

For immediate release
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Japan Association for the 2005 World Exposition
Toyota Motor Corporation

EXPO 2005 Aichi, Japan to Feature Futuristic Transit Systems —IMTS and Fuel Cell Hybrid Buses to Provide On-site Transportation—

Tokyo—The Japan Association for the 2005 World Exposition (the Association) and Toyota Motor Corporation (TMC) announced today that they have agreed on a joint project to provide on-site transportation for the 2005 World Exposition, Aichi, Japan (EXPO 2005 Aichi, Japan)^{*1} using advanced transportation technologies.

The movement of visitors within EXPO 2005 Aichi, Japan's Nagakute area^{*2} will be facilitated by TMC's IMTS (Intelligent Multimode Transit System), which features non-mechanically linked vehicles moving in platoon formation. Meanwhile, hydrogen-powered fuel cell hybrid buses developed by TMC will aid movement between the Nagakute and Seto areas.

Under the agreement, TMC, as a technical partner, will develop and supply the needed vehicles, while the Association will be in charge of developing the related infrastructure and of system operation and management. As this project will involve the first full-scale mass-transport operation of the rail-less but train-like IMTS, the Association has already obtained the required railroad operation permission from the Japanese government.

As the aim of EXPO 2005 Aichi, Japan is to propose a new global society model for the 21st century, the Association had been studying a variety of futuristic, eco-friendly transit systems that would be safe, comfortable and capable of turning simple transportation into a pleasant experience. TMC, meanwhile, had been looking for a way to offer many people firsthand experience of the convenience of IMTS as a next-generation urban transit system and of the efficiency and potential of fuel cell vehicles. After both sides confirmed their similar intentions, they agreed to use IMTS and fuel cell hybrid buses at the exposition.

With work underway by Aichi Rapid Transit Co., Ltd. to initiate Japan's first magnetically levitated linear motor car service (High Speed Surface Transport, or HSST, popularly known as "Linimo") as a means of access to the Nagakute area, the use of IMTS and fuel cell hybrid buses will enable EXPO 2005 Aichi, Japan visitors to experience futuristic mass transit systems traveling to, between and within the event's exhibition areas.

^{*1}From March 25 to Sept. 25, 2005 in Aichi Prefecture. ^{*2} EXPO 2005 Aichi, Japan will comprise two exhibition areas—one in Nagakute Town and part of neighboring Toyota City and the other in Seto City.

More...

IMTS

IMTS is a new transit system based on the latest ITS (Intelligent Transport Systems) technology that allows the unmanned, automatic and platoon operation (in which multiple units run in file formation at unified speeds) of buses on dedicated roads, as well as manual and independent operation on ordinary roads. The system features the punctuality, high speed and large passenger capacity of conventional rail-based mass transit systems such as trains and the economic efficiency and flexibility of buses serving regular routes.

Fuel cell hybrid bus

The fuel cell hybrid bus operates on motors powered by high-pressure hydrogen-supplied fuel cells and a nickel-metal hydride secondary battery. Unlike gasoline- and diesel-fueled vehicles, it does not emit carbon dioxide or other toxic substances during operation and is highly energy-efficient, as well as quiet.

For overviews and operational details of the IMTS and fuel cell hybrid buses to operate at EXPO 2005 Aichi, Japan, please see Attachment 1 and Attachment 2.

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ATTACHMENT 1

IMTS (Intelligent Multimode Transit System)



An artist's rendering of IMTS in platoon operation at EXPO 2005 Aichi, Japan

Overview

The next-generation transportation system IMTS features the following advantages:

- Adjustable capacity: As the units in platoon operation (file formation at uniform speeds) are not mechanically linked, it is easy to increase or decrease their number, depending on fluctuations in demand.
- High speed and punctuality: Vehicles running in platoons on dedicated roads achieve speed and punctuality suitable for an advanced transit system.
- Excellent multiple-modality: Dual mode operation (in a platoon on dedicated roads and as independent units on ordinary roads) allows smooth, limited-transfer travel.
- Route setting flexibility: The combined use of dedicated roads and ordinary roads can be flexibly arranged, and this, together with a far-smaller turning radius and the ability to ascend much sharper inclines than is possible with trains, allows flexibility in setting routes.
- High economic efficiency: The absence of need for rails and power transformers (which are necessary in conventional rail-based systems), along with the system's compact control system and compact vehicle terminals, etc., contributes to construction and maintenance cost efficiency. Unmanned operation on dedicated roads also reduces labor and related costs.

Technical features

IMTS vehicles are navigated and controlled by magnetic markers imbedded in the middle of their dedicated roads. A thorough fail-safe system is adopted, featuring automatic speed regulation and braking functions assured by inter-vehicle communication, ground signals and other means.

