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PLENARY MEETING

Pacific Islands Telecommunications Associations

CURRENT STATUS OF TELECOMMUNICATIONS DEVELOPMENT IN
 PACIFIC ISLANDS COUNTRIES

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1 Introduction

Firstly I wish to thank our hosts and the people of Malta for making us feel welcome in this beautiful country. I wish to thank the ITU for giving the Pacific Island States an opportunity to expressive its views and have a say on how the ITU and the Pacific should work in partnership. The ITU office in Bangkok worked tirelessly and actively in ensuring the Pacific Nations views were heard. I must also thank the Pacific Island countries for nominating PNG and me personally to present our views. To all of you I say thank you.

The Pacific Ocean region covers one third of the globe consisting of thousands of islands scattered over approximately 54 million square kilometres of ocean. The region is characterized by small island land masses the vast distances between them, sparse populations, and the huge differences between the smallest and the largest countries in the region. (Please see Table 1).

TABLE 1
Population, total land, and telecommunication coverage

Country/Territory	Population	Land (Sq. km's)	No. of Populated Islands	Populated Islands with no access to telecom
1 Cook Islands	19 100	238	11	3
2 F. States of Micronesia	105 900	607	71	67
3 Fiji	778 450	18 333	99	20
4 Kiribati	78 300	684	23	18
5 Marshall Islands	54 069	176	25	21
6 Nauru	10 600	21	1	0
7 Niue	2 100	259	1	0
8 Palau	16 500	494	5	0
9 Papua New Guinea	3 951 500	462 840	60	50
10 Solomon Islands	367 400	30 303	N/A	N/A
11 Tokelau	1 500	10	3	0
12 Tonga	98 300	691	48	36
13 Tuvalu	9 500	26	9	0
14 Vanuatu	164 100	12 000	80	8
15 Western Samoa	163 500	2 935	4	1
Totals	5 820 819	529 617	416	203

Because of the nature of their topographical structure, the islands are not well endowed with natural resources with most very dependent on foreign aid and economies based on subsistence agriculture and fishing. There are pockets of export potential in mining, deep-sea fishing, small-scale manufacturing, tourism and some specialized agricultural products, but for smaller countries there are no natural resources to rely upon except the ocean surrounding them.

Because of the very small isolated pockets of population (often in villages less than 500 people which are extremely remote and cannot be served by economical terrestrial mean) the cost to provide telecommunications is extremely high. The lack of reliable main power at these remote sites increases costs further. Land issues are very crucial to the infrastructure development and maintenance.

In the capitals of these small Pacific Island States, the large fixed infrastructure costs necessary to provide international services for a relatively small population emphasize the lack of economies of scale afforded to developed countries. For example Rarotonga, the capital of the Cook Islands, has full international services, but only for a population of 10 000.

The telecommunication infrastructure is generally regarded as one of the fundamental factors for economic development, but in the Pacific it is more than that. Telecommunication infrastructure is considered to be a lifeline for the scattered Pacific Island nations. Therefore development of telecommunications is considered high priority by all countries in the region.

The infrastructure that is currently in place in the Pacific has been established to a great extent by external aid and is heavily based on satellite systems, with limited number of satellite service providers. Therefore development of telecommunications in such an environment has been a long, complicated and costly process. At the same time the operational cost of established networks in the developing countries of the Pacific continues to be way above world average, further limiting the ability of small telecommunication operators to expand their telecommunication services. As a result, about half of the populated islands in the developing countries of the Pacific have no access to basic telecommunication services, as shown in Table 1.

In the subsequent sections of this paper is briefly described the current position of telecommunication development in each developing country of the Pacific region.

2 Current status of telecommunications development in Pacific Islands countries

2.1 Cook Islands

Telecommunications services in the Cook Islands is provided by Telecom Cook Islands Ltd (TCI), a joint venture between the Cook Islands Government (40%) and Telecom Corporation of New Zealand Ltd (60%). TCI formed in 1991 operates the national and international telecommunications services and has exclusive rights for service provision to the year 2001.

2.1.1 Existing telecommunications services

TCI provides local, national and international telecommunications services.

The backbone network, comprises of a Standard B earth station which serves as the international gateway and hub to seven remote Standard D-1 earth stations at each of the most populated islands on the domestic network.

International access is via a 2 Mbps IDR link to the Auckland Gateway Switch in New Zealand. The Domestic Satellite Network operates via the Telstra PACT DAMA Network utilizing a total of 57 modems spread over the network. The domestic network allows communications between islands as well as to international destinations.

