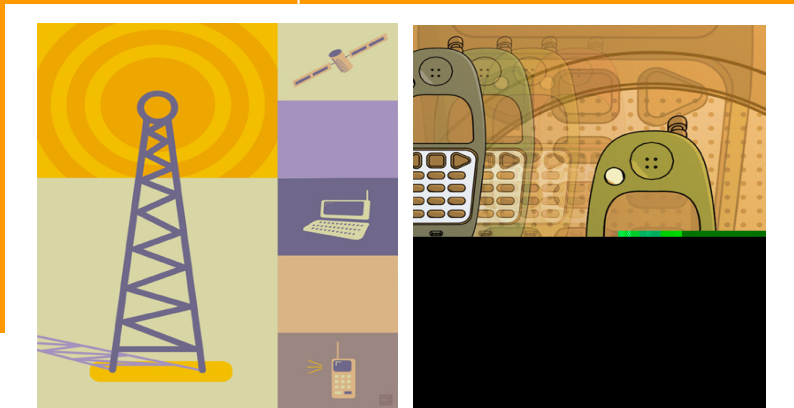


End-to-End Reconfigurability (E²R) - System and network support aspects



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DoCoMo Euro-Labs
1st DAIDALOS Workshop
14.12.04 - Stuttgart

<http://www.e2r.motlabs.com>



E²R Presentation Outline



E²R Presentation Outline

- E²R Project Overview
- E²R System Research
- E²R Network Support for Reconfiguration
- E²R Liaison Activities
- E²R Web Site



E²R Project Overview

(2/4)



E²R Project Objective

- The key objective of the E²R project is to **devise, develop and trial architectural design of reconfigurable devices and supporting system functions** to offer an expanded set of operational choices to the **users, application and service providers, operators, regulators** in the context of heterogeneous Mobile Radio Systems
- **Innovative Research, development and proof of concept** will be sought in an **end-to-end aspect**, stretching from user device all the way up to Internet protocol, and services, and in **reconfigurability support**, intrinsic functionalities such as management and control, download support, spectrum, regulatory framework and business models



E²R Project Overview (3/4)



E²R Project Highlights

E²R Phase 1 Duration

Jan. 04 – Dec. 05

Consortium (Phase 1)

27 Organizations

10 Countries

Budget (Phase 1)

16.2 MEuros

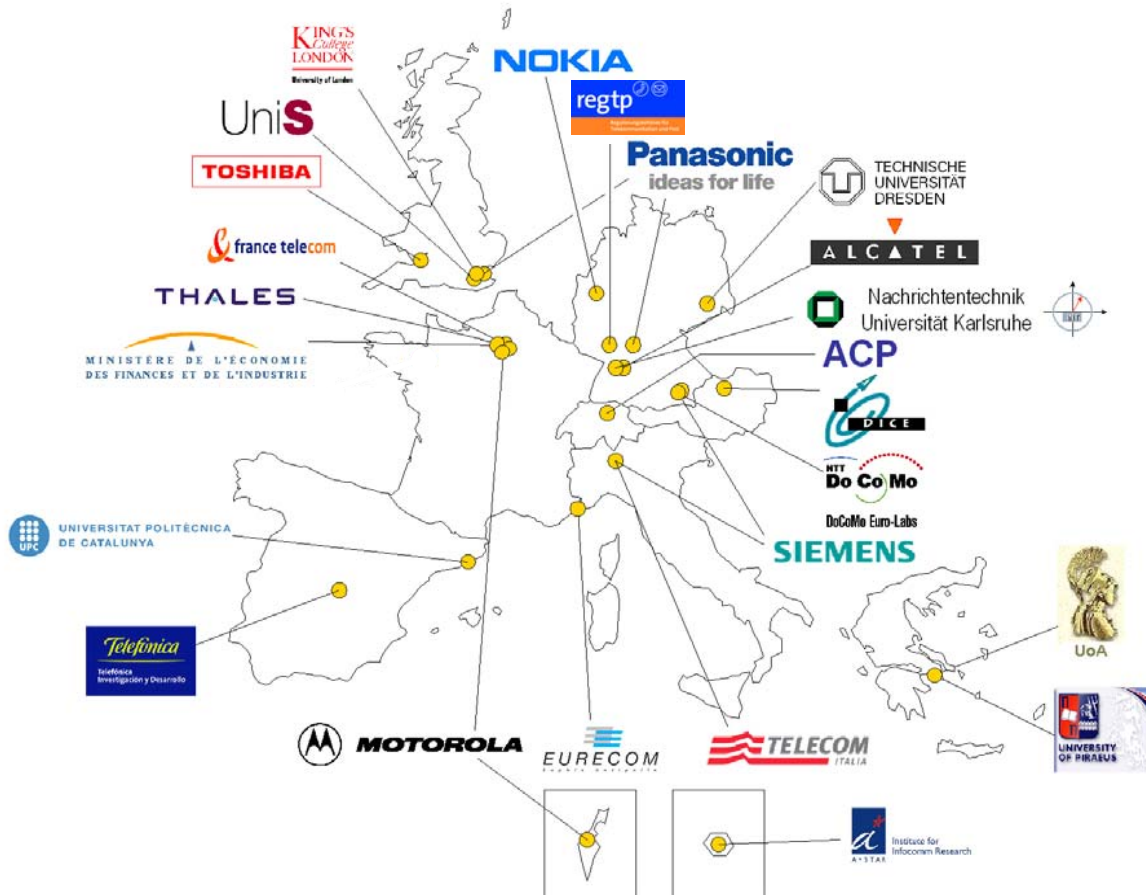
EU Budget (Phase 1)

