Activities in Satellite Standardisation Bodies - A Rough Guide to Contribution

Gorry Fairhurst
University of Aberdeen

v04

- Introduction to tutorial
- ISO (MPEG)
- DVB (DVB-S)
- IETF - How it works
  - IETF Working Groups (ipdvb)
- ETSI (BSM Working Group)
- Conclusion (How to Influence Standards)

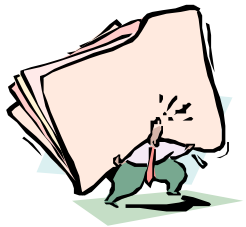
Aims

Improved awareness of ***requirements***

- *Which WGs are* ***Relevant***
- *What WG's* ***Need***

Improved awareness of ***procedure***

How WG's ***Work***



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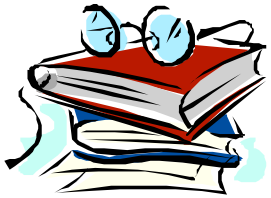
Many Different Groups

IETF Inet: IPv6; ipdvb; magma; mip4; mip6 mipshop; nemo; ippm
IETF Ops: mboned; v6ops; manet
IETF Routing:
IETF Transport: MMUSIC
IETF Sec: ipsec; msec
IETF Transport: tsvwg; rohc
ETSI/TIPHON (QoS)
ETSI/3GPP Chair
ETSI/SES HARM
ETSI/SES GMR
ETSI/SES S-UMTS & IMT-2000
ETSI/SES MAR
ETSI/SES ECSS
ETSI/SES AES
ETSI/SES BSM
ETSI/SES Ku-Band AES
ETSI/SES/STF237
ETSI/BRAN
ETSI/NGN
ETSI/SDR

3GPP
SATLABs
DVB
DVB/GBS
DVB/RCS
DVB/S2
DVB/CBMS
DVB/CPCM

CEPT
CENELEC
R&TTE
SMPTE
DOCSIS / CableLabs
WorldDAB
WiMAX
GBSI

TIA TR-34.1(Communications & Interoperability)
TIA TR 34.2 (Spectrum & Orbit Utilization)
ITU-T (SG4, SG6)
ITU-R
ITU-ICGSAT
CCSDS
IEEE
ISO
ESOA
ATSC
GVF
ASMS-TF



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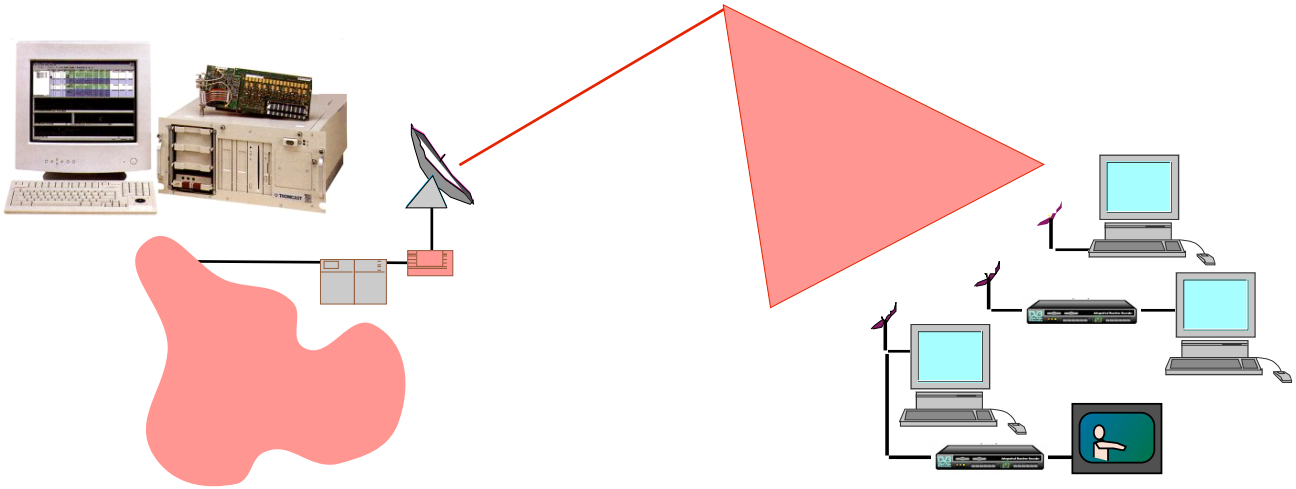
SATNEX WP3300

IP Delivery via DVB



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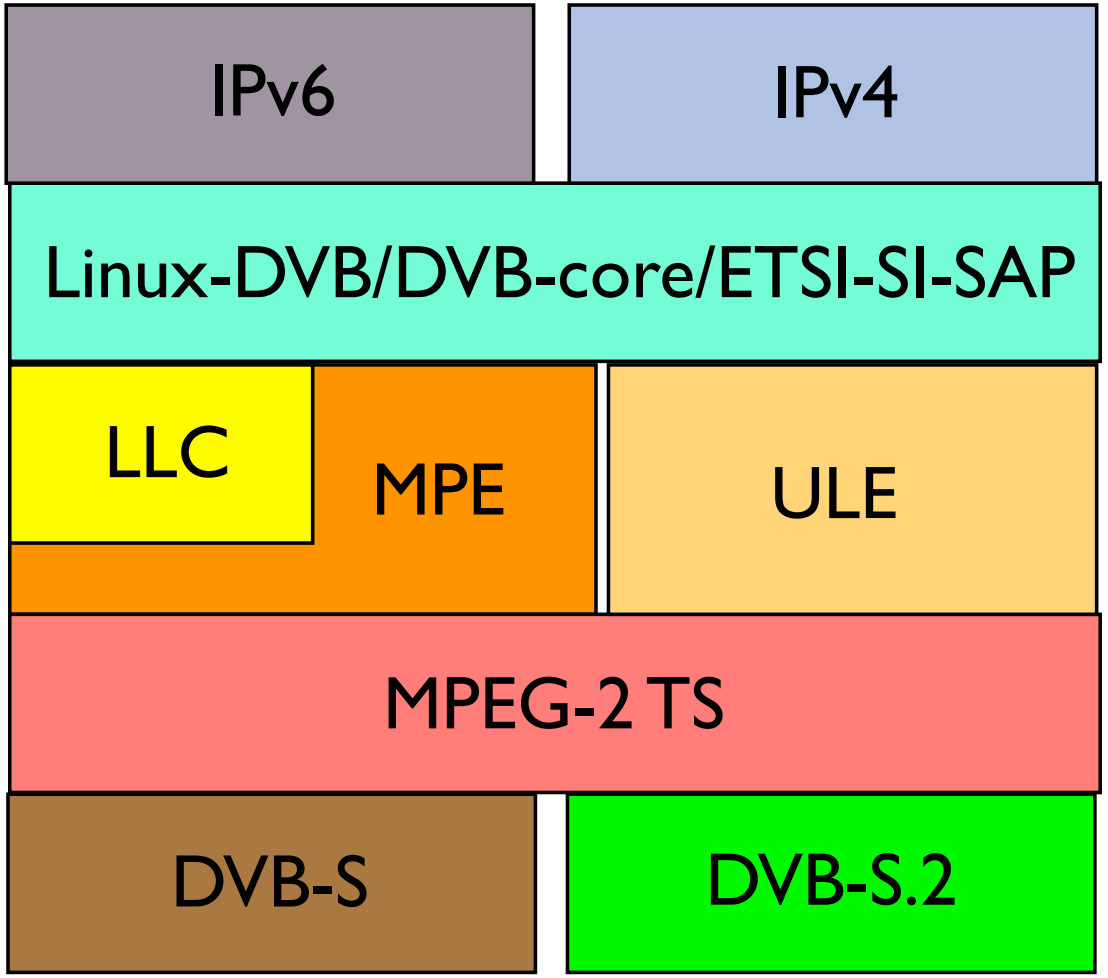
Protocol Stack



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- Introduction to tutorial
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- Conclusion (How to Influence Standards)

