

The AntibacBuggy

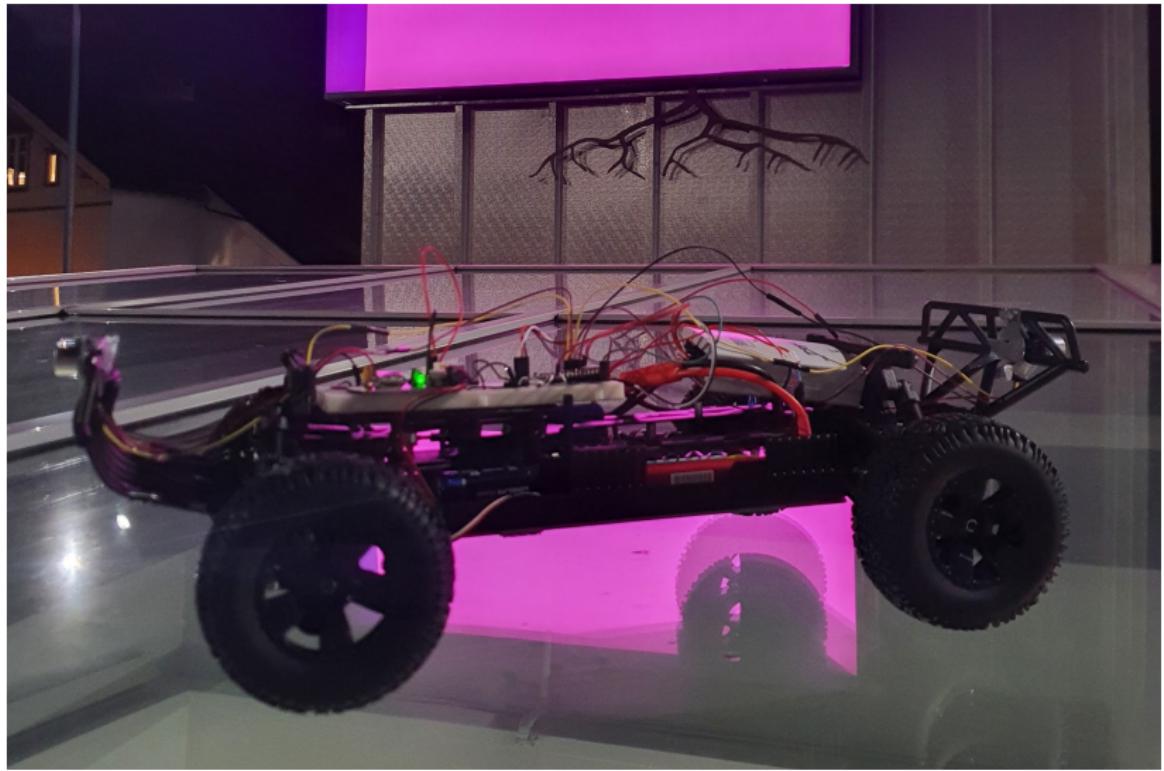
Kent Odde, Stian Onarheim, Tarald Vestbøstad

