AC 201 TOMAS

Inter-Trial Testbed of Mobile Applications for Satellite Communications

**TEN Telecom Workshop
Brussels
2 February 1999**

BOSCH

INMARSAT

MARAC ELECTRONICS S.A.

Media Mobil

UNIVERSITÄT BREMEN

NERA TELECOMMUNICATIONS

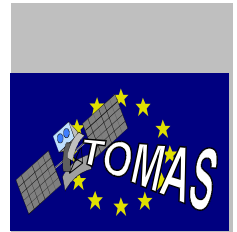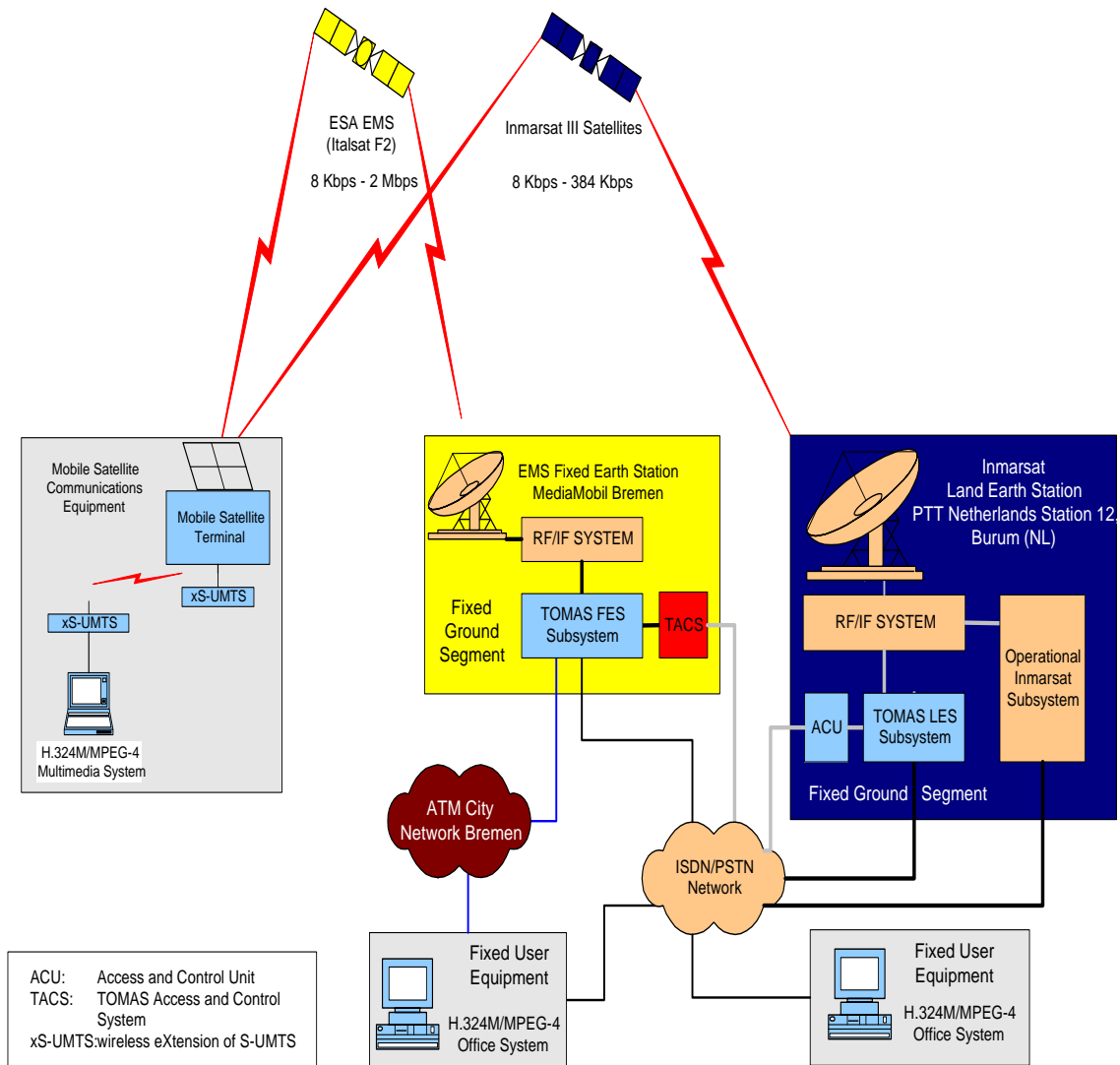AXON TECHNOLOGIE CONSULT GMBH

