Evaluation of questions for the practical part

											Answer option	Answer	20 participants
ID / Scenario	Is it needed?	Question	Answer 1	Count	Answer 2	Count	Answer 3	Count	Answer 4	Count	Note	Free-text note	Summary
GEC_01: BEFORE HILL	Yes	Would a moving live video be better, or live static videos from one or more perspectives?	Live static video, one perspective	6	Live static video, multiple perspectives	5	Moving live video (scan surroundings / follow vehicle)	1	Combination of live static videos and moving live video	4	Why?	o Scouting + insight into possible collisions o Orbit + static video o Third-person (racing game) o To avoid damage to the vehicle	Before the obstacle, an additional live image from a drone can be useful. The focus is on static videos at a distance of 1–4 meters. Two-thirds say there are multiple positions that are helpful. The selected static videos were sufficient to continue driving. Additional info was mostly not needed; in a few cases, a scan of the surroundings was requested.
		What is the optimal distance to the vehicle?	< 1 m		1 - 2 m	5	2 - 4 m	10	> 4 m	1			
	16	Are there multiple camera positions that are helpful in this situation?	Yes	11			No	5			Focus on?	o Possible contact points change during the drive o Front bumper for approach angle o Tow hitch because it may dip at the rear o Ground clearance to avoid bottoming out o All-round view	
	No	Does the required camera position change over the course of the situation?	Yes	8			No	8			Why?	o Hill can be viewed from multiple angles o A side perspective is sufficient o Ein All-round view reicht aus	
		Is the extra live video sufficient to continue driving?	Yes	16			No				Why?		
	4	Would additional information be necessary?	Yes	4			No	12			Which?	o Side slope (during scouting) o Scan of surroundings, approach angle o As much information as possible o Display distances to narrow spots with scale or color-coding of terrain by risk/difficulty	
ID / Scenario	Is it needed?	Question	Answer 1	Count	Answer 2	Count	Answer 3	Count	Answer 4	Count	Note	Free-text note	Summary
GEC_02: HILL UP	Yes	Would a moving live video be better, or live static videos from one or more perspectives?	Live static video, one perspective		Live static video, multiple perspectives	7	Moving live video (scan surroundings / follow vehicle)	2	Combination of live static videos and moving live video	8	Why?	o Auskundschaften, ob man weiterfahren kann (Wie geht der Weg weiter?) o Standvideo und Fahrzeug verfolgen hilft o Rundflug	Most participants preferred multiple perspectives from static videos or a combination of moving and static videos at a distance of 1–4 meters. There were mostly multiple options for camera perspectives. Changing camera positions was used as often as it was not. The available live image was always sufficient to continue driving. In most cases no additional info was requested; when it was, it related to the surroundings.
		What is the optimal distance to the vehicle?	< 1 m	1	1 - 2 m	7	2 - 4 m	9	> 4 m				
	17	Are there multiple camera positions that are helpful in this situation?	Yes	14			No	3			Focus on?	o Possible contact points change during the drive (zuerst Kontakt vorne, dann hinten und dann Unterboden) o Stoßfänger vorne o Anhängervorrichtung o Ground clearance to avoid bottoming out o Details directly in front of the vehicle	
	No	Does the required camera position change over the course of the situation?	Yes	10			No	7			Why?	o Possible contact points change during the drive (zuerst Kontakt vorne, dann hinten und dann Unterboden) o Knowledge of the vehicle and assessment of the terrain are sufficient	
		Is the extra live video sufficient to continue driving?	Yes	17			No				Why?		
	3	Would additional information be necessary?	Yes	4			No	13			Which?	o Side slope (during scouting) o So viel Info wie möglich o Display distances to narrow spots with scale or color-coding of terrain by risk/difficulty	
ID / Scenario	Is it needed?	Question	Answer 1	Count	Answer 2	Count	Answer 3	Count	Answer 4	Count	Note	Free-text note	Summary
GEC_03: HILL DOWN	Yes	Would a moving live video be better, or live static videos from one or more perspectives?	Live static video, one perspective	6	Live static video, multiple perspectives	3	Moving live video (scan surroundings / follow vehicle)		Combination of live static videos and moving live video	5	Why?	o Scouting + insight into possible collisions o Rundflug	Der Großteil der Probanden wünschten sich einzelne Perspektiven aus Standvideos bzw. einer Kombination aus Bewegte Videos und Standvideos aus einer Entfernung von 1-4 Meter. Größtenteils gab es mehrere Möglichkeiten für Kameraperspektiven. Die Kamerapositionsänderung würde verstärkt für nicht nötig erachtet. Das zur Verfügung gestellte Livebild hat immer für eine continuation of driving ausgereicht. Es waren in den meisten Fällen keine zusätzlichen Infos gefordert. Wenn aber doch dann mehr bezogen auf die Umgebung.
		What is the optimal distance to the vehicle?	< 1 m	1	1 - 2 m	6	2 - 4 m	7	> 4 m				
	14	Are there multiple camera positions that are helpful in this situation?	Yes	9			No	5			Focus on?	o I can reverse down the same path I came up. o No choice due to limited line options o Tow hitch at the rear o Knowledge of the vehicle and assessment of the terrain are sufficient o Fokus auf Details	
	No	Does the required camera position change over the course of the situation?	Yes	6			No	8			Why?	o Focus shifts from ground clearance to tow hitch to front bumper + terrain behind the vehicle o Going down along the same line is easy	
		Is the extra live video sufficient for reversing?	Yes	14			No				Why?		
	6	Would additional information be necessary?	Yes	3			No	11			Which?	o So viel Info wie möglich o Display distances to narrow spots with scale or color-coding of terrain by risk/difficulty	
ID / Scenario	Is it needed?	Question	Answer 1	Count	Answer 2	Count	Answer 3	Count	Answer 4	Count	Note	Free-text note	Summary
GEC_04: ENGSTELLE VOR GROBER UNTERGRUND	Yes	Would a moving live video be better, or live static videos from one or more perspectives?	Live static video, one perspective		Live static video, multiple perspectives		Moving live video (scan surroundings / follow vehicle)	9	Combination of live static videos and moving live video	7	Why?	o Scouting + insight into possible collisions o Rundflug + Fahrzeug verfolgen o Bild ist nur eine nice to have Ergänzung für Abhang oder Bodenfreiheit	Der Großteil der Probanden wünschten sich mehrere Perspektiven aus Standvideos bzw. einer Kombination aus Bewegte Videos und Standvideos aus einer Entfernung von 1-4 Meter und teils darüber. Größtenteils gab es mehrere Möglichkeiten für Kameraperspektiven. Die Kamerapositionsänderung würde verstärkt für nötig erachtet. Das zur Verfügung gestellte Livebild hat immer für eine continuation of driving ausgereicht. Es wurden keine zusätzlichen Infos gefordert.
		What is the optimal distance to the vehicle?	< 1 m		1 - 2 m	2	2 - 4 m	12	> 4 m	2			
	16	Are there multiple camera positions that are helpful in this situation?	Yes	16			No				Focus on?	o Focus on large rocks / drop-off o Front wheels + immediate surroundings o Bodenfreiheit o Switching sides left/right	
	No	Does the required camera position change over the course of the situation?	Yes	12			No	4			Why?	o Changes in distance to the vehicle o An overview is sufficient o Wechsel der Perspektive links/rechts	
		Does the extra view influence line choice? If so, how?	Yes	14			No	2			How?	o Avoiding sharp rocks / obstacles o Keep the drop-off in view o Overview of possible lines	
		Is the extra live video sufficient to continue driving?	Yes	16			No				Why?		
	4	Would additional information be necessary?	Yes	1			No	15			Which?	o Display distances to narrow spots with scale or color-coding of terrain by risk/difficulty	
ID / Scenario	Is it needed?	Question	Answer 1	Count	Answer 2	Count	Answer 3	Count	Answer 4	Count	Note	Free-text note	Summary
GEC_05: ENGSTELLE ZURUECK GROBER UNTERGRUND	Yes	Would a moving live video be better, or live static videos from one or more perspectives?	Live static video, one perspective		Live static video, multiple perspectives	1	Moving live video (scan surroundings / follow vehicle)	8	Combination of live static videos and moving live video	7	Why?	o Nach hinten gespiegelte Bilder(analog zu TEST 04) o Rundflug + Fahrzeug verfolgen o Standvideo + Fahrzeug verfolgen	Der Großteil der Probanden wünschten sich mehrere Perspektiven aus Standvideos bzw. einer Kombination aus Bewegte Videos und Standvideos aus einer Entfernung von 2-4 Meter. Größtenteils gab es mehrere Möglichkeiten für Kameraperspektiven. Die Kamerapositionsänderung würde verstärkt für nötig erachtet. Das zur Verfügung gestellte Livebild hat immer für eine continuation of driving ausgereicht. Es wurden keine zusätzlichen Infos gefordert.
		What is the optimal distance to the vehicle?	< 1 m	1	1 - 2 m	1	2 - 4 m	13	> 4 m	1			
	16	Are there multiple camera positions that are helpful in this situation?	Yes	15			No	1			Focus on?	o Focus on large rocks / drop-off o Rear wheels + immediate surroundings o Bodenfreiheit	
	No	Does the required camera position change over the course of the situation?	Yes	14			No	2			Why?	o Change of terrain o Changes in distance to the vehicle o Wechsel der Perspektive links/rechts	
		Does the extra view influence line choice? If so, how?	Yes	16			No				How?	o Ausweichen von spitzen Felsen/Hindernissen o Keep the drop-off in view	
		Is the extra live video sufficient for reversing?	Yes	14			No				Why?		
	4	Would additional information be necessary?	Yes	2			No	14			Which?	o Empfehlung zur Linienwahl (Spotter) o Display distances to narrow spots with scale or color-coding of terrain by risk/difficulty	

