

The Role of Mobile Networks in the Future BVLOS Drone Operations: Safety, Compliance and Innovation

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We invest billions in future capabilities!

Strengthening the best networks in Sweden
– upgrading 4G and build new 5G networks

Modernizing 4G

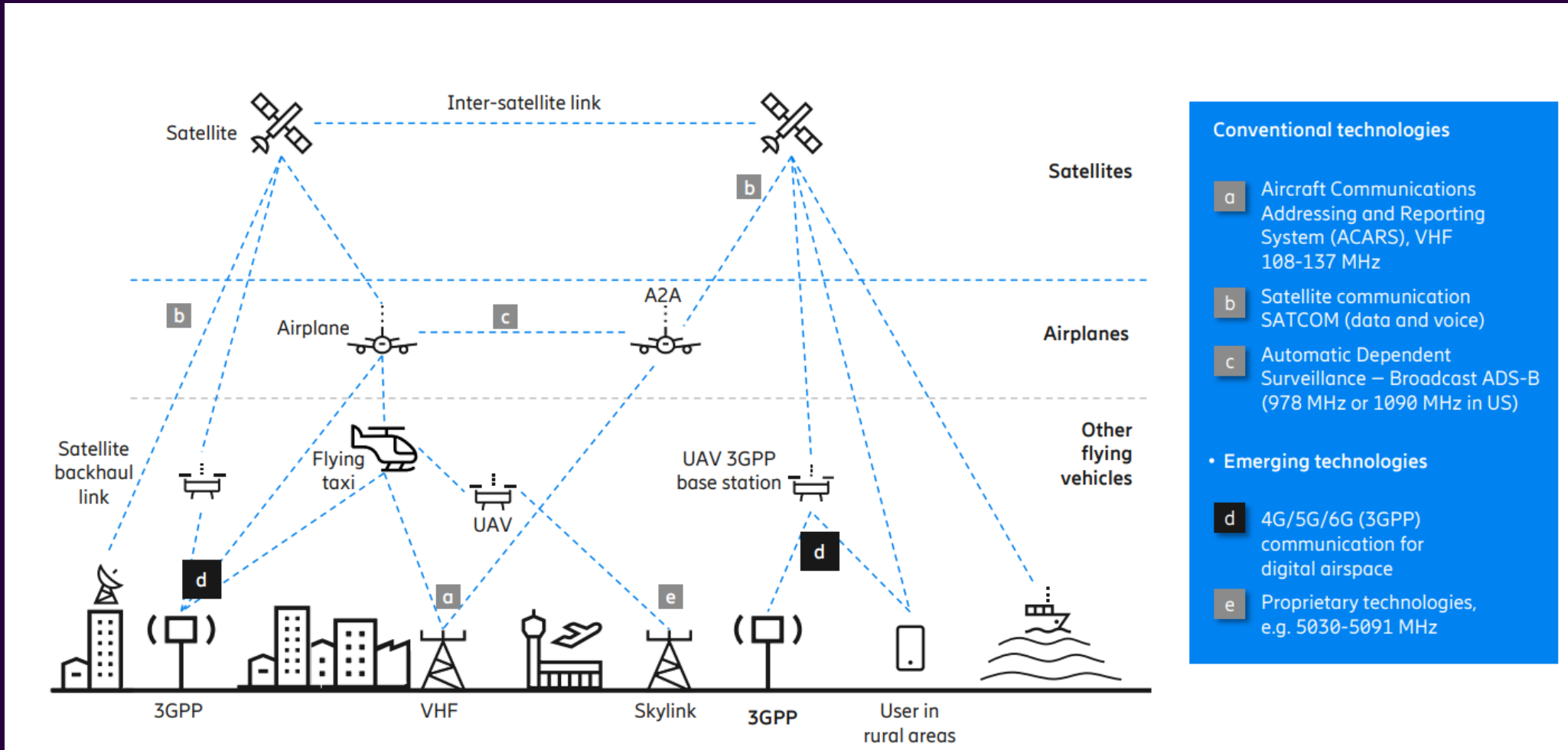
Building new 5G

Removing old
Copper, 2G and 3G

4G + 5G

>77%
av befolkningen

Communication Technologies in Digital airspace



The beauty of the public mobile network - it is standardized to connect equipment that moves around

