

STATUS OF RC SPECIFICATION

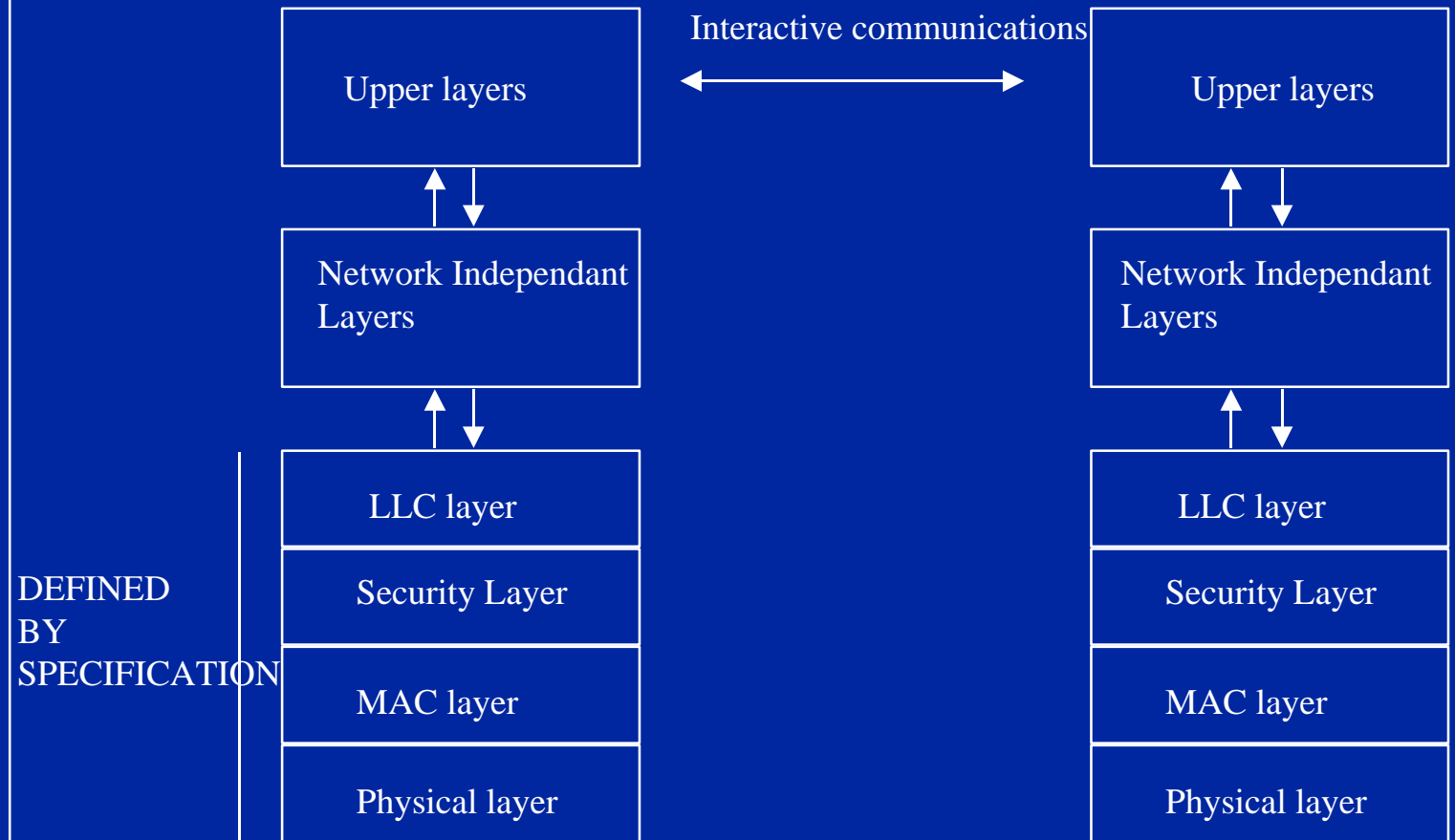
DAVIC INFO DAY

Jean-Charles Point *Thomson Broadcast Systems*

