

# IMT Connectivity by Stratospheric Base Stations

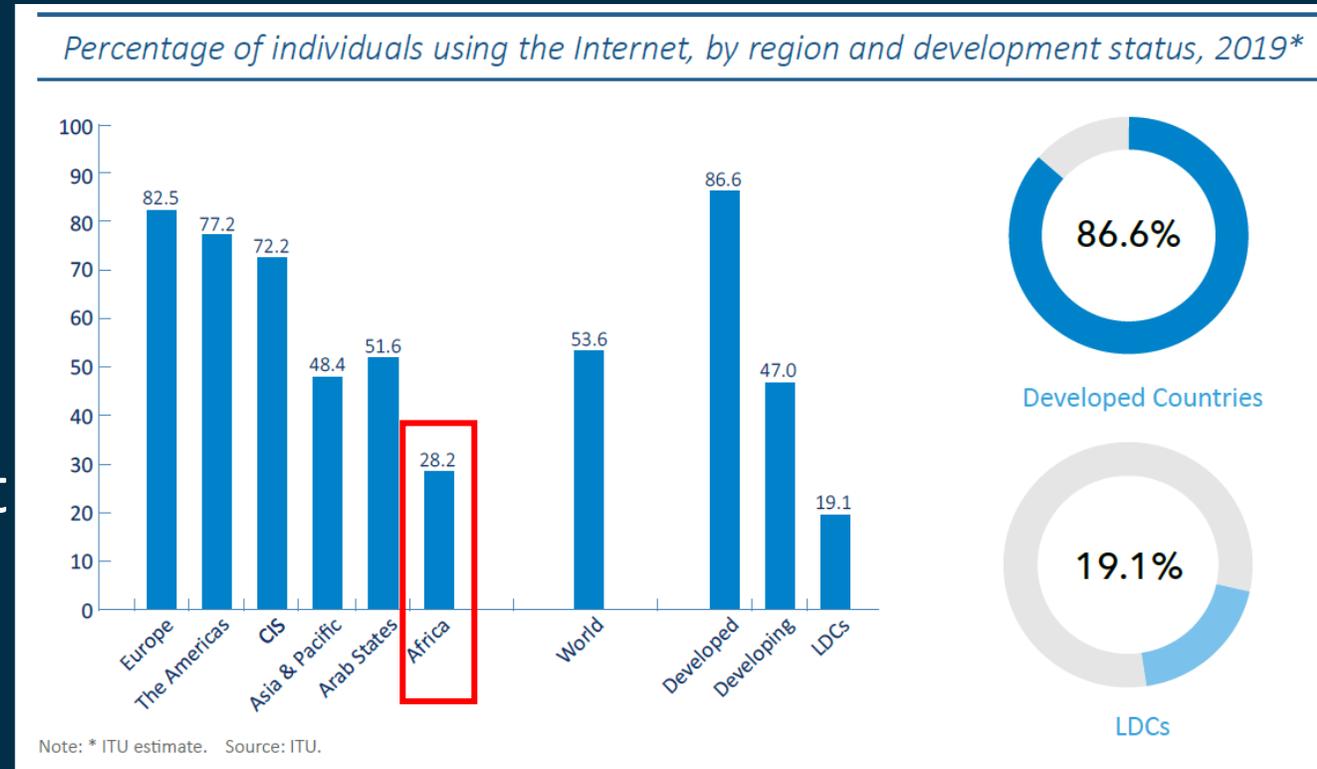
Presented by Policy Impact Partners (PIP)

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# Africans still mostly unconnected

- The COVID-19 pandemic forced most countries to impose lockdowns –
  - Most offices and businesses closed
  - No public gatherings
  - Only leave the house for food, medicine or emergencies
- People in countries with high Internet penetration:
  - Worked and studied remotely from home using Internet access
  - Consumed entertainment via online sources such as Netflix
  - Kept in touch with work colleagues, family and friends via online tools such as Zoom & Microsoft Teams



