



ROUTE2025

European Research and Innovation in the Saarland

Closing document for "Route2025"

Index

Foreword.....	4
Route 2025 - Offering comprehensive EU research funding support in the Saarland	6
The Saarland's participation in "Horizon 2020".....	8
MyPal	12
Fostering Palliative Care of Adults and Children with Cancer through Advanced Patient Reported Outcome System	
PHOENIX	14
Pharmaceutical Open Innovation Test Bed for Enabling Nano-pharmaceutical Innovative Products	
EBiSC2	16
A sustainable European Bank for induced pluripotent Stem Cells	
EVIDENCE	18
Erythrocytes properties and viability in dependence of flow and extra-cellular environment	
NovAnI	20
Identification and optimisation of novel anti-infective agents using multiple hit-identification strategies	
K-IND	22
A new photonic standard component for 3D sensing	



Foreword

Research and innovation are key to promoting jobs, competitiveness and prosperity in Europe, Germany and the Saarland.

Therefore, the participation of Saarland universities, research institutions and companies in the European Union's research and innovation framework programmes, has always been of great importance for the Saarland and forms a central building block in the Saarland innovation strategy.

In the last EU framework programme "Horizon 2020", which ran from 2014 to 2020, the Saarland was particularly successful in securing funding of around EUR 130 million, which significantly surpassed the state government's ambitious target of EUR 100 million EU. Compared to the total amount of EUR 91 million acquired in the predecessor programme "FP7", the Saarland was able to increase its EU funding in "Horizon 2020" by 40% and position itself well over the national average.

Saarland University is a central player in the Saarland's research and innovation landscape and at the same time the state's institution with the most significant EU grants in "Horizon 2020": European Research Council (ERC) grants. These offer funding of excellence for individual scientists and form about 30% of the total funds and thus a significant share of the Saarland's total EU funding. ERC grants are also an internationally recognised and highly prestigious mark of scientific excellence for the Saarland.

With "Route2025", Saarland University has coordinated an advisory and information project that was supported by the State Chancellery with funds from the Saarland and by the European Union within the framework of the "European Regional Development Fund (ERDF)" programme. This project has substantially supported Saarland universities, research institutions and companies in their successful participation in EU research and innovation funding programs.

I am proud to point out that this project has definitely contributed to the excellent performance the Saarland's research and innovation players have had in "Horizon 2020", and I thank all those involved for their successful commitment in positioning research and innovation from the Saarland at such a high EU-level.

And so, I look to the future with hope. This positive outcome allows Saarland University, but also many of the other research institutions and companies from the Saarland, to look confidently to the new funding period of "Horizon Europe" (2021-2027). We are well positioned in terms of European cutting-edge research and innovation competence.

This brochure provides a brief overview of the key measures, results and successes of "Route 2025". Further information, including a comprehensive project database, can also be found on the project's information platform www.route2025.eu.

I hope you enjoy reading this interesting document and that the success stories of the Saarland's higher education and research landscape will inspire you to take advantage of the opportunities offered by "Horizon Europe".

Prof. Dr Manfred Schmitt,
President of Saarland University



Offering comprehensive EU research funding support in the Saarland

Route2025's main objective was to provide research institutions and companies from the Saarland with extensive information and advice about the EU framework programme "Horizon 2020" via a wide range of different measures, in order to help them successfully understand and apply for EU funding.

Through the set-up of a comprehensive project database, all EU-funded research projects with participating organisations from the Saarland can now be accessed quickly and easily with just a few clicks. This is not only relevant for statistical evaluation, but also shows at a glance to what extent the Saarland was successfully involved in Horizon2020.

The communication, information and advisory measures implemented as part of Route2025 helped complement the existing information and support services in the region and close any "information gaps". A number of information events and practical workshops in various formats directly addressed those interested in EU-funding, and the monthly newsletter also provided a direct communication channel. In addition, the Route2025 website was created as a central platform and reference point for information on the topic of EU funding and the Saarland's participation.

EU funding programmes are considered complicated and rather unattractive compared to other low-threshold funding programmes. By presenting actual success stories we want to inspire, motivate and provide tangible examples of what can be achieved with an EU grant.

This brochure presents a small selection of success stories from the Saarland, ranging from individual funding of excellent science and innovative technology, to joint research projects, to industrial cooperation and international training networks.

