

User-friendly Information Tool on Urban and Regional Access Regulations Schemes

Contract: MOVE/B4/SER/2019-498/SI2.832125

Deliverable 2.1 – Overview report on legal processes for UVAR
definition

Consortium:



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Administrative section

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Disclaimer

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General section

1 General description of the deliverable

1.1 About this Document

The purpose of this deliverable is to provide insight into the business processes of the legal creation of UVARs. The analysis of the processes covers both static regulations (broadcasted by static traffic signs and road markings) and dynamic regulations (e.g. triggered by events – most commonly air quality levels – and broadcasted via for example Traffic Management Centres). It includes all types of UVARs that are part of the project – see output of WP1, especially Task 1.1.

The aim of this work is to understand the process, both country-specific and general, and to find out where and how the UVAR Box Tool should be integrated best in the legal process of UVAR ordinances in order to secure data maintenance as close as possible within the existing processes and to ensure that it is an integral part of the process, so reducing the chances of it being a forgotten stage of the process.

Based on the analysis of the legal processes and the knowledge about the national institutional arrangements, the UVAR Box Tool will be specified and developed.

1.2 Methodology

The process analysis was based on desk research on the regulatory process of defining UVARs (and other traffic regulations) from previous projects as well as consortium expertise.

Based on this information, and after collecting relevant questions about the individual process steps that are relevant for the assessment, a questionnaire was created to involve the different key public UVAR authority stakeholders and private entities on the UVAR Box to gather information and feedback on this understanding of the workflow. This was done in cooperation between WP2, 4, 5 and on the basis of the first output of WP1.

The questionnaire was designed in English, Italian, German, and French. The dissemination was undertaken by the country coaches using their contact list, which was evolved during the activities of WP5. The feedback was screened and deepened in country specific calls, meetings and workshops in spring and summer of 2021. More detailed information about the questionnaire can also be found in the Interim Report.

The information gathered including the output of the questionnaire was then presented in country-specific stakeholder workshops for the focus countries of the UVAR Box Project. In these workshops, the country coaches presented both the commonalities and country-specific differences, and recommendations as to where the UVAR Box Tool could be integrated in the process.

These lessons learned are now part of this deliverable, and together with inputs from the countries on specific requirements for the UVAR Box, serve as basis for the several outputs of the project, namely D2.2.

In the country-specific chapters below, the Country Coaches of the 5 focus countries describe in more detail their conclusions, views and methods.

1.2.1 Austria

The methodology for Austria is comparable with the other countries in the given project. The result of the survey and the desk-research have shown that the suggested process fits most of the UVARs, sometimes with slight adjustments in some municipalities and minor cities. National workshops and bi-lateral meetings took place with ASFINAG, ÖAMTC, ITS Vienna Region, the Association of Cities and Towns, as well as several minor cities which pointed out their interest of collaborating with the UVAR Box.

1.2.2 Belgium

Through the questionnaire and desk-research it was possible to gather insights from the three so-called "front runner" cities in Belgium; Brussels, Antwerp, and Ghent. Based upon this there were bi-lateral meetings with individual representatives of the cities, as well as in workshops with multiple Belgian stakeholders in order to identify the cities' needs and capabilities regarding the implementation of the UVAR Box DATEX II data model and tool. The first discussions have been held on the possibilities for organising Proof of Concepts with cities and the NAP.

1.2.3 The Netherlands

Through the questionnaire and desk-research, the insight gathered was that the process of digitalisation in The Netherlands has already been started with a nationwide process using a top-down approach. Bi-lateral meetings have been on the agenda with the ministry, the NAP, and cities in order to try to align the national actions with the actions taken in the UVAR Box project.

1.2.4 Germany

The result of the survey and the desk-research have shown that the suggested process fits most of the UVARs, sometimes with slight adjustments. National workshops and bi-lateral meetings took place with stakeholders such as the Umweltbundesamt (Environment Agency), the NAP provider, the Bundesländer as well as several cities, mainly the frontrunners and cities interested to join the project (see chapter 2.4.4). Additionally, there have been meetings with the regions of Stuttgart and Frankfurt in order to discuss their possibility to serve as a regional data coordinator, mainly to support small and medium sized cities without sufficient resources.

1.2.5 Italy

An efficient strategy was needed to contact the highest number of municipalities and UVARs responsible, given the high number of UVARs in Italy.

As first step, the Italian CCs defined the list of municipalities potentially having at least one UVAR. This basic information has been collected by starting from the CLARS database and making a deeper analysis of the current regional and local regulations available on the respective websites. On the basis of the activities developed, the e-mail addresses of those colleagues responsible for the UVARs were collected in order to be able to contact them. The e-mails sent included some general UVAR Box project information, the link to the questionnaire defined by the consortium and the Italian CCs contact information to be used in case of more clarifications were needed. In several cases phone calls and virtual meetings have been carried out in order to explain the project's objectives. These have been done for all the Regions involved in the Accordo del Bacino Padano and for the most important Italian cities: Milan, Rome, Turin, Verona, etc..

Several bi-lateral meetings were held to explain project objectives and to support colleagues in the UVAR municipalities responsible in filling in the questionnaire. A national workshop was organized to present the results of the surveys, the project objectives and the strategy defined for data collecting to be done in the following period. The Italian Ministry ("MIMS - Ministero delle Infrastrutture e della Mobilità Sostenibili"), National Technology Associations (e.g., "TTS Italia") and several municipalities attended the event.

Some of the most relevant authorities were contacted again after the release of the UVAR Box Tool to show the platform and support them in using the solution. This activity started from the frontrunner cities which expressed their availability and may continue with the other cities that might potentially be interested in the Tool in the next future.

1.2.6 Other countries

For UVAR generators in countries outside our 5 focus countries, the methodology to collect information was also to disseminate the survey and organise a workshop to confront survey results with stakeholders' perceptions. The difference for other countries is that we did not dig deeper into details with calls and bi-lateral discussions, as UVAR generators in these countries are not supposed to be pioneers, but relied on the proactive cities that came forward on the information disseminated, and general workshops. Also, considering the survey and workshop were in English and we did not have multipliers' contacts in all countries, we completed the missing responses with data from the CLARS platform and consortium members expertise.

2 Detailed work

As described in chapter 1.2, the beginning of the analyses of the regulatory process of defining UVARs was a draft process taken from information in previous projects and consortium expertise, which described both the process for defining static and dynamic traffic regulations. This was then refined by outreach work within this project.

Summing up, the following steps are taken for the creation of UVARs. Deviations from these steps and additional information are documented in the country-specific chapters "Process for creating an UVAR":

1. Identification of needs for regulation and usage of space: The start of this step derives from the regional and local policies and plans from local authorities and in particular its mobility, infrastructure, and environmental departments. This step should provide answers to the following questions:
 - Which problems and bottlenecks are encountered to achieve mobility and environmental goals and objectives?
 - Which organizations, governmental bodies and departments should be in the lead (or involved) in solving these challenges?
2. Solutions development and plan of approach: Analysis and evaluation of problem(s); Development of scenarios and evaluation of potential solutions and approaches (impact assessment studies) combining several governmental departments: mobility, environment, planning and infrastructure. Sometimes already including a first consultation with involved stakeholders. At the end of this step, a solution choice has been taken and detailed in a policy implementation plan produced. This will usually be with the EU-wide SUMP process (Sustainable Urban Mobility Plan¹).
3. Legislation and regulation approval procedure: The chosen solution is detailed and translated into a legislation and regulation proposal which is set for internal (different governmental bodies) and external consultation with relevant stakeholders (lobby organizations, local groups of users, etc.) before approval at the regional or city level.

Figure 1 gives an overview on the regulatory process of defining UVARs and where the UVAR Box Tool comes into play.

As soon as the approval process starts, there comes the need to document the regulation and the associated traffic measures in such a way that all affected road users are aware of this measure and can comply with it. This is the first entry point for the UVAR Box Tool.

Highlighted in orange in Figure 1 is the first and best step in the regulatory process to use the UVAR Box Tool to incorporate the concrete regulation details as well as the location of the regulation into a software system - ideally in a standardised form. This way the information can be processed in a machine-readable

¹ <https://www.eltis.org/mobility-plans/sump-process>

manner and can also be interpreted across countries, languages and systems and more easily included into navigation tools.

The UVAR Box Tool – designed to fulfil exactly these needs – can therefore be used to document the UVAR scheme approved by the authority and facilitates publishing this later on digital channels.

In parallel, the current necessary steps for creating legal regulations can be undertaken with the existing (country-specific) instruments – e.g., informing relevant persons/institutions, installation of permanent traffic signs or activate and deactivate dynamic signs.

Hence, the UVAR Box Tool is not planned to remove existing country-specific tools or procedures for creating the legal documents of traffic regulations, but to improve the process for publication in a standardised, machine to machine readable and therefore exchangeable way.

