CURRENT APPROACHES IN TOURIST COACHES MOBILITY MANAGEMENT

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ABSTRACT

Land is a precious and scarce resource, especially in urban and high-density environments, and the mobility of tourist coaches, like all transport related activities, may be land-consuming. Furthermore, tourist coaches management in urban areas implies a certain level of complexity according to the shape and infrastructure characteristics of such areas. As a result of such land consumption and major local externalities caused by coach tours, more and more Municipalities are adopting schemes aimed at limiting the impacts of tourist coaches on local mobility.

The paper analyses the tourist coach plans implemented in some European cities from Salisbury to Rome, including Brussels, Salzburg, Amsterdam, Munich, Barcelona and Paris. The results highlight some relevant operational criteria. Tourist coach plans generally enforce charges and time-limited occupancy policies according to different parking functions. Moreover, Municipalities managing small/rural areas usually implement strict circulation and parking schemes, locating public transport terminals next to long-stay parking areas. In cities with a limited number of parking lots but with high unit capacity, facilities are integrated with the public transit network. Finally, management in metropolitan areas is based on a system approach and parking supply is arranged according to different levels of accessibility.

1. INTRODUCTION

Many Municipalities are considering issues related to tourist transport management within their local strategies for urban mobility. These focus mainly on the impacts traffic and parking operations of tourist coaches on the urban environment.
Land is a precious and scarce resource, especially in urban and high-density environments, and the mobility of tourist coaches, like all transport related activities (static and dynamic), may be land-consuming. As an example, Figure 1 shows typical size of a vehicle and spaces required to park it.

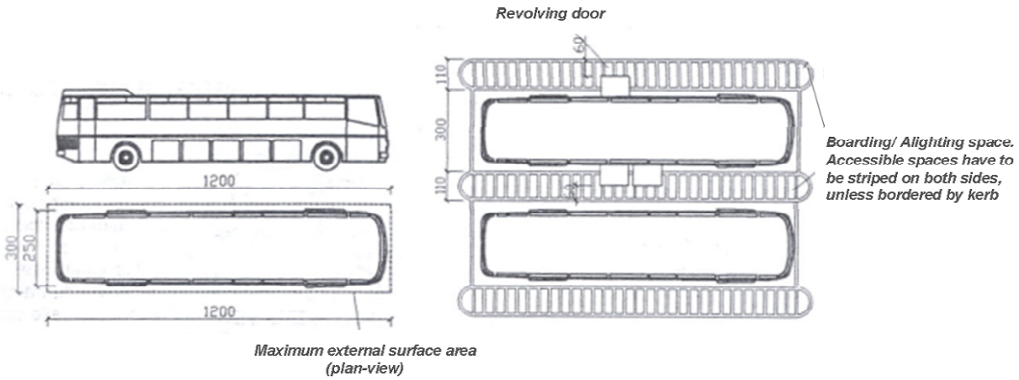

Figure 1 - Coach size (left) and parallel parking spaces (right) [1]

In Europe, tourist coaches are usually 12.0 m long x 2.5 m wide and the minimum space required for passengers boarding/alighting is 13.0 x 2.5 m (to be provided along a straight kerbside), along with a minimum length of 19.0 m with a midsection of 13.0 x 3.0 m for on-street parking bays; in case of additional vehicle, a 12.0 m length has to be added to the overall length [2]. In case of parallel parking, manoeuvring spaces and access aisles have to be added, taking into account that adjacent spaces can share a single access aisle.
Tourist coach management in urban environments implies a certain level of complexity depending on the shape and infrastructure characteristics of such areas. Such management, if not properly arranged, can produce significant "friction elements" on the urban spaces and on local mobility patterns. This also reduces the level of service of roads and public transport performances, as well as having negative impacts on environment and safety.
As a result of such land consumption and major local externalities caused by coach tours, some practices have been adopted aimed at improving local accessibility, by avoiding a concentration of tourist traffic flows headed to a single parking destination and, at the same time, re-arranging dedicated facilities for coaches.

2. MOBILITY AND TOURIST COACH PARKING SCHEMES: AN ANALYSIS AT EUROPEAN LEVEL

This section analyses the peculiarities of tourist coach tour schemes and parking plans in some European cities of different sizes - from Salisbury (50,000 inhabitants) to Rome (2.7 million inhabitants), including Brussels, Salzburg, Amsterdam, Munich, Barcelona and Paris.

2.1 Salisbury (50,000 inhabitants)

Salisbury is a medieval town situated 150 km far from London, in Southern England's rural heartland, and included in the archaeological circuit of *Stonehenge* and *Avebury*. In recent years there has been an important increase in the tourists number (about 350.000 visitors/year) and almost 10% of them come in organized coach tours [3].

