AS FOLLOWS:

Article 1 – Definitions

As used in this Agreement the following capitalized terms, either in plural or in the single form, have the following meaning:

1. “Agreement” shall mean this PARTNERSHIP PROJECT AGREEMENT, including all annexes and amendments hereto.

2. “Affiliate” shall mean a legal entity which controls, is controlled by or is under the same control as a Party; “control” for the purposes hereof meaning (i) the direct or indirect ownership of more than fifty percent of the capital stock of a company, (ii) the power to exercise more than fifty per cent of the voting rights in a company, and/or (iii) the power to determine the policy of a company in a decisive way.

3. “Background” shall mean any and all inventions, outcomes, materials, methods, processes, products, programs, software, findings or discoveries, including know-how, and any and all Intellectual Property rights pertaining thereto, that are or have been generated before or independently of the Project and which are needed for the Project or for the use of Results.

4. “Effective Date” shall mean the signing date of the last Party to sign this Agreement.

5. “Intellectual Property Rights” shall mean patents, utility certificates, utility models, industrial design rights, copyrights, database rights, trade secrets, any protection offered by law to Information, semiconductor IC topography rights and all registrations, applications, renewals, extensions, combinations, divisions, continuations or reissues of any of the foregoing.

6. “Project” shall mean the research project, titled: “[description]”, as described in the Project Proposal in Annex 1.

7. “Project Leader” shall mean the person employed by the Institute that is the main beneficiary of the Grant Letter and who bears ultimate substantive and financial responsibility for the Project.

8. “Results” shall mean all inventions, outcomes, materials, methods, processes, products, programs, software, findings or discoveries, including know-how, that are generated during and within the framework of a Project, and any and all Intellectual Property Rights pertaining thereto.

9. “ESI Industry Partners” shall mean ASML Nederland B.V., Océ Technologies B.V., Philips Medical Systems Nederland B.V. and/or Thales Nederland B.V.

10. “Other ESI Industry Partner” shall mean an ESI Industry Partner other than Contributing ESI Industry Partner.
11. Industrial Users: private parties participating in the User Committee, including the ESI Industry Partners

12. “User Committee” shall mean the user committee as described in Article 2.4 of this Agreement.

Article 2 – Conduct of the Project

1. The Institute shall conduct the Project in accordance with the Project Plan, the Grant Letter, the applicable “NWO Grant Rules 2017” as attached in Annex 3 and the “Guidelines Users’ Committee NWO domain NWO-AES 2017” as attached in Annex 4 to the best of its knowledge and ability and taking into account the criteria and standards applicable to scientific and/or technological research. The Institute shall conduct the Project during the term of this Agreement.

2. For the performance of the Project, the Institute shall select and appoint personnel with appropriate qualifications. <name> is appointed as Project Leader. The Institute shall ensure that the Project Leader and the other employees that are involved in the Project comply with the obligations imposed on the Institute and its employees in this Agreement.

3. During the performance of the Project, the Institute will comply with all applicable legislation and will behave in an ethically acceptable manner as may be expected in scientific and/or technological research. The Institute shall inform NWO-AES and TNO immediately if new information emerges which is relevant to (the conduct of) the Project or the utilization of the Results.

4. A User Committee will be formed in conformity with the User Committee Guidelines, consisting of a maximum of two representatives of each Party. The Project Leader chairs the User Committee and a representative of NWO-AES shall act as its secretary. The User Committee shall meet at least once a year. During such meetings, the User Committee shall discuss the progress of the Project, on the basis of the written progress report, prepared by the Project Leader. The progress report shall be sent at least two weeks before the User Committee meeting to the User Committee members and shall contain amongst others a description of the Results obtained so far. The Project Leader shall use the format, as can be found on the website of NWO-AES. The Parties may only invite representatives of other organizations to join the User Committee as advisory members, upon the prior written consent of all Parties. NWO-AES and Institute shall not withhold consent for Other ESI Industry Partners to join the User Committee.

Article 3 – Funding and payment

Project funding takes place in accordance with the Grant Letter, as attached in Annex 2. The conditions on the basis of which the Institute can claim its expenses, are described in the NWO Grant Rules 2017.

