



## Peer-review exercise and thematic workshop - Barcelona, 1st July 2015

# DEMAND-RESPONSIVE TRANSPORT IN CATALONIA



## Minutes

The thematic workshop started with an opening message from the **Director of the Territorial and Sustainability Department of the Generalitat of Catalonia, Mr Pere Padrosa**, who has emphasized the role of mobility as tool for facing and balancing both societal and economic challenges.

The Catalan region is experiencing several changes especially from a territorial perspective: if we look at the current trend of concentrating schools and hospitals to foster specialization and quality instead of small-scale dispersed services, we can easily understand how public transport becomes crucial for the whole functioning of the system and for social cohesion.

The regional strategy for improving collective road passenger transport is based on two main pillars: a new network of high level of service intercity bus links called Exprés.cat and a closer look at the local mobility needs of the different counties and municipalities, including those smaller and dispersed ones where flexible/on demand transport services can be more effectively implemented also to connect those communities to the main road and rail network.

**Mr Benjamin Cubillo** provided an overview of the Department's experience and approach for ensuring the "universal access to the public transport network" throughout the territory.

The 2020 Passenger Transport Plan of Catalunya defined a proper strategy for the services to be implemented in the Catalan Counties (Comarca): it should be ensured direct or indirect connections to/from the county capital, the interurban bus and rail network and the healthcare services (hospitals).

The department worked closely with the local administrations and county councils and a number of studies were carried out to verify both needs and transport solutions for the communities living in low-density areas. Since 1991, the system is based on a number of different conventions signed with the "comarcas".

In 2014, a total of 185 county transport services have been founded by the Generalitat. The assigned budget for 2015 is of around 1,8 M€ but also at municipal level the Government signed additional 43 conventions.

Both the evolution of the different conventions and the results of the studies demonstrated that one sole solution cannot be applied when looking at the needs of low demand areas. What is fundamental to guarantee is a public transport service that is of high quality, accessible and affordable, both for local communities and the Government. In this direction, demand-responsive transport services demonstrated to be the most viable and effective solution.

There are currently 214 on demand transport services in Catalonia. The presentation included a number of examples and data from different Catalan cities.

**Mr Carles Labraña** presented the updated AMTU study on “transport a la demanda” (TAD) services as well as the cost analysis for the implementation of a centralized TAD management center. The main findings have been summarized by AMTU and reported in the next section. The lawyer Ms **Maria Dolors Vilalta** illustrated the normative framework related to the introduction and implementation of DRTS in Catalonia.

The different types of “On Demand” public transport services were presented and discussed from real and long-term implementations during the case study session.

**Ms Marina Muntada** of Castellar del Vallès (18.000 inh) illustrated the transformation of a sub-urban bus line connecting the city centre with the neighbouring communities of Can Font and Ca n’Avellaneda into a [TAD service](#) operated by taxi (see also this [news](#) and the [update](#)). This change was also due to the reduction of activities (and thus passengers) of the industrial area at Pla de la Bruguera that was the terminus of the bus line. The financial balance, net of ticket revenues, passed from around € 100.000 in 2012 to € 12.000 in 2014 whereas passengers decreased from average 717 per month, including passengers to/from the industrial area no longer served by the TAD, to 318/month in 2014 on the Castellar/Can Font/Ca n’Avellaneda route. But exactly on this route passengers increased: were 277/month in 2012.

**Ms Anna Fernàndez** from the Municipality of Alella presented their [TAD taxi service](#). In 2013, for compensating the reduction of the urban bus service, the municipality decided to introduce a supplementary service for elderly (over 65 years) and disabled residents: they only pay € 2,00 for the taxi trip whereas additional € 4,00 are paid by the local administration to compensate real costs.

**Ms Maria Ángeles Garcia** from the company GMV illustrated the TAD scheme implemented in Castilla y León. This autonomous region in north-western Spain has a very dispersed population as well as rural and mountainous characteristics of its territory that suggested a widespread application of DRTS to meet the mobility demand of the different communities. GMV supported the regional government in the introduction of a TAD scheme with a preliminary study in 2003 and a pilot test in 2004. The scheme was implemented in two phases and after 11 years is now the largest TAD system in Spain with 108 operative zones, 293 vehicles, 147 operators, 811 routes and 3.557 served communities. The model works on fixed/on demand departures but flexible routes.

GMV also developed DRTS solutions in Molina de Aragón (Castilla La Mancha), Medio Tejo (Portugal), the Madrid area and in Szczecin (Poland).

The recommendations for future TAD implementations were presented as in the following:

- Strictly linking transport supply to mobility demand using historical data (also introducing flexibility elements in classic bus lines and incorporating a new, more diversified vehicles’ mix).
- Merge different transport services (public transport, transport services for schools, hospitals, disabled people) and simplify/clearing responsibility and management.
- Implement TAD services in metropolitan areas (i.e. in low density areas) by installing virtual public transport stops and integrating regular existing bus lines.

