

International cooperation projects

Development of digital technologies

DLR Projektträger

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1. International cooperations

The German Federal Ministry for Economic Affairs and Energy (BMWi) supports a number of bilateral and multinational research and development (R&D) cooperation projects with selected partner countries in the European and international arena. The aim is, on the one hand, to transfer technological developments to foreign application areas and markets and, on the other hand, to learn from the specific competences of research institutions and companies from the respective partner country in current funding areas for joint activities.

Digital technologies are deeply changing our ways of working and doing business as well as the way we interact and communicate. They are a prerequisite for maintaining the competitiveness of individual enterprises and the economy as a whole. The COVID-19 crisis has further emphasized the importance of digital technologies and infrastructures and showed how our societies and economies rely on digital solutions.

The BMWi promotes development of digital technologies, among others, by providing funding for pre-commercial research and development projects. A number of diverse technology programmes are currently supported, such as "Innovation competition on artificial intelligence", "Secure digital identities showcase", "Smart data economy" and "Smart services worlds", to name just a few.

Apart from national projects, the BMWi is also providing funding for bilateral cooperation projects in Europe and internationally to support the transfer of technological developments to foreign markets and for harnessing the specific skills of companies and research institutions. Currently, there are ongoing projects with Austria, Canada and Japan. Further bilateral cooperation projects with Austria and France are in preparation.

The BMWi also provides funding for stand-alone projects that are part of the EUREKA clusters CELTIC-NEXT and the new initiative of several EUREKA clusters on AI (Σ ! AI Call). At present, the BMWi co-funds three cooperation projects with Canada, the United Kingdom and Singapore that stem from this "bottom-up" approach.

Country	Project name	Application area
	AIR_PTE	Health management
Conside	ARIBIC	Robotics
Canada	FLAIROP	Robotics
	NephroCAGE	Health management
	BIMcontracts	Construction industry
	CampaNeo	Automotive industry
	ExDRa	Production and process industry
	Future Data Assets	Business administration
	PLASS	Production and supply chain
	Telemed5000	Health management
	EMPAIA	Health management
Austria	Knowledge4Retail	Trade
Austria	KI-SIGS	Health management
	AIQNET	Health management
	D-TRAS	Traffic safety
	SmartDIS	Disassembly
	CARNIVAL	Sensor technology
	EUProGigant	Production
	IDunion	Secure digital identities
	ONCE	Secure digital identities
Japan	AIRPoRT	Robotics

Overview of the current bilateral international cooperation projects

Overview of the current EUREKA international cooperation projects

Country	Project name	Application area
UK and Canada	AIMM	Further development of 5G
Singapore	AISSI	Semiconductor manufacturing
UK	Piccolo	Automated driving

2. Cooperation with Canada

In cooperation with the Canadian Embassy in Berlin, the BMWi has initiated a bilateral research cooperation. Canada is an attractive partner as a strong location for innovation and due to its leading role in the development of artificial intelligence. Transatlantic exchange has a long tradition: In 2021, Germany and Canada will celebrate the 50th anniversary of their successful scientific and technological cooperation.

Both countries are continuously working to advance technological progress together. Similar to the German Federal Government's High-Tech Strategy 2025, which identifies the digitization of the economy and society as a priority task for the future, the Canadian government and the Canadian provinces have also defined investment in digital development and the location of high-tech companies as a clear goal.

The cooperation between the BMWi and the Canadian Embassy in Berlin has resulted in four research projects with Canadian and German partners, which are funded by the Canadian National Research Council (NRC) in Montreal, the Natural Sciences and Engineering Research Council of Canada (NSERC) in Ontario and the BMWi. The goal of the funded research projects is the further development and innovative application of artificial intelligence methods, so that companies benefit from the bilateral exchange. All four projects held a kick-off event in spring 2021 and successfully began their work. In the next three years, innovative technological developments are expected in the areas of health management and robotics.

Current Canadian-German bilateral projects		
ARIBIC	Artificial Intelligence based Indoor Cartography	
AIR_PTE	Al-based risk prediction and treatment effect estimation based on health data	
FLAIROP	Federated Learning for Robot Picking	
NephroCAGE	Nephrology Disease Cooperation between Canada and Germany for Applied AI	

2.1. ARIBIC - Artificial Intelligence based Indoor Cartography

The German-Canadian ARIBIC consortium aims to develop AI-based algorithms that enrich a 3D geometric map with additional semantic information.

The goal of the consortium is to develop an Albased open platform for the localization of autonomous transport vehicles in warehouse applications. This will enable digital applications and services that enable safe driving in these environments. In addition, typical fleet and warehouse management software systems can be linked to the platform to provide relevant data on the vehicles to perform picking tasks or specific deliveries.

The algorithms developed in the project for the real-time automatic generation and continuous updating of a highly accurate and detailed 3D indoor map provide the basis for safe movement of transport robots and thus for effective tracking and tracing of these vehicles in real time. The necessary data and information are provided by autonomous mobile robots or automated vehicles and stored in the cloud. The result can be

Key facts and figures:

2.5 YEARS DURATION



March 2021 – November 2023

4 PARTNERS



<u>Canadian</u>: LeddarTech; University of Toronto-STARS Laboratory <u>German</u>: STILL GmbH; Karlsruhe Institute of Technology

€ 0.7 MILLION FUNDING



The total project costs are \notin 1.1 million, of which \notin 0.7 million will be funded.

considered as a living digital twin of the warehouse. The fully automated creation of 3D maps for indoor spaces also offers potential for use in various areas such as smart living, autonomous driving, intelligent construction or smart production.

Contact of the project coordinator: Dr. Patrick Erbts, STILL GmbH, <u>patrick.erbts@still.de</u>

2.2. AIR_PTE - AI-based risk prediction and treatment effect estimation based on health data

AIR_PTE aims to develop artificial intelligencebased methods to improve and automate treatment effect estimation based on health insurance claims data in Canada and Germany. Both Canada and Germany can build upon large representative samples of long-term health claims data, well suited to obtain real world evidence and to exploit AI based methods.

The methods will be developed and compared on the example of the current therapeutic options to treat venous thromboembolism (VTE) on Canadian and German health care claims.

The project's goal is to support multiple evaluations and therapy decisions with modern AI methods by using the analysis platforms SAHRA (BMWi funding program "Smart Data"), EVA (ingef spectrumk) and Macadamian HealthConnect Platform™.

