

Department of Automotive Technologies – Vehicle Mechanics Fundamentals

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Optimum lap championship

Introduction

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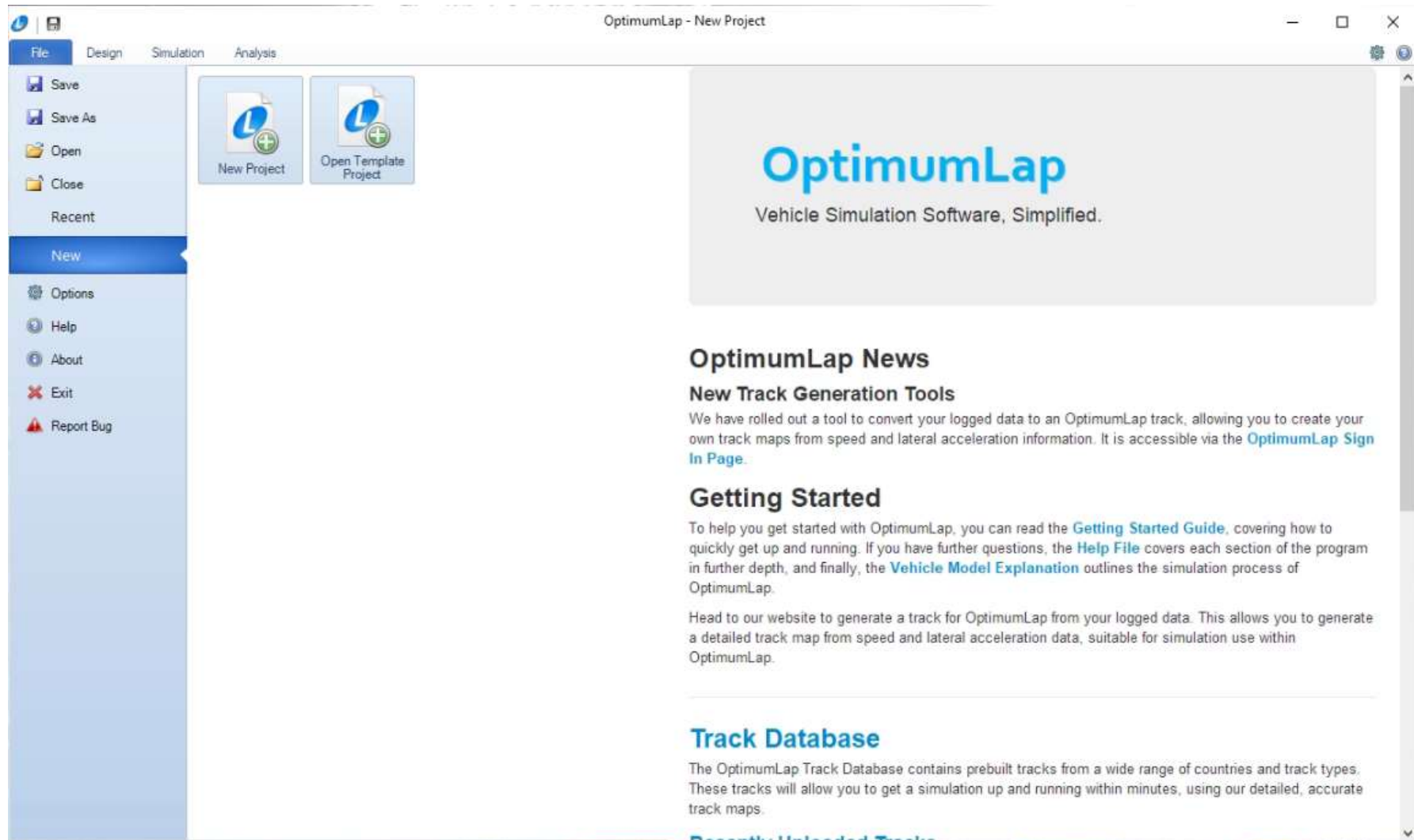
Download and install software