Emerging connected use-cases have similar need for control and payload and remote management



Phones/PADs/PCs



Trucks



Cars



Boats



UAVs



AGVs/Robots

All use-cases have dedicated need for predictive connectivity characteristics to function properly

Robustness

Speed

Latency

Security

APIs

Integrity

Costs

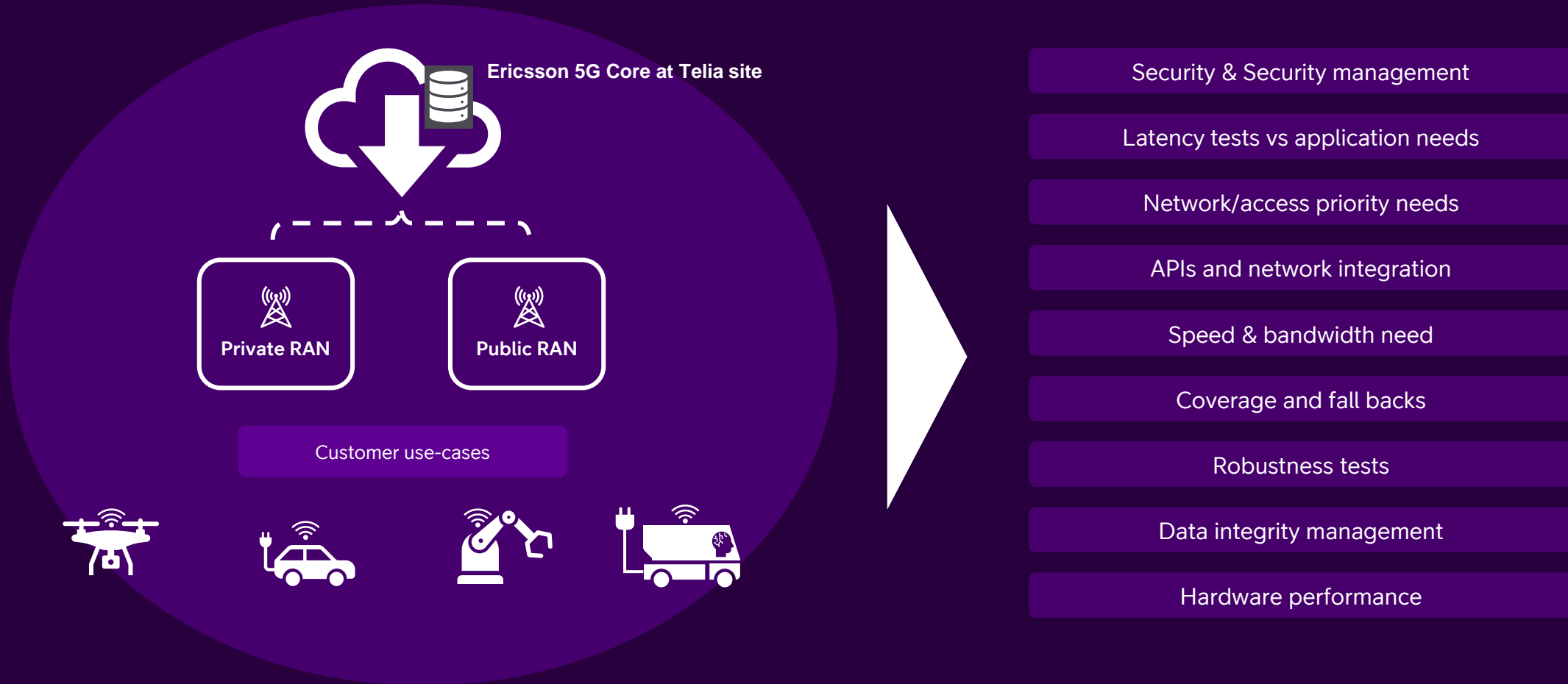
Priority

Coverage

Regulation



Providing state of the art 5G technology – bring the lab out on the road or up in the air



