EASA.2021.HVP.30 HORIZON EUROPE PROJECT

D-1.1 TO D-1.5 - REPORT REGULATORY ASSESSMENT

IMPLEMENTATION OF THE AERODROME 'TRIPLE ONE' CONCEPT

Final Report
Version 1.3.
Date: 20.09.2024

airsight GmbH
Gustav-Meyer-Allee 25
13355 Berlin
Germany
Phone: +49 30 45803177
Fax: +49 30 45803188
www.airsight.de

Version	Date	Description	Prepared by	Audited by
0.9	17.03.2022	Triple One Study – D-1.1 to D-1.5 – Report – initial version	Lydia Schuppe	Jan Walther (PL) Dr. Chehab Salih
1.0	05.09.2023	Comments EASA incorporated	Lydia Schuppe	Jan Walther (PL) Dr. Chehab Salih
1.1	31.05.2024	Added EASA requirements on equipment at aerodromes	Rainer Flicker	Jan Walther (PL)
1.2	03.07.2024	Added European flag, added latest regulatory updates	Yasmin Said	Jan Walther (PL)
1.3	20.09.2024	Update regulatory framework and GAPPRI	Jan Walther (PL)	

This report consists of:

65 pages

Approval granted

JAN WALTHER
DIPL.-ING. TRANSPORT ENGINEERING
HEAD OF AERODROME SAFETY & OPS

Table of Contents

List of Figures

List of Tables

Executive Summary

EASA has commissioned a study to investigate possible safety gains and risks by the so called "Triple One" concept, describing the use of one frequency and one language for all movements associated with a runway. The intention of this concept is to improve situational awareness of all air traffic participants in the aerodrome environment and thus decrease the risk for runway incursions.

The study is divided into 6 tasks (refer to EASA Procurements Documents – EASA.2021.HVP.30). The first task is to obtain a comprehensive overview of the regulatory situation on ICAO and EASA level, also compared to other major aviation regions. This document sets out the results of the regulatory assessment as Task 1 of the study.

In order to approach Task 1 and obtain a comprehensive overview of the requirements in connection with "Triple One", the following topics were defined:

- Language

- Radio communication procedures

- Operation of vehicles on the manoeuvring area

- Competence

Both ICAO and EASA have recognized the benefit in situational awareness for all parties involved in runway operations, if vehicle drivers in the close area of the runway communicate on the same frequency as air traffic and have included recommendations as well as partly binding requirements in that matter. It should be emphasized, however, that the recommendations in the European Action Plan for the Prevention of Runway Incursion (EAPPRI) [1] and in the latest Global Action Plan for the Prevention of Runway Incursions (GAPPRI) [2]refer to the runway operations (assumingly including runway safety areas), while ICAO and EASA requirements cover the entire manoeuvring area.

The main difference between ICAO and EASA requirements is the stringency of the rules. While ICAO mainly gives recommendations on the language and frequency to be used, some of these recommendations are already mandatory under the EASA regulatory framework. This involves that under EASA rules all drivers with access to the manoeuvring area must speak operational English (with exceptions). Specific phraseology tailored to operational situations of aerodrome vehicle drivers does not currently exist in the regulations, although standardized phrases shall be used whenever possible. For communication between air traffic controllers and pilots, on the other hand, it is only mandatory to use English at airports with more than 50,000 international IFR movements per year.

Following the analysis of ICAO and EASA rules, regulations in other major aviation regions, such as USA, Australia and Canada, have been reviewed. The FAA for instance follows a different strategy than EASA and envisage the equipment of all vehicles with ADS-B.

In summary, considerable progress has been made in legislation with regard to the elements of "Triple One", yet it remains a challenge to find a uniform regulation that can be implemented by every Member State and every airport within the scope of EASA without insurmountable challenges.

List of Abbreviations

AC	Advisory Circular
ADR	Aerodrome
ADS-B	Automatic Dependent Surveillance-Broadcast
AELP	Aviation English Language Proficiency
AELS	Aviation English Language Standard
AMC	Acceptable Means of Compliance
AROC	Aeronautical radio operator certificate
ATC	Air Traffic Control
ATCO	Air Traffic Controller
CAA	Civil Aviation Authority
CAR	Civil Aviation Regulations
CASA	Civil Aviation Safety Authority
CASR	Civil Aviation Safety Regulations
CFR	Code of Federal Regulations
IR	Implementing Rule
LPRs	Language Proficiency Requirements (LPRs)
EAPPRI	European Action Plan for the Prevention of Runway Incursions
EASA	European Union Aviation Safety Agency
FAA	Federal Aviation Authority
FAR	Federal Aviation Regulations
GELP	General English Language Proficiency
GM	Guidance Material
ICAO	International Civil Aviation Organization
MOS	Manual of standards
NfL	Nachrichten für Luftfahrer
R/T	radiotelephony
R	Recommendation
SERA	Standardized European Rules of the Air
SMGCS	surface movement guidance and control system
SMR	Surface Movement Radar
ST	Standard

Part I   Introduction

I.1   "Triple One" concept

I.1.1   The "Triple One" concept describes the use of a single frequency and a single language for all movements associated with a runway: "one runway, one frequency, one language".

I.1.2   The concept was derived from the recommendations included in the European Action Plan for the Prevention of Runway Incursions (EAPPRI) [1] as listed in Figure 1.

#	Recommendation	Action
1.3.3	Implement, monitor and ensure the use of the readback procedure (also applicable to manoeuvring area drivers and other personnel who operate on the manoevring area).	Air Navigation Service Provider (lead), Aircraft Operator (lead), Aerodrome Operator (lead).
1.3.4	Where practicable, improve situational awareness by conducting all communications associated with runway operations using aviation English.	Air Navigation Service Provider (lead), Aircraft Operator (lead), Aerodrome Operator (lead).
1.3.5	When practicable, improve situational awareness, by implementing procedures whereby all communications associated with runway operations are on a common or cross-coupled frequency.	Air Navigation Service Provider (lead)

Figure 1: EAPPRI recommendations as base for "Triple One"

I.1.3   The EAPPRI recommends the communication of air traffic control (ATC) with everyone intending to use a runway – for take-off, landing, crossing, inspections or maintenance – in aviation English and on a common (or cross-coupled) frequency. These recommendations aim to increase the situational awareness of all parties involved in runway operations – air traffic control, pilots and drivers. The awareness about the activities on and around the runway can be seen as an additional safety barrier in the system and can help to reduce the probability of runway incursions.

I.1.4   Despite the clear positive impact on safety, this concept is subject of controversy among airports and air navigation service providers (ANSP) because there must be preconditions that are not always easy to implement, while the challenges vary from airport to airport and from state to state.

I.1.5   It must be noted, that during the lifetime of the study, the Global Action Plan for the Prevention of Runway Incursions (GAPPRI) [2] has been released in August 2024 as a

successor set of recommendations. The reference for this study as part of the defined scope was, however, the state of the definitions in the EAPPRI. In principle, the GAPPRI still contains the recommendation for a common frequency and language even though the structure of the formulation is different. The following recommendations refer to "Safe Runway Operations Communications" and thus relevant elements of the Triple One concept:

ADR25	Develop and implement a phased plan for use of one frequency and English language for all communication associated with the operation of a runway. The phased plan should aim at improving the shared situational awareness of all front-line operators and should provide realistic and practicable measures that ensure an adequate level of safety for each of its phases.
ADR26	Periodically evaluate radio telephony practices, assessing elements such as use of ICAO-compliant phraseology.
ADR27	In cooperation with ANSPs, implement communication procedures for airside vehicles' drivers on what phraseology needs to be applied by both parties, including standard phrases for: a. Radio checks and readability scale. b. Radio communication failures (transmitting blind). c. When a driver becomes lost or uncertain of the vehicle's position in the manoeuvring area. d. Position reporting. e. Runway access and runway crossing requests.

Figure 2: GAPPRI recommendations relevant for runway operation communications

I.1.6   The GAPPRI provides more detailed context and guidance in Appendix A (Chapter 10), notably including a phased approach for implementation and a suggested minimum set of runway phraseologies for drivers (four for safety).

I.2   Study on the "Triple One" concept

I.2.1   To identify constraints and possible negative safety impacts, in addition to the clear positive effect on situational awareness, EASA has initiated a call for tender to investigate the current status of the implementation of the individual elements of the "Triple One" concept in a study.

I.2.2   EASA aims to gain a comprehensive picture of the current state of implementation at all airports in Europe in order to be able to make a detailed and objective analysis of the safety gains and possible risks or operational disadvantages. Based on the study results and its recommendation, the European legislator will subsequently decide to what extent the "Triple One" concept should be taken into account in future legislation.

I.2.3   airsight has been commissioned to conduct the study in cooperation with Brussels Airport Corporation, which has already implemented "Triple One". Extensive stakeholder participation is a central part of the analysis in order to understand the different implementation options, advantages and disadvantages as well as costs and backgrounds. The study involves airport operators, associated competent CAAs and ANSPs, as well as ATCOs and pilots and is be supported by ACI Europe.

I.2.4   Figure 3 shows the overall strategy of the study on the "Triple One" concept, with the regulatory assessment presented in this document being the first of six tasks.
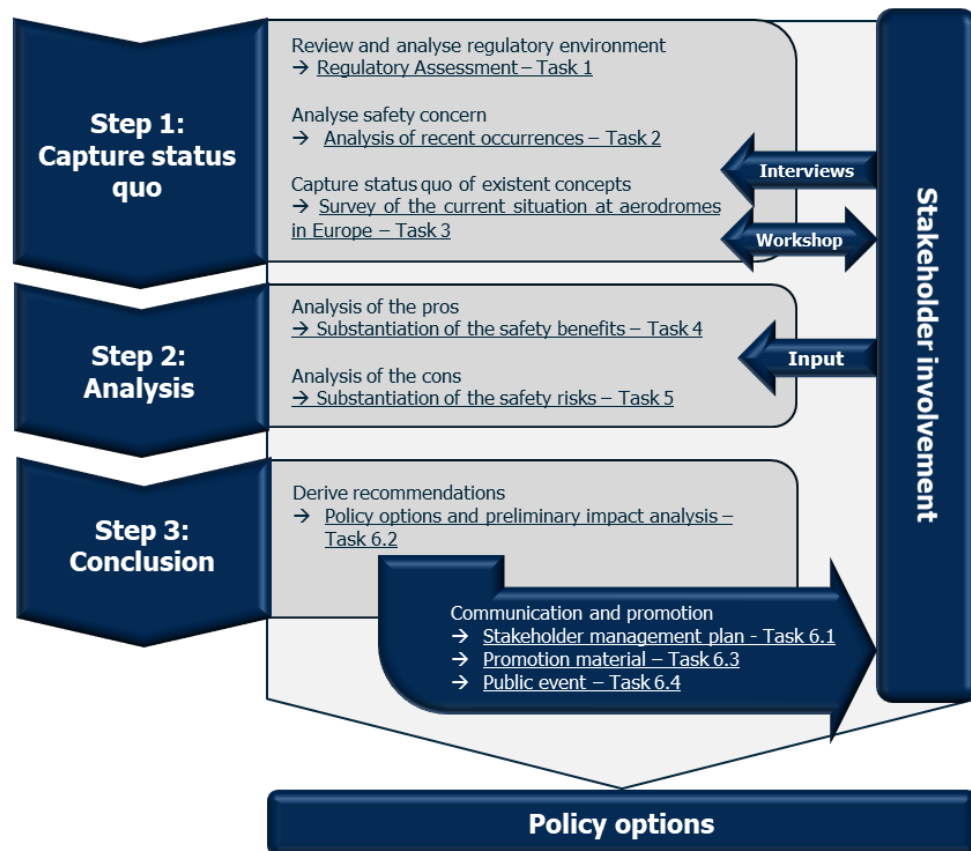
Figure 3: Overall strategy for the study on the "Triple One" concept

I.3   Scope of the regulatory assessment – Task 1

I.3.1   The first task is to carry out a comprehensive analysis of the current status of regulatory requirements with regard to all elements of the "Triple One" concept on an international and European level. The objective of this task is to review relevant ICAO Standards and Recommended Practices, Procedures and Manuals, EASA requirements as well as to gather relevant literature, documents and studies on the "Triple One" concept. The results of the regulatory assessment are presented in this document.

Additionally, the regulatory EASA framework is compared to other aviation regions (United Sates of America – FAA, Australia – CASA, Canada – Transport Canada). A regulatory gap analysis between EASA and ICAO, the recommendations in EAPPRI [1] and other aviation regions is carried out.

I.4   Approach

I.4.1   The stakeholders involved in the operation of the runway are characterised by different backgrounds: Commercial airline pilots and air traffic controllers have undergone very stringent training, including the use of standardized ICAO phraseology in English for communication. They are able to communicate with their various counterparts in the airspace and at international airports. Drivers on the manoeuvring area are often very experienced in their local environment and have to adapt to aircraft movement patterns. However, their focus is on communication within the airport, and the level of standardized communication skills is often lower. In addition, at many airports, they communicate with air traffic control in their local language.

I.4.2   Therefore, the regulatory assessment focuses on the requirements for vehicle operators allowed to drive on the manoeuvring area, particularly on the runway. However, since radio communication is the medium shared by all parties – pilots, controllers, and drivers – the language proficiency requirements for pilots (especially pilots licensed under visual flight rules (VFR)) and controllers are also portrayed.

I.4.3   With the main focus on vehicle drivers, derived from the EAPPRI [1] recommendations in Table 2 the regulatory assessment aims to review EASA and ICAO requirements for the following aspects that are directly related to "Triple One":

- the requirements for language and language proficiency

- the frequency on which communications associated with runway operations have to be conducted, and

- common read-back procedures.

I.4.4   However, in addition to the requirements and recommendations directly related to "Triple One," i.e., language and frequency, the regulatory framework and related guidance for the equipment of vehicles on the manoeuvring area and how they are controlled and monitored by air traffic control (ATC) should also be reviewed. The "Triple One" concept is primarily intended to create a common situational awareness among all airport users, which can also be achieved by other means, e.g. appropriate technological equipment of vehicles, aircraft and airport. In order to analyse which safety advantages and potential risks the implementation of "Triple One" would entail, other aspects must therefore be considered in addition to language and frequency requirements.

I.4.5   In conclusion, the following four main areas that are considered to be relevant for the "Triple One" concept have been identified:

1. Language

- What requirements exist on the language(s) that has to be spoken in association with operations on the runway for all involved parties – ATC, Aerodrome (ADR) operational personnel, pilots?

- What level of proficiency is required in that language(s)?

- What proficiency is required in aviation English?

- Are there regular proficiency checks?

2. Radio Communication Procedures

- What are the rules for communication (e.g. read-back, listening watch, radio discipline, …)?

- When do vehicle drivers have to contact, report to and communicate with ATC?

- Are there requirements regarding the use of standard phraseology for vehicle drivers?

- How are vehicles identified and distincted from aircraft in radiotelephony (e.g. call signs)?

3. Operation of vehicles on the manoeuvring area

- How is the access to the manoeuvring area regulated?

- How is the access to the runway and safety areas regulated?

- Which equipment is required for vehicles when operating on the manoeuvring area, specifically on the runway?

- How is the surveillance of vehicles on the manoeuvring area, specifically on the runway, regulated (transponder, SMGCS, …)?

- What are the provisions regarding the radio communication frequency when entering the runway?

4. Competence

- What aviation and airport knowledge do vehicle drivers have to have?

- What provisions exist regarding a system of driver's licenses?

- Is a radiotelephony certificate required to be allowed to communicate on an aviation frequency?

- What are general training requirements for vehicle drivers?

- Is radiotelephony training required?

I.4.6   Derived from the four main areas above the relevant topics for the regulatory assessment are summarised in the following table.

Table 1: Relevant topics related with "Triple One" defined for the regulatory assessment

ID	Topic	ID	Subtopic
1	Language	1.1	Language(s) to be used
		1.2	Language proficiency
		1.3	Proficiency checks
2	Radio Communication Procedures	2.1	Rules for Communication
		2.2	Phraseology
		2.3	Call Signs
3	Operation of vehicles on the manoeuvring area	3.1	Frequency to be used
		3.2	Operational requirements
		3.3	SMGCS
		3.4	Vehicle equipment requirements
4	Competence	4.1	Competence
		4.2	Licences
		4.3	Training

I.5   EAPPRI recommendations related to "Triple One"

I.5.1   Based on the topics identified in the previous chapter, the EAPPRI [1] was reviewed and the relevant recommendations for "Triple One" were identified. Those on which the "Triple One" concept is based are listed in 1.3.3, 1.3.4 and 1.3.5. However, as explained in the previous chapter, there are further elements related to "Triple One". In the following table, all recommendations are arranged according to the main topics.