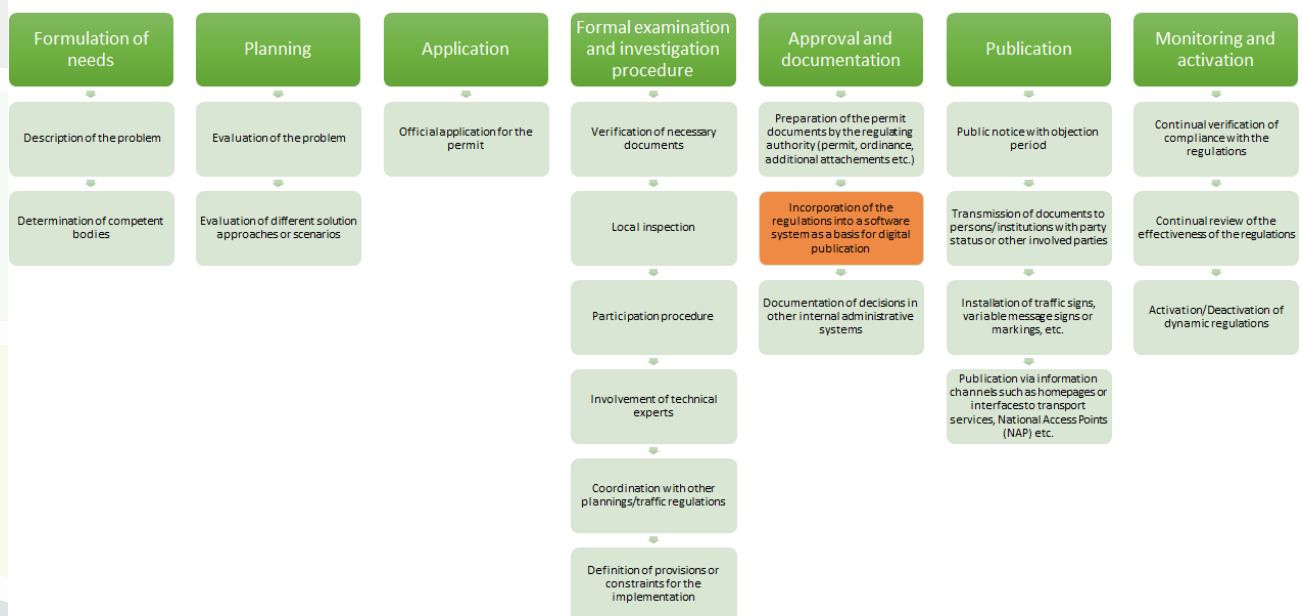


Figure 1 - Regulatory process of defining UVARs

The following country-specific chapters give insights to the processes, organizations and tools for creating and publishing UVARs – outlining the commonalities between countries and/or with the described process, but also the differences. In addition, the chapters “Implementation challenges” per country specify where expected implementation challenges are to be expected, that are very valuable inputs for the next steps of the process, as well as for interested pioneer cities or regions, that want to be amongst the first cities to use the UVAR Box Tool. Where necessary, information is divided by UVAR type.

2.1 AUSTRIA

2.1.1 Process and tools for creating an UVAR

2.1.1.1 Involved organisations and authorities

LEZ: Most of the organisations involved in charge of creating and maintaining UVARs are at a regional level as it is in the responsibility of regional administrations to deal with them. Anyhow, in future as well city administrations might start delegating local UVARs, then it will be with them to create and maintain them. A minor part of the process is also handled on a national or state agency level in terms of national and state law. Most of the IT solutions are produced by external partners, of which [K5](#)² is the main company that supports the required IT infrastructure and software solutions when it comes to implementing new schemes. Out of 2,065³ minor and major municipalities, more than 1,694 have K5 as an external IT contractor at a local level to manage the dataflow and services for the given city/municipality. In addition, K5 works closely with the regional administrations which results in having K5 as the most important IT contractor when it comes to LEZ. The remaining municipalities have different minor IT providers, not yet identified by the consortium.

CS: There are no congestion charges in Austria in place or planned.

LTZ and PED: The limited traffic zones (LTZ) and pedestrian zones (PED) regulations are part of the portfolio of the mobility department of a city or a whole region. In Vienna the city traffic department, [MA46](#)⁴, is in charge of traffic organization and technical traffic matters for new pedestrian zones.

LTZ is handled by [ASFINAG](#) which is the road operator for Austrian highways.

PARK: Parking regulations are part of the portfolio of the mobility department of a city or municipality. In Vienna, MA46 is also in charge of the parking regulations and legal fines. In smaller cities, the city government is responsible for parking regulations in compliance with federal, state, and municipal laws.

2.1.1.2 Existing Tools for UVAR Management

The first draft of a new UVAR is established in a Word document, which is then converted to a PDF for further dissemination. Most of the legal aspects are covered by the Traffic Regulation Order (TRO⁵) and Austrian Road code⁶. Geographic Information System (GIS)-based planning and/or approval system often supports UVAR-related administrative processes. The Graph Integration Platform⁷ is a nationally coordinated Geographical Information System, the common GIS platform in Austria. In the GIP, it is possible to mark entire areas or zones within the established UVAR for a geographic coverage with polygons and characteristics attached to the polygons. The location is usually via coordinates or street

² <https://k5.at/>

³ http://www.statistik.at/web_de/services/publikationen/751/index.html?includePage=detailedView§ionName=Regionale+Gliederungen&publd=70

⁴ <https://www.wien.gv.at/kontakte/ma46/index.html>

⁵ <https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10011027>

⁶ <https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10011336>

⁷ <https://www.gip.gv.at/en/index.html>

names with street numbers, in some cases, coordinates. The UVARs currently implemented in Austria rarely need updating; there is no regular program of updates and they are updated only when a change of the legal framework occurs. Most of the Austrian UVARs are of static nature. In the case of a dynamic/triggered UVAR, like the IG-L for air pollution (Emergency Smog Scheme), the activation of the UVAR depends on the pollution levels with the given UVAR area, and the information as to whether they are active or not is.

The Austrian Federal law for Emission Control Act – Air points out:

- the daily mean value for PM₁₀ in accordance with Annex 1a with no more than 35 exceedances per year
- the annual mean value for nitrogen dioxide increased by 10 µg/m³ in accordance with Annex 1a,
- the annual mean value for PM₁₀ in accordance with Appendix 1a,
- of an emission limit value specified in an ordinance pursuant to § 3 par. 5
- the half-hourly mean value for sulphur dioxide pursuant to Annex 1a
- the daily mean value for sulphur dioxide in accordance with Annex 1a,
- the half-hourly mean value for nitrogen dioxide in accordance with Appendix 1a,
- the limit value for lead in PM₁₀ in accordance with Appendix 1a, or - the limit value for arsenic

2.1.1.3 Process for creating an UVAR

The General Administrative Procedure Act (AVG⁸) and Road traffic regulations⁹ provide the legislation for the creation of UVARs. When creating an UVAR, first the description of the given problem is drafted by the regulators body for the given area. After which there is an official application for the permit to implement the UVAR.

This permission leads to the incorporation of the regulation into a software system as a basis for digital publication. The Publication can be issued in different ways. The most common type are traffic signs, variable message signs (VMS), or traffic road markings. The next step is to monitor the UVAR and adapt the UVAR if necessary.

2.1.2 Publication of UVARs

2.1.2.1 Existing Channels

The new UVAR is published on different channels, via:

- the city's main website like www.wien.gv.at or <https://www.salzburg.gv.at>
- other human-readable media channels like newspapers or online news portal like www.orf.at

⁸ <https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10005768>

⁹ <https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10011336>

- software interfaces with the specific software of the GIS system or ArcGIS, that are openly available on the web
- via newspaper
- road signs, both “vertical” and “horizontal” (metal and on the road surface)
- official journals like www.ris.bka.gv.at
- news broadcast on radio and television as well as public announcements in the public space (with VMS traffic signs)
- In the future, the Austria NAP would also like to provide and share UVAR data in DATEX II version 3.3 format.

2.1.2.2 Formats

In Austria, the following table describes the use of different data formats for UVARs. It is divided between MS-Office solutions and GIS-based formats like XML and JSON.

Table 1 - Different data formats for UVARs in Austria.

Option	Amount	Percentage
Word/*.docx	2	15.38%
Excel/*.xlsx	1	7.69%
PDF	4	30.77%
DATEX II	1	7.69%
TXT	1	7.69%
XML/JSON	2	15.38%
Other: Please describe.	2	15.38%
In total	13 answers	

Most respondents pointed out that they don't publish machine-readable formats on the website. Moreover, the DATEX II standard is also not commonly used for new UVAR regulations or implementation.

2.1.3 Implementation challenges

In a meeting in July 2021 ITS Vienna Region pointed out that a new system or a new tool is always a barrier when it comes to implementation and usage. Besides that, a lot of municipalities use an external IT provider named K5 which is in charge for IT solutions and implementation of new tools, so any tool UVAR Box provides should be linked to/used by K5. In addition, Austrians motorway operator ASFINAG is providing UVAR relevant data coming out of their operative traffic management system. This system

currently has a DATEX II V.2.xx interface, which is not compatible with DATEX II V.3.xx. Anyhow, there are plans at ASFINAG to change the current DATEX II V.2.xx interfaces to DATEX II V.3.xx in the upcoming years. A detailed timeframe is not known yet.

2.1.4 Pioneers for our project

Most of the answers were from Vienna, which is especially interested in the UVAR Box and would like to be one of the first test users in this project. Tyrol and Salzburg are also interested to take a part as beta tester.

Table 2 – Austrian cities interested in being pioneer in the project.

Option	Amount	Percentage
Yes, I would like to be a pioneer and/or share my previous experience or requirements. Please contact us for further information under this address:	3	50%
I will join as soon as the toolbox is finished and ready for integration of my UVARs. Please contact us under this address:	1	16.67%
Maybe on a later timescale.	2	33.33%
Total	6 answers	

2.1.5 Other country-specific highlights

Austria has different stakeholder groups when it comes to legal aspects and their implementation. Municipalities have their own grouping called "Association of Municipalities"¹⁰. Given the size of a city, there is also a group which covers the bigger cities of Austria called "Austrian Association of Cities"¹¹. Both of this Associations act as stakeholder amplifiers. About 65 percent of the population and 71 percent of jobs are located in Austria's metropolitan areas. The Austrian Association of Cities and Towns is the municipal lobby group for a total of 259 cities and larger municipalities.

In addition to Vienna and the provincial capitals, virtually all municipalities with over 10,000 inhabitants are member of the Austrian Association of Cities. The smallest member municipality has just under 1,000 inhabitants. Membership is voluntary. In addition to the Austrian Association of Municipalities, which represents the smaller municipalities, the Austrian Association of Cities and Towns is an advisory partner for the government at the federal and provincial levels and is explicitly mentioned in the Austrian Federal Constitution (Art. 115 Par. 3).

