



Handling Analysis and Control Development of Commercial Trucks with

VOLVO TRANSPORT MODELS (VTM)



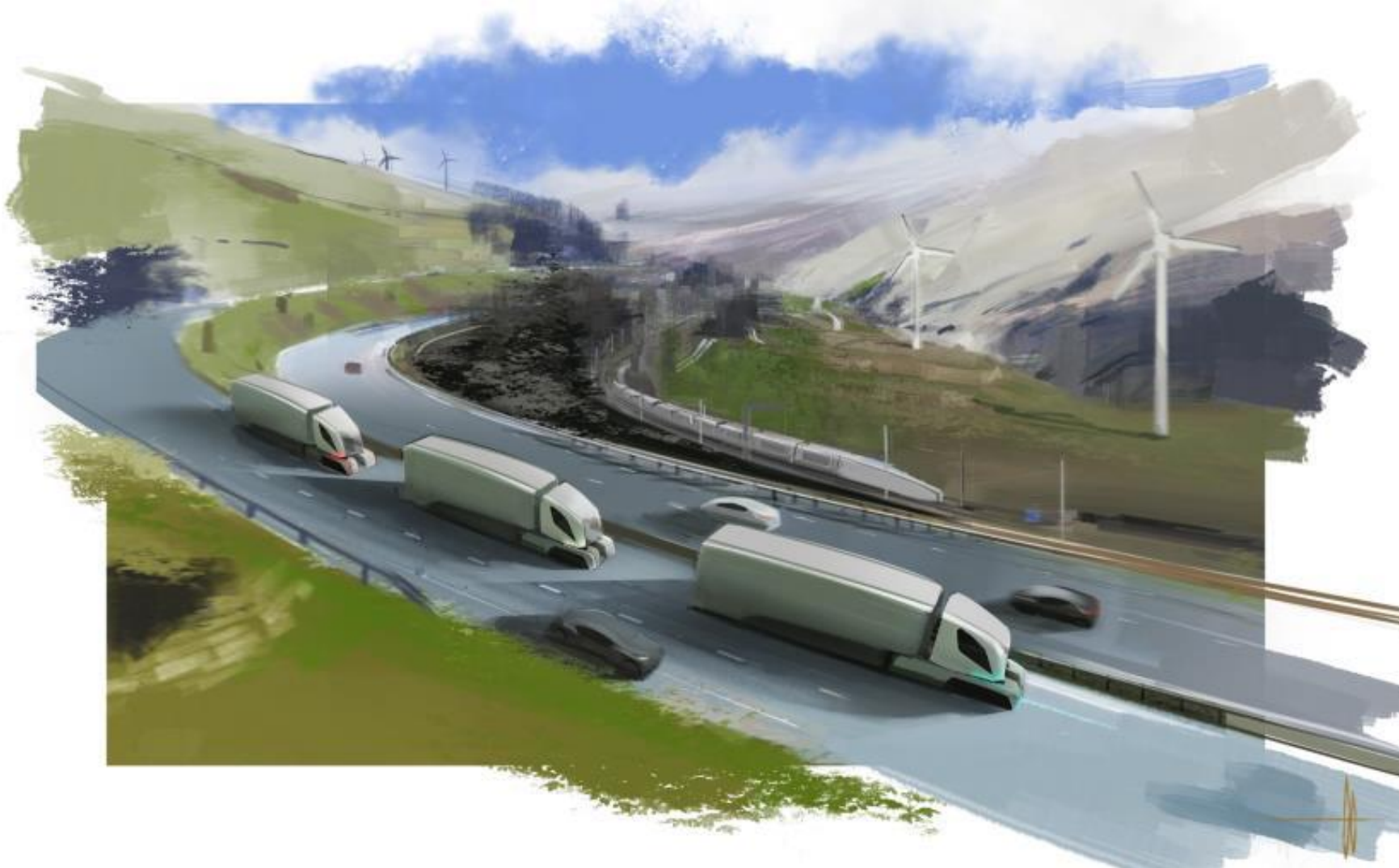
Niklas Fröjd

Volvo Group

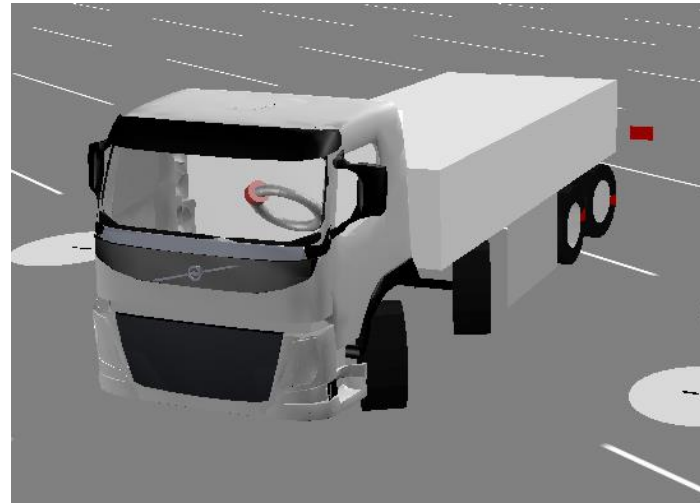
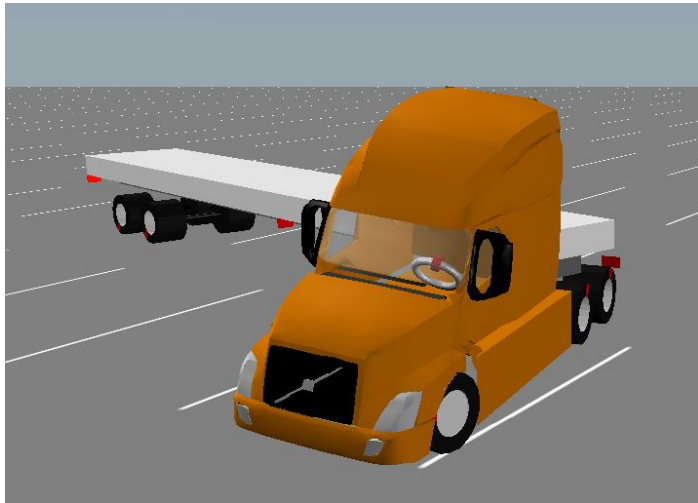


EMPLOY 100.000 PEOPLE,
PRODUCTION IN 18 COUNTRIES
SELLS ON 190 MARKETS.