Although the city does not have a high tourist coaches impact, a route and parking scheme has been arranged. In fact, the area is served by two main coach parking lots, namely *Millstream* and *Britford* Park & Ride (Figure 2). The former is a fully-equipped area (including a drivers rest room, television and snack/drink vending machine) connected by pedestrian path to the cathedral. The latter is located 1.5 km from the centre and is convenient for coaches coming from the South; drivers can stop at the drop-off/pick-up point close to the cathedral, then park in *Britford* and use a free bus ticket to the city [4].

In order to monitor and improve local mobility, during the summertime, the city access points are manned by traffic staff providing drivers with information on recommended routes and parking zones.

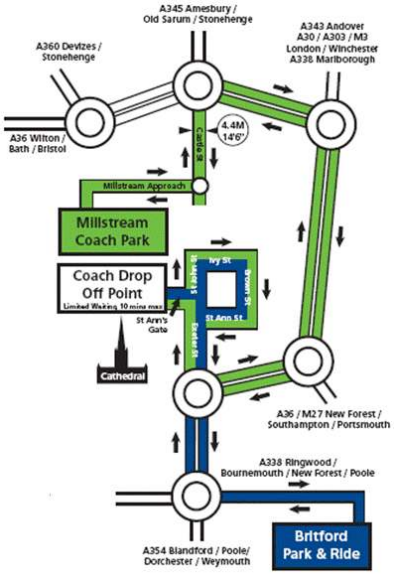

Figure 2 - Coach parking areas and recommended routes (green and blue colour)

2.2 Brussels (140,000 inhabitants)

In the last decade the city of Brussels has seen a meaningful increase in the number of visitors (about 2.2 million/year), about 34% of them are "tourists for leisure" [5]. Concerning the mobility system, Brussels presents some peculiarities that: *"can be partly explained by the fact that, thanks mainly to Expo58* (editing note: 1958 Universal and International Exhibition)*, efficient road infrastructures were quickly available to the public at the very time the automobile "took-off" which reinforced the "4-wheel dream" [Hubert, 2008]. The result is a discrepancy between an oversized road and parking lot infrastructure in some areas and the capacity of a city where most neighbourhoods were not designed with cars in mind"* [6]. Such peculiarities probably affected the parking supply configuration that favours accessibility for coaches coming from the northern area (Figure 3).

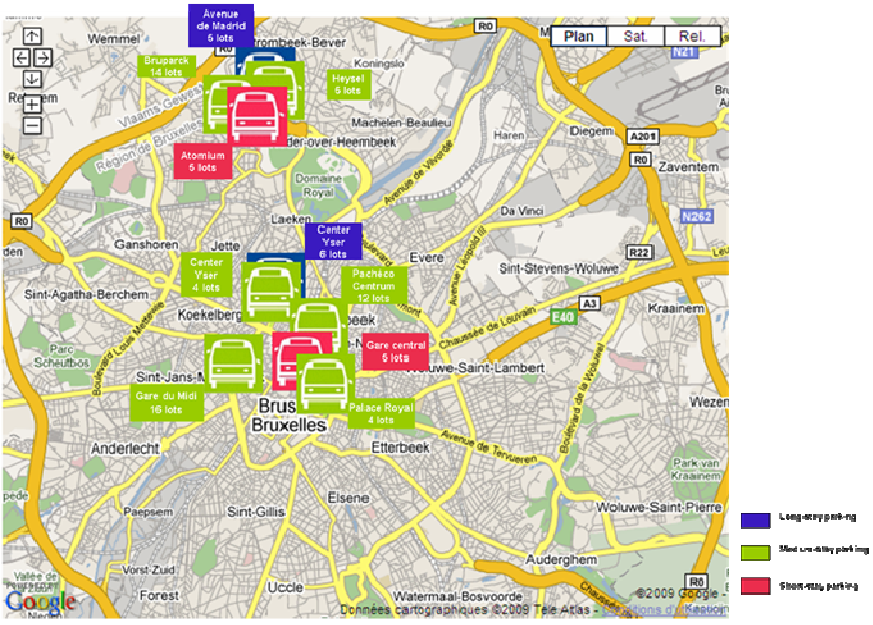

Figure 3 - Brussels: coach parking locations [7]

Brussels is provided with ten main coach parking lots, which are all inside the ring road (9-12 km far from the centre). There are two long-stay areas where parking is allowed for more than five hours and/or for one night (blue colour). Six medium-stay zones, where parking is limited to five hours/day, are distributed within the urban centre (green colour). There are, also, two short-stay areas, close to the central railway station and the *Atomium* (memorial of the *Expo58*) where 30 minutes stop is allowed (red colour). Parking has an average fee of 10 €/day.

2.3 Salzburg (150,000 inhabitants)

The Austrian town is a well-known international venue hosting famous festivals and important events that attract about 600,000 tourists/year. At present Salzburg is not equipped with a proper tourist coach plan but a parking scheme is currently in force. Within the urban perimeter, parking is allowed only in designated spaces; depending on which direction they come from, incoming coaches are directed towards specific parking lots [8].

