ATM-Sat Demonstration Environment

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Fraunhofer Institute for Open
Communication Systems

ATM-Sat Demonstration Environment

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Outline

Demonstrator

Architecture Overview
User Terminal
DLC System
Satellite Channel Emulation
Control Station
Simulation Scenario
Management (Graphical User Interface, Internal Structure)

Outlook

Highlights
Enhancements

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Demonstrator
Architecture Overview

consists of of-the-shelf
components (IPCs)

DLC system separated
from the terminal to be
independent from OS

Satellite Channel emulated
in software based on pre-
calculated tables

Control Station manages
the environment and the
satellite

terminals

ATM switch

DLC4

DLC3

ethernet links

DLC2

DLC1

satchannel

control station

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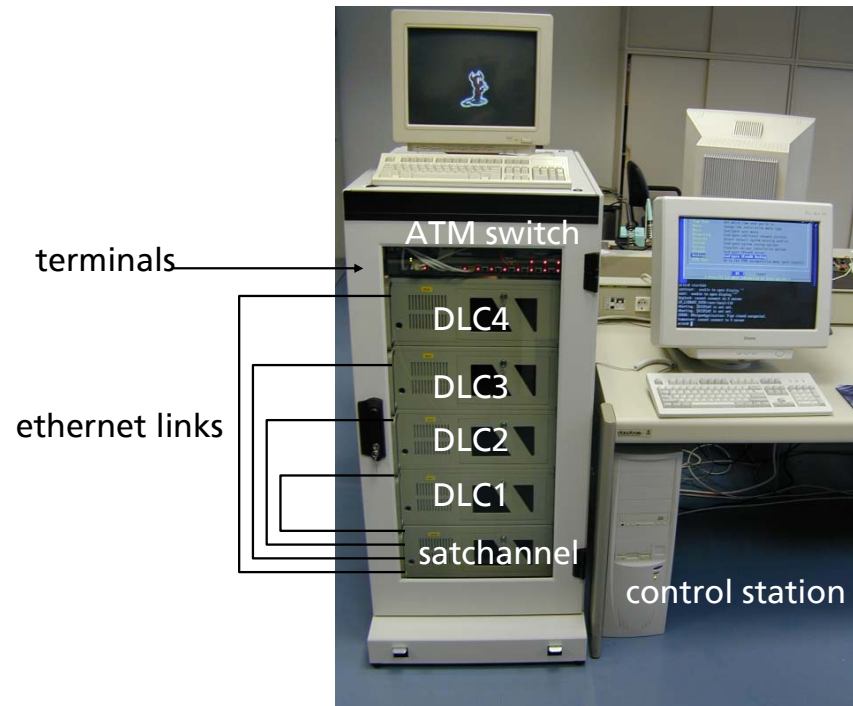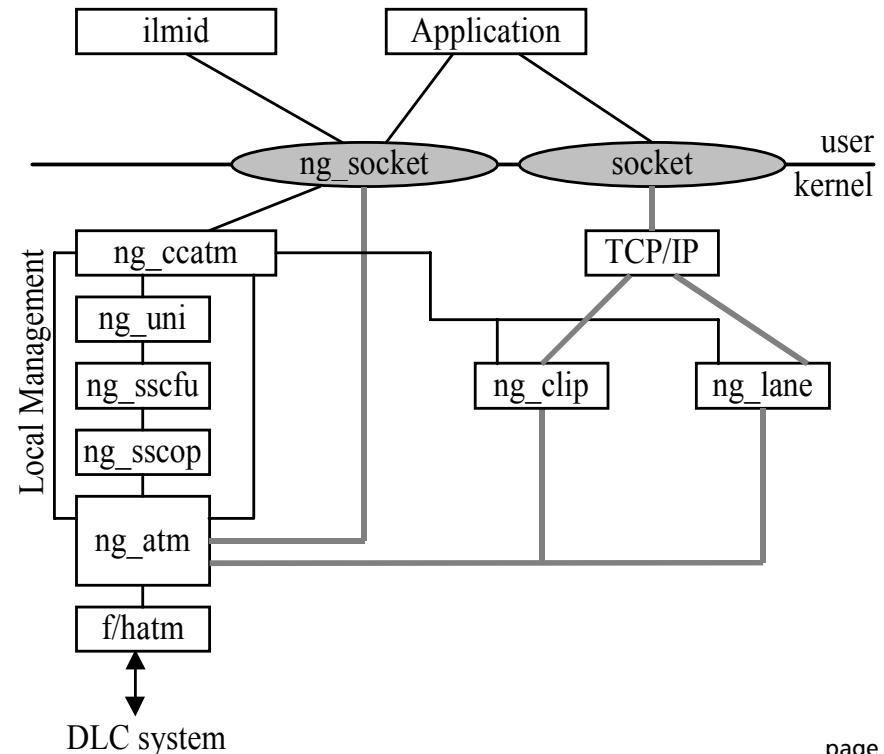
Demonstrator
User Terminal

