Open-ETCS

Meeting and Report

09-10 Sept 2014
Brussel
Provisional.....

Open-ETCS

Practical informations
Rue Washington 40 / Washingtonstraat 40
1050 Bruxelles (Ixelles) / Brussel (Elsene)
Tel : +32 2 640 16 65
Fax : +32 2 646 05 25
Email :
mai@mai.be
Website :
http://www.mai.be

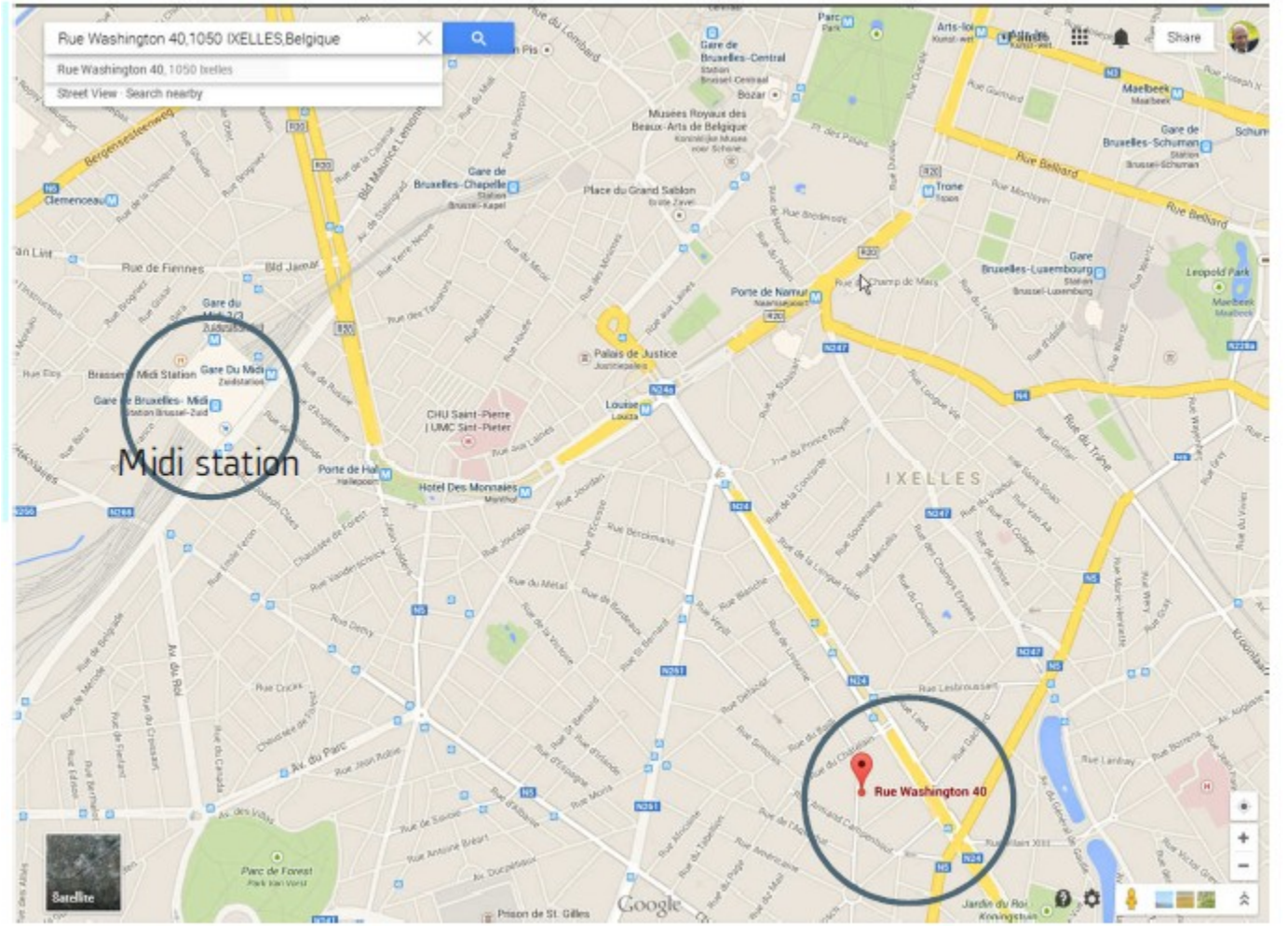
(Tram 81,94 Bus 54 stop BAILLI)

Agenda

9th	**10:30 – 18:00**
10th	**08:30 – 16:00**

Wifi available

OpenETCS


Rue Washington 40,1050 IXELLES,Belgique
Rue Washington 40, 1050 Ixelles
Street View - Search nearby
Share
Midi station
Rue Washington 40
Satellite
Google
IXELLES

OpenETCS

First day on 9th :

10:30 PM to 12:30 :

Train Positioning and API of MMU and BTM

Break from 12.30 AM to 1 PM.

