



Interreg



Danube Transnational Programme RADAR

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Your Road Safety is on our RADAR.

O.T. 3.2. Databases on Pilot Actions

TA3 ITS - HUNGARY



RADAR – Risk Assessment on Danube Area Roads



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Abbreviation list

AADT	Annual Average Daily Traffic
ARM	A family of reduced instruction set computing (RISC) architectures for computer processors
iRAP	International Road Assessment Programme
ITS	Intelligent Transport System
KTI	KTI Institute for Transport Sciences Non-profit Ltd.
PA	Pilot Action
PP	Project Partner
RADAR	Risk Assessment on Danube Area Roads
TA	Thematic Area

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1. Introduction

The RADAR (*Risk Assessment on Danube Area Roads*) project implements learning and transnational cooperation activities at different levels to help the responsible road safety organizations in the Danube area identify risk on their road networks and also helps them reduce risk systematically, by improving infrastructure and road layout. RADAR addresses all road users but pays particular attention to vulnerable road users as well as to safety on major roads near schools. It also holistically approaches the issue of safety and tackles speed as a major risk on roads.

The fifth Work Package of the project aims to give the project partners practical experience in using techniques, information and countermeasures to reduce road casualties. With the help of Pilot Actions (PA), testing of best practice and methodologies become possible. PP3-KTI as a project partner is responsible for the third thematic area, namely ITS and speed-management. Accordingly, Pilot Actions have been carried out by KTI to examine and demonstrate the effects of two selected speed management devices:

- i. vehicle activated speed warning signs, and
- ii. fixed site speed cameras,

which work as speed reducing tools. The efficacy of the devices has been measured and estimated considering the evidence of the correlation between speed reduction, and reduction in crashes.

The potential effects of vehicle activated speed warning signs and fixed site speed cameras have been determined based on speed measurements at 7 different locations. Speed data have been analysed using mathematical-statistical methods. According to our results, both devices result in the reduction of average and v85 speed of the traffic. Based on this work, Implementation-Ready Road Layout Concept Plans for speed management have been elaborated for 2 locations.

The aim of this document is to present the databases created during the above mentioned work process.

1.1. Process of data collection

In the following chapter, the data collection processes and applied equipment are presented.

Measurements have been done in July and August of 2020, at weekdays, avoiding peak hours (to avoid distortion of potential congestions).

At each location (5 locations with vehicle activated speed warning signs, 2 locations with FamaLaser III speed camera):

- 9 hours of measurement have been carried out at 3 different weekdays with the speed signs operating / speed camera placed on the roadside;
- 9 hours of measurement have been carried out at 3 different weekdays when the speed signs didn't operate / speed camera was not placed on the roadside.

Vehicles approaching the devices were measured in one half of the measurement period, and vehicles leaving the devices was measured in the other.

We have cooperated with local municipalities and road operators, who arranged the shutdown of the vehicle activated speed warning signs for the duration of the measurements. The measurements were approved by the competent authorities.

For the measurements we used a digital Falcon Plus II intelligent microwave detector with an ARM¹ based computer (self-developed by KTI's subcontractor). The measurement principle of this detector is based on the Doppler effect. The detector unit is bouncing a microwave signal off to a desired target and analysing how the motion of the object has changed the frequency of the returned signal. Calculations of the Doppler effect accurately determine the velocity of the detected objects. Our unit has both a counting and tracking function. The equipment can also detect if the vehicle is arriving or leaving, therefore it is able to detect movement either uni- or bidirectional. During the measurement, the computer is recording the exact time and location of the measurement and the time vs. speed data continuously in microsecond intervals from the first moment the vehicle is within the range until it is detectable. Several speed samples are available for each vehicle, therefore speed vs. time or distance curves can be also generated. The radar unit is also equipped with a sophisticated communication module to provide the data remotely even during the measurement real time or afterwards.

The maximum range of the equipment is 50 meters, but can vary according to weather conditions, colour and size of the measured vehicle, etc. The equipment can detect vehicles almost up to its own location (line), therefore we considered the last measured point 1 meter away from the equipment.

Based on the above consideration and recorded time and speed data, the elaborated data processing software was able to calculate the distance of the vehicles from the measuring equipment in case of each fixed measurement time moment. For the analysis, the vehicle speeds were determined for every integer meter value by linear interpolation, starting from 1 meter away from the line of the measuring equipment. Note, that the measuring equipment was in line with the vehicle activated speed warning sign (they were mounted on the same column), or the speed camera.

