Centre for Development of Telematics (C-DOT)

Low Power Communications Solution for Rural India

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CHALLENGES IN INDIAN TELECOM

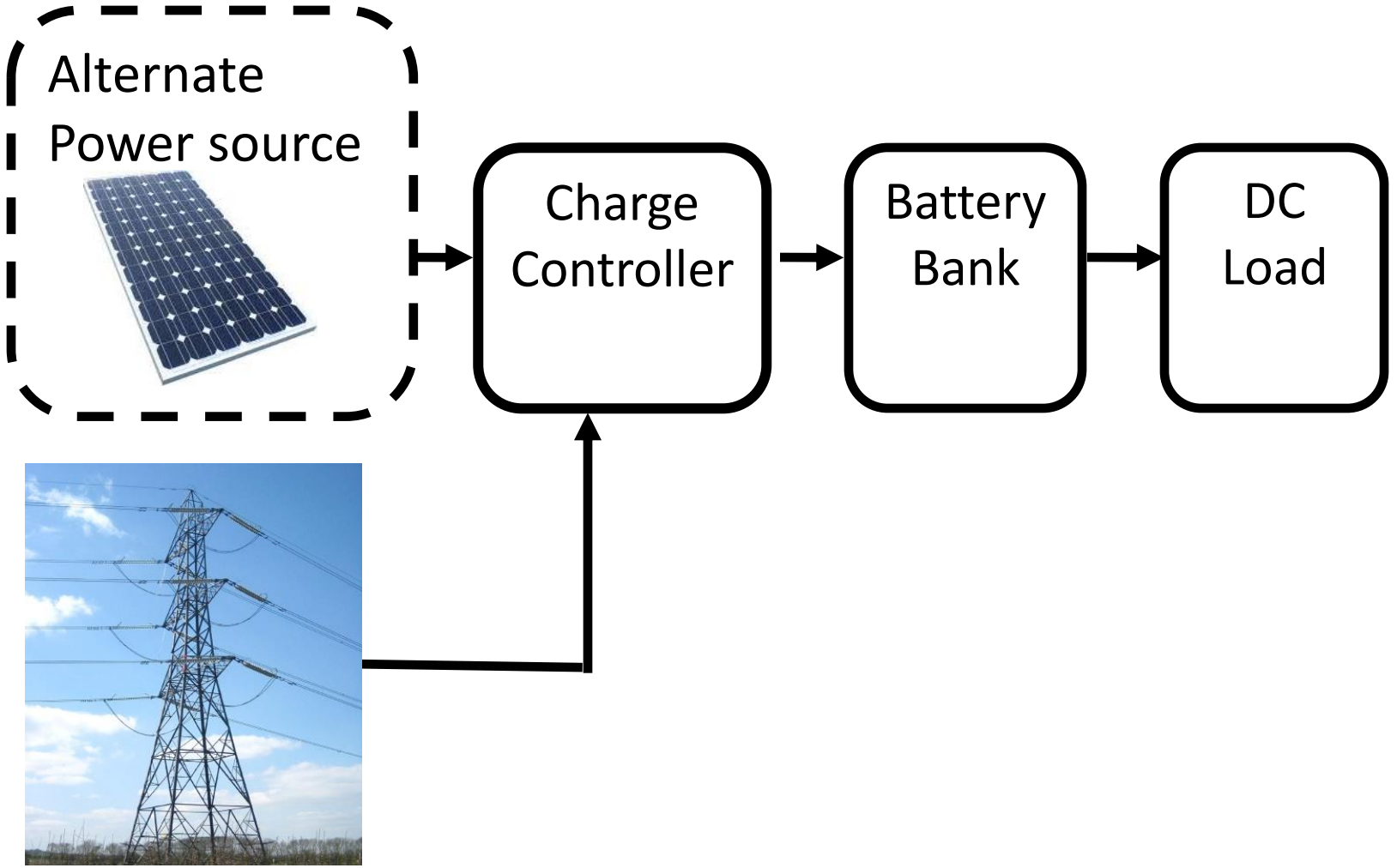
- Unreliable Power Grid Supply
- 70% of BTS mobile towers (totally 4L) in India faces up to 8 hours per day of outage
- 40% power requirements are met by grid electricity and 60% by diesel generators
- Diesel generators are of 10-15 KVA capacity and consume about 2 liters of diesel per hour and produce 2.63 kg of CO_2 per liter
- Non-renewable – Fossil fuel (Scarcity, exhausting)

SOLUTIONS ?

