

Key 5G Infrastructure PPP project platforms & demonstrated vertical use-cases

The logo for 6G SNS IA is displayed within a white speech bubble shape. It features the text '6G SNS IA' in a bold, blue, sans-serif font. The '6G' is larger and more prominent than 'SNS IA'.

**6G SNS
IA**

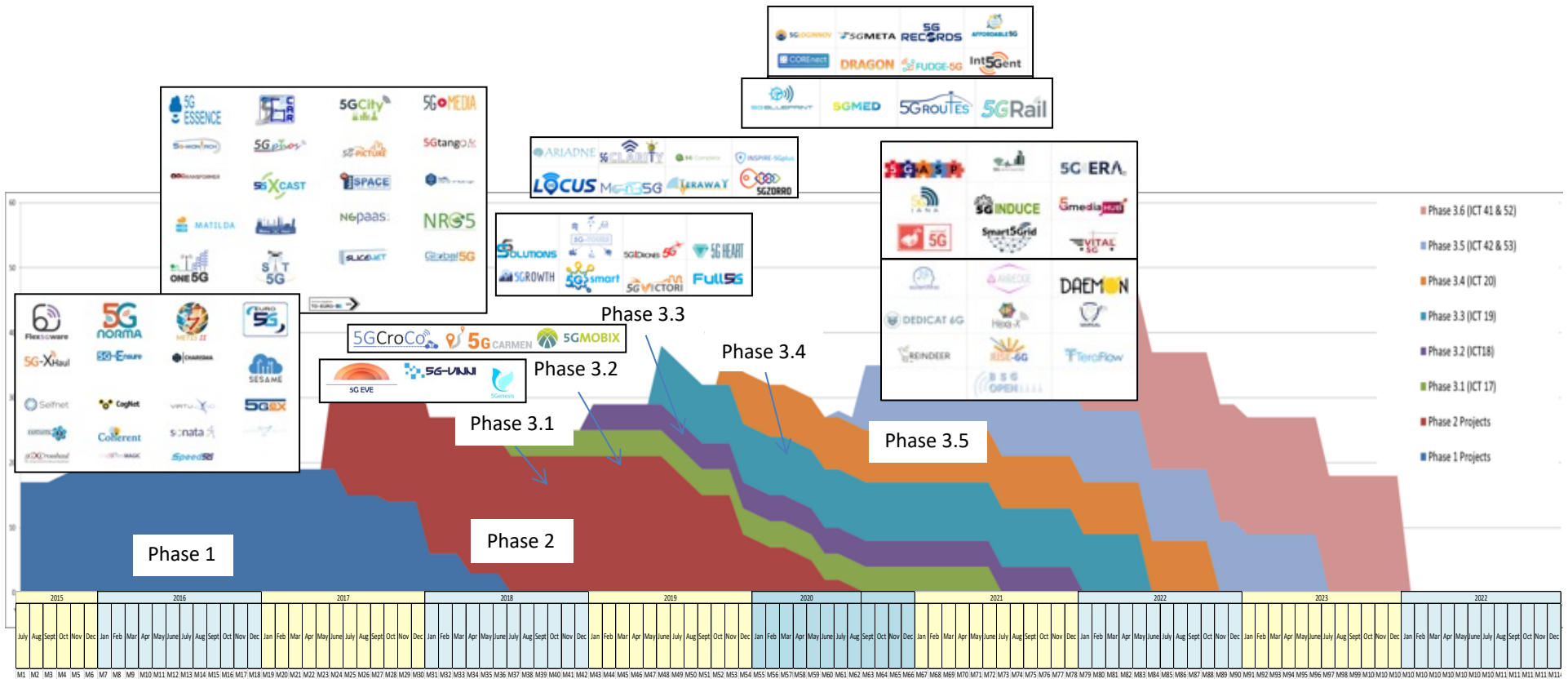
**The voice of the European industry for the
development, deployment and evolution of
6G Smart Networks and Services**

