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## **SATELLITE MOBILE PHONE IN MALAYSIA**

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### **12.1 INTRODUCTION**

A satellite telephone is a mobile phone that communicates directly with orbiting communications satellites [1]. Today, it is possible to send voice, data, pictures, video, stills etc to distant lands at unimaginable speeds in analog and digital formats. Depending on the architecture of a particular system, coverage may include the entire Earth, or only specific regions [1]. They pack the power of instant global voice, fax, and data communication, all at the size and weight of a notebook computer.

A Satellite phone therefore is a distinctive instrument, which has been devised to enable voice and other data transmission possible through a satellite; in the form of radio waves [2]. There are many variations of landline telephones and even more variations in cellular phones [2]. .

The clarity is in the landline if the voice or data is sent in the analog format is susceptible to noise interferences [2]. Cell phones depend on cell towers and cell exchanges [2]. If you have to talk to someone 1000 kilometers away in all probability you may have to cross many cells to reach the receiver. Again, if the receiver happens to be in the so called ‘fringe areas’, the reception may not be to your satisfaction [2]. .

Since satellite telephones do not need the existence of cell-towers or cell sites, they go out of the territory of any geographical dependency and, therefore, it becomes possible to have a

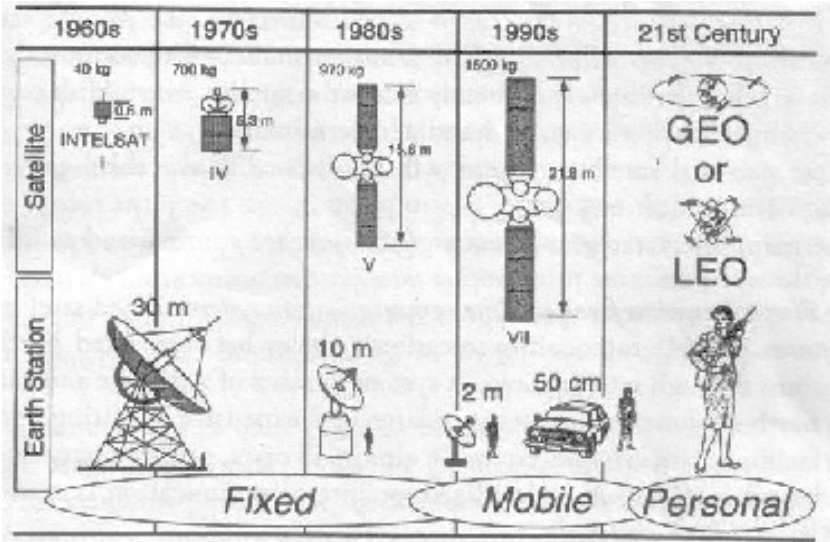
dependable and regular communication [2]. They can be used from any place on the globe. Governments and Militaries of many countries are using satellite phones for many years [2]. Only over the last couple of years, satellite phone are being used for commercial and personal use [2]. They can be very handy if you go into a very remote area such as desert or a jungle.

The mobile equipment, also known as a terminal or earth station, varies widely. A satellite phone handset has a size and weight comparable to that of a late 1980s or early 1990s mobile phone, but usually with a large retractable antenna [1]. A fixed installation, such as used shipboard, may include large, rugged, rack-mounted electronics, and a steer able microwave antenna on the mast that automatically tracks the overhead satellites [1]. Satellite phones have notoriously poor reception indoors, though it may be possible to get a consistent signal near a window or in the top floor of a building if the roof is sufficiently thin [1]. The phones have connectors for external antennae that are often installed in vehicles and buildings [2]. .

## **12.2 THE LEGACY OF THE SATELLITE PHONE**

Satellite phones today are of great use if people are already getting rid of the outmoded telephones at home or the miserable cellular phones due to signal failures.

Mobile satellite phone are not necessarily new. They have been developed and implemented based on technologies of first generation of satellite communications [3]. They are called fixed satellite communication systems back before [3]. Mobile satellite communication systems are called the second generation of satellite communication systems [3]. Further, in the 21<sup>st</sup> century, mobile satellite communication will advance to the third generation, that is personal satellite communication systems. Figure 12.1 shows the relationship between the growth of satellite (the INTELSAT, International Telecommunication Satellite Organization satellites are shown as example) [3].



**Figure 12.1:** The transformation of satellite usage [3].

It was in the early 1960 to 1990's that the satellite phone was introduced to the market [2]. The pioneering satellite phone that offer the first ever planetary coverage is known as the Iridium Satellite Phone, which until now still exists [2]. The name Iridium was derived from the chemical element in the periodic table, Iridium with an atomic number of 77 [2]. In the beginning it consists of 72 active constellations but at present it has only 66 active satellites [2].

