SCOPING DOCUMENT

Version: 1

Date: 22.01.2024

1 INTRODUCTION

1.1 OBJECTIVES OF THIS DOCUMENT

The main objective of this document is to describe the planned airspace risk assessment (ARA) to be conducted for Tallinn CTR to determine the potential U-space airspace location within the CTR. The ARA project will help to overview Tallinn CTR airspace demand by manned and unmanned stakeholders in preparation for determining potential U-space locations within Tallinn CTR, either as a single block or as a combination of sectors/structures.

The ARA project will collect and analyze data which helps to understand the needs of both manned and unmanned traffic. The ARA project will include the assessment of the risks related to unmanned operations regarding safety, security, privacy, and environmental impact, and produce a series of recommendations for the performance requirements for UAS and U-space services.

The ARA project is also expected to output recommendations for designing airspace (incl. geographical zones) in a safe and efficient way, by determining the applicable operational conditions and airspace constraints.

Regarding the scope of the assessment, the geographic limits of the airspace volume considered in the assessment (defined as the assessed airspace volume) will be the whole current Tallin CTR, including horizontal and vertical dimensions.

Finally, regarding the definition of the potential U-space airspaces, the expectation is that the vertical limit of the U-space will be approximately 500ft/150m AGL. In addition, the CTR borders are expected to change from 04.2024, with a smaller CTR as a result. Any future U-space airspace should include vertical and horizontal buffers as deemed necessary.

1.2 WHAT IS AN AIRSPACE RISK ASSESSMENT?

The Regulation (EU) 2021/664 requires EU Member States to conduct an ARA to support the designation of U-space airspaces. U-space airspace is, in turn, an airspace volume in which UAS (drone) operations can only be performed with the provision of U-space services, which are a series of digital services and automation of functions designed to support safe, secure, and efficient access to U-space airspace for a large number of UAS.

An ARA consists of three main phases that are performed in sequence:

1) During the Preparation phase, the scope of the assessment is defined (i.e.: the airspace volume under assessment), the assessment team is created, and the resources required for the assessment are gathered and prepared. The primary output of this phase is the Scoping Document (i.e., this document), which aims to provide a complete description of the ARA project to be executed.
2) The Reference Scenario phase follows the Preparation phase. This phase is focused on creating a thorough understanding of the context of the assessment, including both the ground and air aspects. The core steps of the Reference Scenario Phase are data collection, interviews, data verification, and the establishment of the reference scenario. The primary output of this phase is the Reference Scenario document, which aims to provide complete insight regarding the airspace volume under assessment before any changes are introduced.

3) During the Assessment phase, safety, security, privacy, and environmental risks are assessed to derive the main outputs of the ARA: UAS capabilities and performance requirements, U-space service performance requirements, and airspace limitations and operational constraints. The airspace is assessed on the basis of the concept of operations (ConOps) and the Reference Scenario. In these assessments, the different hazards are identified, along with the risks associated with these hazards. Appropriate mitigation measures are then identified with the goal that the designated U-space airspace will be acceptably safe, and that any security, privacy, and environmental concerns will have been properly addressed.

Once the ARA project is finished, the findings of the project can then be used in a coordination mechanism established by the Member State to formally designate the U-space airspace, as required by Article 18(f) of Regulation (EU) 2021/664. Additional guidance regarding the execution of an ARA can be found in the published EUROCONTROL Guidelines, available online here.

1.3 THE NEED FOR AN AIRSPACE RISK ASSESSMENT

The main objective of the ARA project is to analyze Tallinn CTR as a potential first U-space airspace in Estonia. Estonia currently has preliminary rules and procedures in place enabling limited access to controlled airspace by drone operators. It is well-positioned to introduce advanced U-space concepts, with the goal of establishing Estonia as an innovation and entrepreneurial hub for UAS and U-space technologies.

Whilst the European Commission enables the adoption of initial U-space regulation and procedures from January 26th, 2023, Estonia has the opportunity to deploy U-space services to enable the existing Estonian UAS economic potential, while encouraging new players to enter the market to ensure safety, security, and privacy within and along Estonia's national border, airports, private property, and such.

1.4 INTENDED AUDIENCE

This document is meant primarily for stakeholders involved in the ARA project, as well as decision-makers who could have an impact on the ARA project.

In addition, the present document can also be useful for aviation and aviation-related entities that may be already using UAS or wish to introduce UAS for everyday purposes, and companies that are interested in providing USSP services in the future when the U-space is established. It should also provide useful input for UAS operators, professional or recreational, to understand airspace design and purposes.

1.5 DOCUMENT STRUCTURE

This document consists of 5 sections and Annexes, each section has subsections for a more detailed overview. The sections are:

1. Introduction
2. Management of the assessment
3. Scope of the assessment

4. Summary of the applicable regulatory framework
5. Assumptions, constraints, and other aspects
6. Annex A: ARA stakeholders and teams

2 MANAGEMENT OF THE ASSESSMENT

2.1 PROJECT MANAGER

The Project Manager is responsible for the correct and timely execution of the ARA, having the authority over the project.

The Project Manager for the ARA is:

- Mr. Pavel Buhharin- Senior inspector (Transport Administration)

2.2 CORE TEAM

The Core Team is responsible for carrying out the main tasks of the ARA project.

The Core Team members are:

- Mr. Priit Rifk- Head of UAS Department in Transport Administration
- Mr. Madis Prink- UTM development manager (EANS)
- Ms. Maria Tamm- UTM Expert (EAVA)
- Mr. Tõnis Jürimäe- UTM Expert (EAVA)

2.3 SUPPORT TEAM

The Support Team will play an auxiliary role through supplying/collecting data and undergoing interviews.