Figure 4 – North and South parking lots and access routes to the terminals (pink colour) [8]

Northward bound coaches are routed to the *North* long-stay area, where a shuttle service connecting the historical city centre is available only for drivers. So, they can get their parked coaches in the long-stay area and then join tourists at meeting points located just outside the pedestrian zone. Vice-versa, coaches coming from South can use *South* and *Hellbrunn* parking facilities, where a public transport service links the parking to the historical centre easily (Figure 4).

The *North* and *South* areas charges are 38 €/day; the *Hellbrunn* area charges 10 €/hour or 50 €/day (it is free for Water Games visitors). Such points are closely monitored in order to assure the time limit respect for boarding/alighting and also to guarantee fast turnover.

2.4 Amsterdam (755,000 inhabitants)

Amsterdam is the “town of the canals” and, due to its special hydrographic system and road network configuration, coach traffic flows are routed along the main radial access roads and bypasses, leading to the urban centre.

Along such roads several drop-off/pick-up points are arranged and five additional long-stay coach parking areas integrate the local parking supply (Figure 5). Three are in the North-East sector (respectively P2, P4 and P5), one is located in the South-West area (P3). Except for P4 and P5 that are free for visits to the *Gassan Diamond Centre* and the *Artis Zoo*, the average fee is 10 €/hour. There is not a maximum time limit and in the winter it is possible to park in P3 paying only 2.50 €/hour [9].

The last one is a Park & Ride facility (P1) in the East area, providing a fee of 6 € for the first three hours and then 2.50 € for every additional hour.

Figure 5 - Access routes, drop-off/pick-up points (dark blue) and parking lots (red) [*9*].

2.5 Munich (1,300,000 inhabitants)

Munich is a very popular tourist destination thanks to the *Oktoberfest* (6 million visitors/year) and the traditional Christmas markets (nearly 3 million visitors/year). It stages also other international events that attract huge flows of visitors [10], many of them arriving by tourist coaches.

Munich is provided with five boarding/alighting points located along the inner ring road (*Altstadtring*) and close to the town centre (Figure 6, left side). They are connected to the main tourist sites by a pedestrian walkway, with a walking distance variable from 300 m (from the *Oskar-von-Miller-Ring* point) to 700 m (from the *Thomas-Wimmer-Ring* point).

In the South-West sector there is a large parking facility (*Hansastrasse*) suitable for coaches gravitating towards the urban centre and during mass events. The city is also provided with three Park & Ride terminals (Figure 6, right side), conveniently sited for fast access to the metro network (trips take about 5-15 minutes to reach the city centre), and a

new coach parking area within the central bus station (ZOB - *Zentralen Omnibusbahnhof*) [11].

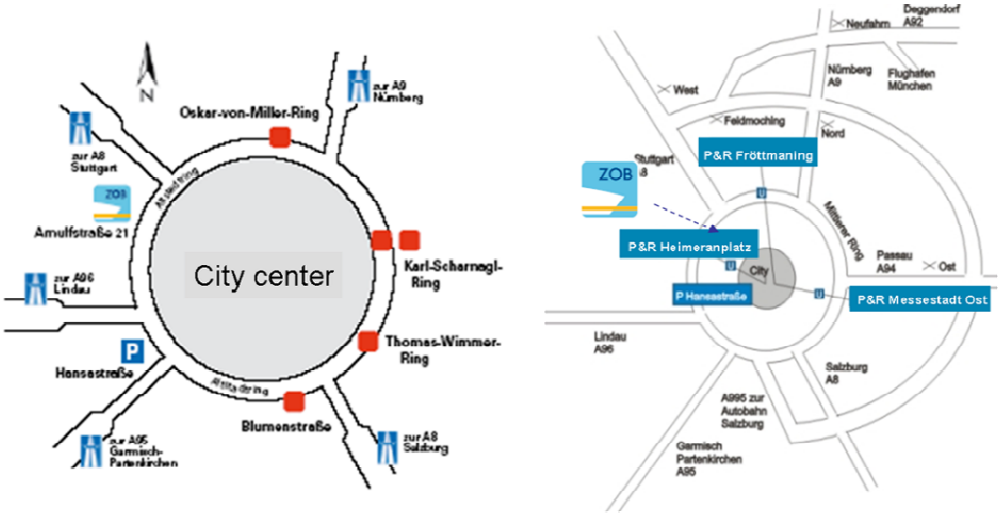

Figure 6 - Pick-up/drop-off points (red colour, left) and P&R and terminals facilities (right) [10].

