Innovative Use Cases for Dynamic Spectrum Access Technologies
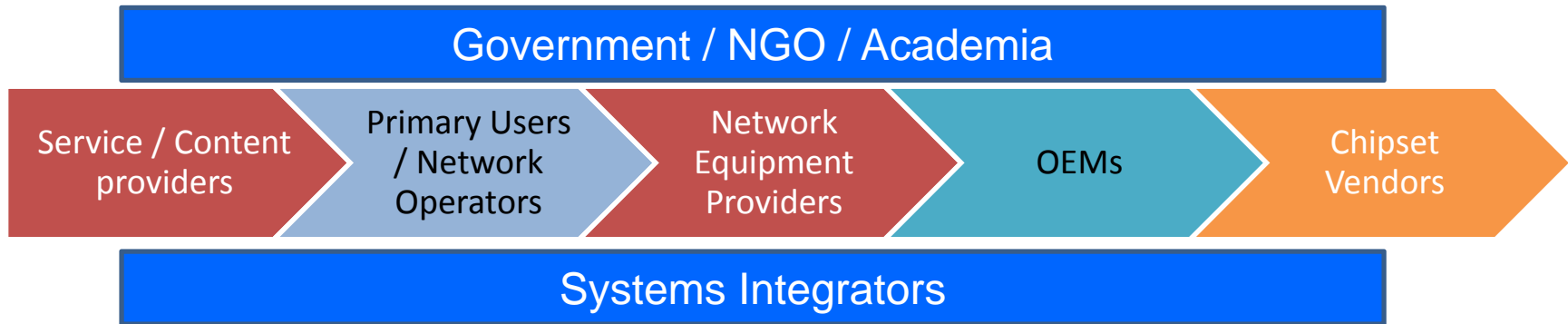
Dr. Apurva N. Mody

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WhiteSpace Alliance

Government / NGO / Academia

Service / Content providers → Primary Users / Network Operators → Network Equipment Providers → OEMs → Chipset Vendors

Systems Integrators

- WhiteSpace Alliance is a technology neutral organization – It promotes the use of unused and under-utilized spectrum

- WSA engages in technology development and market awareness activities. This includes Pilot programs for early access to nascent markets.

- The Alliance *creates and simplifies standards*

- WSA conducts programs for *inter-operability and certification between products*

- WSA plans to adopt *IEEE, IETF and 3GPP Standards* for use in the WhiteSpaces.

Applications

Technologies and Standards

Industry and Govt. Collaboration

WSA Inter-op Specifications
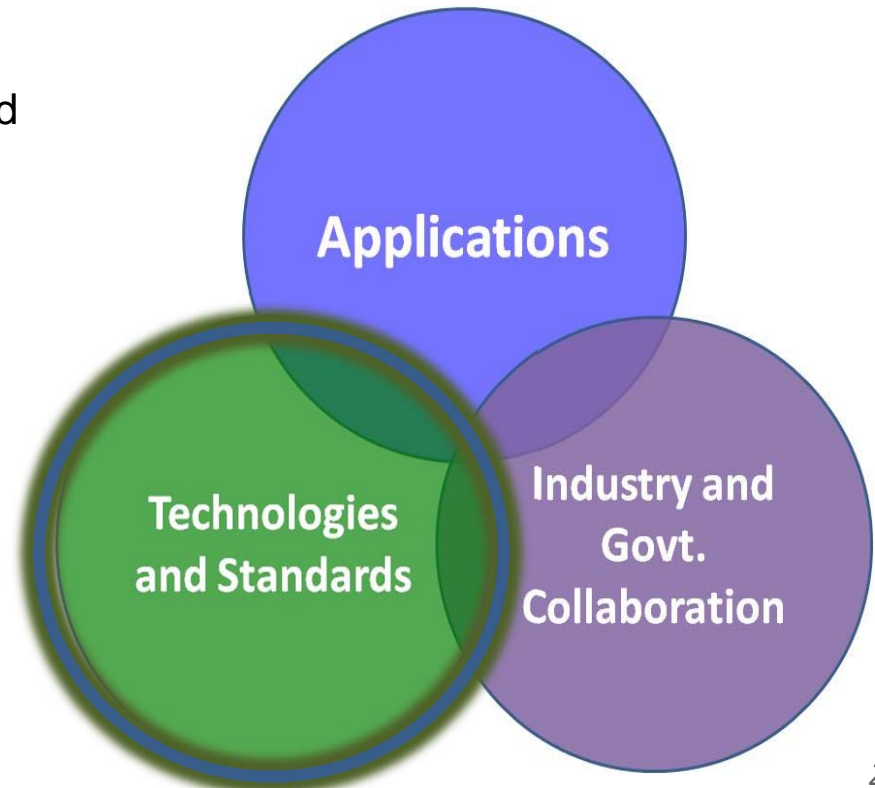
WSA Wi-FAR™ Interoperability Specification

