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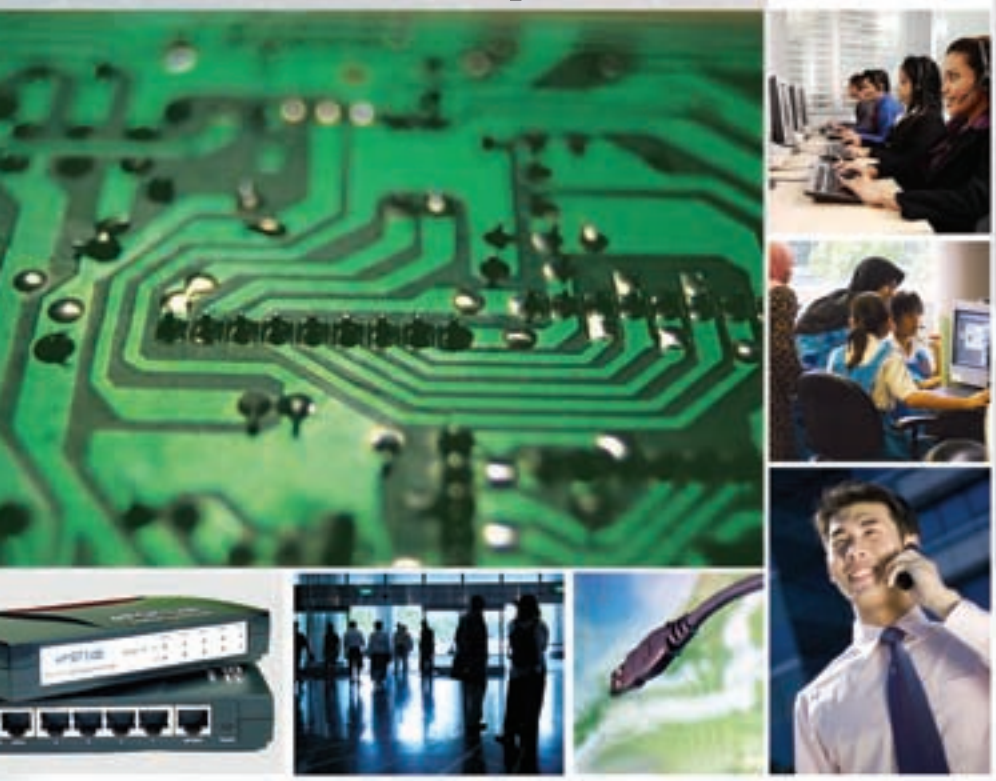
MyICMS 886
Malaysia's Formula For ICT Development



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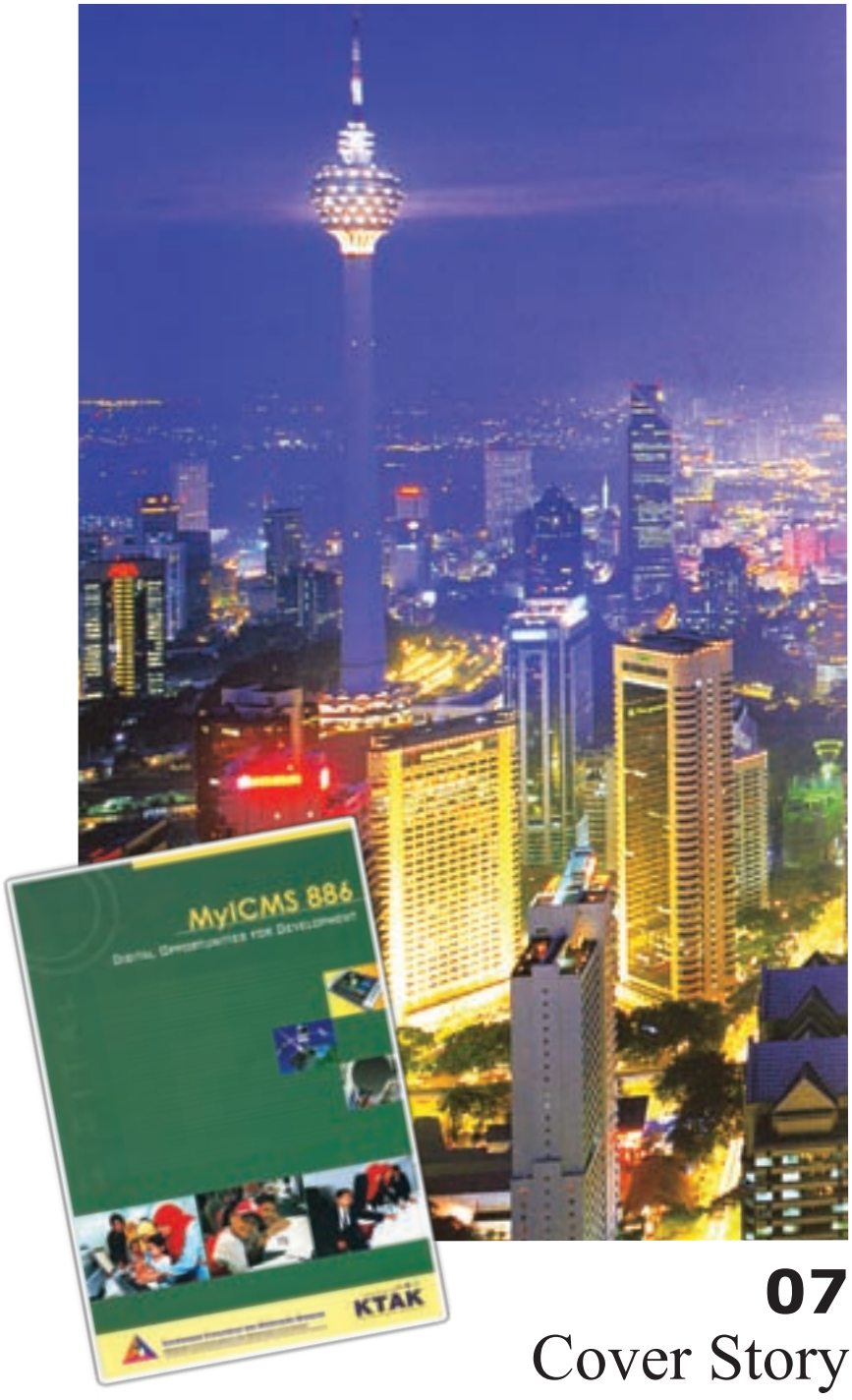

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Regulars

I would like to congratulate the editorial board for a job well done. The process of conceptualizing and giving form and substance to a magazine such as the one that you hold in your hands now is not an easy one. Even the choice of an appropriate name befitting what readers will come to identify as the flagship magazine of the MCMC has proven to be challenging. But indeed *.myConvergence* fits the bill nicely reflecting the regulatory platform of the MCMC.

Within these pages you will read contributions by practitioners and experts from the ranks of the MCMC, the industry and academia. Be that as it may, editorial policy has been one of trimming down on technicalities to render the articles as comprehensible to as wide a readership as possible. The magazine also sports a lighter side bringing you varied reading in kaleidoscopic fashion as well as informing you about goings-on locally and abroad in regulatory circles of the C&M industry. In more ways than one this is indeed a 'knowledge magazine' subliming the wealth of tacit knowledge in our sphere into explicit knowledge for the record.

Once again to the editorial board and contributors, well done and keep up the good work!

Datuk Dr. Halim bin Shafie

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CONSUMER PROTECTION

Consumer Protection lies at the heart of the Communications and Multimedia Act (CMA) 1998. The CMA makes provision for the establishment of a framework to protect and promote the interests of consumers.

The CMA also establishes the duty of the MCMC to assist in resolving consumer complaints and provides that the MCMC may use any or all of its powers to do this.

Consumers are encouraged to self-manage their complaints by trying to seek resolutions with their service providers.

However, consumers are welcome to channel their complaints and grouses to the MCMC and every complaint will be handled in accordance to our Clients' Charter.

Consumers may choose any one of these methods to lodge their complaints with the MCMC:

1. via mail or fax;
2. via email;
3. via phone; or
4. visit us personally at MCMC.

The complaint form and guidelines on complaints handling are available from the MCMC's website, www.mcmc.gov.my.

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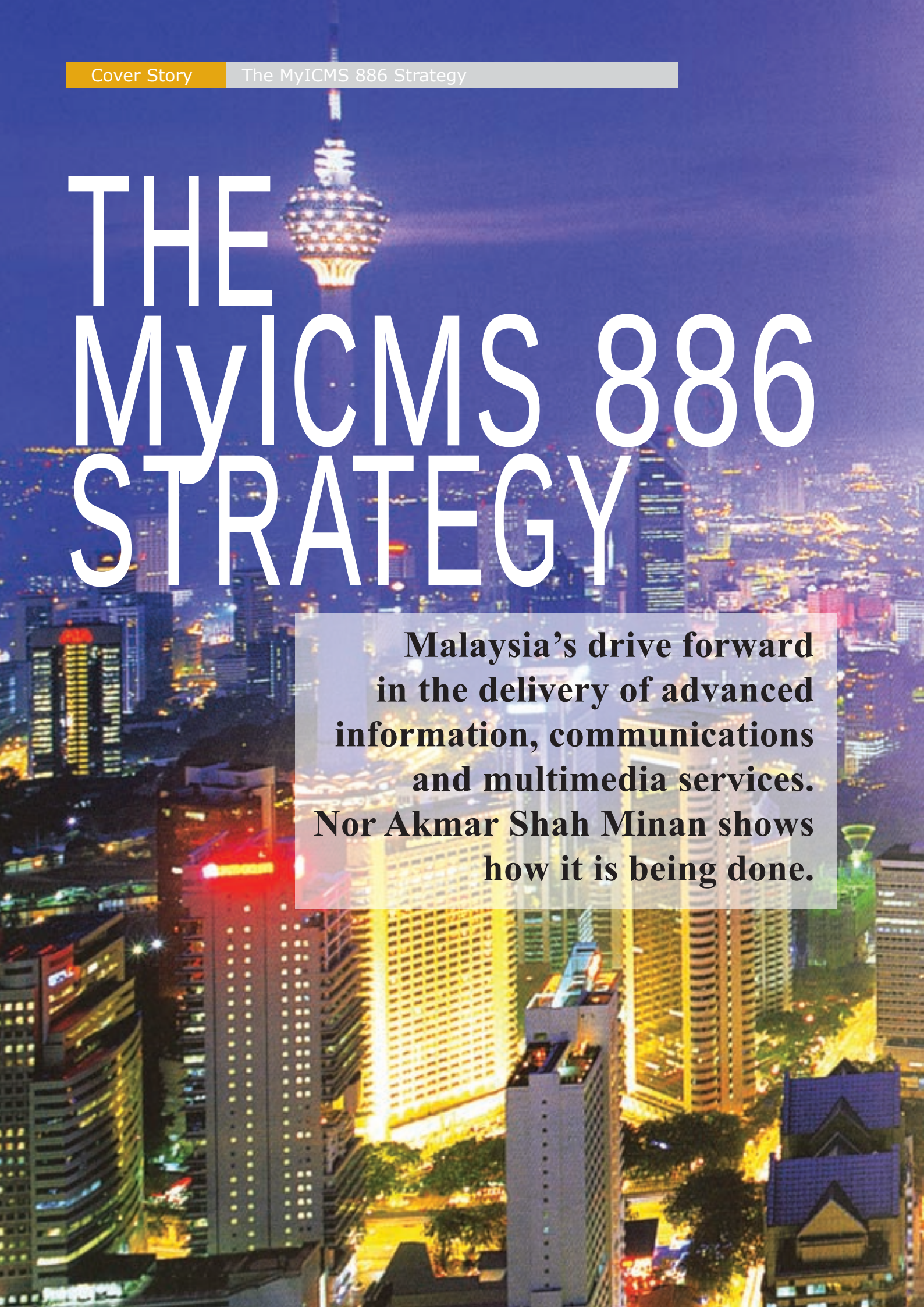
Freephone Number: 1-800-888-030 (weekdays, 8.30am - 5.30pm)
Fax: +603-86881003 **Email:** consumer_complaint@cmc.gov.my



THE MyICMS 886 STRATEGY

Malaysia's drive forward in the delivery of advanced information, communications and multimedia services. Nor Akmar Shah Minan shows how it is being done.

The mid and late nineties have been very significant years as they were marked by major strides by the country towards developing the ICT sectors of industry. The launching of the Multimedia Super Corridor in 1996 and the implementation of the Communications and Multimedia Act 1998 or CMA in 1999 are the two most significant events to shape the communications and multimedia industries.

However the country may not have been seeing the full impact of all these initiatives as they tend to be implemented separately and in isolation. These programmes need to be integrated into a cohesive and comprehensive strategy so that they complement and synergize with one another and with output targets.

To address this, Malaysia has to come up with a blueprint for the industry; a plan and strategy for the delivery of advanced information, communications and multimedia services. This blueprint, MyICMS 886, presents a comprehensive strategy that addresses the core aspects of the industry and places into perspective the value chain in the delivery of advanced information, communications and multimedia services.

The Launch of MSC

Way back in 1996 the Multimedia Super Corridor was conceptualised and today more than 1200 SMEs and MNCs have set up operations focused on multimedia and communications products, solutions, services and research and development.

The first phase of MSC (1996 – 2003) has created several **Flagship Applications:**

- Electronic Government
- Multipurpose Card
- Smart School
- Telehealth
- R&D Clusters
- E-Business
- Technopreneur Development

The second phase of MSC (2003 to 2010) will extend the MSC to a wider community. It will see the roll out of MSC to other parts of the country and enhancing local ICT industry. There will be an increase in usage and adoption of innovative domestics ICT products and services.

By end of Phase 3 in the year 2020, the MSC Agenda will be extended to the whole country. Malaysia will become a Knowledge-based Economy and Society, as envisaged in the Vision 2020.

MyICMS 886

Malaysian Information and Communications Multimedia Services 886 or MyICMS 886 is a strategy for communications and multimedia services that will help the government take Malaysia through to the Vision 2020.

While many people assume MyICMS 886 is similar to the national IT strategies of certain other countries, MyICMS 886 has its own unique story.

By the end of 2004, five years after the MCMC was set up, Malaysia was still missing its strategic technology roadmap for information, communications and multimedia services.

While the CMA recognized the convergence of telecommunications, broadcasting and computer technology and embodies the national objectives to develop the advanced information, communications and multimedia services for Malaysia, there really wasn't a strategic blueprint that served as a guide to the industry.

The CMA as a leading edge convergence law put the country on a solid path of development. Since the implementation of the regulatory framework under this Act, the industry has made significant progress. In the last five years the gross turnover of the communications and multimedia industry has doubled from RM12 billion in 1999 to RM24 billion in 2004.

The communications and multimedia industry is very important for the development of the country, not only because of the revenue and investments it generates, but also because it constitutes an important component in the production process of other goods and services and can define the competitiveness of the country.

The MCMC embarked on a "Technology Roadmap Exercise" in early 2005 to come up with a roadmap on the information, communications and multimedia services. The exercise ran for three months from January 2005. Industry players which comprised of licensees, systems supplier & manufacturer and R&D entities presented their plans for services and products roll out for the period of 2006 to 2010.

Several other aspects of the technology roadmap such as technologies issues were highlighted and proposals for strategic collaboration between industries and regulator were put forward.

MyICMS 886 leverages on existing policies and programmes

At the end of the exercise, an outline of a Technology Roadmap for ICMS in Malaysia was drawn up and was ready to be discussed with the industry and public.

At the same time, while Malaysia marked a significant growth in cellular communication the development of other services such as high speed broadband, 3G, internet telephony, mobile TV, digital multimedia broadcasting and RFID applications were not seen making significant progress.

These services need to be promoted too due to the synergies they generate both within as well as outside of the ICT sectors. The potential of these services must also be leveraged to promote the local design and manufacture of related appliances and equipment.

Benchmarking Successes

In coming up with its national strategy, Malaysia is seeking to benchmark the success of other countries in ICT such as Singapore, Korea and Japan which have their own development plans such as Korea IT839 , e-Japan and Singapore IN2015.

With the IT839 strategy, Korea has established its image as a global IT powerhouse. The development of a series of innovative technologies such as the wireless broadband Internet (WiBro) and multimedia broadcasting (DMB) has emerged as a key driving force of the Korean economy.

The Korean IT industry has clearly developed into a global industry with new services that create demand, establishment of infrastructure that enables the provision of new services and enhanced manufacturing capabilities. Korea's development strategy to adopt new IT services ahead of competitors and commercialize them preoccupied the IT service industry and turned out to be very successful.

Korea's IT839 Strategy

The Ministry of Information and Communication (MIC) of Korea drew up the IT839 Strategy which set forth telecommunication services, infrastructure, equipment, software and content as the elements that comprise vertical and horizontal value chains of the IT industry.

Under the value chain, the introduction of 8 new services will prompt investment into the building of 3 essential networks. And these networks will pave the way for the 9 new sectors to grow fast, creating synergic effects. The MIC is committed to the implementation of the Strategy to achieve USD20,000 GDP per capita earlier than the original schedule.

IT839 will promote an effective industrial development model that creates future growth engines through the strong collaboration among IT services, infrastructure and manufacturing.

The Birth of MyICMS 886

Upon seeing the commitment shown by the Korean government in realizing the IT839 Strategy and realizing the importance of technology, the Minister of Energy, Water and Communications instructed MCMC to formulate a similar strategy.

Based on the input from the Technology Roadmap, a similar strategy was formulated taking into consideration Malaysia's industry readiness. The strategy was formulated based on the importance of technology and productivity as the main source of economic growth

today. Technology is the main determinant of competitiveness and it also affects the welfare of individuals and society.

Realizing the state of Malaysian readiness and the absence of Malaysians in the areas of technology creation and high technology manufacturing, the strategy focuses on the services that would deliver advanced ICM services to Malaysians while improving the quality of life. The strategy also set some targets that would boost Malaysia's global competitiveness. The elements of the strategy are towards providing a ubiquitous service environment.

The strategy was finetuned with feedback and comments gathered from the industry. It was intentionally designed to present a cohesive and comprehensive strategy towards further invigorating the ICT industry. Although the strategy focuses on services delivery it is also linked to the requirement to have the necessary support systems. The aim is to create a service environment that would generate some new growth areas for Malaysia's ICT industry.

MyICMS 886 was launched in December 2005 by the Honourable Minister of Energy, Water and Communications, Dato' Sri Dr. Lim Keng Yaik.

The national strategy aims to create a catalytic cycle by enhancing the existing investments in ICMS infrastructure that will support future growth of ICM services. The introduction of the eight (8) new services catalyses and promotes the development of eight (8) essential infrastructures - both hard and soft.

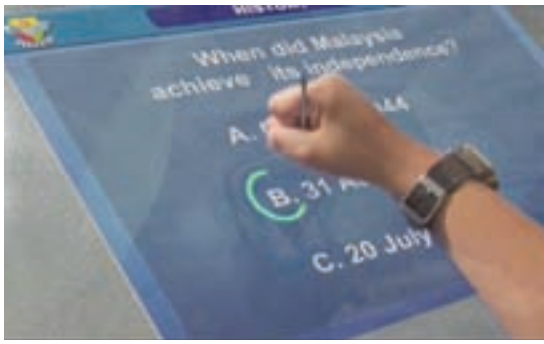
These new services and infrastructures are aimed at generating growth in six (6) areas that have been identified as key for the consumers and businesses in Malaysia.

How MyICMS 886 fits into the nation's Master Plans

The ICT focus on the 9th Malaysian Plan is to enhance Malaysia's position as a global ICT and Multimedia hub by expanding the communications network to ensure more equitable access to information and services. It will intensify efforts at bridging the digital divide. The development of the existing cybercities as well as promoting new cybercities and MSC multimedia applications will foster new sources of growth in the ICT sector including bioinformatics; a convergence of biotechnology and ICT.

MyICMS 886 proposes an orderly guideline that integrates the ICT focus areas in the 9th Malaysian Plan.

MyICMS 886 rides on the earlier National Broadband Plan (NBP): an operational framework to provide for nationwide broadband including rural and underserved areas. MyICMS 886 is the overall strategy that places High Speed Broadband as the service that would catalyse the development of the overall ICMS industry in Malaysia.



The MyICMS 886 Implementation Strategy

MyICMS 886 is an industry driven initiative that will leverage on existing policies and programmes. It does not envisage public expenditure. However, the government will intervene from time to time to provide policy guidance and fine tune existing policies. The Ministry of Energy, Water & Communications with MCMC will make the necessary adjustments to the regulatory framework to ensure the success of MyICMS.

The implementation of MyICMS will be managed and monitored closely to ensure that its objectives are met.

Looking at the core element of MyICMS 886 itself, one may wonder how the 8+8+6 areas can be linked-up to each other in a "harmonious" manner.

The core element of MyICMS 886 consists of 8 service areas, 8 infrastructure and 6 growth areas. The services are **High Speed Broadband, 3G & Beyond, Mobile TV, Digital Multimedia Broadcasting, Digital Home, Short Range Communications (e.g. RFID-based), VoIP/ Internet Telephony and Universal Service Provision (USP).**

Eight Services

While the first seven services are familiar to all, the eighth service, Universal Service Provision, shows the government's commitment towards ensuring communications services reach all Malaysians. In the roll-out of the new services, the government will not relinquish its efforts to provide universal service. It is the objective of the government to ensure that all Malaysians, irrespective of their location, age or condition get access to communications services. The government will continue to rectify the imbalance between rural and urban areas in access to ICT infrastructure and services. The universal service

programme is currently being reviewed, and necessary regulatory changes are being proposed to ensure greater roll-out of services, including broadband.

Eight Infrastructures

The infrastructure elements of MyICMS 886 are categorised into two categories, hard and soft. The hard infrastructure areas are Multiservice Convergence Networks, 3G Cellular Networks and Satellite Networks. These are the physical networks that would support the roll out of the eight services.

The soft infrastructures are Next Generation Internet Protocol (IPv6), Home Internet Adoption, Information & Network Security, Competence Development and Product Design & Manufacturing.

The soft infrastructure areas are as vital to the success of the strategy as the physical networks.

Malaysia needs to foster local capabilities in building digital societies. Programmes for ICT awareness will be introduced and such awareness and education programmes will gear the society into easier acceptance of the new knowledge economy (K-economy). As a result this would in turn drive the Home Internet Adoption within the society. Malaysians can then be assured of online access to knowledge and information at favourably affordable costs.

There will also be a need to develop globally competitive ICT skills and manpower that can meet and support the demands of the ICT and Multimedia industries. This will also require Competence Development, with appropriate main focus toward ensuring a balanced growth of competent human resource to lead the new growth areas in ICT. Competent human resource will lead to the capability in Product Design and Manufacturing of the communications and multimedia devices.

Product Design and Manufacturing capabilities represents the push to locally manufacture devices and equipment that are related to the services and infrastructure with the aim to produce cheaper devices that would increase the take up rate of the new services.

MyICMS 886 has identified some devices which are directly related to the services areas. These are Digital Multimedia Receivers (set top box, digital radio), Communication Devices (e.g. VoIP phones) and Embedded Components & Devices (e.g. RFID chipset)

While realizing Malaysia does not specialize in producing its own communication systems such as switches & routers, base stations etc., there are other components that Malaysia has the potential to manufacture such as passive components like smart antennas and terminal devices.

Six Growth Areas

Six growth areas have been identified as being key for businesses, consumers and society. These areas are Content Development, ICT Education Hub, Digital Multimedia Receivers, Communication Devices, Embedded Components & Devices and Foreign Ventures.

The adoption of digital technologies will require widespread development of content industries for local and global markets. The contents are crucial for all services including education, entertainment, games, commerce and industrial activities.