The switching network is fully digitalized, with Rarotonga served by a NEAX (NEC) 61E telephone exchange and the outer islands served by REDCOM RDX exchanges. The TCI core transmission

network is fibre optic covering two thirds of Rarotonga's main traffic route. Other TCI responsibilities include the provision and maintenance of the following services:

HF & VHF Maritime	VHF Land Mobile	Fixed HF Radio	Bureaufax
Telex Service	Postal Service	Paging Service	Cellular Service
PABX Service	Radio Licensing	Frequency Management	
Radio & TV Broadcasting			

2.1.2 Development plans

Upgrading of remaining islands communications links from HF communications to satellite-based communication.

Upgrading of the domestic DMA network from analogue to digital.

Promoting Internet services.

Probable investigation into the feasibility of introduction of B-ISDN to meet future demands.

Observing developments in PCS systems and benefits offered for the future.

2.2 Federated States of Micronesia

The FSM Department of Transportation and Communications is the responsible regulatory entity while the FSM Telecommunications Corporation (FSM Telecom), a public corporation created in 1983, is the sole provider of telecommunications services in the country.

2.2.1 Telecommunications services

To provide the FSM with telecommunications services, FSM Telecom uses four Intelsat Standard B earth stations in Chuuk, Kosrase, Pohnpei and Yap for interstate voice and data communications. A fifth Intelsat Standard A earth station at the company's corporate headquarters in Pohnpei routes international traffic.

Other elements in the FSM Telecom Network include a DMS-100/200 with two remotes and a DMS-300 on Pohnpei; individual DMS-10s on Chuuk, Kosrae and Yap; eight traffic operator position systems (TOPS); two FMT-150 systems, a Meridian Norstar system; some 410 miles of buried cable; 53 miles of buried fibre optic cable; and various radio-linked telephones.

2.2.2 Telecommunications development

FSM Telecom will continue to invest in the long-term future in order to improve its services. The company plans to expand telephone service to the more isolated and remote islands in the FSM and is exploring options including the use of a low-Earth orbit (LEO) satellite system to offer these services.

Given the growing importance of data communications worldwide, FSM Telecom Corp plans to become the Internet Service Provider (ISP) for the FSM. The proposed service will provide access to the Internet for customers as well as host content on the World Wide Web.

Other priorities include: enhancing support and service operations, improving voice and data services, and continuing to reduce communication costs.

2.3 Fiji

Telecommunication services in the Fiji Islands are provided by Telecom Fiji Ltd the National Service Provider and Fiji International Telecommunications Ltd (FINTEL) the international carrier.

Telecom Fiji operates as a private liability company formed in 1989 and replacing the former P&T Department and was known then as the Fiji Post & Telecommunications Ltd. In 1996, history was created when the postal services were separated from telecommunications leading to the formation of the two new companies, Telecom Fiji Ltd and Post Fiji Ltd.

Telecom Fiji is licensed to provide and operate telecommunication services throughout Fiji. The license gives the company monopoly on the provision of network services with the provision of terminal apparatus open to competition.

The international carrier FINTEL, is a joint venture company between the Fiji Government (51%) and Cable & Wireless, plc (49%). FINTEL holds a monopoly in the provision of internal telecommunication services to the Fiji public.

2.3.1 Telecommunications services

International access is via FINTEL's Standard A earth station and submarine cable terminal in Suva. From 1991, FINTEL introduced digital satellite technology, replacing its analogue with digital IDR links. To date the satellite earth station provides 17 IDR links to Pacific Rim countries Japan, Hong Kong, Singapore, Australia and New Zealand. To the north there are links to Canada and the United States. Pacific Islands linked via IDR are Tonga, Solomon Islands, Vanuatu and Western Samoa. Other island destinations are linked via SCPC and through the PACT DAMA Network.

FINTEL offers alternate routing via the ANZCAN submarine cable system to Australia, New Zealand, United States and Hawaii and Canada, which is used as transit points to other destinations.

Other services offered by FINTEL include Leased Data services; Packet Switched Data; Videoconferencing; Occasional Use TV; Internet Access.

Telecom Fiji Ltd now provides a total exchange line capacity of 89 405 with a total working line capacity of 71 579 (July 97). This is made possible with a switching network of Ericsson AXE10 exchanges (11 AXE105; 7 AXE104; 20 RSS & 1 REDCOM 380).