**Dr. Alexandros Kaloxylos, Executive Director
6G Smart Networks and Services Industry Association (6G-IA)**

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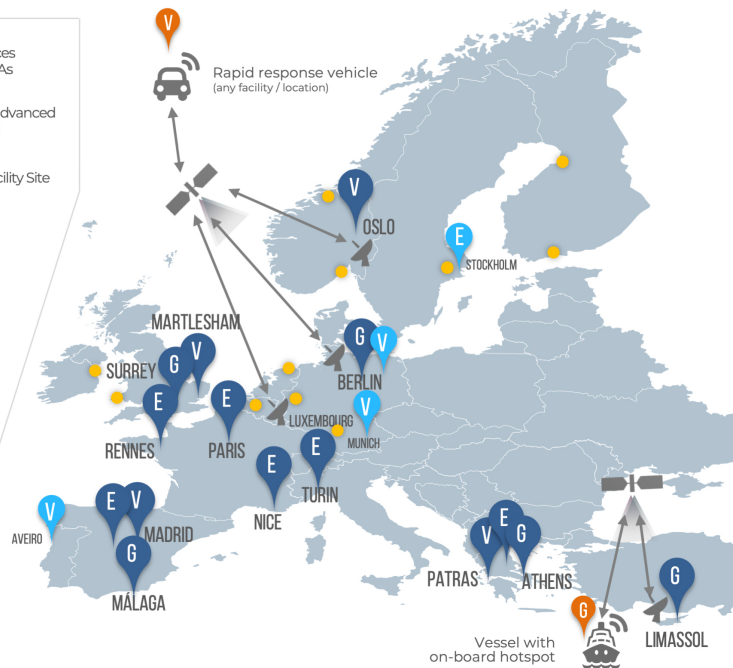
5G PPP - working on phases

(examples of projects dealing with verticals)



Pan-European platforms Link to vertical projects

- Main Facility that offers Services to ICT-19 with well defined SLAs
 - Experimentation Facility for advanced Experimentation and Testing
 - Moving Experimentation Facility Site
- E** 5G-EVE
 5g-eve.eu/end-to-end-facility
V 5G-Vinni
 www.5g-vinni.eu/facility-site
G 5Genesis
 5genesis.eu
- Additional 5G PPP Projects Platforms & Nodes:** Aachen, Aalto, Bristol, Brussels, Dublin, Groningen, Heroya, Kista, Oulu, Reutlingen and Trondheim



	5G EVE	5Genesis H2020 EU PROJECT	5G-Vinni
5G! DRONES	✓	✓	
5G HEART	✓	✓	✓
5G GROWTH	✓		✓
5G smart	✓		
5 SOLUTIONS 5G Solutions for European Citizens	✓		✓
5G TOURS	✓		
5G V FACTORI	✓	✓	✓



Examples of vertical areas

	Industry 4.0	Agriculture & agri-food	Automotive	Transport & logistics	Smart Cities & utilities	Public Safety	Smart (air)ports	EnergyY	eHealth & wellness	Media & entertain.
5G EVE	✓		✓		✓	✓		✓	✓	✓
5GENESIS				✓	✓	✓				✓
5G VINNI	✓			✓		✓		✓		
5GIDRONES				✓		✓				✓
5G HEART		✓	✓	✓					✓	
5G GROWTH	✓			✓				✓		
5G SMART	✓									
5G SOLUTIONS	✓				✓		✓	✓		✓
5G TOURS				✓	✓		✓		✓	✓
5G VICTORI	✓			✓				✓		✓