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Due to the operating principle of the equipment, the following difficulties had to be overcome:

- It is not possible to set up the equipment to see only one traffic direction. However, the speeds in different directions are recorded with different signs (arriving vehicles: positive; leaving vehicles: negative). This made it possible to remove unnecessary data measured in the undesired direction.
- In case of different directions, or sufficient following distance between two vehicles in the same direction, the equipment recognizes automatically if it measures a new vehicle. However, it cannot distinguish between vehicles moving close to each other in the same direction. Thus, it records the data in case of an arriving group of vehicles continuously, without interruption. We dealt this phenomenon using the counted distance values: in case of a close group of cars in the same direction, the distances calculated starting from the line of the equipment become high due to the large amount of continuously recorded data. As the maximum range of the instrument is 50 meters, data points calculated for a greater distance have been deleted. With this approach (assuming that the difference

¹ ARM – a family of reduced instruction set computing (RISC) architectures for computer processors

in speed within the close group of vehicles is minimal), we kept the data of the last vehicle of the group for each group of vehicles.

During the procession of the measurement data, further data filtering has been performed as follows:

- Measurements were deleted if the equipment did not “see” the vehicle at a distance of at least 20 meters.
- Measurements were deleted if the equipment did not record at least 10 measurement points (time moments) of a vehicle.
- Measurements were deleted if the distance between two adjacent measurement points for the same vehicle was higher than 5 meters. (In these cases, the coherent data probably belong to two different vehicles).
- Measurements were deleted if the average speed of a vehicle was lower than 40 km/h where the speed limit was 60 km/h, or was lower than 30 km/h if the speed limit was 50 km/h. (These values arose probably from traffic issues and distort the analysis).
- Measurements were deleted if the standard deviation of speed values of a vehicle was higher than 10% of the speed limit. (For some data sets, there was an unrealistic standard deviation due to measurement error).

1.1.1. Speed measurements at vehicle activated speed / speed limit displays

For the evaluation of the effects of vehicle activated speed warning signs, we have carried out speed measurements at 5 different locations. The locations varied according to their characteristics (type of area, reason of being placed), and according to the type of the devices (showing the speed limit, or the speed of the vehicle, colour, etc):

- 9121 Győrszemere, road 83, 63+390 km section (47.5955862, 17.58716091)
- 1038 Budapest, Ezüsthegy street 34-42. (47.600180, 19.046550)
- 1097 Budapest, Határ road 30. (47.458197, 19.118598)
- 2162 Órbottyán, road 2104, 12+770 km section (47.690259, 19.257157)
- 2162 Órbottyán, road 2103, 7+980 km section (47.700312, 19.295032)

1.1.2. Speed measurements modelling fixed site speed cameras

For modelling the effects of fixed site speed cameras, we have used a FamaLaser III (VHT-507/DVRM-G) speed camera and carried out measurements at 2 different locations:

- 2330 Dunaharaszti, road 510, 16+850 km section (47.373785, 19.099045)
- 1116 Budapest, Hunyadi Mátyás street 57. (47.448422, 19.024794)

According to our assumptions, the used speed camera placed at a clearly visible place near the road is appropriate for modelling fixed cameras, which are also well known and visible for the drivers, especially for those who travel at the road section regularly. The main reason of this

surrogate was that it made it possible to make speed measurements at the selected road sections also without the device.

1.1.3. Potential effects of implemented Pilot Actions

Pilot Actions have been elaborated at two locations:

- 2700 Cegléd, road 40, 27+320 km section, both directions (47.182424, 19.889272)
- 2462 Martonvásár, road 7, 33+539 km section (towards the city centre) (47.305684, 18.780898)

The potential effects of Pilot Actions have been assessed by the iRAP Star Rating methodology. The Star Rating for Designs Tool has been used to evaluate the Star Rating Score (SRS) of the investigated road sections both before and after the implementation of the Pilot Actions. This tool is capable of taking into account not just the change in speed, but also other parameters affecting road safety (presence of safety barriers, roadside objects, condition of road surface, etc).

At the first Pilot Action (near Cegléd, road 40), the road section has been analysed at a length of 700 meters (road 40; between 27+710 - 27+010 km sections), in 100-meter sections. In case of the second Pilot Action (Martonvásár, road 7), a 500 meter long road section (road 7; between 33+330 - 33+830 km sections) was analysed in 100-meter sections.

2. Database on Pilot Action on TA3 in Hungary

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In the following chapters, databases collected by the above described methods are presented in details.

