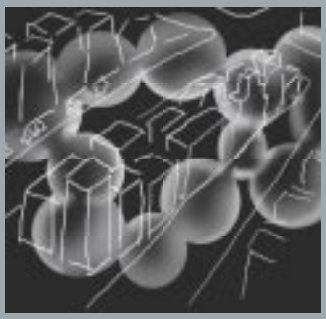
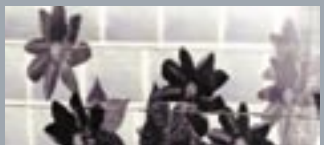
SMART BUS LINES

Smart urban mobility systems





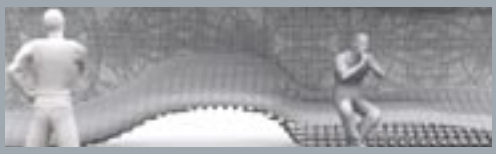

The horse-drawn omnibus was introduced to Paris in the 19th century, and the fuel-powered bus in 1906. Today, smart urban mobility systems – making use of advanced sensing, computing, and networking technologies – promise a similarly profound revolution in transportation.

The bus was one of the most successful inventions in the history of transportation, and it has served cities effectively for a century. Nowadays, we face new design challenges, and new technologies can help to meet them.

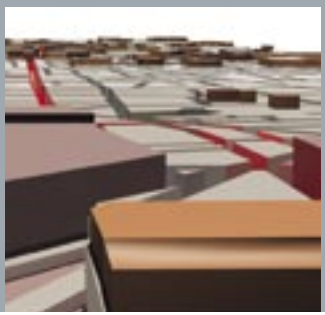
This exhibit, a concept station – the result of two-year collaboration between MIT and RATP on *Smart mobility* – explores their emerging potential: the bus stop, a self-organizing landmark.








In 1662, Blaise Pascal initiated the world's first public transportation system – consisting of "five-penny" horse-drawn carriages. He also invented a calculator. Smart urban mobility systems belong to this rich genealogy, and draw these two themes of Pascal's imagination together in a new way.



RETHINKING THE BUS SYSTEM

Urban mobility systems traditionally combine high-speed, high-volume, point-to-point transportation with more flexible but slower and lower-volume modalities – walking, bicycling, taking a taxi, and driving.

Ubiquitous access to information through mobile wireless devices shifts the balance toward individual mobility. It allows high-volume transportation to become more flexible and responsive, and consequently, the traditional distinction between collective and individual transportation blurs.

Transportation systems can become more responsive to changing demands, users can make better transportation decisions, and vehicles can provide important new services.

The *Smart Mobility* project demonstrates the application of these concepts to the Paris bus system. Further details can be found online at **http://mobile.mit.edu/bus_stop**

LANDMARK INTERACTIVE BUS STOPS

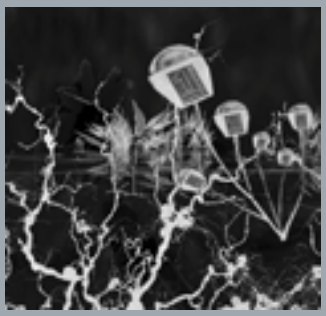
The bus stops of smart urban mobility systems function as powerful urban landmarks, particularly in areas of the city that need strengthening of identity and focus.

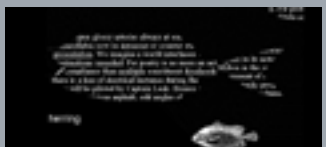
They can take advantage of twenty-first century digital display technology, in the same way that Guimard took advantage of the industrial technology of his time in his designs for Metro stations.

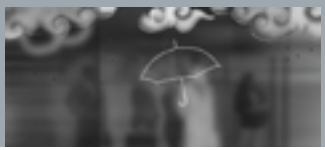
Electronic, networked bus stops can serve as entry and orientation points for transportation systems and neighborhoods, supporting bus line agents – *neighborhood concierges* – who provide guidance and advice, both in person and online.

The transportation system can broaden its role from that of a provider of physical mobility to that of a comprehensive source of efficient access to the varied and far-flung resources and attractions of the city.

This exhibit features a working prototype of a landmark interactive bus stop constructed from inexpensive materials. It does not have a standardized form, but takes advantage of new design and fabrication technology to adapt to different contexts and needs.







THE DOUBLE-SIDED BUS STOP INTERACTING AND ENGAGING

Facing the city, the exterior of the prototype bus stop has a smart skin that senses and responds to the presence of pedestrians – thus creating a playful, engaging art work. It can be programmed with a wide range of continually changing content as appropriate to particular localities and seasons. This particular prototype employs LEDs embedded in silicone tiles and video sensing for the smart skin.

Facing the waiting passengers, the interior provides displays and interaction screens for way-finding and schedule information, news, local businesses and points of interest, and local community networking.






RECONFIGURING BUSES

By embedding electronic intelligence, buses can become more flexible, so that they wiggle themselves through the streets in more agile fashion. They can provide effective service to areas with narrow streets, winding roads, and complex topography.

Use of flexible, versatile buses help to better manage interchanges among different transportation modes, thus making travel more efficient and less confusing; the *"snake"* bus can penetrate more areas of the city, and the *"worm"* bus can go underground.
Below street level, in addition, the *"worm"* bus can enter efficient multimodal interchanges where pedestrians can access multiple transportation systems – private cars, shared cars, bicycles, and other public transportation systems. And versatile buses can combine passenger transport and cargo transportation during off peak hours, especially during the night. Furthermore, the *"stadium"* bus can provide both a window on the city and a place for bicycle storage.

Through use of networking, display, and interaction technologies, buses can now provide many additional services, extending their role far beyond transportation. They can become mobile network nodes, so that passengers are connected for guidance, entertainment, mobile work, and tourism. Both interior and exterior surfaces can carry information displays. Buses can increasingly become work, entertainment, and social spaces on wheels, while their exteriors serve as dynamically programmed urban information displays.

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