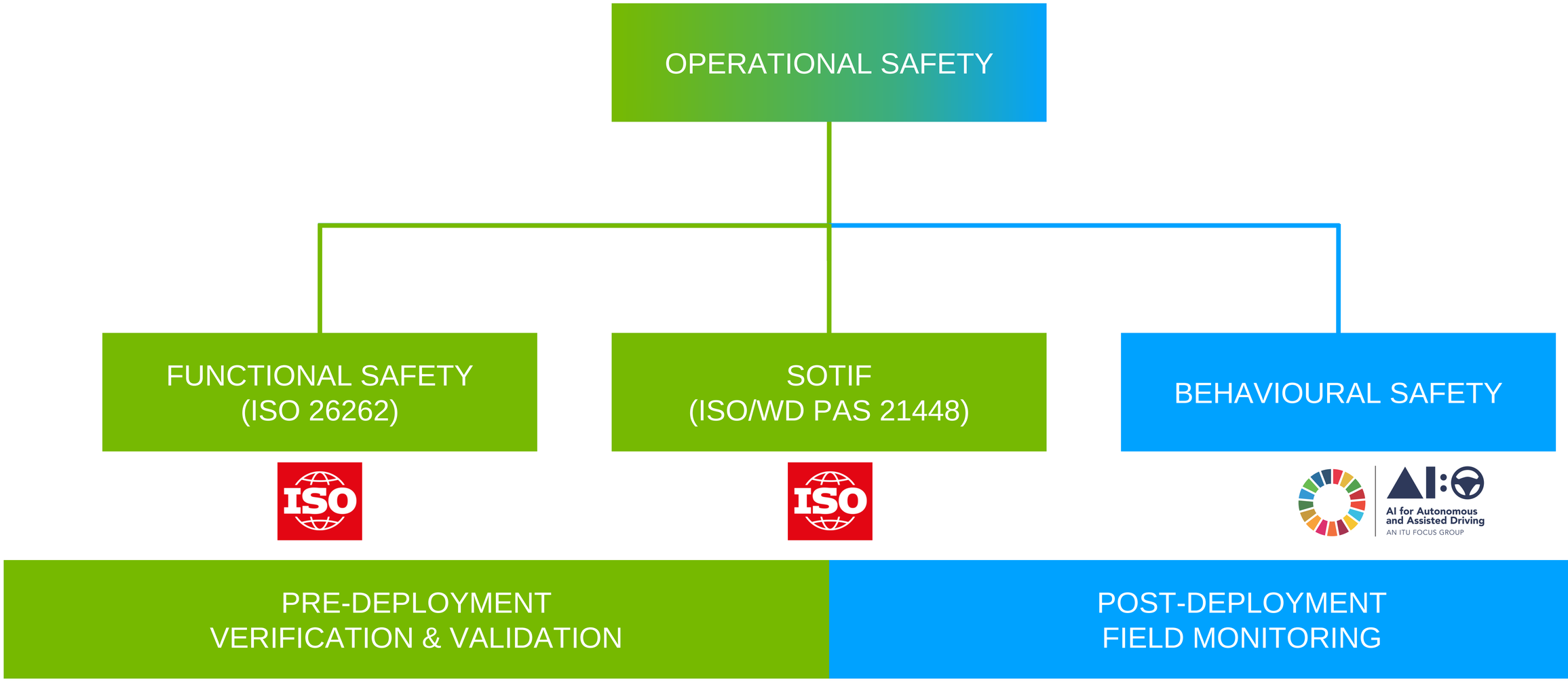
Update on FG-AI4AD activities

4th Meeting

2nd December 2020

Geneva, Switzerland

Operational Safety



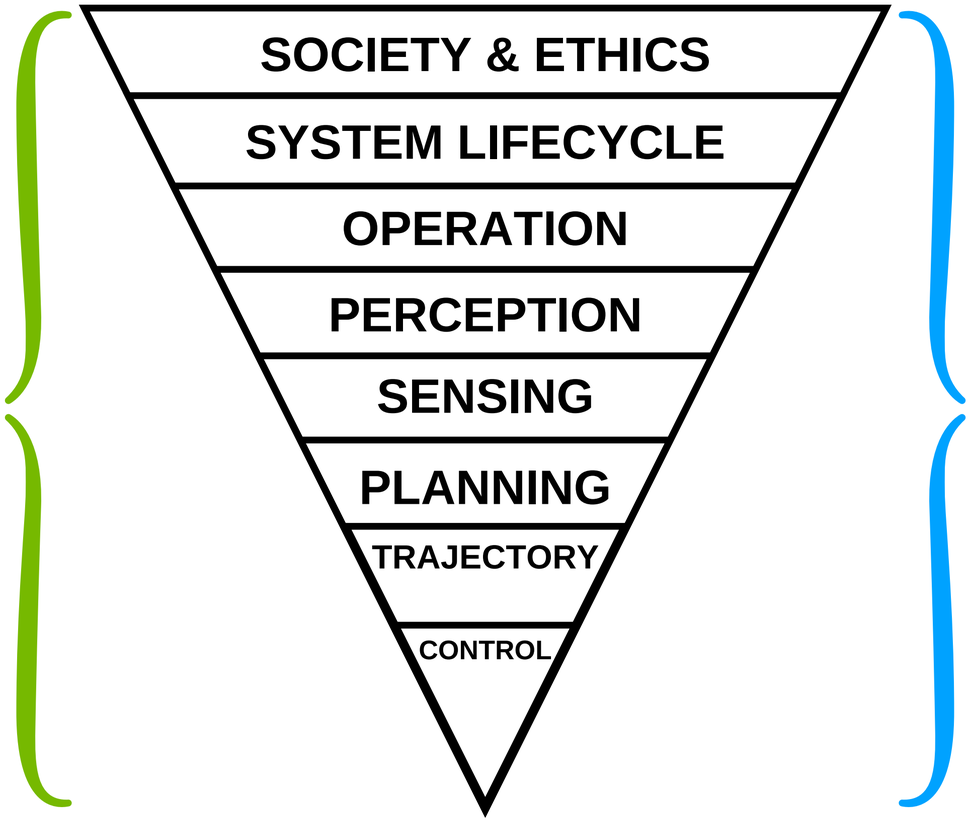
https://publications.tno.nl/publication/34626550/AyT8Zc/TNO-2018-streetwise.pdf

Global Regulatory Landscape

UNECE

UNECE WP29

Agreement concerning the Establishing of Global Technical Regulations for Wheeled Vehicles…



UNECE

UNECE WP1