Table 2: EAPPRI recommendations related with "Triple One"

ID	Topic	#	EAPPRI recommendation
1	Language	1.3.4	Where practicable, improve situational awareness by conducting all communications associated with runway operations using Aviation English.
2	Radio Communication Procedures	1.3.1 a)	To avoid the possibility of call sign confusion, implement the use of full aircraft or vehicle call signs for all communications concerning runway operations.
		1.3.1 b)	To avoid call sign confusion at aerodromes, implement the introduction of discrete RTF call signs to manoeuvring area vehicles.
		1.3.2	Implement, monitor and ensure the use of standard phraseologies as applicable: EU: SERA Part C AMC ICAO: Doc. 4444, PANS-ATM
		1.3.3	Implement, monitor and ensure the use of the readback procedure (also applicable to manoeuvring area drivers and other personnel who operate on the manoeuvring area).
		1.3.6	Consider regular evaluation of radio telephony practices, assessing elements such as frequency loading and use of EU/ICAO compliant phraseology.
3	Operation of vehicles on the manoeuvring area	1.2.6	Promote the adoption of 'sterile cab' procedures to improve communications when on the manoeuvring area.
		1.2.8 a)	Ensure all vehicles on the manoeuvring area are in radio contact with the appropriate Air Traffic Control service, i.e. ground and/or the tower either directly or through an escort.
		1.2.8 b)	Assess the numbering policy for aerodrome vehicles and consider assignment of unique numbers or airside identification call signs for each airside vehicle (to reduce the risk of vehicle related call sign confusion).
		1.2.10	Enable the tracking of vehicle movements on the manoeuvring area when possible.
		1.2.11 c)	Introducing procedures to increase situational awareness (of ATC and drivers) when vehicles occupy a runway (e.g. Vehicle 'Operations Normal' calls to ATC).
		1.2.11 d)	Temporarily suspending operations to allow a full runway inspection to be carried out without interruption.
		1.2.17 b)	Ensure that the Protected Area map is used in manoeuvring area driver training and is present in all vehicles that are driving on the manoeuvring area.
		1.3.5	When practicable, improve situational awareness, by implementing procedures whereby all communications associated with runway operations are on a common or cross-coupled frequency.
		1.9.1	Improve situational awareness by adopting the use of technologies that enable operational staff on the manoeuvring area to confirm their location in relation to the runway e.g. via GPS with transponder or airport moving maps, visual aids, signs etc.
4	Competence	1.2.3 a)	Assess formal Driver training and refresher programmes (including practical training and proficiency checks) against driver training guidelines e.g. the training programme frame work at Appendix C.
		1.2.3 b)	Carry out regular audits of airside driving permits (e.g. check 'recency' of use) in particular those allowing access to the runways, which should be as few as possible.
		1.2.4	Assess formal RTF communications training and assessment for drivers and other personnel who operate on or near the runway.

Part II   ICAO regulatory framework – D-1.1

II.1   Considered ICAO regulations and documents

II.1.1   On international level, the following ICAO requirements and recommendations for the manifold parts of the "Triple One" concept have been reviewed:

- Annex 1 – Personnel Licensing, 14th Edition, July 2022 [2]

- Annex 6 – Operation of Aircraft, Part I – International Commercial Air Transport – Aeroplanes, 12th Edition, July 2022 [3]

- Annex 6 – Operation of Aircraft, Part II – International General Aviation – Aeroplanes, 11th Edition, July 2022 [4]

- Annex 10 – Aeronautical Telecommunications, Volume II – Communication Procedures inlcuding those with PANS status, 7th Edition, July 2016 [5]

- Annex 11 – Air Traffic Services, 15th Edition, July 2018 [6]

- Annex 14 – Aerodromes, Volume I – Aerodrome Design and Operations, 9th Edition, July 2022 [7]

- Doc 4444 – PANS Air Traffic Management, 16th Edition, 2016 [8]

- Doc 9981 – PANS Aerodromes, 3rd Edition, 2020 [9]

- Doc 9432 – Manual of Radiotelephony, 4th Edition, 2007 [10]

- Doc 9137 – Airport Services Manual, Part 8, 1st Edition, 1983 [11]

- Doc 9835 – Manual on the Implementation of ICAO Language Proficiency Requirements, 2nd Edition, 2010 [12]

- Doc 9870 – Manual on the Prevention of Runway Incursions, 1st Edition, 2007 [13]

II.1.2   Not all regulatory documents reviewed as listed above contain important information related to "Triple One". In the following chapters, following a summary of the most important aspects, relevant sections from ICAO regulations and guidance are cited in a table organized by the four main areas identified in Chapter I.4.

II.2   ICAO requirements on Language

II.2.1   Because of many incidents related with communicational misunderstanding, ICAO introduced the language proficiency requirements (LPRs), that are laid down in ICAO Annex 1 [2]. Section 1.2.9.1 of ICAO Annex 1 [2] requires that everyone participating in radiotelephony in the aerodrome environment (aeroplane, airship, helicopter and powered-lift pilots, air traffic controllers and aeronautical station operators) has to demonstrate language proficiency in the language used for radiotelephony communication to at least the operational Level (level 4) of the language proficiency rating scale in ICAO Annex 1, Attachment A [2]. According to the ICAO rating scale, language proficiency is composed of the components outlined in Figure 4.
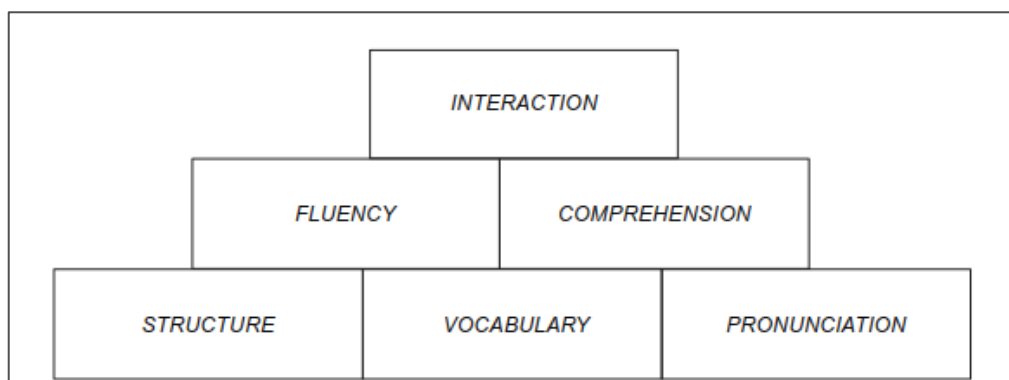
Figure 4: Pyramid structure of language proficiency skills (ICAO Doc 9835, Figure 2-2)

II.2.2   The requirements for speakers to be considered proficient are written down in ICAO Annex 1 [2], Appendix 1 and are stated as follows:

- Shall be able to communicate accurate, clear and effectively on common, concrete and work-related topics in face-to-face situations as well as radiotelephony;

- Use communication strategies to exchange messages and resolve misunderstandings;

- Be able to handle unusual situations varying from routine work situations;

- Speak in an understandable pronunciation.

II.2.3   Sections 1.2.9.5 and 1.2.9.6 of ICAO Annex 1 [2] state that no formal re-evaluation is required for the expert level, which means that a language is spoken as a native language. All other levels must be evaluated at regular intervals, i.e., every 3 years for level 4 and every 6 years for level 5.

II.2.4   ICAO Annex 10 [5], section 5.2.1.2 provides further information on the language that has to be used in radiotelephony. Air-ground communications shall be conducted in the language normally used by the station on the ground or in English. English shall always be available on request from any aircraft station, at all stations on the ground serving

designated airports and routes used by international air services. The languages available at ground stations shall be specified in the Aeronautical Information Publications and other published aeronautical information.

II.2.5   ICAO Doc 9870 [13], section 4.2.5 points out that the use of standard aviation English at international aerodromes will improve the situational awareness of everyone listening on the frequency.

II.2.6   With Doc 9835 – Manual on the Implementation of ICAO Language Proficiency Requirements [12] ICAO has dedicated an entire manual to the language proficiency. Therein, the difficulty of acquiring sufficient language skills is described because language proficiency not only includes standard phraseology but also free speech, and it takes regular use of the language for proficiency not to be lost.

II.2.7   The following table summarizes the most important aspects in ICAO's requirements on the topic "language" when intending to operate on the manoeuvring area.

Table 3: Details on subtopics related to "language" in ICAO rules

ID	Subtopic	Details
1.1	Language	• Communications shall be conducted in the language usually used by the ground station or in English • English must be available on request at airports open to international traffic
1.2	Language proficiency	• For radiotelephony at least the operational level (level 4) of language proficiency is required
1.3	Proficiency checks	• Language proficiency has to be checked in regular intervals, every 3 years for level 4 (operational) and every 6 years for level 5 (extended level)

II.2.8   In Table 4 the most important sections from ICAO regulations and guidelines related with the topic "language" are cited.

Table 4: Most important ICAO standards and recommendations related to "language"

Subject	Status	Reference	Details
ST – Standard; R – Recommendation			
Annex 1 – Personnel Licensing			
Language	ST	1.2.9.1	Until 2 November 2022, aeroplane, airship, helicopter and powered-lift pilots, air traffic controllers and aeronautical station operators shall demonstrate the ability to speak and understand the language used for radiotelephony communications to the level specified in the language proficiency requirements in Appendix 1.
Proficiency checks	ST	1.2.9.5	Until 2 November 2022, the language proficiency of aeroplane, airship, helicopter and powered-lift pilots, air traffic controllers and aeronautical station operators who demonstrate proficiency below the Expert Level (Level 6) shall be formally evaluated at intervals in accordance with an individual's demonstrated proficiency level.
Proficiency checks	R	1.2.9.6	Recommendation.- As of 3 November 2022, the language proficiency of aeroplane, airship, helicopter and powered-lift pilots, air traffic controllers and aeronautical station operators who demonstrate proficiency below the Expert Level (Level 6) should be formally evaluated at intervals in accordance with an individual's demonstrated proficiency level as follows:

Subject	Status	Reference	Details
			ST – Standard; R – Recommendation
			a) those demonstrating language proficiency at the Operational Level (Level 4) should be evaluated at least once every three years; and b) those demonstrating language proficiency at the Extended Level (Level 5) should be evaluated at least once every six years. Note 1. – Forma evaluation is not required for applicants who demonstrate expert language proficiency, e.g. native and very proficient non-native speakers with a dialect or accent intelligible to the international aeronautical community. Note 2. – The provisions of 1.2.9 refer to Annex 10, Volume II, Chapter 5, whereby the language used for radiotelephony communications may be the language normally used by the station on the ground or English. In practice, therefore, there will be situation whereby flight crew members and remote flight crew members will only need to speak the language normally used by the station on the ground.
Language proficiency	ST	Appendix 1	Proficient speakers shall: a) communicate effectively in voice-only (telephone radiotelephone) and in face-to-face situations; b) communicate on common, concrete and work-related topics with accuracy and clarity; c) use appropriate communicative strategies to exchange messages and to recognise and resolve misunderstandings (e.g. to check, confirm, or clarify information) in a general or work-related context; d) handle successfully and with relative ease the linguistic challenges presented by a complication or unexpected turn of events that occurs within the context of a routine work situation or communicative task with which they are otherwise familiar; and e) use a dialect or accent which is intelligible to the aeronautical community.
Language proficiency	ST	Attach-ment A	ICAO LANGUAGE PRIFICIENCY RATING SCALE […] The Operational Level (Level 4) is the minimum required proficiency level for radiotelephony communication. Levels 1 through 3 describe Pre-elementary, Elementary, and Preoperational levels of language proficiency, respectively, all of which describe a level of proficiency below the ICAO language proficiency requirement. Level 5 and 6 describe Extended and Expert levels, at levels of proficiency more advanced than the minimum required Standard. As a whole, the scale will serve as benchmarks for training and testing, and in assisting candidates to attain the ICAO Operational Level (Level 4).
			Annex 10 – Aeronautical Telecommunications (Volume II)
Language	ST	5.2.1.2	5.2.1.2.1 The air-ground radiotelephony communication shall be conducted in the language normally used by the station on the ground or in the English language. […] 5.2.1.2.2 The English language shall be available on request from any aircraft station, at all stations on the ground serving designated airports and routes used by international air services. 5.2.1.2.3 The languages available at a given station on the ground shall form part of the Aeronautical Information Publications and other published aeronautical information concerning such facilities.
			Annex 11 – Air Traffic Services
Language	ST	2.31	2.31.1 An air traffic services provider shall ensure that air traffic controllers speak and understand the language(s) used for radiotelephony communications as specified in Annex 1. 2.31.2 Except when communications between air traffic control units are conducted in a mutually agreed language, the English language shall be used for communications.
			ICAO Doc 9870 – Manual on the Prevention of Runway Incursions
Language	R	4.2.5	4.2.5 All communications associated with runway operations should be conducted in accordance with ICAO language requirements for air-ground radiotelephony communications (Annex 10 — Aeronautical Telecommunications, Volume II, Chapter 5, and Annex 1 — Personnel Licensing, Chapter 1 and Appendix 1, refer). The use of standard aviation English at international aerodromes will improve the situational awareness of everyone listening on the frequency.
Language	R	Appendix A	1.5 The use of ICAO language requirements for air-ground radiotelephony communications (language normally used by the station on the ground or the English language) will facilitate the establishment and maintenance of situational awareness for all participants associated with runway operations. To be effective, a limited set of phraseologies (15 to 20) could be identified for vehicle drivers. Annex 1 contains a Recommended Practice concerning the minimum language proficiency requirements for pilots and ATS personnel.

II.3   ICAO requirements on radio communication procedures

II.3.1   The rules for communication are mainly laid down in ICAO Annex 10 [5]. Radio discipline must be observed during all communications (ICAO Annex 10 [5], 5.1.1). Aeronautical stations shall maintain listening watch as required by the appropriate authority (ICAO Annex 10 [5], 5.2.2.1).

II.3.2   If a vehicle is radio equipped, radio contact to the aerodrome control tower has to be established before entering the manoeuvring area according to ICAO Annex 14, section 9.7.5.

II.3.3   All messages shall be acknowledged and read-back: "vehicle drivers operating or intending to operate on the manoeuvring area shall read back to the air traffic controller safety-related parts of instructions which are transmitted by voice, e.g. instructions to enter, hold short of, cross and operate on any operational runway or taxiway" (ICAO Annex 11 [6], 3.7.3)

II.3.4   According to ICAO Annex 10 [5], section 5.1.1 standard phraseology has to be used in all situations for which it has been specified. General words and phrases to be used are contained in ICAO Annex 10 [5], section 5.2.1.5.8. ICAO Annex 10, section 5.2.1.6 includes the composition of messages. Only when standardized phraseology cannot serve an intended transmission, plain language shall be used. In every situation, discipline in radiotelephony shall prevail and messages kept short, clear and unambiguous.

II.3.5   ICAO Doc 9432 [10] specifies techniques for clear speech, transmission of numbers, letters, times, words and phrases and call signs. It also points out in section 3.2.2 that standard phraseologies cannot serve every situation and therefore sufficient plain language proficiency is required. Therefore, standard phraseology should be supplemented by appropriate subsidiary phraseologies, like plain language or regionally or locally phrases. Doc 9870 [13], Appendix A recommends the development of a limited set of standard phraseology for vehicle drivers.

II.3.6   The importance of a system of call signs for vehicles differing from aircraft call signs when using one single or cross-coupled frequency is pointed out in ICAO Doc 9981 [9], section 1.4.3.

II.3.7   The following table summarizes the most important aspects in ICAO's requirements on the topic "radio communication procedures" for vehicle drivers intending to operate on the manoeuvring area.

Table 5: Details on subtopics related to "radio communication procedures" in ICAO rules

ID	Subtopic	Details
2.1	Rules for Communication	The following rules regarding radio communication procedures for vehicles drivers apply: • Radio discipline • Acknowledging and reading back of instructions / messages • Continuous listening watch on the movement area • Radio contact to the aerodrome control tower before entering the maneouvring area
2.2	Phraseology	• Use of standard phraseology whenever possible; • Recommendation: development of a limited set of standard phraseology for vehicle drivers
2.3	Call Signs	• Vehicle call signs should differ from aircraft call signs

II.3.8   Table 6 cites the most important sections from ICAO regulations and guidelines related with the topic "radio communication procedures".