FreeBSD netgraph subsystem used for entire ATM signaling stack

applications can access ATM directly or via usual TCP/IP

IP realised via CLIP and ATM Forum LAN emulation

local management interface (UNI <-> DLC) implemented via a PVC between the systems

of-the-shelf IP and native ATM applications can be demonstrated

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Demonstrator
DLC System

DLC layer node with three SAPs (ng_dlc)

convergence layer for ethernet encapsulation (ng_SATtrans)

multiplexer for ATM connections between DLC system and terminal system (ng_mux)

ATM cells from separate PVC for UNI messages are directly forwarded to the DLC layer

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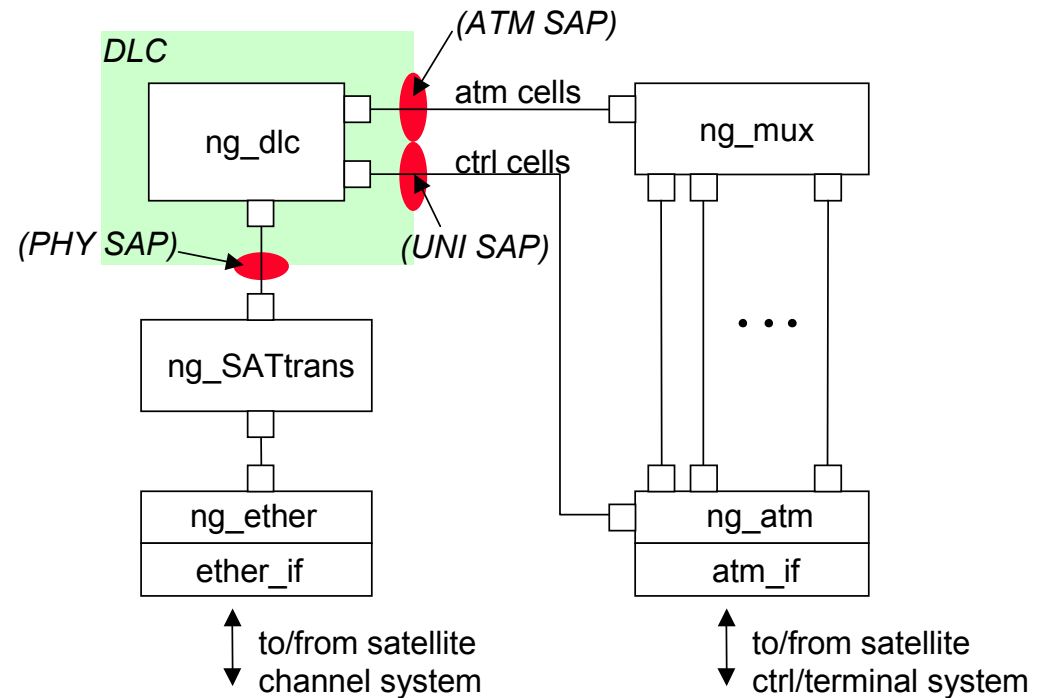
Demonstrator
Satellite Channel Emulation