Summary

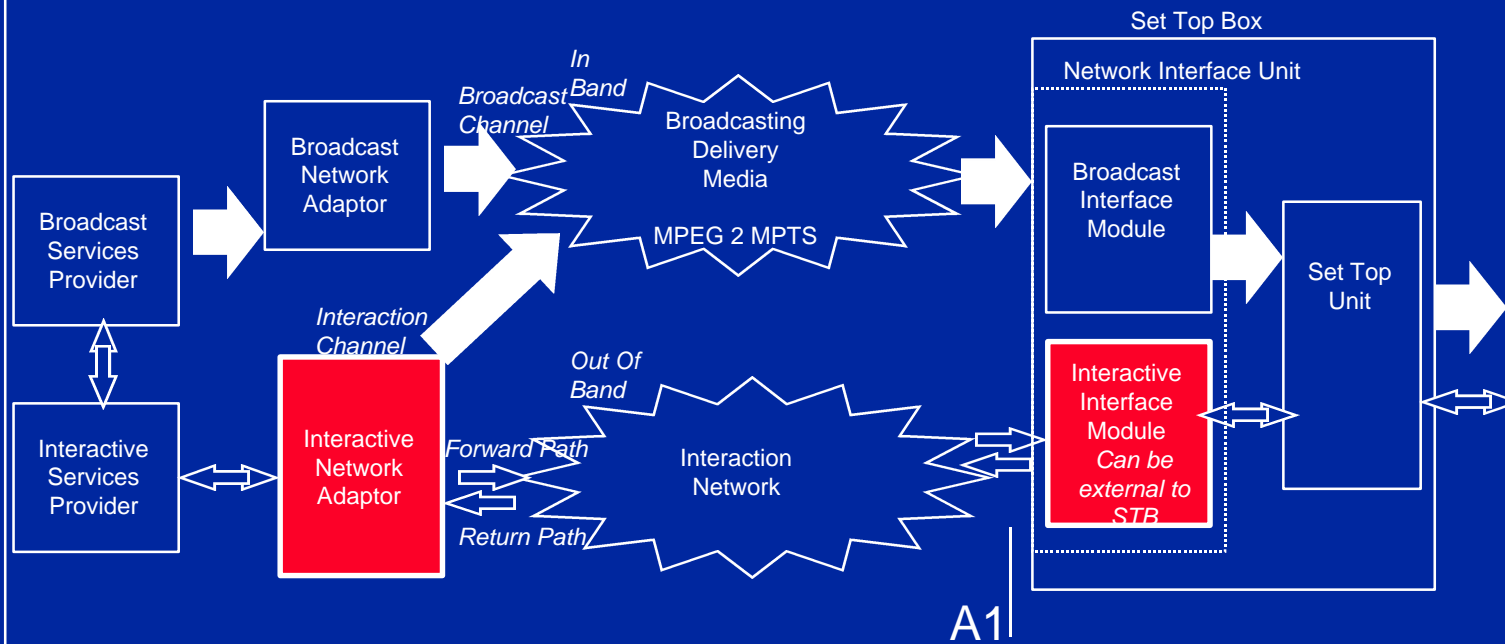
- Standardisation status**
- Standard Overview**
- Future work**
- Conclusion**

