

Multi operator small cell for dense outdoor areas: Holy Mosque of Makkah case study

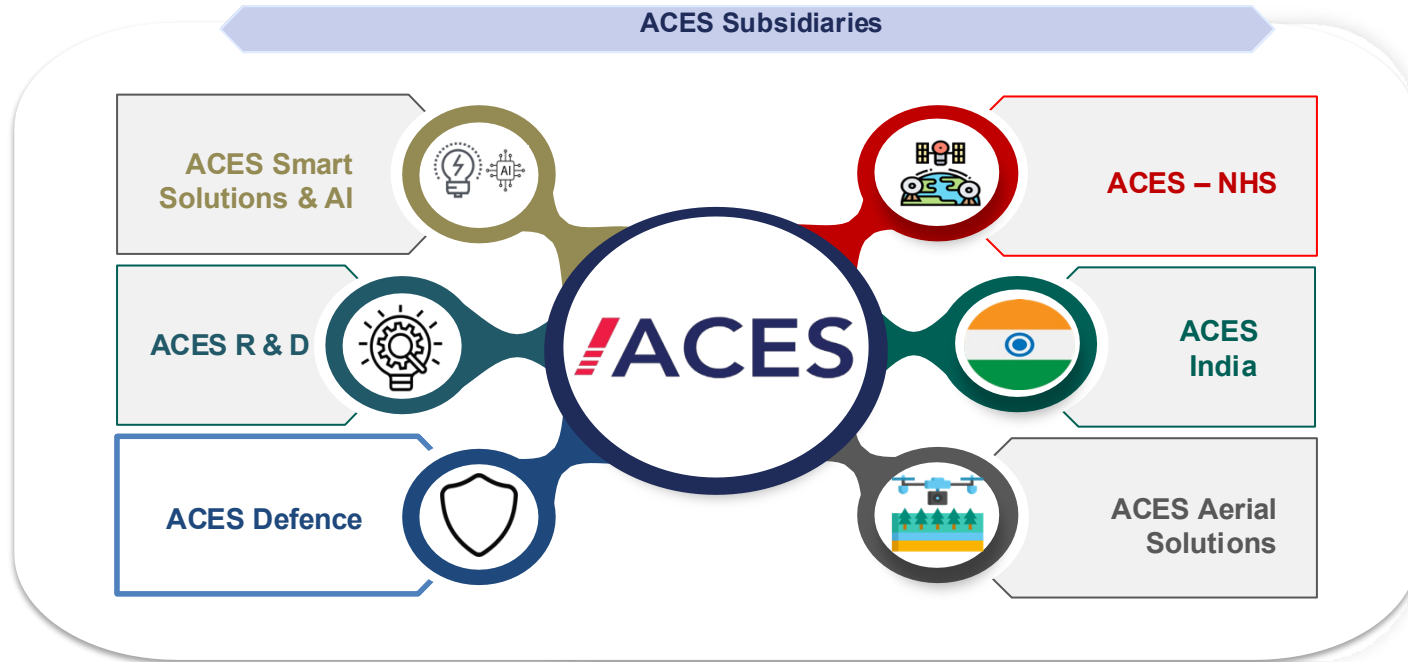


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ACES Subsidiaries

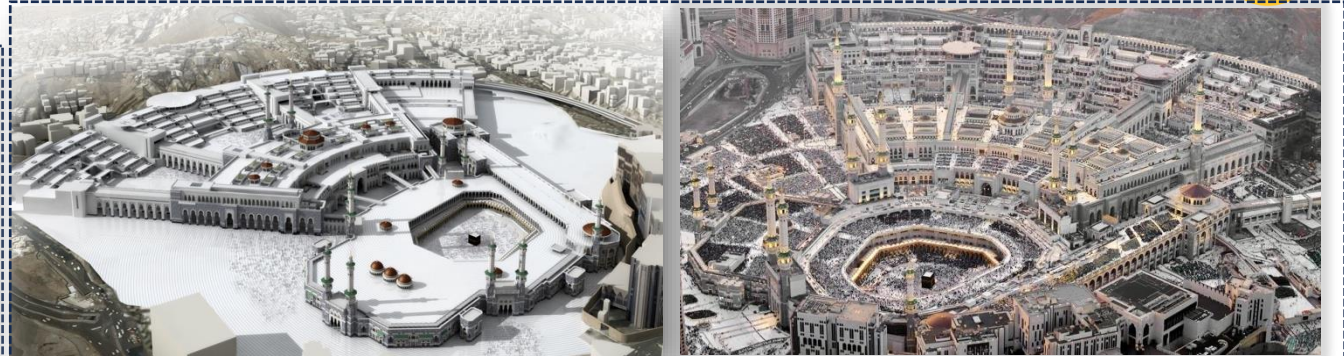
ACES built its dominance and established a strong foothold across the globe by leveraging its expertise in the sector which has led to expanding its horizons and getting awarded of some of the largest projects.