Objectives of ACTS Project TOMAS

- Realisation of Satellite-UMTS test platform for multimedia services up to 2 Mbps channel rate

- Execution of joint trials with cooperating projects

- Identification of generic requirements for S-UMTS services and contribution to technical guidelines

- Cost/benefit analysis from the end user, service provider and network operator perspective

- ACTS horizontal activities and public dissemination

TOMAS Intertrial-Platform

ESA EMS
(Italsat F2)

8 Kbps - 2 Mbps

Inmarsat III Satellites

8 Kbps - 384 Kbps

Mobile Satellite
Communications
Equipment

Mobile Satellite
Terminal

xS-UMTS

xS-UMTS

H.324M/MPEG-4
Multimedia System

EMS Fixed Earth Station
MediaMobil Bremen

RF/IF SYSTEM

Fixed
Ground
Segment

TOMAS FES
Subsystem

TACS

Inmarsat
Land Earth Station
PTT Netherlands Station 12.
Burum (NL)

RF/IF SYSTEM

Operational
Inmarsat
Subsystem

ACU

TOMAS LES
Subsystem

Fixed Ground   Segment

ATM City
Network Bremen

ISDN/PSTN
Network

Fixed User
Equipment

H.324M/MPEG-4
Office System

Fixed User
Equipment

H.324M/MPEG-4
Office System

ACU: Access and Control Unit
TACS: TOMAS Access and Control
              System
xS-UMTS:wireless eXtension of S-UMTS

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Overview of TOMAS Services

Bearer Services

- *Low Speed* with data rates of n x 8 Kbit/s (up to 64 Kbit/s) and interconnection to ISDN,

- *Medium Speed* with data rates of n x 8 Kbit/s (up to 384 Kbit/s) and interconnection to ISDN,

- *High Speed* with data rates of N x 8 Kbit/s (up to 2 Mbit/s) and interconnection to ATM

- All data rates can be symmetric or asymmetric and can be selected on demand

Tele Services

- H.324 real time multimedia service

- MPEG-4 real and non-real time multimedia service

- IP Connectivity

- Service rates can be symmetric or asymmetric and can be selected on demand

Overview of TOMAS Trials

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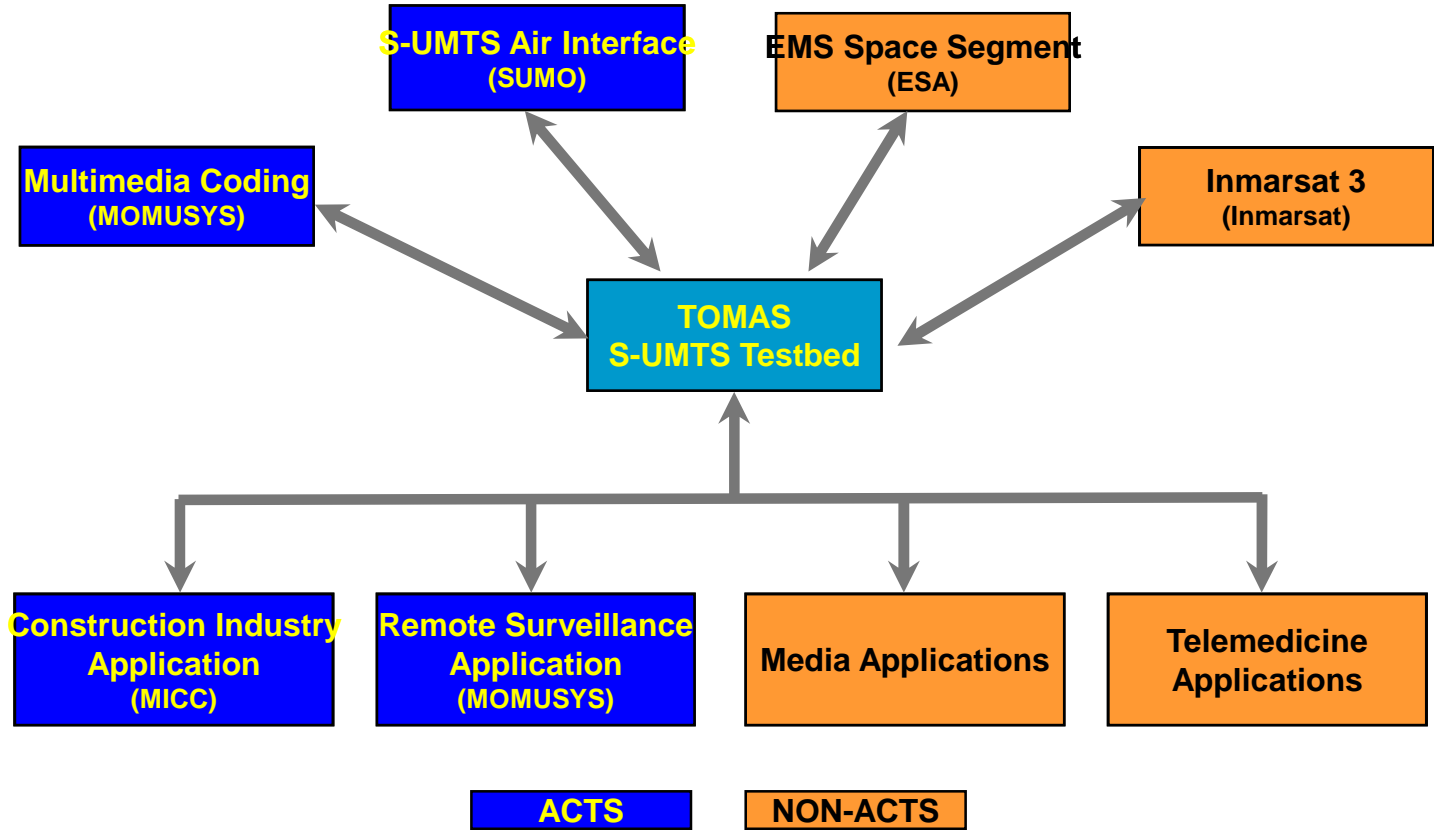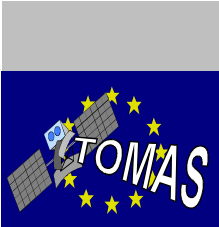
Joint Trials Performed in 1998

