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Impact Of The Use Of The Palapa Satellite On The Development
Of Indonesia And The Asia-Pacific Region

By

Sukarno Abdulrachman
INTRODUCTION

Every invention in the technological field and its application can have an impact in the economic field, in the social and cultural field and most probably also in the political and security field as well.

The capability of mankind to put objects in orbit, for telecommunications purposes, is now a most popular application of the technologies developed during the past few decades, as evident among others by the small rooftop or back-yard parabolic antennas, Inmarsat antennas on yachts, etcetera.

There has emerged the GLOBALIZATION OF INFORMATION DISTRIBUTION, the growing tendency towards THE GLOBAL VILLAGE and the change into INFORMATION SOCIETIES.

Indonesia was quick to recognize the potential benefits of the satellite technology in solving its telecommunications problems in the framework of the national development. 1963: Indonesia became a founding member of INTELSAT, 1976: the inauguration of the PALAPA domestic communications satellitesystem, 1986: Indonesia becomes the 24th member of INMARSAT.

+) co-authors:
1. A.Ph. Djiwatampu, Deputy Director General, Telecommunications
2. Bambang Setiawan, Planning, Perumtel
THE PALAPA SYSTEM

The satellite technology was chosen to overcome major shortcomings in Indonesia's telecommunications network in the early 70's, considering its profound advantages, among others the capability to cover, including for television broadcasting purposes, the whole of the Indonesian archipelago, speed of construction, quality of communications, flexibility of network structure and economics as well.

The two generations of satellites which have been executed show the growth and use of the Palapa system:

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<th>Palapa-A</th>
<th>Palapa-B</th>
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<tbody>
<tr>
<td>1</td>
<td>Weight at launch</td>
<td>547 kg</td>
</tr>
<tr>
<td>2</td>
<td>Size (height)</td>
<td>3.45 m</td>
</tr>
<tr>
<td>3</td>
<td>No. of transponders</td>
<td>12</td>
</tr>
<tr>
<td>4</td>
<td>Transmitter power</td>
<td>5 watts</td>
</tr>
<tr>
<td>5</td>
<td>E.I.R.P.</td>
<td>28.5-34.5 dBW</td>
</tr>
<tr>
<td>6</td>
<td>Lifetime (guaranteed)</td>
<td>7 years</td>
</tr>
</tbody>
</table>

The number of earthstations has grown to more than 200 stations for public telecommunications use (Perumtel), with additional earthstations owned and/or operated by the TVRI, Ministry of Defence, ASEAN countries, etc.

APPLICATIONS AND IMPACTS OF THE PALAPA SYSTEM

NATIONAL SCOPE

The PALAPA system has proven itself as a multipurpose infrastructure, among others for:

a. Transmission means for the penetration of public telecommunication services.
Telecommunication services, such as telephone, telex, telefax and data services are improved and reach many isolated areas, not possible to be reached by other telecommunication means. The concept and target as recommended by the ICWTD (International Commission for Worldwide Telecommunications Development), that... 'by the early part of the next century, virtually the whole mankind should be brought within easy reach of a telephone'...is not an impossible objective to be achieved with the help of the PALAPA system. The latest application of PALAPA has been the use of the satellites for a public VSAT data communication system (using parabolic antennas with diameters less than 2 meters), under a cooperation scheme between Perumtel and a private Indonesian party.

b. Distance education and training

PALAPA has been used for a number of education programs, such as the Open University for connecting 32 Longdistance Learning Units. Distance lectures to 11 universities in the eastern part of Indonesia are conducted (sound and text).

The SHARE (Satellite for Health and Rural Education) experimental program was executed in 1987, proving the feasibility to conduct computer conferencing between Indonesian universities and research institutes between themselves and with the GUELPH University in Canada.

It is my impression, that the capability of PALAPA as a point-to-multipoint media has not been fully exploited for educational and training purposes in Indonesia.

c. Television Transmission

The capability of the PALAPA system, as was intentionally planned in the satellite design, for television program transmission has been utilized by the Department of Information. Nowadays, almost the whole population of Indonesia has access to the
televison programs. Through the rebroadcasting of the national programme, augmented by the locally produced programmes by the various local television studios, an optimal program content has been created, recognizing the variety of needs of the regions.

Moreover, through the use of TVRO's or small, inexpensive "backyard parabolic antennas" quasi direct broadcast could be established since 1987.

The possibility for using the Ku-frequency-band was studied and surveyed by a French consulting company, Satel Conseil together with the Department of Tourism, Post and Telecommunications (1985-1987) and propagation measurements in the Ku-band were carried out in 1986-1989 by the consultant and Perumtel.