The Support Team members are:

- Mr. Jaan Erik Kiissel - Ministry of Climate
- Mr. Mihkel Haug - Head of the Air Traffic Control Department (EANS)
- Ms. Eve Härm - Head of ATS/AD Department (Transport Administration)
- Mr. Kristjan Telve - Head of Safety Department (EANS)
- Mr. Mathias Tammaru – Safety expert (EANS)
- Mr. Aigar Tarre – Aeronautical information expert

2.4 OTHER STAKEHOLDERS

The following list describes a series of other stakeholders that are also involved in the ARA project:

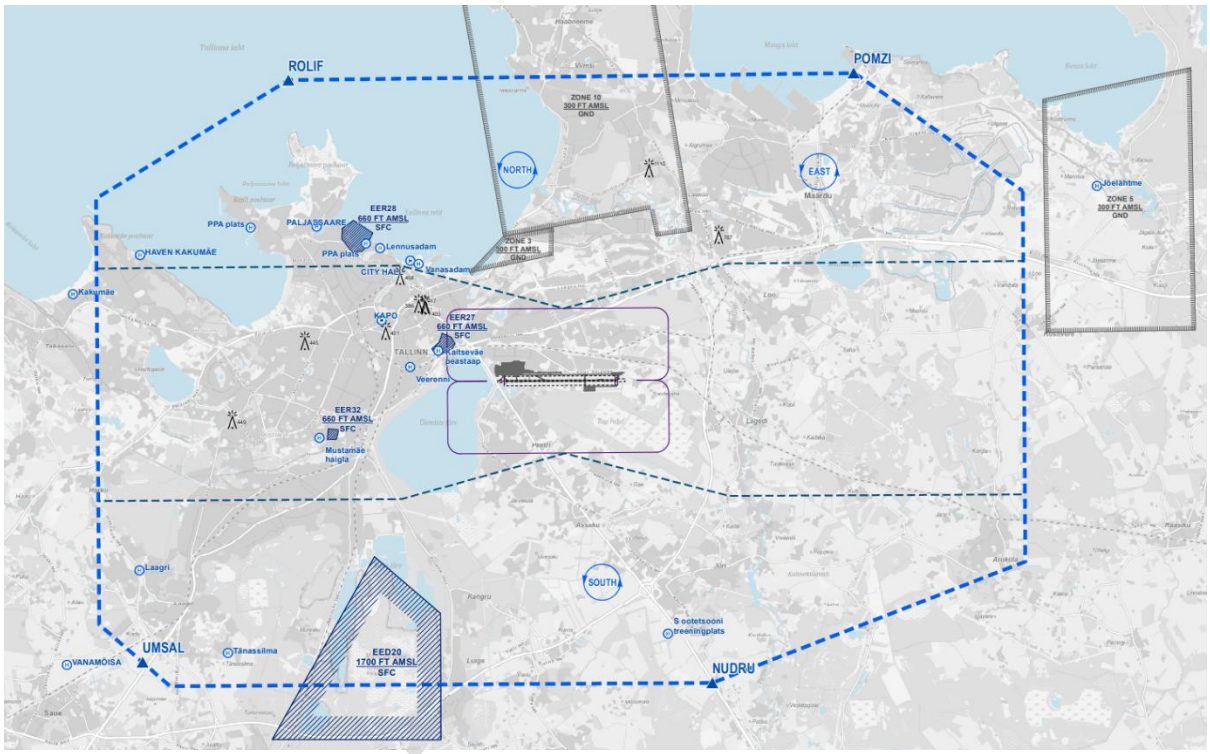
- Mr. Hannus Vard and Ms Laura Inno - Tallinn Airport
- Ms. Siiri Lõhmus - Tallinn Harbour
- Mr. Siim Lindmaa and Mr Eero Oja - Estonian Police and Border Guard Board
- Ms. Tiina Josepson and Mr Jüri Joonas - Estonian Environment Agency
- Mr. Raido Haas - Estonian Rescue Board
- Mr. Viktor Popov - Aviation Safety Advisor (Transport Administration)

3 SCOPE OF THE ASSESSMENT

3.1 ASSESSED AIRSPACE VOLUME AND PLANNED U-SPACE AIRSPACE

The scope of the ARA project is the entire Tallinn CTR, which is considered to be the assessed airspace volume.

The implications of this are that the ARA project will consider manned and unmanned aircraft within the CTR borders, and also ground infrastructures, populated areas, or other relevant areas on the ground that lie within the CTR.



The Tallinn CTR is delimited horizontally by:

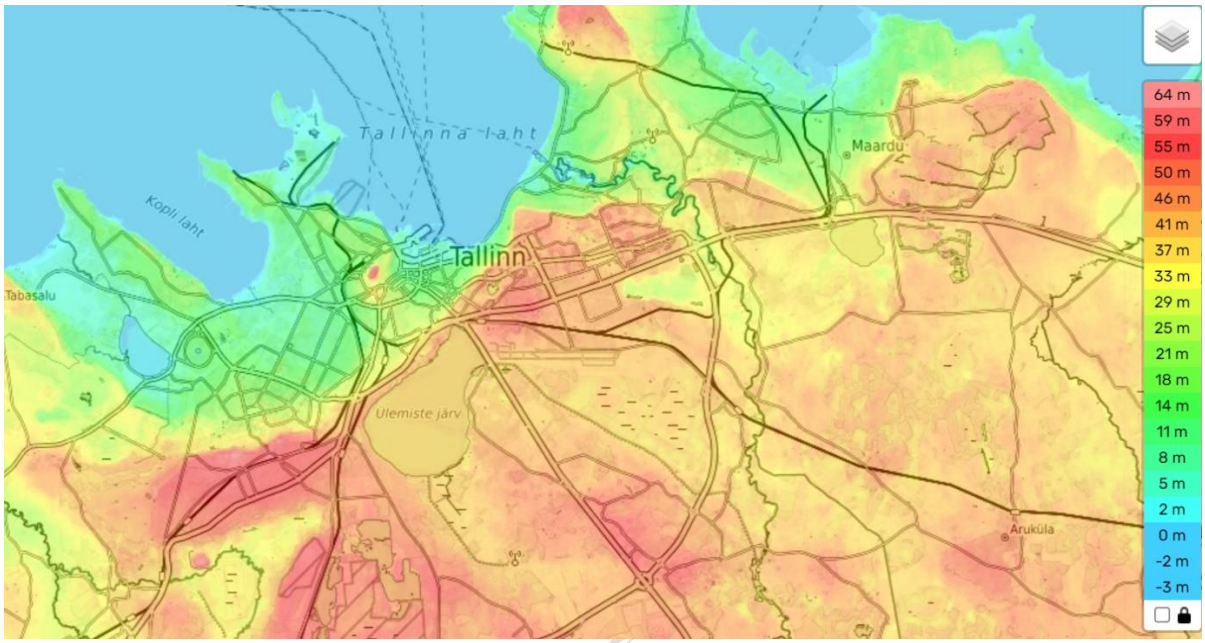
DDMMSS		N_DDdd	E_DDdd
593000N	0250010E	59.5	25.002778
592756N	0250547E	59.465556	25.096389
592135N	0250540E	59.359722	25.094444
591935N	0245508E	59.326389	24.918889
591938N	0243700E	59.327222	24.616667
592042N	0243439E	59.345	24.5775
592800N	0243440E	59.466667	24.577778
593000N	0244110E	59.5	24.686111

593000N	0250010E	59.5	25.002778

The ceiling of the assessed airspace volume is the ceiling of Tallinn CTR which is 1700ft, elevation/reference temperature 135ft.

The whole volume is in class C airspace.

Elevation map of Tallinn CTR:



Flood Map: Elevation Map, Sea Level Rise Map

The maximum difference between the highest and the lowest terrain elevation in Tallinn CTR is around 60 meters.

The assessed airspace volume is controlled airspace class C in its entirety, as defined by the Estonian AIS for the Tallinn CTR.

The purpose of the Tallinn CTR ARA project is to determine in which area within the Tallinn CTR should U-space airspace be designated and to identify which would be the applicable conditions and requirements for operations to be safe.

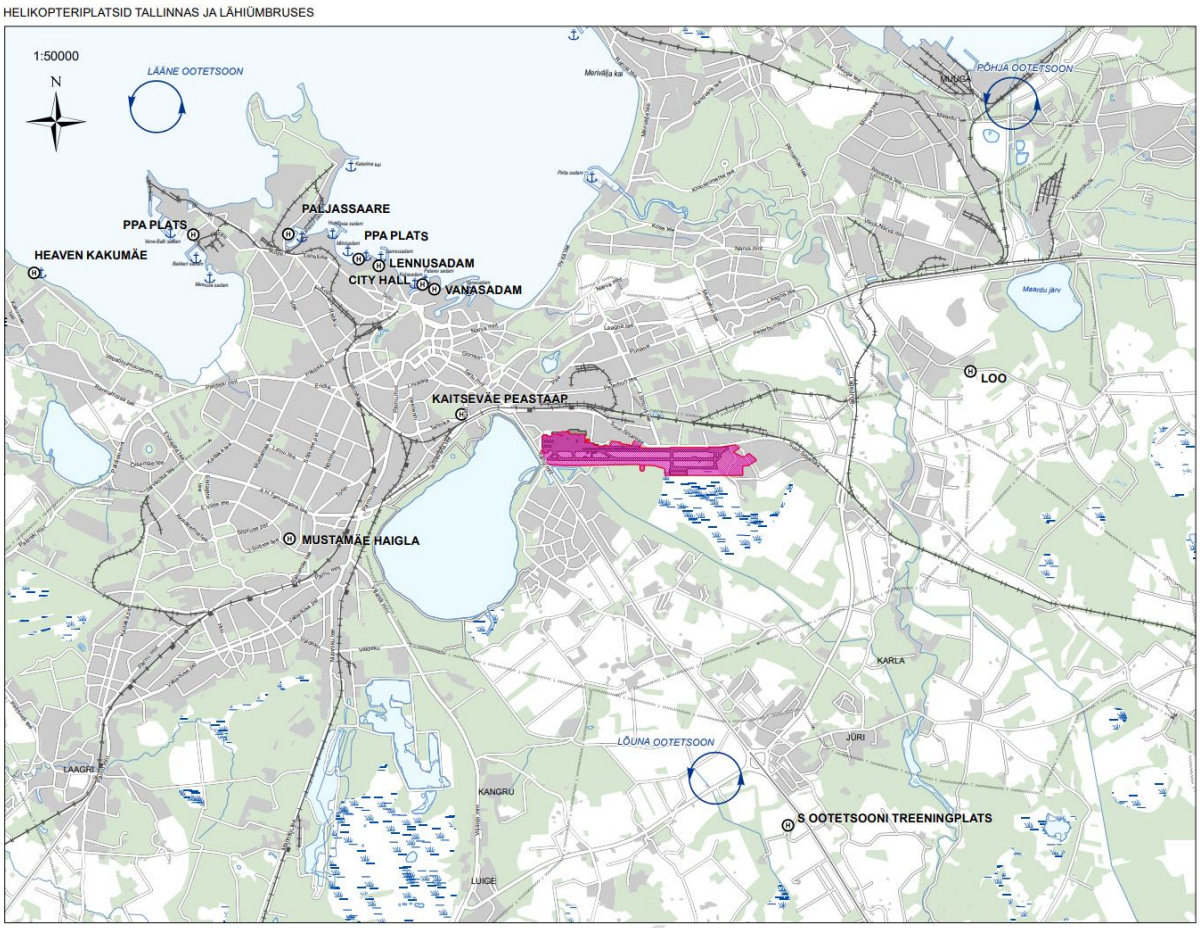
3.2 INITIAL INVENTORY OF ELEMENTS TO BE CONSIDERED