Experience from the operation of digital health platforms, especially with regard to data protection and user acceptance, will be combined with experience from the application of innovative modelling methods to historical health insurance Key facts and figures:

2 YEARS DURATION



Sept. 2020 – Aug. 2022

4 PARTNERS



<u>Canadian</u>: McGill University Montreal; Macadamian Health-Connect

German: DCC Risikoanalytik GmbH; Ingef- Institut für Angewandte Gesundheitsforschung

€ 0.7 MILLION FUNDING



The total project costs are \notin 1 million, of which \notin 0.7 million will be funded.

data. The result will provide reliable methods for treatment effect estimation and for personalized decision support at the point of care in Germany, Europe and Canada.

Contact of the project coordinator: Prof. Thomas P. Zahn, DCC Risikoanalytik GmbH, thomas.zahn@risikoanalytik.de

2.3. FLAIROP - Federated Learning for Robot Picking

FLAIROP aims to develop a distributed learning approach for pick-and-place robots to robustly recognize and grasp known as well as unknown objects.

The goal is to provide current artificial intelligence (AI) solutions with more data while respecting privacy regulations. There should be no exchange of training data (e.g. images, grasping points, etc.). In this context, FLAIROP investigates how training data from multiple plants or even companies can be used to increase recognition performance compared to single robot training.

The project focuses on automated generation of learning data required for the grasp detection and federated learning algorithms, via cloud structure. The AI models are designed to be as efficient as possible to both run locally in each site and globally on the central cloud server. This represents the next stage of development for the simple handling of autonomously acting systems in the context of Industry 4.0.

Federated learning has been used predominantly

Key facts and figures:

2 YEARS DURATION



March 2021 – November 2023

4 PARTNERS



<u>Canadian</u>: University of Waterloo; Darwin Al <u>German</u>: Festo SE & Co. KG; Karlsruhe Institute of Technology

€ 1 MILLION FUNDING



The total project costs are € 1.4 million, of which € 1 million will be funded.

in the medical sector for image analysis (protection of patient data). Transferring the technology to the increasingly interconnected Industry 4.0 / Logistics 4.0 offers strong potential for the use of AI and development of new, more powerful algorithms - while maintaining data protection guidelines.

Contact of the project coordinator: Jan Seyler, Festo SE & Co. KG, jan.seyler@festo.com

2.4. NephroCAGE - Nephrology Disease Cooperation between Canada and Germany for Applied AI

The German-Canadian consortium is testing the safe application of AI on multinational health data using chronic kidney disease as a use case. The project's goal is to enable an international comparison of treatment strategies.

The project partners will create a learning AI system that will be used to match organ donors and recipients accurately in advance to reduce risks in kidney transplants and prevent organ damage. To this end, clinical centres of excellence in both nations are contributing transplant data from the past 10 years. They will be analysed using artificial intelligence and combined with a novel matching algorithm to create clinical prognostic models for kidney transplant recipients. To enable the international comparison, a clinical prediction model is developed that allows combined analysis of clinical data, laboratory data, and genetics in kidney transplant patients.

By using a federated learning approach, the algorithms are transferred to the data: thus, data protection is maintained and the sensitive health data of both nations can serve as a comKey facts and figures:

2 YEARS DURATION



February 2021 – January 2023

9 PARTNERS



German: Hasso-Plattner-Institut für Digital Engineering; Pirche AG; Charité Berlin; Karlsruher Institut für Technologie <u>Canadian</u>: TheUniversity of British Columbia; McGill University Health Centre; Genome Canada; Genome BC; Genome Quebec

€ 1.4 MILLION FUNDING



mon basis for clinical prediction models without having to leave the respective hospital.

Contact of the project coordinator: Dr. Matthieu Schapranow, Hasso-Plattner-Institut für Digital Engineering gGmbH, <u>schapranow@hpi.de</u>





3. Cooperation with Austria

Since 2018, the BMWi with its funding framework "Development of Digital Technologies" has cooperated with the Austrian Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology (BMK) and its programmes "ICT of the Future" and "Production of the Future". Both ministries have agreed on the common goal of intensifying cooperation between the R&D projects of the respective technology funding programmes. Austrian and German companies as well as research institutions can complement each other in their respective profiles and jointly create attractive solutions in the pre-competitive area, also in the direction of the digital European single market. Both ministries have implemented corresponding project funding for this purpose. For the cooperation within the programme "Production of the future", budget is provided by the Austrian Research Promotion Agency (FFG). Currently there are joint projects by German-Austrian consortia in four funding priorities.

3.1. ICT of the future - Smart Data Economy

The area of data economy offers good opportunities for the joint development of German-Austrian solutions. Both ministries have implemented cooperative project funding for this purpose. The funding calls "Smart Data Economy - Artificial Intelligence, Semantics, Sovereignty" from Germany and "Smart Data Economy AT/DE 2018 - AI-based Data Products" from Austria enabled cooperative research and development projects.

Current projects in funding priority "Smart Data Economy"		
BIMcontracts	Automated Payment and Contract Management in the Construc- tion Industry Using Distributed Ledger Technology and BIM-5D	
CampaNeo	Platform for real-time vehicle data campaigns	
ExDRa	Exploratory Data Science over Raw Data	
Future Data Assets	Smart data balancing to determine corporate data assets	
PLASS	Platform for analytic supply chain management services	
Telemed5000	Development of a smart system for subsidiary telemedical care for large groups of cardiological risk patients	

3.1.1. BIMcontracts - Automated Payment and Contract Management in the Construction Industry Using Distribute Ledger Technology and BIM-5D

BIMcontracts aims to develop a solution based on blockchain technology to simplify and automate contract and payment management in construction projects with greater transparency. This should speed up construction projects and avoid payment delays.

In the BIMcontracts project, an automated payment and contract management system is being developed and tested in concrete application cases with a construction company. The intended solution, the so-called BIMcontracts Demonstrator, is based on blockchain architecture and links this with digital building models (Building Information Modelling, BIM for short) and smart, automated contract processing (Smart Contracts). Every project step is automatically logged and transparently documented. Once the service has been accepted, payment is automatically released. Blockchain technology ensures that all interactions are traceable.

As part of a joint transnational research programme between Germany and Austria, BIMcontracts is being developed and tested in parallel with Austrian projects BIMd.sign and FMCHAIN in a cooperative exchange.

