

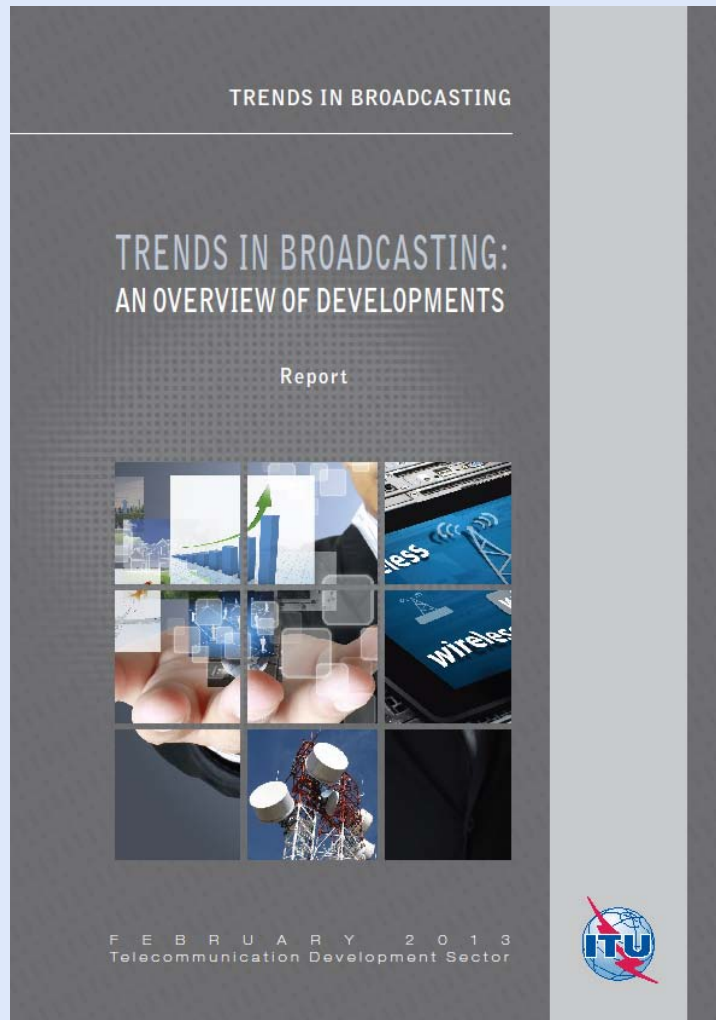
## RDS2 - what it is all about



- **This is a very mature technology**
  - Widely used worldwide
  - FM radio is over 60 years old
  - RDS is over 30 years old
  - Over one billion FM/RDS receiver chips are now made per year worldwide
  - Price is as low as 1 USD per FM/RDS chip
  - Smart phones have been the largest market
  - Car radio market is next and in Europe almost 100%
  - Most radio receivers sold in Europe and in the USA have RDS
  - RDS has been a kind of “silent revolution”

