IMT-2020 and beyond networks- Terrestrial and Satellite connectivity convergence

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ABOUT RASCOM

RASCOM is a Pan-African Satellite Communication Organization, created from the will of African Governments and States, and set up in order to bridge the digital divide between the continent and the rest of the world.

- Created in 1992 following the adoption of resolution RASCOM/02 of the Conference of Ministers in charge of telecommunications of African Union**, RASCOM gathers 45 african countries members and 2 african organisations**. RASCOM is headquartered in Abidjan, Côte d'Ivoire.
  - Some of the objectives include but not limited to:
    - Provide large-scale telecommunications infrastructure at least cost to rural areas of the continent using appropriate technology;
    - Improve and/or develop long distance communications in each country;
    - Establish direct lines between all African countries without exception;
    - Provide facilities for radio and television broadcasts in each country and enable exchanges of radio and television programs between African countries;
    - Supporting international connectivity: continuing to connect where others cannot go;

Coverage and orbital position

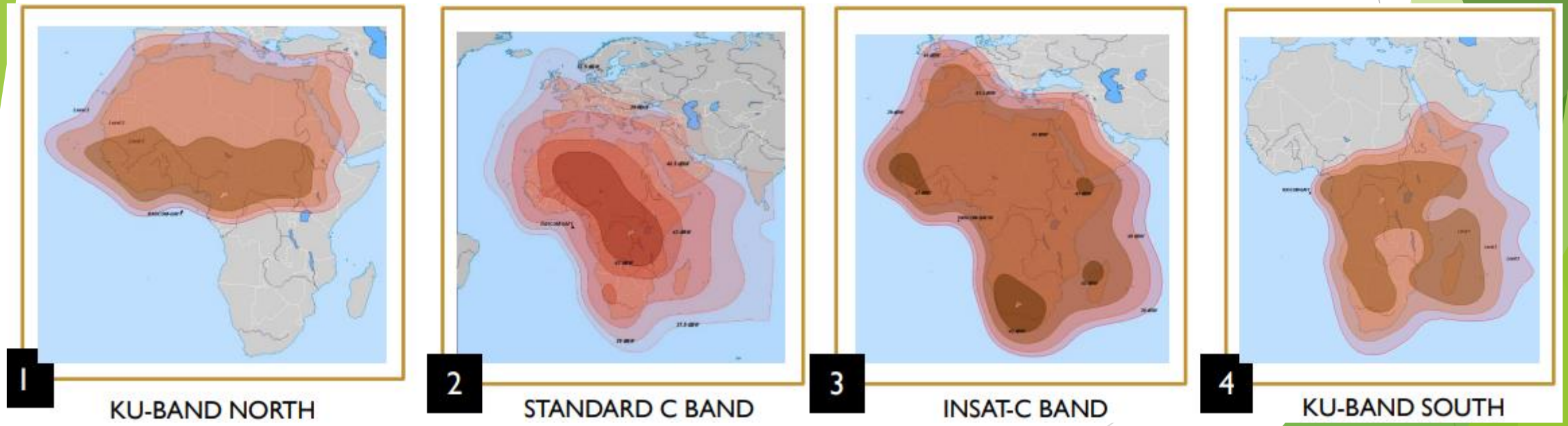
LOCATION : 2.9 E

COVERAGE: Unique Coverage of The Whole African Continent

CONNECTIVITY to South and Western Europe

BAND SPOTS One Single C Band Spot and one Single Insat-C band beam covering all Africa

2 Ku Band Spots Covering North and South of Africa with higher EIRP in rainy zone



RASCOM MEMBER STATES-45

1		AFRIQUE DU SUD	2		ALGERIE
3		ANGOLA	4		BENIN
5		BURKINA FASO	6		BURUNDI
7		CAMEROUN	8		CAP VERT
9		COMORES	10		CONGO
11		COTE D'IVOIRE	12		DJIBOUTI
13		EGYPTE	14		ERYTREE
15		ETHIOPIE	16		GABON
17		GAMBIE	18		GHANA