¹⁰ <https://gemeindebund.at/>

¹¹ <https://www.staedtebund.gv.at/>

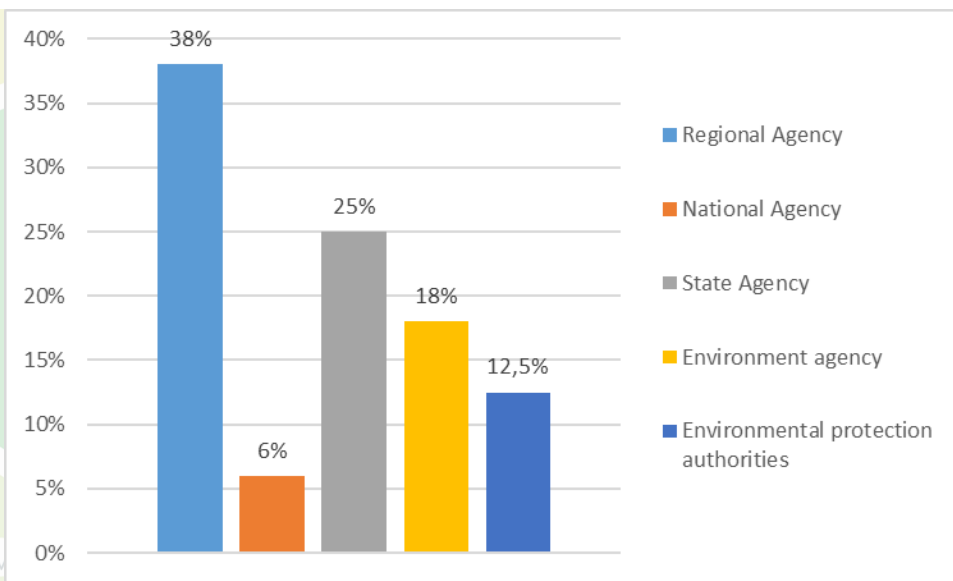


Figure 2- % for question 7 - Which organisations or authorities are involved in the regulation/ordering of a UVAR?

2.2 BELGIUM

2.2.1 Process and tools for creating an UVAR

2.2.1.1 Involved Organizations and authorities

LEZ: For the implementation of UVAR regulations, different regional and city departments are involved. Cities can introduce local exemptions to regional UVAR regulations. As the LEZ aims to reduce vehicle emission and improve air quality in a city, it is the city's environmental department that initiates the plans for the implementation of an LEZ. The cities' mobility department is involved in the implementation of the LEZ, to determine the right measures for how vehicles need to be rerouted, and how they will be informed about the zone. An IT department of the city is then involved for the implementation of the necessary systems for enforcement of the UVAR, as the LEZs are camera enforced. The IT department also helps to provide user information, such as a website and any registration required. Lastly, a fiscal department is involved for the actual enforcement of the regulation.

CS: In Brussels the congestion charging scheme is part of the regional government of Brussels, with the environmental and fiscal departments involved. Currently, it is still in the public consultation phase.

LTZ and PED: The limited traffic zones and pedestrian zones regulations are part of the portfolio of the mobility department of a city.

PARK: Parking regulations are part of the portfolio of the mobility department of a city. In Brussels there is a separate parking entity that implements and manages parking services.

2.2.1.2 Existing Tools for UVAR Management

The most common tools used for UVAR management are MS Word and MS Excel, or a similar tool. For the visualisation of the UVARs, programs like ArcGIS or ArcMap are used. In order to define their locations, indications of urban areas or other administrative units are used, as well as specifications of coordinates and indications of street names with house numbers.

Polygons are used to define the UVARs. With this, entire areas or zones are defined. From these zones certain streets can be excluded. The types of shapes that are used less often are streets with polygon characteristics or singular points for a given location. The information regarding the UVARs is updated when needed or once a year.

ArcGIS and ArcMap are also mentioned by Ghent and Antwerp to be tools that support UVAR-related administrative processes. Next to this, Ghent uses custom made and off the shelf information systems: City Permit, Trafiek, Zoneguard, ESSA, Planon and City Control.

2.2.1.3 Process for creating an UVAR

The process of development and adoption of UVARs is very similar for each of the regions, as well as the involved local authorities and stakeholders and follows the steps outlined at the beginning of chapter 2.

2.2.2 Publication of UVARs

2.2.2.1 Existing Channels

The most important channels for the publication of UVARS are the city websites. The Flemish government also publishes the regional formal legal regulatory mechanism on behalf of a city if an UVAR is also applicable on the higher-level road network. The road users are also notified through electronic billboards, traffic signs, floor markings, newspapers, or response teams on site. There are no links with the NAP established so far.

2.2.2.2 Formats

The formats that are most used for publication of UVARs are PDF and Word. The digital publications on the open data portals support the (geo)JSON format. There are differences in the way the different UVARs are published on the open data portal. Brussels, for example, publishes specific parking regulations for handicapped parking, motorbike parking, electric charging station parking locations, and parking for coaches in CSV, JSON or Excel format. In Gent the differentiation is made between street parking, parking garages and Park and Ride, and parking tariff zones. DATEX II is not yet used as a machine-to-machine (M2M) readable format for UVARs in Belgium.

2.2.3 Implementation challenges

One of the most important implementation challenges identified during the meetings with Belgian stakeholders is the costs and time associated with the implementation of a new digitalised process for the publication of UVAR-related data. In Antwerp there is already a process in place, so here it is necessary to identify a method that allows for efficient transition to the proposed DATEX II standard in this project. But even within regions or cities there is no harmonized process in place regarding decision-

making or digitalisation of UVARs. There is also a personnel issue. Especially the smaller municipalities seem to lack resources to commit to being involved with the UVAR Box project or to digitise their UVARs.

2.2.4 *Pioneers for our project*

Pioneers for this project in Belgium are the cities of Antwerp, Brussels, Ghent, and Mechelen.

2.2.5 *Other country-specific highlights*

At this moment there are no other highlights for Belgium.

2.3 THE NETHERLANDS

2.3.1 *Process and tools for creating an UVAR*

2.3.1.1 *Involved Organizations and authorities*

In the Netherlands the implementation of a UVAR is usually undertaken at a regional scale, and it is therefore mostly the regional organisations that are involved with the UVARs creation. The Ministry of Infrastructure and Water provides a national legal framework, and is involved by launching an initiative that tackles the need to produce and collect city data, of which a part is also related to UVARs, digitally available to the public and accessible to third parties, as well as running a national LEZ website, on which these digital boundaries can be found. The digitalisation of part of the UVARs is already being undertaken, outsourced to a private organisation.

2.3.1.2 *Existing Tools for UVAR Management*

The most used tools for UVAR management are:

- Word, for among others making the policy documents and writing the regulations.
- Excel, for example cost calculations or data analysis of Automatic Number Plate Recognition registrations and permission system exports.
- GIS based tools for the creation of maps and geofencing.

The most common way to define the location of UVARs is to use an indication of urban areas. Next to that, indications of street names with house numbers, the specification of coordinates, and an indication of kilometre values are used.

Polygons are used most often are entire areas or zones to determine the geographic coverage. From these zones certain streets can be excluded. Additionally, streets with polygon characteristics, streets with line characteristics, and points for a given location are used. The information on the UVARs is updated when the legislation changes.

Different software tools such as City Control, City Permit, Mappi, and Microstation help the cities setting up UVARs, enforcing rules, and administrating permissions.

2.3.1.3 Process for creating an UVAR

The process for development and adoption of UVARs in the Netherlands follows a standard procedure initiated either by national or local authorities, usually with the EU-wide SUMP (Sustainable Urban Mobility Plan) process and in line with the steps outlined at the beginning of chapter 2.

LEZ: The mobility and/or environmental departments of the cities are usually the leading groups for initiating and implementing LEZ regulations.

Recently, the Dutch Ministry of Infrastructure and Water Management, driven by the “Paris Climate Agreement”, has launched a national initiative to support Dutch cities in the process of implementation of Zero Emission Zones (ZEZs). The objective is in 2025 to have 30-40 cities with a ZEZ, with access restrictions for heavy duty vehicles and delivery vans. This supporting program includes both an advisory service to cities, as well as a standard step-by-step process for developing and implementing a ZEZ until the final traffic decision and regulation¹². There is also a national harmonized framework for these ZEZs.

This step-by-step process comprises the following stages:

1. Motivation, argumentation, and vision
2. Insight in the subject at hand
3. Action plan in cooperation with the stakeholders
4. Decision by the college
5. Traffic regulation order
6. Start of regulation

2.3.2 Publication of UVARs

2.3.2.1 Existing Channels

The most important channels for the publication of UVARs are the city websites and notice boards that advertise the introduction or existence of a UVAR. Next to that, the regulations are published on a national website “staatscourant”¹³. For Amsterdam, the LEZ is linked to the NAP. There are many other entities that publish UVARs on their own initiative, for example, the Dutch Automobile Club (ANWB), publishes and disseminates LEZ data. There is a national website¹⁴ where the digital maps are presented, as well as other information on the Dutch LEZs.

2.3.2.2 Formats

The formats used most often to publish UVARs are PDF and Word. There are also municipalities publishing in XML and JSON. Also, the National Parking Register publishes in XML and JSON. Usually, this is not only published in text, but also supplemented with pictures on the city websites. In Amsterdam, DATEX II is used as a M2M readable format.

12 <https://opwegnaarzes.nl/gemeenten>

13 <https://www.officielebekendmakingen.nl/staatscourant>

14 <https://www.milieuzones.nl/>

2.3.3 Implementation challenges

The Netherlands is quite advanced when it comes to digitalisation of UVAR information. There is a process in place for different UVARs, for example LEZ and LTZ information is already disclosed through a private organisation, commissioned by the responsible ministry, and presented on the national website. The biggest challenge for the UVAR Box project is to make good use of the infrastructure that is already in place in order to make the largest impact. The proposed process with the DATEX II model should be integrated in current processes, and therefore the focus would be less on the use of the UVAR Box Tool itself (however there is still interest in the tool) and more as a potential option for future UVAR digitisation activities. As mentioned for other countries, budget and personnel can be a challenge for regional governments to find a sustainable manner in which the processes can be implemented.