Table 6: Most important ICAO SARPs related to "radio communication procedures"

Subject	Status	Reference	Details
ST – Standard; R – Recommendation			
Annex 10 – Aeronautical Telecommunications (Volume II)			
Rules for communication	ST	5.1.1	In all communications the highest standard of discipline shall be observed at all times.
Phraseology	ST	5.1.1.1	ICAO standardized phraseology shall be used in all situations for which it has been specified. Only when standardized phraseology cannot serve an intended transmission, plain language shall be used.
Rules for communication	R	5.2.1.9.2.3.1	PANS. – An aeronautical station should acknowledge position reports and other flight progress reports by reading back the report and terminating the readback by its call sign, except that the readback procedure may be suspended temporarily whenever it will alleviate congestion on the communication channel.
Annex 14 – Aerodromes			
Rules for Communication	ST	9.7.5	The driver of a radio-equipped vehicle shall establish satisfactory two-way radio communication with the aerodrome control tower before entering the manoeuvring area and with the appropriate designated authority before entering the apron. The driver shall maintain a continuous listening watch on the assigned frequency when on the movement area.
ICAO Doc 9981 – Aerodromes			
Call Signs	R	1.4.3	The aerodrome operator shall establish a system of allocating RTF call signs to be used by vehicles, so that the potential for confusion between vehicles and aircraft is minimized. This is particularly important at aerodromes where the RTF frequency used by vehicles is the same as that used by aircraft, or where the RTF frequency used by vehicles is re-broadcast on the RTF frequency used by aircraft.
ICAO Doc 9432 - Manual of Radiotelephony			
Phraseology	R	3.2.2	Phraseologies have evolved over time with periodic initiatives by bodies responsible for codifying and standardizing their use. ICAO phraseologies are developed to provide maximum clarity, brevity, and unambiguity in communications. Phraseologies are applicable to most routine situations; however, they are not intended to cover every conceivable situation which may arise. The success and widespread adoption of the ICAO phraseologies

Subject	Status	Reference	Details
			ST – Standard; R – Recommendation
			has given rise, to some degree, to an expectation on the part of some users that phraseologies alone could suffice for all the communicative needs of radiotelephony communications. ICAO provisions related to the use of language adopted by the ICAO Council in 2003 better clarify that, while ICAO phraseologies should always be used whenever they are applicable, there also exists an inherent requirement that users also have sufficient "plain" language proficiency. ICAO documents make this clear in a number of instances.
Phraseology	R	3.2.3	In the PANS-ATM, it is further emphasized that the phraseologies contained therein are not intended to be exhaustive, and when circumstances differ, pilots, ATS personnel and other ground personnel will be expected to use appropriate subsidiary phraseologies which should be as clear and concise as possible and designed to avoid possible confusion by those persons using a language other than one of their national languages. "Appropriate subsidiary phraseologies" can either refer to the use of plain language, or the use of regionally or locally adopted phraseologies. Either should be used in the same manner in which phraseologies are used: clearly, concisely, and unambiguously. Additionally, such appropriate subsidiary phraseologies should not be used instead of ICAO phraseologies, but in addition to ICAO phraseologies when required, and users should keep in mind that many speakers/listeners will be using English as a second or foreign language.
Rules for communication	R	3.2.4	The use of plain language required when phraseologies are not available should not be taken as licence to chat, to joke or to degrade in any way good radiotelephony techniques. All radiotelephony communications should respect both formal and informal protocols dictating clarity, brevity, and unambiguity.
Rules for communication	R	5.1.3	Correct RTF operating techniques must be observed by all users. It is important that a continuous listening watch is maintained by all drivers on the movement area, not only in case of further instructions from the control tower, but also so that drivers can be aware of the movements, and intended movements, of other traffic, thereby reducing the risk of conflict.
			ICAO Doc 9870 – Manual on the Prevention of Runway Incursions
Phraseology	R	4.2.2	Standard ICAO phraseologies should be used in all communications associated with runway operations.
Phraseology	R	4.2.3	Periodically it should be verified that pilots, drivers and air traffic controllers are using standard ICAO phraseologies in all communications associated with runway operations.
Phraseology	R	Appendix A	1.5 The use of ICAO language requirements for air-ground radiotelephony communications (language normally used by the station on the ground or the English language) will facilitate the establishment and maintenance of situational awareness for all participants associated with runway operations. To be effective, a limited set of phraseologies (15 to 20) could be identified for vehicle drivers. Annex 1 contains a Recommended Practice concerning the minimum language proficiency requirements for pilots and ATS personnel.
Phraseology	R	Appendix A	1.7 The use of ICAO standard phraseologies for radiotelephony communications between aircraft and ground stations is essential to prevent misunderstanding of the intent of messages and to reduce the time required for communications. ICAO phraseology should be used in all situations for which it has been specified. When standard phraseology for a particular situation has not been specified, plain language is to be used.
Call Signs	R	Appendix A	1.8 The use of full call signs for all traffic operating on or in close proximity to a runway has been identified as a critical element in enhancing the safety of runway operations. While the ICAO provisions in Annex 10, Volume II, Chapter 5, allow for the use of abbreviated call signs in certain circumstances, it is deemed best practice not to use abbreviated call signs in runway operations.

II.4   ICAO requirements on operation of vehicles on the manoeuvring area

II.4.1   Two-way radio communication for vehicles to ATC is recommended but not necessarily required for the operation of vehicles on the manoeuvring area: "*two way radiotelephony communication facilities shall be provided for aerodrome control service for the control of vehicles on the manoeuvring area, except where communication by a system of visual signals is deemed to be adequate*" (ICAO Annex 11 [6], 6.3). If a vehicle is radio equipped, radio contact to ATC and constant listening watch is prescribed on the manoeuvring area (ICAO Annex 14 [7], 9.7.5).

II.4.2   ICAO Doc 9981 [10], section 1.4.1 gives the recommendation that vehicles operating on the manoeuvring area should be equipped with radio communication devices tuned to appropriate frequencies. Also, ICAO Doc 9137, Part 8 [11], section 19.1.1 includes the recommendation that vehicles operating on the manoeuvring area should be equipped with radiotelephony (R/T) equipment or escorted by an R/T equipped vehicle. However, radio communication equipment is not necessarily required for vehicles on the manoeuvring area when vehicles are only occasionally used on the manoeuvring area under specific conditions (ICAO Doc 4444, 7.6.3.2.3.1 [9]).

II.4.3   The entering of the manoeuvring area by a vehicle is only allowed with permission by ATC (ICAO Annex 14 [7], 9.7.1). A call on each entry and exit should be made to ATC (ICAO Doc 9137 [11], 3.3.1). In this context, monitoring of vehicles must be ensured. ICAO Annex 14 [7], section 9.8.1 prescribes that a surface movement guidance and control system (SMGCS) shall be provided at an aerodrome, including vehicle control.

II.4.4   It should be noted that ICAO regulations do not distinguish between access to the manoeuvring area and access to the runway and its safety areas. However, the recommendations from EAPPRI [1] and the "Triple One" concept refer to runway operations.

II.4.5   When vehicles operate on the manoeuvring area, ICAO Annex 10 [5], section 5.2.2.3.4 suggests that coordination and cooperation between aeronautical stations should not be conducted on the main frequencies for ATC control and communication with aircraft stations should take priority over the inter-ground station communications. This seems to be contrary to the EAPPRI [1] recommendation to use one frequency for all communications associated with a runway. Also, section 6.3 in ICAO Annex 11 [6] "*where conditions warrant, separate communication channels shall be provided for the control of vehicles on the manoeuvring area*" is not conforming with the EAPPRI [1] recommendation.

II.4.6   Guiding factors on determining the need for another communication channel are described in Appendix A to Chapter 8, Section 2 of ICAO Doc 9426 [14]: "*1.2.1 When determining the need for ATS radio control positions, the following factors are taken into account: a) the amount of air traffic; b) the configuration of the airspace; c) the method of control used; d) effects on the over-all communications workload resulting from the systematic reduction of air-ground communications and/or the use of "silent control""*". The manual is related to air-ground control, however, could also be applied to ground-ground communications.

II.4.7   Still, in ICAO Annex 10 [5], section 5.2.2.1.5 is stated: "when two or more ATS frequencies are being used by a controller, consideration should be given to providing facilities to allow ATS and aircraft transmissions on any of the frequencies to be simultaneously retransmitted on the other frequencies in use thus permitting aircraft stations within range to hear all transmissions to and from the controller", indicating that also ICAO recommends to use at least cross-coupled frequencies so that all air traffic users and vehicle drivers are aware of movements on and around the runway.

II.4.8   Following this, also Doc 9870 [13], section 4.2.6 states that "All communications associated with the operation of each runway (vehicles, crossing aircraft, etc.) should be conducted on the same frequency as utilized for the take-off and landing of aircraft." and recommends in Appendix A to conduct all communications for all operations on a runway on the assigned VHF frequency or use frequency coupling.

II.4.9   In conclusion, ICAO is not specific with regard to the use of the frequency for movements associated with a runway, as is also formulated in ICAO Doc 9981 [9], section 1.4.1: "*depending on the complexity of the aerodrome, ATS may operate a number of radio frequencies. Typically, in these cases, the aerodrome ground controller will be responsible for all vehicles operating on the taxiways, and the air controller will be responsible for all vehicles wishing to enter or cross the runway(s)*".

II.4.10   The following table summarizes the most important aspects in ICAO's requirements on the topic "operation of vehicles on the manoeuvring area".

Table 7: Subtopic details related to "operation of vehicles on the manoeuvring area" in ICAO

ID	Subtopic	Details
3.1	Frequency	• All communications associated with a runway on one frequency, when conditions allow • However, coordination and cooperation not in main frequency • Frequency coupling recommended when more than one frequency is used
3.2	Operational requirements	• Two-way radio communication for vehicles on the manoeuvring area to ATC is recommended but not necessarily required • Entering of the manoeuvring area only as authorized by the aerodrome control tower
3.3	SMGCS	• Control of vehicles must be ensured by a SMGCS
3.4	Vehicle equipment requirements	• Vehicles operating on the manoeuvring area should be equipped with radio communication devices, unless escorted

II.4.11   The most important sections from ICAO regulations and guideline on the topic "operation of vehicles on the manoeuvring area" are cited in Table 8.

Table 8: Most important ICAO SARPs related to "operation of vehicles on the manoeuvring area"

Subject	Status	Reference	Details
ST – Standard; R – Recommendation			
Annex 10 – Aeronautical Telecommunications (Volume II)			
Frequency	R	5.2.2.1.5	Recommendation. – When two or more ATS frequencies are being used by a controller, consideration should be given to providing facilities to allow ATS and aircraft transmissions on any of the frequencies to be simultaneously retransmitted on the other frequencies in use thus permitting aircraft stations within range to hear all transmissions to and from the controller.
Frequency	R	5.2.2.3.4	PANS. – When, notwithstanding the provisions of 5.1.1, air-ground frequencies are used for the exchange between network stations of messages essential for coordination and cooperation between the stations, such communication should, so far as possible, be effected over network frequencies not being used at that time for the bulk of the air-ground traffic. In all cases, the communication with aircraft stations should take priority over the inter-ground station communications.
Annex 11 – Air Traffic Services			
Operational requirements	ST	3.8.1	The movement of persons or vehicles including towed aircraft on the manoeuvring area of an aerodrome shall be controlled by the aerodrome control tower as necessary to avoid hazard to them or aircraft landing, taxiing or taking off.
SMGCS	R	3.10	Recommendation. – In absence of visual observation of all or part of the manoeuvring area or to supplement visual observation, surface movement radar (SMR) […] or other suitable surveillance equipment, should be utilized to: a) Monitor the movement of aircraft and vehicles on the manoeuvring area; b) Provide directional information to pilots and vehicle drivers as necessary; and Provide advice and assistance for the safe and efficient movement of aircraft and vehicles on the manoeuvring area.
Vehicle equipment requirements	ST	6.3.1.1	Two-way radiotelephony communication facilities shall be provided for aerodrome control service for the control of vehicles on the manoeuvring area, except where communication by a system of visual signals is deemed to be adequate.
Frequency	ST	6.3.1.2	Where conditions warrant, separate communication channels shall be provided for the control of vehicles on the manoeuvring area. Automatic recording facilities shall be provided on all such channels.
Annex 14 – Aerodromes, Volume I			
Operational requirements	ST	9.7.1	A vehicle shall be operated: a) on a manoeuvring area only as authorized by the aerodrome control tower; and b) on an apron only as authorized by the appropriate designated authority.
Operational requirements	ST	9.7.5	The driver of a radio-equipped vehicle shall establish satisfactory two-way radio communication with the aerodrome control tower before entering the manoeuvring area and with the appropriate designated authority before entering the apron. The driver shall maintain a continuous listening watch on the assigned frequency when on the movement area.
SMGCS	ST	9.8.1	A surface movement guidance and control system (SMGCS) shall be provided at an aerodrome.
SMGCS	R	9.8.2	Recommendation. – The design of a SMGCS should take into account: a) density of air traffic b) visibility conditions under which operations are intended; c) the need for pilot orientation d) the complexity of the aerodrome layout; and movement of vehicles.
SMGCS	R	9.8.4	Recommendation. – An SMGCS should be designed to assist in the prevention of inadvertent incursions of aircraft and vehices onto an active runway.
SMGCS	R	9.8.5	Recommendation. – The system should be designed to assist the prevention of collisions between aircraft and between aircraft and vehicles or objects, on any part of the movement area.
ICAO Doc 9981 – Aerodromes			

Subject	Status	Reference	Details
		ST – Standard; R – Recommendation	
Frequency	R	1.4.1	The movement of vehicles on the manoeuvring area is ordinarily subject to authorization by air traffic services (ATS). Depending on the complexity of the aerodrome, ATS may operate a number of radio frequencies. Typically in these cases, the aerodrome ground controller will be responsible for all vehicles operating on the taxiways, and the air controller will be responsible for all vehicles wishing to enter or cross the runway(s). It is essential that all vehicles required to be under positive control on the manoeuvring area are equipped with the appropriate radio communication devices tuned to the appropriate frequencies.
		ICAO Doc 9137 - Airport Sevices Manual - Part 8	
Operational requirements	R	3.3.1	Before commencing runway inspection, permission must be obtained from air traffic control. On entering the runway a positive entry call, e.g. "checker entering for inspection", must be made; on leaving the runway, air traffic control must be advised when the inspection vehicle is clear of the runway strip. Most inspections are carried out on an ON/OFF basis (i.e. where the inspection vehicle may be required to enter or leave the runway at short notice). The above calls must be made on each occasion that the inspection vehicle enters the runway.
Operational requirements	R	3.3.2	It is essential to maintain listening watch on the appropriate R/T channel during any runway inspection.
Operational requirements	R	3.3.3	If, during an ON/OFF inspection, air traffic control requests the inspection team to clear the runway, the vehicle must move outside the runway strip before advising air traffic control that they are clear. They must then remain outside of the runway strip shile awaiting re-entry instructions.
Operational requirements	R	3.3.4	Clearance must be obtained before crossing any runway.
Vehicle equipment requirements	R	19.1.1	Air traffic control responsibility. Air traffic control is responsible for the control of the movement of vehicles on the manoeuvring area. To maintain such control, vehicles operating on the manoeuvring area should be fitted with R/T on the appropriate channel, or closely escorted by a R/T equipped vehicle.
Vehicle equipment requirements	R	19.1.2	Airport responsibility. The airport operator is responsible for ensuring that all possible steps are taken to co-operate with air traffic control in discharging its responsibility for control of vehicles on the manoeuvring area. In particular, action should be taken to see that: […] b) R/T equipment is provided on vehicles and is maintained in a fully serviceable condition; […] d) an airport plan is displayed in the cab of all vehicles indicating the boundaries of the manoeuvring area and the runway crossing points; e) unless specifically exempted, vehicles are fitted with appropriate obstacle marking and lighting as specified in Annex 14, Chapter 6.
		ICAO Doc 9426 - Air Traffic Services Planning Manual	
Frequency	R	Section 2, Chapter 8 Appendix A	1.2.1 When determining the need for ATS radio control positions, the following factors are taken into account: a) the amount of air traffic; b) the configuration of the airspace; c) the method of control used; d) effects on the over-all communications workload resulting from the systematic reduction of air-ground communications and/or the use of "silent control"; e) special national requirements; f) the average capability of the control personnel.
		ICAO Doc 9870 – Manual on the Prevention of Runway Incursions	
Frequency	R	4.2.6	All communications associated with the operation of each runway (vehicles, crossing aircraft, etc.) should be conducted on the same frequency as utilized for the take-off and landing of aircraft.
Frequency	R	Appendix A	1.6 To maintain high levels of situational awareness, it is also recommended that communications for all operations on a runway (landing, departing and crossing aircraft, vehicles crossing and runway inspections, etc.) take place on the VHF channel assigned for that runway. To accommodate vehicles that are equipped with UHF radios only, channel/frequency "coupling" should be employed to ensure that all UHF communications associated with runway operations are simultaneously transmitted on the appropriate VHF frequency and vice versa.
Frequency	R	Appendix A	2.3.1 The movement of vehicles on the manoeuvring area is subject to authorization by ATC. Depending upon the complexity of the aerodrome, ATC may operate a number of frequencies. Typically the aerodrome (tower) controller will be responsible for all vehicles operating on the runway, and the ground controller will be responsible for all vehicles operating on the taxiways. It is essential to fit all vehicles that operate on the runway with the appropriate radio communication frequencies.

II.5   ICAO requirements on competence

II.5.1   To ensure that drivers can perform their duties thoroughly and competently, they need training to achieve a certain level of qualification. ICAO Annex 14 [7], section 18.1 requires vehicle drivers on the movement area to be trained in, among other topics, airport geography, radiotelephony operating procedures, and terms and phrases used in aerodrome control.

II.5.2   Additionally, a driver's license, a state radio operator's licence or other licences may be required for any specialist function according to ICAO Annex 14 [7], section 18.2.

II.5.3   Training programmes for all aerodrome operational personnel should be developed, including recurrent training and knowledge verification at regular intervals (ICAO Doc 9981 [9], 1.2).

II.5.4   Specifically with regard to radiotelephony, according to ICAO Doc 9870 [13], section 2.3.2 drivers of vehicles operating on the manoeuvring area should have a high degree of competence with respect to the use of RTF phraseology and ICAO language requirements. This includes:

- Phonetic alphabet and standard phraseology

- Call signs for aircraft, ATC and vehicles

- Readback procedures

- Readability scale

- Lost or uncertain of position

- Vehicle breakdown

- Radio failure

- Transmitting techniques and use of RTF

- Safety while using radios

II.5.5   The following table summarizes the most important aspects in ICAO's requirements on the topic "competence" for vehicle drivers intending to operate on the manoeuvring area.

Table 9: Details on subtopics related to "competence" in ICAO rules

ID	Subtopic	Details
4.1	Competence	• High level of competence in RTF phraseology and ICAO language requirements
4.2	Licences	• A state's radio operator's licence may be required
4.3	Training	• Radiotelephony training

II.5.6   In Table 10 the most important sections from ICAO regulations and guidelines related with the topic "language" are cited.