LAYERS ARCHITECTURE



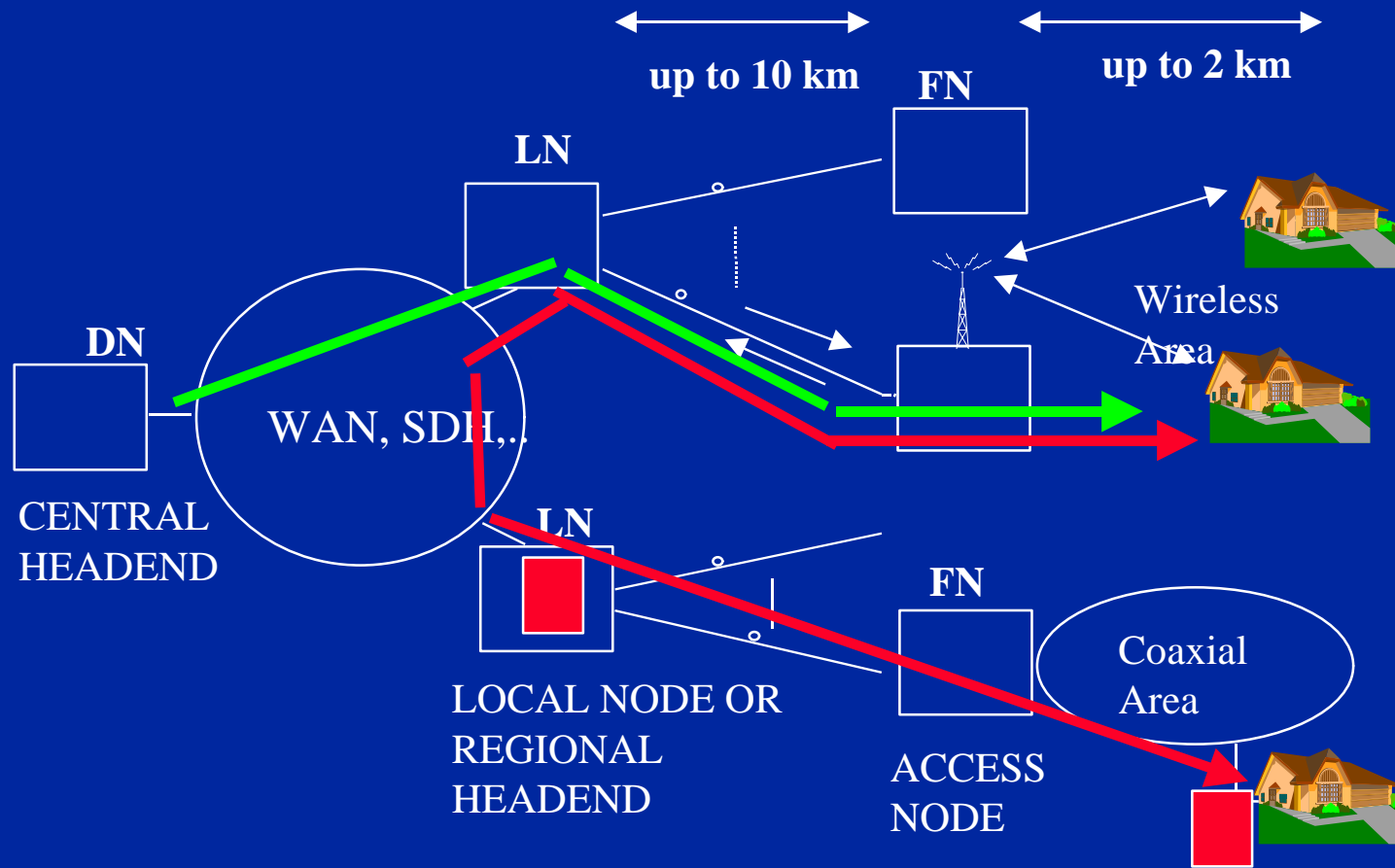
DEFINED BY SPECIFICATION

SYSTEM ARCHITECTURE



In the case of HFC and LMDS, Interaction network and broadcast network are the same.

HFW system overview : interactive service path



Transmission standards

- ❑ DAVIC passband : ad hoc group defining network dependant layers (dedicated to HFC)
- ❑ DVB-RCCL : ad-hoc group for standardisation of HFC and LMDS network dependant layers for the following services
 - INTERACTIVE TV, INTERNET ACCESS
 - TELEPHONY
- ❑ HFC : ETS 300 800 and ITU T J112 (A) voted 03/98;
EQUIVALENT TO DAVIC 1.2

Transmission standards

❑ VERSION 2 INCLUDING SOME EXTENSIONS
DELIVERED 09/98 FOR VOTE

❑ ETS 300-800 approved by DAVIC (1.5)