2.1.1. Databases of speed measurements at vehicle activated speed / speed limit displays

Databases of speed measurements at vehicle activated speed / speed limit displays have been uploaded to the following folders in Seafire:

- 04 RAD_PM/WP5 - Pilots/Act 5.3 Pilot Action TA3 ITS/D5.3.1 Concept Plans/HUNGARY/_Database on Pilot Actions in Hungary/Speed measurement_Győrszemere, road 83
- 04 RAD_PM/WP5 - Pilots/Act 5.3 Pilot Action TA3 ITS/D5.3.1 Concept Plans/HUNGARY/_Database on Pilot Actions in Hungary/Speed measurement_Budapest, Ezüsthely street 34-42
- 04 RAD_PM/WP5 - Pilots/Act 5.3 Pilot Action TA3 ITS/D5.3.1 Concept Plans/HUNGARY/_Database on Pilot Actions in Hungary/Speed measurement_Budapest, Határ road 30
- 04 RAD_PM/WP5 - Pilots/Act 5.3 Pilot Action TA3 ITS/D5.3.1 Concept Plans/HUNGARY/_Database on Pilot Actions in Hungary/Speed measurement_Órbottyán, road 2103

- 04 RAD_PM/WP5 - Pilots/Act 5.3 Pilot Action TA3 ITS/D5.3.1 Concept Plans/HUNGARY/_Database on Pilot Actions in Hungary/Speed measurement_Örbottyán, road 2104

Each folder contains two Excel sheets. In all cases, the Excel file which name starts with the word “BEKAPCSOLT” contains data of speed measurements with the operating status of the vehicle activated display.

Contrarily, the Excel file which name starts with the word “KIKAPCSOLT” contains data of speed measurements with the non-operating status of the vehicle activated display. The structure of both cases are the same as follows.

The first worksheet of the Excel files (“Összes közeledő +”) describes data of vehicles approaching the speed / speed limit display.

The second worksheet of the Excel files (“Összes távolodó -”) describes data of vehicles leaving the speed / speed limit display.

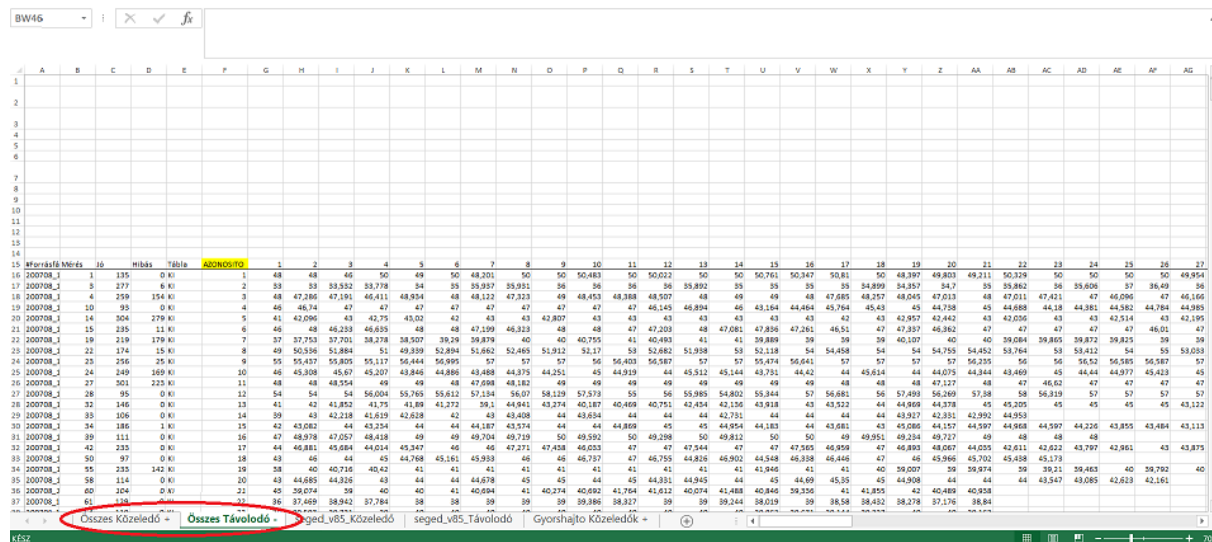


Figure 1 Relevant worksheets in the Excel files

Speed data of individual vehicles are described in the area starting from row 16, between columns A and BJ. Vehicles are separated by the rows of the Excel file (each row contains the data of a new measured vehicle).

