Satellite Communication Helps Cross the Digital Divide in Indonesia

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Background

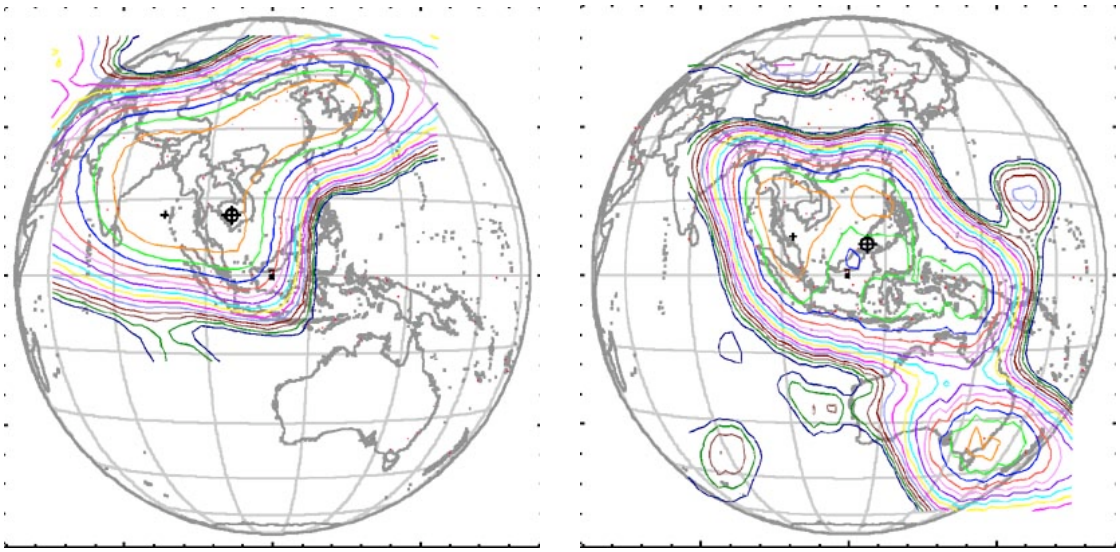
Indonesia is an archipelago country consisting of 17,000 + islands and spreading from 95° East Longitude to 141° East Longitude and 11° South Latitude to 6° North Latitude. It is neither easy nor very economical to deploy a terrestrial network in the country. With that kind of size and geographical condition, it was very strategic when Indonesia decided to go for satellite communication to improve the quality of its communication network and penetration to remote and isolated area. The nature of satellite communication is good for remote area and quick deployment of the ground segment for a wide range of applications.

The government of Indonesia was early to recognize the value of a nationwide telecommunications network and so was first in Southeast Asia with its own satellites. Due to the high cost of earth stations in 1976, the initial Palapa network served 40 major cities on 15 islands. By 1993, the reduced cost of VSATs made it possible to extend medium data rate service to government and industrial users in remote provinces on the islands of Kalimantan, Irian, Sulawesi, and Maluku Islands. Extending the Internet across Indonesia, while challenging, has depended heavily on the latest generation of geostationary satellites discussed below.

It started back in 1976 with PALAPA-A1 and continued with PALAPA-A2 1978, PALAPA-B family (B1, B2R, B2P and B4), PALAPA-C family (C1 and C2) and TELKOM-1.

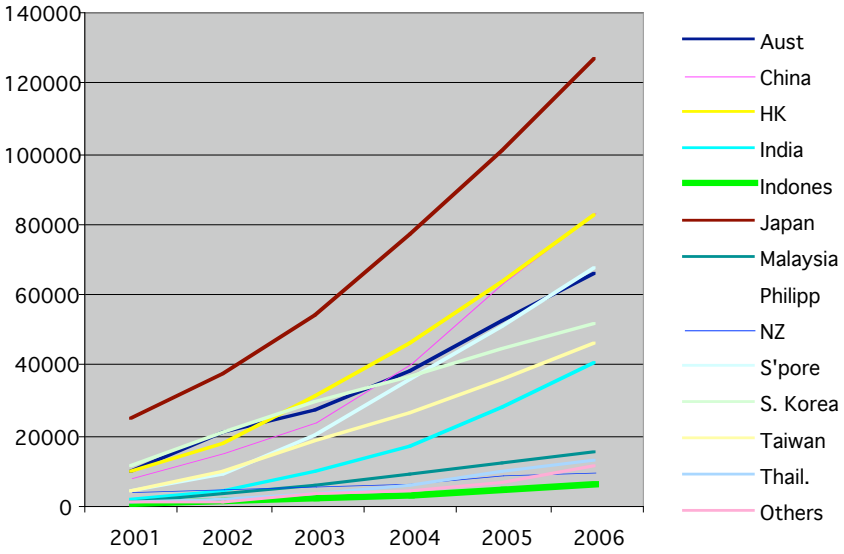
PALAPA-C2 Satellite – the Third Generation