Keeping Sweden at the forefront of innovation

- NorthStar is a unique collaboration between Telia and Ericsson
- Providing access to next-gen 5G network and computing technologies
- Connecting industry, academia and the public sector
- Accelerating the development of monetizable and more sustainable solutions



AstaZero



+ leading brands in automotive and transport industries

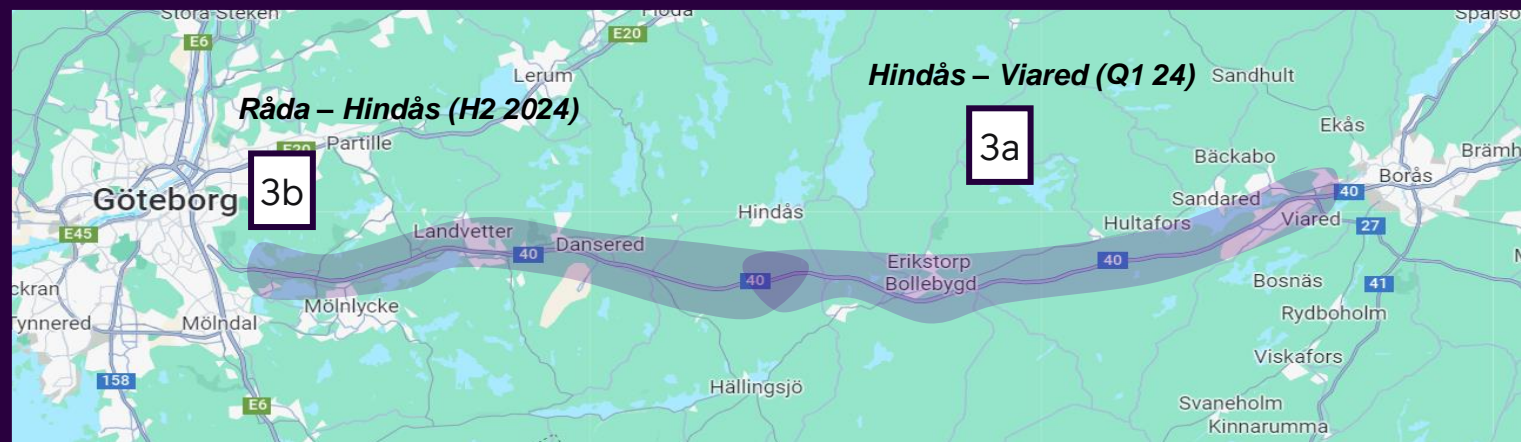
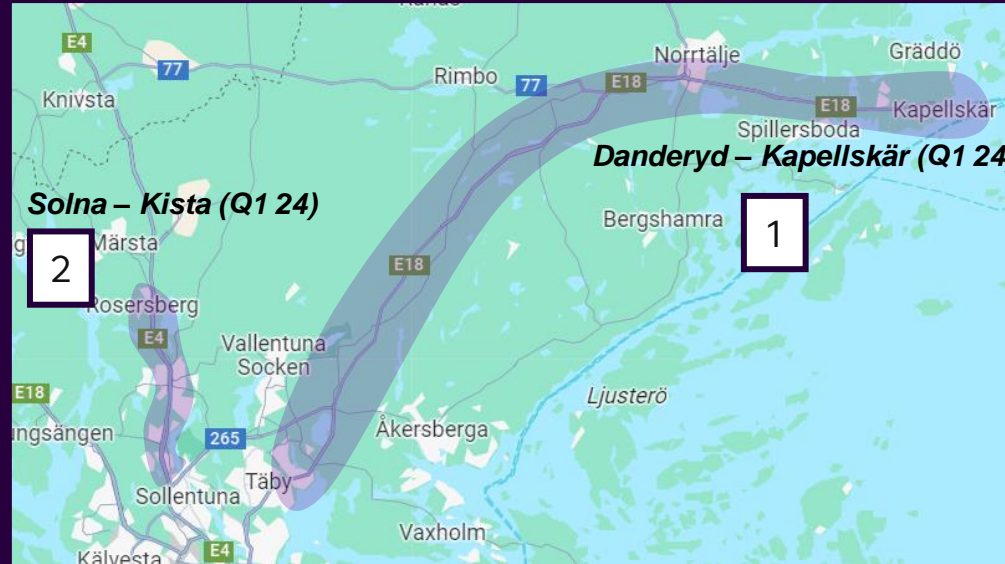