<https://5g-ppp.eu/5g-ppp-platforms-cartography/>

5G PPP Platforms Cartography



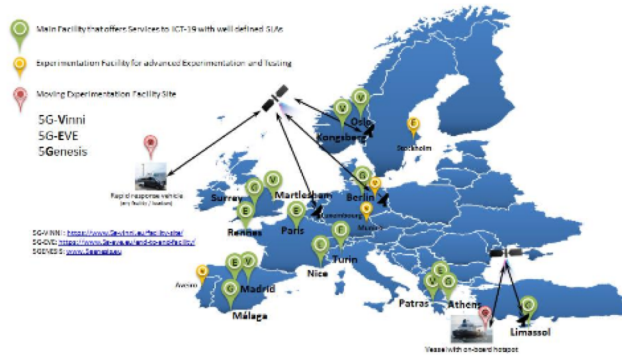
5G PPP PLATFORMS CARTOGRAPHY

TB PPP Platforms Cartography

As detailed in the 5G Pan-EU Trials Roadmap Version 4.0 (https://5g-ppp.eu/wp-content/uploads/2018/11/5GInfraPPP_TrialsWG_Roadmap_Version4.0.pdf), experimental platforms for 5G developments and trials in EU are the results of private and public efforts at national and EU level. Accelerating trial capabilities and other pilots, the platforms remain subject to continuous efforts targeting the full 5G picture and future evolutions. As such, the future roadmap of actual 5G infrastructure deployment is highly dependent on the capability to up-date existing or deliver a new relevant and comprehensive set of platforms addressing the remaining gaps and challenges. One should also consider platforms as valuable and demonstrated set of 5G enablers, beyond trial objectives. In order to increase the complementarity of the available platforms and the forthcoming developments, tight coordination is needed, including first in the documentation of the platforms. It is of tremendous importance to describe the matching elements of each platform compared to the complete 5G landscape. This documented orientation helps 3rd parties to assign their interests to the respective platform purpose. To boost access to 5G platforms, it is necessary to help different stakeholders on their knowledge level to identify the right platform targeting their interests. Therefore a common classification and documentation for 5G platforms addressing different target groups is mandatory. Consistent data structures and unified meta information like name of the platform, countries where the platform is deployed and additional information on features and capabilities is fundamental. The data collections provided by platforms have to support questions from diverse stakeholders including research, public sector or industry.

5G Infrastructure PPP Phase 3 platforms projects (2018-2021) started in July 2018 and provide a pan-EU large-scale end-to-end 5G validation network infrastructure, covering about 20 EU sites and nodes on a pan-EU basis. This infrastructure will provide the adequate level of openness to make it possible for vertical industries to test their innovative 5G business cases using ad-hoc network resource control.

The key platforms and cities of the PPP Phase 3 platforms projects are summarized in the geographic cartography presented in the following Figure.



5G Infrastructure PPP Phase 3 Platforms Projects – Geographic Cartography

The key capabilities and features of the PPP Phase 3 platforms projects are summarized in the following Table. It should be noted that (1) capabilities will be incrementally added until the end of the projects and availabilities dates in the following Table will be specified as soon as fixed for the different projects/platforms; (2) interworking refers to the capability to execute one service E2E involving at least two platforms; (3) integration will be developed by ICT-19 Vertical Pilots projects and (4) exact time line will be communicated after evaluating ICT-19 needs, projects starting in June 2019. The notes (2), (3) and (4) apply as reported in specific corresponding capabilities rows:

Platforms Capabilities	5G-EVE	5G-VINNI	5GENESIS
Rel15-5G NR in Non Standalone Alone (NSA) mode	Turin, Madrid, Paris, Athens <i>January 2020</i>	Oslo, Martlesham, Patras, Madrid, <i>January 2020</i>	Athens, Berlin, Limassol, Malaga, Surrey <i>January 2020</i>
Rel15-5G NR with Rel15-5G Core in Standalone Alone (SA) mode ⁽⁴⁾	Turin, Madrid, Paris, Athens <i>July 2020</i>	Oslo, Martlesham, Patras, Madrid, Aveiro. <i>After January 2020</i>	Athens, Berlin, Malaga, Surrey <i>January 2020</i>
Rel16-5G NR and 5G Core (NSA or SA) ⁽⁴⁾	Turin, Madrid, Paris, Athens <i>January 2021</i>	Oslo, Martlesham, Madrid, Patras <i>After January 2020</i>	Berlin, Surrey <i>After January 2020</i>
Network Slicing as a service ⁽³⁾	Turin, Madrid, Paris, Athens <i>January 2020</i>	Oslo, Martlesham, Patras, Madrid, Aveiro <i>January 2020</i>	Athens, Malaga, Surrey <i>January 2020</i>
Customized network slice (e.g. SFC, security, enhanced Cloud access) ⁽³⁾	Turin, Madrid, Paris, Athens <i>July 2020</i>	Oslo, Martlesham, Patras, Madrid, Aveiro <i>After January 2020</i>	Athens, Berlin, Limassol, Malaga, Surrey <i>After January 2020</i>
Hosting of 3rd party VNFs ⁽³⁾	Turin, Madrid, Paris, Athens. <i>January 2020</i>	Oslo, Martlesham, Patras, Madrid, Aveiro <i>After January 2020</i>	Athens, Berlin, Limassol, Malaga, Surrey <i>January 2020</i>
Interworking ⁽²⁾ with other ICT17 facilities ⁽³⁾	Turin, Madrid, Paris, Athens <i>July 2020</i>	Oslo, Martlesham, Patras, Madrid <i>After January 2020</i>	Athens, Malaga, Surrey <i>After January 2020</i>
Integration of additional gNB to ICT-17 facility ⁽³⁾	Turin, Madrid, Paris, Athens <i>January 2020</i>	Oslo, Martlesham, Patras, Madrid, Aveiro <i>After January 2020</i>	Athens, Berlin, Limassol, Malaga, Surrey <i>January 2020</i>
Edge Computing	Turin, Madrid, Paris, Athens <i>January 2020</i>	Oslo, Patras, Madrid, Aveiro, Martlesham (TBD). <i>After January 2020</i>	Athens, Berlin, Malaga, Surrey <i>January 2020</i>
Distributed Data fabric service for analytics	-	Oslo, Patras (TBD), Madrid. <i>After January 2020</i>	Athens <i>After January 2020</i>

5G PPP Verticals Cartography

Verticals Cartography

[Home](#) » Verticals Cartography

Between 2021 and 2025, €145 billion will be invested in Europe on 5G rollouts (Source: *Mobile Economy Europe*, GSMA 2021). According to *The Impact of 5G on the European Economy* (Accenture 2021), 5G will drive €2 trillion of additional sales in Europe (EU27, plus UK), adding €1 trillion to European GDP, bringing or transforming up to 20 million jobs. This will trigger a multiplier effect, for example, for every €1 invested in 5G by the ICT industry, €1 of value will be created in the economy. Industry verticals are contributing significantly in terms of socio-economic benefits. For example, from 2025, automotive, healthcare, transport and the utilities are forecast to generate €62.5 billion/year of direct economic benefits.

This Verticals Cartography tracks the progress of Europe's 5G Public Private Partnership (5G PPP) in developing 5G technology enablers and applications across diverse market segments through a large set of use cases, spanning proofs of concept, prototypes, demonstrations, trials and pilots to give consumers and vertical end-users tangible examples of 5G usage. Launched in September 2018, the Cartography is designed as a sustainable resource across Europe and globally with regular reports on updates and impacts of 5G use cases within the 5G PPP. These are available for [June 2019](#), [March 2020](#) and [September 2020](#).

Annual showcase brochures of successful mature use cases stem from the competitions coordinated within the 5G-IA Trials Working Group. Three such brochures are available: *5G Infrastructure PPP - Trials and Pilots* published in [September 2019](#); [December 2020](#) and [August 2021](#). Each year, the top ten trials and pilots are selected by WG Panel Members based on pre-defined evaluation criteria.

How to use the 5G PPP verticals cartography:

To view the many examples available, click on industry vertical, country locations, type of use case experiment and functionalities defined by the International Telecommunications Union (ITU): Enhanced Mobile Broadband (eMBB), Massive Machine Type Communications (mMTC), and Ultra Reliable Low Latency Communications (URLLC), as well as 5G technical Key Performance Indicators achieved within the 5G PPP.

