

DAB+ network implementation

High power vs low tower
implementations from a
broadcasters perspective

Hanns Wolter, DAB Italia s.c.p.a. - ABU – ASBU – WorldDAB
Technical Workshop

Overview

- What is HPHT and LPLT?
- Classic use cases
- MPMT
- Rollout history
- The truth is out there

HPHT



LPLT



HPHT LPLT

SITE	HPHT	LPLT
Structure	BIG	Not so big
N. antennas	4 or more	1 - 4
TX Power	High – 1KW or more	10W – 250W
ERP	10 KW or more	10W– 1KW
Coverage	Extensive	Limited
Cost	High	Low/Medium

Classic use cases

- HPHT
 - Extensive coverage
 - Rapid network rollout
 - Excellent cost efficiency
- LPLT
 - Local coverage (local stations, indoor coverage)
 - Filling gaps in the coverage
 - Difficult access to HPHT sites

MPMT

- There is a gap between the HPHT and LPLT sites
- Depending on the existing network infrastructure and the morphology of the territory a significant amount of transmitter sites will fall in between HPHT and LPLT
- MPMT – Medium Tower Medium Power

Rollout history



PROGRAMME OF THE
EUROPEAN UNION



Rollout history - Territory

- Italy has a very complex landscape
- We have...
 - Very large flat areas surrounded by high mountains
 - Lots and lots of hilly terrain
 - Lots of real mountains and deep valleys
 - 2 really big islands: Sardinia and Sicily (for European Standards)
 - Lots of smaller islands too...
 - High mountains next to the sea
 - An endless coastline
 - Lots of warm water supporting great propagation effects
 - Many many neighbors! (at least 14 to coordinate with)

Rollout history

- First steps

- When we started planning a “test” rollout the situation for DAB was very uncertain
 - DAB+ was new
 - No car receivers
 - Strong existing FM landscape in which digital radio was considered only a cost
 - No real frequency plan in place for DAB+
 - DAB+ was considered an old technology
- First DAB sites have all been HPHT for a number of reasons
 - Coverage (territory + population)
 - Availability
 - Commonality with FM sites
- Results
 - Great highway coverage (important for the car manufacturers)
 - Limited indoor service

Rollout history - Extension

- Slow but systematic development of the network
- No HPHT sites
- Mainly MPMT sites
 - Limited availability of HPHT sites
 - Cost
 - Coverage needs
 - SFN...

