GUIDE

Supporting the Strategic
Deployment Agendas for
The EU Corridors

5G Corridors
Best Practices
2024

Brussels, 16 October 2024

5GCorridor Projects

A mixture of Studies and Works projects to improve the availability and functionality of 5G services in the European transport corridors

Funded by the CEF-Digital Program

CEF-Digital funded 5G corridor projects: Call 1 & 2

Study projects

5G Brno – Bratislava
Brno (CZ) to Bratislava (SK)
~ 140 km

5G MELUSINA
Luxembourg (LU) to Metz (FR)
~ 70 km

5G on Track
Mulhouse (FR) to Karlsruhe (DE)
~ 200 km

5GCarolina
Prague (CZ) to Munich (DE)
~ 70 km

5G Gail
Udine (IT) to Villach (AT)
~ 200 km

5G Estuary
Antwerp (BE) to Vlissingen (NL)
~ 260 km

Latest 5GS
Tallin (EE) to Vilnius (LT)
~ 670 km

EUMOB
Bordeaux (FR) to Bilbao (ES)
Perpignan (FR) to Barcelona (ES)
~ 9500 km

5G ADRIA
Koper (SI) to Rijeka (HR)
~ 378 km

5G FREJUS
Fourneaux (FR) to Bardonechchia (IT)
~ 26.5 km

5G HSL EUROLINK
Paris (FR) to Brussels (BE)
~ 468 km

5G-SITACOR
Udine (IT) to Postojna (SI)
~ 275 km

Works projects

5G SEAGUL
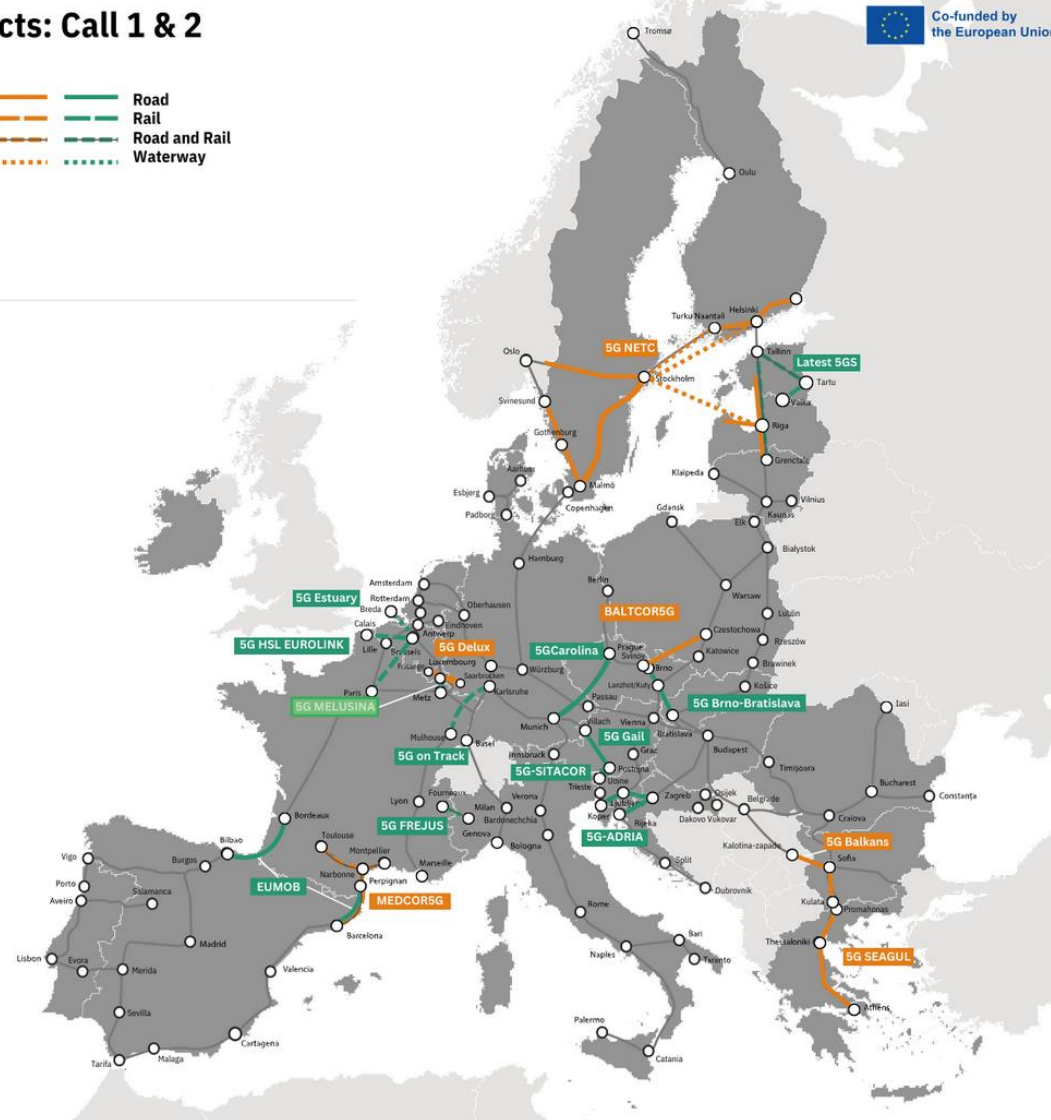Sofia (BG) to Velestino (EL)
~ 473 km