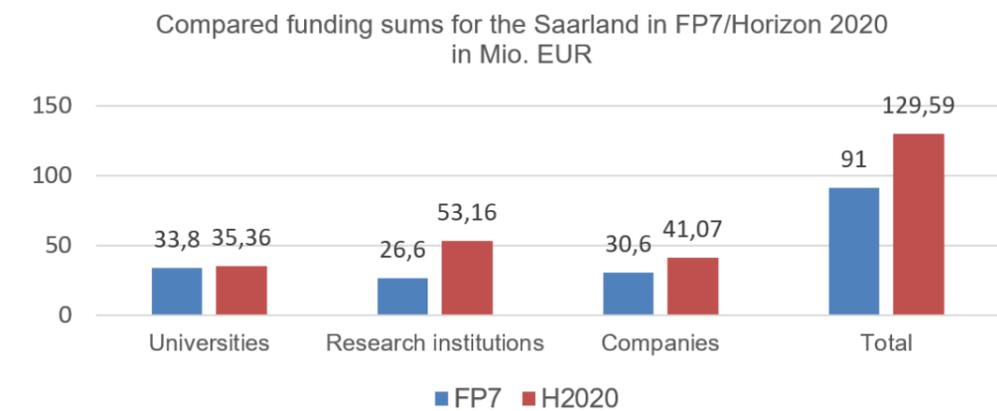
The online launch event for the start of the new EU funding programme for research and innovation "Horizon Europe" on December 11, 2020 set the stage for the Saarland to maintain its successful course, to develop it further and to continuously renew it.



The Saarland's participation in "Horizon 2020"

In summary

Saarland institutions have acquired approximately 130 million EUR in "Horizon 2020" funding. In total, 32 Saarland institutions participated in 199 EU projects in "Horizon 2020" with 216 project participations. This is a strong increase compared to the previous programme "FP7".



Distribution among institutions

41.0% of the Saarland's EU funding is allocated to non-university research institutions, 27.3% to Saarland universities and 31.7% to Saarland companies. 13 of the 32 Saarland institutions participating in Horizon 2020 (40%) are "newcomers" and have not received FP7 funding.

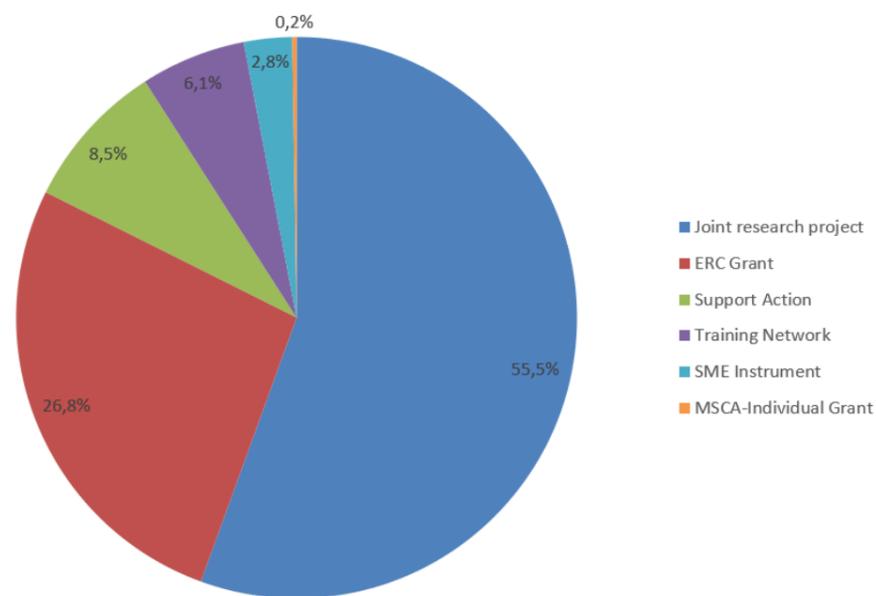
High share of SMEs

The share SMEs' have in the total funding amount, places the Saarland before Berlin and amongst the top federal states, with a share of over 30% the Saarland is well above the national average of 18.6%.