**HIBS will be located in the stratosphere – much closer to earth than traditional satellite systems**

Cosmic Space

36,000 km



GEO Satellite

Exosphere

Exobase

Thermosphere

Karman line

Mesosphere

Stratosphere

Ozon layer

Troposphere

1,200 km

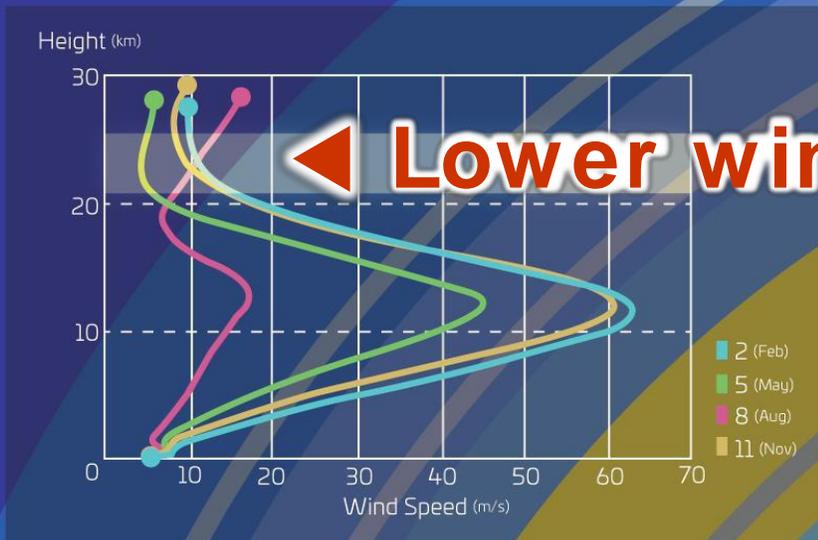


LEO Satellite

20 km



HIBS



**Lower wind speed**

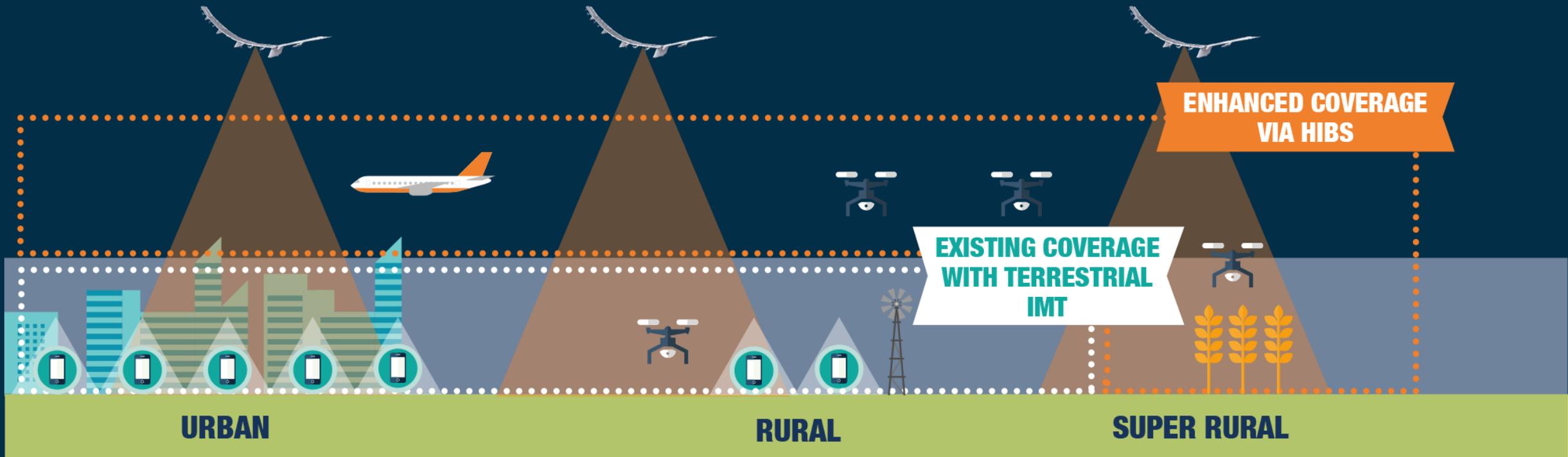
**High altitude platform stations as IMT base stations → HIBS**

# Why Africa needs HIBS

- The widespread deployment of HIBS would provide a highly-effective and efficient way to meet the growing demand for mobile broadband in underserved areas.
- **HIBS offers:**
  - A very large footprint (~200km diameter) that can extend the coverage provided by mobile network operators
  - Much lower latency than higher-orbit satellite systems, including the latest “non-GSO” (non-geostationary satellite orbit) solutions
  - Minimal ground infrastructure and maintenance requirements
  - Support for existing IMT-compatible mobile devices