emulated characteristics

variable or const. propagation delay

const. or variable bit-errors (based on pre-calculated

tables)

configure FEC (on/off, type)

emulate shadowing based on real world measurements
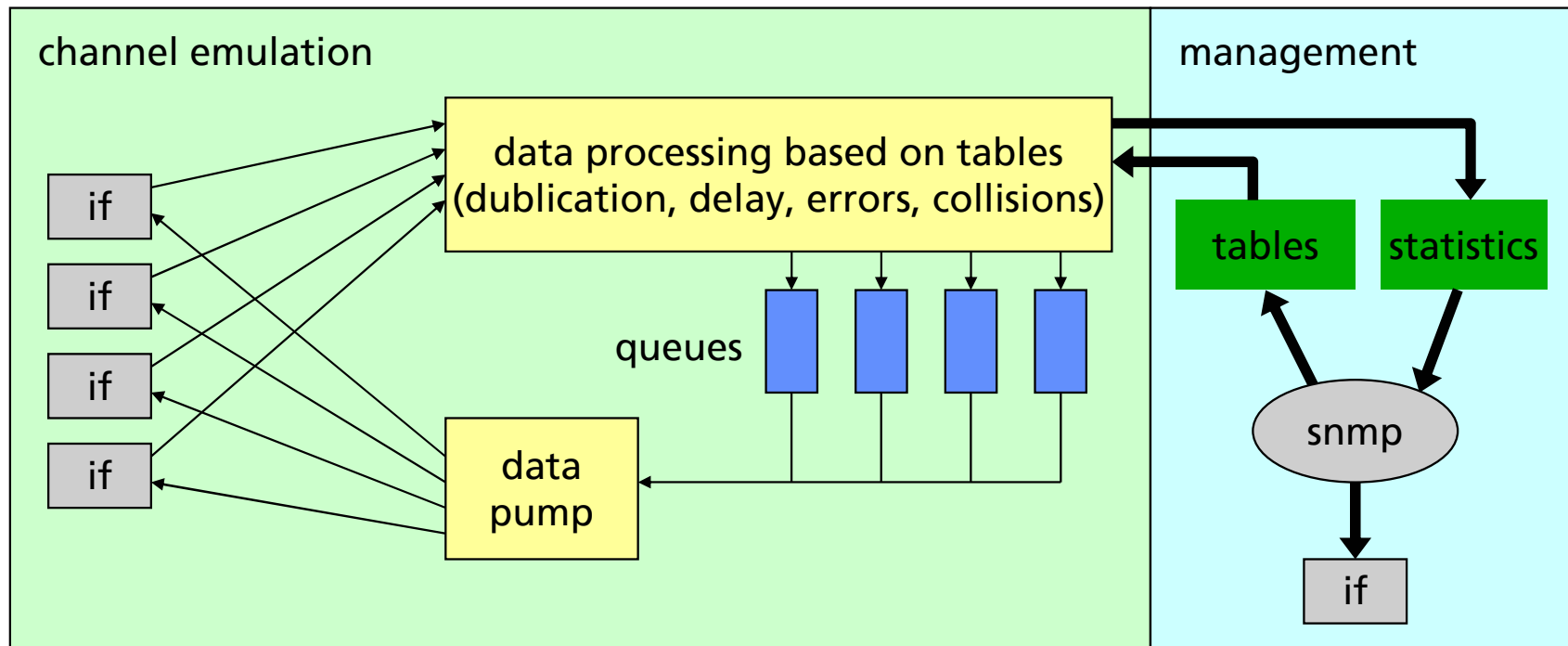
emulate collisions within random access slots

packet flow
DLC

packet flow configurable depending on the connected
system (SDLC or TDLC)