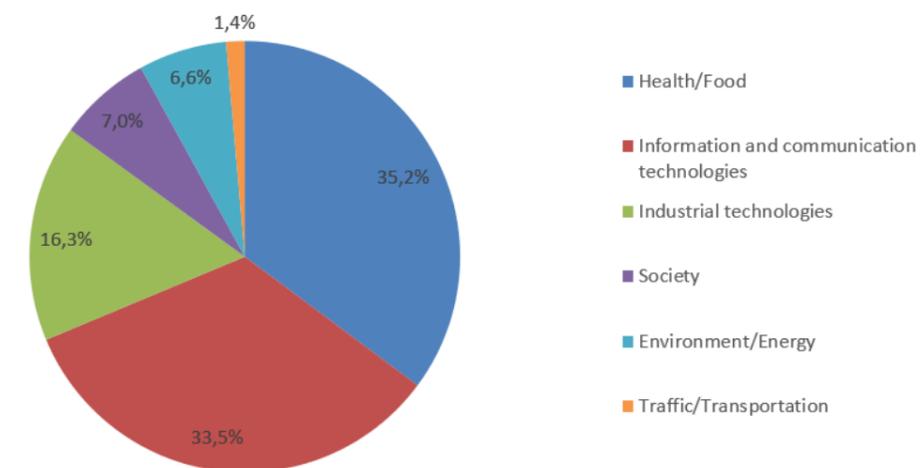
Successful in promoting excellence

The funding of excellence through ERC grants makes up an important part of the Saarland's "Horizon 2020" acquired funds, with a share of 26.8% of the total funding amount. This figure is one of the highest in Germany and is significantly higher than the average of 21.8% for Germany as a whole. Compared to FP7 (14.9%), the ERC share in the Saarland's has nearly doubled in "Horizon 2020".

Percentage of funding instruments based on total funding sum



Funding percentage for the Saarland based on thematic areas



Thematic focus

The Saarland's participation in "Horizon 2020" is focussed mainly in these thematic areas:

- a) Information and communication technologies
- b) Health and food
- c) Industrial technologies and new materials research

These areas are also identified as key areas in the Saarland's innovation strategy and cover 85.1% of the Saarland's "Horizon 2020" funding.

Support for patients with cancer

Young cancer patients use app to give feedback through play

Having patients use PROs (Patient Reported Outcomes) to directly report their health status without prior interpretation by a physician is currently making headways. Overall, the use of PROs has become a prominent topic in healthcare innovation, highlighting the role of the patient experience as a key measure of healthcare quality. PRO recording enables the direct measurement and electronic documentation of patients' experiences, thus constituting a critical element of person-centred, high-quality care for patients with chronic illnesses such as cancer.

In this way, people with cancer can be supported throughout the course of their disease, including palliative care if needed. With the help of PROs, patients can accurately record their complaints and symptoms and communicate them directly to their healthcare providers. This ultimately optimises the time employed for any targeted action by promptly identifying important clinical issues. All of this improves care and significantly contributes to improving the patient's quality of life.



“This is an innovative project that aims to improve the care of children with cancer during all stages of treatment. The developed IT infrastructure as well as the apps will be evaluated in the project through clinical studies and can serve as an example for other diseases after a successful validation.”

Professor Dr Norbert Graf,
Saarland University



In MyPal, clinicians, palliative care experts, software developers and researchers from seven European countries are working together to use the latest advances in information and communication technology for this purpose, in order to support cancer patients and their families as well as healthcare providers. To achieve this, a digital health platform with mobile apps is being developed that takes this this concept of self-reporting and further adapts it.

In the Saarland, the clinical feasibility study MyPal4Kids is investigating the use and acceptance of two apps, developed specifically for children with cancer, by incorporating a ,serious game'. Within this ,serious game', children and adolescents are playfully asked to enter their current feelings and symptoms while exploring an underwater world. Their parents also have the opportunity to report their perception on how the child is feeling at certain points in time. The treatment team can read this information and respond in a timely manner. Both apps allow direct communication with each other and with the treatment providers.



More information:
<https://mypal-project.eu/>

Research & Innovation Action:
MyPal - Fostering Palliative Care of Adults and Children with Cancer through Advanced Patient Reported Outcome System

From Bench to Bedside

Nano-pharmaceuticals offer great clinical and socioeconomic benefits

Nano-pharmaceuticals represent an emerging field where the size of the drug particle or a therapeutic delivery system work at the nanoscale. They are expected to bring about a revolution in treatment strategies as they would enable targeting specific delivery of drugs and therapeutic molecules. Such precision targeting via nano-pharmaceuticals has many benefits as it can lead to higher efficacy and lower toxicity in many disease conditions.