The core trunk network is made up of optic fibre interlinking the major urban centres, copper plant between local trunk networks, and digital trunk microwave radio interlinking the centres across the main islands. Small rural locations utilize VHF single or multiple channel radio systems. Fiji's northernmost island is linked to the national network via satellite on the DAMANET Network, which is the first digital DAMA link on the Telstra DAMA Network.

Telecom also provides business systems (PABX etc.), Telex Service, Digital Data Network, Value Added Network.

Digital Mobile Communications is provided by Vodafone (Fiji) Ltd. Vodafone uses an Ericsson GSM switch (MSC) with 21 base stations operating through a single Base Station Controller (BSC) to provide coverage along the coast of the main island from the south-east to the north-west. The basic target service is the main business/commerce centres and along the tourism belt along the Coral Coast. It has a single base station linked through the TFL core network to the northern division. Through FINTEL's links to international administrations, Vodafone is capable of providing global roaming capabilities.

2.3.2 Telecommunications development

Telecom Fiji Ltd (TFL), since its privatization in 1989, began a network modernization programme. The major thrust aimed at upgrading and replacing existing switching and trunk network.

Telecom has now replaced all analogue exchanges in urban centres to have a 98% digital switching network. In 1996, Telecom together with FINTEL introduced C7 signalling through the switching network both on national and international links, resulting in a more efficient connection and switching time between exchanges.

Also the introduction of DRMASS radio systems to rural communities outside urban centres has greatly improved access to areas previously with poor communications links. Major radio trunks utilize 140 MB Digital Radio Systems (DRS), and 140 MB Fibre Optic Digital Radio Systems to interlink the main switching centres

To remote and outer island communities, Trunk Radio Systems are used. Other rural communities are linked to main exchanges using line concentrator systems.

New services introduced by Telecom Fiji include Toll Free Service (0800), Voice Mail Service, Calling Card Service, Paging Service, and is also the Internet Service Provider.

On the international links conversion of analogue links on the submarine cable system on Australia and New Zealand routes have greatly improved the quality of service on them and also increased capacity through the use of circuit multiplication equipment.

2.3.3 Future developments

As part of its five-year development plan, TFL will digitalize the switching and transmission network by the year 2000 in support of the company's business plan.

Demand for telecommunication services brought about economic growth in the past few years is a driving factor to improving network reliability through the introduction of appropriate technology and to fulfil service obligations and increase penetration.

New technologies to be introduced include wireless local loop systems, which will supplement services in areas where capacity is exceeded or in areas lacking infrastructure.

To keep abreast of technological advancement both service providers are wary of the requirements for change and the need for resource management and training.

2.4 Kiribati

Telecommunications services in the Kiribati Islands is provided by Telecom Services Kiribati Ltd (TKSL), a joint venture between the Kiribati Government (51%) and Telstra Ltd of Australia (49%). TKSL was formed in 1990 to operate both the national and international telecommunications services.

2.4.1 Existing telecommunications services

TKSL is the service provider in Kiribati providing local, national and international telecommunications services.

International access is provided through the Bairiki Gateway earth station, which comprises of a Standard B earth station on south Tarawa.

International access is via an IDR link to Sydney Australia allowing global access and through the Telstra PACT DAMA Network to Pacific Island countries. The IDR bearer currently has 16 bearer channels, which includes two for dedicated data bearers.

Kiribati utilizes 8 modems on the PACT network allowing access to Pacific Island neighbours on the PACT Network.

The switching network is fully digitalized. The network consists of three main exchanges on Bairiki, Betio and Bikenibeu. Kiribati utilizes the Alcatel E10 exchange as main exchanges. The Bairiki switch caters for the business centre of Kiribati, where the most population of Kiribati are.

Communication links to the 17 outer islands still use HF Radio grouped in 6 sub stations, providing service in a manual scheduled basis. The HF system has recently been upgraded in the utilization of an automatic Radio to Telephone Interconnect System (Codan). This now allows automation of remote subscribers dialling into the south Tarrawa switching network.

Kiritimati Island in the eastern Line and Phoenix Group consists of 16 islands. Serving as Kiribati's second port of entry, is linked to Kiribati via a 7.2 metre earth station. A 300 line ALCATEL E10 exchange serves Kiritimati.

2.4.2 Development plans

- Upgrading of remote islands HF communications links.
- Upgrading of the domestic DAMA network from analogue to digital.
- Investigation into the introduction of Internet services.