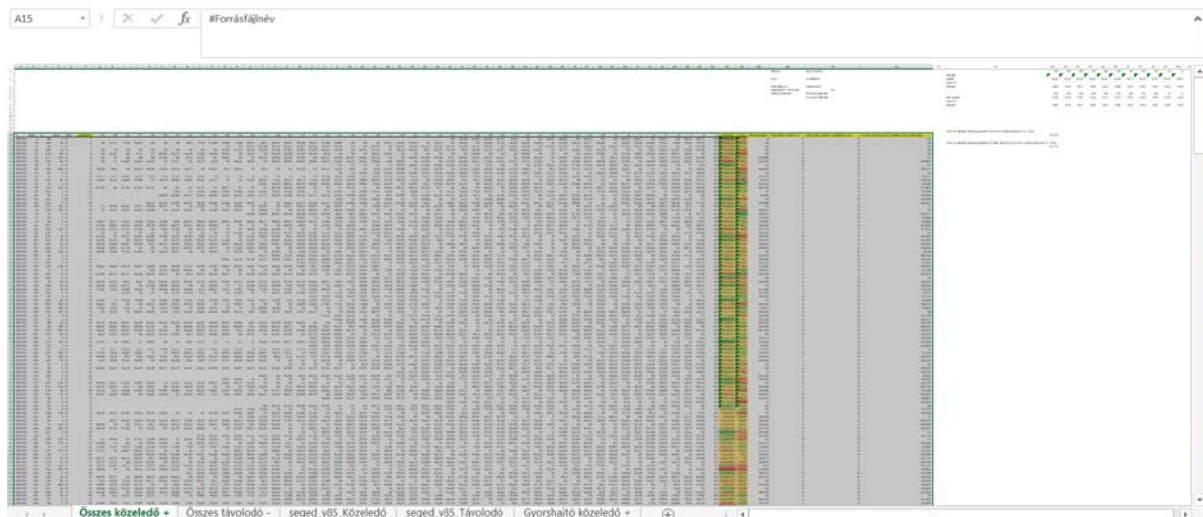


Figure 2 Perspective image of the area describing the speed data of individual vehicles

The worksheets contain the following information in a uniform manner, starting with row 16 (row 15 is the heading):

- Column A: Source file of the measurement
- Column B: Identifier of the measurement in the source file
- Column C: Number of good measurement instants
- Column D: Number of missed or inappropriate measurement instants
- Column E: Indication of the status of the vehicle activated display (BE means it was operating, KI means it was not operating)
- Column F: Identifier of the measurement in the examined Excel file

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	A	B	C	D	E	F	G
10							
11							
12							
13							
14							
15	#Forrástáj	Mérés	Jó	Hibás	Tábla	AZONOSÍTÓ	-50
16	200708_0	0	112	125	BE	1	49
17	200708_0	1	224	32	BE	2	42
18	200708_0	2	219	0	BE	3	
19	200708_0	3	264	102	BE	4	49,303
20	200708_0	4	133	0	BE	5	
21	200708_0	5	257	494	BE	6	40,122
22	200708_0	7	172	0	BE	7	
23	200708_0	8	71	0	BE	8	
24	200708_0	9	268	161	BE	9	45,879
25	200708_0	17	234	0	BE	10	
26	200708_0	19	173	1243	BE	11	44
27	200708_0	23	235	371	BE	12	36,785
28	200708_0	26	135	1	BE	13	
29	200708_0	27	134	0	BE	14	
30	200708_0	28	119	0	BE	15	
31	200708_0	29	164	1	BE	16	36,959
32	200708_0	30	333	123	BE	17	36,769

Figure 3 Example of data in columns A-F

- Columns G-BD: speed data of the vehicles in different distances from the vehicle activated display (for every integer meter, ranging from -50 to -1 meters in case of approaching vehicles, and from 1 to 50 meters in case of vehicles leaving the device)