Group Trucks Technology



Volvo Transport Models, VTM



- Fast
- Easy to overview
- Useful for many motion studies
- Expandable

VTM Evolution

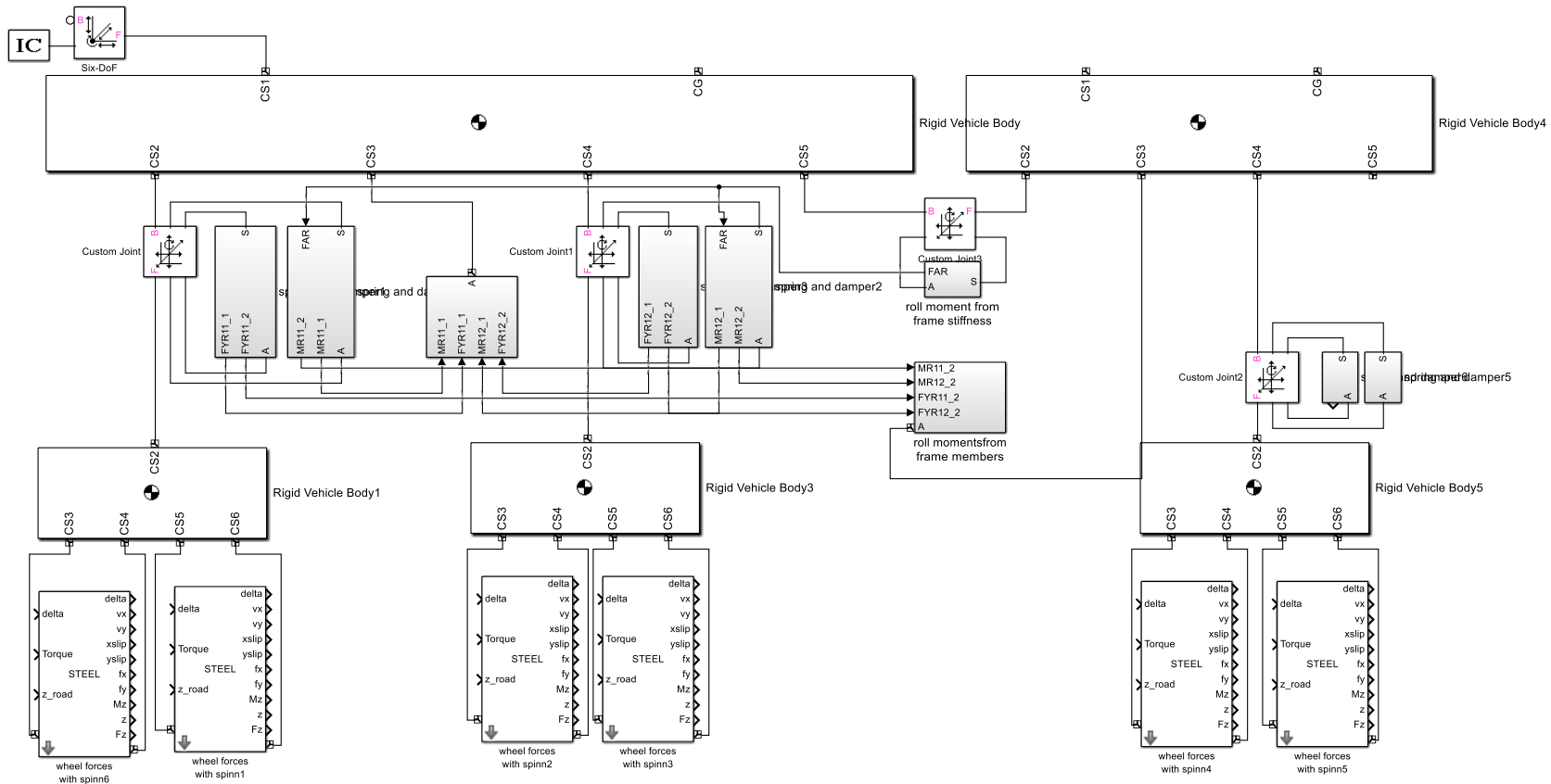
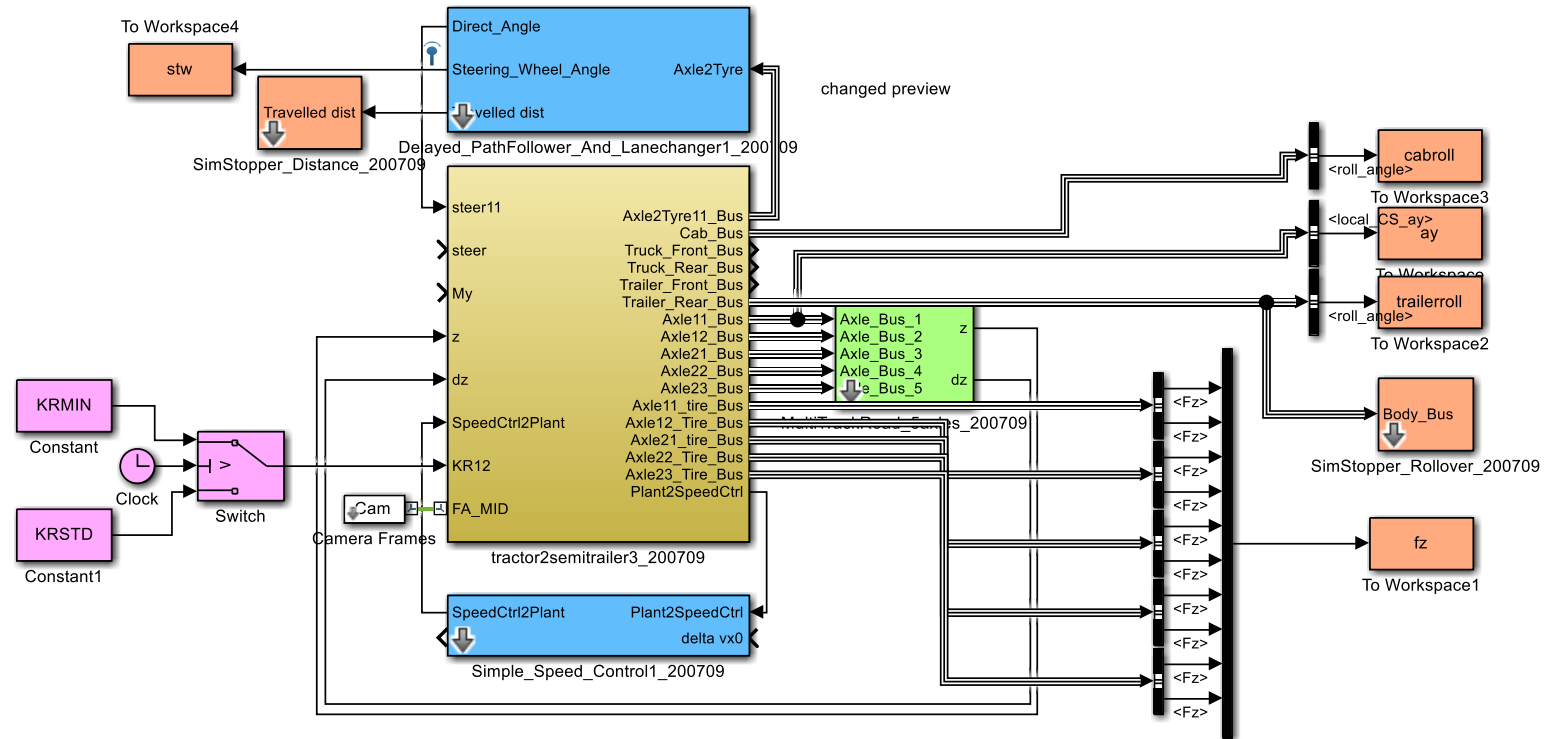


