

## Satellite Communication and Long Distance Education

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**Abstract:** Since Indonesia introduced communication satellite for telecommunication network, the satellite has brought a number of advantages for national development in various areas, such as telephone network, mass media development, business, education, politics, security and national defence as well as regional and international cooperation. In education, satellite communication could be used for long-distance learning as implemented by 13 state universities in eastern parts of Indonesia. It is also possible to develop the Open University System in teaching and learning process, particularly since the internet technology has been intensively used.

**Keywords:** communication satellite, long-distance education, telecommunication network.

Until 1965, or twenty years after Indonesia's independence, the condition of telecommunication infrastructure in Indonesia was still poor. During that time, there were only 83.675 telephone lines for the whole country. The transmission used open wire line and HF radio, while telegraph communication still used the Morse system. For international link, transmission was through HF and VHF radio which could not be used for 24 hours per day. Realizing the importance of international and domestic telecommunication network, particularly in supporting the Five-Year National Development Plan (Repelita) which started since April 1, 1969 Indonesian Government continued the development of Nusantara Microwave Tele-

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communication project and decided to use Intelsat Network to provide telecommunication services to foreign investors.

Although the Nusantara Microwave network project and Intelsat have started operating, Indonesian's government aware is that in anticipation of the increasing demand for telecommunication services as the result of development activities and the advancement of communication technology, Indonesian government through the state corporation PT Telkom decides to develop its own satellite communication system. This is done for the following considerations. Firstly, Indonesia is the largest archipelago in the world which consists of 17,508 islands and islets located between two continents (Asia and Australia) and two oceans (Pacific and Indian). As a coastal territory, Indonesia faces crucial problems in security such as smuggling, piracy, and border transgressions for economic reasons or for espionage. Secondly, the construction of satellite communication needs only 18 months, while the microwave system took 17 years just to connect 47 cities in Indonesia. Thirdly, the construction of telecommunication infrastructure by a number of foreign investors and Indonesian government corporations could determine the natural resources in the remote areas. Besides it requires a high cost, there is also the possibility that it will disturb aeronautical and navigation systems. Fourthly, satellite communication has high quality transmission and could be integrated (connected) with microwave and submarine systems. It has large coverage area, and could cover all Indonesian territory as well as ASEAN countries. Fifthly, satellite communication is more flexible and provides various kinds of sophisticated telecommunication services.

#### **PALAPA SATELLITE COMMUNICATION**

The decision made by the Indonesian government to use satellite communication drew criticism from other countries and some Indonesian citizens. They accused Indonesia was too ambitious to use high technology which needs high financial support. Indonesia was considered unable to finance the project due to its economic condition. In addition, lack of skilled human resources to operate the technology was also a big handicap.

Recognizing the need to improve this situation, Indonesian government initiated external relations to create a good image through several seminars, exhibition of communication satellite technology in campuses and publication in foreign media. Eighteen months after the agreement was signed,

the Hughes Aircraft Company agreed to construct the satellite. The Indonesian domestic communication satellite *Palapa* was launched on 8 July 1976 from Kennedy Space Center at Cape Canaveral, Florida, USA.

After 25 years, when Indonesia has used satellite communication technology, it was realized that a number of advantages have been identified. The advantages involved the following areas.

#### **Telephone Network**

Before *Palapa* Satellite was launched in 1976, there was an average of only one telephone line for every 88 households or 429 people. After 25 years using *Palapa* satellite, the number of telephone lines increased from 305,455 in 1975 to more than 6 millions in 2000, or an increase of 74.57% per year. The data did not show the booming use of cellular telephone among Indonesian users. Now the cellular telephone is predicted to be around three millions in this country.

#### **Mass Media Communication**

As a consequence of the use of satellite communication, the number of TV stations has increased from 12 to 18 TV stations, including 6 private TV Stations. There was also increase in the number of TV sets from 429,833 to more than 30 millions for 25 years.

Another advantage of the use of satellite communication in mass media development is the teleprinting system. The publishers need not spend time and money to deliver newspaper to the airport for their costumers in the provinces. The publisher has only to send the proof copy of the newspaper through satellite services like the facsimile system. The distribution agencies in the provinces can receive the newspaper proof copy and print it. Hence, the readers in different provinces in the whole country receive the newspaper at the same time.

#### **Economy**

Since the adoption of policy to use communication satellite in 1976, Indonesia has had an opportunity to improve telecommunication infrastructure, as it is the requirement to create the climate conducive to economic development. Information (telecommunication) has been identified as one

of the prime movers of economic activities, particularly production and exchange (Jussawala, 1989). In the case of Indonesia, several national and private corporations have used satellite communication facility to increase their activities through on-line system, such as banks, travel agencies, hotels, shopping centers etc.

### **Education**

When the idea to use satellite communication was introduced in 1974, the educators were very enthusiastic. They considered that the satellite communication is one of the ways to solve Indonesia's problem in education, particularly to educate Indonesian who has not an opportunity to attend regular class in the universities. To prepare the use of this facility, several seminars on the use of satellite communication for education were conducted in various universities. The effort resulted in the use of Palapa satellite in Indonesian Distance Education Satellite System (Indess) and Open University.

Besides the four advantages of the use of Communication Satellite for national development, it could also be used to arouse political participation, cultural promotion, regional and international cooperation, security and national defence.