D12	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE
10																															
11																															
12																															
13																															
14																															
15																															
16	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
17	53.592	53.529	53.067	54.464	52.53	52.213	52.551	52.89	53.229	53.568	53.907	54.442	53.392	54	54.169	54.291	54.567	54	53.672	53.103	54.733	53.915	53.598	53.281	53	53.524	54.725	53.827	53.566	50	
18	46	46	46	47	46	46	46.082	44.605	45.643	47	45	46	46	44.007	45.898	44.254	45	46	45	45.577	45	45	44	44.34	45	44.203	45.562	44.039	44.494	45	
19	51.962	51.024	51	51	52	52	51.463	51.202	51	51.53	51.766	52	52.1	51.052	50.039	48.651	48.539	51.929	51.279	51.715	51.875	51.258	49.592	50.583	51	50.895	50.514	51.072	50.036	48	
20	68.47	68.101	69.047	69.51	69	68	69	69	68.633	68	68.637	67.427	66.765	68.4	68	68.597	68	67.238	67.28	66.345	66.446	67	67	67	65	64.923	64.621	64.218	64.026	65	
21	53.784	55.744	55.285	56.274	56	56	57	55.842	55	55.058	55.619	55	55	56.684	55.769	57	56	55.664	55	55.818	56	55.218	56.407	56	55.94	55.168	52.794	56.543	56.507	53	
22	81	82.706	82.352	82.392	81.132	78.56	83.902	81.324	79.163	81.849	81.646	81.343	81.039	80.82	79.735	79.449	79.162	79	79	79	79	79	79	79	79	78.898	79.23	80	79	79.573	
23	48.361	48.011	49.944	49	49.593	49.791	49.979	49	49	47.673	50	49	49.52	49.6	49.556	49	49	50	49.566	50	48.933	49.859	50	50	49	49	49	49	49.22	51	
24	61	61	58.976	60.842	61	61.612	59.769	60.368	61.666	58.166	59.638	59.95	59.826	58.406	50.229	59.009	59.32	60.646	59.172	56.245	59	59.706	58.017	59	60.754	61	60.88	60.647	59	60	
25	67.232	68.993	68.378	70.481	68.705	69	69	67.056	67.392	69.975	67.821	67.252	69.216	67.106	69	67	70.995	66.952	66.059	68.598	67.941	67.806	65.038	66.713	68.758	67.682	66	66	66.758		
26	54.62	54.662	54.703	54.744	54.785	54.827	54.868	54.909	54.95	54.991	54.797	54.541	54.285	54.029	53.467	52.38	51.072	51.433	51.793	53.235	53.481	53	53.711	54.36	53.364	48.901	52.225	52.7	53.672		
27	66.237	66.684	67.131	67.578	68.08	69.491	71.641	71.596	70	72.497	69.896	70.911	70.592	68.763	71.799	70	69.079	69.147	70.964	69.202	62.968	69	65.072	66.07	68.896	67.815	68.712	67.808	66.904	66	
28	69.307	69.174	69.402	69.819	66.714	67.657	68.318	68	67.326	65.375	66.764	66.567	65.422	64.706	63	63	61.882	63	61.761	61	62.965	61.069	61.499	61.921	61.166	58.213	57.104	57.042	55.365	56	
29	70.317	71	71.138	69.06	71.911	72	72	69	70	70.103	70.398	69.047	68.497	70	69.852	69.471	68.407	70.844	70	69	69.13	68.065	69.307	68.447	68.511	69.444	68	69.981	68.494	67	
30																															
31	82	80.827	82.167	82	82	83	83	82.402	81.993	82	82	80	81.697	80.432	81	76.552	78.765	79.672	81	80	78.523	78.08	78.173	78.518	78	78.613	73.252	76.665	73.835	75	
32	66.051	64.736	63	62.457	63.44	62.445	63.62	62.617	63	63	63.624	63.165	63	63	62.584	63.542	61.877	62.014	62.028	60.239	62.282	62.528	58.236	59.641	63	61.471	62.377	59.603	59.984	62	
33	59.931	57.153	57.583	58	57	57.789	55.686	55.939	57	56.011	56.366	56.992	57	56.526	57.508	56.929	56.35	56.35	56	56	56.698	56.032	56	56	54.557	55.326	53.418	54	55.289		
34	62.718	67.909	67.724	67.443	67.162	66.881	66.6	66.318	66.037	66	66	66	67	65.211	65.223	65.454	65.884	65.915	66	66	66	65.14	65.589	66	66.76	65.959	64.944	65	65		
35	55	55	55	55	54.118	51.333	54.45	55.534	54.078	55.226	57.522	55.078	55.701	52.402	54.058	55.513	56.968	55.257	55.486	54.775	54.88	55.82	54.822	53	55.205	55.782	56.86	54.117	54.556		
36	57.465	57.965	58.96	59	59	59	59	59.171	59.44	59.709	59.879	58	55	56.709	56.394	57.821	58.38	57.973	59	58.32	58	59.868	57.398	56.451	57.744	58.562	57.432	58.423	54		
37	57.3	57.529	57.758	57.987	56.212	55.074	57.68	57.112	57.427	56	58.853	55.769	57.121	59	58.112	58.596	56.238	56.148	58	58	60.899	57.09	58.821	59.376	59.49	58.879	57.668	57.057	57		
38	80.336	78.25	79.21	81.365	81.471	76.155	80.889	81	77.899	77.327	79.054	79.091	78.404	78.849	78.964	79.719	80	80	78.008	75.078	79.375	80.315	80.198	77.089	78.328	77.177	74.08	74.707	73.553		
39	59	59	59	59.873	59.822	60.271	60.72	61.184	61.673	61.553	60.2	59.918	60.511	60	60	60	60	60	60	60	60	58.855	59.405	59.123	59	59.879	59.787	58.775	59	58	
40	68.434	70.682	70.75	71	70.291	69.245	70.043	71.098	71.665	72	72.563	70.852	71	72	71	69.897	70.615	69.856	70.034	69.646	71.843	71.632	70.145	71	68.119	71.733	70.636	71.637	69.14		
41	69	69	68.123	67.168	67.53	67.144	67.27	67.105	67.878	67.767	67.638	65	68	65	67.927	67	66	66.584	65.121	67	66.611	68.305	67	66.661	65.32	66.41	64.204	66.315	65.051		
42	54.458	55	54.437	54	52.710	52.553	53.05	50.952	52.708	55	54.41	53	53.155	53.865	54.296	53.574	52.879	51.352	51.249	53	54	54	52.543	53	52.521	52.085	53.445	52.237	53.803		
43	40.784	40	41	40.168	40	37.902	39.777	41.491	42	41	41.647	42.809	43	42	43	43	42.087	42.995	43	43	43.375	43.761	45	44	45.328	45.052	45.615	46.177	46.74		
44	71.51	69.818	68.1	68.22	68.34	68.46	68.58	68.7	68.819	68.939	70.35	68.545	66.316	68.13	69.411	68.003	65.995	65.58	66.698	67.816	67.953	67.056	69.894	69.694	67.775	66.248	67.483	68	68		
45	52	50.156	50.2	51.872	51.798	51	51	50.297	50.144	49.4	50.862	50.15	51.468	50	49.996	50.142	50.119	49.735	48.918	49.09	48.307	49.401	49.011	47.555	46.452	46.087	46.506	40.318	46		
46	58	57	57.289	57	56.789	58	57.292	56.93	58	58	57.404	56.16	57	57.124	57	57.195	57	57	57	57	57	57	57	57	57	57.739	56.886	57.935	56.054	57.941	

