A Dynamic Parking Guidance System for Europe
Concept from Setrix AG

1. Present Situation

A Parking Guidance System (PGS) uses information displays to inform motorists about parking space availability. PGS's can be static or dynamic. A dynamic PGS has the advantage of also displaying the number of parking spaces currently available in the various parking lots, so that motorists can decide well in advance which parking garage or parking lot to head for.
As a dynamic PGS requires a higher capital investment, their cost benefit is often called into question. However a dynamic PGS, by providing valuable information about vacant parking spaces, will also reduce parking search traffic and therefore contribute to environmental protection.

The following are some arguments both for and against a dynamic PGS:

Contra:

No useful information for local motorists:
Local motorists already know their way around and will drive to a familiar parking garage without paying attention to information displays or checking on parking space availability. When parking garages are full, local motorists will be aware of alternative parking lots and will head for them.

C**ity visitors rely on past experience:**
Motorists who visit the city center infrequently will head for familiar parking garages. The parking information displayed is irrelevant for them as long as their regular parking garage has vacant parking spaces. The dynamic display is only useful if their regular parking garage is full and they do not know of alternative parking lots.

Strangers to the city only use the information when parking is critical:
Strangers will not use the information displays until the parking situation becomes critical.

Operators of parking lots often only see a limited benefit:
As operators are often charged a flat rate for the operating cost of parking guidance systems they consider them to be of limited benefit, especially when there are often enough parking spaces available.

Summary of Contra arguments:
Why should a city invest in a dynamic PGS when the information is only relevant for motorists on a few days a year and for a small minority of motorists, especially when the capital investment is €0.5 – 1.5 million? In addition, there is the supplementary operating cost of the dynamic displays, which has to be paid annually.

Pro:

No more problems with parking spaces in the city center:
One political benefit lies in being able to scientifically prove to citizens that parking space problems do actually exist. However, this aspect will be already well known to motorists.

P**arking spaces available for customers of local retailers:**
This is an important benefit, because parking space availability is a crucial economic factor for retailers. More and more shopping center operators prefer inner city locations.

Avoidance of parking search traffic:
Advance information for motorists helps to avoid unnecessary vehicle traffic in the inner city. Advance information is especially important during peak periods and special events.

Avoidance of unnecessary toxic vehicle emissions:
Motorists searching for parking space can decide well in advance to head for a Park+Ride facility on the city perimeter and then travel to the city center by public transportation.

In future, these arguments will gain in importance as population densities in cities rise and stricter environmental regulations are introduced. This is why dynamic parking guidance systems are becoming more important for all cities in Europe.

2. New Innovative Dynamic Parking Guidance System (Virtual Parking Guidance System)

There is a basic problem with a conventional PGS: The motorist receives the information about parking space availability too late, when they have already decided to drive to the inner city or to a specific parking garage. Information provided in advance during their journey will help to effectively redirect the flow of traffic.

The widespread erection of dynamic display signs can mean a large investment. A plethora of traffic signs and information panels hinder rather than help motorists. That is where the concept of the new virtual parking guidance system comes in. This solution focuses on the cost-effective introduction of parking guidance systems for municipalities and private operators (trade fairs, airports, hotels, companies, sports arenas).

2.1 Specification for the new PGS:

– information for motorists well in advance, up-to-date, and everywhere
– low investment
– rapid rollout without major planning effort
– minimal (small) installation effort
– secure, reliable continuous operation
– open platform

The investment cost of conventional systems is their greatest disadvantage. This is why this new concept must include an initial “bridgehead” phase. This is true above all for cities that do not already have a suitable infrastructure (i.e. parking garages not networked; no cable network exists for dynamic displays). The initial installation must be clearly affordable in order to be

considered and must be flexible enough so that future services can be supported.
Moreover, planning efforts that take several years (and can make a PGS obsolete when finally rolled out) must be drastically shortened.

2.2 Technical advantages of the new virtual PGS system

The Internet is used for **communications**. Parking garages are linked via DSL and the displays are connected without cables using wireless GPRS (mobile radio).
Advantage: Existing infrastructure can be used to minimize the cost and can be extended at any time. Existing systems can be easily integrated or new display sites easily and flexibly extended through wireless communications.

The information is provided to drivers **not only** via **dynamic displays**; motorists can also call up information from their **navigation systems** via the **Internet** at all times.

The application runs via the Internet on a special server. This guarantees protection against unauthorized data access. Operations, monitoring and data security are ensured automatically. The system opens up new ways of implementing a parking guidance system.

The PGS software is browser-based; this means the system can be operated from any computer and does not need to be installed especially. All that is required is a browser with internet access and a valid user name. The system offers great flexibility and can be optimally integrated into the city's other operational processes.

City departments such as planning and city marketing as well as the police can access the service at all times. Each user group is awarded special function and access rights suited to their particular tasks. The number of authorized user groups can be extended or reduced as required. New possibillities for the integration of garage operators, radio stations and citizens can be implemented.

2.3 Staged concept for setting up PGS in cities

The services of the new PGS are divided into three categories. It can be introduced using a step-by-step approach. This helps to reduce the planning and implementation effort:

1) Collecting data on vacant parking spaces in the city
The system is based on the collection of data on parking space availability. Parking garages are linked to a superordinate system via the Internet without the need for a new communications infrastructure. The municipality can determine at all times whether enough parking spaces are available. This data can be used to draw conclusions for planning purposes.

2) Displays
Each municipality can freely decide upon the number of dynamic displays to use. In the simplest application, without the use of dynamic displays, the data is electronically transmitted to each driver. The city's information system becomes a parking guidance system for all visitors. Motorists are updated via the city's homepage and the ADAC ParkInfo service, which acts as an interface to mobile services and navigation systems to direct traffic flows as

required. The city can also install dynamic display boards; the simplest application would feature displays at the entrances to the inner city. A more comprehensive application would consist of a complete guidance system with direction signs at all decision points. The system then takes over control of the directional signs automatically.

3) Administration of the system
The application operates via the Internet on a dedicated server. Data security and continuous operations are guaranteed. Operating, monitoring, and data protection are ensured automatically. The application is administered by the city via a web browser, but can also be administered by a third party if desired.

Munich and Erlangen have already been using this innovative technology for data capture and data provision via the Internet for around 4 years.

3. Advantages of the new Virtual PGS

3.1. Advantages for sales
– Sale without tender possible as a pioneering move in this field
– Extending the customer base for ADAC Parkinfo (parking information system)
– Opportunity for renewing old systems
– Rapid implementation
– No risks because of universal positive experience on two major projects in Bavaria
– Positive effect for ADAC (automobile club membership)
– Not only an infrastructure topic, but also current environment/energy issue

3.2 Advantages for cities
– No planning costs, no burden on planning budget
– No civil engineering costs
– No investment in central control station; operating cost included in maintenance costs
– Positive political impact for the city mayor
– Short implementation period (e.g. in Erlangen only 2 months)

3.3 Advantages for Europe
– Fair distribution of Traffic investment funds
– Simple interface to superordinate system (Internet), i.e. ADAC Parkinfo (parking info system)

4. Conclusion

The innovative PGS presented here is already being used successfully. It can be easily and quickly implemented with a small capital investment by the PGS operator. A staged rollout is possible.

The virtual PGS encourages widespread use of the ADAC Parkinfo Online System. This way motorists have universal access to up-to-date parking information; this helps to reduce parking search traffic and makes a significant contribution to environmental protection.

5. Technical architecture