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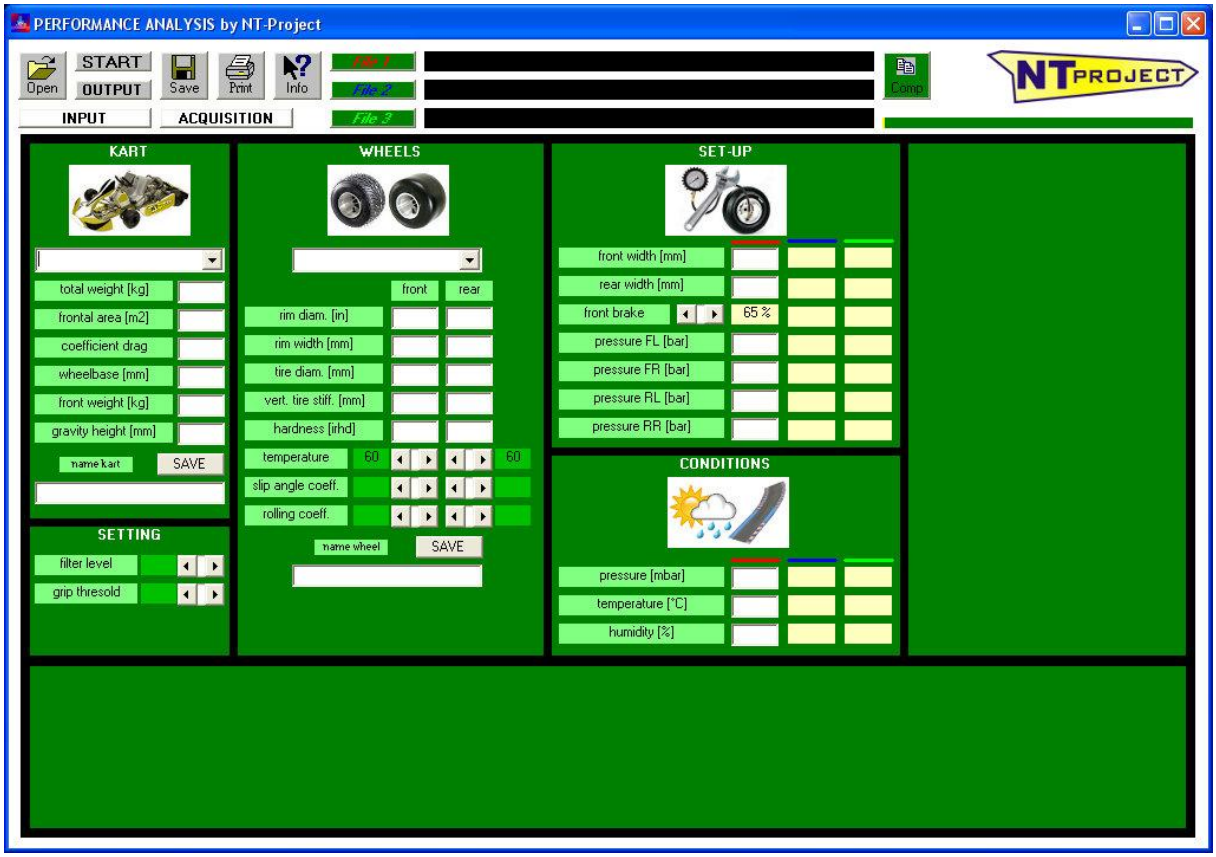
PRESENTATION SOFTWARE PERFORMANCE ANALYSIS

When opening the software appears this screenshot:

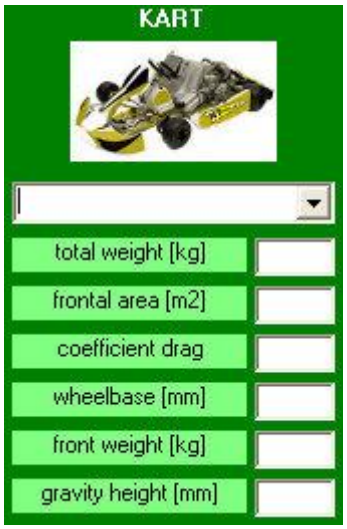


data entry

The data entry areas of the software are the screenshot INPUT that you've at the software opening, and that to upload the acquisition file. You can move from the two areas using the specific buttons

The INPUT data are divided into the following sectors:

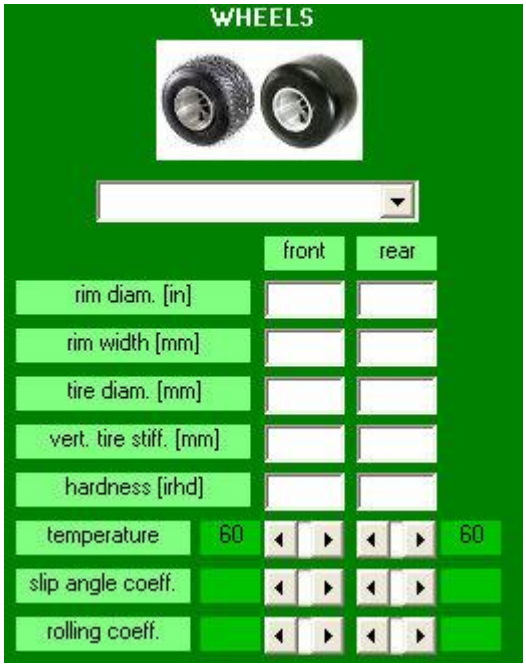
KART



Must be entered the main characteristics of the kart necessary to perform the dynamic calculation.

In the software there is the possibility of using predefined data for the main categories.