2.5 Marshall Islands

The National Telecommunications Authority (NTA) provides all national and international telecommunications services in the Republic of the Marshall Islands.

The then 100% Government owned enterprise formed in 1987, was privatized in 1991 to operate as a private corporation. Since then, NTA has embarked on a project to replace and expand the telecommunications infrastructure throughout the Marshall Islands.

2.5.1 Telecommunication services

All of NTAs national and international traffic is via satellite. NTA operates two Standard B satellite earth stations on Majuro and Ebeye.

NTA offers direct international services to Hawaii, the US mainland, Japan, Guam, Kiribati, Nauru, Fiji, Cooks, Niue, Solomon Islands, Tuvalu, Australia and New Zealand.

From 1992, NTA began converting all transmission links from analogue to digital.

The heart of the switching network is centred on two Northern Telecom DMS100/200/300 switches on Majuro and Ebeye brought into service in 1993. In addition to this, NTA provided remote switching equipment to increase capacity and penetration of telecommunications services to Majuro Atoll. Similar expansion work conducted on Ebeye has led to an increase in customer base in the two main islands.

In 1994, NTA introduced its cellular telephone service. The service is available on Majuro, Ebeye and Kwajelein. The cellular service complements the normal telephony service where terrestrial means cannot access.

Communications to remote outer islands is via single side band radio systems and appropriate emerging technologies to better communications to these communities will be looked at as they are developed.

The development of telecommunications has advanced in the Marshall Islands since the formation of NTA. NTA envisages to keep telecommunications services within the Republic abreast of global trends.

2.6 Nauru

The Nauru Government through the Department of Telecommunications provides telecommunications services in the Republic of Nauru.

The Nauru network is fully digitalized. The heart of the network is an AT&T 5ESS switch connecting about 1 500 circuits to local residents and businesses and also connects to the gateway earth station for international communications. The 5ESS serves both as the domestic and international gateway switch.

Nauru's Standard B earth station supports a multi-destinational IDR carrier to Australia (Telstra) and the United States (AT&T). The digital satellite service uses an AT&T integrated access terminal (IAT) capable of compressing 150 circuits onto the 2MB carrier.

Nauru's Cellular Radio System uses a Plexsys D200 analogue switch. The system supports 72 channels with 800 subscribers. The cellular exchange is trunked to the 5ESS switch through microwave trunks.

2.7 Niue

Telecommunications services in Niue is provided by Telecom Niue. Telecom is government owned and under the Communications Act 1989 is empowered to operate domestic and international postal and telecommunications networks and services and to control and manage the frequency spectrum.

Telecom Niue also operates a marine coast station and meteorological service and is contracted by the Civil Aviation Department to maintain communication and navigation equipment. Telecom Niue has provided modern telephone services to almost every single occupied household in Niue. It continues to develop and provide telecommunications infrastructure to a small residing population.

2.7.1 Telecommunication services

International telecommunication services is provided by a 512 kbps link to New Zealand through the gateway Standard B earth station. A 2 Mbps optical fibre cable interconnects the earth station to switching centre. Niue also operates a single modem on the Telstra PACT DAMA Network.

Telex and telegraph services is provided via a leased analogue circuit to New Zealand. The service is provided using an NEC TDM multiplexing equipment accessing the Telecom New Zealand telex exchange.

A 500 line Redcom Telephone Switch caters for the telephone service to PSTN subscribers handling both national and international service. Other services provided through the switch are operator assistance service dealing with customer assistance and fault reporting.

Niue's Cellular service was commissioned in December 1996. The Harris Cellular Network provides both fixed and mobile coverage for the whole of Niue through two cell sites.

2.7.2 Telecommunications developments

Niue's five-year development plan to 1997, has included the upgrading of the satellite earth station software.

Improvements in access to the villages of Makefu and Tuapa, and studies on the expansion of telephone service to remote villages.

Upgrading of the earth station power and HPA systems and the introduction of cellular services.

The Internet Access Project is underway.

2.8 Palau

Telecommunications services in the islands of the Republic of Palau is provided by the Palau National Communications Corporation (PNCC). PNCC is a public corporation formed in 1982 when the Palau Government privatized its telecommunications services.

PNCC operates both the national and international telecommunications services.

2.8.1 Telecommunication services

The majority of Palau's business and residential community are located on Koror the capital state.

