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Preliminary market consultation and contextual non-binding request for offer (provision of non-invasive origin / destination sensors and data analysis service)

Project and CUP: D39G18000040002- MENTOR – INTERREG ITALY-SWITZERLAND

Dear service provider,

NOI SpA intends to initiate a preliminary market consultation pursuant to art. 20 of LP no. 16/2015 and art. 40 of Directive 2014/24/EC for the provision of a set of non-invasive origin / destination sensors and related data analysis, to be used in the scope of the aforementioned project and as described in more detail in the Annex.

NOI SpA invites all interested economic operators to participate by filling in an expression of interest, **in the form of a non-binding quote/offer**, in relation to the products and requirements described in the Annex.

Where applicable, NOI SpA **reserves the right of a direct award of the contract pursuant to article 36, para. 2, letter a) of D.Lgs. 50/2016.**

DEADLINE FOR THE DELIVERY OF THE OFFER (21.06.2019):
The offer is to be sent exclusively by e-mail to r.cavaliere@noi.bz.it

Best regards
Roberto Cavaliere

ANNEX: Details of the preliminary market consultation

1. An introduction to the MENTOR project	2
2. An introduction to the origin / destination monitoring system	3
3. Functional requirements of the sensors	4
4. List of requested services	5
5. Conditions and obligations	5
6. Timing for the implementation	6
7. Contents of the offer	6
8. Invoicing procedures	6

1. An introduction to the MENTOR project

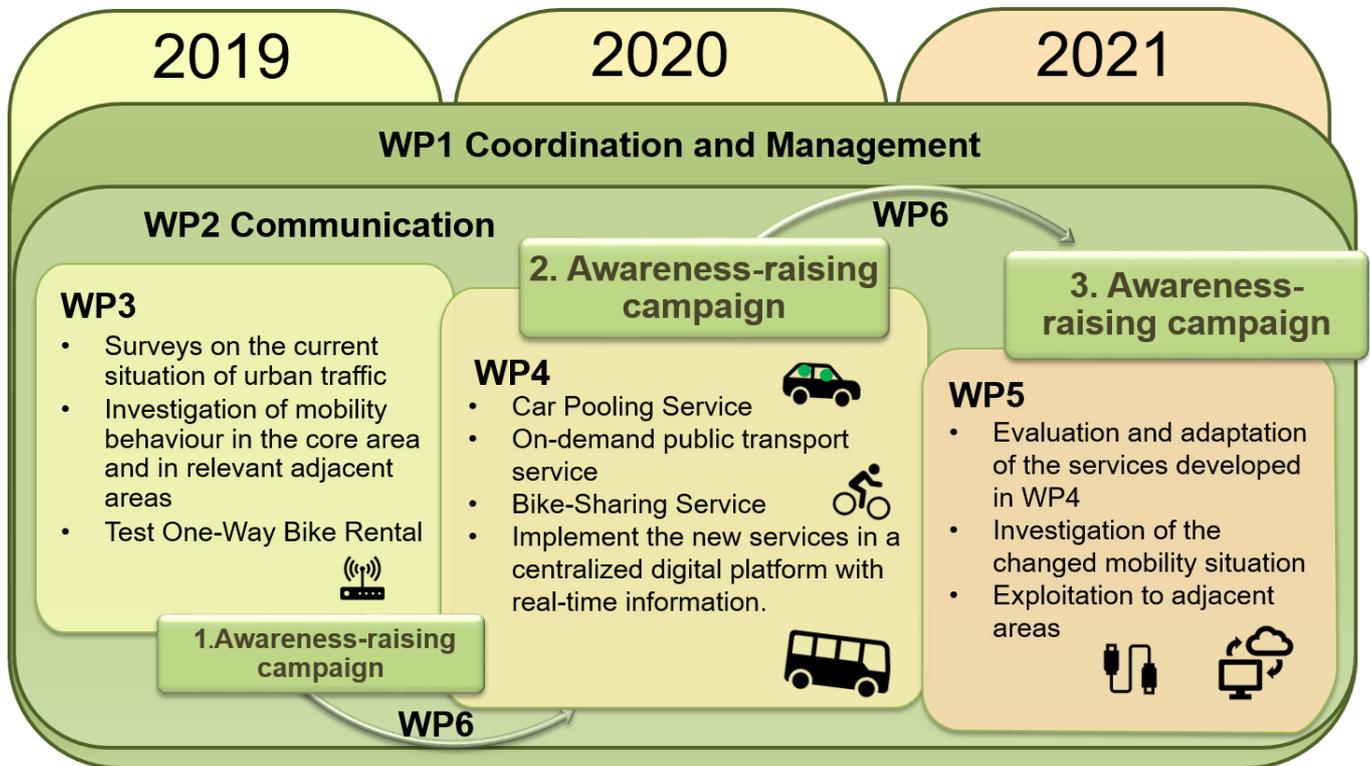
The MENTOR project is a project financed by the **Interreg-V-A Italy-Switzerland** programme, coordinated by the Municipality of Merano and implemented in collaboration with **NOI Techpark, SASA**, the **Municipality of Brig-Glis** in the Canton of Valais and **Postauto**.

