



How to make a Tacx compatible RLV

9. august 2015

Equipment	
Camera	GoPro +3 black
GPS	Garmin 1000
Software	RLV Studio
	RLV-Workbench
	Video editing prg.



Recording the ride:

Start recording video and GPS signal before riding. I often wait half a minute before I ride, this makes it more easy to cut video and GPS later - also when I am done with the ride I wait half a minute before the equipment is turned off.

For this guide I recorded a small ride (00:04:14 - around 1km) and stopped 2 times (I am going to cut out the stops from the video later).

Preparing files and folders

Here I make a folder on my desktop named "RLV_GUIDE" (I always give the folder the name of the finished RLV) and place the Video and GPS data in it.



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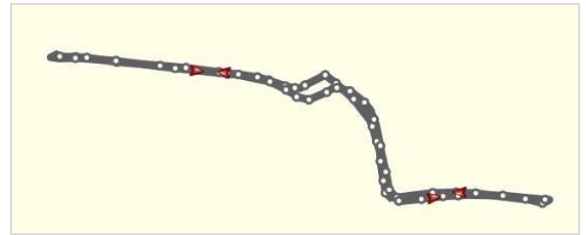
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Now it is time to get a closer look at the GPS data.

The GPS data must be accurate before they can be used.

I use Garmin Map-source for that, but you can use almost any GPS/MAP software for that. I am looking for "holes" in the data and other irregularities. Usually, I look for anomalies in stage length and speed. *I sometimes had to throw perfectly good video because of bad GPS tracks.*



Below are data, which I previously have discarded (it allows additional training, when you have to ride the route again to get a good GPS track :)

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Sporegenskaber



Navn: RLV GUIDE

It is very important that the GPS data recorded with the same fixed time interval - for example, every second.

Indeks	Klokkeslæt	Højde:	Dybde	Temperatur	Etapelængde	Etapetid	Etapehastighed	Etapekurs	Position
1	08-08-2015 11:01:52	40 m			0 m	0:00:04	0.1 km/t	80° sand	N55 32.257 E9 36.687
2	08-08-2015 11:01:53	41 m			0 m	0:00:06	0.0 km/t	55° sand	N55 32.257 E9 36.687
3	08-08-2015 11:01:54	41 m			0 m	0:00:09	0.0 km/t	145° sand	N55 32.257 E9 36.687
4	08-08-2015 11:01:55	41 m			1 m	0:00:09	0.2 km/t	16° sand	N55 32.257 E9 36.687
5	08-08-2015 11:01:56	40 m			1 m	0:00:10	0.4 km/t	156° sand	N55 32.257 E9 36.687
6	08-08-2015 11:01:57	40 m			1 m	0:00:15	0.3 km/t	323° sand	N55 32.257 E9 36.687
7	08-08-2015 11:01:58	40 m			14 m	0:00:05	10 km/t	286° sand	N55 32.258 E9 36.686
8	08-08-2015 11:01:59	40 m			5 m	0:00:01	17 km/t	271° sand	N55 32.260 E9 36.674
9	08-08-2015 11:02:00	40 m			35 m	0:00:07	18 km/t	280° sand	N55 32.260 E9 36.669
10	08-08-2015 11:02:01	40 m			16 m	0:00:03	19 km/t	274° sand	N55 32.263 E9 36.636
11	08-08-2015 11:02:02	40 m			19 m	0:00:04	17 km/t	268° sand	N55 32.264 E9 36.622
12	08-08-2015 11:02:03	41 m			29 m	0:00:08	13 km/t	259° sand	N55 32.263 E9 36.604
13	08-08-2015 11:02:04	42 m			5 m	0:00:02	9 km/t	268° sand	N55 32.261 E9 36.577
14	08-08-2015 11:02:05	42 m			7 m	0:00:03	8 km/t	324° sand	N55 32.260 E9 36.572
15	08-08-2015 11:02:06	42 m			3 m	0:00:01	12 km/t	0° sand	N55 32.263 E9 36.568
16	08-08-2015 11:02:07	43 m			11 m	0:00:03	13 km/t	351° sand	N55 32.265 E9 36.568

Data from the RLV_GUIDE seems ok to me. It is possible manually to edit the data, but can be quite intricately.