- WSA Wi-FAR interoperability specification is derived from the **IEEE 802.22 Standard.**

- Wi-FAR provides Point to Multi-Point and Middle-Mile Broadband Wireless Access under Line of Sight and Non Line of Sight Conditions.

- Each Wi-FAR cell will provide **22 to 29 Mbps of aggregated throughput per TV Channel**. Typical distances covered range from **10 km up to 30 km**.
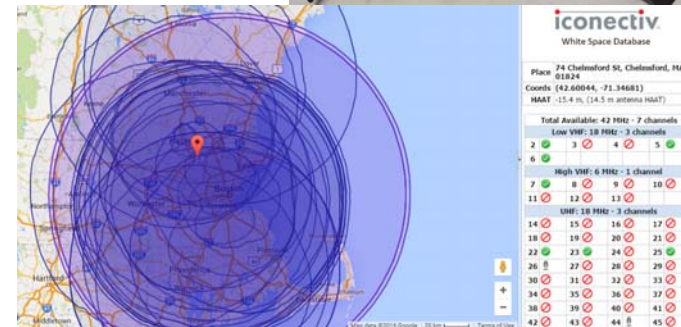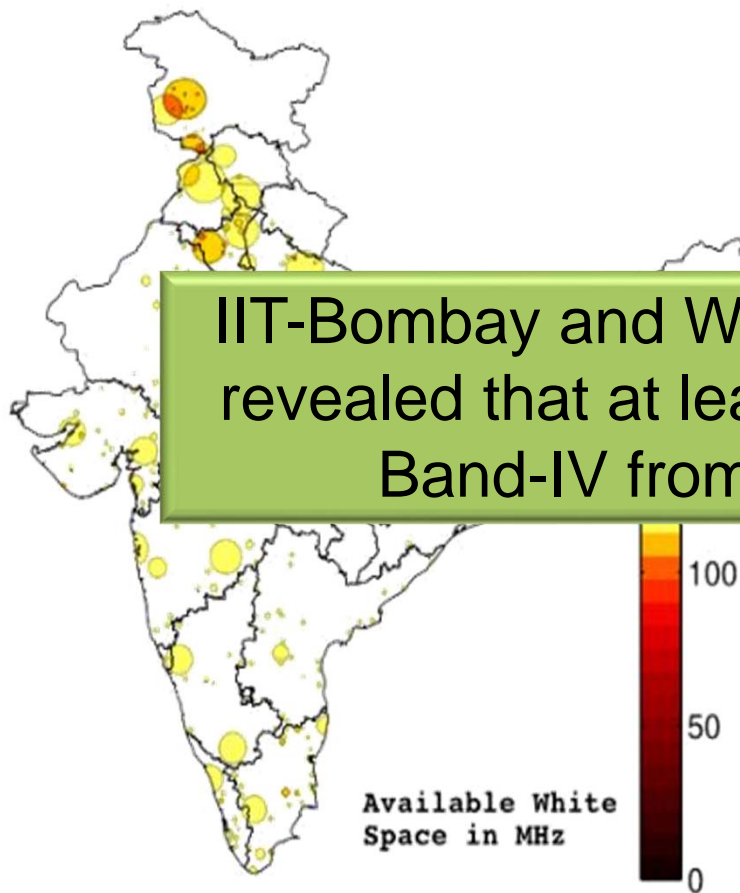
WSAConnect™ Interoperability Specification

- The WSAConnect interoperability specification is derived from the IETF Protocol to Access White Spaces (PAWS) Standard. The specification has been completed in 2015 and inter-operability tests are under way.