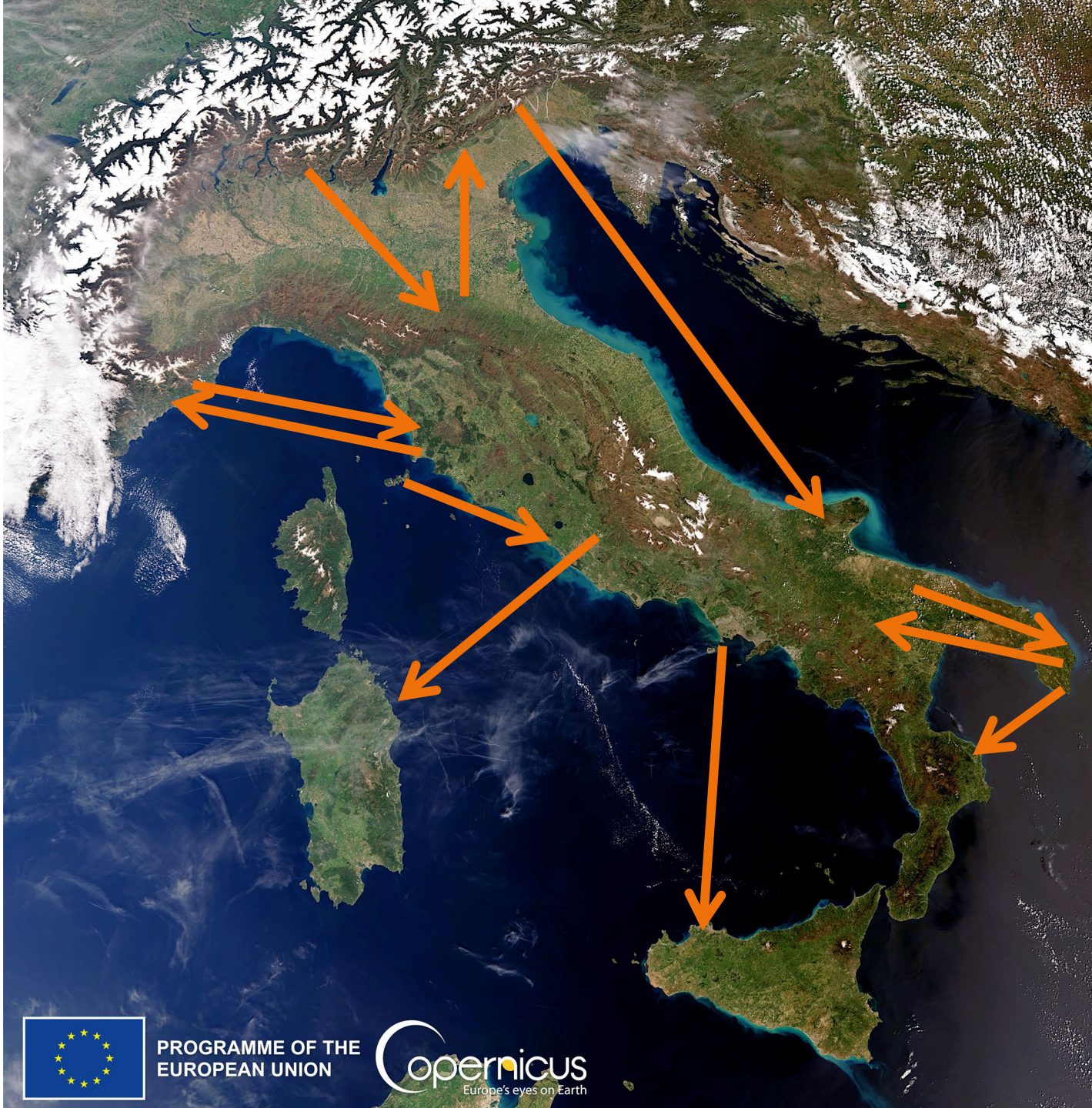
Rollout history - Long Term Evolution

- More MPMT
 - Coverage of extensive areas
- More HPLT sites
 - Indoor service in urban areas
- More LPLT sites
 - Gap fillers and small area coverage

But this is only half of
the story

SFN, Frequency reuse & International coordination

- The key characteristic of DAB+ from a broadcasting point of view is SFN
 - It is the most powerful feature of DAB and also its weak point IF not well managed
 - HPHT sites are generally speaking not suited to build extensive SFNs
 - HPHT sites might work well in small SFNs....
- Frequency planning at national and international level for DAB can introduce a limitation for the use of HPHT sites
 - Difficult reuse
 - Complex cross-border coordination



PROGRAMME OF THE
EUROPEAN UNION



Network resilience

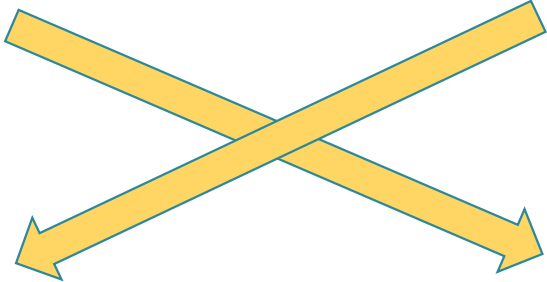
- Transmitter site redundancy is expensive
- HPHT sites are difficult to protect against failures
- When the sites is off-air no more service at all

- When using MPMT, HPLT and LPLT sites a more resilient network is created which, if reasonably planned, is far more robust in case of a single failure of a transmitter site

High
Power
High
Tower

Low
Power
Low
Tower

+



Low
Power
High
Tower

High
Power
Low
Tower

+

The Wolter Law

Some suggestions from our perspective

- Use as few HPHT sites as possible
- Go HPLT!
- Plan for a comprehensive network from day 1
- Don't be afraid to adapt the network once put into operation – things not always work as planned
- Use SFNs as much as possible, switching between blocks is not always straightforward from the receiver side



LPHT!!!!

Thank you for your attention!

Hanns Wolter

wolter@dab.it

www.dab.it