In approaching the spectrum of services, infrastructure requirement and the growth areas, Malaysia is poised to include various ICT courses in universities and prepare for competent work skills to support the ICMS ecosystem. This will prepare Malaysia with highly competent workforce that will further enhance and elevate Malaysia's competitiveness.

Coming back to the implementation strategy, MyICMS 886 defines the areas which are not under the purview of the Ministry of Energy, Water and Communications and MCMC. Those areas such as Soft Infrastructure; Competence Development and Product Design & Manufacturing and the six growth areas are under the various other government agencies and industry sectors. MCMC as the implementing agency collaborates with related government agencies and other industry sectors to maximize on synergies.

The Ministry has set up an Implementation Coordination Committee (ICC) in which the members are the representatives from the various ministries and agencies who are the stakeholders of MyICMS 886. Below the ICC are various Working Committees who will look into the issues of implementing MyICMS Strategy.

The success of MyICMS 886 strategy and the growth of the industry depend on the support and participation of the various stakeholders in their attempts to plan in a strategic and focused manner. .my

MyICMS 886 ACTION PLANS

The MyICMS 886 is not a development plan that provides for capital expenditure by the government. Rather, it aims to guide as well as leverage on investments by the private sector to create a catalytic cycle that will drive the development of the services, infrastructure and growth areas. To facilitate this catalytic cycle, the Ministry of Energy, Water and Communications (MEWC) together with MCMC outlined the action plans to provide the necessary policy, regulatory and institutional framework to support the implementation. These broad action plans were formulated to address the various implementation issues.

Policy & Regulatory Framework

The initiatives cover the review of existing policies as well as formalising new policies. The areas of Policy and Regulatory framework include liberalisation of provisioning of back-haul facilities, cross sector policies addressing the broadcasting of content by Application Service Providers and Satellite Communications with regard to use of foreign satellites. Also addressed are the improvement of the Access Framework and review and assessment of the Unbundling the Local Loop (ULL) requirement as well as the establishment of Malaysia Internet Exchange to provide open peering. The National Numbering and Electronic Addressing Plan and Spectrum Policies for various wireless and mobile services are also included in the policy and regulatory framework.

Broadband Roll out

The policy and regulatory initiatives outlined above will be supplemented by initiatives under the National Broadband Plan aimed at creating a critical mass that can act as a catalyst for the rapid uptake of broadband users in the public and private sectors. Amongst the initiatives that have been taken are:

1. Establishment of Broadband Stakeholders Group to increase awareness as well as coordinate the implementation of the National Broadband Plan.

2. State Broadband Plans to catalyse the promotion and roll out of broadband in the states through the provisioning of broadband infrastructure, applications and content.

3. Treating broadband as a public utility by deploying wireless hotspot facilities that support high speed broadband access throughout the whole country. For new housing and industrial areas, a proposal for amendment to the Uniform Building By-Laws (UBBL) is being forwarded to the government to ensure broadband communication is regarded as a public utility like water and electricity.

4. Public-Private Sector Collaboration is required in investing in broadband infrastructure. The deficiency of investments in broadband is expected to continue requiring new approaches to be considered, including private sector capex funding

backed by government procurement contracts or joint-venture funding between private and public sectors and private sector funding upon award.

5. Broadband research and analysis is required in view of broadband being given different definitions by various parties. In addition to this an analysis of demand and supply for broadband will also be done to ensure services are provided in a timely and efficient manner. A broadband portal has been set up by MEWC to assess the demand and supply situation for broadband services.

6. Promotion of broadband is required to stimulate demand for broadband services.

Klang Valley Broadband Push (KVBP)

KVBP is a specific initiative to have a fair comparison with other city states such as Singapore and Hong Kong with regards to broadband development and penetration rate.

The initiative was formulated following the Prime Minister's statement on turning Klang Valley into an MSC area. The focused initiative for Klang Valley is to accelerate deployment of broadband infrastructure and spur adoption of broadband services. The Klang Valley is chosen due to its high concentration of urban and affluent population as well as being the heartland for industry and commerce.

The objective of KVBP is to increase broadband household penetration within Klang Valley to 90% by 2010.

Amongst the projects identified under this initiative are:

1. Pilot Project - Hotspots in Selected Libraries;
2. Pilot Project – Schools (placement of ICT interns);
3. U-Library Project;
4. Model Local Authority;
5. "Hotspots" in Selected Universities;
6. Metropolitan Web Portal – kl2u.com;
7. Improving Quality of Broadband Services;
8. Pilot Project - Mobile Broadband showcase between two capitals from Putrajaya to Shah Alam

The stakeholders of the KVBP initiative are infrastructure and service providers, State Government, Local Authorities, Government Agencies, Content Providers and Consumers.

The KVBP will see the Klang Valley turn into a model metropolis to be emulated in other states.

Institution Building

Research and development plays in key role in the promotion, development and utilisation of new advanced technologies. Besides this, R&D activities can develop the necessary expertise and applications taking into account the requirements of the domestic industry. Towards this end, MEWC and MCMC have, with the cooperation of institutions of higher learning established the following R&D facilities:

1. Centre of Excellence on Sensor Technology and Application at University Pertanian Malaysia.
2. IPV6 Centre of Excellence at University Sains Malaysia.
3. ITU Centre of Excellence in rural communicatons in Universiti Utara Malaysia.
4. Digital Home Centre of Excellence and Model Digital Home at Multimedia University.

The adoption of digital technologies will require widespread development of content industries for local and global markets

Inter-Agency Collaboration

Being responsible for the rolling out of services and building up the relevant infrastructure, MCMC and MEWC

are taking charge of the industry's activities and issues. Any pertinent issues and relevant recommendations will be put forward to the ICC.

For Content and Applications development, in view of the number of agencies who have jurisdiction over the content issues, MCMC, MEWC and various agencies including the Multimedia Development Corporation (MDeC) will work hand in hand to ensure the development of content is being addressed in a cohesive manner that would benefit the stakeholders.

For Manufacturing and Foreign Ventures, efforts are being stepped up to set up a database of local industry capabilities as well as the various development funds available. Continuous programmes and awareness promotions are being carried out to inform local companies about new opportunities offered by the MyICMS strategy. In the areas of Foreign Ventures, a study on strategic investment in the ICMS industry will be carried out to determine the revenue projection as a result of foreign ventures.

In the areas of Human Capital Development, assessment on required competencies of the "demand" side will be carried out to determine the areas of competence to be addressed. The outcome of the assessment will be the establishment of Apprentice/Attachment Programmes between institutions of higher learning and industry which would help improve collaboration between them.

MyICMS – The Success

The lives of Malaysians will be changed with the implementation of the MyICMS strategy. It will create a New Digital Paradigm. With digital devices and services reaching all the way into homes, a day in the life of citizens will likely involve extensive use of technologies powered by digital devices and services.

As described earlier, strong ICT development and a highly competent workforce will place Malaysia in the global arena in the ICMS industry.

Foreign ventures will bring about the opportunity for the industry players to compete on the global stage. The foundation for this growth area will be through the liberalized market environment and collaboration with international key players in the industry. This will encourage the development of human capital and the export of local know-how in the related areas.

In order to achieve the objectives to boost Malaysia's global competitiveness, this will require effort to make Malaysian products and services more visible and attractive in the overseas market. Efforts will be coordinated and facilitated to create strong branding and marketing for Malaysian products and services.

The activities undertaken in the foreign ventures growth area are expected to expand the industry's base in various aspects at the same time contributing sizably to the revenue generation for the communications & multimedia industry.

The MyICMS is a strategy that draws upon the linkages and synergies of existing plans and programmes to promote and further develop the ICT industry in Malaysia. Significant progress has been made since MyICMS was launched one and half years ago. .my

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MOBILE NUMBER PORTABILITY FOR MALAYSIA

Norizan Ghazali gives details of the upcoming service that allows users to keep their numbers when they switch operators

Mobile Number Portability (MNP) is a service that allows customers the choice of switching from one mobile service provider to another while still retaining their existing telephone numbers.

A study on the implementation of MNP was conducted in July 2005 by MCMC, following a 10 September 2004 ministerial directive calling for the service to be implemented as soon as possible.

Malaysia currently ranks second highest among South-East Asian countries in terms of mobile telephony penetration and its mobile landscape makes it an ideal country for the implementation of mobile number portability.

Three celcos dominate the local mobile industry, which recorded revenues of RM15 billion in 2005, with Maxis accounting for nearly 40% of subscribers, Celcom with 35% and DiGi, 25%.

There is no doubting the healthy growth of the mobile telephony industry and the introduction of MNP would only increase competition among the celcos and improve network quality and customer relation management – all to the benefit of the subscriber.

It is also a move welcomed by all parties. The response to a public inquiry conducted in 2005 showed overwhelming approval for MNP from both the public and industry respondents. The general view expressed by the survey participants was that MNP would allow greater freedom in choosing service providers.

The introduction of MNP is also in tune with the development of the mobile telephony industry in Malaysia.

Since the introduction of mobile telephony in the 1980s, the industry has undergone tremendous growth and has matured into major celcos who are capable of competing with each other, again to the benefit of the consumer.

Also, this matured industry means that mobile providers now largely compete on new services and affordable prices.

Technologically, too, the industry has boomed, growing from providing one single service – voice calls – to offering a plethora of services that includes SMS, MMS and Broadband applications that stem from the industry's embracing of developments like 2.5G, 3G and 3.5G.

Similarly, consumers are increasingly tech-savvy; readily adopting the enhancements that newer technologies have introduced. In a striking demonstration of how newer mobile services have supplanted voice calls, a survey conducted by MCMC in 2005 showed that Malaysians sent out an average of four text messages a day which was at par for voice calls.

It is to be expected that the further lowering of the costs of services and mobile devices will attract more Malaysian subscribers to adopt the newer technologies on offer.

As far as infrastructure is concerned, Malaysia is in an enviable state among developing countries, already having the potential to drive the country forward in implementing next generation telecommunication services such as Next Generation Network (NGN), Fixed Mobile Convergence (FMC), IP Multimedia Subsystem (IMS) and Internet Protocol (IP) based applications.

The scene, so to speak, is ready for the introduction of MNP.

There are two main functions in the implementation of MNP: the Provisioning Process for number porting and the routing of calls to ported numbers. There are various technical approaches that can be taken to address these two functions.

In Malaysia, it has been decided that these functions will be carried by taking a central clearing house and All Call Query approach.

The Central Clearinghouse (CCH), as it will be known in Malaysia, is a system that interconnects mobile operators using similar rules for number porting requests.

It also serves as the repository for a database of all ported numbers, the National Reference Database (NRDB). The database will be downloaded to Query Databases (QDB) periodically to allow operators to route all originating calls to ported numbers. The QDB and NRDB will be owned and managed by an independent third party.

The Provisioning Process will involve two parties – the Donor and Recipient Operators. It begins when a subscriber approaches a Recipient Operator (RO) and asks to be ported from the Donor Operator (DO).

The RO will then check on the billing status of the subscriber with the DO. Upon clearance, the RO will inform the CCH that the number is ready to be ported.

The CCH, in turn, will inform the DO and other celcos that the number has been ported, after which the RO activates the number.

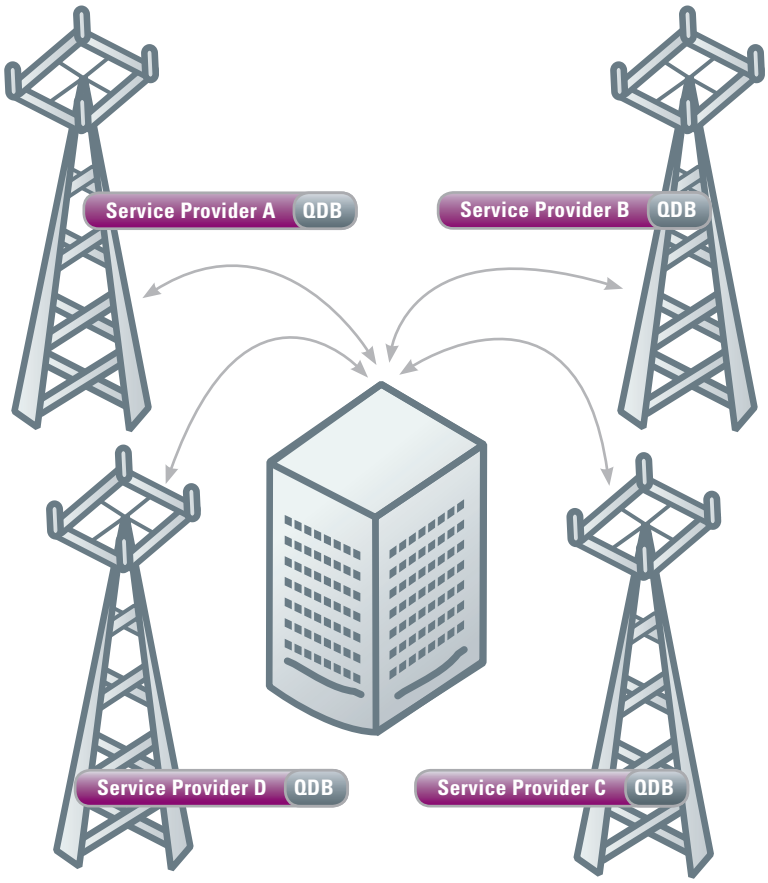

Figure 1: Central Clearinghouse Approach

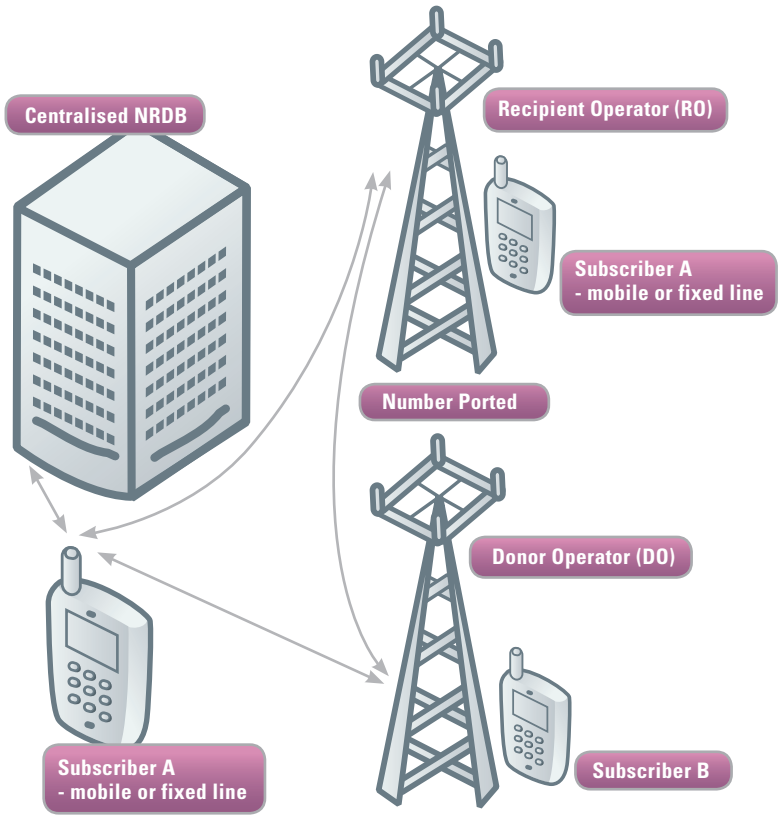

Figure 2: All Call Query (ACQ) Approach

The duration for the Provisioning Process will take 5 working days in the first year of MNP's implementation. As celcos become more familiar with the process, the duration will be reduced. The fee, as approved by the government, is capped at RM25 per porting.

The other primary function of MNP is the routing of calls to ported numbers. There are a number of options available to carry out this function.

One is the basic Call Forwarding, which is already offered by celcos, and does not require a CCH or upgrades on the part of the service providers. It calls for two numbers, including the subscriber's original number, to support the ported customer. Its drawbacks, however, include inefficient use of number resources and the original number not being able to utilise MMS and IP-based services.

In Onward Routing, a call will be sent to the DO where it will be identified as a ported number and rerouted to the RO.

Another option is Query on Release (QoR). Here the Originating Network (ON) will query the Donor Operator's database and if the number is identified as a ported number it will then query the numbers registry for the ported information and send it on to the new RO. In this option, there is a central clearing house too but it also involves extra routing in the various networks.

In the Call Dropback (CDB) method, the donor network will receive the call and send a message indicating the number has been ported. The originating network will read that message and send the call to the new recipient network.

Finally, the preferred option is known as All Call Query, where all calls from the originating network will question the centralised NRDB before being routed to the RO. This option is the most efficient on network utilisation as it will not involve the DO and extra routing.

The implementation of MNP will, of course, come with its attendant costs.

Firstly there will be Network Costs which will involve upgrades of switching centres to support MNP, software and IN platform upgrades. There will also be Infrastructure Costs involving the connection of QDB and NRDB and the cost of sharing information of the porting process through the NRDB. Finally there will be Operations Costs involved with running the system. This will include the various processes such as billing system, customer care system, fault management system and inter celcos/ operator MNP system.

Billing systems and new procedures to take into account MNP will also add cost to MNP.

Other costs are call conveyance related as all calls to ported numbers will need to go through additional network routing, signalling, call processing, setup and database queries.

The issue of cost recovery for both mobile operators and CCH will need to be resolved before MNP can be fully implemented. To this end a working group, led by the MCMC and comprising the service providers, will be set up to come up with solutions that will not burden both service providers and customers.

Various models have been implemented in other countries to recover the cost of implementing MNP.

Among the choices available to recover costs are having the Receiving Operator pay all costs, or the Donor Operator pay all costs or sharing the costs between both operators. Cost division could also be decided by negotiation between both operators.

The MCMC will ensure that guidelines will be drawn up fairly to ensure appropriate allocation of cost. These guidelines will be established along well accepted principles set by the Monopolies and Mergers Commission, UK in 1995 which take into account the cause of the costs, who benefits, ensuring effective competition, minimalisation of costs, reciprocity and practicality. .my

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iBURST

Despite some fears, a recent test shows this emerging wireless technology can cohabite with current GSM equipment. Syed Khairulazrin Syed Khairuldin elaborates.

Internet has become a necessity in our life. For most people, connecting to the Internet using a PC with a 56K dial up account is no longer enough. They need to connect with speed and that calls for broadband. But speed alone is not sufficient for people who live in a fast moving world. They need to have that connectivity while on the move. Mobility is needed and the best way to get mobility is by going wireless.

Wireless broadband, then, is the way to go today. Almost everyday, new technologies are being introduced in the category of wireless broadband, constantly improving the technologies they replaced. In Malaysia, one of these latest emerging technologies in the wireless broadband family to be implemented is 'iBurst'.

iBurst Wireless Broadband System is a mobile wireless broadband technology that was developed by ArrayComm Inc from USA and promoted by Kyocera Japan. This technology can provide data rates of up to 1 Mbps for downlink and 346 kbps uplink. It operates in a 5 MHz bandwidth in TDD (Time Division Duplex) mode and each 5 MHz band supports eight radio frequencies carrier with a 625 kHz separation.

iBurst uses the HC-SDMA (High Capacity Spatial Division Multiple Access) system which adopts the frequency, time division and spatial division multiplexing techniques to maximize available base station time slots which means each radio resource can be used up to three times per sector.

The available user timeslots are as follows: [8 Carriers x 3 Timeslots – 1 Broadcast Channel (BCH) Timeslot] X 3 Spatial Channels = 69 Timeslots.

To maximise the Base Station range and capacity, iBurst utilizes smart adaptive array antenna technology. The antenna used has the ability to detect the phase and amplitude of each antenna and user terminal, and then focusing the signal power to deliver a stronger signal to the subscriber unit. Not only that, it is also able to suppress interference. By allowing the base station to detect any signal interference, it will then adjust the signal phase and amplitude to minimize any interference effect on the base station. Concurrently, other terminals are also protected from interference by the base station by stopping any transmission to the terminal which is causing interference.

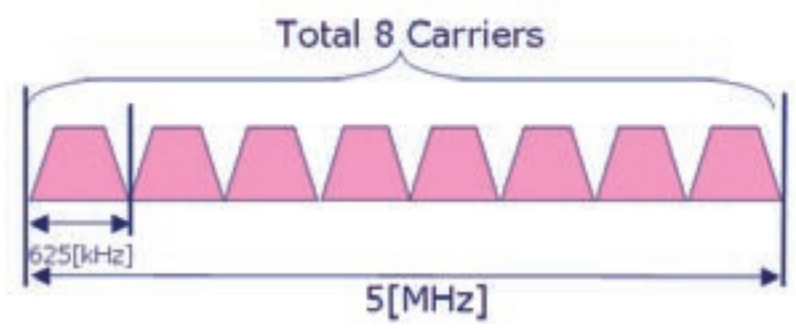

Figure 1: iBurst carrier separation

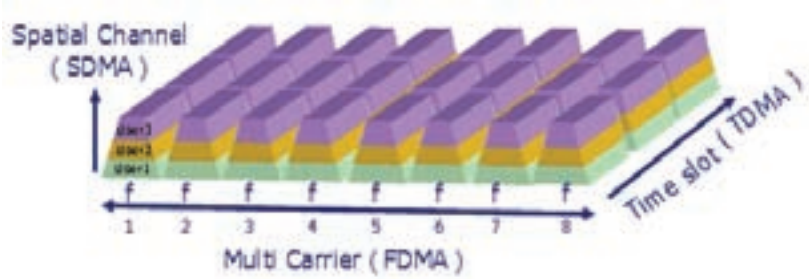

Figure 2:
HC-SDMA (High Capacity Spatial Division Multiple Access) System (Source: Kyocera)

As for spectrum requirements; iBurst technology can reside in the 1600 – 2600 MHz band. In Australia, for example, iBurst is operating in the 1905 – 1910 MHz while in South Africa it is operating in the 1787 – 1792 MHz band. Currently the iBurst technology is deployed in 13 countries.

In Malaysia, the company that is promoting iBurst is Mobif Wireless Broadband Sdn Bhd. Trials have been carried out in Klang Valley to see whether this technology can be implemented here. For the trials, iBurst was assigned to be used in the 1790 – 1795 MHz. However, one inconvenience of deploying a service in this band is that this band is the separation band between uplink and downlink for GSM1800 that is between 1785 – 1805 MHz.

There have been concerns by cellular operator that there will be interference if iBurst exists in this band. One of the main concerns is the minimum separation distance required. Based on studies from various parties, the minimum separation distance is said to be around 200m. To address this issue, a joint interference test was conducted between the three cellular operators (Celcom, DiGi and Maxis) and Mobif.

The key objective for the test was to gauge the impact of the interference on GSM voice quality and data modulation scheme. The tests were based on the four possible scenarios:

1. iBurst BS (Base Station) impact to GSM BTS (Base Transceiver Station)
2. iBurst CPE (Customer Premises Equipments) impact to GSM BTS / In-building
3. iBurst BS impact to GSM MS (Mobile Station)
4. iBurst CPE impact to GSM MS

The test was conducted at the premises of DiGi and Celcom in Subang Hi-Tech. The iBurst Base Station (BS) was placed in DiGi's compound and the antennas were located 10 metres above ground. The iBurst antenna used in the trial consisted of 12 omni directional antennas with a 6 degree electrical tilt.

A mobile GSM Base Station (BTS) was placed 260 metres away from the iBurst BS. It was equipped with two antennas that were placed at different heights of 9.5 metres and 8.5 metres.

As for user terminals, three different types of iBurst Customer Premises Equipment (CPE) were used in this test. These are

a. PCMCIA type (UTC)
b. USB type (UTU)
c. Desktop type (UTD)

Figure 3:
iBurst Smart Antenna

Twenty four CPEs were used and placed at different locations. 12 CPEs were placed close to the iBurst BS while the remaining 12 were placed at Celcom's compound. The reason for this was to gauge the effect of the iBurst BS coverage when there are CPEs in the fringe coverage area.

