

GETTING THE PACIFIC ONLINE: ACCESS ISSUES, CHALLENGES & OPPORTUNITIES





Pacific Is Countries

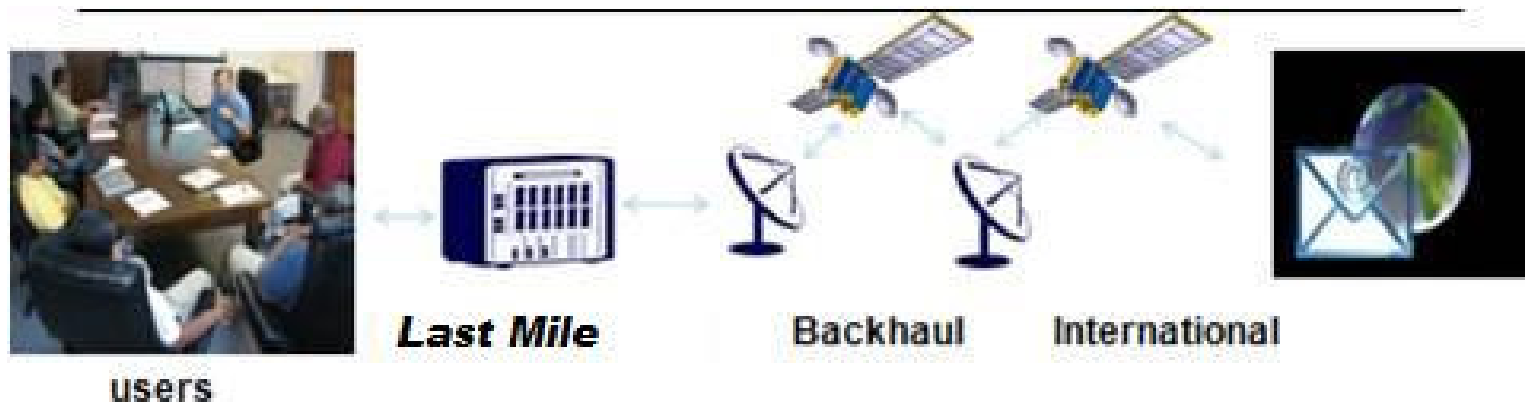
A VAST Ocean space – 1/3 of the Planet
19 Small Islands & Developing Economies
Sparse Populations but ~8 million in total

Agenda

- Typical country Characteristics & Setups
- Country issues and challenges
- Technology applications and some case studies
- Discussion of Opportunities
- Comments and discussions from floor

