

“Crystal Mover” Automated People Mover System in Operation at Miami International Airport’s North Terminal



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Following an order from the Miami-Dade County Airport Authority as part of the Miami International Airport North Terminal expansion project, an automated people mover (APM) system developed by Mitsubishi Heavy Industries, Ltd. (MHI) began operation as the airport’s “Skytrain” on September 15, 2010. This paper provides an overview of aspects of the operation and maintenance of MHI’s Crystal Mover APM system.

1. Crystal Mover Overview

MHI’s Crystal Mover APM system is a fully automated, driverless, medium-volume passenger transport system that utilizes rubber-tired vehicles and other subsystems such as a signaling system, a power distribution system, a communication system, station platform doors, exclusive tracks, a central control room and maintenance facilities. The APM system, which is generally considered to be on a scale between a bus and a railway system, is well-suited for operation in the range of 1,000 - 15,000 passengers per hour per direction (pphpd). The rubber tires of the APM set it apart from conventional railway cars in terms of its silent operation, ride quality and performance on slopes.

2. Miami International Airport APM System

The system, located in a secured area (air side), consists of four trains each comprised of four cars, (plus one standby train) and covers the entire four-station route in the North Terminal (Terminal D) in approximately eight minutes. This fully automated, driverless system operates at two-minute intervals during peak hours, providing a safe and comfortable ride to all departing, in-transit and arriving passengers at this terminal.

Each station is equipped with platform doors to ensure passenger safety in an air-conditioned environment. Furthermore, the east side of each station and train is dedicated exclusively to international arrivals in order to maintain security.



Figure 1 Boarding/disembarking at a station



Figure 2 Interior view

3. System Operation and Maintenance

24-hour operation and maintenance (O&M) services for the system are provided by Crystal Mover Services, Inc. (CMS), a company funded by MHI America and Sumitomo Corporation of America. Based on O&M experience with the same Crystal Mover APM systems already in use at Washington Dulles International Airport and Atlanta International Airport, CMS was able to facilitate the smooth, on-schedule launch of the system by implementing measures such as pre-launch test runs and the training of maintenance staff.

• Operation

The central control room provides a centralized supervision platform for the operating status of each train and the subsystems such as stations, signaling, power distribution and communication. Furthermore, strategically-positioned CCTV cameras facilitate a visual assessment of operations.

In order to provide safe and smooth system operations, a central control room operator makes in-train or station announcements depending on the operational status and when necessary, maintenance staff can be dispatched to patrol trains and stations. For emergencies, the central control room coordinates its actions with airport control, police and the fire department to ensure that passenger safety is given top priority.



Figure 3 Central control room

• Maintenance

The maintenance facilities for the system include areas for train storage and inspection, pre-operation inspection, spare part and consumable component storage, vehicle washing equipment and dismantling inspection, as well as an O & M office. At these facilities, the APM trains undergo wide-ranging inspections from daily post-operation inspections in the evening and extensive annual inspections. Maintenance duties also include station and wayside inspections conducted at night and the maintenance management information system (MMIS) enables a variety of other tasks including the control of the maintenance schedule, maintenance records and data storage, as well as the monitoring of spare parts and the processing of consumable components



Figure 4 Train maintenance facility



Figure 5 Undercarriage inspection