Table 10: Most important ICAO standards and recommendations related to "competence"

Subject	Status	Reference	Details
ST – Standard; R – Recommendation			
Annex 14 - Aerodromes, Volume I			
Competence	ST	18.1	The authorities responsible for the operation of vehicles on the movement area should ensure that the operator are properly qualified. This may include, as appropriate to the driver's function, knowledge of: a) The geography of the aerodrome; b) Aerodrome signs, markings and lights; c) Radiotelephone operating procedures; d) Terms and phrases used in aerodrome control including the ICAO spelling alphabet; e) Rueles of air traffic services as they relate to ground operations; f) Airport rules and procedures; and Specialist functions as required, for example, in rescue and firefighting. […]
Licences	ST	18.2	[…] In addition, as required for any specialist function, the operator should be the holder of a state's driver's license, a state radio operator's licence or other licences.
ICAO Doc 9981 - Aerodromes			
Training	R	1.1.1	The activities by an aerodrome operator require the competence and appropriate training of personnel in order to carry out their assigned tasks.
Training	R	1.2	1.2.1 Aerodrome operator shall ensure that training programmes are developed and implemented for all personnel involved in aerodrome operations. 1.2.2 The training programmes shall include procedures for the verification of personnel knowledge and for the practical application thereof, at adequate intervals.
Training	R	1.3	1.3.1 The aerodrome operator should establish a system ensuring that drivers maintain competence in their driving rules, duties and procedures in those areas where they are permitted to drive. The aerodrome operator may delegate these functions to third-party driver trainers, vehicle operators or other parties, but in such circumstances, will need to conduct regular audits in order to assess the effectiveness of the training and assessment of drivers and the assessment and record-keeping of maintenance of competence of drivers. Such competence is additional to the continuing maintenance of competence to operate the vehicle/piece of equipment.
Competence	R	1.4.2	All drivers of vehicles on the manoeuvring area shall have an appropriate level of competence with respect to the use of RTF phraseology.
ICAO Doc 9870 – Manual on the Prevention of Runway Incursions			
Competence	R	2.3.2	All drivers of vehicles operating on the manoeuvring area should be expected to display a high degree of competence with respect to the use of RTF phraseology and ICAO language requirements for airground radiotelephony communications. Emphasis should be placed on the following areas:a) Hierarchy of message priority […] b) Phonetic alphabet […] c) Standard phraseology […] d) Call signs for aircraft, ATC and vehicles […] e) Readback procedures […] f) Readability scale […] g) Lost or uncertain of position […] h) Vehicle breakdown […] i) Radio failure […] j) Transmitting techniques and use of RTF […] k) Portable radios […] l) Safety while using radios […]
Competence	R	4.6.5	A formal driver training and assessment programme should be introduced in accordance with the driver training guidelines contained in Appendix D or, where already in place, these guidelines should be reviewed.

Part III   EU/EASA regulatory framework – D-1.2

III.1   Considered EU/EASA regulations

III.1.1   In comparison to international law, European regulation is directly effective and applicable in the EU states. In light of this and the importance of European regulation in the context of the Triple One Concept, the purpose of this chapter is to analyse the degree of application of the Triple One elements in the European regulatory environment.

III.1.2   The following European Implementing Rules (IR) as well as Acceptable Means of Compliance (AMC) and Guidance Material (GM) have been reviewed[1]:

- Basic Regulation (EU) No. 2018/1139 [15]

- Commission Regulation (EU) No 139/2014 – Aerodromes [16], including all Amendments as wells as AMC & GM

- Commission Implementing Regulation (EU) 923/2012 – Air Traffic Management/Air Navigation Services [17], including all Amendments as wells as AMC & GM

- Commission Implementing Regulation (EU) 116/2021 – Supporting implementation of the European Air Traffic Management Master Plan [18]

- Commission Regulation (EU) No 1178/2011 – Aircrew [18], including all Amendments as wells as AMC & GM

- Commission Regulation (EU) No 965/2012 – Air Operations [19], including all Amendments as wells as AMC & GM

- Commission Implementing Regulation (EU) 2017/373 – Air Traffic Management/Air Navigation [20], including all Amendments as wells as AMC & GM

- Commission Regulation (EU) 2015/340 - Air Traffic Controllers' Licensing and Certification [21], including all Amendments as wells as AMC & GM

III.1.3   Furthermore, the following future amendments of existing rules have been considered:

- Commission Delegated Regulation (EU) 2024/1400 - amending Regulation (EU) No 139/2014 as regards aerodrome safety, change of aerodrome operator and occurrence reporting [23]

---

[1] A full list of amendment numbers can be found in the reference list.

III.1.4   In the following chapters, after a summary of the most important aspects, relevant sections from EU/EASA regulations and guidance are cited in a table organized by the four main areas identified in Chapter I.4.

III.2   EASA requirements on language

III.2.1   Detailed requirements on the language to be spoken in radio communication and language proficiency requirements are contained in:

- Commission Regulation (EU) No 139/2014 [16] for aerodrome personnel, such as vehicle drivers

- Commission Regulation (EU) No 1178/2011 [18] for aircrew

- Commission Regulation (EU) 2015/340 [21] for air traffic controllers

III.2.2   According to ADR.OPS.B.029 (a) [22] drivers intending to drive on the manoeuvring area shall be able to speak English as well as any other language(s) used at the aerodrome for communication with ATC to at least the operational level (level 4). The language proficiency scale is analogue to the ICAO scale and contained in AMC1 ADR.OPS.B.029 (b) [22]. Drivers on the manoeuvring area have to be able to communicate on work-related topics, resolve misunderstanding and handle unexpected events, not only routine situations.

III.2.3   There is the possibility for the aerodrome operator to issue individual authorisations to the vehicle drivers exempting them from the requirement to speak English until 7 January 2026 according to ADR.OPS.B.029 (h) [22]. In addition, Member States may decide that vehicle drivers may be excluded from the requirement to speak the English language at operational level in general by the conduction of a safety assessment according to ADR.OPS.B.029 (g) [22]. "*The safety assessment required by point (g) of ADR.OPS.B.029 should be conducted prior to the issuance of a formal decision of a Member State not to require the demonstration of language proficiency in the English language by vehicle drivers.*" (AMC1 ADR.OPS.B.029(g) [23]).

III.2.4   Language proficiency shall be demonstrated by a certificate according to ADR.OPS.B.029 (c) [22]. Analogue to ICAO, there are regular intervals for language proficiency checks, every 4 years for the operational level 4 and 6 years for the extended level 5 (ADR.OPS.B.029 (d) [22]).

III.2.5   It has to be noted that, while rules for air traffic controllers are more stringent, language proficiency requirements for pilots seem to be less strict than for aerodrome personnel. FCL.055 (a) [24] states that pilots shall *"have a language proficiency endorsement on their licence in either English or the language used for radio communications involved in the flight"*, i.e. while aerodrome personnel must be able to speak English as well as other local languages, for pilots this is only indicated by "or". The standardized European rules of the air (SERA) also make the use of English in flight operations mandatory only at airports with more than 50,000 international IFR movements per year (SERA.14015

[25]). If English is not the only language used in the member states a safety assessment for the affected aerodromes had to be carried out by 31 December 2017 at the latest and the Agency and the Commission had to be informed about the conclusions (SERA.14015 [26]). GM1 SERA.14015 [26] points out the benefits to situational awareness when using English also at aerodromes smaller than 50,000 commercial IFR movements. In addition, consideration should be given to applying the requirement for English-only communications also to communications with vehicles in order to enhance situational awareness.

III.2.6   The following table summarizes the most important aspects in EASA's requirements on the topic "language" for vehicle drivers intending to operate on the manoeuvring area.

Table 11: Details on subtopics related to "language" in EASA rules

ID	Subtopic	Details
1.1	Language	• English and any other language(s) used at the aerodrome for communication with ATC
1.2	Language proficiency	• At least the operational level (level 4) • Vehicle drivers on the manoeuvring area can be exempted from the requirement to speak English to the operational level by a safety assessment
1.3	Proficiency checks	• Language proficiency has to be checked in regular intervals

III.2.7   In Table 12 the most important sections from EU/EASA regulations and guidelines related with the topic "language", not only for vehicle drivers but also for pilots and air traffic service providers, are cited.

Table 12: Most important EASA rules related to "language"

Subject	Status	Reference	Details
IR – Implementing Rule; AMC – Acceptable Means of Compliance; GM – Guidance Material			
Basic Regulation (EU) No. 2018/1139			
Language	IR	Annex VIII, 4.4.1	An air traffic controller shall demonstrate proficiency to speak and understand English to the extent he/she is able to communicate effectively in voice-only (telephone/radiotelephone) and in face-to-face situations on concrete and work related topics, including in emergency situations
Language	IR	Annex VIII, 4.4.2	Whenever necessary in a defined volume of airspace for Air Traffic Service (ATS) provision purposes, an air traffic controller shall also have proficiency to speak and understand the national language(s) to the extent described above
Aerodrome rules			
Language proficiency / Language	IR	ADR.OPS.B.024	(a) Except as provided for in point (d), the driving of a vehicle on any part of the movement area or other operational areas of an aerodrome shall require an authorisation issued to the driver by the operator of that aerodrome. The driving authorisation shall be issued to a person who: [...] (4) has demonstrated language proficiency in accordance with point ADR.OPS.B.029, if that person intends to drive a vehicle on the manoeuvring area; [...]
Language proficiency / Language	IR	ADR.OPS.B.029 (a)	A person required under point ADR.OPS.B.024 to demonstrate language proficiency, shall demonstrate proficiency, at least at an operational level both in the use of phraseologies and in plain language, in accordance with point (b), in: (1) the English language; and (2) any other language or languages used at the aerodrome for radio communication purposes with the air traffic services unit of the aerodrome.
Language proficiency	IR	ADR.OPS.B.029 (b)	The applicant shall demonstrate the ability to: (1) communicate effectively in voice-only and in face-to-face situations; (2) communicate on common and work-related topics with accuracy and clarity; (3) use appropriate communicative strategies to exchange messages and to recognise and resolve misunderstandings in a general or work-related context; (4) handle successfully the linguistic challenges presented by a complication or unexpected turn

Subject	Status	Reference	Details
IR – Implementing Rule; AMC – Acceptable Means of Compliance; GM – Guidance Material		
			of events which occurs within the context of a routine work situation or communicative task with which they are otherwise familiar; (5) use a dialect or accent which is intelligible to the aeronautical community.
Language proficiency	IR	ADR.OPS.B.029 (c)	Language proficiency shall be demonstrated by a certificate issued by the organisation that conducted the assessment, attesting the language or languages, the level or levels of proficiency, and the date of the assessment.
Proficiency checks	IR	ADR.OPS.B.029 (d)	Except for persons who have demonstrated language proficiency at an expert level, the language proficiency shall be re-assessed every: (1) four years from the date of the assessment, if the level demonstrated is operational level; (2) six years from the date of the assessment, if the level demonstrated is extended level.
Proficiency checks	IR	ADR.OPS.B.029 (e)	The demonstration of language proficiency shall be done through a method of assessment, which shall contain: (1) the process by which an assessment is done; (2) the qualifications of the assessors conducting assessments of language proficiency; (3) the appeal procedure.
Language proficiency	IR	ADR.OPS.B.029 (f)	The aerodrome operator shall make available language training to maintain the required level of language proficiency of its personnel.
Language proficiency / Language	IR	ADR.OPS.B.029 (g) (h)	(g) By way of derogation from point (a), the Member State may decide that the English language proficiency may not be required for personnel referred to in point ADR.OPS.B.024, for radio communication purposes with the air traffic services unit of the aerodrome. In such case, it shall perform a safety assessment covering one or several aerodromes. (h) The operator of the aerodrome may issue an authorisation to a person who has not demonstrated compliance with points (a) and (b) until: (1) 7 January 2026 as regards English language; (2) 7 January 2023 as regards any language other than the English language
Language proficiency	AMC	AMC1 ADR.OPS.B.029 (b)	- language proficiency table - Operational level (Level 4) is the minimum required proficiency level for radiotelephony communication.
Language proficiency / Language	AMC	AMC1 ADR.OPS.B.029 (g)	SAFETY ASSESSMENT WHEN PROFFICIENCY IN THE ENGLISH LANGUAGE IS NOT DEMONSTRATED The safety assessment required by point (g) of ADR.OPS.B.029 should be conducted prior to the issuance of a formal decision of a Member State not to require the demonstration of language proficiency in the English language by vehicle drivers.
Standardized European Rules of the Air		
Language	IR	SERA.14015	(a) The air-ground radiotelephony communications shall be conducted in the English language or in the language normally used by the station on the ground. (b) The English language shall be available, on request of any aircraft, at all stations on the ground serving designated aerodromes and routes used by international air services. Unless otherwise prescribed by the competent authority for specific cases, the English language shall be used for communications between the ATS unit and aircraft, at aerodromes with more than 50000 international IFR movements per year. Member States, where at the date of entry into force of this Regulation, the English language is not the only language used for communications between the ATS unit and aircraft at such aerodromes, may decide not to apply the requirement to use the English language and inform the Commission accordingly. In that case, those Member States shall, by 31 December 2017 at the latest, conduct a study on the possibility to require the use of the English language for communications between the ATS unit and aircraft at those aerodromes for reasons of safety, so as to avoid incursions of aircraft on an occupied runway or other safety risks, while taking into account the applicable provisions of Union and national law on the use of languages. They shall make that study public and communicate its conclusions to the Agency and the Commission. (c) The languages available at a given station on the ground shall form part of the Aeronautical Information Publications and other published aeronautical information concerning such facilities.
Language	AMC	AMC1 SERA.14015	The competent authority should only prescribe other conditions for the use of English language at aerodromes with more than 50 000 international IFR movements per year for specific cases, based on an individual assessment of the local arrangements. In any case, deviation from the requirement should be limited to exceptional cases and should be accompanied with a safety assessment. In States which decide not to apply the requirement to use the English language, the study referred to in SERA.14015 should include an independent and comprehensive assessment of the impact of not using English for air-ground radio communications. Such an assessment should in particular take into account: (a) Any available accident and incident investigation reports at least at EU level, where the use of language has been identified as a contributing factor. For this purpose, the central repository created in accordance with Commission Regulations (EC) Nos 1321/2007 and 996/2010 for such reports should also be consulted.

Subject	Status	Reference	Details
			IR – Implementing Rule; AMC – Acceptable Means of Compliance; GM – Guidance Material
			(b) The proportion of pilots frequenting that airport, with English language proficiency endorsement. (c) The proportion of pilots frequenting that airport, lacking language proficiency endorsement in the alternative language to be used. (d) A consultation of flight crews operating at the airport in question, on their preferences and ability to use the languages in question. (e) A consultation of the safety investigation authority.
Language	GM	GM1 SERA.14015	In addition to the requirement in SERA.14015, positive consideration should be given by competent authorities to the benefits of situational awareness which could improve safety on airports and relevant surrounding airspace sectors by extending the use of the English language on some safety critical frequencies at aerodromes and relevant surrounding airspace sectors also with less than 50 000 commercial IFR movements per year, but with international traffic, and a large majority of qualified pilots with acceptable level of English. This consideration would in particular encompass: (a) use of a single frequency for all the safety-critical operations on a runway or a set of runways; (b) the need to and feasibility of applying the requirement for English-only communications also to communications with vehicles in order to enhance situational awareness; and (c) where this consideration could lead to a change in current communication arrangements, it should be based on the outcome of a local safety assessment.
Language	GM	GM2 SERA.14015	The competent authority should also consider extending the requirement for the use of English language to aerodromes with less than 50 000 international IFR movements per year based on local needs, such as seasonally high levels of international air traffic.
			Rules for Aircrew
Language	IR	FCL.055 (a)	(a) General. Aeroplane, helicopter, powered-lift and airship pilots required to use the radio telephone shall not exercise the privileges of their licences and ratings unless they have a language proficiency endorsement on their licence in either English or the language used for radio communications involved in the flight. The endorsement shall indicate the language, the proficiency level and the validity date.
Language proficiency	IR	FCL.055 (b)	(b) The applicant for a language proficiency endorsement shall demonstrate, in accordance with Appendix 2 to this Part, at least an operational level of language proficiency both in the use of phraseologies and plain language. To do so, the applicant shall demonstrate the ability to: (1) communicate effectively in voice-only and in face-to-face situations; (2) communicate on common and work-related topics with accuracy and clarity; (3) use appropriate communicative strategies to exchange messages and to recognise and resolve misunderstandings in a general or work-related context; (4) handle successfully the linguistic challenges presented by a complication or unexpected turn of events which occurs within the context of a routine work situation or communicative task with which they are otherwise familiar; and (5) use a dialect or accent which is intelligible to the aeronautical community.
Proficiency checks	IR	FCL.055 (c)	(c) Except for pilots who have demonstrated language proficiency at an expert level, in accordance with Appendix 2 to this Part, the language proficiency endorsement shall be re-evaluated every: (1) 4 years, if the level demonstrated is operational level; or (2) 6 years, if the level demonstrated is extended level.
Language proficiency	IR	FCL.055 (d)	(d) Specific requirements for holders of an instrument rating (IR) or en-route instrument rating (EIR). Without prejudice to the paragraphs above, holders of an IR or an EIR shall have demonstrated the ability to use the English language at a level which allows them to: (1) understand all the information relevant to the accomplishment of all phases of a flight, including flight preparation; (2) use radio telephony in all phases of flight, including emergency situations; (3) communicate with other crew members during all phases of flight, including flight preparation.
Proficiency checks	IR	FCL.055 (e)	(e) The demonstration of language proficiency and of the use of English for IR or EIR holders shall be done through a method of assessment established by the competent authority.
Language proficiency	AMC	AMC1 FCL.055	(a) The language proficiency assessment should be designed to reflect a range of tasks undertaken by pilots but with specific focus on language rather than operational procedures. (b) The assessment should determine the applicant's ability to: (1) communicate effectively using standard R/T phraseology; (2) deliver and understand messages in plain language in both usual and unusual situations that necessitate departure from standard R/T phraseology.
Language proficiency	AMC	AMC2 FCL.055	- language proficiency rating scale - operational Level (Level 4) is the minimum required proficiency level for R/T communication
			Rules for Air Traffic Controllers' Licensing and Certification