Vertical Industries

- Agriculture and Farming
- Automotive across borders
- Automotive
- Broadcasting & Media
- Energy
- Health
- Industry
- Public Safety
- Satellite for Verticals
- Smart Cities - multiple verticals
- Smart Cities - indoor spaces
- Smart Cities
- Transport & Logistics

Countries

- Austria
- Denmark
- Finland
- France
- Germany
- Greece
- Ireland
- Italy
- Luxembourg

<https://global5g.org/cartography>

Trials and Pilots Brochures

Trials and Pilots Brochures:

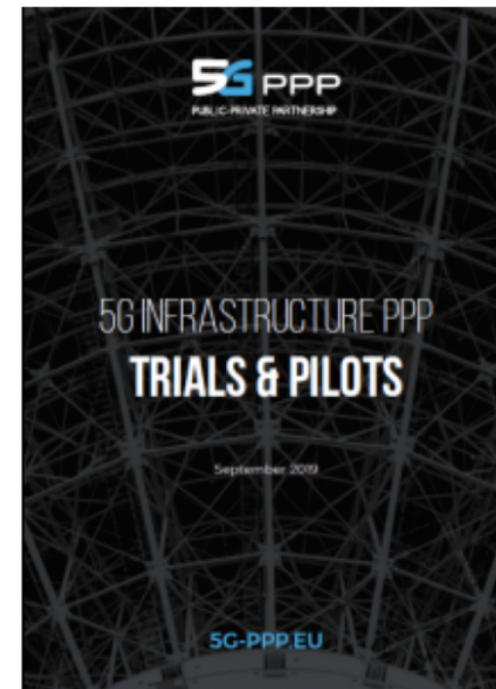
Trials & Pilots 2021



Trials & Pilots 2020



Trials & Pilots 2019



<https://5g-ppp.eu/flayer-brochure/>

Some considerations

Analyzing the work of 5G PPP on verticals

5G Features	Automotive	Transportation	Media	Smart City	Healthcare	Smart Factories	Energy	Public Safety	(Air)Ports	Tourism	Agrifood
Network Slicing	X	X	X	X	X	X	X	X	X	X	X
Mobile Edge Computing	X	X	X	X	X				X	X	X
Functional Split in RAN		X	X								
Advanced Security	X			X					X		
Smart network management			X	X	X		X	X			
Location services & Context Awareness	X	X	X		X	X		X	X		
5G NR capabilities	X	X	X	X	X	X	X	X	X	X	X
Softwarization	X		X		X				X		
Service chaining		X	X		X						
Traffic steering			X								
Spectrum and Coverage	X	X	X								
Guaranteed QoS	X	X		X	X	X	X				

Some considerations

Analyzing the work of 5G PPP on verticals

5G Features	Automotive	Transportation	Media	Smart City	Healthcare	Smart Factories	Energy	Public Safety	(Air)Ports	Tourism	Agrifood
Network Slicing	X	X	X	X	X	X	X	X	X	X	X
Mobile Edge Computing	X	X	X	X	X				X	X	X
Functional Split in RAN		X	X								
Advanced Security	X			X					X		
Smart network management			X	X	X		X	X			
Location services & Context Awareness	X	X	X		X	X		X	X		
5G NR capabilities	X	X	X	X	X	X	X	X	X	X	X
Softwarization	X		X		X				X		
Service chaining		X	X		X						
Traffic steering			X								
Spectrum and Coverage	X	X	X								
Guaranteed QoS	X	X		X	X	X	X				

Lessons learned

5G is not only about improving speed, delay, reliability

Modularization, dynamic chaining of virtual functions, allocation of computational and network resources i.e., **flexibility** is the main advantage for verticals

Work is still needed between several vertical industries and telecom solution providers to understand what is needed and what can be provided

Not all envisioned services can be supported to the fullest with 5G networks. Advanced features and new futuristic services will be addressed by 6G networks

Planning for the 6G era

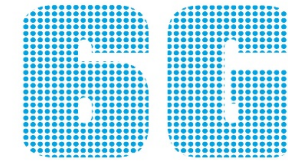
SNS R&I WP (1/2)



5G Evolution (40%) → evolutionary path

Stream A: Smart communication components, systems and networks for 5G mid-term Evolution systems

