

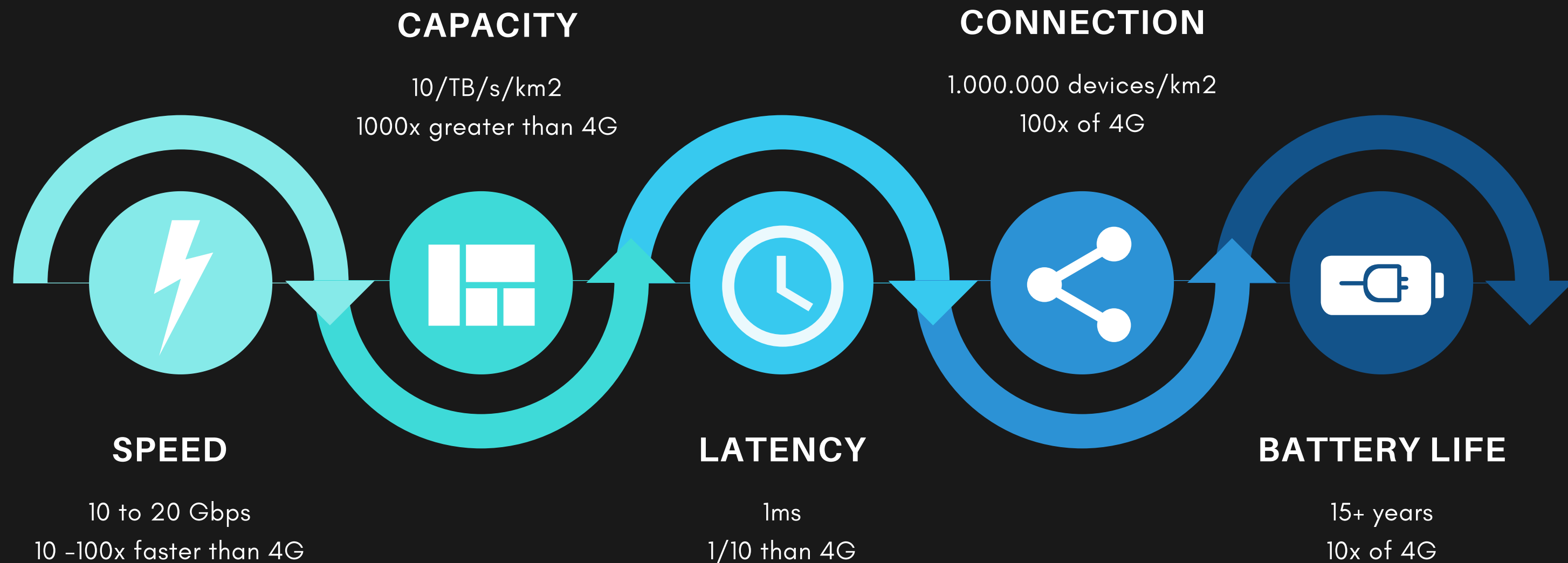


5G IN DEVELOPING COUNTRIES

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5th year ISS

INTRODUCTION

5G will bring substantial network improvements, including:



All these benefits could be used in favor of countries in development . . .



PROMISING SECTORS FOR 5G

*From a perspective of developing countries:
how can 5G help improve life conditions in these regions?*

HEALTHCARE

These solutions can provide isolated underdeveloped communities, regions in conflict with have access to healthcare:



Remote surgery

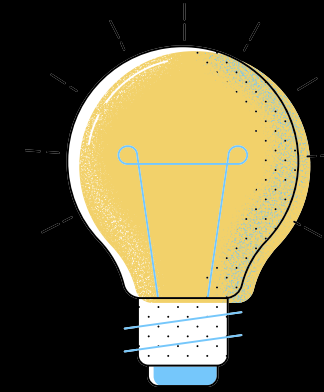
Due to 5G's low latency, remote surgery could be possible to improved healthcare in locations **lacking trained specialists** or populations without means to travel to top hospitals



Remote diagnosis

5G-enabled **cameras, sensors** and other devices can enable distant medical professionals to diagnose some conditions without an in-person visit

EDUCATION



Availability & access - distance learning by giving opportunities for people that are unable to access education in less-developed countries, reaching:

- **Isolated communities** and rural regions
- **Countries in conflict**, where people can't walk freely to the school/university
- People who are prevented to attend school because of work or **mobility obstacles**

DISASTER ASSESSMENT

In underdeveloped countries where the **lack of infrastructure** usually puts the population in frequent risk situations. 5G can enable:

- Rapid delivery of richer time-sensitive and critical information
- Remote piloting of drones and other vehicles in response to emergencies
- Improved options for emergency communications enhanced and faster disaster responses





Water management & agriculture

Use of **connected sensors** to crop fields can help optimize growing and efficient use of water and fertilizers through more targeted application.



Social

Lower-income populations tend to be more smartphone-dependent, relying on mobile broadband as their primary and oftentimes sole connection to the internet. A faster network for everybody can help **reduce social disparity**.