As part of EU CEF2 ambition to enable 5G innovation, we now build 150 km transport network corridors

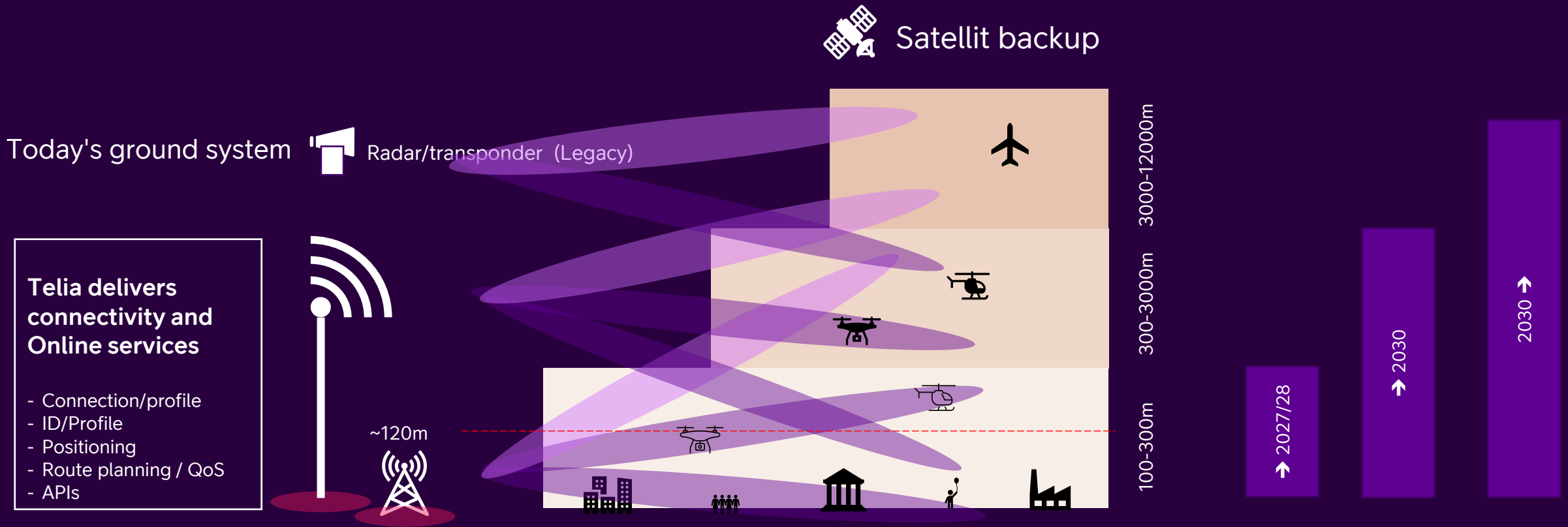


Co-funded by
the European Union

- **Totally 11 Billion SEK for cross-border 5G corridors in EU**
- **Enables connected and automated transport**
- **Supports supply chain efficiency and EU long term competitiveness**