1 PM to 4.15 PM :

Overall Structure / Internal Data Structure.

(2.00 to 3.00 PM : project coordination meeting in separate room : Baseliyos Jacob, Jacques Pore', Fausto Cochetti)

Short break from 4.15 to 4.30 PM.

4.30 to 6.00 PM :

Balise receiving.

6:00 to 6.30 PM : some remarks from WP1 (Baseliyos Jacob)

- *Objectives of project from WP1,*
- *Goals and expectations from WP3 meeting,*
- *Interaction WP3with other WPs*

OpenETCS

First day on 9th , details :

1 PM to 4.15 AP :
Train Positioning and API of MMU and BTM
document from All4Tec:
Train Position Vx.pdf
document from Lloyds :
Train Position and Locations.odt

DetermineTrainLocationProcedures.docx
scade model from Uwe : To be found at
https://github.com/openETCS/modeling/blob/master/model/sysml/WP3-Initial-Architecture/WP3-Initial-Architecture.di

OpenETCS

First day on 9th , details :

2.15 to 4.15 PM :
Overall Structure / Internal Data Structure.

document from Lloyds :

Internal data structure[1].pdf

Comments_Datastructure.docx

Short break from 4.15 to 4.30 PM.

4.30 to 6.30 PM :
Balise receiving.

document from Uwe :

To be found in Github

OpenETCS

Second day on 10th:

Starting at 8.30 AM

Review of WP3 OpenETCS Database version V9,

- Remarks from All4Tec
- Remarks from Uwe

up to 11 AM

Feedback of On-going Actions

Feedback on New Actions

up to 12.30 AM

Break up to 1 PM

Planning of Objectives up to 3:30 PM

Closing Remarks from WP1 (Baseliyos Jacob) 3:30 16:00

OpenETCS

Second day on 10th, details :

Starting at 8.30 AM
Review of WP3 OpenETCS Database version V9,

- Objectives
- Context
- Data
- Process
- SysML
- Excel
- more details on database,
- compressed data & decompressed

up to 11 AM

OpenETCS

Second day on 10th, details :

Starting at 11 AM
Feedback of On-going Actions
    SysML diagram rework
    Subset inaccuracy
    Mock-up (train position & balise receiving)
    Vector and Matrix in Scade
Feedback on New Actions : to be redefined up to 12.30 AM