WHEELS



Must be entered the main characteristics of the wheels and of the tires used on the kart.

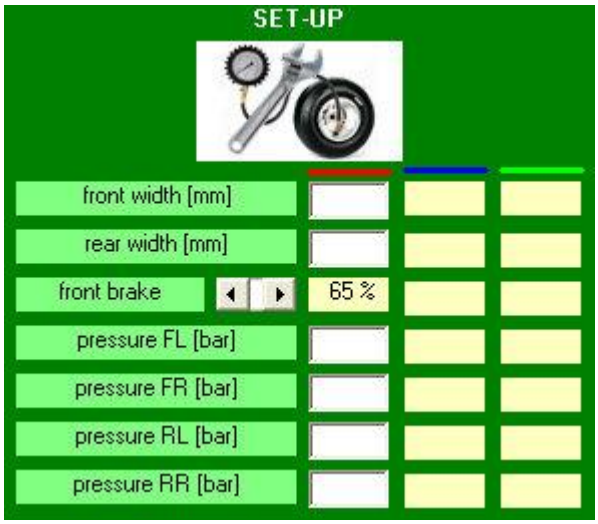
In the software there is the possibility of using predefined data for the main tyres.

In addition to the wheel and tire data, there are some parameters that can be modified to refine the calculation based on experimental data.

- temperature > if you know the average temperature of the front and rear tires at the end of the lap, you can move the preset average value (60 °C) to the one closest to the values detected.
- slip angle coeff. > if the power calculated at the exit of the corner is lower than that detected experimentally, it may be that the slip angle of the kart is higher than the estimated one, therefore the coefficient must be increased, vice versa, decreased.
- rolling coeff. > if the power calculated in the straights is lower than that detected experimentally, it may be that the rolling losses of the kart are higher than the estimated one, therefore the coefficient must be increased, vice versa, decreased.

For both KART and WHEELS data, if you enter data differents than the preset ones, you can save them in the respective lists.

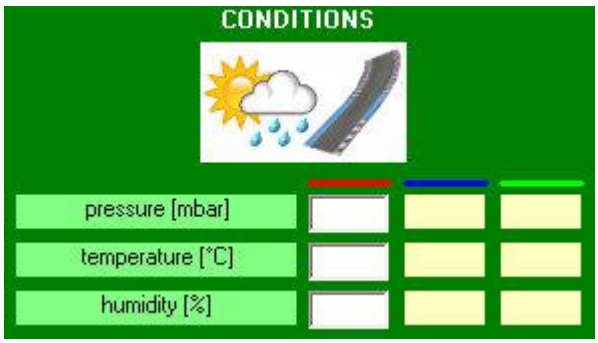
SET-UP



Must be entered the kart setup adjustments that affect the dynamic calculation that comes performed.

From these are very important the tire pressure values which influence both the slip angle behavior, both the rolling resistance. It would be better to be able to insert the hot pressures, but if you don't have the possibility to do so, you can insert the cold ones, it is important that you use the same criterion for all the runs that you want to compare.

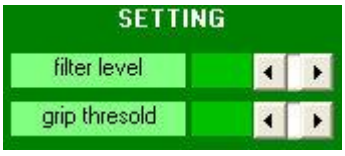
WEATHER CONDITIONS



Must be entered the weather conditions of the run because these affect the drag resistance and the power that the engine can provide.

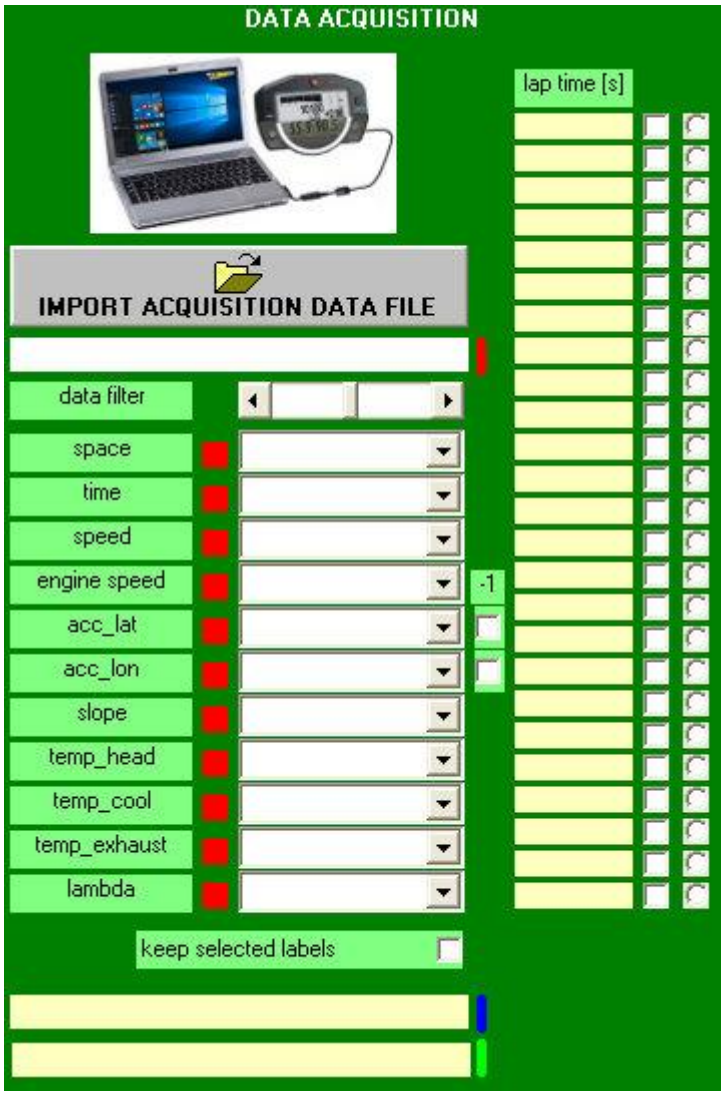
Both for the SET-UP data, both for the WEATHER CONDITIONS, when you upload the data of more files to compare the results, the values are reported in the respective columns, so it's possible to see immediately the differences from the runs.