1. visit <https://optimumg.com/>
2. products-> all products -> Optimum lap
3. Get started -> Signup
 - working email address needed
4. Go to your email account
5. In one email you find downloading link and License Key for that email address
6. Download software, install it using your license key

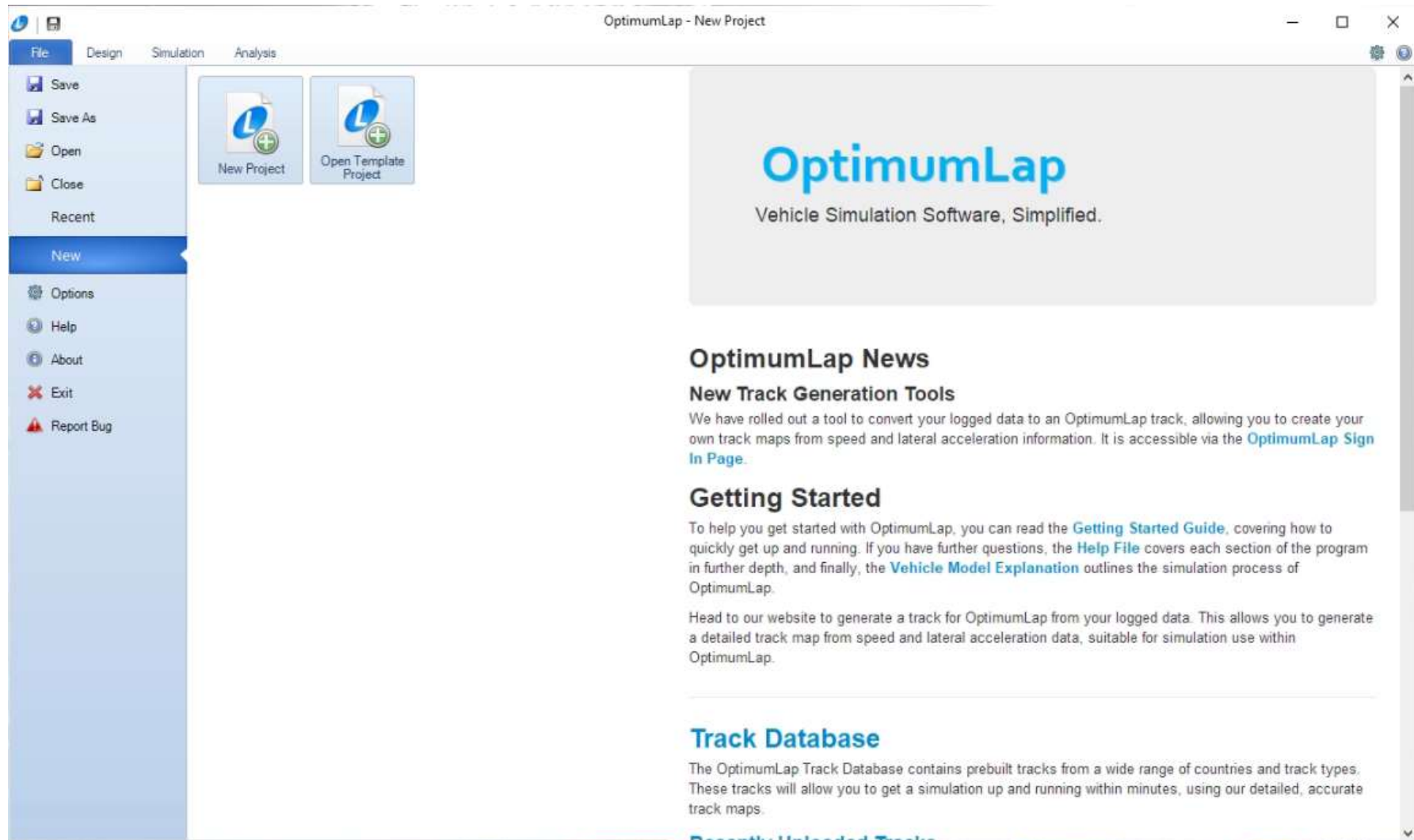
Using the software