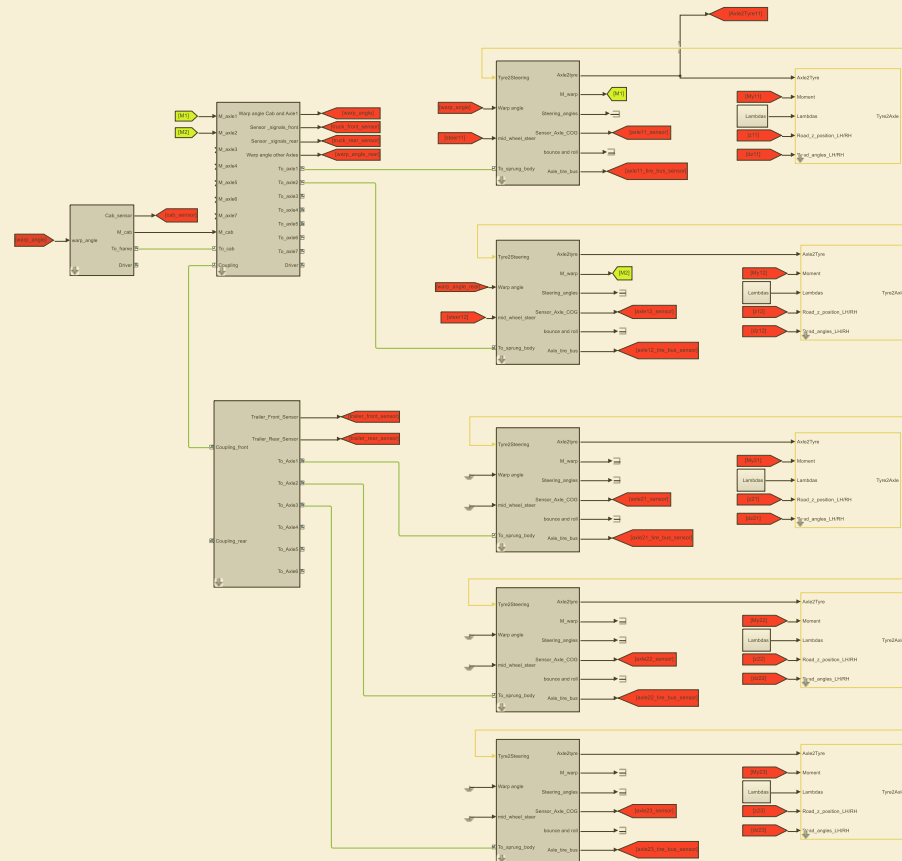


Foto: **VOLVO** VOLVO GROUP **KOZON**
En person dog när en tankbil med släp, lastad med det brand- och explosionsfarlig isobutyraldehyd, vältte och fattade eld på E6 vid Heberg mellan Falkenberg och Halmstad på måndagsmorgonen. WEBB-TV: Tankbilen i lågor vid E6