SETTING



To obtain better results, the calculated data is appropriately filtered, and a precision threshold of the calculated grip is defined. The initial settings have already been defined on the most suitable values, however in particular situations of acquired data that are not exactly precise, changes to these parameters may be recommended.

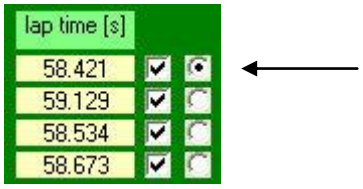
ACQUISITION



Using the IMPORT DATA ACQUISITION FILE button you can upload the session file that you want to analyze, exported from your acquisition software.

The files exported form the acquisition software must be in the format CSV.

On the procedures for exporting the file correctly from the different acquisition software, you can consult the specific document on our web-site, or contact us for a copy.



When comes uploaded the file, for the analysis automatically is selected the best lap, anyway it's possible to select another lap.

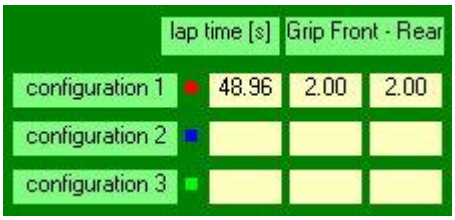
When you upload the data of more files to compare the results, the respective acquired data files that were used are reported.

results

Performance is fundamentally linked to three aspects:

- tire efficiency;
- chassis efficiency;
- engine efficiency.

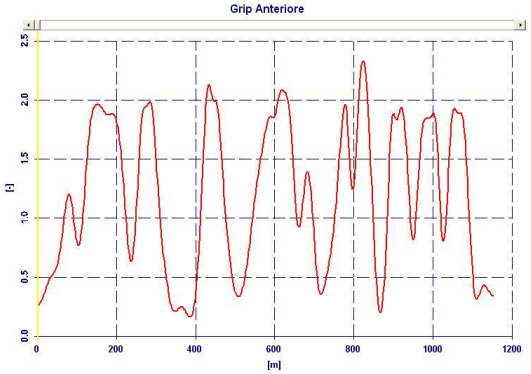
The efficiency of the tire is evaluated by analyzing the grip that it is able to provide. The efficiency of the chassis is evaluated by analyzing how much grip can be exploited during braking and acceleration, and how the engine power can be exploited during acceleration. The efficiency of the engine is evaluated by analyzing the power that it can develop at full load.



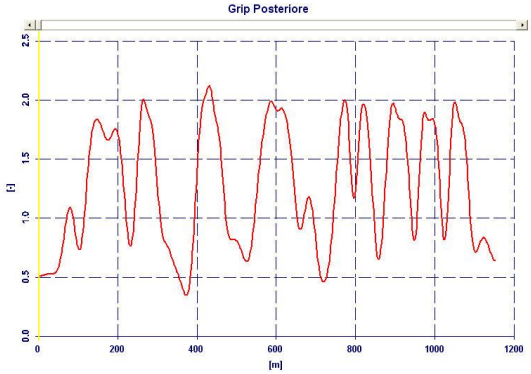
At the end of the calculation the first result that is shown is the maximum grip that was provided on average by the front and the rear tyres.
Together to this is reported the time of the lap analyzed. If you compare more runs, the values are reported for each configuration.

In addition to this the following graphs are shown:

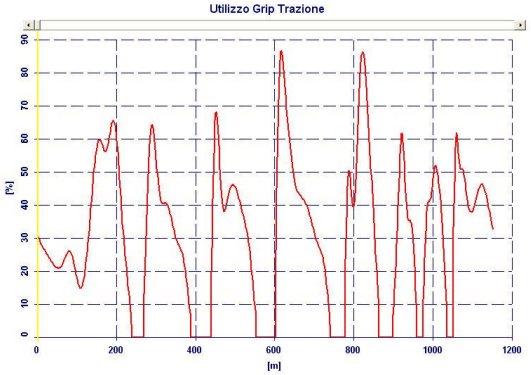
FRONT GRIP



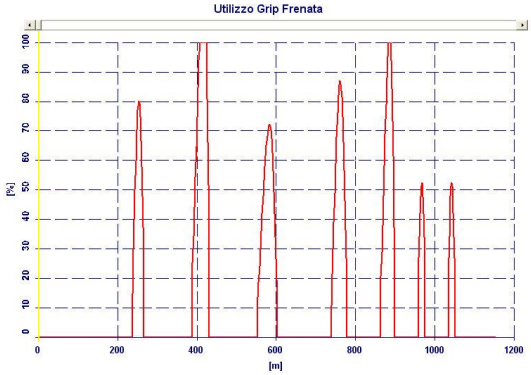
REAR GRIP



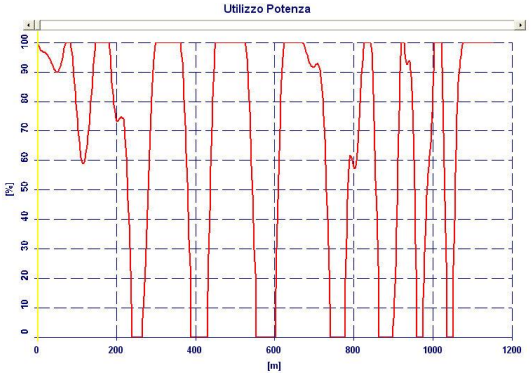
UTILIZATION GRIP TRACTION



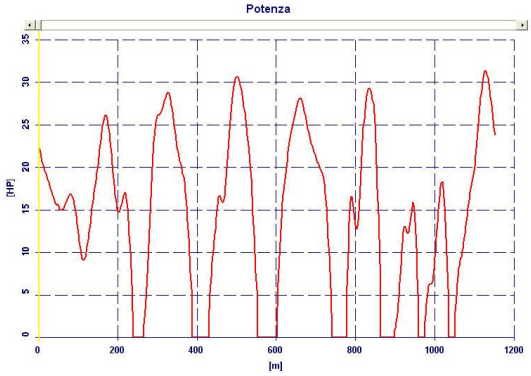
UTILIZATION GRIP BRAKING



UTILIZATION POWER



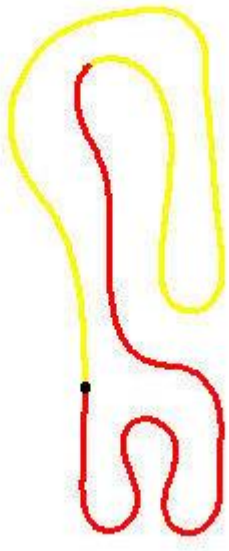
POWER



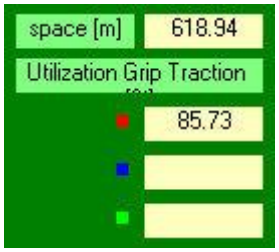
These graphs show the trend of the different quantities at each point of the track, therefore when comparing different runs it's possible to make an analysis point by point of the performance.

In fact, the software allows you to zoom in on the graphs to analyze in the detail the quantities at specific points of the track.

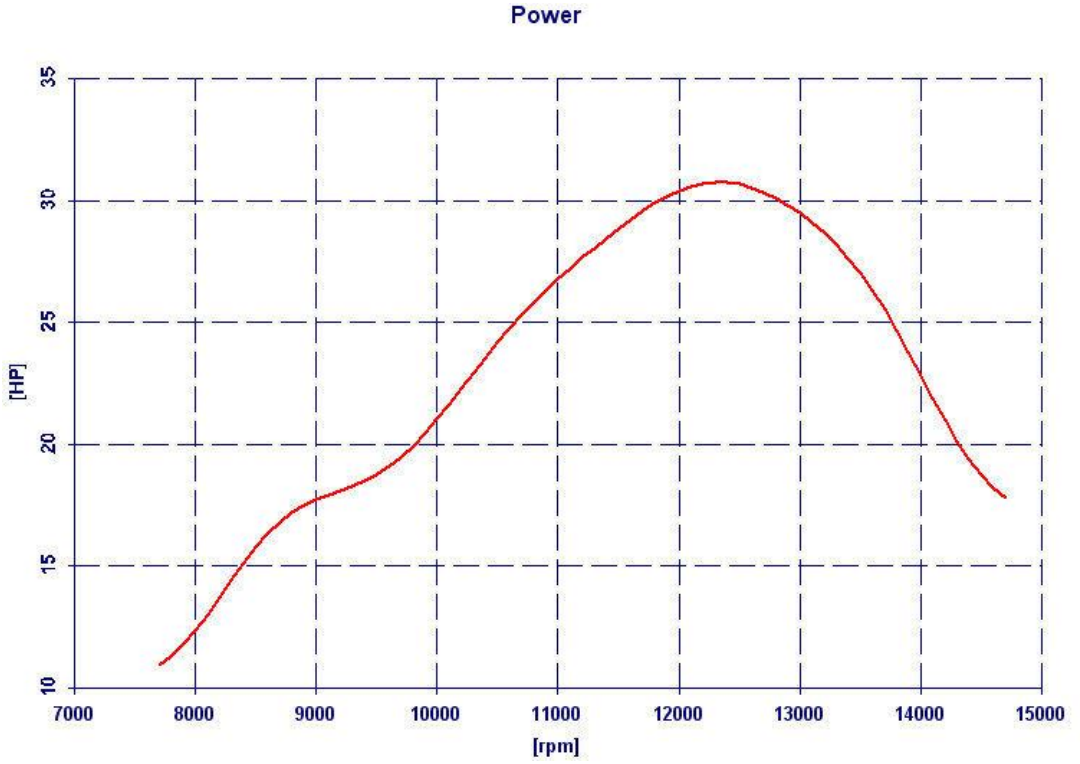
The yellow line highlights the distance traveled from the finish line to the point where you want to start the detailed analysis.



It is also possible to move a cursor on the graph which allows you to see the value of the quantity under examination point by point. In case of comparison of more files the values will be shown for all the different configurations to be analysed.



In addition to the graphs of the quantities shown for each point of the track, the software calculates also the power curve provided by the engine in the specific lap as a function of the rpm. This power curve is corrected according to the atmospheric conditions, so if the conditions were very different from the runs that you're comparing, you can always have a realistic comparison of the engine performance.



