



5G-OPERA Deliverable 2.1

Identify country-specific Conditions and
relevant Participants

- Stakeholder Workshop Report -



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1. Introduction

The Federal Ministry for Economic Affairs and Climate Action (BMWK), together with the French Ministère de l'Economie et des Finances et de la Relance (MEFR), funds bilateral innovation projects on the topic of “Technical developments and application ecosystems for private 5G networks” such as the main project 5G OPERA.

The goal of 5G OPERA is to build a Franco-German ecosystem for private 5G networks under the joint leadership of TU Dresden and EURECOM. The project focuses on the idea of open hardware, software and interfaces so that multiple providers can participate in the technical equipment of private 5G networks and user needs can be flexibly realized. The overall goal of the project is to ensure that the hardware and software of all project partners can work together technically, independently of the respective manufacturer. In addition to setting up reference test environments and demonstrators in Industry 4.0 environments of both countries, 5G OPERA is supporting the trials in the three demonstration projects.

Key success factor to achieve the project goal of 5G OPERA is an early cross project involvement of stakeholders and experts. Therefore, on behalf of 5G OPERA project team we invited stakeholders and experts to the first cross project and organization stakeholder and expert workshop held on May 13th, 2022 in Dresden. The aim of the workshop was to disseminate knowledge on technical options, solutions and applications for all major stakeholder groups. Further it was also a starting point to initiate new cross-country partnerships, case studies, prototypes, spin-off projects or exploitation of results.

2. Objectives of the 5G Opera Stakeholder Workshop

The objectives of the one-day workshop—which took place at the Messe Dresden, Messering 6, 01067 Dresden, on the 13th of May 2022—were to foster the discussion on disseminate knowledge on technical options, solutions and applications for all major stakeholder groups. Further it was also a starting point to initiate new cross-country partnerships, case studies, prototypes, spin-off projects or exploitation of results.

3. Deliverables & Expected Results

Anticipated outcomes of the workshop were improved understanding of participants on the knowledge on technical options, solutions and applications for all major stakeholder groups, as well as the new cross-country partnerships, case studies, prototypes, spin-off projects or exploitation of results; and recommendations for necessary next steps.

4. Participants

Participants included a range of representatives from 22 institutions, including government secretaries, intergovernmental agencies, civil society organizations and academic institutions. Experts from various fields were engaged, including representatives from the, which provided presentations on their work in this field and the current status of 5G private Campus network projects.

A total 43 participants joined the day for the workshop. See Annex 2 for full list of participants.



Figure 1: Workshop group photograph

5. 5G Opera Stakeholder Workshop Summaries

5.1 Welcoming addresses

Prof. Frank Fitzek, TU Dresden

Marie Jousset, Axel Baratte, MEFR, provided welcoming remarks, highlighting the importance of 5G and future telecom networks, including notes on French strategy.

Walter Mattauch, BMWK, underlined the value of new technologies and the importance of the 5G OPERA Project. Franco-German ecosystems were explained and the cooperation between BMWK and MEFR were highlighted. Also the intentions for the stakeholder workshop were mentioned.

5.2 Mutual introduction

5.2.1 large technology projects

5G OPERA

Florian Kaltenberger showed in his presentation the mission of 5G OPERA and the expected impact. The workpackages and the expected deliverables were explained, including related projects and upcoming events.

Campus OS

Prof. Dr.-Ing. Slawomir Stanczak, Fraunhofer HHI gave a overview of the project aim. The CampusOS project aims to create a modular ecosystem for open 5G campus networks based on open radio technologies and interoperable network components. This should enable more flexibility through manufacturer independence and more competition as well as innovation in order to strengthen the digital sovereignty of companies in Germany and Europe. 22 partners from industry and research examine different operator models, develop reference architectures, and evaluate interoperability and performance of the integrated solutions in reference test fields. Moreover, selected scenarios will be prototypically realized in the industrial environment as field trials.

