© HPA-Bildarchiv: Andreas Schmidt -Wiethoff

5G Network Slicing

Trial at Hamburg Seaport

Hendrik Roreger – Head of Business Intelligence - Hamburg Port Authority
5G MoNArch Event – Hamburg - 05.06.2019

The Hamburg Port Authority (HPA)

- Institution under public law
- Future-oriented port management services offering one face to the customer since 2005
- The HPA was established as part of the merging of various Hamburg authorities with port-related duties
- Carrying out of infrastructure works
- Workforce: about 1,800 employees
- Landlord model: HPA owns whole port areas

© HPA image archive, Andreas Schmidt-Wiethoff

The Hamburg Port Authority (HPA)

Key duties:

- Maintaining the waterside and landside infrastructure
- Ensuring safe and efficient navigation
- Maintaining & upgrading the port railway facilities
- Managing the port property
- Carrying out statutory duties within the port area as well as providing port industry services

Challenges:

- Creating growth despite limited land resources
- Port ist public area – an industrial area in the heart of the city of Hamburg

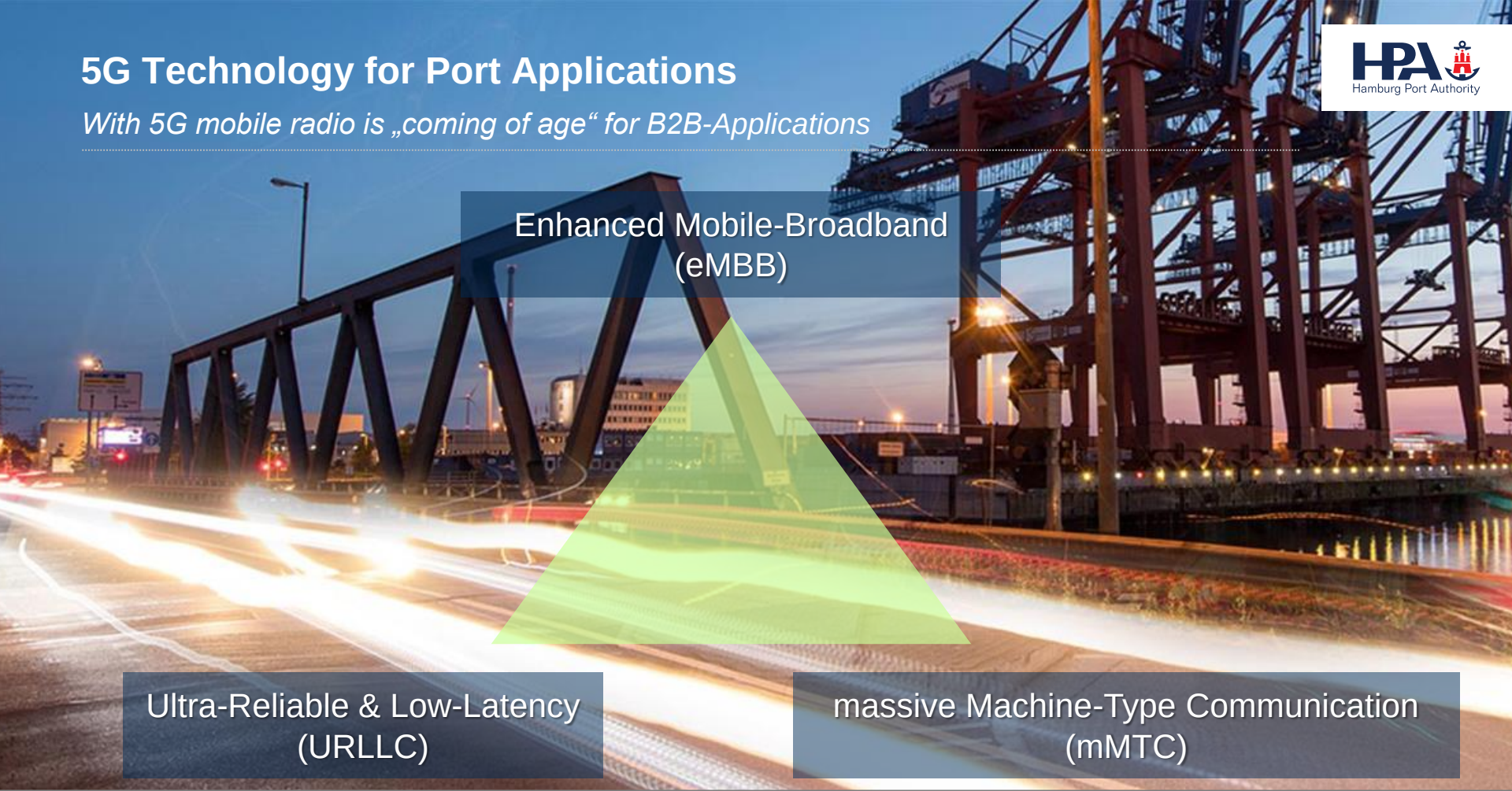
© HPA image archive, Andreas Schmidt-Wiethoff