International service is provided through Palau's international gateway earth station The Standard B earth station operates to mainland United States, Hawaii, Guam and Japan.

Palau's main switching centres are located on Koror and Babeldaob Island. The main exchange on Babeldaob is a Lucent Digital Switch. IDD service was implemented in Palau in 1993. In Koror there is a C7 Domestic Switch module that is linked to the host in Babeldaob via a fibre optic link. In addition remote carrier equipment are interfaced throughout the fibre optic network.

Palau's distribution network is still traditionally the copper plan.

2.8.2 Telecommunication development

The PNCC currently is involved in modernizing and expanding their telecommunications network.

Installation of digital switches and subscriber carrier equipment is in progress. The copper outside plant is being replaced by a combination of optic fibre, copper and microwave facilities.

The expansion programme will see the introduction of a second digital AT&T switch in Koror and installation of 14 remote switches to the islands of Peleliu, Kayangei and Angaur. These switches will be connected in tandem to the Babeldao exchange.

A SONET fibre optic network is being installed to connect local networks throughout the islands of Palau. This includes a fibre optic ring festooning Babeldaob and an optic fibre link to Peleliu. These facilities will have the capability of providing distance learning, telemedicine and cable TV applications.

Microwave radio facilities will link the remote switches on Kayangei and Angaur to fibre hubs interlinked into PNCC's main switching centres. Also in addition to upgrading the copper distribution network, wireless in the local loop systems are being investigated.

PNCC has also recently introduced Internet services utilizing a 64 kbps pipeline to the Internet gateway and are also exploring broadband applications that would provide distance learning and telemedicine capabilities to schools and medical centres.

2.9 Papua New Guinea

Telikom PNG a 100% government owned enterprise was formed in January 1997 to replace the former Post & Telecommunications Corporation (PTC). Telikom is licensed to provide all telecommunications services throughout PNG on a monopoly basis till the year 2002.

2.9.1 Telecommunication services

Currently Telikom PNG has 52 000 telephone lines, which serves 4 million people. In addition these are 4 000 customers connected to the AMPS mobile Telecom service. PNG hopes to have its GSM in place this year. The Internet service has already proven successful.

The 52 000 exchange lines in PNG represents 1% of the telephone penetration. 85% of the population in PNG live in rural communities and have access to 4% of the total telephone lines available in PNG.

The PNG telecommunications system is 100% automatic, with international links to 143 countries, and domestic services to most urban centres.

PNG'S Domestic and International Communications Centre located at Gerehu in Port Moresby includes an 18 metre Intelsat Standard A earth station and a 7 metre Optus Antenna providing global and direct links to Australia. A second Optus antenna commissioned in September 1996 links Lae to Optus in Sydney Australia. The Optus links are fully digital links utilizing CCS7 signalling. An 18 metre Domsat antenna serves as a hub for the domestic satellite system. PNG has access to INTELSAT, Inmarsat, AUSSAT, PALAPA and ASIASAT.

The Domsat network interconnects 13 provinces throughout PNG using a leased transponder on an Intelsat satellite. The domestic network in addition to telephony services also provides a TV distribution service, and replaces a troposcatter system to two remote locations, and also provides a telephony restoration service. It also has a number of transportable earth stations for emergency purposes.

From 1992, Telikom commenced a five-year modernization programme to replace all analogue telephony switches to digital. The programme will allow greater traffic volumes, faster switching and improved services throughout the country.

PNG has begun introducing from 1991, fibre optic in its core network to interconnect its switching centres in the urban centres. Also in 1991, card operated public telephones were introduced for the benefit of the PNG public.

Mobile communications services are provided by Pacific Mobile Communications, a 100% wholly owned subsidiary of Telikom. The service using AMPS technology covers the Port Moresby, Lae and Mount Hagen regions.

Communication links to remote rural out stations remains on HF Radio. There are 1 200 HF stations throughout PNG that are licensed to operate on the Outstation Network.

2.9.2 Telecommunication development plans

The government has embarked on an extensive rural telecommunication programme. The target it has set for the service provider is that by the year 2000 the telephone penetration must be 3%. The government has allowed Telikom to retain dividends payable to Government to implement the Rural Telecom Programme. Four (4) provinces have recently benefited from this exercise.

In addition to achieving this target of 3%, a service known as the Fixed Price Service has been introduced. Demand has now outstripped supply since this service was introduced. It attracts a fixed fee of about minimum \$US 10 per month and a direct debit scheme.