Contact of the project coordinator: Sverre Nader, adesso SE, <u>sverre.nader@adesso.de</u> Key facts and figures:

3 YEARS DURATION



August 2019 – July 2022

5 PARTNERS



Austrian associated partner: Technische Universität Wien German: adesso SE; Ruhr-Universität Bochum; University of Duisburg-Essen; FREUNDLIEB Bauunternehmung GmbH & Co. KG; Kapellmann und Partner Rechtsanwälte mbB

€ 2.3 MILLION FUNDING



The total project costs are \notin 3.3 million, of which \notin 2.3 million will be funded.

3.1.2. CampaNeo - Platform for real-time vehicle data campaigns

The CampaNeo project is developing an open platform for private and public institutions to collect and analyse vehicle data in real time.

To reduce technical and legal obstacles to data collection, CampaNeo is developing a campaignoriented approach based on encouraging users to share their data. This is rooted in the assumption that participants are generally willing to share their data if they see a clear added value in it, for example by avoiding accidents. The project aims to develop a manufacturer-independent platform for private and public institutions to collect and analyse vehicle data in real time. Model regions are the cities of Hannover and Wolfsburg, along with nationwide scenarios, as well as the implementation of the first smart use cases based on the campaign data. The use of distributed ledger technology ensures decentralized and traceable data processing. The results of the project include technologies and analysis techniques that are useful for many user groups such as municipalities, fleet management providers, insurance companies and service providers in the fields of data science and mobility are of great Key facts and figures:

3 YEARS DURATION



August 2019 – July 2022

4 PARTNERS



Austrian associated partner: Universität Innsbruck German: Volkswagen AG Nutzfahrzeuge, Leibniz Universität Hannover, CSTx Software Engineering GmbH, momatec GmbH

€ 1.6 MILLION FUNDING



The total project costs are € 2.6 million, of which € 1.6 million will be funded.

importance. The results are validated together with business users in selected application scenarios and economically and scientifically exploited by the consortium as well as the German and Austrian associated partners.

Contact of the project coordinator:

Dr. Timo Graen, Volkswagen Aktiengesellschaft, timo.graen@volkswagen.de

3.1.3. ExDRa - Exploratory Data Science over Raw Data

ExDRa is facilitating the analysis of large amounts of heterogeneous raw data from different sources and helping to ensure more reliable monitoring and fail-safe operation of industrial plants.

In the ExDRa project, a demonstrator is being developed that supports the explorative data science process using heterogeneous and distributed raw data. This includes data, for example, that originates from different computer systems. This should simplify and accelerate the assessment of new data products. Data products in this context are, for instance, predictions or machine learning models obtained during data analysis. Raw data can be stored and processed remotely, ExDRa also guarantees the legally compliant processing of sensitive or export-restricted data. The solution will undergo practical testing in the process industry at Siemens AG, for example in the remote monitoring of pumps by using machine learning methods. ExDRa relies on the modular implementations from the Simens' aiTools, based on technologies such as SystemDS, developed by the Austrian TU Graz and NebulaStream of DFKI and TU Berlin.

Key facts and figures:

3 YEARS DURATION



June 2019 - May 2022

4 PARTNERS



<u>Austrian</u>: Graz University of Technology <u>German</u>: Siemens AG; Technische Universität Berlin; DFKI GmbH

€ 1.7 MILLION FUNDING



The total project costs are \notin 2.5 million, of which \notin 1.7 million will be funded.

ExDRa will eventually improve monitoring models, making plants more reliable and productive, while reducing costs. ExDRa is therefore particularly suitable for remote monitoring of distributed systems, such as those found in the chemical and pharmaceutical industries or oil and gas production.

Contact of the project coordinator: Dr. Claus Neubauer, Siemens AG, <u>claus.neubauer@siemens.com</u>

3.1.4. Future Data Assets - Smart data balancing to determine corporate data assets

Future Data Assets is developing a system for evaluating the data inventory of companies and providing it via a digital platform. With the help of machine learning methods, the data capital of a company can be evaluated to offer information to external stakeholders

The goal of Future Data Assets is to develop a framework for setting up so-called data balance sheets. The data balance sheet is designed to visualize the commercial value and potential of a company's data stocks, thereby closing a gap in traditional reporting to various stakeholders. The data balance sheet as a reporting tool should contain two central components: 1) the data balance management report shows the data stock of a company and its balance sheet value for a certain period in the past; 2) the data balance forecast report provides information on a company's future data management. Machine learning methods can be used both to predict future developments and to estimate planned investments

The German partners gained the necessary know-how in evaluating the value of data in pre-

Key facts and figures:

3 YEARS DURATION



August 2019 – July 2022

5 PARTNERS



Austrian associated partner: SWISDATA GmbH German: atlan-tec Systems GmbH, Deloitte GmbH, DMG MORI Services GmbH, FIR at RWTH Aachen University, Saarland University



The total project costs are \notin 2.7 million, of which \notin 1.6 million will be funded.

vious research projects. The Austrian partner will contribute its experience in big data analysis and data extraction with the utilization of self-developed machine learning methods.

Contact of the project coordinator: Thomas Froese, atlan-tec Systems GmbH, <u>T.Froese@atlan-tec.com</u>

3.1.5. PLASS - Platform for analytic supply chain management services

PLASS is creating the basis for a better supply chain management. The platform is using Albased analysis of multilingual raw data to provide information about technologies and their suppliers to help manufacturing companies optimize their supply chain.

PLASS is using AI to optimize supply chains (supply chain management). The goal of the project is to develop a B2B platform that supports companies in making decisions and weighing risks concerning their suppliers. The solution filters machine-readable knowledge about suppliers, alternative suppliers, products, and technologies from global and multilingual sources. AI-based analysis of this data enables opportunities and risks to be identified, for example alternative suppliers of technology. In the so-called human-inthe-loop approach, the system is supported by humans in situations that are not yet known. This concept enables the system to learn continuously. Distributed ledger technology additionally ensures that the information is always traceable.