Video Port of Hamburg

Hamburg Port Authority

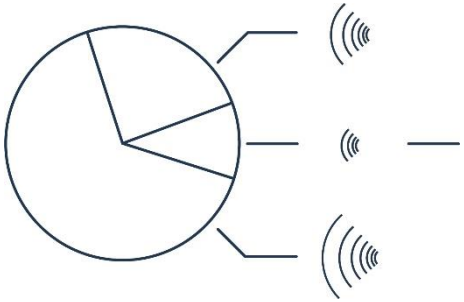
5G Technology for Port Applications

With 5G mobile radio is „coming of age“ for B2B-Applications



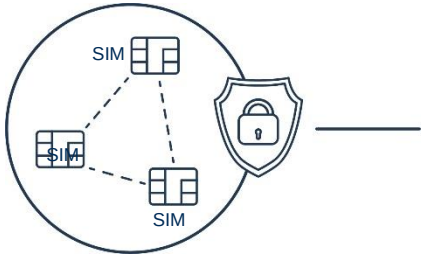
5G Network Slicing

Enabler for B2B-Applications



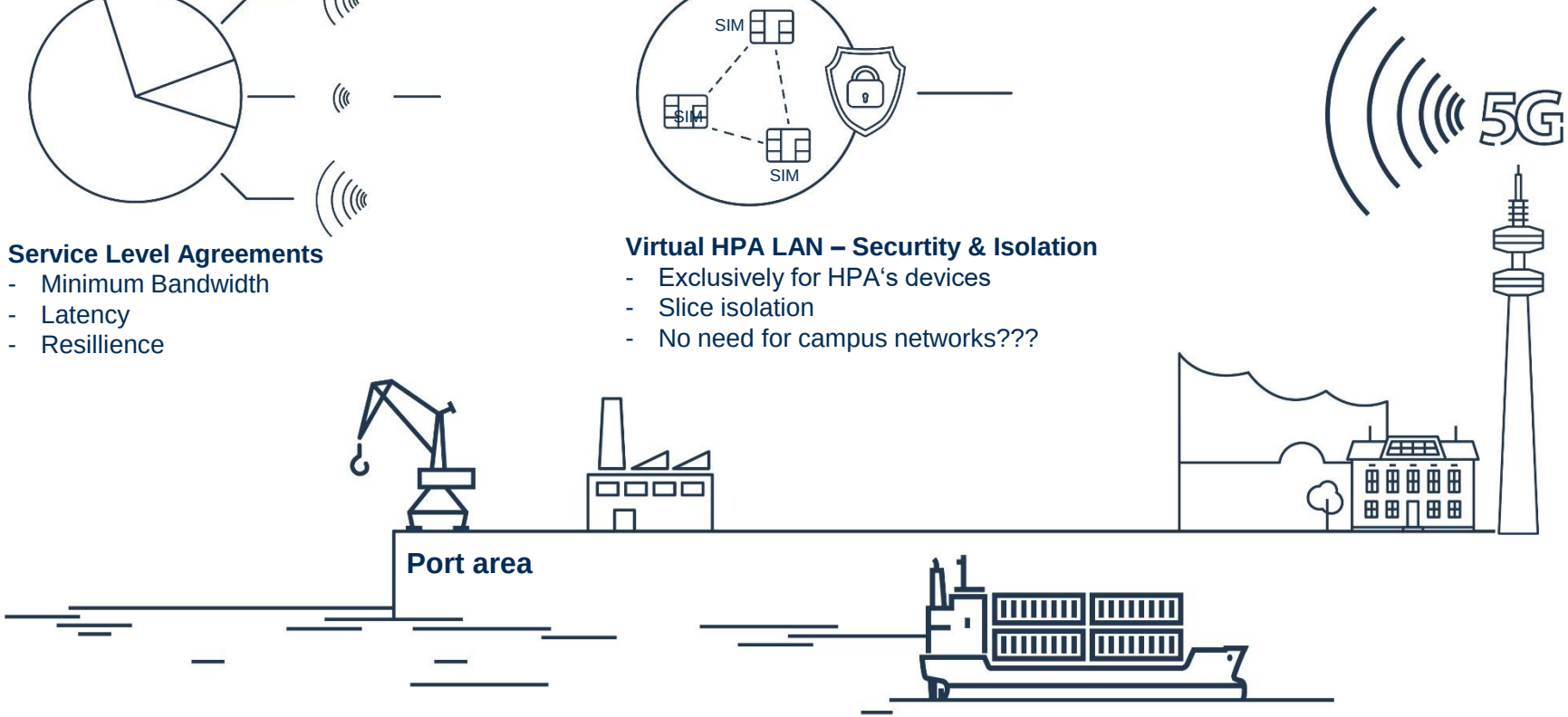
Service Level Agreements

- Minimum Bandwidth
- Latency
- Resillience



Virtual HPA LAN – Securtity & Isolation

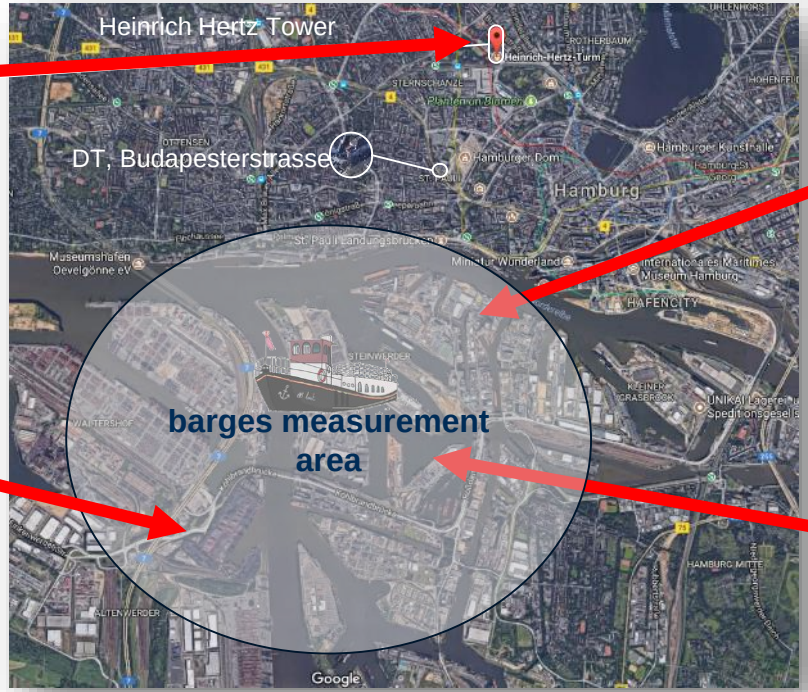
- Exclusively for HPA‘s devices
- Slice isolation
- No need for campus networks???