- Use Energy Efficient Modules and Systems
- Optimize power consumption of resources
- Using renewable energy sources
- Solar, Wind, Hydro (abundant)

Green Power Supply Unit (GPSU)

HYBRID POWER SUPPLY ARCHITECTURE



GPSU- INTEGRATED BATTERY

GPSU 250W APPLICATIONS

System rating	250W
Products supported	ONT, Gyansetu, BBWT, Street lights

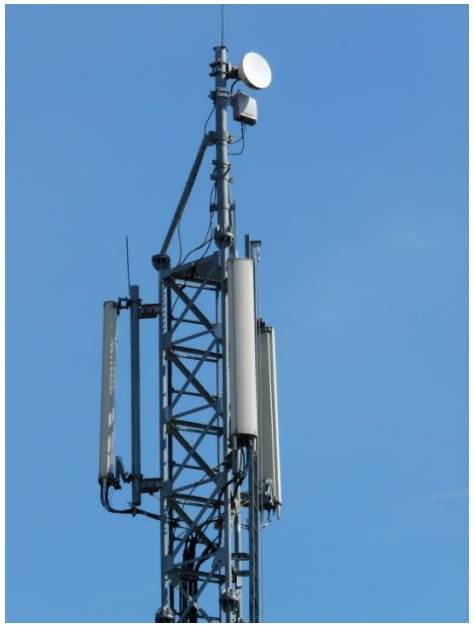
BBWT

GPSU (2KW/5KW) APPLICATIONS

System rating	2000/5000W
Products supported	Mini BTS, IP-PBX, Mobile Towers

Mini BTS

IP-PBX



Third Party BTS

Centre For Development Of Telematics (C-DOT)

Broad Band Wireless Terminal (BBWT)

What is a Wireless Terminal?

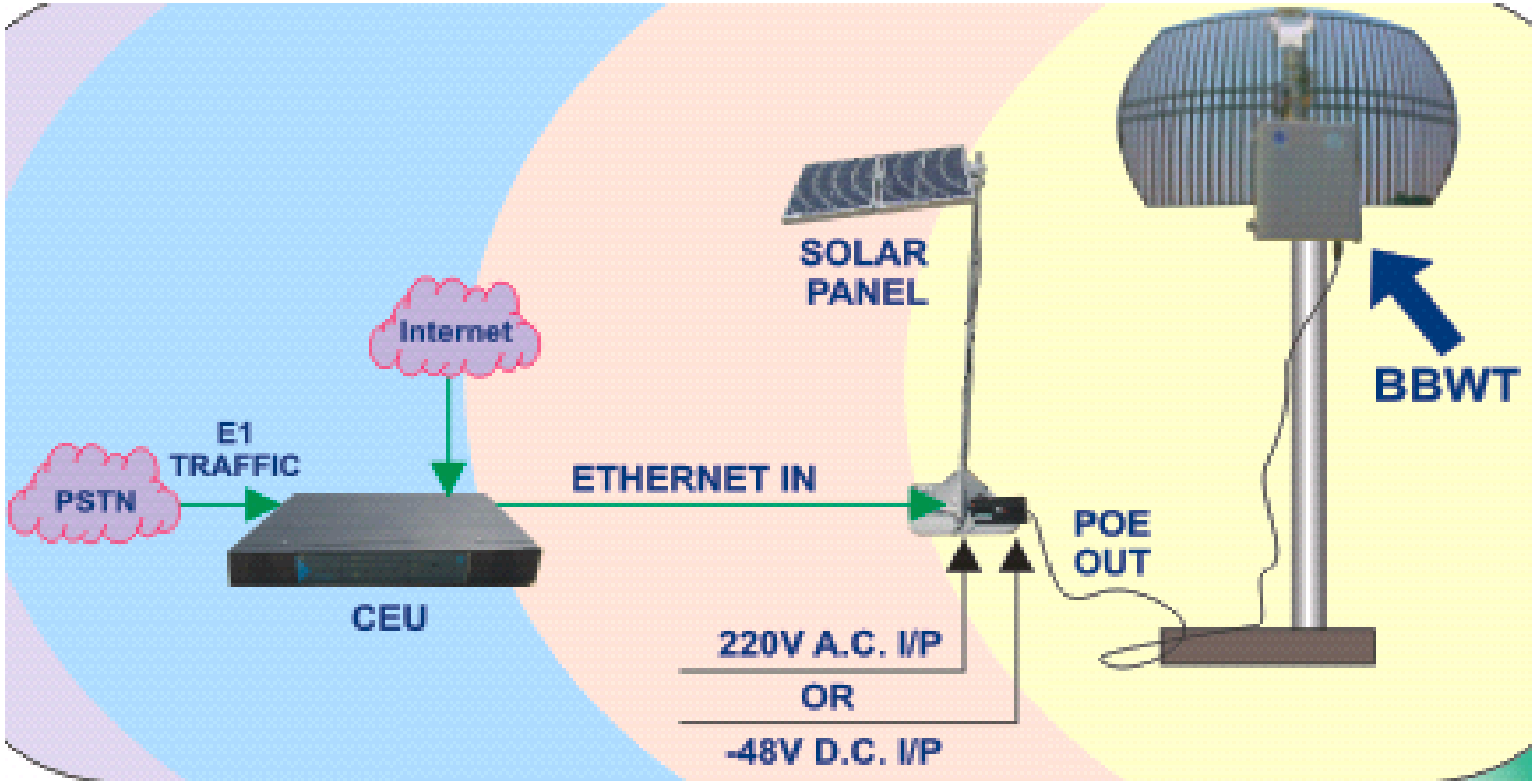
- ✓ Is a wireless communication link as the "last mile / first mile" connection for delivering plain old telephone service (POTS) and/or broadband Internet to telecommunications customers.