MEDCOR5G
Barcelona (ES) to Montpellier (FR)
~ 548 km

5G DeLux
Frisange (LU) to Saarbrucken (DE)
~ 98 km

5G NETC
Malmö (SE) to Helsinki (FI)
to Riga (LV)
~ 3354 km

5G Balkans
Sofia (BG) to Dimitrovgrad (RS)
~ 135 km

BALTCOR5G
Czestochowa (PL) to Ostrava/Svinov (CZ)
~ 147 km

Road
Rail
Road and Rail
Waterway

Co-funded by the European Union

Funded by the European Union

What is a "Best Practice"

An opportunity to re-use experience
to make future implementations better, easier and faster.

This is considered in three parts:

- Proposal Submission
- Studies
- Works Projects

Best Practices: Proposal Submission

The key recommendations are:

- Start Early
  - CEF Digital participants need pre-approval from national authorities to support the submission. Deadlines for this can vary for different countries.

- Check Eligibility:
  - Scope of proposal must be appropriate for a Study or a Works project
  - Eligible participants and countries, and the right mix of participants
  - Eligible activities: Projects must comply with EU policy interests and priorities (such as environment, social, security, industrial and trade policy, etc.).

- Credible Proposal:
  - For all proposals, show that the developments concerned will provide a viable return in terms of increased revenue or a desired improvement in the service quality that justifies the investment.

What are the good practices? (Studies)

- To involve key stakeholders regularly through the whole project for open and transparent discussions to have a common understanding on the situation.

- Social Impact analysis

- Agreement with mobile operators and communication with operators

- Use of the theoretical, concept & deployment best practice from other 5G highway corridors.

- The pooling of infrastructure between MNOs and railway companies is an experiment. This mutualisation is experimental because we could share construction costs.

- Cross-industry collaboration, the ability to innovate & support by political agenda (green deal, modal change , CO_2 reduction)

- Standard Framework already in place for working for safety and working procedure working in rail and road tunnels

- Create and review network plans, Ensure the network is adaptable to support new technologies, Collaborate to continuously improve and stay updated with the latest tech

The Key opportunities : Studies

"Use of the theoretical, concept & deployment best practice from other 5G highway corridors."

Only possible if info can be shared……

Mostly facilitated by having common aspects:

    Partners

    Equipment

    Regulations

    Geography

    ……/

What are the good practices? (Works)

- The learning and insights gained from work in terms of challenges/obstacles,
  - necessary processes and licensing,
  - timetables for roll-out and configuration,
  - best practices for network interconnection and roaming configurations, etc., .
- Good architecture definition.
- Stakeholders value chain definition
- Preparation of requirements and contracts, involving all parties from the start
- Efficient RFQ execution and inclusive stakeholder involvement are crucial. Strong planning, reporting, and monitoring of subcontractors ensure timely, quality outcomes
- Cross-border cooperation between Partners of the Consortium
- "Cooperation in our consortium is great. ☺ Also support of HaDEA ☺"

The Key opportunities : Works

Same as Studies plus:

Lessons learned from Functional Upgrades
- Proposals which are planning to make functional upgrades on existing infrastructures to offer improved CCAM or rail or waterway services
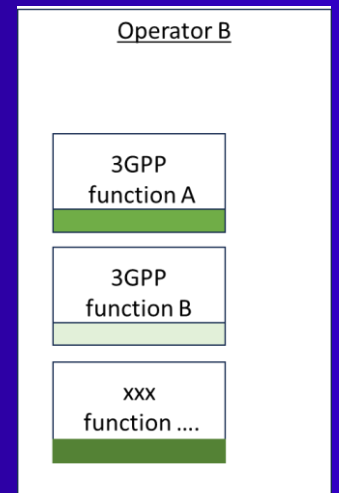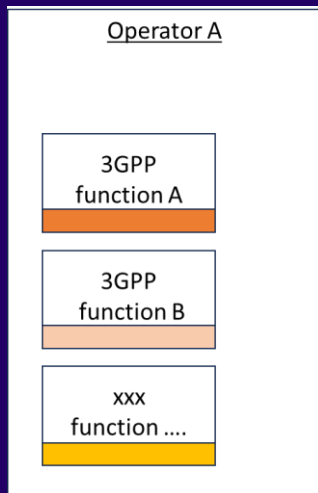
Lessons learned from Infrastructure Upgrades
- Proposals which need to deploy a new 5G infrastructure on a corridor in order to offer the requested services.

Functional Upgrades

- Select a set of functions as defined by 3G-PP
- Agree the set with peer organisation(s)
- Approach Equipment Manufacturers
- Consider impact analyses
- Consider roaming agreement limits
- Anticipate there may be unforeseen impacts

- Replicability depends on having similar equipment suppliers and capabilities

Operator A

3GPP function A

3GPP function B

xxx function ….

