Viasat Cellular Network Extension System enables mobile network operators to profitably deliver GSM (2.75 G) voice, messaging, application and data services to underserved communities. A fully integrated cellular and satellite backhaul network allows operators to easily extend their existing networks to address underserved areas or create greenfield networks.

DELIVERING PROFITABLE MOBILE SERVICES TO UNDERSERVED COMMUNITIES

Mobile network operators (MNO) face the challenge of providing services to those beyond the reach of terrestrial infrastructure. To sustain their growth they need to profitably expand their networks by reducing costs and improving availability, coverage and quality.
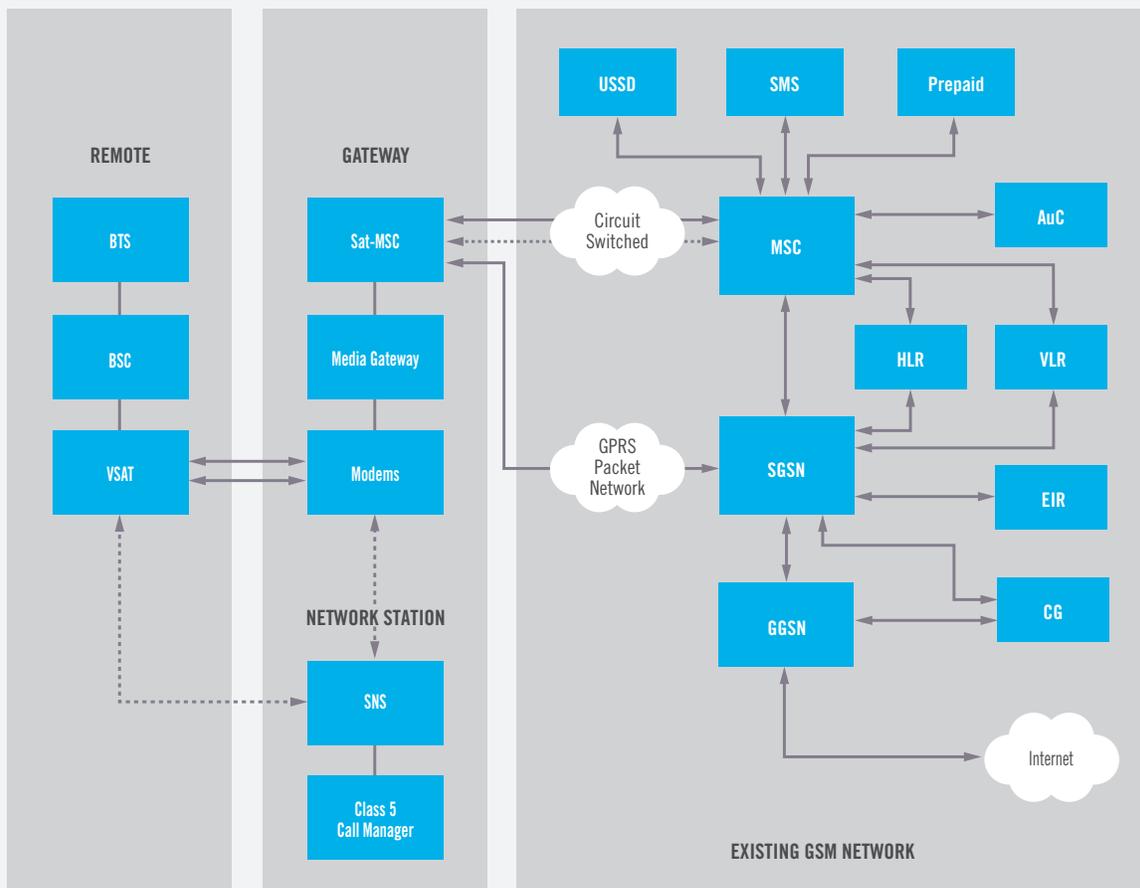
Viasat's Cellular Network Extension System gives operators the ability to provide profitable and sustainable services by connecting low-capacity remote VSAT-GSM terminals to MNO interconnect points via narrow band satellite links. The remote terminal can be easily and quickly deployed across a region by using locally trained staff. The system interoperates with existing GSM management systems and facilitates roaming and MNO inter-working.