For this purpose I would like to explore PALAPA-C2, the third generation of PALAPA which is more powerful than its predecessor. At this moment SATELINDO (PT Satelit Palapa Indonesia) owns and operates PALAPA-C2 with C-band and Ku-band transponders at 113° East Longitude. The C-band transponder is precious in this area since the performance of C-band is very effective in a rainy tropical region. The Ku-band transponder is not popular in Indonesia since the link availability of the Ku-band is quite low. Indonesia is in the highest rainfall region of the world, e.g., the P region of ITU Rain Model.



Picture: PALAPA-C2 Coverage

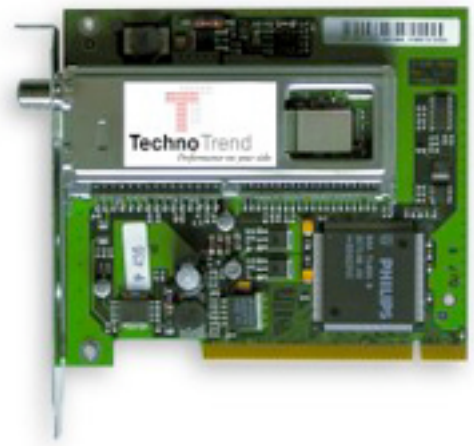
With a specifically tailored contour over landmass in Indonesia and Asia Pacific at this moment, PALAPA-C2 is carrying a mix of traffic. Currently the ratio between video broadcast traffic and data traffic is 55% : 45%. This is a change from 60% : 40% in 2000 and the trend is changing steadily. That Indonesian VSAT providers keep increasing their leased capacity in PALAPA-C2 signifies robust traffic growth on the ground. The IP-based data traffic including multimedia has increased greatly in the last few years in the Asia Pacific Region, including Indonesia. Projections, such as those below, indicate that Indonesia's rate of growth is significant although lower than other Asian countries.



Picture: IP Traffic Trend in Asia Pacific (Source: Gartner Dataquest 2002)

PALAPA-C2 Connects Indonesia to the Internet World

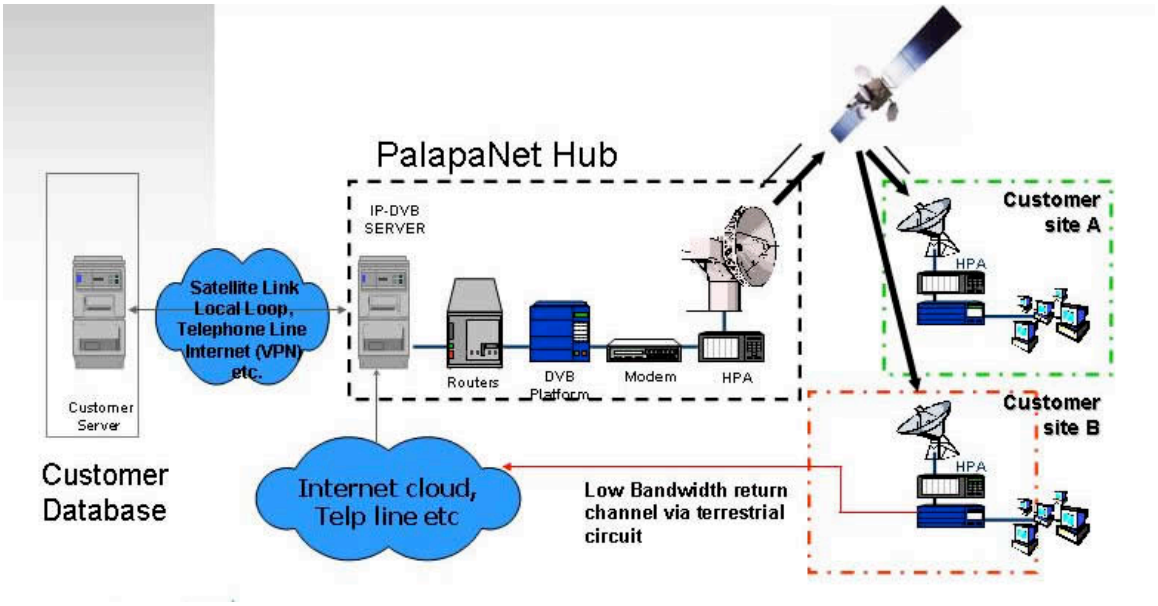
To respond to this IP-based data traffic trend and market need, Satelindo has developed two services: Palapa-Net and PalapaBroadband. Palapa-Net is the high speed IP-access services to link ISPs and corporations who wish to have Internet access via satellite. PalapaBroadband is an IP-DVB based content delivery service capable of delivering up to 45 MBps down stream. The service package includes but not limited to fast Internet access, content distribution, news feed and web cast for ISPs, on-line streaming data applications, IP-TV, push services and replication of distributed data bases. PalapaBroadband services enable the customer to use COTS IP-DVB receivers (see picture of internal PCI card) using an open standard (unless they choose the protected mode where data is secured by encryption).