RASCOM MEMBER STATES-CONT

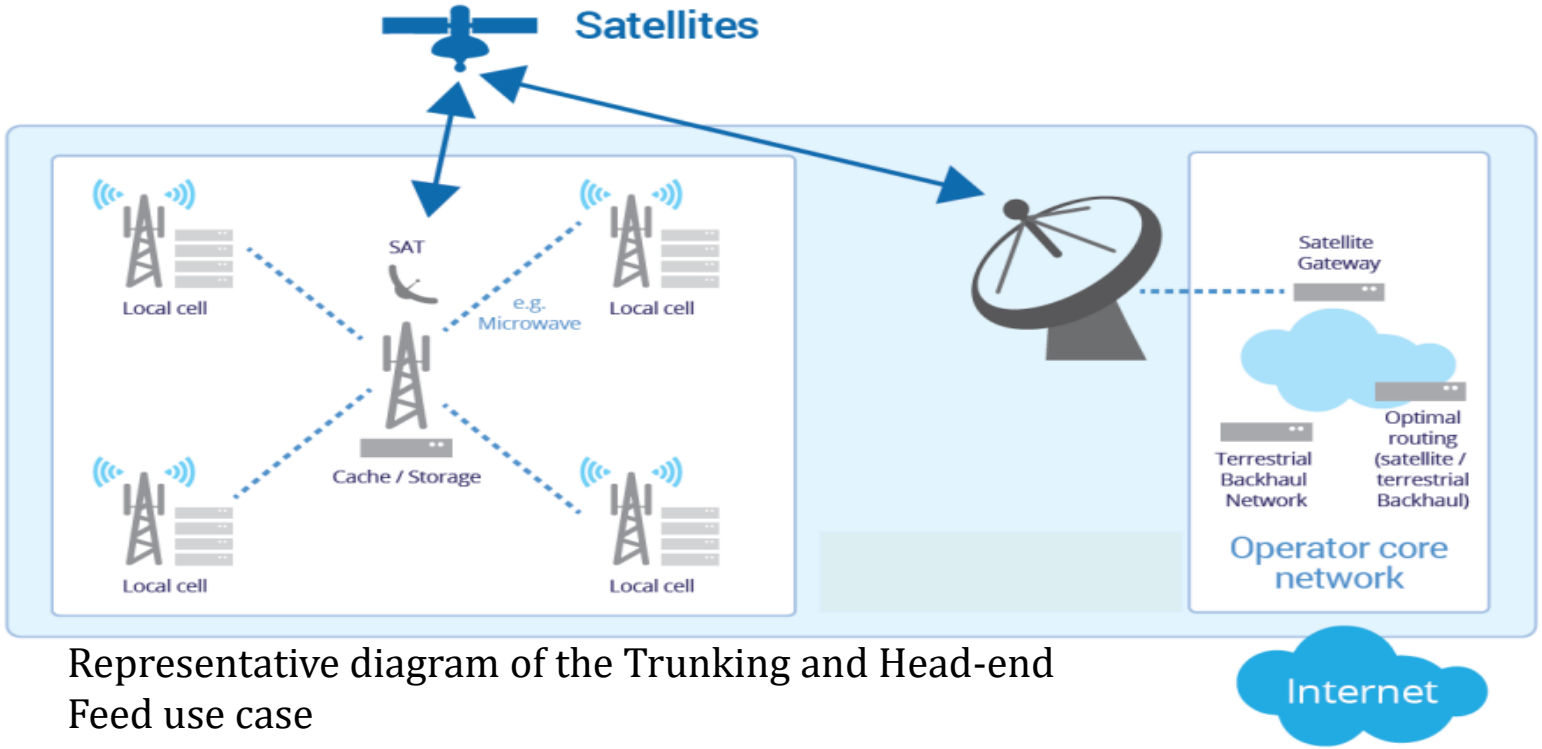
19		GUINEE	20		GUINEE-BISSAU
21		ILE MAURICE	22		KENYA
23		LIBERIA	24		LESOTHO
25		LIBYE	26		MALAWI
27		MALI	28		MAURITANIE
29		MOZAMBIQUE	30		NAMIBIE
31		NIGER	32		NIGERIA
33		OUGANDA	34		REPUBLIQUE CENTRAFRICAINE

Members

35		REPUBLIQUE DEMOCRATIQUE DU CONGO	36		SENEGAL
37		SIERRA LEONE	38		SOUDAN
39		SWAZILAND	40		TANZANIE
41		TCHAD	42		TOGO
43		TUNISIE	44		ZAMBIE
45		ZIMBABWE			