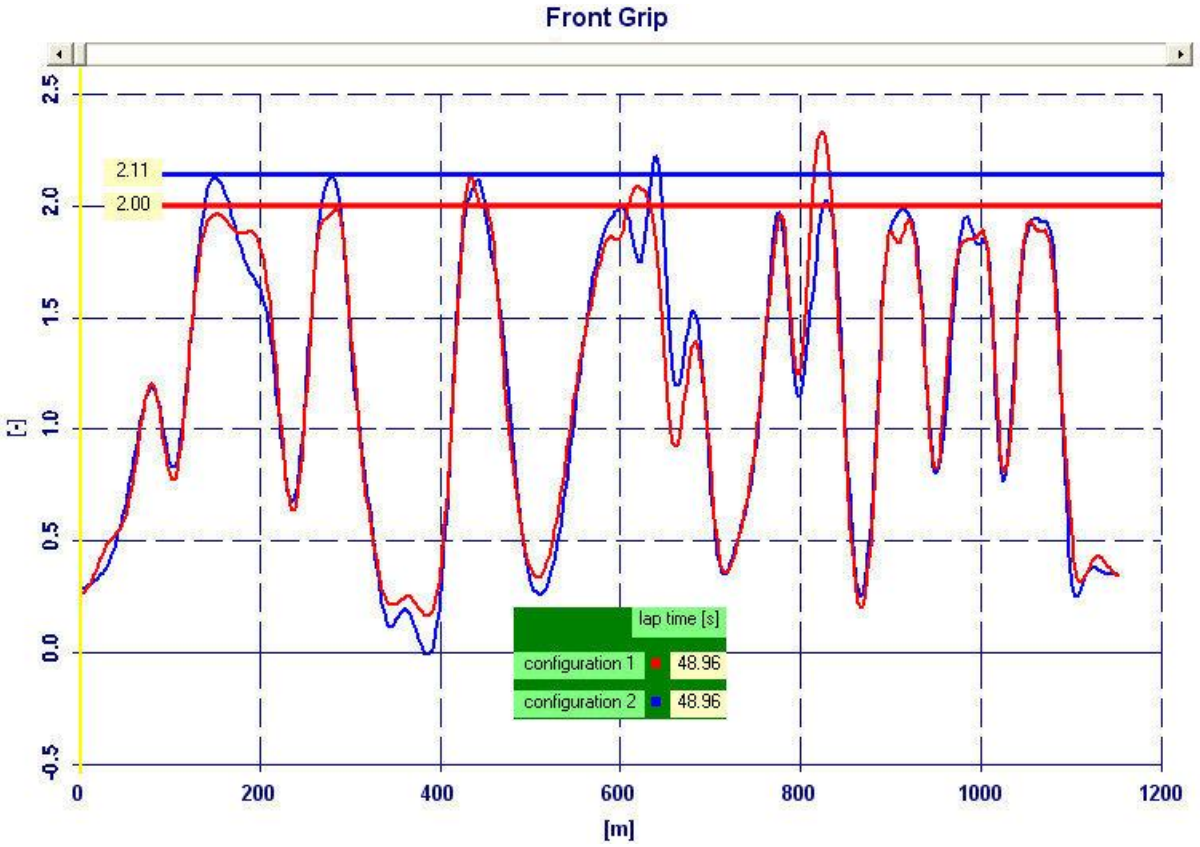
example

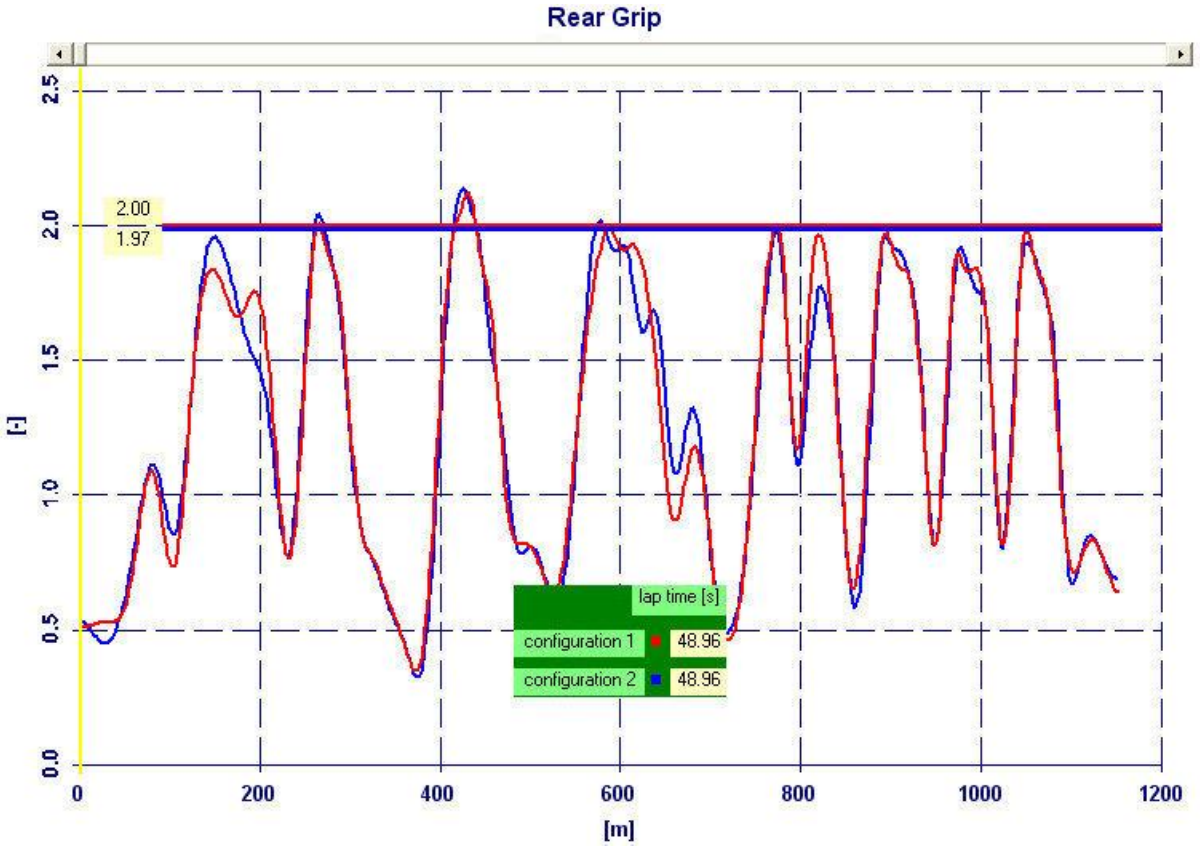
To understand the usefulness of the Performance Analysis software let's look at a concrete example.