AN OVERVIEW OF 5G IN DEVELOPING COUNTRIES

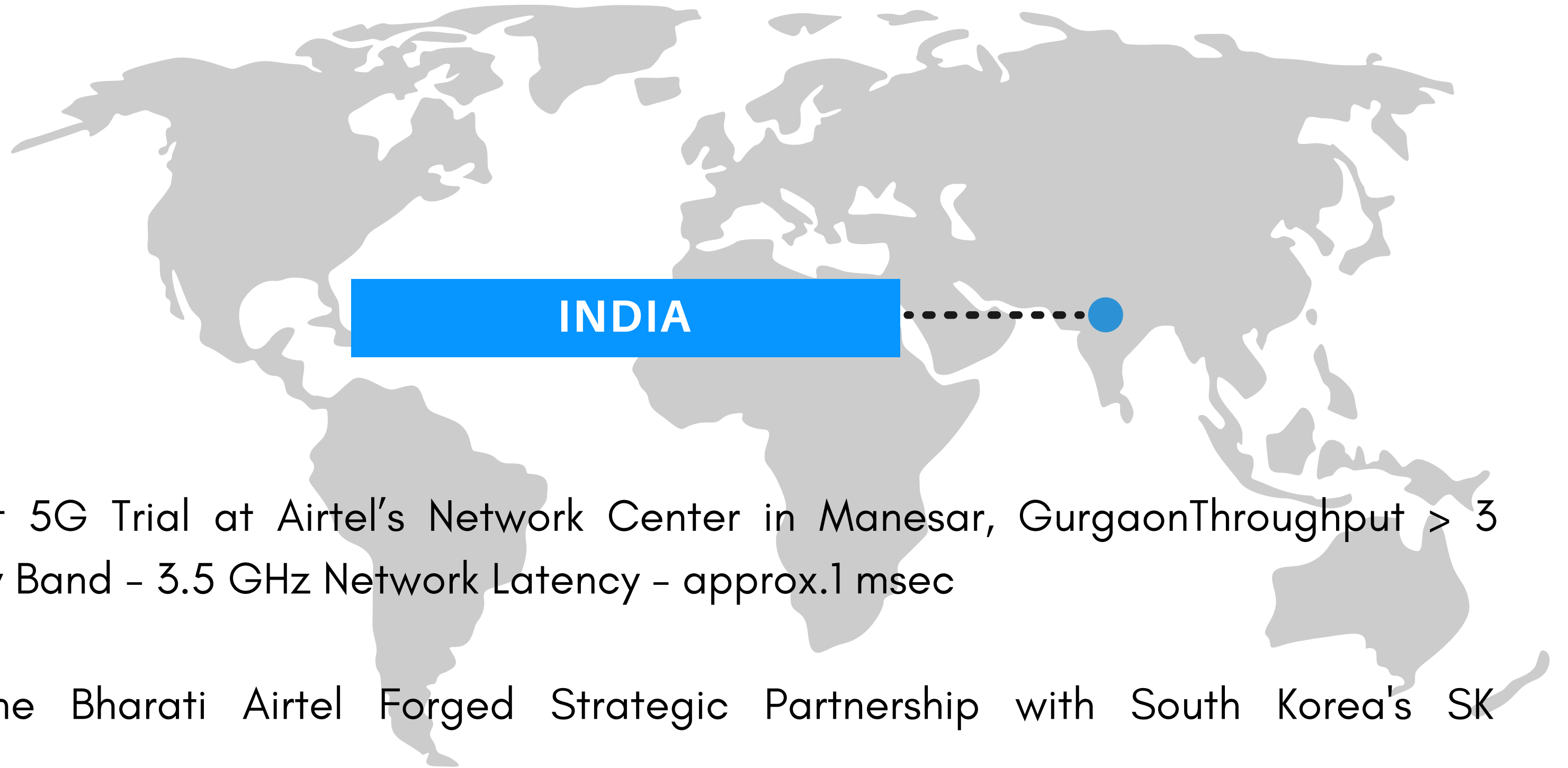


2013: National research group IMT-2020 (5G) Promotion Group

2017: First 5G test base station in Guangzhou

2018: 5G trials in 20 cities

2020: 5G commercial use in main cities



Feb. 2018: First 5G Trial at Airtel's Network Center in Manesar, Gurgaon
Throughput > 3 GBPS
Frequency Band - 3.5 GHz
Network Latency - approx. 1 msec

Sept. 2018: The Bharati Airtel Forged Strategic Partnership with South Korea's SK Telecom
Sept

2018 :Airtel announced the deployment of Massive MIMO - Multiple-Input Multiple-Input ("pre-5G technology") in Bengaluru and Kolkata.

In Brazil, 5G might only be implemented in the second semester of 2021 due mainly to jurisdiction problems.



BRAZIL

December 2019: it was supposed to happen a big auction, leaded by Anatel (biggest telecommunication agency in Brazil) to sell frequency spectrum to the operators

2020: Anatel auction to sell frequency spectrums to telecommunication operators & definition of standards for 5G

2021: 5G commercial use in main cities

Only 36% of Africa currently has internet access. The 4G market is still in its infancy in Africa while the 5G market has only newly opened to small parts of the developed world. And it's one of the countries with higher data costs.



AFRICAN COUNTRIES

Construction and development of the mobile communications industry requires an essential condition of stable energy supply. However, there are still some countries in Africa that **cannot provide sufficient electricity**. For example, in Nigeria, the lack of electricity supply is a problem that everybody, every family, and every company needs to face every day.

CONCLUSION





The Threat of 5G ?



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