Testbed Hamburg

2 antennas on the Heinrich Hertz tower supply the testbed

T · · NOKIA



Use-Case 2: Mobile sensors on barges for emissions measurement

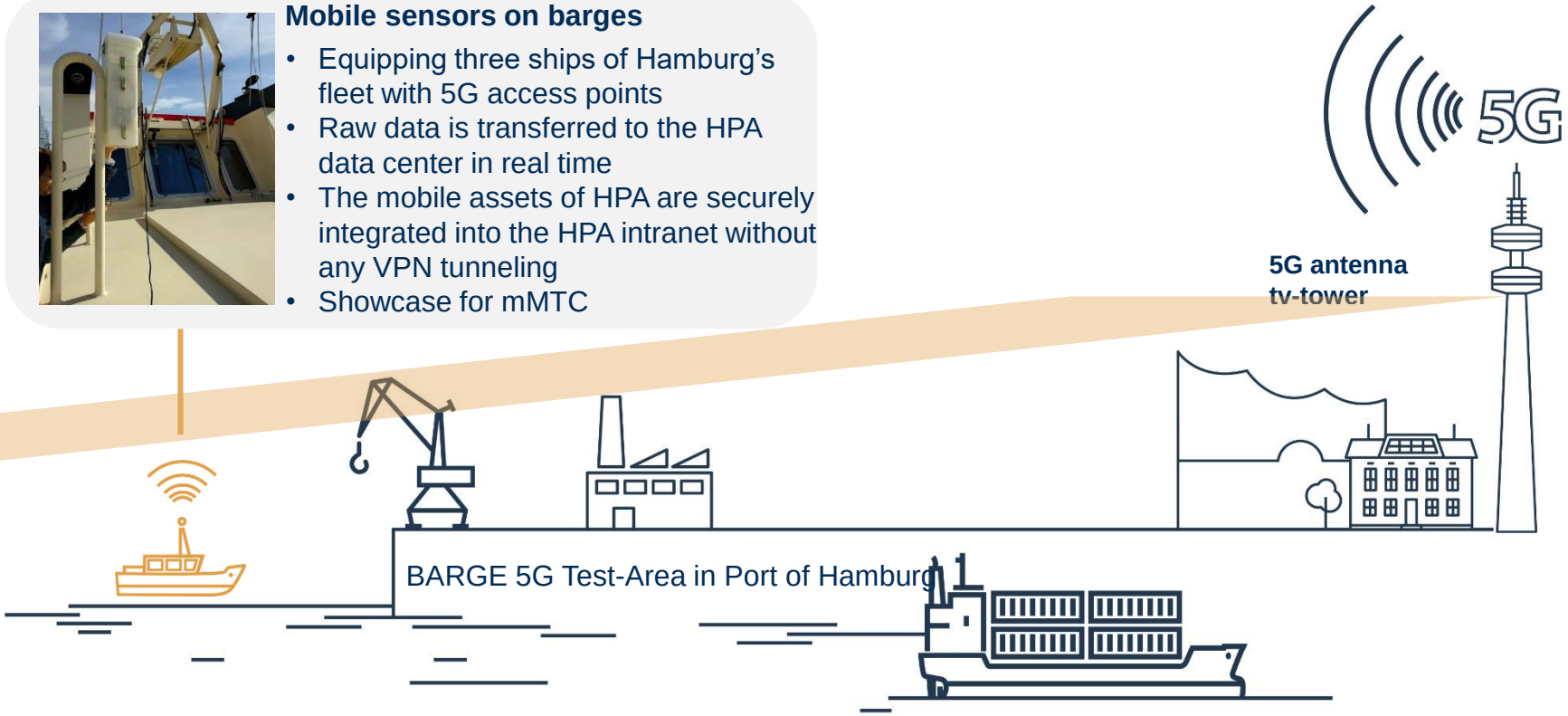
Use-Case 1: Traffic light control for better traffic flow