Figure 4 Example of data in columns G-BD

- Column BE: standard deviation of the speed data of the vehicle
- Column BF: average speed of the vehicle
- Column BG: speed of the vehicle 30 meter away from the display
- Column BH: Indicates if the vehicle decreased speed in case of approaching vehicles, or the vehicle increased speed in case of leaving vehicles, comparing the first and last measurement points of the given vehicle (1- yes, 0 – no)
- Column BI: Indicates if the vehicle decreased speed in case of approaching vehicles, or the vehicle increased speed in case of leaving vehicles, by at least 10% of the speed limit, comparing the first and last measurement points of the given vehicle (1- yes, 0 – no)
- Column BJ: speed of the vehicle at the first measured point of the given vehicle in case of approaching vehicles, and the last measured point in case of leaving vehicles

C	BD	BE	BF	BG	BH	BI	BJ	BK
-2	-1	V_SZÓRÁSA	V_AVG	Sebesség segr	Sebességet csökkent-e?	Sebességet csökkent-e legalább 6-al?	Az első mérési ponton mekkora volt a sebessége	
57	52	3,45863222	60,8554	62,326	1	1	70,882	
366	50	1,06096021	53,8227	53,592	1	0	55,955	
494	45	1,57721173	44,8358	46	0	0	42,523	
036	49	0,9281962	51,1508	51,962	1	0	50,15	
016	65	1,70877434	68,1583	68,47	1	0	70,413	
507	53	0,99539724	55,3611	53,784	1	0	55,054	
573	80	1,60895853	80,5986	81	0	0	79,62	
922	52	1,02519557	49,4089	48,361	0	0	50	
59	60	1,31004471	60,4343	61	1	0	61,288	
758	66	1,40578225	67,7012	67,232	1	0	66,535	
672	53	1,21804995	53,8192	54,62	1	0	54,002	
904	66	2,25049717	68,608	66,237	1	0	69,882	
365	56	4,94669655	65,9128	69,307	1	1	69,257	
494	67	1,42000831	70,0964	70,317	1	0	71,646	
739	63	1,34851335	66,7125	0	1	0	68,01	
833	75	2,62896011	80,518	82	1	1	84	
394	62	1,71040649	63,1099	66,051	1	0	66,678	
289	55	2,68666947	58,2374	59,931	1	1	62,849	
65	65	1,04379687	66,0046	62,728	1	0	67,562	
044	56	1,41145888	54,537	55	0	0	54,731	
423	54	1,22578792	58,2454	57,465	1	0	56,804	
57	57	1,4390715	57,2963	57,3	0	0	54,605	
353	76	2,57031686	76,9784	80,536	0	0	75,729	
59	58	0,99699047	59,3894	59	1	0	59,644	
914	71	1,65226814	70,0573	68,434	0	0	69,286	
051	63	1,48321445	67,3543	69	1	1	70,749	
803	52	1,42168944	53,8637	54,458	1	0	52,009	
674	45	2,9191822	43,855	40,784	0	0	42,136	
68	68	1,53597357	68,6294	71,51	1	0	70,278	
238	46	2,42118277	49,9701	52	1	1	53,036	