2.6 Barcelona (1,600,000 inhabitants)

Barcelona is one of the European cities that has experienced the highest rates of growth of tourist flows over the last years: from 1990 – 2006, tourists raised from 1 to 7 millions/years [12].
In summer 2009, the Barcelona City Council enhanced parking supply by 18%; this measure aimed at satisfying tourist coach demand (1,200 vehicles/day during peak periods) was, also, integrated with a new web-based tool that allows drivers to download GPS coordinates (to be installed on their on-board navigator) of the main tourist sites, recommended routes and stop/parking areas [13]. Five large parking lots are available to welcome tourist coaches groups coming into the city (Figure 7).

Figure 7 - Routes, coach parking lots and tourist sites map [14]

Only one of these (*García Faria*) is reserved for tourist coaches, while the remaining are for both coaches and private cars. The average fee is 5 €/hour and 40 €/day. There are further short-stay areas, called “blu zones” (two hours time limit), and several drop-off/pick-up points (ten minutes). The parking supply system is well connected to the public transport network, providing an excellent level of integration and service accessibility. Just as an example, the *Wellington-Zoo* parking lot, which is located in a secluded area, is well connected to the city centre by few stops of *Trambesos* T4 streetcar line (*Wellington* stop) or L1 subway line (*Navy* station).

3. MANAGING TOURIST COACHES IN METROPOLITAN AREAS

Tourist coach management in urban areas is a quite difficult matter since it cannot ignore the real daily mobility demand, both systematic and non-systematic. Such activities become more complex in metropolitan cities where, most likely, the central areas are sites of high archaeological/architectural value with great tourist attractiveness and, at the same time, places of residential and business activities. Due to such a dual feature of the city life, tourist coach management has to be approached systematically, considering coaches mobility and their interference with urban dynamics.

3.1 Paris (2,201,578 inhabitants)

The Municipality of Paris, in cooperation with the main tour operators, the public transport company (RATP - *Régie Autonome des Transports Parisiens*) and the Prefecture of Police, has undertaken a set of measures - applied progressively over a five year period - aimed at managing the tourist coach traffic inside the urban area. During the planning phase, a joint plan with the involved actors was created to find the most suitable solutions for tourist operators, but without conflicting with residents’ expectations and requirements.

Such a coach plan has been a key opportunity to solve a critical problem dealing with the management of great numbers of incoming daily coaches - about 1,400 tourist coaches/day and, at the rush hour, more than 300 access in the main tourist areas [15] - which until mid 2003 were not controlled and parked in spaces free of charge.
It is noteworthy that the distribution of parking facilities was designed on the basis of the “weight”, in terms of appeal and consequent impact of tourist coaches flows on urban traffic, of 14 tourist zones that are defined strategic for coaches management (Figure 8).

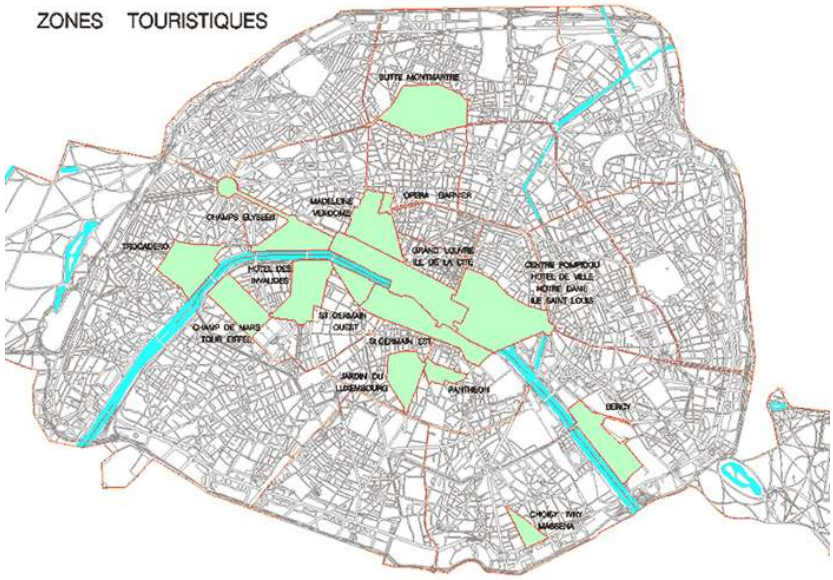

Figure 8 - Tourist zoning (Prefecture of Paris).

In such zones, stops and parking are allowed only in selected spaces and ignoring the no–parking restrictions attracts a fine of 135 €.

Parking supply is arranged in 35 long and short-stay areas and several pick-up/drop-off points, distributed according to the above-mentioned zoning. Special conditions have been also set for accessibility to the two islands of the river Seine, where coach traffic is not allowed. In fact, since a regular boat service takes visitors to the islands, after tourists have been dropped off just outside the embarkation zone, coaches are directed towards four parking lots nearby.