1. Open OptimumLap from your computer



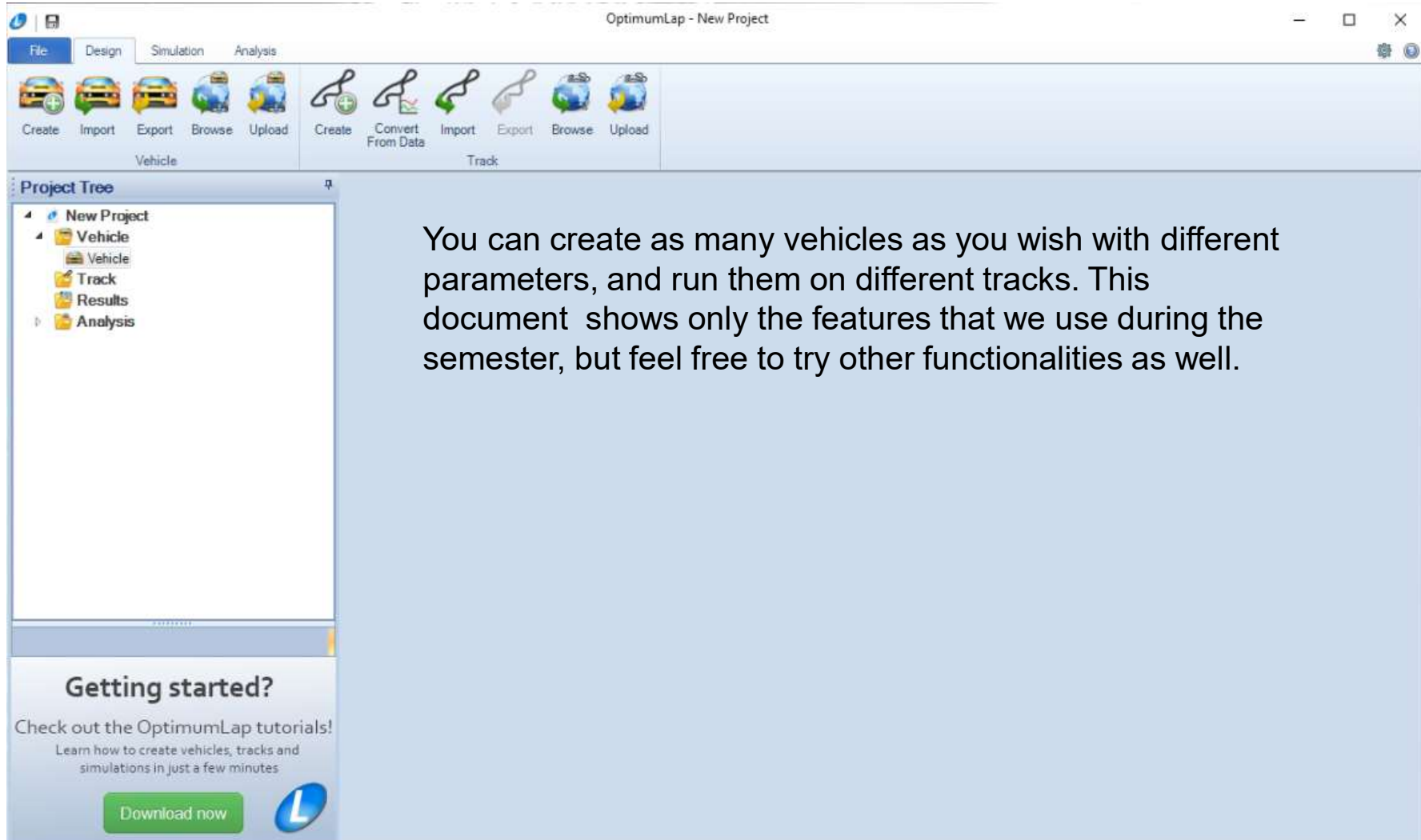
Using the software

2. click New Project, then select a working directory and name the project



Using the software

3. This is your project view



OptimumLap - New Project

File Design Simulation Analysis

Create Import Export Browse Upload Create Convert From Data Import Export Browse Upload