Break up to 1 PM

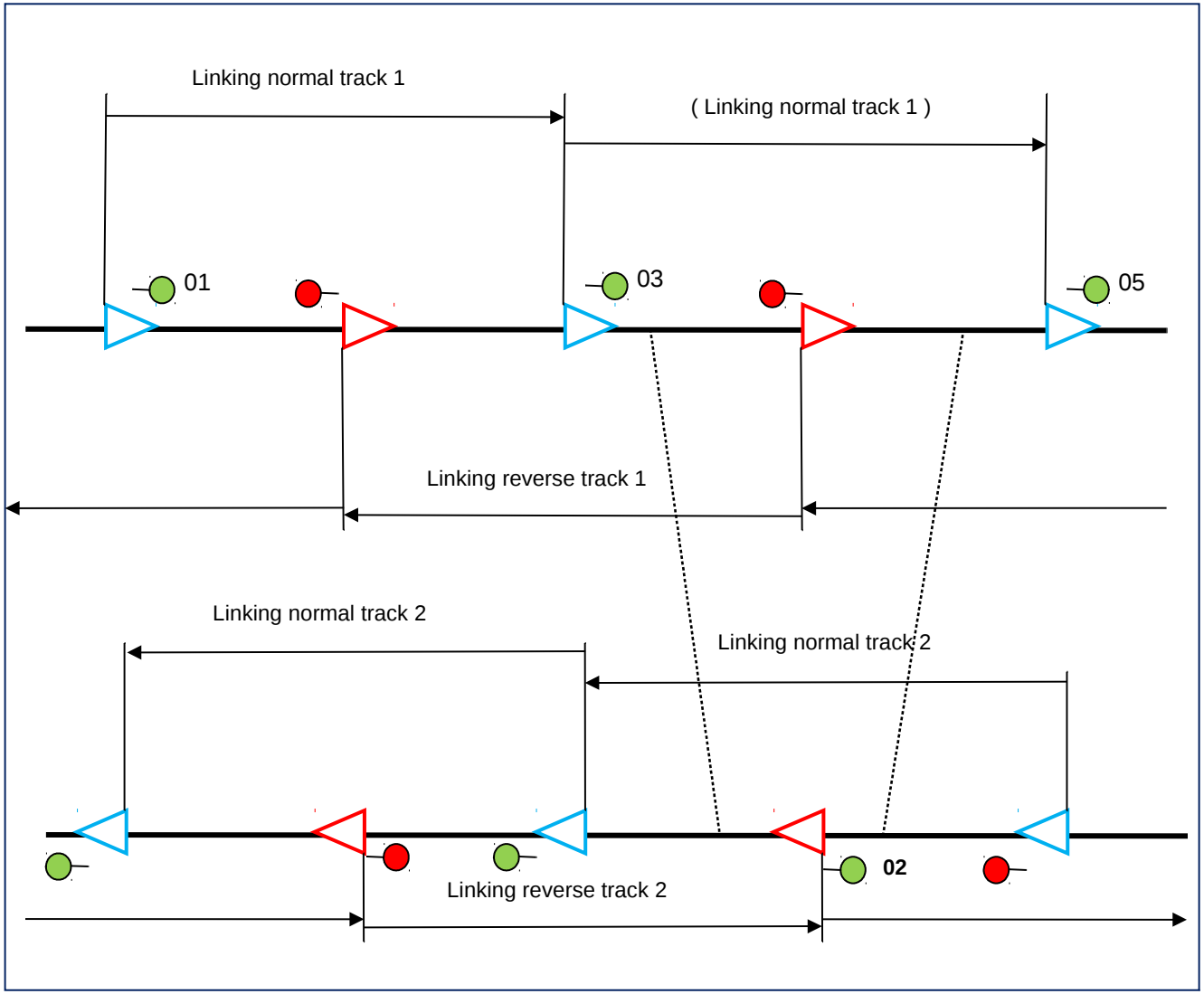
Planning of Objectives up to 4 PM

OpenETCS

Technical details

OpenETCS

Balise track layout



OpenETCS

Comments on track layout :

1) A track of double direction is equipped with beacons all oriented in same way
2) Beacons describing track in one direction are linked together
3) There is no need to link all beacons in both direction
4) It is always possible to invert both beacons and running direction

OpenETCS

The MMU provides at the beginning of each real time cycle :

Coordinate : 3 absolute counters of distance :

- C_estimate : nominal estimated value, so-called “Cn”,
- C_doubt-over : maximal value, so-called “Cmax”,
- C_doubt-under : minimal value. so-called ”Cmin”.