- ✓ Other terms for this type of access include **Broadband Wireless Access** (BWA), **Radio In The Loop** (RITL), **Fixed-Radio Access** (FRA) and **Fixed Wireless Access** (FWA).

Long Range Wi-Fi

- ✓ Long Range Wi-Fi is based on IEEE 802.11 standard and has emerged as the “de facto standard” for unlicensed wireless access .

- ✓ An alternative to other fixed wireless, cellular networks or satellite Internet access.


SOLAR
PANEL
Internet
E1
TRAFFIC
PSTN
ETHERNET IN
BBWT
POE
OUT
CEU
220V A.C. I/P
OR
-48V D.C. I/P

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About C-DOT BBWT

- C-DOT's **BBWT** is a cost-effective **Wi-Fi** solution for IP connectivity to Remote & Rural areas through wireless n/w.
- Can also be used for Backhaul link for Wi-Fi hotspots, cellular base stations and base station controllers, Bank ATMs, Database servers etc.
- Is an Extension to LAN and provides Real Time Applications.
- Operates in RF bands **2.4 Ghz** and **5.8 Ghz**.
- Minimizes the need for wired connection up to the last mile and easy to install.
- Combines data connectivity with User Mobility.
- Green Solution using Solar powered system.

BBWT Applications

- Remote Video Surveillance & Site Monitoring.
- Meteorological Application.
- Sensor Networks.
- Disaster Management Networks.
- Rural & Remote Area Network.
- Metropolitan Area Network.
- Backhaul link for Wi-Fi hot spots, cellular base stations etc.