8.9 MEuros

Resources (Phase 1)

1308 PM (~55 PY/Y)

Contractual Outcomes (Phase 1) : 44 Deliverables and 77 Milestones





E²R Project Overview

(4/4)



E²R Project Structuring

- **WP1: E²R System Research** aims to build and develop the system research for end-to-end reconfigurability, aggregating the technical, business and regulatory visions from the different actors of the project across the project WPs
- **WP2: Equipment Management** addresses the reconfiguration issues related to equipment which are capable of being reconfigured securely, reliably and seamlessly
- **WP3: Network Support for Reconfiguration** concentrates on the support of reconfigurability of network entities and terminals by network functions for secure download, reconfiguration management and validation
- **WP4: Radio Modem Reconfigurability** focuses on the development of local configuration control concepts and mechanisms for the physical layer resources, reconfiguration strategies and the development of the reconfigurable physical resources
- **WP5: Evolution of Radio Resource and Spectrum Management** aims at developing the mechanisms for dynamic allocation of radio resources, combining reconfigurable technology and support structures with novel resource management techniques
- **WP6: E²R Proof of Concept Evolutionary Environment** aims at developing and validating an experimental proof of concept environment capable of demonstrating E²R features in an all-IP heterogeneous network architecture

WP1: System Research

- **Partners (10):** Thales Communications, France Telecom, UoAthens, Telecom Italia, Telefonica, DoCoMo Euro-Labs, KCL, UoSurrey, RegTP, DiGiTip

- **sWP1.1: E²R System Analysis and Techno-Economic**

Scenarios and Requirements Capture

Business Path Elaboration

Roadmap

- **sWP1.2: Architectures, Models and Reconfigurability Management**

Reconfigurability Management Architectures and Models Elaboration

Reconfigurability Management Relationships and Interface Validation

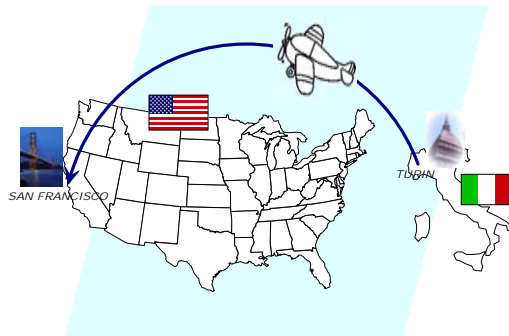
- **sWP1.3: E²R Regulatory Perspectives**