We compare two runs (in the software you can also compare three runs at the same time) with different set-up and different atmospheric conditions.

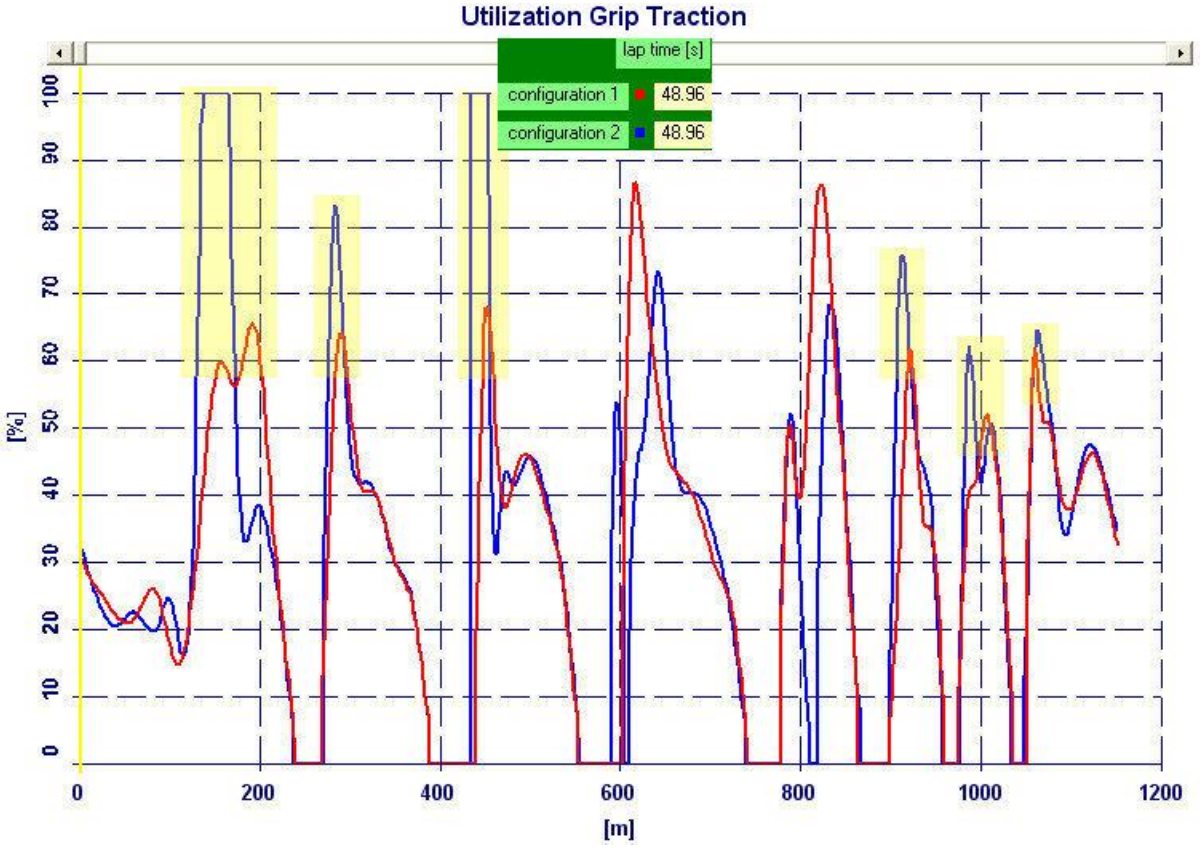
In the two runs the same best lap time was obtained, so apparently the set-up modifications did not bring any changes, but let's see how thanks to the Perfomance Analysis software it is easy to understand what happened, and therefore take it into account to make subsequent set-up modifications in the right direction.