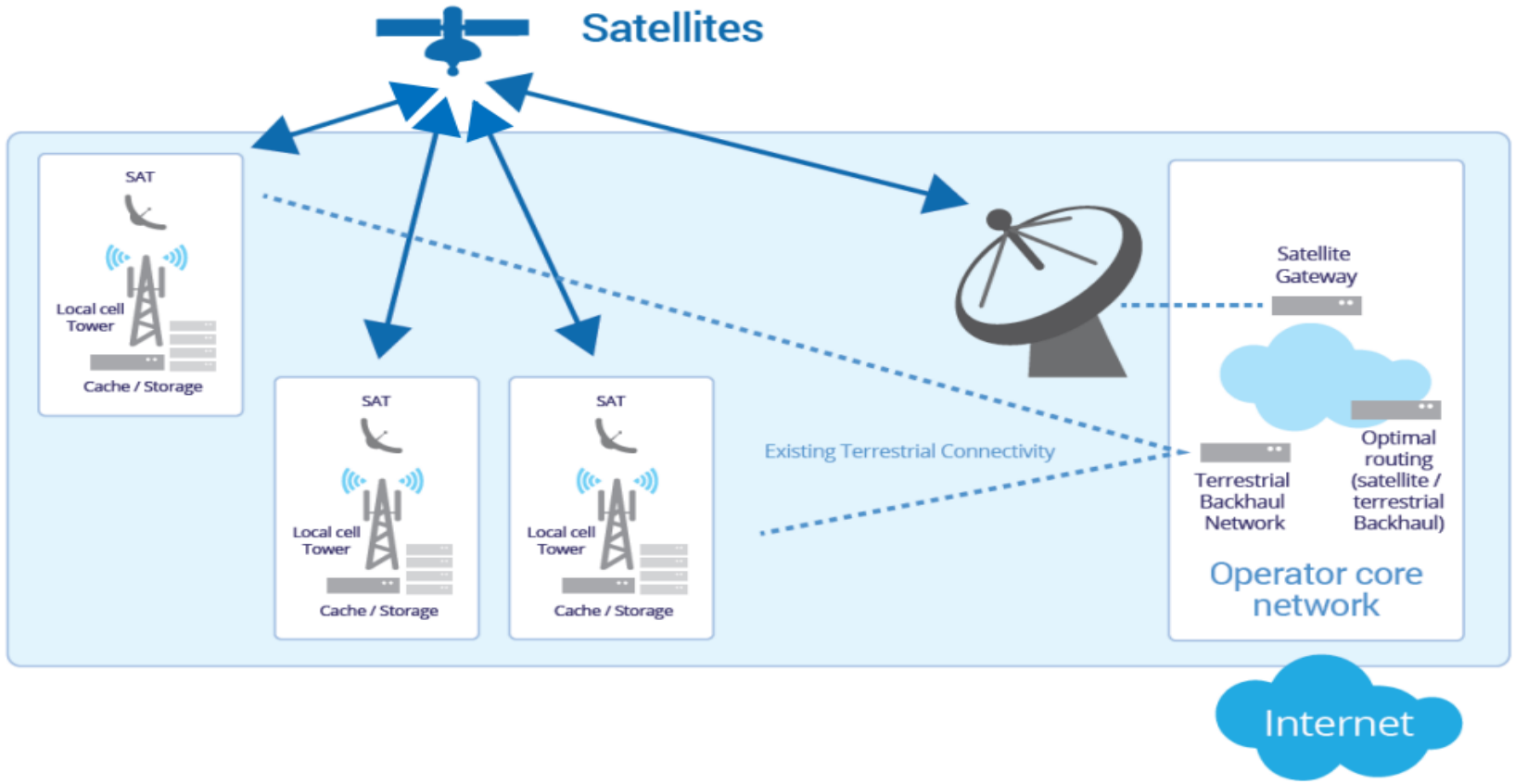
- The two Non signatory members are :
  - 1**. West African Development Bank (BOAD)**
  - 2. **Air Navigation Safety in Africa and Madagascar (ASECNA)**