Both, the manufacturing industry and suppliers, in particular start-ups and SMEs, will benefit from the solution. As PLASS users, manufacturing

Key facts and figures:

3 YEARS DURATION



July 2019 – June 2022

5 PARTNERS



Austrian associated partner: Research Studios Austria Forschungsgesellschaft mbH <u>German</u>: Siemens AG, DFKI GmbH, Ubermetrics Technogies GmbH, Institute for Applied Computer Science e.V., Beuth University of Applied Sciences Berlin

€ 3.9 MILLION FUNDING



The total project costs are € 5.3 million, of which € 3.9 million will be funded.

companies can use the PLASS 'Microservices' to quickly adapt their supply chain.

Contact of the project coordinator: Mark Buckley, Siemens AG, mark.buckley@siemens.com

3.1.6. Telemed5000 - Development of a smart system for subsidiary telemedical care for large groups of cardiological risk patients

Telemed5000 is developing a smart system that enables the telemedical care of large groups of patients with a chronic heart condition.

In Austria and Germany, telemedicine centres have been able to care for a maximum of 500 patients at the same time; future plans call for up to 5000 to ensure that care for this chronic disease can be provided in line with demand. To achieve this, vitality data recorded by the patient at home using modern smartphone technology is transferred to a data protection-compliant electronic health record and pre-analysed by an Al-supported decision support system. The system not only evaluates classic vital signs, such as heart rate, ECG, blood pressure, or weight based on historical patient data but also analyses new parameters, such as voice and physical activity as prognosis markers for mortality and morbidity due to heart failure. Self-learning algorithms help medical staff to decide whether a critical situation exists for a patient. Telemed5000 thus reduces the workload of medical staff and increases the care capacity per telemedicine centre. The solutions will be evaluated together with the Austrian partner in an observational study.

Key facts and figures:

3 YEARS



August 2019 - July 2022

6 PARTNERS



Austrian: Austrian Institute of Technology – AIT Graz <u>German</u>: Charité – Universitätsmedizin Berlin, GETEMED Medizin und Informationstecnik AG, University of Potsdam – Hasso Plattner Institute, SYNIOS Document & Workflow-Management GmbH, Fraunhofer Institute for Intelligent Analysis and Information Systems

€ 5.2 MILLION FUNDING



The total project costs are € 6.5 million, of which € 5.2 million will be funded.

Contact of the project coordinator:

Prof. Friedrich Köhler, Charité Universitätsmedizin Berlin, friedrich.koehler@charite.de

3.2. ICT of the future - AI platforms

Parallel to the BMWi's innovation competition "Artificial intelligence as a driver for economically relevant ecosystems", an Austrian call invited proposals for "ICT of the future - AI platforms". Four Austrian submissions qualified for funding in cooperation with a project from the AI innovation competition. These efforts further promote cross-border cooperation in the field of artificial intelligence. The following cooperation projects have been established:

Current projects in funding priority "AI platforms"		
EMPAIA	EcosysteM for Pathology diagnostics with AI Assistance	
Knowledge4Retail		
KI-SIGS	Artificial Intelligence Space for Intelligent Health Systems	
AIQNET	Medical Data Ecosystem	

3.2.1. EMPAIA - EcosysteM for Pathology diagnostics with Al Assistance

Only through the use of AI in diagnostics will modern treatment procedures such as personalised medicine be possible across the board. EM-PAIA is therefore using pathology as an example to establish a platform for standardised, certified and explainable AI solutions for image-based medical diagnostics. In addition to an infrastructure for access to training data, a marketplace with AI applications for clinical practice will be created on the platform. In addition, solutions for the legal and billing challenges will be developed.

EMPAIA is the first platform for the development, marketing and use of AI solutions in pathology. Users can integrate data and AI models into diagnostic processes in a legally secure manner and also bill them correctly. The solutions developed in the project can be easily transferred to other fields, paving the way for the broad application of AI in diagnostics. The EMPAIA platform will be financed, among other things, by user fees for the data sets and AI solutions provided.

The platform envisioned in the EMPAIA project intends to overcome all current barriers to the development, distribution and use of AI in pathology. To achieve this, a highly qualified GerKey facts and figures:



January 2020 – December 2022

5 PARTNERS



Austrian associated partner: Medizinische Universität Graz German: Charité - Universitätsmedizin Berlin; Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung; Technische Universität Berlin; Qualitätssicherungs-Initiative Pathologie QuIP GmbH; Vitasystems GmbH

€ 11.3 MILLION FUNDING



The total project costs are € 20.6 million, of which € 11.3 million will be funded.

man and Austrian associated partners have joined the project.

Contact of the project coordinator: Prof. Peter Hufnagl, Charité Universitätsmedizin Berlin, <u>peter.hufnagl@charite.de</u>

3.2.2. Knowledge4Retail

By creating a platform solution, Knowledge-4Retail (K4R) is advancing the development and use of AI and the use of service robots in retail. Here, so-called "semantic digital twins" of shops serve as the basis for all applications and give retailers the opportunity to align their assortment even better with the wishes of their customers and to make the connection between online and offline shopping more effective. For example, services can analvse customer behaviour in the shops and optimise the placement of goods in terms of visibility and accessibility based on this. Other services will enable automated inventory and shelf replenishment with the help of service robots. This will strengthen the stationary retail trade in the long term.

The emerging K4R platform is intended to drive the dissemination and development of Al-supported hardware and software services in the retail sector with the help of standardised data formats, interfaces and solutions.

The Austrian contribution extends K4R with the expertise and qualifications in the field of AI methods for visual perception leading to an explainable interpretation.

Contact of the project coordinator: Andreas Wulfes, team neusta GmbH, <u>a.wulfes@neusta.de</u> Key facts and figures:

3 YEARS DURATION



January 2020 – December 2022

13 PARTNERS



<u>Austrian associated partners</u>: TU Wien

<u>German</u>: team neusta GmbH, German Research Center for Artificial Intelligence GmbH, dm-drogerie markt GmbH + Co. KG, dmTECH GmbH, EHI Retail Institute GmbH, fortiss GmbH, Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e. V., Nagarro AES GmbH, neusta GmbH, neusta software development West GmbH, Ubimax GmbH, University of Bremen, Technische Universität München

€ 8 MILLION FUNDING



The total project costs are € 12.4 million, of which € 8 million will be funded.

3.2.3. KI-SIGS - Artificial Intelligence Space for Intelligent Health Systems

The aim of KI-SIGS is to create a common institutional framework, the "KI-Space", for the model region of Northern Germany. It serves to develop medical AI technologies better and faster and to bring them to application. The central instrument is a platform through which knowledge transfer is organised and planned developments are coordinated. In addition, regulatory and ethical guidelines are jointly developed.