2.3.4 Pioneers for our project

The pioneers for our project in the Netherlands are the Regional Data Teams in the Netherlands, and the cities of Amsterdam and Rotterdam.

2.3.5 Other country-specific highlights

What is important for the Netherlands is that there is a nationwide program supporting a harmonised process for the collection and digitalisation of data that is the same level of service. This can function as an example for other member states in their process to digitalisation of their policies.

2.4 GERMANY

2.4.1 Process and tools for creating an UVAR

2.4.1.1 Involved Organizations and authorities

According to the findings of the questionnaire, it is mostly municipalities (89%) that are involved in the process of UVAR creation. In some cases, authorities on the national (32%) and state level (42%) as well as environmental projection authorities (32%) are also involved.

LEZ: In Germany, low emission zones are usually ordered on the city level, however there is involvement of the states (Länder), which may require a city to implement a LEZ if the EU air quality limit values are not met. Thus, municipalities in form of the responsible road authority are responsible for its implementation, while the public works department is responsible for the placement of the traffic signs. Currently, there are 80 German cities with LEZs. The process also involves the responsible units on the state level who collect the information. There is often regional coordination of the LEZs through the states (Länder), so that, for example, all require the same emissions standard, or cover a contiguous geographic area. On the national level, LEZs are collected by the German Environment Agency (Umweltbundesamt UBA) that receives the data from the states.

CS: There are no existing or planned congestion charges in Germany.

LTZ and PED: Limited traffic zones as well as pedestrian zones are ordered by municipalities. Usually the mobility, traffic, or public works department is responsible for these two types of UVARs.

PARK: Parking regulations are mostly ordered and implemented by cities. In bigger cities such as Berlin, the responsibility lies with the districts. In some rare cases, it can also be on the regional or state level.

2.4.1.2 Existing Tools for UVAR Management

Most German authorities use MS Word or similar tools (68%) in the process. Some also use GIS-based systems (37%) as well as MS Excel or comparable tools (32%) for the creation of UVARs.

In order to define the location of the UVARs legally, it is mostly street names with house numbers (74%) that are used, as well as urban areas or other administrative units (58%) are used, whereas geographic coordinates (21%) occur less frequently as the basis for location information.

UVARs in Germany usually cover polygons. Most of these are entire areas or zones (84%), some are streets only (63%), others are areas with certain streets excluded (68%). Some UVARs are in the shape of points (32%).

75% of the UVAR data in Germany is currently updated less than once a year (62%) or never (13%), whereas 19% are updated several times a year.

2.4.1.3 Process for creating an UVAR

About half of the organizations agree with the process presented in Figure 1 (see chapter 2), which was part of the questionnaire. Some state that the different steps may vary occasionally or that the process fits for most of the UVARs, but not for all of them, and that there might be deviations in individual cases. It was also mentioned, that the terminology for the same things varies from region to region.

Some respondents gave additional comments about the policy development of the UVAR and decisions as to what UVAR was developed, which are undertaken by most cities. These included the fact that implementation and monitoring are missing in the process scheme given in UVAR Box. One authority also mentions that an evaluation is only executed during implementation, but not during the planning stage. Others comment, that project groups are formed and problems discussed. Stakeholders who need to be addressed include traffic planners, road authorities, police and, if necessary, district, state or national authorities. It is also mentioned that an impact analysis will be conducted. UVAR Box focuses on the stages to implement an UVAR once the UVAR policy has been decided; which we should perhaps have been clearer in the questionnaire.

2.4.2 Publication of UVARs

2.4.2.1 Existing Channels

The most important channels for the publication of UVARs are the website of the city or region (74%) as well as other human readable media channels such as newspapers (63%). Only 21% of the organizations use GIS software interfaces to publish their data.

Road users are notified via traffic signs (79%), internet (53%), electronic billboards (32%), floor markings (32%), paper forms such as newspapers, letters or trade associations (26%) or response teams on site (11%).

Currently, 44% of the organizations publish their UVAR data completely (25%) or partially (19%) via the NAP for traffic data, and 12% more plan to do so in the near future.

The Umweltbundesamt publishes summarised information for all LEZs, as well as links to the individual cities.

2.4.2.2 *Formats*

The most popular formats used to publish UVARs are PDF (74%) and Word (53%), followed by Excel (32%), XML/JSON (32%) and TXT (11%), while only 5% (1 organisation) use DATEX II for publication of UVARs at the moment.

More than a third (37%) of the respondents did not know what DATEX II is and only one organisation is using DATEX II already.

2.4.3 *Implementation challenges*

The most important challenges, identified in workshops and interviews, are:

- Several stakeholders from different departments/levels of government are involved.
- Some of the data has to be collected from several districts (e.g., there are 12 districts in Berlin).
- Data is available in text form and on websites, but not in a machine-readable form.
- New tools are not a main focus for big cities, since most of them already have one or more tools, and would instead want these tools to be able to produce any DATEX II formats.
- People responsible for UVAR are usually not the ones involved in IT or EU projects.
- Most cities have very limited personnel resources, so involvement in activities such as UVAR Box is not an issue of interest but of resources.
- Policy makers must get involved, since the digitalisation of UVARs needs a clear legal framework.

2.4.4 *Pioneers for our project*

The organizations who are willing to be pioneers, from the start or when the tool of UVAR box is developed, are:

- City of Berlin
- City of Dusseldorf
- City of Hagen
- City of Wiesbaden
- Federal Environment Agency (Umweltbundesamt)
- Verkehrsverbund Rhein-Sieg (Cologne area)

Additionally, the authorities willing to join the project at a later time scale, are:

- City of Aachen
- City of Bielefeld
- City of Castrop-Rauxel
- City of Dortmund
- City of Essen
- City of Heidelberg
- City of Kassel
- City of Stuttgart
- Governmental district of Arnsberg
- Governmental district of Cologne

2.4.5 Other country-specific highlights

Germany, compared to other EU countries, has currently no road or city charges. On the other hand, environmental zones exist in many cities and the use of a sticker (“Umweltplakette”) to mark the emission level of a car was first introduced in Germany. There is, a well-established National Access Point with the Mobilitäts Daten Marktplatz¹⁵ has even been used to publish some UVARs.

2.5 ITALY

2.5.1 Process and tools for creating an UVAR

As described in section 1.2.5, there have been lots of engagement activities carried out by Italian Country coaches, by email, phone calls and bilateral meetings. Thanks to the questionnaire defined by the UVAR Box Consortium, and the Italian National UVAR Workshop, organized by the Italian CCs, feedback from a good percentage of the many Italian municipalities which have implemented UVARs have been received. 57 questionnaires have been filled in by colleagues responsible in Italian municipalities. Among those, contributions have been provided by the biggest Italian cities as Milan, Rome, Turin and Parma.

In order to collect more information required by the project, peer-to-peer meetings have been organized among CCs and municipalities. During these meetings, one of the main aspects discussed concerned the process to plan and implement an UVAR, from the objectives’ definition to the monitoring phase.

2.5.1.1 Involved Organizations and authorities

Although there is a similar UVAR creation process among the cities, some differences have been highlighted, in particular concerning the available tools for UVAR definition and the authorities involved. About this latter aspect, around 38% of Municipalities stated that Regional Agencies have been involved in the UVAR definition processes (Figure 3).

¹⁵ <https://www.mdm-portal.de>

As indicated in D1.1, most of the LEZs implemented (which are considered as one of the main measures available to reduce air pollution) are located in the North Italy Regions, that are those which subscribed the "Po Basin agreement" ("Accordo di Bacino Padano"). This explains the percentage of 38% having regional agency involvement indicated above but also the around 24% related to the Environment agency involvement.

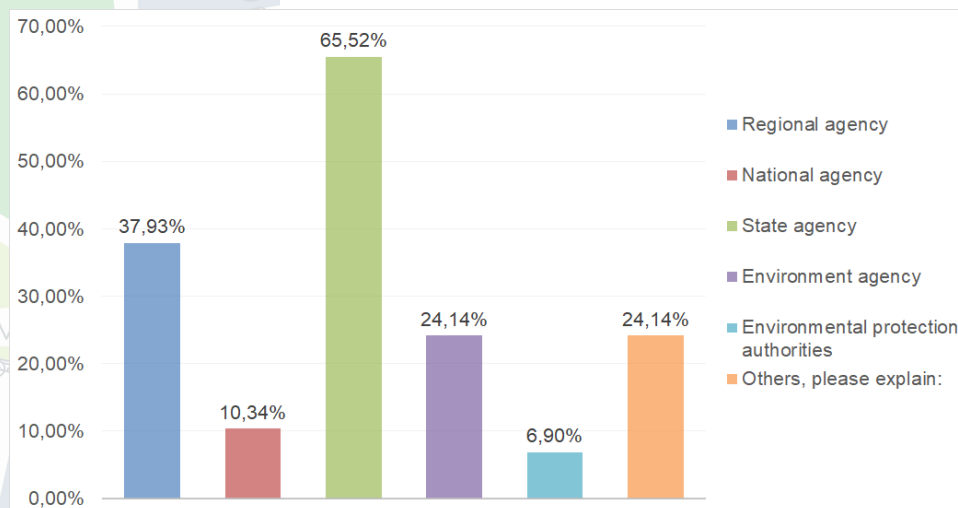


Figure 3- % for question 7 - Which organisations or authorities are involved in the regulation/ordering of a UVAR?

Furthermore, the municipalities which have indicated the National Agency involvement, clarified that this means the Italian Ministry for Sustainable Infrastructures and Mobility (MIMS) has to been involved to provide the authorization for the operational start of "ACS – Access Control System" (i.e. cameras) for LTZ enforcement. It is important to recall that the current Italian Directive, "D.P.R. n° 250 / 1999" will be repealed by the end of 2021, with new directive which will allow the operational ACS to start without the ministry authorization. However, the act of repeal has not yet been implemented, and it appears that the ministry may be reconsidering its repeal.