BBWT Configuration Type I

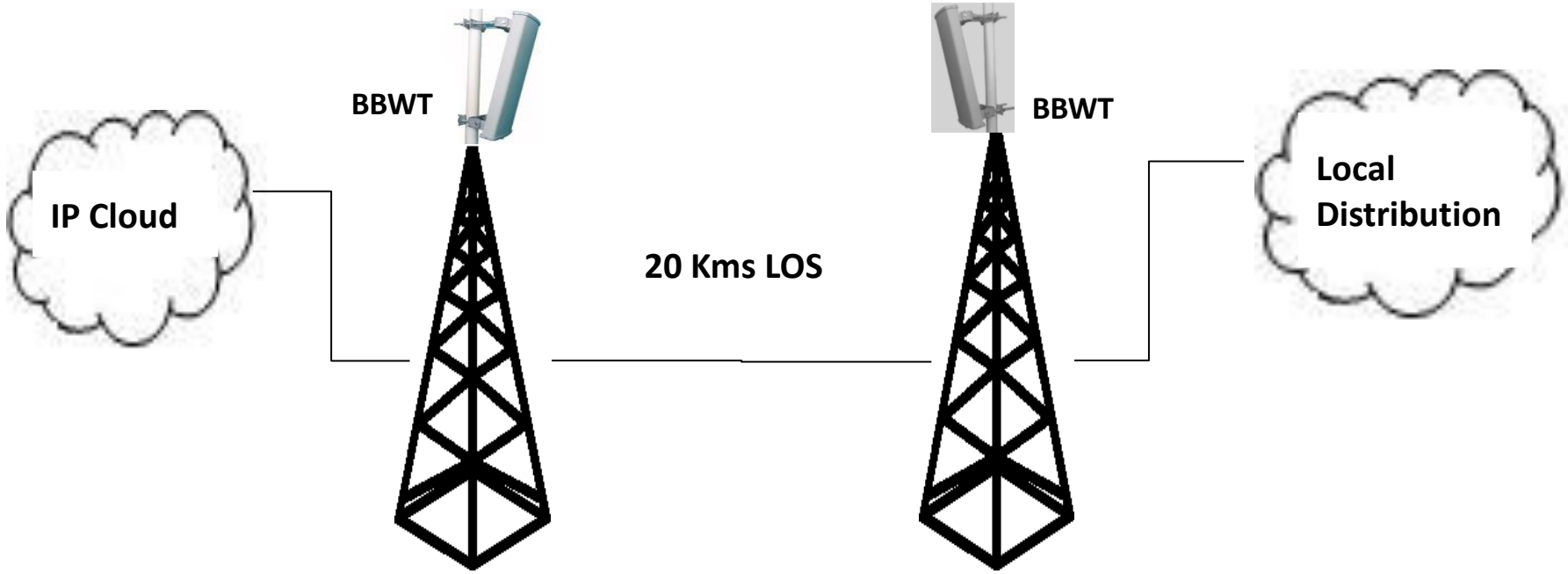


Figure: C-DOT's BBWT Point to Point Configuration

BBWT Configuration Type II

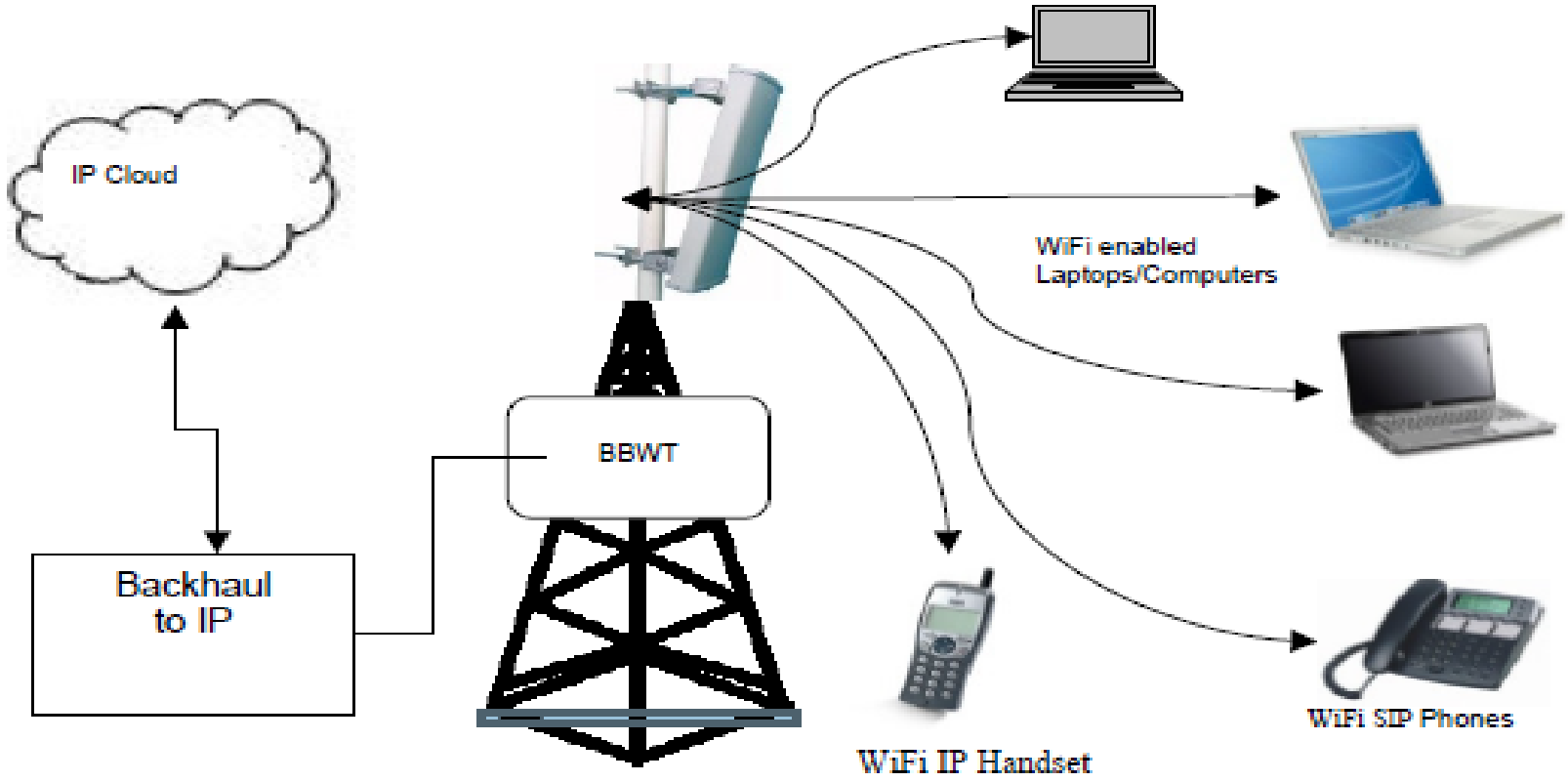


Figure: C-DOT's BBWT as Point to multi point Backhaul

BBWT Configuration Type III
(With Repeater)