- Develop/implement smartphone applications (ticketing, booking, vehicle localisation, route mapping and estimated/real time time of arrival).

**Mr Luca Santiccioli** of AMT Genova (Italy) illustrated the [Drinbus](#) and [Taxibus](#) services.

Drinbus was introduced as [CIVITAS measure](#) in 2002 to cover hilly areas where public transport was not present or not adequate. Afterwards, it was also extended to operate the night service in 2011 by replacing some bus lines.

Apart for the orographic element, the reason for introducing a DRTS in some districts of the city was the dense and narrow structure of the road network, with no main axis and a dispersed demand. The implemented scheme was “many to many” with no fixed routes.

From the very beginning the service was based on a ITS platform allowing for trip booking at least 30 minutes before the departure. A fleet of CNG Mercedes Sprinter minibuses equipped with on-board devices was used.

In 2014, the Drinbus service registered over 50.000 passengers. It is very appreciated by the citizens and allowed AMT to reach a number of benefits like costs recovery and also the reintegration of drive staff not yet fit to drive on longer regular buses. Among the users who own a car, 80% stated they reduced car use.

AMT also introduced in 2013 the Taxibus service to replace 8 bus lines on some fixed routes. On-board terminals integrated with the taximeter and always connected with the AMT were installed on 120 taxis as well as external displays showing the route destination.

Despite the initial reluctance from taxi drivers, AMT was successful in both installing and monitoring the service. This resulted in -59% of operating costs recovery and a new market for taxis (11.500 trips per year).

**Mr Luciano Spaggiari** of TEP Parma (Italy) presented the [Prontobus](#) experience: introduced in 2001 as night service, it is currently operated with 7 buses and on a many to many scheme. What Mr Spaggiari highlighted is the fact that by reducing the number of operating buses per night, from 8/9 to 6/7, mostly for budget reasons, passengers dropped by 50% from around 120.000 to current 60.000 in 2014 (162 people/day on average). If not properly linked to the demand, and thus increasing the number of refused trip because of no vehicles available, frequent users rapidly abandon the option of using the Prontobus for their night mobility. Prontobus is also active on some suburban areas offering the public transport option to around 9.800 residents. TEP also operates the [HAPPY BUS](#) public school transport service on a DRTS basis.

**Mr Giorgio Fiorillo** of SRM Bologna (Italy) explained the mobility agency experience in both analysing flexible services (i.e. through the projects [Inmosion](#), [Flipper](#) and [CIVITAS MIMOSA](#)) and implementing a DRTS in a low demand district of Bologna.

The developed financial model demonstrated the viability of on demand services by linking subsidy to transported passengers. Furthermore passengers are easy to control because they buy tickets and these revenues are registered in the balance of the operator. SRM decided to pay fixed rate + a variable rate for passengers till a maximum cap.

In 2009 the service was launched by using 8-seats minibuses always available from 8:00 AM to 6:00 PM. The demand was below expectations registering around 11 passenger per day. In 2010 the service switched to a different model by giving fixed departure/availability times and using cars instead of minibuses. Despite a considerable cost reduction, from € 27 to € 11 per passenger, the service was ended in 2012 because the persistent low demand. The experience demonstrated how a DRTS has to be properly assessed but also the fact that not in every area such service can be financially justifiable.

## **STUDY OF ON DEMAND TRANSPORTATION SYSTEMS IN AMTU MUNICIPALITIES**

**English summary from the Catalan version (AMTU, March 2015)**

### **1. INTRODUCTION**

Even though the motorisation rate of the majority of Catalonia's population is high, there are segments of captive population (elders, People with Reduced Mobility, young people...) that depend on Public Transport in order to move around, and whose access to the basic services (such as health or education) must be guaranteed.

For this reason, there is a need of more flexible, economic and environmentally-friendly alternatives of transport that adapt in a better way to the real needs of every part of the population.

In this sense, the aim of this study is to evaluate the viability of implementing Public Transport on Demand Services and converting Regular services into on Demand ones. Moreover, it is intended to create as well a Central Office that manages all the On Demand Transportation Systems in Catalonia.

### **2. ANALIZED CASES WORLDWIDE**

In order to characterize the situation of Transport on Demand in our country and worldwide, a total of 33 cases were analysed and some conclusions were driven. In this analysis, there were considered cases such as *AST, Connect2, Drinbus, Evreux, Publicar, Taxi-Tub, Tele-bus, LandaBus, MobiBus, Transdev, Uber*, etc., as well as some Catalan and Spanish examples.