PNG wants to ensure that the people in the rural areas get the same service as those enjoyed by the urban dwellers.

2.10 Solomon Islands

The Solomon Telekom Company Ltd (Telekom) provides telecommunications services. Telekom is a joint venture between the Solomon Islands Government (58.1%) and Cable & Wireless plc (41.9%). Telekom was formed in 1989 when the international service provider SOLTEL (Solomon Govt/C&W - JV) took over the government run national service.

2.10.1 Telecommunications services

The national switching network in the Solomon comprises an Alcatel E10B and an NEC NEAX 61K trunk exchange forming the core switch in Honiara. Four NEC NEAX 61S and four GPT UXD5 local switches are on outer locations.

The Alcatel E10B has three remote concentrators providing services within the greater Honiara area.

The core trunk transmission comprises of DAMA satellite network and digital microwave links interconnecting the main islands to Honiara to form the National Telephone Network.

Telekom operates a domestic satellite system (VISTA) which uses six 6.5 metre dishes on the outer islands working to the 7.6 metre hub in Honiara. The Honiara international gateway earth station is a Standard B working to eight destinations (AUST/NZ/FIJI/PNG/HKG/SNG). All destinations are linked via IDR bearers.

To provide communications to the outmost islands Telekom utilizes OPTUS Mobilesat service through the OPTUS B1 satellite. Mobilesat uses a briefcase type mobile phone with tube antenna linking customers direct to the Optus network in Australia. Registered customers are billed by Telekom through data received from Optus. Telekom is also introducing Inmarsats mini M service.

Other services offered by Telekom are:

Telephony	Facsimile	Telex	Telegraph	HF Radio
Data	Packet Switch	Paging	PABX Systems	Mobile Cellular (A-AMPS)

Internet SP

Telekom will continually introduce new products when they are feasible.

2.10.2 Telecommunications development

Telekom is currently embarking on a major rural telecommunications infrastructure development in an endeavour to increase penetration throughout the island group.

The project targets second line rural locations beyond the provincial centres; to provide basic telecommunications services. A recent ITU consultancy identified 219 rural community locations, with villages and settlements having medical centres, police and aid posts and post offices.

Appropriate technologies identified for the project are point-to-multipoint terrestrial digital microwave (IRT2000) which can provide a minimum of 8 telephone or fax lines at each radio site.

Telecom is planning to implement 4 IRT systems to cater for the 219 community locations. Other technologies under consideration to provide access where terrestrial access is not possible or is not practical are satellite (VSAT) or other low capacity domestic systems.

2.11 Tonga

Telecommunications services in the island Kingdom of Tonga are provided by Tonga Telecommunications Commission (TTC) which provides all national services and Cable and Wireless plc (C&W plc) franchised by the Tongan Government to provide international services.

2.11.1 Telecommunication services

The international gateway earth station operated by C&W plc is located at Nuku'alofa on Tongatapu. The earth station has IDR links to the United States and Hawaii, Australia, New Zealand, Hong Kong and Fiji caters for the bulk of telephony traffic to these destinations. C&W provides maintenance service on the international links.

Other services provided by C&W include;

Internet Services Bureaufax

Telex Telegram

Leased Data Circuits Card Phones

The TTC provides and operates the telephone switches for both national and international telephone services. The main telephone switches are on the islands of Tongatapu, Vava'u, Ha'apai and Eua. The main exchanges are Ericsson AXE10 switches whilst there are still a couple of analogue Ericsson ARF switches still in operation in Tongatapu.

The four main island groups are linked via a Troposcatter Radio System. This system is being planned to be replaced by a domestic satellite system by 1998.

Communications links to the northernmost Tin Can Mail islands is by HF Radio.

TTC also operates an AMP Cellular Telephone System. The CMTS provides telecommunications services to about 12 remote rural villages without landlines or radio access on Tongatapu.

2.11.2 Telecommunications development

Development over the last five years has seen the introduction of digital exchanges and Remote Subscriber Stages (RSS) to improve communications. The introduction of the Cellular Mobile Telephone System has improved service provision to remote rural villages on Tongatapu.

There is a lot of modernization in Customer Premises Equipment especially in the business sector with the introduction of PMBX and EPABX business systems and the phasing out of telex services.

The five-year development plan includes an on-going modernization programme for the replacement of analogue systems on the network, and introduction of digital services. From 1998, the introduction of a Domestic Satellite System to replace the present Troposcatter HF Radio Systems will greatly improve communications services to the outer islands.