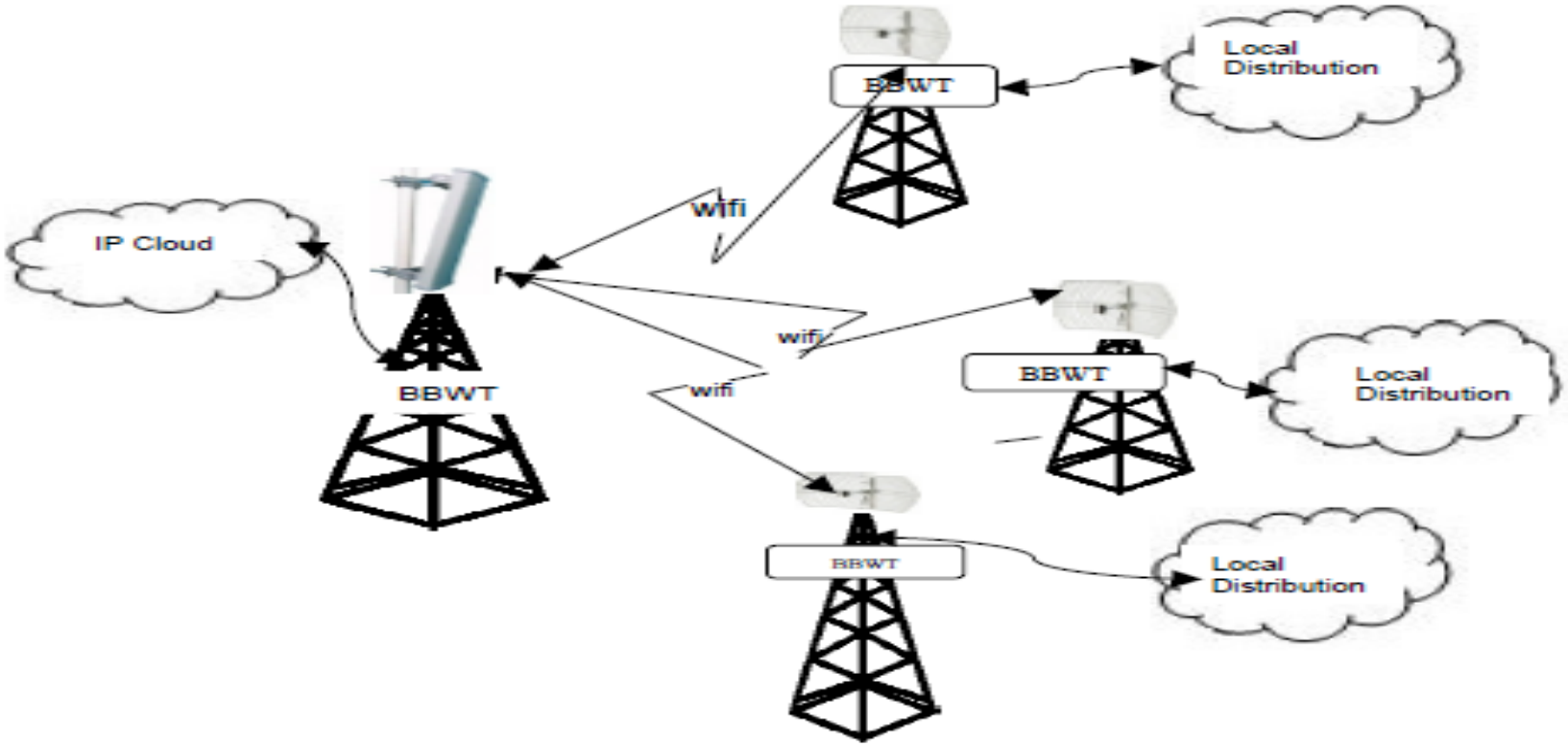


Figure: C-DOT's BBWT as Point to multipoint last mile

C-DOT BBWT System (Cont.)

Figure: C-DOT's BBWT with Yagi Antenna

Figure: C-DOT's BBWT with Sector Antenna's for Telephony Application

C-DOT BBWT System (Cont.)

Figure: C-DOT's BBWT with Parabolic Grid Antenna

C-DOT BBWT System (Cont.)

Surveillance Video Camera

Terminal With BBWT, POE Splitter & Video Server

Power Amplifier

Omni Directional Antenna

POE Injector

Figure: C-DOT's BBWT with Surveillance Camera

About C-DOT's Green Power Source

- Is a highly cost-effective power solution using Solar Power energy as the primary source with an integrated POE (Power Over Ethernet).
- Most suitable for Rural Applications where continuous power availability is a major concern.