Regulatory framework for E²R

Potential Evolution of Regulation in E²R Context

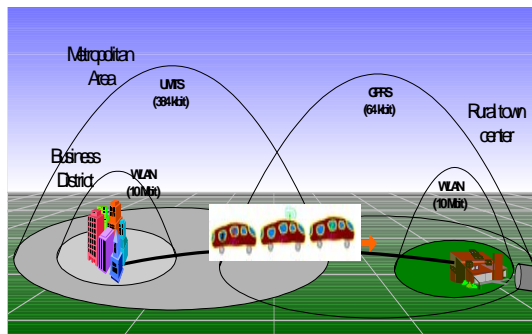
E²R System Scenarios

Ubiquitous access



➔ Global roaming

Pervasive services



➔ Flexible service provisioning

Dynamic Resource Management

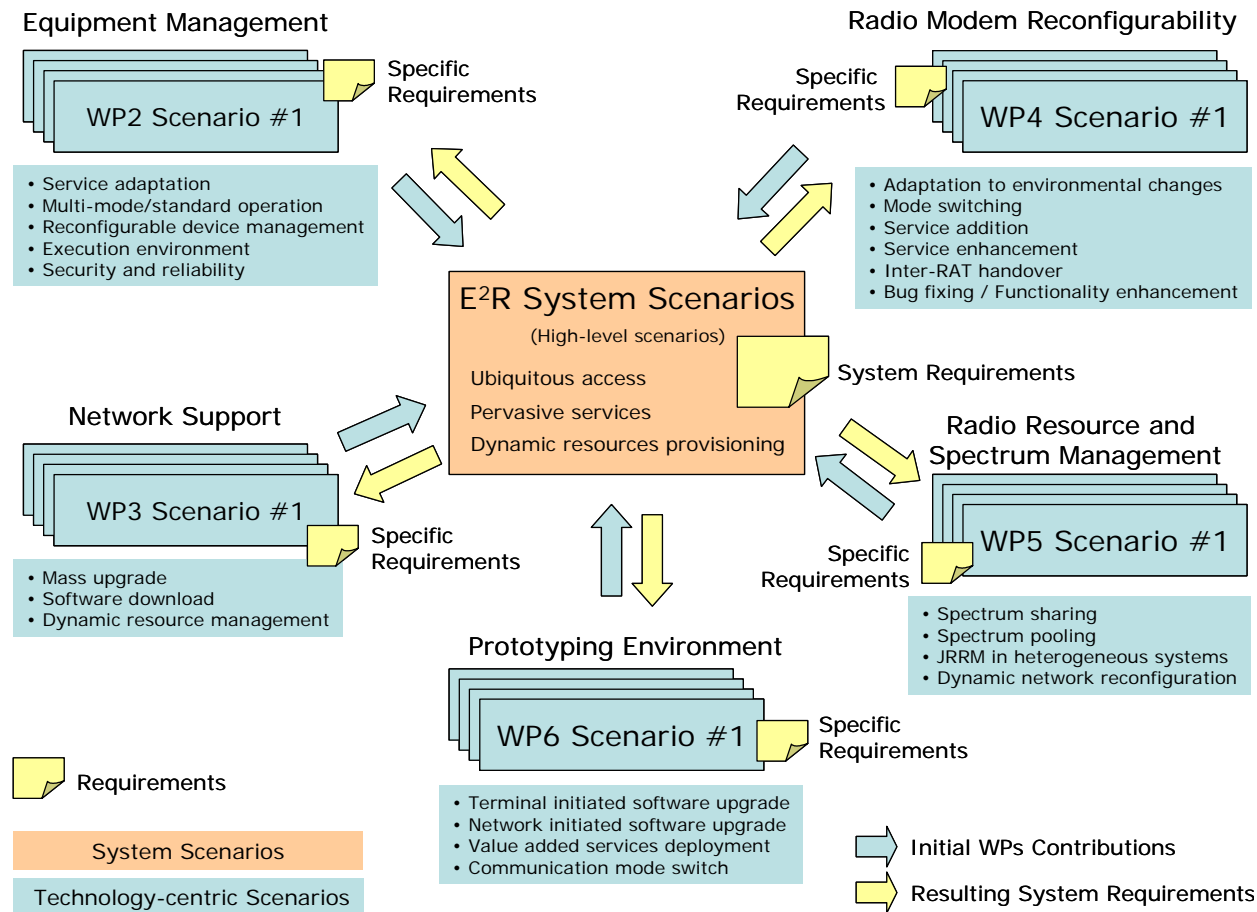
During the day, hot spot traffic areas will move and services required by users will also evolve.

Moreover, in cases of unusual events (such as sporting event, accident, natural disaster...), the different communication systems covering such areas must **adapt** to these **load** and **services variations**.

To dynamically face these changes of traffic and provide fast and cheap hot spot coverage to the E²R reconfigurable equipments, the network operators would perform a **spatial/temporal reconfiguration** and/or **redployment** of their **network capacities** as well as a **load balancing**, based on different **cooperation schemes**. For that purpose, SW may be **updated** in **terminals** and **network equipments**.

