Informatikai rendszertervezés

HF5: Simulation and allocation

KBGG csapat

Csapattagok:

Kis Benjámin	**AJF0S2**	kis.benjamin@edu.bme.hu
Gembela Gergely	**FXD9AM**	gergelygembela@gmail.com

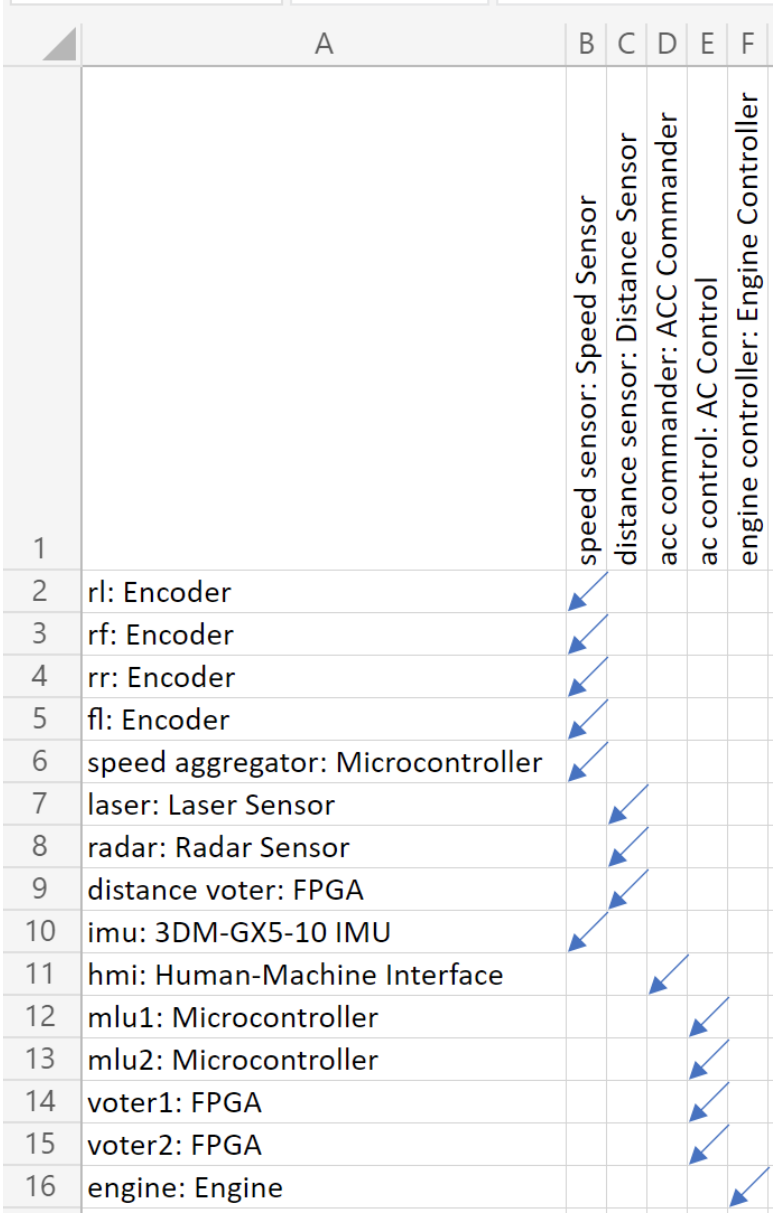
KBGG team information

As our teammates decided not to contribute to any further RETE homeworks, we formed a new team, named KBGG. We did not manage to accept the GitHub classroom assignment with our new team (the invitation redirects to our old teams), our model, and exported images of the relevant diagrams are available at: gergelygembela/retehf5

Task a)

