HYBRID SATELLITE-TERRESTRIAL

5G NETWORKS SERVING REMOTE AREAS

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HYBRID SATELLITE-TERRESTRIAL 5G NETWORKS

Solution to achieve 100% 5G coverage in Brazil

Coverage of Remote Areas

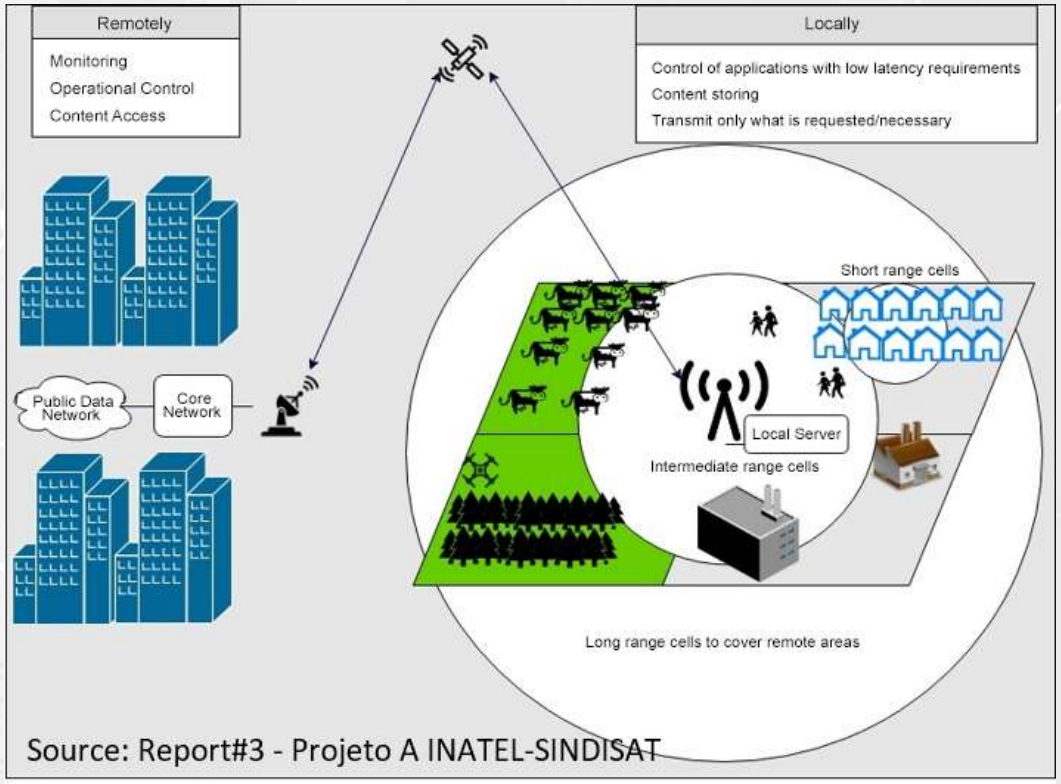
- Brazilian territory has 5.570 municipalities of which 67% have less than 10.000 inhabitants, although 86% of the 207 million inhabitants live in urban areas
- This clearly point out to the need for larger 5G cells to serve remote areas

Local functions

- Controlling / Content caching
- Requesting/transmitting to remote only if/when needed