The Lennart Meri Tallinn airport, with ICAO code EETN, is located at the center of the Tallinn CTR. The following table, obtained from the AIS, describes the most relevant information for this aerodrome:

1	ARP coordinates and site at AD	592448N 0244957E 1974 M / 261 MAG FM THR 26
2	Direction and distance from Tallinn	2.7 NM SE from the centre of Tallinn
3	Elevation / Reference temperature	135 ft / 22.2°C (JUL)
4	Geoid undulation at AD	59 ft
5	MAG VAR / Annual change	9° E (2020) / +0.2°
6	AD operator, address, telephone, telefax, e-mail, AFS, URL	Post: AS Tallinna Lennujaam Lennujaama tee 12 11101 Tallinn ESTONIA Tel: +372 605 8701 Fax: +372 605 8433 SITA: TLLXT8X E-mail: administration@tll.aero AFS: EETNZXZX URL: www.tallinn-airport.ee
7	Types of traffic permitted (IFR/VFR)	IFR/VFR
8	Remarks	NIL

Heliports and helicopter landing sites

At the moment there are no certified heliports within Tallinn CTR. Below is presented the map with heliport locations in Tallinn CTR.



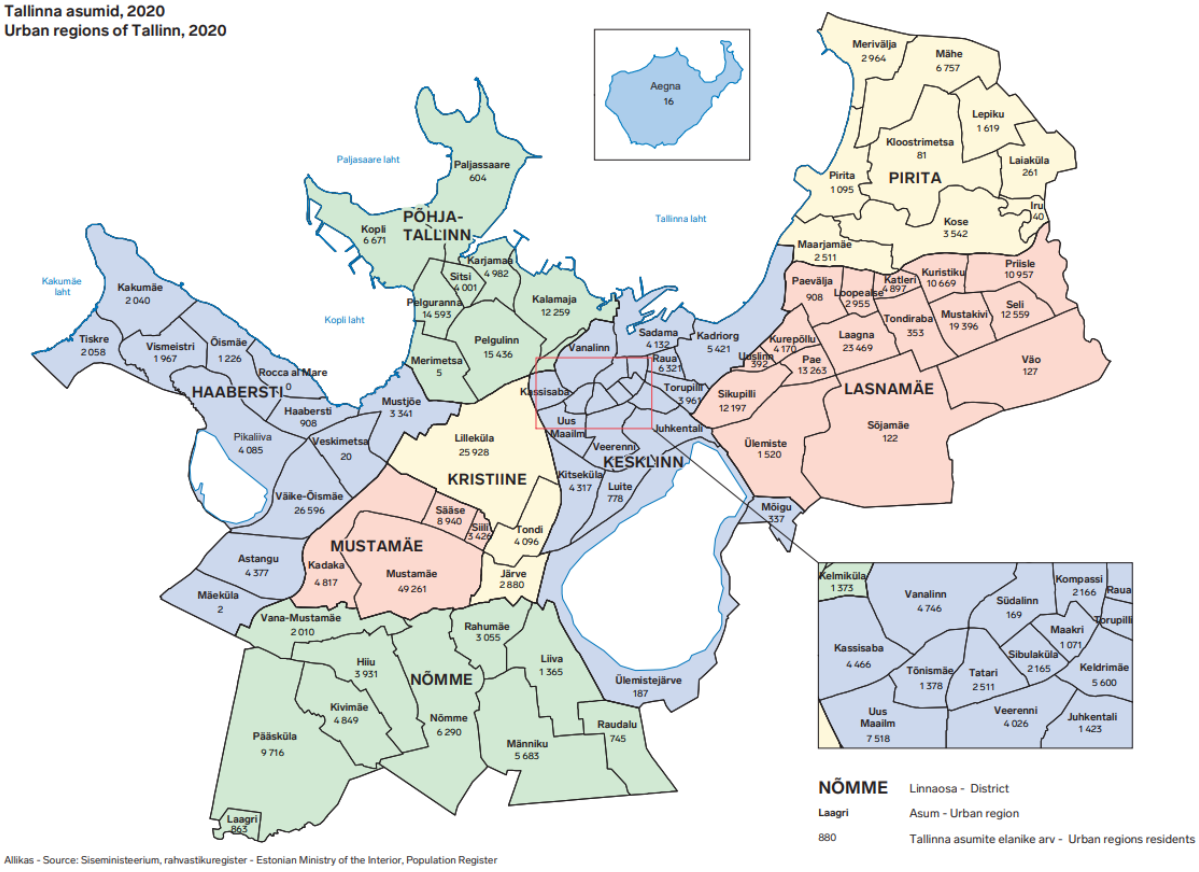
https://www.bing.com/ck/a?!&&p=40254f34d3b465b0JmltdHM9MTcwNDE1MzYwMCZpZ3VpZD0xZjgwOWNjZi0xYjc3LTYzM2ItMDI2Ni04ZTAxMWFkNDYyZjkmaW5zaWQ9NTM3Mg&ptn=3&ver=2&hsh=3&fclid=1f809ccf-1b77-633b-0266-8e011ad462f9&psq=helikopteriplatsid&u=a1aHR0cHM6Ly93d3cudHJhbnNwb3JkaWFtZXQuZWUvbWVkaWEvMTUzNTIvZG93bmxvYWQ&ntb=1

List of heliports:

- City Hall (EECL): 59°26'52.98"N 24°45'11.96"E is situated in the harbour, just beyond the walls of the Old Town.
- Haven Kakumäe (EEHV): 59°26'21.90"N 24°33'52.00"E. Located in the suburbs of Tallinn in the northwestern part of the city.
- Paljassaare (EEPS): 59°27'29.00"N 24°42'4.00"E. Located in the northern part of Tallinn, approximately 6 kilometres from the centre of the city.
- Mustamäe medical campus: 59°23'51.74"N 24°42'4.90" helicopter landing site is located in the southwestern part of the city surrounded by a residential building.
- Joint Headquarters of the Estonian Defence Forces: 59°25'20.16"N 24°46'6.03"E helicopter landing site is located a couple of kilometres to the south from Tallinn city centre.
- Estonian Internal Security Service helicopter landing site: 59°25'51.955"N 24°44'12.787"E is located in the centre of the city.
- Old City Harbour *(Vanasadam):* 59°26'49.46"N 24°45'28.56"E helicopter landing site is located in the Nothern part of Tallinn close to the city centre.

- Seaplane harbour *(Lennusadam)*: 59°27'6.25"N 24°44'10.94"E helicopter landing site is located in the Nothern part of Tallinn around 2 kilometers to the west from Old City Harbour.
- Veerenni: 59°25'4.11"N 24°45'5.16"E
- Estonian Police and Border Guard Board *(PPA plats)*: 59°27'11.11"N 24°43'42.57"E
- Estonian Police and Border Guard Board *(PPA plats 2)* 59°27'28.69"N 24°39'50.86"E
- Laagri: 59°21'37.2"N 24°36'00.6"E
- Tänassilma: 59°20'11.5"N 24°38'56.9"E
- South Holding training site *(S ootetsooni treeningplats):* 59°20'26.13"N 24°53'40.36"E
- Loo: 59°25'49.11"N 24°57'59.19"E

The most populated areas of Tallinn are the city center (Kesklinn), Lasnamäe, Mustamäe, Kristiine, most part of Põhja-Tallinn, the western part of Lasnamäe and eastern part of Haaberti named Väike-Õismäe.



Source: [306638 (tallinn.ee)]

According to the 2011 census data and comparing the location of people during the day and night, the most densely populated square kilometer is located in the center of Tallinn around Estonia Boulevard (1.8NM SE from Tallinn Airport), where it is estimated that more than 19,800 people stay during the day.

At night, there are almost 5,800 people in the same square kilometer, so the difference between the day and night population around Estonia Boulevard is 14,000 people. More than 15,000 people also stay in the area at the beginning of Tallinn Harbor and Tartu Road. The area of Muhu Street and Linnamäe Road in Lasnamäe loses the most people (over 6,500) during the day. The number of people

in the center of Tallinn increases significantly during the day, while shoppers, participants in events, sportsmen, and tourists are not included. In reality, the daily population of some regions may be even higher. The outskirts of Tallinn - Haabersti, Nõmme, and Pirita districts - can be defined as suburban areas, because people leave there during the day and comeback in the evening.

DMEs – **D**istance **M**easuring **E**quipment - provides aircraft with distance from a beacon and is located on the territory of Tallinn Airport.

ENR 4.1 RADIO NAVIGATION AIDS - EN-ROUTE

Name of station (VOR/VAR)	Id	Frequency (CH)	Hours of operation	Coordinates	ELEV DME antenna	Remarks
1	2	3	4	5	6	7
TALLINN DME (9°00'E 2020) (decl.:-)	TLL	112.200 MHz (CH 59X)	H24	592441N 0245018E	200 FT	Coverage: FL 500/80 NM

DF - Direction Finder provides air traffic controllers with the direction to the aircraft in their airspace, i.e. its azimuth from the radio receiver at a certain time moment. It works only on designated frequencies. DF is also located on the territory of Tallinn Airport.

There are multiple ports within Tallinn CTR. Below you can find the list of Tallinn ports and a map.

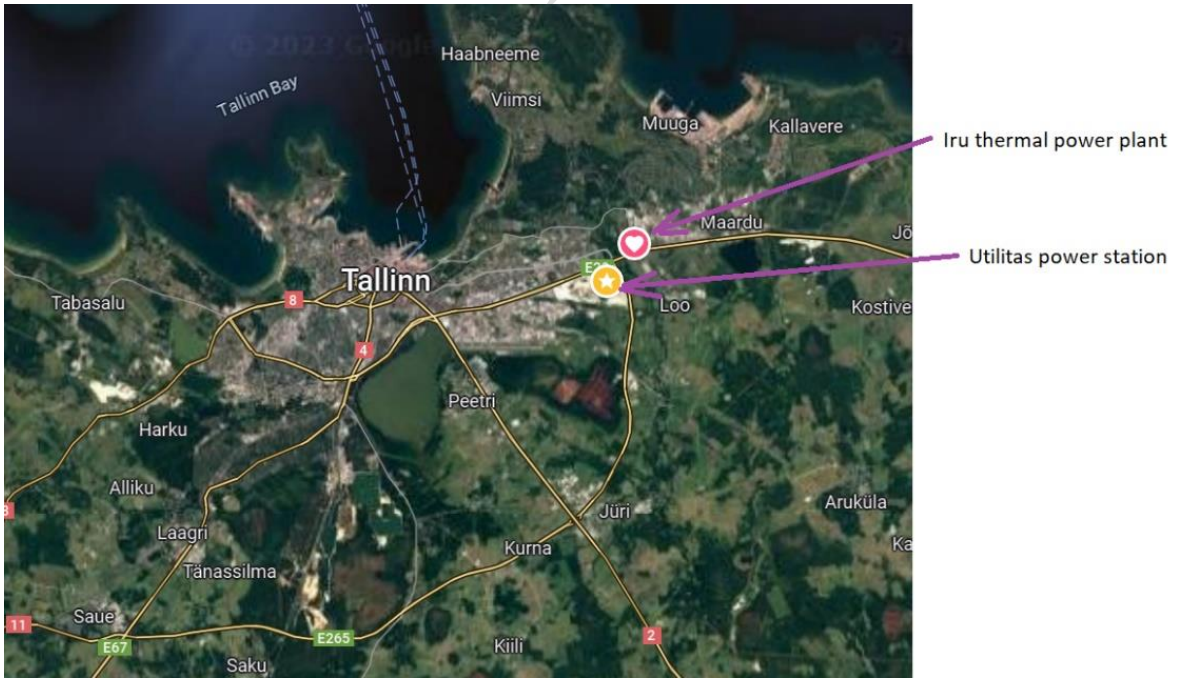
Tallinn ports:

- Kakumäe sadam
- Meeruse sadam
- Bekkeri sadam
- Piirivalvesadam
- Vene-Balti sadam
- Katariina kai
- Paljassaare sadam
- Lahesuu sadam
- Hundipea sadam
- Miinisadam
- Noblessneri sadam
- Lennusadam
- Kalasadam
- Patareisadam
- Vanasadam
- Pirita Sadam

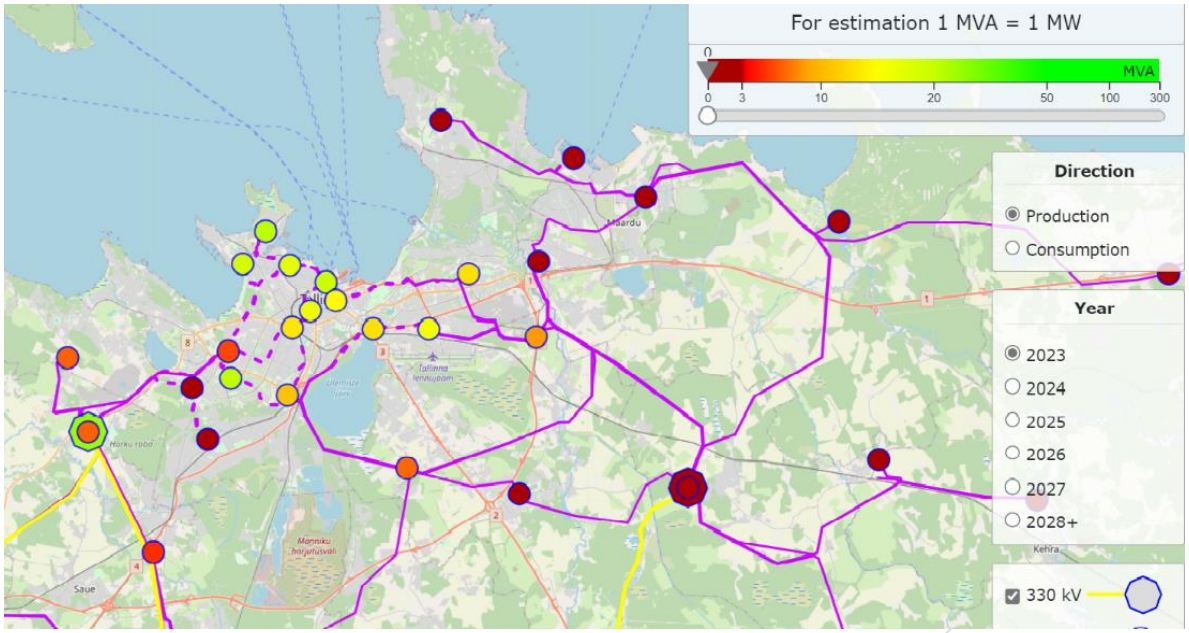
https://maaamet.ee/

Power stations:

- Iru thermal power plant is located outside of Tallinn to the east in the place called Iru between Tallinn and Mardu.
- Utilitas power station is located in the eastern part of Tallinn.



Substations:



[e-Gridmap (elering.ee)]

- Viimsi 110 kV substation
- Ruma 110 kV substation
- Kallavere 110 kV substation
- Jägala 110 kV substation
- Iru 110 kV substation
- Ida 110 kV substation
- Ranna 110 kV substation
- Tõnismäe 110 kV substation
- Endla 110 kV substation
- Elektrijaama 110 kV substation
- Volta 110 kV substation
- Kopli 110 kV substation
- Paljassaare 110 kV substation
- Veskimetsa 110 kV substation
- Mustamäe 110 kV substation
- Järve 110 kV substation
- Kadaka 110 kV substation
- Kivimäe 110 kV substation
- Harku 110 kV substation
- Tabasalu 110 kV substation
- Topi 110 kV substation
- Järveküla 110 kV substation
- Jüri 110 kV substation
- Raasiku 110 kV substation
- Jägala 110 kV substation

Protected areas:

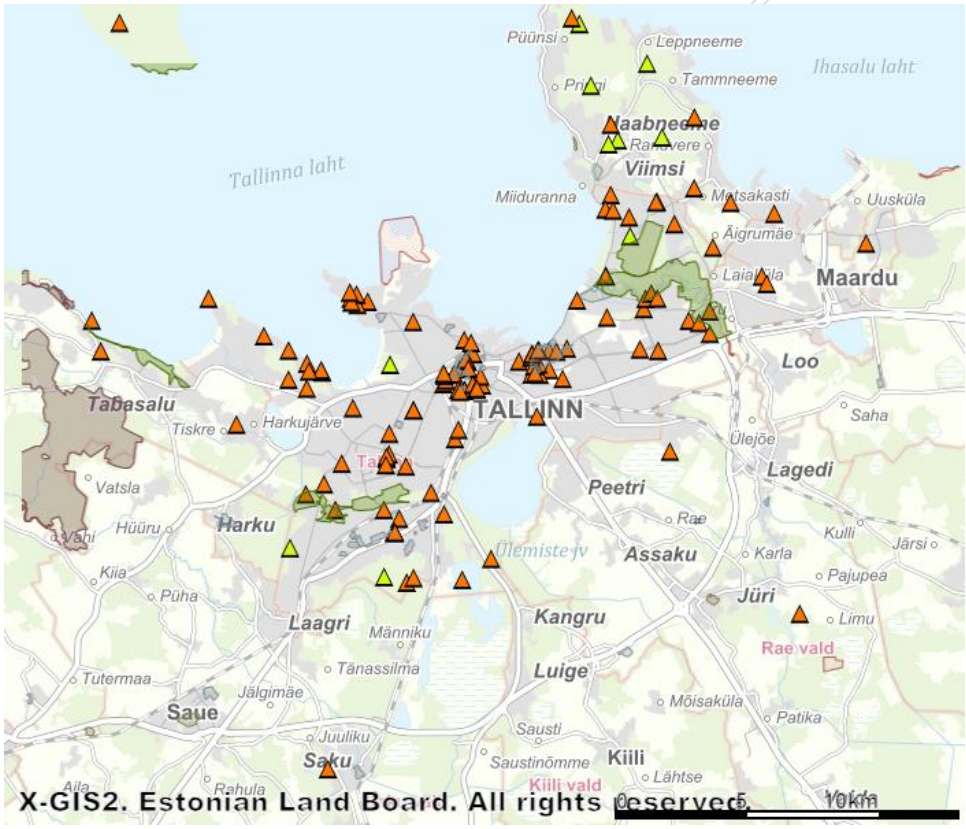
Estonia has a total of 843 nature-protected areas (800 325 ha). A lot of them are located inside Tallinn CTR.

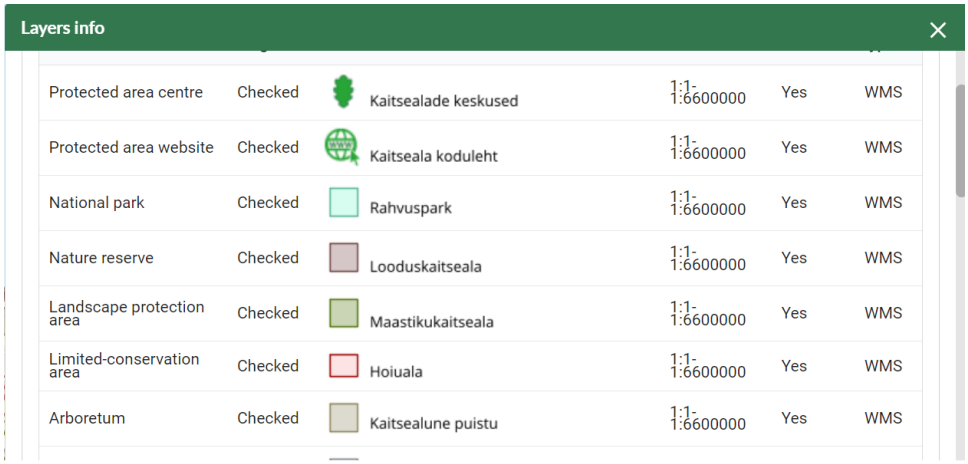
The biggest ones (in green color) are landscape protection areas. A landscape protection area is an area prescribed for the preservation, protection, restoration, research, introduction, and regulation of the use of landscapes of the protected area.

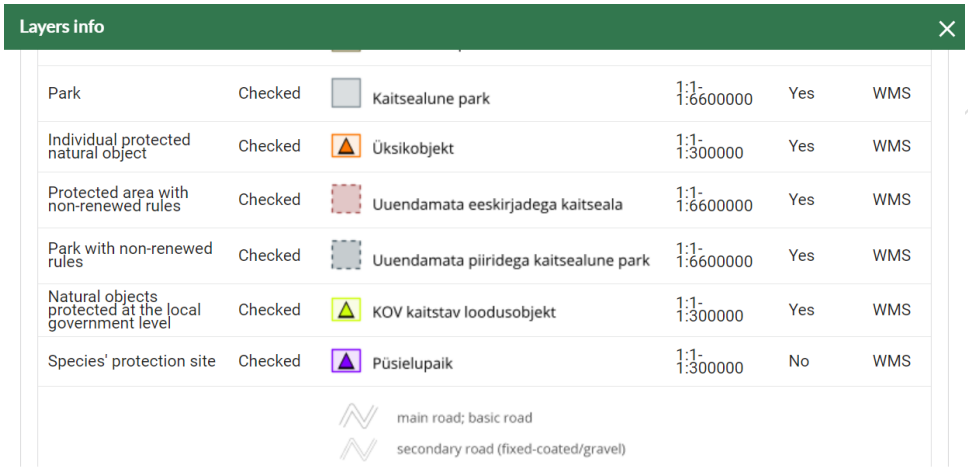
A red triangle is an individual-protected natural object. An individual protected natural object means an animate or inanimate natural object such as a tree, spring, erratic, waterfall, rapid, bluff, terrace, outcrop, cave, or karstic form or system that is protected.

Yellow triangle- natural objects protected at the local government level. At the local government level, a landscape, valuable arable land, valuable natural biotic community, individual landscape object, park, green area, or an individual object of a green area that has not been placed under protection as an individual protected natural object and is not located within a protected area may be a protected object.

