

Jonathan Dickson Memorial Lecture 2000:

Digitising Auntie!

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BBC Research & Development

Presentation - 1

- ★ What is BBC R&D?
- ★ Why digitise Auntie?
- ★ What is digital TV?
- ★ How does it work at Auntie's?
- ★ Where are we now?
- ★ Whatever next?

BBC R & D - Kingswood Warren



- ★ Part of the BBC's Technology Directorate
- ★ ~120 R&D Engineers
- ★ Strategic R & D work
- ★ Define new standards and frequency plans
- ★ Lead technology strategy work
- ★ International reputation for broadcast R&D

BBC R & D - Main work areas

- ★ Digital television - test-beds, standards, piloting and implementation of new services
- ★ Digital Radio - DAB, DRM
- ★ Spectrum Planning
- ★ Content management/“Metadata”
- ★ New ways of making ‘programmes’
- ★ BBC Online development

BBC R & D - more info

<http://www.bbc.co.uk/rd/>

Presentation - 2

- ★ What is BBC R&D?
- ★ *Why digitise Auntie?*
- ★ What is digital TV?
- ★ How does it work at Auntie's?
- ★ Where are we now?
- ★ Whatever next?

“Auntie’s” analogue PSTV channels

- ★ BBC One, BBC Two
- ★ London generates ‘sustaining’ service
- ★ Opting, insertion and branding of junctions at 3 national regional centres (Belfast, Cardiff, Glasgow)
- ★ Opting at 10+ English regional centres
- ★ Terrestrial/Cable delivery

Why change?

★ External influences

- ✿ Competitive pressures
- ✿ Digital 'convergence'
- ✿ Calls to make efficient use of spectrum
- ✿ Governmental will

★ Internal wish to develop...

- ✿ wider portfolio of services
- ✿ 'richer' services

Technology enablers

- ★ Developments in picture coding
 - ✿ 150Mbit/s of information transmitted at 4Mbit/s or less!!
 - ✿ Decoded at a 'give-away' price
- ★ Developments in modulation techniques
 - ✿ Multipath tolerant systems - COFDM
 - ✿ Robust systems which can co-exist with analogue transmissions at x1/1000th the power

Presentation - 3

- ★ What is BBC R&D?
- ★ Why digitise Auntie?
- ★ **What is digital TV?**
- ★ How does it work at Auntie's?
- ★ Where are we now?
- ★ Whatever next?

Digital TV is...

- ★ A wider range of 'TV' services...
- ★ ...and more ways of getting them

BBC Digital TV services



BBC ONE
National and
English
regional
variants



BBC NEWS 24



BBC TWO



**BBC
KNOWLEDGE**



BBC CHOICE
National
regional
variants



**BBC
PARLIAMENT**

BBC Text service - 1

The screenshot displays the BBC Text service interface. At the top left, the word "Home" is shown. On the top right, the time "17:10" and date "29 Nov" are displayed. A vertical menu on the left side includes "News" (highlighted with a blue bar and a small triangle icon), "Finance", "Sport", "Weather", "TV/Radio/Web", and "Community". The main content area features a video player showing a news anchor. Below the video, the text "BBC News 24" is visible. A navigation instruction reads: "Use up, down and 'select' to choose an item from the menu". At the bottom, there is a blue bar containing the BBC logo, the text "GO TO", "HELP", "BACK", and "HOME", and a news headline: "Al-Fayed Gave Hamilton Cash, Court Told".

BBC Text service - 2

Weather Regional 4 Day Forecast 17:12 29 Nov

Monday 5 of 5 ◀▶

Temp °C	min	max
Aberdeen	-1	5
Edinburgh	1	6
Glasgow	1	6
Inverness	2	7
Lerwick	0	2
St Andrews	-1	6

From the BBC Weather Centre
Data supplied by the Met Office

Use the up and down keys to view other days Page 1 of 5 ⬆⬇

BBC | **GO TO** **HELP** **BACK** **HOME**
Man Charged After Church Sword Attack

Enhanced TV services

TEST TRANSMISSION

Main Menu

The latest results and statistics from four Championship matches.



-  **Current Scores**
- Previews
- News
- Results & Analysis
- Players
- Wimbledon Diary
- The Guide
- Quiz

FULL SCREEN VIDEO BACK HOME BBC SPORT

Programme guides

sky guide 2.46pm Mon 8
TV GUIDE LISTINGS

	Today 2.30pm	3.00pm	3.30pm
101 BBC ONE	Ironside	Through t..	Playd..
102 BBC TWO	Match of Their..	The Vi..	
103 ITV	..press 'tv' then '3' for ITV		
104 Channel 4	Rotten to the Core	Collector..	
105 Channel 5	Good Afternoon	Shutdown	
106 Sky One	Sally Jes..	Jenny Jones	
109 UK Gold	Dallas	The Bill	
110 UK Gold Classic	..programmes start on Friday		
112 Living	Special Ba..	Living Room	
115 Disney	Quack Pack	The Little..	Art Attack