Article 4 – Intellectual property

1. Ownership
   a. All Results capable of protection by Intellectual Property Rights solely generated by one or more employees of Institute, shall be jointly owned by NWO-AES and Institute. All Results capable of protection by Intellectual Property Rights jointly generated by employees of Institute and TNO and/or ESI Industry Partner(s) shall be jointly owned by NWO-AES and
Institute, unless TNO and/or ESI Industry Partner(s) and Institute(s) mutually agree to deviate from this arrangement; such deviating arrangement in mutual agreement will be mentioned by TNO and/or ESI Industry Partner(s) in their support letters for this Project.

b. All Results capable of protection by Intellectual Property Rights solely generated by one or more employees of an Industrial User shall be solely owned by that Industry User.

c. All Results capable of protection by Intellectual Property Rights jointly generated by two or more ESI Industry Partner(s) to this Agreement shall be jointly owned by the concerned parties.

2. Licenses
   a. NWO-AES and Institute hereby grant, to TNO, a non-exclusive, worldwide, perpetual, royalty-free and fully paid-up license under Results referred to under article 4.1.a, and will make available such Results, to use such Results for research, development and commercial purposes, and with the right to grant non-exclusive sublicences to subcontractors insofar as required to perform their contractual obligations towards TNO, which license TNO hereby accepts. Such license shall furthermore include the right to grant field-limited non-exclusive, worldwide, perpetual, royalty-free and fully paid-up sublicense to all ESI Industry Partners to use, make, have made, offer for sale, sell, and otherwise make available any embodiment incorporating or protected by such Results.

   b. A Party that owns rights to Background is, at its sole discretion, entitled to grant the right to all Parties to use that Background for the Project and for the duration of the Project, free of charge, provided that the owner in question is entitled to grant this right.

   c. If this Background set forth in article 4.2b above is needed for the commercial use of Results, the owning Party will grant to the Parties requiring the Background for the exploitation of Results, the right to use that Background commercially, on FRAND (fair, reasonable and non-discriminatory conditions as will be agreed.

   d. Additional arrangements regarding Background in as much as needed or desired will be made in mutual agreement between the Parties at the start or during the course of the Project. such additional arrangement needed before the start of the project/programme in mutual agreement will be mentioned by ESI Industry Partner(s) in their industry support letters for this Project. Additional arrangements needed during the Project will be effected by a mutually agreed amendment.

3. Open source
If Institute desires to incorporate or link to open source software in Results this will only be after consultation with TNO and the Contributing ESI Industry Partner and may be subject to additional arrangements made between Institute and Parties at the start or during the course of the Project. Such additional arrangement in mutual agreement will be mentioned by ESI Industry Partner(s) in their industry support letters for this Project.

4. Option
NWO-AES and the Institute hereby grant to TNO an option to obtain ownership of the Results (the “Option”) subject to the licenses granted pursuant article 4.2. NWO-AES and the Institute shall not offer to license or transfer its ownership share in the Results to another entity without written notification of TNO reasonably in advance of such offer in order to allow TNO to exercise the Option.

Parties shall inform each other immediately if they are of the opinion that Results are generated which are eligible for protection by a patent. The Project Leader shall then complete an invention
disclosure form ("IDF"), the format for which can be found on the website of NWO-AES. NWO-AES shall send this IDF to TNO, at which moment the Option period of six (6) months commences. Based on said IDF, TNO shall consult the ESI Industry Partners and decide whether or not to exercise the Option. If exercised, TNO and the ESI Industry Partners will subsequently decide whether or not to apply for a patent pertaining to such Results. If TNO and the ESI Industry Partners decide to apply, then TNO or the ESI Industry Partner (Applicant) will subsequently decide on the details for the patent application procedure. The patent application, if any, shall be filed with Applicant as applicant. The out of pocket costs related to the patent application shall be borne by Applicant.