Vehicle Track

Project Tree

- New Project
 - Vehicle
 - Track
 - Results
 - Analysis

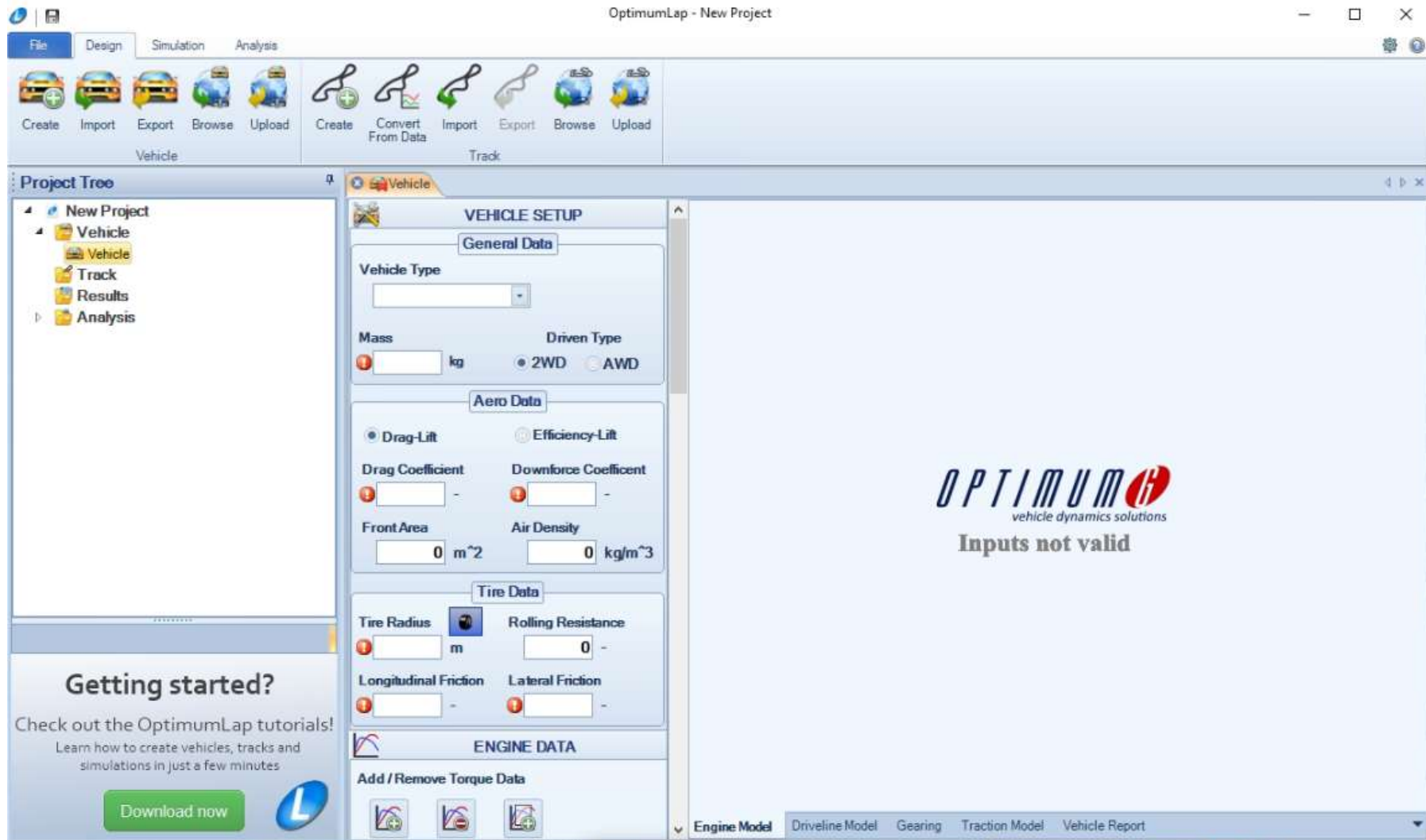
Getting started?
Check out the OptimumLap tutorials!
Learn how to create vehicles, tracks and simulations in just a few minutes

