

## Contact

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## Synopsis

The goal of 5G is to be more than another mobile access technology with higher data rates, lower latency, better security, and increased efficiency. 5G aims to become an open communication architecture that joins legacy and novel technologies on the resources, technologies, protocols, and applications sides likewise.

A major concern is the integration of verticals offering networked services that 4G cannot cover today, e.g., remote e-health, autonomous driving, tactile entertainment, IoT, and M2M. The application specific communication features advise network splicing, i.e., application aware resource provisioning.

Software Defined Networking (SDN), Network Function Virtualisation (NFV), Mobile Edge Computing (MEC) and Fog Computing (FC) are thus central to 5G, possibly more than novel transmission technologies, although latter are clearly required for specific applications.

## References

[GSMA, December 2014] Discussion around 5G falls broadly into two schools of thought: a service-led view, which sees 5G as a consolidation of 2G, 3G, 4G, Wi-fi and other innovations providing far greater coverage and always-on reliability; and a second view, driven by a step change in data speed and order of magnitude reduction in end-to-end latency. However, these definitions are often discussed together, resulting in sometimes contradictory requirements.

[5G-PPP, February 2015] 5G will integrate networking, computing and storage resources into one programmable and unified infrastructure. This unification will allow for an optimized and more dynamic usage of all distributed resources, and the convergence of fixed, mobile and broadcast services. In addition, 5G will support multi tenancy models, enabling operators and other players to collaborate in new ways.

[3GPP, October 24, 2016] The initial Cellular Vehicle-to-Everything (V2X) standard, for inclusion in the Release 14, was completed last week – during the 3GPP RAN meeting in New Orleans. It focuses on Vehicle-to-Vehicle (V2V) communications, with further enhancements to support additional V2X operational scenarios to follow, in Release 14, targeting completion during March 2017.

## Verticals for 5G & service example

- *Automotive:* Automated driving
- *eHealth:* Remote health-care services
- *Factories of the future:* Autom. manufacture
- *Media&Entertainment:* Immersive media
- *Energy:* SmartGrid management & control

## AICO experience & current focus

- Telecommunications, V2X communication
- Embedded systems, interoperability
- Requirement analysis, perf. modelling
- TDM-switching, content caching schemes
- Smart homes, virtual power plants

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## Contribution

AICO Software, formally called AICO EDV-Beratung GmbH, is a specialised software services SME, proud to be a member of the NetWorld2020 experts group. We are open for international cooperation, in particular as subcontractor or within national and international funded R&D projects.

Our prime interests in the realm of 5G reside in SDN and NFV based communication design and evaluation, e.g., *predictive resource orchestration* and *smart QoS provisioning mechanisms* essential for timely reliable communications, as possibly necessary for V2X (car-to-everything) and M2M (machine-type communication).

## Infrastructure

The AICO office in Vienna provides space for a temporal workplace including laboratory and test equipment. Meeting space for project meetings and alike can be arranged in the same building.

In cooperation with an Austrian academic partner in Graz we can offer:

- lab-infrastructure for parts development, integration and testing of components (SW & HW),
- experienced project management (joint consortium lead).

If required, these services may be provided remotely. The tools we commonly work with comprise but are not limited to:

- Octave, MATLAB Simulink, SPICE, different programming languages in development & testing,
- L<sup>A</sup>T<sub>E</sub>X, TikZ/pgf, Inkscape, and so on for documentation and dissemination.

A network attached storage providing space for common project related documents, accessible via VPN, is in preparation. If required and economically viable we might extend our IT infrastructure by a full scale server with ample remote processing capacity and a complete Redmine installation for project related content management.

## Partner

The above mentioned potential partner is the Institute of Microwave and Photonic Engineering at Graz University of Technology (TU-Graz), in particular the research group led by Prof. Erich Leitgeb. He and his team have solid expertise in free space optics and the issues related thereto.

Currently we are evaluating a new application field where joining an all-optical fibre based data network with highly reliable short-term wireless communication with external terminals is aspired.

- For more information on the team at TU-Graz see: <http://optikom.tugraz.at/>

Other partners can be addressed where utile for a particular project. Based on our long history as subcontractor for the industry, we can rely on an established network of contacts in Austria and neighbouring countries.

## Motivation

To continue our consulting and subcontracting business at the highest possible level we are eager to participate in state-of-the-art research. Obviously, we want to be involved to learn first-hand about novel developments, but also to be more visible and to strengthen our skills on up-to-date challenges.

Aside these direct benefits, in the course of a project we may also identify potential application fields of new technologies and maybe find early adopters that can utilise project results.

Please feel free to contact us any time to develop an idea or whatever you wish.