The tourist coach plan works as an integrated tool aimed at guaranteeing regular access and parking procedures [16]; besides the setting up of a *strategic* tourist zoning, the main measures implemented by such a tool are, as follows:

1. the introduction of the *Pass Autocar* (PA) as the only permit system, based mainly on web booking and payment in advance and via a user-account. Daily fees are variable from 20 (6 hours), to 30 (12 hours) and 50 € (nightly);
2. the introduction of a dedicated web service – where the PA can be purchased – to provide operators with information on the parking system, traffic flows and occupation rates of parking lots (encouraging the utilization of decentralized or under-used parking);
3. the implementation of the PA subscription for tourist operators frequently travelling within the Parisian circuit, to build tourist companies loyalty by offering them lower rates, also making more user-friendly reservation procedures;
4. the enhancement of the monitoring system aimed at reducing irregularities during circulation and parking activities, also preventing congestion phenomena near the sites of interest;
5. the manning of access points to direct coach drivers to the available parking areas;
6. the distribution of brochures/maps, the use of improved traffic signs and info display panels signalling recommended routes (main and alternative links) to facilitate readability/understanding, especially for foreign drivers.

3.2 Rome (2,724,347 inhabitants)

The city of Rome is one of the most outstanding and, at the same time, crowded tourist sites in the world [17]. In 2007 tourist accommodation facilities recorded more than 20 million tourists [18], of which about 8 million arrived by tourist coaches [19].
The first tourist coach plan, in force until June, 2010, was drawn up in 1999 by the Roman Agency for the Jubilee but, over the years, showed important drawbacks limiting its effectiveness. Indeed, the lack of proper parking supply compared with the increased tourist demand and non compliance with road traffic and parking rules, caused some significant problems.

After testing a revised plan for a four-year period, the Municipality of Rome implemented an upgraded plan, which took into account the guidelines of the 2009 Strategic Plan of the Sustainable Mobility. The guidelines outlined the importance of introducing a set of new infrastructural and operational measures aimed at creating a more sustainable and integrated approach involving private and public mobility and parking supply systems [*20*].
The new plan, which has been in force since July, 1st 2010 introduces an improved distribution of parking lots (more than 300 spaces increased), better connections to public

transport, more effective information to coach companies, parking payment procedures simplification and, finally, a proper monitoring and enforcement system to prevent irregularities (the fines are increased from 35 to 415 €). Currently, the main parking lots and stop points are manned by traffic staff and Police but an electronic-based monitoring system will be in operation by 2011. In fact, tourist coaches will be equipped with on-board GPS devices, allowing the Mobility Control Centre to check the LZT (Limited Traffic Zones) access, the hourly time limit and the 15 minutes turnover; such a system will also allow to provide drivers with information on parking availability and under-used parking lots.

The intervention area of the tourist coach plan covers 344 km^2 within the Outer Ring Road (namely GRA - *Grande Raccordo Anulare*); this area is divided in two LTZs, distributed on two concentric surfaces, whose centre is ideally located at the bend of the Tiber river. Access to urban area requires vehicles registration and advance payment, via web or on-site, at three specific check points, in the West (*Aurelia*), East (*Ponte Mammolo*) and South (*Laurentina*) zones, all well connected to the suburban railway and subway lines (Figure 9).