Download now

You can create as many vehicles as you wish with different parameters, and run them on different tracks. This document shows only the features that we use during the semester, but feel free to try other functionalities as well.

Using the software

4. Create new Vehicle



The screenshot displays the OptimumLap software interface for a new project. The window title is "OptimumLap - New Project". The interface includes a menu bar (File, Design, Simulation, Analysis) and a toolbar with icons for "Create", "Import", "Export", "Browse", and "Upload" for both "Vehicle" and "Track" categories. The "Project Tree" on the left shows a hierarchy: "New Project" > "Vehicle" > "Vehicle" > "Track" > "Results" > "Analysis".

The main workspace is divided into two panes. The left pane, titled "VEHICLE SETUP", contains several sections of input fields:

- General Data:** "Vehicle Type" (dropdown), "Mass" (input field with "kg" unit), and "Driven Type" (radio buttons for "2WD" and "AWD").
- Aero Data:** "Drag-Lift" (radio button), "Efficiency-Lift" (radio button), "Drag Coefficient" (input field with "-" unit), "Downforce Coefficient" (input field with "-" unit), "Front Area" (input field with "0 m^2" value), and "Air Density" (input field with "0 kg/m^3" value).
- Tire Data:** "Tire Radius" (input field with "m" unit), "Rolling Resistance" (input field with "0" value), "Longitudinal Friction" (input field with "-" unit), and "Lateral Friction" (input field with "-" unit).
- ENGINE DATA:** "Add / Remove Torque Data" section with three icons.

The right pane displays the "OPTIMUM" logo with the tagline "vehicle dynamics solutions" and a large red error message: "Inputs not valid".

At the bottom left, a "Getting started?" section offers a "Download now" button and a link to tutorials. The bottom status bar shows tabs for "Engine Model", "Driveline Model", "Gearing", "Traction Model", and "Vehicle Report".

Using the software

4. Create new Vehicle

VEHICLE SETUP

General Data

Vehicle Type
Open Wheeler Car

Mass
743.000 kg

Driven Type
 2WD AWD

Aero Data

Drag-Lift Efficiency-Lift

Drag Coefficient
1.000

Downforce Coefficient
2.000

Front Area
2.200 m²

Air Density
1.200 kg/m³

Tire Data

Tire Radius
0.330 m

Rolling Resistance
0.025

Longitudinal Friction
2.100

Lateral Friction
1.950

ENGINE DATA

Add / Remove Torque Data

Engine Speed (rpm)	Engine Torque (N.m)
3500	450.00
4500	500.00
5500	550.00
6500	580.00
7500	610.00
8500	630.00
9500	650.00
10500	660.00
11500	670.00
12500	660.00
13500	640.00
14500	610.00

Thermal Efficiency (optional)
100.000 %

Fuel Energy Density (optional)
E85 25650000 J/kg

TRANSMISSION DATA

Transmission Type
Sequential Gearbox

Add / Remove Gears

	Gear Ratios
▶ Gear 1	2.8750
Gear 2	1.8490
Gear 3	1.6707
Gear 4	1.2886
Gear 5	1.1462
Gear 6	0.9919
Gear 7	0.8778
Gear 8	0.7686

Final Drive Ratio
7

Drive Efficiency
100.000 %

SCALING FACTORS

Power Factor
100.000 %

Aero Factor
100.000 %

Grip Factor
100.000 %

Using the software


5. Load track



Using the software

5. Load track



Nem biztonságos | share.optimumg.com/tracks/





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OptimumLap Track Database



The following tracks are designed for use with OptimumLap. If you would like to generate your own track from logged data, please see our [online track conversion tool](#). Make sure to also check out the [Vehicle Database](#).