2.5.1.2 Existing Tools for UVAR Management

Another aspect that gives significant differences concerns the tool used to define the UVARs. Obviously, there is a significant gap between big municipalities and the smaller ones. For instance, cities like Milan and Rome have the availability of suitable tools not only to define the UVAR on regulations side, but also in terms of UVAR "drawing" and data digitalisation (e.g., standardised in DATEX II or other formats/standards).

More than 73% of Municipalities stated that currently they use MS Word and around 41% MS Excel (Figure 4). Only 12% confirm that they use a GIS-based software. The lack of digitalised information is the main barrier to achieve the integration targets aimed by the European Commission. The MS Word application might be a good way to provide/collect data, but the information must be included in a predefined template to be effectively machine-readable.

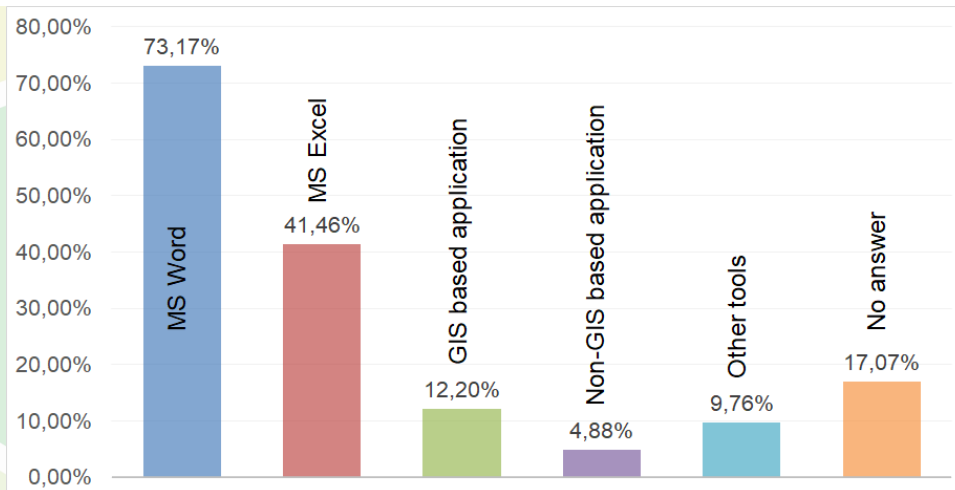


Figure 4- % for question 8 - Which tools do you or your colleagues use while creating an UVAR?

GIS-based applications are useful for defining and digitising information related to different types of UVARs. Municipalities should be supported in UVAR design activity, as most of them relate to areas (polygons) or areas with specific roads excluded (Figure 5).

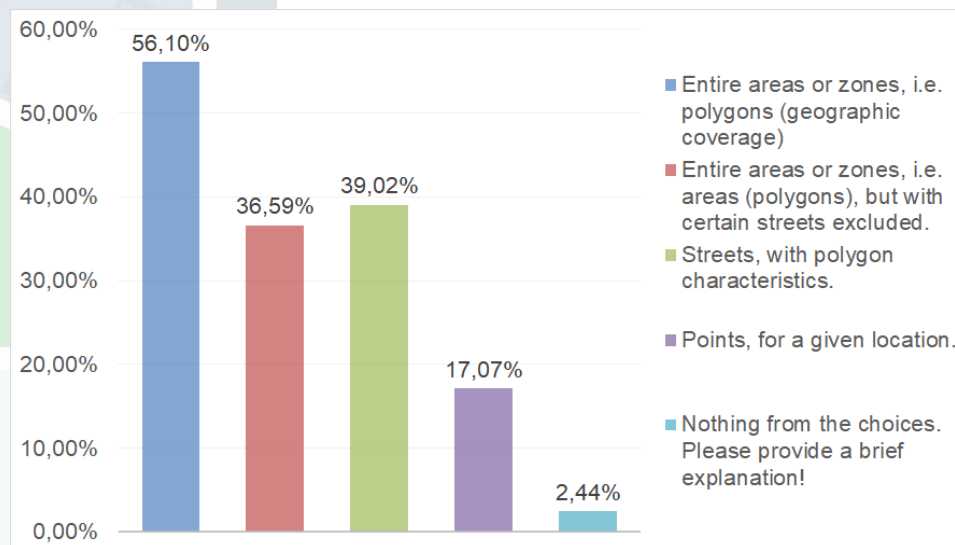


Figure 5- % for question 9 - If you think of your UVARs, which type of shape do they have?

According to what was mentioned above, there are several IT software available and used by Italian cities. In this regard, each municipality could tender the purchase of an IT solution by their own. This means there is no standard available and these platforms do not share data with the MIMS or the NAP.

Specific UVAR creation tools (such as the UVAR Box Tool) are very helpful, in particular during the first UVAR definition stage when, after data input into the tool, not only in terms of geography, but also time windows, area of interest, vehicle restrictions, etc., the information can be digitalised and standardised based on DATEX II protocol, in order to be ready for data sharing with the NAP or service providers.

Concerning the updating phase, the aspects related to the tool will be less important, considering the low frequency of UVAR change/update, as highlighted by the feedbacks collected. Currently, the frequency of UVAR updating is less than once time per year, in general related to the need of legal changes in regulation – see Figure 6.

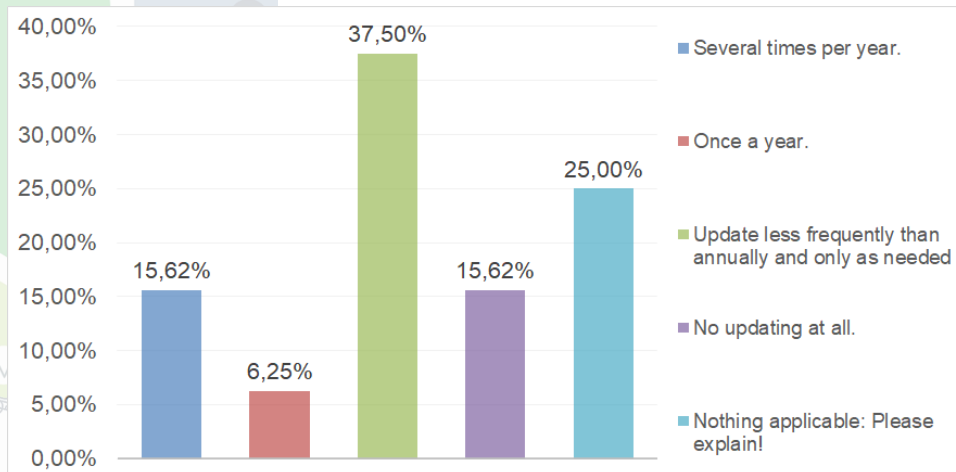


Figure 6- % for question 23 - How often do you currently update the information on your UVARs in your different systems once they are incorporated?

Concerning the emergency/triggered smog schemes, to be activate when exceeding maximum air pollutants threshold (measured or foreseen for next days, as stated by Piemonte Region with the “D.G.R. 26th February, 2021, n. 9-2916¹⁶”) the availability of a specific tool such as the UVAR Box Tool can represent a support to provide information about UVAR activation current status. This aspect can be useful in order to manage the traffic in a near real-time way, and, for instance by making use of C-ITS solutions, or transferring information to real time service providers.

2.5.1.3 Process for creating an UVAR

The information collected highlighted how this process is very similar among different municipalities, regardless the site’s size of UVAR implementation. In general, the steps followed for a good UVAR definition process are very similar and follow the steps outlined at the beginning of chapter 1.2.

Regarding Figure 1 “Regulatory process of defining UVARs” (chapter 2), which was included in the questionnaire, one municipality responded that the “participation procedure” step is anticipated compared with the “needs definition” one. Furthermore, another consideration has been provided stating that the sub-steps included in the “participation procedure” are not very aligned with the implemented process.

2.5.2 Publication of UVARs

¹⁶ http://www.regione.piemonte.it/governo/bollettino/abbonati/2021/09/attach/dgr_02916_1050_26022021.pdf

After the UVAR definition phase, the regulation needs to be published/disseminated through the different communication channels available by municipalities. Currently the dissemination is mainly carried out through the city's website where the regulation is made available and, in the first stage of UVAR activation, with the use of newspaper to warn the citizen about the new regulation, and for triggered / smog schemes also local radio.

2.5.2.1 Existing Channels

Currently, not all Italian municipalities are able to publish the regulations defined using digital tool (GIS, etc.) to share the information with other kinds of application based on GIS and similar (Figure 7). Most of them publish the UVAR data using the municipality website and not machine-readable media channels, sometimes with just the geography in Shape file format, or similar. Furthermore, the same data or a subset of data is sometimes also published by other authorities or bodies different from the municipalities as, e.g., affiliated companies and trade associations. For instance or the Lucca city the LTZ information is provided not only on institutional website of Lucca municipality¹⁷ but also on the "Metro" website¹⁸ - the company managing the permits for LTZ access

The lack of digital tools and the use of non-machine-readable channels can entail several issues in terms of road users UVAR notification and readiness to provide data to NAP following the DATEX II standard. Another hurdle in Italy is that the state of the NAP does not allow for UVAR data to be placed on it.

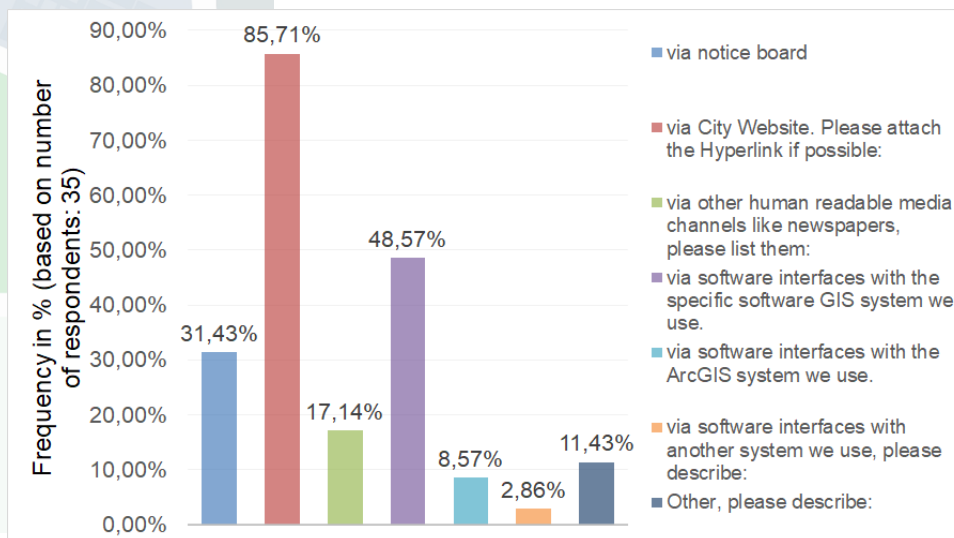


Figure 7- % for question 13 - As you finished your regulation document, via which channels this regulation is published?