TNO may exercise an Option for any Result up to within six (6) months of being notified by Institute of such Result, which term may be extended by mutual agreement between TNO and Institute. After TNO exercises the Option, Parties (NWO-AES/Participant and Applicant shall promptly enter into negotiations in good faith to reach an agreement within three (3) months of exercising of the Option, which term may be extended by mutual agreement between Parties; the agreement shall include at least the following provisions:

Applicant will pay to NWO-AES a remuneration in line with FRAND conditions in exchange for exercising the Option, which remuneration NWO-AES will share equally with the Institute. This remuneration shall be a lump sum and/or a royalty payment based on the revenues generated by the Applicant with the Results. The remuneration shall take into account the (cash and/or in-kind) contribution of TNO and the ESI Industry Partner to the Program and the Project. Such negotiations shall be conducted in good faith by the Parties.

The Applicant shall make reasonable endeavours to commercialise the Results for which it exercised an Option.

NWO-AES and the Institute that generated the Result retain at all times a non-exclusive, non-transferrable and royalty-free right to use the Results for further non-commercial internal research and education purposes.

NWO-AES and the Institute are not liable for any loss or damage incurred by TNO arising out of the use or exploitation of the Results. Subject to article 6.2 TNO indemnifies NWO-AES and the Institute from claims from third parties due to damage arising out of the use or exploitation of the Results by or through TNO.

If TNO fails to (timely) exercise an Option, or if the Parties are unable to agree on the terms of an agreement within three (3) months after exercising an Option, which term may be extended by mutual agreement between TNO and Institute, such Option shall lapse and NWO-AES and Participant shall subsequently be free to offer the Results concerned to a third party subject to the licenses granted pursuant article 4.2.

Article 5 – Confidentiality and publication

Confidentiality
1. All information of whatever nature or form disclosed during the Project by a Party (the "Discloser") to any other Party (the "Receiver") in connection with the Project, including Background, the contents of this Agreement and any and all Results and/or conclusions derived from the Project and which:
   a. if disclosed in tangible form, was marked as confidential at the time of such disclosure; or
   b. if disclosed orally, was identified as confidential at the time of such disclosure and summarized and confirmed as confidential in writing within thirty (30) days after disclosure; is "Confidential Information".
2. Each Receiver undertakes not to use Confidential Information for any purpose other than in accordance with the terms of this Agreement.

3. Each Receiver undertakes to apply for the security of Confidential Information at least the same degree of care as it applies for the security of its own Confidential Information (but in any case shall apply not less than reasonable care) and not to disclose Confidential Information to any third party without the prior written consent of the Discloser.

4. For any Confidential Information, the period of confidentiality shall be five (5) years from the moment of completion of the Project.

5. No information disclosed by any Discloser shall be deemed to be (or to remain) Confidential Information to the extent that any Receiver can show that the information concerned:
   a. has come into the public domain prior to, or after the disclosure thereof and in such case through no wrongful act of the Receiver;
   b. was already known to the Receiver, as evidenced by written documentation in the files of the Receiver;
   c. has been lawfully received by a Party without restrictions or breach of this Agreement;
   d. has been or is published without violation of this Agreement;
   e. is independently developed in good faith by employees of the Receiver who did not have access to the Confidential Information.
   f. is required to be disclosed by law or court-order.

Publication procedure

6. The Institute shall be entitled to publish the Results, however with due observance of the following publication procedure:
   a. The Project Leader will submit an intended publication to NWO-AES at least 30 days before its intended disclosure.
   b. NWO-AES will then submit the publication to all members of the User Committee and ask them to let NWO-AES know within 10 working days whether they consider that the publication contains a patentable invention, contains Confidential Information of such Party and/or has Utilisation possibilities.
   c. NWO-AES will let the Project Leader know within 30 days after the publication has been submitted to NWO-AES whether there is any objection to its publication. If no objection has been made within this period, the Project Leader may disclose the publication. NWO-AES may decide to suspend the publication for up to 9 months if there is an objection or in order to obtain patent protection for Results contained in the publication. NWO-AES will decide on this after consulting the Project Leader.

7. The Institute shall ensure that every scientific publication contains a declaration to indicate that the Results were achieved with financial support from NWO-AES. The text shall be provided by NWO-AES. Where possible, the publications, including scientific posters and prototypes, should also contain the NWO-AES logo. The Institute shall furthermore consult with TNO whether TNO and/or Contributing ESI Industry Partner(s) want its support to the Project to be mentioned as well in the publication.