Typical Country Characteristics & Access Setup

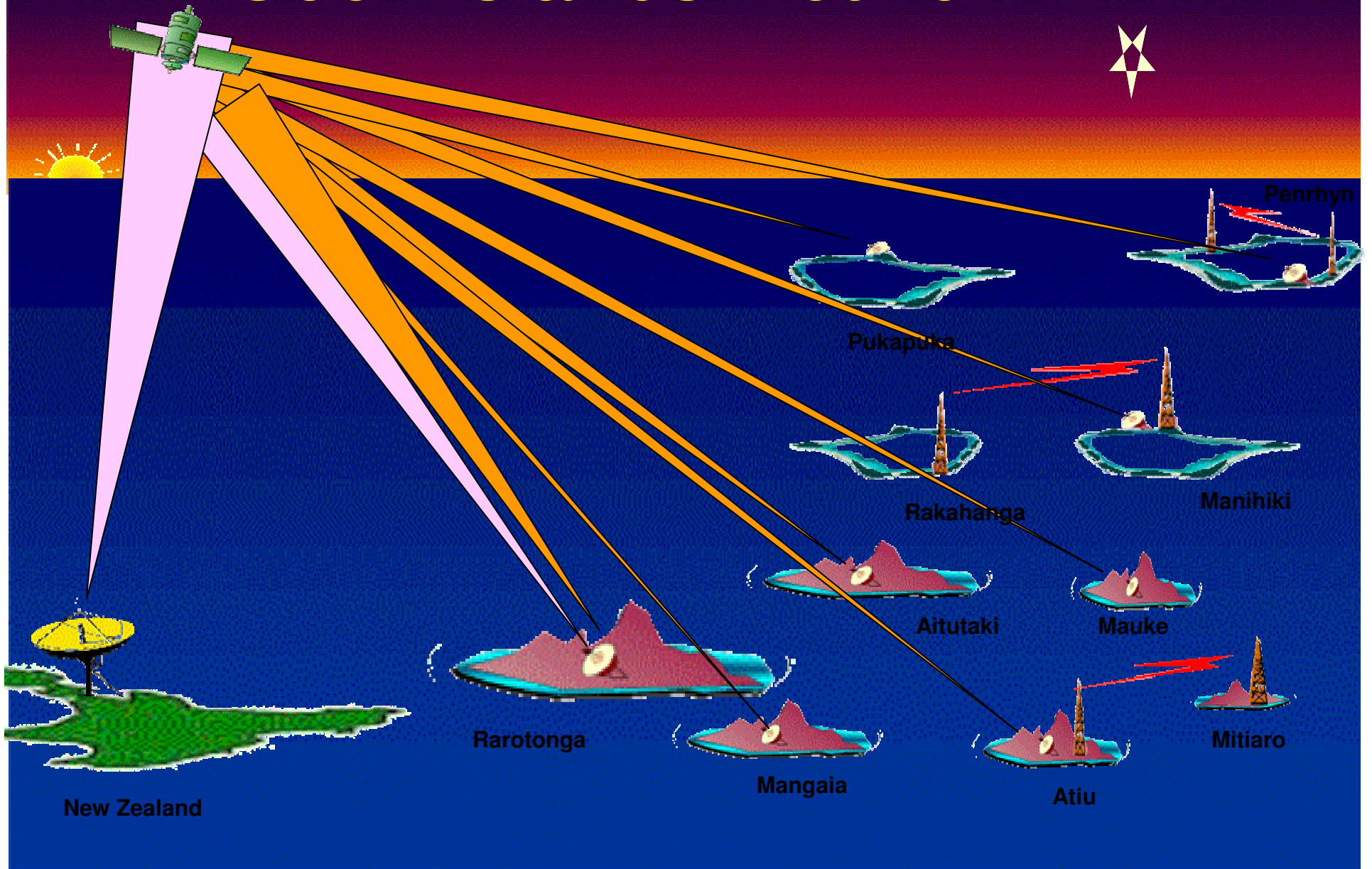
- Small Island countries with vast distances from main centre, or Larger Islands with very difficult terrain
- Sparse and small population, Vast differences: Tokelau 1800- PNG 6m.
- Least Developed & Developing countries with lack of skilled resources and strong frameworks
- Lack of the scale of economy, dependant on funding
- Strong communal bonding and responsibilities