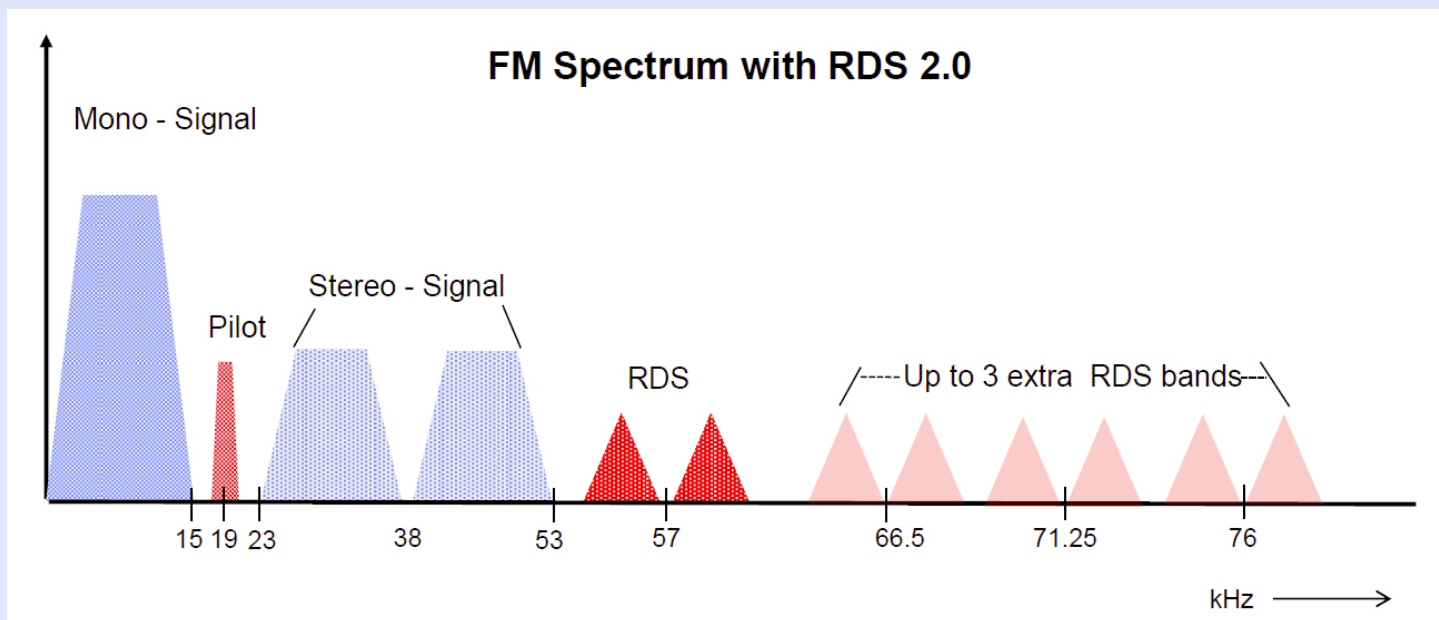


- FM radio with RDS is mature, cheap and universally available
- FM radio attracts by far the largest number of listeners everywhere
- Traffic services TA/TP and TMC are well established
- Due to sophisticated technologies like multiple tuners; multiple antenna systems and RDS algorithms this system is just about perfect
- The perceived audio quality does not differ significantly from that heard via Digital Radio
- A general FM switch-off is unlikely within the next 10 to 15 years and on top of this, it is ecologically crazy to throw away millions of FM/RDS radios
- Outside Europe the number of FM radio listeners even increases as also smart phones are used as receivers



- “Conclusions on
  - Broadcasting by the end of this decade
- “FM will remain an important means of delivery of audio broadcasting. In general switch-off of FM stations lies far ahead, but a few countries may have switched-off analogue radio.”

- **Use additional subcarriers**
  - Remains within the ITU modulation limits of 10% (Rec ITU-R BS.450-3)



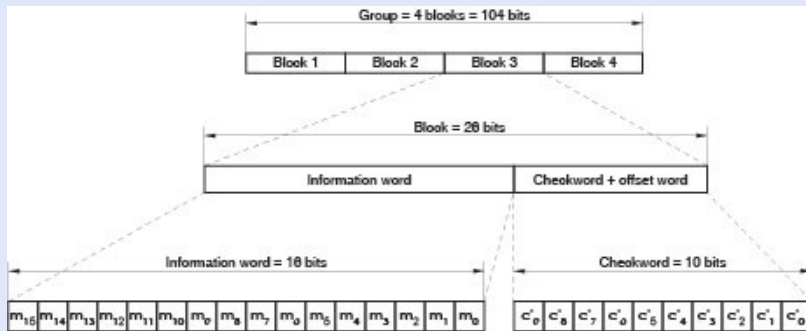
- **Basic RDS will ensure backwards compatibility on stream 0**
  - Streams 1 to 3 will transmit only ODAs

- **Remove from RDS 1.0 unused features**
- **Enhance the coding of some features**
  - ECC needed for unique worldwide FM radio programme identification
  - Planned FM band extensions (AF coding) for Brazil, China, etc.
  - Long PS name (32 byte)
  - Universal character coding with UTF-8
    - To support text in any language worldwide
- **Avoid major changes to the RDS standard**
- **On streams 1 to 3 use exclusively ODAs**
  - New features shall use ODA concept where ever possible
    - Example: Programme Service logo
  - **Increase data transmission rate for ODAs by more than 10 – 20**
    - RDS 1.0 stream has capacity for 2 – 4 ODA groups/sec
    - xRDS streams 1 to 3 can transport over 40 ODA groups/sec
- **How ?**

