INSIG

Why 3G Networks need LORAN-C

Dr Mark Searle

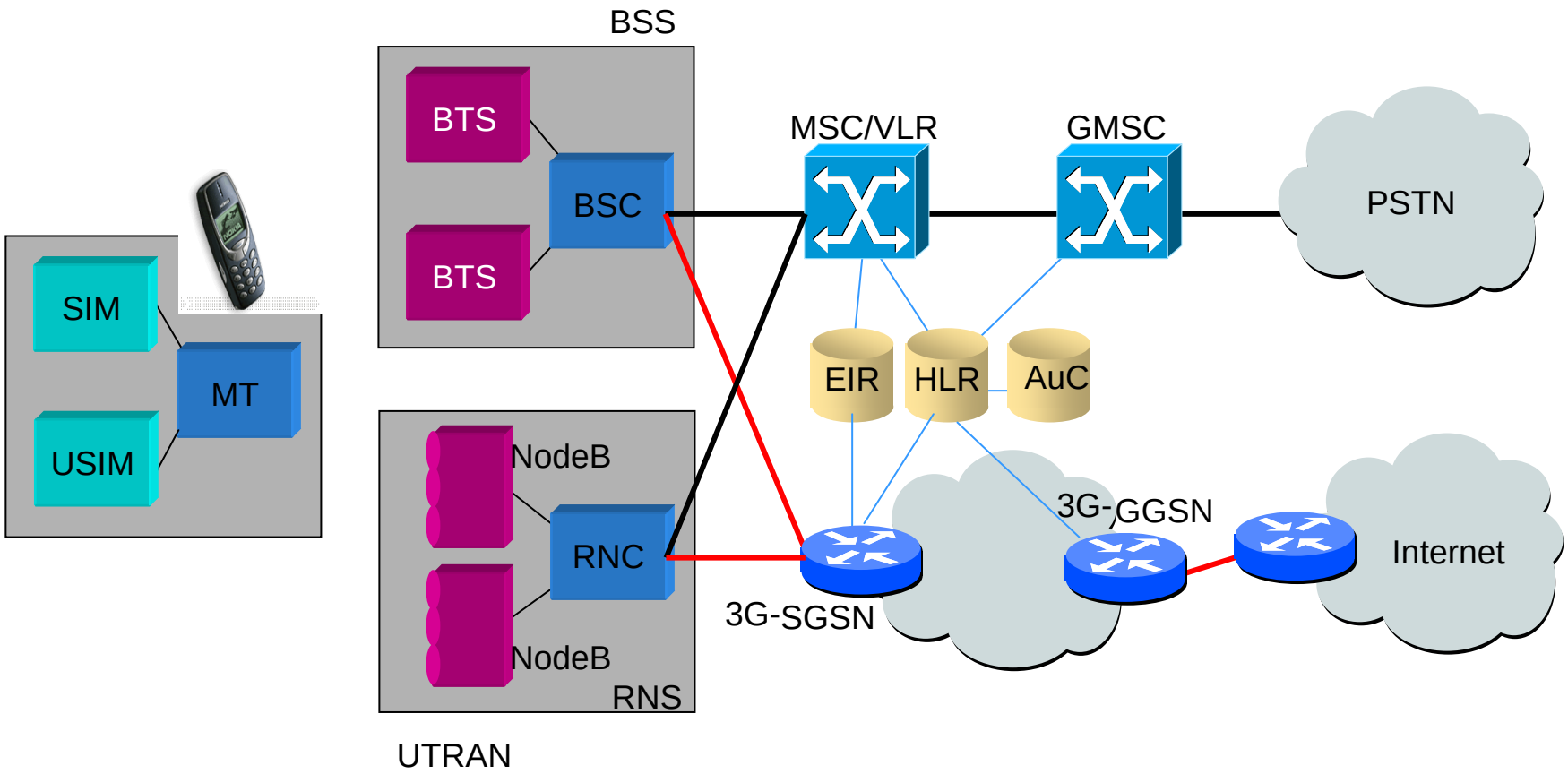
Albany House, 14 Shute End

Wokingham, Berks RG40 1BJ, UK

email: msearle@insig.co.uk

Tel +44 118 974 0120

GSM/IS95 to UMTS Evolution

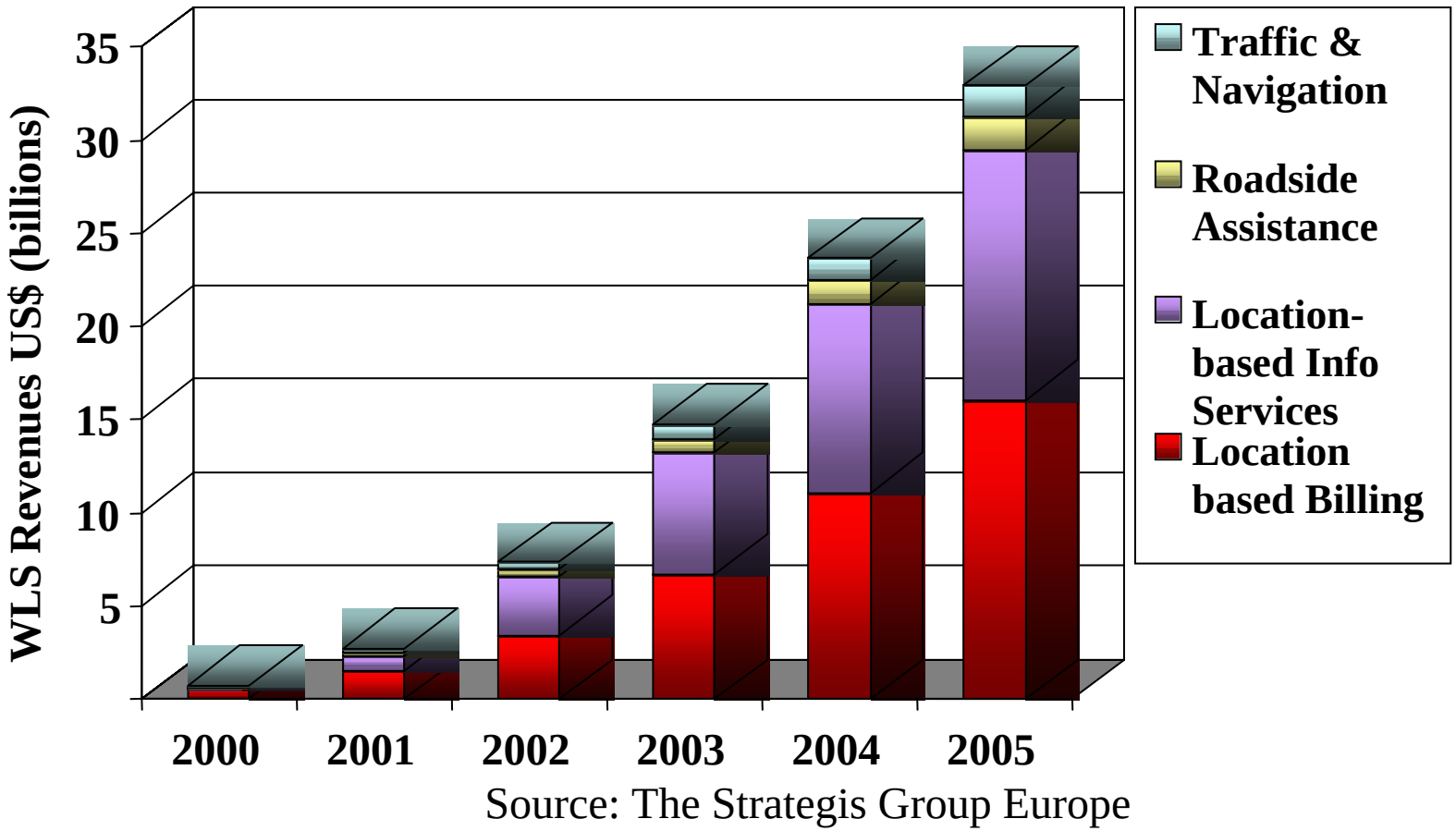


Location-Based Services definition

"Business and consumer 3G services that enable users or machines to find other people, vehicles, resources, services or machines. They also enable others to find users, as well as enabling users to identify their own location via terminal or vehicle identification."

