



Current and future development of ERTMS in MOROCCO

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AGENDA

- Moroccan Railways Modernization
- Why ERTMS
- Implementation of ERTMS



Moroccan Railways Modernization

The development strategy of ONCF (Moroccan Railways) includes the building of a new high speed network as well as modernization of the conventional network.

To do that, ONCF is doing among others, the following actions:

- Renewing the tracks and building of new ones
- Railways Electrification
- New signaling systems, including electronic interlocking and ETCS
- New telecommunication systems GSM-R
- Renewing the main stations
- Upgrading or building logistics platforms

Why ERTMS?

- Support of operation by continuous supervision
- Enhancement of safety level
- Interoperability with other countries: Europe and Maghreb

Implementation of ERTMS

There is no ATP system before implementing the ERTMS → No legacy

This issue makes easier the transition to a new ATP system such as the ERTMS.

The solution for both High Speed and Conventional Lines is:

- To equip ERTMS L2 on the HSL and ETCS L1 on Conventional Lines
- To upgrade the trains with ETCS onboard
- GSM-R deployment

Implementation of ERTMS

HSL: ERTMS L2

1st phase:

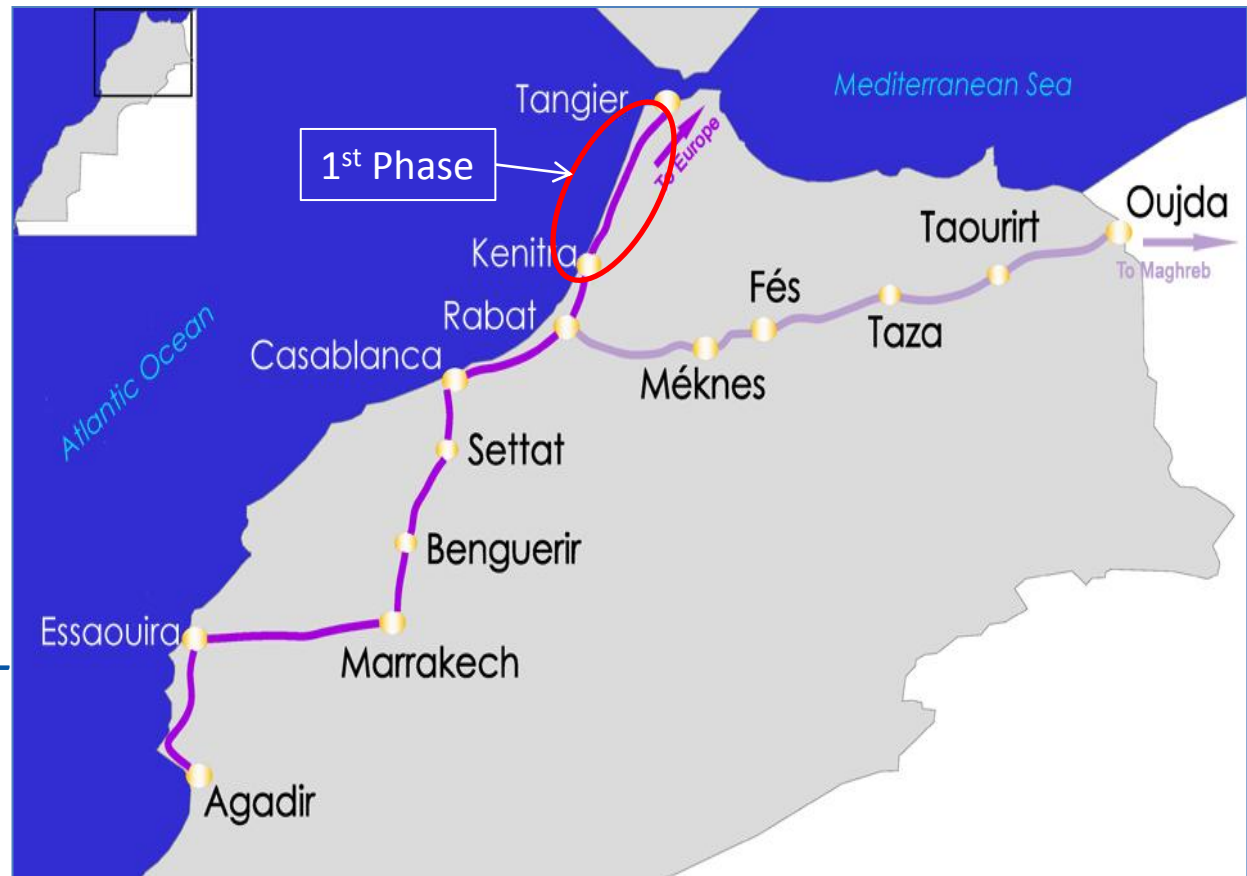
Line 200 Km length

ETCS L2: 1 RBC

Ansaldo STS

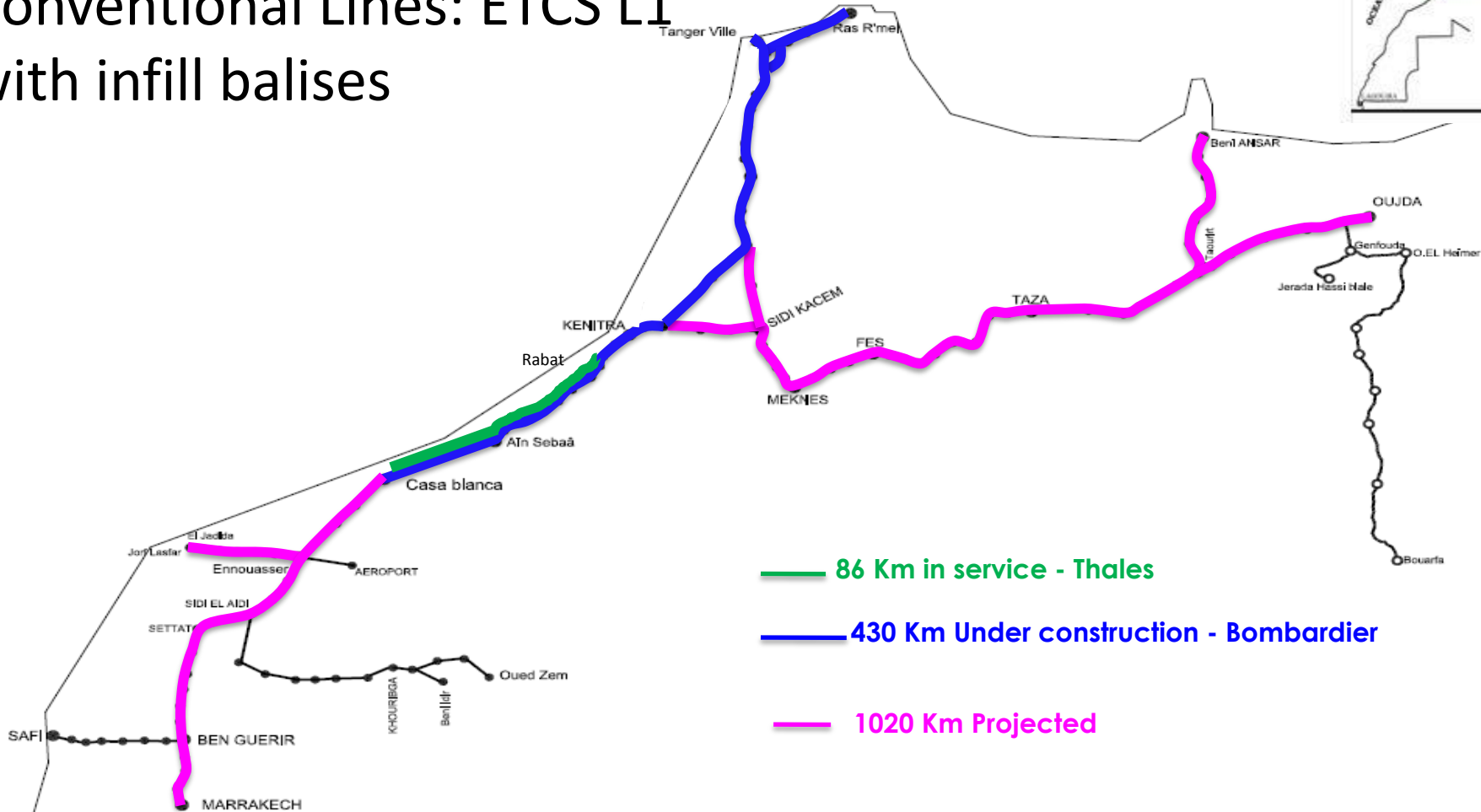
GSM-R:

Thales/Huawei/IMET



Implementation of ERTMS

Conventional Lines: ETCS L1
with infill balises



- 86 Km in service - Thales
- 430 Km Under construction - Bombardier
- 1020 Km Projected

ETCS ONBOARD EQUIPMENT

Trains onboard Equipment:

- HS Train: 12 (Alstom)
- Conventional Trains (Siemens)
 - 37 EMUs
 - 60 Locomotives (passengers and freight)

Our rolling stock strategy

Equipment or pre-equipment of new rolling stock:

- All high-speed trains
- EMUs for Regional trains
- Passengers and Freight locomotives

Conclusion

ONCF has embraced the ERTMS as a key element of its railway network modernization. For many reasons:

- ✓ Guarantees the safety level
- ✓ Fixes current obsolescence problems with legacy systems
- ✓ Facilitates better railway operation and maintenance
- ✓ Takes advantage from the current developments in a bigger scale market (Europe)
- ✓ Benefit from multi-vendor environment
- ✓ Continuous technology improvement