SCHEDULE 2 Regulation 2

Advanced robotics

Interpretation

1. In this Schedule—

"cognitive" means having the abilities of reasoning, perception, communication, learning, planning, problem solving, abstract thinking, decision making or organisation;

"core components" means—

(a) sensors enabling advanced robotics to track and sense its environment;

(b) end effectors or other devices attached to advanced robotics allowing it to interact with its task or perform its operation;

(c) locomotion, where the advanced robotics is capable of moving in its environment;

(d) an energy source, including passive sources such as solar energy, providing power delivery enabling advanced robotics to move independently and to carry out its functions;

(e) hardware or software enabling sophisticated computational capabilities, including the use of artificial intelligence to process data and data sets received from the sensors and adapt the behaviour of the advanced robotics;

(f) communications capability, including the ability to communicate with a human operator or other advanced robotics.

Activities – advanced robotics

2. A qualifying entity carrying out any of the following activities—

(a) developing advanced robotics;

(b) producing advanced robotics;

(c) developing or producing core components specially designed or modified for use in advanced robotics.

Advanced robotics

3. Subject to paragraph 6, "advanced robotics" means a machine that meets either or both the descriptions set out in paragraph 4 and is capable of carrying out multifunctional physical actions, including positioning or orientating materials, parts, tools, special devices or itself through variable movements in three-dimensional space.

Description of advanced robotics

4. The descriptions referred to in paragraph 3 are—

(a) having the characteristic of autonomy set out in paragraph 5; and

(b) being capable of using its sensors to carry out sophisticated surveillance and data collection in respect of any aspects of its environment in order to collect, store or communicate to the operator, significant volumes of high-fidelity data.

Characteristic of autonomy

5.—(1) Advanced robotics has the characteristic of autonomy where it is capable of performing actions—

(a) independent of human control; or

(b) independent of human control but complemented by—

(i) manual (including tele-operation) control;

(ii) pre-programmed operations or controls; or

(iii) control derived from other robotics or software control systems.

(2) The characteristics of autonomy may include either or both of the following—

(a) using physical, sensory and cognitive capabilities in combination, to decide on and implement a course of action that will vary depending on—

(i) the environment; or

(ii) the behaviour, dynamics, properties or arrangement of objects in the environment, which may include the ability to self-navigate or react to stimuli or changes in order to improve performance; or

(b) adapting or learning by carrying out actions to improve the performance of tasks from iteration and experience, which may include—

(i) the ability to self-heal;

(ii) the capability to identify and repair damaged robotics or components; or

(iii) having soft robotics capabilities (robotics made from compliant materials that mimic capabilities in living organisms that enable them to adapt or respond to their surroundings).

Exclusions

6.—(1) Subject to sub-paragraph (2), "advanced robotics" does not include—

(a) machines containing robotic systems that are readily available for purchase by consumers, including robotic toys, domestic appliances described as "smart", vacuum cleaning robots and consumer-focussed drones, where "consumer" means an individual acting for purposes that are wholly or mainly outside of that individual's trade, business or craft;

(b) industrial automation systems that use mechanical tools performing repetitive functions with very basic or no sensors or cognitive ability, including—

(i) simple sensing or imaging devices that do not confer any ability to react or change their behaviour given a change in circumstances, without human intervention;

(ii) devices that carry out functions that require pre-set sequences of actions or require pre-set sensing of the environment;

(c) smart speakers or similar devices lacking end effectors or locomotion.

(2) The description of exceptions set out in sub-paragraph (1)(a) does not include self-driving vehicles.