■ Page Up
 ■ Page Down
 ■ +24 Hours
 ■ -24 Hours

Choose title and press **SELECT**

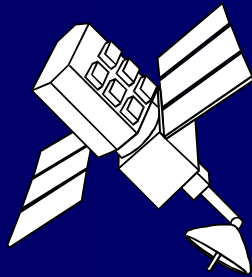
DSAT Now/Next



DTT Now/Next

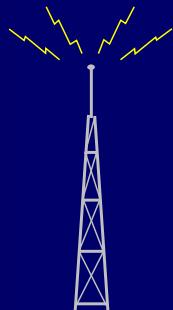


Digital TV platforms - 1



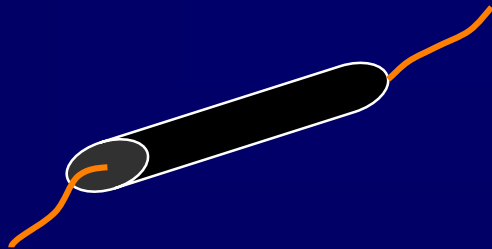
DSAT

October 1998



DTT

November 1998



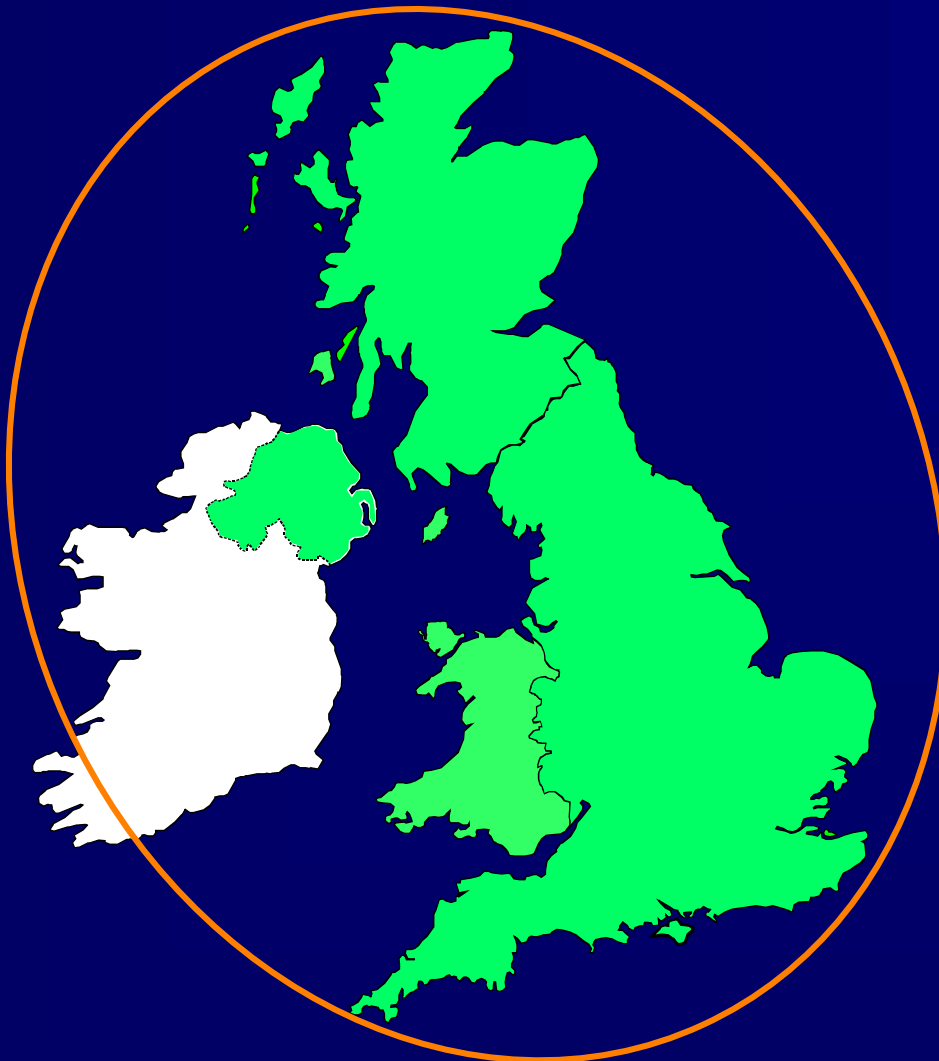
DCABLE

~ Q1 2000

Digital satellite

- ★ 24 transponders per Astra 2 satellite
- ★ ~33Mbit/s per transponder
- ★ BSkyB Set Top Boxes ('free' when subsidised by Open....)
- ★ Three-day Electronic Programme Guide
- ★ EPG/Data service applications run in OpenTV
- ★ Video service = video, audio, World System Teletext (Ceefax & page 888 subtitles)

DSAT coverage



- ★ UK wide coverage
- ★ Encryption used to limit reception area
- ★ BBC services remain 'free-to-view'
- ★ BBC has two full transponders plus space in a third
- ★ BBC One limited to 'home' area by encryption (postcode based)

Digital terrestrial

- ★ 6 terrestrial multiplexes, 81 transmitters
- ★ ~24Mbit/s per multiplex
- ★ On digital STBs and receiver industry IDTVs
- ★ Now/Next Programme Guide
- ★ Data service applications run in MHEG-5 (UK Profile)
- ★ Video service = video, audio, MHEG text, DVB subtitles
- ★ Mandated transmission of subtitles, audio description and signing

DTT multiplexes

Mux 1 BBC	BBC ONE	BBC TWO	BBC CHOICE	BBC NEWS 24	BBC TEXT	BBC PARLMNT (audio only)	
Mux 2 D3/4	ITV Channel 3	ITV2	Channel 4	FilmFour	Teletext	Four Text	
Mux A SDN	Shop!	Channel 5	ONrequest			BBC KNOWLEDGE	
Mux B ONdigital	Carlton Cinema	FirstON-digital	British Eurosport	Cartoon Network	Sky Premier	Sky Sports 1	Sky One
Mux C ONdigital	UK Gold	MTV	Sky Movie Max	Sky Sports 2	Granada Breeze/ Men&Motors	Granada Plus	
Mux D ONdigital	UK Play	Sky Sports 3	ONGames 1	Onsports 1	UK Style/ Horizon	Discovery K & W	Carlton Food

Digital cable

- ★ ~60 multiplexes (limited to 18 at present)
- ★ ~38Mbit/s per multiplex
- ★ Cable company replacement of STBs
- ★ Electronic Programme Guide
- ★ STB runs HTML-based software with Internet connection via cable modem
- ★ Video service = video, audio, ...?
- ★ 'TV Internet' content also available

And then...

- ★ BBC Online
- ★ Telephone lines - xDSL
- ★ Mobile phones - WAP etc.
- ★ Personal organisers
- ★ ...and even your microwave oven!

