

Presentation on Importance of Ubiquitous Connectivity & Sustainability in the Design of 6G

By

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How important it is to enable ubiquitous connectivity and sustainability in the design of 6G for India

- Ubiquitous connectivity
- Global connectivity
- Cell connectivity
- NTN and satellites
- Ethical 6G

Table 1: Digital India 2030 Mobile and Broadband Policy Objectives (indicative)

2022 Roadmap	2030 Roadmap (?)	Spectrum Requirements 2030 (5G+ and 6G) (?)	Spectrum Bands to be made available
<ul style="list-style-type: none"> • High speed broadband to citizens, Enterprises, public services. Connect all villages • 10 Gbps to every GP • 50% Households with Broadband • 10 Million public Wi-Fi Hotspots • 5 Billion IoT Devices; Enterprise Digitization (ITS, Urban management) • Personal and Home Connectivity (SRDs) • UAVs with limited action 	<ul style="list-style-type: none"> • 100 Mbps to every citizen (large coverage of 5G and beginning of 6G) • 500 Gbps to every GP • 90% Households with High-speed Broadband • 50 Million public Wi-Fi Hotspots • 25 Billion IoT Devices Smart Enterprises & Factories (Smart Infrastructure Rural and Urban) • Connected and Intelligent Living • UAVs in Delivery Services, logistics, Disaster management 	<ul style="list-style-type: none"> • Likely to double from the current planned spectrum quantities (covering lower, mid, millimeter and Tera Hz bands) • Diverse access technologies Mobile, GSO, NGSO, HAPS, HIBS etc. • High speed backhaul to complement Fibre connectivity • FWA - Fixed Wireless Access (would be a cost-effective option) using 5G and E, V Band links & other access technologies including fibre • New License Exempt Spectrum bands • New License Exempt Spectrum for M2M connectivity to power smart cities and communities • Extremely low power intelligent devices of all kinds everthing around • Defined IMT and unlicensed bands with ultra-reliability and control (application specific) 	<ul style="list-style-type: none"> • <1 GHz Bands Mid Band: up to 10 GHz 6.425-24 GHz Bands Millimetre Bands: 26, 28, 40, 66, 70, 90 GHz etc. Tera Hz bands • Q, V, E, D, W Bands Free Space Optics 6.425-24 GHz Bands • Millimeter bands of 37, 50, 66 GHz V Band (57-66 GHz) 6.425-24 GHz Bands Free Space Optics • 6 GHz, V-Band, >95 GHz Tera Hz Bands • 915-935 MHz V Band >95 GHz bands THz bands • Hundered of bands to be identified continuously based on innovation • <1 GHz Bands Band: up to and above 10 GHz

Figure 2 shows the potential of new services by 2030 from 5G+ and 6G Technologies. These include convergence of multiple access technologies (e.g., terrestrial and satellite), complementary technologies of broadband and broadcast, universal coverage & high capacity for improved user experience, and improved usage to multiple industries.