General statements on implementation / practice

1	Additional scouting would be helpful as a supplement
2	Additional information can be too much at first with a split screen alongside existing vehicle cameras (a lot of input while driving)
3	A lot of focus is placed on the new drone image and driving is partly or entirely based on the screen
4	Great added value for line choice when the drone follows the vehicle. It only partially replaces the spotter because the drone does not provide line recommendations.
5	During the test, the image on the drone remote was too small
6	Instructions and selection of situations leave room for unexpected solutions
7	The selected driving situations were not difficult enough for some drivers to require drone use, but drone perspectives were still chosen as 'nice to have'
8	Manche Fahrer möchte so viel Informationen wie möglich auch der Drohne bekommen, ohne diese genau zu benennen.
9	Possible confusion when the drone looks head-on at the front of the vehicle due to the mirrored live image. Some tend to steer incorrectly (rethink) — repeatedly! Because it is not looking in the direction of travel
10	Split screen frequently requested between vehicle cameras and drone live image + memory function for forward and reverse
11	Switching desired because otherwise too much information is present at the same time
12	The rougher the terrain (rougher than the tests), the more added value the drone live image has.
13	Entertainment factor +++
14	If the drone films the vehicle from behind, steering is more logical than with a front view. Feels more natural
15	Additional information and driving recommendations were requested from the drone videos, such as color coding (green = easy path, red = obstacle / difficult path) and a distance display to the next narrow spot/obstacle
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