Use-Case 3: Mobile AR- and VR Headsets

Use Case 1 – Mobile sensors on barges for emissions measurement

Mobile sensors on barges

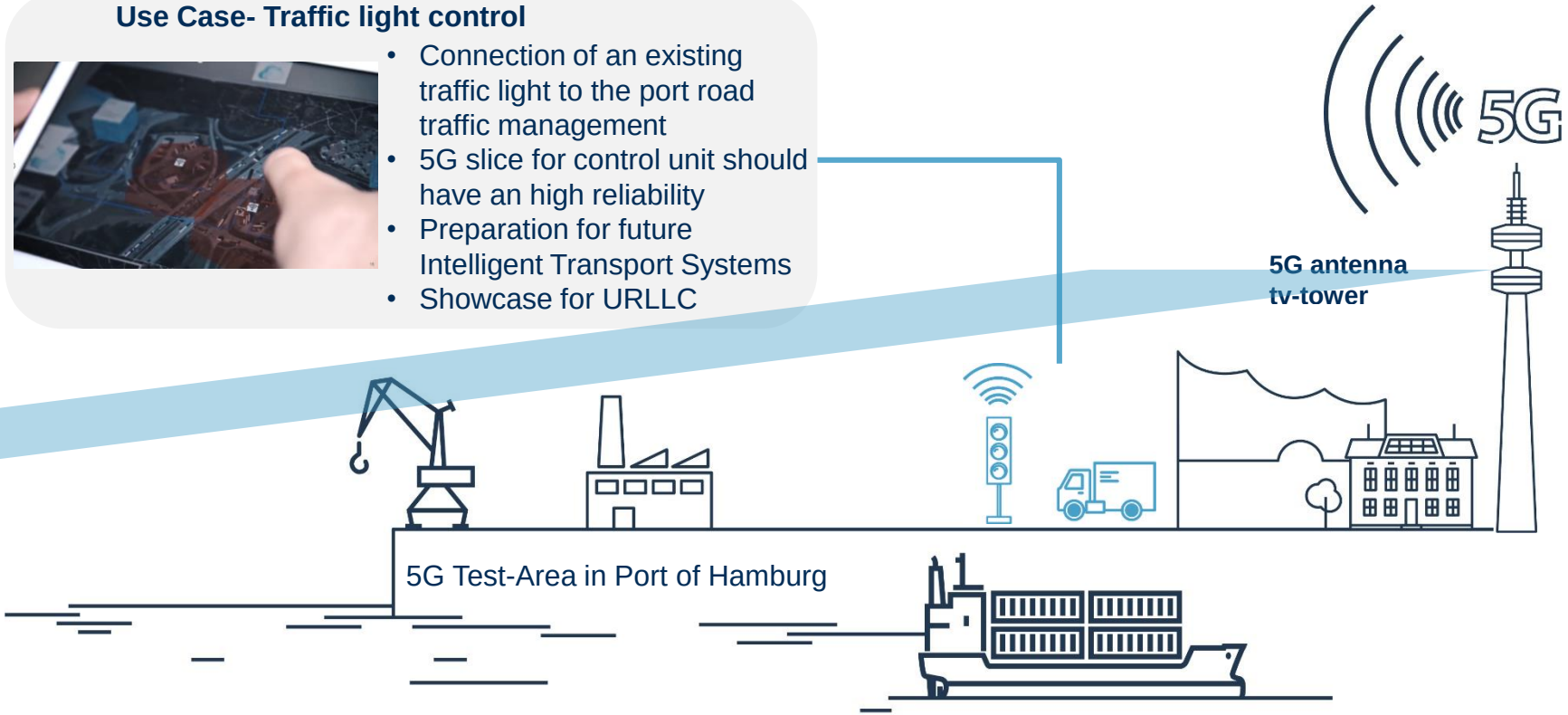
- Equipping three ships of Hamburg's fleet with 5G access points
- Raw data is transferred to the HPA data center in real time
- The mobile assets of HPA are securely integrated into the HPA intranet without any VPN tunneling
- Showcase for mMTC