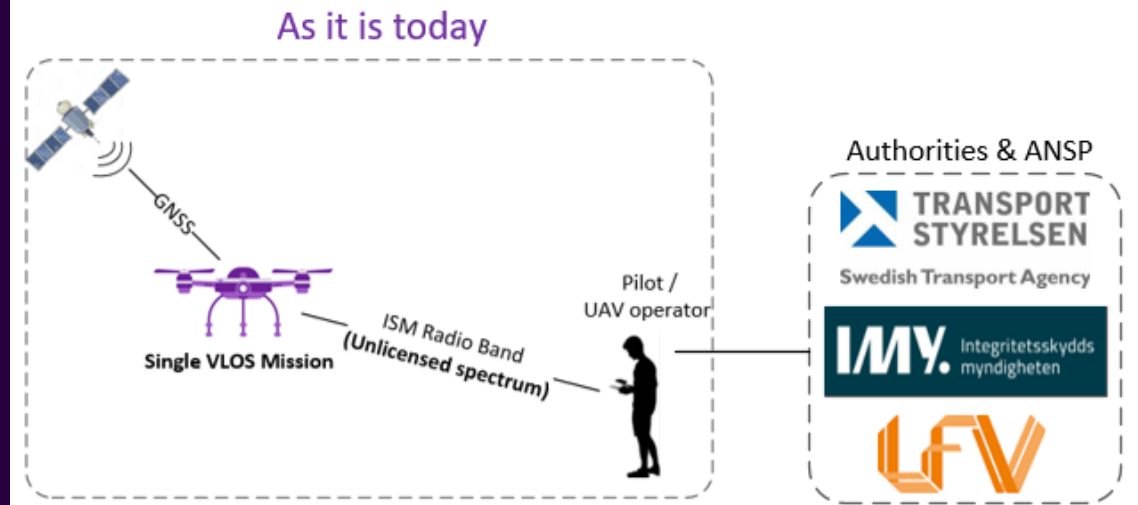
The national mobile network is an important platform to enable control of the airspace, initially at the lower altitudes



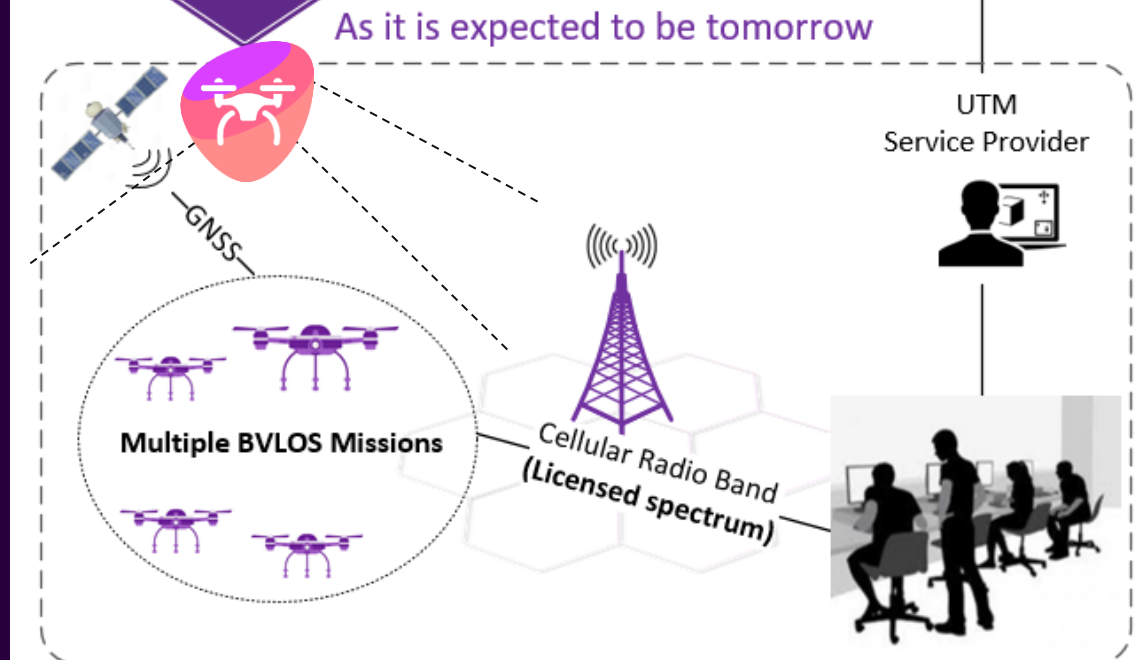
Enhancing BVLOS Drone Operations with Mobile Networks

Milestone 1

Advanced IOT SIM for C2 and Payload data
Coverage Maps in Air



Transformation towards
Safer, Autonomous
BVLOS missions



5G enabling BVLOS flights _ Value Added Service

5G network reliable connectivity

How to seamlessly transmit data between drone and ground stations in a reliable way?



Quality of Service

Network Slicing

UAV flight management

How to manage the growing number of drones and UAV in the airspace?



