Problem Statement

1 The Problem

TV networks and cell phone networks have always had fundamentally different communication models. TV is (by design) a broadcast medium, meaning that there's one central content creator whose output is delivered to a large number of content consumers (receivers) at the same time. Receivers can't communicate with the content creator or with other receivers over the broadcast medium, so a broadcast system is essentially a one-way street. Mobile networks, on the other hand, establish ad-hoc one-to-one connections between the participants. From a content point of view, a mobile network is a peer-to-peer network. Every participant is a content creator and a content consumer at the same time, and there is no central content creator or consumer (except intelligence agencies maybe).
The bandwidth gap between TV and mobile networks has been reduced to the point where advanced video compression algorithms allow the transmission of small-size, low-quality video streams. TV networks offer far better picture and sound quality, but their use has been limited by the lack of mobility for the receivers, their bulky antennae and their one-way medium character. The new DVB-H video broadcasting standard, however, allows small, mobile receivers integrated into other devices, e.g. PDAs or cell phones. Therefore, it is possible to build mobile devices capable of receiving DVB-H TV transmissions and establishing UMTS data or speech connections.
DVB-H transmissions are based on IP packets, so manufacturers of combined UMTS/DVB-H devices face the problem if and where DVB-H IP packets and IP packets coming through a UMTS data connection converge into a single service, application or network layer on the device. Combined devices also require a special range of measuring equipment for R&D, production and service purposes.

Your assignment is to create a wireless distributed lecture system, CampusTV, on top of UMTS and DVB-H, serving a testbed suitable for testing and evaluating combined UMTS/DVB-H devices and the aforementioned measurement equipment. CampusTV shall support

- transmission of a lecture as a video stream via DVB-H and UMTS
- student interaction with the lecturer via UMTS
- interaction between students (peer-to-peer)
- multimedia interaction (text, audio, pictures, videos, etc.)
- transparent substitution of single transmission channels (downstream, upstream or both) with simulated channels for testing purposes

All of the above aspects of the systems must work in environments where no wired network of any kind is available (e.g. on a park bench).

2 Scenarios

In the following sections, typical scenarios for CampusTV are described.

2.1 Interactive Lecture

... insert interactive lecture scenario here ...
keywords: students asking the lecturer questions, students discussing, voting, UMTS

2.2 Distributed Lecture

... insert distributed lecture scenario here ...
keywords: students in other locations with DVB-H and UMTS coverage

2.3 Park Bench Lecture

... insert global lecture scenario here ...
keywords: students in other locations with UMTS coverage, but without DVB-H

2.4 Channel Substitution

... insert R&S scenarios here ...
keywords: channel substitution, measurement equipment, test series etc.

3 Requirements

The following sections list the functional and nonfunctional requirements for CampusTV.

3.1 Functional Requirements

... insert functional requirements here ...

3.2 Nonfunctional Requirements

... insert nonfunctional requirements here ...

4 Target Environment

The target environments are

- Windows
- Linux
- Mac OS X
- a yet-to-be-built device with no specification whatsoever
- the R&S office coffee maker

5 Deliverables

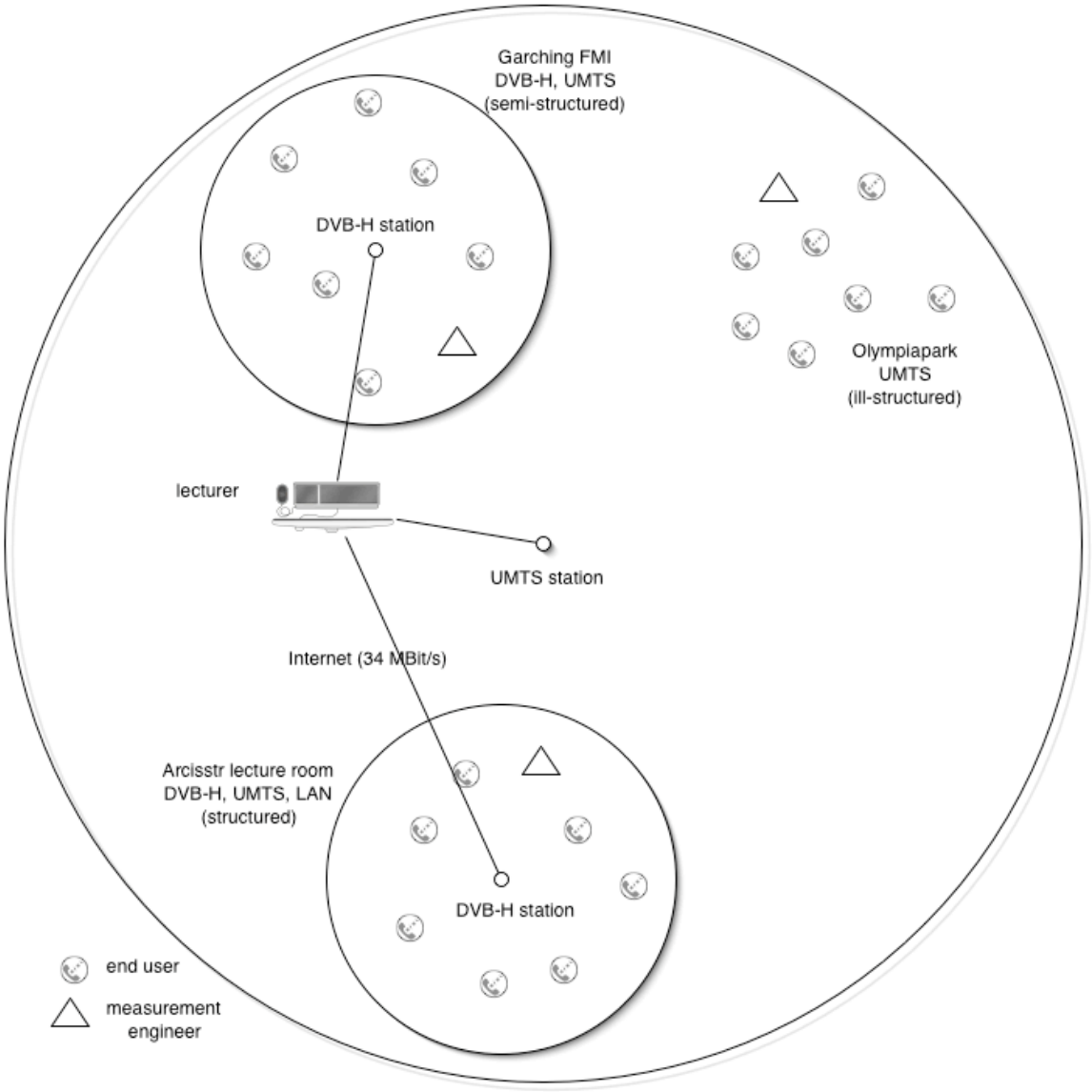
... insert deliverables here ...

6 Schedule

October 19: Project Kick-off
-> Planning and requirements analysis
November 16: Requirements Analysis Review
-> System design
December 7: System Design Review
-> Object Design
December 21: Object Design Review
-> Implementation
January 18: Implementation Review
-> Integration of the system
February 8: Client Acceptance Test, Demonstration of the final system
February 9-14: Archival of Project
February 15: Post-Mortem Review

7 Top-level Design

The final system must support the following node distribution scheme.



8 Team Organization

tbd

9 Client Acceptance Criteria

... insert client acceptance criteria here ...

10 Development Environment

tbd