CRIIoT

At a time when 5G is being rolled out for mobile phone networks, another type of 5G communications—for critical IoT devices—is being prepared for deployment. So-called "critical" IoT devices are found in industry, medicine, and research, where the high data transmission speeds that are so important for 5G mobile phone networks take a back seat to reliability and low latency. The CRIIoT (CRITICAL IoT) project, will help get this type of 5G technology ready for deployment. The idea is to roll out the infrastructures that will be needed for these types of critical communications. Not all of the hardware used will be new.

6G-Life

Prof. Dr. Fitzek presented 6G-life project, which will drive cutting-edge research for 6G communication networks with a focus on human-machine collaboration. 6G-life provides new approaches for

sustainability, security, resilience and latency and will sustainably strengthen the economy and thus digital sovereignty in Germany.

5.2.2 demonstration projects and application fields

5G4BP

To avoid the digital divide, 5G For Business Parks (5G4BP) has set itself the goal of creating an Open RAN-based solution for the small and medium-sized enterprises often located in business parks, in which the 5G campus network extends over the entire business park and is built and operated by an operator specialised in this scenario. In order to reach companies even further away from the business park, a directional radio connection will be offered.

5G-FORUM

The 5G Forum will provide an open platform where diverse participants of the industry can join various areas of 5G R&D and collaboration, and make commitments to bring the 4th Industrial Revolution closer to us. 5G Forum keeps promoting the collaboration of government, ICT, and vertical industries, institutes, and academia to integrate 5G into the vertical industries.

5G-OR

The "5G-OR" project aims to create a Franco-German 5G-enabled operating theatre ecosystem for hospitals to improve patient care. Different 5G applications in the operating environment will be developed, which will be deployed interoperably in German and French facilities with 5G campus networks and validated in a realistic clinical environment. Among other things, the use of data-driven and AI-assisted surgery should lead to improved patient outcomes and patient safety. The overall goal is to demonstrate the added value of a private 5G ecosystem in the healthcare sector.

5.4 Cross-project cooperation

A world café is a structured conversational process for knowledge sharing in which groups of people discuss a topic at several small tables like those in a café. Some degree of formality may be retained to make sure that everyone gets a chance to speak. Although pre-defined questions have been agreed upon at the beginning, outcomes or solutions are not decided in advance.

Advantages of the World Cafe methodology:

- It is good at generating ideas, sharing knowledge, stimulate innovative thinking, and exploring action in real life situations.
- The World Cafe process can deliver new thinking, meaningful conversations, an inclusive and relaxed atmosphere and deeper relationships and mutual ownership of outcomes in an existing group.
- Works best with a mix of people bringing different ideas and experiences.
- Useful for researching an issue or building collective intelligence
- Creates a sense of community and mutual respect

It was organized three (3) progressive rounds of conversation with each round addressing one question. At the end of each round, participants are invited to move to a different table. New question

is discussed while linking and connecting ideas with previous conversation rounds. Paper tablecloths are provided to create a visual memory of the conversation.

5.4.1 The World Café Table "test lab & test fields"

Impulse questions for – The World Café test lab & test fields

- In your opinion, how can the various fields of application be integrated with Testlab?
- Which topic clusters such as health, Industry 4.0 must be taken into account?
- Do you see special general conditions and specifications, which ones do you think are important?
- What do you want to bring to the test lab?
- Which requirements have to be considered when integrating your solution?

Advances in technologies like 5G yield significant opportunity to accelerate innovation across nearly every industry – from healthcare and manufacturing, transportation to consumer device support. But, to turn innovation into impact, testing the reliability and effectiveness of new technologies is crucial. With the Testing Labs, technology providers have a one-stop shop to not only test and verify their solutions cohesively from device-to-cloud – but collect additional detailed insight about device performance across multiple variables and truly raise the bar for consumer 5G experiences. Silicon providers, device OEMs and Telcos can leverage the 5G Testing Labs to not only validate their solutions today, but determine how to scale, expand and innovate well into the 5G future.