To ensure that the CPEs were active, all CPEs were to continuously download a 600 MByte file for the BS test and upload the same file for CPEs test.

For the first two tests; which measured the impact of iBurst BS and CPEs to the GSM BTS, the 'Idle Channel Measurement' statistics were collected. The measurements were carried out for three hours in the morning and three hours in the afternoon. For the test on GSM MS,

Figure 4:
GSM Mobile BTS

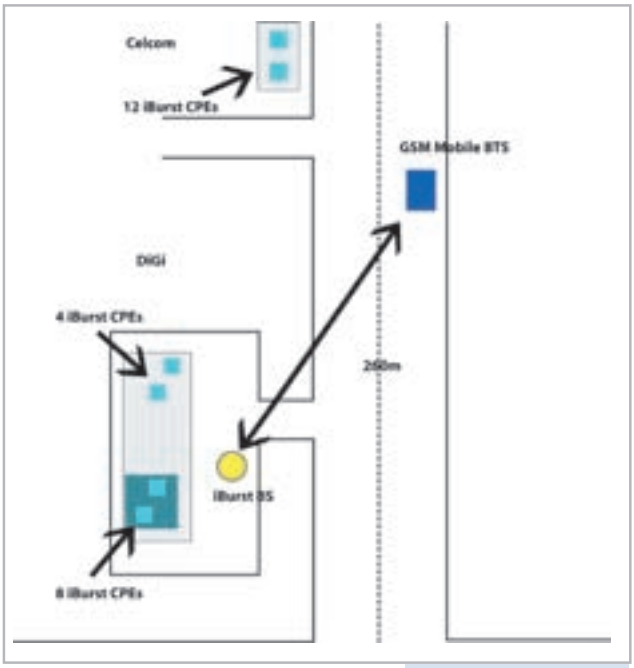

Figure 6: Test setup

TEMS Software was used to obtain both voice and data results.

Results from the first two tests showed that there was no change in the readings of the idle measurement thus showing no effects of interference. As for tests no. 3 and 4, there is a slight shift of signal strength distribution, however the values collected were still within the requirement of less than -95 dBM. It was also observed that for data, there was a downward shift of the data coding from CS-4 to CS-1; translates to reduction of network speed.

As for the iBurst CPEs performance, they were all within normal operating limit and no interference was observed in the CPE.

From these results, it was shown that the outcome of the test was positive. To further test the limit, the distance between the GSM Mobile BTS to the iBurst BS was reduced to 200 metres. However, only test no. 2 was repeated. The height of the mobile BTS antennas were reduced to 6 metres and 7 metres respectively. This time, the result shows an increase on interference for antenna at 6 metres.

Based on the results, it was concluded that the iBurst system can reside in the GSM 1800 separation band. However, certain criteria must be met. One of the main criteria is the separation distance between the iBurst BS and the GSM 1800 BTS. It was decided and stated in the Standard Radio System Plan (SRSP) that the iBurst BS should not be installed at less than 250 metres radius from an existing GSM 1800 BTS. There are other criteria to be met and these were also documented in the SRSP.

The introduction of another wireless broadband system would further spur and increase the broadband penetration in Malaysia thus realizing one of the goals of MyICMS 886.

Further information on the Joint Interference Test between celullar operators and Mobif can be found on MCMC's website as an attachment to Standard Radio System Plan: Requirements for Broadband Wireless Access (BWA) Systems Operating in the Frequency Band from 1790 MHz to 1800 MHz (MCMC SRSP-544 BWA). .my

Figure 5: Different type of iBurst CPEs

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UNIVERSAL POSTAL SERVICE

Mohd Zaidi Abdul Karim expands on Community Cluster Letter Boxes for Rural Addresses.

Resident receiving letter at CCLB Kanowit

*All photographs courtesy of POS MALAYSIA BHD.

> An innovative community solution is ensuring that sparsely populated areas are also able to enjoy quality postal services

Delivering mail by longboat

Mail being transferred to the longboat

The national postal network forms a ubiquitous physical communication link that allows each Malaysian to communicate not only across Malaysia – any place within Peninsular and Sabah and Sarawak, but also across the five continents. The system binds the nation and world communities together, supports the growth of commerce and fuels the nation's economy. Each day, Pos Malaysia delivers more than 3.5 million mails to more than 18 million delivery points throughout the country.w The postal service is an essential part of our everyday life.

Along with this important role in linking Malaysians comes a responsibility. A Universal Service Obligation (USO) has been an integral feature of postal policy. In Malaysia USO includes two key features: ubiquitous delivery (delivery to any addressed points in Malaysia), and uniform price (one price goes anywhere stamp). While ubiquity of service and uniformity of price are the foundation of USO, there are other USO features: an obligation on delivery service standards, an obligation not only to collect letters but also to collect and deliver parcels, an obligation to provide post office facilities and other services of general interest to the public. The USO makes the postal system striking as compared to other channels of communications and it receives continued support from the general public and businesses even in the modern communication era.

Connecting sparsely populated areas has long been a major objective of the Malaysian postal policy. Deliveries of mail to rural areas are not so easy. Mail sometimes cannot be delivered because of incomplete address, unsystematic numbering and the use of addresses not approved by local authorities. In certain rural areas there are even no proper roads. Having a proper home address seems trivial for people in town areas but it is not so in rural areas. This has made rural delivery of mail inefficient and difficult.

One solution has been delivery call points. A delivery call point is a one stop centre for delivery in rural areas normally at a designated convenient place such as sundry shops and

Longboat ready to go

> "CCLBs have brought benefits to users as well as the postal services"

Main post office at Kanowit

community halls where mails are delivered and collected by the rural addressees themselves. Nearly 4,500 call points exist in rural areas throughout the country.

The call point system helps in reducing the rural delivery problem but it has its own problems - letters can be opened or collected by non addressees, letters are lost, torn or remain uncollected, and registered letters remained uncollected, although notification cards have been sent out to the addressees.

While delivery call points have been useful to rural Malaysians, they haven't been the best of solutions. Pos Malaysia did receive a number of complaints from the users relating to loss of letters and tampering.

A few years ago, Pos Malaysia came up with a better solution: Cluster Community Letter Boxes (CCLB). The CCLB initiative provides a more efficient method than a call point system for rural mail delivery. The community facilities are installed in strategic location convenient to the rural community such as in the district offices, premises of village heads and community centres. CCLB go beyond delivery call points. Each cluster contains a number of units of letter boxes and each household in the village is allocated with one letterbox. The rural communities can collect their letters from the letter boxes allocated to them. They can use the address of the CCLB in all their correspondence. There is no charge for using this facility.

Pos Malaysia has installed more than 20 CCLB in rural areas like in Kampung Pulau Timbul, Jitra, Kedah; Rumah Panjang Julau in Sarawak; and other rural areas in Kelantan, Johor and Terengganu. CCLBs have improved rural delivery accuracy and security. Customers in rural areas are satisfied; fewer complaints are reported and they can now look forward to a quality delivery of mail to their areas.

CCLBs have brought benefits to users as well as the postal services.

The security of mails is no longer a major issue. The CCLB system has improved security as all mails for the addressees will be sorted into the respective letter boxes located in special premises. Previously, mails to such delivery areas would be left in a dedicated callers point and cases such as loss of mails and tampering is unavoidable.

The system has minimized undelivered mails and improved delivery standards in remote rural areas. Delivery of mails in the interior of rural areas was also expedited. Mails can be delivered in any weather condition as they are sorted out in respective boxes.

Users too found a more practical solution. Mail collection can be done at any time convenient to the addressees without the ever present fear that mail may go missing. No one else except the owner of the letter box has access to each individual box. With the mails being kept in a proper letter box and in safe custody, tampering and damage are avoided.

There is cost savings on fuel, motor vehicles and manpower as door-to-door delivery are not performed. Also, the standard of service has improved while Pos Malaysia staff no longer have to work longer hours.

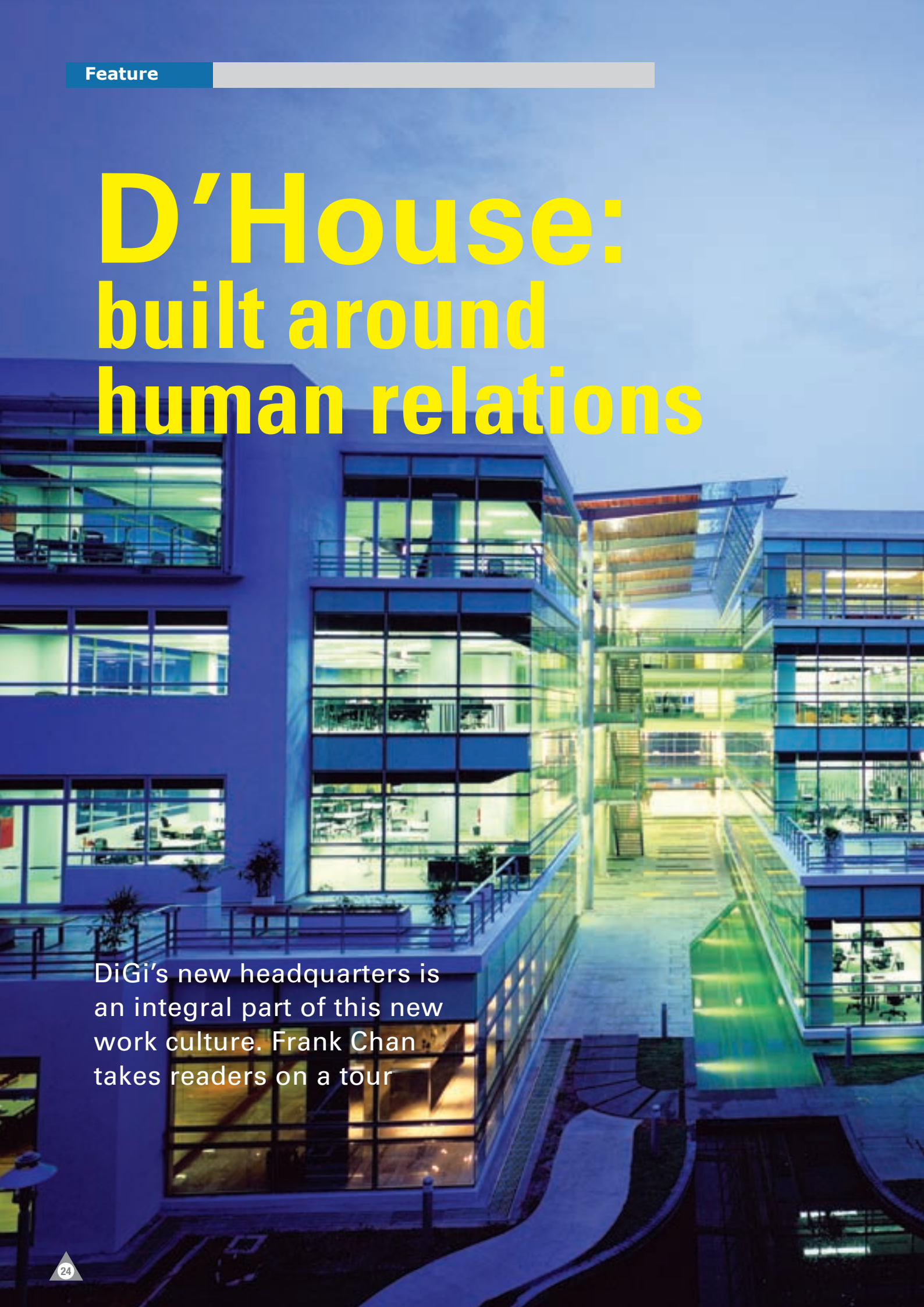
Briefly, the CCLB project has benefited 70,703 people and served 6,000 houses in six states through a more coordinated delivery service. It has improved the standard of mail service for remote rural areas where the communication structure is still lacking. The introduction of this project has indicated positive results in respect of the access to the postal service in rural areas.

CCLB will be implemented in phases in many more rural areas in the next few years by Pos Malaysia so that rural delivery can be more efficient and secured, and all Malaysian can enjoy the benefits of Universal Postal Service anywhere in the country. .my

Inside the CCLB

Mohd Zaidi Abdul Karim is the Director at the Postal Department of the MCMC. He can be contacted at zaidi@cmc.gov.my

D'House: built around human relations



DiGi's new headquarters is an integral part of this new work culture. Frank Chan takes readers on a tour

In DiGi's own words, one competitor was a "shining superstar" the other was a "resourceful incumbent".

DiGi, which pioneered prepaid in Malaysia, was literally squashed between the two. It was seen as a cheaper alternative and good by some. DiGi realised that its predicament was in no small way due to organisational structure, work and management practices, and its corporate culture.

While the other were headquartered in impressive towering edifices in Kuala Lumpur, DiGi which saw itself as a "weak third" contender operated out of humble unpretentious buildings in industrial parks in Selangor, with RM1.4 billion revenue and 16% market share in 2003.

So it aspired to be Asia's new benchmark company for mobile services, an irresistible choice for smart consumers and businesses, and the first choice of place to work for Malaysia's professionals.

To achieve that, DiGi started right from the ground up - DiGi started to plan for a new headquarters. DiGi also made sure that there was a total change in corporate culture and workstyle to match its new aspirations.

The result is DiGi Telecommunications' new building called D'House, occupying 325,000 sq ft on a 6.5 acre plot of land, altogether costing RM85 million.

Before the building is explored, a look at the organisational transformation will help paint the whole picture.

Back then, DiGi was a fragmented organisation with 12 divisions reporting to the chief executive officer. In 2004 it had 640 staff reporting to 270 managers. There were a total of 16 job grades across non-executive, executive, managers and senior management levels and a whopping 65 titles from driver and despatch clerk up to CEO.

The higher up the corporate ladder one was, the more leave days they were entitled to, like 22 days a year for the CEO and 14 days for a clerk or driver. Senior managers had the best medical benefits, followed by the managers, then the rest, while both senior managers and managers' spouses and children were automatically covered, while the rest had to share the premium equally with the company.

Senior managers could travel business class on airlines, while the rest had to travel economy. Membership fees of social and recreational clubs were available only to senior managers.

The management were entitled to unlimited mobile phone bills, while the rest were only entitled to RM100 for voice and data.

This all led to attitudes among employees which adversely affected their work and the interest of the company. People were obsessed with having their title upgraded and were reluctant to help their colleagues.

To survive, DiGi realised it had to dramatically and radically transform itself internally at first by challenging and involving everyone in the initiative.

It took the radical, egalitarian step to provide the same terms and conditions across the board, so drivers and clerks, right up to the CEO enjoyed the same number of leave days, allowances, medical and other benefits.

It consolidated its organisational structure down to six divisions, with between four and nine departments under them.

Except where necessary for outside interaction, DiGi dispensed with titles on business cards, leaving only the staff's name, department, division and contact details.

It organised its staff into teams of 3 to 15 people, comprising junior staff to senior experts and while most teams were function-oriented and became stable over time, some teams were created for specific purposes and later disbanded once their function was over.

At the same time, the boss/subordinate relationship between team members was done away with, consultation was encouraged and even the most junior members are encouraged to provide feedback and advice.

DiGi personnel were asked to challenge existing norms, strive for operational excellence, constantly raise their standards, achieve targets and have professional pride in their work.

Back to the building then, while D'House's concept and design is certainly very radical and impressive, all that thought and expenditure wasn't just to create a model of a futuristic workplace.

D'House is part of the solution. Its design is expected to continue enabling and facilitating DiGi's new work and operational culture.

Its exterior comprises mostly glass, steel and wood, which enables maximum natural lighting that combines modern and natural elements.

Designed by architect Lillian Tay, it was built around the concept of people, as an organisation's most valuable asset


Open Work Area


Open Discussion Cubicle


Artistic Corridor


Rest and relaxation place

and also to provide them with a conducive environment which facilitates its new flattened organisational structure, harmonious human relations, fluid work practices which can respond to change quickly and an egalitarian corporate culture which challenges the traditions of corporate hierarchy and bureaucracy.

Emphasising this new attitude and philosophy, DiGi's youngest employee was the first to enter through the front door of D'House on 28 July, 2006, when DiGi staff from six locations around the Klang Valley consolidated their workplace in the building located at Subang Hi-Tech Industrial Park, Shah Alam, Selangor.

D'House was launched on 24 January, 2007 by Deputy Prime Minister, Dato' Seri Mohamad Najib Tun Abdul Razak.

A noticeable feature in D'House are many work areas with no desks or cubicles assigned to individual employees.

Instead they are like reading areas of libraries, with large tables or "hot-desks," which employees or their teams occupy temporarily to do their work with their notebook PCs connected via WiFi anywhere in the building.

There are no fixed telephone lines or network cabling, employees rely on the mobile phones and WiFi access to the company network.

They have no in or out trays and if they need to keep a copy of documents, they can scan them using common facilities and keep a soft-copy and if they need to print any documents, they can do so on the nearest mobile printer.

In the event they need to carry any physical documents, they are each provided with a stationary box and a locker to store them in.

Each office has one or more unique discussion area for both social and work discussions.

Located around D'House are open cubicles and meeting rooms where staff can use for discussions.

There are also 28 informal areas based on Zen and nature themes for employees to relax. Lounge chairs, settees, sofas and low tables are placed around the building.

All DiGi staff, including its CEO, Morten Lundal wear no ties and dress casually, unless when at official meetings and functions outside.

D'House's corridors and common areas, as well as its foyer are also very colourful, with removal pictures to break the monotony, and paintings with abstract, heritage and other themes, as well as mounted on the walls of corridors and common areas.

Even the internal stairwell was not spared, like when Lundal saw a dull, white stairwell, which reminded of one in a hospital, he got the art group, Art Attack, to paint the outlines of paintings and got the artist Yusof Ghani to inspire over 100 children aged between 5 and 12 years to paint the rest of its walls with different concepts of forests,


Norwegian Bakery


D'House Cafeteria


Hospitality area


Courtyard

marine life, underwater scenes, plants and animals. And so, plain white walls were done away with in D'House.

Just past reception is the Norwegian Bakery, which bakes its own bread right there and it has been a hit with employees, especially for breakfast and snacks.

The open courtyard behind reception is an employee rest area with stackable lounge chairs and benches, and is often used for our social events and parties.

Featuring a combination of a Zen garden, it is a great place to hang out for discussions, while the water from the Waterfall flows through the Courtyard and around the office areas is quite auspicious to believers in geomancy or feng tsui in Chinese.

Adjacent to the courtyard is the hospitality area to host DiGi's guests. There are two meeting rooms, Mittgard and Serambi, respectively reflecting both the Norwegian and Malaysian culture.

With its origins from Norse mythology, the word Mittgard means middle world – a dwelling place for humans and resembles a Norwegian log cabin. Mittgard was designed, commissioned and built by Telenor as a gift to DiGi and was built to resemble a typical Norwegian Log Cabin and using lots of pine wood,

Serambi is Malay for Verandah - a typical place overlooking the garden of a traditional Malay house to greet and host visitors to the house. It uses all Malaysian timber which tends to be medium hardwood and dark in tone and its walls are panelled with songket, a typical Malay weaving and on its walls hang paintings by Malaysian children.

Another open area has benches with plants beside them to provide greenery, while the balconies of higher floors have plants and benches for employees to rest.

A long walkway on the upper level leads to the staff cafeteria built on the hill slope at the back.

Then there is the Town Hall, where DiGi staff need to gather from time to time for companywide announcements and discussions and social gatherings. Its different divisions also book the place for their activities and the staff also hold regular sports activities there.

DiGi's revolution has paid off handsomely, with DiGi increasing its market share to 24% with revenue of RM3.1 billion by the fourth quarter of 2006 and growing at 27%.

The Wall Street Journal cited DiGi as a company where management were driving a more motivated workforce and who now had a different work culture.

In January this year, it cited DiGi as the third most admired company in Malaysia, up from 8 in 2006 and 24 in 2005 and also cited it as the most admired company in Malaysia for innovation.

Most of DiGi's new practices are unique to itself and are not even practiced by its parent, Telenor in Norway. .my

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Smart Antennas for Wireless Communication Systems

Next generation wireless systems designed to carry multimedia services will require high capacities and data rates. Creating smart antennas that can overcome interference is a route engineers have been exploring. Prof. Dr. Tharek Abd Rahman explains the technology behind smart antennas

Smart Antenna

Traditionally, system designs have employed omni-directional and sectorized antenna technologies. These approaches have a limit on their capacity which is mainly caused by uncontrolled interference. Smart antenna systems appear to be the best candidate to meet the high capacities requirements that will enhance the performance of the wireless system.

The receiver and transmitter antennas are among the most critical of components in the design of a wireless communication system. A well-designed antenna can improve overall system performance and greatly reduce infrastructure costs. It has been demonstrated that using a beam-forming antenna instead of an omni-directional antenna in the wireless communication system can increase system capacity and improve overall system performance.

This performance enhancement is due to the reduction in interference through the attenuation of interference signals which have different directions of arrival at the receiver antenna site. This is called spatial processing because the direction of arrival is related to the mobile location. The system performance can be improved by exploiting the delay spread of the received signals. Each path usually has its own delay and direction of arrival. Using a smart antenna means that we would ideally receive only one path and ignore the others.

Smart Antennas

A smart antenna is defined as an array of antennas with a digital signal processing unit that can change its pattern dynamically to adjust to noise, interference and multi-paths. The conceptual block diagram of a smart antenna system is shown in Figure 1. There are three main blocks: array antenna, complex weights and adaptive signal processor.

These three blocks work together intelligently by dynamically adjusting the direction of the antennas, by assigning weights to signal strengths and by implementing interference suppression to enhance the capacity of the wireless link. This will allow more users to utilize the data channel or provide current users more data capacity. It

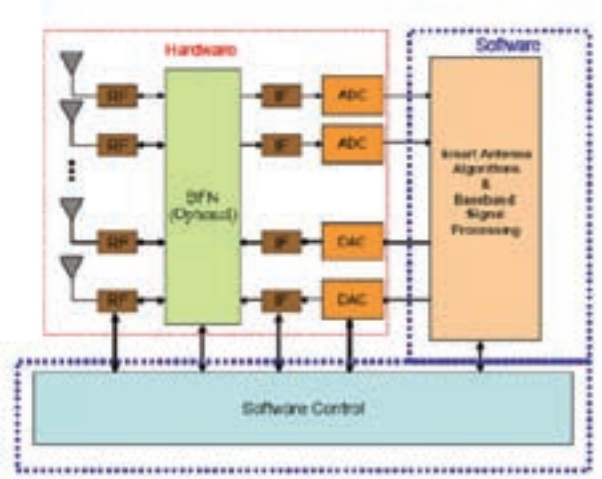


Figure 1: Block Diagram of a Smart Antenna System

should be noted that the term "smart" refers to the whole antenna system and not just the array antenna alone.

Smart antennas work by assuming that there is a user sending a signal to the base station. Each element of the smart antenna array in the base station will receive the signal but at different time instances since the distance between the user and each element of array is different from other elements. By using this time delay and the distance between antenna elements, the location of the user can be calculated. The transmitter can then send its signal to the exact location of that user. This strategy can be applied for multiple users as well.

A smart antenna receiver can also suppress interference by using this strategy. The smart antenna is able to process the signals received by the array or transmitted by the array using suitable array algorithms to improve wireless system performance. An antenna array consists of a set of distributed antenna elements (dipoles, monopoles or directional antenna elements) arranged in certain geometry (e.g., linear, circular or rectangular grid), where the spacing between the elements can vary. The signals collected by individual elements are coherently combined in a manner that increases the desired signal strength and reduces interference from other signals. Hence, a smart antenna can be viewed as a combination of "regular or conventional" antenna elements that transmit or receive signals by processing "smart" algorithms.