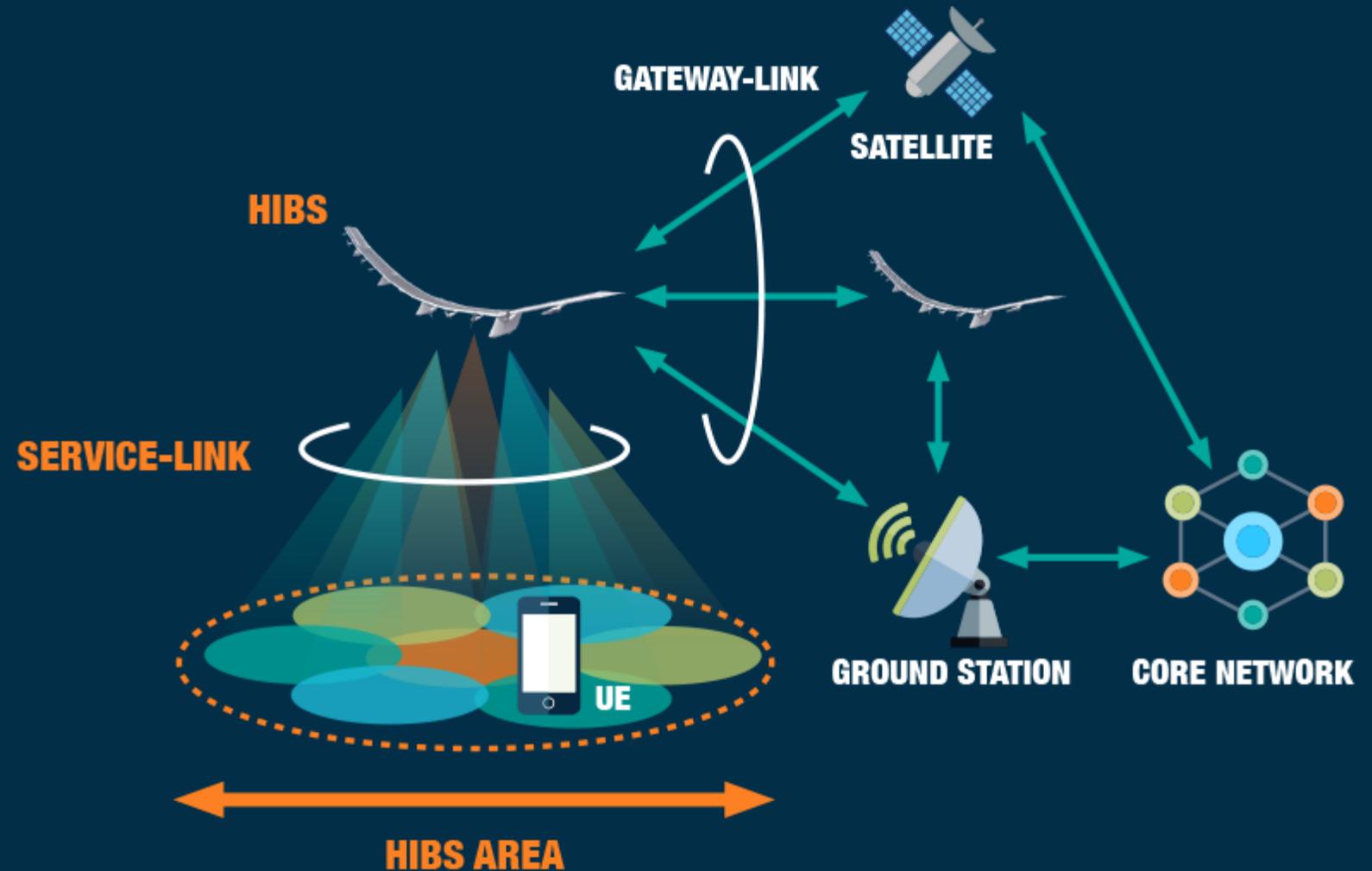
# Extending MNOs' coverage with HIBS

**HIBS CAN DELIVER:**  
**STRONG SIGNAL AND LOW LATENCY**  
**DIRECT ACCESS TO EXISTING SERVICES**  
**WIDE AREA COVERAGE (MORE THAN 31,000 SQUARE KM PER HIBS)**



# Connecting HIBS to the wider world

- Each HIBS will connect to other networks and the Internet via a gateway link.
- In cases where it is difficult to deploy ground stations, inter-HIBS or HIBS-satellite links may be used for this purpose.
- The frequency bands (6 GHz to 47 GHz) identified for HAPS could be used for links to ground stations.