USN

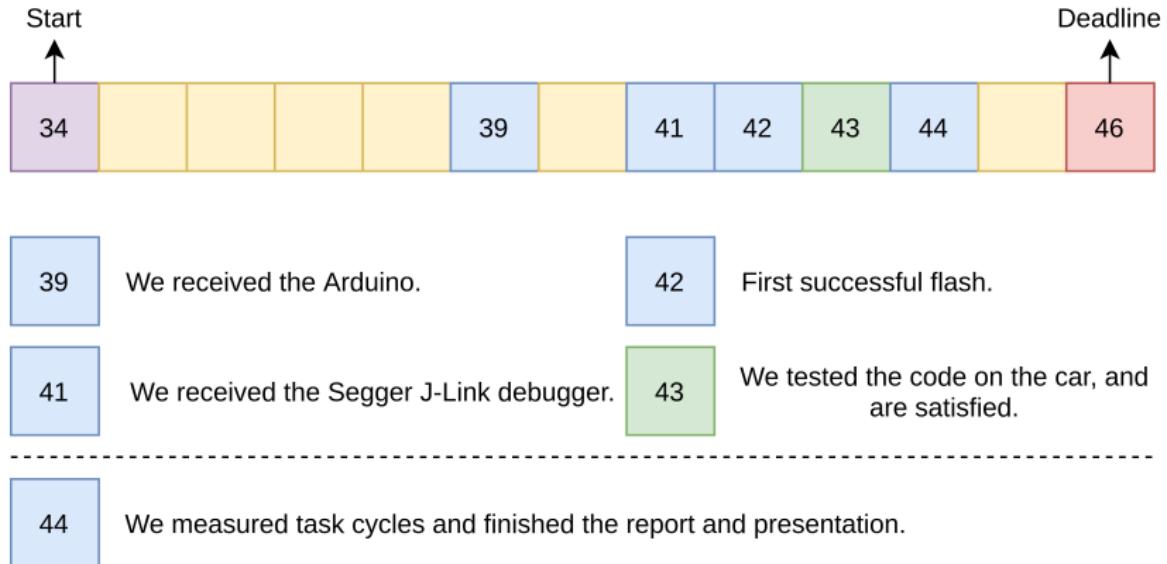
Autumn 2020

Showcase

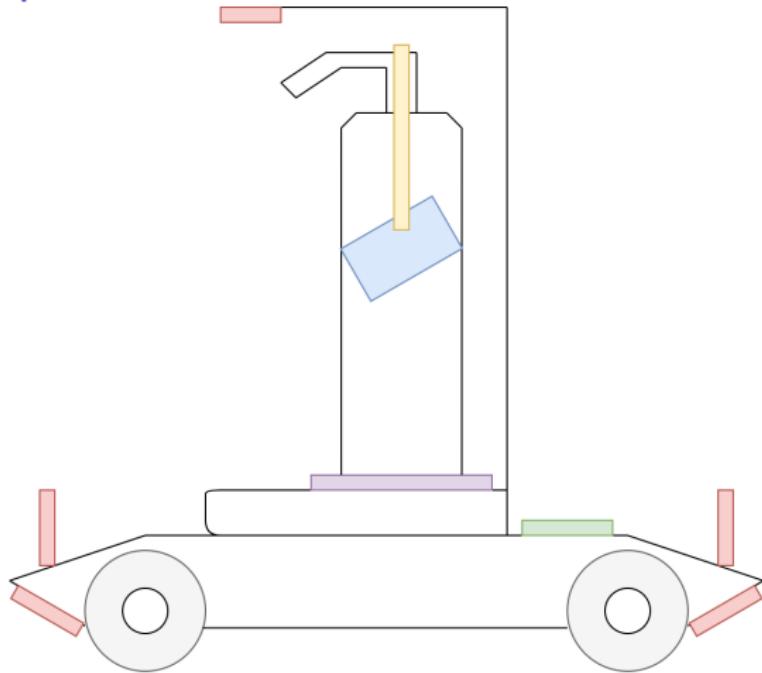
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Timeline