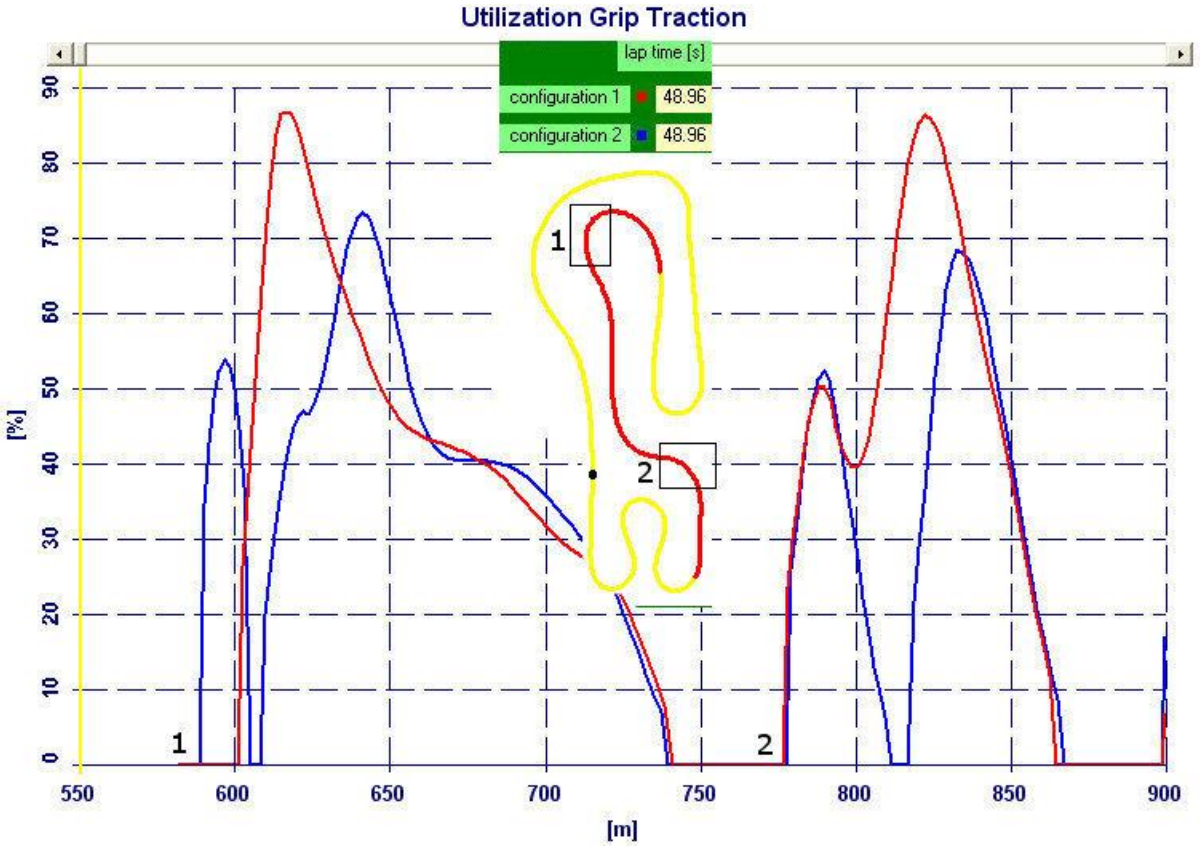
From the grip analysis it is clear that the front tires have worked better in run 2, while the behavior on the rear has been similar.



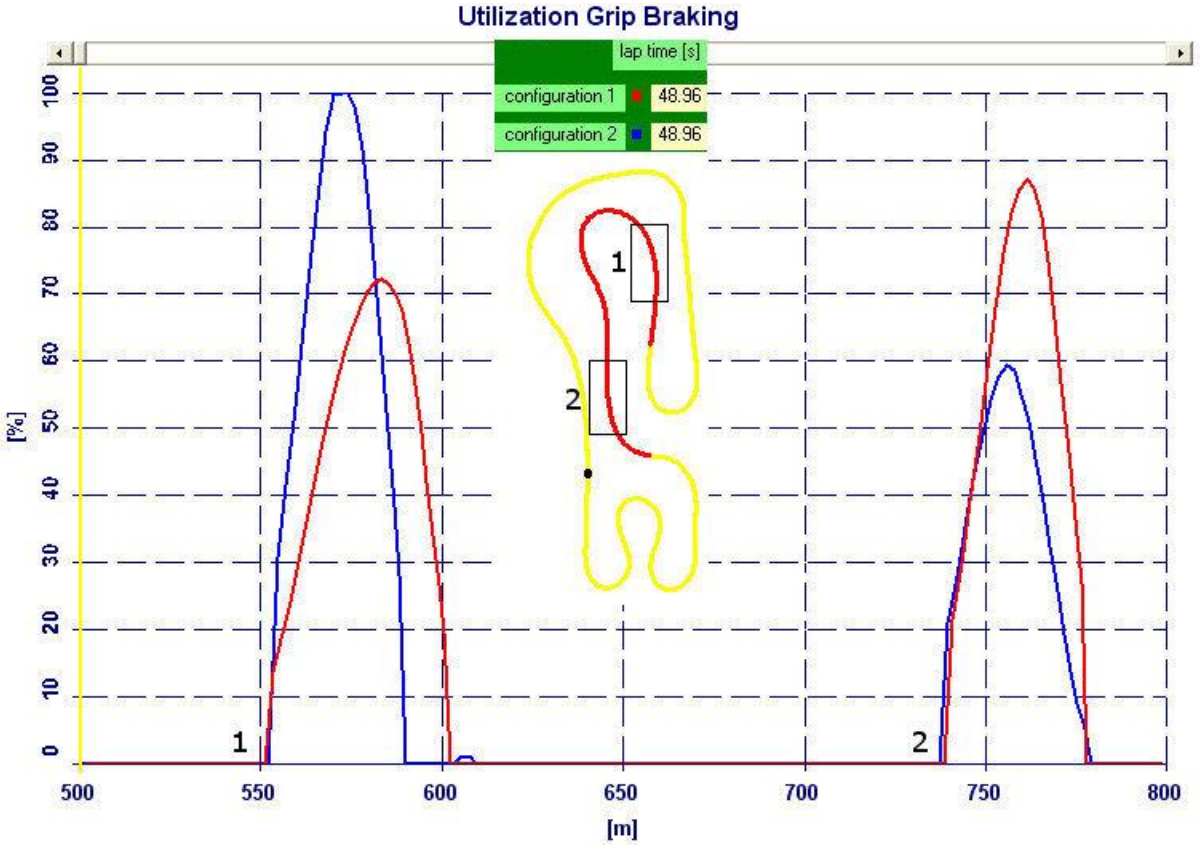


In the run 2 the chassis has allowed to exploit better the grip in the acceleration phase almost in all the run, excepts in a couple of fast corners.