The aim of the project is to demonstrate a concept of "**Mobility-as-a-Service**" (MaaS) in the two pilot municipalities, which are representative of the Alpine environment. MaaS is currently one of the main drivers of technological innovation in mobility and is based on the idea of being able to combat the use of the private car with integrated packages of sustainable mobility services, which the user can easily use, book and pay.

The demonstration will be carried out on three axes of intervention:

- **Experimentation of new mobility services**, designed to be integrated with the public transport offer, which in the vision of the project partners must be the backbone of a MaaS ecosystem. Specifically, following services will be tested:
 - **Merano**: car pooling service, bike sharing service, on-demand service
 - **Brig-Glis**: on-demand transport service
- **Experimentation of MaaS tools, aimed at making access to these services as simple as possible**:
 - **Merano**: evolution of the experimental portal mobility.merano.eu. In particular, a real-time inter-modal routing function will be developed, so that people can have a valid travel option for each possible travel from A to B.
 - **Brig-Glis**: an evolution of the MaaS app that Postauto is already implementing will be tested.
- **Demonstration of automated mobility services**, aimed at creating a high acceptance by local travellers to use this new generation of vehicles. In particular, a first demonstration of small self-driving shuttles on predefined, traffic-free routes in Merano and Brig-Glis is planned for September 2019.

The project started in December 2018 with an expected duration of 3 years. An overview of the project activities is summarized in the following picture.



2. An introduction to the origin / destination monitoring system

The project aims also to investigate new techniques for the study and understanding of the origin / destination mobility patterns of people. This aspect is not only important for monitoring the evolution of the mobility habits during the project execution: thanks to the advanced level of detail and knowledge that such techniques promise to achieve, it could be possible to more efficiently design and implement the new mobility services that the project aims to experiment.

This study will be limited in the city of Merano and will be based on a network of non-invasive Bluetooth / Wi-Fi sensors, which constitute the subject of this market consultation. These sensors are monitoring units that can detect the MAC address of devices with active Bluetooth / Wi-Fi communication interface which could be devices installed on-board of the vehicles or personal devices that the users have with them while on-trip (smartphones, wearable devices). The goal of this monitoring network is to the better understand of the characteristics of the origin / destination patterns of vehicles, cyclists and pedestrians moving through or within the city of Merano, and provide real-time information about the travel times on particular routes.

A first draft of the monitoring network has been already finalized, and covers not only the Municipality of Merano but also the main road connections with the neighbouring towns. The design of this network will be finalized according to the results of this market consultation. It is possible to request a copy of this draft network for the preparation of the offer.

3. Functional requirements of the sensors

The sensors are intended to be “low-cost”, in the sense that is expected that they are an assembly of off-the-shelf components that today are available.

Service providers are requested to provide a synthetic technical sheet of the proposed sensors, which must include at least following aspects:

- Type and technical characteristics (e.g. RAM availability) of the **single-board computer**.
- Type and technical characteristics (e.g. monitoring range) of the **Bluetooth / Wi-Fi antenna(s)**.

If available, service providers are requested to include some quantitative data in terms of **monitoring capability** with respect to the total amount of traveling vehicles / cyclists / pedestrians (in percentage). It is also requested to indicate if some native MAC anonymization process is performed inside the monitoring unit before the data are remotely transmitted.

Service providers must also clearly indicate also if it possible to make with a single monitoring unit make a **combined scanning of Bluetooth and Wi-Fi devices**. Service providers shall also describe how certain monitoring complexities are managed (e.g. use of random “locally administered address” instead of MAC addresses by portable devices).

The remote connection of the units can be done in three different ways:

- **Cellular** network connection
- Connection to a **LoRaWAN** deployed in the city of Merano
- Connection to a **Free Wi-Fi** network managed by the Municipality of Merano

The service provider must describe the ability of the sensors to establish a remote connection in these three different ways. The connection is intended to be “real-time”, i.e. a transfer of the collected data is expected to take place in the order of minutes. The sensors must guarantee a minimum of **caching** availability so to ensure that all measurements can be successfully transmitted even if there is a situation of temporary network connection unavailability. The service provider provides some details about the amount of local caching that is possible to perform.

The data will have to be transmitted to the Open Data Hub managed by NOI via API. In case of **LoRaWAN** connection, connection details will be provided by Azienda Servizi Municipalizzati of Merano (ASM) and the company systems which currently manage this network. In this case, the delivery of the sensed data to the Open Data Hub will take place through a connection with the LoRaWAN network backend system; in this case the development of such interface won't be a task of the service provider.