The fundamental idea behind the smart antenna dates back to the early 1960s when it was first proposed for electronic warfare as a counter-measure to signal jamming. Until recently, cost barriers have prevented the use of smart antennas in commercial systems. In existing wireless communication systems, the base station antennas are either omni-directional, which radiate and receive equally well in all azimuth directions, or sector antennas, which cover slices of 60 or 90 or 120 degrees. The development of low-cost Digital Signal Processors (DSPs), Application Specific Integrated Circuits (ASICs) and innovative signal processing algorithms, however, have made smart antenna systems practical for commercial use.

The smart antenna system for cellular base stations can be divided into two main categories. These are switched beam system and adaptive arrays systems. In either case, most smart antennas form narrow beams directed to each particular user in order to enhance the received signal strength (RSS) and/or signal-to-noise ratio (SNR).

Switched Beam Systems

A switched beam antenna system consists of several highly directive, fixed, pre-defined beams which can be formed through a beamforming network. The system detects the signal strength and chooses one of a set of beams that gives maximum received power. A switched beam antenna can be thought of as an extension of the conventional sector antenna in that it divides a sector into several micro-sectors. It is the simplest technique and easiest to retro-fit to existing wireless technologies. However, switched beam antenna systems are effective only in low to moderate co-channel interfering environments because it lacks the ability to distinguish a desired user from an interferer. This means that if a strong interfering signal is at the centre of the selected beam instead of the desired user, the interfering signal will be enhanced greatly while the user will experience poor quality of service.

Generic implementation of the smart antenna system

The antenna arrays have input or output as Radio Frequency (RF) signals in the analog domain. These signals are passed to and from the RF analog front end, which usually consists of low noise amplifiers, mixers and analog filters. In the receive mode, the analogue RF signals are converted to digital signals by analog to digital converters (ADCs) and, in transmit mode, the baseband digital signals are converted to RF using digital to analog converters (DACs). The down-conversion from RF to baseband or up-conversion from baseband to RF can involve the use of IF signals. The baseband signals received from each antenna is then combined using the "smart" algorithms in a digital processing section. Each antenna element has a RF chain going from the antenna element to RF front end to digital conversion for receiver and vice-versa for transmitter. The digital processing section can be implemented on a microprocessor or a DSP or FPGA. Hence, the "smart" algorithm implementation usually utilizes a software code unless implemented in ASIC or FPGA.

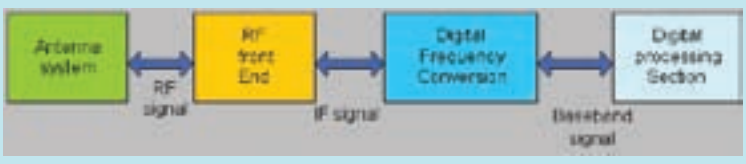


Figure 2:
Block diagram of smart antenna implementation

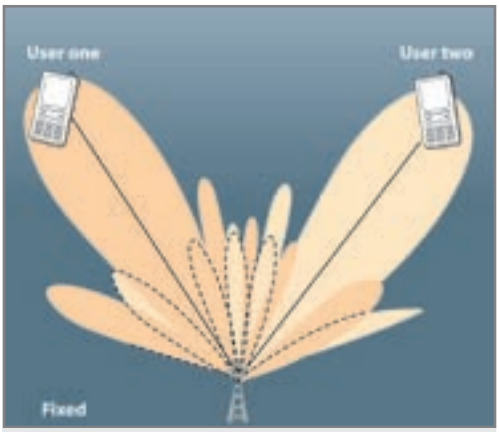


Figure 3: Switch Beam Configuration

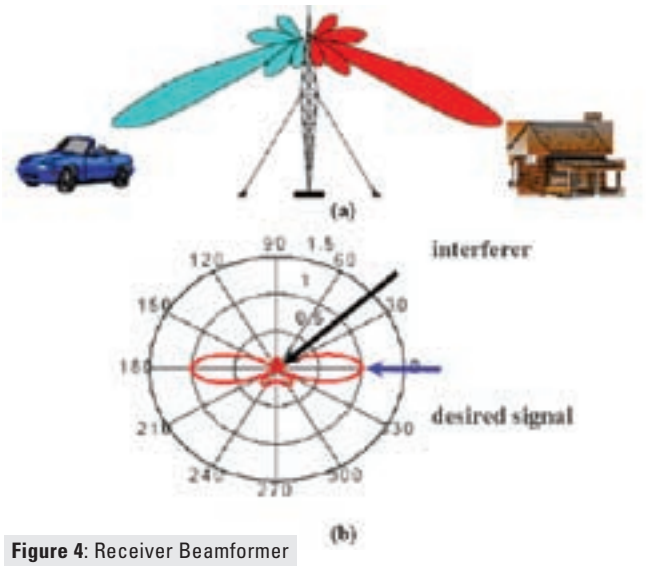


Figure 4: Receiver Beamformer

Adaptive Array System

In an adaptive array, signals received by each antenna are weighted and combined using complex weights (magnitude and phase) in order to maximize a particular performance criterion, e.g. the Signal to Interference plus Noise Ratio (SINR) or the Signal to Noise Ratio (SNR). A fully adaptive system uses advanced signal processing algorithms to locate and track the desired and interfering signals to dynamically minimize interference and maximize intended signal reception. The main difference between a phased array and an adaptive array system is that the former uses beam steering only, while the latter uses beam steering and nulling. For a given number of antennas, adaptive arrays can provide greater range (received signal gain) or require fewer antennas to achieve a given range. However, the receiver complexity and associated hardware increases the implementation costs.

Through beamforming, a smart antenna algorithm can receive predominantly from a desired direction (direction of the desired source) than from undesired directions (direction of interfering sources). This implies that the digital processing has the ability to shape the radiation pattern for both reception and transmission and to adaptively steer beams in the direction of the desired signals and put nulls in the direction of the interfering signals. This enables low co-channel interference and large antenna gain to the desired signal.

Figure 3 shows a receiver beamformer which puts a null in the direction of interferer and the formation of transmit beams to desired users by choosing appropriate weights using adaptive beamforming algorithm.

Advantages of Smart Antennas

Primarily, smart antennas can be used at base stations in a cellular network to improve user capacity (the number of subscribers that can be simultaneously serviced in a system). Usage of omni-directional antennas causes co-channel interference when two users use the same band of frequency that eventually limits the user capacity in a system. Since smart antennas can focus their beams towards a desired user while reducing interference to other users on the same frequency band, the user capacity can be improved using spatial division multiple access (SDMA).

Other advantages include robustness against multi-path fading and co-channel interference, thus improving reliability of received signal; reducing power consumption for handsets; low probability of interception and detection; and enhancing both location estimates and reception range. As there are obstacles and reflectors in a wireless propagation channel, the transmitted signal arrives at the receiver from various directions over a multiplicity of paths, a phenomenon known as multi-path (Figure 5). It is an unpredictable set of reflections and/or direct waves each with its own degree of attenuation and delay. Recent studies on use of smart antennas in mobile terminals have shown improved network capacity in ad-hoc networks.

Smart antenna systems can improve link quality by combating the effects of multi-path propagation or constructively exploiting the different paths, and increase capacity by mitigating interference and allowing transmission of different data streams from different antennas.

Disadvantages of Smart Antennas

Smart antennas do have disadvantages too and the major one is in their design. Multiple RF chains can increase cost and make the transceiver bulkier. Most of the baseband processing requires coherent signals, which means that the entire mixer Local Oscillators and Analogue to Digital Converter clocks (ADCS) need to be derived from the same sources. This can present significant design challenges. The phase characteristics of RF components can change over time. These changes are relatively static and need calibration procedures to account for phase differences.

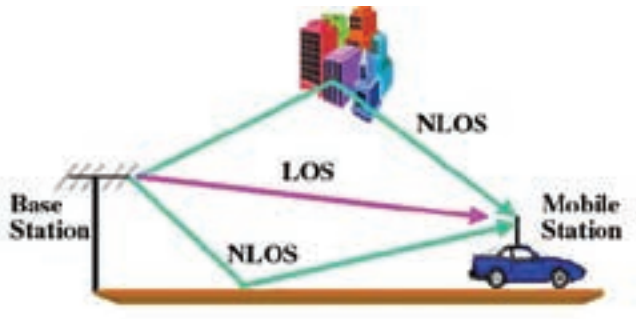


Figure 5: Multi-path propagation

Note: LOS - Line of sight , NLOS - Non line of sight

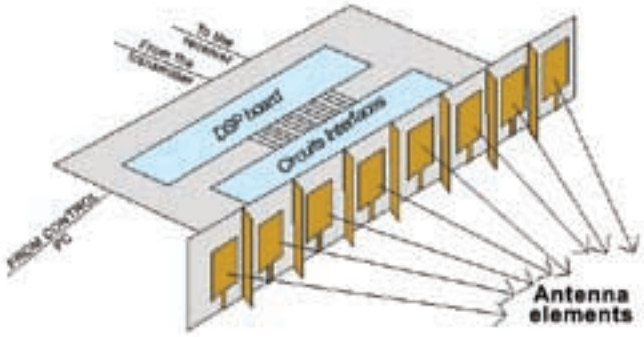


Figure 6: Linear Array Structure

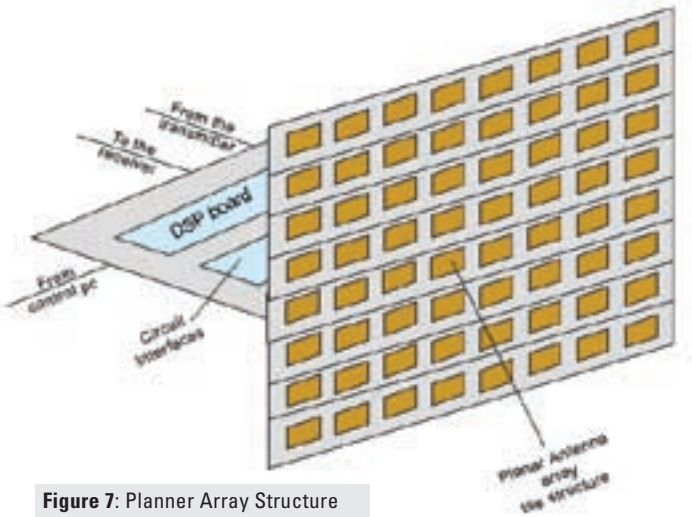


Figure 7: Planner Array Structure

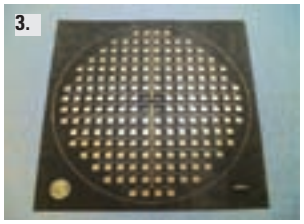
Most of the devices used, like the mixers amplifiers and ADCS, are non-linear. Using smart antennas can increase the number of such components used. This can affect the performance of the array if not checked periodically. In addition, since antenna arrays use more than one source of signals, the data bandwidth required for digital processing increases linearly with number of antenna elements used. This can limit data rates for different applications. However, these technological challenges can be overcome by using miniaturized RF components and faster and low power processors.

The accommodation of the antenna array itself within a small factor device remains a challenge. Base stations can easily host antenna arrays of four or more elements but with existing microstrip or patch antenna technology, up to three elements can be fitted in a handset form-factor.

1. Digital Signal Processing Board for Smart Antenna

2. Smart Antenna Prototype

3. Planner Array for Smart Antenna



Smart Antenna Project at Universiti Teknologi Malaysia (UTM)

The Wireless Communication Centre (WCC) of Universiti Teknologi Malaysia started working on a smart antenna project at the beginning of 2007. The centre plans to implement two types of smart antenna systems. The first is smart linear array antenna for application in mobile communications (Figure 6), while the other is smart planar array antenna for application in radar systems (Figure 7).

The smart antenna structure for phase one is shown in Figure 6. The antenna elements consist of 8 rectangular-shaped microstrip antenna elements. The algorithm is programmed by a computer using C language and then executed in a DSP board.

Digital Signal Processing (DSP) has a major role in the smart antenna system. For the first phase, DSP is used only for shaping the beam using the predefined weights in the library of the system. The location of the user can be identified using one of the directions of arrival algorithm. The second phase of the smart antenna project is adaptive arrays where the weights are calculated in any time instance depending on user location and environmental conditions.

The microstrip antenna will be used for these projects. As the scanning and shaping of the beam depend on array elements pattern, any type of antenna, such as dipole, monopole, horns, reflectors, loops or aperture, can be used depending on application. Compared with other type of antenna, the microstrip antenna for wireless mobile communication could be the best option due to its low price and ease of design procedure and also its fair efficiency. .my

This article is based on a public lecture presented by Prof. Dr. Tharek Abd Rahman
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Faculty of Electrical Engineering,
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Khoo Han Wei

Student turned IT Entrepreneur

Khoo Han Wei is a director of Xirien Technologies Sdn Bhd, which currently conducts research and development into a rather new, close range mesh networking technology called ZigBee.

It all began in his second year of his electronics engineering course at Multimedia University in Cyberjaya, where he developed a keen interest in wireless technology while experimenting with generic radio communications development. Khoo believes his company is one of the few Malaysian companies using ZigBee, which has potential for application in many interesting and exciting ways.

One thing led to another and Khoo did his final year project based on ZigBee, a low power, short range personal area network

> **We want to build systems which will make life more efficient and easier for people**

(PAN) technology similar to Bluetooth which most of us are familiar with these days.

A big difference is that ZigBee, which is also based on the Institute of Electrical and Electronic Engineers' IEEE 802.15 family of standards as Bluetooth, is best suited for use in a self-organising, ad-hoc, digital radio network.

With ZigBee, radio signals between a central controller called a ZigBee coordinator are transmitted and received from ZigBee end devices via intermediate nodes called ZigBee routers which relay the signals to other ZigBee devices, thus enabling an extensive expansion of coverage of the network by relaying signals from one device to another within its range.

"Potential applications of this are many, since ZigBee can be used in home networking, for communication between machines in factories or for automatically reading electricity meters in houses, apartments and offices from a central location," said Khoo.

"It does away with lots of messy wiring and lets us rearrange our home without worrying about having to reconnect everything and it lets us remotely control our home, factory or office equipment," he added.

It was mid-way through his final year project when Khoo founded Xirien, partly funded by Multimedia University and Malaysia Venture Capital Management Bhd (MavCap), Cradle Investment Programme.

After graduation in mid-2004, Khoo developed a smart home system, which was a fully integrated home security system in which all sensors and control modules can be controlled from a mobile phone. Home owners can see what's going on in their home by viewing a video stream of the scene in their home on the phone, from anywhere within mobile data coverage, including while roaming overseas.

This won him the MSC-APICTA 2004 Award for Tertiary Student Projects – Software/Hardware under Multimedia University and the Hong Kong APICTA Award in the Best Tertiary Networking Project Category.

"I felt really great for having developed something substantial but it is still in its research and development stage so it is still in prototype," said Khoo.

In 2006 in Beijing, he won the Intel Cup China Embedded Project Award for remote meter reading, which attracted interest from Malaysian electricity utility company, Tenaga Nasional Berhad. Xirien is discussing a possible joint venture to implement an electricity meter reading system in Malaysia using his technology.

That would certainly solve the problems of meter readers not being able to enter locked premises to read meters because the owner is at work and save the owners from receiving estimated bills.

Xirien is also discussing a possible joint venture with a multinational to develop and market an automatic meter reading system overseas.

"Wireless meter reading is still very young in Malaysia, compared to other countries," said Khoo.

For example, meter reading is done over mobile networks in other countries like the Philippines but the methods are more costly than using mesh networks, like in Bangkok.

Still based in Multimedia University, Khoo is determined for Xirien to be known for its smart systems of all types in smart homes, smart security, smart data collection.

"We want to build systems which will make life more efficient and easier for people," he said.

Khoo plans to initially focus Xirien's marketing efforts on Asia where the market is the largest and youngest before venturing out to North America and Europe.

Meanwhile, after receiving the APICTA awards, Khoo had developed a programme with an interactive interface which let him control anything from a mobile phone and he implemented a project specifically for Multimedia University which let people remotely control the movements of a model car and also have a car-eye-view of what was ahead of the car on his phone via streaming video from a camera on the car.

Around that time, the Maxis Developer Programme (MDP) showed interest in his remote monitoring, control and security system through phones and invited Xirien to participate as a developer under its umbrella at CommunicAsia 2005 in Singapore.

There, Khoo met the director of fellow MDP developer Vision Technology Consulting Sdn Bhd and found they shared similar interest and expertise in mobile applications, and this led them to found a joint-venture, Forwen Sdn Bhd.

Unlike Xirien, Forwen develops media and content delivery platforms which broadcast audio over High Speed Downlink Packet Access (HSDPA), 3G and EDGE (Enhanced Data Rates for GSM Evolution) mobile networks to 3G, HSDPA or EDGE modems connected to sound systems in public places.

It is currently working with Star RFM (formerly Radio Rediffusion) to broadcast its 988 and red 104.9 FM radio programmes live and free to listeners over these mobile networks and Forwen's latest project is to provide a live broadcasts of customised radio programmes by Star RFM with targeted advertisements to passengers on KL Monorail's stations and trains.

Well that certainly is quite an achievement for this young man of 26.

On opportunities for young people in Malaysia today, Khoo said, "It is really a nice time for young people to become technology entrepreneurs in Malaysia today."

"Development funds and grants are available from several sources, like the Multimedia development Corporation technopreneur Fund Grant, MavCap's Cradle and Multimedia University's programme under its Centre for Commercialisation and Technopreneur Development, which funds office space and provides money for startup companies," he added.

On what will be hot over the next five years, Khoo believes all types of technologies from Web-based technologies to electronic communications will be hot over the next three to five years.

"Technology evolves very fast and in a couple of years companies offering them will have a fighting chance to become big, unlike established businesses like advertising, oil and gas and so on, where one has to compete with the established giants," said Khoo.

"For example, Google created an efficient algorithm to sift through and categorise keywords in Web pages and in doing so, beat its predecessors like Yahoo!, Microsoft Network (MSN) and AltaVista. Malaysians can develop something here and take it overseas," he added.

While Khoo could become very rich, rather surprisingly, he is motivated by more noble reasons.

"I want to create something which will leave a legacy behind, rather than to get rich, though I certainly wouldn't mind becoming rich," said Khoo.

Khoo was born in Kuala Lumpur in 1981 and grew up in Kajang, where he attended the Yu Hua Kajang national-type secondary school.

Upon completing school, he got a scholarship to study electronic engineering from Sedaya College but after six months, was awarded a place to continue his studies at Multimedia University. .my

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Asia Pacific Internet Research Alliance

4th APIRA International Conference

7-8 August 2007
MCMC
Cyberjaya, Malaysia

- Latest findings
- Newly emerged Internet technologies and phenomenon
- Research on Internet information statistical technologies
- Consultation on coming year's working plans of APIRA

About APIRA

APIRA stands for Asia Pacific Internet Research Alliance. ARIRA is a non-profit regional organization that serves as a forum for Internet researchers, government agencies and universities in the Asia Pacific region.

The aim of the alliance is to enhance communication and comparison in Asia-Pacific region on the Internet information, deepen the research on statistical techniques of the Internet information, facilitate the cooperation among Asia-Pacific countries and regions on the Internet information survey and research, and boost the regional development of the Internet researches.

Previous Conferences

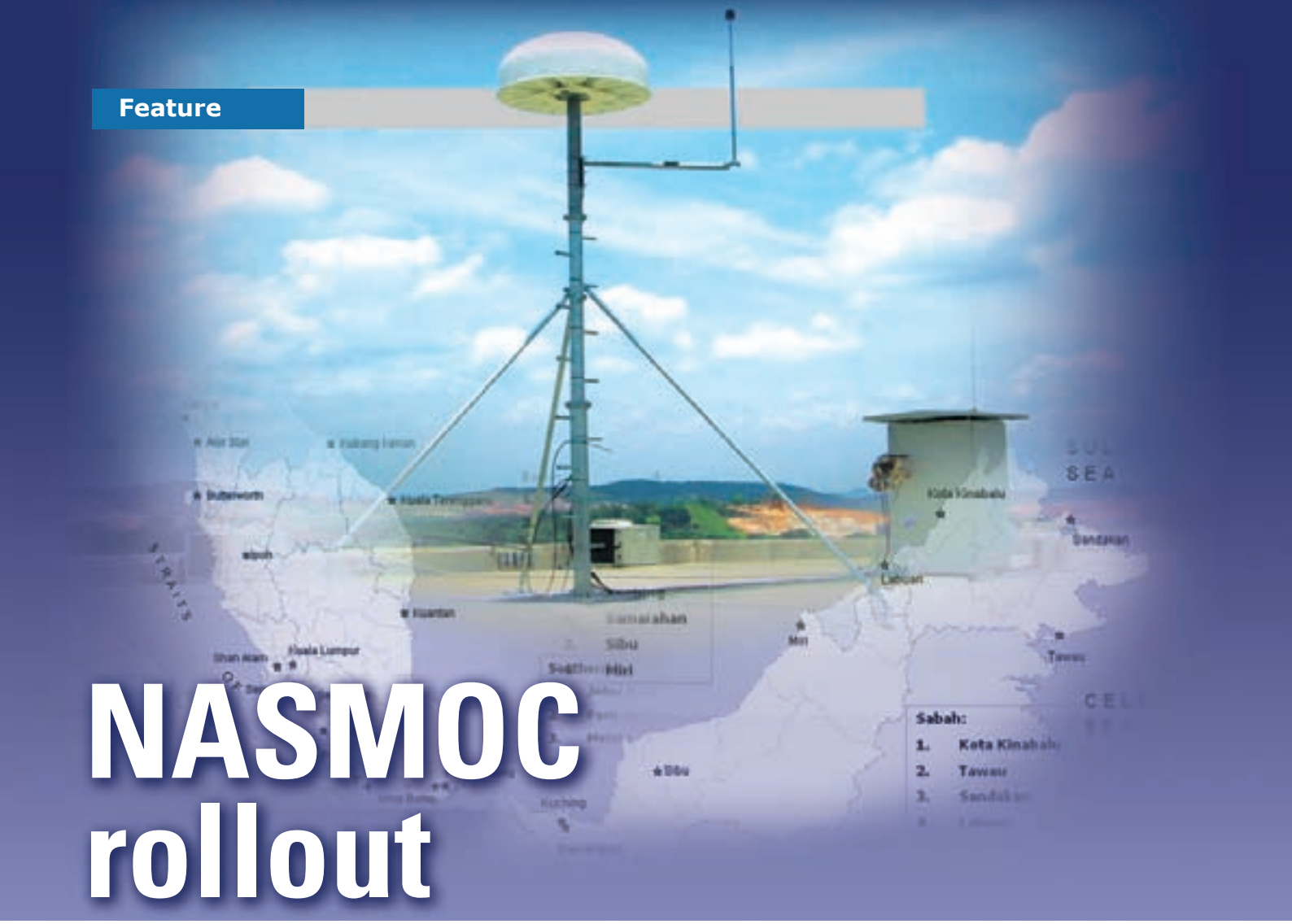
3rd International Conference and Member Meeting of APIRA, Taipei

2nd International Conference and Member Meeting of APIRA, Seoul, Korea

1st Asia-Pacific Internet Research Alliance (APIRA) member meeting, Macao and Hong Kong

Enquiries: statistics@cmc.gov.my

APIRA member organisations



NASMOC rollout

The project that will automate and centralize the monitoring and management of spectrum utilization in Malaysia is well on its way to completion. Norafidah Mohd Yusof unveils details of this project.

The evolving nature of radio technology and the resulting increase demand on spectrum usage creates the need for harmonisation and management of frequencies. In Malaysia, MCMC is tasked with the monitoring and resolution of interferences within the works of Spectrum Management. Under Article 15 of the Radio Regulations of the International Telecommunications Union (ITU), every administration is required to do monitoring as a means of managing spectrum use.