During time of the world café table participants discussed such themes like: requirements, components, controlling, catalogue of tests and security. All the participants were agreed, that is very important to find the best practice in this field and research their experience.



Figure 2: World Café table 1 - test lab & test fields

As we can see on the Figure 4, the most important for test labs is approved catalog of test. It is interesting that for participants it was more important than defining the goal. After this it is necessary to prepare documentation and think about commercial test equipment reference. At the last place is Environments of Test lab.

Testlab & test fields

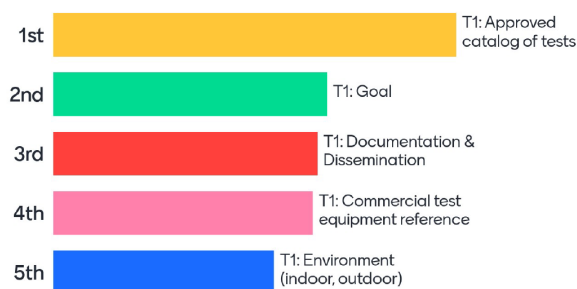


Figure 3: World Café table 1 - voting results

5.4.2 The World Café “standardization”

The evolution of 5G and the upcoming 6G standard will be defined by several organization bodies such as 3GPP, O-RAN, Small Cell Forum, IEEE, etc. The challenges that they are working on are (i) incorporating security by design, (ii) providing a framework for AI and ML algorithms, (iii) RAN/core convergence and SBA evolution, and (iv) testing and certification. Especially AI and ML are going to play a greater role, so these need to be accommodated in the standards. Moreover the standards should be accompanied by open source reference code and architectures. For example the OpenAirInterface project aspires to become the reference implementation for both 3GPP and O-RAN standards.

Impulse questions for – The World Café Table “standardization”

- What are the challenges in standardization?
- What are the specifics for the next leaps in innovation?
- To what extent can you contribute to standardization (e.g. to the structure of the reference architecture)?
- Which fields and working groups must be considered in the next (three) years and in which ones are you already involved or would you like to be involved?