ONE PLACE.
BILLIONS OF HEARTS.





2 MILLION VISITORS

~356,000 m²

MILLIONS OF SESSIONS SUPPORTED

CONNECTING HEARTS,
ENABLING WORSHIP

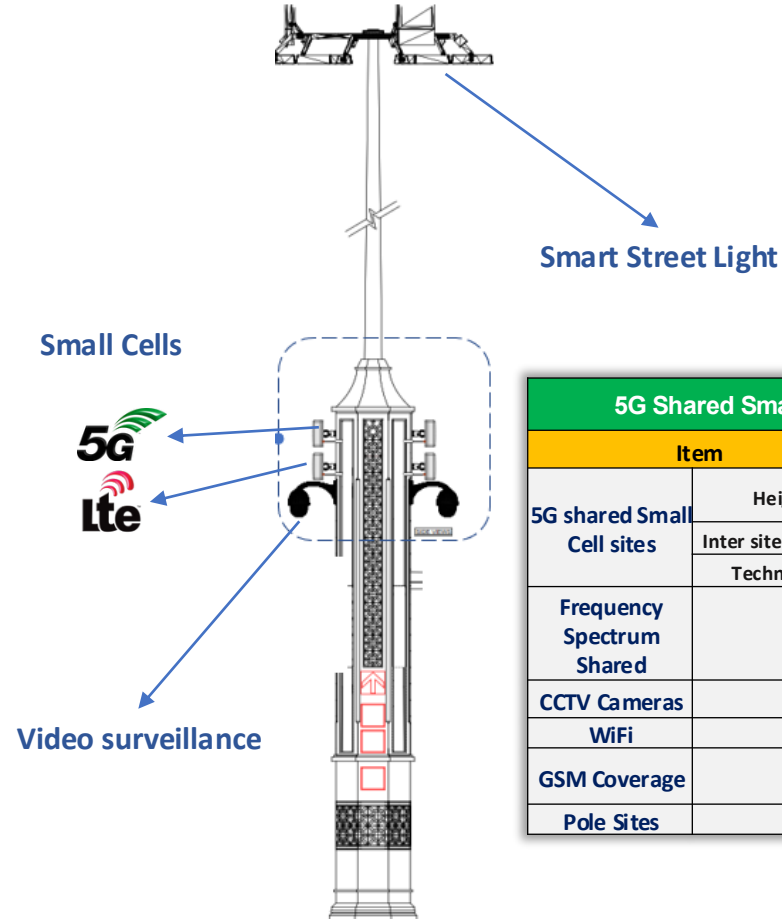
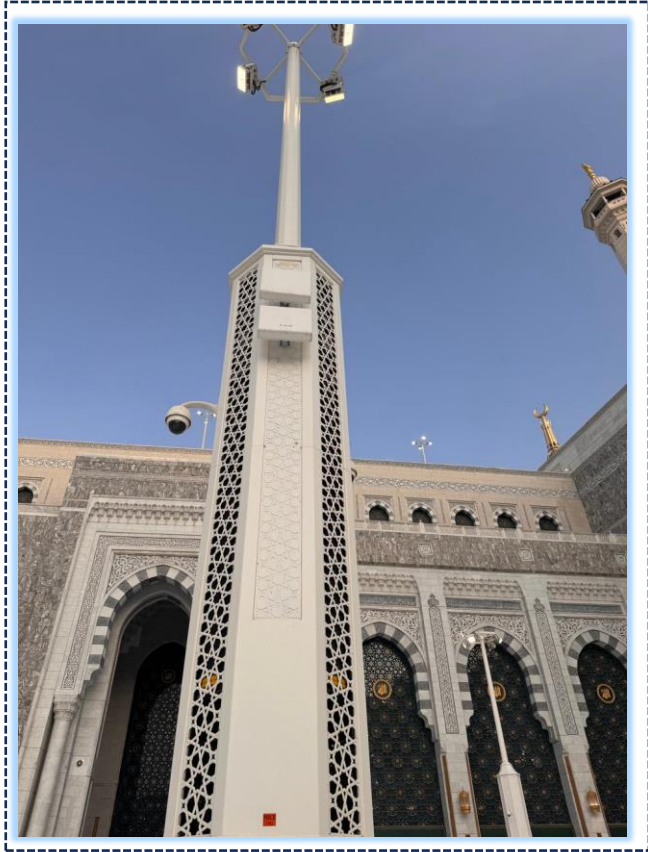