- 



1.3 km
0.8 mi

2010 SCCA Solo Nationals West
Lincoln - NE, United States
- 

3.2 km
2.0 mi

Adelaide Street Circuit
Adelaide, Australia
- 

5.3 km
3.3 mi

Albert Park
Melbourne, Australia
- 

4.0 km
2.5 mi

Anderstorp Raceway

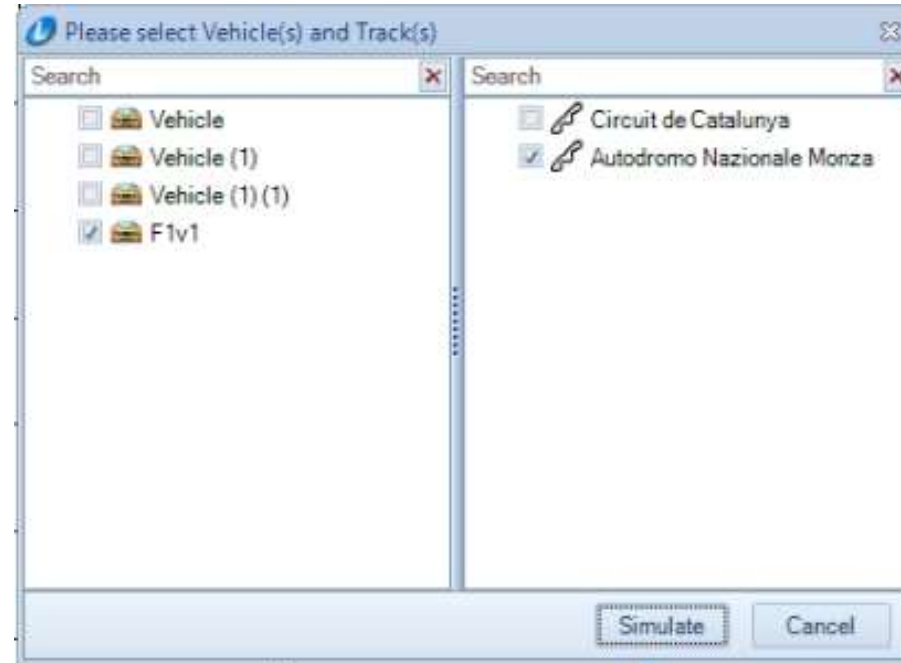
Using the software

5. Load track