With KI-SIGS, a platform is being created on which data and services relating to medical care can be posted and obtained. For the first time, a kind of regional excellence cluster is formed as a community of science, business and medical institutions around AI in medicine. The development of new AI technologies will be closely interlinked with joint business models of these players. Contributions from the participating companies and scientific institutions, fees for services and, in the long term, licensing income from successful product developments will finance the AI Space.

The Austrian associated partner is researching the addition of cybersecurity functionalities to the KI-SIGS ecosystem to ensure the confidentiality of sensitive data. Key facts and figures:

3 YEARS DURATION



April 2020 – March 2023

20 PARTNERS



Austrian associated partners: Software Competence Center Hagenberg Gmb <u>German</u>: UniTransferKlinik, Uni Lübeck, Uniklinik Hamburg, Gesundheit Nord, Drägerwerk, Image IS, Pattern Recognition, mbits, Philips, apoQlar, Söring, Advanced Bionics, Stryker, szenaris, DFKI, FhG, Uni Bremen, Uni Hamburg, Uni Kiel, Uniklinik Schleswig-Holstein

€ 10.7 MILLION FUNDING



The total project costs are € 15.4 million, of which € 10.7 million will be funded.

Contact of the project coordinator: Prof. Martin Leucker, UniTransferKlinik, <u>leucker@unitransferklinik.de</u>

3.2.4. AIQNET - Medical Data Ecosystem

Medical device manufacturers and clinics for scientific studies rely on medical data. To meet regulatory requirements, however, many hurdles need to be overcome for data collection and data usage. In most cases, the data is distributed across non-interoperable systems or is available in different formats. The AlQNET project is developing a digital ecosystem that enables the use of medical data across sectors and in compliance with data protection regulations. The acquisition and analysis of the data will be largely automated with Al.

The AIQNET digital ecosystem aims to structure and make available medical data through software applications - modelled on the app stores on mobile devices. Automated data collection with AI applications can eliminate time-consuming tasks, leaving more time for treatment. For medical technology companies, access to product-related data makes it much easier to fulfil their legal obligation for ongoing product monitoring and to conduct clinical trials. Software providers can use the provided infrastructure and access to medical data to develop data-driven applications in a short time. Key facts and figures:



January 2020 – December 2022

16 PARTNERS



Austrian associated partner: ONDEWO GmbH German: Raylytic, Berlin Cert, BioLago, BioRegio STERN, Biotronik, Charité Berlin, Eberhard Karls Uni Tübingen, ExB Labs, HWI pharma services, inomed Medizintechnik, Aesculap, MedicalMountains, Uniklinik Magdeburg, TZM, Uniklinik Jena, Uniklinik Leipzig

€ 9.2 MILLION FUNDING



The total project costs are \notin 15.7 million, of which \notin 9.2 million will be funded.

Austrian and German associated partners allow integration into an interdisciplinary network of experts.

Contact of the project coordinator: Frank Trautwein, RAYLYTIC, <u>frank.trautwein@raylytic.com</u>

3.3. ICT of the future

As part of Austria's national ICT funding programme "ICT of the future", the Austrian Federal Ministry invited tenders for projects in April 2020, whereby the participation of German partners was a prerequisite for funding. The aim of the call was to strengthen cooperation between Austrian and German project partners in topics such as:

- Mastering complex ICT solutions: systems of systems
- Justifying trust: safe and secure systems
- Conquering data: intelligent Systems
- Ensuring interoperability: interfaces of systems.

The call resulted in the following three cooperation projects, which started in spring 2021.

Current projects in funding priority "AI platforms"		
D-TRAS	Digital Platform for Traffic Safety-Risk Prediction in Rural Areas	
SmartDIS	Smart Disassembly with a Knowledge-based Automation System	
CARNIVAL	Consistent Aerial Radar-based Navigation In Visibility challenged	
	Areas and Landscapes	

3.3.1. D-TRAS - Digital Platform for Traffic Safety-Risk Prediction in Rural Areas

The project 'D-TRAS' brings together leading organizations in the field of digital mobility from Austria and Germany in a strategic partnership. The project's goal is to predict individual road safety risks, focussing on rural areas. Vehicles should be able to share safety-related data to improve the safety of other road users traveling on the same road. For this purpose, a combination of heterogeneous sensor data from different groups of road users (cars, motorcycles) with safety-relevant data from mobility data marketplaces and open data is investigated.

The D-TRAS concept involves computing safetyrelated information from sensor data ("on the edge") and transferring it to a digital platform in the cloud, where AI models are trained and implemented to predict a spatiotemporal traffic risk. The D-TRAS concept is validated in two European regions with different topology, data availability and behavior, namely Styria (Austria) and Central Germany. Key facts and figures:



5 PARTNERS



<u>Austrian</u>: Virtual Vehicle Research GmbH; motobit GmbH <u>German</u>: Universität Göttingen; Caruso; Next Data Service AG

€ 0.6 MILLION FUNDING



The total project costs are € 0.8 million, of which € 0.6 million will be funded.

Three different demonstrators for traffic risk information and warning will be evaluated in field studies together with at least one hundred road users.

Contact of the project coordinator: Andreas Festl, Virtual Vehicle Research GmbH, <u>adreas.festl@v2c2.at</u>

3.3.2. SmartDIS - Smart Disassembly with a Knowledge-based Automation System

SmartDIS represents a strategic partnership of leading organizations in the field of complex ICT solutions from Austria and Germany. The goal of the project is to develop and implement an automated knowledge-driven robot-centric disassembly system that autonomously adapts to the particular specifications and constraints required to disassemble a given product. A systematic approach to the automation of disassembly processes is ensured by applying knowledgebased systems and providing a semantic coupling between recognition, grasping, manipulation and individual disassembly operations.

The concept of SmartDIS is to link the semantic representation of a product model with an image realize recognition system to automatic identification. Methods of image processing are integrated into the optimization algorithms of path planning and model-based robot control to achieve a dynamic specification of the robot's motion sequence for the individual disassembly processes. The SmartDis system will be implemented as a demonstrator for the Key facts and figures:

2.5 YEARS DURATION



March 2021 – August 2023

7 PARTNERS



<u>Austrian</u>: Practical Robotics Institute Austria; Institut für Automatisierungs- und Regelungstechnik; Ing. Eric Dokulil; Reichmann SPS-Service; Augusta Buntmetalle <u>German</u>: Christian-Albrechts-Universität; Boxx-IT Solutions

€ 0.27 MILLION FUNDING



The total project costs are \notin 0.35 million, of which \notin 0.27 million will be funded.

disassembly of desktop PCs. The possibility to use the system for a wider range of products in waste separation, will be demonstrated in another use case.

