



Case Study - Tuvalu Telecom



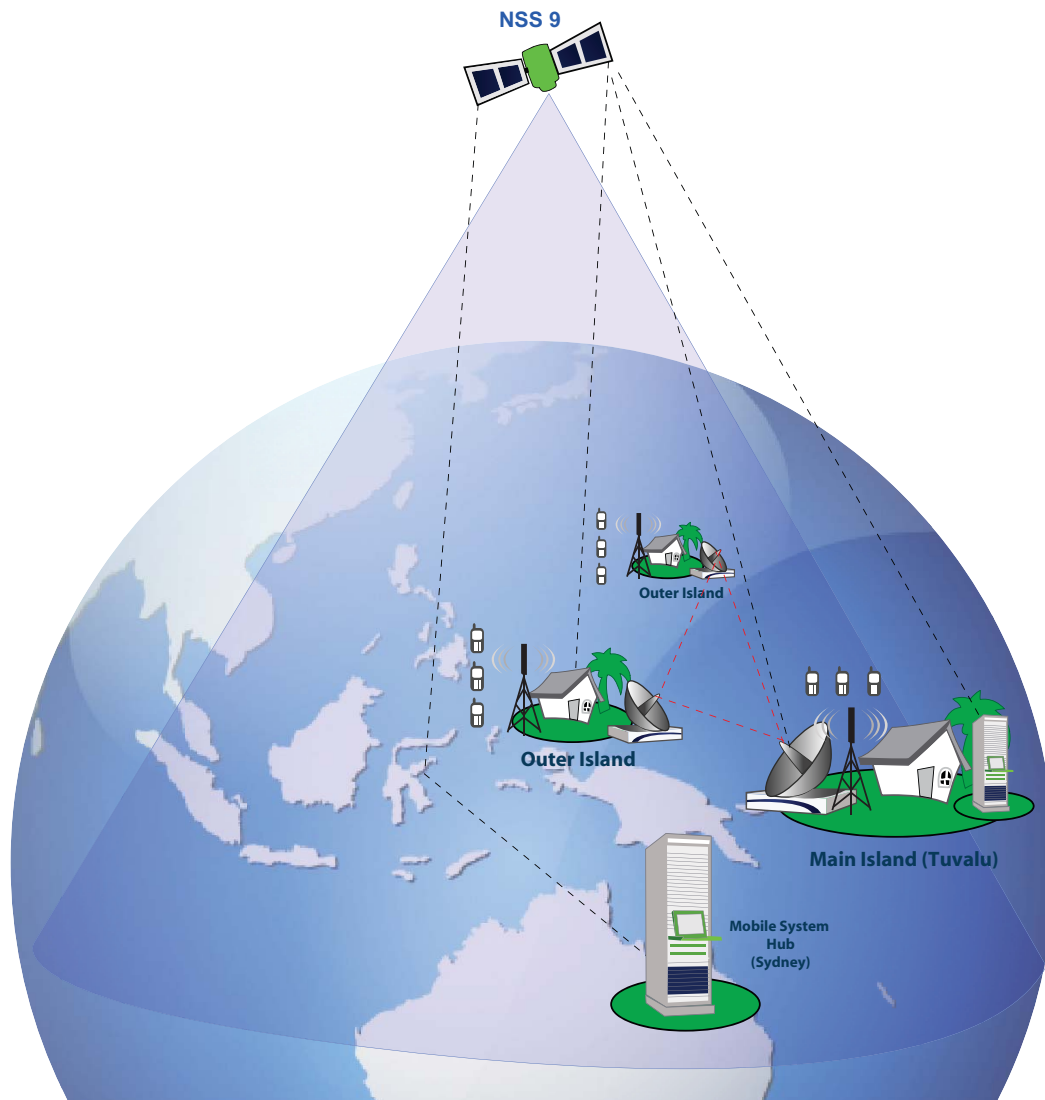
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Project Development

Pactel International has been appointed by the Tuvalu Telecom Corporation to deploy and operate a new mobile system in Tuvalu at a cost appropriate to their small market. Tuvalu's original mobile system was destroyed by storm in 2007, leaving the residents of the country with no mobile coverage. The project began in November 2009 and took 3 weeks to deliver.

The deployment in Tuvalu consists of an autonomous remote system, which runs 3 mobile cells on Funafuti atoll. Extension of the system to the outlying islands of Tuvalu is underway, using Tuvalu Telecom's existing domestic satellite hub to link remote cells back to Funafuti.

The diagram below illustrates this set-up:



The Tuvalu mobile system contains a local controller and is completely autonomous. It is directly connected to the International and Domestic Public Service Telephone Network and all calls are switched locally. Equipment providing complex services such as billing, roaming and international SMS is installed in Pactel's Sydney data centre. Load testing, failover and disaster recovery have been performed to ensure that the system works as designed.

Multiple BTS devices developed specially for rural islands are mounted on the existing tower in Funafuti to provide coverage. The local controller option has been designed by Pactel International's engineering team to enable the Mobile network to continue working locally in case of satellite communication failures, when connection to the rest of the world is lost.

Challenges Faced

The installation proceeded according to the schedule, but (as anticipated), had a number of challenges, including:

- **Physical:** Pactel's installation faced extreme weather conditions, such as high temperatures, high humidity and marine environments with no air-conditioning available.
- **Power:** power consumption had to be kept as low as possible, for compatibility with solar installations and to reduce battery sizes.
- **Autonomous Operation:** the equipment in remote sites had to be able to continue to operate if disconnected from the core infrastructure or international PSTN.
- **Poor communication links:** the links from remote sites are frequently poor, both in terms of reliability and performance. The system had to be designed to cope with this.
- **Testing in remote areas:** there is no access to the spare parts, hardware and machine tools. Despite the beautiful scenery, power and communication outages are a way of life in Tuvalu, and new parts/equipment take 3-4 weeks to arrive. On-site engineers had to work around these conditions.

Results

Despite the challenges faced, Pactel International has managed to restore mobile coverage in Tuvalu, creating a fully-featured cellular mobile phone system with a low deployment cost.

Pactel's experience in other installations has produced a system which is designed to survive in remote locations with extreme environments, poor access, no power and no on-site technical personnel. The equipment is designed to use only one third as much power as the nearest competitors'. Its' simple and centralised administration allows easy control of the mobile telephony system at remote sites.

As a result, residents of Tuvalu now have access to a low-cost mobile system, which provides all standard mobile telephone facilities, including:

- Voice calls (local and international)
- SMS
- Voicemail and EDGE (2.5G) data services
- Multiple billing solutions, including subscriber registration and pre-paid top-ups (via scratch card, credit card and vendor), as well as balance transfers between mobile accounts.

Lessons Learnt

During the course of the Tuvalu project, Pactel International mastered their strategies for dealing with remote installations and the extreme environmental conditions found in Tuvalu. In addition, the project highlighted the need to produce a system which could be installed and operated by staff untrained in mobile telephony systems.

Overall, this project has once more proved Pactel International's ability to design, manage and customise a solution that meets their customer's specific needs.