8. For the purposes of reporting to government bodies and the general public, NWO-AES may publish executive summaries of the Project following consultation with the Project Leader. NWO-AES shall ensure that such summaries shall not affect the possibility of applying for patent rights with regard to the Results or disclose any Confidential Information.
Article 6 – Liability and warranties

1. In respect of any information or materials or Results supplied by a Party to another under this Project, no warranty or representation of any kind is made, given or implied as to the sufficiency or fitness for purpose or non-infringement. Therefore,
   a. the recipient Party shall in all cases be entirely and solely liable for the use to which it puts such information and materials and Results; and
   b. no Party makes any representation or warranty, express or implied, other than as expressly stated in this Agreement.

2. Subject to article 6.4, each Party shall indemnify and hold harmless the other Parties from any claims from third parties due to damage caused by the application of the Results by or through the indemnifying Party.

3. Parties shall not hold each other or any Institute liable for damage to property or injury arising out of the performance of the Project unless the damage or injury was caused by gross negligence or wilful intent of such Party or Institute.

4. Except in case of gross negligence, wilful misconduct, the maximum aggregate liability of a Party shall be equal to 25% of the overall Project budget. Furthermore, no Party shall be liable to another Party for any loss of profit, indirect or consequential loss or damage which may be suffered by the other Party in connection with this Agreement.

Article 7 – Term and termination

1. This Agreement shall enter into force on the Effective Date and shall remain in effect for until three (3) months after the end date of the Project, which is the date the last appointment funded by NWO-AES under this Project ends.

2. After this Agreement is expired or terminated vis-à-vis a Party pursuant this article 7, the articles 4, 5, 6, 7.2, 8 and 9 shall remain in full force and effect.

3. With regard to a Party:
   i. that has not, not timely or not properly fulfilled its obligations under the Agreement and, after having been summoned thereto in writing, has failed to remedy such breach within a reasonable term mentioned in the summons, without prejudice to the right of the other Parties to claim the losses it has suffered as a result of the default and/or termination of the Agreement;
   ii. in respect of which a suspension of payment is granted, bankruptcy is granted, an administration order is filed, a receiver is appointed in respect of its assets or a general assignment for the benefit of creditors is made; or
   iii. that goes into liquidation or that permanently discontinues its business,

the other Parties may terminate this Agreement with immediate effect, without judicial intervention or any further summons being required, by giving written notice by registered mail. The remaining Parties shall discuss if they wish to continue the Agreement and on what conditions. Should the participation of the Institute be terminated and the other Parties decide that they nevertheless want to continue the Project, the Institute will, at the request of NWO-AES and TNO, cooperate to the best of its ability in transferring the Project to another research institute to be selected by NWO-AES and TNO and ensure that all Results remain available for the Project.
4. NWO-AES and TNO shall furthermore be jointly entitled to terminate the Agreement prematurely, without judicial intervention or any further summons being required, by giving written notice by registered mail,
   
a. if a negative decision has been given on a continuation application (as mentioned in paragraph 3.3.5 of the NWO Grant Rules 2017); or
b. if the Project Leader is no longer employed by the Institute.

In the latter case, the Institute will, at the request of NWO-AES and TNO, cooperate to the best of its ability in transferring the Project to another research institute to be selected by NWO-AES and TNO and ensure that all Results remain available for the Project.

5. When the participation of a Party has been terminated in accordance with paragraph 3 or 4 above, paragraph 2 above shall apply, with the understanding that said Party shall not acquire any rights with regard to the Results, generated after the termination of its participation.

Article 8 - Governing law and jurisdiction

1. This Agreement shall be governed by the laws of the Netherlands.

2. If any dispute should arise between any of the Parties, such Parties shall use reasonable effort to settle such dispute before pursuing any remedy they may have at law.

3. Any dispute, resulting from this Agreement, or further agreements resulting therefrom which do not stipulate otherwise, shall be submitted to the competent court of law in Utrecht, the Netherlands.

Article 9 - Miscellaneous

1. None of the Parties shall be entitled to transfer, by means of assignment, sale or otherwise, or to encumber any and all of the rights granted under and obligations deriving from this Agreement, either in whole or in part, to a third party without the prior written consent of the other Parties.