Initial Concept



Arduino NANO 33
BLE SENSE



Pressure
Plate



Rubber Band

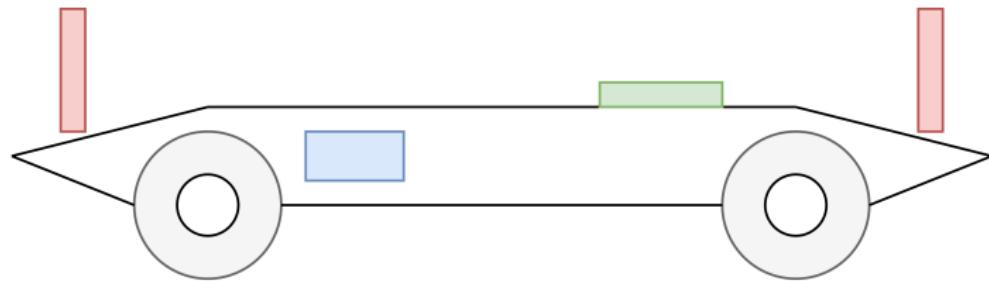


Proximity
Sensor



Servo Motor

Final Design



Arduino NANO 33 BLE SENSE

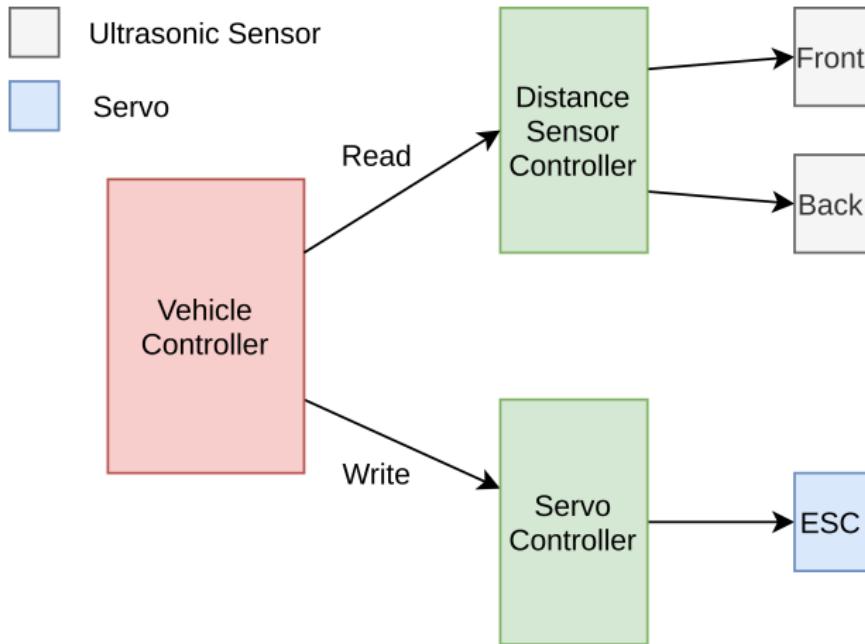


Proximity Sensor

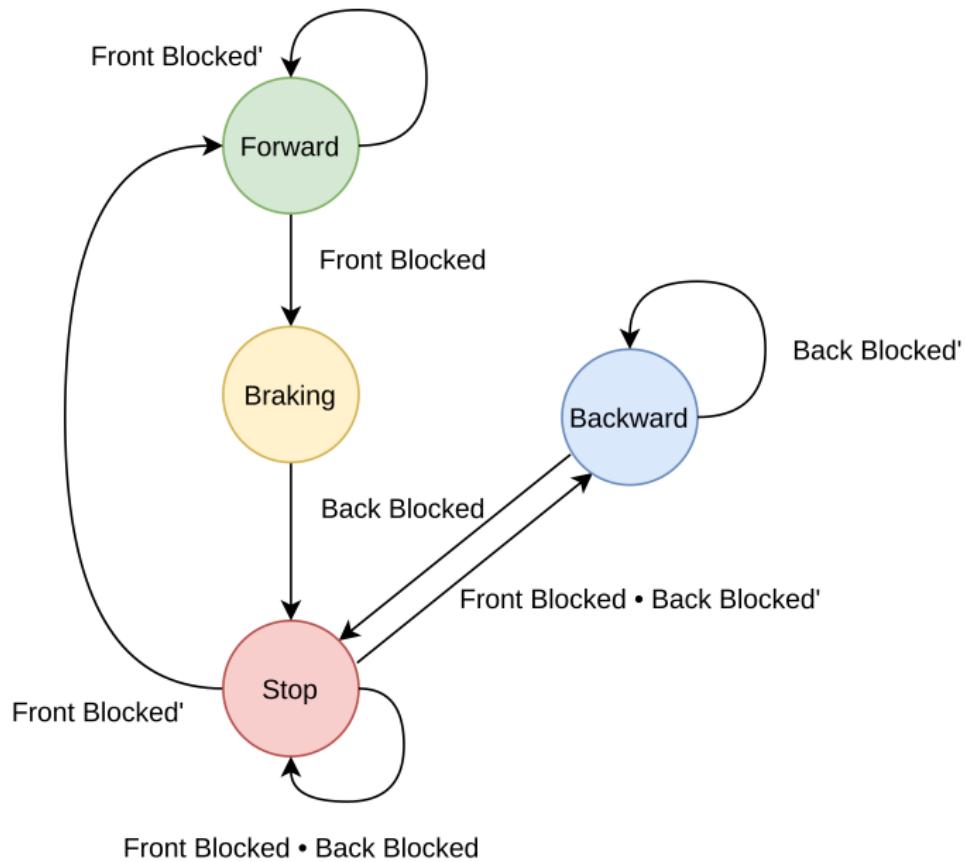


Brushless Motor ESC

System Architecture

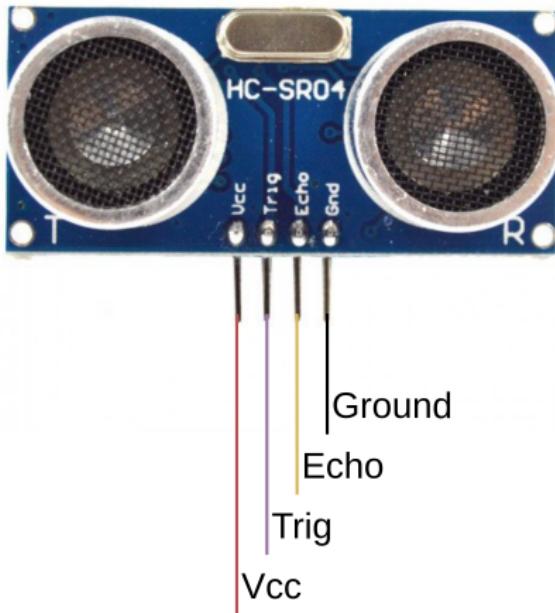


Finite State Machine

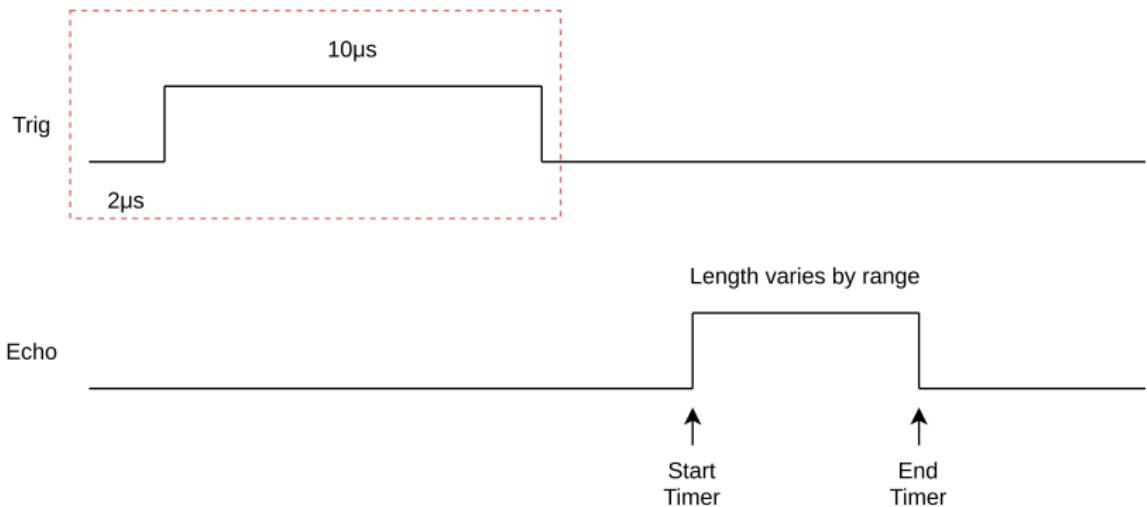


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Distance Sensor

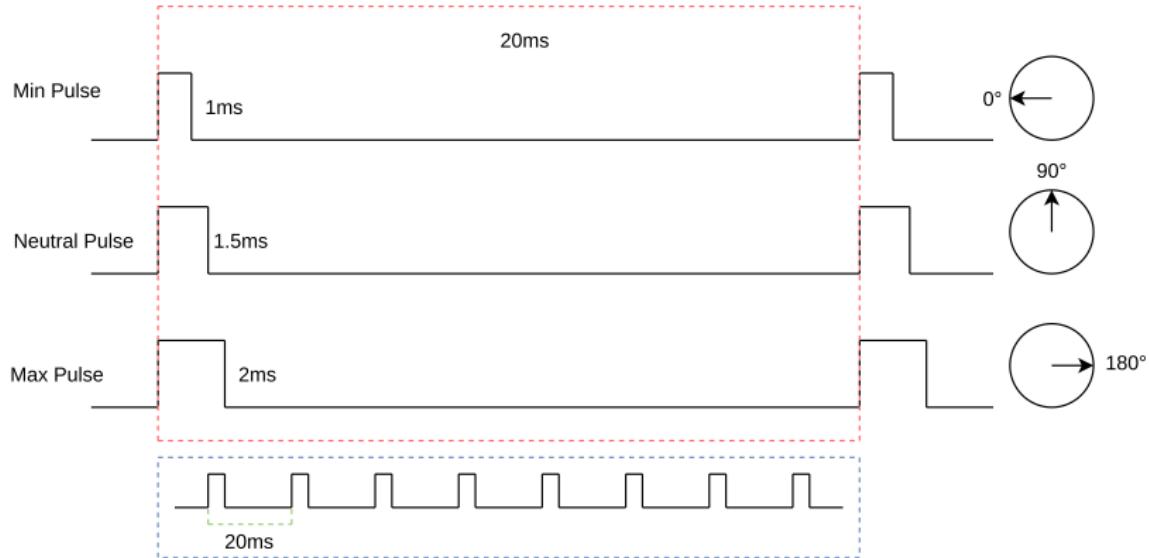


Distance Sensor