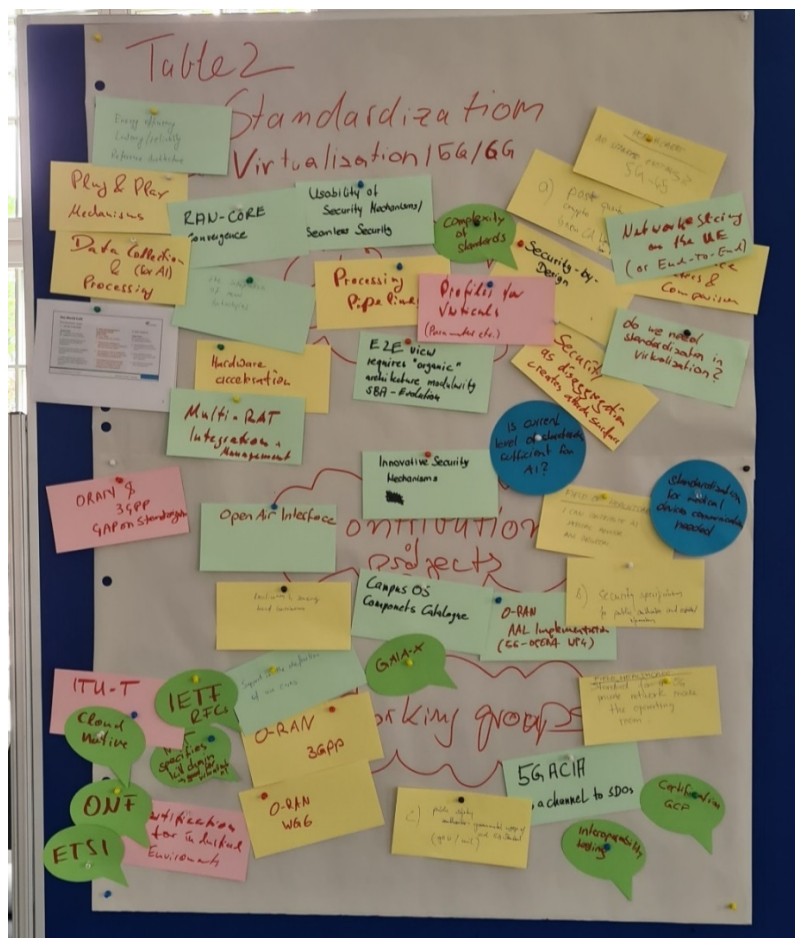


Figure 4: World Café table 2 - standardization

Participants decided that the most significant is O-Ran Testing and certification, the same importance is security by design. Data Collection for AI\ML and RAN/Core convergence and SBA evolution are in the third and fourth place in the ranking.

Standardization

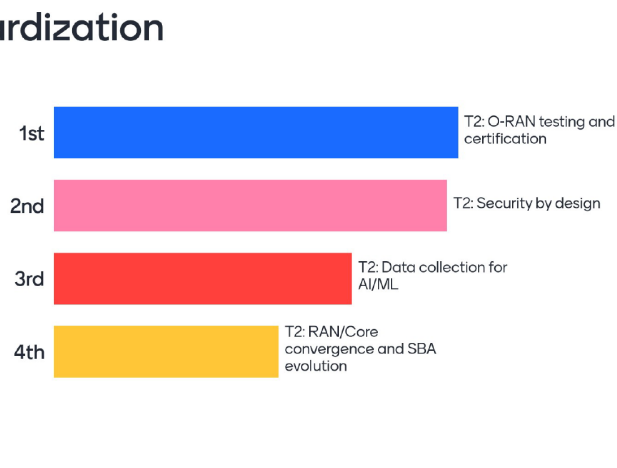


Figure 5: World Café table 2 - voting result

5.4.3 The World Café “solutions”

5G is not only important because it has the potential to support millions of devices at ultrafast speeds, but also because it has the potential to transform the lives of people around the world.

Improving accessibility

Improvements in 5G technology can help make life better. For example, significant advances in autonomous vehicle technology are possible with 5G, creating the potential for people to have new levels of personal and professional freedom. Connected appliances can help automate tasks around the house, which can not only improve personal convenience but also help those who need assistance with everyday tasks.

Extending the reach of mobile broadband

5G can power technology well beyond what current mobile technology permits. Thanks to its speed and bandwidth, 5G promises to make significant improvements in 3D holograms, virtual reality and augmented reality, creating opportunities to connect people far beyond what current cellular technology allows.

Improving safety, health and security

Access to 5G technology promises to improve mission-critical services that affect safety and security of services today. Opportunities include smart cities with 5G in public spaces, the potential for remote surgery, better traffic control and many other applications that depend on nearly instantaneous response time.

While many of the applications for 5G are expected to directly impact how businesses run, the implications for accessibility, the reach of mobile broadband and the improvements in society's safety, health and security have the potential to be farther reaching. 5G technology is important for consumers as well as businesses as we move into the Fourth Industrial Revolution and explore all that 5G has to offer, including things we likely have not thought of yet.

- Which potential fields of application and technical solutions do you see and which are decisive for the further development of 5G campus networks?
- What technical priorities do you set in your project work?
- Where do you see the greatest opportunities and potential for new fields of application?