# The regulatory situation today

- Existing ITU Radio Regulations (RR 5.388A) allow for the use of HIBS in parts of the 2 GHz range (R1: 1 885-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz) identified for IMT (Resolution 221).
- Adopted by 45 countries, RR 5.388B identifies technical conditions to enable the use of HIBS while providing protection to terrestrial IMT and other mobile and fixed services.
- Agenda item 1.4 for WRC-23 will consider the use of additional bands identified for IMT below 2.7 GHz by HIBS (without negatively impacting ground based IMT services).
- WRC-19 identified spectrum and related regulations for HAPS in the frequency range 21 GHz to 47 GHz to improve broadband connectivity to fixed terminals.

# Agenda item 1.4 can deliver more flexibility

## CURRENT REGULATION



**NO FLEXIBILITY**

**ONLY 2 GHz CAN BE USED**

(SEE RR 5.388A AND RR 5.388B)

MNOs' spectrum holdings  
(example)

## AGENDA ITEM 1.4 COULD OPEN UP MORE IMT BANDS



**FLEXIBILITY TO USE EXISTING IMT SPECTRUM HOLDINGS**

(THE BANDS SHOWN IN ORANGE)

# Preparing for agenda item 1.4

- ITU-R technical studies will address the compatibility of HIBS with other services in the IMT bands below 2.7 GHz.
- The technical studies and a review of the existing Radio Regulations for HIBS will inform the development of the regulatory options for the conference preparatory meeting (CPM) report.
- These options should:
  - Provide sufficient flexibility for use of the IMT bands by HIBS;
  - Ensure no negative impact on the use of the bands by terrestrial IMT networks;
  - Fully complement terrestrial IMT in the IMT bands below 2.7 GHz;
  - Ensure protection of other services with primary allocations.

# Summary

With access to IMT spectrum below 2.7 GHz, HIBS will be able to:

- Extend coverage of terrestrial IMT base stations to improve mobile broadband connectivity for all IMT devices in unserved and underserved areas
- Support a wide range of safety, security, consumer and business applications without negatively impacting existing services in the IMT bands
- Help accelerate the deployment of 5G

Next steps:

- Support the WRC-23 agenda item 1.4 to allow HIBS to use the IMT spectrum below 2.7 GHz to extend terrestrial IMT services
- Input to ITU-R studies to assess the compatibility of HIBS with terrestrial IMT and other services operating in the bands below 2.7 GHz
- Support the revision of existing Radio Regulations for HIBS to include the bands considered under agenda item 1.4 for use by HIBS

# Contact details

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**Additional slides**

# Existing Regulations for *High Altitude Platform Stations*

- **4.23** Transmissions to or from high altitude platform stations shall be limited to bands specifically identified in Article 5.

(WRC-12)

- **1.66A** *high altitude platform station*: A station located on an object at an altitude of 20 to 50 km and at a specified, nominal, fixed point relative to the Earth.

# Existing Regulations for HIBS

- **5.388A** states the following spectrum bands may be used for HIBS in accordance with Resolution 221 (Rev. WRC-07):
  - In ITU Regions 1 and 3 (Europe, the Middle East, Africa, Asia, Oceania), the bands 1885-1980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz
  - In ITU Region 2 (the Americas), the bands 1 885-1 980 MHz and 2 110-2 160 MHz

The use of these bands by HIBS does not preclude their use by any station in the services to which they are allocated and does not establish priority in the Radio Regulations (WRC-12).

- **5.388B**, adopted by 45 countries,\* states that a HIBS in neighbouring countries, in the bands referred to in No. 5.388A, shall not exceed a co-channel power flux-density of  $-127 \text{ dB(W/(m}^2 \cdot \text{MHz))}$  at the Earth's surface outside a country's borders unless explicit agreement of the affected administration is provided at the time of the notification of HAPS. This regulation is intended to protect fixed and mobile services, including IMT mobile stations, from co-channel interference (WRC-19).

\*Algeria, Saudi Arabia, Bahrain, Benin, Burkina Faso, Cameroon, Comoros, Côte d'Ivoire, China, Cuba, Djibouti, Egypt, United Arab Emirates, Eritrea, Ethiopia, Gabon, Ghana, India, Iran (Islamic Republic of), Israel, Jordan, Kenya, Kuwait, Lebanon, Libya, Mali, Morocco, Mauritania, Nigeria, Oman, Uganda, Pakistan, Qatar, the Syrian Arab Republic, Senegal, Singapore, Sudan, South Sudan, Tanzania, Chad, Togo, Tunisia, Yemen, Zambia and Zimbabwe.