

Use of Commercial Technology for Telecoms Surveillance

Tim Phipps

Wireless Homeland Security



Agenda:

- 1 A quick introduction to who we are**
- 2 Market trends**
- 3 Technology trends**
- 4 Demonstration of capability**

Quick Introduction to Cambridge Consultants

- A world leader in technology and product innovation
 - Providing design services, IP and consulting
- One of the world's largest wireless contract development teams
 - Company of 320 engineers, with sites in Cambridge UK and Cambridge MA, USA



...creating breakthrough products in a variety of sectors



Market trends - Identity

- “Know your enemy”
- Identification is a crucial first step in defending the public against potential threats
- Ubiquitous mobile phone ownership
 - Up to 96% in USA
 - Generally personal devices
- Mobile phone SIM card gives a unique, electronically readable personal identifier



Market trends – Mobile surveillance

- Technology is a “moving target”
 - Movement from voice to data connectivity
 - Machine to Machine communications (M2M)
 - Evolving standards GSM to GPRS to 3G to HSPA to LTE
 - White-space radio...



GSM

3GPP
A GLOBAL INITIATIVE

Lte



Market trends – Mobile surveillance

- User needs
 - Smaller size units
 - Fast deployment
 - Scalable usage
 - Covert operation
 - Reduced number of unwanted phones detected

- And finally... within a budget



Market Trends – Consumer products driving innovation

- Example – femtocells are compact cellular base-stations in your home
- High performance –when compared to a conventional base station, still has a similar processing requirement
- Extremely compact – requires highly integrated solution
- Growth opportunity – mass market consumer product
- Investment - new architectures and technologies



driving convergence work

Technology Trends – Software Defined Radio

- picoChip baseband processing chip
- All baseband processing requirements from digital samples to and from RF through to network interfacing is integrated enabling an extremely low BOM cost
- For example, PC312 consists of a 3GPP Node B PHY, ARM11 processor, cryptographic engine, high speed accelerators and peripherals
- Software defined radio architecture allows manufacturers to develop whilst specifications are maturing and update design using software patches



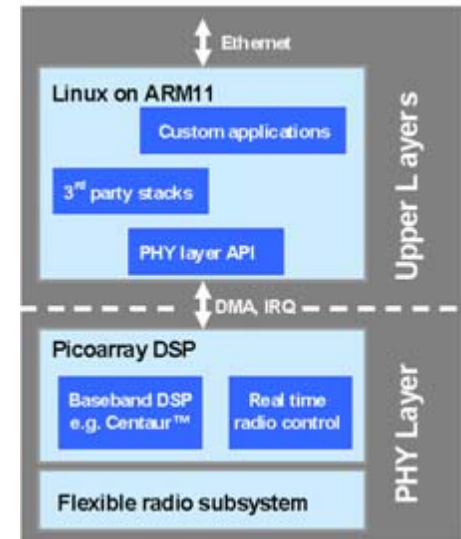
Market trends – Consumer technologies taken into other markets

- Iridium is the only truly global telecoms network
 - Low Earth Orbit satellites, with low delay and no orientation of the handset antenna
- Challenge is to create a broadband data terminal
- Solution
 - Set of 7 antennas in ground terminal equipment to track satellites moving at 8km/s whilst also adapting to movement of the platform
 - Compensation for the small received signal and the Doppler shift caused by the very fast movement of the satellites
 - Platform based approach to design, using Software Defined Radio architecture
 - Consumer technology taken from femto-cell products
- Cambridge Consultants responsible for full system design and implementation, from concept to product



Small cellular base station - concept

- Commercial components and technology to implement a “tiny base-station”
 - Baseband processing from picoChip
 - Programmable radio receiver from Lime microsystems
- Cellular communication physical layer
 - Reference design for GSM / GPRS
 - Software upgrade to 3G
 - Functions as base station and network sniffer, for detection of background cellular conditions



Small cellular base station - demonstrator

- Lab demonstrator
- Implementation
 - Size of 8cm x 9cm
- Reference design
 - Starting point for product development



Small cellular base station – uses

- Covert
 - Low power, can run from battery
 - Small size
- Mobile phone identification
 - IMSI grabbing
- Ad-hoc communications
 - Private local network for independent team working when infrastructure networks are not an option

Small cellular base station – uses

- Adaptable for...
 - Mobile phone location
 - Spectrum capture and intercept
 - Custom communications

Summary

- Cambridge Consultants
 - Independent product design
 - Capability in Software Defined Radio solutions
 - Defense and Security applications



Contact details:

Cambridge Consultants Ltd

Science Park, Milton Road
Cambridge, CB4 0DW
England

Tel: +44(0)1223 420024
Fax: +44(0)1223 423373

Registered No. 1036298 England

info@CambridgeConsultants.com
www.CambridgeConsultants.com

Cambridge Consultants is part of the Altran group, the European leader in Innovation Consulting. www.Altran.com

Cambridge Consultants Inc

101 Main Street
Cambridge MA 02142
USA

Tel: +1 617 532 4700
Fax: +1 617 532 4747