Speed : vital speed so-called “Vn”,

Acceleration : not vital (?) so-callled ”Acc”,

Motion_State : vital boolean so-called “Motion”,

Motion_Direction : vital boolean so-called

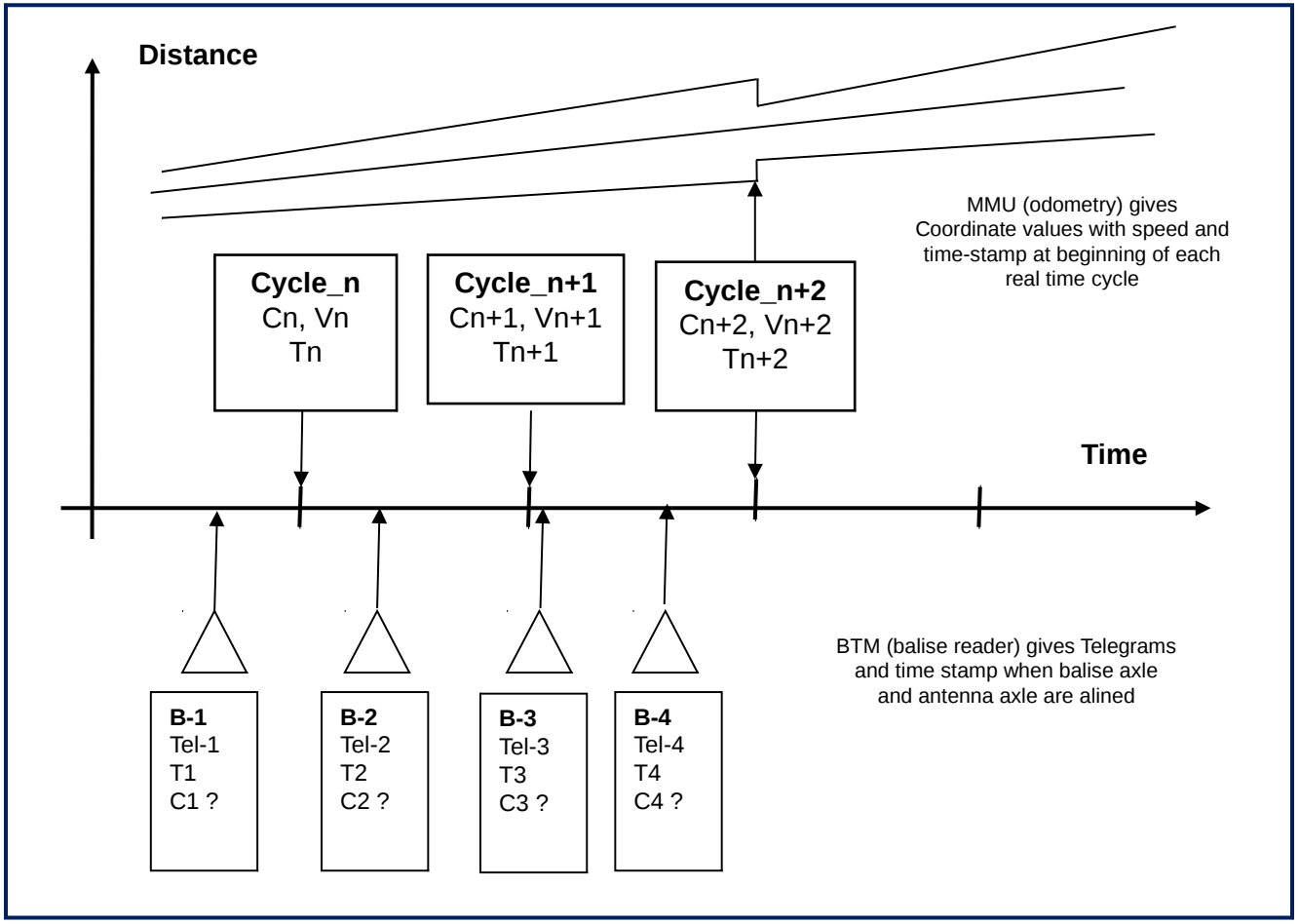
OpenETCS

1) Coordinate is absolute and signed counters of distance
2) Signed means value is : -2exp(n-1)..0..+2exp(n-1)-1
3) 1 is 10 cm, with n = number of bit = 32
4) Overflow is : 2exp(n-1) = 2147483648 = 214748364 meters
5) overflow impossible : 214 748 km

6) Time is also one signed counter over 32 bits
7) 1 is 10 ms , with n = number of bit = 32
8) Overflow is : 2exp(n-1) = 2147483648 = 21474836 seconds
9) overflow impossible : 248 jours

