

Operations Approach and Safety Management



The design of Ultra is focused upon world-class levels of reliability. However, excellence in service delivery is wider than mere reliability and is a reflection of the full spectrum of interactions between customers and the service from first to last. How customers perceive those points of interaction will determine their perception of the system.

The operational success of a PRT system can be judged by a series of critical success factors. These may include aspects such as reliability and wait times and also encompass elements such as passenger perception. A series of secondary targets on items such as cleanliness, presentation, and quality of information provision can also be used to gauge the operational success of the scheme.

Passenger Support Services

Ultra control room staff (Controllers) will provide a factual, customer-focused interpretation of a passenger query/situation. Controllers are chosen for outgoing personalities as a significant portion of their responsibility is friendly interaction with passengers. They will provide timely, accurate information and answer further questions via the passenger call-points as a customer support situation develops.

Every vehicle will have a Passenger Call Point (PCP) for use by passengers to talk directly with the Controller. All Controllers will be trained in how to respond to PCP activations. The Controller will be trained to assess the circumstances and, depending upon the nature of the call, deal directly with any matters or summon other assistance. The vehicles have two call buttons, one for general inquiries and a second for use in an emergency. The emergency call would take priority in the control room.

The CCTV system is critical to creating a safe and secure environment for passengers, so it is crucial that the system performance and support is of the highest standard. The operation of CCTV on the

system and in vehicles will be done in accordance with state / federal legislation and international / industry guidance ensuring that the sensitivity of image monitoring is recognized.

Our CCTV system operates in both standard mode and infrared mode. The infrared mode allows for viewing in low-light, night-time operation without requiring a lighted guideway.

Guideway trespassers are detected by Ultra control room staff via CCTV.

Maintenance Timing

All intrusive system maintenance can be achieved outside busy operating hours. This will include all routine inspection and maintenance of infrastructure, systems and vehicles. In addition, vehicles will receive their “deep” battery condition charging at night. At Heathrow we have analyzed the demand figures for the system and have set up maintenance procedures that give maximum vehicle availability during highest demand periods.

Presentation

Cleanliness of a system is immediately apparent to all who use it. Much of the mistrust and low modal shift associated with some public transport systems is associated with failed standards of cleanliness. Ultra vehicles and stations will be kept clean. To assist with the volume of cleaning activity an automated vehicle wash will be provided at the Operations and Maintenance Facility (OMF), with a water recirculation system to reduce the environmental impact.

Standards will be maintained by unifying cleaning and preparation for service under the care of a team, led by the Cleaning Team Leader. During the day, it will be ensured that vehicles stay clean in service by positioning cleaning staff at critical locations to collect litter and sweep through to remove newspapers and other items discarded by passengers. The cleaning staff provides rapid response for urgent cleaning of vehicles in case of spills or worse.

On a regular, scheduled basis, vehicles and stations will receive a deep clean, conducted during system shutdowns. These will involve a much more intensive cleaning effort to ensure that all the facilities on the system remain bright and fresh. At Heathrow we have agreed standards of cleanliness with recognized measures and inspections.

Operations staffing

Four main grades of staff will be used. The key to the most cost effective solution is to seek multi-skilling to allow effective utilization of staff. Staffing levels accommodate someone reporting sick or arriving late. Descriptions of the four staff positions follow below. In addition, there are the management positions of Control Manager and Technical Manager.

Duty Controllers

The Duty Controller provides shift leadership, owning the system during the shift. The individual will make final decisions on priorities and incident management (other than engineering judgments). Staff on duty for that shift will take operational instruction from the Duty Controller e.g. releasing vehicles for cleaning. The Duty Controller will be competent on all Control System equipment. Duty Controllers will report to the Control Manager.

Technicians & Controller Technicians

Technicians are competent to faulting and maintenance level on virtually the full range of assets on the system (except for specialist skills such as air conditioning maintenance). A technician presence is required during operating hours to allow immediate attendance to a vehicle or system failure.

Controller technicians usually work alongside the duty controller in the control room but also have a technical background allowing them to assist the technician if required. They do not have the in-depth skills of the technician but are able to undertake basic faulting and repairs.

Station Staff

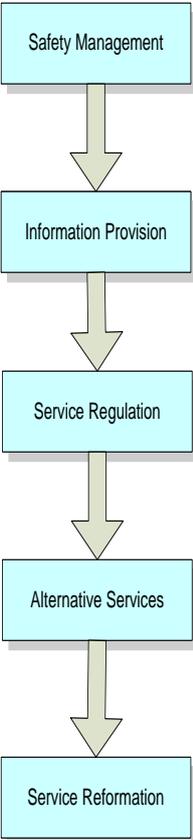
These members of staff are located at each station and are responsible for assisting customers and guarding the station premises. The number of station staff required will depend on the level of automated monitoring / passenger assistance installed, and whether their presence is only required at specific hours / locations.

It should be noted that stations at Heathrow are planned to be unstaffed, and that increasing user familiarity with future systems will lead to less demand for passenger assistance over the years

Cleaners

Cleaners move from task to task dependent upon asset availability. They are also a visible staff presence on the system. They also aid with daily visual checks of the vehicles, checking that all buttons and in-vehicle media are working correctly.