Presentation - 4

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The technical challenge

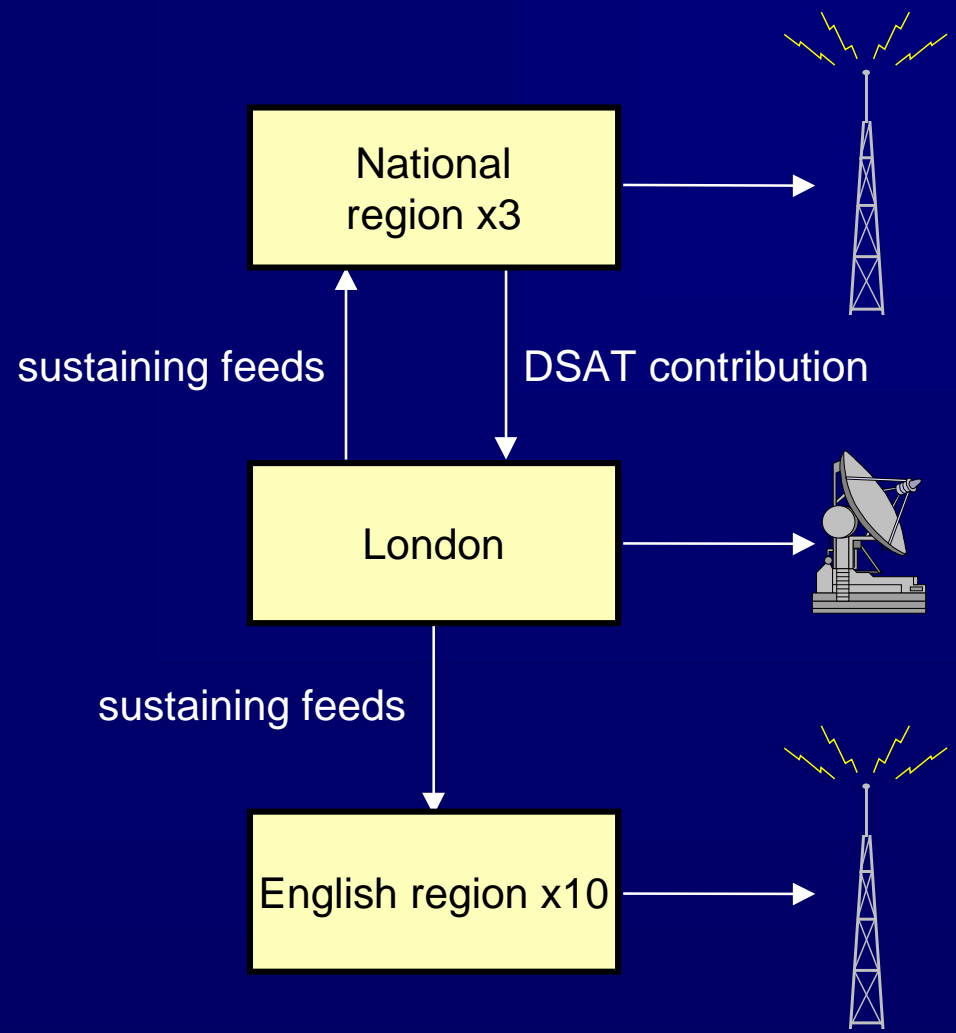
Design and commission a system to transmit:

- ★ digital channels alongside analogue
- ★ full range of regional variants
- ★ to three different platforms
- ★ new text and enhanced TV services
- ★ electronic programme guides
- ★ a fuller range of services for viewers with impaired hearing and sight.

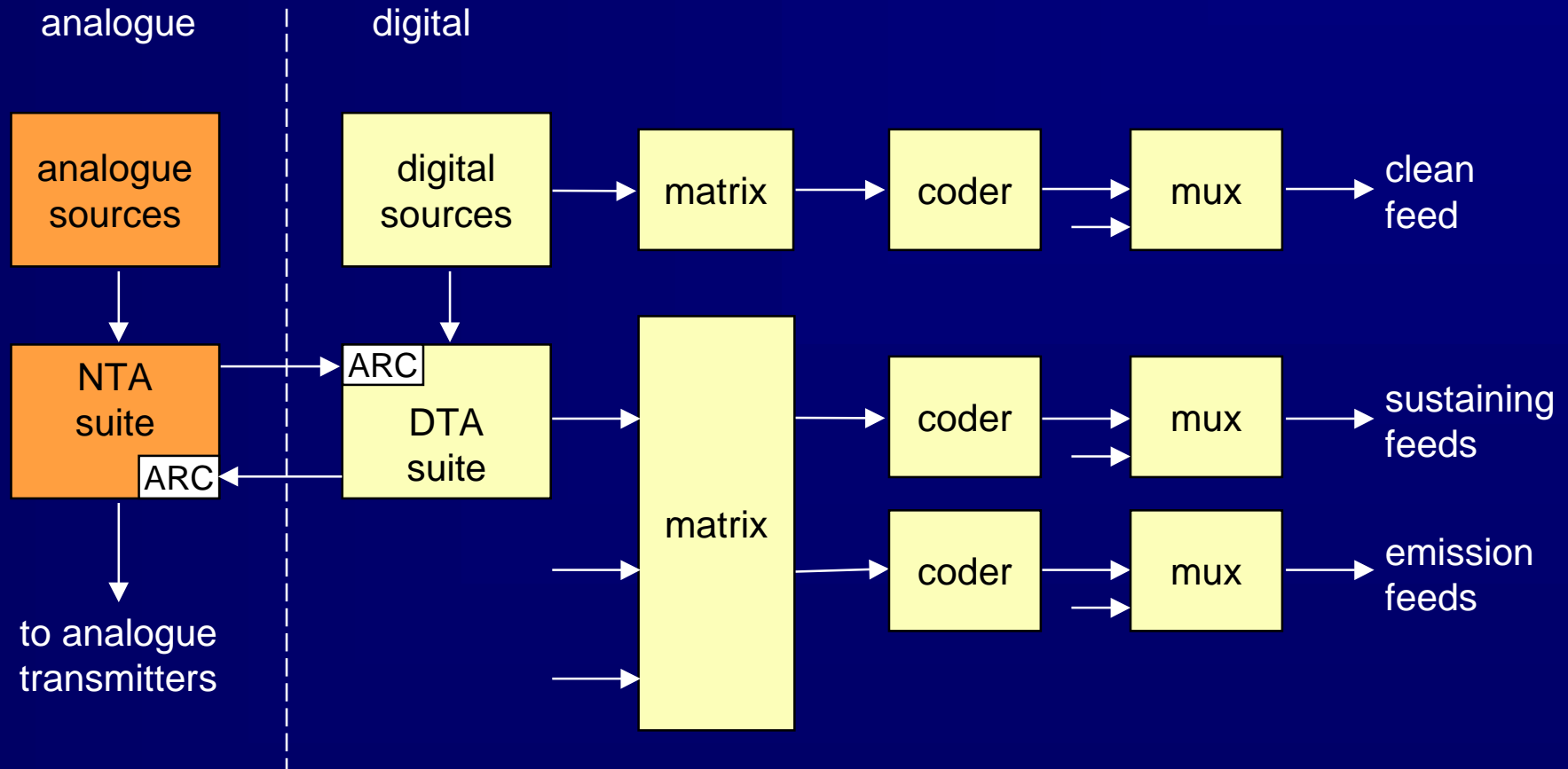
PSDTV core facilities - Features

- ★ Common coding for all platforms
- ★ Separate multiplexing for each platform
- ★ Separate digital widescreen transmission suites in London and the National centres
- ★ Server-based architecture for London and Nations
- ★ 'Sustaining' rate used to distribute 'opting' services, 'emission' rate for 'non-opting' services