Drone identification

Drone remote control

UAV flight security through 5G

How to fly drone in a secured way and reduce the risks for other aviation and people?

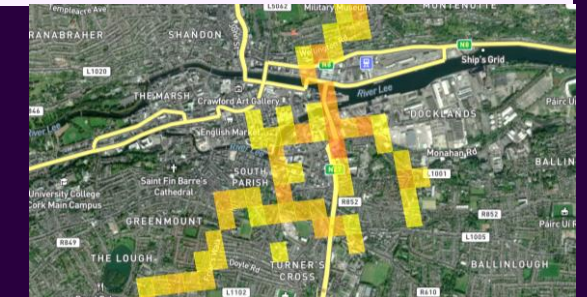
How to mitigate ground risk for Special Operations Risk Assessment (SORA)?



Network estimated Position Area



Drone location tracking



Geographic SIM density



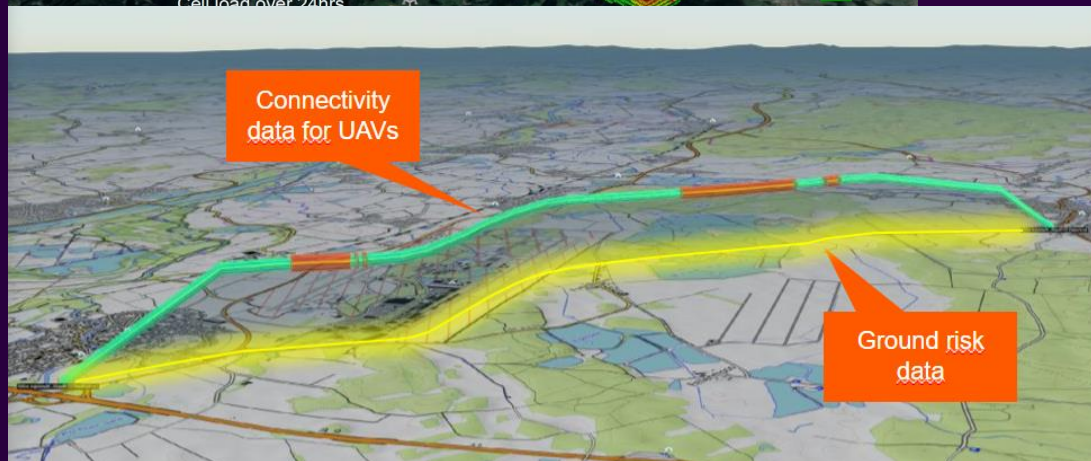
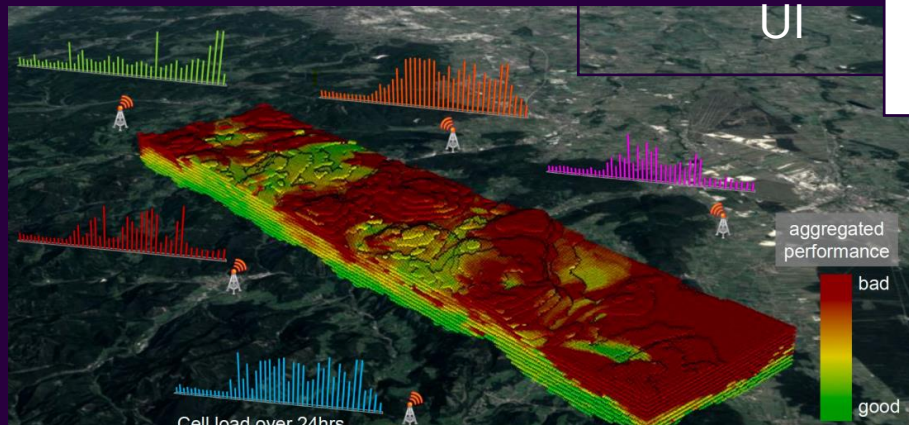
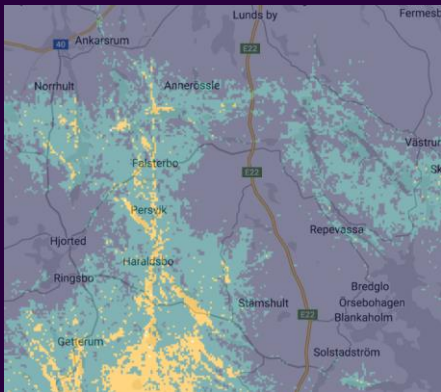
Provide dynamic real-time Connectivity Coverage data for pre, in, and post-flight assessment to mitigate risk