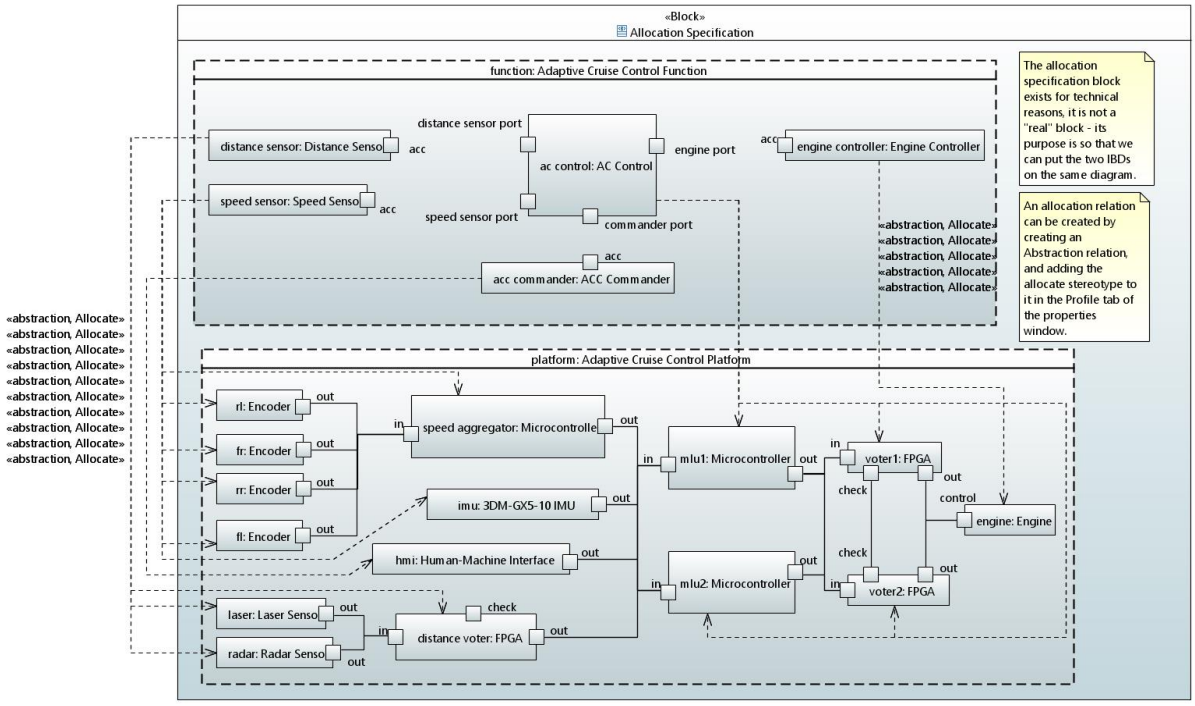
Section I. - Allocate high-level components to platform elements.

Prior to allocating components in Papyrus, we created an allocation matrix in Excel:



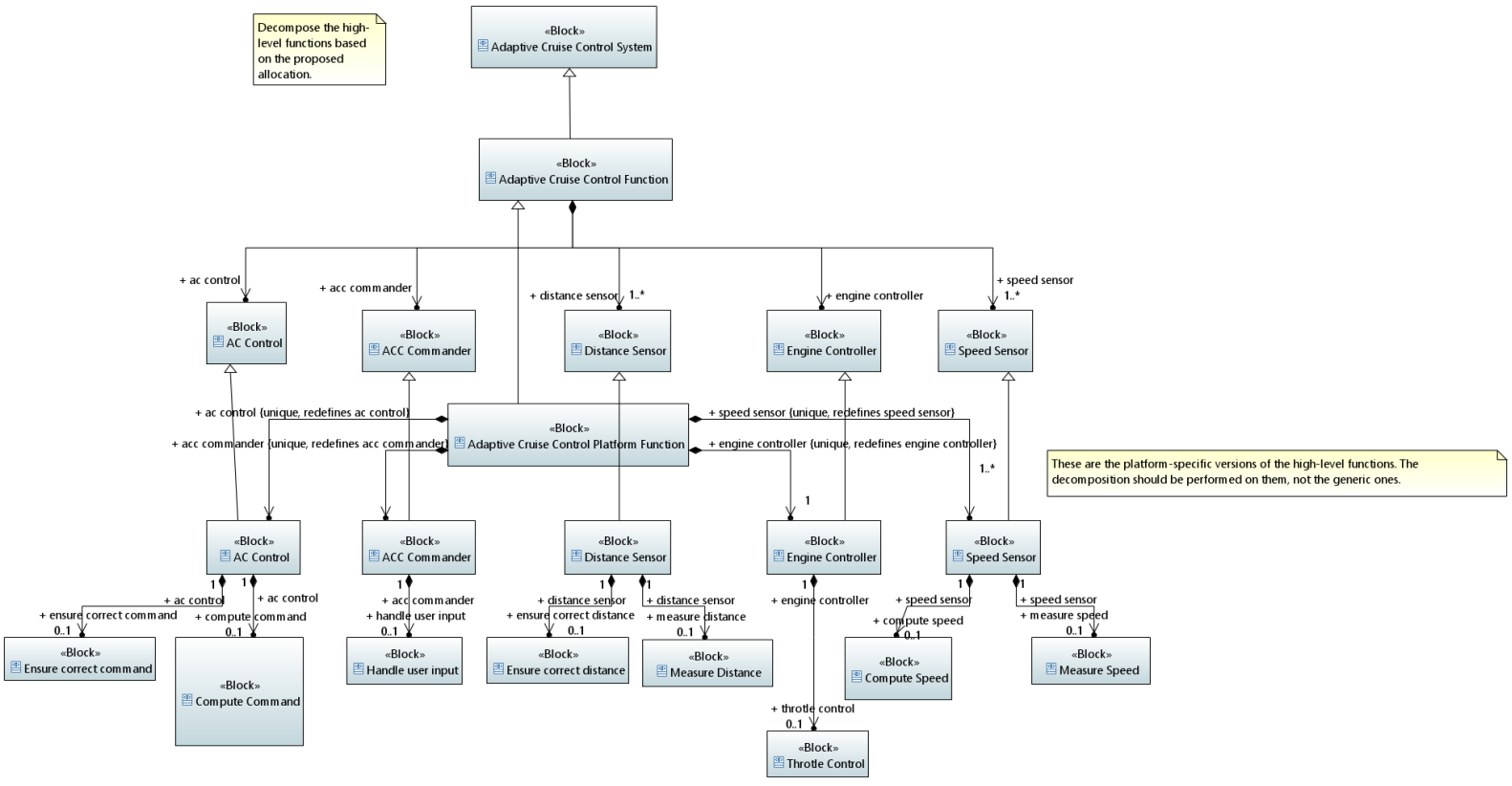
	A	B	C	D	E	F
1		speed sensor: Speed Sensor	distance sensor: Distance Sensor	acc commander: ACC Commander	ac control: AC Control	engine controller: Engine Controller
2	rl: Encoder	↙				
3	rf: Encoder	↙				
4	rr: Encoder	↙				
5	fl: Encoder	↙				
6	speed aggregator: Microcontroller	↙				
7	laser: Laser Sensor		↙			
8	radar: Radar Sensor		↙			
9	distance voter: FPGA		↙			
10	imu: 3DM-GX5-10 IMU	↙				
11	hmi: Human-Machine Interface			↙		
12	mlu1: Microcontroller				↙	
13	mlu2: Microcontroller				↙	
14	voter1: FPGA				↙	
15	voter2: FPGA				↙	
16	engine: Engine					↙

All the "dashed arrows" we used in this diagram are allocations, to maintain readability we collected them to groups.