The main prerequisites to further enhance the growth and innovation capacity in this field are affordable and advanced testing, as well as the setup of manufacturing facilities and services for novel nano-pharmaceuticals. Another key step to successfully make the transfer from lab to industrial scale, in other words to take nano-pharmaceuticals from bench to bedside, is to establish current good manufacturing practice (cGMP) in large scale production.

MyBiotech is a Contract Development and Manufacturing Organization (CDMO) that offers end to end development, manufacturing services and innovative products for biotech and pharma. As scientific coordinator of the EU project PHOENIX this expertise is invaluable for the creation of a science- and regulatory-based Open Innovation Test Bed (OITB), aimed at bridging the gap between good manufacturing practices on-site in the lab to upscaled GMP at production level. The PHOENIX-OITB will offer a consolidated network of facilities, technologies, services and expertise covering all aspects of technology transfer - from characterization, testing, and verification to scale-up, GMP compliant manufacturing and regulatory guidance. The project will develop and establish new facilities and upgrade existing ones to make them available to SMEs, starts-up and research laboratories looking to test, GMP-produce and scale-up innovative nano-pharmaceuticals.

“With PHOENIX all the services and expertise needed for the development, testing, safety assessment, GMP production and commercialization of nano-pharmaceuticals will be made available.”

Dr Nazende Günday-Türelı,
MyBiotech



More information:
www.phoenix-oitb.eu

Innovation Action: PHOENIX -
Pharmaceutical Open Innovation
Test Bed for Enabling Nano-
pharmaceutical Innovative
Products

Global banking of multipurpose cells

Securing long-term access to human induced pluripotent stem cells

The European Bank for induced Pluripotent Stem Cells (EBiSC) centrally stores human induced pluripotent stem cells (iPSC) to ensure access by academia and industry for research into specific diseases and the development of new therapies.

Since their discovery by Nobel laureate Shin'ya Yamanaka in 2006, research on human iPSCs has been carried out worldwide. Considered a breakthrough technology, iPSCs are expected to enable new approaches for the development of personalised medical therapies and to expand the understanding of genetic diseases. iPSCs can theoretically differentiate into virtually any type of cell in the human body and are ethically simpler than human embryonic stem cells. iPSCs not only represent an important breakthrough in regenerative medicine, they also provide the perfect experimental basis for cell-based screening. With the help of cells obtained from both donors with a medical condition and healthy donors, scientists are able to test how different patients react to new drugs or evaluate how genetic diseases develop. iPSCs are particularly important for researching diseases for which it is difficult to obtain relevant tissue samples from living patients, such as neurodegenerative diseases like Alzheimer's, Parkinson's or Huntington's disease.

“EBiSC2 will spearhead Europe in the international standardisation of iPSC banking. The EBiSC2 cell catalogue will be continuously expanded. We will distribute cell lines and develop a range of additional services around iPSCs, both to maximize the value of these resources as well as to reduce operating costs through state-of-the-art upscaling and automation”

Professor Dr Heiko Zimmermann,
Head of Fraunhofer IBMT and EBiSC2 coordinator



In its 2nd project funding phase, EBiSC2 is coordinated by the Fraunhofer Institute for Biomedical Engineering IBMT under the leadership of Janssen Pharmaceutica. Working with international partners from academia and industry (IMI2), the fully operational Bank aims at becoming self-sustaining by expanding the existing cell line catalogue and offering additional application-specific services based on human iPSCs. EBiSC2 will ensure long-term access to well-characterized, quality-controlled and disease-relevant research grade iPSC lines, data and cell services for academic and commercial research worldwide and will continue to support R&I activities such as disease modelling and drug development, material innovation for bioreactors, tissue-engineered scaffolds, and novel autonomous cell production.



More information:
www.ebisc.org

Innovative Medicines Initiative:
EBiSC2 - A sustainable European Bank for induced pluripotent Stem Cells (Grant number 821362)

Photos:
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Going with the flow

A mathematical model for the flow behaviour of red blood cells

Blood is constantly flowing through our bodies. Our knowledge of how red blood cells behave and move is limited, however, since blood is almost always analysed when it is stationary outside of our circulation system. This leads to a loss of valuable information about the properties and behaviour of red blood cells.

