
ITU

Third annual ITU IMT-2020/5G Workshop and Demo Day – 2018

18 July 2018

Session 3:
Industry's achievements on IMT-2020/5G and potential future developments

GRUPPO TELECOM ITALIA

TIM deployment of 5G in italian cities

Luca Pesando, TIM
WP1/13 co-chairman

TIM

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TIM Approach: Project, Activities, Partnerships

Industry Influencing

EU 5G Action Plan

- 3GPP
- GSMA
- ETSI
- IETF
- ITU
- NGCM
- BBF

Partnerships

- Ericsson
- Huawei
- Juniper
- Qualcomm
- 5G for Italy
- +52 partners
- UniTo, PoliTo
- UniBa, PoliBa, Uni Salento
- SSSA

Labs

- 5G Radio Lab
- 5G Core Slicing Lab
- FutureNet Lab
- IoT Open Lab
- Giga Services Lab
- Machine Learning Lab
- I4.0 Competence Centres

Ecosystem

- Torino 5G
- San Marino 5G
- Bari Matera 5G
- EU Horizon2020
  5G Crosshaul, Fantastic5G
  Flax5Gware, MiWaves
  Metis II, MonArch

5G on field: TIM trials

Bari Matera 5G: relevant numbers

Economics

55 Partner

5G Target Coverage

10 verticals, over 70 use cases

More than 60 Mln € in 4 years

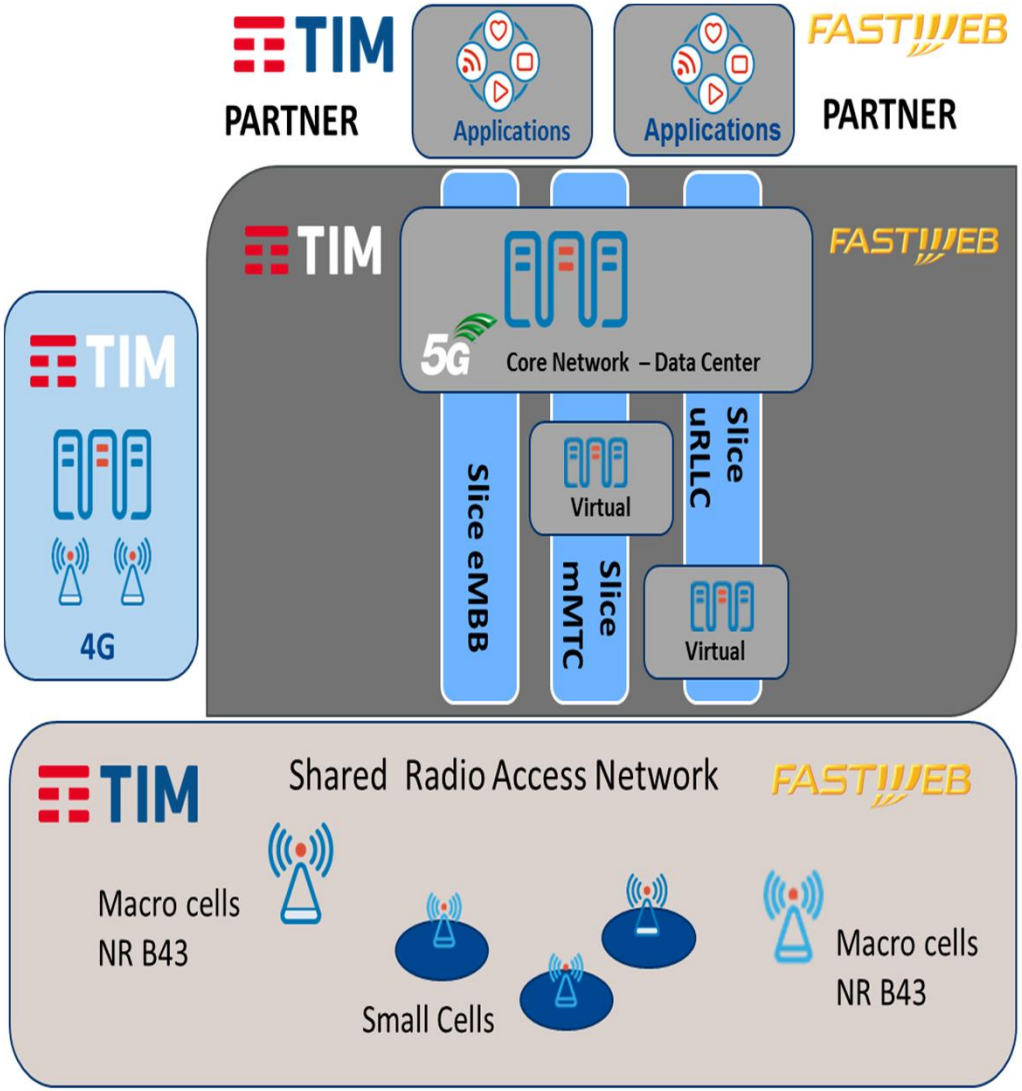
3	7	11	22	12
Leader operators	Universities/ Research	Public actors	Local Companies	Industry Leaders

