

# AI and Safety Regulation and Standardization

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# AI and Safety

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# AI and Safety

## Definitions and expectations

- Alan Turing: AI is demonstrated if a machine's behavior is indistinguishable from human intelligence in conversation.
- OECD: a machine-based system that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments. Different AI systems vary in their levels of autonomy and adaptiveness after deployment.

Expectations to  
human intelligence

≠

Expectations to  
artificial intelligence

# AI and Safety

## Differences

AI Act	Machinery Regulation
<p>‘AI system’ means a <b>machine-based system</b> that is</p>	<p><b>Control systems</b> of machinery or related products</p>
<ul style="list-style-type: none"><li>designed to operate with <b>varying levels of autonomy</b> and</li></ul>	<ul style="list-style-type: none"><li>that are designed to operate with <b>varying levels of autonomy</b></li></ul>
<ul style="list-style-type: none"><li>that <b>may</b> exhibit <b>adaptiveness after deployment</b>, and that,</li></ul>	<ul style="list-style-type: none"><li><b>with</b> fully or partially <b>self-evolving behaviour</b> or logic</li></ul>
<ul style="list-style-type: none"><li>for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments;</li></ul>	<p>Recital (55) Provisions (...) should only apply to (...) <b>safety functions</b>. On the contrary, those provisions should not apply to software incapable of learning or evolving, and programmed only to execute certain automated functions of machinery or related products.</p>

# AI and Safety

## Key Characteristics

Adaptiveness

fully or partially self-evolving behaviour or logic



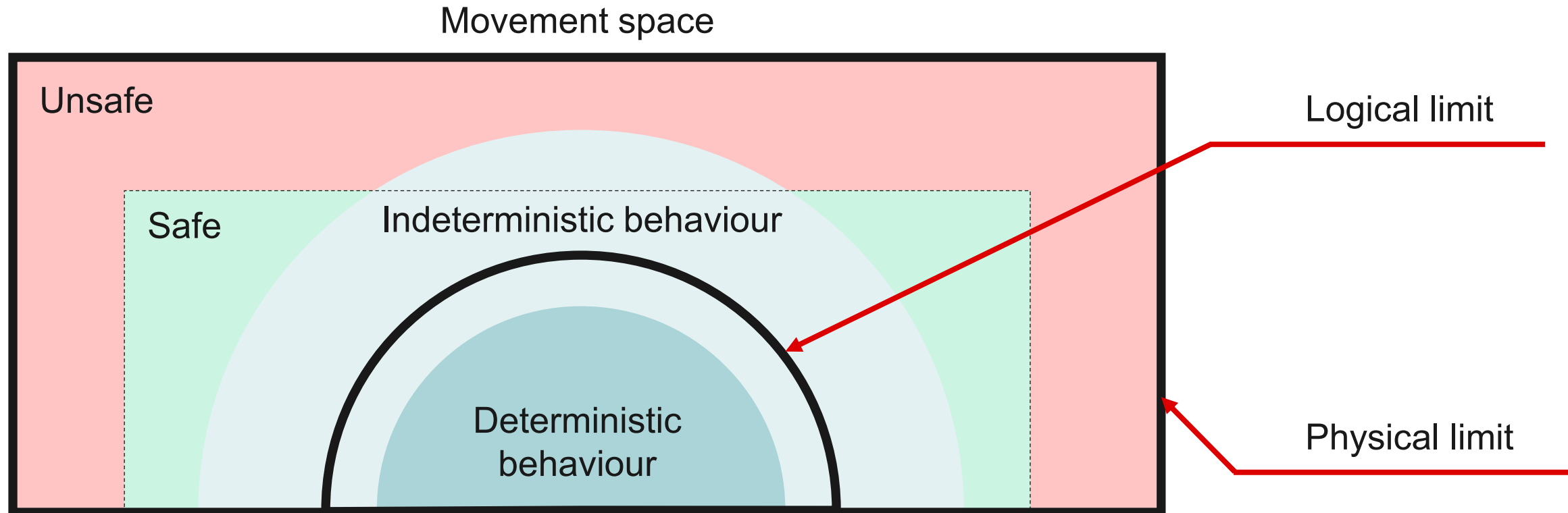
Uncertainty

Indeterministic

Untrustworthy

# AI and Safety

## Movement Space



# AI Act vs MR

## Desing Requirements

AI	MR
	shall be designed and constructed in such a way that:
	(a) they shall not cause the machinery or related product to perform actions beyond its defined task and movement space;
	(b) recording of data on the safety related decision-making process for software based safety systems ensuring safety function including safety components, after the machinery or related product has been placed on the market or put into service, is enabled and that such data is retained for one year after its collection, exclusively to demonstrate the conformity of the machinery or related product with this Annex further to a reasoned request from a competent national authority;
	(c) it shall be possible at all times to correct the machinery or related product in order to maintain its inherent safety.

Safety Components  
High-Risk AI Systems

# AI and Safety

## Sources of Uncertainty

Development Environment SW

generates →

Non-Safety-Related SW

Safety-Related SW

Development Environment SW

generates →

Non-Safety-Related SW

Safety-Related SW

AI

Development Environment SW

generates →

Non-Safety-Related SW

Safety-Related SW

AI

AI

Development Environment SW

generates →

Non-Safety-Related SW

Safety-Related SW

AI

AI

AI

# AI and Safety

## Standardization

- Standardization is key to managing complexity
- Key active committees
  - ISO/IEC JTC 1/SC 42 - Artificial intelligence
    - ISO/IEC JTC 1/SC 42/WG 1 Foundational standards
    - ISO/IEC JTC 1/SC 42/WG 2 Data
    - ISO/IEC JTC 1/SC 42/WG 3 Trustworthiness
    - ISO/IEC JTC 1/SC 42/WG 4 Use cases and applications
    - ISO/IEC JTC 1/SC 42/WG 5 Computational approaches
    - ISO/IEC JTC 1/SC 42/JWG 4 IEC TC65/SC65A: Functional safety and AI systems
  - CEN/CLC/JTC 21 - Artificial intelligence

# AI and Safety

## Standardization

- Relevant technical specifications being drafted
  - ISO/IEC CD TS 22440-1 Functional safety and AI systems — Part 1: Requirements
  - ISO/IEC CD TS 22440-2 Functional safety and AI systems — Part 2: Guidance
  - ISO/IEC CD TS 22440-3 Functional safety and AI systems — Part 3: Examples of application
- ISO/IEC AWI TS 25223 Guidance and requirements for uncertainty quantification in AI systems
- ISO/IEC AWI TS 25570 Reliability assessment of AI systems
- CEN/CLC prEN 18282 Cybersecurity specifications for AI systems

# AI and Safety

## Application to Lifts and Escalators

- Standardisation request M/605 (Machinery) and M/xxx (Lifts)
- Deadline for readiness of standard: 20 January 2034
- Work on these standards will likely be handled by CLC/TC44X and CEN/TC10