Digital Switchover and Digital Dividend:
The European experience

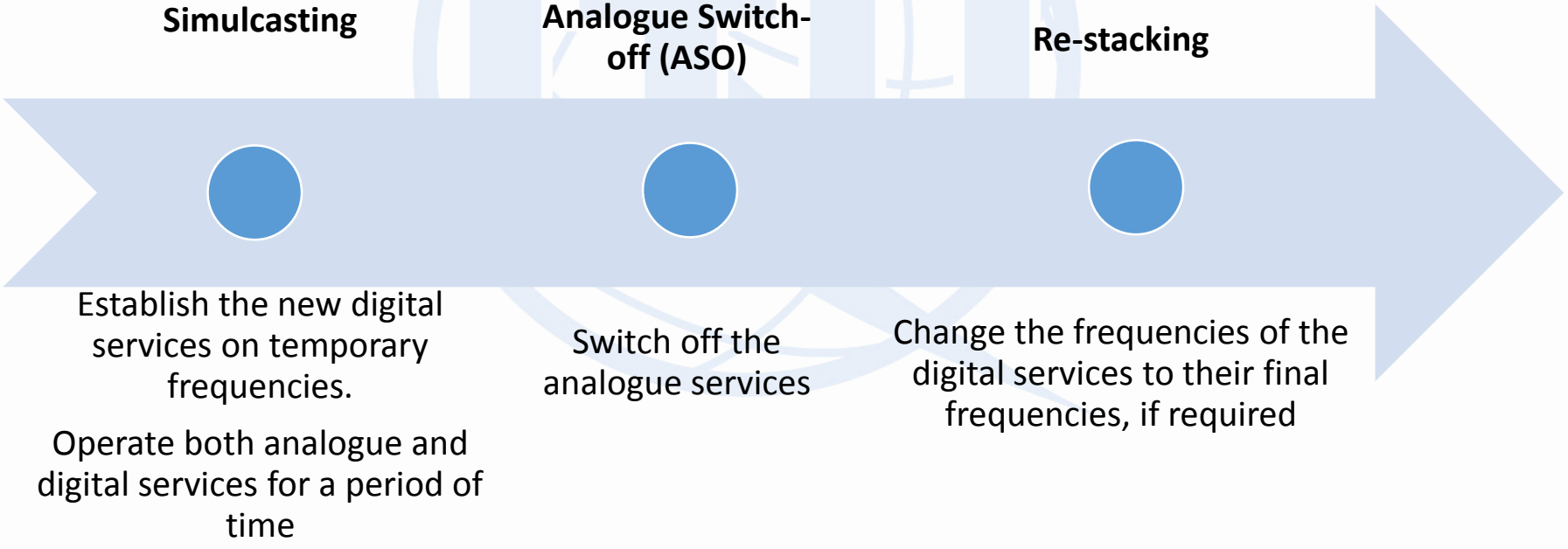
Juan Castro
ITU Radiocommunication Bureau

Summary

1. Definitions
2. DSO/DD Benefits and Costs
3. DSO Status in Europe
4. 700 MHz and 800 MHz bands
5. Useful Links

Definitions
Digital Switch Over (DSO)

DSO is the process in which analogue television broadcasting is replaced by digital television broadcasting.



Definitions
Digital Dividend (DD)

DD is the amount of spectrum made available by the transition of terrestrial television broadcasting from analogue to digital.

Some digital characteristics at the origin of DD:

- **Digital video compression** reduces the transmission size (bits) of the video signal.
- **Multicarrier digital modulation (COFDM)** minimizes the multipath interference effect and the needed transmitting power is reduced.
- **Single-Frequency Networks (SFN)**: The same frequency can be used in adjacent cells as long as the same broadcast content is transmitted.

DSO Benefits

- Instead of one, typically from **4 to 8 digital programs** of equivalent or better quality can be broadcast in the same 6, 7 or 8 MHz wide channel
- **Improved picture and sound** quality and potential for **interactivity**
- **Economies** for broadcasters (less power, less transmitters, new pay-tv services…)

DSO Costs

Country	Purpose	Amount	Source
France	ASO + Help Scheme	€ 397 million	Government/Broadcasters
UK	Help Scheme	€ 693 million	BBC
	Marketing activities	€ 230 million	Digital UK
	DSO total	€ 4.37 billion	Private/public
Italy	Help Scheme	€ 50 per qualifying HH	Government
	ASO pilots	€ 55 million	Government
	DTT roll-out	€ 33 million (2007)	Government
	DTT subsidy	€ 220 million	Government
Spain	DSO projects	€ 75 million	Government
	DSO as of March 09	€ 1.2 billion	Private/public
Finland	ASO	< € 1 million	Increased license fee for YLE
Sweden	Help Scheme	No special budget	Government
	Marketing activities	€ 2 million	Government
USA	DTV coupon program	$ 1.9 billion	Government

Source: DIGITAG

DD Benefits

- A significant amount of high quality **radio spectrum** can be made **available for new services** (such as IMT) or to increase TV offer and new TV services.