OpenETCS

MMU / BTM Timing Diagram

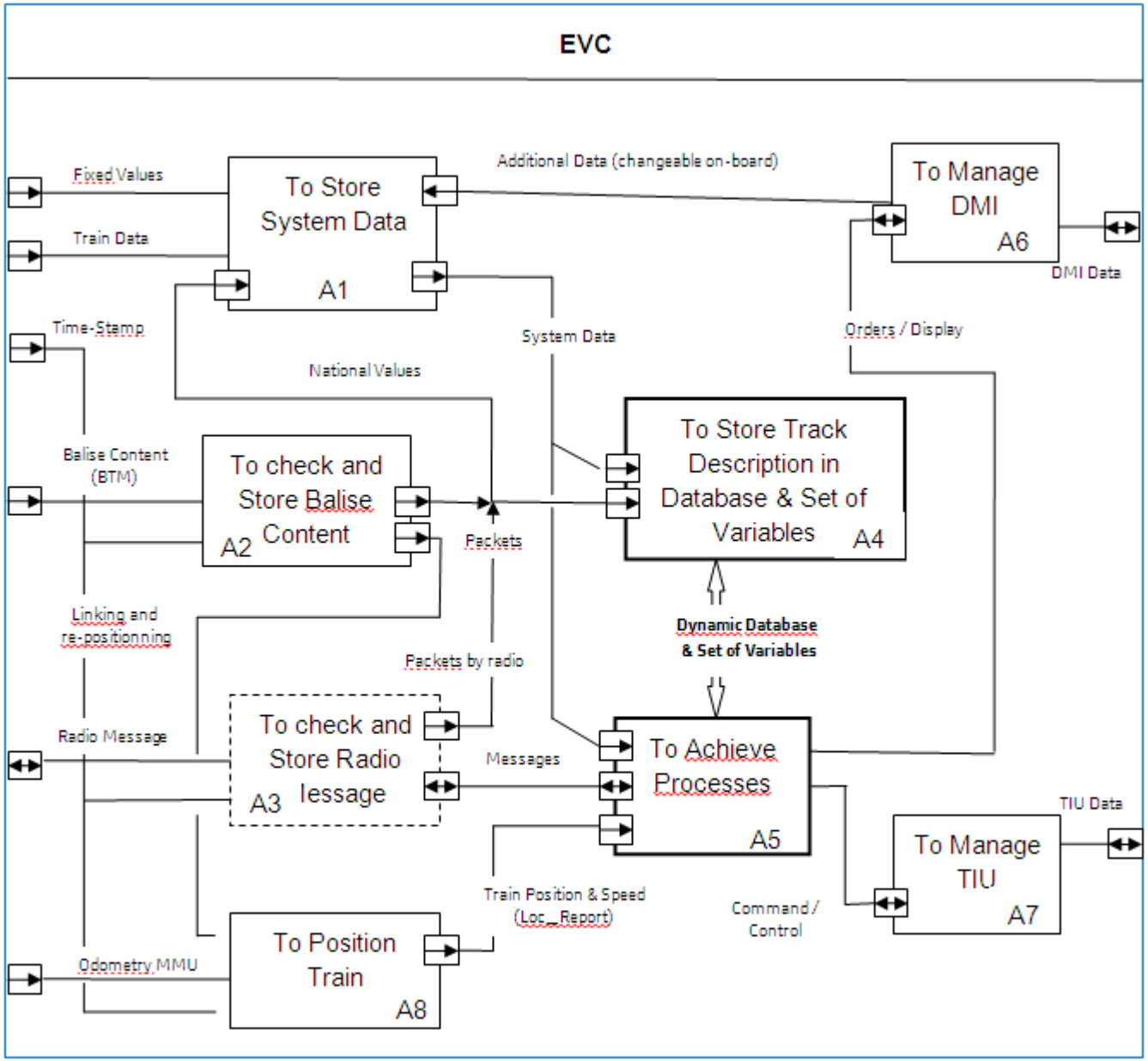


OpenETCS 24/25 june 2014

Cycle “n” : LRBG is positionned by C0,
MMU provides Cn, Vn, Tn,
BTM has provided Tel-1, T1,
Balise B1 position is : C1 = Cn – Vn * (Tn – T1),
Compute C1 with Doubt-Over and Doubt-Under.

Cycle “n+1” : LRBG is still positionned by C0,
MMU provides Cn+1, Vn+1, Tn+1,
BTM has provided Tel-2, T2,
Balise B2 position is : C2 = Cn+1 – Vn+1 * (Tn+1 – T2),
Compute C2 with Doubt-Over and Doubt-Under.