- ITU-R M.2083, § 6.1.2 Relationship between IMT-2020 and other access systems, "[u]sers should be able to access services anywhere, anytime. To achieve this goal interworking will be necessary among various access technologies, which might include a combination of different fixed, terrestrial and satellite networks. Each component should fulfil its own role, but should also be integrated or interoperable with other components to provide ubiquitous seamless coverage".
- Further in the ITU-R M.2460-0, which talk about Next Generation Access Technology (NGAT), Four main use cases can be identified for satellite-based solutions into **NGAT**: **Trunking and Head-end Feed**, **Backhauling and Multicasting Tower Feed**, Communications on the Move and Hybrid Multiplay.



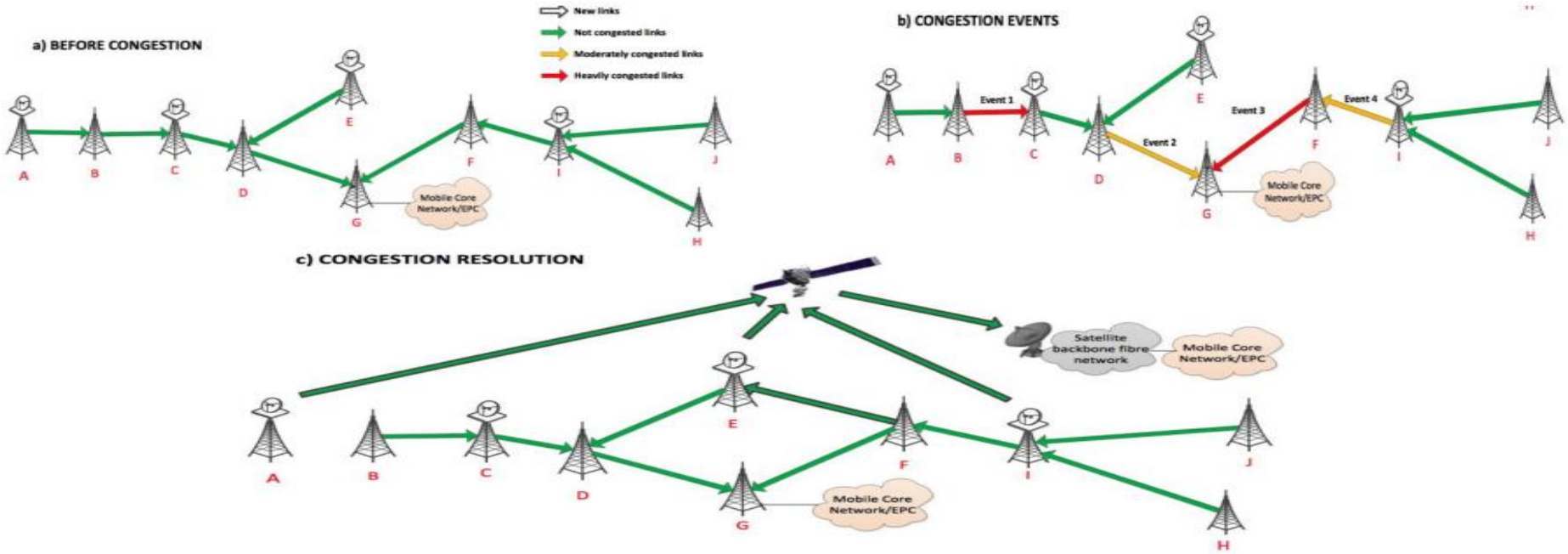
Representative diagram of the Trunking and Head-end Feed use case

Representative diagram of the Backhauling and Multicasting Tower Feed use case



A high throughput, multicast-enabled, satellite link from geostationary and/or non-geostationary satellites, direct to the cell towers complements existing terrestrial connectivity to enable backhaul connectivity to individual cells with the ability to multicast the same content (e.g. video, HD/UHD TV, as well as non-video data) across a large coverage area as well as efficient backhauling of aggregated IoT traffic from multiple sites.