Spectrum Management in Malaysia was not a major issue before the 1980s. In 1984, Malaysia's first private TV station was introduced and the Telecoms Department, Jabatan Telekom Malaysia was privatised in 1987 and renamed Telekom Malaysia Bhd. However, the name Jabatan Telekom Malaysia (JTM) was kept and used by the Regulator of the Telecommunications Industry, a small organization overseeing spectrum usage, standards, and licensing under the ambit of the Ministry of Energy, Telecommunications and Post.

In 1990, the previous Jabatan Telekom Malaysia embarked on a government-to-government project with the Canadian government in the development of a Spectrum Management System encompassing procurement of consultant works, a database system and monitoring tools capable up to 1 GHz. Before this project, the government was only capable of monitoring systems up to 30 MHz i.e. within the High Frequency bands.

NASMOC

The National Spectrum Monitoring and Control Centre or in short, NASMOC, is the name given to the project that will equip MCMC with the erection of 22 unmanned monitoring sites. The project started implementation in mid year 2005 and is expected to be completed this year. Equipment was sourced from a US company,

The NASMOC equipment is located right at the top of the Selangor state government headquarters in Shah Alam

TCI which is one of the three major providers of spectrum monitoring tools globally.

Prior to the NASMOC project, the MCMC had already procured six monitoring vehicles for the same purpose under the Data Collection Monitoring Unit (DCMU) project. All six vehicles have been assigned to regional offices for mobile monitoring activities. These mobile vehicles are capable of monitoring systems up to 3 GHz as well as performing direction findings. The vehicles are also equipped with a set of cellular coverage test equipment for both 2G and 3G systems. The DCMU project was completed late 2004 and is specially focused on mobile monitoring.

For the NASMOC project, monitoring systems are placed at fixed sites at highly radio populated locations. The system is able to perform spectrum monitoring automatically within the range 10 kHz up to 3 GHz.

NASMOC is also capable of carrying out direction findings of an unidentified signal more so when adjacent monitoring sites are netted with each other or netted with the monitoring vehicles.

For spectrum above 3 GHz to 40 GHz, monitoring will be done manually and "on site" set up is required. For these activities, transportable systems are deployed and in cases involving interferences inside buildings, portable units are used.

NASMOC Unmanned Sites

The project was designed for efficient operation with minimal manpower requirements. All 22 sites are planned to be unmanned and remotely controlled.

Currently the sites are in various stages of implementation and the launching of all systems at the command centre is targeted by mid July 2007. At the time of writing, twelve sites are in operation.

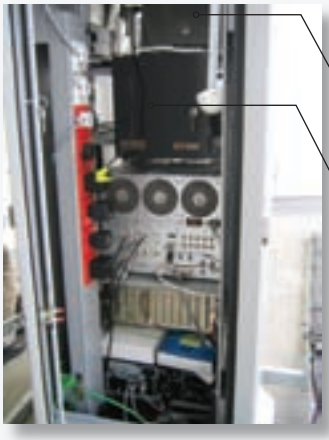
One of the NASMOC sites is located at the Selangor government headquarters in Shah Alam. The site was chosen as it is one of the most suitable sites overseeing the Klang Valley area.

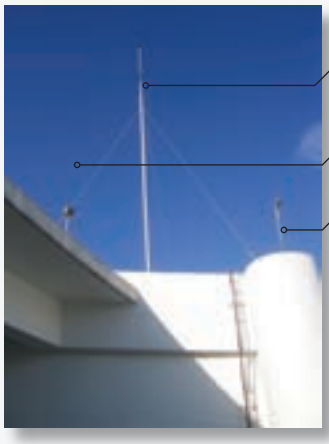
In the following pages, readers will see the NASMOC monitoring system in action as well as the equipment used at the unmanned sites.

Mobile monitoring vehicle (DCMU)

NASMOC Equipment

Detailed description of the structure and the functioning of equipment used on rooftop sites such as the Selangor State Government Headquarters, Shah Alam.



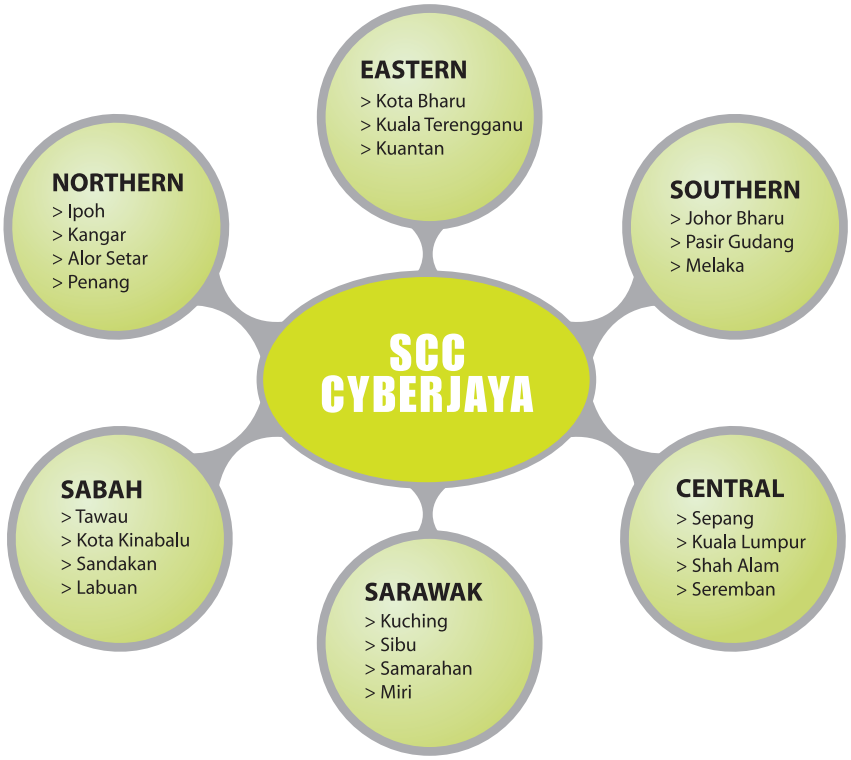


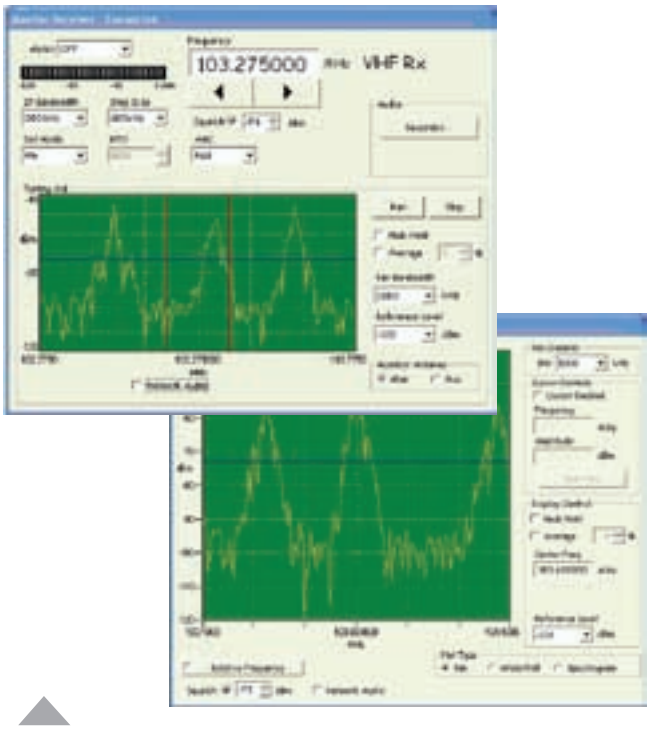
A brief description of the items shown above

No	Equipment Name	Function
1	Lightning Brush	For lightning arrestor
2	Lightning Protection / Franklin France Saint Elmo	
3	Antenna Mast / Member, 2 meter	To support Radom/antenna
4	Antenna Mast / 3-legged support member, 4 meter	
5	7641-Radom	For monitoring and DF of UHF
6	7031-HF Antenna	For monitoring purpose in the HF bands
7	GPS Antenna	Synchronization of location and time
9	ADSL Modem (Aztech)	Main connection for IPVPN.
18	Zyxel ISDN Router 202H	Alternate connection for IPVPN
19	Modem/GSM/GPRS - Maestro 100	Backup connection for remote access
20	Modem/56k PSTN - DLINK	
12	LAN switch/SUPERSTACK 3 SWITCH 422T, 24 port	Switch for IPVPN or backup connections to alarm system and TCI server
8	LA-UDS-10 (Lantronix)	Alarm system interface to IPVPN
21	Alarm System/ADT/KT300	Main control unit for alarm system
10	KT-PC4108 8 Zone Input Expansion Module	
11	Temperature Sensor c/w indicator	To perform temperature check if air-condition malfunction
13	8067B Processor	Processing unit for TCI server to handle task by the TCI clients
14	8412 RF Switch	To control HF antenna
15	7642-Watch-Dog	Self-check mechanism for system error or power off to shutdown the processor
16	APC-UPS	Backup AC supply for emergency
17	Air-condition controller	To rotate air-condition power for every 6 hours

NASMOC in Action

All sites are connected via an IPVPN network to the command centre stationed in the MCMC building in Cyberjaya. The network consists a privately subscribed network provided by Telekom Malaysia. At the command centre, data collected are scrutinized and analysed via various displays made available by the system.

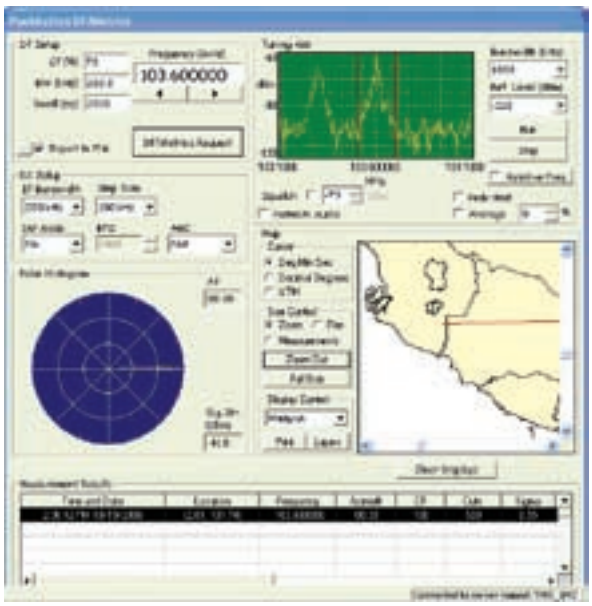




Frequency Monitoring

The diagram above shows the screen display of a Receiver. The receiver is able to monitor frequency from 10 kHz to 3 GHz. It measures the signal strength in dBm and perform audio recording.

Marker measurement can be performed when switching to Pan Display. Frequency, amplitude and bandwidth can be measured.

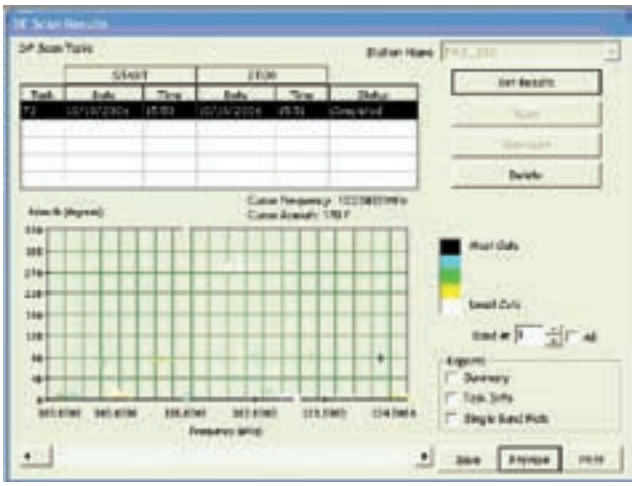


Single Station Direction Finding

The Push Button Direction Finder (DF) provides direction of the transmitter under question. As an example, the FM radio 103.6 MHz transmitter is showing that the signal is coming from Negeri Sembilan.

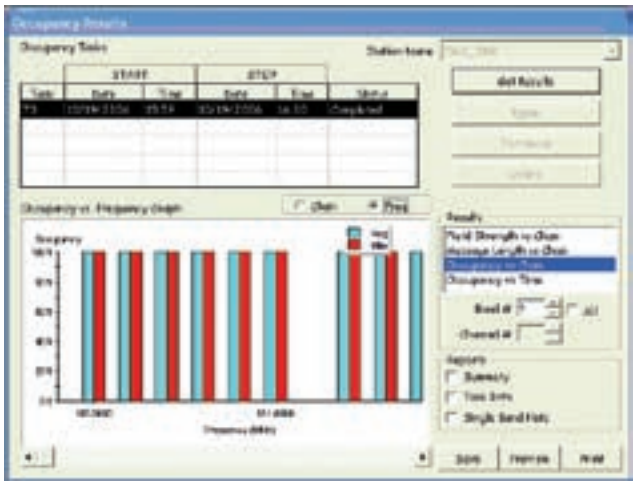
Multiple Station Direction Finding

Netted DF provides exact location of a transmitter. Two sites of the NASMOC will converge to a point of intersection and display below tells that the transmitter of an FM radio 88.5 MHz is originating from KL Tower.



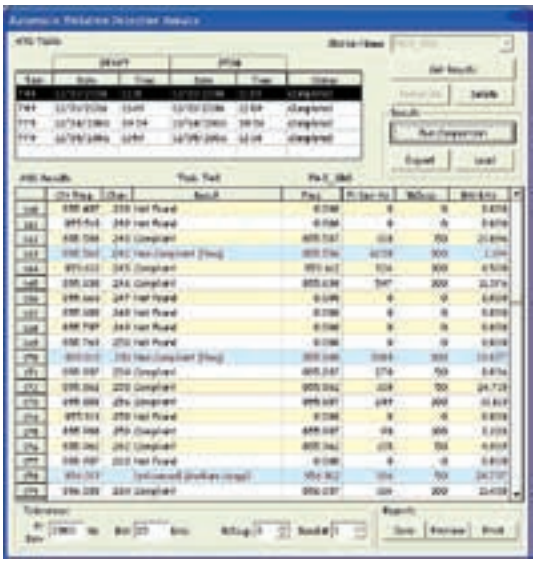
DF Scanning

DF Scan is very useful to locate an illegal transmitter that interferes with a licensed user. For example, if the licensed user is located to the north of NASMOC station, the DF Scan should plot on 0 degree. However when a DF Scan shows two different plots, one of the plots should come from an illegal user.



Occupancy Scanning

Spectrum Occupancy is used to identify the usage of spectrum at certain NASMOC station for certain period of time ranging from a few hours to weeks. With this, demand usage of the channel could be verified for future planning and assignment purposes.



Automatic Violation Detection (AVD)

All use of frequencies must be registered in the MCMC database namely AFMS. These data are often used for verification purposes. Data is taken from the AFMS and loaded to the NASMOC system to be compared with real situations on the field. The example above is made for the verification use of frequencies according to assigned status from 851 to 866 MHz. The result of AVD will display as seen above.

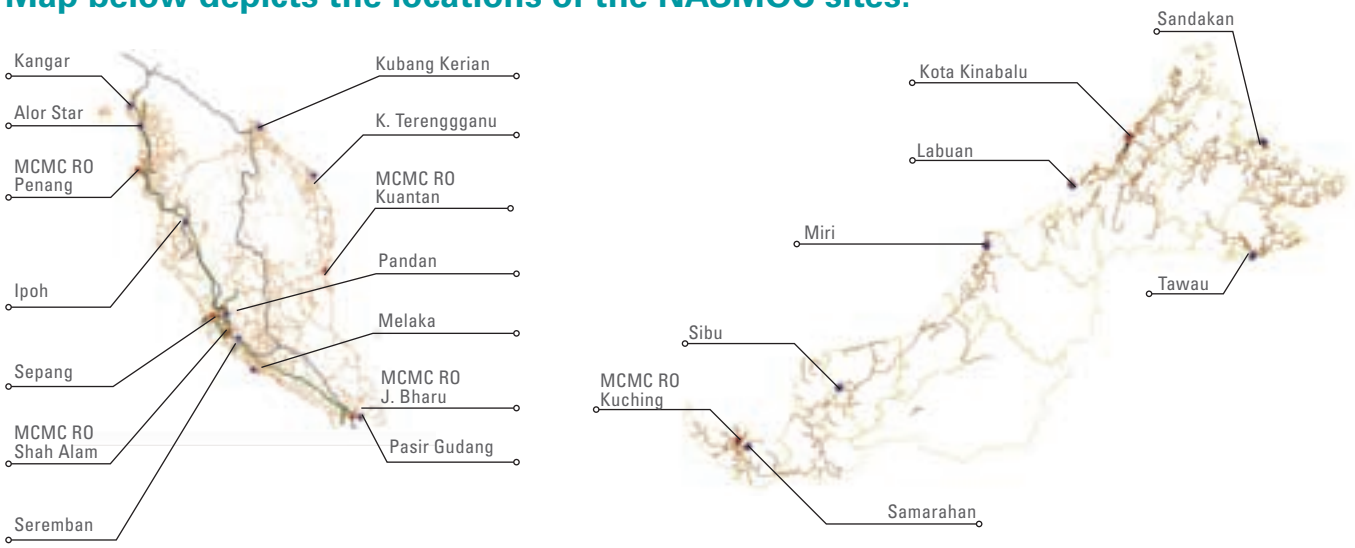
Automatic Violation Detection (AVD)

The screen below is made clearer and actually shows unlicensed use of frequencies and non-compliance of the use of frequencies though assigned.

From results scanned, the frequencies in MHz 851.2125, 853.7125, 856.0125, 856.5125, 857.0125, 857.5125 are all being used without any approval.

Centre Freq (MHz)	Channel	Measured Freq (MHz)	Freq	Occup.	Measured BW (MHz)	Result	AFMS 75km SPG	AFMS Malaysia
851.2125	0	851.21211	395	100	13.355	Unlicensed (High Usage)	#N/A	NA
851.6375	54	851.63139	6111	100	3.763	Non compliant (Freq)	01317161-000SU/262006	
853.4375	0	853.43735	154	50	3.486	Unlicensed (Medium Usage)	#N/A	Bukit Beruang Station (92km)
853.7125	0	853.71239	114	50	11.965	Unlicensed (Medium Usage)	#N/A	NA
854.0625	167	854.06885	6349	50	1.57	Non compliant (Freq)	01317147-000SU/262006	
854.5625	194	854.55654	5957	100	5.545	Non compliant (Freq)	01389617-000SU/262006	
854.8125	203	854.80641	6089	100	1.78	Non compliant (Freq)	01389622-000SU/262006	
855.5625	242	855.55627	6230	100	1.194	Non compliant (Freq)	01389617-000SU/262006	
855.8125	251	855.80869	3810	100	13.077	Non compliant (Freq)	01317147-000SU/262006	
856.0125	0	856.01269	186	50	24.737	Unlicensed (Medium Usage)	#N/A	NA
856.5125	0	856.51255	54	50	7.973	Unlicensed (Medium Usage)	#N/A	NA
857.0125	0	857.01243	69	50	11.502	Unlicensed (Medium Usage)	#N/A	NA
857.5125	0	857.51243	67	50	13.171	Unlicensed (Medium Usage)	#N/A	NA

Map below depicts the locations of the NASMOC sites:



With the wireless environment rapidly increasing in complexity and usage, the monitoring of the spectrum will require correspondingly powerful tools; hence this project. When all the Nasmoc sites are up and running, the capacity of MCMC to manage and monitor spectrum usage will be greatly enhanced. .my

Norafidah Mohd Yusof is the Director at the Spectrum Engineering & Interference Resolution Department of the MCMC. She can be contacted at nora@cmc.gov.my

From Cave Drawings to Fibre Optics

The art of cramming a history of telecommunications into a two storey building.

Telecommunications has got to be among the most advanced of technologies today. Wireless technologies magically allow communications across borders and high tech phones almost impossibly seem to fit in umpteen gadgets into one small device.

And if you really want to see how much telecommunications has advanced, the best place to do that is the Muzium Telekom.

The Gallery

As you enter the present Gallery, the first set of exhibits brings home a too often ignored truth that information and communications technology, including telecommunications is as old as mankind.

Throughout the ages, people exchanged information between their distant fellows using communications technologies of their time, like smoke signals by the Native Americans or drumming by the Africans.

The first exhibit is a replica of drawings of different coloured symbols since the neolithic period, found on the walls of the Tambun Caves in Ipoh, Perak, north of Kuala Lumpur.

The symbols include line drawings of humans in various poses, animals, shapes or wavy lines conveying coded messages only fellow tribes people could understand.

Also on display is a large ceramic vase with inscriptions all over its outer surface, which was a status symbol given as ceremonial wedding gifts as dowry, and this exhibit illustrates communication.

Closer to the present are the first printed books in Malay printed by the London Missionary Society in 1817, followed by the first newspaper the Akhbar Peranakan in 1878. Newspapers and magazines are a form of multimedia with use of text and pictures to tell the story.

The first Chinese language paper, the Kong See Boo Poh was published in 1892, followed by the first Indian paper, the Tamil Nesan on 24 September, 1924.

The different woven patterns of the traditional kain songket or songket cloth convey different meanings and was a form of communications.

A hand-written copy of the Al-Quran, the Muslim holy book from the mid-13th century helped on the spread of religious knowledge about Islam by a circle of scholars, palace writers and religious leaders to glorify the majesty of the ruler.

Then there is the icon of an elephant used to carry loads and royal pronouncements. Even the humble sampan, a kind of canoe, was used to overcome physical barriers by allowing people to cross rivers to communicate with others, as well as to exchange goods.

Malaysia also had its own form of early aural communications, the ketuk-ketuk, or "knock-knock," a large, piece of wood hung in community places.

People knocked it with a stick, creating a loud sound, for example to summon villagers to hear announcements by the village head or royal messengers. It was also used for aural telecommunications (communications at a distance) between neighbouring villages.

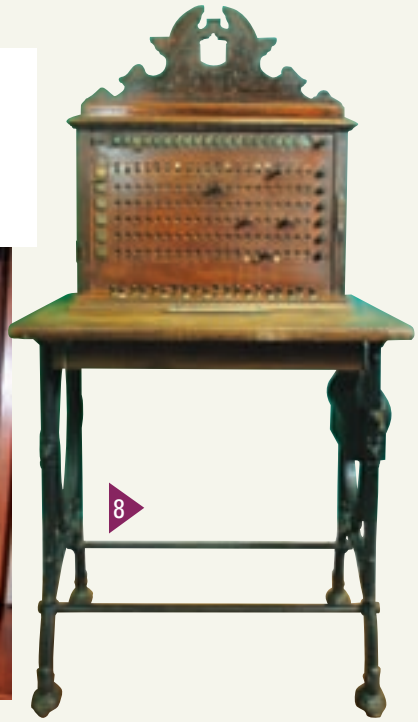
Electronic communications

Moving into the era of electronic communications, the form most of us are familiar with, the first electronic communications service to involve Malaysia was the submarine cable, laid in 1870 to carry telegraphic signals between Malaysia and Indonesia.

Before Alexander Graham Bell made the first successful telephone call using a gallows-frame telephone on 3 June 1875, communications was conducted between trained operators who converted written text into Morse Code, tapped out through a switch, while the operator at the other end translated the sequences of long and short sounds back into written text.

1. Cave Drawings
2. Ceramic Vase
3. Kain Songket
4. Ketuk-Ketuk
5. Telegraph operator
6. Maritime operator

7. Three-carrier equipment
8. Magneto switchboard
9. Police radio
10. 1950s and 1960s era dial telephones
11. Candlestick telephone
12. Premium Ericophone



Asrul Muzaffar Mohammed

Muzium Telekom to modernise

Menara Kuala Lumpur Sdn Bhd, which manages the museum plans to take it beyond the traditional definition of a museum and turn it into a public reference resource featuring the history telecommunications technologies according to Asrul Muzaffar Mohammed, public relations, events and marketing manager.