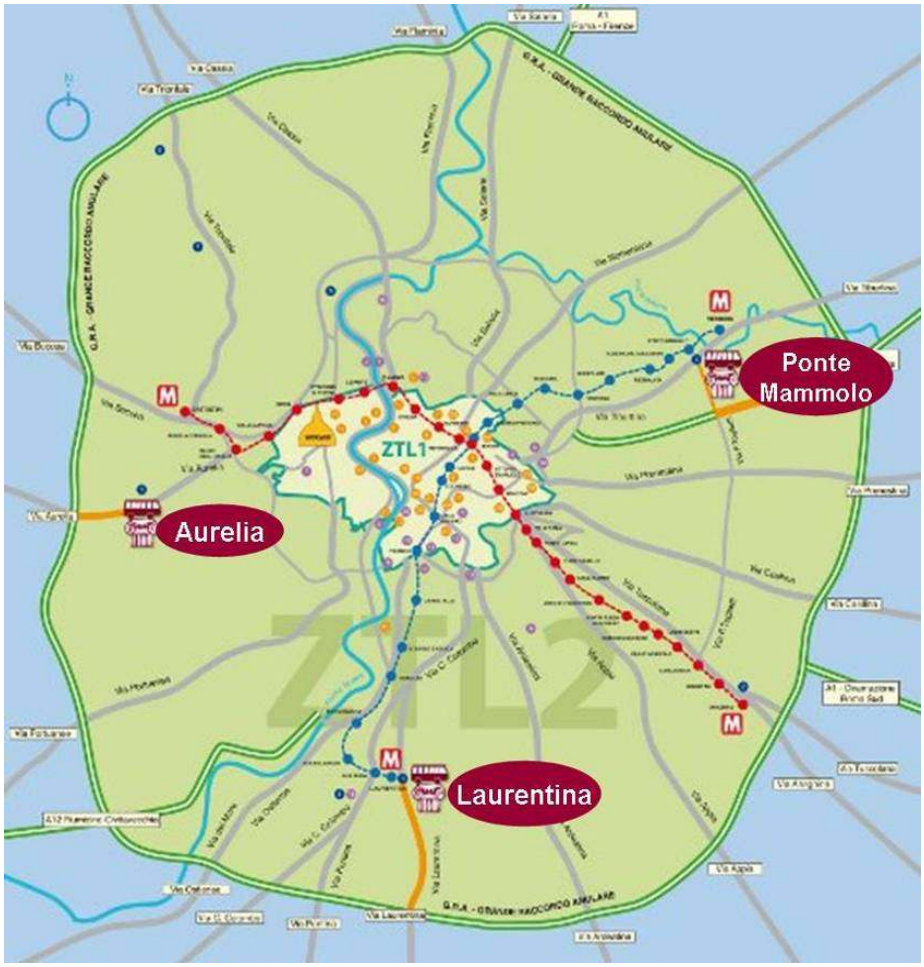

Figure 9 - Rome tourist coach plan: LTZs and check points [21]

Every coach provided with a travel pass can circulate within the LTZ2 area, where parking is permitted only in nine parking terminals. Such facilities, three of which overlap with the check points, are located along the main consular axes and/or radial accessing roads and provide a capacity of 228 spaces.
The inner urban area, called LTZ1, includes the zone between the *Aurelian Wall* and the *Vatican City*. Within the LTZ1 coach access is restricted (threshold value is 300 passes/day) and a proper permit is also required. Parking is allowed in 20 short-stay areas

(two hours time-limit); the parking supply is also integrated by drop-off/pick up points essentially distributed near the main historical sites, where stops of up to 15 minutes are permitted. Just as an example, the on-street parking bay in *Via Monte Oppio* (Figure 10) is located in the influence area of the *Coliseum*, the *Domus Aurea* (*Nero's Golden House*) and *Trajan's* and the *Roman Forum*.

Figure 10 - Drop-off/pick-up points in Monte Oppio (Rome)

Different rates have been set depending on the zones chosen for circulating and parking. The LTZ2 access fee varies from 13-27 €/day; for circulation in both LTZs and long-stay parking, the fee goes from 59 to 126 €/day. Such variations depend on purchase procedure (on-line or on–site) and customer typologies (regular/reserved on-line or not reserved). Whatever solution is chosen, for vehicles having a length over 8 m, the fare is increased by 45 – 50%.

Due to the new plan environmental-friendly and citizen-friendly approach, less-pollutant vehicles, such as electric, methane or LPG fuelled ones, pay a reduced fee (up to 50 % discount). Moreover, from 2011 and over the next four years, a more strict vehicle emissions requirements within LTZs (no access for Euro 2 and Euro 3 vehicles) are gradually being introduced.

4. CURRENT PRACTICES AND OPERATIONAL CRITERIA

The sizing of parking supply, the proper locations of parking lots and their time slots arrangement are some of the most important criteria in the tourist coaches management and, depending on such elements, several European cities have implemented different practices.

Moreover, it is useful to make a preliminary remark on some relevant factors related to the urban road network supply, also considering that tourist coach traffic can produce important negative impacts on the local mobility patterns, due to mixed use of roads by private and public mobility (cars, motorcycles, buses, taxis, etc.). In fact, "car-oriented" cities, which are provided with a high amount of collectors/access roads and car parking supply, offer both good links connectivity and territorial accessibility. However, such cities, many of them affected by high motorization rates, are the most subject to network congestion that cause decrease of average road speed [22]. It is also noteworthy that such a value is reduced by 30 - 40 % during the peak periods [23].

Concerning the analysed cities, an overview of the main characteristics related to road network and car parking facilities is presented in Table 1. The table shows that, like in the larger municipalities, even in small and medium-size cities the "weight " of private mobility (*motorization rate*) as well as the allocation of land for transport activities (*road density index*) can be significant. It is also interesting to calculate the *car parking density index*, defined as the ratio between the parking spaces availability and the related municipality land size. As the *density* indicator was normalized, the values range is between 0 and 1.