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Demonstrator
Satellite Channel Emulator Components

channel emulation

management

if

if

if

if

data processing based on tables
(dublication, delay, errors, collisions)

queues

data
pump

tables

statistics

snmp

if

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Demonstrator
Control Station

control station

| cc (call control) |
| atmroute |
| ilmi |

UNI-N stack 1

UNI-N stack 2

SNMP/ LAN emulation

40   41   42   43

VCI=5   VCI=16   VCI=5   VCI=16

DLC1   DLC2
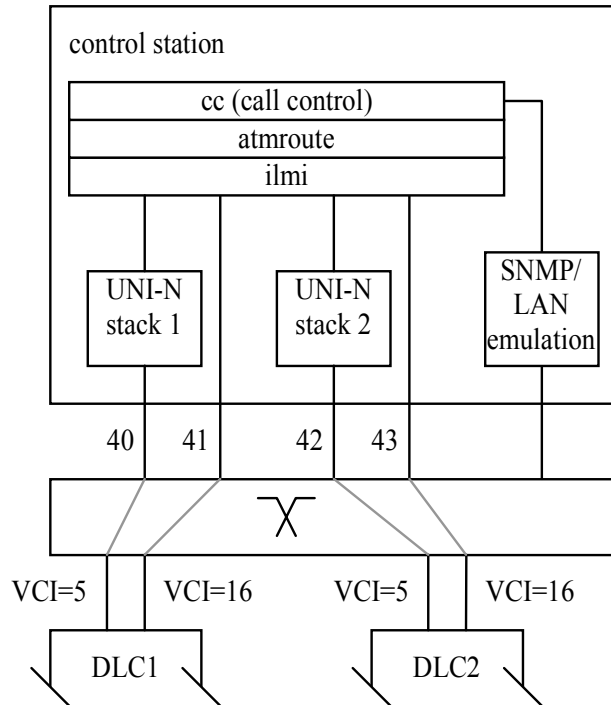
console server for the DLC systems and the ATM switch

signaling VCs are forwarded as PVCs to the control station preforming the signaling
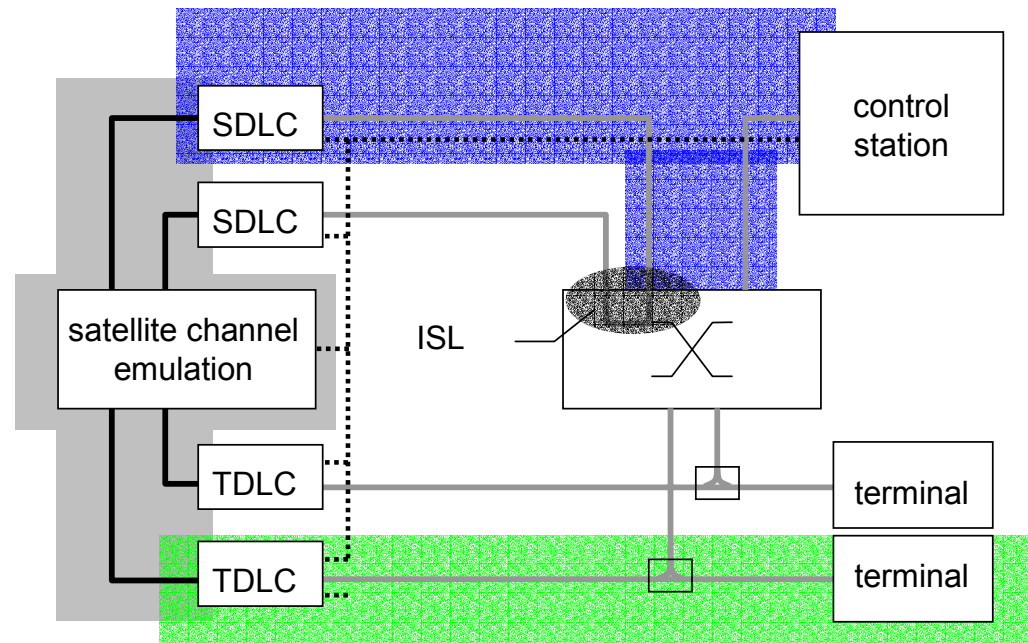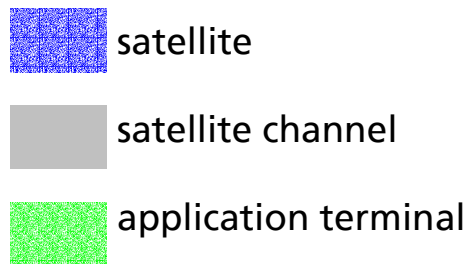
call control daemon is built around an SNMP daemon