Staff training



Substantial staff training takes place during system commissioning. The Ultra Heathrow team has developed a series of specialized training courses and documents that will be adapted for training use on the Amritsar system. Hence staff will have a more rounded understanding of not just the technical aspects of the system but the context and standards of performance that can be expected. Staff will be actively involved in designing, reviewing and testing operation and maintenance plans, ensuring not only that staff are familiar with the plans and that they are fit for purpose, but also that there is strong buy-in and ownership from the staff right at the outset.

Training and incident drills continue throughout each staffer’s career.

Contingency planning and management

In spite of the proven reliability of the system and vehicles, a prudent operator will prepare for unexpected problems. There will be procedures in place for normal operations and abnormal operations (under Contingency and Emergency Plans).

The plans will be developed and agreed during the mobilization period. Key to recovery from any service disruption or system incident will be contingency plans that have been carefully constructed and tested. We will work with emergency services and local authorities to test and improve our contingency planning arrangements, which have been developed in detail for the London Heathrow system.

The ability to provide multi-discipline responses, to resolve different and sometimes complicated situations, is a fundamental part of delivering a safe and efficient service. It is important that failures are correctly diagnosed to enable the correct response to be deployed. Ultra PRT has many years of experience and understanding of the PRT system, which has enabled understanding of how to diagnose and manage systems failures.

Ultra PRT will ensure that all staff have detailed knowledge of policies and procedures to resolve different situations and failures that arise. This will ensure a cohesive response to all incidents, putting the safety and convenience of passengers first.

Failure management has a direct influence on customers' perception of the quality of service – based on how much the service deviated from what was expected. Effective management of service disruption is required to ensure that impact of disruption is limited to as few customers as possible, for the shortest time possible.

Ultra PRT will locate recovery vehicles at strategic points on the network for rapid rescue of any failed vehicles. These vehicles are capable of deploying to any point on the network and towing a failed vehicle back to a safe detraining point with the minimum of delay. To ensure their immediate operational readiness these vehicles are also used for routine guideway inspections and are kept on standby charge when not in use.

Vehicle-on-Guideway Emergency Evacuation

Ultra's non-electrified passive guideway meets U.S. National Fire Protection Association (NFPA) 130: Standard for Fixed Guideway Transit and Passenger Rail Systems. For NFPA evacuation requirements, Ultra passengers may exit the front of the vehicle and safely walk on the guideway. Safety rails are attached to the guideway, primarily for safety of maintenance personnel, but the rails also serve to ensure safety of evacuating passengers.

Note on Guideway Emergency Evacuation

UK strategy for emergency evacuation of the PRT guideway uses the guideway as the pathway for passenger evacuation on elevated and at grade sections of the guideway. The case for this approach considers the following:

- PRT stations are typically 500m to 1000m apart and provide good controlled emergency access to the guideway and egress for passengers
- The guideways are 'one way' so a failure of a vehicle on the guideway will result in vehicles ahead completing their journey unhindered and those behind stopping behind the failed vehicle. All new journey requests are automatically held. Within a short time there will be no vehicle movements on the guideway.
- All the guideways are fenced and provide a good walking surface.
- Normal emergency procedures are to request that passengers remain in the failed vehicle until the emergency services arrive to escort them to the nearest exit from the system, normally a station.
- Only in the event of an emergency that demands evacuation of the vehicle (e.g. a fire or smoke within the vehicle) would the passengers be instructed to exit via the emergency exit hatch at the front of the vehicle (shown in photo)
- Operation of the emergency escape hatch automatically triggers the vehicle's safety relay cutting all power to the traction system (the vehicle cannot restart without a technician resetting the relay) and automatically flags the open emergency hatch to the Controller.

- Controllers have CCTV images of the interior of the vehicle and are in audio contact with the passengers as soon as the vehicle starts to slow (i.e. starts to fall behind schedule). They are therefore in a position to provide instruction, dependent upon the nature of the emergency, and to keep the passengers calm.
- Should it be essential for the passengers to vacate the vehicle they will be instructed to disembark through the emergency exit and wait on the guideway until Ultra control room staff or emergency rescue services arrive to escort passengers off the guideway. In the case of mechanical failure, Ultra staff will handle the situation directly without calling emergency services.
- CCTV coverage of the guideway allows the Controller to monitor the situation and if required to advise the emergency/rescue services on the developing incident.



Figure 1: Front of Vehicle Escape Hatch

Comparison with Automated People Movers (APM)

Smaller vehicles allow for smaller maintenance facilities and reduced spares storage space. Regular inspection and maintenance of a few vehicles at a time allows for fewer technicians and better utilization of personnel. Off-the-shelf automotive components are cheaper to replace and require less specialized maintenance equipment.

Because of low column loadings, Ultra guideway is simple and slender. Heavy APMs require massive guideway and columns. Therefore Ultra guideway maintenance requires less time, fewer personnel, and cheaper materials and maintenance equipment.

The level of automation provided by the Ultra system allows for a reduced operator work load, resulting in the need for fewer operators. Automatic control and management of vehicle operations with respect to demand levels ensures that the system uses energy to move passengers in the most economical way. Computerized demand management systems ensure that operational planning is matched with expected demand levels, feeding performance data back into the system to provide continual improvements to service levels and customer experience. These factors all contribute to significant savings in O&M compared to APMs.