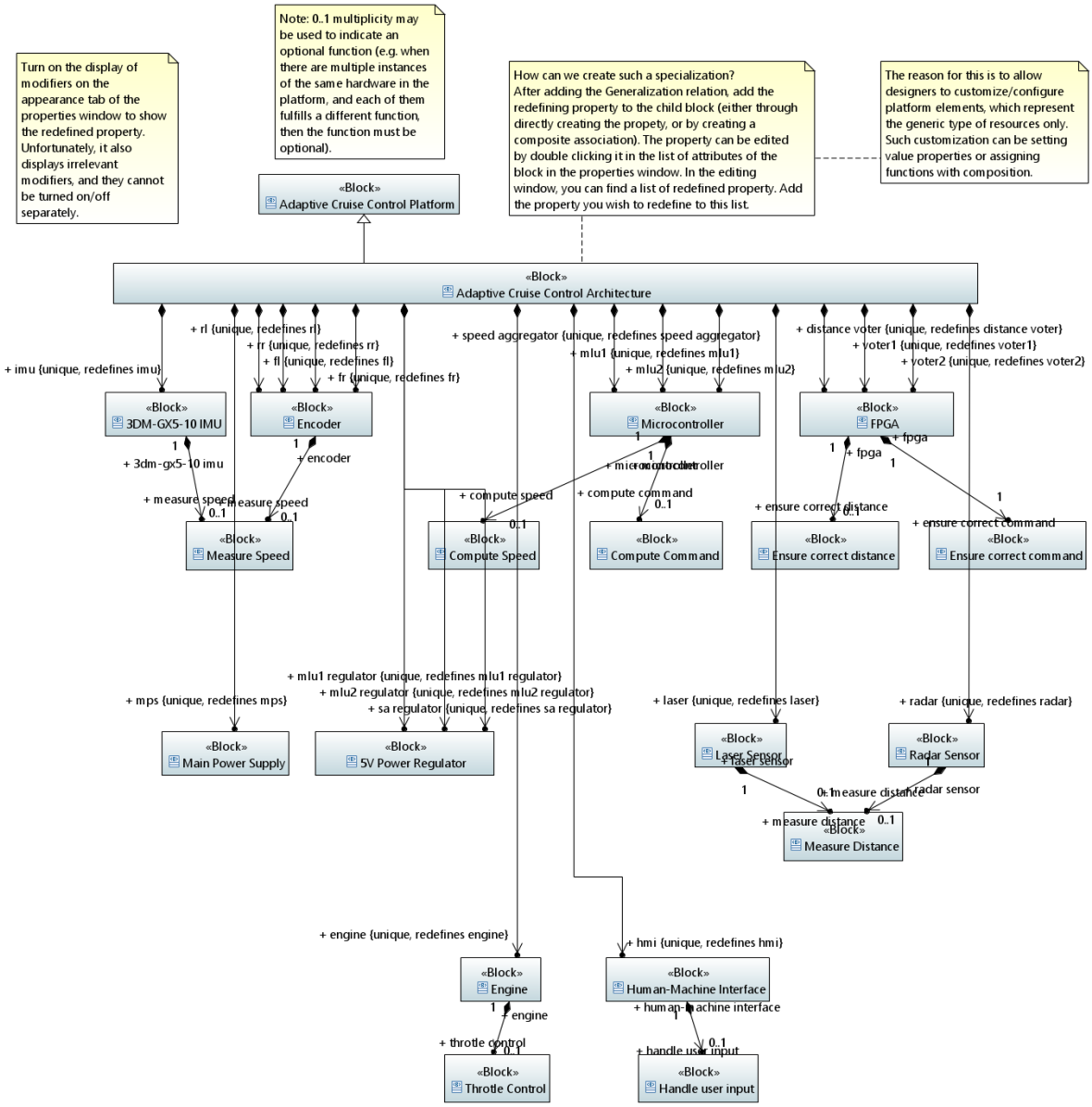
Section II. - Define a low-level (platform-specific) decomposition for the ACC function based on the allocation.

We "mapped" all functions to lower level, and more specific functions.