History of MPEG

Work in digital compression lead to DCT algorithms

Joint Photographic Experts Group (JPEG) active

1988 Motion Picture Expert Group (MPEG) formed

1992 MPEG-2 (TV) and MPEG-3 (HDTV) combined

1993 MPEG-2 Main profile defined

1994 ISO Standard 13818 for MPEG2

1996 Set of DVB standards published by ETSI

1996 HDTV (1250/50) demonstrated in 16:9

1996 2M MPEG-1 video disk players in China

1997 Extended CPU graphics instruction sets

1997 >200 DVB Satellite TV Channels

1997 First interactive DVB service

1998 Digital Versatile Disk (DVD)

1998 1Q Active Movie API

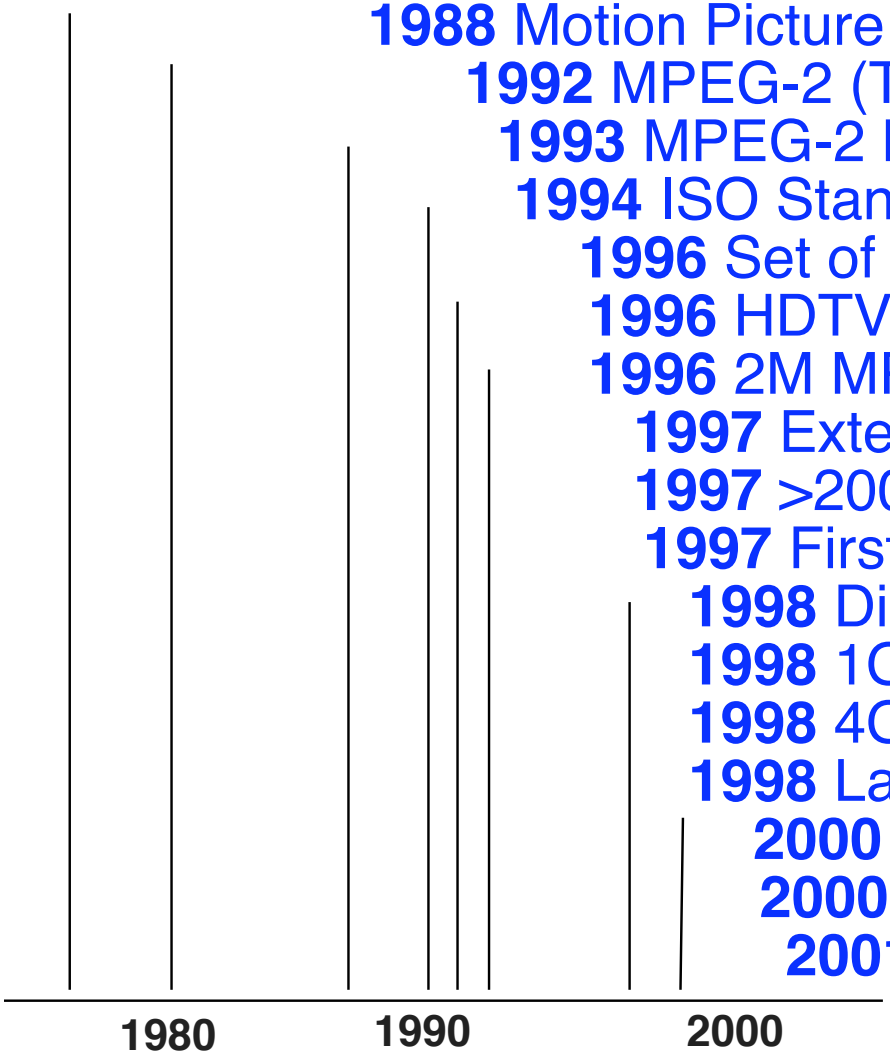
1998 4Q Launch of DVB-T in UK

1998 Launch of DTV service in U.S.A

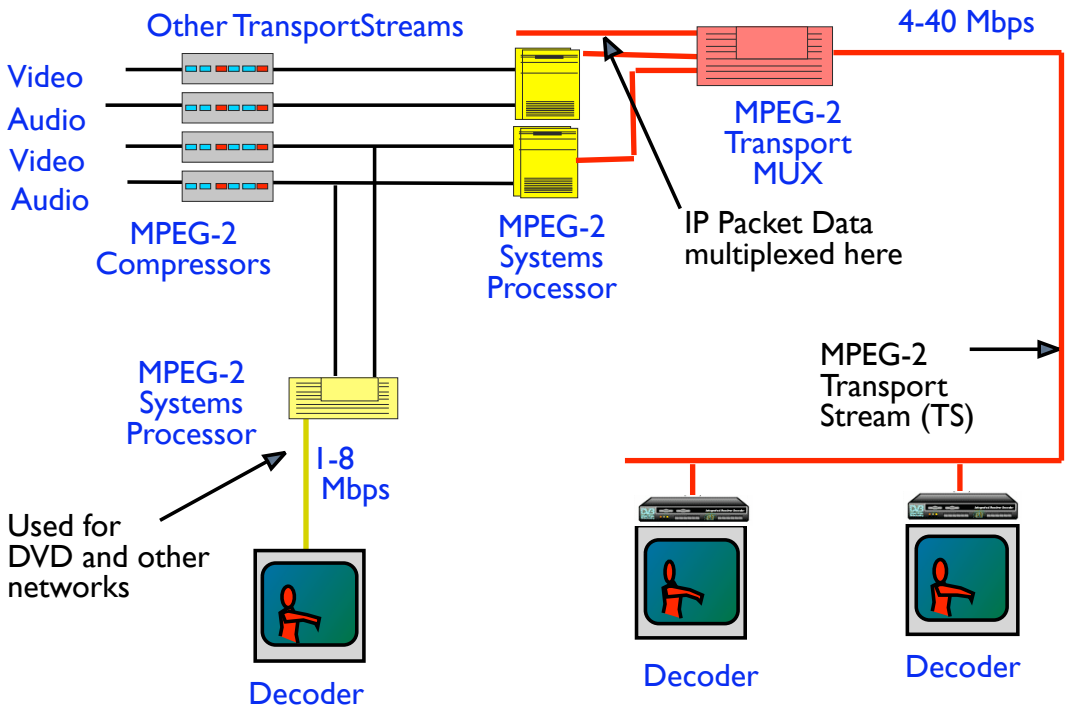
2000 Specification of DVB-RCS

2000 MPEG-4

2001 Definition of DVB MHP

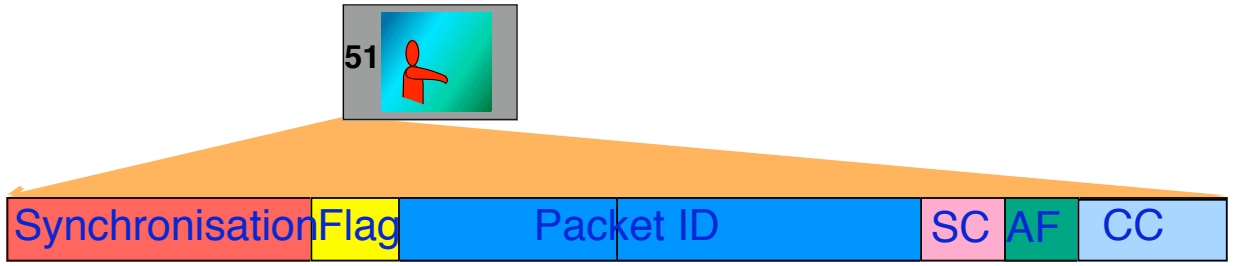


MPEG-2 Streams



[ISO 13818-1; EN300468]

4 Byte MPEG-2 Transport Header



Synchronisation byte (8 bits) 0x47
Flag bits (3 bits) :
- 1.Transport error
- 2.Start of a payload (payload_unit_start_indicator) *
- 3.Transport priority bit

Packet Identifier (PID) (13 bits)
Scrambling control bits (2 bits)
Adaption field control bits (2 bits):
- 01 – no adaptation field, payload only
- 10 – adaptation field only, no payload
- 11 – adaptation field followed by payload
- 00 – RESERVED for future use

Continuity counter (4 bits)

*For data: 1=1-byte pointer follows; For PES: 1=PES starts in 1st byte

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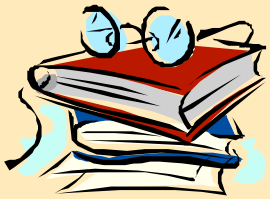
ISO: Way of Working

Work brought by National standards bodies

Documents approved by ISO members orgs.

Voting restricted to member orgs.

Standards issued by ISO (fee payable)



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- Conclusion (How to Influence Standards)

What is DVB?

Digital Video Broadcasting Project (formed 1992)

Industry-led consortium:

- Over 270 broadcasters, manufacturers, operators, software developers, regulatory bodies, ...
- 35 countries committed to global standards for global delivery of digital television and data services.