Convention on Road Traffic

Road User & Driver Behaviour

PRE-DEPLOYMENT
VERIFICATION & VALIDATION

POST-DEPLOYMENT
FIELD MONITORING

EDGE CASE RESEARCH https://www.slideshare.net/PhilipKoopman1/the-big-picture-for-selfdriving-car-safety-standards

Safety Standard Landscape

AI for Autonomous and Assisted Driving
AN ITU FOCUS GROUP

UL 4600

SAFETY EVALUATION AUTONOMOUS PRODUCTS

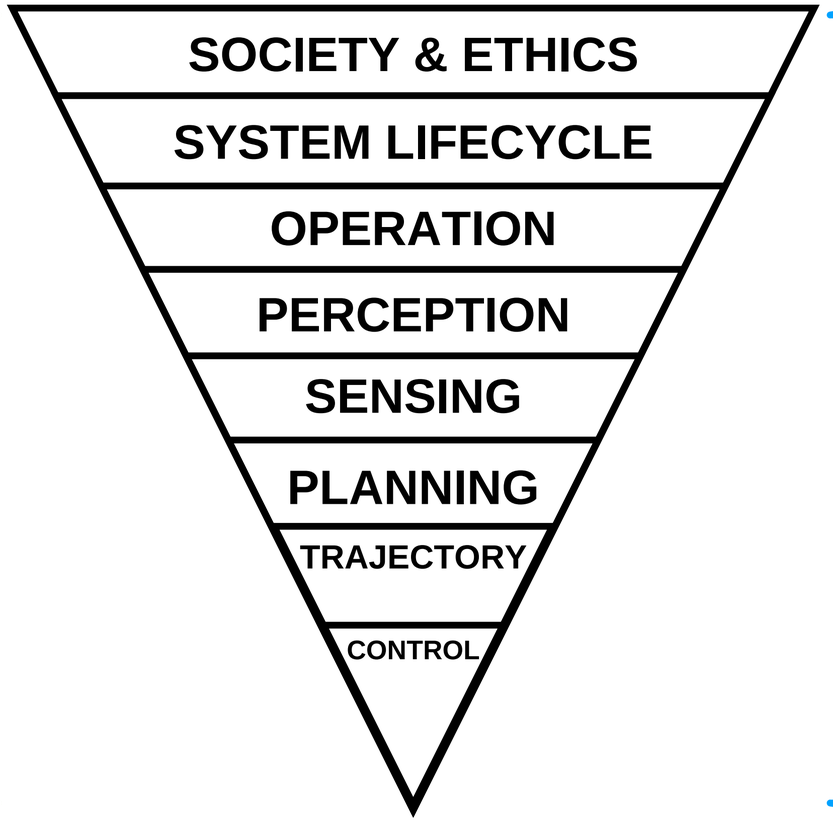
IEEE P700x

ISO 21448

(SOTIF)