Wifi Products & Solutions

Solar Wi-Fi

Long Range Wi-Fi

High Speed Access Point

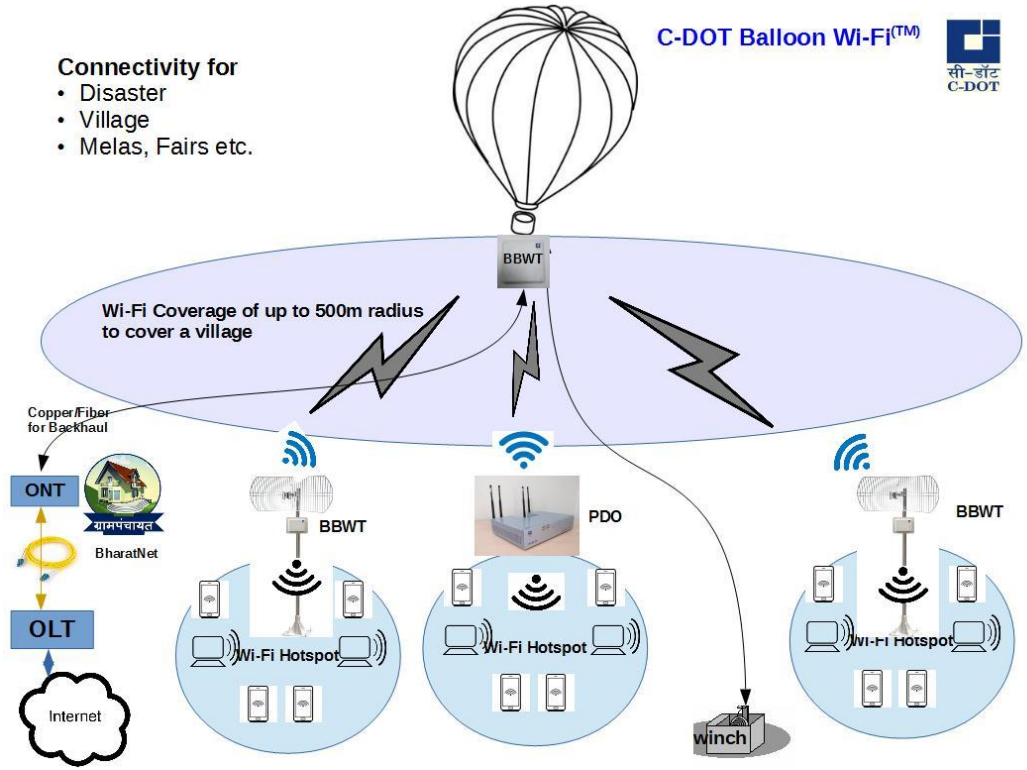
PDO (Public Data Office) & miniPDO - WANI

Core Solution (Controller, AAA, EMS &NMS)