In line with the introduction of new services, both service providers are wary of the requirement to develop human resources through appropriate training programme to ensure a contribution to development.

2.12 Tuvalu

Central Pacific country comprised of eight islands. The Tuvalu Telecommunication Corporation (TTC) provides telecommunication services. The Tuvalu Telecommunications Corporation (TTC) was formed in February 1994; before then TTC was a Government department and had been operating for over twenty years.

2.12.1 Telecommunication services

Telecommunications in Tuvalu can be divided into domestic and international network.

The domestic network is based on a SPC exchange located in Funafuti providing telephone services locally by copper cable and remotely to each one of eight outer islands via a digital domestic satellite system.

The international network connects the SPC exchange to an international gateway via 8 satellite analogue channels (4 x PAMA and 4 x DAMA).

HF radio is used as a backup communications system.

2.12.2 Telecommunications development

The TTC short-term development plans include:

Update the international circuits to digital technology (IDR) and increase the capacity.

Join the Internet community.

Install a radio cellular system in Funafuti

2.13 Western Samoa

Telecommunications in Western Samoa is still under a government department. The Samoa Posts and Telecommunications Department operates under the Ministry, and the Chief Executive appointed as Director, is responsible to the Minister.

The P&T Department, is responsible for development and maintenance of all national and international postal and telecommunications services within the country.

2.13.1 Telecommunication services

Development in telecommunications over the last five years have seen the replacement of Samoa's only crossbar exchange with five digital SPC exchanges (Ericsson AXE10), a national microwave network, extensive external plant and a fully digital Standard "A" earth station. This was brought about by an ADB/World Bank and EEC funded project.

The project has resulted in a progressive growth of the telecommunications network, and a marked improvement in service quality. Of the 5 exchanges, 4 serve rural areas and are linked into the main exchange in Apia via digital microwave links.

Rural communications were upgraded through the introduction in 1995, of Digital Radio Multiple Access Subscriber Systems (DRMASS) which now allow up to 70% of the population access to telephone services.

The network utilizes Ericsson AXE10 switches and NOKIA DR240E/NEC DRMASS/IRT2000 Transmission Equipment to form the core network. Digital Microwave interconnects all regional exchanges to Apia.

International access via the Maluafofou earth station provides direct IDR links to FIJI/HAWAII/JAPAN/NEW ZEALAND/AUSTRALIA/USA. A terrestrial digital microwave link provides access to neighbouring American Samoa.

In addition to telephony, the P&T also provides telex service longlined to New Zealand, leased data services to various destinations, and recently introduced Internet services through Computer Services Ltd, who is the current ISP. Access is provided via a 64 kbps link to Big Pond in Australia. There are plans to replace this service with a higher capacity link to the United States in the future.

An AMPS Cellular Mobile telephone system was put into service in July 1997, and has reached the 1 100 subscriber mark after only 5 months.

2.13.2 Telecommunications development

Future development in telecommunications services will see expansion to the switching network through increasing capacity on the present exchanges. The Digital Radio systems have capacity for expansion and will meet requirements

Emerging and appropriate technologies such as wireless in the local loop and cellular will be of interest, especially in the area of increasing penetration and meeting demand both in the populated and rural communities. Preparations are now under way for the corporatization of Post and Telecommunications Department by 1 July 1998.

3 ITU and telecommunications development in the Pacific region

ITU development activities in the Pacific have a long history. For many years, ITU, as executing agency for UNDP funded projects, has assisted developing countries of the Pacific in the planning of their telecommunication networks, training their staff and implementing their development programmes. Virtually every island country in the subregion has started development of its telecommunications based on first Master Plans prepared with the help of UNDP/ITU. It can be safely said, therefore, that ITU and UNDP have indeed laid the foundation for development of telecommunications in the subregion.

After completion of UNDP funded programmes, ITU remained a strong supporter of telecommunication development in the subregion. Soon after the closure of the UNDP/ITU project office in SUVA, ITU established an Area Office for the Pacific, which is currently located in Bangkok. In the last four years, since the Buenos Aires World Development Conference, ITU/BDT carried out an impressive number of activities in the subregion. These include four regional studies, five pre-investment studies, implementation of two capital projects, provision of expertise in the areas of Policies, Regulation and Legislation, Licensing, Corporate Planning, Tariff Setting, Accounting Rates and International Settlements, Frequency Spectrum Planning and Management, Broadcasting and Improvement of Maintenance. During this period ITU/BDT provided also valuable assistance in the Area of Human Resources Development (HRD). ITU/BDT supported the Suva and Solomon Islands Training Centre in development of new courses, conducted one seminar on Tariff Engineering, two presentations on LEO Satellite Systems, three workshops on Maritime Radiocommunication Services and one workshop in Telecom Sector Governance. ITU also provided numerous fellowships for training of staff from the subregion in various telecommunication areas.