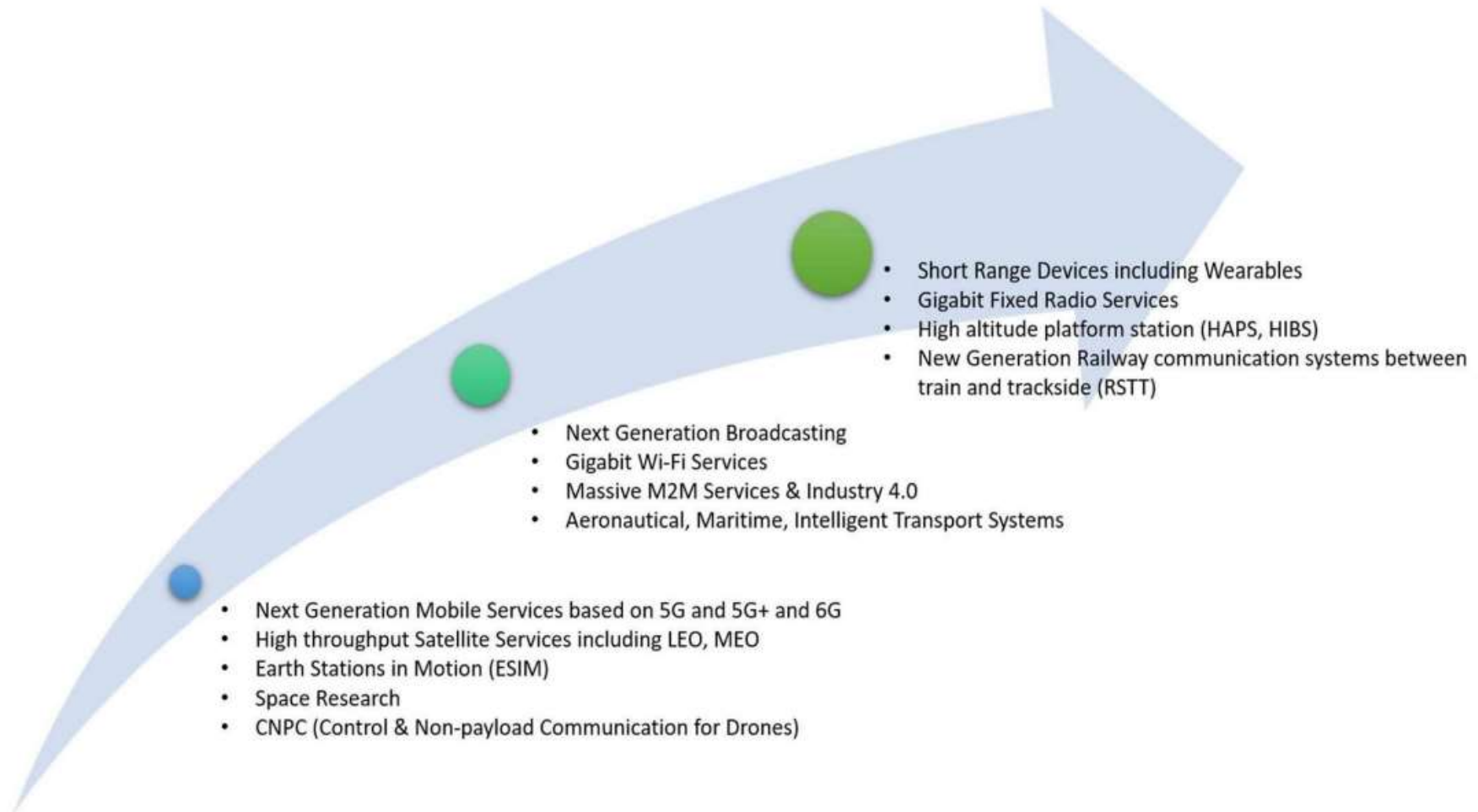
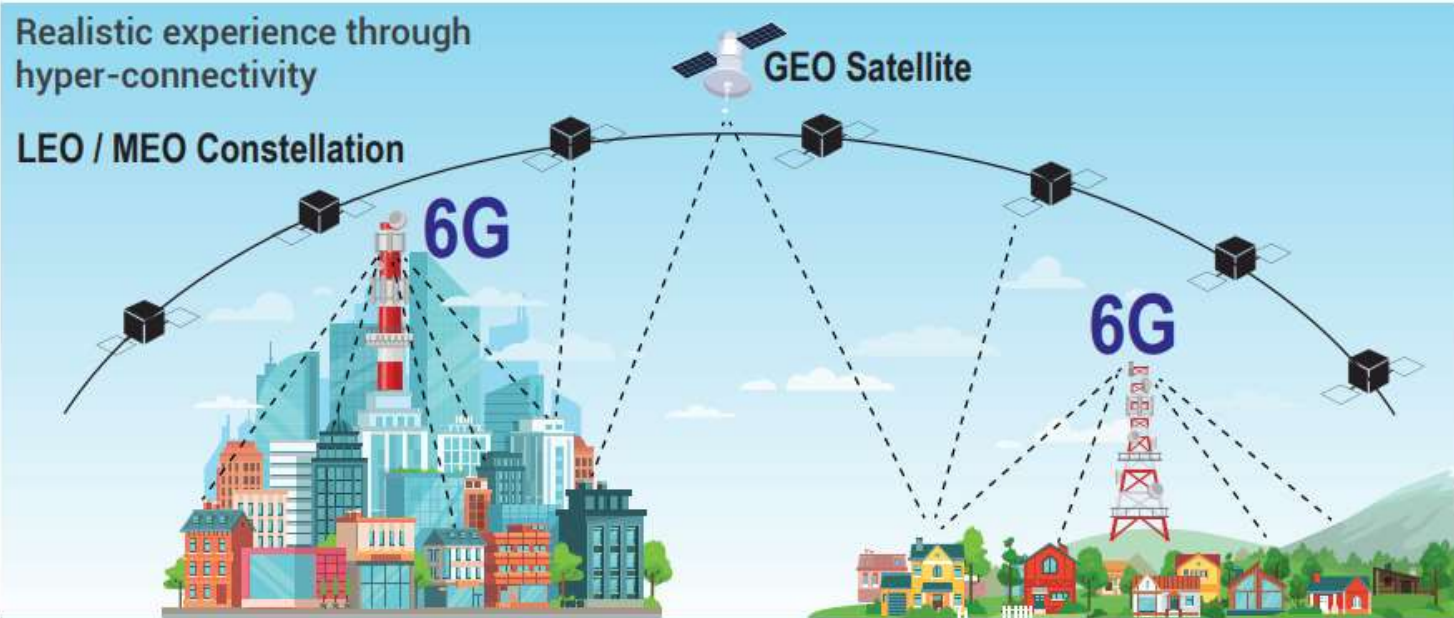