Country Issues and Challenges - Domestic

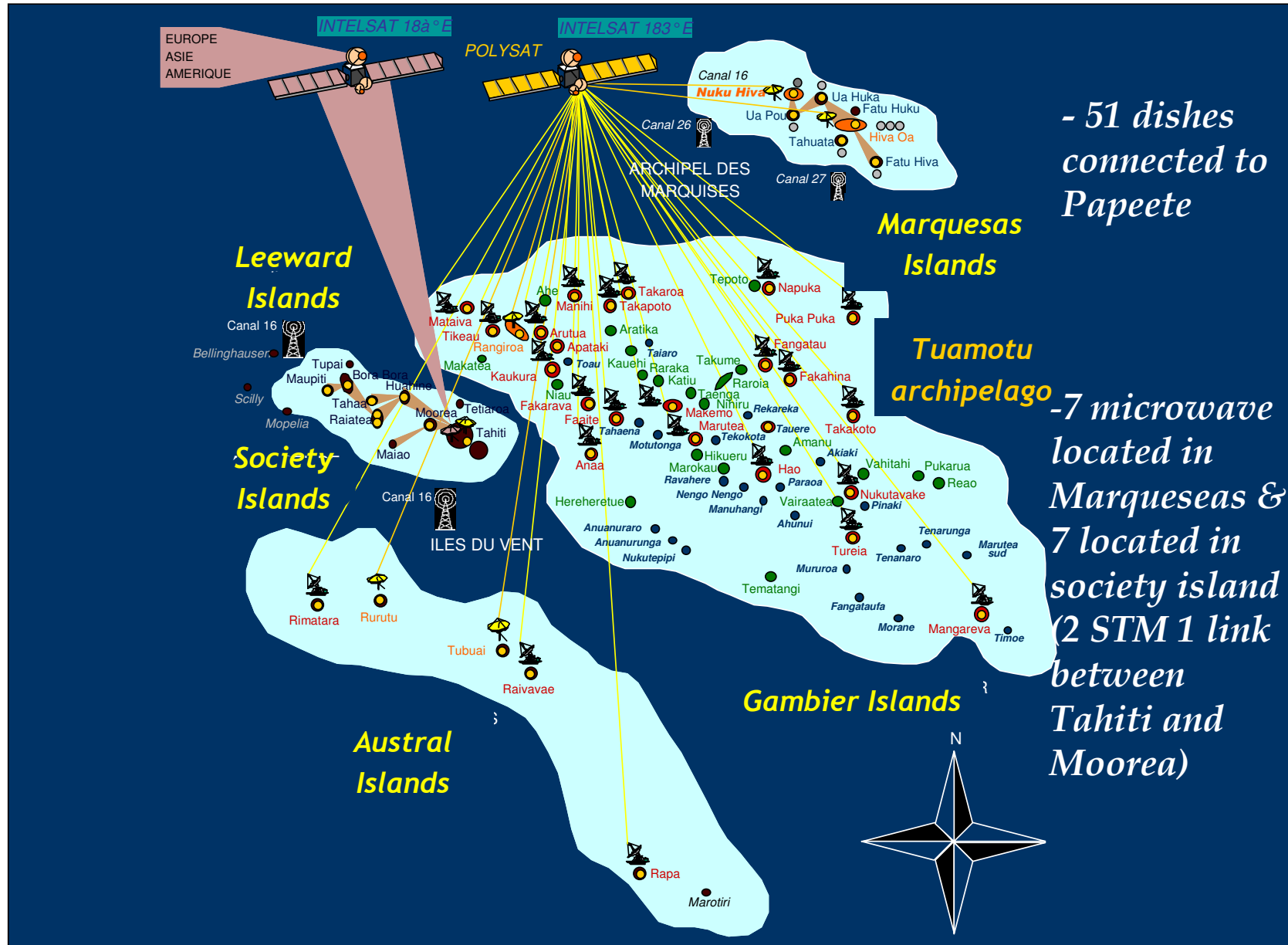
- Great reliance on satellite for international, rural and outer island communications
- Huge costs to deploy and maintain infrastructure and access to sparse populations
- Access cost making about 60-80% of costs.
- Different and mixture of technologies employed
- Growing deployment of wireless applications vs. wire line
- Business case for DSL
- Small market issues
- Skills & Retention
- Universal Services: USO and USF: Subsidy
- Weak regulatory & policy framework

Cook Islands Network



OPT PF Network

IGF2008



- 51 dishes connected to Papeete

- 7 microwave located in Marquesas & 7 located in society island (2 STM 1 link between Tahiti and Moorea)



Country Issues and Challenges - International

- Satellite bandwidth limited and costly: 20-40%
- Double satellite hops for rural and outer island communications
- Unfair charging regime for Internet - Full Circuit Costs by small island countries
- Lack of link diversity
- Growing demand for bandwidth
- Growing consumption of bandwidth from peer to peer, and spam
- Restrictions to market and promote for demand, thus increasing volume for better costs

Pacific Islands Internet Indicators

Country	Pop	No ISP	Users	Delivery
PNG	5.7m	4	51k	LL, DU, BB
Fiji	906k	4	20.5k+	LL,DU,WL,BB,CDMA,GSM,VSAT
Solomon Is	560k	1	2k+	LL,DU,WF,DSL,BB,GSM,HF
Tahiti	275k	1	30k	LL,DU,BB,WL,VSAT
N Caledonia	264k	5	28k	DU,DSL,WL,GPRS
Vanuatu	209k	1	7.5k	DU,WL,BB
Samoa	180k	4	8k+	LL,DU,BB,WF
Kiribati	106k	2	1k+	DU,WL
Tonga	100k	2	1.2k+	DU,WL,DSL,KU VSAT TRIAL
Marshall Is	60k	1	1.5k+	DU,DSL
Palau	22k	2	3k+	DU,WL,BB,DSL
Nauru	13k	1	350+	DU,WF
W & Futuna	13k	1	710+	DU,DSL
Tuvalu	12k	2	400+	DU,WF, WLBB & DSL in progress
Cook Is	8.6k	1	1940+	LL,DU,BB,WF,WM,DSL
Norfolk	1.8k	2	450+	DU,WL,BB,LL