Unlike other satellite phones, Iridium is the only constellation that allows the planetary coverage [2]. This is because of its inter-satellite links that the other satellite phones do not possess [2]. But this is not global because there are some countries that do not have the network yet.

The original design of the Iridium came out as early as 1960's with control and time-triggered messages over its orbit and it will be uploaded each time the satellites pass through the pole

[2]. But it was found out that this design did not offer the sufficient bandwidth so it was turned down in the market [2]. Since it is considered to be the pioneer of the satellite phones, it paves the way of other companies to discover new models of mobile phones. There starts the development of the Motorola [2].

It was on November 1, 1998 that the Iridium Communications service was launched and due to insufficient demand for the service and poor management, a tremendous bankruptcy took place on August 13, 1999 [2]. The worse thing that happened was, since there was the bankruptcy that is why whether big or small investors nobody receive a return of their investment [2]. It was a gamble of money.

### **12.3 HOW DO SATELLITE MOBILE WORKS**

How do these satellite phones work? Satellite phones are invented in case of emergency and unexpected circumstances. They allow you to have voice and data communication for instances that the local landline and the cellular systems are disrupted [1].

When an individual makes a call from a satellite phone the signal is sent to the satellites of that particular company. These satellites process the call and relay it back to Earth via a gateway [1]. The gateway then routes the call to its destination using the regular landline and cellular networks [1]. The Globalstar constellation is made up of 48 satellites and every call is relayed by up to 4 satellites down to Globalstar gateways on Earth [4].

If an individual uses a satellite phone to call another satellite phone then the call is sent up to the satellite from the caller's phone [4]. The satellite then routes the call back down to the receiver's phone without using any land infrastructure. Thus, satellite phones on the same network can be used to call each other without using any landline or cellular phone infrastructures.

Figure 12.2 shows the visualization of satellite phone call. A caller uses Globalstar mode to place a call via the satellite to one or more Gateways [5]. The Gateway routes the call to the existing phone network, in the case indicated below, a cellular Public Land Mobile Network (PLMN) network [5]. The PLMN routes the call

to the intended receiver [5]. The call is completed. The call duration, service used, and service area are reported to the Service Provider for billing [5].

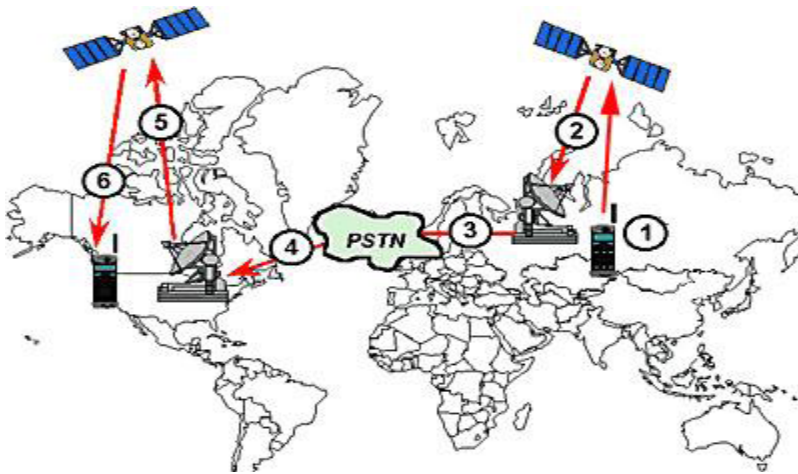
While in figure 12.3, we can see the example of making a call via satellite versus cellular. For example, a subscriber in Russia is calling her friend in San Francisco on her Globalstar satellite phone [5]. Her signal is handled by a passing satellite [5].

The satellite relays the call to a Gateway in its footprint [5]. The Gateway converts the signal to work with the local PSTN and passes on the call [5]. The PSTN uses the call's routing information to connect to another Gateway that knows where the receiving phone is located [5].

The Gateway located closest to the receiving phone converts the signal to Globalstar format and uplinks it to a satellite [5]. This information was stored in the Gateway's Visitor Location Register (VLR) [5]. The call is relayed to the receiving phone and the call linkage is completed [5].



**Figure 12.2:** Overview of a Globalstar phone call [5]



**Figure 12.3:** Making a Call via Satellite vs. Cellular [5]

One important thing to keep in mind with satellite phones is that the phone or the phone's antenna must be located in the open to allow it to have an unobstructed view of the sky [1]. Satellite phones require a clear line-of-sight view of the satellite to be able to send and receive signals from the satellite [1]. While Iridium phones use a non-directional antenna, which means that the antenna need not point in any particular direction, Inmarsat uses geostationary satellites [1]. In this case, the phone's antenna must point directly at the satellite with a clear, unobstructed view to get transmission [1].