75% of population by 2018

Completed in 2019

Automotive e Mobilità	Smart Agriculture	Monitoraggio Ambientale	Public Safety	Smart City
Sanità 5G	Industry 4.0	Media, Education e Realtà Virtuale	Turismo e Cultura	Porto di Bari

Bari – Matera 5G – The network view



Network open to development of services and apps by third parties

«Network Slice» fitting the use case requirements

Development of the multi-operator access network (*) - First in Italy

Adaptive antennas and micro-cells for optimum coverage

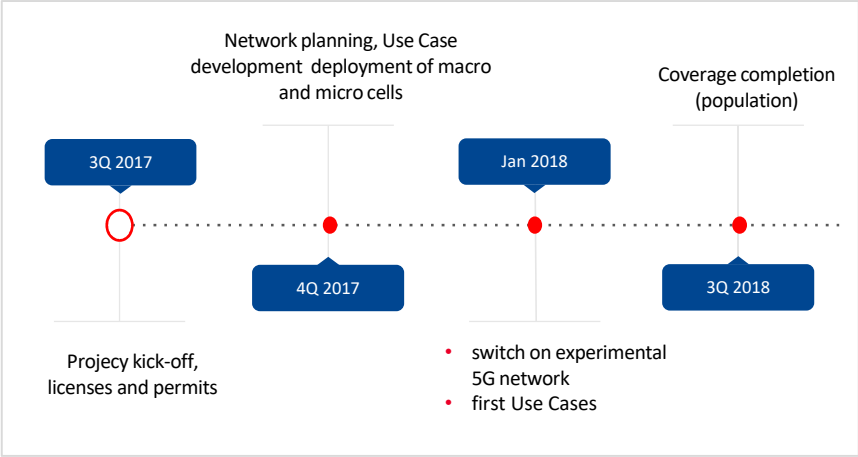
(*) 3GPP 23251 Standard and evolutions

Republic of San Marino 5G

SAN MARINO

TIM leading 5G innovation

ROADMAP



- **Frequencies**: B42 (3400 – 3600) →200 MHz + 26 GHz→ up to 800 MHz
- **8 RAN sites,** multiple antennas (each one multi-sector)

USE CASES

Public safety	Security enhancements to support citizen and assist police, using wearable cam, sensors, drones.
eTourism	Virtual Reality City Tour with guides, multimedia info point with real time and HD infotainment contents
Smart metering	Smart metering of gas and water- Smart City Control Room
Traffic manag.	Sensors and applications to intelligently manage in/out traffic and parking lots – SC Control Room
eHealth	Remote monitoring and remote assistance of patients
Smart retail	Vertical solution for fashion brands (i.e. Internet of Products)

Torino 5G: a guiding experience

Establish a strong research community

... and many other partners joining

Torino Smart Roads:
- *15+ partners*
- *MISE Smart Road framework (Jan 2018)*
- *Test paths for Urban ADAS (streets, bulevards and parking areas)*
- *Hybrid Road infrastructure (5G, LTE, C-V2X, ITS G5 planned)*
- *5 use case families under definition*