Saankhya Labs IEEE 802.22 Prototype

NICT IEEE 802.22 Prototype

Iconectiv IETF PAWS compliant database

WhiteSpace Alliance

DSA
DYNAMIC · SPECTRUM · ALLIANCE

Band Characteristics

1 — Primary user: Doordarshan 373 transmitters overall

2 — 15 channels of 8MHz

> IIT-Bombay and WhiteSpace Alliance Analysis revealed that at least 100MHz unused in UHF Band-IV from 470 MHz – 585 MHz

always available

4 — Better propagation characteristics than existing unlicensed band

5 — Potential for providing affordable rural broadband

100

50

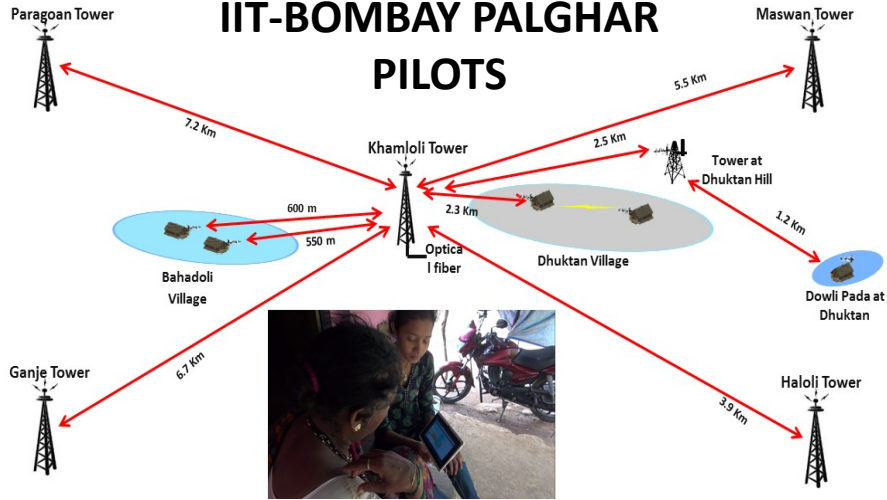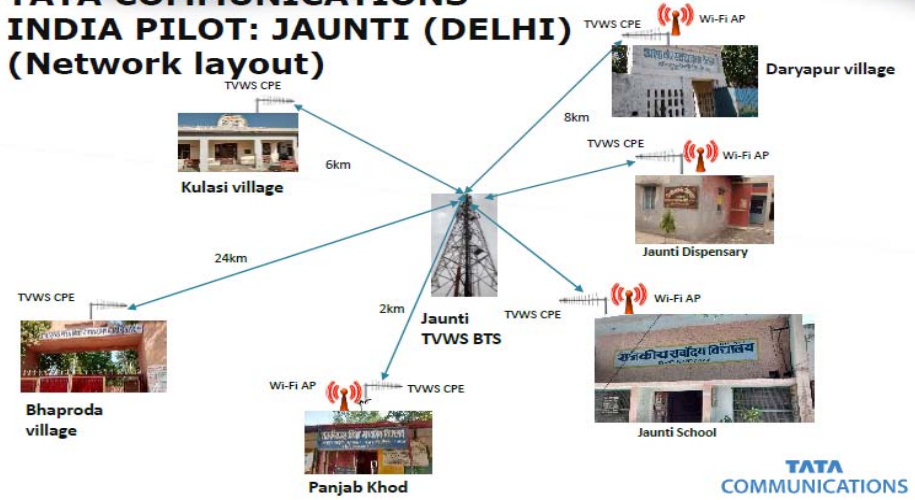Available White Space in MHz

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Link to the White Paper

WSA
WhiteSpace Alliance ®

IIT-BOMBAY PALGHAR PILOTS

Paragoan Tower · Maswan Tower · Khamloli Tower · Tower at Dhuktan Hill · Bahadoli Village · Dhuktan Village · Dowli Pada at Dhuktan · Ganje Tower · Haloli Tower · Optical fiber

7.2 Km · 5.5 Km · 2.5 Km · 600 m · 2.3 Km · 550 m · 1.2 Km · 6.7 Km · 3.9 Km

TATA COMMUNICATIONS' INDIA PILOT: JAUNTI (DELHI) (Network layout)