Contact of the project coordinator: Dr. Munir Merdan, Practical Robotics Institute Austria, <u>merdan@pria.at</u>

3.3.3. CARNIVAL - Consistent Aerial Radar-based Navigation In Visibility challenged Areas and Landscapes

Recent advances in the miniaturisation and performance enhancement of radar sensors, particularly their high frame rate and ability to penetrate many environmental conditions (night, fog, particulate matter, smoke, etc.) that interfere with visual sensors, have given them a tremendous boost in several sectors. Just as Visual-Inertial Odometry (VIO) has had a breakthrough effect for GNSS (Global Navigation Satellite System) applications in impaired areas, the fusion of radar and inertial measurement is expected to enable and revolutionise applications in GNNS and visibility-restricted areas for this project.

The "CARNIVAL" project's challenge is, among other things, to generate and analyse radar signals for the best extraction of motion information and to use these to extract motionspecific features from a raw radar signal. These will then be merged with inertial measurements and fed into a self-calibrating state estimator for both localisation and control of highly agile platforms. Key facts and figures:

3 YEARS DURATION



March 2020 – February 2024

3 PARTNERS



<u>Austrian</u>: Universität Klagenfurt <u>German</u>: Deutsches Zentrum für Luft- und Raumfahrt; Neura Robotics GmbH

€ 0.34 MILLION FUNDING



The total project costs are € 0.73 million, of which € 0.34 million will be funded.

Contact of the project coordinator: Prof. Stephan Michael Weiss, Universität Klagenfurt, <u>stephan.weiss@aau.at</u>

3.4. Production of the future I

A joint German-Austrian call for proposals "Smart and sovereign use of data for production" by the German BMWi and the Austrian Research Promotion Agency (FFG) for the funding of a lead project ran until 20 August 2020. The aim of the cooperation is:

- identification, extraction and organisation of production-relevant data
- to increase flexibility and efficiency in production by processing productionrelevant data
- ensuring the security and availability of production-relevant data.

In particular, the lead project should also illustrate the technological and economic benefits of the open GAIA-X platform.

As the winner of the competition, the EuProGigant project with a German-Austrian consortium started on 1 March 2021.

Current projects in funding priority "Production of the future I"		
EuProGigant	Digital Platform for Traffic Safety-Risk Prediction in Rural Areas	

3.4.1. EuProGigant - Digital Platform for Traffic Safety-Risk Prediction in Rural Areas

In this project, leading representatives of industry and science from Austria and Germany will demonstrate the technological and economic benefits of the GAIA-X platform. The goal of the project is to demonstrate a cross-site digitally networked production ecosystem with resilient, data-driven and sustainable value creation.

The central research questions of the project are: How can (1) value chains be equipped with a resilience towards market changes and enabled for a high variety of variants, (2) interdependencies between value-added stages be recognized and made usable for increasing economic efficiency, (3) reactive and at the same time universal platforms for production systems be designed?

In answering these questions, the consortium focuses on optimizing the speed and flexibility of value creation by implementing the technical architecture of a data ecosystem in the sense of GAIA-X. High-frequency data acquisition by means of open low-cost solutions in combination with process-oriented aggregation of the acquired data should provide a high incentive for new users. An easy, selfconfigurable networking of the infrastructure ecosystem with the data

Key facts and figures:

4 YEARS



March 2021 – February 2025

12 PARTNERS



Austrian: Pilotfabrik Industrie 4.0, TU Wien; Concircle Management Consulting; crafworks; Stark Spannsysteme; A1 Digital Inter-national; WFL Millturn Technologies GmbH&Co; Plasser & Theurer, Export von Bahnbaumaschinen, Gesellschaft; EIT-Manufacturing East <u>German</u>: TU Darmstadt; IGH Infotec; Gebrüder Heller Maschinenfabrik; Software AG

€ 5 MILLION FUNDING



The total project costs are \in 8.6 million, of which \in 5 million will be funded.

ecosystem should accelerate the speed of value creation.

Contact of the project coordinator: Dr. Claudia Schickling, Pilotfabrik Industrie 4.0, TU Wien, <u>claudia.schickling@tuwien.ac.at</u>

3.5. ICT of the future - Secure digital identities

The "Secure digital identities" showcases aim to strengthen digital sovereignty by developing eIDAS solutions, which are at the same time user-friendly, trustworthy and costefficient. These solutions should be easier to access for administration, businesses - especially SMEs - and the general population. The aim is to create application-oriented eID ecosystems that are characterised by openness, interoperability and simple, intuitive and barrier-free usage.

The call for proposals was part of a cooperation between the Austrian Federal Ministry for Climate Protection, Environment, Energy, Mobility, Innovation and Technology (BMK) and the German Federal Ministry for Economic Affairs and Energy. The focus of the call was to make an R&D contribution to at least one of the running showcase projects supported by the BMWi. This resulted in the following two cooperation projects.

Current projects in funding priority "Production of the future I"		
IDunion		
ONCE	Online einfach anmelden	

3.5.1. IDunion

Private technology companies are of significant importance in the digital age. They process personal data and bear responsibility for its secure storage and controlled use. To give users sovereignty over their own data, IDunion is creating an open and secure ecosystem for digital identities. Thereby, the project adopted the self-sovereign identity (SSI) approach.

The aim is to give users the option to decide when and with whom they want to share their data. IDunion will test specific use cases in the model regions Berlin and Cologne to integrate SSI technology into everyday life. In doing so, IDunion is focusing on a solution which can be used across Europe. The users' personal information is stored and administered autonomously in a special app, a wallet, on their smartphones. Personal information is validated by public institutions, hence these digital credentials can be used in a legally secure manner.

Austrian partners will test this technology for the administration of COVID-19 test certificates from individuals in Austria, as well as examine transnational interoperability by using German IDunion and EU EBSI/ESSIF networks, with a connection to the Austrian project EBSI4Austria.