➔ Optimisation of network resources

E²R Interrelations between WPs



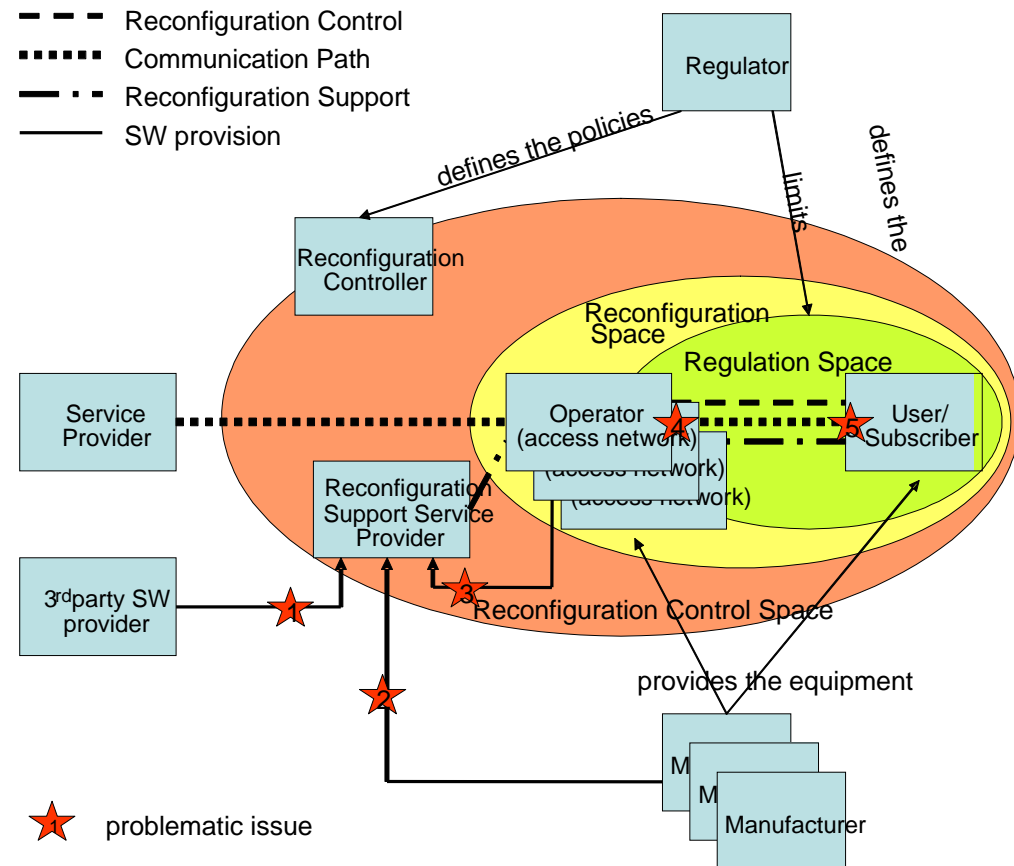
E²R Responsibility Chain Concept

Model for the assignment of responsibilities to actors

- Important to understand relationships between actors
- Actors can be made accountable for reconfigurations of user equipments

Five problematic issues identified

- (1) SW provided by 3rd party
- (2) SW provided by manufacturer
- (3) SW provided by operator
- (4) Access to networks
- (5) Activation of new configuration



WP3: Network Support for Reconfiguration

- Partners (11): Siemens (GE/IT), Thales Communications, UoAthens, Telecom Italia, Motorola, KCL, Panasonic, Alcatel, DoCoMo Euro-Labs, Telefonica

- sWP3.1: [Reconfiguration Management, Policies and Services](#)

Reconfiguration Policies, Related Services and Platforms

Reconfiguration Security and Safety Concepts

- sWP3.2: [Reconfiguration Architectures and Mechanisms](#)

