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MIT researchers map the flow of urban trash

--Trash Track findings, published in current issue of *Science*, reveal trash's distant travels

Photos/Video available

CAMBRIDGE, Mass. — In August 2009, a team of researchers from the Senseable City Lab in the MIT Department of Urban Studies and Planning embarked on a major project to track the journey of 3,000 items of waste as they moved through Seattle's disposal system. The goal of the project, called Trash Track, was to monitor the patterns and costs of urban disposal and to help create awareness of the impact of trash on the environment.

The results of the project, which recently won the 2011 National Science Foundation International Science and Engineering Visualization Challenge, will be published in the Feb. 18 issue of *Science*. Among the findings: More than 75 percent of the waste tracked in the study reached recycling facilities — significantly above the U.S. average. And, overall, 95 percent of the trash reached an EPA-compliant end destination in the vicinity of the Seattle metropolitan area, which speaks to the effectiveness of the municipal waste removal system in Seattle.

"Trash disposal is one of today's most pressing issues — both directly and as a reflection of society's attitudes and behaviors," said Associate Professor Carlo Ratti, director of the Senseable City Lab. "Our objective with this project is to reveal the disposal process of our everyday objects, as well as highlight potential inefficiencies in today's recycling and sanitation systems."

To track the trash, the MIT team, together with a group of local volunteers, attached more than 3,000 custom-developed smart tags to waste objects discarded by households and schools across the Seattle metropolitan area. The tags' trajectories were then monitored in real-time on a central server at MIT.

"As the location reports from the tracked objects started coming in, we were fascinated to see an invisible infrastructure unfolding," said Dietmar Offenhuber, Trash Track project leader. "The extent and complexity of the network of waste trajectories was quite unexpected."

Results also showed how surprisingly far some of the Seattle waste traveled, effectively spreading across the entire country. Electronic and household hazardous waste, for example, which was sent to specialized recycling and reuse facilities in other states,

traveled on average more than 1,500 km (932 miles).

A printer cartridge reported the longest trace with a length of 6,152 km (3,823 miles), suggesting that, in some cases, the carbon emissions produced in getting waste to a recycling facility negates the expected benefit of recycling.

Beyond providing a unique insight into the workings of the trash-removal system, Trash Track aims to get people thinking about what they throw away.

"Trash Track presents a new opportunity for citizens to engage with the urban system," said Assaf Biderman, associate director of the Senseable City Lab. "It is a bottom-up process in which pervasive technologies allow individuals to monitor and describe their environment, while also providing an insight into the impact of their own actions."

The Trash Track project is supported by Waste Management, Qualcomm, Sprint, the Architecture League of New York, the City of Seattle and the Seattle Public Library.