

## Technology Development Toward New Railway Services

### ■ R&D using Smart Station Lab Building

Smart Station Lab Building, a new experimental facility with the same area and equipment as a regular station, was completed in June 2010 at the Saitama City-based JR East Group Research and Development Center. In this facility it is now possible for us to conduct tests on customer flow behavior (lines of movement from free passageways through ticket gates, concourses, stairways, and train platforms) that have previously been impossible in operating stations or within the narrow confines of laboratories. We are, therefore, now in a position to make overall assessments of passenger behavior.

Currently we are also carrying out basic assessment tests with the goal of developing an information system using smartphones and the introduction of light transmissive organic thin-film solar cells to the railway business.



Smart Station Lab Building

### (1) Smartphone information system

We are currently carrying out research into station information systems utilizing smartphones and Augmented Reality (AR) technology. With such a system if passengers look at AR identification markers on station floors and elsewhere through a smartphone, information regarding locations of ticket gates, toilets, and other facilities will be displayed on their smartphone screens. Using AR technology in this way will enable information provision via smartphones, even inside stations where GPS and electronic compasses often fail to function adequately. In November 2011, a group combining four companies—JR East, Softbank Telecom Corp., DNP Digitalcom Co., Ltd., and Bookmark—won the 2010 Good Design Frontier Design Award.



### (2) Basic assessment tests toward the introduction of light transmissive organic thin-film solar cell to the railway business

We are currently conducting basic assessment tests on the potential for the introduction of light transmissive organic thin-film solar cells to the railway business. Compared to traditional silicon (inorganic) solar cells, organic solar cells have the following advantages: heat emissions during manufacturing are low, resources are abundant, expensive manufacturing equipment is unnecessary. The cells are light, thin, bendable (glass is not used as a base), and highly transmissive which make it possible to introduce them without large-scale station structural reinforcements, etc. There is also the advantage that they can be used in station windows and on platform ceilings without decreasing the flow of light. At present the energy transformation efficiency we have achieved is low and cannot compare with silicon cells, but there is potential for a considerable boost in power generation capabilities within several years. Given this, we will continue to plan for the future and consider their application in stations.



Light transmissive organic thin-film solar cell

#### ■R&D regarding more comfortable seats

On commuter trains we have introduced such improvements as widening seats and clarifying individual seat spaces so that as many passengers as possible can sit comfortably. We found, however, that there are many instances where passengers are made uncomfortable by others sitting with their legs wide open, leaning on their neighbors, and/or stretching out their legs. We also found out that some seated passengers are worried that they themselves might be causing discomfort in others.

As a result, we designed and produced prototype seats that are comfortable to sit on and not invasive to nearby passengers with the aim of balancing comfort and compromise. With an eye to commercialization, from June 2011 we have been conducting trials on one car on the Yamanote Line in order to verify the comfort, durability, cost, etc., of the seats.



The result of our pursuance of improved passenger comfort