New Jan 2018

Industry and innovation pilots

Virtual Reality

Public Safety, Push-to-drone

Environment monitoring,

Smart City Control Room: IoT platform and control center

Public Safety wearable CAM & Bracelet

Smart Parking, Assisted Driving

Connected Factory in the Cloud

Assisted Mobility and eITS

Roadmap

Virtual Reality demo for Tourism ; First Small Cells @23 Gbps

1Q2017 — **MoU signed and kick-off**

3Q2017 — **5G trial launch in the city area**

2018

2019

2020 — **Full 5G city coverage and evolution of experienced use cases**

TIM turns on the first 5G antenna at Politecnico of Torino

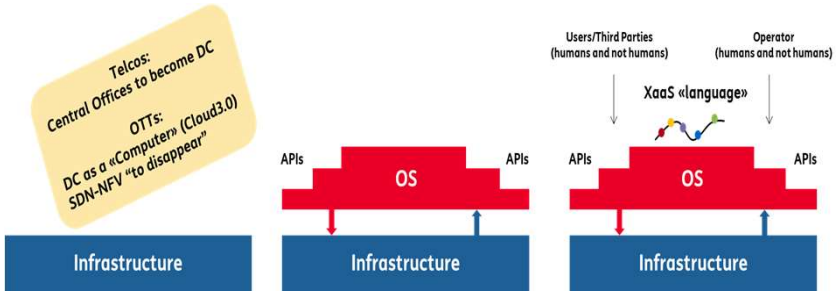
15 Dicembre 2017

A new record for TIM, with Ericsson collaboration, which allowed to show 5G power. The frequencies at 28 GHz have been used , in the focus of TIM innovation effort , in partnership with a well known big player as Qualcomm.

Campus 5G – three pillars for an Open Lab on 5G

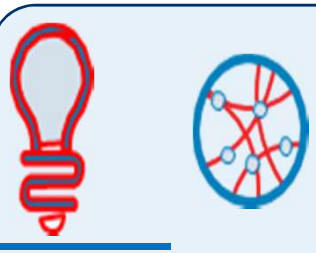
Open and distributed network infrastructure for an ecosystem for demand studies

Network/service transformation (softwarisation …); Involvement of partners, clients and suppliers…



Infrastructure for advanced tech, know how e new projects; involving the City, Torino5G project and verticals; university

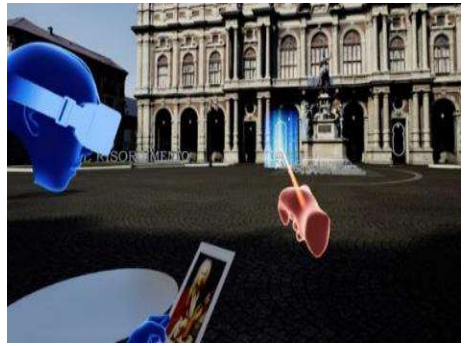
«New Radio»
Pre-5G infrastructure innovative, experimental and open
Pre-commercial **RAN technologies,** pre-standard solutions and PoCs, hosted by PoliTO in specific areas



«FutureNet: Experimental Core infrastructure; open, offering Network APIs for NaaS.
core and fixed network related techs (Future.Net, Software Defined Network, MEC-Fog, Slicing, Open Source , TIP…)
by vendors, Open Source projects, research projects in partneship with PoliTO

«Living Lab»
PoC development and demos of innovative services and e Apps exploiting the infrastructure
Involvement of PoliTO in conceiving and developing new services
i3p project with verticals as partners

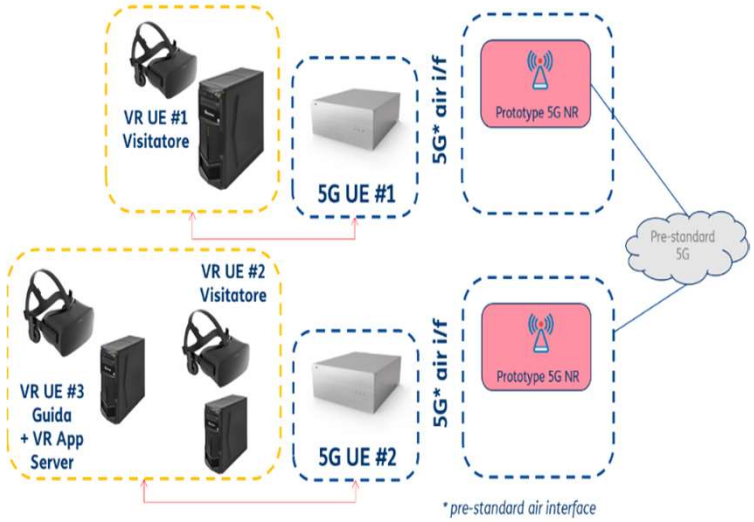
Virtual Reality - 5G enabled guided visit to Palazzo Madama (Torino) and the Pietro Micca Museum



Visitors can virtually access touristic sites **wearing VR glasses** during the virtual visit it is possible to move freely within the visited space, get close to objects of interest and have a tactile experience.