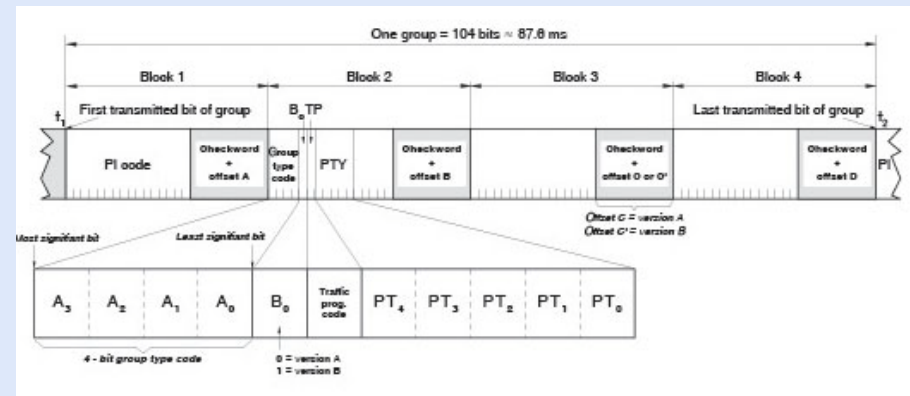
# How can the data capacity be increased?

RDS FORUM 2014

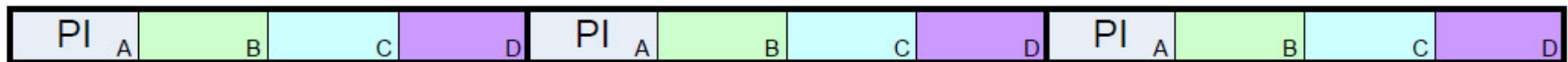
## ■ RDS coding structure



## ■ RDS2 uses “compacted” groups:



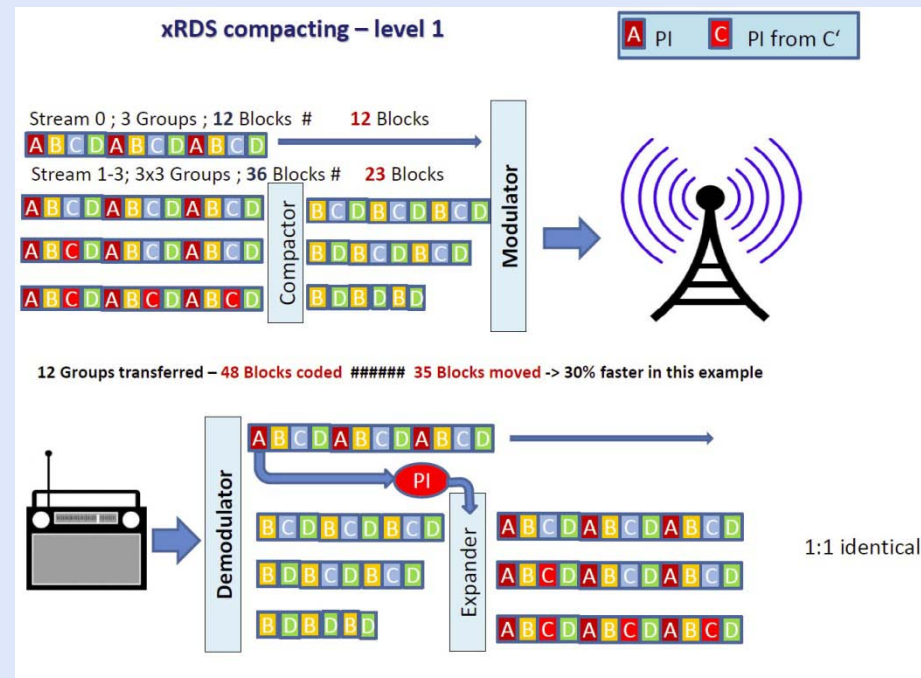
RDS group



xRDS group



- PI code not needed on streams 1 to 3 (not used for auto-tuning)
- 10 – 20 times ODA capacity is indeed possible !
  - RDS 1.0 can transmit 11.4 groups/sec (45.6 Blocks) of which 2 to 4 groups may be ODAs (8 to 16 Blocks)
  - RDS2 can transmit 45.6 Blocks per stream: 137 Blocks > with compacting 15.2 group type A/sec >
  - On all three streams together: 45.6 groups/sec, i.e. 10 to 20 times more !!!