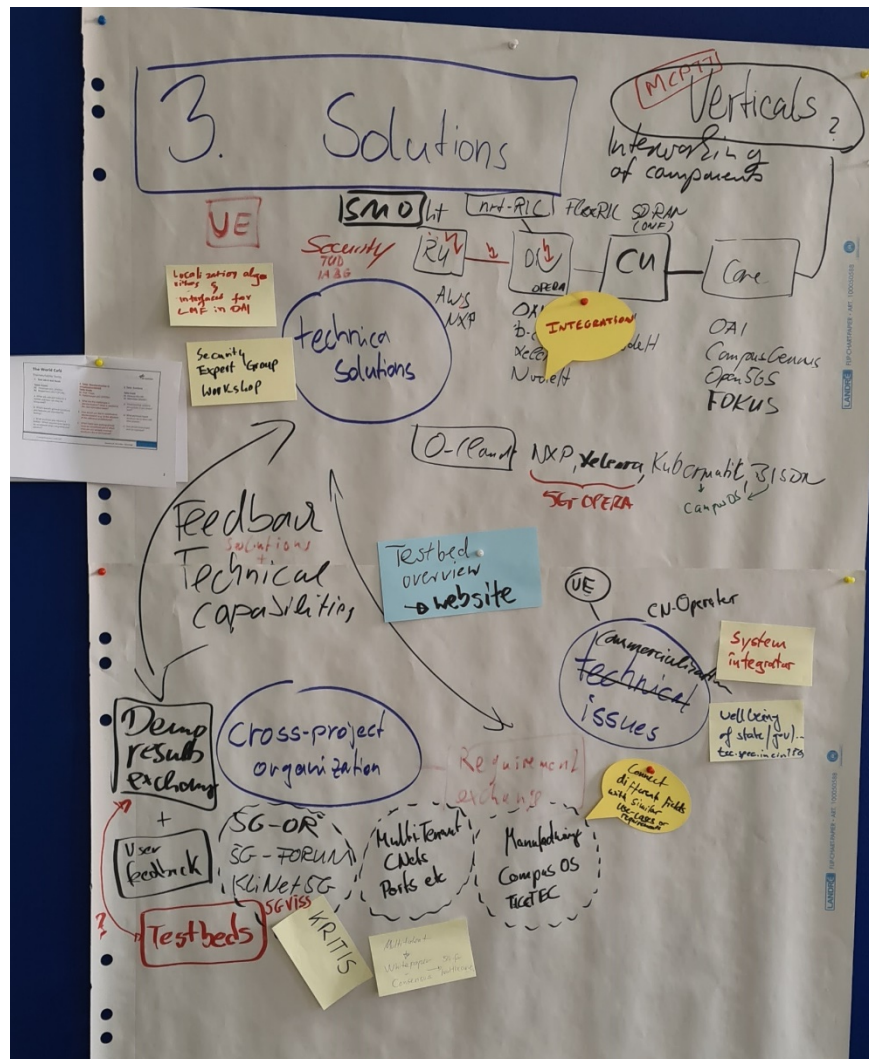


Figure 6: World Café table 3 - solutions

The participants mentioned that by implementing 5G we need to remember about that solutions need to include verticals and devices. Also was noted importance of E2E solutions for various deployments. More than half of participants mentioned that it will be useful to have box of bricks for multiple projects. And of course, we need not to forget about security testing and commercialization.

Solutions

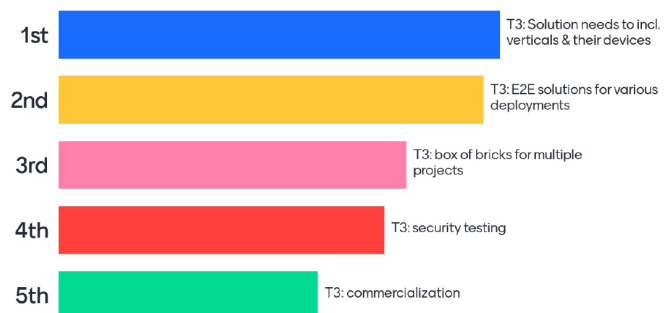


Figure 7: World Café table 3 solutions - voting result

6. Conclusions and next steps

The first Stakeholder Workshop Report is a crucial starting point and contribution to building the Franco-German ecosystem. Already at this first workshop, the broad spectrum of participants from other projects and different institutions in Germany and France provided a comprehensive picture of the framework conditions for the successful establishment of a 5G private campus network ecosystem. The presentations of the representatives provided a very good overview of the planned activities in the different projects. In the subsequent interactive group work, open questions could be discussed in depth and then evaluated according to their relevance.