Use Case 2 – Traffic light control

Use Case- Traffic light control

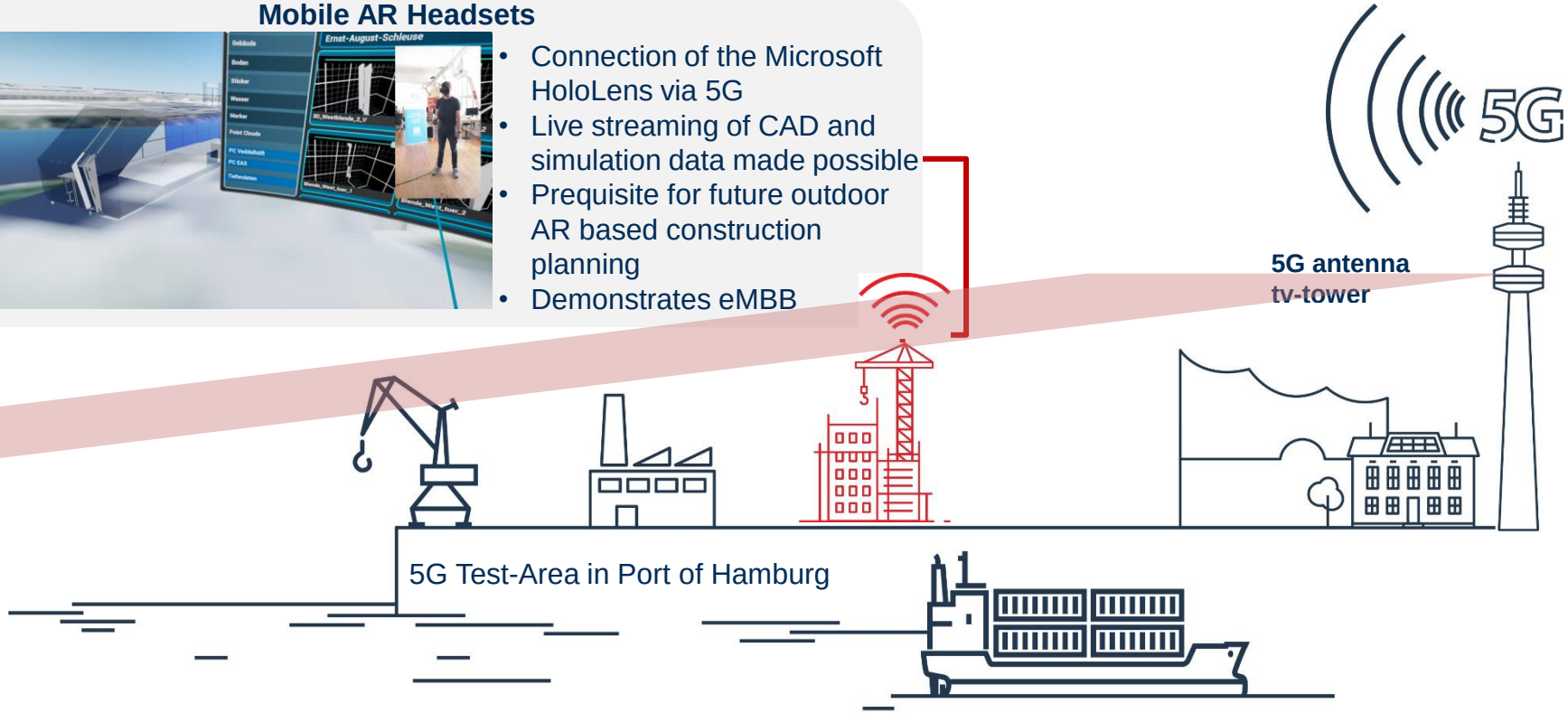
- Connection of an existing traffic light to the port road traffic management
- 5G slice for control unit should have an high reliability
- Preparation for future Intelligent Transport Systems
- Showcase for URLLC



Use Case 3 – Mobile broadband for augmented reality headsets

Mobile AR Headsets

- Connection of the Microsoft HoloLens via 5G
- Live streaming of CAD and simulation data made possible
- Prequisite for future outdoor AR based construction planning
- Demonstrates eMBB



Intermediate Conclusion – Project still ongoing

Port of Hamburg is 5G ready

1. Port of Hamburg core area is covered since Jan 2018
2. Evaluations on waterways and ashore show: Signal is permanently stable
3. Hamburg has secured a major technological lead for itself through the test field.
4. Deutsche Telekom, Nokia and HPA won GloMo-Award (5G Industry Partnership Award) at Mobile World Congress for seaport testbed

Outlook

Implication of 5G field test on Port and City of Hamburg

Prototyping stimulates Ideation

Ideas for new 5G-Use Cases in HPA

The way to 5G

Seaport Testbed

5G Smart Sea Port Demonstrator

- 2017/18 – Network-Slicing with“Multi-Service” is available for HPA
- 2018/19 – Implementation and evaluation of the testbed Hamburg use-cases
- From 202X – General availability of 5G

© HPA-Bildarchiv, Andreas Schmidt-Wiethoff

Hendrik Roreger
Head of Business Intelligence
Hendrik.roreger@hpa.hamburg.de
Tel.: +49 40 42847-5007

Hamburg Port Authority AöR
Neuer Wandrahm 4
20457 Hamburg
Tel.: +49 40 42847-0