Picture: Internal IP-DVB Receiver (Courtesy of Technotrend)

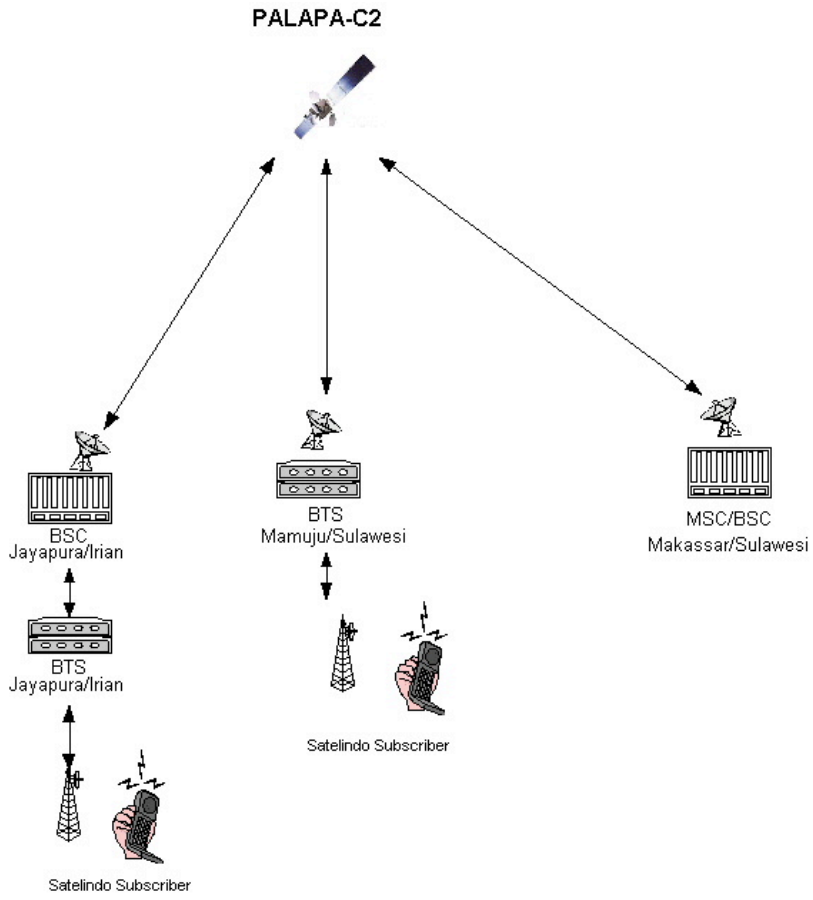
With Palapa-Net and PalapaBroadband, Satelindo helps people in remote areas - or even in the dense area with congested terrestrial network - to have easy access to the Internet. For example, a Satelindo customer in a remote area of Sumatra employs PalapaNet service to provide connectivity to the Internet. They use a VSAT to link their LAN's hub with our Internet server in Satelindo HQ in Jakarta with data speed of 256 kbps. A block diagram of how this service is arranged is shown below.