Existing Sites in Masjid Al-Haram



Proposed ACES Sites in Masjid al-Haram



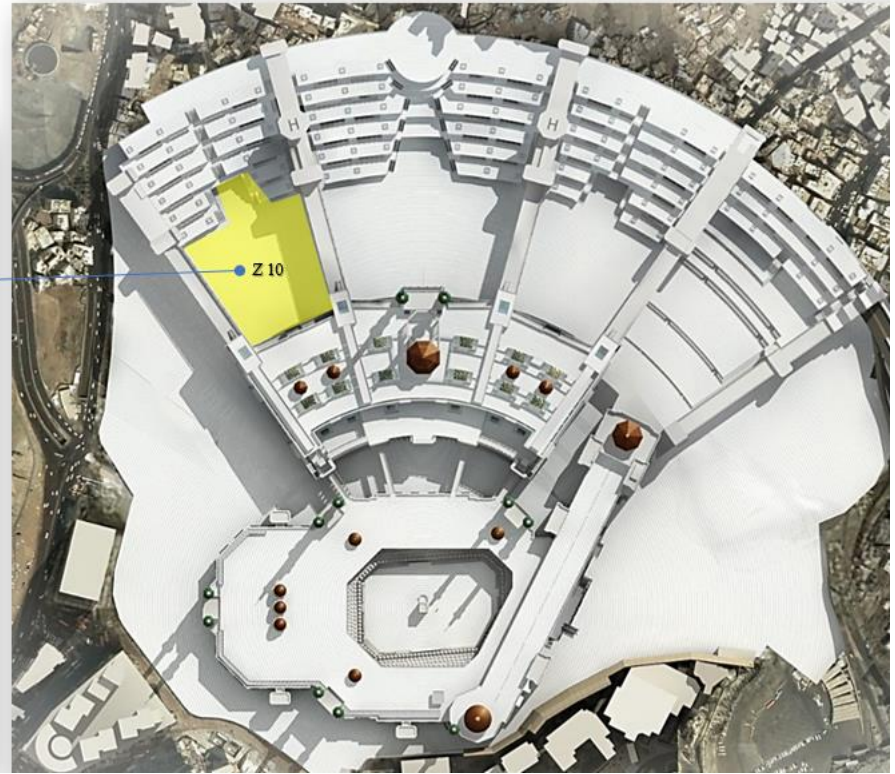
5G Shared Small cell Proposal

Item		Specifications
5G shared Small Cell sites	Height	14 meters
	Inter site distance	~200 meters
	Technology	4G, 5G
Frequency Spectrum Shared	MORAN	
CCTV Cameras	✓	
WiFi	Ready	
GSM Coverage	✓	
Pole Sites	✓	