Operator B

3GPP function A

3GPP function B

xxx function ….

Infrastructure Upgrades

- Planning rules:
  - Planning permission
  - Access rights
  - Frequency licenses

- Procurement Processes
  - Specifications & Tenders
  - Equipment delivery schedules

- Synchronised Planning
  - Appropriate applications being made on both sides of the border
  - Synchronisation of implementation plans

The reusability of this experience is related to the context and the partners

Summary Conclusions

- Results from running and completed projects can show what is possible for 5G Corridors

- Projects contain some generic approaches that are reusable, but also have specific implementation details that are not inherently suitable for sharing.

- Half of Studies felt they had achieved enough to go forward with a Works proposal

- Business models remain an issue

- Common partners seem to be the most efficient method of bringing forward best practice

- Common scenarios are obviously the most suitable for reusing lessons learnt.

- 5G Corridors program is making the opportunities and possible solutions more visible

Reserve Slides

Best practices/Feedback section

F1: What are the main difficulties that you are expecting ?

F2: What are the good practices already experimented that you are planning to use ?

F3: What are the key stakeholders to involve? Which ones and why?

F4: Are OEM requirements mandatory?

Best practices/Feedback analysis F1

What are the main difficulties that you are expecting ?

- Support from National Administrations
- Modification of existing infrastructure (towers, rooftops) to add 5G.
- Regulatory and policy implications play a vital role in facilitating 5G deployment.
- Spectrum allocation, licensing requirements, interoperability standards, and safety regulations must be carefully addressed.
- The main issue is the creation of a strong and stable consortium. The agreements between the beneficiaries will be legally long to build in a short window. Financial Sourcing and lengthy permission procedures for construction of sites.
- That necessary actions are streamlined between the operators and their main suppliers/vendors in order to ensure that the cross border corridor will have the needed coverage of 5G according to the project's mission.
- Agreement with MNOs
- Lack of willingness at some MNOs to roll out the solution along all borders.
- Cross-border dimension management; Heterogenous spectrum policy; Complexity of working environment
- Implementing 5G corridors demands significant investment in base stations, antennas, and fiber optics. Companies face complex regulatory challenges, including lengthy permit processes and spectrum regulations, often taking up to a year per base station, which delays infrastructure deployment
- Discrepancies in the technical visions of the project (e.g. V2X layer in view of road administrator, MNOs' technical needs).

Best practices/Feedback analysis F2

What are the good practices already experimented that you are planning to use?

- to involve key stakeholders regularly through the whole project for open and transparent discussions to have a common understanding on the situation.

- Social Impact analysis

- Agreement with mobile operators and communication with operators

- Use of the theoretical, concept & deployment best practice from other 5G highway corridors - projects in the works phase (deployment) like 5GroCo, CARMEN und running DELUX, SEAGAL etc.

- The pooling of infrastructure between MNOs and railway companies is an experiment, even though we have already seen cases of infrastructure sharing in France. This mutualisation is experimental because we could share construction costs. During the study phase, the cooperation between the partners has been fruitful.

- Cross-industry collaboration, the ability to innovate & support by political agenda (green deal, modal change , CO2 reduction)

- The learning and insights gained from work in terms of challenges/obstacles, necessary processes and licensing, timetables for roll-out and configuration, best practices for network interconnection and roaming configurations, etc., are expected to be considered as well.

- Good architecture definition. Stake holders value chain definition

- Cooperation in our consortium is great. Also support of HaDEA

- Standard Framework already in place for working for safety and working procedure working in rail and road tunnels

- Efficient RFQ execution and inclusive stakeholder involvement are crucial. Strong planning, reporting, and monitoring of subcontractors ensure timely, quality outcomes
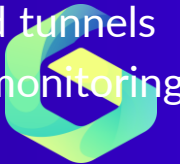
Best practices/Feedback analysis F3

What are the key stakeholders to involve? Which ones and why?

- key stakeholders: port authorities, authorities, users in the area, and companies that develop solutions
- Public Administration for getting the permits and as potential clients, MNOs for connectivity, and OEMs as end-users and data providers
- Mobile operators with regard to radio planning and avoiding possible interference.
- Government bodies, telecom operators, and technology providers are therefore essential for the successful implementation of 5G services and intelligent transportation systems.
- Five key stakeholder: (1) EU/National states & their organization (ministry of transportation, road operators etc.), (2) OEM of passanger vehicles, vans and trucks, (3) Academic organizations, (4) MNOs and (5) TowerCos.
- Railway companies and MNO are the key stakeholders.
- MNOs, Tower Companies, Communication System Suppliers, Governmental and Regulatory bodies both on national and EU level.
- The operators and their main suppliers/vendors – Also Ministries, Municipalities, Road Infrastructure Entities, Police Authorities and Customs Agencies.
- MNO, road operator, car manufacturers, signals manufacturers
- MNOs involved: BMW, EC, 5GAA, 3GPP

Best practices/Feedback analysis F4

Are OEM requirements mandatory?

- Only 5 projects among 17 are considering that OEM are mandatory