2. Unless explicitly agreed otherwise in writing, none of the Parties is entitled to act or make legally binding declarations on behalf of any of the other Parties. Nothing in this Agreement shall be deemed to constitute a joint venture, agency or any other kind of formal business grouping or entity between the Parties.

3. Any amendments or additions made to the Agreement shall only be valid and binding between the Parties if made in writing and executed by all Parties.

4. This Agreement contains 4 Annexes which form an integral part of this Agreement:

   Annex 1  Project Proposal “[title]”
   Annex 2  Grant Letter
   Annex 3  NWO Grant Rules 2017
   Annex 4  Guidelines Users’ Committee NWO domain TTW 2017

If and to the extent the Annexes and this Agreement are mutually conflicting, this Agreement shall prevail.
5. The Institute shall inform the other Parties immediately if there are indications during the term of this Agreement that the Results are covered by a patent or patent application of the Institute or a third party.

6. In the event that during the course of this Agreement the Parties agree to use (biological) material from TNO or participating ESI Industry Partner(s), TNO or participating ESI Industry Partner(s), is entitled to ask for the signing of a material transfer agreement prior to the exchange of said material, which material transfer agreement has to be in line with the provisions of this Agreement.

7. None of the Parties grants any rights and/or licenses to the other Parties, either explicit or implicit, nor waives any of its existing rights, unless explicitly mentioned in this Agreement.

As agreed upon and signed in [number]fold,

**NWO Domain Applied and Engineering Sciences**
Utrecht, ........................................

........................................
Dr. Ir. H.H. Nijhuis,
Director

**[TNO]**
[Place], ........................................

........................................
[Name],
[Title]

**[INSTITUTE]**
[Place], ........................................

........................................
[Name],
[Title]
Annexes to Partnership Project Agreement [title]

Annex 1  Project Proposal “[title]”

Annex 2  Grant Letter

Annex 3  NWO Grant Rules 2017

Annex 4  Guidelines Users’ Committee NWO domain TTW 2017
18. Appendix 8 Further information

Contact

General information is available from:

Netherlands Organisation for Scientific Research
NWO domain Applied and Engineering Sciences

visiting address   telephone
Van Vollenhovenlaan 661   **31 (0)30 6001 211
3527 JP Utrecht
The Netherlands

fax   **31 (0)30 6014 408

postal address   e-mail
Postbus 3021   ESI-AES-PPP@nwo.nl
3502 GA Utrecht
The Netherlands

internet
www.ttw.nwo.nl

IBAN NWO
NL89ABNA0642330824 (BIC ABNANL2A)

Chamber of Commerce
The Hague 27367015

Btw (Dutch VAT)
NL.002305884.B01

NWO domain AES office
If referred to the NWO domain AES office, contact the program officer assigned to you or ring the general telephone number and ask for a program officer in your specialist area.

Technical questions about the online application system ISAAC

For technical questions about the use of ISAAC please contact the ISAAC helpdesk. Please read the manual (tab 'Help') first before consulting the helpdesk. The ISAAC helpdesk can be contacted from Monday to Friday between 10:00 and 17:00 hours CET on +31 (0)20 3467179. You can also submit your question by e-mail to isaac.helpdesk@nwo.nl. You will then receive an answer within two working days
**Links**

- Netherlands Organisation for Scientific Research (NWO): www.nwo.nl
- NWO Domain AES www.nwo.nl/aes
- Salary tabel personnel (rates) www.nwo.nl/ttw-aanvrager (scroll to bottom of the webpage)
- Co-funding in personnel (rates) www.nwo.nl/ttw-aanvrager (scroll to bottom of the webpage)
- Info foreign expenses www.nwo.nl/ttw-aanvrager (scroll to bottom of the webpage)
- Info thesis printing costs www.nwo.nl/ttw-projectleider (scroll to bottom of the webpage)
- Nagoya Protocol: https://www.cbd.int
- ISAAC: www.isaac.nwo.nl
- How ISAAC works: An ISAAC manual can be found in ISAAC (tab ‘Help’)
- ISAAC helpdesk: isaac.helpdesk@nwo.nl
- Netherlands Organisation for Scientific Research (NWO): http://www.nwo.nl/
- Open Access: www.nwo.nl/openscience-en