The outcome of the study showed the high propagation loss, attenuation, caused by heavy rain in the Indonesian archipelago, so that with current technology, a direct broadcast satellite system in the Ku-band for Indonesia, would result in loss of signal or very low received signals from the satellite to be 9 times as frequent, compared to the use of the C-band, as is now the case. Another result of the study was also the conclusion that telecommunication traffic (data, etcetera) will face difficulties by using the Ku-band on the satellite.

It seems, that for technical as well as economic reasons, the use of the C-band is better suited for Indonesia, than the Ku-band, for DBS purposes.

ASIA-PACIFIC REGION

Currently, 8 countries or authorized entities in the Asia Pacific region are using PALAPA transponder space through leasing from Perumtel or have leasing agreements with Perumtel for execution within a short time. These are: Malaysia (2.5 transponders), Thailand (3.5),
Phillipines (3.0), P.N.G. (3), Vietnam (0.5), Australia (2.0), Hongkong (2.0), and for occasional use (2.0).

Also carried through the PALAPA is border traffic between Indonesia and certain neighbouring ASEAN countries.

The very important impact of PALAPA on ASEAN countries and neighbouring Asia-Pacific countries is, and has been, that they have had the benefit of PALAPA for development purposes of their respective countries more economically, compared with the alternative of owning their own satellite system.

The socio-economic benefit of the use of the PALAPA system for the advancement of Indonesia, for ASEAN countries as well as outside the ASEAN region has been recognized by the world.

Considering all facts as mentioned, and looking ahead, we see several challenges, which need our attention. These are among others:

1. The economic benefits of PALAPA will increase if the "per channel cost", or "the cost per traffic unit carried or transmitted" can be pushed down as far as possible. Within these costs should be included costs of the space segment, the ground segment and other operating costs during the satellite lifetime.

   The rapid developments in telecommunications technology and the ensuing alternatives should be used as reference for our satellite system planners.

2. Competing terrestrial transmission alternatives such as optical fiber systems will or could influence the choices in the future, including the transmission of television signals through submarine cables, as these technologies will become cheaper in the future.

3. Other satellite systems, operating in this area of the world could move away the current international users of the PALAPA satellites, and thereby reducing the financial and economic benefits for the PALAPA owners, and Indonesia in general.
CONCLUSIONS

1. 14 years of experience with PALAPA have confirmed the achievements as envisaged at the time of the first conception of the Indonesian domestic satellite system back in 1974.

2. The PALAPA system is the correct solution for solving telecommunication problems in the archipelagic country.

3. The impact of the PALAPA system has been the successful and rapid penetration of services to all parts of Indonesia, in the context of equitable distribution of the development. Impact was also very substantial in television broadcast, use by special agencies and a multitude of sectors, including education/human resource development.

4. Efforts to optimize the use of PALAPA for certain purposes which need its point-to-multipoint or wide-casting characteristic, such as television broadcasting and education, are feasible through the quasi-DBS nature of PALAPA.

5. The PALAPA system has given an extremely positive impact on the socio-economic development in the Asia-Pacific region, especially in ASEAN and its surrounding countries. In the future, PALAPA could continue to function for this purpose, for which due attention should be paid to a number of challenges being faced, such as optimal satellite system design for low cost-per-channel operation, facing alternative terrestrial solutions such as submarine cables as well as other satellite systems in the Asia-Pacific area.
ANNEX I

SATELLITE COMMUNICATIONS AND RURAL DEVELOPMENT

Indonesia’s domestic satellite system PALAPA has been and will continue to be instrumental to rural development.

However, technically, the telecommunication infrastructures used will depend to some extent on the specific conditions of the rural area and the application/purpose of the telecommunication service concerned. For instance in dense populated areas, like Java, South Sumatra, will be different than in scarce populated areas with larger distances between villages.

TELEVISION BROADCAST

Basically, the availability of low cost TVRO terminals, can be used anywhere in the country, so that penetration to all villages by quasi-direct broadcast from PALAPA can be achieved, if the village is outside the reach of the local TV broadcast transmitter. Low cost TVRO terminals are locally produced.

TELECOMMUNICATIONS (TELEPHONE, TELEGRAM SERVICES)

The current practice, is to combine small earth stations, ranging from 3 telephone channels per earth station to 20 channels, with other infrastructures.

These are:

1. Small Earth Stations: 3 - 20 channels: Produced locally

2. Small digital telephone exchanges: from 100 - 900 lines capacity, designed and produced locally by the Indonesian telecommunications industry.
3. Transmission from and to the small earth stations: various types of locally assembled Rural Subscriber Systems, using solar panels for power-supply.

4. Telecommunications Service Centres: No need to immediately develop Automatic Exchanges, starting services by setting up Service Centres, where longdistance telephone services (dialed by the users themselves), telex messages and telegrams are handled. The current practice is, that private initiative and as well as cooperatives are encouraged to establish those centres to serve the public at potential locations.

These steps are considered valid to optimize the development of rural areas in Indonesia, in an orderly fashion.