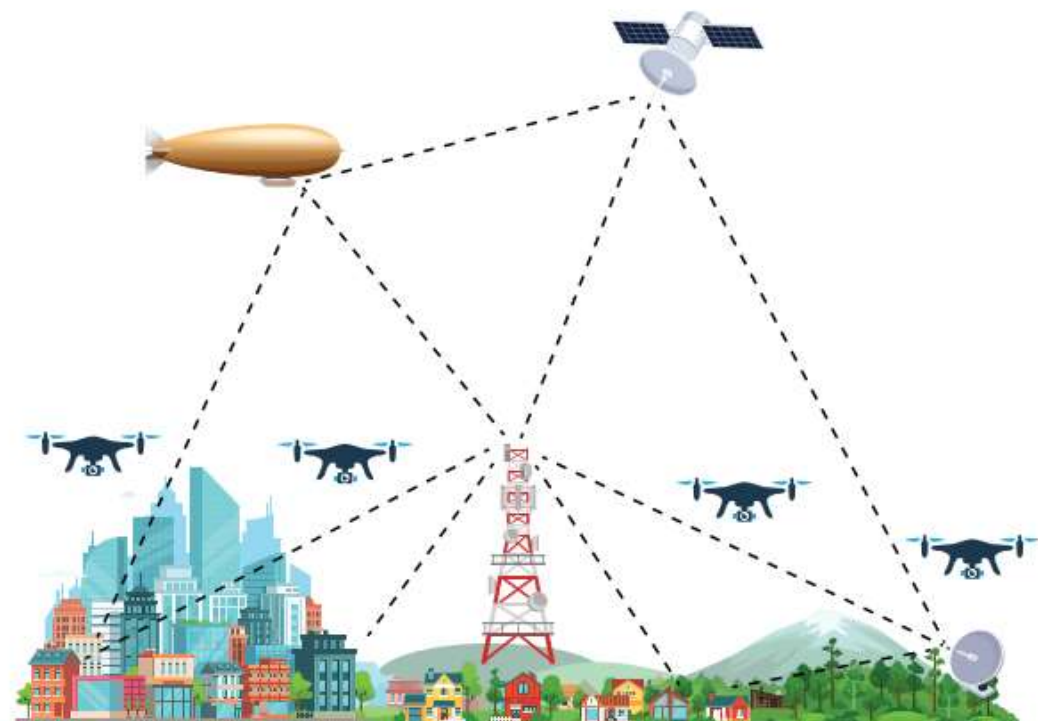