Top level simulation model



Inside the VTM plant model



VTM Animation

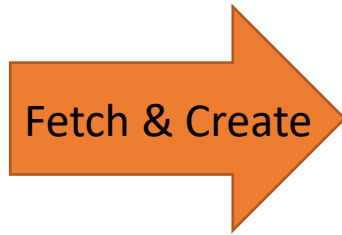


lanechange video

VTM Parameterization



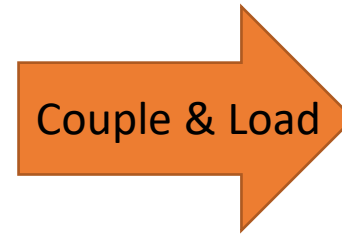
PDM



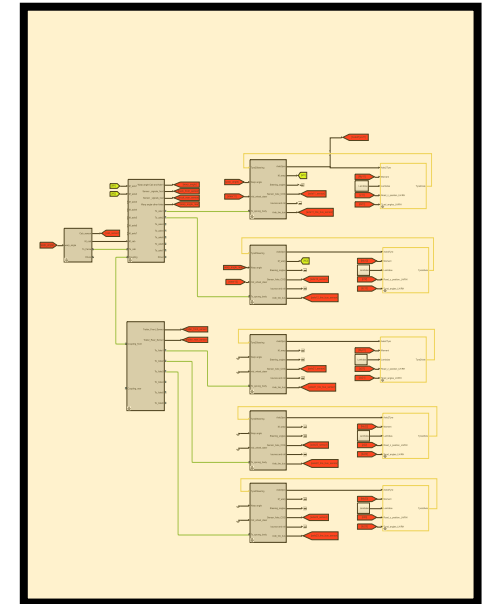
Fetch & Create

```
C:\vtm_development\VTM16b\Parameter Template Files\Init3_Tractor3_Template.m
EDITOR PUBLISH VIEW
+ Find Files
Open Save Compare Go To
New Open Save Compare Go To
FILE NAVIGATE BREAKPOINTS RUN
20 %% Basics
21
22 % Short description, reference to spec
23 vtm.desc(1)='3-axle tractor with single front axle';
24
25 % Number of axles [-]
26 vtm.na(1)=3;
27
28 % Vehicle type (rigid or tractor)
29 vtm.type(1)='tractor';
30
31 % Number of front axles [-]
32 vtm.nfa(1)=1;
33
34 % Type of axle 1=driven 0=non driven
35 vtm.axletype(1,1:vtm.na(1))=[0 1 1];
36
37 % Type of rear axle steering 1=steered 0=non steered
38 vtm.susprear_steertype(1,1:(vtm.na(1)-vtm.nfa(1)))=[0 0];
39
40 % Axle positions r.t. first axle [m]
41 vtm.ll(1,1:vtm.na(1))=[0 -3.4 -4.77];
42
43 % Coupling positions r.t. first axle [m]
44 vtm.lc(1,1:2)=[0 -3.75];
45
46 % Coupling height r.t. ground [m]
47 vtm.hc0(1,1:2)=[0 1.13];
48
49 % Unladen tractor axle group loads [kg]
50 vtm.fale=[5767.97];
51 vtm.rale=[4151.25];
52
53 %% Axles, wheels and tyres
54
55 % Axle mass [kg]
56 vtm.maxle(1,1:vtm.na(1))=[750 1300 1300];
57
58 % Track width [m]
59 vtm.w(1,1:vtm.na(1))=[2.09 1.85 1.85];
60
61 % Track width [m]
62 vtm.w(1,1:vtm.na(1))=[2.09 1.85 1.85];
```