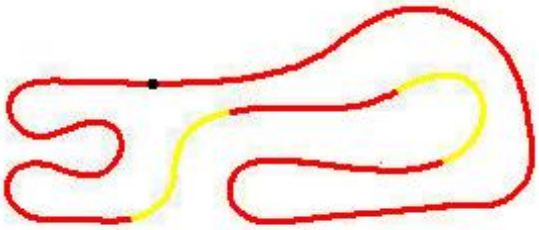


Looking instead at the exploitation of the grip during the braking phase, we see that at the entrance to the two fast corners the braking phase is much quicker in run 2, this means a faster entry, which can explain the difficulties in managing the phase of acceleration.



Finally, analyzing the engine power, we see that the performance is similar in the two runs, and the differences are mostly due to the differences in management of the acceleration phase highlighted above.

Overall, turn 2 is decidedly better, so even if the performance was the same, it is certainly worth focusing on this set-up, making the driver focus on better management of the braking and acceleration phases of these two fast corners.

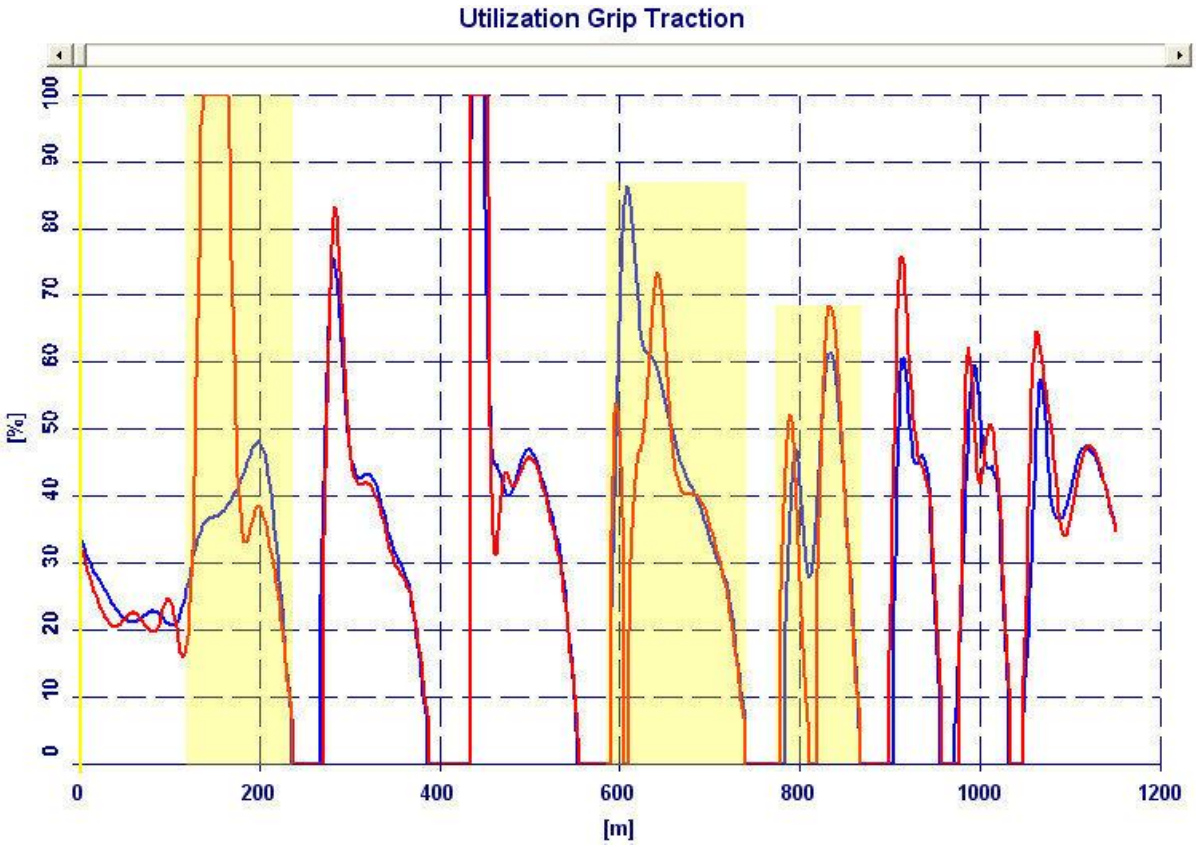


To complete the picture of the usefulness of the Performance Analysis software, we show you another example where run 2 and run 3 are compared, in which the only changes were made to the engine set-up.

Comparing with the software the best lap of each session, we can actually see that the efficiency of the tires is practically identical.

	lap time [s]	Grip Front - Rear	
configuration 1	48.96	2.11	1.97
configuration 2	48.88	2.08	1.98

While as far as the chassis is concerned, the driving difficulties in the fast corners shown above remain.



Thanks to the software, however, we can immediately see that the best lap time in run 3 is due to an improvement in the engine efficiency, therefore the engine set-up used in this run is undoubtedly the one on which it is worth continuing to work.

open and save data file

The data can be saved in a file * .pan through the "SAVE" button.

The stored data can be easily retrieved through the button "OPEN" and even if they were saved to the output through the OUTPUT button is possible to instantly review the results and move in the graphs through the << and >> button.

comparison results

The software allows you to compare the results with those of other two analyses previously saved.

To compare the results, after that you've performed the calculation and saved the results, you must open the first file that you want compare from the button "Open" or the button "File1", the second file from the button "File2", and the third file from the button "File3".

After that you've selected the files, clicking on the "Comp" button will display the comparison of the results (those of File1 in red, those of File2 in blue, those of File3 in green).

print

The software allows you to print input data and output by clicking the PRINT button