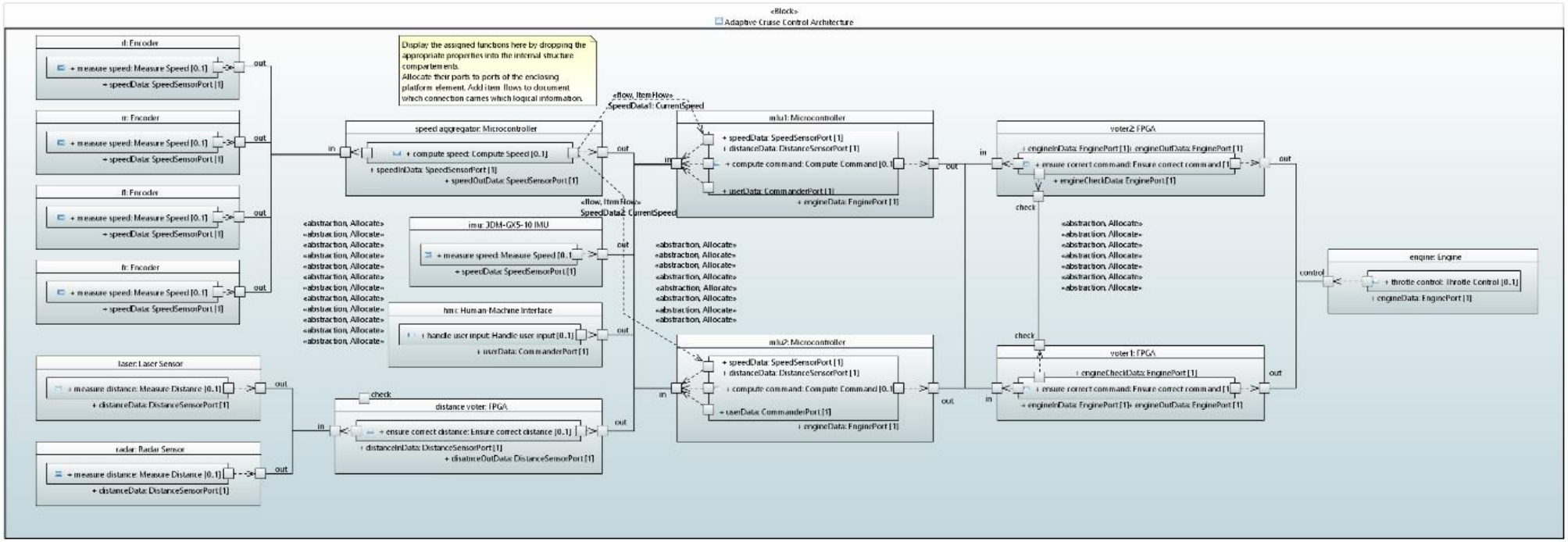
Section III. - Assign the low-level functions to platform elements.

The assignments are visible more clearly on the "Adaptive Cruise Control Architecture" IBD attached to the next subtask.



Section IV. - Display the platform functions inside the realizing platform elements to specify which function to run where.

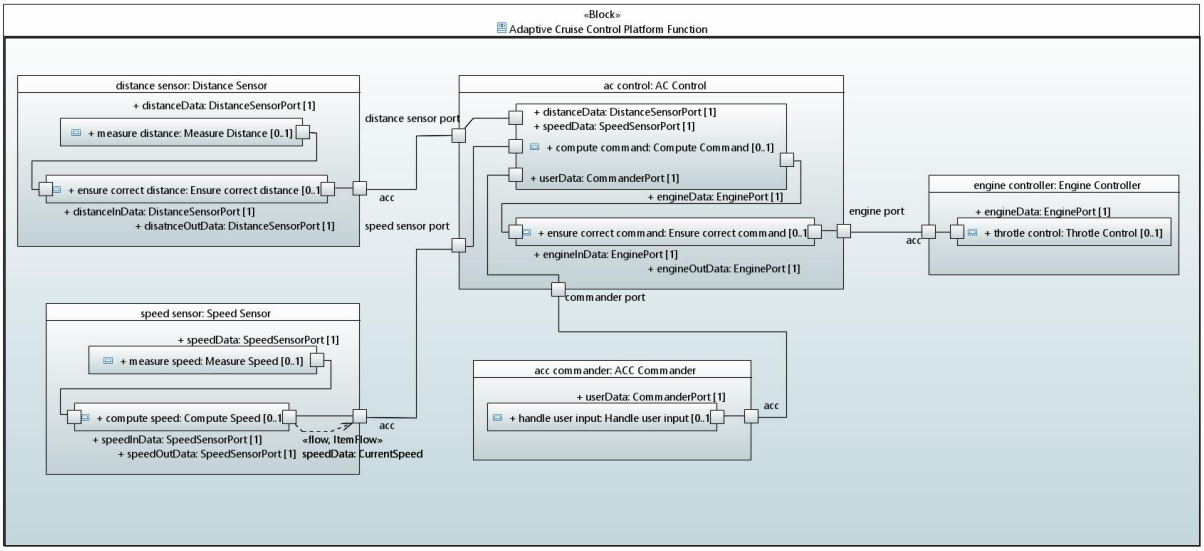
All the arrows connected to physical ports are allocations. The diagram is available in better resolution in our GIT repo.