Figure 5 Example of data in columns BE-BJ

Further uniform data in the worksheets:

- Column BI, row 1: Name of the measurement location
- Column BI, row 2: Measurement direction ("Közeledők" means approaching vehicles, "Távolodók" means leaving vehicles)
- Column BI, row 3: Operating status of the vehicle activated display ("Bekapcsolva" means operating state, "Kikapcsolva" means non-operating state)
- Column BI, row 4: Speed limit at the measurement location

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	BG	BH	BI	
1		Helyszín	Győrszemere	
2		Irány	Közeledők	
3		Tábla állapota	Bekapcsolva	
4		Megengedett sebesség	60	
5		TÖRÖLT ADATOK	40 km/h alattiak	

Figure 6 Example of data in column BI between rows 1 and 4

The further data on these worksheets, and the data on other worksheets not described above are auxiliary data used for calculations by the analysts.

2.1.2. Databases of speed measurements modelling fixed site speed cameras

Databases of speed measurements at fixed site speed cameras (modelled by the FamaLaser III speed camera) have been uploaded to the following folders in Seafire:

- 04 RAD_PM/WP5 - Pilots/Act 5.3 Pilot Action TA3 ITS/D5.3.1 Concept Plans/HUNGARY/_Database on Pilot Actions in Hungary/Speed measurement_Budapest, Hunyadi Mátyás street 57
- 04 RAD_PM/WP5 - Pilots/Act 5.3 Pilot Action TA3 ITS/D5.3.1 Concept Plans/HUNGARY/_Database on Pilot Actions in Hungary/Speed measurement_Dunaharaszti, road 510

Each folder contains two Excel sheets. In all cases, the Excel file which name starts with the word “BEKAPCSOLT” contains data of speed measurements with the speed camera placed near the road.

Contrarily, the Excel file which name starts with the word “KIKAPCSOLT” contains data of speed measurements without the presence of speed camera near the road.

The first worksheet of the Excel files (“Összes közeledő +”) describes data of vehicles approaching the speed camera.

The second worksheet of the Excel files (“Összes távolodó -”) describes data of vehicles leaving the speed camera.

The structure of the Excel files are exactly the same as described in the previous chapter.

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2.1.3. Databases on the potential effects of implemented Pilot Actions

Databases on the potential effects of implemented Pilot Actions can be found at the following place in Seafire:

- 04 RAD_PM/WP5 - Pilots/Act 5.3 Pilot Action TA3 ITS/D5.3.1 Concept Plans/HUNGARY/_Database on Pilot Actions in Hungary/Data of Pilot Action1_road 40.xlsx
- 04 RAD_PM/WP5 - Pilots/Act 5.3 Pilot Action TA3 ITS/D5.3.1 Concept Plans/HUNGARY/_Database on Pilot Actions in Hungary/ Data of Pilot Action2_road 7.xlsx

These Excel files contain several worksheets.