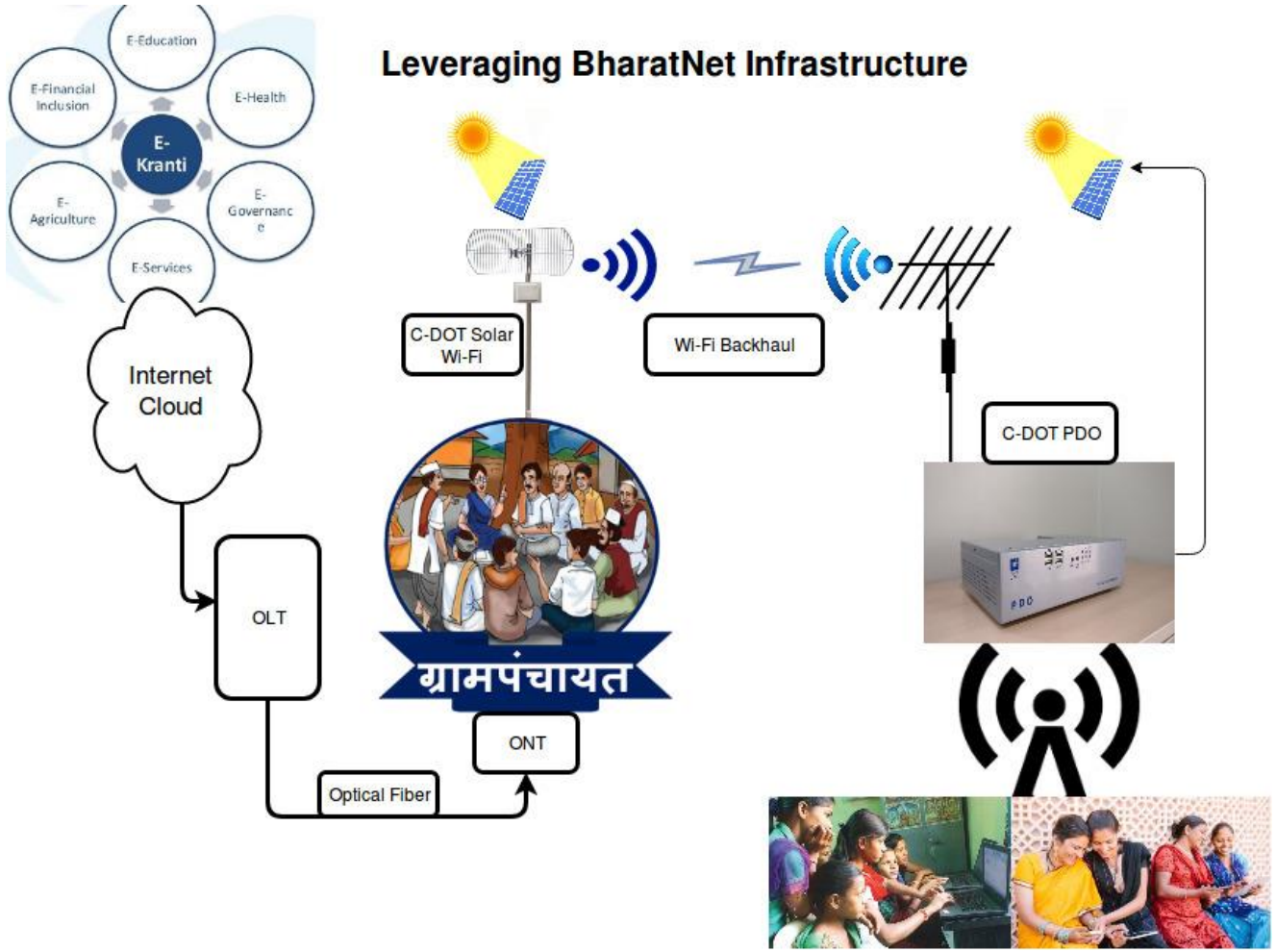
Wall Mountable Model

Table Top Model

C-DOT Balloon Wi-Fi



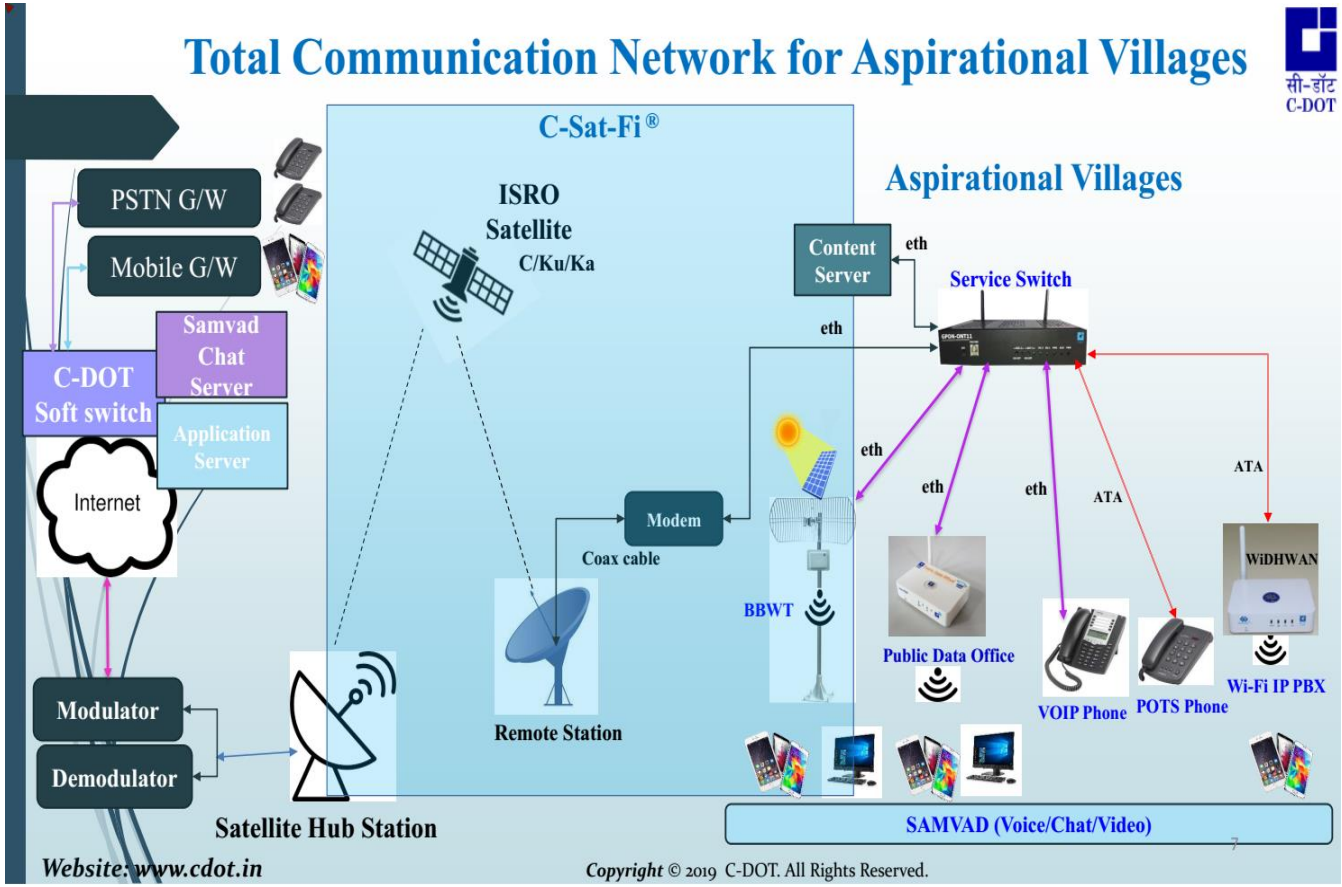
Wi-Fi Products Deployment



C-Sat-Fi ®

(C-DOT Satellite Wi-Fi)