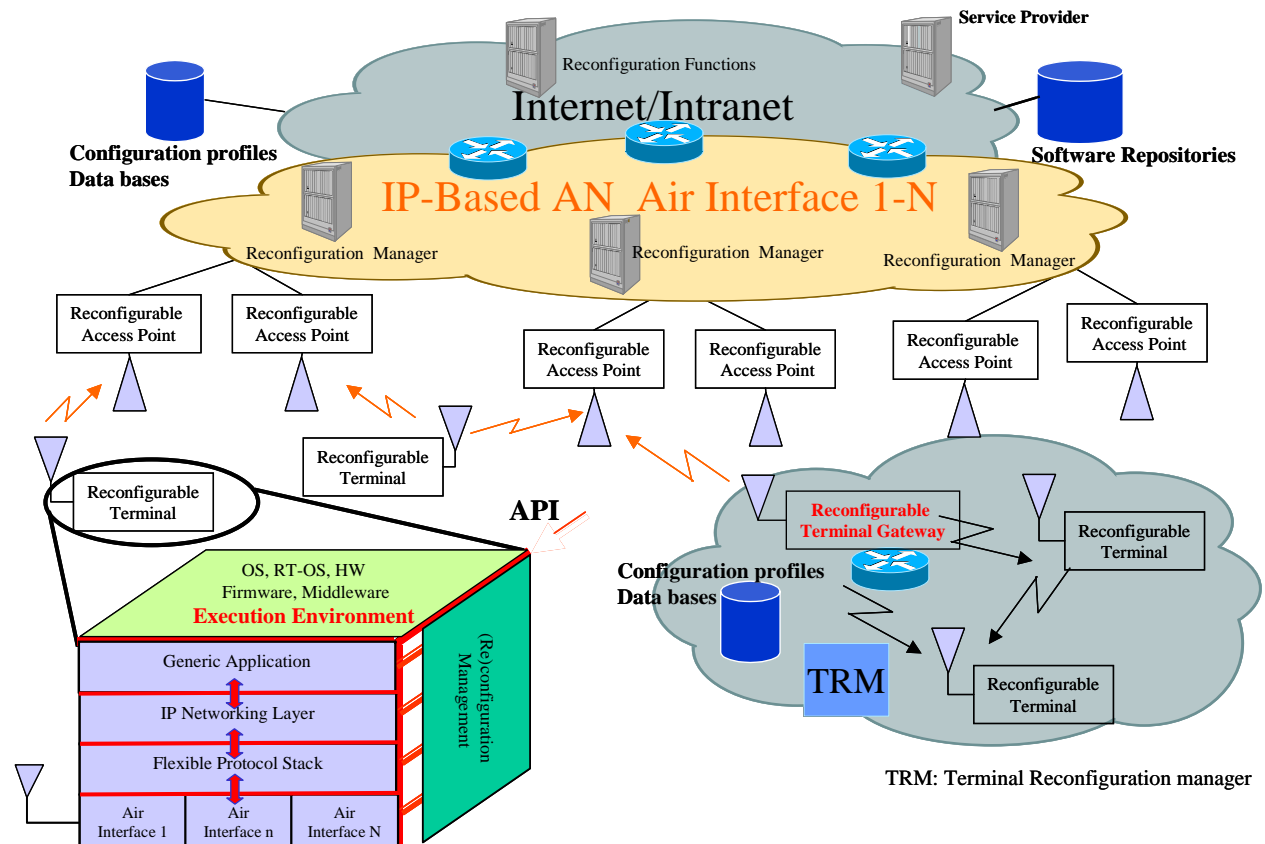
Download and Reconfiguration Functions provided by Network

Network Planning Concepts and Flexible Partitioning

E²R Architectural Perspective

Higher flexibility, scalability, configurability and interoperability than currently existing mobile communications systems

Key enabler to support heterogeneous radio access systems in a flexible, secure and intelligent manner



E²R Project Architectural Vision of the Beyond 3G System

E²R Technical approach

➡ Definition of a reconfiguration plane

- Set of management and reconfiguration functions, e.g. :
 - ✓ Software download management
 - ✓ Performance/load monitoring for basestations
 - ✓ RAN detection and monitoring for user equipments
- Extension of existing planes stretching across users, services, networks and terminals

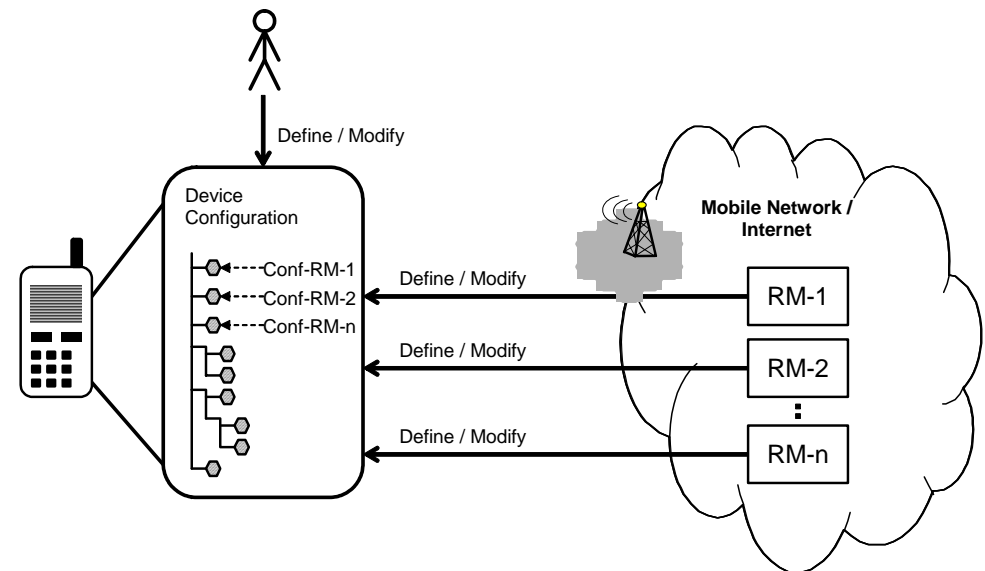
➡ Appropriate reconfiguration architectures derived

