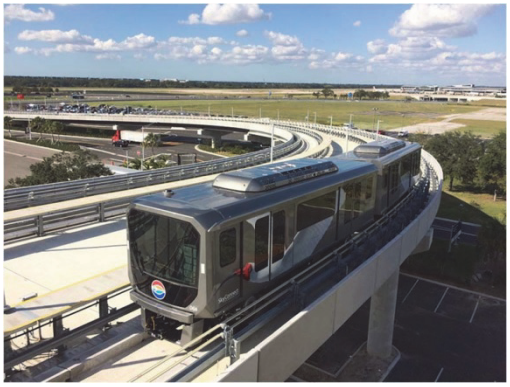
Commencement of Automated People Mover System “SkyConnect” at Tampa International Airport in U.S.



Mitsubishi Heavy Industries Engineering, Ltd.

Mitsubishi Heavy Industries Engineering, Ltd. received an order for automated people mover (APM) systems from the Hillsborough County Aviation Authority to connect the Main Terminal of Tampa International Airport to the newly built Rental Car Center. This new service line, called “SkyConnect,” started operating on 14 February 2018. Tampa International Airport had already introduced APM systems in the 1970s ahead of other countries, to connect the main terminal to the satellite gates.

This report provides a general description of our APM system, which was installed at Tampa International Airport, and its operation and maintenance.

1. Outline of the Crystal Mover

Our “Crystal Mover” APM system is a fully automated, medium capacity, driverless system for passenger transport and consists of the following subsystems: vehicles with rubber tires, a signal system, an electric power system, a communications system, stations/platform screen doors, dedicated railway tracks, and a central control room/maintenance facility. It generally falls in the intermediate category between buses and railways and is suitable for a transport capacity of 1,000-15,000 passengers per hour per direction (pphpd). Unlike train cars, Crystal Movers employ a rubber tire system and therefore excel in terms of quietness during operation, ride quality and performance on gradients.

When compared with conventional types of vehicles in U.S. projects, those in operation at Tampa International Airport are lightweight, have adopted many innovative technologies including new carriages, a self-manufactured brake system and a CBTC signaling system, and can reach a top speed of 80 km/h (50mph), thus improving the convenience of passengers (**Figure 1**).

2. New APM system “SkyConnect” at Tampa International Airport

The system is 2.3 km long and connects the airport’s Main Terminal through the Economy Parking station to the Rental Car Center (ConRAC station) in about 5 minutes. The transport capacity at peak times is 2,500 pphpd. **Table1** shows the main configuration and specifications.

Table 1 Main configuration and specifications

Vehicle	A total of 12 vehicles. 2-car configuration. Extendable to 4-car configuration. With 4-car configuration, trains operate at an interval of roughly 2.5 minutes.
Signal	CBTC
Power	750 VDC, receiving 13.2 kV electric power at two substations. SCADA system.
Communications	Data/voice and CCTV (Guideway, Stations, Vehicle), O&M wireless system, access control
Station	Platform screen doors (8 platforms/station) and passenger announcement system/displays
Track	Double track, emergency sidewalks, and LED lighting along the line
Depot	Administration office, central control room, pre-departure inspection and maintenance facilities, vehicle washing facility, parts storehouse

In response to the customer's request, the vehicle features an unprecedentedly new and stylish exterior design.

3. System operation and maintenance

System operation and maintenance (O&M) is carried out on a 24-hour basis by Crystal Mover Services Inc. (CMSI), jointly founded by Mitsubishi Heavy Industries America, Inc. and Sumitomo Corporation/Sumitomo Corporation of Americas. In operating the system, CMSI provided maintenance staff with training and OJT sessions. As experienced O&M staff, who were transferred after having worked at other sites for O&M, also participated in the sessions, the start-up went smoothly.

[Operation]

The Central Control Room provides centralized management for train operating status, subsystem operation including signaling, communications, electric power and platform screen doors, and access to the system (**Figure 2**). Situations at the stations and in the compartments and track conditions can be monitored by CCTV. The operator makes a train/station announcement in accordance with the service operating status. Maintenance staff make the rounds of the stations and compartments to ensure smooth operation. During an emergency, the safety of passengers will be ensured by connecting the hotline to the Airport Operation Center. CCTV images are shared with the existing airport systems to provide for emergency management.

[Maintenance]

At the Depot, the vehicles are inspected daily on the track for light maintenance (with pits), and tire changes and important parts inspections are carried out on the track for heavy maintenance. Other inspections (for example, tracks and station facilities) are conducted at night. The Maintenance Management Information System (MMIS) enables the carrying out of a variety of tasks such as provision of daily work instructions, management of work records and data, and management of parts and consumables (**Figures 3** and **4**).

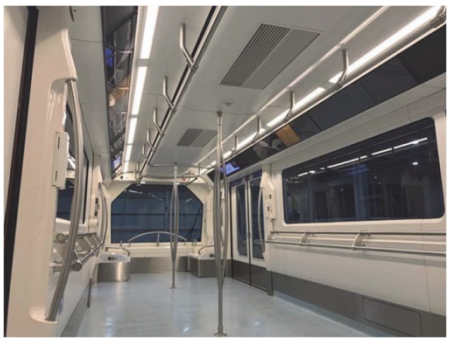


Figure 1 Interior view

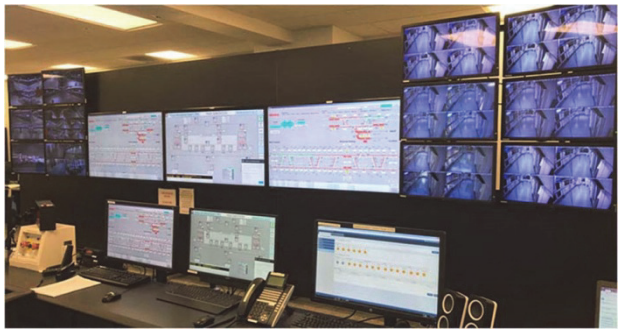


Figure 2 Central Control Room

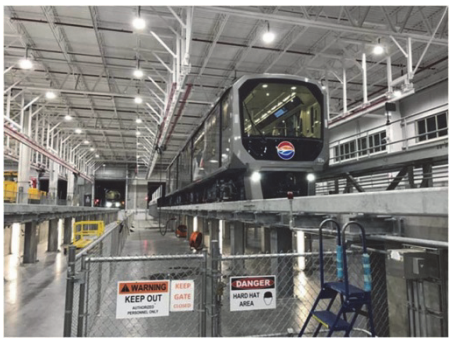


Figure 3 Vehicle maintenance facility

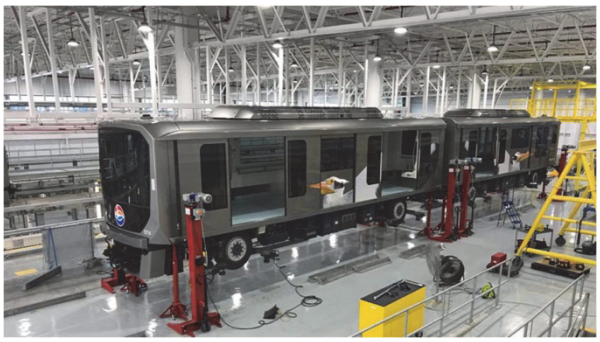


Figure 4 Vehicle inspection

4. Future directions

At the APM Conference held in Tampa in May 2018 (scheduled to be convened every other year), our APM system was presented to people working for airports and those in the industry, promoting our technologies and achievements. We will further improve our publicity and aim to acquire new customers.