

# RESEARCH, DEVELOPMENT AND INNOVATION PROGRAMME ICT 2023: Industrial Internet

## Research, development and innovation programme ICT 2023

The research, development and innovation programme ICT 2023 is jointly coordinated and funded by the Academy of Finland and Tekes, the Finnish Funding Agency for Innovation. The aim of the programme is to further improve Finland's scientific expertise in computer science and to promote the extensive application of ICT. The programme is based on the report *21 Paths to a Frictionless Finland* by the ICT 2015 Working Group. At least 10 million euros of the Academy's budget authority for 2017 will be used to implement the ICT 2023 programme.

## Industrial Internet

Industrial internet requires multidisciplinary research approach in the fields of automation, computer science, telecommunications, measurement technology and mechanical engineering and process technology. Research results in these fields have broad impact on society as well as on effective, economical and clean manufacturing and production chains. The impacts of the industrial internet are particularly evident in the renewal of industrial business models, networks and business processes.

There are challenges in planning, developing and introducing integrated systems or software in different areas of application, and these challenges require solutions to extensive research questions. Research in this area requires the combination of different scientific disciplines as well as application and integration of both existing and new research results in close collaboration with different actors.

Technologies related to the industrial internet have been the subject of research over a long period, and the technological readiness for solutions already exists. The first applications of the industrial internet are already in practical use in different branches of industry. Reference architecture models have been developed for manufacturing and industrial automation systems. The industrial internet is present at all stages of product and system life cycles from research, product development and manufacturing to user support, recycling and disposal.

## Thematic areas

The call includes the following key thematic areas:

- architectures, concepts, methods and tools for planning and configuring open platforms and systems
- data processing, analysis and storage (centralised, distributed, cloud, integration).

Emphasis will be placed on method development related to these areas, including

- complex systems: multi-layered, scalable, centralised and distributed process and operative models
- data contextualisation methods (from data to knowledge):
  - methods for remote monitoring, fault diagnostics and maintenance
  - methods for remote operations and optimisation
  - real-time remote control
- smart cloud computing methods and architecture as well as local edge and fog computing

- utilising user data for optimising human-machine interaction
- integration methods for manufacturing execution systems and process control towards flexible and agile process industry value chains
- telecommunications latency (time-critical applications) and edge computing
- adaptation of business models to industrial internet applications.

Information security is a natural part of these systems, but the development of information security does not fall within the scope of research within this thematic call.

## How applications are reviewed

In reviewing applications and making funding decisions, in addition to the Academy of Finland's general review criteria for research programmes (see [Review criteria](#) on the Academy's website), particular attention will be paid to the following issues:

- international engagement
  - attracting top-level young, talented researchers from abroad to Finland or hiring researchers who have recently come to Finland to work on the project
  - research visits by Finnish researchers to leading-edge foreign universities and research institutes
- business collaboration
  - cooperation between universities, research institutes and business companies
  - problem-setting in research
  - application potential of results
- intersectoral mobility of leading-edge researchers
  - mobility from universities to business companies
  - mobility from business companies to universities
- use of universities' and research institutes' own resources to carry out research
  - use of resources of the site of research and the partners
  - level of commitment and funding contribution by the site of research.

The applications will be reviewed by an international panel of experts. The reviewers will use the Academy's review form for programmes.

The threshold rating for Item 1.1 (Project's relevance to the programme) is 4 on the scale from 1 to 6. If an application fails to meet this requirement, the review will be discontinued and the applicant will only receive feedback on Item 1.1.

If an application does not receive at least rating 4 for Item 1.2 (Scientific quality and innovativeness of research plan), the review will be discontinued and the applicant will receive feedback only on Items 1.1 and 1.2.

This call is a single-stage call. The non-negotiable deadline for applications is 26 April 2017 at 16.15. Applicants may be invited for interviews during the review process.

The funding is granted for two years. As a rule, the funding period will start on 1 January 2018.

## Consortium applications

If the applicant is a consortium, see detailed guidelines on our website under [Guidelines for consortium application](#). Please note that consortium PIs can submit the consortium application only after all consortium subprojects have completed their applications. The non-negotiable call deadline also applies to consortia. Consortium compositions cannot be changed after the deadline has expired. If the project involves business collaboration, see the detailed guidelines below.

## Business collaboration

If the project involves business collaboration, that collaboration must be clearly indicated in the research plan. In addition, your application must also include a collaboration plan as a separate appendix.

**Collaboration plan** (no more than three pages):

- List all project parties.
- Describe the collaboration as well as the management and research duties included in the project.
- Describe the mechanisms by which the project will integrate all participating organisations and individual researchers.
- Describe, if relevant, the implementation of intersectoral researcher exchange.
- Define each PI's required input to the project, and justify why each party's expertise is necessary to achieve the project's objectives.
- Describe the complementary roles of the parties involved, and explain which research results can be jointly utilised by the participating companies.
- Describe the application potential of the results.
- Make sure that the collaboration plan's length and details are proportional to the size of the project. The plan should be extensive enough to ensure that the project parties will work together as one whole.

The potential business collaboration is entered on the application form under *Partners/Collaborators*. In the Academy's online services, enter as consortium parties only parties that are applying for funding from the Academy.

## Programme coordination

The PIs of the projects are required to

- assume responsibility for and report on the scientific progress of the project and on the use of the funds in accordance with the Academy's instructions
- see to that the whole research team attends all meetings, seminars and workshops organised by the programme coordination, and facilitate cooperation and exchange of information between the research teams within the programme
- take part in producing reviews, syntheses and information material around the programme, and actively disseminate information about the programme's progress and results on public and scientific forums.