Figure 2: New Era of Services by 2030 from 5G+ and 6G Technologies

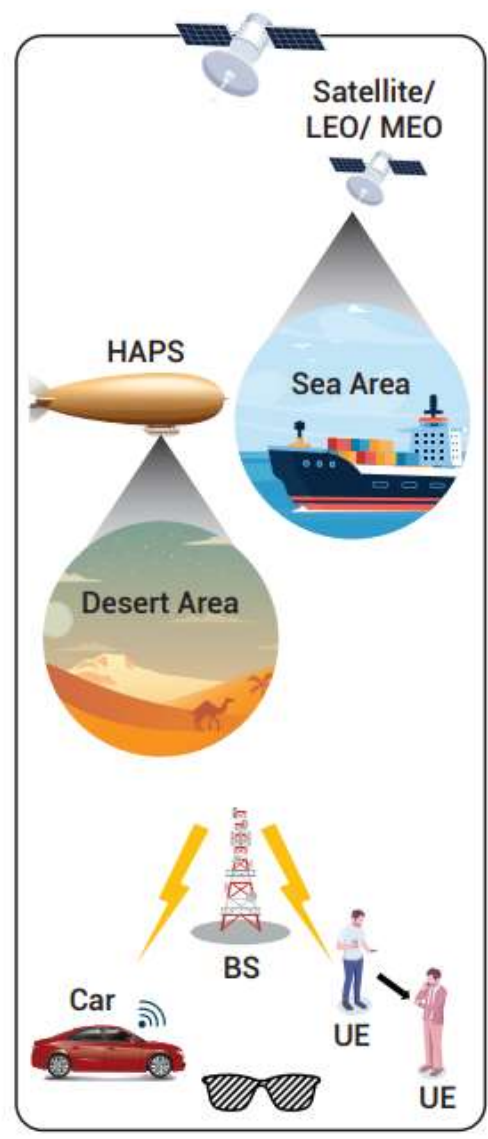


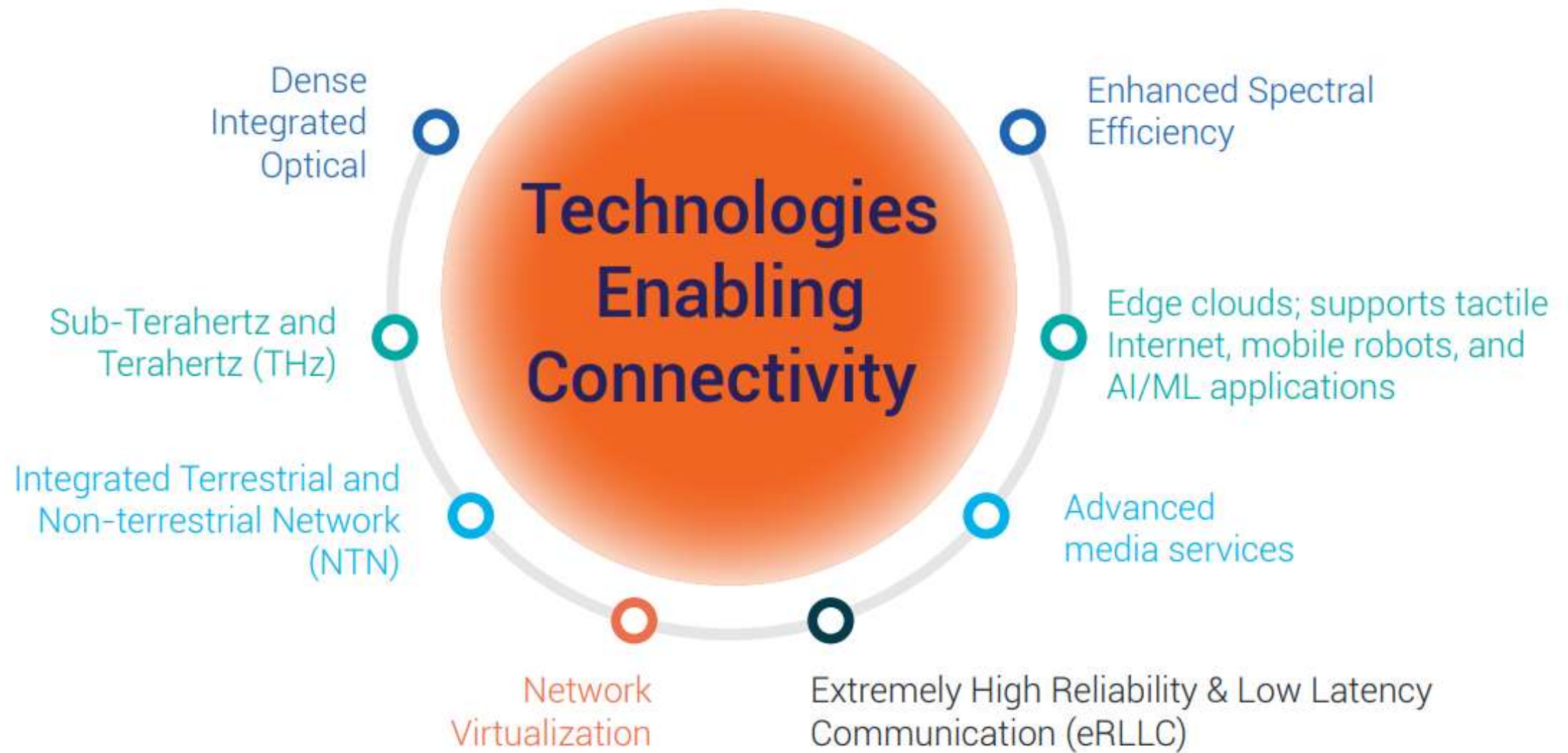
UBIQUITOUS CONNECTIVITY

Robotic Healthcare Center	eCommerce		Advance Agriculture Technology	eCommerce
Connected Fire station	Ultra High Connectivity		Connected Fire station	Ultra High Connectivity
Online Police services	Industry Hubs		Online Police services	Connected Transportation
Smart Electric Devices	Smart waste Management		6G Connected Homes	Online Banking
Smart Classes	Secured POS Services		Smart Classes	Remote ATM
Multi-National Companies	Automated Public Transport		Digital Post Office	Connected Retail Services
Augmented & Virtual Reality	Digital library		Augmented & Virtual Reality	Digital Schools



E- Health	E-Education	Technology	Entertainment
<ul style="list-style-type: none"> • Robotics Surgery • Online clinical treatment • Automated labs & pathology 	<ul style="list-style-type: none"> • Smart Classes • Digital Schools • Real Time Distance Education 	<ul style="list-style-type: none"> • High-altitude platform systems (HAPS) • Artificial Intelligence/ Machine Learning, IoT Platform • Analytics Engine 	<ul style="list-style-type: none"> • Metaverse Experience • Real-time Gaming Experience • Teleoperated Driving Experience • Intelligent Bots





THANKS