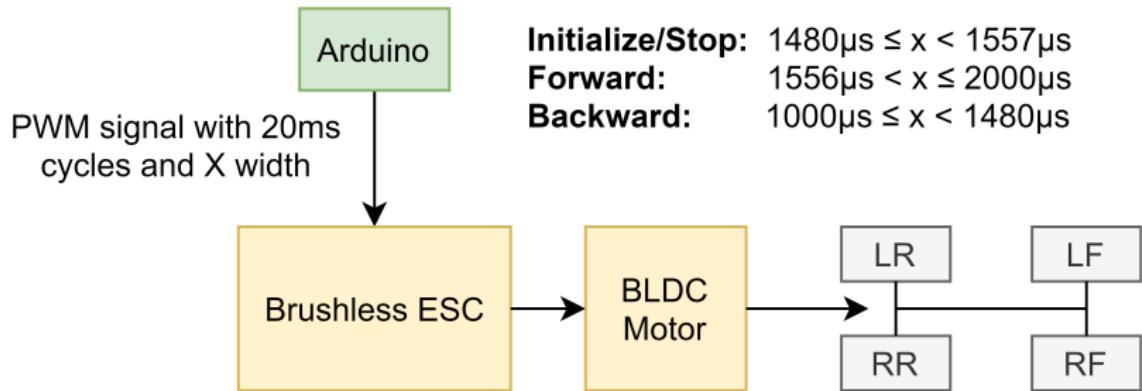


Servo

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Brushless Motor ESC



Scheduling with utilization test

Task	Period(T)	Comp. time(C)	Priority(P)	Util(U)
Engine	20ms	4094ns	4	0.0002
Compute	16ms	844ns	3	0.000052
Sensors	16ms	11600190ns	2	0.72
Lights	200ms	13438ns	1	0.000067
Main	N/A	16ns	0	0

The utilization factor for this system is

$$U_{Sum} = 72.0319\%$$

which is lower than the limit of 74.1% for five tasks.

Scheduling with response time analysis

$$R_i = C_i + \sum_{j \in hp(i)} \left\lceil \frac{R_i}{T_j} \right\rceil C_j$$

Task	Period(T)	Comp. time(C)	Priority(P)	Response Time(R)
Engine	20ms	4094ns	4	4094ns
Compute	16ms	844ns	3	4938ns
Sensors	16ms	11600190ns	2	11605128ns
Lights	200ms	13438ns	1	11618566ns
Main	N/A	16ns	0	N/A

Demonstration

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Live Demo

Questions

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Any questions?

The End

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Thank you for your attention. :)

You can find our Ada_Drivers_Library fork and the source code over
at <https://github.com/stykk-gruppen>