Daryapur village · Kulasi village · Jaunti Dispensary · Jaunti School · Bhaproda village · Panjab Khod · Jaunti TVWS BTS

TVWS CPE · Wi-Fi AP · 8km · 6km · 24km · 2km

TATA COMMUNICATIONS

Rural Broadband

Bank ATMs (Micro-finance)

Tele-education

WhiteSpaces to Improve Socio-economics

© IIT-Bombay, © Tata Communications, Presented at the WSA Global Summit, New Delhi, 2015

WSA WhiteSpace Alliance

Tele healthcare

E-Panchayat

E-Commerce

Brazil Pilot Program with Inatel - Santa Rita do Sapucai

- TVWS Radios used in Point to Multi-point configuration to provide broadband access.

- TVWS Base Station at INATEL
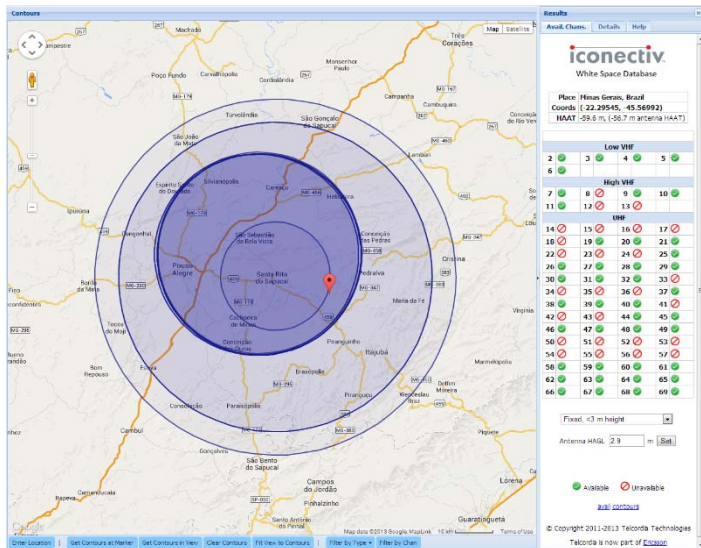
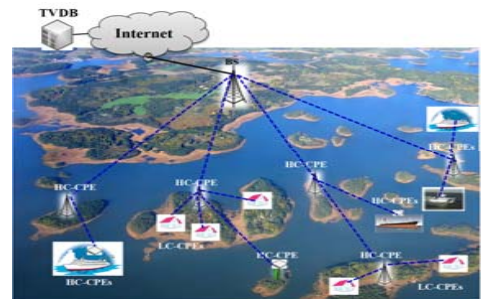## WhiteSpaces to Provide Connectivity to Rural Schools
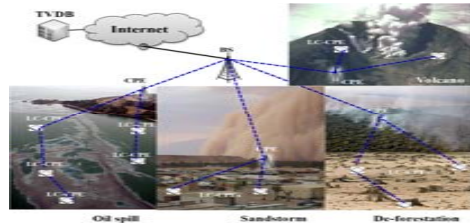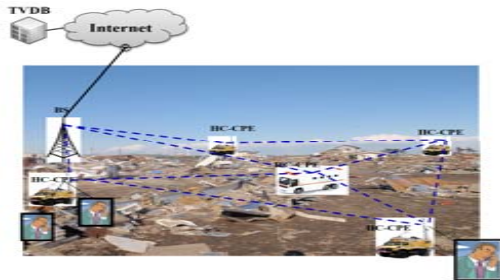
Smart Grid Comms

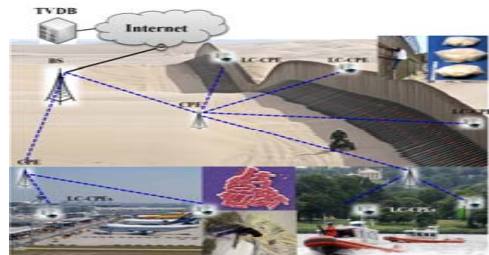Muni Wi-Fi

Security and Monitoring

Maritime Communications

Environment Monitoring

Public Safety and Disaster Response

Border Protection

Transportation Systems