In case of **cellular network** or **Wi-Fi connection**, the data must be transmitted according to the API documented in this repository: <https://github.com/noi-techpark/bdp-core>. More specifically, the folder “writer” contains the API, the folder “dto” the library with a description of the data structure and the folder “dc-interface” contains a Java client implementing the API. At NOI Techpark, we already developed a first Bluetooth sensor proof-of-concept deploying such API. The related software running on this is available in this repository: <https://github.com/noi-techpark/bdp-bluetooth-vehicle-traffic/blob/master/data-collectors/bluetoothbox/scripts/live.py>. In this case, it is task of the service provider to implement to this API for the remote data transmission

In case of cellular network connection, the service provider must also take care of the SIMs and of the additional connection hardware that may be requested.

The **installation** of the units is not under the responsibility of the service provider. Installation activities will be of responsibility of the Municipality of Merano and other partners such as ASM. The responsibility of the service operator ends with the provision of the assembled sensors. The service provider must however guarantee a proper collaboration with the installation team in case of issues or clarifications needs. As far as the **power supply** is concerned, sensors are expected to be powered by available sources (e.g. traffic light, public lighting system). The service provider must provide technical details on how the sensors must be properly powered and clearly indicate if alternative power supply systems such as back-up battery or solar panels can also be foreseen. The service provider must also describe if proper countermeasures are taken into account for avoiding a malfunctioning of the sensor due to an improper power supplying.

The service provider must **guarantee the proper functioning of the Bluetooth boxes within the duration of commitment**, even if the maintenance of the network is expected to be under the responsibility of the Municipality of Merano and its partner ASM. In case of a malfunctioning of responsibility of the service provider, it is requested to solve the issue within 10 working days. The service provider must also provide in case of need proper helpdesk support to Municipality of Merano and its partner ASM in case some maintenance work is deemed to be necessary (e.g. with stop and relaunch of the monitoring operations).

4. List of requested services

The services which are required are not only limit to the **assembly and provision of the sensors**, according to the indications of the previous paragraph. Following data analysis services are also requested:

- Development of **origin / destination matrixes of reference traffic conditions** (e.g. commuter days, holidays, with / without tourists) and possibly associated to different transport modes (vehicular traffic, cycling mobility, pedestrian flows). The dataset for implementing these data analysis will be made available through the Open Data Hub API.
- Execution of an **ex-ante / ex-post analysis of the mobility patterns** revealed by the origin / destination matrixes, with quantification of the impacts through quantitative KPIs (e.g. shifts in terms of alternative routes or in terms of alternative transport mode).

We understand that the execution of such analysis enters in the field of research and development and therefore a detailed economic estimation for its execution can be hardly achieved. This is the reason why the economic offer for this activity is requested as indicated in Chapter 7. Because of the complexity and the potential of this analysis, it is requested a strict cooperation with NOI in the development of this analysis.

5. Conditions and obligations

If the creation of material subject to rights of privacy is envisaged, including copyright, the sui generis right on data, related rights, including that on mere photographs, industrial design, all the rights of economic exploitation on what has been developed are attributed to NOI S.p.a. except for those expressly excluded in the offer. The developed sensors will be property of NOI and of the other partners of the MENTOR project.

If the material consists of data, creative works (drawings, literary works, films, figurative art, photographs), industrial design or other material subject in whole or in part to rights of privacy owned by third parties, it will be allowed to use such material provided that it is licensed under conditions compatible with the license under which such material must be published, if indicated. If no license is indicated, the material shall be subject to conditions compatible with the Creative Commons CC0 license.

Any software components specifically made as part of this activity must therefore be provided to NOI Techpark in their final version in the source format.

6. Timing for the implementation

The cooperation with the services provider is expected to last until the project's end (November 2021). Following milestones are proposed:

- Provision of full set of sensors: within 4 months after the formal commitment;
- Development of first origin / destination matrix describing mobility patterns in Merano: after 12 months after the successful installation of the whole network;
- Completion of the ex-ante / ex-post analysis: within the project's end.

The proposed milestones are however indicative and the service provider is requested to provide a feedback about the viability of this draft, in particular as far as the sensors' preparation is concerned. An alternative plan can be suggested by the service provider in its offer and can be agreed with NOI before the commitment is formalized.

7. Contents of the offer

An economic offer is required for the requested services together with a technical concept describing how all open points of this market consultation are going to be addressed by the service provider. The offer must be prepared as follows:

- **Cost / sensor**, including maintenance activities as described in Chapter 3. The offer must be prepared by considering a supply of about 20-30 sensors, with about 30% of which Wi-Fi ones. The offer must be detailed according to the different set-up options indicated in Chapter 3 of the offer.
- **Hourly cost** for the execution of the requested **data analysis**.

8. Invoicing procedures

All billing details will be indicated in the order. NOI Techpark is subject to the system of electronic invoicing with split payments. A unique invoice is foreseen, at conclusion of the requested services. An initial invoice can also be foreseen if explicitly requested by the service provider.