- Economical (for regulators): Auction/Bids processes to award freed-up bands to new services

- Economical (for businesses): New business opportunities

Example of Auctions (800MHz)

Country	Amount of auction in €	Year of auction
Austria	2 billion	Oct-2013
Belgium	360 Million	Nov-13
Croatia	40 million	Sep-12
Czech Republic	266 million	Nov-13
Denmark	99Million	2012
Finland	108 Million	30.10.2013
France	2.6 billion	Dec-11
Germany	3.57 billion	2010
Ireland*	854.64 million (spectrum fees included until 2030)	2012
Italy	2.96 billion	Jan-13
Lithuania	2,4 million	Oct-2013
Latvia	4.7 million	Oct-2013
Netherlands	3.8 billion	Dec-2012
Portugal	270 million	2012
Romania*	682 million	Sep-12
Spain	1,3 billion	Jul-05
Sweden	233 million	2009
Switzerland*	CHF 996.3 million	Jul-05
UK	2.7 billion	Feb-2013

*: 800 MHz with other frequency bands

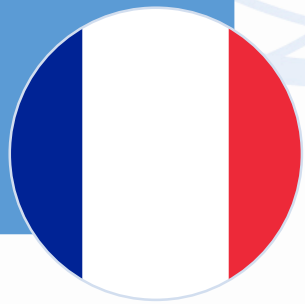
700 and 800 MHz Bands in Europe

- **700 MHz**: 694 – 790 MHz | **800 MHz**: 790 – 862 MHz
- **Mobile service** is allocated on a **shared co-primary basis** with the broadcasting service
- **800MHz band** has been assigned to **mobile services (IMT)**
- **700 MHz band**: European Commission obligation to repurpose to **mobile broadband by 2020**
- **Multilateral coordination** through several groups: NEDDIP, WEDDIP, SEDDIF

Examples of 700 MHz release and auctions

- **November of 2015:**
  700 MHz spectrum auction raised €2.8 billion
- **4th of April 2016**
  - MPEG-2 -> MPEG-4, maintaining the DVB-T: higher compression freed up spectrum for IMT

France



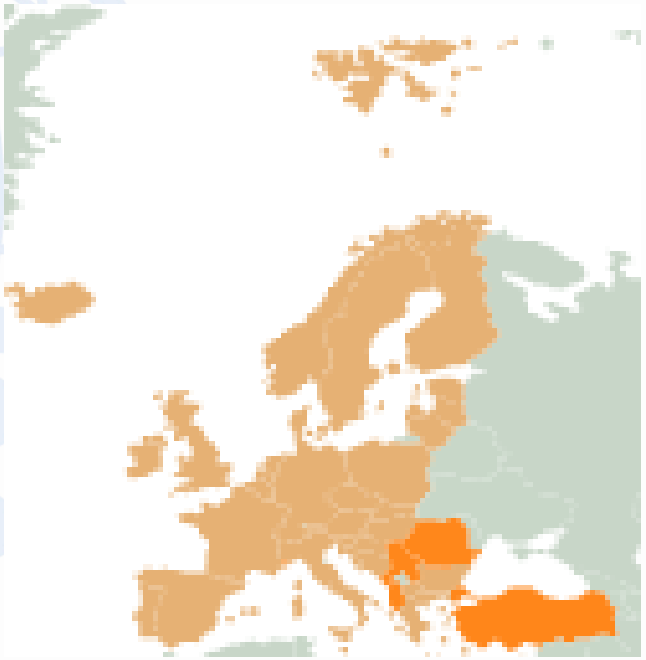
- **May 2015**:
  700 MHz spectrum auction raised €1.0 billion
- **29th of March 2017**
  - DVB-T/MPEG-2 -> DVB-T2/HEVC in several urban areas, Portable reception modes
  - Full DVB-T2 will be gradually rolled out until mid-2019
  - Change in business model (monthly fee)

Germany

DSO Status in Europe

Europe has generally completed DSO

- **Completed**: 38 countries
- **Ongoing**: Albania, Bosnia and Herzegovina, and Romania
- **Not started**: Turkey
- **Digital standard being used**: DVB-T / DVB-T2



Source: www.itu.int/en/ITU-D/Spectrum-Broadcasting/Pages/DSO

Releasing the 700/800 MHz DDs ensuring the continuity of the DTT

- Evaluate the content that needs to be taken into account (present and future)
- Current demands have to be met: no loss of capacity or content. Demands can be met with introduction of DVB-T2 and HEVC

DTT Service Requirement :

- Re-planning the spectrum
- Introducing New Technologies
- Existing licenses and contracts
- Re-engineering of transmission sites

National Decisions

- Step 1: Common understanding about national requirements and access to spectrum
- Step 2: Allotment shapes and sizes are amended if necessary
- Step 3: whenever possible, exchange of DTT channels

International coordination

Challenges

Everybody is in favor of spectrum harmonization

Everybody wants it to be their own way

DSO Useful Links

- **Guidelines:** https://www.itu.int/en/ITU-D/Regional-Presence/AsiaPacific/Documents/AtoDguidelinesV3.pdf
- **Report:** http://www.itu.int/dms_pub/itu-r/opb/rep/R-REP-SM.2353-2015-PDF-E.pdf
- **ITU-R FAQ on the DIGITAL DIVIDEND and the DIGITAL SWITCHOVER:** http://www.itu.int/en/ITU-R/Documents/ITU-R-FAQ-DD-DSO.pdf
- **Website:** http://www.itu.int/en/ITU-D/Spectrum-Broadcasting/Pages/DSO/Default.aspx
- **Training:** https://academy.itu.int

Thank you

juan.castro@itu.int