In partnership with



Planning based on the capabilities of the mobile network to securely carry out mission

Today's tool is a ground-level coverage map



3:rd party app
1

3:rd party app
2



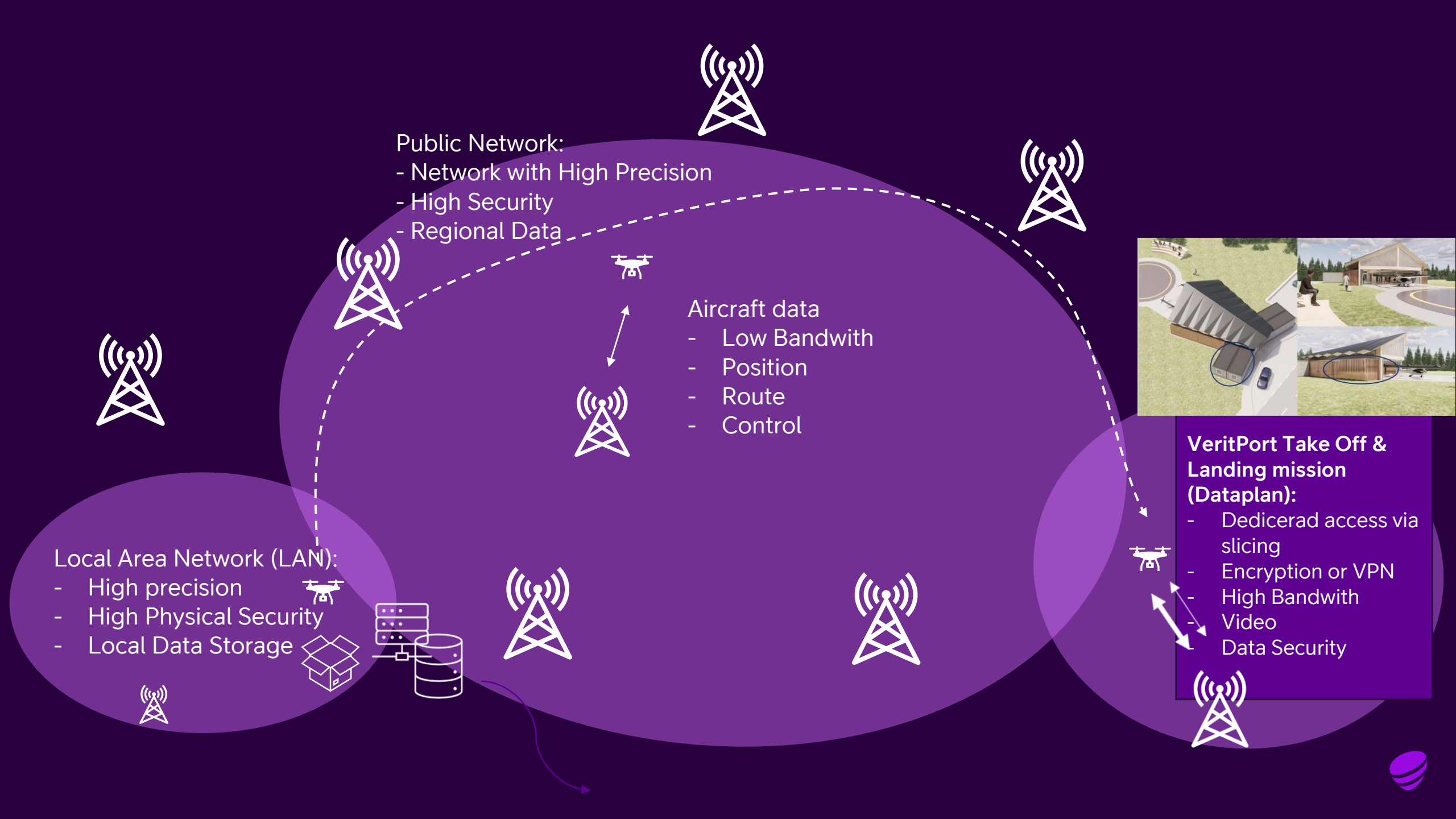
UAV Operation Control Centre

API
API tailored to convey necessary information for various types of external parties