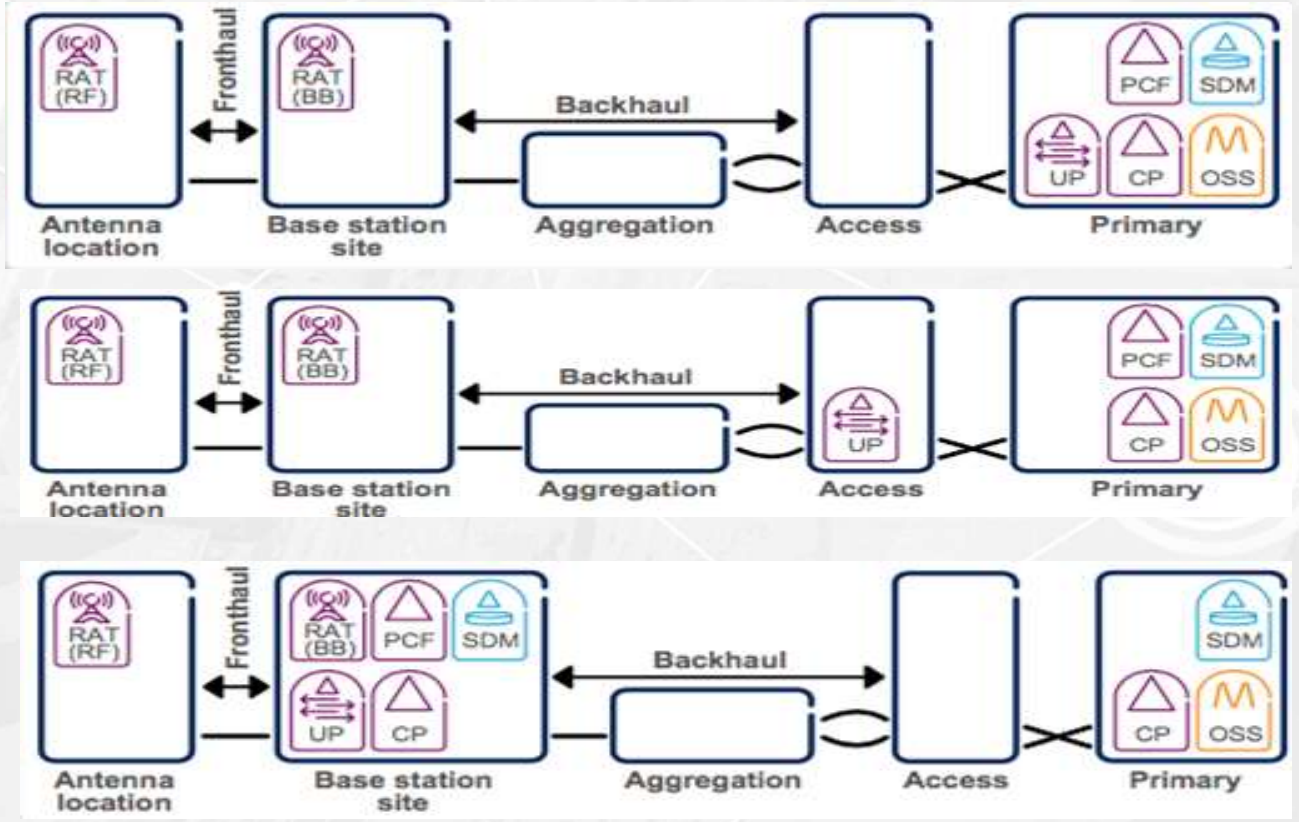
Remote functions

- Supervising / Monitoring
- Defining operations
- Access to content if/when not available locally



LOCAL-REMOTE FUNCTIONS, NETWORK SLICING & EDGE COMPUTING

5G base stations serving rural and remote areas will be able to leverage network slicing and edge computing techniques to better deal with latency requirements in hybrid satellite-terrestrial networks



Source: 5G Brasil Infrastructure Commission Report

USE CASES: AGRIBUSINESS ECONOMIC DRIVER IN BRAZIL

- Agribusiness is an important component of Brazil's economy, summing up to 20+% of the country's GDP: agriculture, transformation and distribution *

- Applications span from pure connectivity requirements to flying drones to improve farming yields

* Source: Report#2 IoT – 5G Brasil – Research and Use Cases Commission

Source: Portal R2S


Source: GSMA

RURAL & REMOTE EDUCATION WITH 5G ENHANCED BROADBAND

- Schools in rural and remote native indigenous regions connected via satellite can also serve as base stations for larger 5G cells serving the communication needs of wider communities
- In addition to primary school, distance learning can also bring higher level education to remote areas through institutions like EDSAT – Brazilian Education Network via Satellite and Associated Centers
- A combination of direct to home with large cells connected to 5G base stations co-located with VSATs will bring a new frontier to increase digital inclusion in Brazil

IMPROVING E-HEALTH WITH 5G

- It is expected that the 3 main 5G scenarios, namely enhanced broadband, massive machine type communications and crtical/ultra reliable/low latency communications, will support important of e-Health applications in Brazil's remote areas

- Local doctors in such remote areas will be able to get support from expert doctors from main cities through a number of 5G infrastructures, including hybrid satellite-terrestrial networks