Digital Video Broadcasting

MPEG-2 standard for video & audio

Fixed rate simplex transmission

Extends MPEG-2 transport facilities:

- Service Information (SI)
- Spec.s for Conditional Access (CA)
- Optional return channel for interactive services
- Support for various types of packet

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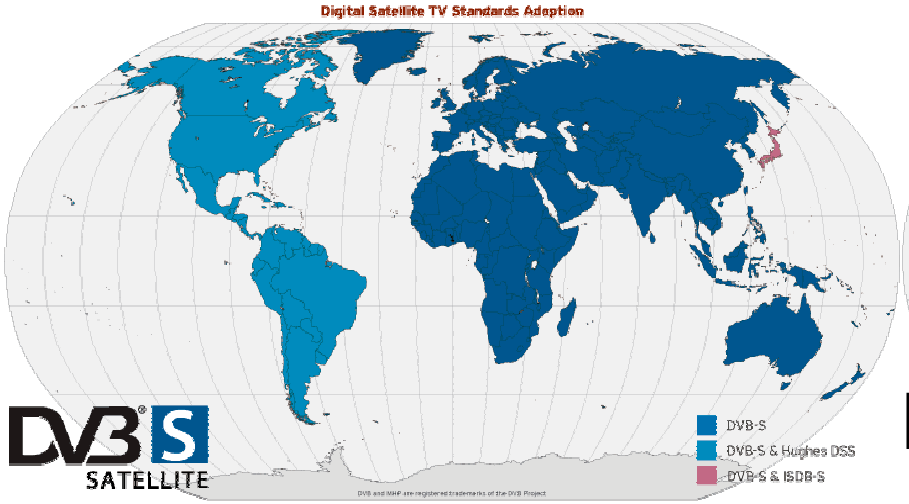
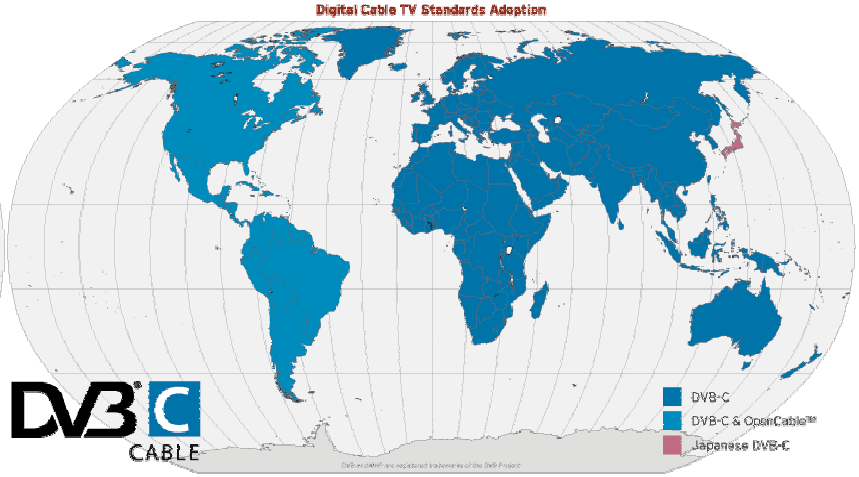
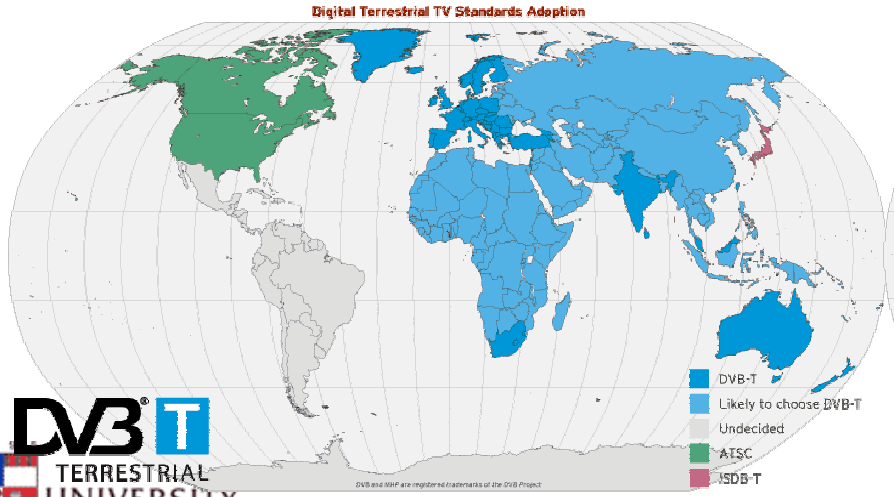
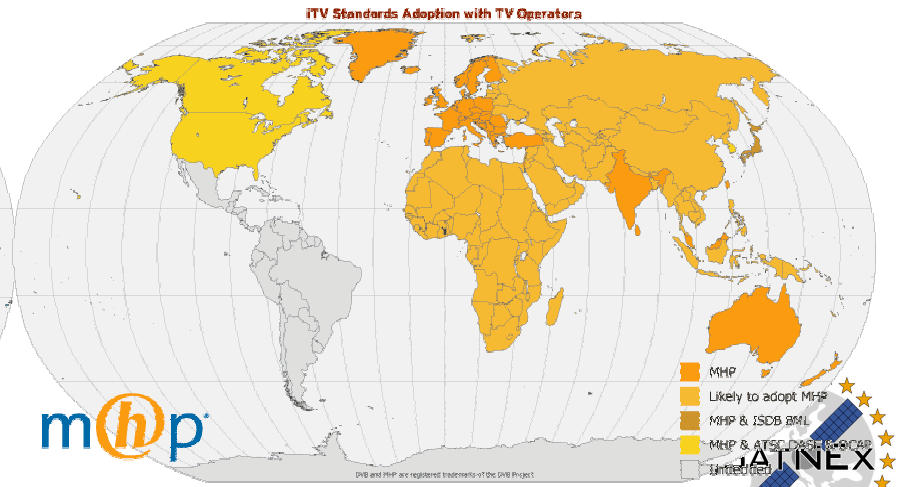
Digital Video Broadcasting