17 website: <https://www.comune.lucca.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/3554>

18 website:

<https://www.metro.srl.it/AllegatiPagine/201800016/Widget/12/ordinanza%201840%20del%2031.10.2019%20limitazioni%20accesso%20in%20zona%20verde.pdf>

2.5.2.2 Formats

Only few Italian cities have currently made digital UVAR data available. Among those cities making digitised data available are some of the frontrunners such as Milan and Rome which are currently digitising data for future sharing with the NAP or other access points. In any case, most of the municipalities that have replied stated that they don't have available standardised data and, around 25%, are not familiar with DATEX II – see Figure 8.

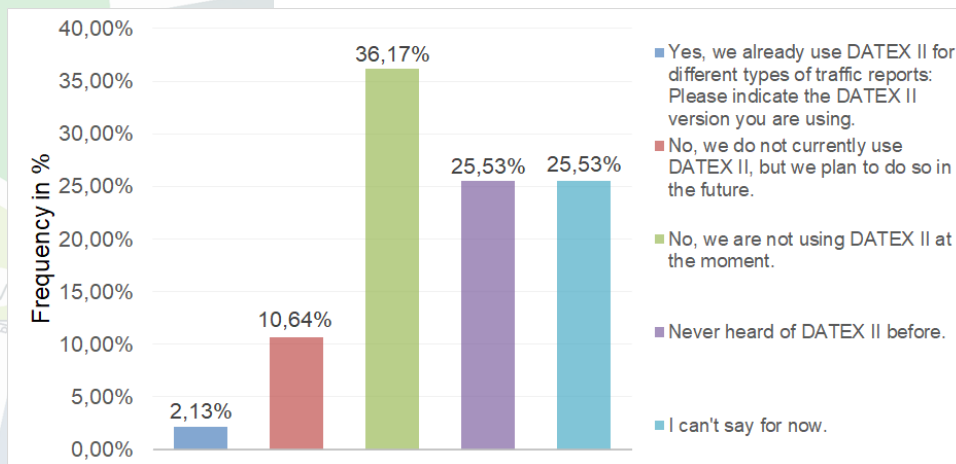


Figure 8- % for question 16 - Is your department or authority using DATEX II as a machine-readable format for publishing e.g., UVARs or other traffic regulations?

For these reasons, the UVAR Box Tool will be fundamental to support and to help the Municipalities to start the UVAR data digitalisation activity, aiming the data integration into the NAP and Single Digital Gateway (SDG).

2.5.3 Implementation challenges

Small/medium size Italian cities cannot overcome the issues related to the lack of tools and knowledge, as mentioned in the previous sections. In many cases, municipalities do not have sufficient resources and capabilities to face the efforts required by UVAR definition, publication, and monitoring activities.

To summarise, the UVAR municipalities responsible are concerned by the new workload which could be entailed by the request of digitalised and standardised data to integrate into the NAP. Some disappointments might emerge relating the inclusion of a new tool into the UVAR creation process. In particular, the use of a new tool, such as the UVAR Box Tool, could be perceived as another thing to do which requires more skills and additional activities compared to the current process where digitisation is not yet carried out. For this reason, the Consortium has tried to make the tool as user-friendly as possible and has provided active support to the municipalities.

2.5.4 Pioneers for our project

Several cities expressed their availability to participate as active a “pioneer city” in order to provide input data using Word template or the UVAR Box Tool. Furthermore, they showed willingness also to validate the data and to be involved into UVAR Box Tool validation process. The list below includes only part of the Italian cities which could be really interested to be engaged in terms of data provision and tool validation, these cities signed a letter of support and declared to be interested once the tool will be available for them. Due to the lack of time, these cities will be ready to be frontrunner for data validation in the next UVAR project.:

- Bellagio
- Bergamo
- Bologna
- Genova
- Lecce
- Lucca
- Milano
- Padova
- Parma
- Piacenza
- Portoferraio
- Prato
- Quartu Sant'Elena
- Ravenna
- Rimini
- Roma
- Treviso
- Verona

In addition, letters of support have been provided also by the Italian Ministry for Sustainable Infrastructures and Mobility and by Emilia Romagna Region.

2.5.5 Other country-specific highlights

At current project stage, no additional information needs to be mentioned. Based on the subsequent activities results, further considerations could be elaborated.

2.6 OTHER EU MEMBER STATES

2.6.1 Process and tools for creating an UVAR

The processes and tools to create UVARs in cities and regions from countries other than Austria, Belgium, Germany, Italy and the Netherlands will be exposed below per country, for the countries in which we

could collect information. The information comes from the responses we obtained to a questionnaire we prepared and disseminated as widely as possible in Europe. It was completed with an exchange with UVAR-responsible authorities organised as a workshop in June 2021, and with most recent information from the CLARS platform. For the other countries, we did not pursue intensive follow-up work, as was undertaken for the 5 main countries of the project.

2.6.1.1 *Involved Organizations and authorities*

In Portugal, Ireland, and Latvia, only local authorities are involved in defining and implementing UVARs.

In France, Spain, The Czech Republic, Poland and Sweden, national authorities are involved in the framework for low emission zones, but measures are defined at local level. Limited traffic zones, parking regulations, and pedestrian zones are entirely decided in cities. In Sweden, charging schemes depend on a national law.

2.6.1.2 *Existing Tools for UVAR Management*

In France, UVARs are ordinances from mayors in human-readable formats. Their localisation is defined with GIS tools in polygon forms covering defined zones, with lists of streets in some cases. Some cities have a digital road network, which is used in some cases to reference roads affected by the UVARs. Updates occur several times a year and when it is necessary.

In Ireland, UVARs are traffic regulation orders from regional and national agencies in human-readable format as well, also localised on GIS tools as polygons. The city of Dublin in Ireland uses an excel table to keep an overview of all UVARs and their updates. They don't have a digital road network. Update occurs only when necessary.

In Sweden, the city of Stockholm uses a standard program from a company called Sokigo. They create the regulation and the system provides a simple GIS-tool too. With the system they export their regulations to the national registry, STFS (<https://rdt.transportstyrelsen.se/rdt/defaultstfs.aspx>) provided by the Swedish Transport Agency. The map links are imported to NVDB (<https://www.nvdb.se/sv>) also provided by the Swedish Transport Agency and can be used for GPS, interactive maps and so on. There is significant interest in geofencing in Sweden, which may provide future incentives for UVAR digitisation.

In Spain, UVARs are made up of several ordinances in human-readable formats. MS Excel is used to manage and record uses and infractions. GIS based analysis and visualization tools (population, socio-economic data, car plates registry together with census data, etc.) are used to support decision making. UVARs' coverage is represented with streets and urban areas. Updates of the UVAR documents take place only when there is a legal change in the regulation.

2.6.1.3 *Process for creating an UVAR*

Most of the respondents to our questionnaire – mainly from France, Ireland, Spain, the Czech Republic, and Hungary - have recognised the UVAR Box proposed process of UVAR creation as similar to theirs. That means they follow these steps:

1. Define needs in terms of regulating the access of vehicles to the city and the competent bodies to answers these needs.
2. Plan a regulation to solve issues defined – based on the SUMP UVAR guidelines¹⁹ in the case of Budapest.
3. Provide an objection period to citizens.
4. Prepare documents and implement them.
5. Monitor the performance of the regulation implementation.

2.6.2 Publication of UVARs

2.6.2.1 Existing Channels

UVARs are communicated to road users and the wider public on city websites in most countries surveyed. In France, Ireland, and Spain they are also displayed on Variable Message Sign (VMS), while in Sweden they are published on the national registry STFS (Svensk trafikföreskriftssamling - Swedish collection of road traffic regulations) provided by the Swedish Transport Agency, which produces map links usable for GPS & interactive maps. In France, UVARs are published in official journals. In Ireland, Spain, and Sweden, they are included also in local newspapers.

2.6.2.2 Formats

In France, Ireland, and Spain, UVARs are published in human-readable formats. However, some are also available in XML/JSON or Shapefile formats in France. In Sweden, UVARs are published in machine-readable formats, in addition to text files in non-DATATEX II format.

2.6.3 Implementation challenges

One of the challenges for the implementation of the UVAR Box tools is language. French UVAR generators are mostly reachable in French and that might be an obstacle for their uptake of any other tools. The same issue appears for Latvian cities, for example.

Another challenge is the diversity of institutional framework among diverse countries, which could make it difficult to identify the right contacts who really create and share the UVARs.

2.6.4 Pioneers for our project

Although there are no pioneers planned for other countries, from our contacts we already have cities that want to use the UVAR Box tool, although we will aim for this to be after the pioneer stage.

2.6.5 Other country-specific highlights

We had contacts with the National Access Point of France to raise awareness on the tool. This cooperation will hopefully be pursued after the project through the NAPCORE. We also had a workshop

¹⁹ https://www.eltis.org/sites/default/files/uvar_brochure_2019-09-26_digital_version_v2.pdf

with the Ministry of Transport of Lithuania to support them in developing their national recommendation to cities on UVAR digitisation and communication.