C-DOT Satellite Wi-Fi (C-Sat-fi)

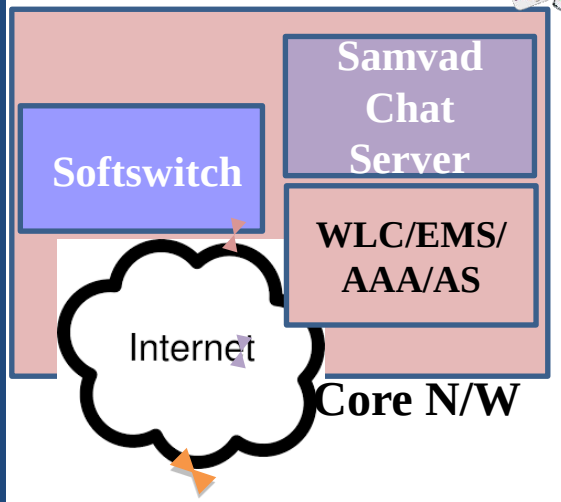


Objective of C-Sat-Fi ®

- To provide digital connectivity by integrating C-DOT BBWT with VSAT technology.
- To extend connectivity in the entire village by using C-DOT Wi-Fi terminals in Hotspot, Point to Point, Multi Point & mesh configurations over satellite link and complete Solar powered using C-DOT GPSU
- **To provide Voice, Data and Video services.**
- To provide multiple simultaneous voice calls using narrowband satellite backhaul.
- To optimize satellite bandwidth usage by hosting relevant video content locally.
- **To send Emergency Alerts/communication during Disaster situation**
- To install rugged and suitable system for rural and remote terrain (like Aspirational Villages)
-

Total Communication Network for Aspirational Villages

C-Sat-Fi ®



Core N/W

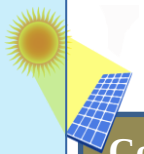
Modem

Coax cable

Remote Station

Satellite Hub Station

Aspirational Village



Content Server

eth

Service Switch

eth

eth

BBWT

eth

Public Data Office

ATA

POTS Phone

ATA

WiDHWA

Wi-Fi IP PBX

Voice/Chat/Video

Website: www.cdot.in

Field Trial Undertaken @Nainital, UA

Harish Tal GP

Talli Sethi GP

Field Trial Undertaken @Tripura

Gokulpur GP

Birchandranagar GP

Deployment Option

1. Only Voice Services
2. Voice, Data and Video Services

Only Voice Service with 02 POTS Phone

C-Sat-Fi ®

ISRO Satellite C/Ku/Ka

Softswitch

Internet

Core N/W

Modem

Coax cable

Remote Station

Satellite Hub Station

eth

Aspirational / DSPT Site

Service Switch

ATA ATA

POTS Phone

Only Voice Service

Voice, Data & Video Services

C-Sat-Fi ®

ISRO Satellite C/Ku/Ka

Softswitch

Samvad Chat Server

WLC/EMS/ AAA/AS

Internet

Core N/W

Modem

Coax cable

Remote Station

Satellite Hub Station

Aspirational Village

Content Server

eth

eth

Service Switch

eth

eth

ATA

ATA

WiDHWA

BBWT

Public Data Office

POTS Phone

Wi-Fi IP PBX

Voice/Chat/Video

Components of Total Communication Network

VSAT Modem : To provide internet backhaul at any location using C/Ka/Ku band satellite connectivity through any communication satellites.

Service Switch : To function as Service Switch to provide optimized local connectivity distribution with the support of multiple VLAN.

Broadband Wireless Terminals (BBWT): To create Wi-Fi hotspots and extend connectivity in a village through Mesh, P2P and P2MP configurations.

Public Data Office (PDO): To enable any Village level entrepreneurs (VLE) to establish internet business and resell data in sachets/coupons.

Content Server: To provide local and relevant content i.e. videos etc. through **MANORANJAN** platform which will reduce the satellite bandwidth consumption.

Component of Total Communication Network

ATA: To provide connection through normal POTS phone for making voice calls over IP network

WiDHWAN: To provide Wi-Fi IP-PBX functionality

Core: Required for Chat, voice and video call functionality using Soft switch & Chat server hosted at central location. This will be provided by the TSP/ISP

GPSU: The system will be powered by C-DOT Green Power Supply Unit (Solar based Charge Control Unit).

SAJAG Platform: Application to provide Emergency Alerts during Disaster communication

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C-DOT

Thank you

THANK YOU.

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