- MoMuSys Expert User trials with TOMAS H.324M and MoMuSys MPEG-4 terminal: Verification of H324M/MPEG-4 developments for S-UMTS

- MICC trials with ISDN satellite services supporting construction site applications: Web Browsing and data transmission/retrieval and Video conferencing

- Support of HECTOR telemedicine applications with TOMAS mobile satellite equipment and bearer service

- MoMuSys End User trials with end-to-end MPEG-4 multimedia transmission: Remote video surveillance trials by security services

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Evaluation of System Performance:
TOMAS H324 and MoMuSys MPEG4 Multmedia Terminal

Configuration
- Comparison and validation of TOMAS H.324M and MoMuSys MPEG-4 terminals over satellite
- Configuration 1: via live geostationary satellite link
- Configuration 2: via satellite simulator

Satellite Delay
- In interactive communications the effect of the satellite delay is noticed by the users
- Users get accustomed to the delay after a number of conferences

Bit Error Rate
- For H324M and MPEG4 coding standard up to a BER of 1E-6 no degradation in quality can be identified
- H324M and MPEG4 standard cope with a BER up to 1E-5 (some errors are noticeable)

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Economic and Social Impact

TOMAS provides Infrastructure and Mobile Services

❑ Full real-time multimedia functionality including voice, still pictures, motion video, file transfer

❑ Video Conferencing, Telephony, Internet and Data B. Access

Economic and Social Impact

❑ Requirements of modern society for increasing mobility and increasing bandwidth are met by achievements

❑ More information at any time in any location leads to higher reliability of decisions and reduces costs

❑ Less waste of time and efforts for travel to come to a con-ference. Transport of information instead of human beings

Exploitation of the Achivements

- **TOMAS S-UMTS Bearer and Tele Services**
  - ❏ Inmarsat and MediaMobil intend to provide TOMAS services as commercial services. Developments will be continued in the TEN-Telecom project SATISFY2000

- **TOMAS Mobile Satellite Terminals Version A and B**
  - ❏ Nera and MARAC intend to transfer the technology of TOMAS prototype MST in commercial products

- **TOMAS Fix and Land Earth Stations**
  - ❏ Inmarsat and MediaMobil intend to implement billing and accounting as well as fraud protection features in upgraded prototype FES and FES for commercial use

- **TOMAS Multimedia System**
  - ❏ Further developments will be done by Bosch to use the multimedia coding technology in commercial products