- Course-keeping function: Magnetic markers imbedded in the middle of the dedicated roads ensure automatic navigation and control.
- Platoon running function: Three electronically linked vehicles run in file formation at uniform speeds.
- Speed-keeping function: Stops at stations, departures and traveling speed are automatically regulated in line with the operation timetable.
- Fixed-point stop function: Each vehicle in a platoon is controlled to stop exactly at set points along the station platform.
- Anti-collision function: Inter-vehicle communication, ground signals and other means allow automatic brake control.

At EXPO 2005 Aichi, Japan

At EXPO 2005 Aichi, Japan, IMTS will have the following characteristics:

- Leading design: Each unit will feature a “Z-CAPSULE” design that gently embraces passengers, projecting an image for a new form of public mobility. Its round and gentle glass cabin, with its esthetically pleasing lines, provides the occupants with a panoramic view
- Dual-mode operation: Operation will feature both unmanned automatic operation on a dedicated road and manned manual operation on on-site ordinary roads.
- 3-vehicle platoons, automatic platoon-size adjustment: On the dedicated road, three units will run in a platoon; the last unit will automatically separate to travel on an ordinary road when needed and will then automatically rejoin the formation when it returns to the dedicated road.
- Barrier-free consideration: Units will feature low floors and will stop at station platforms at a point in which floor height is equal to platform height.
- Environmental friendliness: Units will feature clean CNG (compressed natural gas) engines.

Planned operation is as follows:

- Period: March 25 – Sept. 25, 2003 (185 days)
- Hours: 9 a.m. – 10 p.m. (tentative)
- Service areas:
 - Automatic operation zone—on an IMTS dedicated road connecting the North Gate Station, West Gate Station and South Big Event Hall Station for a total one-way distance of about 1.6 km
 - Manual operation zone—on an on-site ordinary road connecting the West Gate Station and the Conventional Hall Bus Stop for a total distance of about 0.8 km
- Number of units: 14
- Traveling speed: About 30 km/h maximum and about 20 km/h on average
- Terminal-to-terminal traveling time: About 7 minutes (for automatic operation)
- Departure intervals:
 - Automatic operation zone—every 7.5 minutes (8 departures/hour)
 - Manual operation zone—every 30 minutes (2 departures/hour)
- Expected passenger volume (rough estimate):
 - Automatic operation zone—27,000 passengers/day (round trip)
 - Manual operation zone—2,400 passengers/day (round trip)

ATTACHMENT 2

Fuel Cell Hybrid Bus



**The FCHV-BUS2 fuel cell hybrid bus
(An improved version is due to operate at EXPO 2005 Aichi, Japan.)**

Overview

The fuel cell hybrid buses to be used at EXPO 2005 Aichi, Japan will represent an improved version of the FCHV-BUS2—a large low-floor commuter bus that features a hybrid system powered by high-pressure hydrogen and that TMC and Hino Motors, Ltd. have been jointly developing since 2000.

The FCHV-BUS2, equipped with two units of TMC's high-performance Toyota FC Stack and incorporating the hybrid technologies found in the Toyota Prius hybrid passenger sedan and Hino's HIMR System, achieves high running efficiency by recovering energy during deceleration and delicately alternating between its fuel cells and secondary battery for power supply to the motor according to running conditions.

The FCHV-BUS2 was the first fuel cell-powered bus officially approved by Japan's Ministry of Land, Infrastructure and Transportation. Issued a license plate in 2002, the vehicle has been carrying out trial runs on public roads. It is also expected to run on regular Tokyo metropolitan bus routes this summer as part of a fuel cell bus pilot project promoted by the Tokyo Metropolitan Government.

Technical features

As explained above, the fuel cell buses that will operate at EXPO 2005 Aichi, Japan will represent an improved version of the FCHV-BUS2. The main specifications of the current FCHV-BUS2 are as follows:

Vehicle	Base platform	Blue Ribbon City (Hino low-floor commuter bus)
	Overall length / width / height	10,515 / 2,490 / 3,360 mm
	Maximum speed	80 km/h
	Occupant capacity	60 people
Fuel cell stack	Type	Polymer electrolyte fuel cell
	Output	90 kW x 2
Motor	Type	Permanent magnet
	Maximum output	80 kW x 2
	Maximum torque	260 Nm x 2
Fuel	Type	Pure hydrogen
	Storage method	High-pressure hydrogen storage tank
	Maximum storage pressure	35 MPa (350 atmospheres)
Secondary battery	Type	Nickel-metal hydride

At EXPO 2005 Aichi, Japan

At EXPO 2005 Aichi, Japan, the improved fuel cell hybrid buses will operate as follows:

- Period: March 25 – Sept. 25, 2003 (185 days)
- Hours: 9 a.m. – 6 p.m. (tentative)
- Service area: Between the Nagakute and Seto areas (about 3.5 km)
- Traveling time: about 10 minutes (one way)
- Departure intervals: Every 6 - 8 minutes
- Passenger capacity: Approximately 900 - 1,200 passengers/hour, round-trip