Visitors can interact with each other and with a virtual touristic guide, (vocally) questioning them and chatting in real time.

The network assures an adequate performance. AR/VR based visits benefit of the digital scan of the visited places made by Media Company.



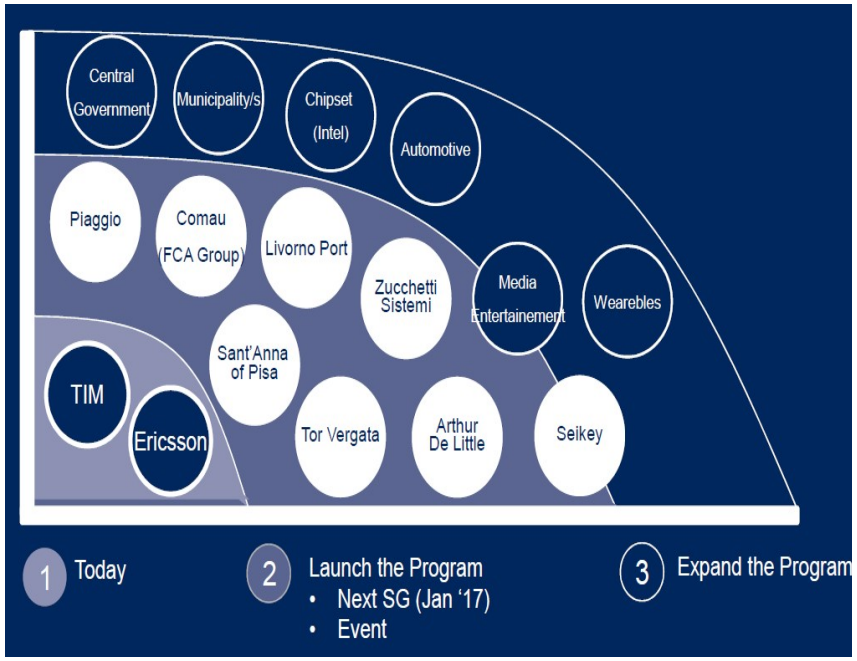
Resolution	30Kx24K
Bit depth	36
Frame rate	60
Stereoscopic	x2
Compression	1/600

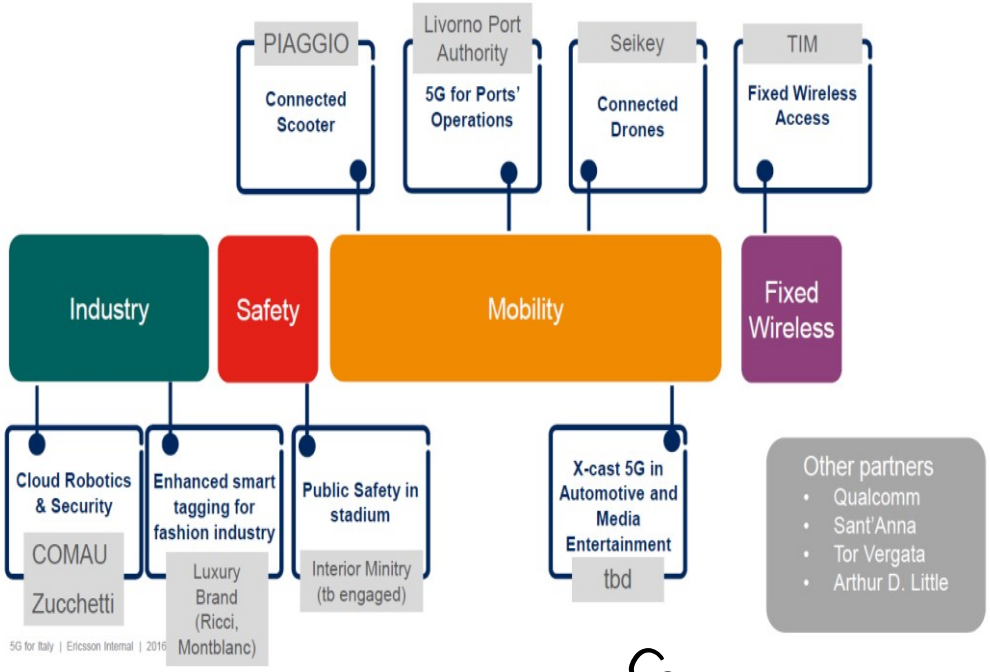
~5.2 Gbps

Last but not least: speed record 23 Gbps (on 28Ghz band)