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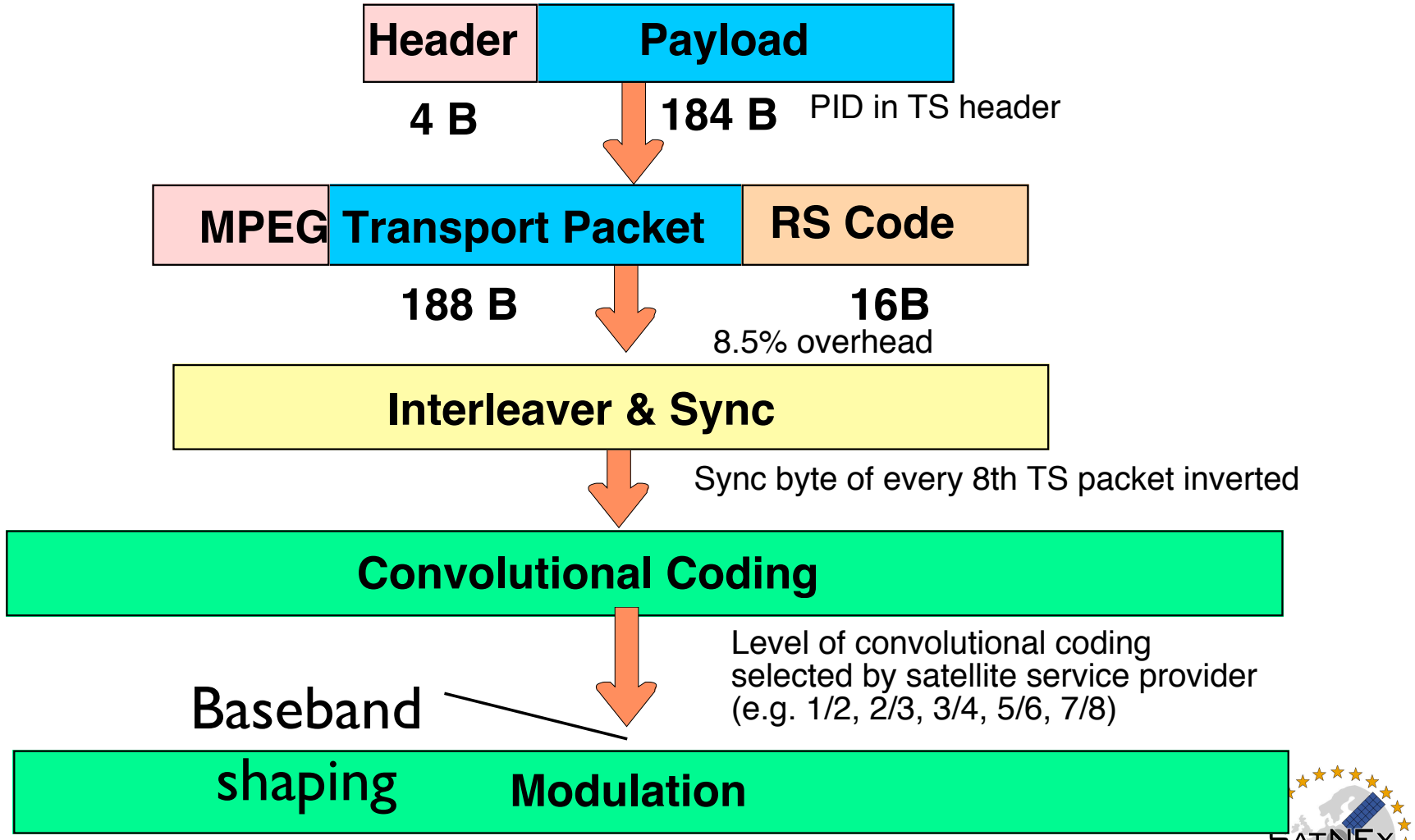
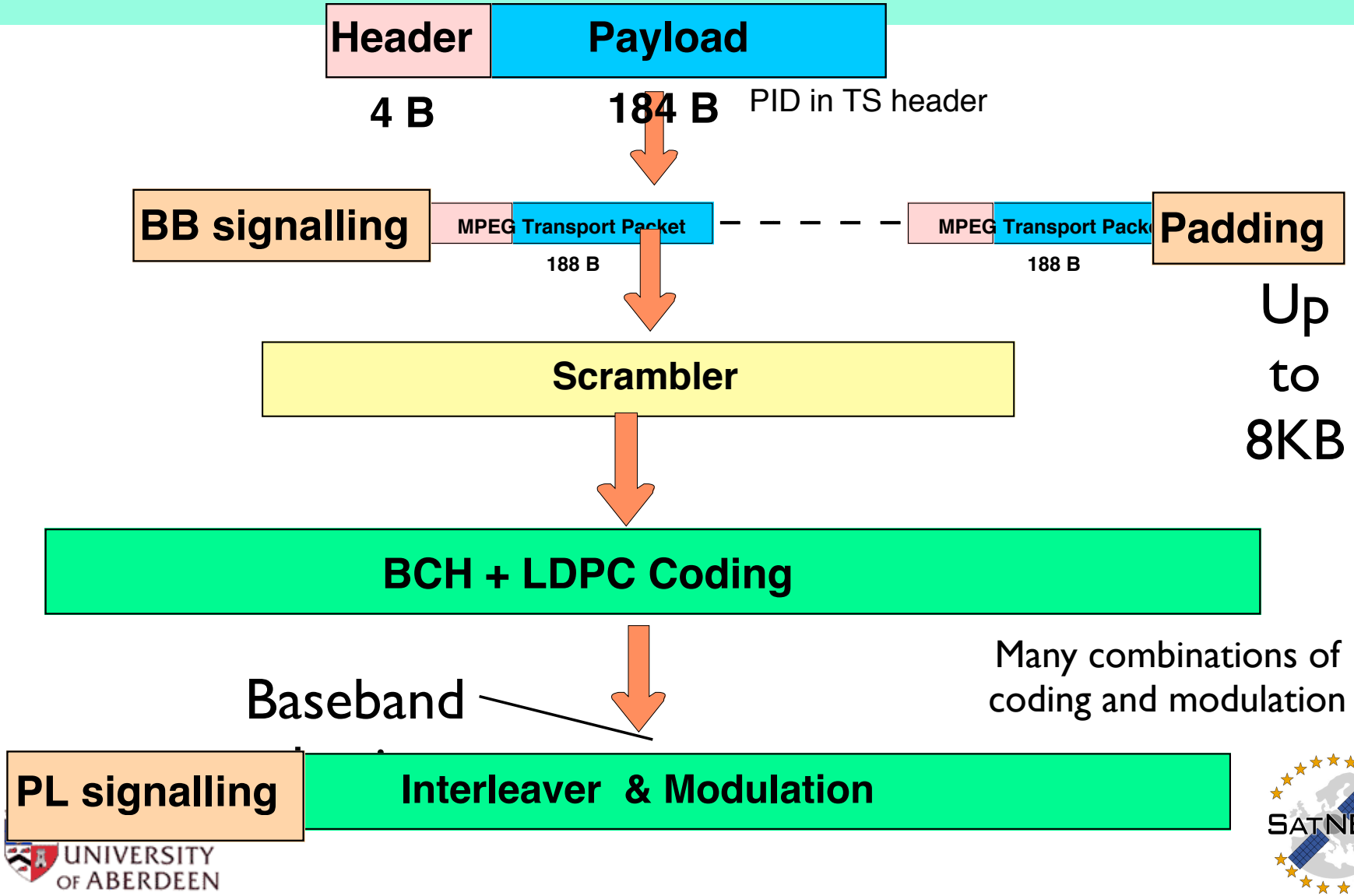
DVB Transport Stream Coding



DVB S2 Coding/Modulation



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FEC

1/2 – 9/10

Modulation

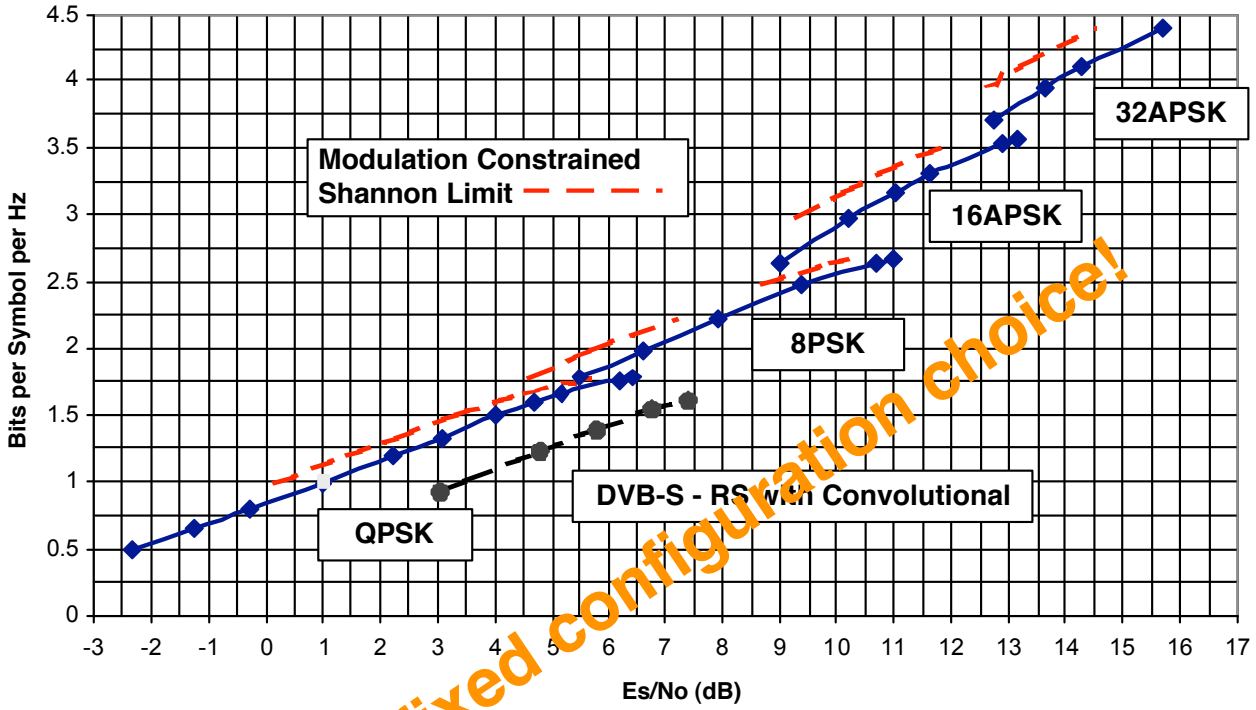
BPSK

QPSK

8PSK

16APSK

32APSK



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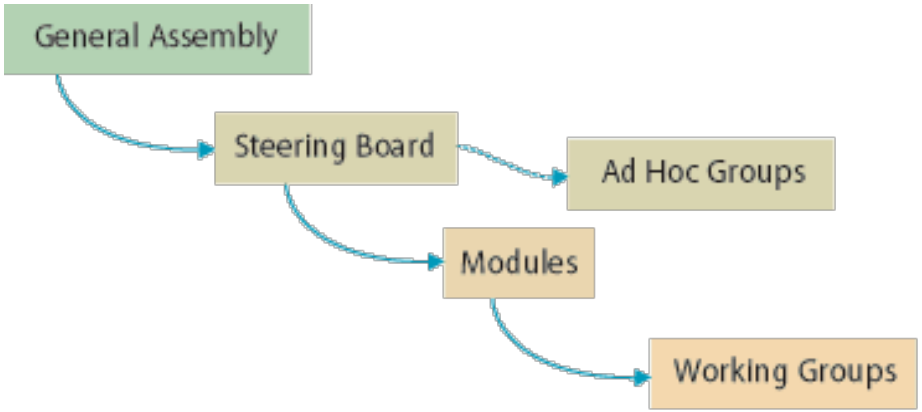
DVB Organisation