- The structure of RDS will be completely maintained : its simply adds three more 'pipes' to deliver the RDS datastream to the RDS device
- In traffic terms it's like widening a single carriageway road to four lanes
- The data throughput is increased quite dramatically – not just by a factor of four, but by more, as it's not necessary to carry in the additional sub-carriers 'mandatory' RDS elements that are already in the 'main' sub-carrier

For example the 'PI Code' – which mandatorily takes up 25% of the main sub-carrier doesn't need to be carried at all in any of the additional sub-carriers, as it is already in the groups carried in the main sub-carrier

- Everything that has no future could be deleted from the RDS standard
- A good alternative to redefining unused bits will be to declare them as reserved for future use
- A list of features will be useful that would be nice to have in RDS2, such as PS (32 bytes long) with UTF-8 coding
- However in RDS2, the ODA concept will be on top of everything
  - We need to create a new IEC standard for RDS2
- We shall build it of course on RDS 1.0
- **In June 2015 the RDS Forum's annual meeting will be asked to approve the new concept**

- The RDS standard will remain the IEC 62106 with an incremented edition counter
- However, the setup and partitioning of the various chapters will be entirely new.
- RDS2 will cover now also the frequency band extension from 64 MHz to 87.5 MHz (China) and 76 to 87.5MHz (Brazil)
- The difference of RDS2 with respect to the existing RDS (1.0) standard will be clearly explained
- The backwards compatibility issue is fully secured
- The new setup will have similarities with the one from the TMC standard with a number of parts structured under the umbrella of IEC 62106

RDS feature	Group	Usage Intense	Usage Seldom	Usage Never	Future	Observations
AF	0A	x			x	
AID (ODA)	3A	x			x	
CI (PI)	all	x			x	
CT	4A	x			x	
DI	0A&0B					
DI-d <sub>1</sub>	0A&0B			x		Mono/stereo
DI-d <sub>2</sub>	0A&0B			x		Artificial head: yes/no
DI-d <sub>3</sub>	0A&0B			x		Compressed: yes/no
ECC	1A		x		x	Needed for RadioDNS
EG (Linkage)	14A		x			
EON	14A	x			x	
eRT	ODA		x		x	Future potential
EWS	9A		x			Can be replaced by ODA
EWS id	1A		x			Can be replaced by ODA
IH	6A&6B		x			Can be replaced by ODA
ILS (Linkage)	14A		x			
LA (Linkage)	1A&14A		x			
LSN (Linkage)	14A		x			
Language code	1A			x		
MS	0A&0B&15B			x		
ODA		x			x	
PI	all	x			x	
PIN	1A			x		
PS	0A&0B	x			x	
PTY	all	x			x	
PTYI	DI-bit d <sub>3</sub>		x		x	Static/dynamic PTY id
PTYN	10A		x		x	
RP	7A		x			Can be replaced by ODA
RP id	1A		x			Can be replaced by ODA
RT	2A&2B	x			x	
RT+	ODA		x		x	Future potential
TA	0A&0B&14A15B	x			x	
TDC	5A&5B		x			Can be replaced by ODA
TMC	ODA (8A)	x			x	
TP	all	x			x	

Features never used by RDS receivers and without future can now be deleted

- The critical review of RDS1.0, clears ‘dead-wood’ to save wasting space, and allows full compatibility between RDS 1.0 and RDS2
- As there is no need whatever for a type 2B group, the 2B group will be dropped, and only 2A used for RadioText
- No receivers have ever used DI (Decoder Information) nor PIN (Programme Item Number) – neither are now needed, so these features will be dropped
- ‘B’-type groups become ‘fast-switching’ (rather than ‘fast-tuning’) groups, and always associated with their ‘A’ group
- TDC, IH, Paging, EWS – which were originally defined in the RDS spec. will be dropped entirely, continuing to exist as ODAs



The PS name in RDS (1.0) has 8 characters at maximum. It shall be static so that listeners can see what radio programme they hear

...but not always used as standardised



In this particular case PS is toggled as ENERGY and BERN

- Hence a good example why a long PS is now needed





Screen shot: VW - 2014

In addition to the existing “short” PS there will be a long PS with max. 32 byte  
Character coding in all languages worldwide will then be possible