VSAT explained

- Growing deployment of VSAT satellite communications systems, central site Hub or aggregation equipment and the remote terminal equipment
- VSAT = Very Small Aperture Terminals
 - = relatively small antennas at customer premises
- VSAT is generally used as a last option where no other terrestrial communications infrastructure is economically possible
- VSAT is also used as a bandwidth delivery solution for WiMax and cellular “last mile” distribution systems, ie, to island resorts



VSAT explained

- In the Pacific region, the previous point is relevant for most of the region – except those few nations with submarine cable connections, Fiji, PNG, New Caledonia, Saipan currently, and French Polynesia, Samoa, Marshall Is and FSM in the future.
- A VSAT network is completely independent from any terrestrial infrastructure, each remote site is autonomous and can be powered from a solar power system, thus even the most remote location can have a VSAT service.
- A VSAT remote site can be deployed in any location – as long as there is visibility towards a satellite, ie, some villages in the bottom of valleys may not be able to get clear line of sight to a satellite.

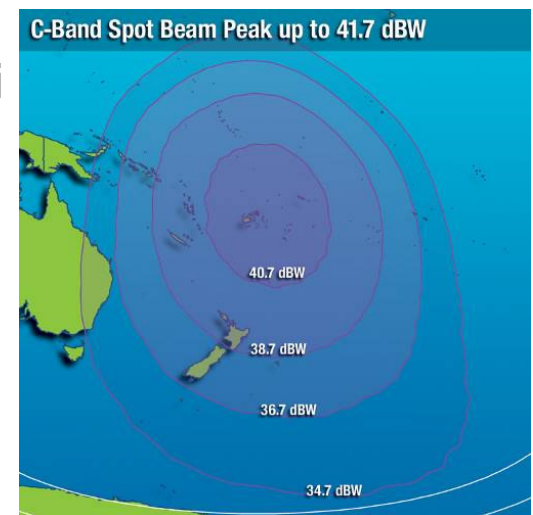
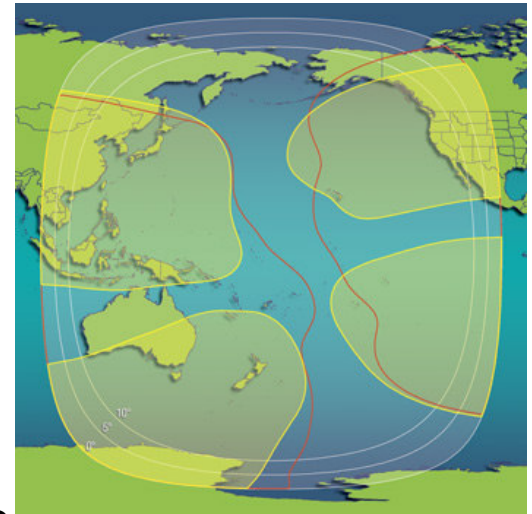
VSAT network architecture

- **Point-to-point connection:**
 - VSAT to HUB connection via the satellite
 - VSAT to VSAT connection via the HUB
 - VSAT to VSAT direct connection (mesh)
- **Point-to-multipoint connection:**
 - HUB to all the VSATs “Broadcast”
 - HUB to a specific group of VSATs “Multicast”
- **Different applications on the same platform:**
 - Data (Internet/Intranet/Video/Multimedia)
 - Voice (VoIP or POTS)
 - Cellular Backhaul (2G/3G/CDMA)
 - WiMax Backhaul
 - etc