ISO 26262

FUNCTIONAL SAFETY



SITUATIONAL AWARENESS

WORLD MODEL + RISK ASSESSMENT

VEHCILE DYNAMICS

FG-AI4AD

BEHAVIOURAL SAFETY EVALUATION

PRE-DEPLOYMENT VERIFICATION & VALIDATION

POST-DEPLOYMENT FIELD MONITORING

EDGE CASE RESEARCH

https://www.slideshare.net/PhilipKoopman1/the-big-picture-for-selfdriving-car-safety-standards

Field Monitoring - Leading Measures & Metrics

POST-DEPLOYMENT
FIELD MONITORING

LAGGING MEASURES

Observations of safety outcomes or harm

LEADING MEASURES

Reflect performance, activity, and prevention

Formula 1 Bahrain GP 2020

Romain Grosjean Collision - Safety Factors

- - The carbon fibre safety cell
- - The head & neck safety device (HANS)
- - 6 point safety harness
- - Fireproof clothing & helmet
- - Cast titanium 'halo' device covering the cockpit
- - Extraction training for all drivers
- - Rapid intervention by rescue crews

Race Control - Stewards

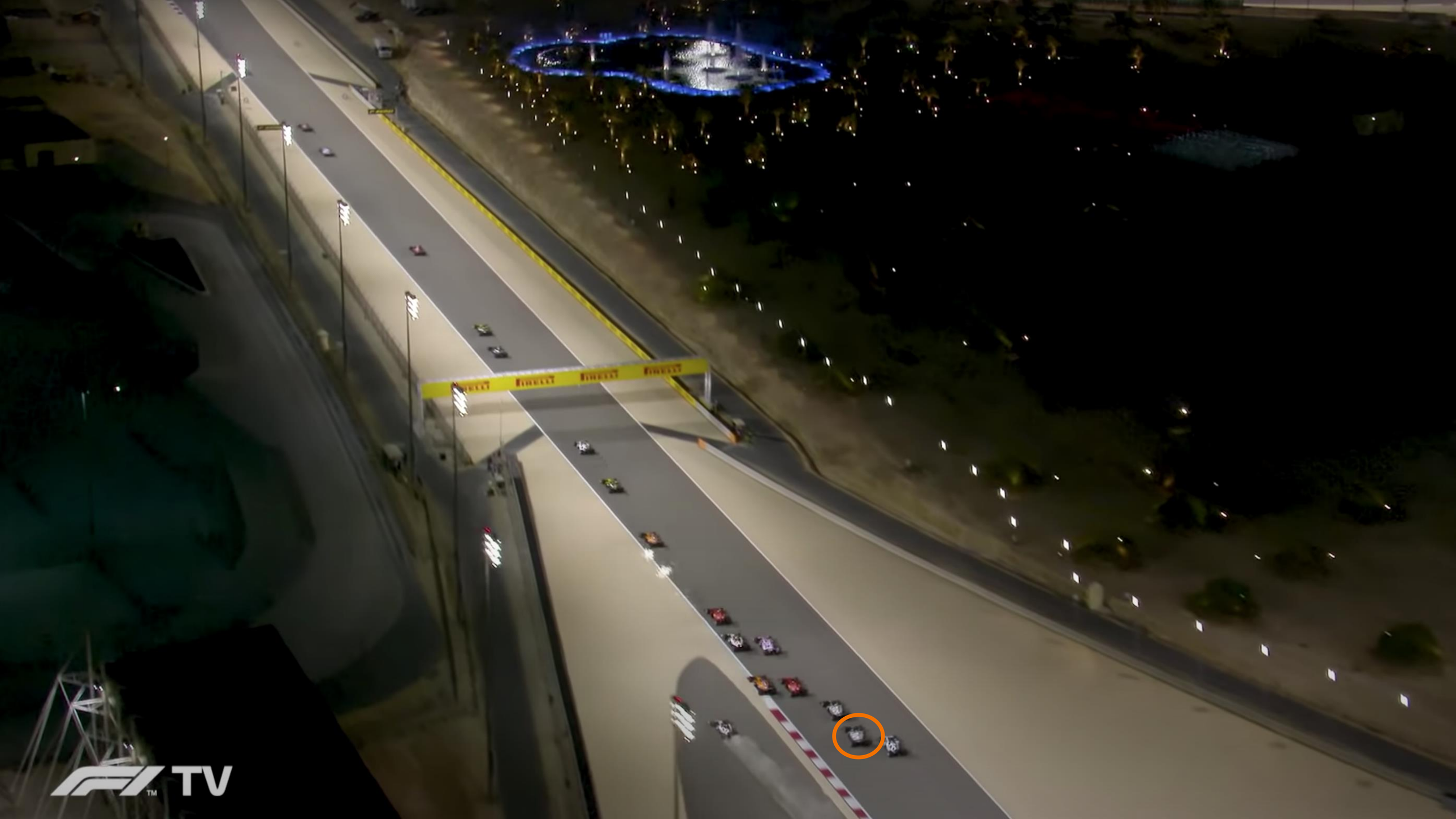
Formula 1 Bahrain GP 2020

Romain Grosjean Collision - Causal Factors

- Situational awareness
- Risk evaluation
- Risk mitigating action


SAINZ
VETTEL
JACK&JONES
F1 TV


F1 TV


F1 TV

The Molly Problem

Public Survey Results (preliminary)

Sample dates: 11-20th October 2020

The Molly Problem was created by the Autonomous Drivers Alliance (ADA) to provide insight on the public expectations for safety critical ethics, behaviour and explainability for AI software used for self-driving vehicles.

This survey was conducted in collaboration with the Technical University of Munich as part of the ITU Focus Group on AI for Autonomous and Assisted Driving (FG-AI4AD) and the AI for Good Global Summit Webinar Series.

For more details please follow the link below;

https://www.itu.int/en/ITU-T/focusgroups/ai4ad/Pages/MollyProblem.aspx

The Molly Problem: Background

These preliminary survey results are based upon responses obtained between 11-20th October 2020 from 296 respondents (70% male, 25% female);

Aged between 18 and 73 yrs (mean age of 41 yrs)

Living in rural, city, suburban but mainly urban environments

94% hold a drivers license

Three quarters of respondents were *excited* and *willing* to travel in an automated vehicle.

The Molly Problem: Survey Respondents

A young girl called Molly is crossing the road alone and is hit by unoccupied self-driving vehicle.