E²R Decentralised reconfiguration control

Several Reconfiguration Managers (RM) owned by different actors want to modify the user device configuration over the air

Use of several **device configuration profiles**

- Activated and configured only by the RM used in the visited network
- Possibility to restrict the modifications that a visited network can perform



E²R Liaison activities

- ✓ Liaison Agreement signed between E²R and **SDR Forum** (April 2004)
- ✓ Response to **SDR Forum** RFI on HAL (May 2004)
- ✓ Introduction to **IEICE** Yokohama Meeting (May 2004)
- ✓ Introduction to **ECC PT8** (former RA12) Meeting in France (June 2004)
- ✓ Contribution to **ITU WP8F** Meeting in Germany (June 2004)
- ✓ Introduction to **OSGi Alliance** Member Meeting in USA (July 2004)
- ✓ Introduction to **ECC PT1** Meeting in London (September 2004)
- ✓ Presentation to **OMG SBC** Workshop in Washington (September 2004)
- ✓ Introduction to **ECC PT8** Meeting in Brussels (November 2004)
- ✓ Introduction to **OMA DM** in Barcelona (November 2004)
- ✓ Release of E²R – **SDR Forum** Interaction Programme (November 2004)
- ✓ Introduction to **ARIB ART** Symposium in Tokyo (December 2004)
- ✓ Next Steps: Contribution to **ECC PT1 / ECC PT8 / ITU** (January/February 2005) and future Contributions to **identified Std and Reg. Bodies**



The screenshot shows the E2R website homepage. At the top left is the E2R logo and the text 'END-TO-END RECONFIGURABILITY'. Below it is a navigation menu with links: 'welcome', 'announcements', 'search', 'sitemap', and 'contact us'. A search bar is located at the top right. The main content area features the title 'End-to-End Reconfigurability (E²R)' and a welcome message: 'Welcome to the End-to-End Reconfigurability (E²R) website! E²R is an Integrated Project (IP) of the 6th Framework Programme of the European Commission, addressing the core of the strategic objective "Mobile and wireless systems beyond 3G".' Below this is a paragraph inviting visitors to explore various sections like 'Project Overview', 'Technical Approach', 'Challenges and Impacts', 'Structure and Schedule', 'Partners', 'Publications', 'Deliverables', 'Related Links', 'Press Releases', 'Partner News', 'Training', and 'Workshops'. A map of Europe is displayed with labels for partner countries: UNITED KINGDOM, FRANCE, SPAIN, GERMANY, SWITZERLAND, AUSTRIA, ITALY, GREECE, ISRAEL, and SINGAPORE. The map is titled 'END-TO-END RECONFIGURABILITY'. To the right of the map is a calendar for September 2004, with the 30th highlighted. Below the calendar is an 'announcements' section listing events: 'WWI Symposium: 9-10.12.04 (Brussels) 2004-09-28', 'Successful E2R Workshop (Barcelona) 2004-09-28', 'Joint Workshop E2R - SDR Forum (Germany) 2004-04-27', and 'Eurecom in 3GSM World Congress 2004 2004-02-23'. On the left side of the main content area, there is a 'navigation' menu and a 'log in' form with fields for 'Name' and 'Password', and a 'log in' button. At the bottom left of the main content area, there is a link 'About the SSL security on this site'.

- ✓ Updated Website with current Information
- ✓ Access to Public Deliverables
- ✓ Direct Access to all E²R Papers and Presentations
- ✓ More Information on Events, Workshops, Trainings, Partners...

www.e2r.motlabs.com