

# ISO/TR 4448-1:2024-08 (E)

## Intelligent transport systems - Public-area mobile robots (PMR) - Part 1: Overview of paradigm

---

<b>Contents</b>		<b>Page</b>
Foreword .....		v
Introduction .....		vi
1	Scope .....	1
2	Normative references .....	1
3	Terms and definitions .....	1
4	Abbreviated terms .....	3
5	Purpose and justification .....	3
5.1	General .....	3
5.2	Safety and conflict-avoidance .....	4
5.3	Planning .....	4
5.4	Commercial .....	4
5.5	Operations and management .....	4
5.6	Legal, liability and insurance .....	5
6	Parts outline .....	5
6.1	General .....	5
6.2	Definitions and data .....	5
6.2.1	Data definitions and general concepts .....	5
6.2.2	Security, privacy, testing and data: threat, vulnerability and risk profiles .....	5
6.3	Behaviours .....	5
6.3.1	Loading and unloading of goods and passengers at the kerb .....	5
6.3.2	Public-area mobile robot access on human pathways .....	6
6.3.3	Public-area mobile robot behaviour on human pathways .....	6
6.3.4	Public-area mobile robot-to-human communication signals .....	6
6.4	Safety .....	6
6.4.1	Safety and reliability for public-area mobile robots .....	6
6.4.2	Journey planning sufficiency for public-area mobile robots .....	7
6.4.3	Journey data recorder (JDR) for public-area mobile robots .....	7
6.5	Municipal readiness .....	7
6.5.1	Suitability of pathway infrastructure for public-area mobile robots .....	7
6.5.2	Environmental worthiness of public-area mobile robots .....	7
6.5.3	Post-crash procedures for public-area mobile robots .....	7
6.5.4	Mapping maintenance for public-area mobile robots .....	8
6.6	Personal assistants .....	8
6.6.1	Personal assistant robots for human transport .....	8
6.6.2	Personal assistant robots for tasks and goods movement .....	8
7	Context .....	8
7.1	Automated vehicles .....	8
7.1.1	Automated motor vehicles at the kerb .....	8
7.1.2	Automated devices (PMRs) on pedestrian infrastructure .....	8
7.2	The evolution of the sidewalk and accelerators for PMRs to operate there .....	10
7.2.1	General .....	10
7.2.2	History .....	10
7.2.3	Safety .....	10

7.2.4	Cost .....	11
7.3	The challenges .....	12
7.3.1	General .....	12
7.3.2	Infrastructure .....	12
7.3.3	Revisions of existing regulations for PMR use on public infrastructure .....	13
7.3.4	Greater variety of mobility types, and configurations .....	13
7.3.5	Greater demand for orchestration in pedestrianized mobility space .....	14
7.3.6	Growing access demands on pedestrianized space .....	14
7.3.7	Growing mismatch between infrastructure configuration and user capabilities .....	15
7.3.8	Regulatory or infrastructural bias: pedestrian vs PMR .....	15
7.3.9	The problem of compute resources for PMR automation .....	16
8	Operating principles for PMRs .....	16
8.1	Contrasting types of infrastructure .....	16
8.1.1	General .....	16
8.1.2	Contrasting pathway and kerb .....	16
8.1.3	Contrasting cycleways and footway .....	17
8.2	Behavioural factors .....	17
9	Governance principles for PMRs .....	19
9.1	General .....	19
9.2	Similarities between PMRs and wheeled, human-assistive devices .....	20
10	Environmental and social considerations .....	21
10.1	Environmental (climate and weather) resilience certification .....	21
10.2	Social considerations .....	21
11	Use cases .....	22
	Bibliography .....	24