Task B)

Section I. - Specify how low-level functions interact with each other: add ports, introduce new logical signals, if necessary.

As our task was to specify interactions between the IMU and MLUs, we think only the communication between the "compute speed" and "AC Contol" functions are relevant.



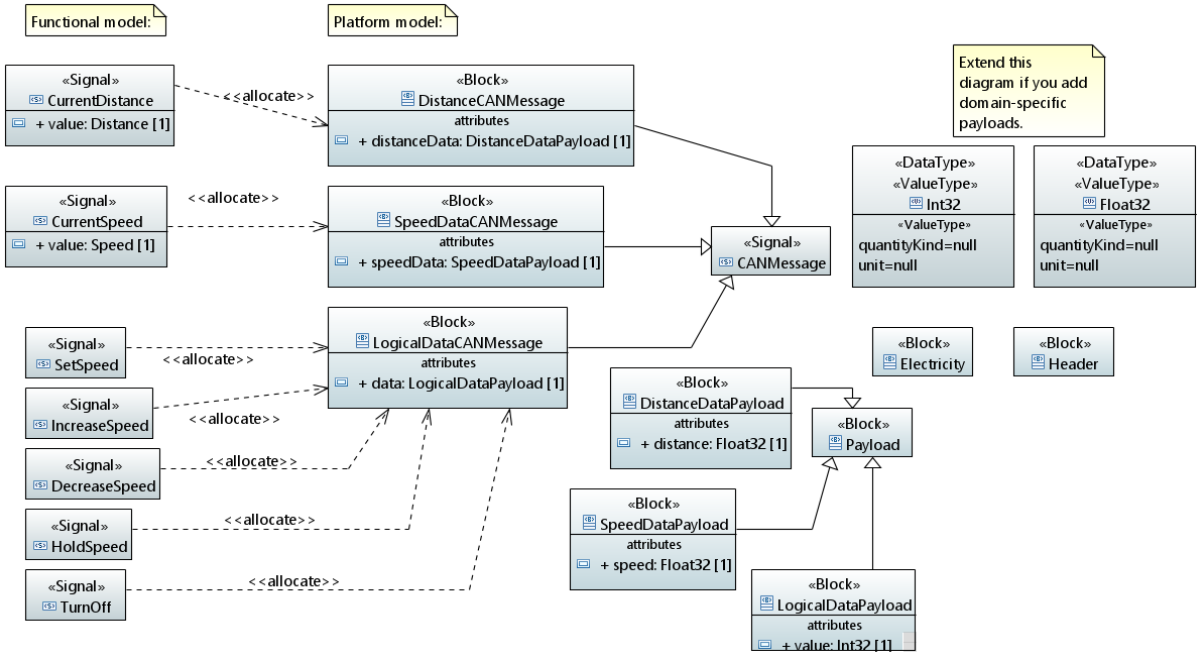
Section II. - Display ports of the low-level functions and allocate them to ports of the enclosing platform elements.

As we created a diagram displaying ports and their allocations in task a), we did not include the diagram once again.

Section III. - Allocate signal and data types to platform data formats: create new subtypes of payload if necessary.