3 Conclusions and future work

This overview report on legal processes for UVAR definition provides insights into the business processes of the legal creation of UVARs, mainly in the 5 focus countries of the UVAR Box Project. The aim was to understand the process, both country-specific and in general, and to find out where and how the UVAR Box Tool should be best integrated. The insight into the legal processes help us understand how to help digitise the data, and to outline strategies for the sustainable creation and collation of these data.

3.1 General conclusions

Based upon the knowledge provided by WP1, further information from the different countries was gathered during personal and virtual meetings, workshops, and an online questionnaire.

An overview table of the key country-specific findings for the topics covered in detail in Chapter 2 can be found in Annex – chosen results of the questionnaire – to be easily compared and get a cross-country view.

In summary, it can be said that the process for creating UVARs, which was defined at the beginning of the project based on the previous experience of the partners from the various countries, has proven to be fundamentally correct, and that the differences between the countries and within countries generally lie in the details.

Notwithstanding, the degree of digitisation still varies widely between and within the different countries, so that while in some cities UVARs are already available in machine-readable (usually non-DATEX II) format, or the geography only is in GIS format, in others the data is still exclusively human-readable. In all countries, the larger cities tend to be more developed and digitised, and able to digitise; smaller ones have fewer UVARs implemented as well as less machine-readable data and resources with which to provide that digital data.

DATEX II as a data exchange format is already known to some cities or regions, but for others, it is still completely unknown or its use is only in the planning stage. Within that framework, the data exchange of UVAR data with the NAPs rarely takes place anywhere yet – the exception being the Netherlands, for which machine-readable UVAR data has already become available during this project.

Those cities that already use GIS or other digital tools (rather than MS Office tools) for the management of their UVARs, did not want to introduce another tool and would require / prefer for interfaces to or the incorporation of the UVAR Box software into their existing tools. Cities and regions that do not yet use any digital tools referred to the issue of the lack of resources and the extra work as being a barrier to using a new or additional tool.

However, many cities and regions from the 5 focus countries want to do pioneer work and are willing to be one of the first users of the UVAR Box Tool. The usefulness of a uniform and cross-country data exchange format was understood by many and welcomed despite the concerns mentioned above.

For the UVAR Box project, this means that in developing a strategy for the sustainable future management of the digitisation of UVAR data, there is no single solution, nor is there a clear path per country, but across countries, different solutions need to be evaluated on how to use the UVAR Box Tool in different settings efficiently, in terms of resource use and effectively in terms of having the most complete and up-to-date data possible; complete data for each UVAR, as well as including all the relevant UVARs in that country.

The steps to get closer to this goal of the sustainable, complete, up-to-date creation and collation of machine-readable UVAR data will be addressed and further concretized in the cross-work package activities of the UVAR Project, led by WP5.

3.2 Country-specific conclusions

For Austria, a major conclusion is that there is already a process in place, when it comes to digitising UVARs. This could be a chance to strengthen the NAP when it comes to publishing up to date UVARs. Moreover, Austria is taking part in the NAPCORE project which will harmonise the different NAPs.

For Belgium, there is a lack of a coordinated approach for UVARs on a national scale. The departments and cities can implement for example their own LEZ. This results in varying requirements to enter an LEZ throughout the country. Furthermore, the cities themselves are responsible for any digitisation activities, future work could be aimed to introduce a nationwide program that will support regions and cities with such activities. This could be included also in initiatives like NAPCORE.

Future actions for the Netherlands that will be relevant can focus on a programmatic way to interact with the users of data. This way, needs and requirements can better be collected and it may increase the use of the data. In addition, focus can be put on creating a process for data validation. So far this is a manual action that takes up a lot of time. An automated process would increase the value of the data for the service providers, and it would help with the issue of keeping data up to date.

For Germany, a major conclusion is that the state of digitalisation and the availability of resources are very heterogeneous in different cities. The resources available correlates with the size of the city. While in big cities many people and units are working on UVARs, in small cities UVAR is one of many responsibilities of one person. Additionally, the fact that some of the bigger cities are already managing their UVAR data in exiting software systems makes it necessary to follow different approaches of data collection:

- Convince cities with existing systems to implement a standardised interface and provide the data in the DATEX II model provided by UVAR Box.
- Enable cities with no system but with personal resources to use the UVAR Box Tool.

- Support small cities with digitising their UVAR, ideally by a regional data coordinator, e.g., “Verband Region Stuttgart” or “Intelligentes Verkehrs- und Mobilitätsmanagement der Region Frankfurt-Rhein Main”.
- Integrate data collected by the German Environment Agency (Umweltbundesamt)

The most important goal of the UVAR Box project is to establish sustainable processes for long-term data collection. All approaches mentioned above are different means, suitable for different data providers, to reach that goal. Therefore, all approaches have been pursued in Germany in order to collect the maximum of available data.

Based on the results of the questionnaire and the discussions of the CCs with various cities in Italy it is clear that the Italian municipalities present two different and opposing conditions: i) aligned with last EU instructions concerning UVAR, data digitalisation and sharing toward NAP and ii) lack of economic resources and human skills to start the needed digitalisation process. On this second category the EU should and CCs efforts have been focused in order to engage the highest number of cities and to collect as much information as possible.

For all the other countries, which were not in the focus of the UVAR Box project, it will be a good idea to start with countries with higher numbers of UVARs and make use of approved or at least tried out strategies out of the pool of the developed ones for focus countries of the project.

Further details about the data digitisation experiences in the 5 pilot member states are documented in subsequent deliverables, including D2.4 “Specification of UVAR related data-flows for data generation, collection and data maintenance”.

Glossary

Term	Definition
ACS	Access Control System
AVG	General Administrative Procedure Act in Austria
CLARS	Charging, Low emission zones, Access Regulation Schemes – most complete platform currently identifying UVARs in Europe
CC	Country coach
CS	Congestion charging Scheme
CSV	comma-separated values file
DATEX II	Electronic language used in Europe for the exchange of traffic information and traffic data
EU	European Union
GIP	Graph Integration Platform
GIS	Geographic Information System
HGV	Heavy Goods Vehicle
IG-L	Austrian Emission Class Ordinance
JSON	JavaScript Object Notation, open standard file format and data interchange format
LEZ	Low Emission Zone
LTZ	Limited Traffic Zone
MA46	Vienna Municipal Department: Traffic organization and technical traffic matters
MIMS	Ministero delle Infrastrutture e della Mobilità Sostenibili – Italian Ministry of infrastructure and sustainable mobility
M2M	Machine-to-machine
NAP	National Access Point
NPR	National Parking Register in the Netherlands
NRW	Nordrhein-Westfalen, region in Germany
PARK	Parking Regulation

PDF	Portable Document Format
PED	Pedestrian Zone
PMS	Parking Management System
P+R	Park and Ride
RTTI	Real time traffic information
SDG	Single Digital Gateway: European unique portal to access information, procedures and assistance on EU and national rules and rights related the Single Market
Shapefile	data format for storing geographical information
StVO	Strassenverkehrsordnung – German translation of traffic regulation
SUMP	Sustainable Urban Mobility Plan
TIC	Traffic Information Centre
TRO	Traffic Regulation Order
UVAR	Urban Vehicle Access Regulation
UVAR Box Tool	Tool to enable the digitisation of UVARs
VMS	Variable message sign(s)
XML	Extensible Markup Language, markup language and file format.
ZEZ	Zero Emission Zone

Annex – chosen results of the questionnaire

Process and tools for creating an UVAR

	Austria	Belgium	The Netherlands	Germany	Italy	Other EU member states
Entities involved	<ul style="list-style-type: none"> Regional agency National agency State agency Environment agency Environmental protection authorities 	<ul style="list-style-type: none"> Municipality Regional agency 	<ul style="list-style-type: none"> Regional agency National Ministry of Infrastructure and Water 	<ul style="list-style-type: none"> Regional agency National agency State agency Environment agency Environmental protection authorities Others 	<ul style="list-style-type: none"> Municipalities Italian Ministry for Sustainable Infrastructures and Mobility 	<ul style="list-style-type: none"> Municipalities Regional and national agencies
Tools in use	<ul style="list-style-type: none"> MS Word GIS based planning system 	<ul style="list-style-type: none"> MS Word MS Excel GIS based planning system 	<ul style="list-style-type: none"> MS Word MS Excel GIS based planning system Non-GIS based planning system 	<ul style="list-style-type: none"> MS Word MS Excel GIS based planning system Non-GIS based planning system Others 	<ul style="list-style-type: none"> MS Word MS Excel GIS based planning system Non-GIS based planning system Others 	<ul style="list-style-type: none"> MS Word MS Excel GIS tools

	Austria	Belgium	The Netherlands	Germany	Italy	Other EU member states
Location definition	<ul style="list-style-type: none"> Urban areas or other administrative units Coordinates Street names with house numbers Other 	<ul style="list-style-type: none"> Urban areas or other administrative units Specification of coordinates Street names with house numbers 	<ul style="list-style-type: none"> Urban areas or other administrative units Specification of coordinates Street names with house numbers Indication of kilometre values 	<ul style="list-style-type: none"> Urban areas or other administrative units Coordinates Street names with house numbers Other 	<ul style="list-style-type: none"> Urban areas or other administrative units 	<ul style="list-style-type: none"> Urban areas Street names with house numbers
Shape/Geometry	<ul style="list-style-type: none"> Entire areas or zones (geographic coverage) Entire areas or zones (certain streets excluded) Streets Points 	<ul style="list-style-type: none"> Entire areas or zones (geographic coverage) Entire areas or zones (certain streets excluded) Streets Points 	<ul style="list-style-type: none"> Entire areas or zones (geographic coverage) Entire areas or zones (certain streets excluded) Streets Points 	<ul style="list-style-type: none"> Entire areas or zones (geographic coverage) Entire areas or zones (certain streets excluded) Streets Points 	<ul style="list-style-type: none"> Entire areas or zones (geographic coverage) Entire areas or zones (certain streets excluded) Streets Points 	<ul style="list-style-type: none"> Entire areas or zones (geographic coverage) Streets