## 12.4 THE APPLICATION OF SATELLITE MOBILE PHONE WORLDWIDE

In a world where there is no worthwhile landline connectivity or cellular services available in nearly 80% of the land mass, leave alone the oceans, the seas, the mountains, the forests and the deserts; we need a really efficient telephone service that works anywhere and everywhere [6]. The satellite phone can reach any

area on earth with relative ease. Basically, there are 4 companies that offer the breathtaking technology.

#### **12.4.1 Iridium Satellite**

Voice and data solutions are offered by Iridium satellite practically to every corner of earth, inclusive oceans, mountains, forests, deserts [6]. They are, in essence, the only voice and data solutions provider of global magnitude [6]. They have 66 Low Earth Orbiting (LEO) Satellites, cross-linked, covering the entire earth [6]. They have services specifically for heavy industries and government customers [6]. They also have a special data services with a 2.4 kbps throughput and direct Internet data services with a 10 kbps throughput [6]. Their handset is very compact weighing less than 21bs, which enables easy mobility [6].

They very publicly went bankrupt in 1999; one year after the service was launched [5]. However, Motorola Inc. stepped in and settled their debts [5].

#### **12.4.2 Inmarsat Mini M Satellite Phone**

It is designed as a laptop and therefore a bit bulky though it is sturdy [6]. The drawback is that you cannot use it from a speeding vehicle; or, for that matter cannot access from Artic or Antarctic regions [6].

This technology are originally designed for the maritime industry, they now have over 100,000 registered satellite phone terminals [5]. The size is in laptop size phone and not as portable as Iridium or Globalstar [5]. It is capable of high speed data up to 64kbps with fax capability built in [5].

#### **12.4.3 Globalstar**

They have about 48 satellites orbiting the earth [6]. It has a wide coverage and they are the ones who offer the most cost effective services, which, of course, is possible because most of the time

they access their cellular network [6]. Satellite is used only when it has lost a signal [6]. The coverage is not substantial [6].

Has better call quality than iridium and lower "home area" pricing per minute [5]. It is a portable handset and fixed units which have data rates 9.6kbps [5]. .

#### 12.4.4 Thuraya Satellite Phone

Thuraya is a portable phone with coverage in most of Europe, Northern Africa, Middle East and western Asia (No North American Coverage) [5]. It is smaller than Iridium or Globalstar and GSM cell capabilities built in for dual usage [5]. Not as secure as Globalstar or Iridium [5]. It has average voice quality[5].

The satellite mobile phone has a lot of benefit for human being and it shows that there are few crucial situations where the satellite mobile phone can save your life. An example can be seen here is during and after the hurricane [2]. When Hurricane Katrina hit last year, it took down the power lines, the phone lines and the cell phone towers, leaving everyone without communication [2]. Satellite phones work independently of cell towers and the power grid [2]. It is noteworthy that cell service has still not been restored to parts of the south 1 year after the fact [2].



**Figure 12.4:** Gadget of satellite mobile phone [6].





**Figure 12.5:** Few model of satellite mobile phone [6].

## 12.5 MALAYSIA AND SATELLITE MOBILE PHONE

In Malaysia, satellite mobile are still remote as people here have less reason to use. Satellite Communications integrates GSM mobile network together with satellite-based coverage [7].

Celcom is the first and only telecommunications provider in Malaysia to offer such a seamless service [7]. And taking convenience to whole different level, users can access this with just one SIM card [7].

So what users get is connection that goes beyond just GSM reach [7]. They get to stay constantly connected throughout the Asia region.

There are few features that users can gain by rent the satellite mobile phone. For example, businessmen, travellers, international shipping/courier companies, oil and gas workers and others who are constantly on-the-move and use International Roaming facilities get a lot of benefits as they still can communicates [7]. Other than them are the military personnel maritime workers, uniformed guards/personnel patrolling the seas such as the armed forces, coast guards and others [7]. Not forget to mention the indigenous people lacking telecommunication facilities, outdoor and sports enthusiasts, adventurous individuals

who roam the wild and rugged terrain, those in fishing, mining and timber industries and scientists/researchers and explorers who make nature their second home [7].

## 12.6 CONCLUSION

As developments in business, travel and technology have led to the increased human exploration of 'remote and wild corners' on the earth, the demand for a system of communication, beyond that of cellular phones, has arisen. It is for this reason that satellite technology has been developed.

Over the last few years the use of satellite phones has been on the increase, they are now cheaper and more available than ever, however, this has not made it any easier for the consumer. Thus, the technology has somewhat make life a step easier and beyond reach.

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