There are no eye-witnesses.

The Molly Problem for Self-Driving Vehicles

What should happen next?

Respondents have clear expectations for the capability and behaviour of the self-driving software in the case of a pedestrian collision event.

The Molly Problem: A young girl called Molly is crossing the road alone and is hit by unoccupied self-driving vehicle. There are no eye-witnesses.

97%

expect the software *to be aware* of the collision

2% unsure & 1% don't

The Molly Problem: A young girl called Molly is crossing the road alone and is hit by unoccupied self-driving vehicle. There are no eye-witnesses. What should happen next?

AI for Autonomous and Assisted Driving
AN ITU FOCUS GROUP

94%

expect the software *<u>to stop</u>* at the collision site

4% unsure & 2% don't

The Molly Problem: A young girl called Molly is crossing the road alone and is hit by unoccupied self-driving vehicle. There are no eye-witnesses. What should happen next?

AI for Autonomous and Assisted Driving
AN ITU FOCUS GROUP

97%

expect the software *to indicate a hazard* to other road users

2% unsure & 1% don't

The Molly Problem: A young girl called Molly is crossing the road alone and is hit by unoccupied self-driving vehicle. There are no eye-witnesses. What should happen next?

AI for Autonomous and Assisted Driving
AN ITU FOCUS GROUP

94%

expect the software *to alert emergency services*

5% unsure & 1% don't

The Molly Problem: A young girl called Molly is crossing the road alone and is hit by unoccupied self-driving vehicle. There are no eye-witnesses. What should happen next?

AI for Autonomous and Assisted Driving
AN ITU FOCUS GROUP

What should happen next?

In addition to post-collision behaviour respondents were asked about the information recall capabilities of the self-driving software.

The overwhelming majority had strong and clear expectations for the development of explainable AI for self-driving software.

The Molly Problem: A young girl called Molly is crossing the road alone and is hit by unoccupied self-driving vehicle. There are no eye-witnesses.

99%

expect the software to recall the *time* of the collision

1% don’t

The Molly Problem: A young girl called Molly is crossing the road alone and is hit by unoccupied self-driving vehicle. There are no eye-witnesses. What should happen next?

