

Appendix K

Tender No. 42240

Timetabling & Track Possession System

Requirements for participation for demo day

The fulfillment of the following requirements is mandatory for the demo day:

Mandatory System functionalities:

1. General

- The System enables the planning of Timetabling using two methods simultaneously: Planning by ETCS Level 2 and INDUSI.
- The system shall include a module for track possession through a graphical map representation of the railway network.

2. Corresponding requirements:

3. Working environment

- **Multi-user support**

The system must support the work of multiple users simultaneously with different permission levels.

- **Central Data Storage and Handling**

The system stores data on a central database instance. A change made in one module in the system will affect and be displayed in the other modules. This ensures that all stakeholders have access to the most up-to-date information, reducing the risk of discrepancies.

- **Enabling cross-horizon workflow through all modules**

The system supports planning for all ranges of time: strategic timetable (multiyear), basic operational timetable (periodic), daily timetable (short-term).

4. Managing resources

- **Managing stations and operational points**

The system must enable the creation and editing of operational points. The following must be determined: a unique ID, the operational name, the commercial name (if available), the name in multiple languages, the type of operational point like station/junction, geocoordinates (if available).

5. Possession planning

- **Displaying dependencies and conflicts between requests**

Display dependencies and possible conflicts (in terms of spatial and temporal overlaps) between requests.

- **Linking trains to track possession after approval**

If a request is approved, each affected train is linked to the track possession ID.

- **Displaying affected trains in trains**

The trains that are affected by the track possession in place (all trains pass at least one affected infrastructure element) or trains linked with track possession ID are displayed filtered in the trains list. The trains that are affected or not affected by the track possession in time are displayed in the trains list, indicated by separate fields. This is in case, for example, if trains on a line are to be diverted in their entirety during a track possession, even if the closure does not last the whole time.

- **Showing all requested and approved possessions on infrastructure map**

Dynamic map shall show all requested and approved possessions in parallel.

6. Timetable planning

- **Computation of technical running times**

The system computes technical running times in either delta-v or delta-t or delta-s steps with an appropriate precision.

- **Consideration of INDUSI speed supervision**

The running-time computation takes into account speed supervision resulting from INDUSI I60R, if approaching to a closed signal or to a supervised speed change.

- **Consideration of ETCS speed supervision**

The running-time computation takes into account speed supervision resulting from ETCS, if

approaching to a closed signal or to a speed change. Parameters can vary per Movement Authority (e.g. Release Speed, Supervised Location). Speed supervision may result from Permitted Curve or Warning Curve, depending on the local situation.

- **Consideration of ETCS lambda curve**

Running time calculation shall support ETCS L2-based planning using the Lambda curve.

- **Storing of gamma-model**

Per rolling-stock unit, the parameters of the ETCS gamma-model can be stored. It is sufficient, that one confidence level for emergency brake safe deceleration on dry rails (M_NVEBCL) can be handled.

Sincerely,

Company _____

Date _____

First name _____

Last name _____

ID _____

Signature _____