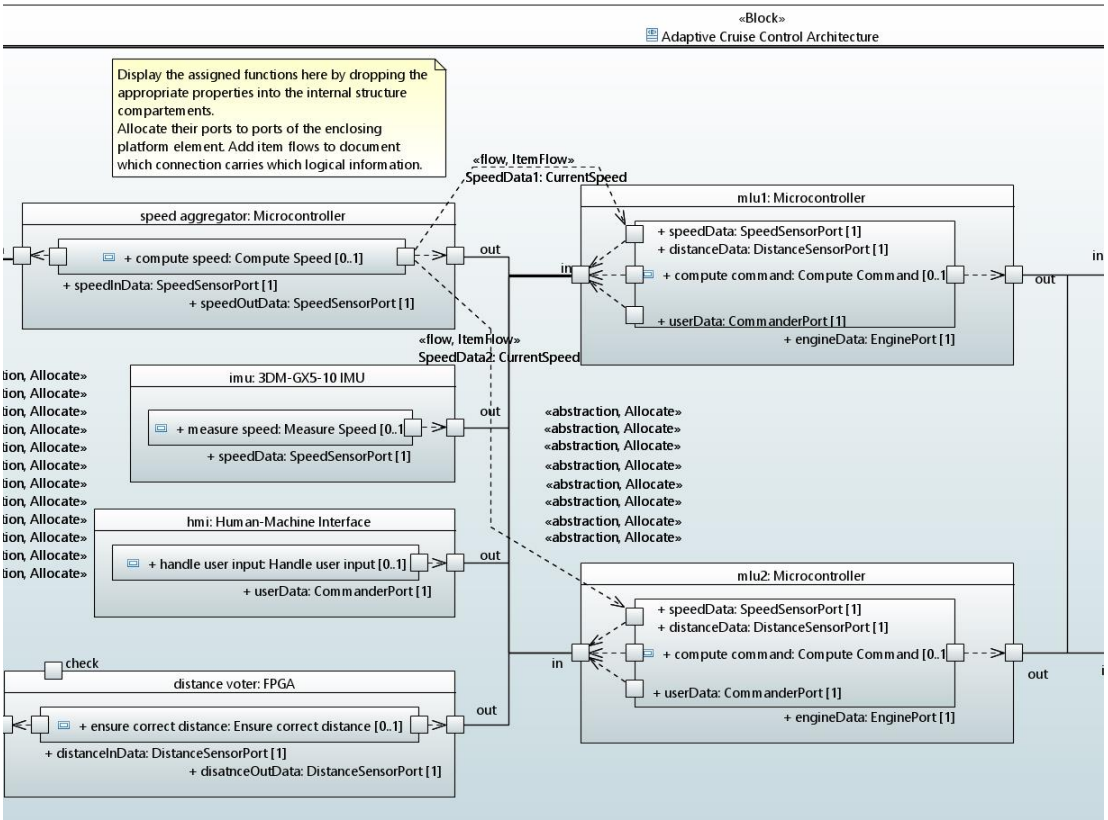
We used „dependency" relations to get *Papyrus* to display our allocations properly, we are aware that allocate is a stereotype, but the diagrams look much better/closer to the SysML standard.

We created specialized CAN packages carrying specialized data payloads. We were not able to represent allocations between attributes of the Signals, CANMessages and Payloads. In our (kind of special) case because there are not more than one attributes, allocations between attributes and their lower level data type/payload type are trivial. We defined LogicalDataPayload to carry logical signals such as Boolean values or enumerations.



Section IV. - Add item flows to the platform connections to show which logical item travels where.

Our solution to this subtask are the two item flows originating at the Compute Speed function's speedOutData port. They carry CurrentSpeed signals, which are transported through SpeedDataCANMessages, all of which carries a SpeedDataPayload. (Below is an excerpt of the Adaptive Cruise Control Architecture diagram.):



Munkanapló

Dátum	Időintervallum	Résztvevők	Leírás
2022.11.21	16:00-18:00	Mindenki	A közös munka feltételeinek megteremtése, feladat értelmezése
2022.11.21	18:00-19:00	Gembela Gergely	A b) feladat értelmezése, signal-fizikai jel allokáció.
2022.11.21	18:00-20:00	Kis Benjámin	Az a) feladat értelmezése, Allokációs mátrix és allokációs diagram elkészítése.
2022.11.22	10:00 - 16:20	Kis Benjámin	Dokumentáció, feladatok befejezése, megoldások és diagramok illesztése.
2022.11.22	10:00-12:00 14:00-16:20	Gembela Gergely	