The two storey 70 years old building was built by the British administration in 1928. It originally housed the Central Battery Manual Telephone Exchange, which served the whole country, though until as late as the 1950s.

In the early 1990s it was slated for demolition but Tun Dr. Mahathir had it gazetted as a heritage building. It was turned into a telecommunications museum in 1994.

"We plan to make Muzium Telekom a venue for seminars and product launches and besides marketing the museum, we will include facilities like a coffee bistro and provide WiFi." said Asrul.

Right now, it has a research centre with PCs and Internet access for students and there is a TM Point service centre for customers to pay their bills or make international calls.

Between 70 and 80% of the exhibits will be upgraded to be interactive.

The dawn of telecommunications within Malaysia was the 27 miles (50 km) long telegraph line laid in 1876 between the British Resident in Kuala Kangsar to the Assistant Resident in Taiping, in Perak.

At that time, tin mining was a booming industry in Malaysia and these developments were closely related to the introduction of the British administrative system to the Malay states.

In 1878, the Post & Telegraph offices were combined into one, though they were separated again on 1st of April, 1946.

Having to tap out messages in Morse Code is relatively inconvenient and slow, which had several inventors in the west looking at developing teletypewriters or teleprinters as they are more commonly known today, which let you type on a keyboard and have the letters printed out at the remote end.

A magneto switchboard installed in Kuching, Sarawak in 1925 and used till 1955 is on display. It was used as an early form of telex exchange to switch between different teleprinters.

Radio communications played a very important part in public safety, like the SOS (save our souls) call for help sent by radio from a ship which had run in Tanjung Tuah. It was received by a Kuala Lumpur radio station which got a rescue party despatched.

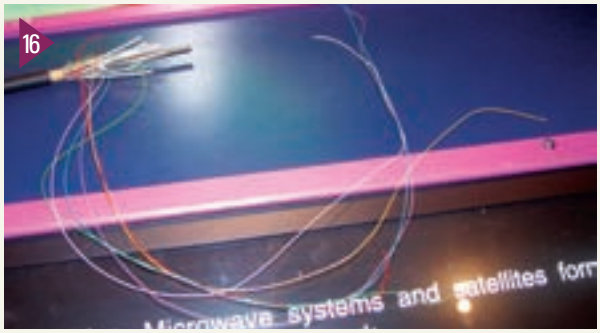
Radio operators on ships were called maritime operators, while those on land, simply radio operators.

The first radio broadcast began in 1931 but was brought under Japanese control during World War II, before passing back to British control in 1945, then a year later, control was passed to the Department of Broadcasting, headquartered in Singapore.

During the Japanese occupation, lots of telecommunications equipment and copper wires were taken away for use in the Japanese war effort, so the Telecommunications Department of Malaya had to rebuild the telephone network after the war and they managed to increase the number of lines nationwide from 10,000 in 1946 to 56,000 in 1956.

On display is a section of the 28 pair and steel wire armoured submarine cable which the Telecommunications Department used to connect Penang island to the mainland on 31 August, 1946. It was 4 inches (10.6 cm) thick and altogether weighed 160 tons (162.5 metric tons).

In the 1950s the telecommunications network was expanded further nationwide using an early form of multiplexing, which enabled multiple telegraphic and voice communications to be carried over a single copper pair between cities and towns to save costs.



13. 50s and 60s era main distribution frame
14. Crossbar switch, Uniselectors and Telephone meters
15. Model of Malaysia's first earth satellite ground station
16. Example of optical fibre cable

On display is the three-carrier equipment, which was a pioneering technology in the 1950s used to connect Kuala Lumpur and Klang, Kuala Selangor, Tanjong Malim and Bentong.

On 13 February, 1960, Malaysia's first prime minister, Yang Teramat Mulia Tunku Abdul Rahman Putra Al-Haj launched a microwave system linking the whole country from the transmission tower on top of Bukit Nanas in the heart of Kuala Lumpur.

People today would find it inconceivable to use a fixed line telephone without a keypad or dial, though that is what the country's early telephone users had to contend with and the museum has several examples on display.

In the 1930s people used those candlestick telephones, where they held the microphone to their mouth with one hand and the earpiece to their ear with the other or they had those tall bulky black-coloured telephones.

Neither had a dial, so to make a call, they picked up the receiver and when the telephonist replied, they gave her the required number, usually four digits or less and she manually connected them to the other party.

The dial telephones which appeared in the 1950s and 1960s were rather big and bulky black coloured devices, though they sat rather reassuringly on the desktop and were not prone to sliding across the desktop as one dialed.

Those who preferred could buy a stylish luxury model like the Ericophone, which was constructed as a single handset with a dial in its base and it came in light colours.

The first telephone directory which appeared in 1939, is half an inch (12.7 mm) thick and contains mainly numbers of government offices and commercial firms across the country, while today, the telephone directory of a single state would be several times as thick.

The museum also features a 1950s and 1960s era main distribution frame, to which all the copper wire pairs connected to telephones in the area or around town are attached, before they are in turn connected to the exchange switching mechanism which connects the calling and called parties together so they can talk.

Examples of the first generation of electromechanical switches based on uniselectors and the second generation based on crossbar switches are on display, together with a rack containing a whole matrix of telephone usage meters corresponding to each subscriber.

Telephone companies usually took a picture of each rack of meters once a month to calculate the bill for each customer.

Examples of 1940s and early 1960s switchboards are displayed. While they both have patch cords and switches for operators to connect calling to called parties or when manually setting up outstation or international calls, the 1940s version has dial, while the 1960s version has a keypad.

One of its interactive exhibits shows how calls from a mobile phone are routed to a fixed line number and so on using a series coloured LEDs to indicate the call's progress.

The museum has a poster but no exhibits of legacy cellular phones like the Ericsson ATUR 450 which made its debut here in January 1985, priced at RM18,000 and the size of a small briefcase and comprises a base unit attached to a receiver like a desktop phone.

There is also a model of Malaysia's first earth satellite ground station which began operation in Kuantan in 1970.

Also displayed is an example of an optical fibre cable, where each strand alone has the capacity equivalent to 22,000 copper telephone lines and is the preferred medium of Internet traffic today.

That exhibit pretty much brought us back to the present. It is mind-boggling when you think about it that so much advancement has taken place in just 150 years. .my

The Muzium Telekom is located at the intersection of Jalan Gereja and Jalan Raja Chulan.
Tel: 03 2031 9966

MyIX – Our latest Internet hub

The talk about reducing hops and latencies when people access locally hosted websites could very well be under the bridge with the arrival of the Malaysian Internet Exchange or MyIX for short. Ahmad Razif Ramli elucidates on this undertaking.

Launched on 15 December, 2006, the Malaysian Internet Exchange is not only meant to increase local Internet efficiency and speed, it will also bring significant cost reductions and foreign exchange savings by keeping Net traffic within the country.

The need for such an Internet exchange has kept growing over the years due to the strong growth in Internet usage in this country and the commitment of the government towards making IT a major focus area.

In addition, while MyIX is the country's first government sponsored Internet exchange, there have been two initiatives previously at creating Internet exchanges (IX) in Malaysia.

Asia's first IX was the Kuala Lumpur Internet Exchange or KLIX (www.klix.net) launched nearly 10 years ago on 19 December, 1997 by Warga Media Sdn Bhd, a homegrown Malaysian start-up, in partnership with the Malaysian subsidiary of Digital Equipment Corporation (DEC) in the United States.

Hosted in the MSC Malaysia, KLIX was based upon DEC's Neutral Internet Exchange

concept and it replicated DEC's Palo Alto Internet Exchange (PAIX), introduced in Palo Alto, California in July 1996.

However, KLIX was very much an online integrated business solutions for various industries and was customised to suit specific industry professionals from architects, engineers, scientists, educationists and researchers of all disciplines, as well as to those in the sales and distribution, purchasing, administrative, human resource and financial areas.

Unfortunately, KLIX did not take off due to lack of acceptance of it.

IX Mark II

In 2003 a Malaysian Internet Exchange (MIX), which could be described as the forerunner of the current MyIX, was launched by the two leading Internet Service Providers (ISP), namely TM Net and JARING.

All this while our domestic traffic was routing like a boomerang out of the country and back in again. To access any locally hosted website, ISPs has to route traffic to their nearest or cheapest IX in another country and back to the users in Malaysia.

For example, when someone sent an e-mail message from their DiGi account to someone with a TM Net account, it would travel all the way through the International gateway to places like the US before it is routed all the way back to the TM Net user in Malaysia.

Also, when someone on a Malaysian ISP accesses a website hosted by another Malaysian ISP or corporate website, the traffic will have to be routed via their respective international gateways and another country before it reaches the user.

Since Internet traffic flows from node to node, the longer the distance, the more the hops between nodes in between. With the combined delays involved, it takes longer for the message or content to come to you. This explains the kind of delays you sometimes experience when watching video on overseas video streaming sites like YouTube or MySpace.

Users typically experience latencies between 80 to 100 milliseconds.

Then there is the hefty cost to ISPs incurred for routing domestic traffic through multiple international hops, via exchanges in Singapore and Hong Kong, and back to Malaysia. This typically costs local ISPs hundreds of millions of Ringgit annually, which contributes to keeping end-user Internet charges high.

However, it was soon seen that the MIX initiative was driven on a purely commercial basis which led to smaller ISPs who were cut out from the IX being unhappy. It was perceived that the IX was not neutral and the subscription rates were high.

By then, the absence of a neutral and equitable exchange together with the high cost of local leased lines had forced ISPs to route domestic traffic through multiple international hops, via foreign-based exchanges and back to end-users in Malaysia.

Enter MyIX

On 14 September 2006, the Minister of Energy, Water and Communications Dato' Sri Dr. Lim Keng Yaik announced that a neutral IX would be established and ready by the end of that year and that MCMC would be responsible for monitoring its progress within the stipulated time.

He made it clear that MyIX was part of the MyICMS 886 strategy to propel the country in becoming a respectable Internet hub in the region.

After its launch last December, MyIX took just three months from conceptualization to be up and running.

During the press conference the Minister expressed his confidence that MyIX would reduce local ISPs' costs for routing local Internet traffic, saving the country some RM2.36bil in foreign exchange outflows over the next five years.

With MyIX, the edge routers of local ISPs are now no more than four milliseconds away from each other. While users might not enjoy a drastic drop in Internet charges, they should experience faster browsing when accessing local websites because of the reduced latencies.

It would also enhance the broadband experience for users and at the same time attract international content providers to host their content in the country.

Presently the consortium members stand at 16. They are AIMS, Airzed, Bizsurf, CNX, DiGi, Extreme BB, FreeNet, Heitech Padu, Jaring, Maxis, MyKris, Nasioncom, Pan Eagle, TimeNet, TM and VDSL.

New memberships have been frozen for the time being; to give existing members time to produce a constitution, form an ad hoc committee and to register with the Registrar of Societies.

Once all paperwork are settled, the consortium will consider new applicants, which will be scrutinized for

AIMS Sdn Bhd CEO, Afzal Abdul Rahim giving VIPs a tour of the facility.

their nature of business and it will only consider local ISPs having a local Autonomous System (AS) number.

"AS numbers" are globally unique identifiers for autonomous systems, in which a group of Internet protocol (IP) networks have a single clearly defined routing policy, run by one or more network operators.

The non profit consortium plans to form a well distributed number of council members committee including the three permanent members being AIMS, TM and Jaring.

There will be six rotating members and the chairmanship should be no more than two terms continuously. The MCMC as the sponsoring agency is currently bearing the startup and running costs of MyIX.

Divided into three phases, the first phase of MyIX was about the proof of concept and ironing out infrastructure needs and it was completed within six months.

The second phase of the exchange will be extended to the other regions such as Penang, Johor Bahru and Kuantan with the creation of regional hubs in the respective locations. For now, these centres will be connected to the current centres at 1Gbps. The final phase will be to connect East Malaysia so that people there are able to enjoy the benefits of the national IX local presence.

Delegates at the AIMS control centre

At the onset, there is also an ongoing initiative by the Terengganu state government to set up their own IX but in actual fact it is a super data centre or a node that will be connected to the MyIX.

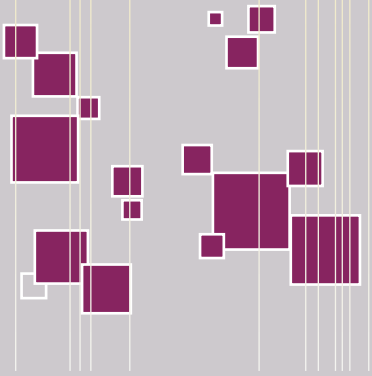
The MyIX Infrastructure is funded by seed money provided by MCMC and there are three reference sites. The control centre is housed in Menara Aik Hua at AIMS. Because of the technology used, those machines do not need much attention.

The other reference sites are Fiberail located at the headquarters of Keretapi Tanah Melayu Bhd (Malaysian Railway) and Jaring. The sites are connected via fibre optic. Both Jaring and Fiberail sites house additional equipment in over 1000 square feet of space.

Technical Aspects

The beauty of the system is that it does not need much maintenance in terms of upgrading because it operates on a Layer 2 peering platform which is virtually hop-less.

Prior to deciding which network layer to use, MCMC engaged a consultant to recommend the viability of using the available Layer 2 or 3 protocols. Based on previous experience, the MIX once used Layer 3 but found it introduced more latency due to its configurations.



Internet Exchange Point

An **Internet exchange point** (**IX** or **IXP**) is a physical infrastructure that allows different Internet Service Providers (ISPs) to exchange Internet traffic between their networks (autonomous systems) by means of mutual peering agreements, which allow traffic to be exchanged without cost. IXPs reduce the portion of an ISP's traffic which must be delivered via their upstream transit providers, thereby reducing the Average Per-Bit Delivery Cost of their service. Furthermore, the increased number of paths learned through the IXP improves routing efficiency and fault-tolerance.

The primary purpose of an IXP is to allow networks to interconnect directly, via the exchange, rather than through one or more 3rd party networks. The advantages of the direct interconnection are numerous, but the primary reasons are cost, latency, and bandwidth. Traffic passing through an exchange is typically not billed by any party, whereas traffic to an ISP's upstream provider is. The direct interconnection, often located in the same city as both networks, avoids data from having to travel to other cities (potentially other continents) to get from one network to another, thus reducing latency. The third advantage, speed, is most noticeable in areas that have poorly developed long-distance connections. ISPs in these regions might have to pay between 10 or 100 times more for data transport than ISPs in North America, Europe or Japan. Therefore, these ISPs typically have slower, more limited connections to the rest of the internet. However, a connection to a local IXP may allow them to transfer data without limit, and without cost, vastly improving the bandwidth between customers of the two adjacent ISPs.

Sourced from Wikipedia (http://en.wikipedia.org/wiki/Internet_exchange_point)

The 16 consortium members

The study visit to other IX installations brought about valuable lessons because it was determined that the Layer 3 network system would involve a huge cabling mess. Each time bandwidth needed to be increased, they would have to add more cables and switches resembling a bad patchwork. In AIMS, the MyIX infrastructure which is based on Layer 2 is clean and organized.

Devices used in a Layer 2 Ethernet network include network interface cards, hubs, bridges and switches. Ethernet devices are able to identify each host and these addresses are attached to network interface cards. Unlike Level 3, the next generation design of Layer 2 networks does not require much physical patches whenever a new peering partner joins the IX.

Also, none of these devices have to disassemble or reassemble data. As nothing is done to the data along the way, Layer 2 networks act faster than Layer 3 networks.

In yet another advanced feature of its network platform, MyIX was designed to switch bandwidth with a flick of a button with the addition of a suitable card. It can switch from 1Gbps to 10Gbps to 100Gbps within a few hours unlike the old Layer 3 networks which could potentially need to redesign its configuration.

When traffic at the exchanges increase with demand and congestion occurs, bandwidth switching will increase the bandwidth and this flexibility allows MyIX to work seamlessly.

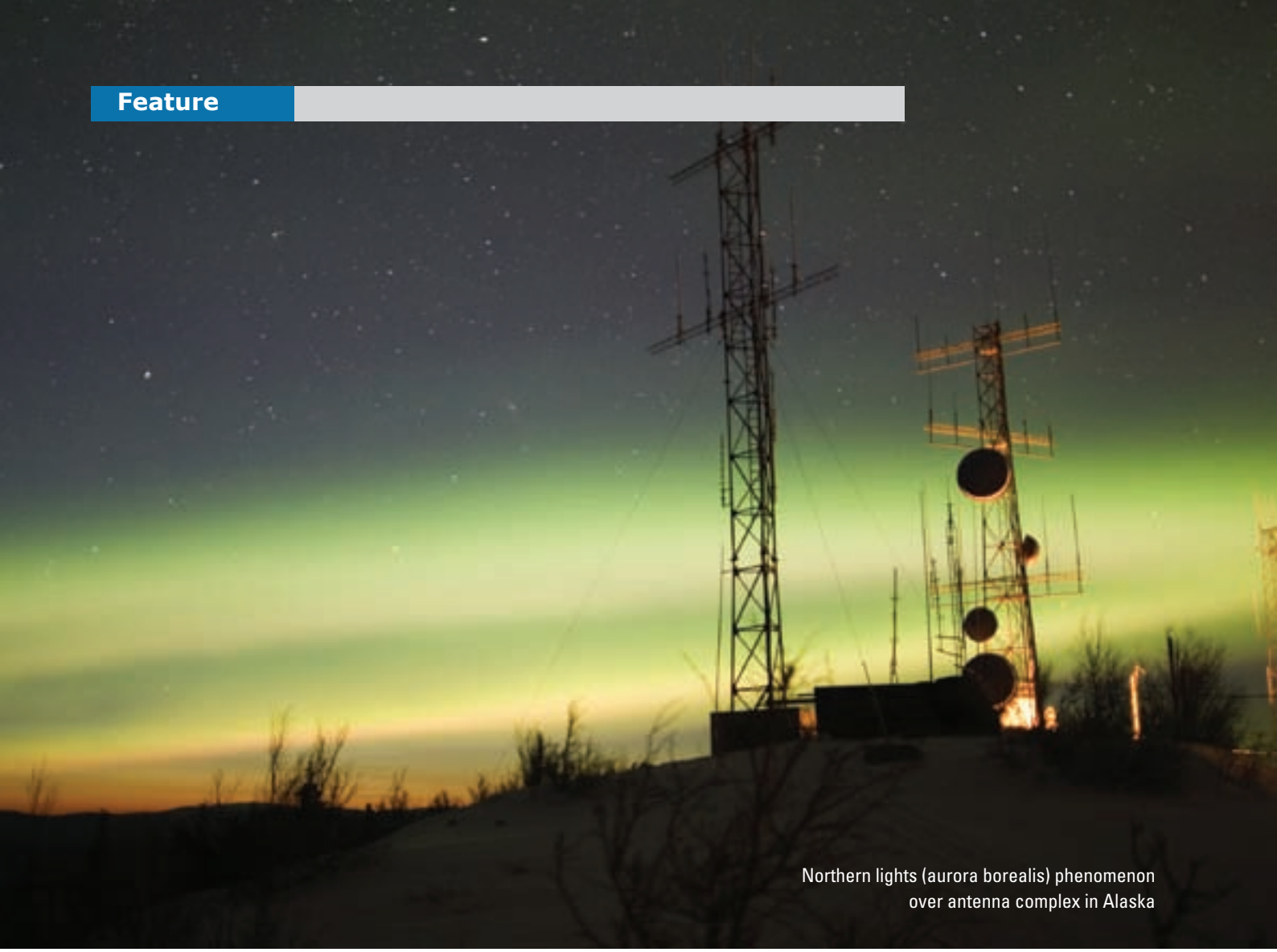
The way forward

MyIX is a critical infrastructure to pave the right direction for the country if we want to establish ourselves as a regional Internet hub. What could have been commercially non-viable in the past is now made possible and neutrality is of great concern. The IX will also encourage content created locally to be hosted within the establishment and not have to rely on providers with bandwidth available internationally.

The participation of these ISPs in MyIX means domestic traffic will no longer need to be rerouted through foreign exchanges. These will not only result in saving in terms of time due to the reduction in the number of hops, but also valuable savings in outflow of foreign exchange settlements. A study done by the appointed consultant shows that if no measures are taken, Malaysia will experience a cumulative Forex loss of some RM2.36 billion over the next 5 years.

With our own IX infrastructure in place we can attract more international content to be hosted locally which will in turn bring in revenue for the local ISPs. The growth of this industry should help us achieve a status as a regional Internet hub. .my

Ahmad Razif Ramli is the Director of Technology & Standards Development of the MCMC. He can be reached at razif@cmc.gov.my



Northern lights (aurora borealis) phenomenon over antenna complex in Alaska

From Sea to Space

Changes in the uppermost part of the earth's atmosphere may be able to warn of earthquakes before they occur. Prof. Ir. Dr. Ahmad Faizal Mohd. Zain discusses this interesting phenomenon.

Introduction

The ionosphere is the part of the upper atmosphere starting from about 50 km above the Earth's surface to as high as 1000 km, according to recent discoveries.

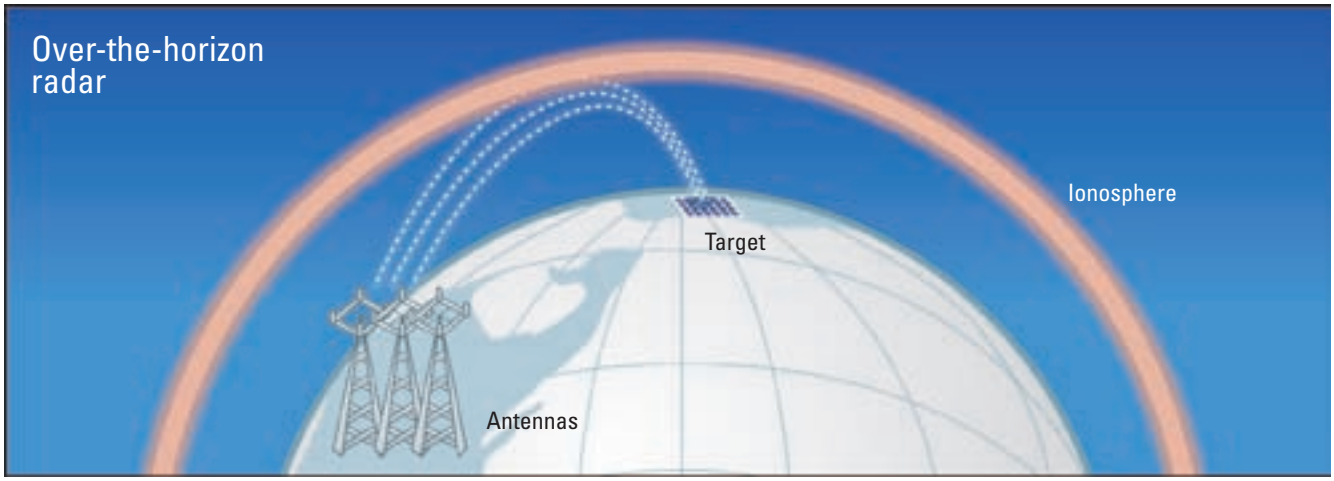
Long before the advent of communications satellites --- long, medium and short wave radio broadcasts were received by listeners on the other side of the planet --- thanks to the signals being reflected back to earth by the ionosphere. It too has enabled international two-way radio communications between amateur radio enthusiasts worldwide.

The U.S. Navy had sponsored many technical studies between 1958 and 1962 into finding ways to transmit its strategic orders to its fleet of ballistic missile submarines operating at great distances from the continental United States.