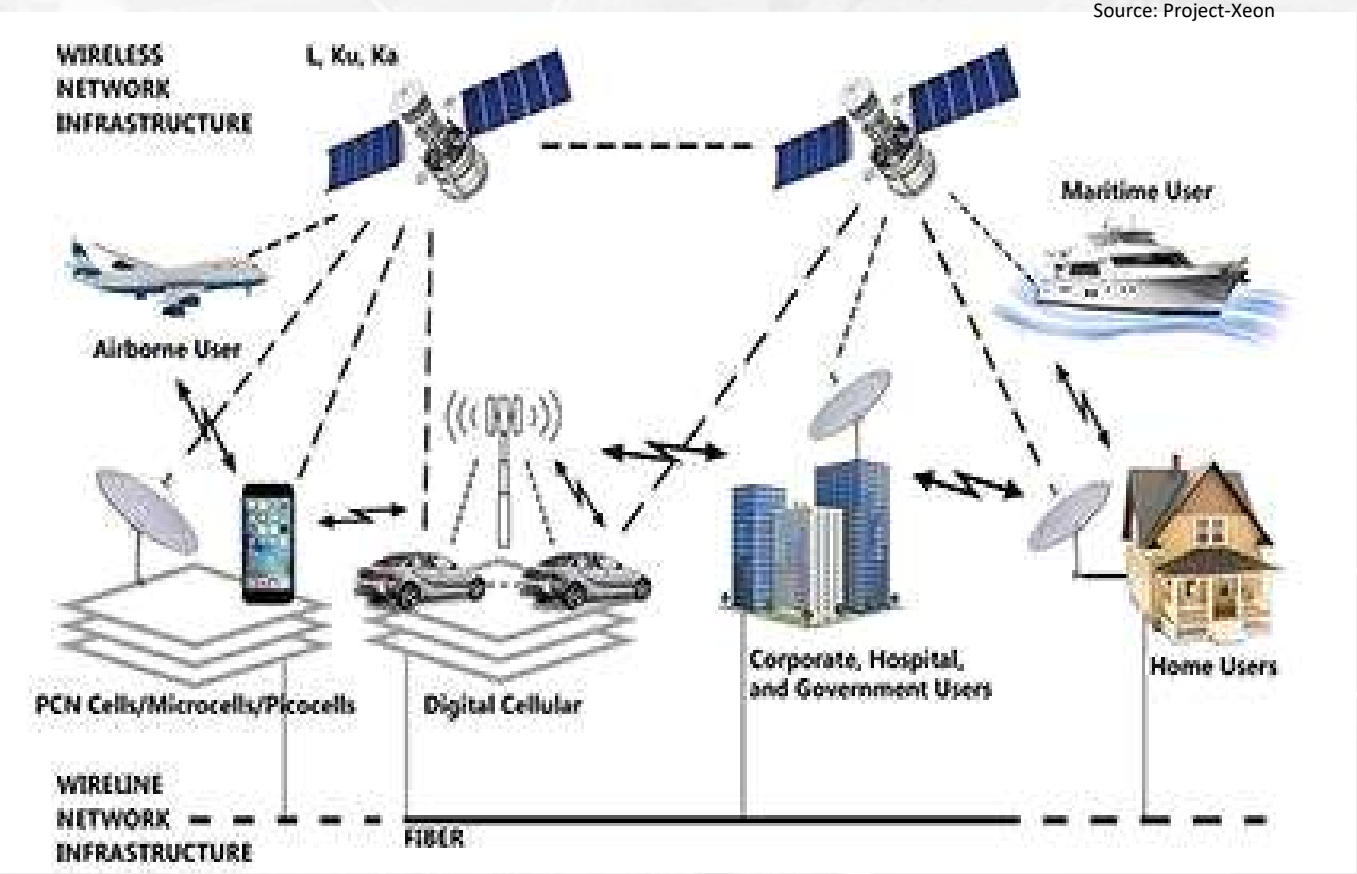
- Robotic surgeries/medical interventions will also be enabled by these hybrid networks, improving quality of life to millions living in rural areas

Source: EHealth Reporter

Source: Startup Saude

SATELLITES IN THE WIDER 5G ECOSYSTEM

Source: Project-Xeon



Interoperability will be key to achieving successful integrated and hybrid 5G satellite-terrestrial networks

CONCLUSIONS

- Reaching rural and remotes areas is a key 5G scenario for Brazil
- Bringing resources to the last mile using techniques such as network slicing and edge computing will make 5G networks more efficient and better capable of dealing with latency requirements using satellite infrastructure
- SINDISAT (Brazilian Satellite Operators and Service Providers Syndicate) is an active participant in 5G Brazil, sponsoring 2 projects in partnership with INATEL involving 5G delivery via satellites and hybrid networks
- Trials of 5G technology via satellite will start in Brazil in December 2018, involving SINDISAT-INATEL-COMTECH using the SES-14 satellite and SES' teleport in Hortolândia – São Paulo

Hybrid satellite-terrestrial networks

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