Commercial Module (CM)

Work done in:

Technical Module (TM)

Ad-hoc work groups of TM

DVB: Way of Working

Decisions to do work is made by TM / CM

WGs develop documents

- Drafts available to DVB & WG members

Documents approved at TM / Steering Board

- Voting restricted to members

Standards issued by ETSI/SES (free) / CENELEC

- Similar process used by 3GPP

Hot Topics in DVB

Selected Hot Topics (Summer 2005)

- DVB-H (IP multicast for 3G)
- DVB-S2 (encapsulation and FMT for satellite)
- DVB over IP (All-IP TV)
- DVB-RCS (QoS, next generation of Spec)

Other Similar Bodies

SMPTE

Society Motion Picture Technical Experts

ATSC

Advanced Television Systems Committee

Chiefly US

DOCSIS

Cablelabs/ Data over cable

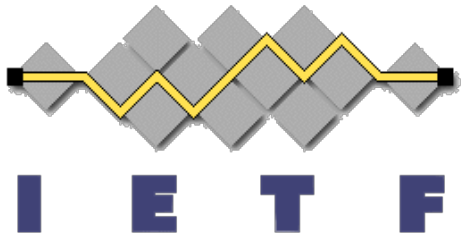
- Introduction to tutorial
- ISO (MPEG)
- DVB (DVB-S)
- IETF - How it works
  - IETF Working Groups (ipdvb)
- ETSI (BSM Working Group)
- Conclusion (How to Influence Standards)

The IETF

The IETF works on the basis of:

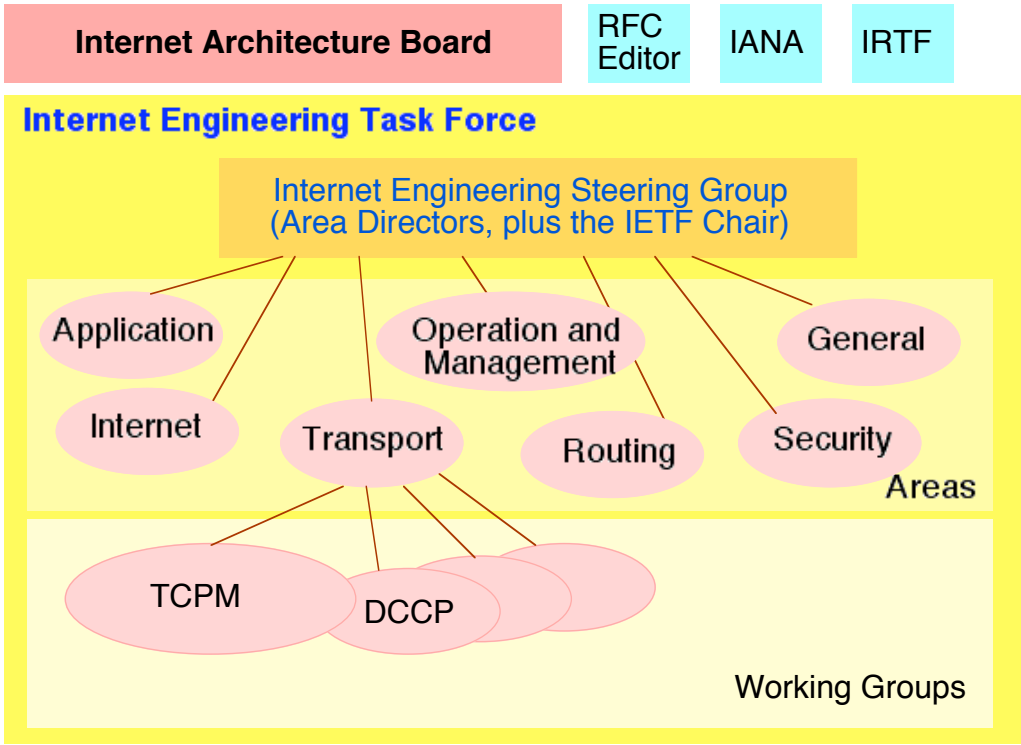
"Rough consensus and running code"

- David Clarke, MIT



IETF Structure

Currently 105 WGs



http://www.ietf.org/overview.html
http://www.ietf.org/html.charters/wg-dir.html

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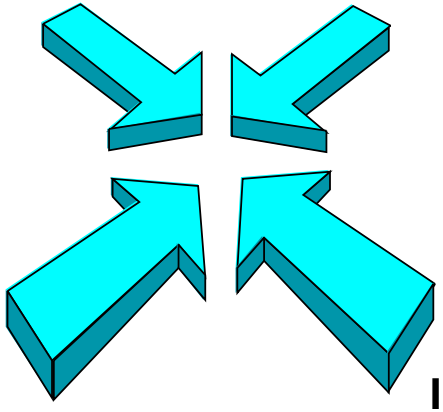
IETF Contributors

ISPs and Carriers (NSPs)
e.g. MCI, SPRINT, BT, Telefonica...

Researchers
e.g. Universities, Labs, ...



Vendors
e.g. CISCO, Microsoft, SUN, Nortel, Alcatel...

Inventors
e.g. Deering, Jacobsen, ...

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IPR Warning!

You MUST disclose any IPR you know of relating to the technology under discussion

When starting a presentation you MUST say if:

- There is IPR associated with your draft
- The restrictions listed in section 5 of RFC 3667 apply to
  - Your draft.
  - When asking questions
  - Commenting on a draft

BCP78 (RFC 3667), BCP79 (RFC 3668) and the “Note Well” text

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Internet Documents

Internet Drafts (IDs) http://www.ietf.org/ID.html

- Working documents (work in progress)
- Individual submissions
- Working group drafts
- Valid for 6 months (archived forever)

Requests For Comments (RFCs)

- Informational
- Best Current Practices (BCP)
- ExperimentalStandards Track
  - Propose Standard
  - Draft Standard
  - Standard
  - Historic