Architecture overview



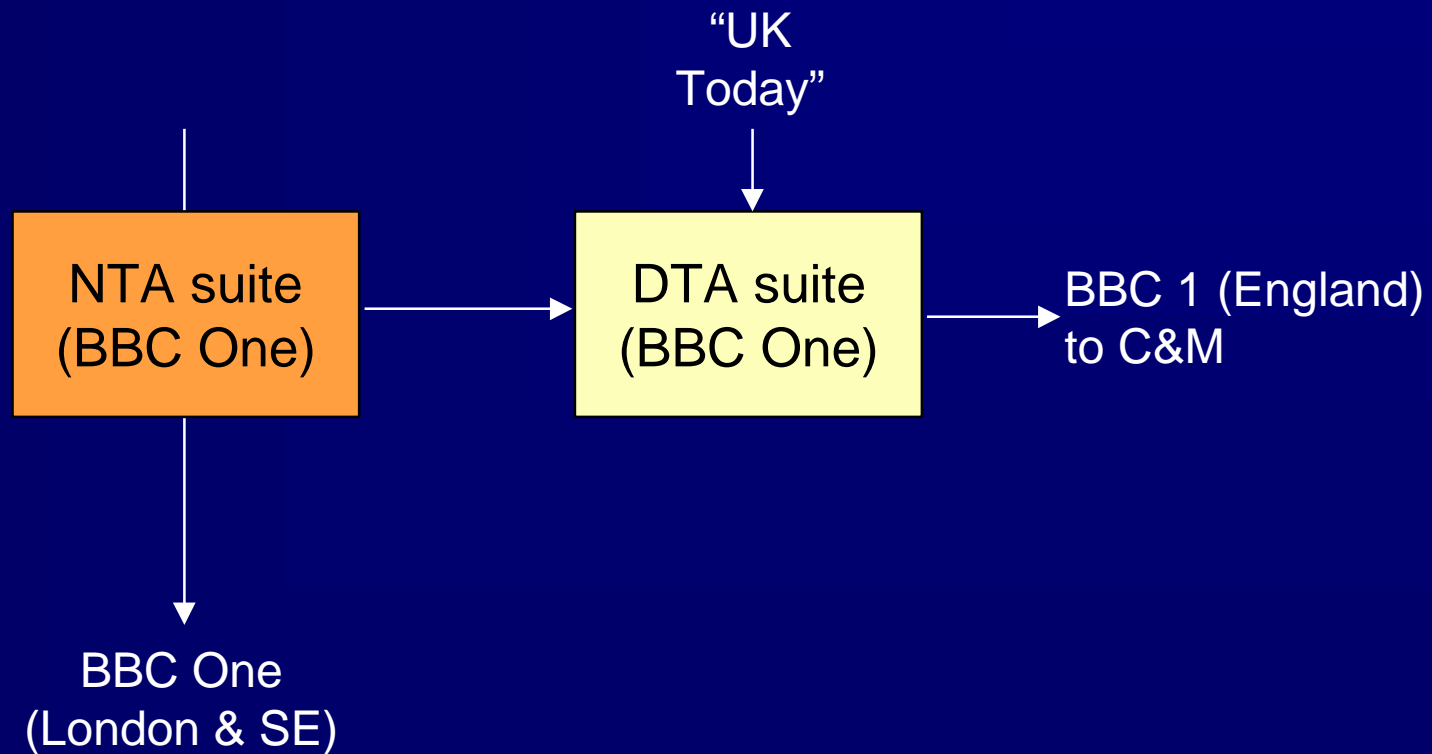
PSDTV core facilities - outline



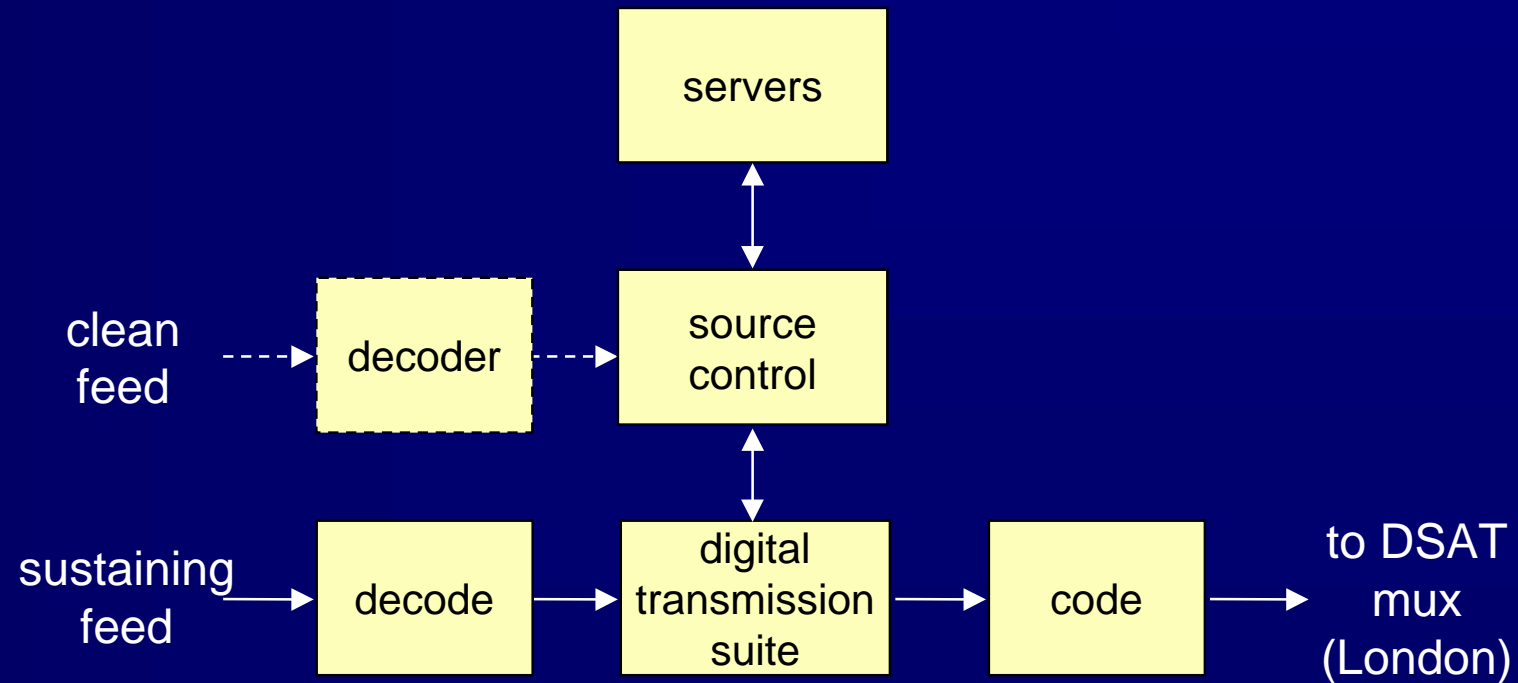
'Code & Mux' - London



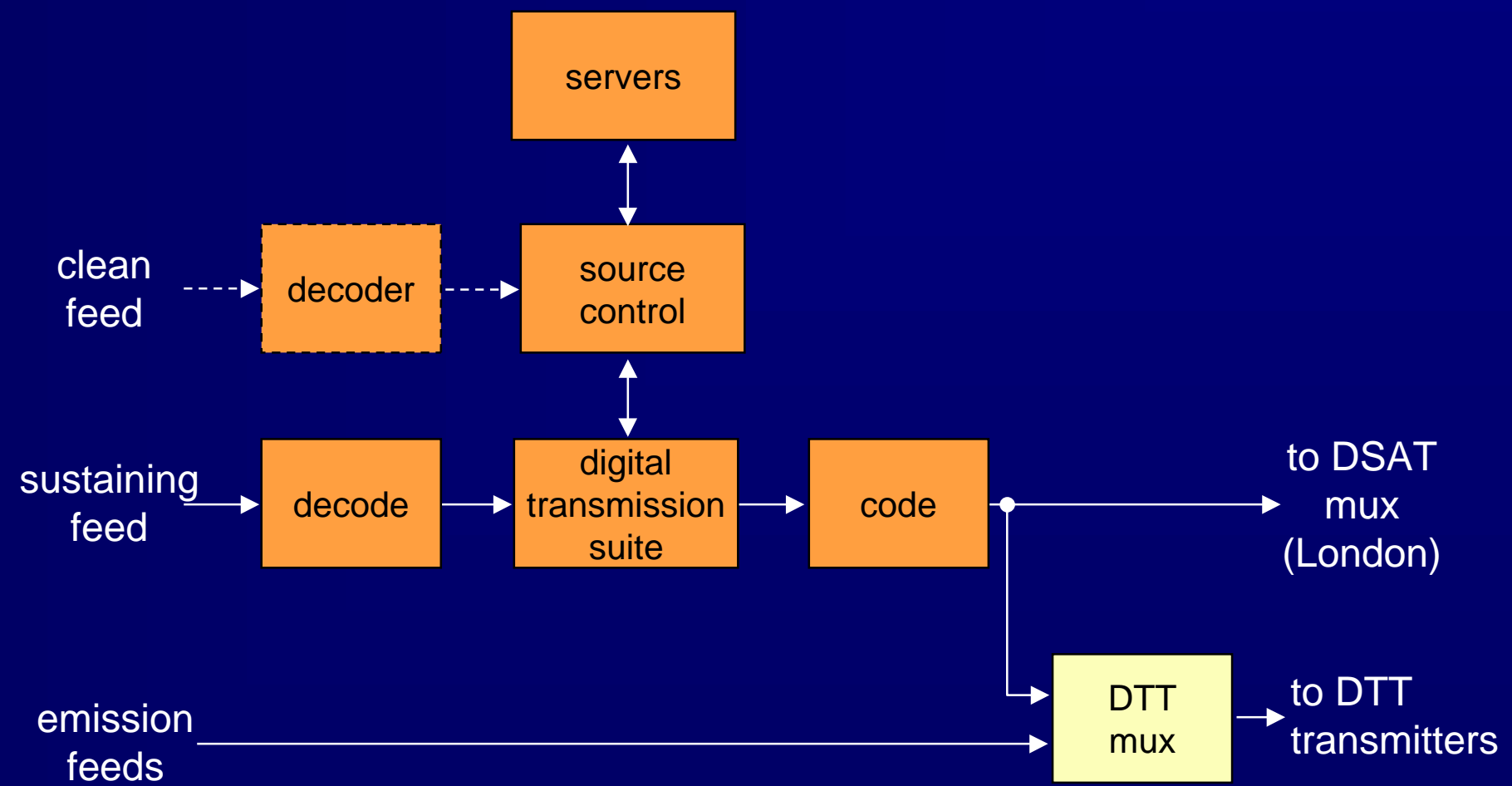
BBC One (England) for DSAT



National region opt-out - DSAT



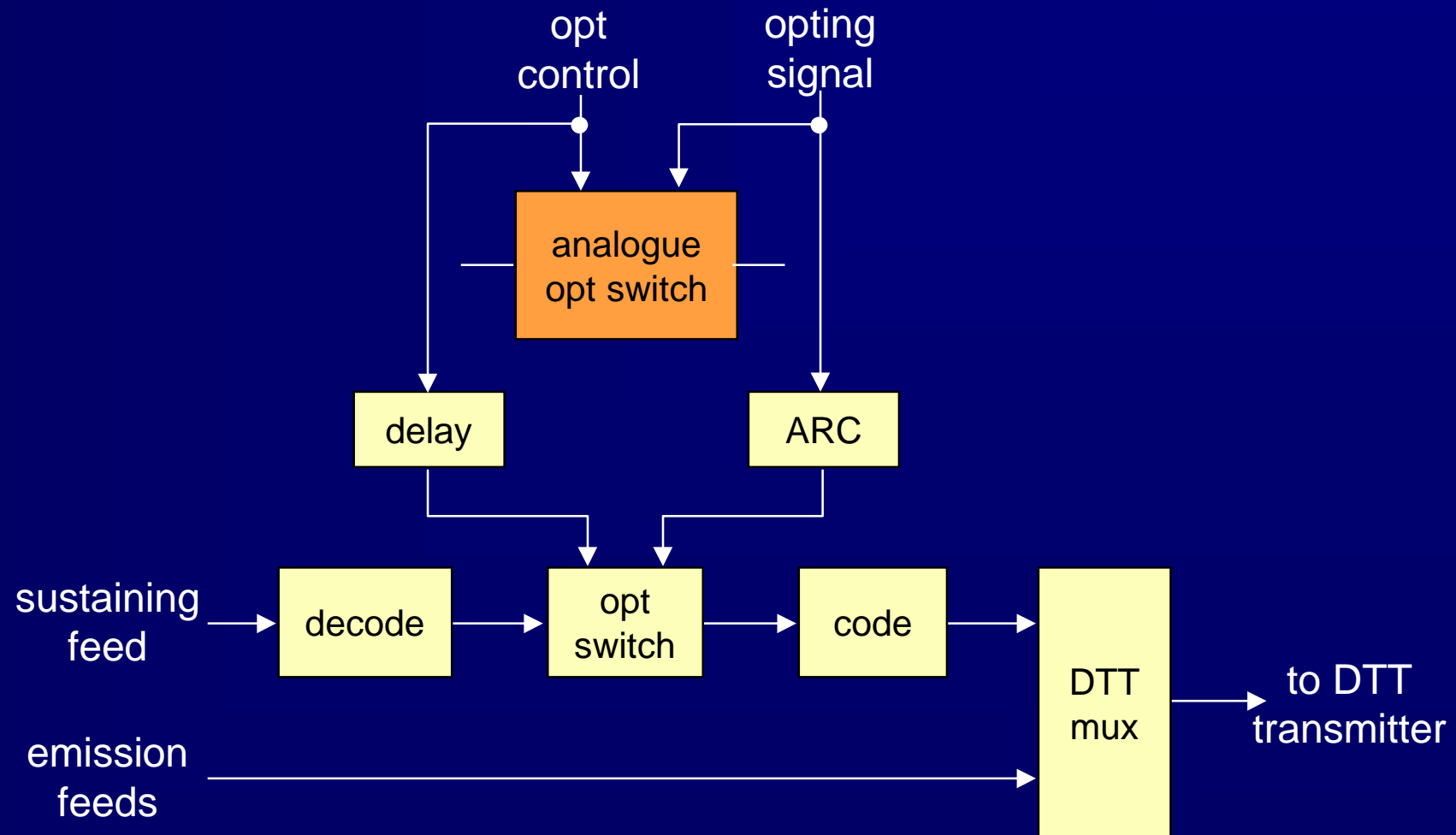
National region opt-out - DTT



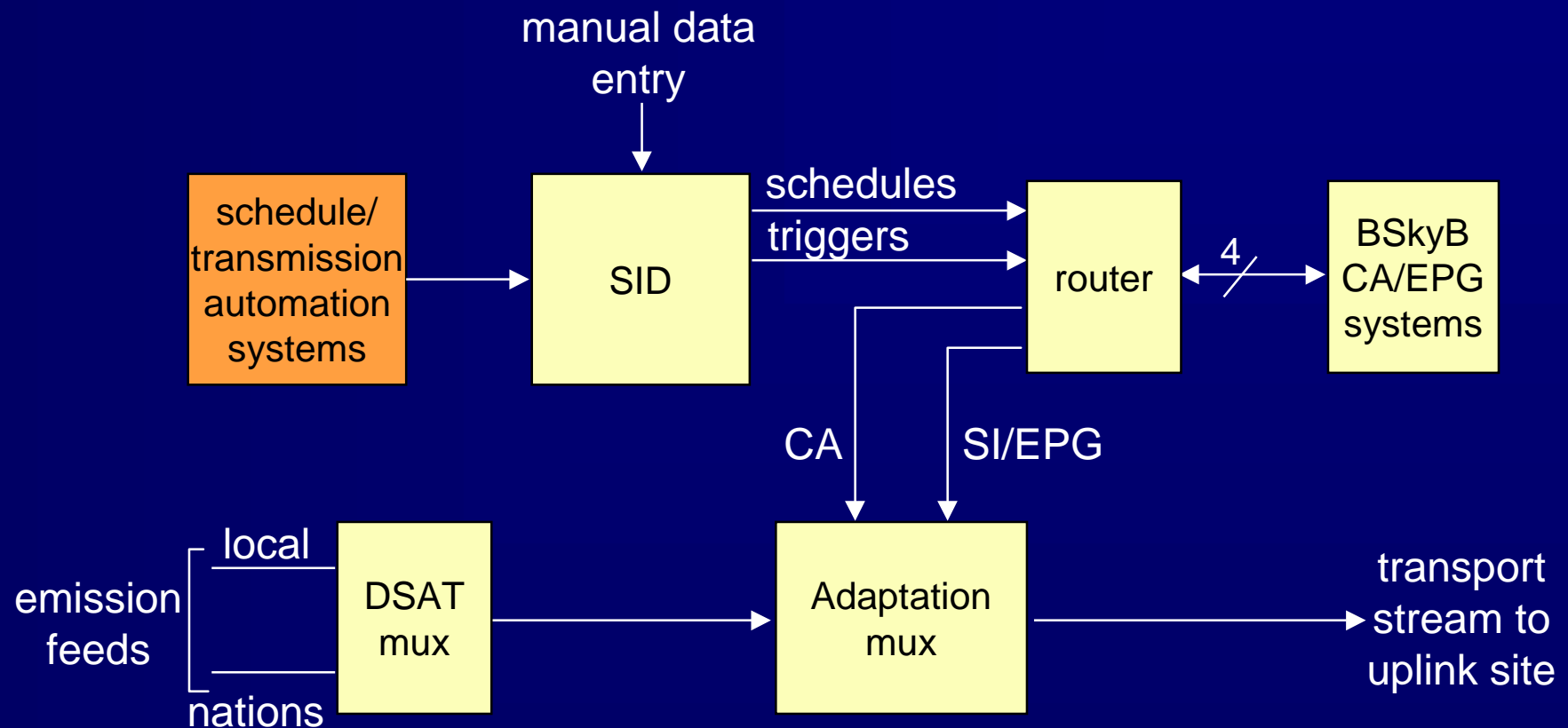
Playout suite



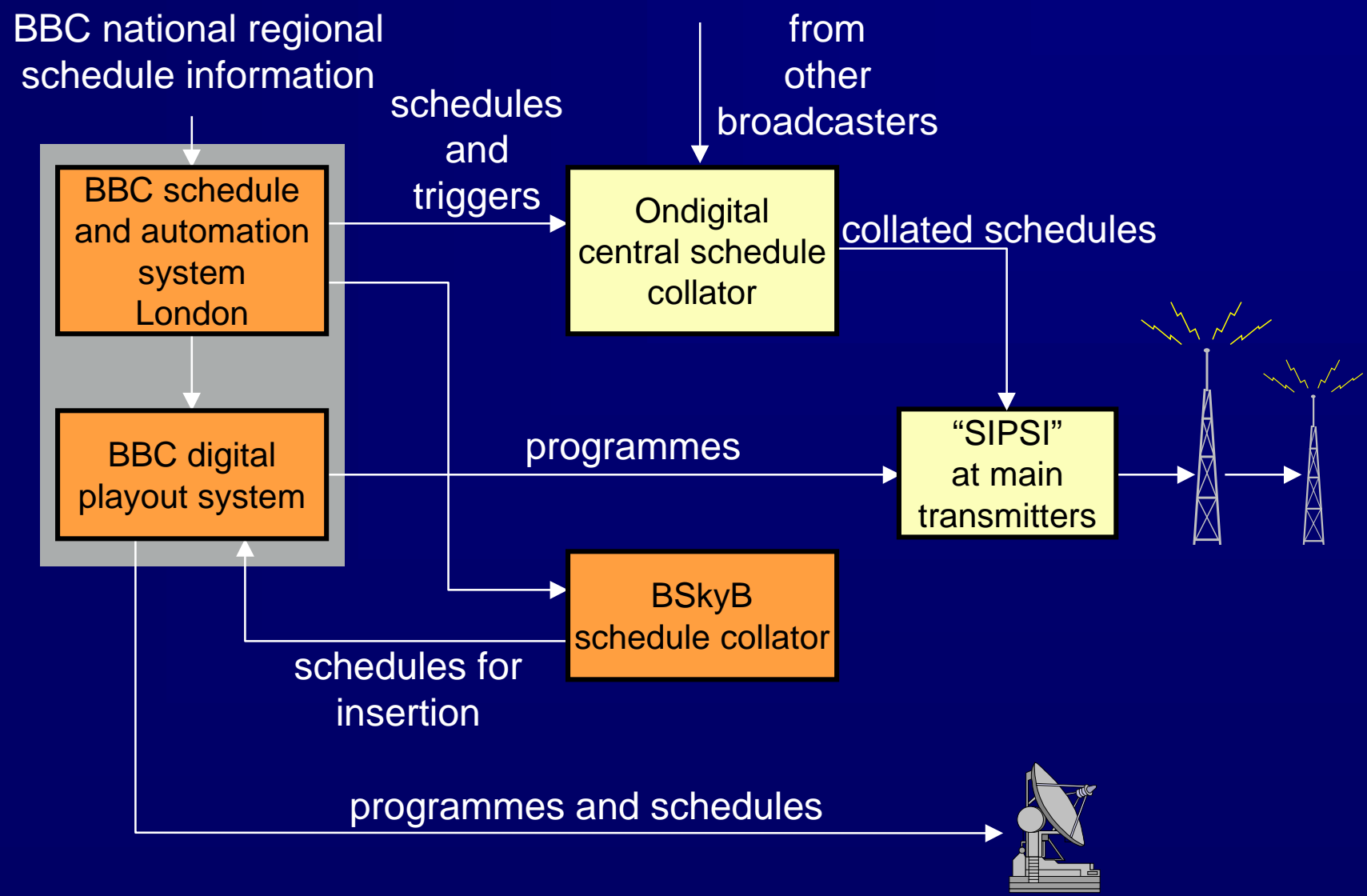
English region opt-out for DTT