❑ **Conclusion :**

○ DVB AND DAVIC HAVE A COMMON SPECIFICATION
FOR CABLE MODEM APPLICATION

○ ETSI HAS A COMMON SPECIFICATION FOR HFC AND
LMDS APPLICATIONS

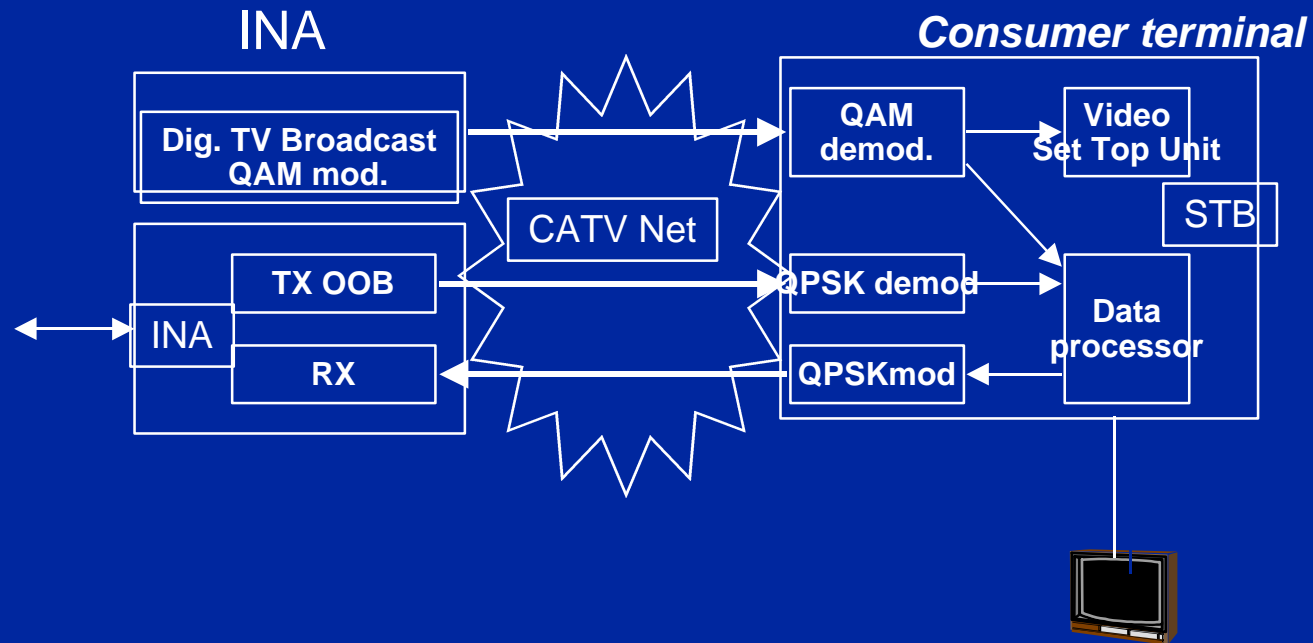
STANDARD MAIN FEATURES

- ❑ 3 COMMON STANDARDS : DAVIC1.5, ETS 300800 (DVBRCC) AND EN 301199 (LMDS)
- ❑ Acces technique : mix of FDMA/TDMA
- ❑ downstream carriers : either 3 Mb/s bit rate (Out Of Band), or ± 40 Mb/s bit rate (In Band)
- ❑ Upstream bit rate : from 256 kb/s to 6 Mb/s
- ❑ MAC layer can support both data and voice services :
 - slotted aloha, reservation and fixed bit rate connections
- ❑ basic cell structure: ATM and minislot