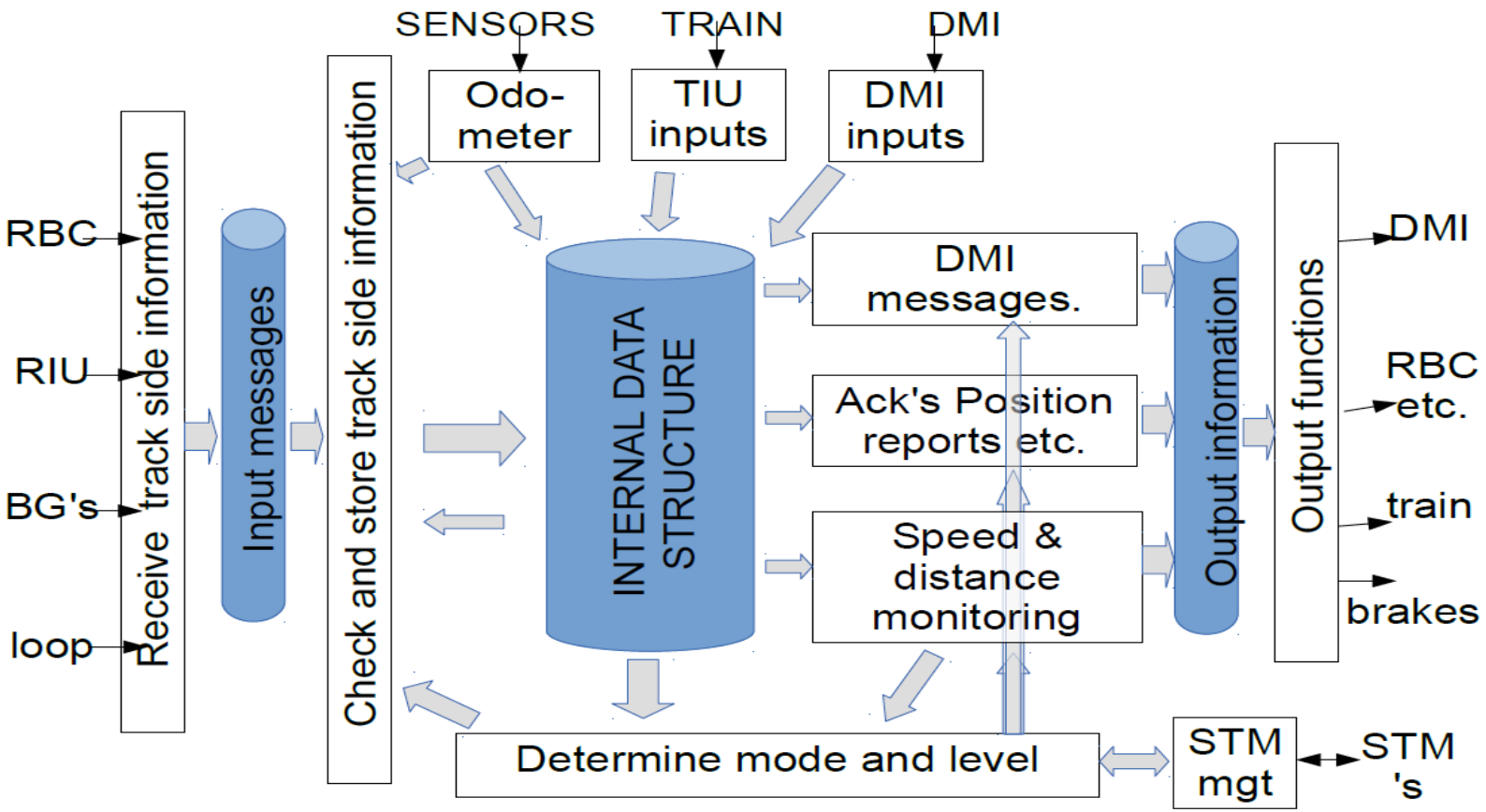
Cycle”n+2” : BG becomes LRBG
B3 and B4 position are computed (same way)
C4 becomes C0



IBD "EVC" of First Level

OpenETCS 24/25 june 2014

SysML IBD Diagram is a formalisation of un-formal diagram extracted from SRS analysis/ Boxes A2 and A4 need to be specified by I/O and function. Matrix structure has to be defined more. Boxe A5 is split into 2 parts.



Track Layout	Type	Position	Value	Asafe	Grd	Mrsp

LRBG

BG_n	Position	Linking	orientation	inaccuracy	other
TrackCond	Pos.	Param.	Asafe	9,81*grd	MRSP
Others	“	“	“	“	“
Grade	“	Value	“	“	“
SSP	“	“	“	“	“

xxx

-1%

60 km/h

LOA

BG_n+1	Position	Linking	orientation	inaccuracy	other
SSP	Pos.	Value	Asafe	9,81*grd	MRSP
Others	“	“	“	“	“
Grade	“	“	“	“	“
SSP	“	“	“	“	“