«5G for Italy»: Engaging the ecosystem

A joint TIM & Ericsson initiative:





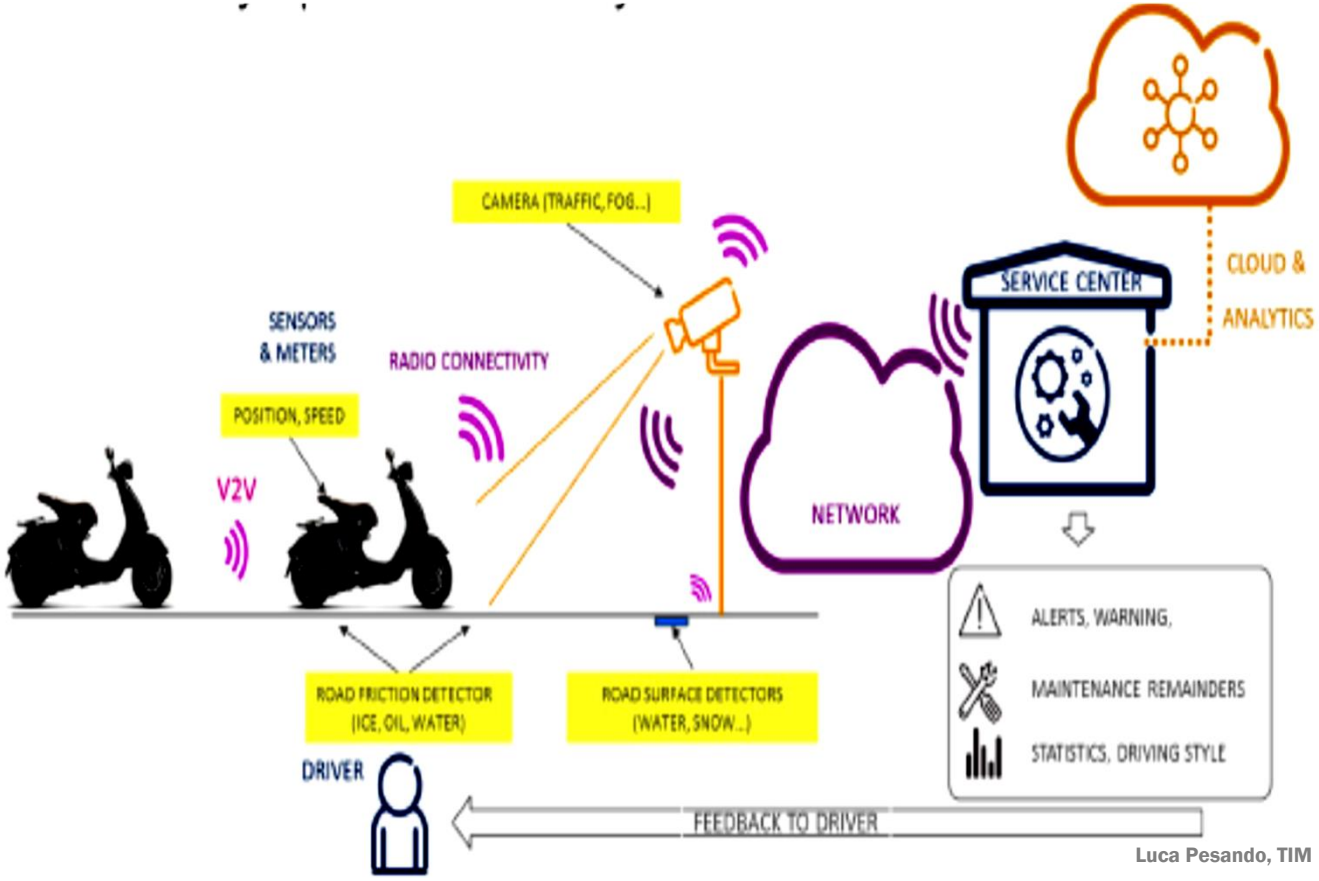
5G for Italy: Tim ed Ericsson open to startups and SMEs

Together with 12 industrial partners collaborating to the project the two companies have started the selection to implement innovative services for automotive area, nella sanità connessa e nel multimedia ultrabroadband