Subject	Status	Reference	Details
IR – Implementing Rule; AMC – Acceptable Means of Compliance; GM – Guidance Material			
Language	IR	ATCO.B.030 (a)	(a) Air traffic controllers and student air traffic controllers shall not exercise the privileges of their licences unless they have a valid language proficiency endorsement in English and, if applicable, in the language(s) imposed by the Member State for reasons of safety at the ATC unit as published in the Aeronautical Information Publications. The language proficiency endorsement shall indicate the language(s), the level(s) of proficiency and the expiry date(s).
Language proficiency	IR	ATCO.B.030 (c)	(c) The applicant for any language proficiency endorsement shall demonstrate, in accordance with the rating scale referred to in point (b), at least an operational level (level four) of language proficiency. To do so, the applicant shall: (1) communicate effectively in voice only (telephone/radiotelephone) and in face-to-face situations; (2) communicate on common, concrete and work-related topics with accuracy and clarity; (3) use appropriate communicative strategies to exchange messages and to recognise and resolve misunderstandings in a general or work-related context; (4) handle successfully and with relative ease the linguistic challenges presented by a complication or unexpected turn of events that occur within the context of a routine work situation or communicative task with which they are otherwise familiar; and (5) use a dialect or accent which is intelligible to the aeronautical community.
Language proficiency	IR	ATCO.B.030 (d)	(d) Notwithstanding point (c), extended level (level five) of the language proficiency rating scale set out in Appendix 1 of Annex I may be required by the air navigation service provider, where the operational circumstances of the particular rating or endorsement warrant a higher level of language proficiency for imperative reasons of safety. Such a requirement shall be non-discriminatory, proportionate, transparent, and objectively justified by the air navigation service provider wishing to apply the higher level of proficiency and shall be approved by the competent authority.
Language proficiency	IR	ATCO.B.030 (e)	(e) Language proficiency shall be demonstrated by a certificate attesting the result of the assessment.
Proficiency checks	IR	ATCO.B.035	(a) The validity of the language proficiency endorsement, depending on the level determined in accordance with Appendix 1 of Annex I, shall be: (1) for operational level (level four), three years from the date of assessment; or (2) for extended level (level five), six years from the date of assessment; (3) for expert level (level six): (i) nine years from the date of assessment, for the English language; (ii) unlimited, for any other language(s) referred to in ATCO.B.030(a). (b) The validity period of the language proficiency endorsements for initial issue and renewal shall start not later than 30 days from the date on which the language proficiency assessment has been successfully completed. (c) Language proficiency endorsements shall be revalidated following successful completion of the language proficiency assessment taking place within three months immediately preceding their expiry date. In such cases the new validity period shall be counted from that expiry date. (d) If the language proficiency endorsement is revalidated before the period provided for in point (c), its validity period shall start not later than 30 days from the date on which the language proficiency assessment has been successfully completed. (e) When the validity of a language proficiency endorsement expires, the licence holder shall successfully complete a language proficiency assessment in order to have his/her endorsement renewed.
Proficiency checks	IR	ATCO.B.040	(a) The demonstration of language proficiency shall be done through a method of assessment approved by the competent authority, which shall contain: (1) the process by which an assessment is done; (2) the qualification of the assessors; (3) the appeals procedure. (b) Language assessment bodies shall comply with the requirements established by the competent authorities according to ATCO.AR.A.010.
Language proficiency	IR	ATCO.B.045	(a) Air navigation service providers shall make available language training to maintain the required level of language proficiency of air traffic controllers to: (1) holders of language proficiency endorsement at operational level (level four); (2) licence holders without the opportunity to apply their skills on a regular basis in order to

Subject	Status	Reference	Details
IR – Implementing Rule; AMC – Acceptable Means of Compliance; GM – Guidance Material				
			maintain their language skills. (b) Language training may also be made available in the form of continuous training.
Language proficiency	IR	Appendix 1	- language proficiency rating scale

III.3   EASA requirements on radio communication procedures

III.3.1   Generally, radio communication procedures always include the requirement to receive authorisation by ATC when entering the manoeuvring area, establish two-way radio communication, continuous listening watch and observe read-back procedures. These requirements are prescribed in ADR.OPS.B.027 [22].

III.3.2   Standardised phraseology shall be used by vehicle drivers as specified in all situations for which it has been specified (ADR.OPS.B.031 [17]). An exhaustive list of standard phraseology grouped per phases of flight or use in specific situations can be found in SERA Appendix 1 to AMC1 SERA.14001 [27]. As these rules are dedicated to flight operations, there is no phraseology for vehicles drivers included.

III.3.3   GM1 ADR.OPS.B.031(b) [23] gives the recommendation to improve situational awareness of all parties involved in runway operations by conducting communications on a common frequency and language, whenever this is possible. However, it is pointed out, that especially when a common frequency is used, a system of call signs for vehicles on the manoeuvring area is required. Call signs shall be coordinated with ATC in such a way that confusion with aircraft call signs is avoided (ADR.OPS.B.026 [22]).

III.3.4   The following table summarizes the most important aspects in EASA's requirements on the topic "radio communication procedures" for vehicle drivers intending to operate on the manoeuvring area.

Table 13: Details on subtopics related to "radio communication procedures" in EASA rules

ID	Subtopic	Details
2.1	Rules for Communication	The following rules regarding radio communication procedures for vehicles drivers apply: • requirement to receive authorisation by ATC when entering the manoeuvring area • establish two-way radio communication • continuous listening watch • observe read-back procedures
2.2	Phraseology	• phraseology training as part of language training
2.3	Call Signs	• system of call signs for vehicles on the manoeuvring area is required • call signs differing from aircraft call signs to avoid confusion
2.4	Radio Communication Failure	• In case of radio communication failure the use of light signals is required.

III.3.5   In Table 14, the most important sections from EU/EASA regulations and guidelines related with the topic "radio communication procedures" are cited.

Table 14: Most important EASA rules related to "radio communication procedures"

Subject	Status	Reference	Details
			IR – Implementing Rule; AMC – Acceptable Means of Compliance; GM – Guidance Material
			Aerodromes rules
Call Signs	IR	ADR.OPS.B.026 (d)	The aerodrome operator shall assign a call sign to a vehicle authorised in accordance with point (a) to operate at the aerodrome, if that vehicle is required to be radio-equipped. The call sign assigned to a vehicle shall: (1) not cause confusion regarding its identity; (2) be appropriate to its function; (3) for vehicles that operate in the manoeuvring area, be coordinated with the air traffic services unit, and disseminated to the relevant organisations at the aerodrome.
Call Signs	IR	ADR.OPS.B.026 (f)	The aerodrome operator shall: (1) establish and implement procedures for: (i) issuing vehicle authorisations and temporary permitting the entry to the aerodrome and operation of vehicles; (ii) assigning call signs to vehicles; (iii) monitoring the compliance of vehicles with point ADR.OPS.B.026 and for taking appropriate action, including the suspension and revocation of vehicle authorisations or permissions to temporarily operate a vehicle; (2) maintain relevant records.
Call Signs	GM	GM1 ADR.OPS.B.026 (d)	VEHICLE CALL SIGNS The use of similar call signs may lead to call sign confusion, which is one of the factors associated with runway incursions. To avoid call sign confusion, when assigning a call sign to a vehicle, careful consideration needs to be given to the call signs used by aircraft operating at the aerodrome, as well as the call signs of other vehicles. Ways to reduce the possibility of call sign confusion include: (a) use of unique numbers or identification call signs for each vehicle; and (b) use of call signs which are appropriate to the function of the vehicle (e.g. 'Operations', 'Fire'). Where more than one vehicle is used in the same function, then a numbering policy may be used, such that the call sign is followed by a number, e.g. 'Operations 1'. At aerodromes where the number of vehicles and the aircraft traffic is high, before assigning a call sign to a vehicle, it is recommended that the aerodrome operator, apart from the coordination with the air traffic services provider, consults also the other organisations operating vehicles at the aerodrome. As soon as a call sign is assigned to a vehicle, this needs to be known to at least the air traffic services provider.
Rules for communication	IR	ADR.OPS.B.027 (c)	The driver of a radio-equipped vehicle, intending to operate or operating on the manoeuvring area, shall: (1) establish satisfactory two-way radio communication with the air traffic services unit on the appropriate air traffic services frequency before entering the manoeuvring area, and maintain a continuous listening watch on the assigned frequency; (2) before entering the manoeuvring area, obtain authorisation from the air traffic services unit and shall operate only as authorised by the air traffic services unit. Notwithstanding such an authorisation, entry to a runway or runway strip or change in the operation authorised, shall be subject to a further specific authorisation by the air traffic services unit; (3) read back to the air traffic services personnel safety-related parts of the instructions which are transmitted by voice. Instructions to enter, hold short of, cross and operate on any runway, taxiway or runway strip shall always be read back; (4) read back to the air traffic services personnel or acknowledge instructions other than in point (3) in a manner to clearly indicate that they have been understood and shall be complied with.
Phraseology	AMC	AMC1 ADR.OPS.B.029 (e)	(a) The language competence assessment should be designed to reflect a range of tasks undertaken by vehicle drivers but with special focus on the knowledge of the language rather than knowledge of the operational procedures. (b) The assessment should determine the applicant's ability to: (1) communicate effectively using standard radiotelephony phraseology; (2) deliver and understand messages in plain language in both usual and unusual situations that necessitate departure from standard radiotelephony phraseology; and (3) deal with an unexpected turn of events and solve apparent misunderstandings.
Rules for communication	IR	ADR.OPS.B.031	(a) Vehicles and the air traffic services unit shall communicate in accordance with the applicable requirements of Section 14 of the Annex to Implementing Regulation (EU) No 923/2012. (b) The aerodrome operator shall, in coordination with the air traffic services provider, establish communication procedures, including: (1) the frequencies and the language or languages to be used for communication between the air traffic services unit and vehicles that intend to operate or are operating on the

Subject	Status	Reference	Details
			IR – Implementing Rule; AMC – Acceptable Means of Compliance; GM – Guidance Material

			manoeuvring area;
			(2) communication between the air traffic services unit and pedestrians that intend to operate or are operating on the manoeuvring area;
			(3) dissemination of significant aerodrome-related information that may affect the safety of operations on the manoeuvring area, using radio communications;
			(4) signals and other communication means, to be used, in all visibility conditions, in the case of radio communication failure between the air traffic services unit and vehicles or pedestrians on the manoeuvring area.
			(c) If signals are used in accordance with point (b)(4), they shall have the following meaning:

Light signal from aerodrome control	Meaning
Green flashes	Permission to cross landing area or to move onto taxiway
Steady red	Stop
Red flashes	Move off the landing area or taxiway and watch out for aircraft
White flashes	Vacate manoeuvring area in accordance with local instructions

(d) In emergency conditions or if the signals in point (c) are not observed, the signal given hereunder shall be used for runways or taxiways equipped with a lighting system and shall have the following meaning:

Light signal from aerodrome control	Meaning
Flashing runway or taxiway lights	Vacate the runway and observe the tower for light signal

Standardized European Rules of the Air

Subject	Status	Reference	Details
Rules for communication	IR	SERA.8015	(e) Read-back of clearances and safety-related information (1) The flight crew shall read back to the air traffic controller safety-related parts of ATC clearances and instructions which are transmitted by voice. The following items shall always be read back: (i) ATC route clearances; (ii) clearances and instructions to enter, land on, take off from, hold short of, cross, taxi and backtrack on any runway; and (iii) runway-in-use, altimeter settings, SSR codes, newly assigned communication channels, level instructions, heading and speed instructions; and (iv) transition levels, whether issued by the controller or contained in ATIS broadcasts. (2) Other clearances or instructions, including conditional clearances and taxi instructions, shall be read back or acknowledged in a manner to clearly indicate that they have been understood and will be complied with. (3) The controller shall listen to the read-back to ascertain that the clearance or instruction has been correctly acknowledged by the flight crew and shall take immediate action to correct any discrepancies revealed by the read-back. (4) Voice read-back of CPDLC messages shall not be required, unless otherwise specified by the ANSP.
Phraseology	IR	SERA.14001	Standardised phraseology shall be used in all situations for which it has been specified. Only when standardised phraseology cannot serve an intended transmission, plain language shall be used.
Phraseology	AMC	Appendix 1 to AMC1 SERA.14001	1. ATC phraseologies 2. ATS surveillance service phraseologies 3. Automatic dependent surveillance - contract (ADS-C) phraseologies 4. alerting phraseologies 5. ground crew/flight crew phraseologies 6. air traffic flow management (ATFM) (Appendix 1 to AMC1 SERA.14001 applicable from 1 December 2022 — ED Decision 2021/014/R)
Phraseology	GM	GM2 Appendix 1 to AMC1 SERA.14001	The phraseologies listed in Appendix 1 to AMC1 SERA.14001 are organised per phases of flight or per use of specific communication, navigation and surveillance technologies that require the exchange of specific communication between ATS personnel or ground crew and flight crews. With regard to the communications between flight crews and ATS personnel, the tables specify the ATS phraseologies to be used to perform ATC service or FIS functions respectively. Consequently, the two rightmost columns indicate which of the ATS

Subject	Status	Reference	Details
			IR – Implementing Rule; AMC – Acceptable Means of Compliance; GM – Guidance Material
			phraseologies are to be used for ATC functions, for FIS functions, or for both ATC and FIS functions. In general, the subject SERA phraseologies constitute a standardised core content of identified phrases for usual situations; they do not constitute an exhaustive list. When circumstances differ, pilots, ATS personnel and other ground crew will be expected to use plain language which should be as clear and concise as possible and, when applicable, in the level specified in the relevant rules on language proficiency. (applicable from 1 December 2022)
Call Signs	IR	SERA.14050	(a) Full call signs: An aircraft radiotelephony call sign shall be one of the following types: (1) Type (a) — the characters corresponding to the registration marking of the aircraft; or (2) Type (b) — the telephony designator of the aircraft operator, followed by the last four characters of the registration marking of the aircraft; (3) Type (c) — the telephony designator of the aircraft operator, followed by the flight identification. (b) Abbreviated call signs: The aircraft radiotelephony call signs shown in point (a), with the exception of Type (c), may be abbreviated under the circumstances prescribed in point SERA.14055(c). Abbreviated call signs shall be in the following form: (1) Type (a) — the first character of the registration and at least the last two characters of the call sign; (2) Type (b) — the telephony designator of the aircraft operator, followed by at least the last two characters of the call sign; (3) Type (c) — no abbreviated form.

III.4   EASA requirements on operation of vehicles on the manoeuvring area

III.4.1   Annex VII, section 2.1 of the Basic Regulation (EU) No. 2018/1139 [15] states: "the aerodrome operator shall ensure, directly or through arrangements with third parties, that movements of vehicles and persons in the movement area and other operational areas are coordinated with movements of aircraft in order to avoid collisions and damage to aircraft."

III.4.2   For this purpose, an airport shall be equipped with surface movement guidance and control system (SMGCS) in accordance with ADR.OPS.B.030 (a) [28], which shall take into account local conditions at an airport.

III.4.3   According to ADR.OPS.B.026 [22] two-way radio communication is required for the authorisation of vehicles on the manoeuvring area, unless a vehicle is accompanied by an escort. Additionally, a transponder or other equipment of surveillance is required if the vehicle is intended to be operated on the manoeuvring area, and the SMGCS makes it necessary. According to AMC1 ADR.OPS.B.026(a)(1);(3) [22] an updated copy of the movement area chart of sufficient size should be available in vehicles.

III.4.4   Vehicles on the manoeuvring area should be limited to those absolutely necessary, especially on the runway (GM1 ADR.OPS.B.026(b) [23]). All movements of persons or vehicles, including towed aircraft, on the manoeuvring area of an aerodrome shall be controlled by the aerodrome control tower as necessary to avoid hazard to them or to aircraft landing, taxiing or taking off (ATS.TR.240 [29]).

III.4.5   It should be noted that, analogue to ICAO, no distinction is made between requirements for vehicles on the manoeuvring area and on the runway and its safety areas. However, the recommendations from EAPPRI [1] and the "Triple One" concept refer to the runway only.

III.4.6   GM1 SERA.14015 [26] recommends the use of a single frequency for all safety-critical operations on a runway or a set of runways, similar to the recommendation in GM1 ADR.OPS.B.031(b) [23], that communications should be conducted on a common frequency and language, whenever this is possible. However, in accordance with ICAO regulations, ATS.OR.425 [29] states that separate channels for air traffic and vehicles shall be used, when required by local conditions: *"(b) Where conditions warrant, an air traffic services provider shall provide separate communication channels for the control of traffic operating on the manoeuvring area."* ATS.OR.445 [29] further states that the need for a second control channel for management of vehicles shall be demonstrated in a Safety Assessment.

III.4.7   The following table summarizes the most important aspects in EASA's requirements on the topic "operation of vehicles on the manoeuvring area".

Table 15: Subtopic details related to "operation of vehicles on the manoeuvring area" in EASA

ID	Subtopic	Details
3.1	Frequency	• Recommends use of a single frequency for all safety-critical operations on a runway or a set of runways • When required separate control channels; however, the need shall be demonstrated in a safety assessment
3.2	Operational requirements	• Two-way radio communication for vehicles, unless escorted • Entering of the manoeuvring area only as authorized by the aerodrome control tower
3.3	SMGCS	• Monitoring of vehicles must be ensured by a SMGCS
3.4	Vehicle equipment requirements	• Radio communication devices, unless escorted • Transponder if required for SMGCS • Movement area chart

III.4.8   The most important sections from EU/EASA regulations and guidelines related with the topic "operation of vehicles on the manoeuvring area" are cited in Table 16.