26	Run-off LOC driver-side	0%		0%		0%		2016.07.17 6:25	1	0	0	1	leav with
27	Run-off LOC passenger-side	66,60%		0%				2016.12.09 11:12	1	0	1	0	leav with
28	Head-on LOC	33,40%		0%				2017.10.23 16:50	1	0	0	1	leav with
29	Head-on overtaking	0%		0%				2017.11.15 7:20	2	1	0	0	hea
30	Intersection	0%		0%		0%		2018.05.27 17:50	1	0	0	2	leav with
PA1 - road 40 27+710 - 27+610 27+610 - 27+510 27+510 - 27+410 27+410 - 27+310 27+310 - 27+210 27+210 - 27+110													

Figure 7 Several worksheets contained by the Excel files on the potential effects of Pilot Actions

The first worksheet in the files (“PA1 – road 40” and “PA2 – road 7”) describes the following basic data of the Pilot Actions (label of the data are in column A):

- Location
- GPS
- Type of area
- Affected section
- Current speed limit
- Proposed speed limit
- AADT (vehicle unit/day)
- Operating speed (mean)- before the implementation of the pilot (km/h)
- Operating speed (v85) - before the implementation of the pilot (km/h)
- Expected operating speed (mean)- after the implementation of the pilot (km/h)
- Expected operating speed (v85) - after the implementation of the pilot (km/h)
- Motorcycle percentage
- Pedestrian peak-hour flows (along passenger and driver side of the road and across the road)
- Bicycle peak-hour flow (along the road)

The further worksheets contain the coded attributes for the iRAP Star Rating process, for each 100-meter-long road section. The name of the worksheet identifies the investigated 1000 meter long section. In the worksheets, labels are indicated in column A, Column B and C contain the values of the parameters (Column B – before the implementation, Column C – after the implementation of the Pilot).

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The coded attributes were:

- Roadside severity - driver-side distance
- Roadside severity - driver-side object
- Roadside severity - passenger-side distance
- Roadside severity - passenger-side object
- Shoulder rumble strips
- Paved shoulder - driver-side
- Paved shoulder - passenger-side
- Carriageway label
- Upgrade cost
- Median type
- Centreline rumble strips
- Number of lanes
- Lane width
- Curvature
- Quality of curve
- Grade
- Road condition
- Skid resistance / grip
- Delineation

- Street lighting
- Vehicle parking
- Service road
- Roadworks
- Sight distance
- Intersection type
- Intersection channelization
- Intersecting road volume
- Intersection quality
- Property access points
- Vehicle flow (AADT)
- Motorcyclist %
- Pedestrian peak hour flow across the road
- Pedestrian peak hour flow along the road driver-side
- Pedestrian peak hour flow along the road passenger-side
- Bicyclist peak hour flow
- Land use - driver-side
- Land use - passenger-side
- Area type
- Pedestrian crossing facilities - inspected road
- Pedestrian crossing quality
- Pedestrian crossing facilities - intersecting road
- Pedestrian fencing
- Sidewalk - driver-side
- Sidewalk - passenger-side
- Facilities for motorised two wheelers
- Facilities for bicycles
- School zone warning
- School zone crossing supervisor
- Speed limit
- Differential speed limits
- Speed management / traffic calming
- Operating Speed (85th percentile)
- Operating Speed (mean)

A12			MIDBLOCK ATTRIBUTES
	A	B	C
1	Road	Section	Chainage
2	Road 40		1 0+200 – 0+300
3	Attribute Group	Before	After
4	ROADSIDE ATTRIBUTES		
5	Roadside severity - driver-side distance	1 to 5m	1 to 5m
6	Roadside severity - driver-side object	Downwards slope	Downwards slope
7	Roadside severity - passenger-side distance	1 to 5m	1 to 5m
8	Roadside severity - passenger-side object	Downwards slope	Downwards slope
9	Shoulder rumble strips	Not present	Not present
10	Paved shoulder - driver-side	None	Medium ($\geq 1\text{m}$ to $< 2.4\text{m}$)
11	Paved shoulder - passenger-side	None	Medium ($\geq 1\text{m}$ to $< 2.4\text{m}$)
12	MIDBLOCK ATTRIBUTES		
13	Carriageway label	Undivided road	Undivided road
14	Upgrade cost	Low	Low
15	Median type	Centre line	Centre line
16	Centreline rumble strips	Not present	Not present
17	Number of lanes	One	One
18	Lane width	Wide ($\geq 3.25\text{m}$)	Wide ($\geq 3.25\text{m}$)
19	Curvature	Straight or gently curving	Straight or gently curving
20	Quality of curve	Not applicable	Not applicable
21	Grade	0% to 7.5%	0% to 7.5%
22	Road condition	Medium	Good
23	Skid resistance / grip	Sealed - medium	Sealed - adequate
24	Delineation	Adequate	Adequate
25	Street lighting	Not present	Not present
26	Vehicle parking	None	None
27	Service road	Not present	Not present
28	Roadworks	No road works	No road works
29	Sight distance	Adequate	Adequate

Figure 8 Example of the coded attributes for the iRAP Star Rating process