Since January 2020, the European research project “EVIDENCE” has been studying red blood cells in vivo as well as under flow conditions in order to gain a better understanding of their pathophysiology and to develop new diagnostic devices. In addition, the project aims to understand the effect of flow conditions on red blood cells in bioreactors. This should enable efficient production in vitro of red blood cells that can be used for personalized transfusions.

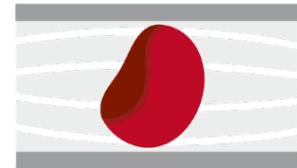
The project is implemented within the framework of an Innovative Training Network (ITN) led by Prof. Lars Kaestner (Saarland University) with the specific aim of fostering the scientific capacities and general research skills of young scientists in a structured manner within an international,



interdisciplinary and intersectoral research and training program. The goal here is to train a new generation of creative, entrepreneurial and innovative young scientists who can draw on the experience and network of an extensive scientific exchange to meet current and future challenges with an expanded range of methods.

“For the young scientists, my wish is that they will be able to work beyond the EVIDENCE project, in the field in which we are training them.”

Professor Lars Kaestner,
Saarland University

EVIDENCE

More information:
<https://evidence.eurice.eu/>

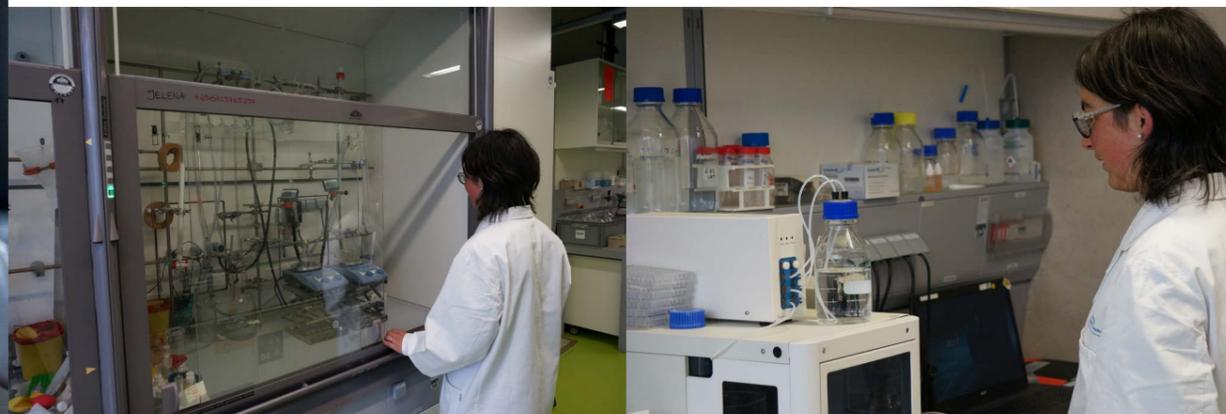
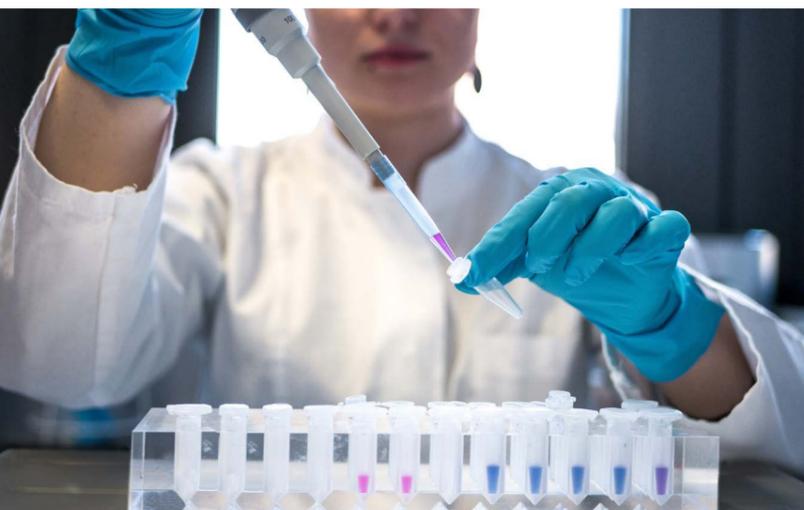
Innovative Training Network:
EVIDENCE - Erythrocytes properties and viability in dependence of flow and extra-cellular environment