Table 16: Most important EASA rules related to "operation of vehicles on the manoeuvring area"

Subject	Status	Reference	Details
IR – Implementing Rule; AMC – Acceptable Means of Compliance; GM – Guidance Material			
Basic Regulation (EU) No. 2018/1139			
Operational requirements	IR	Annex VII, 2.1	The aerodrome operator is responsible for operation of the aerodrome. The responsibilities of the aerodrome operator are as follows: […] (d) the aerodrome operator shall ensure, directly or through arrangements with third parties, that movements of vehicles and persons in the movement area and other operational areas are coordinated with movements of aircraft in order to avoid collisions and damage to aircraft; […]
Aerodrome rules			
Operational requirements	AMC	AMC2 ADR.OPS.B.015 (b)	(b) The aerodrome operator should ensure that all vehicles on the manoeuvring area are in radio contact with the appropriate air traffic services either directly or through an escort.
Vehicle equipment requirements	IR	ADR.OPS.B.026 (a)	The operation of a vehicle on the movement area or other operational areas shall require an authorisation issued by the aerodrome operator. The authorisation may be issued if the vehicle is used in activities related to the operation of the aerodrome and: (1) is serviceable and fit for the intended operation; (2) complies with the marking and lighting requirements of point ADR.OPS.B.080; (3) is equipped with a radio allowing two-way communication on the appropriate air traffic services frequency and any other frequency necessary, if it is intended to be operated on either of the following areas: (i) the manoeuvring area; (ii) other operational areas where communication with the air traffic services unit or other operational units of the aerodrome is necessary; (4) is fitted with a transponder or other equipment that supports surveillance, if it is intended to be operated on the manoeuvring area, and the aerodrome is equipped with a surface movement guidance and control system whose operation requires the use of a transponder or other equipment supporting surveillance fitted on the vehicles.
Vehicle equipment requirements	IR	ADR.OPS.B.026 (e)	By derogation from point (a), the aerodrome operator may permit: (1) a vehicle authorised in accordance with points (a)(1) and (2), which is not equipped with a radio required under point (a)(3) and a transponder or other equipment supporting surveillance required under point (a)(4), to be occasionally operated in the areas referred to in points (a)(3) and (a)(4), provided that: (i) that vehicle is escorted, at all times, by an authorised vehicle meeting the requirement of point (a)(3) and, if necessary, point (a)(4); (ii) the escorting vehicle complies with the marking and lighting requirements of point ADR.OPS.B.080; (iii) low-visibility procedures are not in effect, if the escorted vehicle is to be operated in the manoeuvring area;
Vehicle equipment requirements	AMC	AMC1 ADR.OPS.B.026 (a)(1);(3)	(a) An updated copy of the movement area chart of sufficient size, including hot spots, as well the visual aids configuration on the aerodrome, and areas to be safeguarded, should be readily available in the driver's cabin of a vehicle intended to be operated in the manoeuvring area. If a vehicle is not to be operated in the manoeuvring area, the copy of the chart may be customised to provide only relevant information of the area in which the vehicle is to be operated, along with information of the adjacent areas, to improve the situational awareness of the driver. (b) The aerodrome operator, in coordination with the air traffic services provider and, if applicable, the apron management services provider, if different, should assess in which areas of the aerodrome, except the manoeuvring area, a vehicle needs to be equipped with a radio. The radio with which the vehicle is equipped should allow two-way communication with the air traffic services unit frequency, but also any other unit that the driver of the vehicle may need to establish contact with. Updated information regarding the frequencies of each unit should be readily available in the driver's cabin, as well as the frequencies that may need to be used at different areas of the aerodrome. Moreover, the call-sign of the vehicle should be available at a prominent place.

Subject	Status	Reference	Details
		IR – Implementing Rule; AMC – Acceptable Means of Compliance; GM – Guidance Material	
Operational requirements	AMC	AMC1 ADR.OPS.B.026 (e)	ESCORTING OF VEHICLES The escorting of a vehicle should only be performed by the aerodrome operator directly or through a contracted organisation. The aerodrome operator should establish procedures for the escorting of vehicles, which as a minimum should contain: (a) under which minimum visibility conditions escorting of a vehicle may be performed on the manoeuvring area; (b) communication means and procedures between the escorting and the escorted vehicle(s); (c) escorting procedures when more than one vehicle is to be escorted; and (d) procedures for ensuring that drivers of the escorted vehicles comply with the instructions provided by the air traffic services unit. The procedures should be coordinated with the air traffic services unit.
SMGCS	IR	ADR.OPS.B.030 (a)	(a) The aerodrome operator shall ensure that a surface movement guidance and control system (SMGCS) is provided at the aerodrome. The SMGCS shall: (1) take into account the design characteristics and the operational and meteorological conditions of the aerodrome, as well as human factors principles; (2) be designed to assist in the prevention of: (i) inadvertent incursions of aircraft and vehicles on an active runway; and (ii) collisions between aircraft as well as between aircraft and vehicles or objects on any part of the movement area; and (3) be supported by appropriate means and procedures.
Frequency	GM	GM1 ADR.OPS.B.031 (b)	SITUATIONAL AWARENESS Improving the situational awareness of vehicle drivers operating on the manoeuvring area is important, as it may also affect the situational awareness and decision-making of the air traffic services personnel and flight crews. Situational awareness is improved by conducting communications in a common frequency and language, whenever this is possible.
Standardized European Rules of the Air			
Frequency	GM	GM1 SERA.14015	In addition to the requirement in SERA.14015, positive consideration should be given by competent authorities to the benefits of situational awareness which could improve safety on airports and relevant surrounding airspace sectors by extending the use of the English language on some safety critical frequencies at aerodromes and relevant surrounding airspace sectors also with less than 50 000 commercial IFR movements per year, but with international traffic, and a large majority of qualified pilots with acceptable level of English. This consideration would in particular encompass: (a) use of a single frequency for all the safety-critical operations on a runway or a set of runways; (b) the need to and feasibility of applying the requirement for English-only communications also to communications with vehicles in order to enhance situational awareness; and (c) where this consideration could lead to a change in current communication arrangements, it should be based on the outcome of a local safety assessment.
Rules for Air Traffic Management/Air Navigation Services			
Frequency	IR	ATS.OR.425	(a) An air traffic services provider shall ensure that air-ground communication facilities enable direct, rapid, continuous and static-free two-way communications to take place between an aerodrome control tower and appropriately equipped aircraft operating at any distance within 45 km (25 NM) of the aerodrome concerned. (b) Where conditions warrant, an air traffic services provider shall provide separate communication channels for the control of traffic operating on the manoeuvring area.
Frequency	GM	GM1 ATS.OR.425(b)	Guidance on the establishment of communication channels for the control of traffic operating on the manoeuvring area may be found in Appendix A to Chapter 8, Section 2 of ICAO Doc 9426 'Air Traffic Services Planning Manual'.
Frequency	IR	ATS.OR.430	(a) An air traffic services provider shall ensure that direct-speech or data link, or both, communications are used in ground-ground communications for air traffic services purposes. (b) When communication for ATC coordination purposes is supported by automation, an air traffic services provider shall ensure that the failure of such automated coordination is presented clearly to the air traffic controller or controllers responsible for coordinating flights at a transferring unit.
Frequency	GM	GM1 ATS.OR.430(a)	Indication by time of the speed with which the communication should be established is provided as a guide to communication services, particularly to determine the types of communication channels required, e.g. that 'instantaneous' is intended to refer to communications which effectively provide for immediate access between air traffic controllers; '15 seconds' to accept switchboard operation and '5 minutes' to mean methods involving retransmission.

Subject	Status	Reference	Details
IR – Implementing Rule; AMC – Acceptable Means of Compliance; GM – Guidance Material			
Frequency	IR	ATS.OR.445	(a) Except where communication by a system of visual signals is deemed to be adequate, an air traffic services provider shall ensure two-way radiotelephony communication facilities for either of the following services: (1) aerodrome control service for the control of vehicles on the manoeuvring area; (2) AFIS for the management of vehicles on the manoeuvring area where such service is provided in accordance with point ATS.TR.305(f). (b) The need for separate communication channels for the control or for the management of the vehicles on the manoeuvring area shall be determined subject to a safety assessment. (c) Automatic recording facilities on all channels referred to in point (b) shall be provided.
Operational requirements	AMC	AMC1 ATS.TR.240(a)	CONTROL OF OTHER THAN AIRCRAFT TRAFFIC ON THE MANOEUVRING AREA (a) The movement of pedestrians or vehicles on the manoeuvring area should be subject to authorisation by the aerodrome control tower. Persons, including drivers of all vehicles, should be required to obtain authorisation from the aerodrome control tower before entry to the manoeuvring area. Notwithstanding such an authorisation, entry to a runway or runway strip or change in the operation authorised should be subject to a further specific authorisation by the aerodrome control tower. (b) When an aircraft is landing or taking off, the air traffic controller should not permit vehicles to hold closer to the runway-in-use than: (1) at a taxiway/runway intersection — at a runway-holding position; and (2) at a location other than a taxiway/runway intersection — at a distance equal to the separation distance of the runway-holding position.
SMGCS	IR	ATS.TR.245	Where deemed necessary, in the absence of visual observation of all or part of the manoeuvring area or to supplement visual observation, advanced surface movement guidance and control systems (A-SMGCS) or other suitable surveillance equipment, shall be utilised by the air traffic services unit in order to: (a) monitor the movements of aircraft and vehicles on the manoeuvring area; (b) provide directional information to pilots and vehicle drivers as necessary; (c) provide advice and assistance for the safe and efficient movement of aircraft and vehicles on the manoeuvring area.

III.5   EASA requirements on competence

III.5.1   The Basic Regulation (EU) No. 2018/1139, Annex VII, 2.1 (l) states "the aerodrome operator shall ensure that any person permitted unescorted access to the movement area or other operational areas is adequately trained and qualified for such access".

III.5.2   The Aerodrome operator shall implement a driver training programme (ADR.OPS.B.024 (b)) that covers the following areas:

> "(1) be appropriate to the characteristics and operation of the aerodrome, the driver's functions and tasks to be performed, and the areas of the aerodrome that drivers may be authorised to operate;
>
> (2) include:
>
> (i) theoretical and practical training of adequate duration, at least in the following areas:
>
> (A) regulatory framework and personal responsibilities;
>
> (B) vehicle standards, aerodrome operational requirements and procedures;
>
> (C) communications;
>
> (D) radiotelephony, for drivers that operate in the manoeuvring area;

(E) human performance;

(F) familiarisation with the operating environment;

(ii) competence assessment of the drivers."

III.5.3   The aerodrome operator shall also implement a system for the issuance of driving licences and monitor the compliance of drivers with driving requirements (ADR.OPS.B.024). Drivers who are allowed to drive on the manoeuvring area need additional training (AMC1 ADR.OPS.B.024(b) (a)). This also includes theoretical and practical radiotelephony training required for any driver on the manoeuvring area (AMC3 ADR.OPS.B.024(b)), such as:

- categories of messages

- use of phonetic alphabet

- pronunciation of letters, words and numbers

- use of standard phraseology

- read-back procedures

- test procedures

- transmitting techniques

III.5.4   AMC1 ADR.OPS.B.029(f) specifies again the focus of language training that should be on listening comprehension, speaking interaction and vocabulary building in job-related context.

III.5.5   The following table summarizes the most important aspects in EASA's requirements on the topic "competence" for vehicle drivers intending to operate on the manoeuvring area.

Table 17: Details on subtopics related to "competence" in ICAO rules

ID	Subtopic	Details
4.1	Competence	• Each person who is allowed to enter the movement area or other operational areas needs to be adequately trained and qualified
4.2	Licences	• No license for radiotelephony required
4.3	Training	• Recurrent training including theoretical and practical radiotelephony training

III.5.6   The most important EASA paragraphs from relevant regulations related to the "competence" are listed in Table 18. The relevant requirement ADR.OR.D.017 is not further presented as it deals with the general framework for training and proficiency check programmes.

Table 18: Most important EASA rules related to "competence"

Subject	Status	Reference	Details
IR – Implementing Rule; AMC – Acceptable Means of Compliance; GM – Guidance Material			
Basic Regulation (EU) No. 2018/1139			
Training	IR	Annex VII, 2.1 (k)	the aerodrome operator shall use only trained and qualified personnel for aerodrome operations and maintenance and shall, directly or through arrangements with third parties, implement and maintain training and checking programmes to ensure the continuing competence of all relevant personnel;
Competence	IR	Annex VII, 2.1 (l)	the aerodrome operator shall ensure that any person permitted unescorted access to the movement area or other operational areas is adequately trained and qualified for such access;
Aerodrome rules			
Training	AMC	AMC2 ADR.OPS.B.015 (d)	The aerodrome operator should ensure that personnel conducting movement area inspections should be trained in, at least, the following areas: (1) aerodrome familiarisation, including aerodrome markings, signs, and lighting; (2) Aerodrome Manual; (3) Aerodrome Emergency Plan; (4) Notice to Airmen (NOTAM) initiation procedures; (5) aerodrome driving rules; (6) procedures for radiotelephony, phraseology and ICAO phonetic alphabet; (7) aerodrome inspection procedures and techniques; (8) procedures for reporting inspection results and observations; (9) air traffic services procedures on the movement area; and (10) low-visibility procedures.
Training	IR	ADR.OPS.B.024 (b)	The aerodrome operator shall establish and implement a driving training programme for drivers that operate on the apron or other operational areas, except the manoeuvring area, and for drivers that operate on the manoeuvring area. The training programme shall: (1) be appropriate to the characteristics and operation of the aerodrome, the driver's functions and tasks to be performed, and the areas of the aerodrome that drivers may be authorised to operate; (2) include: (i) theoretical and practical training of adequate duration, at least in the following areas: (A) regulatory framework and personal responsibilities; (B) vehicle standards, aerodrome operational requirements and procedures; (C) communications; (D) radiotelephony, for drivers that operate in the manoeuvring area; (E) human performance; (F) familiarisation with the operating environment; (ii) competence assessment of the drivers.
Training	IR	ADR.OPS.B.024 (e)	The aerodrome operator shall: (1) establish a system and implement procedures for: (i) issuing driving authorisations and temporarily permitting the driving of vehicles; (ii) ensuring that drivers to whom a driving authorisation has been issued, continue to comply with points (c)(1) and (c)(2); (iii) monitoring the compliance of drivers with any driving requirements applicable at the aerodrome and for taking appropriate action, including the suspension and revocation of driving authorisations or permissions to temporarily drive a vehicle; (2) maintain relevant records.
Training	AMC	AMC1 ADR.OPS.B.024 (b)	(2) Manoeuvring area training programme This training should cover the additional specific needs of the drivers who will be operating on the manoeuvring area. A driver is granted the right to operate unescorted on the manoeuvring area subject to the: (i) provisions of ADR.OPS.B.024(a)(4) and AMC3 ADR.OPS.B.024(b); (ii) successful completion of the general driving training programme; and (iii) successful completion of the manoeuvring area training programme.
Training	AMC	AMC ADR.OPS.B.024 (b) (a)	Any driver who will be operating on the manoeuvring area should undertake and complete a radiotelephony training, demonstrating both theoretical knowledge and practical competency in voice communication procedures.
Training	AMC	AMC ADR.OPS.B.024 (b) (b)	Theoretical training The theoretical training should emphasise on the following areas: (1) Categories of messages Message categories and priorities; an understanding of distress, alerting, control and information messages. (2) Use of phonetic alphabet Correct pronunciation and transmission of letters, words and numbers.

Subject	Status	Reference	Details
IR – Implementing Rule; AMC – Acceptable Means of Compliance; GM – Guidance Material			
			(3) Use of standard phraseology (i) emphasis on the need for drivers to use standard phraseology; and (ii) the need for caution with certain phrases such as 'cleared' and 'go ahead'. (4) Use of call signs for aircraft, air traffic services, and vehicles (i) understanding of terminology and acronyms used by air traffic services and pilots; (ii) knowledge of the airline call signs used at the aerodrome; and (iii) knowledge of the vehicle call signs used at the aerodrome. (5) Read-back procedures The need for vehicle drivers to use standard read back, in the same manner as pilots, for instructions such as 'enter/cross the runway', and if conditional clearances are used. (6) Test procedures including readability scale Understanding and use of the readability scale from 1 to 5. (7) Transmitting techniques and use of radiotelephony (i) understanding the reasons for listening out prior to transmitting; (ii) use of standard phraseology and ICAO air-ground radiotelephony communication procedures; (iii) words and sounds to be avoided; (iv) correct positioning of microphones to avoid voice distortion; (v) avoidance of 'clipped' transmissions; (vi) awareness of regional accents and variations of speech; and (vii) speed of delivery of RTF phraseology.
Training	AMC	AMC3 ADR.OPS.B.024 (b) (c)	Practical training In this phase, the training should cover the use of fixed and portable radio communication devices, and the practical use of the theoretical knowledge acquired in the previous phase of the training, through the implementation of the aerodrome's communication procedures. The practical training on radiotelephony may be provided in the course of an overall practical training, which involves the training on the use of vehicles or specialised vehicle/equipment associated with the driver's task, or training on the operating procedures of the aerodrome, etc.
Training	AMC	AMC1 ADR.OPS.B.029 (f)	LANGUAGE TRAINING (a) Language training should contain communication in a job-related context particularly to handle abnormal and emergency situations and conduct non-routine coordination with air traffic controllers, colleagues and other technical staff. (b) Emphasis should be placed on listening comprehension, speaking interaction and vocabulary building.
Training	IR	ADR.OPS.D.080	(a) The aerodrome operator shall establish and ensure the implementation of a training programme for persons providing: (1) marshalling service; (2) "FOLLOW-ME" guidance. (b) The training programme shall be implemented in accordance with point ADR.OR.D.017 of Annex III. (c) The training shall be designed to impart fundamental knowledge and practical skills related to the execution of their duties. (d) The aerodrome operator shall ensure the implementation of a proficiency check programme for personnel referred to in point (a) in order to ensure: (1) their continued competence; (2) that they are aware of the rules and procedures relevant to their functions and tasks. The aerodrome operator shall ensure that persons referred to in point (a) undergo proficiency checks at intervals not exceeding 12 months since the completion of their initial training.
Training	AMC	AMC1 ADR.OPS.D.080(a)(2);(b)(2)(i)	TRAINING FOR 'FOLLOW-ME' VEHICLE DRIVERS (a) As part of the training programme, the initial training for 'FOLLOW ME' drivers should cover, at least, the following aspects: (1) the role and responsibilities of the 'FOLLOW-ME' driver; (2) the content of AMC2 ADR.OPS.B.025 'Operation of vehicles'; (3) 'FOLLOW-ME' specific communication procedures, including radiotelephony procedures; (4) the visual signals included in Appendix 1 'Signals' to the Annex to Commission Regulation (EU) No 923/2012 of 26 September 2012; (5) aircraft taxiing speed and appropriate aircraft–vehicle spacing; (6) specific procedures for guiding aircraft and/or vehicles; (7) aircraft characteristics, both physical and operational; (8) 'FOLLOW-ME' specific procedures for low-visibility operations; (9) emergency procedures in the event of an accident or an incident; and (10) the operation of 'FOLLOW-ME' vehicles and their equipment. (b) 'FOLLOW-ME' vehicle drivers should be briefed or, if required, trained in new procedures or in changes to existing procedures.