Table 1 – Road network features and car parking supply

Cities	**Population** [inhabitants]	**Land Surface** [km^2]	**Road density Index*** [m/urban hectare]	**Motorization rate** [vehicles/1000 inhabitants]	**Av. road speed** [km/h]	**Total car parking capacity** [on street + off-street spaces]	**Land consumed by parking lots** [km^2]	**Car parking density Index** [spaces/km^2]
Salisbury	50.000	434	3	372	n.a.	2.000 **(A)**	0.024 **(A)**	0.006 **(A)**
Brussels	140.000	33	146	520	31	12.000	0.144	0.05
Salzburg	150.000	66	16	556	n.a.	n.a.	-	-
Amsterdam	755.000	202	154	325	34	211.457	2.54	0.13
Munich	1.300.000	310	99	516	32	322.620	3.87	0.13
Barcelona	1.600.000	101	112	370	35	800.457	9.61	1.00
Paris	2.201.578	105 **(B)**	95	459	31	755.000	9.06	0.91
Rome	2.724.347	344 **(C)**	239	978	30	18.000 **(A)**	0.22 **(A)**	0.01 **(A)**

* only urban network (main road axes, collector and local roads).
n. a. = not available.
(A) only *Park & Ride* data are available, so car park density index is calculated by defect;
(B) the 3 outer departments, named "little crown" with a surface of 742 km^2, are not included;
(C) the surface within the Outer Ring Road has been considered (total Rome land surface is 1290 km^2).

Furthermore, in order to explore the main management criteria carried out by the analysed cities, in Table 2 are presented selected measures and indicators dealing with the tourist coach parking supply organization.

Table 2 - Tourist coach parking supply

Cities	**Av. Visitors Volume*** [tourists/year]	**Coach Parking Areas** [number]	**Parking Supply Options**	**Stop points** [number (spaces)]	**Total coaches parking capacity** [spaces]	**Proximity Index** [stop points/parks]	**Coach parking density Index** [spaces/km^2]
Salisbury	350.000	2	S, L	1	54	0.04	0.03
Brussels	2 x 10^6	10	S, M, L	2 (11) **	66	0.33	0.47
Salzburg	600.000	3	L	0	250 **(B)**	0	0.89
Amsterdam	1,8 x 10^6	5	S, M, L	24 (43)	116	0.82	0.14
Munich	12 x 10^6 **(A)**	4	S, M, L	5 (49)	127	1.00	0.096
Barcelona	7 x 10^6	5	S, M, L	12	428	-	1.00
Paris	27 x 10^6	35	S, M, L	14 (46)	422	0.28	0.95
Rome	20 x 10^6	30	S, M, L	31 (89)	539 + 94 **(C)** = 633	0.36	0.43

* concerning incoming daily/yearly coaches, average data are available only for Barcelona (1.200 coaches/day, peak-period), Paris (1.400 coaches/day, peak-period) and Rome (400 coaches/day).
** overlapping the short-stay parking.
S: short stay, **M**: medium stay, **L**: long-stay.
(A): Oktoberfest (6 million visitors/2 weeks) and traditional Christmas markets (nearly 3 million visitors/month)
(B): *P&R Modezentrum Bergheim* (4 km from city centre) e *Urstein* (12 km from city centre) are included;
(C): Gianicolo private terminal has been included (94 spaces); it is placed in the Vatican influence area and provides pedestrian access to St. Peter Square by a tunnel equipped with escalator and moving walkways.

In particular, the *proximity index* is related to a better accessibility to the city centre provided by drop-off/pick-up points (they are generally connected by walkways to tourist sites). As already calculated in car parking, the *coach parking density index* identifies the cities where coaches parking management plays a major role. In fact, Barcelona, Paris and Salzburg marked the highest value of such an indicator, but it is noteworthy that Barcelona and Paris provide also a segmentation of parking supply (in long, medium and short-stay) if compared to Salzburg, where there are not options in parking typology. In

any case, high values of *coach parking density index* explain that the tourist coach parking management, mainly in Barcelona and Paris, has been implemented by a more planning-oriented approach. As described above, both the *proximity* and *density* indicators have been normalized.
A qualitative analysis is also provided, as follows:

1. an adopted approach deals with the limitation of the number of coaches coming into the urban area, constraining their circulation essentially to the main road axes (developed tangentially and/or radially to the area) that are close to the historical centre access points. Hence, the coach stop is allowed in such areas, where drivers can drop off visitors and pick them up, after they have spent their time in the tourist zone (moving around on foot or by public transport).
2. Municipalities managing rural or small towns (i.e. Salisbury, Salzburg), usually arrange stricter traffic patterns (lack of alternative routes); parking areas (in some cases free of charge during the winter) are generally placed out of the built-up areas and near bus terminals providing shuttle services to the city centre. In cities where parking lots are located near the urban outskirts (i.e. Amsterdam, Munich), dedicated drop-off/pick-up points are placed about 300-700 meters from pedestrian zone access points. Moreover, in cities provided with a limited number of parking lots but with high unit capacity (i.e. Barcelona), facilities are well integrated with the public transit network. Furthermore, management in metropolitan areas is based on a system approach, implementing different types of measures, and parking supply is arranged according to different levels of accessibility.
3. Two further measures have also strategic importance. The first is aimed at informing coach drivers (i.e. by local signposts, maps at check points) about access conditions and parking location. Within larger urban areas, operators can also count upon an e-plan to prepay passes and to be informed on traffic conditions. The second is based on coach flows monitoring (i.e. at access/check points, on-street) aimed at guaranteeing compliance to the rules, in terms of no-parking zones and time limits respect.