In April 1963, an extremely low frequency (3 – 30Hz) radio signal reflected off the ionosphere from a shore-based radio transmitter in North Carolina to the submarine USS Seawolf operating with its antenna underwater at about keel depth at a distance of up to 3,200 km and up to 85 km with the submarine at greater depths.

The ionosphere is also used by radar for over-the-horizon detection of approaching intruders.

While those uses of the ionosphere are related to destructive wars, changes in characteristics of the ionosphere due to seismic activity within the earth's crust (lithosphere) are well-known and can be used as an earthquake early warning system,



which could save lives; hence the title of this article, From Sea to Space.

Earthquake early warning system

The interest in using the ionosphere to detect early signs of possible earthquakes was stumbled upon after the tsunami on 26 December, 2004 which resulted in nearly 230,000 people killed and missing.

Researchers at the Wireless and Radio Science Centre (WARAS) at the Tun Hussein Onn University Of Malaysia were using a doppler digisonde (digital ionosonde) throughout December 2004 and managed to record the critical frequency of the ionosphere over Parit Raja, Batu Pahat, Johor. These included ionospheric readings before and during the earthquake and provided an historical record to study.

The critical frequency is the highest frequency of a signal transmitted vertically into a layer of the ionosphere, which will be reflected back to Earth by it. This varies throughout the day, season, location and so on.

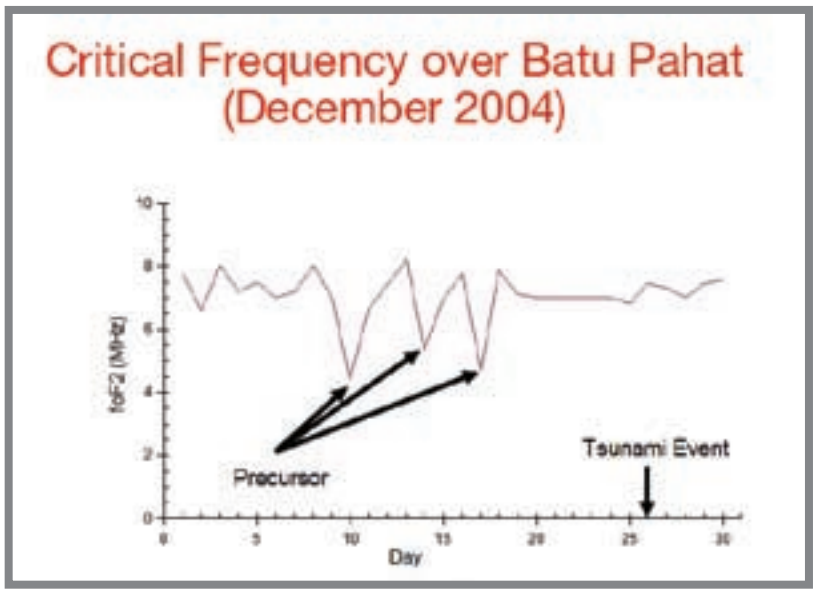
Many scientific papers have reported on the drop in critical frequency before the onset of an earthquake of magnitude greater than 6 and this can be described as the calm before the storm.

WARAS recorded significant dips in critical frequency on 10, 14 and 17 December, 2004, which indicates the usefulness of seismographic data as an early warning of an earthquake.

Other warnings were a marked change in the height profile and gyrofrequency of the ionosphere which was not present before the earthquake but further analysis and investigation must be done to confirm whether this was due to the earthquake or not.

The gyrofrequency is the frequency of the circular motion of a charged particle in a uniform magnetic field.

It appears that the state of the ionosphere can serve as an indicator of possible earthquakes.



WARAS readings

The earth to space connection

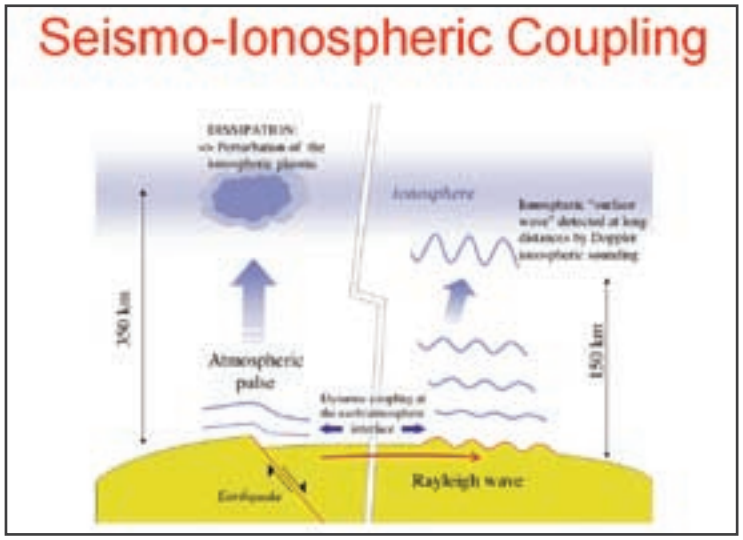
In the aftermath of the earthquake, the Malaysian government called for an earthquake monitoring system to be set up to warn the nation of future earthquakes and tsunamis.

According to the New Straits Times of 30 December, 2004 the Meteorological Service Department has 12 seismological stations to detect earthquakes and triangulate their epicentres.

However, this system only directly records the movement of the earth's crust and ensuing tsunami, if any. Also, the present system involves the direct placement of seismographs on land or in the ocean to detect earth movements.

The effects of seismic activity on the ionosphere are well known and a lot of research has been conducted to investigate the connection between the lithosphere and the ionosphere.

The lithosphere is the earth's crust around 70 km thick under the oceans and 140 km thick under the continents and although the mechanism of interaction between the lithosphere and ionosphere is still being studied, it is clear that the main mechanisms of transfer of energy from the lithosphere



to ionosphere must be acoustic or electromagnetic.

Pulinets (2004) gave a very good description of the seismo-ionospheric process. This phenomena is shown graphically in the diagram above, while a simple diagram describing the process is shown below.

During the earthquake, several types of seismic waves, the largest being the Rayleigh Wave, move along the earth's surface. Shock waves from this Rayleigh Wave are shown to cause large-scale disturbances in the ionosphere, an atmospheric region filled with charged particles (ions) and electrons.

A one millimetre peak-to-peak displacement at ground level can produce oscillations larger than 100 metres at an altitude of 150 km.

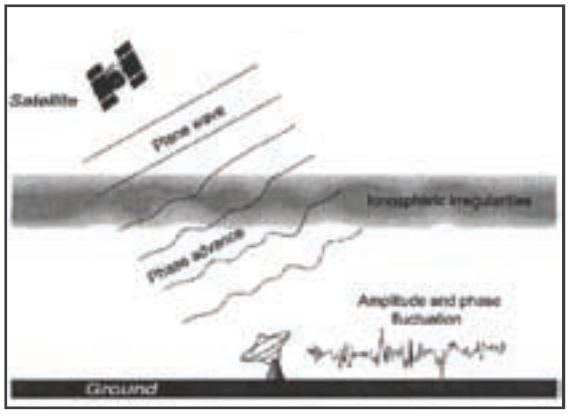
So the ionosphere can act as an amplifier of seismic waves moving across the earth's surface and fluctuations (or scintillations) in the ionosphere can cause GPS (Global Positioning System) signals to be delayed, introducing navigational errors and under extreme conditions, service blackouts.

However, while such interference is a bane to GPS users, it is a boon for researchers to study earthquakes.

Another technique to monitor the ionosphere is to use an ionosonde -- a special type of radar working in the low-frequency to high-frequency bands or 1 – 20MHz, receiving vertical reflections from the ionosphere and the range of this radar signal is between 100 to 1000 km.

The resulting data reveals a lot of useful information about the current condition of the ionosphere, within 400 to 800 km radius at the given location; such as the peak electron density, height distribution of the electron concentration, the presence of ionospheric irregularities and so on.

Due to the dynamic nature of the ionosphere, the effect can be monitored elsewhere, in Malaysia for example, much like remote sensing, even though the epicentre of the earthquake is in the north-west of Sumatra. The variations of these parameters give information as to the state of the ionosphere, or commonly called space weather and space climate.



Satellite monitoring

That mysterious layer

The ionosphere can't be seen, heard, smelt, felt or tasted by humans' five senses but its effects on magnetism and radio signals on earth led scientists and engineers to suspect there was some unknown influence high above and set out to investigate it.

In the 1800s, eminent scientists, Balfour Stewart and Lord Kelvin in Britain and German scientist Carl Frederick Gauss suggested the existence of an electrically conducting region of the upper atmosphere.

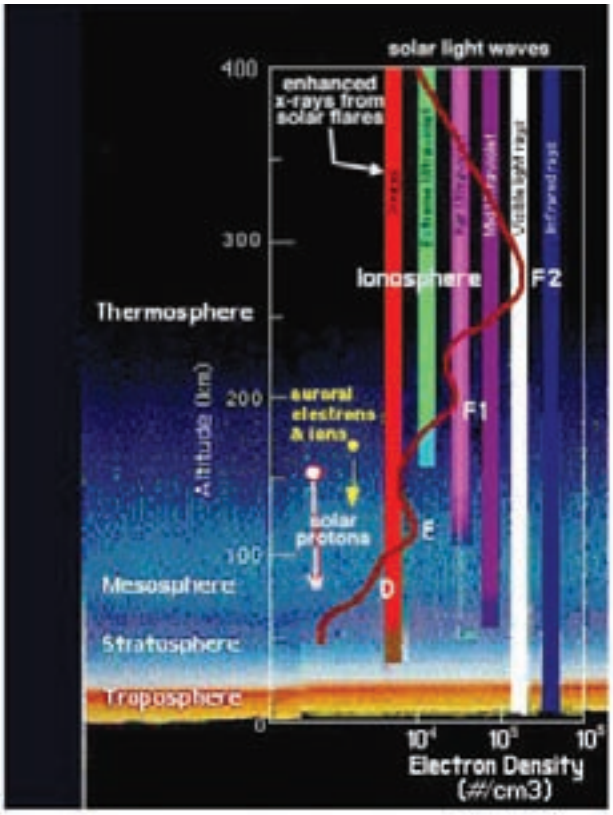
Gauss and Stewart believed electrical currents flowing in this region accounted for observed changes in the Earth's magnetic field.

In 1899, American scientist Nikola Tesla, originally from Croatia, conducted research into radio transmissions over long distances using this layer.

German scientist Carl Frederick Gauss

In 1901, Italian scientist Guglielmo Marconi successfully sent a telegraphic message from Poldhu in South Cornwall, UK, which was received at a distance of 3,500 kilometres in St. John's, Newfoundland (now part of Canada).

In 1902, American electrical engineer, Arthur Edwin Kennelly predicted the presence of an ionised layer in the atmosphere which explained Marconi's radio experiments. In that same year, English electrical engineer, mathematician and physicist, Oliver Heaviside, suggested a conducting layer in the upper atmo-



Ionosphere layers Copyright©2006 A.F.M. Zain

> "It appears that the state of the ionosphere can serve as an indicator of possible earthquakes"

sphere allowed radio waves to propagate around the Earth's curvature.

English physicist, Sir Edward V. Appleton observed that the strength of a radio signal from a transmitter on a frequency like that in the medium wave band was constant over a distance of about 160 km or so during the day but varied during the night.

This led him to suspect that two radio signals were being received, one traveling along the ground and the other reflected by a layer in the upper atmosphere, resulting in interference between the two signals and the overall fading experienced by listeners.

So in 1924, using an ionosonde, Appleton transmitted a radio signal towards the upper reaches of the atmosphere and received it near Cambridge, proving that the signal was being reflected by a charged layer in the upper atmosphere and by making periodic changes to the signal's frequency, was able to calculate the height of the layer, as 60 miles (96 km) above the ground. Sir Edward Victor Appleton was awarded the Nobel Prize in 1947 "for his investigations of the physics of the upper atmosphere especially for the discovery of the so-called Appleton layer".

In 1925, British engineer, Sir Robert Alexander Watson-Watt, regarded by many as the inventor of radar, named this layer the "ionosphere."

No uniform definition of the ionosphere exists even today; but a broad definition might be, "The ionosphere is that region of the atmosphere (or gaseous envelope) surrounding a planet or other body in the solar system where a significant number of low energy, free electrons and ions are present."

However, there is still much which isn't known about the ionosphere. Its characteristics such as its overall thickness, presence and thickness of its different layers, its conductive and reflective properties continuously vary throughout the day (diurnal), according to season, geographic and geomagnetic location, solar cycles and disturbances like occurrence of sunspots and height of the ionosphere's different layers.

The D-layer is the lowest layer ranging from 50 to 90 km above the earth's surface which is responsible for the disappearance of distant AM broadcasts during daytime.

Next is the E-layer from 90 to 120 km above the Earth, which can only reflect radio signal frequencies of less than about 10 MHz.

The Sporadic E-layer is a transient layer which reflects radio waves of between 25 to 225 MHz during the few minutes or hours it exists.

The most important part of the ionosphere is the F-layer, ranging from 120 km to about 900 km above the Earth and responsible for reflecting high-frequency (HF) waves between 3 and 30MHz, used in short wave transmissions and in amateur radio.

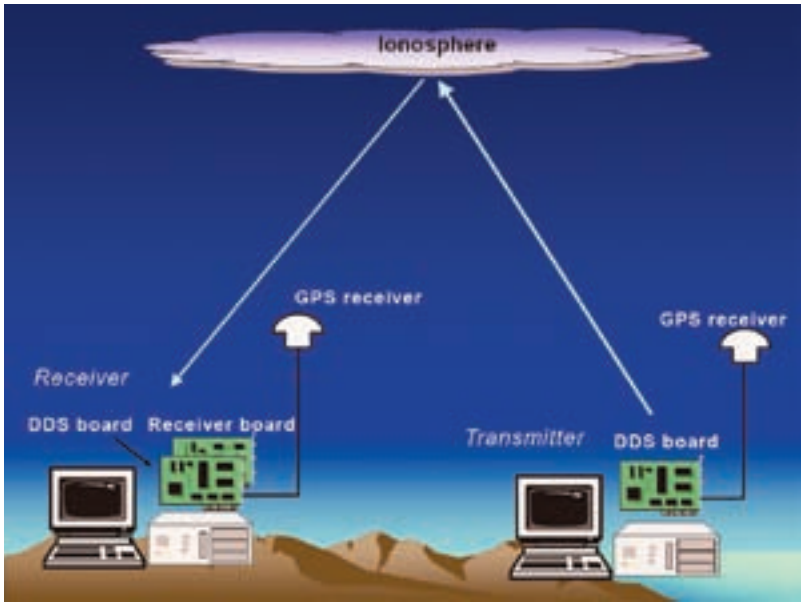
The F-layer is normally divided into the F1 and F2 layers ranging from 120 km to 400 km above the earth but an additional layer was observed within the past 12 years. It was first named G-layer but was subsequently renamed the F3-layer. Its presence is quite prominent in Malaysia and ranges in height from about 700 to 850 km.

Ionospheric research in Malaysia

It is uncertain when was the first ionospheric research or experiment conducted in Malaysia. However, prior to 2004, the last available ionogram in Malaysia was made in 1948.

Research focusing on the equatorial ionosphere earnestly began in Malaysia in the 1990s, with several groups showing interest in conducting research.

One such group was led by the author, who was at that time based at Universiti Kebangsaan Malaysia (National University of Malaysia), in collaboration with the Department of Survey and Mapping Malaysia (JUPEM), conducted a study of ionospheric characteristics and dynamics over Malaysia using JUPEM's network of 15 GPS (Global Positioning System) receivers throughout Peninsular Malaysia, Sabah and Sarawak (Zain and Abdullah, 1999).



Graphical description of deployment of Ionosonde system at WARAS

Zain and Abdullah (1999) have reported on analysis of total electron content (TEC) made using a GPS station at Arau, Perlis in the northern part of Peninsular Malaysia which is closest to the equatorial dip.

Another group at the Pusat Sains Dan Teknologi Pertahanan (Science and Defense Technology Centre), Ministry of Defense Malaysia has a GPS receiving station at Marak Parak, Sabah to study TEC and scintillations (Hassan et al., 1998).

Universiti Sains Malaysia (Science University of Malaysia) has a station in Tronoh, Perak under a partnership with Japan (Igarashi et al., 1999).

This shows there is interest in probing the ionosphere in Malaysia because of her location under the tropical ionosphere where a lot of phenomena like the equatorial anomaly and fountain effect occur (Wright, 1962).

So far, most studies of the ionosphere above Malaysia were conducted reactively using signals from the constellation of GPS satellites to investigate the ionosphere but following the establishment of WARAS, it was possible to proactively probe the ionosphere using radio waves from the ground.

WARAS was established in October 2004 to conduct advanced research in wireless and radio communications and its doppler digital ionosonde is the very first in Malaysia, and it also uses GPS receivers to study the variability of the ionosphere. WARAS has also developed and built a geomagnetic house for observing the earth's magnetic field.

Its main purpose is to prepare the environment for research on issues supporting the next generation of wireless communications systems.

WARAS routinely sounds the ionosphere every 15 minutes or as the need arises, while fixed frequency soundings are made more often as stipulated by the dynamism of the ionosphere.

In both cases, the objective is to create an ionogram showing the virtual heights and critical frequencies of the ionospheric layers measured with an ionosonde and also routine monitoring of the geomagnetic field at Parit Raja.

From a typical ionogram, we can clearly see the existence of the ordinary and extraordinary (O- and X-) modes when the wave splits in two as it traverses the magnetic field of the region.

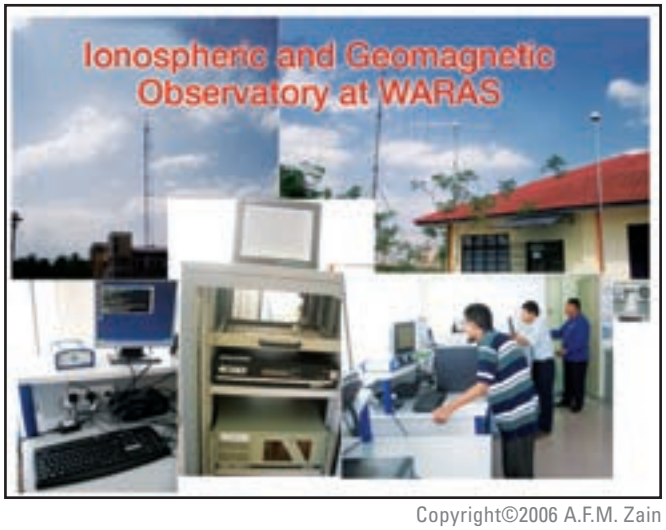
The critical frequency of the O-mode is about 3.5 MHz and 4.0 MHz for X-mode and from this, the gyrofrequency rather interestingly is 1 MHz or twice the difference of the X- and O- modes.

That gives us a magnetic field strength of 36000 nT (nano-Tesla) and routine monitoring of the geomagnetic field showed a total magnetic field strength of about 40000 nT, which confirms the above result.

The virtual height of reflection ranged from 250 km at lower frequencies to 450 km at the critical frequency.

So altogether, a lot of information can be obtained from a single ionogram.

By constantly monitoring the ionosphere, we hope to find the pre-cursor or signature of possible earthquake buildup and we plan to develop an earthquake early warning system using the digisonde and GPS signals. .my



This article is based on a public lecture presented by Prof. Ir. Dr. Ahmad Faizal Mohd. Zain Dean
of Centre for Graduate Studies and
Head of Wireless and Radio Science Centre (WARAS)
Tun Hussein Onn University of Malaysia.

More information and references are available in the publication: *Look Ma, This Antenna is Wire-Less (Uses No Wires)! "Ionospheric Science and Communications: From Submarines to Satellites, and... Earthquakes"*
Ahmad Faizal Mohd. Zain, Ph.D., P.Eng.
November 23, 2005
Email: drfaizal@ieee.org

Asia-Pacific Forum on Telecommunications Policy and Regulation, Regulators-Industry Dialogue and Investment Dialogue 15 – 18 May 2007

The Asia-Pacific Forum on Telecommunications Policy and Regulation, Regulators-Industry Dialogue and Investment Dialogue was held from 15 to 17 May 2007 in Kuala Lumpur. Both meetings were jointly hosted by the Ministry of Energy, Water and Communications (MEWC) and the MCMC. A total of 169 participants representing APT Members, Associate Members, Affiliate Members, International Organizations and the private sector attended these events. This is by far the biggest attendance recorded in the history of the Forum. Malaysia is also glad to go down on record as being the only member country of the APT to have hosted the Forum twice in its seven year history.

This year's sessions addressed key policy and regulatory challenges with regards to Next Generation Networks, Mobile Number Portability, Blogs and sharing of experiences on Free Trade Agreements, Managing Dominant Operators and best practices for public consultation.

The participants of the Forums also took time off to enjoy the cultural traditions of Malaysia.

These fellas think they can pull wool over my eyes...
L-R: YBhg, Dato' Dr. Halim Man, Secretary General, Ministry of Energy, Water and Communications; Y.B. Dato' Sri Dr. Lim Keng Yaik, Minister of Energy Water and Communications; Mr. A. Narayan, Executive Director, Asia-Pacific Telecommunity

Wah how long do I have to keep this up...
L-R: Mr. Colin Oliver, General Manager, International Branch, Department of Communications, Information, Technology and the Arts, Australia, Mr. Mohammed Amir, Chief Executive, Telecommunications Authority of Maldives; Mr. Leong Keng Thai, Director General, Infocomm Development Authority of Singapore; Mr. A. Narayan, Executive Director, Asia-Pacific Telecommunity.

So this is the Malaysian version of the Hokey Pokey...
Ms. Caroline Greenway from the Department of Communications, Information, Technology and the Arts, Australia

Spectrum Assignment Award

The MCMC has officially concluded the IMT-2000 spectrum assignment award when, on 12 February 2007, it assigned MiTV Corporation Sdn Bhd with the fourth and final block of spectrum for third generation or 3G services roll out.

The fourth block covers the frequency bands, 1920 MHz - 1935 MHz; 2110 MHz - 2125 MHz and 1915 MHz - 1920 MHz. The assignment is valid for the period of 12 February 2007 to 1 April 2018.

The MCMC assigned the third block of IMT-2000 spectrum to TT dotCom on 9 November 2006.

This is the second time that the MCMC is awarding 3G spectrum. In 2002, the MCMC awarded the first two spectrum blocks to Telekom Malaysia Berhad and UMTS (Malaysia) Sdn Bhd.

Challenging mobile content developers

MCMC in collaboration with Maxis Communications and the Ministry of Energy, Water and Communications launched the Mobile Content Challenge in Cyberjaya on 10 May. The Minister of Energy, Water and Communications, Dato' Sri Lim Keng Yaik officially launched the challenge.

The aim of the contest is to encourage students to develop mobile content and applications, identify and cultivate an innovative mindset among students and to nurture a community of young entrepreneurs who will develop Malaysian content.

This challenge is being promoted to institutions of higher learning all over Malaysia through roadshows that will cover East and West Malaysia.

The team with the best product will win RM30,000 plus RM30,000 for their institution, while the second and third prizes of RM20,000 and RM10,000 respectively will go to the respective teams only.

Ten finalists will be selected by the panel of judges and these teams will attend a three day training session in July. Also, each finalist team will be assigned a mentor from among leading members of the Maxis Developer Programme.

The teams will take 6 to 8 weeks to develop their content and present the finished product, together with relevant documentation and presentation slides on CD to the panel of judges in September, when the awards will be presented to the winning teams in a ceremony.

MCMC awards 4 Wimax licences

In March this year, the MCMC announced the names of the four companies that had been successful in their application for the 2.3GHz broadband wireless access spectrum tender exercise.