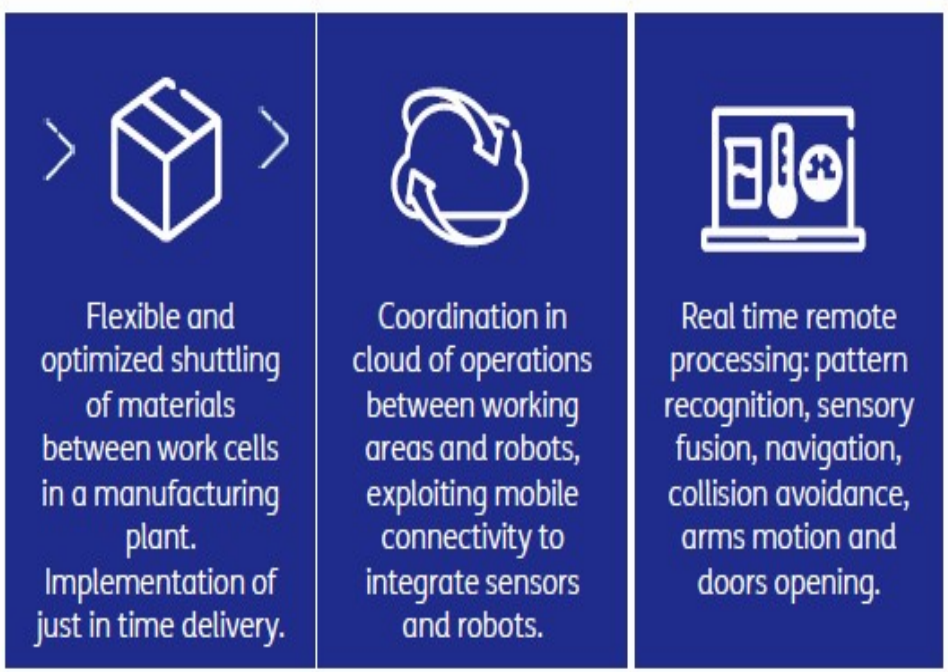
CorCom, Jan 2018

Not only Cars: Connected Scooters (5GforItaly)

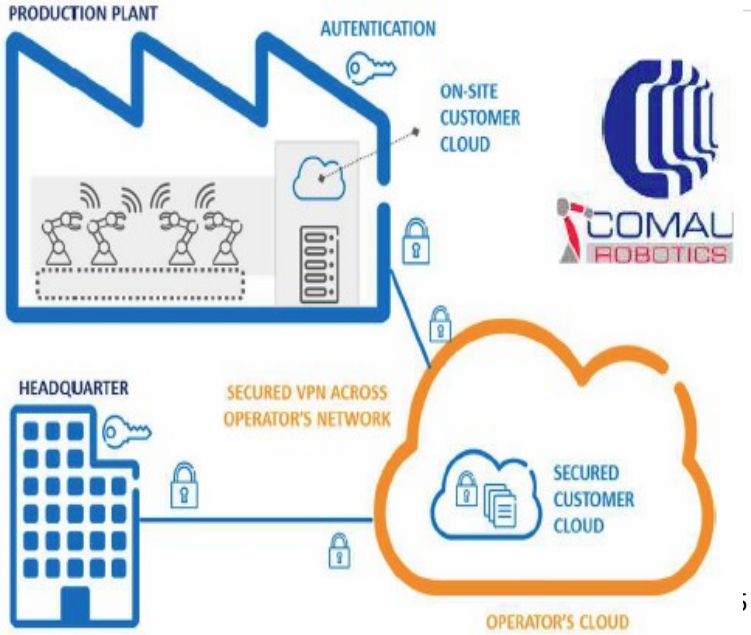
- **PoC/Trials using LTE-A and 5G, to increase driver safety from V2V , sensors and Road Infrastructure**
- **4G/5G Radio Connectivity and NB IoT Accelerator cloud platform could be used to collect and process data from scooters and Infrastructure (e.g. VideoSurveillance, Road sensors, Traffic Management) to improve the overall safety**



5G for Italy: Cloud robotics & Security



- **Use case: 5G Production Plant coverage and process control / robot automation**
- Continuous production monitoring with remote quality inspections
- Measurements on the production chain for fault diagnosis and prevention
- Analytics for anomalies detection and fault prevention
- Guaranteed secure storage of data and secure processing



Will anything happen that will stop all this from becoming reality ?

"Chi ha provato il volo camminerà guardando il cielo, perché là è stato e là vuole tornare"
(Leonardo da Vinci)