5. GAPS TO BE FILLED FOR IMPROVING THE PLANNING APPROACH

As outlined above, the analysed coaches schemes and plans are arranged according to the city dimension, its urban structure/shape and its accessing and distribution road network. However, such a matter calls for a more proper planning approach, because some current shortcomings do not allow to systematically design the coach parking supply according to the collective tourist demand. As a result, the equilibrium demand-supply as well as the assessment of the coherence between the planning schemes and the coach traffic volumes is rather difficult to achieve. In fact, regarding the analysed tourist coach plans, no municipality has implemented a monitoring process, setting a list of performance indicators to assess the ex-ante and ex-post conditions. Consequently, this shortage makes it unfeasible to investigate, from a quantitative point of view, the effectiveness of the implemented measures.

To this end, important gaps have to be filled.
On the *demand side*, monitoring both daily coach access within the urban area and the occupancy rate/turnover of parking lots and stop points is a key factor to better calibrate parking supply sizing, depending on real tourist traffic flows. It is important to underline that an improper sizing of stop points (located along a kerbside) can significantly increase the

time cruising for parking, also causing queuing and local traffic congestion. Therefore, a proper sizing allows to prevent parking overflow conditions and improve tourist demand analysis reliability, taking into account also seasonal variations. However, such data are generally scarce or not available in a homogeneous format. Moreover, the assessment of incoming coach flows is far from realistic: it is generally based on limited sample interviews and, rarely, such estimates are corrected by on-site traffic flows surveys.

On the *supply side*, parking lots are generally obtained by converting the existing car parks into a mixed use; there is not a location planning according to the real sites tourist "weight", the transport services accessibility and the systematic mobility patterns (private and collective).
Regarding such issue, and in order to delineate possible coach-related principles, after having collected the needed demand data, a first step could be oriented towards some car parking planning practices, also considering that a likely conversion factor of coach parking space in "equivalent cars" is about 4,2; in fact, a coach-related road space is about 50 m^2 (538 sq.ft) versus a 12 m^2 (129 sq.ft) surface occupied by a car.

In particular, in "car-oriented" areas, a car parking approach can be based on 85^{th} [24] or 90^{th} [25] percentile demand curves, namely 85% or 90 % of sites will have free spaces even during peak hours, and on a 85^{th} (or 90^{th}) occupancy rate, that is the threshold value beyond which parking are considered full. However, such standards are based on an oversupply with respect to the actual demand, so it is not a good practice at all, because it can indirectly increase the vehicles access, also expanding traffic interferences on the whole urban network.

A more reliable practice deals with a *contingency–based planning* method, aimed at selecting specific solutions to be progressively applied, according to the future requirements. So: *"The lower-bound value is initially supplied, conditions are monitored, and various strategies are identified for implementation if needed……. This allows planners to use lower parking standards with the confidence that any resulting problems can be easily solved"* [24]. Another principle can be borrowed from car parking**,** making the necessary changes. For instance, a 15% reduction of parking spaces provision [26] could be proposed where almost 50% of tourist sites are included within the influence area (having about 400-500 m radius) of subway stations or bus stops.

Although the slavish application of the above-mentioned criteria to coach parking management cannot be considered a desirable and feasible practice, they can certainly suggest further reflections on the parking design and planning exercise, in terms of possible criteria and standards to be defined for developing a more "tourist coach-oriented" planning approach. Such an approach should be developed according to the:

- actual tourist collective demand;
- city "centripetal force", in terms of capacity of attracting potential groups of tourists who arrive by coach;
- minimum parking standard requirements (in terms of number and unit capacity) related to tourist sites density and based on generated traffic flows (similarly to car parking sizing standard for residential and commercial areas);
- coach turnover at the drop-off/pick-up points;
- possible interferences between tourist coaches and city sightseeing tour buses.

6. CONCLUSIONS

The lesson learned by the analysis on some European coaches management practices can be summarised as follows. On the one hand, tourist coach plans generally enforce parking charges and time-limited occupancy policies according to different parking functions. On the other hand, the common adopted criteria aim at limiting coach traffic on main access arterial links, allowing stop/parking only in selected zones and according to different levels of accessibility.
However, such an analysis calls for a more proper planning approach. In fact, due to the lack both of homogeneous and reliable tourist coach traffic data and parking design standards according to the tourist attractiveness of the city , the coherence between the coach parking plan and the tourist traffic volumes is rather difficult to assure. Obviously, such a lack also avoid the evaluation of the management effectiveness and, therefore, if planned goals have been reached.
Future developments of this research will move towards such a direction, identifying possible coach parking principles strictly related to the actual and potential tourist transport demand which urban areas have to bear.

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