Standard Main features

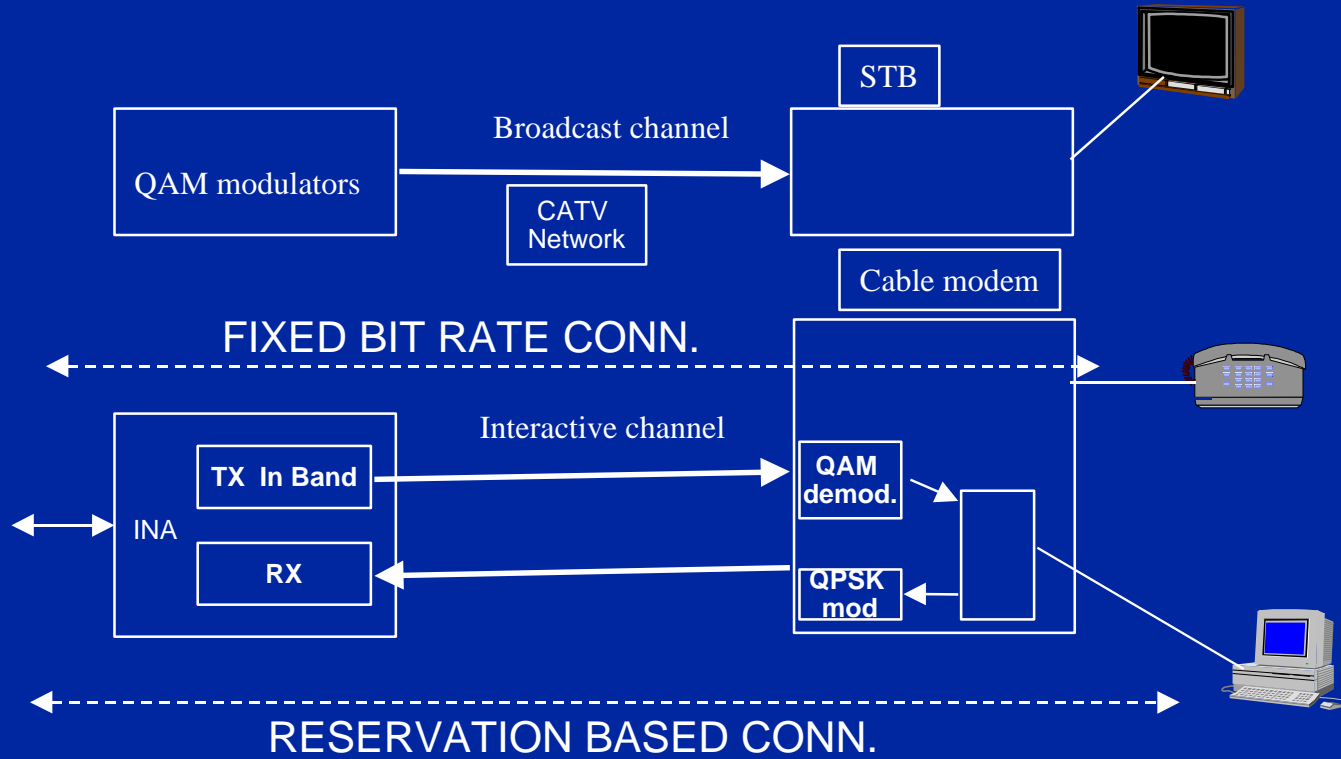
- ❑ Security layer supporting both single cast and multicast sessions

System implementations



OUT OF BAND FOR INTERACTIVE TV

System implementations



IN BAND FOR CABLE MODEM AND TELEPHONE APPLICATIONS

RANGING

3 TYPES OF RANGING ARE PERFORMED :

- Upstream power adjustment
- time adjustment
- upstream frequency adjustment (for LMDS)

During operation, readjustment is possible

Access mode efficiency /use

- ❑ Contention : 35 %; used for MAC messages (1 slot) and small data messages
- ❑ fixed rate : 100 %; used for telephony and low bit rate default connections; medium efficiency for data traffic (delay variation)
- ❑ reservation : 70 - 80 %; very efficient for data traffic (bursty messages)
- ❑ **THE SYSTEM CAN MANAGE A MIX OF 3 ACCESS MODES ON THE SAME CARRIER**

Minislots for reservation request

- ❑ reservation efficiency limited by collisions of reservation request messages in upstream
- ❑ minislot used to improve this efficiency; minislot are introduced from DAVIC 1.3 and in ETS 300 800 V2

Management

- Transmission control message** : allows the INA to stop / resume NIU transmission
- Status request / response message** allows the INA to record the main STB/CM parameters

RATIONALE FOR SECURITY

- ❑ HFC network architecture such as :
 - Downstream messages very easy to intercept
 - upstream messages very difficult
- ❑ CA / higher layer security can support partly security contexts
- ❑ Privacy must be ensured for telephony
- ❑ Authentication/security is required for billing
- ❑ Conclusion : security is an available option according to the network operator requirements