### **LONG-DISTANCE EDUCATION**

#### **The Indonesian Distance Education Satellite System (INDESS)**

In 1980, the United States Agency for International Development (USAID) Bureau for Science and Technology Office of Education initiated the AID - Rural Satellite Program for Developing Countries. The program was implemented to test and demonstrate that audio-teleconferencing could reliably and affordably support development activities in education, health and agriculture.

Three countries have been chosen as location of the project, namely Peru, West Indies and Indonesia. Indonesia was given priority because it already has Palapa satellite communication facility, and because the higher education in Eastern Indonesia is facing a crisis in educational resources.

Because of the limited resources, the Eastern Indonesia State Universities Association (BKS-Intim) and a cooperative working group were eager to promote the development of their institutions through the sharing

of ideas and resources. The association started some modest programs such as faculty exchange program, whereby a teacher from one institution would travel to another campus to teach one or more courses which were not available in the campus because of lack of faculty member. The faculty exchange program, however, would only provide for visiting faculty to teach a course for one or two visits or one or two weeks duration. There were limitations on how long a faculty member could leave their own campuses and how many could be funded in a given semester.

Because of the heavy teaching load at his/her own institution, a faculty member could visit only one campus per semester. This means that each institution has to enter into its own agreement with the institution supplying the teachers. Aware of this problem, the use of satellite communication to link the campus into one network is viewed as an important step toward reducing the obstacles faced by the universities in this area.

In operating the INDESS, a number of telecommunication equipment were used to link the sites, such as telephone terminals, audio-teleconferencing equipment, graphic system, and emergency power system. The equipment arranged in a class provided for 20-40 people per site to participate in academic courses. The course delivery consists of two and a half hours session once a week plus some additional activities conducted by the local tutors. The 150 minute time slot included 10 minutes for preparing the sites before the class, 100 minutes for instructional time, and 5 to 10 minutes for a tutors meeting.

In an assessment of the INDESS operation, the students said that generally the satellite class provide enough time for student participation and interaction with the teacher. Some students also reported that they felt more at ease addressing a question over the satellite system to an unseen teacher than to a teacher in front of them (Shaw, 1987).

When this USAID project ended in 1985, there was an idea for terminating the project due to the high cost of operation. However, some faculty members of Hasanuddin University who were involved in the project deeply regretted this. Fortunately, when the imbalance in the development between western and eastern Indonesia became a national issue in the 1990s, the INDESS was able to get a financial support from the Ministry of Education. At present, INDESS is offering courses on basic science and a number of professional seminars.

### **The Open University**

One of the problems faced by Indonesian universities is the lack of classrooms to accommodate high school students graduating every year. In 1994, the Ministry of Education estimated that there were 900,000 high school graduates, but only 112,500 students or 12.50 percent could be accommodated in the 43 regular state universities (Kompas, July 1994). Private universities, on the other hand, could only provide a relatively poor quality of education and also charge high tuition fees (Cangara, 1987).

To overcome this problem and to equalize educational opportunities, the Indonesian government issued Presidential Decree No. 41 on June 11, 1984 by establishing the "Universitas Terbuka" or Open University using the Distance Learning System. The set up of the Open University took into account the students use of TV and radio broadcasting through Palapa satellite as instructional media, besides printed materials. Unfortunately, the idea to use satellite communication to facilitate learning process at the Open University still use printed media delivered by post offices.

To support the learning process of the students and to coordinate tutors activities and examinations, the Open University established 32 learning centers located in capital cities of the provinces. For provinces with high population density, the Open University established 2 or 3 learning centers. At present, the Indonesian Open University organized four colleges and offered 12 undergraduate courses. These colleges are Economics, Social and Political Sciences, Mathematics, and Education. It can accommodate the largest number of students in the country compared to any regular university with a total enrollment of 314,698 students.

### **THE CHALLENGE**

In the beginning, the operation of the Indonesian Distance Education Satellite System (Indess) focused on Agricultural Higher Education in the Eastern Indonesia. Now, the system serves several courses which are attended by many students, such as environmental studies, sociology, marine science and basic social science. In the development of information technology, particularly the integration of personal computer and satellite communication technology, the Indess combined the audio-teleconference and internet system to provide course materials for their students who live in thirteen provinces in this area.

Similar method is also to be carried out by Postgraduate Study Programme of Hasanuddin University serving students who work as government officials and mining exploration in remote areas of Central Sulawesi, Irian Jaya, Maluku and Kalimantan. Here, the students, through the internet provided in the office or in their house, can get access to the lectures programmed by the lecturers. It is possible for the students to submit their assignment to Postgraduate Study Programme of Hasanuddin University for correction or revision through e-mail. This program is also very useful for sending paper or arranging thesis research proposal without making a visiting schedule for consultation with his/her advisor.

Actually, this system gives interactive opportunity for learning and teaching process, if it can be conducted by Open University for their students who live in separated areas. The other considerations for the use of long-distance education are: the large area of Indonesia as an archipelago state, high number of population, expensive education cost, limited capacity of state universities, and more employees are motivated to master knowledge without having to leave their office duties that need to be managed by Open University in an effort to improve of human resources development.

## CONCLUSION

The satellite communication technology has created many sophisticated innovations, especially after the integration between audio-visual medium (television and radio), computer and printed media. The innovation has been used to support and accelerate national development in various areas, such as telephone network, mass media development, business, and education as well as the demand of human resources development. In this case, the long-distance education as implemented by the Indonesian Distance Education Satellite System (INDESS) and the Indonesian Open University is one of the solutions to improve education quality in this country.

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