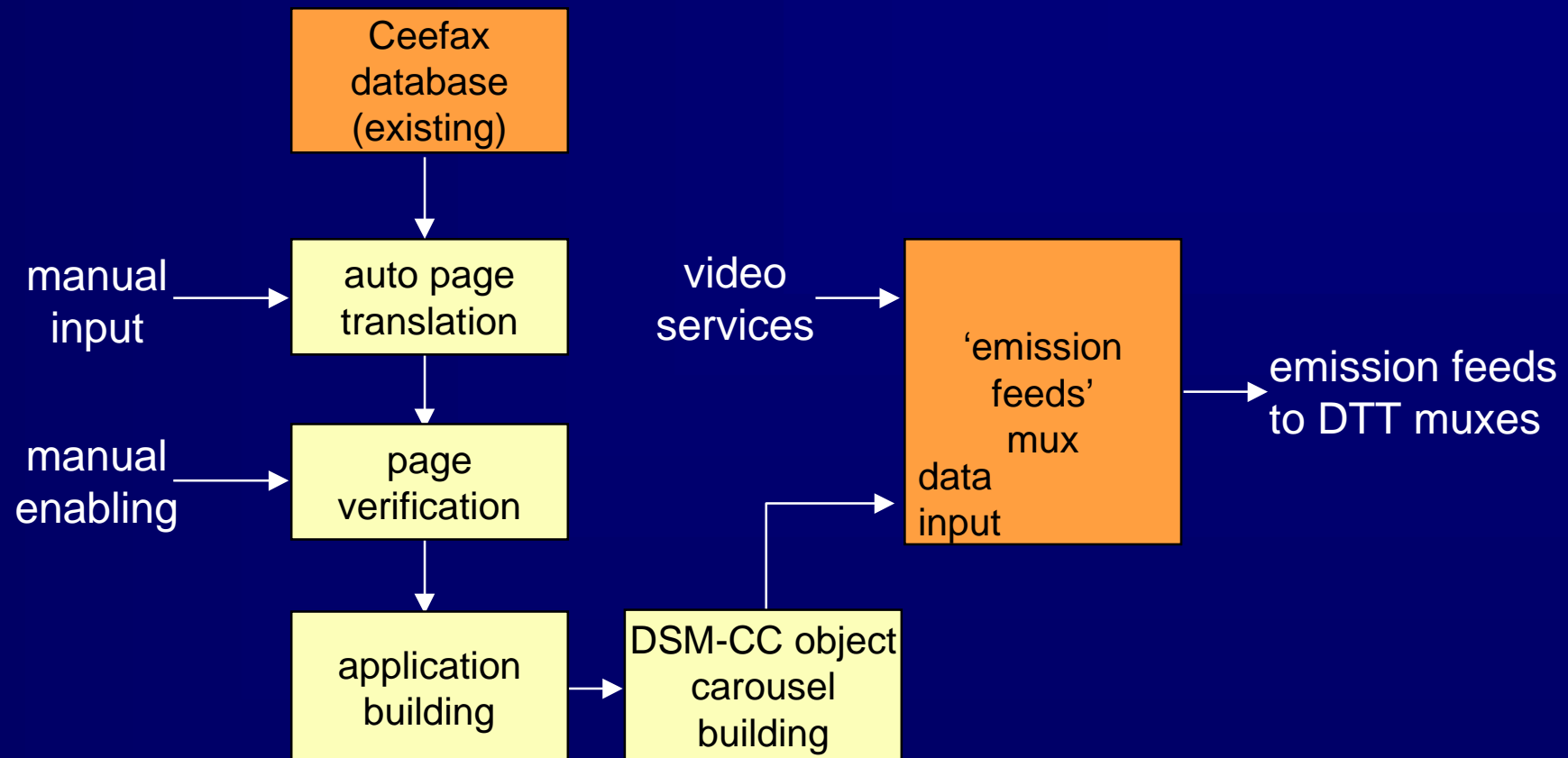
EPG data for DSAT



DTT Now/Next information



Digital text implementation



Digital Text editing



Sight & hearing impaired viewers

★ Subtitles

- ✿ widely available on analogue & digital

★ Signing -

- ✿ open signing, in-vision overnight
- ✿ closed signing under development

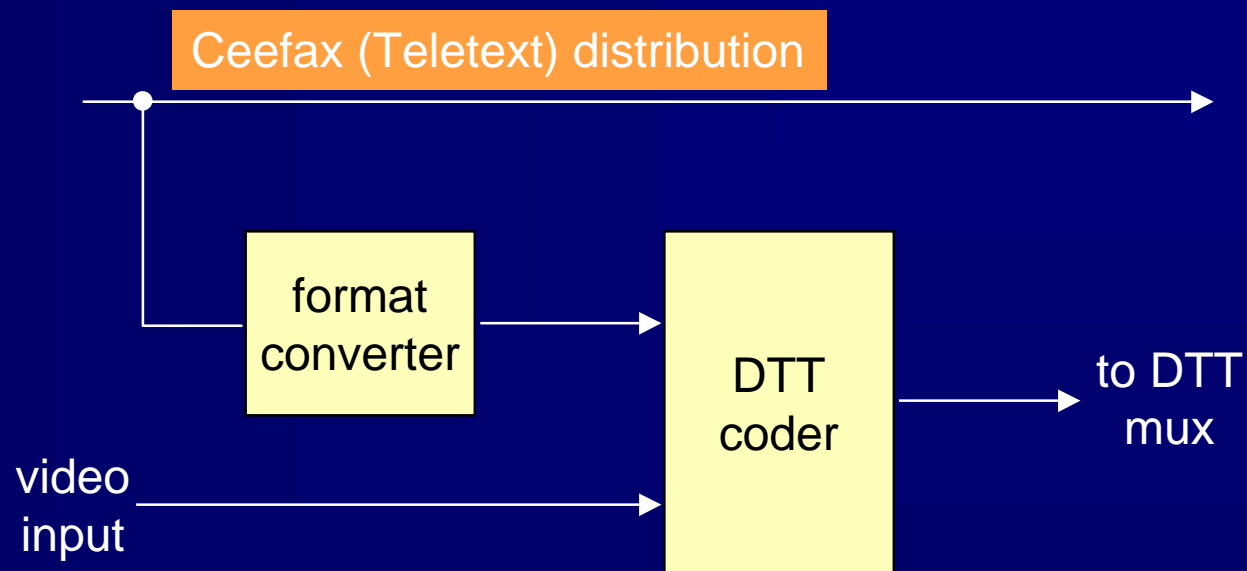
★ Audio Description

- ✿ separate audio channel describes action
- ✿ piloted on Gormenghast