Parameters: for Pre Flight, In Flight, Post Flight

- Flight routing
- Drone type
- Traffic demand (C2, Video and/or additional requirements)
- Time of day
- Etc.

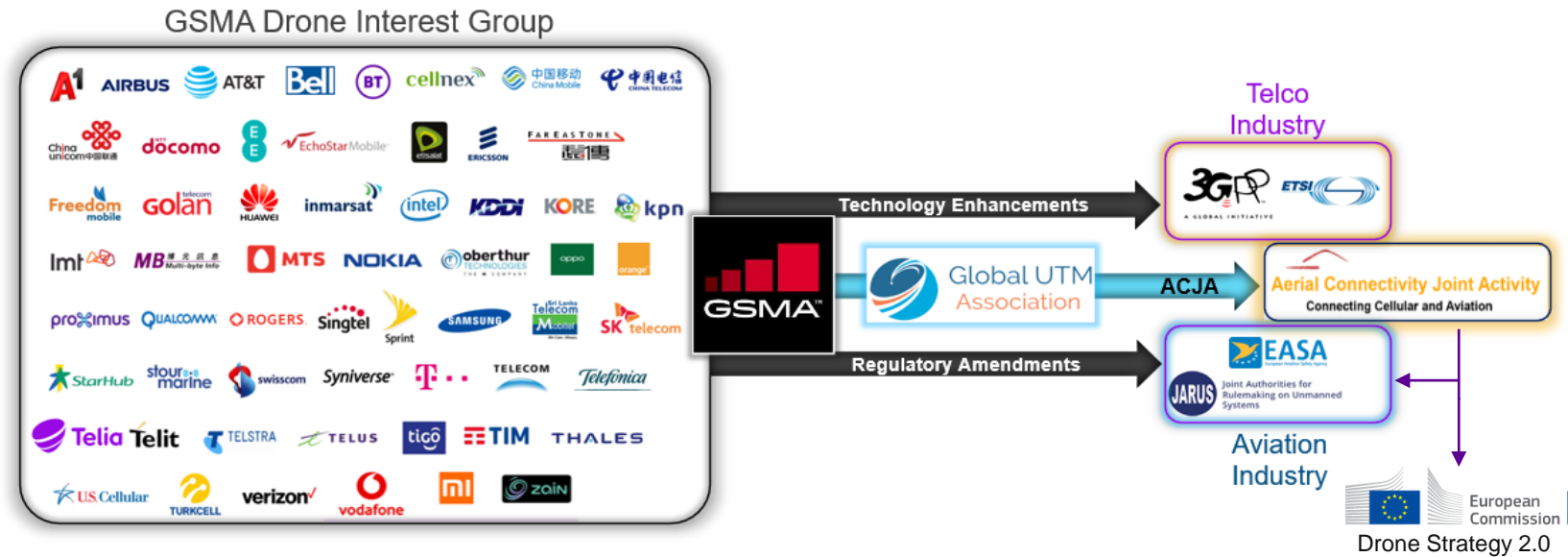




Telia's industry engagement, addressing harmonized and standardized UAS solutions

- Defining technical and regulatory challenges
- Address the challenges as new improvements (standards)
- Increase stakeholders' understanding of benefits the global-standardized cellular capabilities bring for UAS & UTM
- Paving the way for innovation and proof-of-concepts of enhanced and new telco-grade features for aviation

International



National



Take Aways:

Mobile Network is already working well for UAV type traffic cases and will be even better in the future.

- Mobile Network technology is evolving
- New tools to understand UAV coverage based on mission needs
- Operators adapting to support market needs.
- New types of value-added services and offerings



Tack