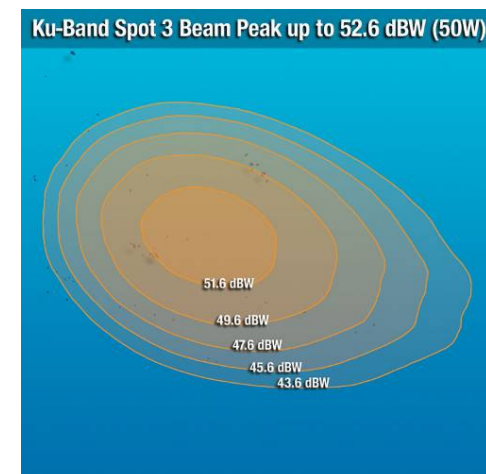
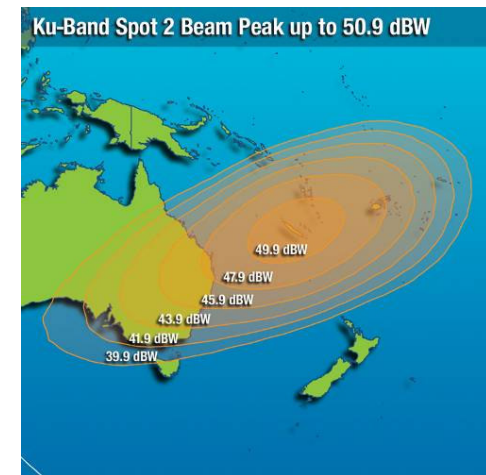
Satellite Coverage

- Satellite coverage is ubiquitous in the Pacific, every nation has coverage from a satellite beam but some areas are better served than others.
- Commercial satellites operate in two frequency bands being C-Band and Ku-Band.
- C-Band has wider coverage and is available from several satellite providers throughout the Pacific. The picture on the left shows the C-Band coverage from Intelsat 701, it has a Global beam, Left & Right Hemi beams and four zone beams as well as a C-Band spot beam
- C-Band requires generally large antennas, up to 3.7 metres in some cases, making them expensive to purchase and expensive to install but until recently, C-Band was the only option available in many locations.



Satellite Coverage

- Ku-Band can operate with smaller antennas, down to 1.2 metres, this reduces capital expenditure and logistics and installation costs.
- Ku Band is affected by rain fade much more than C-Band, so careful system design is required to maintain service availability
- Ku-Band has until recently had less coverage, the map on the right shows the Ku Band coverage from the Intelsat 701 satellite. A spot centered on Fiji/New Caledonia and another on French Polynesia
- A recent entrant into the market (GE-23) has provided the region with full Ku Band coverage from a single satellite, a coverage map is included in a case study later in the presentation.



Challenges – Slide 1 of 5

- **Environmental** – the Pacific region is hot, humid, has a salty atmosphere, strong winds and torrential rain. These factors place heavy requirements on the integrity of equipment and installation practices
- **Logistics** – many remote site locations are only accessible by boat or aircraft. Keeping the size and weight of remote terminal equipment down is crucial in order to achieve a relatively economic site
- **Project Management** – remote site locations are not only difficult to access but sometimes the travel can take several days to reach the destination. It is crucial that all remote site installation requirements are fully catered for as there is no option to get any form of local support.

Challenges – Slide 2 of 5

- **Training** - VSAT systems operators and remote site installers require training in order to perform their tasks correctly. In the Pacific, the cost of sending staff for training is often prohibitive.
- **Installation competence** –the result of inadequate training can manifest as poor system performance and poor remote site installation integrity which often requires corrective remote site visits which are costly
- **Support** – remote site support is very expensive and time consuming to undertake. Sites must be designed with reliability and simplicity in order to ensure the utmost reliability and installations must be of the highest standard.

Challenges Slide 3 of 5

- **Economics** – many Pacific nations are reliant on donor agencies for funding and this places a strain on the budget allocation available for telecommunications infrastructure
- **Regulatory** – the Pacific has many small nations, in the past many nations insisted on implementing their own VSAT system when a more economical option would be to purchase services from another nation.
- **International co-operation** – following on from the previous point, this situation is slowly changing with nations purchasing services from outside their own borders. Examples are the Pacific wide RICS system and Telecom Fiji selling services to Vanuatu.