Contact of the project coordinator: Helge Michael, Main Incubator GmbH, <u>helge.michael@main-incubator.com</u> Key facts and figures:



April 2021 – March 2024

14 PARTNERS



Austrian associated partners: Danube Tech GmbH, Verein zur Förderung der selbstständigen Nutzung von Daten German: Bank-Verlag GmbH, Bundesdruckerei GmbH, DB Systel GmbH. Deutsche Telekom AGesatus AG, GS1 Germany GmbH, ING-DiBa AG, Main Incubator GmbH, Robert Bosch GmbH, Siemens AG, Stadt Köln, Spherity GmbH, Technische Universität Berlin, Institut für Internet-Sicherheit (Westfälische Hochschule), YES Payment Services GmbH

€ 15.6 MILLION FUNDING



The total project costs are € 31.4 million, of which € 15.6 million will be funded.

3.5.2. ONCE - Online einfach anmelden

ONCE aims to build decentralized, humancentric, open ID wallets to unify and manage multiple different digital identities of an individual. The project focuses on developing digital identities with a high level of technical security that originate from trustworthy institutions and companies. Companies and administrations should be supported in the digitalization of their services with digital IDs and online documents for the purpose of accessing the corresponding digital identities.

ONCE is developing different applications. ONCE Wallet-App will enable the administration and transfer of ID data on smartphones and the subsequent control via access management. The separate back-end system ("lifecycle management") includes functions for blocking and updating digital identities. In ONCE ID Gateway, identity data is transferred to service providers as needed. Integration interfaces are designed to enable operators of online services to use and verify the ID data.

The Austrian partner aims to bridge ONCE with its project Digidow to enable optimal synergies in the creation, management, and use of digital identities for a broad population.

Contact of the project coordinator: Walter Landvogt, Bundesdruckerei GmbH, walter.landvogt@bdr.de Key facts and figures:



May 2021 – June 2023

13 PARTNERS



Austrian associated partner: Universität Linz German: HelloGuest Solutions GmbH, Universität Stuttgart, Governikus GmbH & Co. KG, ekom21 - Kommunales Gebietsrechenzentrum Hessen (KGRZ), FhG IAO/AISEC, Anstalt für Kommunale Datenverarbeitung in Bayern (AKDB), Deutsche Telekom Security GmbH, Jolocom GmbH, Giesecke+Devrient Mobile Security GmbH, regio iT GmbH, Behle Hochheide GmbH & Co., Stadt Fürth, Robert Bosch GmbH

€ 9.7 MILLION FUNDING



The total project costs are € 15.5 million, of which € 9.7 million will be funded.





4. Cooperation with Japan

Germany and Japan have set themselves the goal of coordinated research funding for artificial intelligence and the Internet of Things in industrial application fields. This underlines the long-lasting nature in German-Japanese cooperation. In 2017, the German Federal Government developed a joint strategy with Japan, which was laid down in the Hannover Declaration.

In 2018, talks continued within the framework of the Digital Dialogues. Agreement was reached on the goals of joint R&D cooperation, including the goal of increasing productivity in the industrial sector in both countries through the use of AI and IoT. The Joint Declaration of Intent between the German Federal Ministry for Economic Affairs and Energy and the Japanese Ministries of Economy, Trade and Industry (METI) and Internal Affairs and Communications (MIC) of late 2018 sets the political framework for the cooperation [Japan Germany JDI 2018].

The common policy goal is to increase the productivity of the whole economy and to implement the Sustainable Development Goals. Japan and Germany believe that cooperation between platforms, building ecosystems and shaping alliances are important ways to realise the potential of AI and IoT. Services and platforms will be more important in industrial areas in the future. The results and successes of joint research in the field of industrial IoT and AI will lead to the further development of cooperation in the academic field and also provide impetus for the entire economy.

The German-Japanese coordinated call for proposals "Artificial intelligence for mobile industrial communication" by the German BMWi and the Japanese Ministry of Internal Affairs and Communications for the funding of a lead project ran until 17 May 2019. As the winner of the competition, the AIRPoRT project with a German-Japanese consortium started on 1 October 2019.

 Current Japanese – German bilateral cooperation project

 AIRPoRT
 Artificial Intelligence for Robotics and Networked PRoducTion

4.1. AIRPORT - Artificial Intelligence for Robotics and Networked PRoducTion

The aim of the AIRPoRT project is to develop and test innovative technologies for mobile communication and data analysis in flexible production environments based on AI processes. In addition, a comprehensive risk governance strategy is developed to enable corresponding production facilities in multiorganisational process structures to be safeguarded proactively and in a commercially viable manner

The embedding in a German-Japanese project context should help to ensure that the technologies and concepts are best adapted to the requirements of global production contexts.

The German consortium will research, develop and test technologies in the fields of "Wireless communication networks in industrial environments", "Robot teams and populations in industrial production", "Al-based sensor data analysis" and "IT security". In parallel, the Japanese twin project "Reliable wireless communication for managing robots and objects at high speed" will work in the areas of wireless communication for mobile devices and adaptivity of media use in factory environments. Key facts and figures:



October 2019 – September 2022

3 PARTNERS



German: DFKI (Smart Data & Knowledge Services / Intelligent Networks); Fraunhofer Society (Institute for Manufacturing Engineering and Automation / Institute for Industrial Engineering) Japanese: National Institute of Information and Communications Technology

€ 2.6 MILLION FUNDING



The total project costs are \notin 2.6 million, of which \notin 2.4 million will be funded.

Contact of the project coordinator: Prof. Andreas Dengel, DFKI Smarte Daten & Wissensdienste, <u>andreas.dengel@dfki.de</u>

5. Multinational cooperations

In addition to bilateral cooperation, BMWi also offers funding opportunities in European and international programmes. Currently, there are three ongoing projects through the European research initiative EUREKA. Two projects are being funded in the EUREKA cluster CELTIC-NEXT and one project from the first EUREKA Clusters Σ ! AI Call. With these three projects, the BMWi broadened its international cooperation to include Canada, Singapore and the United Kingdom.

EUREKA is an international network established in 1985 between 18 countries with intension to foster European competitiveness and integration and to encourage R&D cooperation. Currently it includes over 45 countries who share the same goals and have national funding available to organisations who apply through EUREKA programmes. The BMWi primarily provides funding for Cluster competition. EUREKA Clusters are strategic, long-term, industry-driven initiatives with a thematic focus. Among the six clusters, CELTIC-NEXT on information and communication technology (ICT) and the joint EUREKA Clusters AI call are currently supported by the BMWi.