EXPANDING SERVICES TO NEW AREAS

With the mobile network environment constantly evolving and the cost of services decreasing, MNOs need to expand beyond their traditional customer base to untapped areas. These areas, beyond the reach of traditional terrestrial and cellular infrastructure, can now provide a profitable service using the Viasat cellular extension. This low cost infrastructure minimizes satellite bandwidth and the low power consumption terminal assures profitable service. Seamless integration into the mobile operator's existing network allows the operator to support standardized service packages to customers irrespective of the access method.

KEY BENEFITS

» Low GSM terminal infrastructure cost

» Highly efficient satellite backhaul

» Lowest cost per minute in the industry for small cell sites

» Consistent call-by-call voice quality

» Low power consumption— affordable solar power reducing OPEX costs

» Utilize existing operator services and features

» 3GPPP standards based

Cellular Network Extension System

REMOTE
- BTS
- BSC
- VSAT

GATEWAY
- Sat-MSC
- Media Gateway
- Modems

NETWORK STATION
- SNS
- Class 5 Call Manager

EXISTING GSM NETWORK
- USSD
- SMS
- Prepaid
- MSC
- AuC
- HLR
- VLR
- SGSN
- EIR
- GGSN
- CG
- Circuit Switched
- GPRS Packet Network
- Internet

MAXIMIZING SUBSCRIBER BASE

Operators are looking to maximize subscribers while minimizing the cost of ownership. As the costs of mobile calls decrease, a way to increase revenues is to expand into underserved areas. New technologies give operators the ability to expand their network into previously uneconomical markets. The Viasat extension infrastructure makes this possible with low cost, minimal satellite bandwidth usage, very low power consumption, and utilization of existing operator services and features and standards based.

MOBILE EXTENSION SERVICES USING THE VIASAT CELLULAR NETWORK EXTENSION SYSTEM: SIMPLE, FLEXIBLE AND COST EFFECTIVE

Seamless Integration into Existing Networks

The Viasat system uses the operators existing applications, system features and functions to simplify network management, service plan provisioning and installation, maintenance and operation. Voice, data, SMS, subscriber billing, including calling card activation, are managed by the MNO's infrastructure assuring consistent service across multiple backhaul technologies.

The decentralized network architecture and full outdoor remote terminal equipment simplifies infrastructure requirements reducing the costs and complexity of deploying remote terminals. These features allow operators to easily expand to new service areas.

Scalable to Expand the Service

As a network grows, management usually becomes more complex. However, through the use of performance monitoring tools developed by Viasat, operators can easily manage network expansion and operation. These tools are included in the network configuration manager and will streamline the administrative workload.

The Viasat system integrates into the existing infrastructure and provides seamless satellite connectivity between the satellite and terrestrial networks. Scaling from 1 to 6 TRX per terminal and incrementally scaling the network size from 1 to 1500 terminals enhances growth and improves network optimization.

Cost Effective for Low APRU Communities

Recognizing that the focus is on underserved areas with limited ARPU, the Viasat terminal uses almost 35% less power consumption than the nearest competing technologies. Additionally, local call switching and enhanced voice compression algorithms minimize satellite bandwidth usage while retaining speech quality. Utilizing a full IP66 all-outdoor enclosure improves OPEX costs by eliminating the need for cooling or protective enclosures.

CELLULAR NETWORK EXTENSION SYSTEM MODULES

A transparent interface between the MNO core and the Cellular Network Extension System allows the existing network monitor and control system to remotely manage the health and traffic of the terminals. This gives operators the flexibility and scalability to easily deploy additional terminals. Key module components are:

» **GSM Core Protocol Translator:** Provides the interface between the remote sites and MSC. Operators maintain CDR's, authenticate phones on the network and support calling features and provisioning plans.

» **Network Station:** The network station provides the satellite bandwidth allocation for voice traffic between the terminals and the central gateway.

» **Remote Terminals:** Fully integrated VSAT-GSM remote infrastructure, housed in fully outdoor IP66 enclosures, featuring extended operational temperture range (operation +55° C) and providing between 1 and 6 TRX of GSM capacity.

» **Traffic Gateway:** Aggregation point for all traffic from the terminals and terminating at the MSC using IP or G.703 interfaces.

NETWORK STATION RACKS