This forms an important input for the further work in the projects as well as the basis for upcoming stakeholder workshops. In addition, a basis for cross-project cooperation was established.

7. Annex 1: Agenda

09:30 - 09:45	Welcoming addresses Welcome address by the host (TU Dresden, Prof. Fitzek) Welcome address by MEFR - including notes on French strategy (Marie Jousset, Axel Baratte) Welcome address by BMWK – including objectives of the meeting (Walter Mattauch)
09:45 - 11:00	Mutual Introduction a) Introduction of large technology projects 5G Opera, CampusOS, CRIIoT, 6G-Life (TUM) b) Introduction to demonstration projects and application fields in FGE and national activities
11:00 - 11:30	Coffee Break & individual networking
11:25 - 12:30	Interactive format to support Cross-project cooperation (e.g., World Café) Topics will address opportunities for knowledge transfer, exchange on technical solutions, use of test fields, standardization activities.
12:30 - 13:30	Lunch & individual networking
13:30 - 13:45	Presentation: of the results from the World Café
13:45 - 14:35	Exchange on application areas Interest groups on: Manufacturing, Health, eventually other
14:35 - 14:45	Wrap-up on cross-project collaboration
14:45 - 15:05	Coffee break & individual networking

8. Annex 2: List of Participants

Degree	First Name	Last Name	Organization
PhD	Walter	Mattauch	Ministry for Economic Affairs and Climate Action (BMWK)
	Axel	Baratte	Ministère de L'économie des finances et de la relance (MERF)
	Marie	Jousset	Ministère de L'économie des finances et de la relance (MERF)
Prof. Dr.	Frank	Fitzek	TU Dresden
M.Sc.	Alexander	Lange	Xelera Technologies GmbH
Dr.	Felix	Winterstein	Xelera Technologies GmbH
	Andreas	Eidloth	Fraunhofer-Institut für Integrierte Schaltungen IIS
	Joachim	Heinrich	Fraunhofer-Institut für Integrierte Schaltungen IIS
	Thomas	Heyn	Fraunhofer-Institut für Integrierte Schaltungen IIS
	Michael	Kaiser	SSH GmbH
	Danny	Städter	SSH GmbH
M	Rakesh	Mundlamuri	EURECOM
	Rocco	Cariglino	DLR Projektträger
	Jean-Luc	Dimarcq	IHU Strasbourg
Dr.	Alain	Garcia	IHU Strasbourg
	Sharique	Ahmad	IABG mbH
	Maik	Holzhey	IABG mbH
PhD	André	Bergmann	DLR Projektträger
Prof	Florian	Kaltenberger	EURECOM
Prof	Dirk	Slock	EURECOM
Dr.-Ing.	Martin	Kasparick	Fraunhofer HHI
Prof. Dr.- Ing.	Slawomir	Stanczak	Fraunhofer HHI
	Alfons	Mittermaier	highstreet technologies GmbH
	Harsha	Master	NXP Semiconductors Germany GmbH
	Javier	Velasquez	NXP Semiconductors Germany GmbH
M.Sc.	Okan	Yilmaz	Chair of Medical Engineering
Dipl.- Ing.	Johannes Daniel Fidel	Horsch	Fraunhofer IPA
M.Sc.	Julian	Rosenkranz	Fraunhofer IPA
	Peter	Sossalla	TU Dresden
	Stefan	Senk	TU Dresden
	Thomas	Hoeschele	TU Dresden
	Elif	Tasdemir	TU Dresden
	Megane	Gammoudi	TU Dresden
	Jenny	Gabriel	TU Dresden

Degree	First Name	Last Name	Organization
	Mauri	Seidel	TU Dresden
	Pierre	DRUART	ALSATIS
Dipl.-Ing.	Andreas Ingo	Grohmann	Comnets
Dr.	Oscar Dario	Ramos Cantor	Robert Bosch GmbH
Prof. Dr.	Thomas	Magedanz	Fraunhofer FOKUS
	Alexander	Dehn	highstreet technologies GmbH