management station for the complete demonstrator

can run many tracing tools for measurements

diskless boot support for DLC systems

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Demonstrator
Simulation Scenario

two terminal in different footprints

satellite

satellite channel

application terminal

SDLC	control station
SDLC	
satellite channel emulation	ISL
TDLC	terminal
TDLC	terminal

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Demonstrator
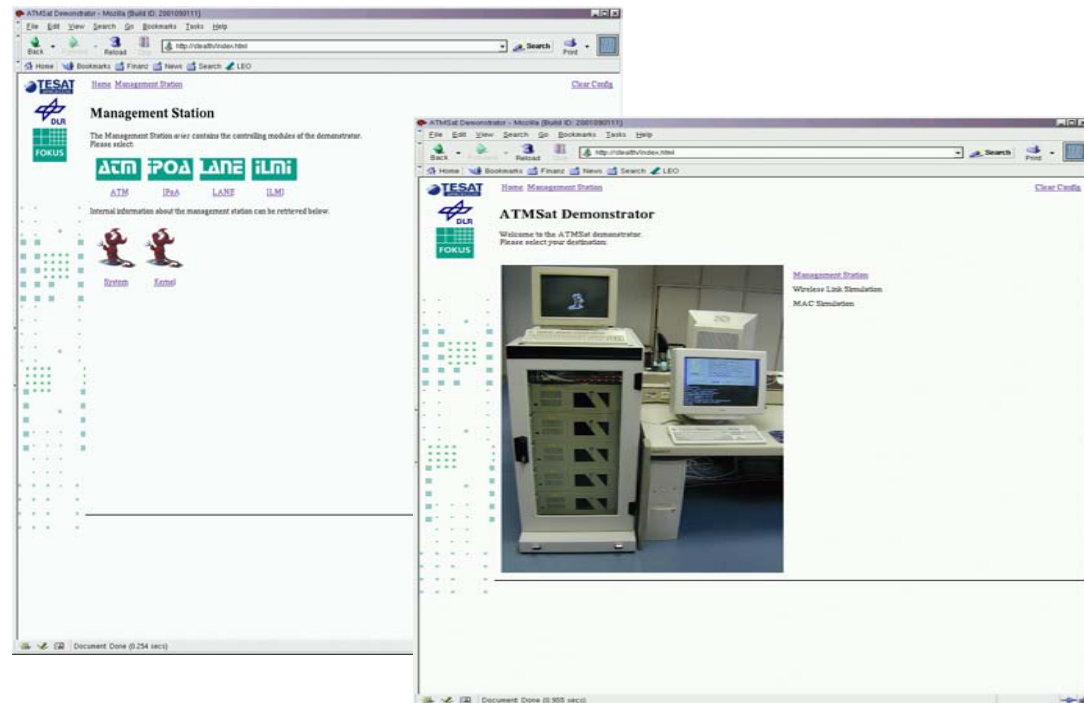## *Management (Graphical User Interface)*