689	19-05-2015 11:01:52	580 m			14 m	0:00:01	51 km/t	281° sand	N46 00.283 E12 10....
690	19-05-2015 11:01:53	581 m			6 m	0:00:01	22 km/t	273° sand	N46 00.285 E12 10....
691	19-05-2015 11:01:54	581 m			4 m	0:00:01	14 km/t	300° sand	N46 00.285 E12 10....
692	19-05-2015 11:01:55	582 m			7 m	0:00:01	26 km/t	222° sand	N46 00.286 E12 10....
693	19-05-2015 11:01:56	582 m			13 m	0:00:01	48 km/t	218° sand	N46 00.283 E12 10....
694	19-05-2015 11:01:57	583 m			38 m	0:00:01	138 km/t	211° sand	N46 00.277 E12 10....
695	19-05-2015 11:01:58	583 m			12 m	0:00:01	42 km/t	214° sand	N46 00.260 E12 10....
696	19-05-2015 11:01:59	584 m			2 m	0:00:01	7 km/t	225° sand	N46 00.254 E12 10....
697	19-05-2015 11:02:00	584 m			3 m	0:00:01	11 km/t	137° sand	N46 00.254 E12 10....
698	19-05-2015 11:02:01	585 m			3 m	0:00:01	11 km/t	64° sand	N46 00.252 E12 10....
699	19-05-2015 11:02:02	586 m			3 m	0:00:01	12 km/t	80° sand	N46 00.253 E12 10....
700	19-05-2015 11:02:03	586 m			5 m	0:00:01	18 km/t	49° sand	N46 00.253 E12 10....
701	19-05-2015 11:02:04	587 m			9 m	0:00:01	31 km/t	32° sand	N46 00.255 E12 10....
702	19-05-2015 11:02:05	587 m			16 m	0:00:01	58 km/t	28° sand	N46 00.259 E12 10....
703	19-05-2015 11:02:06	587 m			41 m	0:00:01	148 km/t	20° sand	N46 00.267 E12 10....
704	19-05-2015 11:02:07	588 m			13 m	0:00:01	46 km/t	33° sand	N46 00.287 E12 10....
705	19-05-2015 11:02:08	588 m			19 m	0:00:01	67 km/t	30° sand	N46 00.293 E12 10....
706	19-05-2015 11:02:09	589 m			10 m	0:00:01	36 km/t	79° sand	N46 00.302 E12 10....

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RLVStudio / RLV-Workbench

You can make the RLV either with RLVStudio or RLV-Workbench I use both.

I import the GPS data into RLVStudio.

Make sure you have the correct "Frame rate" set.

Default settings in RLVStudio marks all data below 2Km/h with **RED**.

Number	Disable	Calc. Abs. Diff	Slope	Slope/Grid	Time Off	Uncutted Frame	Frame	Speed
1	<input type="checkbox"/>		0	0	0	0	0	0
2	<input checked="" type="checkbox"/>	0	0	0	0	0	0	0
3	<input checked="" type="checkbox"/>	0	0	0	0	0	0	0
4	<input checked="" type="checkbox"/>	0	0	0	0	0	0	0
5	<input checked="" type="checkbox"/>	0	0	0	0	0	0	0
6	<input checked="" type="checkbox"/>	0	0	0	0	0	0	0
7	<input checked="" type="checkbox"/>	0	0	0	0	0	0	0
8	<input type="checkbox"/>	0	0	2.3161580611355927	0	1	1	0
9	<input type="checkbox"/>	1.72101069668688	1.6849204918668952	2.3161580611355927	1	31	31	16.981956385080728
10	<input type="checkbox"/>	824415051916908	2.4009748457904991	2.3161580611355927	7	241	241	18.055133971688594
11	<input type="checkbox"/>	354536777427796	2.7336632503310243	2.7336632503310243	3	331	331	18.636146070613069
12	<input type="checkbox"/>	964986373682976	2.9447751427643167	2.9447751427643167	4	451	451	16.749404636629666
13	<input type="checkbox"/>	2.76486359446234	3.2750132816862281	3.2750132816862281	8	691	691	12.959944749350713
14	<input type="checkbox"/>	7.62866741735046	4.1210696296915286	3.8157123980708558	2	751	751	8.7548468811986151
15	<input type="checkbox"/>	4.6037697383492	3.60278395989884	3.8157123980708558	3	841	841	8.3701227851984878
16	<input type="checkbox"/>	1.85730343180921	2.0825736309235789	2.3030370827705049	1	871	871	11.712721296456024
17	<input type="checkbox"/>	3.35015318857768	2.3713965476195233	2.3030370827705049	3	961	961	12.591419708122146
18	<input type="checkbox"/>	3.85503794692937	3.1438733096452314	3.1438733096452314	5	1111	1111	16.20351702601323
19	<input type="checkbox"/>	1.17719944578297	3.43812305483619	3.4381230548361894	2	1171	1171	18.579890697936495
20	<input type="checkbox"/>	3.72616457236353	3.1205344211932844	3.1205344211932844	3	1261	1261	16.068758151884662
21	<input type="checkbox"/>	1.32471940848123	3.07596265908894	3.07596265908894	4	1381	1381	15.83869935251494
22	<input type="checkbox"/>	3.68081172607663	2.79125074545295	3.0797935112448473	1	1411	1411	19.281932343343392
23	<input type="checkbox"/>	1.54946721835432	3.3972244105161162	3.0797935112448473	1	1441	1441	17.527159772199692
24	<input type="checkbox"/>	3.73570372676016	2.6653510816562025	2.6653510816562025	5	1591	1591	17.414090286052218
25	<input type="checkbox"/>	3.58484395959269	2.4238115043588553	2.4238115043588553	6	1771	1771	13.709484139699518
26	<input type="checkbox"/>	3.40765457433537	2.1730204754491007	2.1730204754491007	5	1921	1921	9.2324236426147372
27	<input type="checkbox"/>	4.3328093494685	3.1489560455145083	2.0917587344515089	1	1951	1951	10.530557190479346
28	<input type="checkbox"/>	1.6175814164742	1.9128460041750728	2.0917587344515089	4	2071	2071	15.556294860305105
29	<input type="checkbox"/>	3.35281996776956	3.2840264232746827	2.1594113379317705	1	2101	2101	17.046858784663385
30	<input type="checkbox"/>	1.72091459727261	2.096143555032711	2.1594113379317705	1	2131	2131	15.725140666211006

Locate errors or video you want to remove, select the **Track number** and click **Manual Refresh**. All red markings are listed as frame numbers in the RLV_GUIDE_cut.txt file.

