

## Cuter scooter defined by electricity, portability

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The MIT-designed electric scooter, shown folded up at left. Image courtesy / MIT Smart Cities Group

It's energy efficient, it's clean, compact and simple, and, above all, it's very cool.

All of these factors could be significant in getting people to adopt a lightweight, electrically powered scooter designed by William J. Mitchell, the Alexander W. Dreyfoos Professor of Architecture and Media Arts and Sciences, and several of his students in MIT's Smart Cities Group, in collaboration with SYM, a major scooter manufacturer in Taiwan, and ITRI, Taiwan's Industrial Technology Research Institute.

A prototype of the new design was a hit at the Milan Auto Show, where it was unveiled earlier this month.

Motor scooters are a very popular form of transportation in Asian and European cities, Mitchell said, because they provide convenient, inexpensive transportation. But conventional scooters, using inefficient two-stroke gas engines, are also a source of local air pollution. The new design "was all about providing a clean, green, silent electric scooter that would provide, even better, the same kind of urban mobility," he said.

As an added bonus, the simplicity of the electric design, which eliminates the powertrain by putting motors directly inside each of the two wheels, made it possible to design the scooter so that it could be folded up to about half its size, making it even easier to store in crowded urban environments.

"In very dense urban areas where scooter parking is a big issue, the small size is a big advantage. It makes it possible to park it in narrow streets and alleys," Mitchell said. When folded, it can also be easily wheeled along like a trolley suitcase, and is no larger, making it easy to take along on trains or even indoors.

The simplified design could bring down production costs significantly, he said. "A typical gas scooter has about 1,000 parts, but ours only has 150."

Mitchell and his team envision the scooters being provided in racks at convenience stores, train stations and other convenient city locations as one-way rentals. Users would swipe a credit card to remove a scooter from the rack (in which its batteries would be kept fully charged up), unfold it for the trip and then fold it up again to deposit at another rack at the destination.

The viability of the one-way-rental business model has been demonstrated in Paris, Mitchell said, where a company has recently begun a similar service with 1,000 bicycles.

The design of the scooter is also important in getting the new concept adopted. "People want to look cool," Mitchell said, and the folding scooter was highly praised at the Milan show, where vehicle design is especially prized.

The team now plans to further develop the prototype to come up with two different production models. One will be a refinement of the folding scooter introduced in Milan, and the other will be an even simpler model, without the folding capability, to be produced for regions where low cost is most important and space restrictions are not as crucial.

The whole design project was accomplished in eight months, "from a blank sheet to a built concept," Mitchell said. The multigenerational, cross-disciplinary team included a core group of four graduate students along with several others who made contributions, and a group of MIT's Undergraduate Research Opportunities Program students. One key to their ability to accomplish the innovative design, he said, was that "they don't know what's 'impossible,' so they just go out and do it."

Source: MIT

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