http://www.ietf.org/rfc.html

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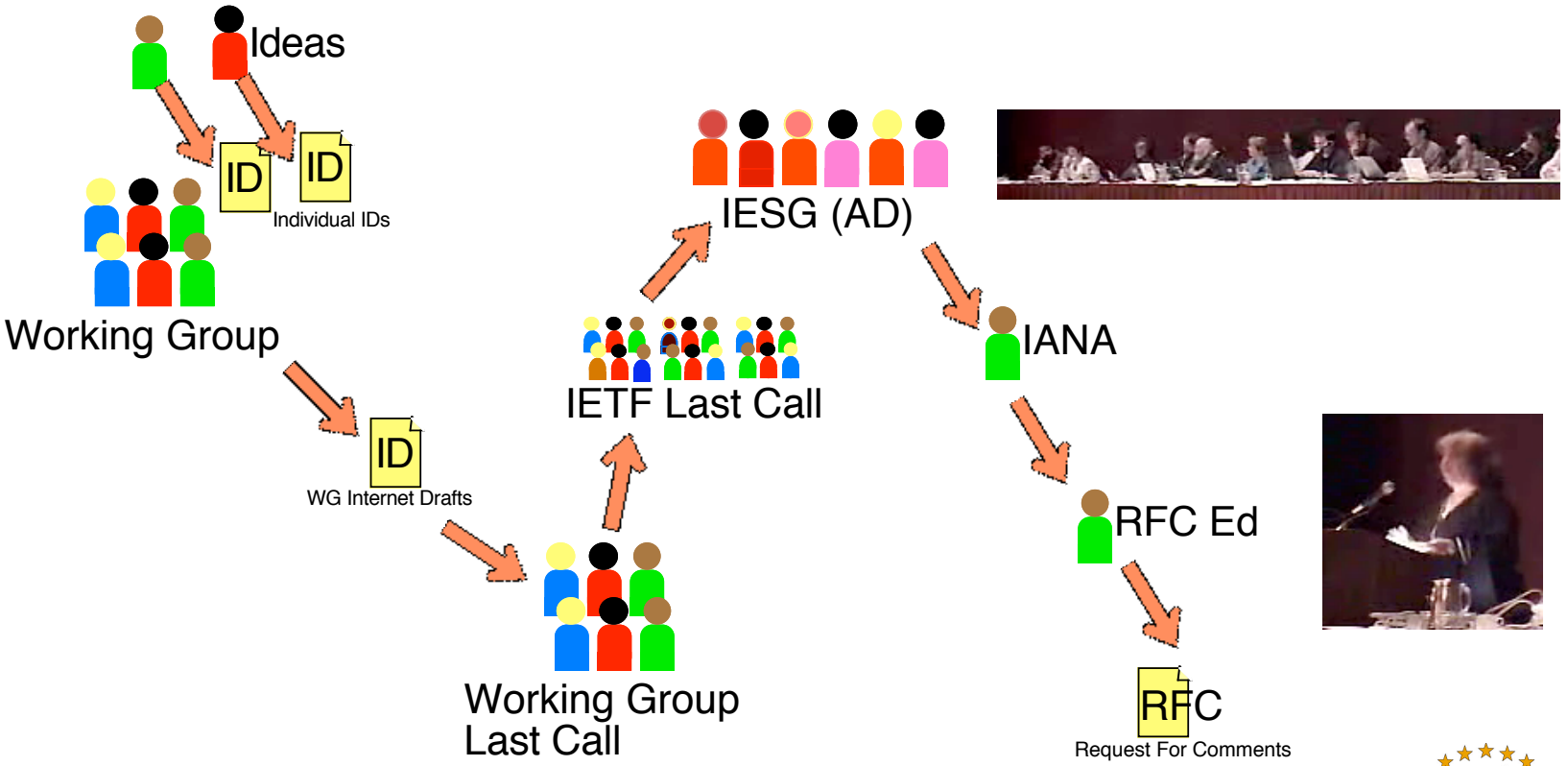
RFC Process



[RFC2026]

IETF: Satellite-Related WGs

Internet Area

- ipdvb - IP over DVB
- ipv6 - IP Version 6 Working Group
- mip6/mip4/mipshop/nemo - Mobility

Operations

- ipcdn - IP over Cable Data Network
- mboned - multicast deployment

Transport

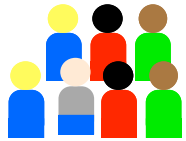
- tsvwg - RSVP, TCP, SCTP, etc
- rohc - Robust Header Compression
- mmusic - Multiparty Multimedia Session Control
- rmt - reliable multicast transport

Security

- ipsec & msec - IP (Multicast) Security

http://www.ietf.org/html.charters/wg-dir.html

How to participate



How to join/start an activity:

Listen...
Contribute little and often...
Consult the WG Chair, if in doubt!

IETF protocols MUST be robust:

"Be liberal in what you accept
be conservative in what you send"
- A good rule also for IETF debates!

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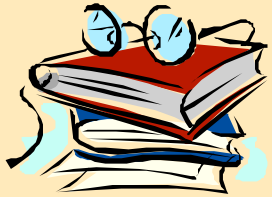
IETF: Way of Working



Decisions to do work is made by IESG/IAB

WGs develop documents

- Internet drafts available to all

Documents approved by IESG

- Cross-Area Review & Expert Review
- No voting
- There can be appeals

Standards as RFCs (free)

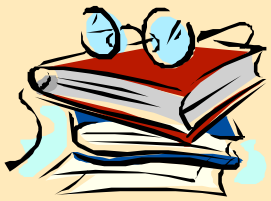
IETF: Way of Working

Documents submitted to RFC Editor

Documents approved by RFC Editor

- Expert Review and/or IESG if required.
- No voting
- There can be appeals

Informational RFCs (free)



Other Standards Bodies

ISO

ITU-T

TIA

TTA

IEEE

- Introduction to tutorial
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IETF ipdvb WG

WG founded by IESG (Jan 2004)

IETF-60 (August 2004, San Diego)
IETF-61 (November 2004, Washington)
IETF-62 (March 2005, Minneapolis)
IETF-63 (August 2005, Paris)

Area:	Internet
Charter:	http://www.ietf.org/html.charters/ipdvb-charter.html
Mailing list:	ipdvb@erg.abdn.ac.uk
To subscribe:	subscribe ipdvb at majordomo@erg.abdn.ac.uk
Archive:	http://www.erg.abdn.ac.uk/ipdvb/archive
Chair:	Gorry Fairhurst <gorry@erg.abdn.ac.uk>

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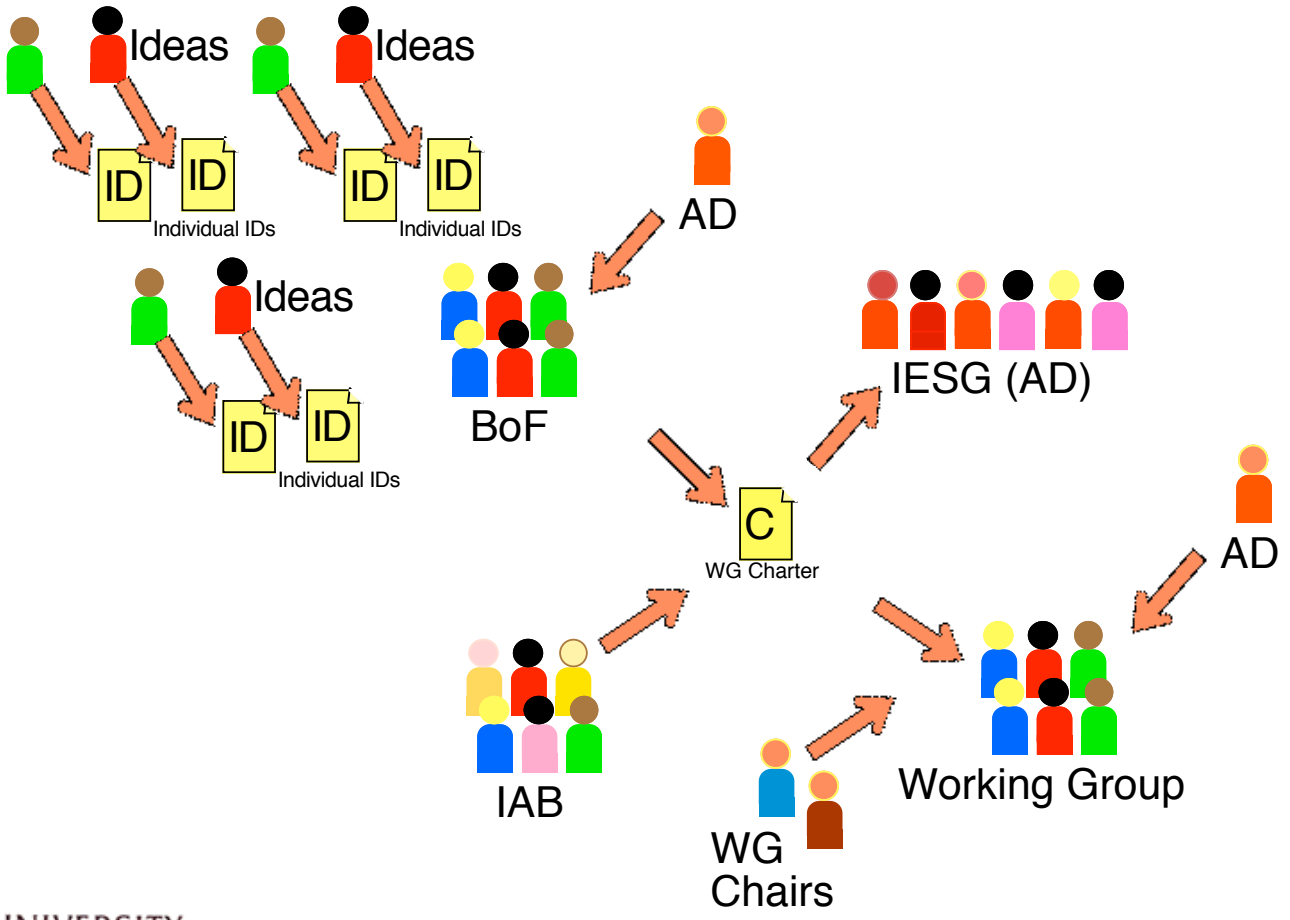
Forming an IETF WG



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ipdvb WG

Milestones

Done Draft of a WG Architecture ID
Done Draft of a WG ID on Encapsulation (ULE)
Done Draft of a WG ID on AR Framework
Done Submit Architecture to IESG
Done Submit Encapsulation to IESG

Feb 05 Draft of a WG ID on AR Protocol
Oct 05 Submit AR Framework to IESG
Dec 05 Submit AR Protocol to IESG
Dec 05 Progress ULE RFC along IETF Standards Track

Dec 05 Re-charter or close WG?