Challenges – Slide 4 of 5

- **Theft and vandalism** – can be a big problem with cables, batteries and solar panels. Education of the incumbent telecommunications authority has resulted in a large reduction of this problem by using a process of involving the local community in the project,
- **Service revenue collection** – most services in the Pacific operate on the pre paid principle, including pay phones and some Internet access. It is almost impossible to offer post paid or billed services except to corporate and business customers.
- **Technology Race** – many nations feel they are being left behind and struggle to adopt the latest and greatest technology, irrespective of the relevance of that the technology in the customer's environment

Challenges – Slide 5 of 5

- **Latency** – This is an inherent characteristic in satellite systems that can be minimised but cannot be removed. This is the single differentiating performance characteristic that separates satellite broadband services from terrestrially delivered services.
- **True Bandwidth Requirements** – Most customers do not need the bandwidth they desire. Many customers have the same expectations as for terrestrial services, thus educating the customer regarding appropriate bandwidth is important.

Solutions

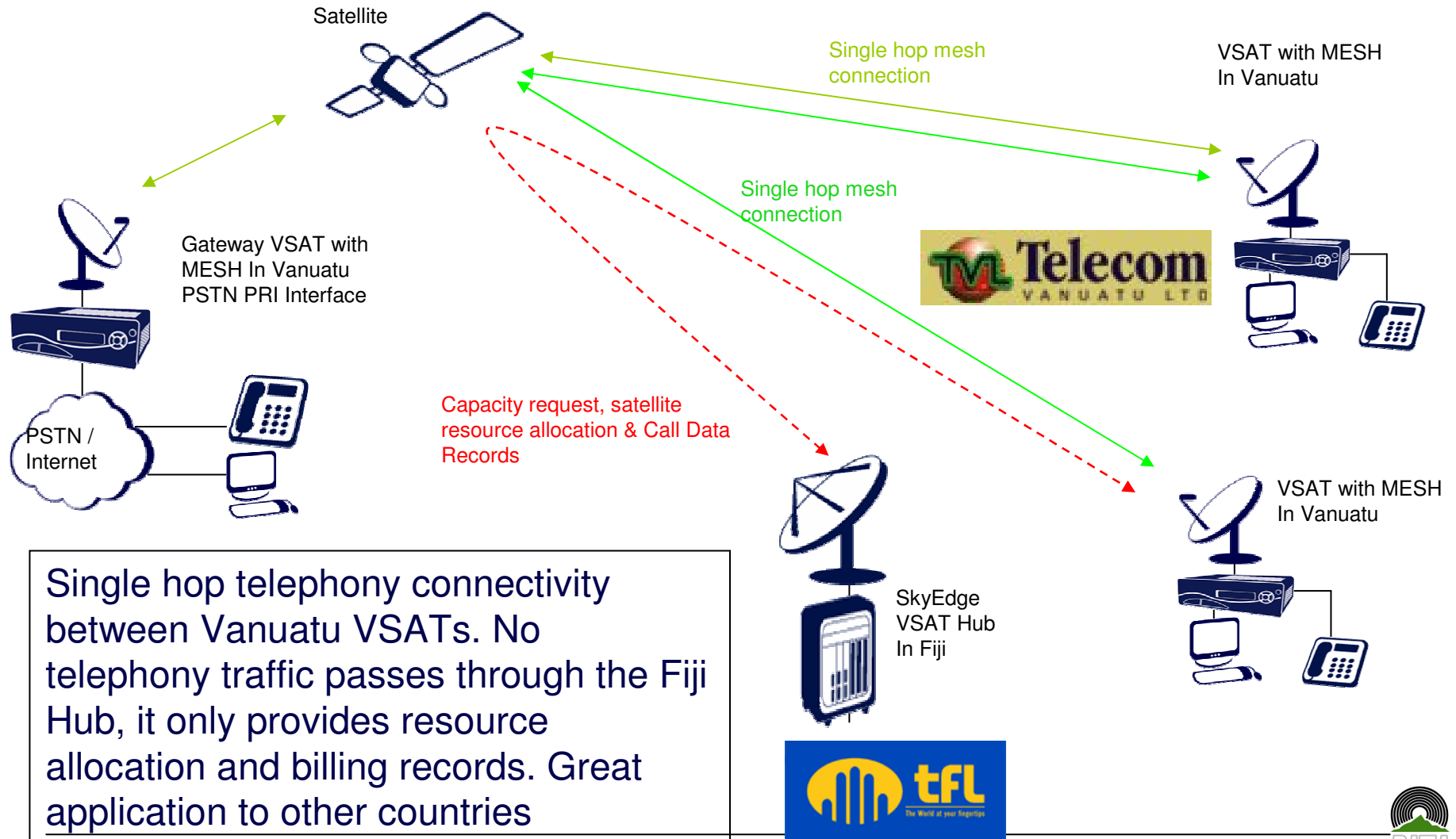
- The following slides detail some case studies of services implemented in the Pacific