Bizsurf (M) Sdn Bhd, MIB Comm Sdn Bhd and Asiaspace Dotcom were given licences to operate in West Malaysia. Redtone-CNX Broadband Sdn Bhd was picked to launch this wireless service in East Malaysia.

In announcing the awards, MCMC said that it expected the winners to quickly roll out the service to 25% of the population in the area given to them by the end of 2007. By the end of third year, it is expected that they will be able to roll services to at least 40% of the population in the areas given to them.

MCMC also made provisions to ensure that subscribers would enjoy reasonable service levels when it asked licensees to ensure wireless broadband speeds of at least 1MBps at affordable rates.

The four licensees are projected to invest between RM250 – RM300 million each in the first three years of implementation of Wimax.

Deputy Minister for Energy, Water & Communications, YB Dato Shaziman Abu Mansor (third from left) launcing the ICT Day in Kepala Batas.

ICT Day

The MCMC took time to participate in a one-day ICT Day organised by the Ministry of Energy, Water & Communications in Kepala Batas, Penang on 12 May. Together with other industry players, the MCMC took the opportunity to promote awareness on the MyICMS 886 strategy, as well as on MCMC's role as regulator and developer of the communications and multimedia industry. To add to the excitement, the MCMC co-organised with DiGi a multimedia competition that saw participation from 17 secondary schools.

Mobile Number Portability (MNP) Clearinghouse

The MCMC has appointed a Consortium made up of three companies, Talian Gerak Alih Sdn Bhd, Unified Communications Sdn Bhd and Telcordia Technologies Inc to operate and manage the Mobile Number Portability Clearinghouse (NPC) in Malaysia.

The Consortium will operate and manage the MNP clearinghouse for 5 years with an option to continue for an additional 5 years, subject to satisfactory performance. The design and development of the clearing house is expected to be completed by August this year. A pilot is slated towards the end of 2007.

Mobile number portability is expected to lead to a more competitive and efficient telecommunications environment. MCMC, together with the industry players, will embark on a nationwide exercise to create consumer awareness exercise on MNP.

USP Launch in Sarawak

MCMC Chairman Datuk Dr. Halim bin Shafie (left) presenting Sarawak Deputy Chief Minister (II) YB Datuk Patinggi Tan Sri Alfred Jabu a token of appreciation.

The Universal Service Provision (USP) rollout in the district of Bau in Sarawak that was launched in January this year saw a total of 500 individual fixed lines and 30 public payphones installed, at the cost of RM5 million. The monies came from the MCMC's USP Fund. USP is a system to promote the widespread availability and usage of network and applications services throughout Malaysia. Its main objective is to give basic communications services, with initial focus on public payphones access, basic telephony and Internet access services, in underserved areas and for underserved groups within the community.

The MCMC was required under the Communications and Multimedia Act 1998 to develop the USP plan. The objective of the plan is to increase usage of network and applications services as well as to encourage installation of network and applications services in underserved areas or for underserved groups within the community.

In Sarawak, the appointed universal service providers have successfully completed most of its Phase 1 projects and Phase 2 will begin this year, involving seven USP districts: Betong, Kapit, Matu, Mukah, Saratok, Sarikei and Serian.

The USP rollout in Bau was launched by Sarawak's Deputy Chief Minister (II) YB Datuk Patinggi Tan Sri (Dr) Alfred Jabu.

A participant of the MyICMS 886 Let's Connect talk session in Kota Kinabalu being quizzed on his knowledge on ICT.

Infosavvy Talk Series

Early this year, the MCMC launched a talk series under the MyICMS 2U Let's Connect banner, specially designed for students from institutions of higher learnings. Three of such talks were held in Sabah in January, Kuching in February, and in March, at MCMC's HQ in Cyberjaya. Industry experts were invited to update students on the latest technology trends globally and locally, as well as to explain the MyICMS 886 strategy that will drive Malaysia forward as a global competitor in the delivery of advanced information.

MCMC Annual Hand Phone Users Survey tracks industry and user trends

The Hand Phone Users Survey 2007 which will run over June and July 2007 will track current mobile trends like mobile banking, international roaming, IMEI awareness, mobile Internet usage and Mobile Number Portability awareness.

This survey has been carried out annually since 2004 and this year 5000 randomly picked subscribers will be canvassed by telephone. Mr Koay Hock Eng, Director, Statistical & Knowledge Resource at MCMC said that the survey will also, as in previous years, collect core data which will include gender, age group, income level, occupation and user location.

MCMC head of corporate communications Adelina Iskandar said that survey would help the MCMC formulate policies as well as providing helpful information on how Malaysians use their mobile phones.

The survey results are expected to be published later this year.

HEALTH

Taking care of the eyes

Most workers spend hours on the PC looking at the screen – when working and even when taking a break. This explains why many people complain of eye strain in the work place.

While the amount of work involving the eyes is not going to change anytime soon there are ways to reduce the strain your eye goes through at the workplace.

Keep your screen either slightly below or level with your eyes. Tilt the screen the right way too. If the screen is slightly below eye level, tilt the top farther away from the eyes than the bottom of the screen.

Keep everything about the same distance when working so that your eye does less refocusing. Use document holders to keep documents at the same distance as the PC screen.

Make use of the full size of your PC screen. Most applications allow you to increase font size and document screen size. Use those to avoid squinting at small fonts.

Avoid extreme light contrasts. A bright window behind your PC screen is extremely uncomfortable on the eye. Make sure there is adequate light in your room and that it is above or behind you; not behind the PC screen.

Ensure there is enough humidity in the room. Air conditioning systems remove moisture from the air. Add moisture back through plants, water purifiers or water mists. Blink often to lubricate your eyes.

Take breaks every hour from the PC screen to focus your eyes on distant items. Get variety into your work - alternate PC intensive work with other kind of work.

Finally, make sure you get your eyes checked by a professional once a year.

FOOD

Best Places for *Nasi Lemak*

There is no denying that one can get *Nasi Lemak* at almost every street corner and local restaurant these days. How good that *nasi lemak* meal dish turns out to be is a different question altogether. As many a cook has ruefully discovered, making an average *Nasi Lemak* dish is easy, but somehow, very few have mastered the art of making the type that people keep coming back for more. That is why real food aficionados will go the distance to eat the best *nasi lemak sotong sambal* or *ayam goreng* in town. Everyone have their own lists of best *Nasi Lemak* shops in the Klang Valley. Here's our six favourite joints.

Nasi Lemak Chik Gu, Kelana Jaya, PJ. At one time, the *Nasi Lemak*. Now with a string of franchised stalls all over but this is the original one. Chunky onionised sambal with standout flavour.

Nasi Lemak Tanglin (Foodcourt), Jalan Cenderasari, KL. Business hours from morning till finish. Enter just after the National Mosque. Expect to see a large crowd but the service is always quick.

Nasi Lemak Antarabangsa, Kg Baru KL. Open at night only. Best *sotong* for miles around.

Nasi Lemak RA, Jln Raja Abdullah, KL. From morning onwards. Laid back ambience. Reputed to have the best *daging rendang*.

Nasi Lemak SS2, PJ. Morning breakfast long-queue favourite between BHP petrol and Police stations. You will not miss it, look for the long queue. It is basically a take away joint which means it does not score in the looks department.

Nasi Lemak Tanjung Puteri, Sri Hartamas is the kind of place you go if you want to impress someone. Excellent ambience and homely décor. Incomparable *ikan bilis* and peanuts!

*Nasi lemak – Fragrant rice steamed with coconut gravy and served with hot spicy sauce (sambal).

*Sotong – squid

*Ikan bilis – anchovies

*Daging - beef

*Rendang – Malay cooking technique involving simmering the meat for a long period

*Ayam goreng – Fried chicken

PLACES

Getting to really know a city landmark

Lake Gardens

For many, the Lake Gardens (Taman Tasik Perdana) has become a place to go to when they have guests from out of town. They are certainly missing a lot. Where else can you find a place that combines a history lesson with a lovely introduction to the beauty of our flora and fauna?

There are two ways to enjoy the Lake Gardens. You can start by checking out the Lake Gardens itself – a half day to one day excursion. The other is to visit the many attractions that are located around the Lake Gardens.

For a walkabout start early in the morning from Jalan Cenderasari behind the National Mosque. Enjoy some great Nasi Lemak at the very famous stall. Keep an eye out for the lovely old government bungalows (now mostly converted into government offices) that line this road. Then spend your day checking out the historical National Monument, the twin lakes and the gardens proper. If you are really adventurous find your way to Carcosa Negara to get an idea of what life was like for British senior officers almost a century ago.

At least two full weekends can be spent checking out the other truly interesting attractions. Do space out your visits so that you can spend adequate time at one attraction.

The Bird Park has thousand of birds flying freely under "The World's Largest Covered Bird Park". You can get close to thousand of butterflies at The Butterfly Park.

See deers including the Malaysian favourite, mouse deer (kancil) roaming around Deer Park. Go crazy over the hundreds of varieties of orchids at the Taman Orkid (Orchid Garden). The Taman Bunga Raya (Hisbiscus Garden) has thousands of varieties of the national flower. Do check out the National Planetarium where one can see exhibits related to space science.

That is not all – there is also the Tun Razak Memorial, the Police Museum, The National Museum and probably many other attractions that even we have not discovered yet. So, do you really know the Lake Gardens?

Kuala Lumpur Butterfly Park (above) and Bird Park (below)

PRODUCTIVITY

Getting Tasks Done the Web 2.0 Way

If you are looking for an easy way to keep track of your tasks, go check out HiTask. It is a free web based task management application that should prove extremely useful just about anyone who works with groups. It makes managing tasks easier and more fun for teams.

It's extremely powerful and yet easy to learn. Drag-and-drop is a core feature in the HiTask management system. Users can drag a task onto a team member's name, or re-arrange their own tasks list very easily by using this function. It has got the right amount of privacy too. Team members do not have to share their entire task lists with other members, they only see tasks that have been assigned to them from your account and other members.

Tasks can be tagged and grouped by colour, username, date or project title. This makes tasks searchable and easy to categorize.

Another of HiTask's great feature is an internal chat application that allows you to initiate a chat with a team member by dragging a team member's name onto the chat screen. You can share tasks with them in the same fashion.

HiTask is not just about managing tasks, it is also a very useful calendar that can be used to keep track of meetings, appointments and important dates. Calendars are easy to rearrange simplified by HiTask's drag-and-drop capabilities.

This may be the right application for small groups and teams. Sign up at www.hitask.com. HiTask will make your working day run smoothly and easily. There is a paid premium version with additional features for larger teams (more than four people) and it only costs US15 a year per person.

UK: Over half of UK adults have broadband at home

UK regulator, Ofcom's latest Digital Progress Report reveals that broadband usage has increased sharply in the UK. Broadband is now one of the fastest growing communications technologies. More than 50% of UK adults now have broadband at home - up from 39% a year ago and a seven-fold increase over the last four years. More than 13 million UK homes and small and medium-sized enterprises (SMEs) are now connected to broadband, compared with 9.9 million a year earlier and 330,000 in 2001. Broadband prices are continuing to fall. Speeds of up to 2 Mbit/s were available for £15 a month in 2006, down from £50 in 2003. At the same time broadband speeds continue to rise. The estimated average headline connection speed was 3.8 Mbit/s at the end of 2006, up from 1.6 Mbit/s at the end of 2005.

A lot of broadband usage is taking place on mobile device. The research showed that 21% of all UK adults owned a Wi-Fi enabled laptop in February 2007 and over one third of those had used public Wi-Fi hotspots to access the internet. In September 2006 there were around 12,000 public hotspots in the UK, a 32% increase on the previous year. Also, 30% of UK adults have an internet-enabled mobile phone in February 2007 and half of those had used their mobile to go online.

Australia: Do Not Call Register launched

Australia has launched a national Do Not Call Register. The Australian Communications and Media Authority (ACMA) will be responsible for establishing and overseeing the Do Not Call Register, determining the fees telemarketers will be charged for accessing the register and for investigating breaches of the Do Not Call Register legislation. ACMA is also responsible for developing a national standard for minimum levels of conduct by telemarketers and research callers.

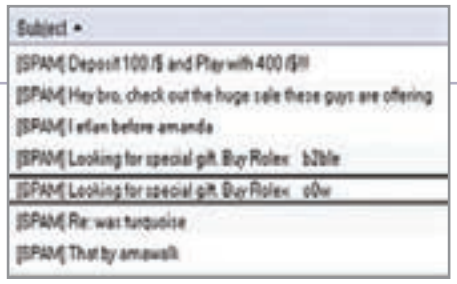
The Do Not Call Register enables individuals with Australian fixed line and mobile numbers to list their fixed and mobile telephone numbers on the register and opt out of receiving a wide range of telemarketing calls.

Industry will contribute to the costs of operating and maintaining the Do Not Call Register through the payment of fees for accessing the register determined by ACMA. Subscription fees and excess usage charges that apply for accessing the register in the first year of operation range from $71 (to wash up to 20,000 numbers) to $80,000 (to wash up to 100 million numbers). There is a subscription type that allows telemarketers to check up to 500 numbers per year at no cost.

SNEAK PEEK OF *FOREVER* STAMP

Recently at a trade show for advertising, marketing and mailing executives, the National Postal Forum, the US Postmaster General and Chief Executive Officer John E. Potter unveiled the image of an innovative stamp, the Forever Stamp. The Forever stamp has the image of the Liberty Bell and the word Forever. With no price on the stamp, customers can mail one-ounce First-Class letters without worrying about price changes in the future or having to buy one- and two-cent stamps.

The US Postal Service started issuing the Forever stamp from April 2007. US customers can purchase this stamp from www.usps.com, by calling 1-800-STAMP-24 and in Post Office lobbies, in booklets of 20. Other places include Post Office vending machines, Automated Postal Centres and convenience and grocery stores. Sheets of 18 are also available from Automated Teller Machines (ATMs).



Singapore enforces anti-spam law

The Spam Control Act 2007 passed in Singapore in April will force mobile marketers and email marketers to comply with set guidelines in their marketing activities.

Dr. Lee Boon Yang, the Minister for Information, Communications and the Arts said in Parliament: "We are starting with a light-touch approach with more focus on industry self-regulation."

The legal guidelines are reasonably easy for marketers to follow, and for consumers to understand. For instance, unsolicited commercial messages will have to carry the label <ADV> in their subject headings, or be the first words to appear in a message to clearly mark it as an advertisement. Marketers would also have to provide a valid return contact for consumers to send a request to be taken off that mailing or distribution list.

Consumers will also be able to set their e-mail filters to screen out such traffic completely.

Marketers who flout the new regulations face potential financial penalties of between $25 for each electronic message sent, or up to $1 million.

Universal Postal Union – POC adopted E-services strategies

In Berne, over three weeks, 1,000 delegates of POC groups and committees from more than 100 countries discussed how e–services and products would help core business and develop new services and revenue streams.

Closing the 2007 session, the organization for international postal service in operations, economics and commerce, the Universal Postal Union or POC, approved an e–services strategy from the Electronic Products and Services Group. It is encouraging other POC groups to include e–services into their future operations. This strategy will be in a four-year roadmap for the world's postal operators and regulators in the 2008 Universal Postal Congress in Nairobi, Kenya, called the Nairobi Postal Strategy.

The POC also approved a report on e–shopping, in which postal operators play a key role in a rapidly growing area. For the postal industry in the Internet, the POC approved a resolution to instruct the International Bureau to fund and commercialize a ".post" project. The Bureau will be negotiating with the Internet Corporation for Assigned Names and Numbers (ICANN), which named the top-level domain of the UPU.

ITU Recommends WIMAX approval

A working group of the International Telecommunications Union (ITU), the UN body telecommunications authority, has given WiMAX a boost when it recommended that a specific subset of the WiMAX technology be included in the IMT-2000 family of 3G standards.

The WiMAX subset has been named OFDMA TDD WMAN. While final approval is by no means certain, the inclusion of WiMAX technology should allow easier access to spectrum allocations worldwide as well as place WiMAX in a position to be included in the next generation 4G technologies standard, IMT-Advanced. The ITU is expected to seek candidates for IMT-Advanced standards from 2008 and hope deployment will take place around 2011.

Opposition to WiMAX have come from some wireless companies that favour other 3G technologies and future roadmaps. These companies have lobbied regulators to allocate much sought after wireless spectrum for the technologies they champion.

India's Express Service Industry Increased Annually by 33 percent

India's Express Service industry has for the past 10 years grown at a CAGR of around 33%, with unorganized but large regional players accounting for more than half the turnover. All this and despite adverse impact of the internet on the postal service and concerns over new postal regulations affecting the industry's growth, there are B2B and B2C trade models opening new horizons.

The USD 1.6 billion industry is expected to doubly increase by 20-22% per annum over the coming five years, what with a growing manufacturing industry needing centric express delivery and logistics services.

Japan Post Office to Top Citigroup As World's Largest Financial Institution

Japan is privatizing its post office in a 10-year plan. As the world's largest postal savings bank with 500 million accounts and 4,000 branch offices, also sales agents for insurance and investment products, the post office will surpass Citigroup to be the world's largest financial institution.

Washington is worried that the Japanese post office will compete with foreign and local rivals using its colossal size, but Tokyo is promising safeguards against such a move. U.S. Trade Representative Susan Schwab told Congress that the US would litigate if an unfair advantage and an uneven playing field are created.

France to Replace 48,000-Vehicle Postal Fleet with EVs

France's state-run La Poste postal service will be replacing 48,000 postal vehicles with electric ones in 5 years. Société de Véhicules Électriques is building the cars, while Milwaukee car-parts maker Johnson Controls and French battery company Saft Groupe are jointly supplying their lithium-ion batteries.

The batteries will save La Poste on operational expense with only 1/6th of the cost of gasoline for its current vehicles. However, they will still account for 60 percent of the unit price, which SVE has yet to finalise.

Poste Italiane Moves into Mobile Virtual Network

Italy's Poste Italiane, with 14,000 offices, is now also a mobile virtual network operator providing m-payment via its BancoPosta saving deposit service. It will also offer additional mobile services so as to differ from other competitions in the Italian MVNO market, such as UniPosta, Carrefour, Auchan, Coop, Conad, TV broadcaster Mediaset, Philippines Pldt, altnet Fastweb, Tele2, Tiscali and Finmeccanica's satellite operator Elsacom. Utilising Vodafone Italia's network, it aims for 2 million subscribers by 2011.

Singapore Postal Sector To Fully Liberalise

After a public consultation in August 2006 by the Infocomm Development Authority of Singapore (IDA), the Singapore Government is opening the Basic Mail Services market to admit new players into the domestic and international mail services, and to inbound and outbound international mail competition.

Within the first quarter of 2007 the Singapore Government held public consultations to harness feedback concerning the regulatory, licensing, and competition frameworks and code. From April 2007 the services will have value-added services and tailored postal solutions, including letter mail tracking and staggered delivery of letters.

Players can apply for two types of licences. Postal Services Operators (PSOs), designated as Public Postal Licensees (PPLs), will collect letters and provide delivery over the whole island. PSOs will also maintain a minimum number of post boxes and post offices for consumers to easily access. They will offer the kind of service quality according to IDA standards. The second licence is for all other PSOs regardless of their scope of service.

Though SingPost's 15-year monopoly licence will end with this liberalization exercise, it will still act as the PPL. The IDA will still grant SingPost the full set of letterbox masterdoor keys. It will give SingPost the right to issue national stamps. SingPost will have the right to maintain Singapore's postal code system and manage the centralized postal code management system.

FCC for à la carte cable programming

In the US, customers of cable operators cannot pick their own programme bundles, because if so they would have to pay more.

Kevin Martin, Federal Communications Commission Chairman of the FCC by U.S. President George W. Bush since 2005, wants the industry to review how it markets its programming.

In the annual industry event, The Cable Show, Martin said he would push for this so that with an à la carte regime customers could have more service choices, such as smaller bundles of individual television channels or bigger ones. His reasoning for this is the skyrocketing prices as more channels are included in expanded basic.

Cable operators have been reluctant to allow customers to choose their own programme bundles, claiming that it would raise prices for consumers.

Thailand to introduce mobile number portability

Thailand's National Telecommunications Commission (NTC) is expected to introduce mobile number portability (MNP) in that country within 10 months, allowing mobile phone users to switch their operator whole retaining their original number.

Chula Unisearch suggested that after completion of a public inquiry and education campaign, which should take three months, cellular operators should begin preparing their network's software , hardware and related systems for number portability over the subsequent next three months, after a test network should be launched for a further three-months, taking it into the first quarter of 2008.

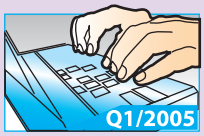
It also noted that the cost of MNP per subscriber in Europe was equivalent to RM85.46 and took from 1 to 30 days to complete, though it believes the cost of porting would be between 200 and 300 Baht in Thailand (RM19.68 and RM29.52)

The NTC has asked operators to work out possible charges for MNP. It held two more public hearings on MNP recently.

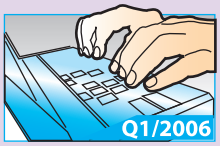
Penetration rates:

Internet Dial-Up, by persons

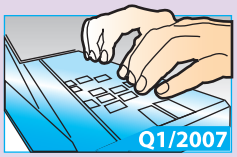
13.2%



13.9%



14.0%



3.406 Billion

7.458 Billion

11.724 Billion

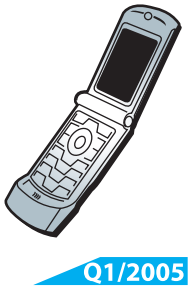
Number of

SMS text messages

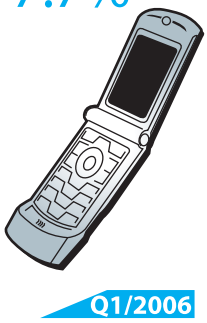
Penetration rates:

Cellular Phones by persons

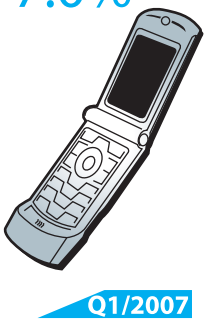
60.9%



77.7%



77.0%



Penetration Rates:

Fixed Lines by persons

16.8%

16.4%

16.1%

Number of

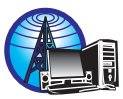
Broadband Subscriptions by technology ('000)

	ADSL	SDSL	Wireless	Others	Total
2005	477.7	3.7	5.9	14.4	501.7
2006	735.9	4.8	15.1	141.4	897.2
2007 (Q1)	784.1	5.2	21.2	181.3	991.8

Penetration rates:

Broadband by persons

Q1/2005 1.2%



Q1/2006 2.2%

Q1/2007 3.7%

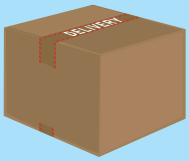
Number of
Post Offices

2004	2005	2006
883	915	947

2004	2005	2006
114	112	114

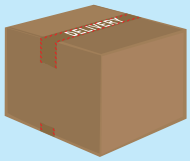
Number of
Courier Companies

Traffic
Postal - Domestic
(Million)



Letters	Parcels	
1,154.9	0.9	2004
1,153.5	1.0	2005
1,154.3	1.1	2006

Traffic
Courier - Domestic
(Million)



	Documents	Parcels
2004	13.6	8.3
2005	13.0	4.2
2006	13.2	6.2

A Bigger Picture

Put together, the covers of the 4 quarters reveal a bigger picture, a montage that draws on the symbolism represented by the Wayang Kulit, a timeless epitome of the Malay tradition and cultural heritage. Wayang Kulit blends communications, multimedia and content to communicate and entertain through a unique art form.

Similarly, *Communications and Multimedia, Selected Facts and Figures* is about communications, multimedia and content but in a different context and in a different form.

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