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ipdvb: Current Active Drafts

draft-ietf-ipdvb-arch-05.txt (approved as RFC)
draft-ietf-ipdvb-ule-06.txt (approved as RFC)
draft-ietf-ipdvb-ar-00.txt (WG I-D)

draft-mjm-ipdvb-config-00.txt (individual I-D)
draft-stiemerling-ipdvb-config-01.txt (individual I-D)
draft-cruickshank-ipdvb-sec-00.txt (individual I-D)

Unidirectional

~~Ultra~~ Lightweight Encapsulation (ULE)

ULE base header

Standards-Track RFC

Native IPv6 (Native Enet; MPLS; etc)

Low/managed overhead

- More efficient in some applications

Extensible Header Format

- Bridging
- Robust Header Comp?
- IPsec-like L2 link encryption?

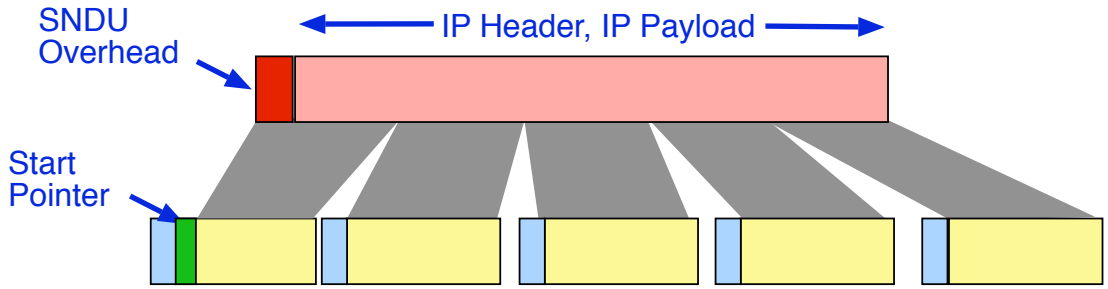
[draft-ietf-ipdvb-ule-xx.txt]

Encapsulation

IP packets typically 40 B – 1500 B

IP packets encapsulated to from SNDU

MPEG-2 TS Packet payload 184 B



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ULE Encapsulation

```
0000:  00 3f 86 dd 01 02 03 04 05 06 60 00 00 00 00 0d
0010:  3a 40 20 01 06 60 30 08 17 89 00 00 00 00 00 00
0020:  00 05 20 01 06 60 30 08 17 89 00 00 00 00 00 00
0030:  00 06 80 00 9d 8c 06 38 00 04 00 00 00 00 00 78
0040:  46 79 a5
```

ULE SNDU Length : 0x3f (63 decimal)
D-bit value : 0 (NPA Present)
ULE Protocol Type : 0x86dd (IPv6)
Destination ULE NPA Address: 01:02:03:04:05:06
ULE CRC32 : 0x784679a5

Source IPv6: 2001:660:3008:1789::5
Destination IPv6: 2001:660:3008:1789::6
IPv6 Payload: 0xd (13 decimal) bytes

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IETF ipdvb: Hot Topics

"arch" and "ULE" in RFC Ed queue

- Important parallels with DVB-S2/GS

IETF ipdvb WG now seeking inputs on:

- Address usage (ipdvb AR I-D)
  - UDLR; L3 AR (ND; DHC; etc)
  - Multicast with uni-directional links
  - Scaling to large numbers of receivers
- L2 security method
- Addressing Protocol (IP->PID/MAC)

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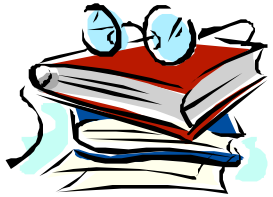
ETSI Work Items

ESTI Technical Committees (TC)
HF- Human Factors
SEC- Security
SES - Satellite Earth Stations & Systems
SPAN- Services &Protocols for Advanced Networks
TMN- Telecommunications Management for Networks

ETSI Projects (EP)
BRAN- Broadband Radio Access Network
ERM- Electromagnetic compatibility
TIPHON- Telecom. & IP Harmonisation Over Networks
UMTS- Mobile (3GPP)

Around 800 ETSI members (> 50 countries)Voting restricted to members

ETSI Document Types



EN European Standard

ES ETSI Standard

TS Technical Specification

EG ETSI Guide

TR Technical Report

SR Special Report

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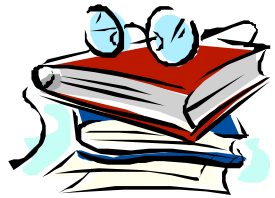
BSM Families

ETSI TR 102 187 Overview of BSM families



TSS-A Alcatel RCS

ETSI TS 102 402 TSS-A;DVB-S/DVB-RCS for transparent satellites
ETSI TS 102 352 TSS-A;DVB-S/DVB-RCS for transparent satellites

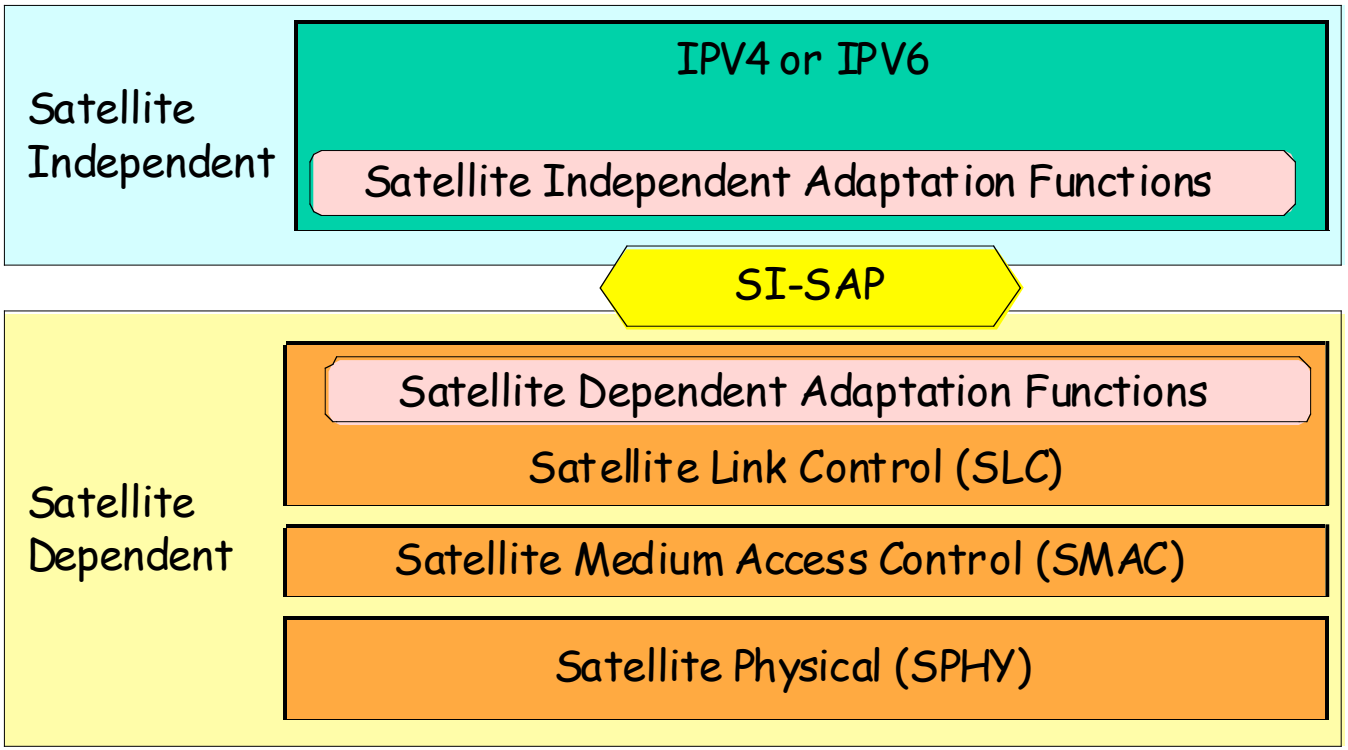
TSS-B RCS

RSM-A Hughes Spaceway

ETSI TS 102 188-1 RSM-A ;Phy spec.;Part 1: General description
ETSI TS 102 188-2 RSM-A ;Phy spec.;Part 2: Frame structure
ETSI TS 102 188-3 RSM-A ;Phy spec.;Part 3: Channel coding
ETSI TS 102 188-4 RSM-A ;Phy spec.;Part 4: Modulation
ETSI TS 102 188-5 RSM-A ;Phy spec.;Part 5: Radio transmission and reception
ETSI TS 102 188-6 RSM-A ;Phy spec.;Part 6: Radio link control
ETSI TS 102 188-7 RSM-A ;Phy spec.;Part 7: Synchronization
ETSI TS 102 189-1 RSM-A;SMAC/SLC layer spec.;Part 1: General description
ETSI TS 102 189-2 RSM-A; ;MAC/SLC layer spec.;Part 2: MAC layer
ETSI TS 102 189-3 RSM-A;SMAC/SLC layer spec.; Part 3: ST-SAM Interface Spec