80 km/h

2%

45 km/h

BG_n+2	Position	Linking	orientation	inaccuracy	other

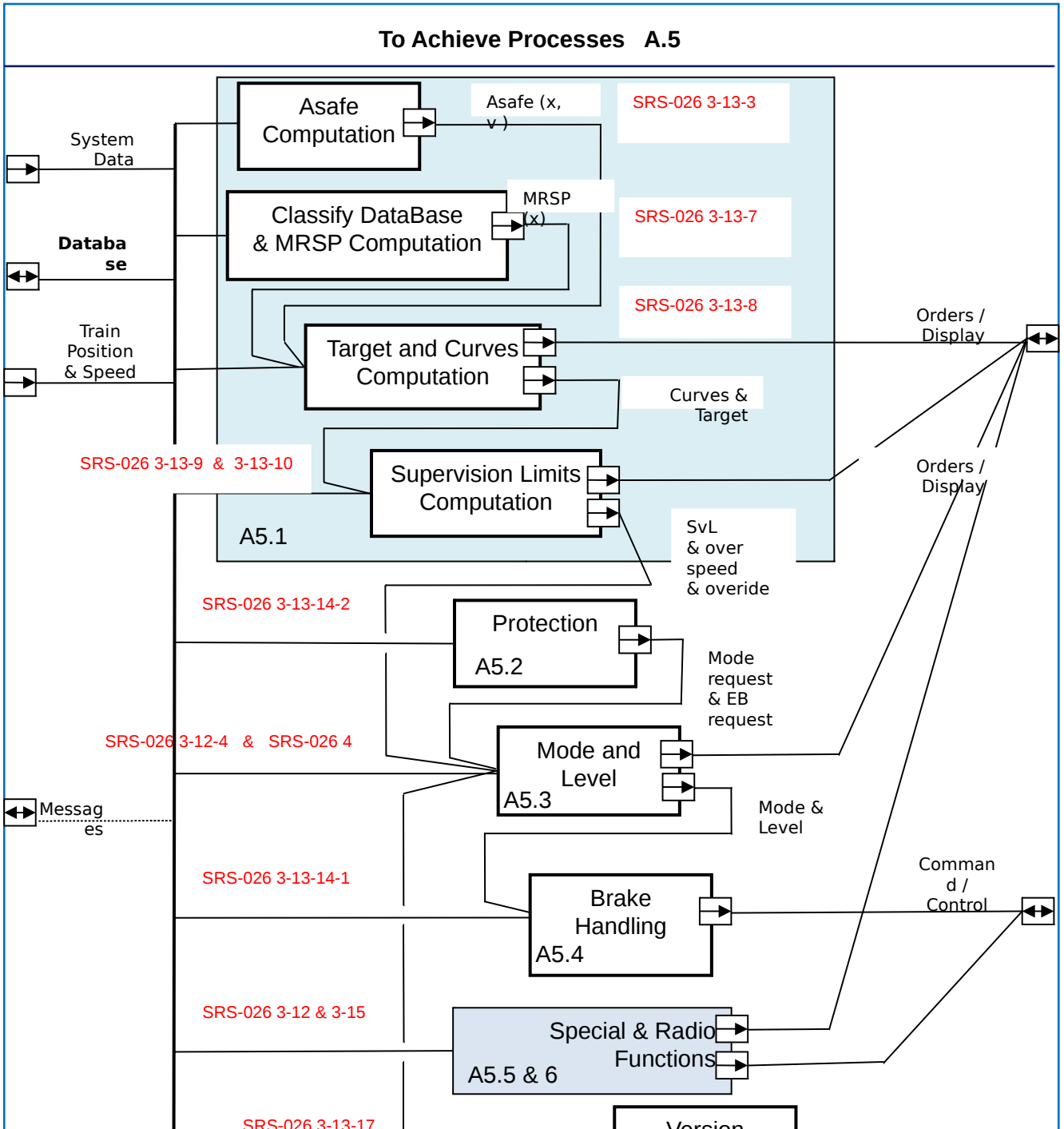
EOA	Pos.	Veoa	Asafe	9,81*grd	MRSP
DP	“	0	“	“	“
OL	“	0	“	“	“

BG_n+3	Position	Linking	orientation	inaccuracy	other
SSP	Pos.	Value	Asafe	9,81*grd	MRSP
Others	“	“	“	“	“
Grade	“	“	“	“	“
SSP	“	“	“	“	“