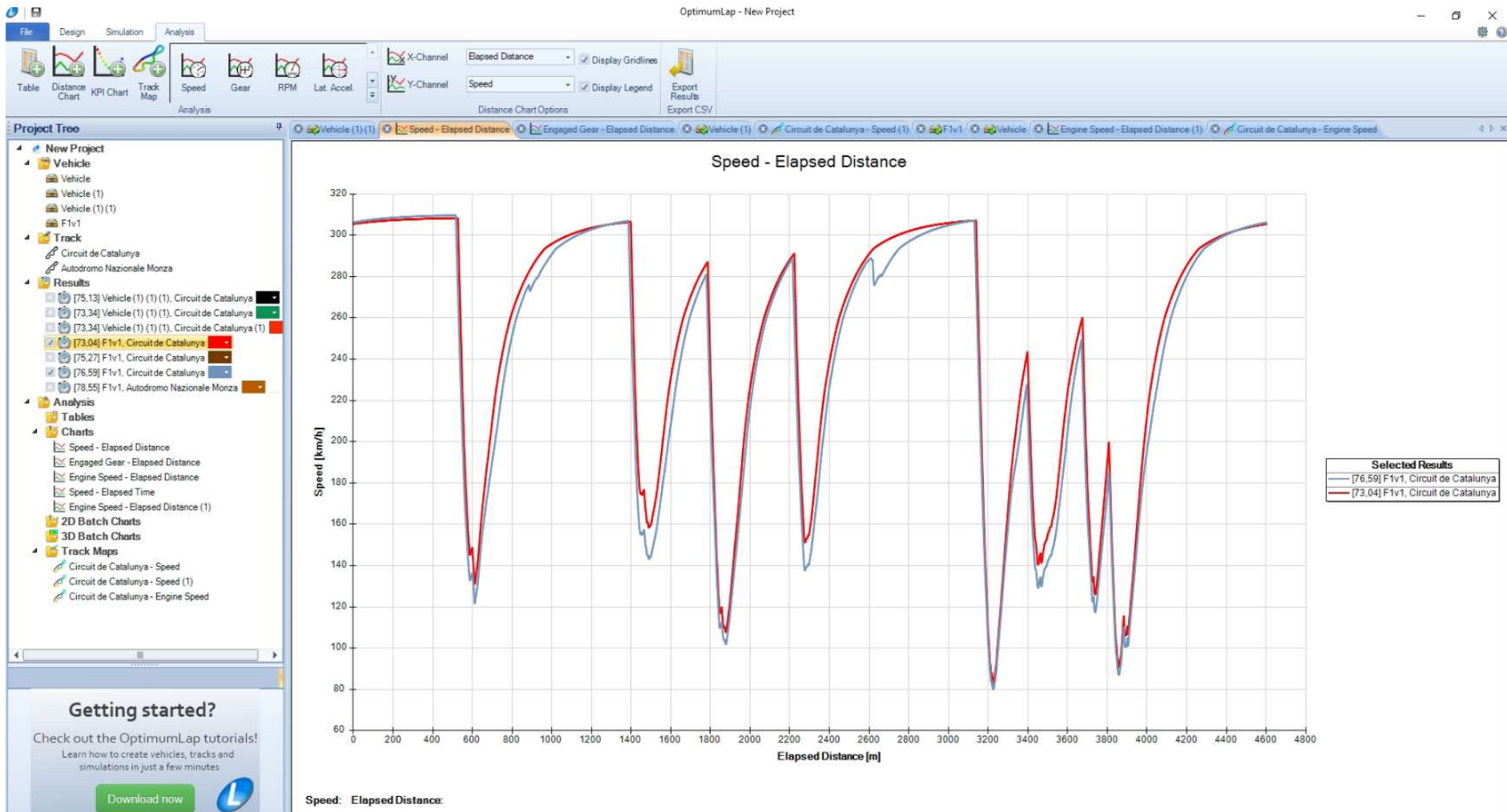
Using the software

6. Simulate



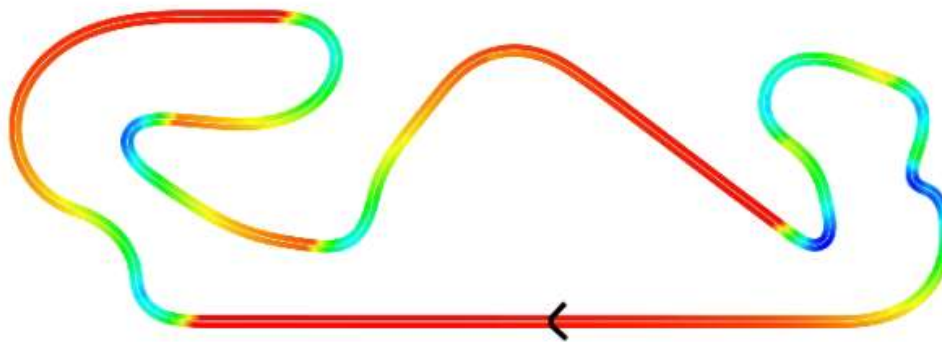
Using the software

6. Simulate



6. Simulate

Circuit de Catalunya - Speed (2)



Speed [km/h]	
■	79,884
■	102,865
■	125,846
■	148,828
■	171,809
■	194,790
■	217,771
■	240,752
■	263,734
■	286,715
■	309,696