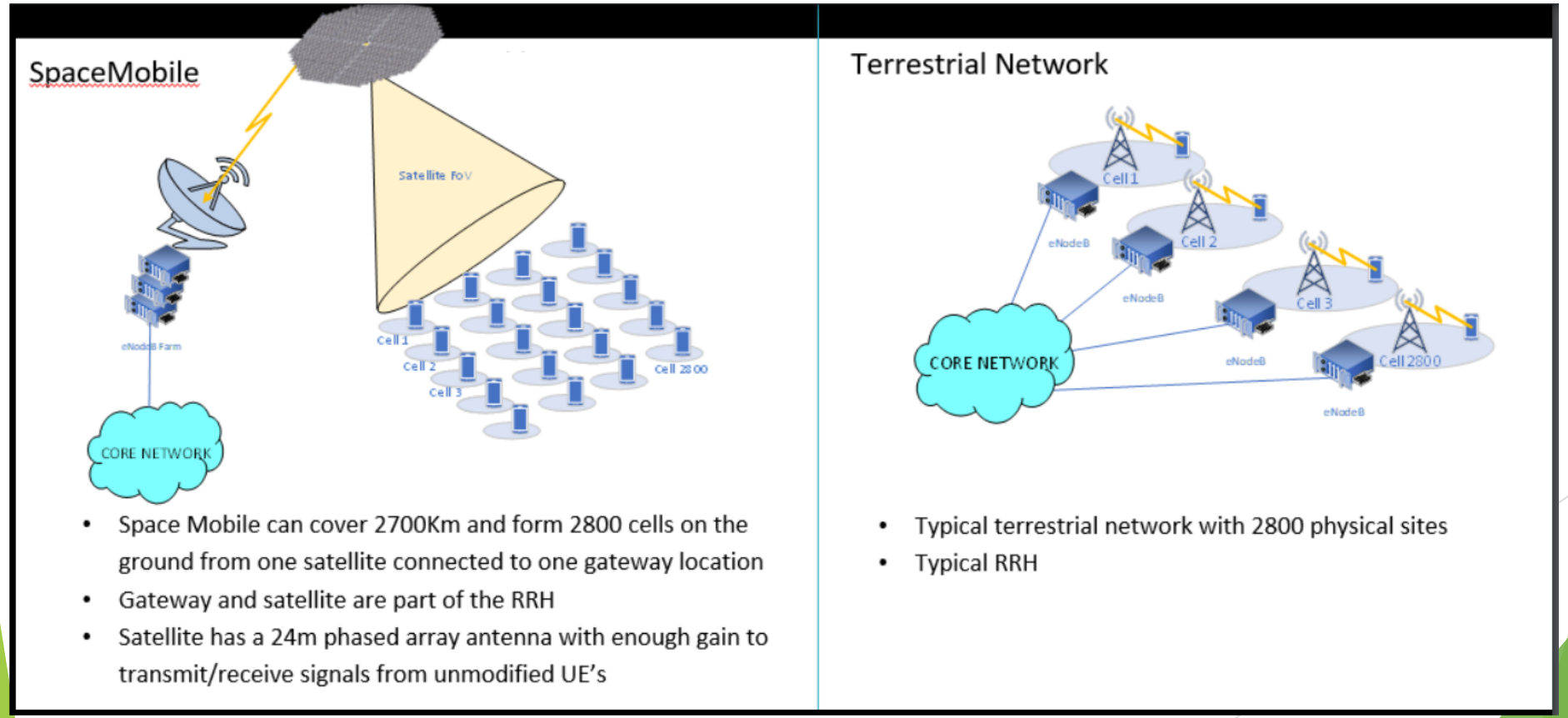
Deployment scenario demonstrating how satellite solution can resolve congestion problem[3]



Satellite connectivity, with the help of hybrid network management, can add flexibility to backhauling networks by either providing an alternative route, through satellite, or through an alternative terrestrial link when another node is available.

Direct satellite communications to a device with a form-factor that is similar to a smartphone is nothing new; operators such as Globalstar, Inmarsat and Iridium have been doing this for years. However, the devices had to be purpose-built with different spectrum and proprietary waveforms.

- The direct satellite-to-device market is the largest opportunity in the history of satellite communications and will soon be a reality now that non-terrestrial networks are included in the definition of 5G and multiple innovators are working to make the technology happen.
- This will further create new opportunities for telecoms but they will have to adapt to new business models and develop new partnerships to pursue these opportunities.



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