Picture: PalapaNet Service Block Diagram

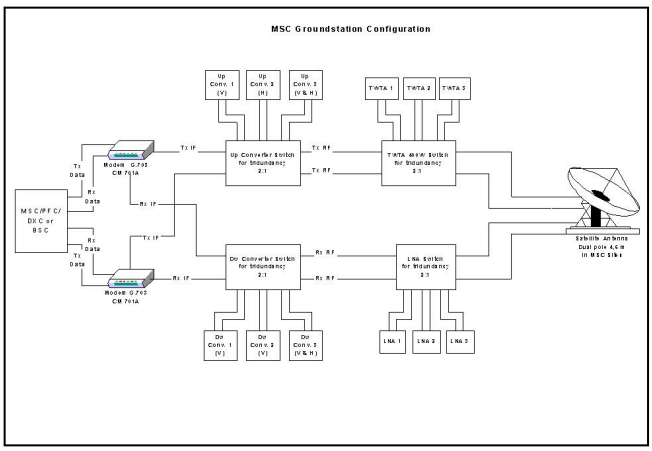


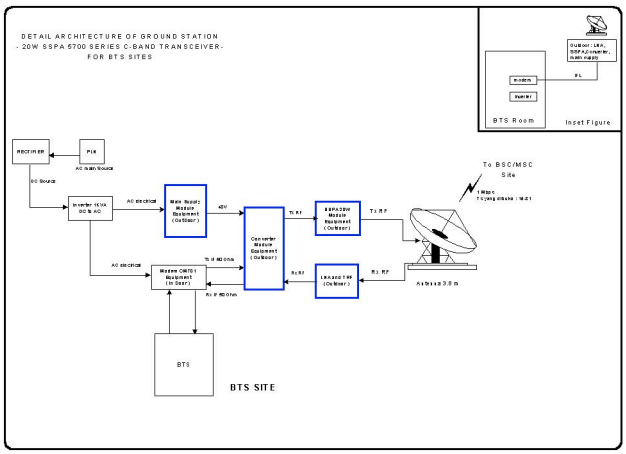
Wireless is the Most Effective Means of Crossing the Digital Divide

SATELINDO is also a major GSM 900 service operator in Indonesia with 3 millions subscribers at the end of 2002 with target subscribers of 5 millions in 2003. With such an aggressive target, SATELINDO must deploy the transmission lines to connect BTSes (Base Transmission Station), BSCs (Base Station Controller) and MSCs (Mobile Switching Center) by using PALAPA-C2 C-band transponder capacity which is quicker than deploying terrestrial transmission lines especially for remote and isolated cities/areas. For example, connecting a BTS in Jayapura (Island of Irian) to a BSC/MSC in Makassar (Island of Sulawesi) can be provided easily and quickly by satellite communication link rather than terrestrial link/network. One of GSM 900 features is GPRS (General Packet Radio Services) which enables subscribers to access the Internet at up to 60 kbps. As a result, SATELINDO GSM subscribers can roam within GSM coverage and access the Internet to engage in mobile transactions, if desired.



Picture: Satelindo's GSM900 Networks via PALAPA-C2 Satellite





Picture: Ground Station's Block Diagram for MSC/BSC and BTS

The above pictures are the detailed block diagrams of the ground station the for MSC/BSC and BTS. The heart of those ground stations is the G703 modem which enables the MSC/BSC and BTS to communicate with other MSC/BSC and BTS. Satelindo employs redundant system to ensure high link availability.

Picture: Satelindo's Ground Station

The above picture is Satelindo's ground station in the city of Pontianak in Kalimantan Island. The ground station consists of satellite ground station, BTS and GSM antenna tower to cover the area.

Conclusion

The PALAPA-C satellite, owned and operated by SATELINDO, helps people in Indonesia get easy access to the Internet world. This access is greatly helped by the nature of satellite communication.

Some of our potential customers are still reluctant to use satellite transmission because of propagation delay. However, we understand this issue and in fact can provide service that is better than terrestrial alternatives. Satelindo is working to educate current and potential customers about the benefits of satellite communication in helping Indonesia to cross the Digital Divide.