Targeting bacterial resistance

Development of new drugs and therapies against infectious diseases

Worldwide, it is becoming increasingly difficult to fight many bacterial infections because of the bacteria's resistance to antibiotics. Infectious diseases are thus more difficult to treat, which can lead to serious complications in some cases. Against this background, drug research aims to develop drugs with a novel mode of action. Thanks to new analytical methods such as the sequencing of entire genomes, scientists have detailed biological information at their disposal.

The starting point for the development of a new active substance is the identification of a target protein - a so-called "drug target" - which has a key function in a disease. This is also where the research work of Anna Hirsch from the Helmholtz Institute for Pharmaceutical Research Saarland (HIPS) begins. She applies innovative methods in her ERC project 'NovAnI' to identify new molecules that affect these target proteins in a specific way, thereby laying the foundation for the development of a new drug. Her research interest lies primarily in the field of so-called "anti-infectives", i.e. the development of new drugs and therapies against infectious diseases.



"The potential the results of my research might actually have in helping people at some point in the future, has always motivated and driven me."

Prof. Dr. Anna Hirsch,
Helmholtz Institute for Pharmaceutical
Research Saarland



It is critical to use innovative methods to find new molecules that can ultimately be developed into a new anti-infective. The basis for this is that these molecules act on new, so-called "targets". Targets are often proteins that lead to the actual therapeutic effect in our organisms, because they can be influenced in their function or structure through the molecules.

NovAnI is funded by a European Research Council (ERC) Starting Grant. This prestigious award generously supports young scientists at the start of their independent research careers and beyond. With the ERC grant, Anna Hirsch can assemble a talented team to support her in her research work - the identification, evaluation and development of new molecules.

More information:
<https://www.route2025.eu/projekte/novani>

ERC Starting Grant:
NovAnI - Identification and optimisation of novel anti-infective agents using multiple hit-identification strategies

Through an innovative lens

A new technology for three-dimensional image capturing and processing

With K|Lens, Matthias Schmitz founded his first own start-up in 2016. Based on research by his co-founder Ivo Ihrke at the Max Planck Institute for Computer Science and Saarland University, K|Lens is developing a revolutionary special photographic technology. The first product, the K|Lens One, consists of a special lens and the corresponding software. Similar to a kaleidoscope, the K|Lens One makes use of a complex mirror system that simultaneously records several slightly different perspectives on the camera sensor. This fundamentally changes the two-dimensional world of photography: in post-processing, K|Lens technology can be used to change areas of sharpness and blur as well as perspectives. In addition, image planes and objects can be easily separated from each other. In the industrial sector, this new form of imaging could be used for three-dimensional quality control.

Since the beginning of July 2020, K|Lens has received funding from the European Commission's EIC Accelerator grant. K|Lens is thus the second company from the Saarland to prevail in the competitive bidding for this highly endowed EU business funding instrument. The EIC Accelerator is

“What really makes this technology special, is that it allows any kind of camera to capture depth information as well as colour information, which subsequently allows 3D imaging.”

Matthias Schmitz,
K|Lens



aimed exclusively at small and medium-sized enterprises (SMEs) that have an idea with high market potential, a high degree of innovation and boast European and global ambitions.

With this funding, the company plans to further develop its innovative and patented light field sensor technology into a handy, cost-effective and fully video-capable 3D sensor and establish itself as the European market leader for the use of 3D photonics technologies.

This enables any full-frame camera to be converted into a 3D camera that records depth information together with the usual colour information. It enables photographers to set different design focal points in one and the same image and give free rein to their creativity.



K | Lens

More information:
<https://www.k-lens.de/>

EIC Accelerator:
K-IND - A new photonic standard component for 3D sensing



About Route 2025

“Route2025” is a project of Saarland University funded by the State Chancellery with funds from the Saarland and by the European Union under the “European Regional Development Fund (ERDF)” programme. In the implementation of the various Route2025 measures, Saar University is supported by the established EU project management office Eurice.

Further information and the project database on Saarland’s participation in “Horizon 2020” can be found at: www.route2025.eu

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