DVB Subtitles



DVB subtitle - implementation



'Open' signing



Delivery to DCable

- ★ Pilots fed from DSAT and DTT
- ★ But this is not ideal:
 - ✿ some incompatibilities - subtitles, aspect-ratio control, non-linear services
 - ✿ knock-ons from DSAT and DTT changes
 - ✿ multiplex capacities are different
 - ✿ no English regional variants on DSAT

Presentation - 5

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- ★ How does it work at Auntie's?
- ★ **Where are we now?**
- ★ Whatever next?

Current position - 1

- ★ Over 3 Million digital subscribers
 - ✿ BSkyB aiming for 5M at end of 2000
 - ✿ Cable companies planning rapid change-over
 - ✿ Push for analogue switch-off in 6-10 years
- ★ The world's most successful DTV launch

Current position - 2

★ Main Issues

- ✿ English Regional opting on DTT
- ✿ Delays to Text/Enhanced TV launches
- ✿ Handling of mixed aspect ratios
- ✿ Multiplex management: more services or better quality but not both
- ✿ Content management and multi-platform playout

Presentation - 6

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- ★ **Whatever next?**

And coming up...

- ★ Set-top boxes with storage
 - ✿ store several hours of TV
 - ✿ able to pause and replay 'live' programmes
- ★ 'Intelligent' programme guides
 - ✿ which you talk to
 - ✿ and can adapt to your preferences
 - ✿ and let you build your own channel
- ★ Use of return path to the broadcaster