Contrary to the bilateral cooperation projects that resulted from political decisions, the multinational cooperation projects are formed in a bottom-up approach, where companies and research institutes get in contact directly.

Current EUREKA projects		
AIMM	AI-enabled Massive MIMO	
AISSI	Autonomous Integrated Scheduling for Semi-conductor In- dustry	
Piccolo	In-network compute for 5G services	

5.1. AIMM - AI-enabled Massive MIMO

AIMM is a CELTIC-NEXT European collaborative research and development project. The new mobile communications standard 5G is an important component in driving forward the digitalisation of Germany and the world. One example is Industry 4.0, which relies heavily on wireless communication. While the standardisation of the first version of 5G with the required basic functionalities has been completed, the focus is now shifting to the further development of these basic functionalities. AIMM is combinig improved "massive multi-antenna functionalities" (massive MIMO) and the use of AI to achieve this goal.

The aim of AIMM is to analyse "conventional" signal processing methods, as they are commonly used today, and to compare them with new Albased methods to be developed in the project. In the course of the project, new concepts will be created, examined and evaluated by means of computer simulations. In addition, individual selected components will be implemented and demonstrated.

The interantional cooperation between British, Canadian and German partners brings a great Key facts and figures:

2 YEARS DURATION



October 2020 – September 2022

10 PARTNERS



British: BT; Vilicom UK Ltd; University of Bristol; Loughborough University; InterDigital Europe Limited Canadian: ThinkRF; CEMWorks German: Nokia Bell Labs

Stuttgart; Universität Stuttgart; IMST GmbH

€ 0.8 MILLION FUNDING

The total project costs are \notin 3.2 million, of which \notin 0.8 million will be funded.

benefit for incorporating German and European requirements into the further development of 5G.

Contact of the project coordinator:

Arman Shojaeifard, InterDigital Europe Limited, arman.shojaeifard@interdigital.com

5.2. AISSI - Autonomous Integrated Scheduling for Semiconductor Industry

AISSI is an EUREKA project from the first EUREKA Clusters ∑! AI Call. The aim of AISSI is to enable European semi-conductor manufacturers to respond to unprecedented demand in semicon-ductor products through a new level of intelli-gent planning of manufacturing processes.

AISSI will develop, integrate, and apply new AIbased approaches that build on European automotive quality thinking. The core innovation of the project is to develop a fundamentally new system for production and maintenance planning in semiconductor manufacturing. This concept is based on a new level of interaction between expertise (human expert knowledge) and AI methods (which identify individual advantages based on human expert judgement). Βv applying reinforcement learning and knowledge graphs in a continual improvement framework for autonomous. integrated production and maintenance scheduling, competition can be outperformed Key facts and figures:



<u>Singaporean</u>: D-SimLab Technologies

€ 1.6 MILLION FUNDING



The total project costs are € 3.3 million, of which € 1.6 million will be funded.

in terms of efficiency, cost effectiveness and quality.

The Singaporean partner, D-SIMLAB, will bring expertise and long track record in wafer fab material flow planning and capacity optimisation to this cross-continental collaboration, supported by BMWi and Enterprise Singapore.

Contact of the project coordinator: Kai Schelthoff, Robert Bosch GmbH, <u>Kai.Schelthoff@de.bosch.com</u>

5.3. Piccolo - In-network compute for 5G services

Piccolo is a CELTIC-NEXT project that is funded by the BMWi in Germany and Innovate-UK in the UK. For 5G networks, more and more scenarios are emerging where the shift of services and functions from central cloud platforms to edge platforms is critical to ensure low latency and high availability. One example is automotive applications, in particular highly automated driving. Piccolo - In-network compute for 5G services - therefore focuses on virtualisation and security for connected mobility and smart city environments. Scaling is achieved by means of small, lightweight virtual functions (hence the name Piccolo).

Piccolo enables the execution of (application) logic not only on dedicated servers in data centres or the edge, but also on any network components, including routers, switches, base stations and future components of a comprehensive ecosystem. In-network computing eliminates the prevailing separation of network elements and computing systems, enabling highly dynamic, flexible sharing and Key facts and figures:

3 YEARS DURATION



March 2021 - February 2024

9 PARTNERS



<u>British</u>: BT, ARM Limited; Fluentic Networks; Sensing Feeling <u>German</u>: Robert Bosch GMBH; Emden/Leer University of Applied Sciences; Technical University of Munich; Peer Stritzinger GmbH; InnoRoute GmbH

€ 1.4 MILLION FUNDING



The total project costs are \in 3.4 million, of which \in 1.4 million will be funded.

allocation of resources - where they are needed and when they are needed. Piccolo will make an effective contribution to the improvement of edge and fog computing through the further and new development of the corresponding technologies. A highly qualified German-British consortium has been formed for this purpose.

Contact of the project coordinator: Philip Eardley, BT (United Kingdom), <u>philip.eardley@bt.com</u>

6. Forthcoming cooperations

The Federal Ministry for Economic Affairs and Energy is always seeking to intensify its international cooperation efforts. Therefore, further bilateral cooperation projects as well as funding opportunities in EUREKA programme are in preparation.

Cooperation with Austria

Austria and Germany are further intensifying their cooperation through joint projects in the further funding priority "Production of the future II: Smart and sovereign use of data for sustainable production". The call closed shortly.

Cooperation with France

As laid down in the Treaty of Aachen, in the Roadmap for a Research and Innovation Network on Artificial Intelligence, and in the Franco-German Dialogue on Technology (October 13, 2020), France and Germany will strengthen their collaboration in the field of artificial intelligence and 5G communication technologies. Joint calls in two funding priorities "Franco-German innovation projects for artificial intelligence" and "Technical developments and application ecosystems for private 5G networks" are recently closed. Thus, we expect new projects to start soon.

EUREKA projects

Within the framework of the EUREKA Clusters, Σ ! Al and CELTIC-NEXT Calls closed recently. Therefore, new projects are expected to start shortly.

Imprint

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Contact Dr. Ruzica Rakic DLR Projektträger Deutsches Zentrum für Luft- und Raumfahrt e. V. Rosa-Luxemburg-Str. 2 10178 Berlin +49 30 67055 8325 Programmbegleitung@dlr.de DLR-PT.de

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