Overview

Part 1 - Dynamics

According to the discussion with Jozimar, IMU and GPS are not yet implemented. Nevertheless, we can already define their outputs according a more general rule in order to build the wrappers inside the SmartData@Linux implementation. In the first implementation, these will be empty boxes in the model.

IMU Transducer

Feeds a X/Y/Z speed, X/Y/Z acceleration, and yaw rate.

GPS

Latitude and Longitude are expected to be converted to X, Y, Z Coordinates in relation to the center of the earth before entering the main system.

Kalman Filter — Location

Is used to improve location. AMPERA implementation is not finished yet. In the case study will simply replicate the input.

Dynamics Model

Combination of every information in dynamics. Defined as Object (see below at Part 2) + Gear, Engine RPM, and Battery State of Charge. Total size = 65B.

SmartData Model

Description	Unit	Unit Meaning	Semantics
IMU Acceleration	0xC4962924	(m/s^2, float 32 bits)	for x's value=0, for y's value=1, for z's value=2
IMU Speed	0xC4963924	(m/s, float 32 bits)	for x's value=3, for y's value=4, for z's value=5
IMU Yaw Rate	0xC4B24924	(rad, float 32 bits)	6
GPS	0x84964924	Meter	for x's value=7, for y's value=8, for z's value=9
Gear	0x3001	Type 3, Length 1	10
Engine RPM	0xE4923924	Frequency Hz	11
Battery State of Charge	0xF8000001	Percentage	12
Kalman Filter Location	0x84964924	Meter	for x's value=13, for y's value=14, for z's value=15
Dynamics Model	0x40041	Type 3, Length 65	16
Heading	0x84964924	Meter	for x's value=17, for y's value=18, for z's value=19

SmartData Model VeReMi Message Extension

Description	Unit	Unit Meaning	Semantics
Send Time	0x84925924	Time (us)	30
Sender ID	0x4924924	Digital Unit	31
Sender Pseudonym	0x4924924	Digital Unit	32
Message ID	0x4924924	Digital Unit	33
IMU Acceleration	0xC4962924	(m/s^2, float 32 bits)	for x's value=34, for y's value=35, for z's value=36
IMU Speed	0xC4963924	(m/s, float 32 bits)	for x's value=37, for y's value=38, for z's value=39
GPS	0x84964924	Meter	for x's value=40, for y's value=41, for z's value=42
Heading	0x84964924	Meter	for x's value=43, for y's value=44, for z's value=45