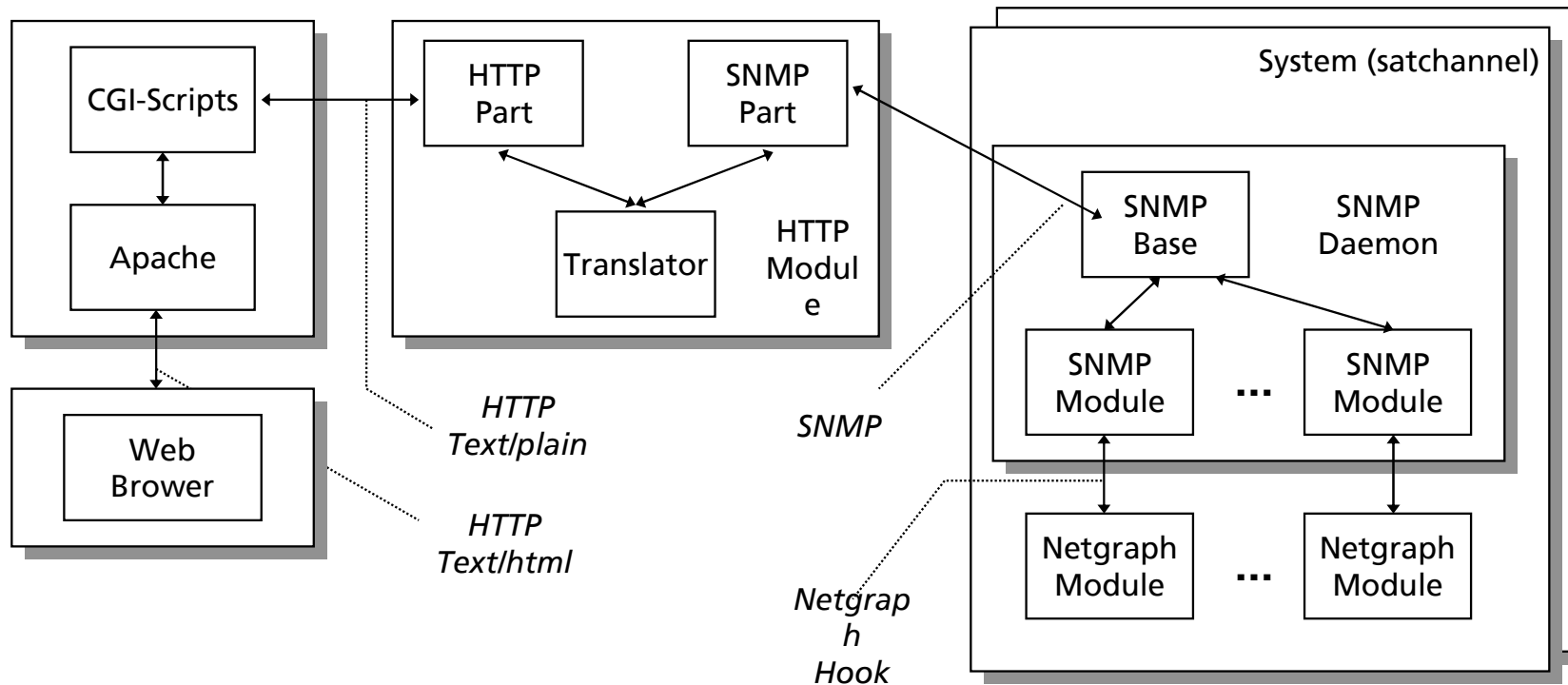**Compatible with almost all browsers with frame support**

For simplicity, only minimum set of HTML features used

Working Page divided in two zones: top part for navigation and status reports, bottom part for setting parameters

Optional additional reporting windows and periodic refresh

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Demonstrator
Management (Internal Structure)

```
CGI-Scripts  <----->  HTTP Part    SNMP Part
     |                    |              |
     v                    v              v
  Apache              Translator    HTTP Module
     |
     v
  Web Brower
```

HTTP
Text/plain

HTTP
Text/html

System (satchannel)

SNMP Base   SNMP Daemon

SNMP Module ... SNMP Module

SNMP

Netgraph Module ... Netgraph Module

Netgraph Hook

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Outlook
Highlights and Enhancements

Innovative   modular in design and therefore easy adaptable

                              development of software for unusual or expensive
hardware   is minimized

Standard Environment   suitable basis for an integrated demonstration and
                                  development platform for satellite networking aspects

Enhancements   handover demonstration (no standardised protocol exists)

                              consider solutions to demonstrate interworking aspects,
e.g.,

                              with UMTS

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