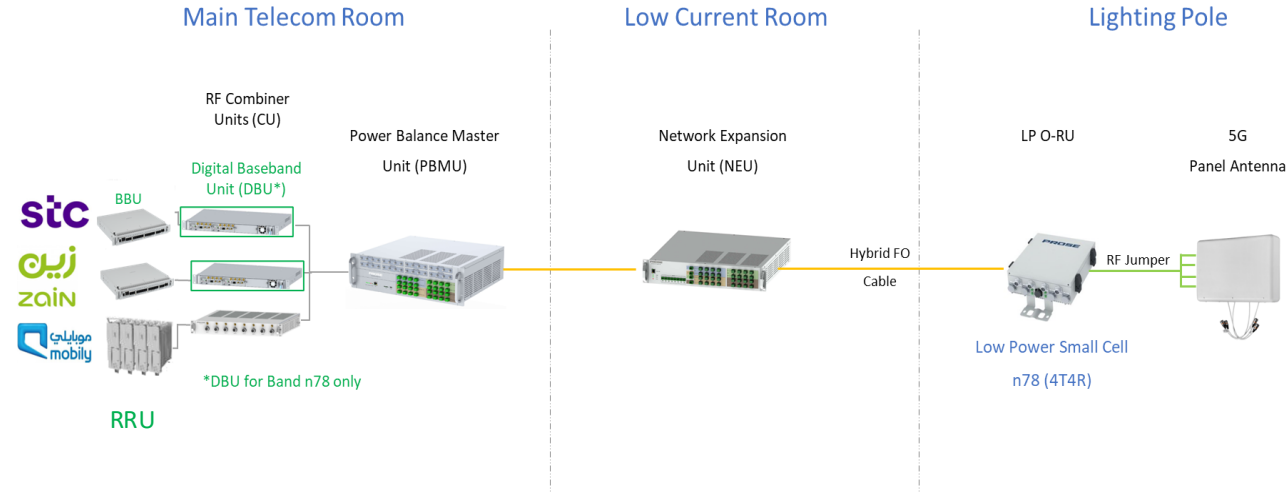


Real Deployment

● 14m lighting Pole Height








- **Combiner Unit (CU)**
 - Up to 8 duplex RF input
- **PBMU (PBU + IM2U)**
 - 2T2R (NR+4G)
 - 4T4R (NR 4T4R + Sub-3G 2T2R).
- **NEU (Network Expansion Unit)**
- Fiber expansion unit with integrated LP Small Cell




MNO	MIMO	5G Spectrum (MHz)	Bandwidth
زين Zain	4x4	3500-3600	100MHz
stc	4x4	3600-3700	100MHz
موبايلي Mobily	4x4	3700-3800	100MHz

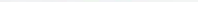


	Total Area (Zone -10) sq.m	19,500
	Expected Number of Users	28,000
	Total No. of Panel Antennas	32
	Total No. of IRUs	32
	No Of Used Lighting Poles	8





SMARTER INFRASTRUCTURE. BETTER CONNECTIVITY.
Efficient. Shared. Future-Ready.



MULTIPLE SITES. HIGHER COMPLEXITY.
Less Efficient. More Clutter. Higher Cost.

Shareable 5G Small Cell

Revolutionizing Indoor Connectivity



The Problem

4G (90%)

5G (10%)

<Requires Upgradation>

ACES Indoor Infrastructure Distribution

Creating an urgent need for a seamless 5G upgrade path.



Socio-Economic Impact

- **Economic:** Cost savings, new business models, accelerated digital transformation
- **Social:** Enhanced public spaces, bridging digital divide, promoting digital inclusion



Vision

Full-scale commercial roll-out and widespread adoption of the Shareable 5G Small Cell product by 2026, providing a near-future solution to the urgent demand for advanced indoor 5G connectivity.



Achievements

12 Publications, 3 IPs Registered, Open RAN 6G Challenge Award , SCWS-London Award Winning, IEEE Future Networks Honorable Mention Award



Shareable 5G Small Cell

Solution

Multiple mobile network operators can utilize the same **small cell**, reducing deployment costs and accelerating time-to-market.

5G



Small Cell Solution

Cost efficient, Energy efficient & Space efficient

Comparison

KPIs	Traditional RAN	O-RAN Compliant C-RAN	% Savings
RAN CAPEX (BBU+RRU)	~50 Million SAR	~17.5 Million SAR	65 %
Power	2,000 Amperes	400 Amperes	80%
Space	300 mètre Square	75 mètre Square	75%
Number of Meet me Room	5	1	80 %
Average Integration Time	8 Months	1 Month	87.5 %

Thank You