	Austria	Belgium	The Netherlands	Germany	Italy	Other EU member states
Discrepancies to general process diagram	<ul style="list-style-type: none"> • Procedure according to TRO (StVO) or AVG 	<ul style="list-style-type: none"> • In general, the feedback is that the process is compliant with the one in place. • Stakeholder consultation is there from the start to finish 	<ul style="list-style-type: none"> • In general, the steps of this procedure are followed 	<ul style="list-style-type: none"> • About half of the organisations agree with the process. • Different steps of the process vary in different organisations or for certain UVARs. • The terminology varies from region to region. 	<ul style="list-style-type: none"> • Most of the municipality's state that general process is compliant with the real one. 	<ul style="list-style-type: none"> • In accordance with the proposed process: Definitions, Planning, Participation, Preparation, Implementation, Monitoring.
Update interval	<ul style="list-style-type: none"> • Several times per year • Update less frequency than annually • Nothing applicable 	<ul style="list-style-type: none"> • Updated when necessary or once per year. 	<ul style="list-style-type: none"> • When needed 	<ul style="list-style-type: none"> • Several times per year • Update less frequency than annually • No updating at all • Nothing applicable 	<ul style="list-style-type: none"> • Several times per year • Once a year • Update less frequency than annually • No updating at all • Nothing applicable 	<ul style="list-style-type: none"> • When legal changes occur

Table 3 – chosen results of the questionnaire - Process and tools for creating an UVAR

Publication of UVARs

	Austria	Belgium	The Netherlands	Germany	Italy	Other EU member states
Publication channel	<ul style="list-style-type: none"> • Notice board • City website • Other media (newspaper, etc.) • SW interfaces with SW GIS system • SW interfaces with SW ArcGIS system Others 	<ul style="list-style-type: none"> • Notice board • City website • Other media (newspaper, etc) 	<ul style="list-style-type: none"> • Notice board • City website • National website • Other media (newspaper, etc.) 	<ul style="list-style-type: none"> • Notice board • City website • Other media (newspaper, etc.) • SW interfaces with SW GIS system • SW interfaces with SW ArcGIS system • SW interfaces with other system • Others 	<ul style="list-style-type: none"> • Notice board • City website • Other media (newspaper, etc.) • SW interfaces with SW GIS system • SW interfaces with SW ArcGIS system • SW interfaces with other system • Others 	<ul style="list-style-type: none"> • Notice boards • City Website • Official journals • Local newspapers • Digital national registry in Sweden
Publication formats	<ul style="list-style-type: none"> • Word/*.docx • Excel/*.xlsx • PDF • DATEX II • TXT • XML / json • Other 	<ul style="list-style-type: none"> • Word • Excel • PDF • XML • (geo)JSON • AMF 	<ul style="list-style-type: none"> • Word • PDF • XML • (geo)JSON • DATEX II 	<ul style="list-style-type: none"> • Word/*.docx • Excel/*.xlsx • PDF • DATEX II • TXT • XML / json • Other 	<ul style="list-style-type: none"> • Word/*.docx • Excel/*.xlsx • PDF • DATEX II • TXT • XML / json • Other 	<ul style="list-style-type: none"> • Word, Excel, PDF • XML/JSON or Shapefile formats

	Austria	Belgium	The Netherlands	Germany	Italy	Other EU member states
Pictures or just textual information	<ul style="list-style-type: none"> • Text and Pictures • Only text • No machine-readable information 	<ul style="list-style-type: none"> • Text and Pictures • Only text 	<ul style="list-style-type: none"> • Text and pictures • Only text 	<ul style="list-style-type: none"> • Text and Pictures • At the moment just text, but also pictures in the future • No machine-readable information • No answer 	<ul style="list-style-type: none"> • Text and Pictures • Only text • At the moment just text, but also pictures in the future • No machine-readable information 	<ul style="list-style-type: none"> • Text and pictures in most cases • No machine-readable information in several cases
Using DATEX II	<ul style="list-style-type: none"> • Currently in DATEX II • Not using DATEX II • Not sure 	<ul style="list-style-type: none"> • Not using DATEX II 	<ul style="list-style-type: none"> • Amsterdam makes use of DATEX II 	<ul style="list-style-type: none"> • Currently in DATEX II • In the future in DATEX II • Not using DATEX II • Never heard of DATEX II • Not sure 	<ul style="list-style-type: none"> • Currently in DATEX II • In the future in DATEX II • Not using DATEX II • Never heard of DATEX II • Not sure 	<ul style="list-style-type: none"> • Not using DATEX II in most cases • One city in France planning to use it • One city in Spain already using DATEX II

	Austria	Belgium	The Netherlands	Germany	Italy	Other EU member states
Notification of road users	<ul style="list-style-type: none"> • Electronic billboard • Response teams on site • Traffic signs • Road markings • Internet • Newspapers, letters 	<ul style="list-style-type: none"> • Electronic billboard • Response teams on site • Traffic signs • Road markings • Internet • Newspapers, letters 	<ul style="list-style-type: none"> • Electronic billboard • Response teams on site • Traffic signs • Road markings • Internet • Newspapers, letters 	<ul style="list-style-type: none"> • Electronic billboard • Response teams on site • Traffic signs • Road markings • Internet • Newspapers, letters • None of the above 	<ul style="list-style-type: none"> • Electronic billboard • Response teams on site • Traffic signs • Road markings • Internet • C-ITS Message • Newspapers, letters • None of the above 	<ul style="list-style-type: none"> • Electronic billboards • Traffic signs • Road markings • Internet • Newspapers
Accessible via NAP	<ul style="list-style-type: none"> • UVARs are not established yet on the NAP, but is planned in the future via DATEX II format 	<ul style="list-style-type: none"> • At this stage there is no link established with the NAP 	<ul style="list-style-type: none"> • The Amsterdam LEZ is linked to the NAP 	<ul style="list-style-type: none"> • Some municipalities publish their UVAR data via the NAP or plan to do so in the future 	<ul style="list-style-type: none"> • At this stage no involved municipality shares the data with the NAP. 	<ul style="list-style-type: none"> • No publication via NAPs

	Austria	Belgium	The Netherlands	Germany	Italy	Other EU member states
<p>Other authorities to publish regulation</p>	<ul style="list-style-type: none"> • Regional Agency • National Agency • State Agency • Environment agency • Environmental protection authorities 	<ul style="list-style-type: none"> • Yes, amongst others the regional government if UVARs are applicable on the higher road network 	<ul style="list-style-type: none"> • Yes, amongst others the Metropole Region The Hague – Rotterdam, TLN (Transport Logistics Netherlands) or the Dutch Automobile Club (ANWB) 	<ul style="list-style-type: none"> • Yes, Umweltbundesamt • Yes, other municipalities • Yes, other units • No • I don't know for now 	<ul style="list-style-type: none"> • Regional Agency • National Agency • State Agency • Environment agency • Environmental protection authorities • Others 	<ul style="list-style-type: none"> • The state published information about UVARs in France, as well as some navigation softwares. • In other countries, respondents to our questionnaire were not aware of other authorities publishing their UVARs.

Table 4 – chosen results of the questionnaire – Publication of UVARs

Implementation challenges

	Austria	Belgium	The Netherlands	Germany	Italy	Other EU member states
Key issues	<ul style="list-style-type: none"> • Budget and lack of personal resources • Many stakeholders involved (2065 municipalities) • Fear of redundant tools • People responsible for UVAR not involved in EU projects 	<ul style="list-style-type: none"> • Costs and time associated with the implementation of a new process • Personnel resources • Fitting in with current publication processes 	<ul style="list-style-type: none"> • The Netherlands is far along the digitalisation process. It will be difficult to make sure the UVAR Box project fits well in with current initiatives • Budget and personnel issues 	<ul style="list-style-type: none"> • Lack of personal resources • Many stakeholders involved • Data has to be collected from districts also • Data only available in text form and websites • New tools not a focus for big cities, since most of them already have tools • People responsible for UVAR not involved in EU projects • Policy makers involvement 	<ul style="list-style-type: none"> • Resources and skills lack • Potential workload 	<ul style="list-style-type: none"> • Language • Institutional diversity

Table 5 – chosen results of the questionnaire – Implementation challenges

Pioneers for our project

	Austria	Belgium	The Netherlands	Germany	Italy*	Other EU member states
Pioneers	<ul style="list-style-type: none"> • City of Vienna • City of Graz • City of Salzburg • City of Mödling • City of Knittelfeld • City's Counsel 	<ul style="list-style-type: none"> • City of Brussels • City of Antwerp • City of Ghent 	<ul style="list-style-type: none"> • Regional Data Teams • City of Amsterdam • City of Rotterdam 	<ul style="list-style-type: none"> • City of Berlin • City of Dusseldorf • City of Hagen • City of Wiesbaden • Federal Environment Agency • Verkehrsverbund Rhein-Sieg (Cologne area) 	<ul style="list-style-type: none"> • Bellagio • Bergamo • Bologna • Genova • Lecce • Lucca • Milano • Padova • Parma • Piacenza • Portoferraio • Prato • Quartu Sant'Elena • Ravenna • Rimini • Roma • Treviso • Verona 	<ul style="list-style-type: none"> • Later stage for other countries

Table 6 – chosen results of the questionnaire – Pioneers for our project

* In addition, letters of support have been provided also by the Italian Ministry for Sustainable Infrastructures and Mobility and by Emilia Romagna Region.

Highlights

	Austria	Belgium	The Netherlands	Germany	Italy	Other EU member states
Highlights	<ul style="list-style-type: none"> Austrian NAP: https://www.mobilitydata.gv.at/en 		<ul style="list-style-type: none"> nationwide program supporting a harmonised process for the collection and digitalisation of data 	<ul style="list-style-type: none"> No road or city charges Environmental zones in many cities Mobilitäts Daten Marktplatz as a well-established National Access Point 		<ul style="list-style-type: none"> Support from national and regional agencies is needed for other countries

Table 7 – chosen results of the questionnaire - Highlights

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