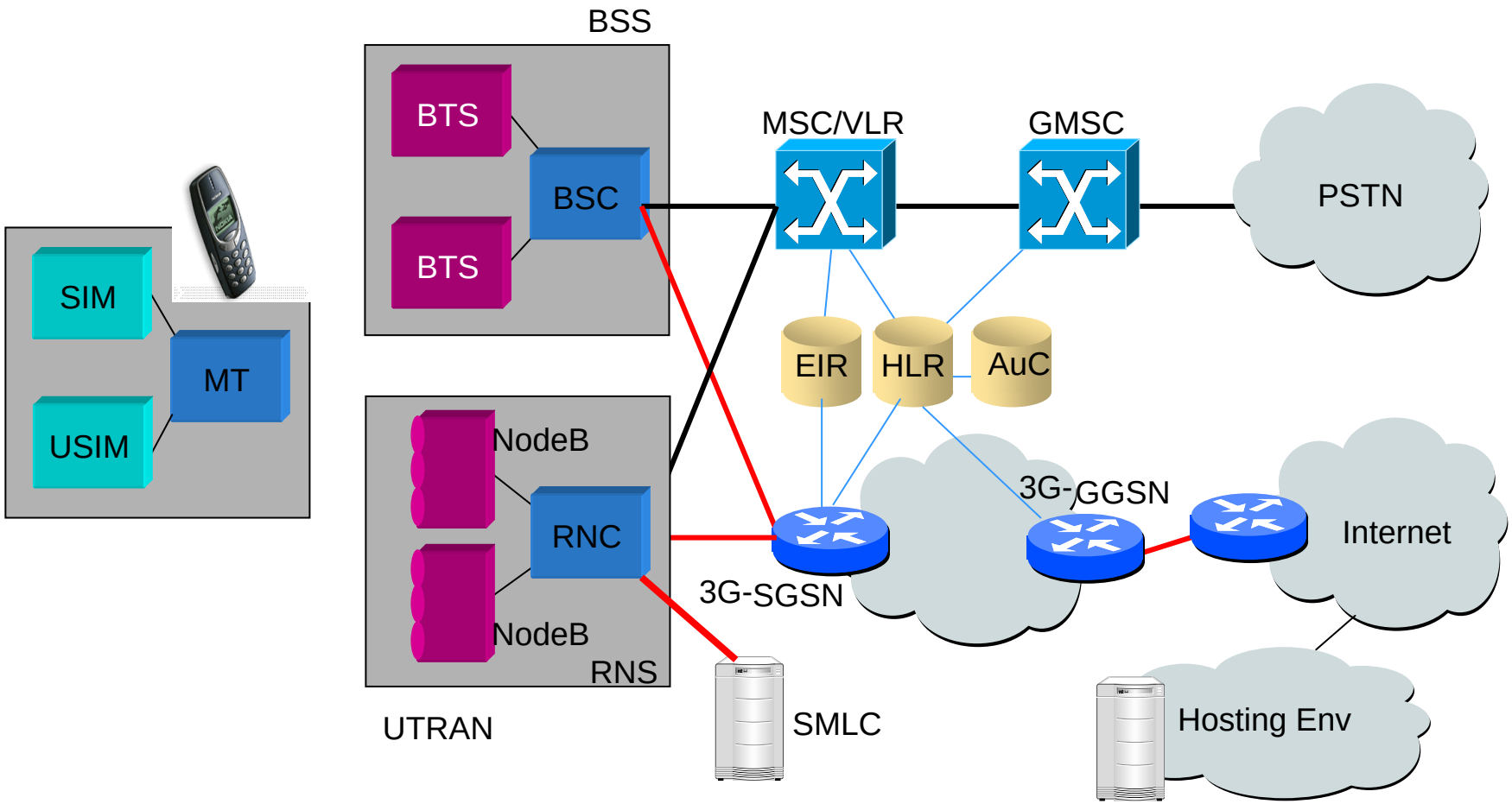
UMTS Forum – Report No.9

WLS Revenues - Europe



Source: The Strategis Group Europe

Location Services - Operator's equipment



Location through the SMLC

- SMLS Serving Mobile Location Centre
- Cell-ID and Timing advance: low precision dependent on cell size.
- Hyperbolic modes OTDOA and EOTD: Medium precision, variable quality
- Assisted GPS: high accuracy, variable quality due to urban coverage
- Also
  - AOA, RNBP