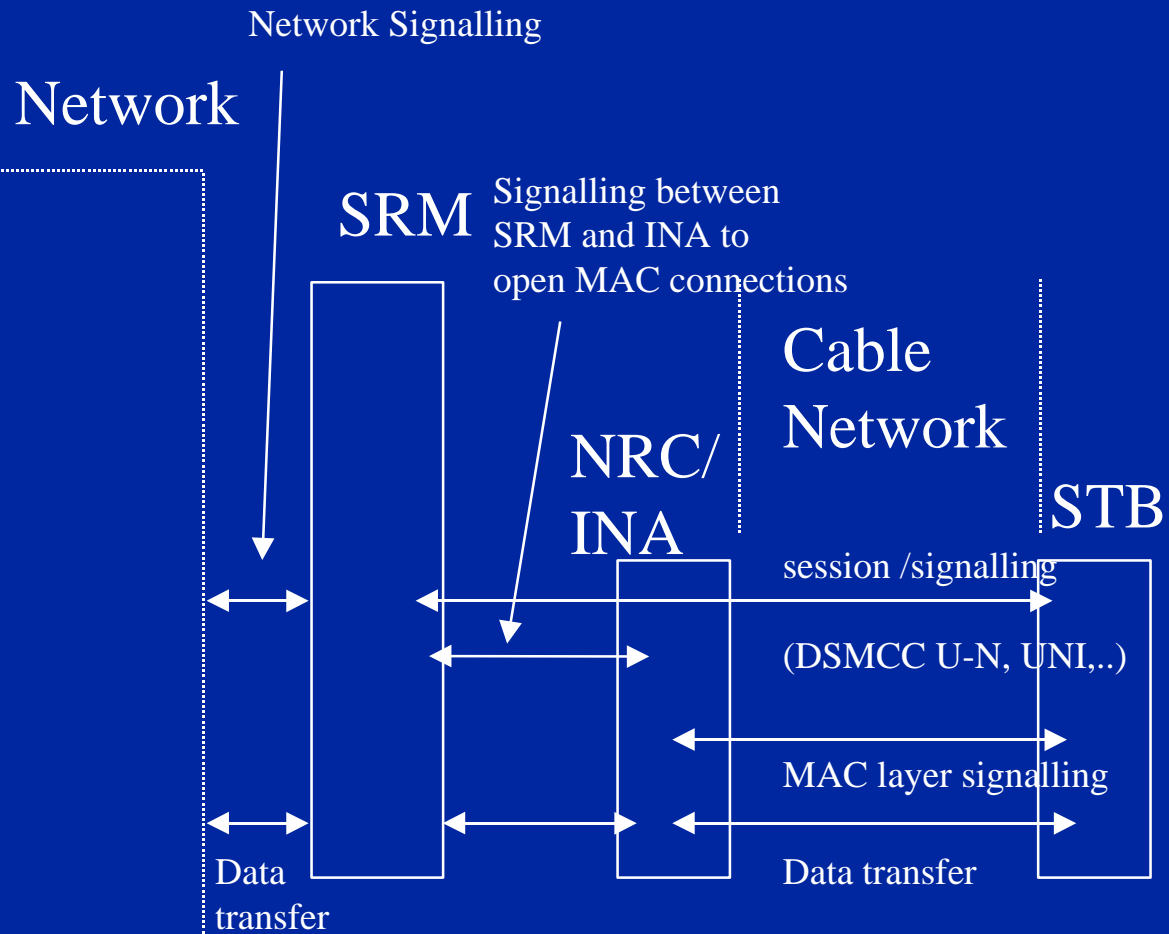
Security functions

- Key exchange
- Encryption on both singlecast and multicast sessions
- Authentication
- Clone detection
- CAN BE IMPLEMENTED ON SEVERAL LEVELS TO
ALLOW COMPROMISE BETWEEN COST AND
PERFORMANCES

Security primitives

- Public key exchange using Diffie Helmann
- One way Hashing using SHA1
- Encryption using DES (40 or 56 bits keys)
- Pseudo random number
- Public key exchange
- Quick key exchange
- Explicit key exchange

Communication model



Interoperability

- ❑ **Open Consortium created to ensure interoperability between products using ETS 300-800/DAVIC 1.5**
- ❑ **goal : providing to the operator the confidence that it can choose between the companies owning to this consortium**
- ❑ **founders : Nokia, Thomson BS, Alcatel, Divicom, Cocom, Hugues NS, SAGEM, Thomson MM, Simac**
- ❑ **Number will increase to around 15 in the coming months**

Planning for future work

INTEROPERABILITY :

- Creation of PICS as an annex to the specification : 01/99
- interoperability test specification : written by the interoperability consortium : 01/99
- test specification

CONNECTION TO UPPER LAYERS :

- communication scenarii for telephony, RT IP, ATM
- MAC "API"

UPDATE OF GUIDELINE DOCUMENT

FUTURE WORK

- SPECIFICATION ENHANCEMENT ACCORDING TO FUTURE NEEDS (HI PHY, ..)**

General Conclusions

- ❑ The DAVIC / DVB RC Specification is standardised and stable
- ❑ The DVB RC / DAVIC 1.5 specification provides a complete standard for the introduction of Interactive TV, Cable modem, and telephony applications in HFC and LMDS networks
- ❑ The standard is getting acceptance from Cable communication associations, and from the major manufacturers.