IMAGINATION TO REALITY

Autonomously Reconfigurable Communications Platform

Technology Overview

This project aims to define a Software Defined Radio (SDR) architecture that integrates with Policy-based Management to create a radio platform that adapts automatically. A proof of concept implementation of this architecture was created, demonstrating GSM base station and Wi-Fi access point applications.

SDR replaces traditional radio signal processing tasks with software components, allowing flexibility as radio standards evolve or resource requirements change. Our architecture includes a policy engine that allows configuration decisions to be made based on a set of rules. Goals like minimum quality of service can be pre-defined and the system will handle the reconfiguration autonomously.

In space and weight constrained applications like in aircraft cabins, a single unit of the platform can be used to provide wireless services to passengers using access technologies such as GSM, CDMA, WLAN, etc. As the users switch on different devices, it can intelligently reconfigure the wireless radios so that the maximum number of devices can be connected.
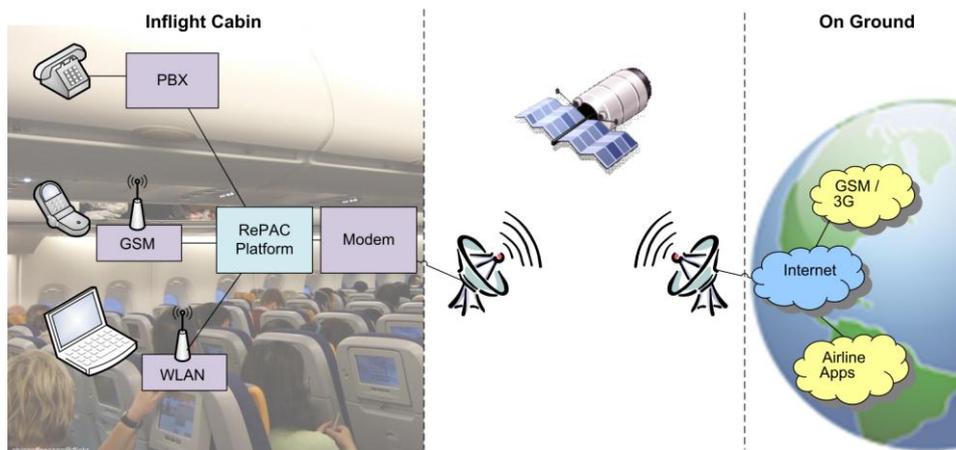

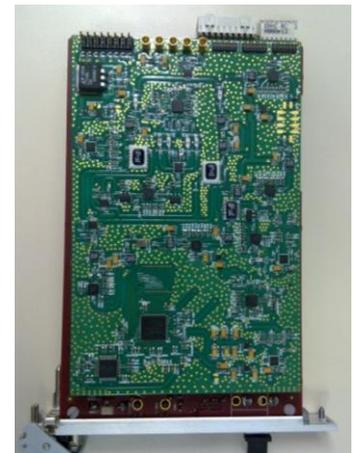Figure 1: Policy-Based SDR Possibilities in Aircraft Cabin Communications

Figure 2: RePAC Radio Frequency Front End mounted on Digital Baseband Processor

Technology Features

- Policy-based Software Defined Radio, a combination of 2 emerging concepts.
- Policy management makes it easily manageable and allows operation with little or no human intervention.
- Modular radio components can be loaded and unloaded dynamically.
- Custom-made Multi-Channel Radio Frequency Front End supports a wide range of frequencies, up to 6GHz.

Potential Applications

1. Commercial transport applications – Supplying communication to aircraft cabins, buses and trains.
2. "Base-station in a box" for rural and underdeveloped regions.
3. Communication for emergency services or disaster recovery.
4. Applications where autonomous/policy-based reconfiguration of modular embedded systems is of use, e.g. factory floor automation.

Benefits

- Multiple radios can operate simultaneously on one platform device.
- Reduces number of hardware components compared to normal radio systems.
- Supports multiple current radio standards, and allows for future ones to be added.
- Uses industry standards for integration with existing systems: SCA for SDR and CIM-SPL for Policy-based management.
- Stakeholders may define their own policy rules to achieve goals.

Contact Us
Industry Development Department
Institute for Infocomm Research (I2R)
1 Fusionopolis Way, #21-01 Connexis (South Tower), Singapore 138632
Tel: (65) 6408 2000   Fax: (65) 6776 1378   Email: inddev@i2r.a-star.edu.sg
www.i2r.a-star.edu.sg

Institute for Infocomm Research
A*STAR