Early results of services

- Cell-ID:
  - Available now - well nearly
  - Very expensive
  - Not suitable for many application types
- AGPS
  - One operator AGPS tests show 30-40m accuracy in dense urban areas and 8m in open urban areas
- EOTD
  - tests by one developer in Cambridge, UK, show 1 sigma <50m, 2 sigma<100m, 100%<150m

For more (limited) information on tests see: www.telematica.de/cgalies/

US mandates, Europe requests

US FCC Wireless E-911 Mandates

- **Third Report and Order (15 Sep 1999)**
  - Revised Phase II location accuracy and reliability standards
    - Network-Based Solutions: 100 m for 67% of calls, 300m for 95% of calls
    - Handset Based Solutions: 50m for 67% of calls, 150m for 95% of calls
  - Phase II capable MS available by Mar. 2001
    - 50% of all MS activated are Phase II capable by Oct. 2001
    - 100% of all MS activated are Phase II capable by Oct. 2002
    - 100% of all MS are Phase II capable by end of year 2004

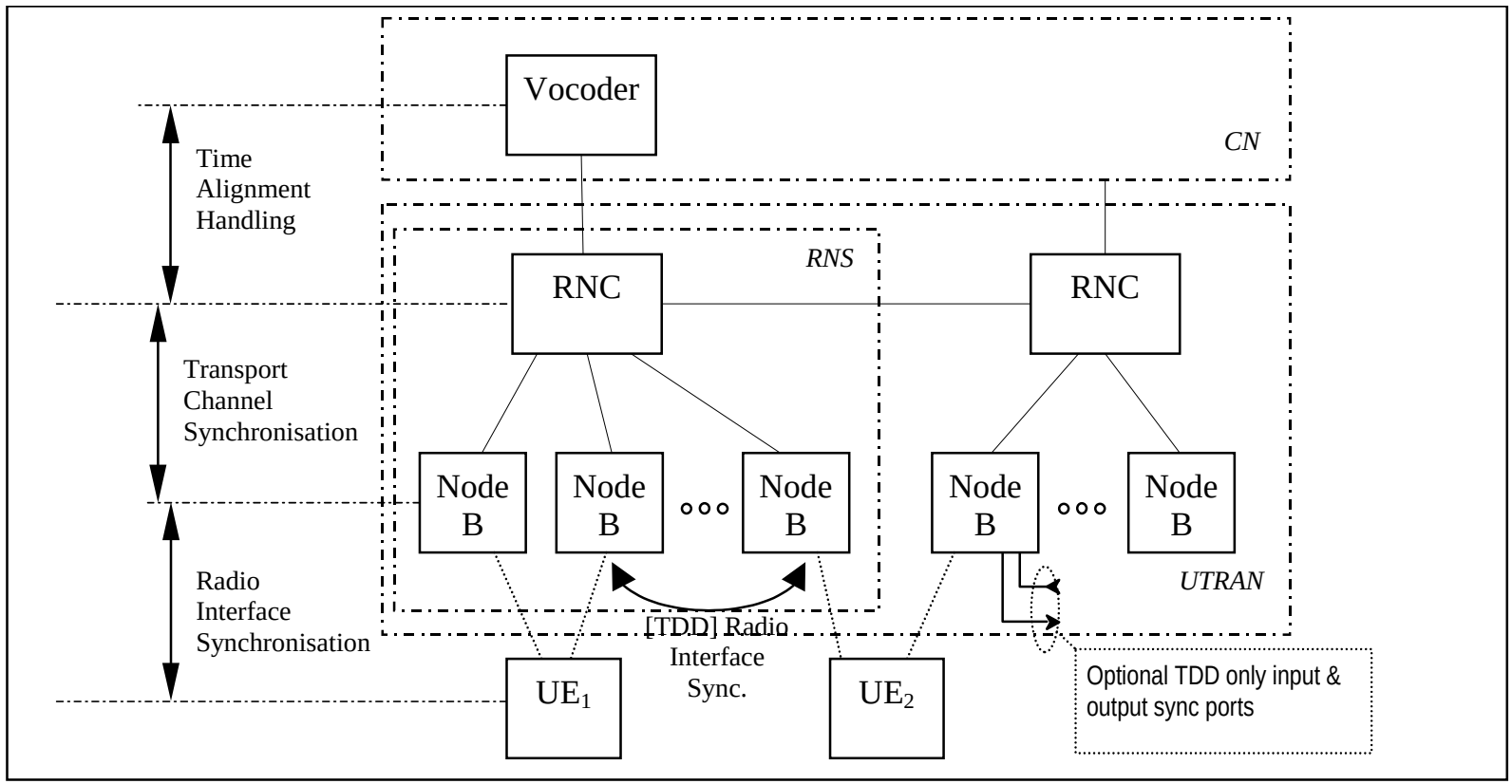
EU declaration

- 1999 Communications Review (COM 1999/539)
  - *It is feasible and in the public interest to set a date by which all fixed and mobile operators provide caller location details to the emergency authorities when emergency calls are made.*

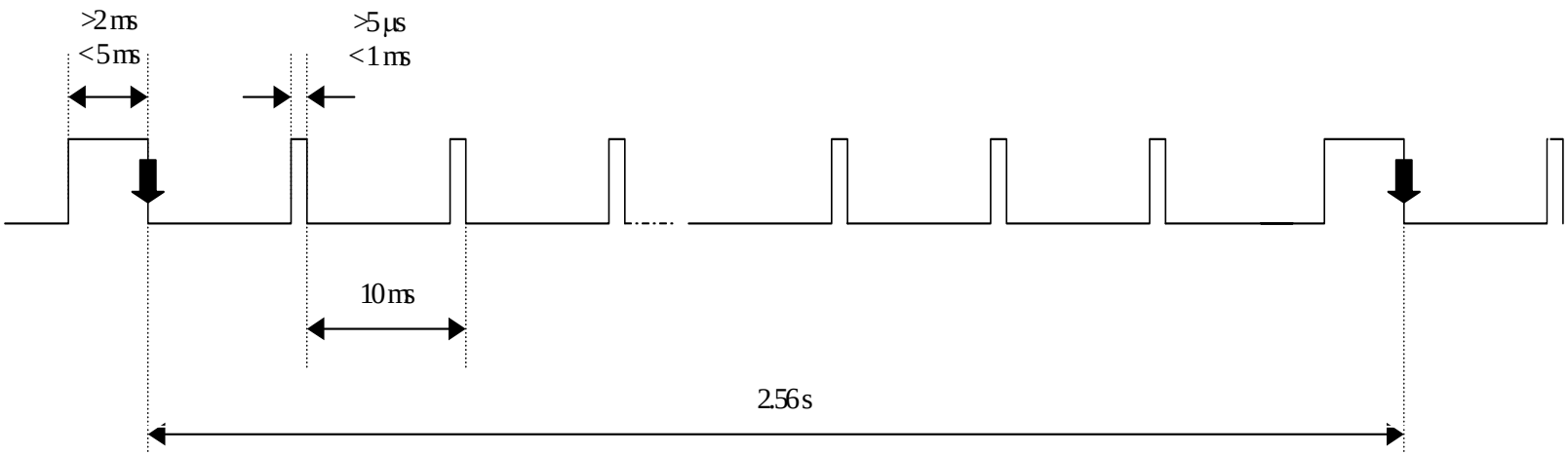
Synchronisation

- The whole telecommunication infrastructure is hugely reliant on sources of timing for synchronisation of high speed links
- In the UK, synch feeds are provided by a sync network. GPS is increasingly used
- UMTS has even more stringent requirements
- UMTS needs synch feeds close to the UTRAN

The UMTS UTRAN Synchronisation model



The sync spec



Conclusions

- A number of activities are presented at this conference
- It is imperative that a way be found quickly to give these activities the security they need to be viable in Europe
- Operators know about Loran but they need further education