RSM-B Amheris DVB-RCS Regenerative

SI-SAP



Satellite Independent Service Access Point

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BSM Published Documents

ETSI TR 102 287 Security aspects
ETSI TS 102 292 Functional architecture for IP interworking with BSM networks
ETSI TS 102 293 IP Interworking over satellite;Multicast group management;
ETSI TS 102 294 Multicast functional architecture
ETSI TS 102 295 BSM Traffic Classes
ETSI TR 102 353 Guidelines for the Satellite Independent Service Access Point (SI-SAP)
ETSI TS 102 354 IP over Satellite (IPoS) Spec. [TIA-1008 (October 2003)]
ETSI TS 102 357 Common spec.;Satellite Independent Service Access Point SI-SAP
ETSI TR 101 374-1 Part 1: Survey on standardization objectives
ETSI TR 101 374-2 Part 2: Scenario for standardization
ETSI TR 101 984 Services and Architectures
ETSI TR 101 985 Broadband Satellite Multimedia;IP over Satellite
ETSI TR 102 155 Addressing and routing
ETSI TR 102 156 IP interworking over satellite;Multicasting
ETSI TR 102 157 Performance, Availability and Quality of Service

BSM: Hot Topics

Architecture (QoS; RRM interface; X-Layer; etc)

Addressing

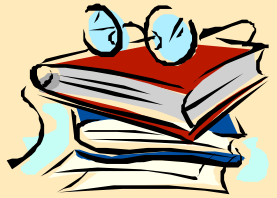
Security

Multicast

QoS

IPv6

ETSI: Way of Working



Around 800 ETSI members (> 50 countries)

Decisions to do work made by ETSI

WGs develop documents

- Drafts only available to DVB & WG members
- STF can assist on key documents

Documents approved by ETSI Plenary (free)

- Voting restricted to members

- Introduction to tutorial
- ISO (MPEG)
- DVB (DVB-S)
- IETF - How it works
  - IETF Working Groups (ipdvb)
- ETSI (BSM Working Group)
- Conclusion (How to Influence Standards)

Conclusions

Many Standards Organisations

Each has it own ways of doing things

- Often few "active" participants on a specific topic

Most need help!

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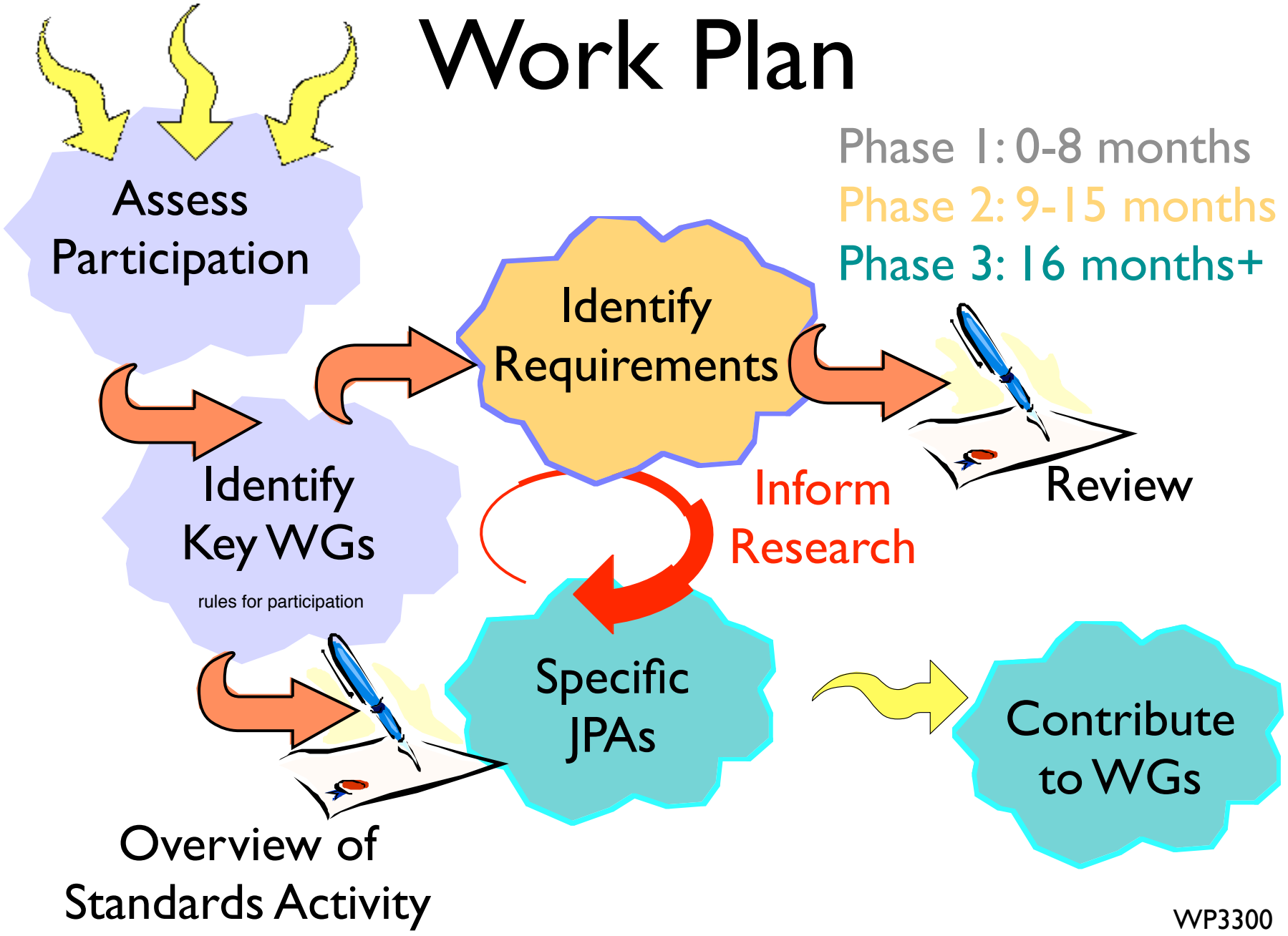
Work Plan

Phase 1: 0-8 months
Phase 2: 9-15 months
Phase 3: 16 months+



WP3300

WP3300 Activities

Partner No.	1	2	5	6	8	11	15	17	18	19
Partner	DLR	BRU	CNES	CNIT	GET	ISTI	TUG	UniS	UoA	UoB
DVB (a)	-	-	3	-	-	-	-	-	4	-
ETSI (b)	-	-	-	2	-	-	-	2	2	2
IEEE (c)	-	-	-	-	-	-	-	-	-	-
IETF	-	-	-	*	-	-	-	3	1	-
ISO (c)	-	-	-	-	-	-	-	-	-	-
ITU-R	-	-	2	-	-	-	-	-	-	-
ITU-T (d)	-	-	-	*	-	-	-	*	*	-
TIA (c)	-	-	-	*	-	-	-	*	*	-

(1) WG Chair / Steering Board
(2) Author of Standards Report/Document
(3) WG Participant/Contributor
(4) Observer/Member of Organisation
(*) Access to some draft documents via liason

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Take action!

1) Find the appropriate WG(s)

2) Understand what they are looking for

- background information? - text? - draft document?

3) Contact the WG Chair...

4) PERSIST in trying to grasp the problem.... :-)

- often the "problem" is not what you think!

4) Email SatNEx WP3300 and tell us!

5) This all takes time.....

Questions and answers

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