III.6   EU requirements on aerodrome equipment

III.6.1   Commission Implementing regulation 2021/116 states in the preamble (16): [18]

"Airport integration and throughput should facilitate the provision of approach and aerodrome control services by improving runway safety and throughput, enhancing taxi integration and safety and reducing hazardous situations on the runway."

III.6.2   The Commission Implementing regulation 2021/116 defines in total 6 ATM functionality (AF) groups required for supporting the implementation of the European Air Traffic Management Master Plan. ATM functionality group number 2 (AF 2) is related to airport integration and enhancing throughput and one of the considered aspects focuses on the exchange of updated operational information and data with all stakeholders involved in the turnaround of air traffic.

III.6.3   Furthermore, in Annex 2.1.1 of the regulation, an electronic clearance input (ECI) system such as the EFS or stripeless systems is required to be implemented, allowing the air traffic controller to input all clearances given to aircraft or vehicles into the ATC system. The system must have appropriate interfaces with A-SMGCS and airport safety nets, allowing the integration of the instructions given by the air traffic controller with other data such as flight plan, surveillance, routing, published routes, gate allocation and procedures. [18]

III.6.4   Section Annex 2.1.3. of the regulation describes airport safety nets:

"— the airport safety support service, which contributes to airside operations as a safety improvement enabling air traffic controllers to prevent hazards and incidents resulting from air traffic controller, flight crew or vehicle driver operational errors or deviations. Such service depends on the surveillance service being in operation;

— the detection and alerting of conflicting ATC clearances to aircraft and deviation of vehicles and aircraft from their instructions, procedures or routing that may potentially put the vehicles and aircraft at risk of a collision."

III.6.5   Furthermore, it is required that Advanced Surface Movement Guidance and Control System (A-SMGCS) data and air traffic controller clearances related to the manoeuvring area has to be integrated. Following safety nets need to be implemented, based on the before mentioned integration between A-SMGCS data, the assigned runway and holding point and clearances given to aircraft and vehicles by the air traffic controller:

- Detection of conflicting ATC clearances (CATC) as preventive alerting system,

- Conformance monitoring of alerts for controllers (CMAC) as preventive alerting system,

- Runway monitoring and conflict alerting (RMCA) as short-term alerting system.

III.6.6   Airport safety nets must alert air traffic controllers when aircraft and vehicles deviate from ATC instructions, procedures or route. The air traffic controller instructions must be integrated with published rules and procedures, and other available data such as flight plan, surveillance and routing. The integration of that data allows the system to monitor the information and alert the air traffic controller when inconsistencies are detected.

III.6.7   The airport safety nets must be implemented by 31 December 2025 for following airports:

- Adolfo Suárez Madrid-Barajas,

- Amsterdam Schiphol,

- Barcelona El Prat,

- Berlin Brandenburg Airport,

- Brussels National,

- Copenhagen Kastrup,

- Dublin,

- Düsseldorf International,

- Frankfurt International,

- Milan-Malpensa,

- Munich Franz Josef Strauss,

- Nice Cote d'Azur,

- Palma De Mallorca Son Sant Joan,

- Paris-CDG,

- Paris-Orly,

- Rome-Fiumicino,

- Stockholm-Arlanda,

- Vienna Schwechat.

III.7   Specific national regulations of EASA member states

III.7.1   All EU/EASA member states are first and foremost subject to EU/EASA legislation (principle of the primacy). Nevertheless, there are regulations at the national level that go beyond the provisions of EASA regarding radiotelephony procedures and the use of languages.

III.7.2   In order to understand what it might mean for individual countries to implement "Triple One", the following sections take a look at the national regulations of individual non-English speaking EU/EASA countries.

III.7.3   Germany

III.7.3.1   The German "Verordnung über Flugfunkzeugnisse (LuftfunkV)" § 1 states that a valid radiotelephony certificate is required for the operation of aeronautical radio navigation services. Different types of radiotelephony certificates exist according to FlugfunkV §2, either in English or German language, depending on the intended use. However, there are several exemptions from this requirement for the following groups:

- pilots in training

- vehicles in communication with balloons, gliders and sports equipment

- authorised persons who carry out maintenance and repair work on radio equipment and who, in the course of this activity, participate in aeronautical radio for checking purposes

- authorised persons using motor vehicles to move around the operational areas of an airport

- fire brigades of airport companies at aerodromes

III.7.3.2   In conclusion, aerodrome personnel do not need to have a radio telephony certificate.

III.7.3.3   The German Air Navigation Service Provider (DFS) regularly publishes the "Nachrichten für Luftfahrer (NfL)". The NfL contain announcements of information and instructions concerning aviation for all participants in air traffic. A NfL is the binding publication for all air traffic users, including air sports pilots, flying in German airspace. They are updated as required (approx. 2x per month).

III.7.3.4   The NfL 2021-1-2304 contains information on standard phraseology in German and radio telephony procedures. It also includes the information that radio communications are to be conducted in English language or German, while the English language is to be used preferably. German may be used when the frequency concerned is approved for

it. The indication of the languages which may be used in radio communication with a particular ground station is part of the aeronautical information publication.

III.7.3.5   Any aircraft shall be capable to use the English language when operating on routes which may be used in international air traffic. In emergencies, any language can be used that is sufficiently mastered by all parties involved.

III.7.3.6   With regards to the provision of frequencies for the control of air traffic and vehicles management associated with a runway, no specific national requirements exist.

III.7.4   Poland

III.7.4.1   In Poland any driver who is allowed to operate on the manoeuvring area should undertake a complete radiotelephony training, demonstrating both theoretical knowledge and practical competency in voice communication procedures. Furthermore, a valid radiotelephony certificate is required for the operation of aeronautical radio navigation services. There are two different types of certificates:

- Airport station radiotelephone operator's certificate (for ground staff operating on the VHF)

- General radiotelephone operator's certificate (for flight deck crews)

III.7.4.2   However, usually aerodrome personnel do not communicate on the Tower frequency but on a separate trunked radio frequency. In Warsaw, for example, according to the aerodrome manual, for ground staff it is even forbidden to communicate in any language other than Polish, because otherwise the situational awareness of the drivers who are not English fluent would not be on the expected level.

Part IV   Further regions and other studies and literature – D-1.3

IV.1   Introduction

IV.1.1   In addition to ICAO and EU/EASA regulations, within this study regulations of three major international aviation regions – the United States FAA, the Australian CASA and Transport Canada – shall be reviewed for the 4 defined topics in chapter I.4 related to "Triple One". In the following sections the most important aspects from these regions are highlighted.

IV.1.2   Furthermore, a list of studies and literature with relevant topics can be found in section IV.5.

IV.2   USA - Federal Aviation Authority (FAA)

IV.2.1   Regulatory requirements on airport operations are contained in Title 14 Code of Federal Regulations (CFR) Part 153 of the Federal Aviation Regulations (FAR). Regulations on airport certification are contained in CFR Part 139. Requirements on aeronautical telecommunications can be found in Title 47, Chapter I, Subchapter D, Part 87. In addition, the FAA issues non-binding advisory circulars (AC) to provide guidance and information or to show a method acceptable to the Administrator for complying with a related Federal Aviation Regulation.

IV.2.2   As the United States are a mainly English-speaking country provisions on language proficiency requirements for ground vehicle operators are kept on very generic level. According to FAA Advisory Circular 150/5210-20A, 3.4 vehicle operators have to be able to understand and communicate in English. Language proficiency tests can be made by the hiring authority. AC 60-28B introduces the FAA Aviation English Language Standard (AELS) that is basically conform with the ICAO language proficiency table. The minimum level is Level 4.

IV.2.3   FAA has dedicated a Guide to Ground Vehicle Operations [30] on how to operate on the movement and safety area, read-back procedures, standard phraseology to be used and procedures for authorisation and communication with ATC.

IV.2.4   Different to EASA and ICAO, in FAR requirements, the control of and communication with vehicles are always specified for movement and safety areas, not for the manoeuvring area.

IV.2.5   According to 14 CFR § 139.329(b) establishing procedures for the safe access to and operation in movement and safety areas are required at all certified airports. In addition, two-way radio communications are required when on movement or safety areas. A

vehicle ("aeronautical utility mobile station") must monitor its assigned frequency during periods of operation under 47 CFR § 87.345.

IV.2.6   Under 47 CFR § 87.417 the purpose of the tower frequency is to provide air traffic control services to aircraft landing, taking off and taxing on the airport as well as aircraft transiting the airport traffic area. For the control of ground vehicles, a separate ground control frequency shall be used according to 47 CFR § 87.349. A vehicle may only be assigned the tower or RCO frequency if the assignment is specifically approved by the FAA. A special characteristic in the US airspace is the Unicom frequency, which is reserved for safety information related with aircraft operations, such as runway condition, fuel types, wind conditions, weather information, dispatching etc. (47 CFR § 87.213). Vehicles which operate on the airport's Unicom frequency or the frequency 122.900 MHz are authorized only to transmit information relating to safety, such as runway conditions and hazards on the airport (47 CFR § 87.345).

IV.2.7   The FAA's efforts go in a different direction than those of EASA. This means that communication with ground vehicles should not be conducted on the same frequency as the control service for arriving and departing aircraft, unless authorised by the FAA. However, the AC 150/5220-26 recommends that all vehicles at an airport should be equipped with Automatic Dependent Surveillance-Broadcast (ADS-B). This allows pilots to see the position of vehicles on moving maps in the cockpit, as all aircraft (except gliders) must be equipped with ADS-B as of January 2020 (14 CFR § 91.225). This will improve surveillance for the tower and create a common situational awareness for drivers and pilots.

IV.2.8   To be allowed to use a radio station an operator must hold a commercial radio operator license or permit according to 47 CFR § 87.89. There are different types of radio operator licenses defined in 47 CFR § 87.87. In addition, training is required in airport communications for personnel with access to movement and safety areas according to 14 CFR § 139.303.

IV.3   Australia - Civil Aviation Safety Authority (CASA)

IV.3.1   Australian regulations on aviation are contained in the Civil Aviation Safety Regulations (CASRs), replacing former Civil Aviation Regulations (CARs). The CASRs consist of different parts whereas each part may have supporting documents like binding manuals of standards (MOS) and Advisory Circulars (ACs) that provide recommendations and guidance.

IV.3.2   As is the case with the FAA, CASA does not have detailed language proficiency requirements for vehicle drivers, as it is an English-speaking country. According to

Part 61 MOS, General English Language Proficiency (GELP) and Aviation English Language Proficiency (AELP) must be demonstrated to obtain a pilot licence and an aeronautical radio operator certificate (AROC). An AROC is required by anyone who needs to communicate on an aviation air-band radio frequency and is not already licensed or qualified.

IV.3.3   Similar to the FAA, CASA provides Unicom services for air-to-air communications on aerodrome and weather information.

IV.3.4   Vehicles on the manoeuvring area must be fitted with surveillance and radiocommunication equipment or be accompanied by another vehicle according to Civil Aviation Safety Regulations 1998. Persons operating a vehicle must hold an appropriate licence, know relevant terminology, be familiar with the airport, understand signs and markings and be content in use of radio communication (MOS Part 139, 10.9.3.2). However, other than that requirements are kept mostly on a generic level.

IV.3.5   On airport level, it seems to be common practice to have a publicly available handbook on vehicle control, wherein detailed aerodrome operational requirements and procedures are specified. Several Australian airports are equipped with the Advanced Surface Movement Guidance Control System (A-SMGCS), which allows both aircraft and vehicles to be closely monitored on the movement area. Vehicles are equipped with a vehicle locator, called a "VeeLo", which is normally installed to be turned on and off by the vehicle's ignition switch and only transmits to air traffic control when the vehicle is in an area of interest to air traffic control.

IV.4   Canada – Transport Canada

IV.4.1   The requirements contained in Canadian Aviation Regulations (CARs) and standards (SOR/96-433) focus mainly on ATC and air crew.

IV.4.2   Section 804.26 states that a person who assesses runway visibility shall be qualified to operate a vehicle equipped with a two-way radio communication system on the manoeuvring area of the aerodrome. However, there is no requirement dedicated to vehicles on the manoeuvring area in general.

IV.4.3   As vehicles on the manoeuvring area take part in radiocommunications, section 602.133 of SOR/96-433 Division VIII — Radiocommunications, stating that English and French are the languages of aeronautical radiocommunication in Canada, is also applicable to vehicle drivers. For air traffic, according to section 602.134, any person operating an aircraft who wishes to receive air traffic services in English or French shall so indicate to the appropriate air traffic control unit or flight service station by means of an initial

radiocommunication in English or French, as appropriate. Whether this can be applicable to ground vehicle traffic on the manoeuvring area is not indicated.

IV.4.4   Section 602.135 of SOR/96-433 states that all air traffic control units and flight service stations shall provide aeronautical radiocommunication services in English.

IV.4.5   For aircrew and Air Traffic Controllers, Transport Canada has implemented the Canadian language proficiency scale which is similar to the ICAO language proficiency rating scale. Aircrew and ATCOs need the operational level in English and/or French for the issuance of their licenses. The language requirements do not apply to vehicle drivers who are allowed to drive on the manoeuvring area.

IV.4.6   In addition to binding requirements in Canadian Aviation Regulations (CARs) and Standards, there are various advisory circulars providing more details.

IV.4.7   AC no. 401-009 on the Conduct of Aviation Language Proficiency Demonstrations provides guidance regarding the conduct of formal and informal aviation language proficiency demonstrations for anyone involved in the aviation language proficiency program. Vehicle driver with access to the manoeuvring are not part of that group.

IV.4.8   AC no. 302-004 on the 'Use of a Follow-me Vehicle Service to Support Reduced/Low Visibility Operations' indicates that Follow-me vehicles "must have appropriate communications equipment, and the vehicle is to be on a common frequency with aircraft [Ground, tower, Mandatory Frequency (MF) or Aerodrome Traffic Frequency (ATF) as appropriate]." (AC no. 302-004, 4.3c). However, this requirement cannot be transferred to all vehicles on the manoeuvring area.

IV.4.9   Alongside the CARs and Standards as well as Advisory Circulars by Transport Canada, the Canadian civil air traffic services provider NAV CANADA has published phraseology guides for visual flight rules (VFR), instrument flight rules (IFR), area navigation (RNAV), and ground traffic operations. These guides support standardized communications and are intended as learning tools and reference guides to phraseology for pilots, ATCOs and vehicles drivers. Standardized phrases for ground-to-ground communication can be found the Ground Traffic Phraseology Guide, Version 3, April 2022 [34].

IV.5   Studies and literature – D-1.5

IV.5.1   Table 19 includes a list of relevant studies and literature, presentations, and other reference materials on the contents related with the "Triple One" concept.

Table 19: List of studies and literature related with elements of "Triple One"

Document	General content	1 Language	2 Radio comm. Proc.	3 Ops. of veh. on the MA	4 Competence
CAP 413 – Manual on Radiotelephony [31]	• guide on clear, concise, standardised phraseology for pilots, ATCOs and ground personnel in UK airspace		x	x	
Supplement to CAP 413 – A reference guide to UK phraseology [32]	• Guide on standard phraseology in different situations for aerodrome drivers		x	x	
EGAST – A guide to Phraseology for general aviation pilots in Europe [33]	• guide on standard phraseology and radio communication procedures dedicated to GA pilots		x		
airservices – An airside driver's guide to runway safety [34]	• a guide how to operate in the aerodrome environment, follow ATC instructions, maintain situational awareness, standard phraseology and communication procedures for vehicle drivers			x	
FAA Guide to Ground vehicle operations [30]	• a guide how to operate in the aerodrome environment, standard phraseology and communication procedures for vehicle drivers			x	
59TH ANNUAL CONFERENCE, WP No. 156 -The Use of Aerodrome Control Frequency for Communications of Vehicle Drivers [35]	• working paper on "Triple One" Concept with exemplary incidents where vehicles were not on the runway frequency • discussion of difficulties	x	x	x	
Nav Canada - Ground Traffic Phraseology [36]	• phraseology for ground vehicle operators		x		
ACRP - Advanced Ground Vehicle Technologies for Airside Operations [37]	• study on potential for advance ground vehicle technologies to improve operations in the airside environment			x	
Airservices Australia – Runway incursion analysis [38]	• Contributing factors: situational awareness, communication (e.g. wrong frequency), non-compliance with ATC/AIP Includes "Lessons Learned" and different statistics, as well as incidents in Australia and the contributing factor			x	
ICAO – Global Runway Safety Action Plan [39]	• recommendations for runway incursion prevention			x	
Eurocontrol – Use of aerodrome Tower VHF frequency by vehicle drivers involved in runway operations [40]	• Questionnaire answers on "one runway, one frequency"	x	x	x	x

Part V   Gap Analysis – D-1.4

V.1   Introduction

V.1.1   In the following sections a regulatory gap analysis is conducted for requirements by EU/EASA compared to ICAO (section V.2) and to what extent recommendations from the EAPPRI are already considered in EU/EASA regulations.