Use the "Create files" and generate the needed files. RLVStudio creates 3 files: RLV_GUIDE.pgmf, RLV_GUIDE.rlv and RLV_GUIDE_cut.txt



See the small video here (no sound, but you will get the point)



Editing video (Sony Movie Studio)

You can use any video editing software as long it is showing frame numbers.

We also need the RLV_GUIDE_cut.txt file to see which frames have to be removed.

I start by removing some seconds from start of the video (with no movement disabled by RLVStudio + those I have selected in the start).

Number	Disable	Calc	Abs	Diff	Slope	Slope/Grid	Time Diff	Uncutted Frame	Frame	Speed
1	<input checked="" type="checkbox"/>	0	0	0	0	0	0	0	0	0
2	<input checked="" type="checkbox"/>	0	0	0	0	0	0	0	0	0
3	<input checked="" type="checkbox"/>	0	0	0	0	0	0	0	0	0
4	<input checked="" type="checkbox"/>	0	0	0	0	0	0	0	0	0
5	<input checked="" type="checkbox"/>	0	0	0	0	0	0	0	0	0
6	<input checked="" type="checkbox"/>	0	0	0	0	0	0	0	0	0
7	<input checked="" type="checkbox"/>	0	0	0	0	0	0	0	0	0
8	<input type="checkbox"/>	0	0	2.3161580611355927	0	1	1	0	0	0
9	<input type="checkbox"/>	172101069668688	1.6849204918668952	2.3161580611355927	1	31	31	16.981956385080728		

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Then I use the cut table to locate where the video should be cut. It can never be exact - I look at the video and cut where I feel it is right.

The cut list is just a guide for me.



```
*****  
***** C U T   T A B L E *****  
*****  
CREATION TIME :      09-08-2015 08:57:24  
by RLVStudio version : 0.1.4.11  
*****  
  
***** V I D E O   I N F O *****  
*****  
Frame rate:          30  
# of uncutted sections: 2  
*****  
  
-----  
REMOVE FROM FRAME#: 0  
REMOVE TO FRAME#:   0  
-----  
RETAIN FROM FRAME#: 1  
RETAIN TO FRAME#:  3360  
-----  
REMOVE FROM FRAME#: 3361  
REMOVE TO FRAME#:  4111  
-----  
RETAIN FROM FRAME#: 4112  
RETAIN TO FRAME#:  7021  
-----  
REMOVE FROM FRAME#: 7022  
REMOVE TO FRAME#:  End of video  
-----
```

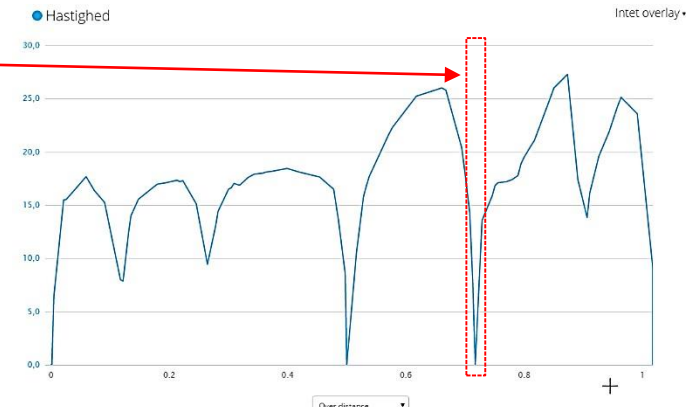
GPS recordings are not always right - if you try my guide, you will find a stop in the video that is NOT on GPS recording.

You can deal with this in more ways:

Back to RLVStudio, locate the place, disable the numbers and create a new set of files....and redo all the video editing..... #SIGH#

or...

Just leave it as it is and enjoy your RLV, with your "Old Fortius software".



The .tts file

Most Tacx users use **TTS** and therefore a **.tts file is needed** to make the RLV run on those versions.

This will make your RLV run on TTS1 and TTS2.....and with **a lot of luck** also on TTS3 and up...

"A lot of luck".... Why is that?

This is due to distance (the .pgmf file) and the number of frames (the .rlv file) is not matching the video length (the .avi file).

So how to fix that?

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I use RLV Workbench to deal with it (*I could also choose to make all the RLV work with this program*). RLV Workbench comes with an excellent manual.....read it!

I use the program to make sure the distance, checksum and rolling friction are set correct.

Again, a small video with no sound - you will get the point.



Now you are ready to make the needed .tts file

I hope my little guide here may help you to make your first RLV.
I would be happy to see and test it.

Niels / route4u