The obtained conclusions were the following ones: the **geographical area of service** exceeded the municipality one; the main **vehicles used** are taxis but also minibuses; generally the **potential demand** is not restricted into a specific age; the **booking procedure** is via Internet and Phone Calls, at most 30-60 minutes before the service; and the services are held usually in **day-time**, even though there are some night services.

### **3. TYPES OF ON DEMAND TRANSPORTATION**

Analysing all the different cases and examples, three different general types of On Demand Transportation can be classified, in terms of the flexibility of their routes and timetables.

- **Virtual Route:** it is the less flexible typology, since it is operated with fixed route and timetable. For this reason, it is the easiest to manage. It can be also considered Virtual Route those routes that have only some stops On Demand.
- **Door-to-Door Service:** it is the most flexible one, since the stops and the timetable is managed in terms of the demand. For this reason, lots of routes need to be calculated and it is the most difficult to manage.
- **Different Origins and Destinations:** it is managed with fixed origins and destinations, and usually with fixed timetable. It is easier to manage than the Door-to-Door Service but more difficult than the Virtual Route.

### **4. ONLINE APPLICATION TO IMPLEMENT ON DEMAND TRANSPORT IN CITIES**

AMTU has developed an online application in order to allow its affiliated Municipalities to detect the needs in their area that might be possibly covered with an On Demand System and to propose recommendations in its implementation. It consists in four different steps, in which:

1. **Step 1. Introduction.** On Demand Transport Systems are introduced, as well as its advantages and different typologies. Moreover, the Municipalities are encouraged to fill the online form.
2. **Step 2. Qualitative Analysis, Phase A.** In this part it is intended to detect possible needs that might be covered with On Demand Systems.
3. **Step 3. Qualitative Analysis, Phase B.** Once the needs are detected, the typology of the On Demand System is decided, and the different Annexes are presented.
4. **Step 4. Quantitative Analysis, Phase C.** The qualitative information is complemented with quantitative data from AMTU database.

So with this application, a city can detect transport need of its citizens that could be solved with On Demand Transportation. If this is the case, some recommendations about which typology of system and how it must be implemented and managed are given.

## ***5. TECHNICAL, LEGAL AND ECONOMIC STUDY OF 8 AMTU MUNICIPALITIES***

In order to implement successfully the Services, a first phase will be considered in which eight out of ten municipalities in which some needs have been diagnosed concerning Public Transport and therefore an On Demand System will be implemented.

These Municipalities are the following: Valldoreix, Santa Maria de Palautordera, Vallirana, Caldes de Montbui, Castellar del Vallès, Santa Perpètua de Mogoda, Mataró and Terrassa.

In each of these cases, a technical, legal and economic study has been carried out in order to obtain a potential demand of On Demand Services, which has been of around **200.000 passengers/year**.

This demand will be used to estimate the costs of the Central Office that manages all the service, and will be considered as an initial stage. Furthermore, in a more advanced stage, once the service is consolidated, more potential services will be added.

## ***6. COST ANALYSIS OF THE MANAGING CENTRAL OFFICE***

The first step is to acknowledge the potential demand that will be managed with the central office. The proposed service is a **Door-to-Destination** one, in which the client is picked up at his/her home and delivered at fixed destinations, mainly focused at over 65 years old people.

As said, the potential demand of the 8 AMTU Municipalities is considered as 200.000 clients/year, and considering a potential demand of the same size from the rest of Catalonia, a total of **400.000 journeys/year are considered**.

From this journey, 20% of the bookings will be via on-line, 40% via non-regular phone calls and the other 40% via regular phone calls. This means a total of **96.000 calls/year**, or **384 calls/day**, which needs a total of **7 operators** (2 at a time.).

Considering the initial stage of 200.000 users/year, the initial costs of the Central Office are the following:

- **Call-Centre equipment and software: 225.000€.**  
Includes vehicle equipment, software licences and installation service.
- **Office material: 7.580€.**
- **Hardware: 9.290€.**

So the **Total Initial Investment Cost is about 242.000,00€.**

Then, the **annual costs of the office's maintenance**, considering the workers (3 operators, a coordinator and informatics support, of 118.125,00€/year), maintenance of the software (5.000,00€/year), rental costs (9.600,00€/year) and general expenses (5.725,00€/year) is up to **138.450€/year.**

Moreover, the **total annual operational cost of the Door-to-Destination service**, considering a cost of 0,75€/km (including direct, indirect and driver costs) and 480.000 km/year (80.000 journeys), is of **360.000,00 €/year**.

So excluding the initial investment, the **total annual expenses** of the On Demand Service for the 8 AMTU Municipalities is of a total of **498.450,00€**. On the other hand, considering a hypothetical price of 1€/journey, it would mean a total of **200.000€/year** of **income**.

With these considerations, finally, the **deficit of the service** would be of **300.000,00€/year**, which means that the incomes would cover roughly **40%** of the annual expenses.

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