Case Study - Rural Telephony & Broadband

- Gilat VSAT Hub serving remote sites throughout the Fiji Islands
- 4 telephone lines per site, pre paid & Internet service available
- Low power consumption Solar Powered sites
- Assisted Telecom Fiji with the implementation of a consultation process to involve the local village residents in the project.
- Involvement of the locals resulted in excellent co-operation including the construction of telephone booths as per picture below



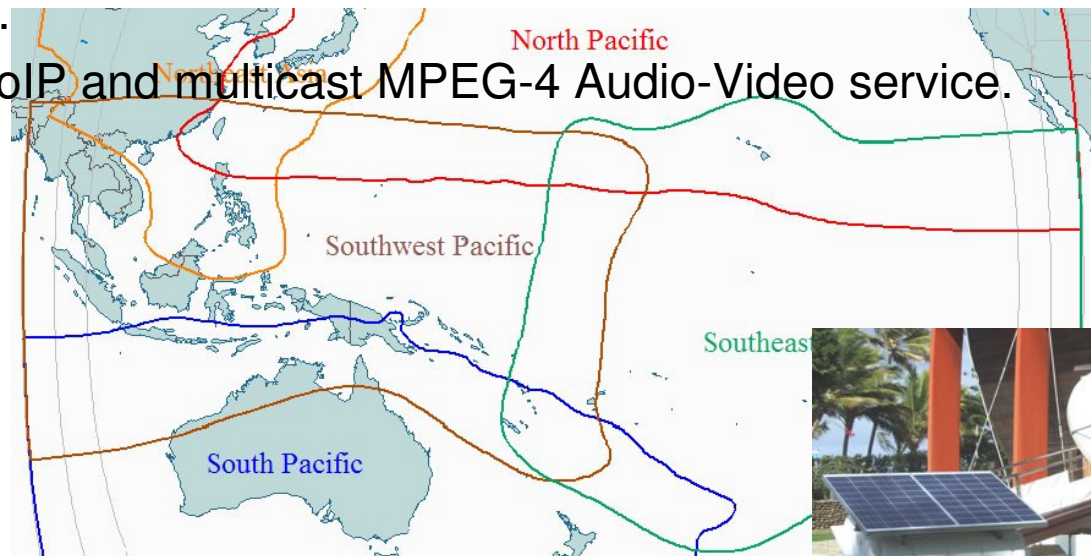
Case Study – Providing services to neighboring nation



Case Study – Pacific Wide VSAT system



- RICS Project initiated by the Secretariat of the Pacific Community (SPC), funded by Australia govt for rural areas.
- Service operated by Pacific Teleports from Australia
- Gilat Dual Outbound VSAT Hub physically installed in Honolulu, Hawaii.
- Full South Pacific Coverage via two separate beams on GE-23 satellite.
- Data, VoIP and multicast MPEG-4 Audio-Video service.



pacificteleports

Summing Up

- VSAT Technology is more affordable and versatile than ever. Compared to just a few years ago, this technology has almost reached commodity status making the technology itself affordable, especially now that Ku Band services are available all over the Pacific
- Almost all VSAT system have performance and throughput capabilities exceeding most real customer requirements. Practically, the system throughput is not determined by the technology, it is determined by the customer's available budget to pay for satellite bandwidth
- Using appropriate design, a VSAT system can be tailored to support almost any application or service. The key factor is versatility, adaptability and choosing appropriate technology for the job at hand

Opportunities for Pacific Islands

- **Affordability of access & optimizing resources**
 - Localizing content
 - Hubbing & Exchange points
 - Aggregation
 - Cost effective technologies: minimum technology
 - Other technologies such as Mobile
 - Dynamics of IP based technology
 - Incentive pricing schemes
- **International collaborations**
 - Initiatives by manufacturers and suppliers for small scale & resilient solutions (e.g. \$100 PC, devices and equipment)
 - Unfair charging regimes
 - Technical & Financial Assistance

For any inputs and interest, please contact:

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Thank You for your attention and
contribution!!!