In short, the ITU/BDT Area Office for the Pacific has become a place where developing countries of the subregion turn almost daily for information, advice and support.

4 Future expectations

The need for ITU support is even greater at these rapidly changing times. The entire telecommunication industry worldwide is currently undergoing dramatic transformations. New technologies are being developed and new services introduced at a rapid pace, old monopolies are breaking up and new operators are emerging, telecommunication markets are expanding beyond national borders and new powerful alliances are being created at the global level. In addition, the role of governments in the telecommunication sector is being redefined. Therefore, more than ever before developing countries and particularly small Island Countries of the Pacific expect ITU/BDT to continue to be the source of unbiased, top-quality and cost-effective expertise and up-to-date and credible reference information.

As described in previous sections of this paper, developing countries in the subregion have made a strong progress in development of their telecommunications, but they still have a long way to go before they reach a desired level of development. Most developing island countries continue to extend basic telecommunication services to all their populated islands. However, like the rest of the world, they have to think and work towards the introduction of new services and broadband networks to enable much needed applications to take root in their countries, such as tele-education and telemedicine. Consequently needs of the developing countries in the Pacific subregion for assistance are both diverse and dynamic.

Therefore the WTDC Action Plan needs to include priorities that can be identified at this stage but should be sufficiently flexible to accommodate new requirements that may emerge in coming years in this diverse subregion.

More importantly, the WTDC-98 Action Plan should reinforce the role of ITU/BDT as an institution where developing countries can turn for unbiased, top-quality and cost-effective expertise, information and support and as a United Nations Specialized Agency that will insure that the voice of small developing countries in the Pacific as well as else where is heard on global issues.

5 List of priorities

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Considering the trend and dynamism of the telecommunications industry and the situation in the Pacific the following list of priorities are proposed to be included in the WTDC-98 Action Plan (not in a priority order):

- 1) A yearly workshop on telecommunications technology applicable for the Pacific's unique environment. To enhance the workshop, it could be combined with an exhibition of modern technology available, and applicable to our environment. The workshop would be an opportune forum to bring together experiences on various telecommunications systems used in different countries for discussion. Discussions on package purchasing, most economical supply source, etc.
- 2) The establishment of a suitable Information Exchange System that will enable access to telecommunication related information. The information exchange will provide up-to-date information on regional/global matters on telecommunications. Sharing of experiences for mutual benefit.
- 3) The elaboration of country programme for LDCs will assist in infrastructure development of these countries. Individual countries will have to identify areas of need and programmes

that could be implemented to assist in these areas. The programmes could be implemented for individual countries or in a group.

- 4) Provision of information/access to distant learning facilities in each country. Possibilities of having own Internet hub, email centre. An education link throughout the Pacific region will be beneficial to all.
- 5) Provision of fellowships and other direct assistance to LDCs. This would accommodate needs and requirements of LDCs as this would facilitate participation of LDCs on forums they would not normally afford to attend. Assistance could be in the form of consultancy work, feasibility studies towards development opportunities and HRD.
- 6) Relocation of the ITU office to a suitable location in the Pacific. This would have many advantages and would greatly enhance collaboration between ITU/BDT and the countries of the subregion.
- 7) Matters of global interest and significant to the small island states that must be addressed include:
 - Accounting Rate Reform.
 - Internet Issues: Voice over Internet and related issues, bypass problems, methods of prevention of distribution of harmful contents, etc.
 - Year 2000 problems: The Millennium Bug.

6 Conclusion

ITU is encouraged to continue its good work and look at the needs and priorities of the Island States that currently need assistance. This is important when the global telecommunications environment is going through significant changes that will have a major impact on the survival of island states.

Small Island Countries of the Pacific expect ITU/BDT to continue to be the source of unbiased, top-quality and cost-effective expertise as they try to adapt to major changes that confront them.

On behalf of the Pacific Island States and the Government of Papua New Guinea I thank you all for your audience.