All screen shots: VW - 2014

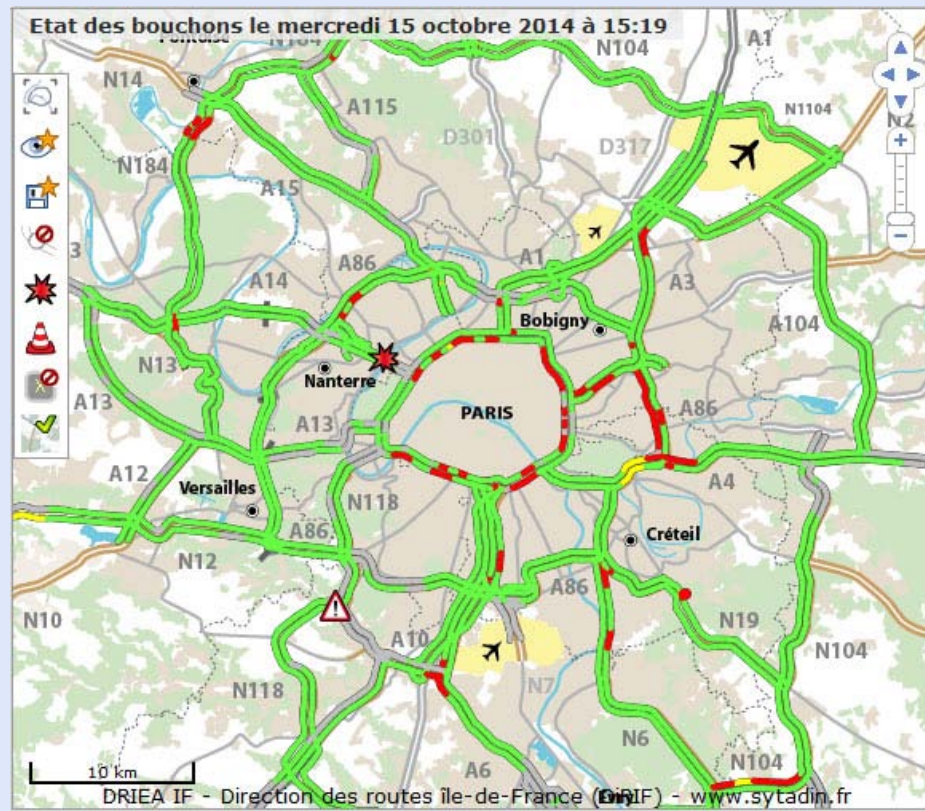
- Best example is **RadioText Plus**
  - Used up to now mostly in Germany and the USA
    - The potential for being used more widely remains very high
      - Not only in car radios but also in smart phones



Screen shot: BMW Professional nav car radio - 2013

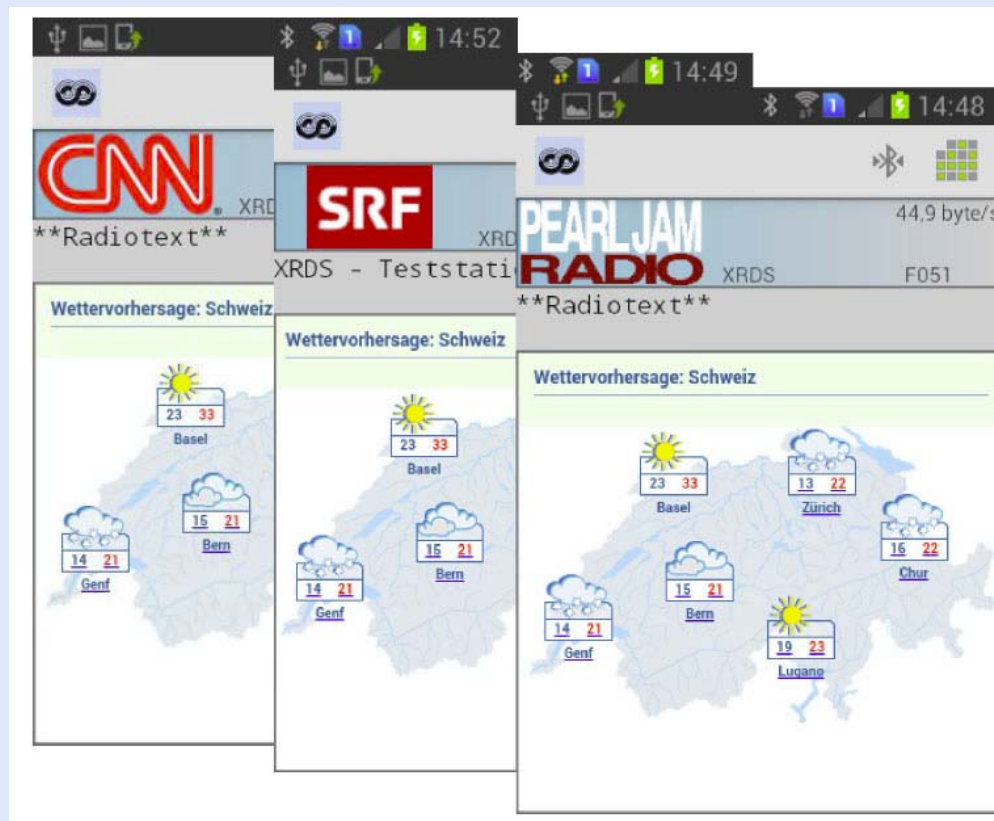
- **During the RDS2 development**
  - RDS 1.0 has to be critically reviewed
  - Unused RDS features will be identified for deletion
    - This will simplify the RDS standard
- **However, changes made to the RDS standard**
  - Must be backwards compatible
  - Also RDS2 must be backwards compatible