V.2   Differences in EU/EASA and ICAO legislation

V.2.1   Basic language proficiency requirements set by ICAO and EASA are similar. Both require at least the operational level (level 4) in the language used for radiotelephony. Language proficiency shall be checked in regular intervals. However, EASA is stricter on the language(s) to be used. It stipulates that English language proficiency is required in addition to the national language(s) whereas ICAO specifies this as alternative ("or"). Nevertheless, ICAO also recommends the use of standard aviation English at international aerodromes to improve the situational awareness. EASA offers the possibility to exempt vehicle drivers from the English language proficiency requirements via a safety assessment.

V.2.2   Provisions on radio communication procedures in EASA and ICAO regulations are essentially the same. Authorisation must be sought by ATC when entering the manoeuvring area, two-way radio communication established, continuous listening watch obtained and read-back procedures observed. Standard phraseology shall be used as far as possible, however, there is no specific phraseology dedicated to aerodrome vehicle drivers.

V.2.3   When it comes to the radio communication frequency for control of vehicles on the manoeuvring area, EASA and ICAO both recommend conducting all communications associated with a runway on one frequency, when conditions allow. Nevertheless, ICAO recommends to not conduct coordination and cooperation between aeronautical stations on the main frequency. Both, ICAO and EASA, stipulate that whenever required by local conditions a separate communication channel shall be used for the control of vehicles on the manoeuvring area. EASA calls for a safety assessment to prove the need for a second control channel.

V.2.4   Both, EASA and ICAO, require a training programme for vehicle operators who are allowed to operate on the manoeuvring area, including radiotelephony training. While competency in radiotelephony procedures and phraseology is to be ensured through training according to EASA, ICAO indicates that a state radio operator's licence may be

required. In the table below the differences and similarities between ICAO and EU/EASA regulations are summarized.

Table 20: ICAO vs. EASA requirements for vehicle drivers on the manoeuvring area related with "Triple One"

Topic	Subtopic	ICAO	EASA
Language	Language	Local language(s) or English; Recommendation: use of aviation English	English and local language(s); Exemption for English through SA possible
	Language proficiency	Operational level (level 4)	
	Proficiency checks	Regular checks: • every 4 years (level 4) • every 6 years (level 5)	
Radio Communication Procedures	Rules for communication	• Clear, unambiguous precise and short messages • Continuous listening watch on the manoeuvring area • Strict adherence to readback procedures • Authorisation by ATC before entering manoeuvring area • Acknowledging of messages • Follow instructions by ATC	
	Phraseology	Standard phraseology whenever possible; Recommendation: limited set of standard phraseology for vehicle drivers to be developed	Phraseology training as part of language training
	Call Signs	Vehicle call signs differing from aircraft call signs	
Operation of vehicles on the manoeuvring area	Frequency	• All communications associated with a runway on one frequency, when conditions allow • However, coordination and cooperation not in main frequency • Frequency coupling recommended when more than one frequency is used	• Recommendation: use of a single frequency for all safety-critical operations on a runway or a set of runways • When required separate control channels; however, the need shall be demonstrated in a safety assessment
	Operational requirements	• Entering of the manoeuvring area only as authorized by the aerodrome control tower • Two-way radio communication for vehicles on the maneouvring area to ATC is recommended but not necessarily required	• Entering of the manoeuvring area only as authorized by the aerodrome control tower • Two-way radio communication for vehicles, unless escorted
	SMGCS	Monitoring of vehicles must be ensured by a SMGCS	
	Vehicle equipment requirements	• Vehicles operating on the manoeuvring area should be equipped with radio communication devices, unless escorted	• Radio communication devices, unless escorted • Transponder if required for SMGCS • Movement area chart
Competence	Competence	• High level of competence in RTF phraseology and ICAO language requirements	• Each person who is allowed to enter the movement area or other operational areas needs to be adequately trained and qualified
	Licences	• A state's radio operator's licence may be required	• No license for radiotelephony required
	Training	• Radiotelephony training	• Recurrent training including theoretical and practical radiotelephony training

V.3   EAPPRI recommendations in EU/EASA legislation

V.3.1   Table 21 provides a complete analysis of which EAPPRI recommendations related with the elements of "Triple One" are already included in EU/EASA regulations. Some are covered completely, some partly and some are not yet included for various reasons.

Table 21: EASA requirements vs. EAPPRI recommendations for vehicle drivers on the manoeuvring area

Topic	#	EAPPRI recommendation	Included in EU/EASA regulations	Details
green = included; orange = partly included; red = not included				
Language	1.3.4	Where practicable, improve situational awareness by conducting all communications associated with runway operations using aviation English.	ADR.OPS.B.029	• Drivers intending to drive on the manoeuvring area shall be able to speak English as well as any other language(s) used at the aerodrome for communication with ATC to at least the operational level (level 4) • Remark: applicable to all manoeuvring area, not only the runway as EAPPRI implies
Radio Communication Procedures	1.3.1 a)	To avoid the possibility of call sign confusion, implement the use of full aircraft or vehicle call signs for all communications concerning runway operations	X	
	1.3.1 b)	To avoid call sign confusion at aerodromes, implement the introduction of discrete RTF call signs to manoeuvring area vehicles.	ADR.OPS.B.026 (d), (f); GM1 ADR.OPS.B.026(d)	• A system of call signs for vehicles coordinated with ATC and in such a way that confusion with aircraft call signs is avoided shall be established
	1.3.2	Implement, monitor and ensure the use of standard phraseologies as applicable: EU: SERA Part C AMC ICAO: Doc. 4444, PANS-ATM	SERA.14001	• Standard phraseology has to be used in every situation for which it has been designed for; however, there is no specific phraseology dedicated to aerdrome vehicle drivers
	1.3.3	Implement, monitor and ensure the use of the readback procedure (also applicable to manoeuvring area drivers and other personnel who operate on the manoeuvring area)	ADR.OPS.B.027 (c)	• Read back to the air traffic services personnel safety-related parts of the instructions
	1.3.6	Consider regular evaluation of radio telephony practices, assessing elements such as frequency loading and use of EU/ICAO compliant phraseology	X	
Operation of vehicles on the manoeuvring area	1.2.6	Promote the adoption of 'sterile cab' procedures to improve communications when on the manoeuvring area.	AMC1 ADR.OPS.B.027(h)(2)	• When driving, a 'sterile-cab concept' should be implemented
	1.2.8 a)	Ensure all vehicles on the manoeuvring area are in radio contact with the appropriate Air Traffic Control service, i.e. ground and/or the tower either directly or through an escort	ADR.OPS.B.026; ADR.OPS.B.027	• Radio contact for all vehicles on the manoeuvring area, directly or through an escort
	1.2.8 b)	Assess the numbering policy for aerodrome vehicles and consider assignment of unique numbers or airside identification call signs for each airside vehicle (to reduce the risk of vehicle related call sign confusion).	ADR.OPS.B.026 (d), (f); GM1 ADR.OPS.B.026(d)	• A system of call signs for vehicles coordinated with ATC and in such a way that confusion with aircraft call signs is avoided shall be established

Topic	#	EAPPRI recommendation	Included in EU/EASA regulations	Details
		green = included; orange = partly included; red = not included		
	1.2.10	Enable the tracking of vehicle movements on the manoeuvring area when possible.	ADR.OPS.B.030 (a); AMC1 ADR.OPS.B.030(a)	• The aerodrome operator shall ensure that a surface movement guidance and control system (SMGCS) is provided at the aerodrome
	1.2.11 c)	Introducing procedures to increase situational awareness (of ATC and drivers) when vehicles occupy a runway (e.g. Vehicle 'Operations Normal' calls to ATC)	X	
	1.2.11 d)	Temporarily suspending operations to allow a full runway inspection to be carried out without interruption	AMC2 ADR.OPS.B.015 (c)	• The inspection procedures should also cater for the temporary suspension of runway operations to allow a full runway inspection to be carried out without interruption, and should address the need to effectively inspect unidirectional lights.
	1.2.17 b)	Ensure that the Protected Area map is used in manoeuvring area driver training and is present in all vehicles that are driving on the manoeuvring area.	AMC1 ADR.OPS.B.026(a)(1);(3)	• An updated copy of the movement area chart of sufficient size, including hot spots, as well the visual aids configuration on the aerodrome, and areas to be safeguarded should be available in vehicles
	1.3.5	When practicable, improve situational awareness, by implementing procedures whereby all communications associated with runway operations are on a common or cross-coupled frequency.	GM1 ADR.OPS.B.031(b); GM1 SERA.14015; ATS.OR.425	• Recommendation to improve situational awareness by conducting communications in a common frequency and language, whenever this is possible • Recommendation to use of a single frequency for all the safety-critical operations on a runway or a set of runways • Separate channels for air traffic and vehicles, when required
	1.9.1	Improve situational awareness by adopting the use of technologies that enable operational staff on the manoeuvring area to confirm their location in relation to the runway e.g. via GPS with transponder or airport moving maps, visual aids, signs etc.	ADR.OPS.B.030	• The aerodrome operator shall ensure that a surface movement guidance and control system (SMGCS) is provided at the aerodrome, including visual aids • The greatest benefit to situational awareness, however, would have moving maps
Competence	1.2.3 a)	Assess formal Driver training and refresher programmes (including practical training and proficiency checks) against driver training guidelines e.g. the training programme frame work at Appendix C.	ADR.OPS.B.024 (b) AMC1 ADR.OPS.B.024(b) (a)	• Requirement to establish driver training programme by ADR Operator • Training for drivers on the manoeuvring area
	1.2.3 b)	Carry out regular audits of airside driving permits (e.g. check 'recency' of use) in particular those allowing access to the runways, which should be as few as possible	ADR.OPS.B.024 (e)	• Requirement to establish a system of driving licenses
	1.2.4	Assess formal RTF communications training and assessment for drivers and other personnel who operate on or near the runway	AMC3 ADR.OPS.B.024(b) (a)	• Radiotelephony training required for any driver on the manoeuvring area

Part VI   Summary and conclusion

VI.1   In this regulatory assessment, as Task 1 of the study on the "Triple One" concept, an overview of the regulatory framework of ICAO and EASA was provided as well as a comparison drawn to the regions USA, Australia and Canada.

VI.2   In summary, both ICAO and EASA have recognized the benefit in situational awareness of all parties involved in runway operations, if vehicle drivers in the close area of the runway communicate on the same frequency as air traffic, and have included recommendations and partly binding requirements.

VI.3   It should be emphasized, however, that the recommendations in the EAPPRI refer to the runway operations, while ICAO and EASA requirements cover the entire manoeuvring area. The FAA should be mentioned at this point, whose regulations always refer to the runway and safety areas in accordance with the EAPPRI recommendations.

VI.4   The main difference between ICAO and EASA requirements is the stringency of the rules. While ICAO mainly gives recommendations on the language and frequency to be used, some of these recommendations are already mandatory under the EASA regulatory framework. This involves that under EASA rules all drivers with access to the manoeuvring area must speak operational English (with exceptions). Specific phraseology tailored to operational situations of aerodrome vehicle drivers does not currently exist in the regulations, although standardized phrases shall be used whenever possible. For communication between air traffic controllers and pilots, on the other hand, it is only mandatory to use English at airports with more than 50,000 international IFR movements per year.

VI.5   ICAO accepts the possibility that a license to use aviation frequencies may be required at the national level. This has been implemented in many countries, for example the USA, Australia and also EU/EASA member states such as Germany and Poland. However, the need for a specific radiotelephony license is not specified at EASA level.

VI.6   Following the regulatory analysis and research of studies and literature on the topic of "one runway, one frequency, one language", it could be determined that it is not a new topic (partly already discussed by Eurocontrol in 2014 [40]) and that there is a worldwide awareness of it. Countries like the USA with the FAA are taking a different track than EU/EASA and are following the approach of equipping all vehicles with ADS-B. According to the FAA, vehicles are even prohibited from transmitting on the air traffic frequency.

VI.7   Considerable progress has been made in legislation with regard to the elements of "Triple One", yet it remains a challenge to find a uniform regulation that can be

implemented by every Member State and every airport within the scope of EASA without insurmountable challenges.

Reference List

[1] Eurocontrol, *European Action Plan for the Prevention of Runway Incursions (EAPPRI), Version 3.0,* 2017.

[2] ICAO, *Annex 1 – Personnel Licensing, 14th Edition,* July 2022.

[3] ICAO, *Annex 6 – Operation of Aircraft, Part I – International Commercial Air Transport – Aeroplanes, 12th Edition,* July 2022.

[4] ICAO, *Annex 6 – Operation of Aircraft, Part II – International General Aviation – Aeroplanes, 11th Edition,* July 2022.

[5] ICAO, *Annex 10 – Aeronautical Telecommunications, Volume II – Communication Procedures inlcuding those with PANS status, 7th Edition,* July 2016.

[6] ICAO, *Annex 11 – Air Traffic Services, 15th Edition,* July 2018.

[7] ICAO, *Annex 14 – Aerodromes, Volume I – Aerodrome Design and Operations, 9th Edition,* July 2022.

[8] ICAO, *Doc 4444 – PANS Air Traffic Management, 16th Edition,* 2016.

[9] ICAO, *Doc 9981 – PANS Aerodromes, 3rd Edition,* 2020.

[10] ICAO, *Doc 9432 – Manual of Radiotelephony, 4th Edition,* 2007.

[11] ICAO, *Doc 9137 – Airport Services Manual, Part 8, 1st Edition,* 1983.

[12] ICAO, *Doc 9835 – Manual on the Implementation of ICAO Language Proficiency Requirements, 2nd Edition,* 2010.

[13] ICAO, *Doc 9870 – Manual on the Prevention of Runway Incursions, 1st Edition,* 2007.

[14] ICAO, *Doc 9426-AN/924 - Air traffic services planning manual, first edition,* 1984.

[15] EASA, *Regulation (EU) No. 2018/1139,* 2018.

[16] EASA, *Commission Regulation (EU) No 139/2014,* 2014.

[17] EASA, *Commission Implementing Regulation (EU) No 923/2012,* 2012.

[18] EASA, *Commission Regulation (EU) No 1178/2011,* 2011.

[19] EASA, *Commission Regulation (EU) No 965/2012,* 2012.

[20] EASA, *Commission Implementing Regulation (EU) 2017/373,* 2017.

[21] EASA, *Commission Regulation (EU) 2015/340,* 2015.

[22] EASA, *Commission Delegated Regulation (EU) 2020/2148,* 2020.

[23] EASA, *ED Decision 2021/003/R - AMC & GM to Regulation (EU) No 139/2014 - Issue 1, Ammendment 5,* 2021.

[24] EASA, *Commission Regulation (EU) No 245/2014,* 2014.

[25] EASA, *Commission Implementing Regulation (EU) 2016/1185,* 2016.

[26] EASA, *ED Decision 2016/023/R,* 2016.

[27] EASA, *ED Decision 2022/020/R,* 2022.

[28] EASA, *Commission Delegated Regulation (EU) 2022/208,* 2021.

[29] EASA, *Commission Implementing Regulation (EU) 2020/469,* 2020.

[30] FAA, *FAA Guide to Ground Vehicle Operations.*

[31] CAA, *CAP 413 - Radiotelephony Manual, Edition 23 Corr,* 2020.

[32] CAA, *Supplement to CAP 413 – A reference guide to UK phraseology for aerodrome drivers,* 2008.

[33] EGAST, *A guide to phraseology for general aviation pilots in Europe,* 2010.

[34] airservices, *An aiside driver's guide to runway safety, 6th edition,* 2016.

[35] IFATCA, *WP No 156 - The Use of Aerodrome Control Frequency for Communications of Vehicle Drivers,* 2020.

[36] Nav Canada, *Ground traffic phraseology, Version 3,* 2022.

[37] ACRP, *Advanced Ground Vehicle Technologies for Airside Operations,* 2020.

[38] airservices, *Runway Incursion Analysis,* 2017.

[39] ICAO, *Runway Safety Programme - Global Runway Safety Action Plan,* 2017.

[40] Eurocontrol, "Use of aerodrome Tower VHF frequency by vehicle drivers involved in runway operations," 2014. [Online]. Available: https://skybrary.aero/articles/use-aerodrome-tower-vhf-frequency-vehicle-drivers-involved-runway-operations. [Accessed 19 06 2023].

[41] EASA, *AMC & GM to Annex IV (Part-CAT) to Commission Regulation (EU) No 965/2012 - Issue 2, Amendment 21,* 2022.

[42] EASA, *Regulation (EU) 2015/340,* 2015.

[43] EASA, *ED Decision 2020/008/R,* 2020.

[44] EASA, *AMC & GM to Regulation 2015/340 — Initial issue,* 2015.

[45] EASA, *AMC & GM to Regulation (EU) No 923/2012 — Issue 1, Amendment 5,* 2022.

[46] EASA, *AMC & GM to Regulation (EU) No 1178/2011 - Initial Issue,* 2018.

[47] EASA, *AMC & GM to Commission Implementing Regulation (EU) 2017/373— Issue 1, Amendment 1,* 2017.

[48] EASA, *ED Decision 2011/016/R,* 2011.

[49] EASA, *ED Decision 2015/010/R,* 2015.

[50] EASA, *GM to Regulation (EU) No 965/2012 — Issue 1, Amendment 3,* 2019.

[51] FAA, *PART 153 - AIRPORT OPERATIONS, Docket No. FAA–2007–29237, 73 FR 47827,* 2018.