

Moving-block Model

In Figure 1, a model of the moving-block system is reported.

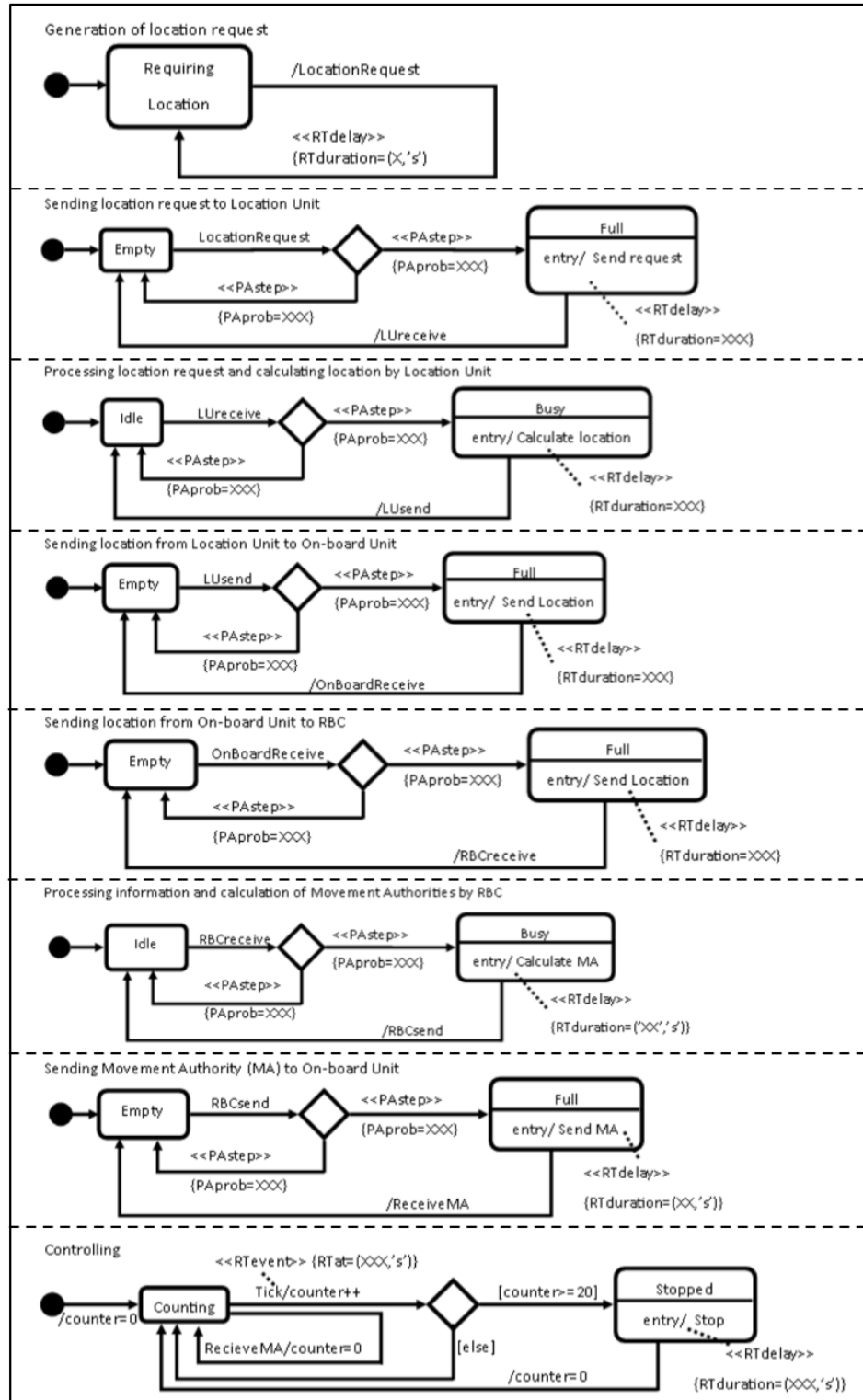


Figure 1 UML Statecharts for the Moving-block System

Requirements for the moving-block system

In the following we report the requirements for the moving-block system, based on the moving-block model.

Architectural Requirements

1. The system shall be composed of three components one On-board Unit (OBU), one Location Unit (LU), and one Radio Block Center (RBC)
2. The OBU and LU components communicate through a bi-directional channel
3. The OBU and RBC components communicate through a bi-directional channel
4. Each component is structured into phases
5. Each phase is independent from the others, and each phase does not suspend itself based on the status of the following one
6. Each phase produces information to be used by the following phase
7. The information is stored in a buffer of SIZE 1, for each phase
8. The buffer can be overwritten by the phase which writes on the buffer

Functional Requirements

1. Every 5 seconds OBU shall send a location request to LU
2. When the LU receives a location request, LU shall compute the location
3. After computing the location, the LU shall send the location to OBU
4. When OBU receives the location, OBU shall send the location to RBC
5. When RBC receives the location, RBC shall compute the movement authority (MA)
6. After computing the MA, RBC shall send the MA to the OBU
7. If OBU does not receive a new MA within 15 seconds from the reception of the last MA, the OBU shall stop the train

OBU phases

- OBU shall be composed of four phases: Generate Request, Send Request, Send Location to RBC, Receive MA
 - *Generate Request (GR)*
 - Every 5 seconds GR shall produce a location request for SR
 - *Send Request (SR)*
 - When SR receives a location request, SR shall send the location request to LU
 - *Send Location to RBC (SLRBC)*
 - When SLRBC receives a location, SLRBC shall send the location to RBC
 - *Receive MA (RMA)*
 - If RMA does not receive a new MA within 15 seconds from the reception of the lastMA, RMA shall stop the train

LU phases

- LU shall be composed of two phases: Calculate Location and Sending Location
 - *Calculate Location (CL)*
 - When CL receives a location request, CL shall produce the location of the train for SL
 - *Sending Location (SL)*
 - When SL receives the location of the train, SL shall send the location to OBU

RBC phases

- RBC shall be composed of two phases: Calculation of MA and Sending of MA
 - *Calculation of MA (CMA)*
 - When CMA receives a location, CMA shall produce the MA
 - *Sending of MA (SMA)*
 - When SMA receives the MA, SMA shall send the MA to the OBU