The area in the North of Tallinn (in red color) is a limited-conservation area. Limited-conservation areas are areas designated for the conservation of habitats, for the preservation of which the impact of planned activities is estimated and activities liable to damage the favorable conservation status of the habitats are prohibited.

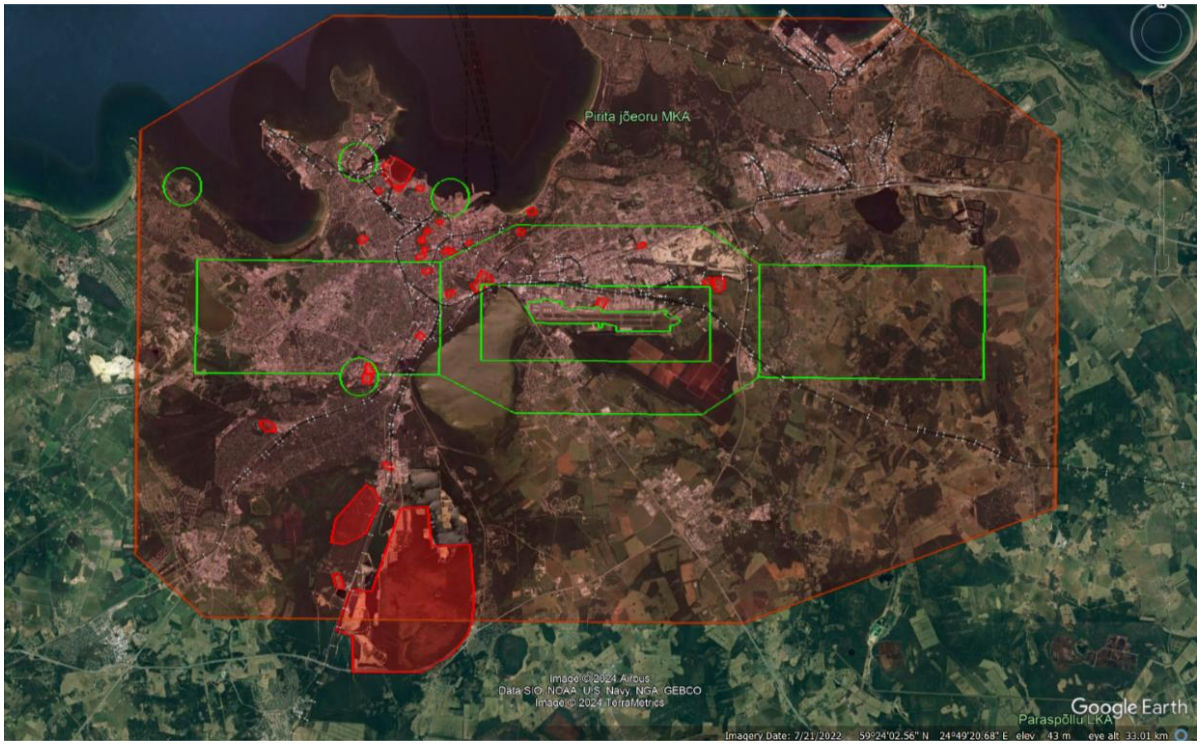






Source: Kaitsealad | Kaitsealad

There are UAS geographical zones established in Estonian airspace and operational conditions that UAS operators must follow. At the same time, there are UAS geographical zones, which have restrictions for security reasons (coordination with authorities, to get flight authorization in it, is required). Airspace assessment will help to ensure that manned aviation safety is not negatively affected and that unmanned operations can be conducted at the same time in different parts of Tallinn CTR.



There are no designated no-drone zones in Estonia. UAS operators can use all the airspace with different conditions.

4 SUMMARY OF APPLICABLE REGULATORY FRAMEWORK

Currently, UAS shall be operated in accordance with the following national requirements:

- Aviation Act;
- Regulation of the Government of the Republic No 240,
- Regulation of the Minister of Economic Affairs and Infrastructure No 24,
- Government regulation nr 82: https://www.riigiteataja.ee/akt/130082022005 notification procedure for establishing GZ
- Government regulation nr 81: https://www.riigiteataja.ee/akt/130082022004 the procedure for applying for and granting a permit and determining the permit grantor (state aviation)
- Government Order nr 229: https://www.riigiteataja.ee/akt/326082022001 creation of GZ for environmental, police, military, etc purposes. Three appendixes that contain GZ coordinates (state aviation)
- TA general precept: https://www.transpordiamet.ee/droonid. Tool for TA to establish ad-hoc requirements for UA and establish GZ for aviation safety reasons.
- Guidelines for cameras in public use (including drones): https://www.aki.ee/sites/default/files/dokumendid/kaamerate_juhend_10.11.2021.pdf

In addition the UAS operator must acquaint himself/herself with the information in currently valid Estonian AIP, its Supplements (AIP SUP) and NOTAMs.

Regarding the EU regulatory frame, the following shall also be considered

- Regulation (EU) 2018/1139 of the European Parliament and of the Council of 4 July 2018 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency
- EU Regulations 2019/947 and 2019/945 set out the framework for the safe operation of civil drones in the European skies.
- EU Regulations 2021/664, 2021/665, and 2021/666 describing the U-space regulatory framework.

5 ASSUMPTIONS, CONSTRAINTS, AND OTHER ASPECTS

The following is a list of major concerns or risks to be addressed:

- As every change needs a legal basis, it is highly dependent on the regulatory framework. At the same time, it is also dependent on stakeholders' interest for cooperation and input.
- Time constraints - it takes from several months to several years to change any legal document. A lot of legal work has to be done, in order to have the right to implement U-space in Estonia.
- New team conducting the ARA.
- Tallinn's new CTR borders from 2024.
- Some data from previous ARA activities might be outdated and was gathered before U-space regulations 2021/664, 2021/665 and 2021/666.