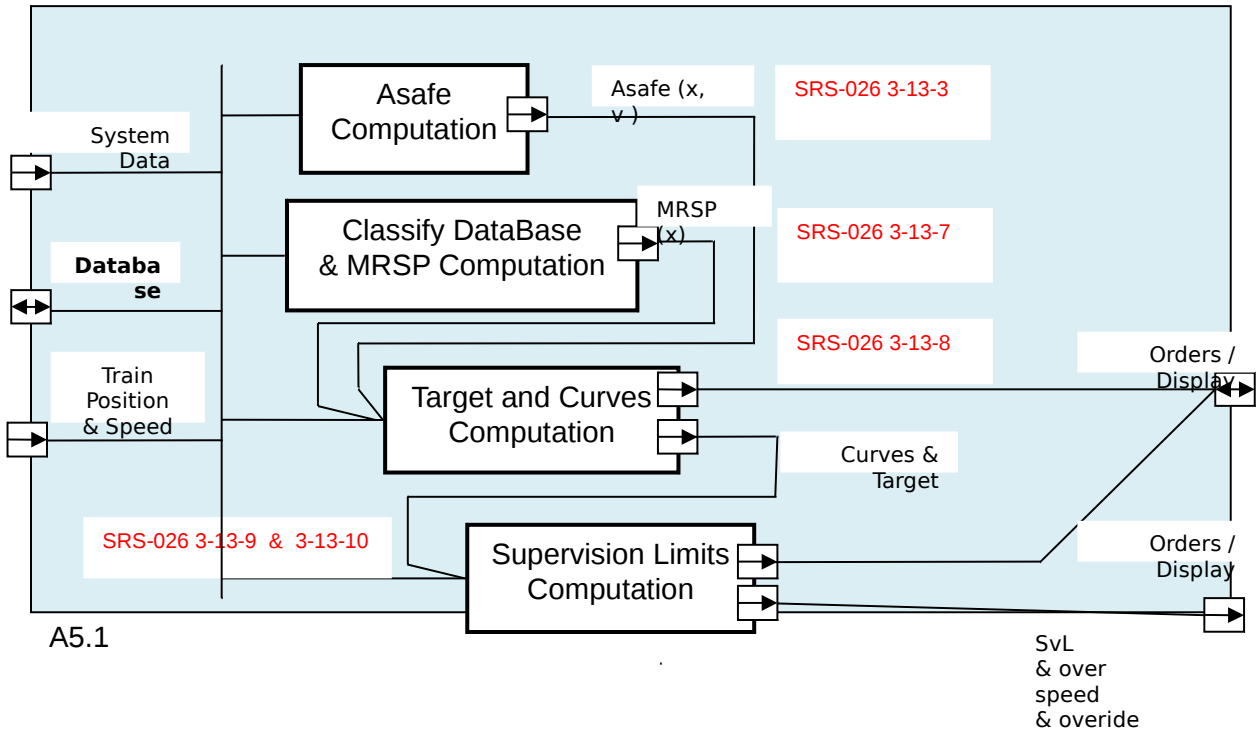
60 km/h

-0,5%

100 km/h


To Achieve Processes A.5
Asafe Computation
Asafe (x, v)
SRS-026 3-13-3
System Data
Classify DataBase & MRSP Computation
MRSP (x)
SRS-026 3-13-7
Database
SRS-026 3-13-8
Orders / Display
Train Position & Speed
Target and Curves Computation
Curves & Target
SRS-026 3-13-9 & 3-13-10
Supervision Limits Computation
Orders / Display
A5.1
SvL & over speed & overide
SRS-026 3-13-14-2
Protection
A5.2
Mode request & EB request
SRS-026 3-12-4 & SRS-026 4
Mode and Level
A5.3
Messages
Mode & Level
SRS-026 3-13-14-1
Command / Control
Brake Handling
A5.4
SRS-026 3-12 & 3-15
Special & Radio Functions
A5.5 & 6
SRS-026 3-13-17

OpenETCS 24/25 june 2014



OpenETCS 24/25 june 2014

- **Actions on-going :**
- **SysML Diagram rework (3) :**
  - Christian G & Jaime & All4tec (sep 1st)
  - Overal Architecture (boxes empty & evident)
- **Subset inaccuracy (1) :**
  - Ian Walverts (sept 1st)
  - Positioning inaccuracy, Eb deceleration
- **Mock-up of Train Position & Balise Content (1) :**
  - ‘Uwe (1st Aug)
  - 1st step as defined
- **Vector & Matrix in SCADE (4) :**
  - Bernd (next meeting)
  - Use vector and matrix in Scade
  - Classification of element

OpenETCS 24/25 june 2014

- **Actions on-going** :
- **SysML Diagram rework (3) :**
  - Progress-on-going :
  - Boxes A2 and A4 to be refined
- **Subset inaccuracy (1) :**
  - Ian Walverts (sept 1st)
  - Positioning inaccuracy, Eb deceleration
- **Mock-up of Train Position & Balise Content (1) :**
  - ‘Uwe (1st Aug) on Going
  - 1st step as defined
- **Vector & Matrix in SCADE (4) :**
  - Bernd (next meeting)
  - Use vector and matrix in Scade : to be examinated
  - Classification of element : to be examinated

OpenETCS 24/25 june 2014

New Actions :

To fix and close API : Alstom

To fix all positioning variables, and

To address re-positioning : All4Tec

To fix Data Architecture : Lloyds

To examine SCADE with Table : Alstom to be trained...

and Papyrus