Stream D: Large Scale SNS Trials and Pilots with Verticals



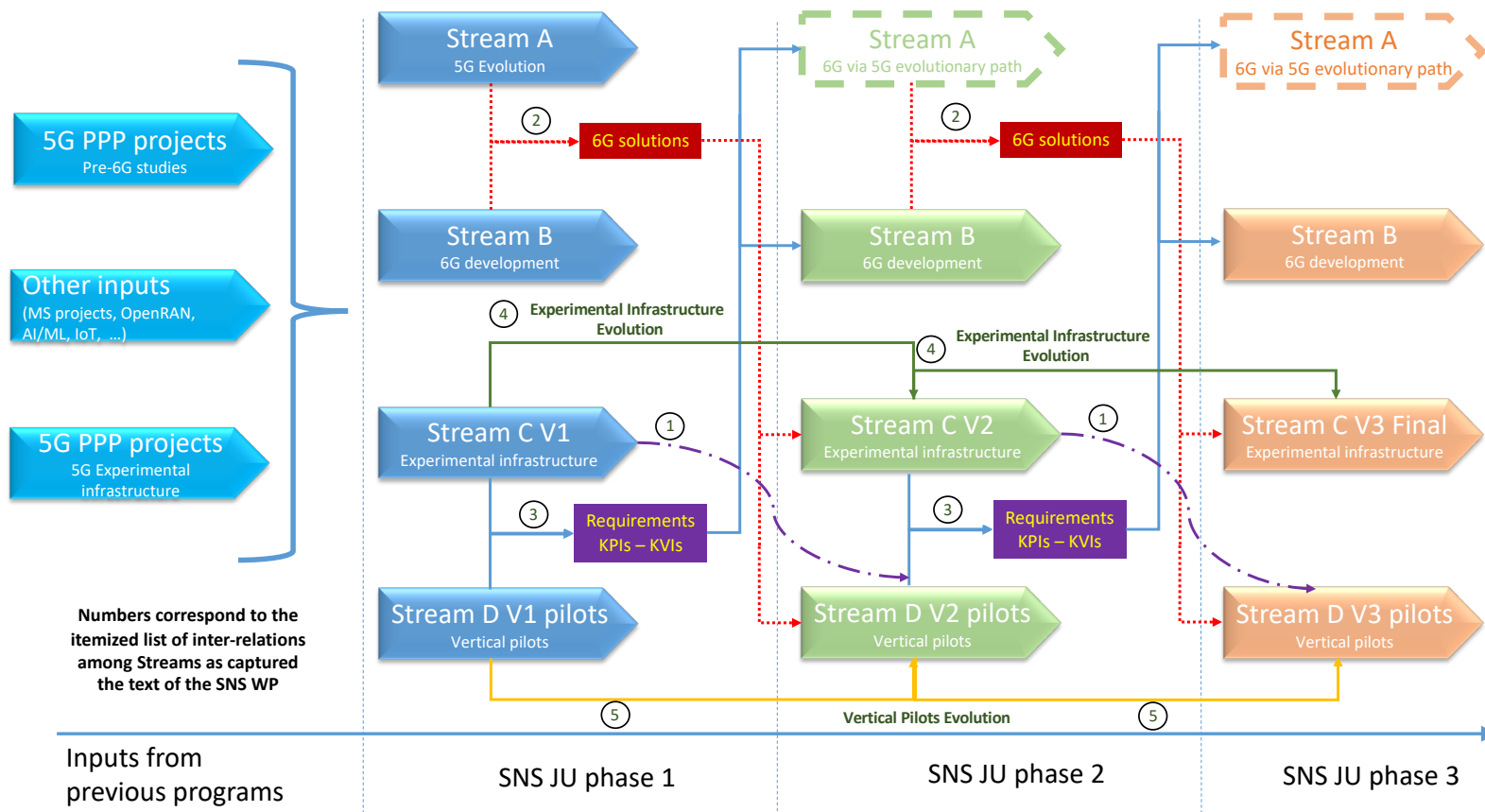
6G (60%) → revolutionary path

Stream B: Research for revolutionary technology advancement towards 6G

Stream C: SNS experimental infrastructures

Planning for the 6G era

SNS R&I WP (2/2)



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5G&6G



5G PPP
PUBLIC-PRIVATE PARTNERSHIP

6G SNS



The 5G PPP is co-funded by the Horizon 2020 programme of the European Union

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