Payload invariant parameters



Couple & Load



Executable model

VTM Deployment

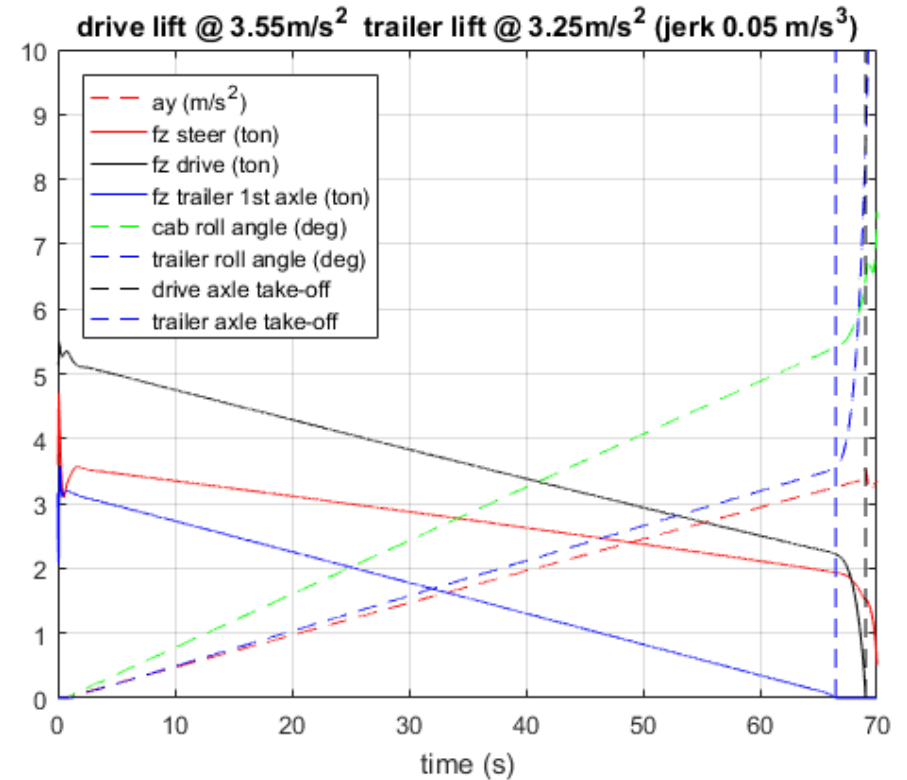
The screenshot shows a Microsoft Teams channel interface for a group named "VTM". The group is identified as "Private group | Confidential". The left-hand navigation pane includes options for Home, Teams, Documents, Notebook, Planner, Calendar, Mail, Site contents, Group information, Recycle bin, and Edit. The main content area features a "Welcome to VTM SharePoint" message with a sub-header "These models are for Volvo AB i". Below the message is a 3D rendering of a yellow Volvo truck on a road. The "Activity" section displays two cards: "General" with the title "VTM Plant Model Parameters" and "Plant Model Garage" with the title "PlantModelUpdate_200709_1". A vertical list of member avatars is visible on the right side of the channel.







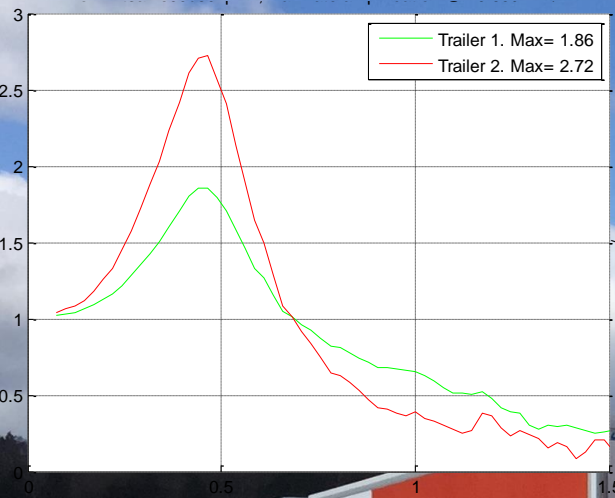
VTM Validation



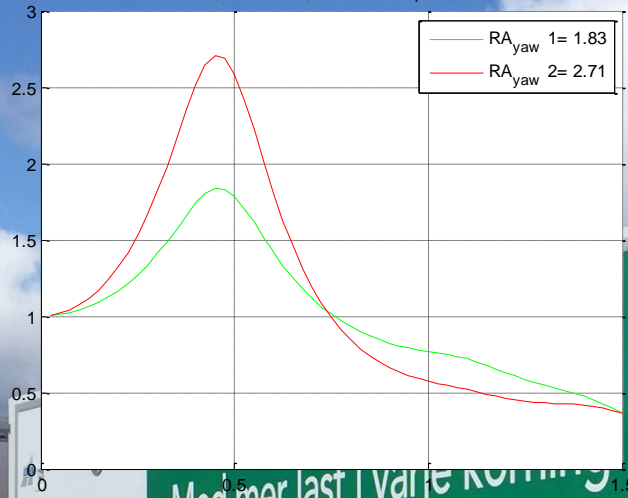
Case	Tilt table test	Simulation
FH-2280 V2	$18.14^\circ \rightarrow \text{atan}(18.14^\circ) * 9.81 = 3.01 \text{ m/s}^2$	3.14 m/s²
FH-2280 V1	$17.60^\circ \rightarrow \text{atan}(17.60^\circ) * 9.81 = 2.92 \text{ m/s}^2$	3.08 m/s²
FH-2280 V0	$16.60^\circ \rightarrow \text{atan}(16.60^\circ) * 9.81 = 2.77 \text{ m/s}^2$	2.90 m/s²



simulation



test





VTM for Longitudinal Control



traction control video



VOLVO
VOLVO GROUP

THE END