99%

expect the software to recall the *location* of the collision

1% don’t

The Molly Problem: A young girl called Molly is crossing the road alone and is hit by unoccupied self-driving vehicle. There are no eye-witnesses. What should happen next?

AI for Autonomous and Assisted Driving
AN ITU FOCUS GROUP

93%

expect the software to recall *when* the collision risk was identified

6% unsure 1% don't

The Molly Problem: A young girl called Molly is crossing the road alone and is hit by unoccupied self-driving vehicle. There are no eye-witnesses. What should happen next?

AI for Autonomous and Assisted Driving
AN ITU FOCUS GROUP

96%

expect the software to recall *if* Molly was detected

3% unsure 1% don’t

The Molly Problem: A young girl called Molly is crossing the road alone and is hit by unoccupied self-driving vehicle. There are no eye-witnesses. What should happen next?

96%

expect the software to recall *when* Molly was detected

2% unsure 2% don’t

The Molly Problem: A young girl called Molly is crossing the road alone and is hit by unoccupied self-driving vehicle. There are no eye-witnesses. What should happen next?

91%

expect the software to recall *if* Molly was detected as a *human*

6% unsure 3% don’t

The Molly Problem: A young girl called Molly is crossing the road alone and is hit by unoccupied self-driving vehicle. There are no eye-witnesses. What should happen next?

AI for Autonomous and Assisted Driving
AN ITU FOCUS GROUP

90%

expect the software to recall *when* Molly was detected as a *human*

7% unsure 3% don’t

The Molly Problem: A young girl called Molly is crossing the road alone and is hit by unoccupied self-driving vehicle. There are no eye-witnesses. What should happen next?

AI for Autonomous and Assisted Driving
AN ITU FOCUS GROUP

98%

expect the software to recall *whether* mitigating action was taken

1% unsure 1% don't

The Molly Problem: A young girl called Molly is crossing the road alone and is hit by unoccupied self-driving vehicle. There are no eye-witnesses. What should happen next?

AI for Autonomous and Assisted Driving
AN ITU FOCUS GROUP

97%

expect the software to recall *when* mitigating action was taken

2% unsure 1% don't

The Molly Problem: A young girl called Molly is crossing the road alone and is hit by unoccupied self-driving vehicle. There are no eye-witnesses. What should happen next?

AI for Autonomous and Assisted Driving
AN ITU FOCUS GROUP

96%

expect the software to recall *what* mitigating action was taken

3% unsure 1% don't

The Molly Problem: A young girl called Molly is crossing the road alone and is hit by unoccupied self-driving vehicle. There are no eye-witnesses. What should happen next?

AI for Autonomous and Assisted Driving
AN ITU FOCUS GROUP

What should happen next?

Having indicated the preference for information recall, respondents were then asked to consider two extension scenarios;

- Should recall capabilities be available for *near-miss events*?
- What should happen if *recall capability is unavailable*?

The Molly Problem: A young girl called Molly is crossing the road alone and is hit by unoccupied self-driving vehicle. There are no eye-witnesses.

88%

expect similar recall abilities for *near-miss events*

5% unsure 7% don’t

The Molly Problem: A young girl called Molly is crossing the road alone and is hit by unoccupied self-driving vehicle. There are no eye-witnesses. What should happen next?

73%

expect *driving* to be *prohibited* for software *without recall capability*

15% unsure 12% don’t

The Molly Problem: A young girl called Molly is crossing the road alone and is hit by unoccupied self-driving vehicle. There are no eye-witnesses. What should happen next?

The Molly Problem preliminary survey results set clear public expectations for *ethical post-collision behaviour* and support for the adoption of *explainable AI* approaches for self-driving software.

Ten key criteria for explainability were supported with the expectation of their *recall* capability in both *collision and near-miss* events.

These findings should be considered by self-driving *developers, insurers, standards bodies and regulators*. In December 2020 the ITU FG-AI4AD participants will decide whether to adopt the ten key criteria as requirements for data standardisation used in both recall and continual monitoring.

The Molly Problem: Preliminary Conclusion

THANK YOU. STAY SAFE. STAY HEALTHY.

Chair ITU FG-AI4AD Bryn Balcombe: bryn@ada.ngo

General mailing list: fgai4ad@lists.itu.int

Dedicated secretariat email: tsbfgai4ad@itu.int

Dedicated webpage: www.itu.int/en/ITU-T/focusgroups/ai4ad