- **RDS2 will be a kind of turbo engine for TMC**
  - Supra-regional TMC can remain on RDS 1.0
  - RDS2 could offer more regional and urban info



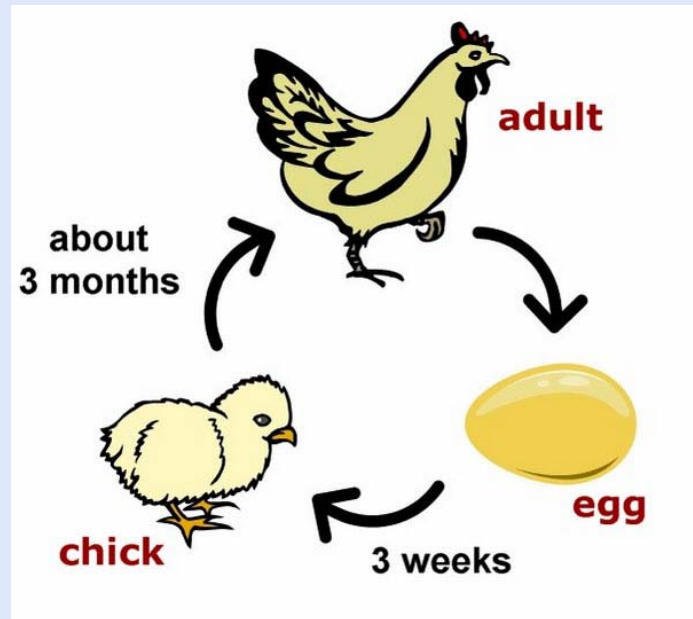
- **PS name possible in characters used worldwide**
- **Two kinds of RadioText will be possible in parallel**
  - RT with group type 2A can be used for English text
  - eRT as ODA with UTF-8 and 128 byte long can be used in addition for Russian, Chinese , Arabic or Indian text (even with possible text flow from left to right)
- **Very widespread TMC could be very much powered up**
  - To provide also more regional & and better local info in urban areas
- **RDS2 will be able to support graphical features, logos etc**
- **RDS2 will be able to support Hybrid radio** (device connected to Internet)
  - To capture additional programme related information from the broadcaster's web site

- Improved possibilities for presenting FM radio



- **Support the connected car concept**
  - Provide Internet links using the Hybrid radio concept
    - Radio France is developing this ODA application since 2013
- **Better support applications development**
  - Example: Android OS
  - Use ODAs to achieve this
  - Support for RDS decoding with Java programming is under study
- **Support character coding as used on the Internet**
  - UTF-8 coding is already applicable worldwide
  - Supports Chinese, Arabic, Cyrillic, Indian etc.
- **Make FM radio look more modern and interactive**
  - Create above all business opportunities for the next 30 years of FM radio with RDS

- We need the complete cycle



- Not just only an innovative RDS Forum and just only a new RDS standard



- **For a proof of concept we need:**
  - RDS2 encoders
  - RDS2 receiver chip firmware adaptations
  - Broadcaster involvement and a test region for validations
  - Involvement of the automotive industry
  - MacBe's TRX011, adapted to RDS2, could be an ideal demonstrator / also for mobile tests
- **All these issues are currently under study within the Forum**
  - Involving very actively some of its members

- RDS2 will offer very strong opportunities where increased data capacity for added value features and services is required
- This may particularly be the case for countries where Digital Radio will not rapidly expand
- It is clear of course that RDS2 is *not* to be seen as a competitor for Digital Radio
- RDS2 may offer a great chance for enriched TMC services, particularly for detailed road information in large urban areas, increasingly required and feasible

## ■ **Thank you for your attention**

and thanks to all those colleagues who gave me feedback  
above all

RDS Forum members Attila Ladanyi, Frits de Jong and Mark Saunders

## ■ **Contact us at the RDS FORUM**

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