

**For discussion
on 18 June 2021**

Legislative Council Panel on Transport

Upgrading of Passenger Ancillary Facilities and Application of Technology on Public Light Buses

PURPOSE

This paper reports to Members the latest development in the upgrading of passenger ancillary facilities and the application of technology on public light buses (“PLBs”).

BACKGROUND

2. Within the public transport system in Hong Kong, the role of PLBs is to provide supplementary feeder service, and to serve areas with relatively lower passenger demand or where the use of high-capacity transport modes is not suitable. There are two types of PLBs, namely green minibus (“GMB”) and red minibus (“RMB”). GMBs operate scheduled services with their routes, fares, vehicle allocation and timetable subject to approval by the Transport Department (“TD”). On the other hand, RMBs are not required to operate on fixed routes¹ or timetable, and can set their own fares.

3. The Government has been maintaining a cap on the number of PLBs. Since 1976, the number of PLBs has been capped at 4 350 by notice in the Gazette. Over the years, the Legislative Council (“LegCo”) has agreed to maintain and extend the effective period of such statutory cap. The LegCo resolved in May 2017 to extend the effective period of the cap on the number of PLBs as specified in the Road Traffic (Public Light Buses: Limit on Number) Notice (Cap. 374X) for another five years until June 2022. As of April 2021, among the 4 350 PLBs, around 3 340 were GMBs providing approximately 600 fixed route services, while the remaining 1 010 were RMBs. In the past five years, the average daily patronage of PLBs was

¹ Under the existing policy, taking into account the road congestion problem in Hong Kong and the objective of encouraging the conversion of RMBs into GMBs, TD has imposed certain restrictions on RMB operation. For example, RMBs can operate in their existing service area but are not allowed to access new towns or new housing developments. They are also subject to restrictions when using expressways.

around 1.7 million, accounting for about 14% of all trips made on public transport each day.

4. In 2017, as the GMB service was not able to meet the passenger demand during the busiest hours, the Government increased the maximum seating capacity of light buses to 19 seats through the Road Traffic (Amendment) Ordinance 2017 in order to improve the demand and supply situation for PLB service, while maintaining the delicate balance amongst various public transport services. PLB operators may take into account the operational conditions and passenger demand in deciding on their own whether to increase the seating capacity, the exact number of seats to be added, as well as the time of implementation. As of April 2021, there were a total of 1 569 19-seat PLBs in Hong Kong, among which 1 376 were GMBs and 193 were RMBs.

5. In addition, to promote the policy objective on green and barrier-free transport, the Government relaxed the length and maximum gross vehicle weight restriction of light buses to 7.5 metres and 8.5 tonnes respectively through the Road Traffic (Construction and Maintenance of Vehicles) (Amendment) Regulation 2020 last year, with a view to introducing light bus models with more environmental benefits and/or barrier-free facilities into Hong Kong, thus allowing more choices for the trades. The relevant requirements took effect on 5 July 2020. At the same time, we are preparing for the legislative amendments to allow light buses to use driver's door, emergency window and escape hatch altogether as an alternative means of emergency exits in addition to emergency door, where safety level and standard is equally upheld. The amendment is expected to take effect within this year.

UPGRADING OF PASSENGER ANCILLARY FACILITIES AND APPLICATION OF TECHNOLOGY ON PUBLIC LIGHT BUSES

6. With the advancement in automobile technology, the design of light buses has become more flexible and practical. The Government has been keeping in view the latest technological development while being accommodative in policies to enable the design of light buses, passenger ancillary facilities and technology application in Hong Kong to keep abreast with times and meet the actual needs of the society and the trade so as to enhance the quality of PLB service and ensure the safety of passengers.

Upgrading of passenger ancillary facilities on PLBs

(a) GMB real-time arrival information

7. To promote the opening-up of the operating data by public transport operators to facilitate commuting of the passengers, the Chief Executive promulgated in the 2018 Policy Address that the Government would fund a data collection system and install location detection devices on all GMBs to enable passengers to access the real-time arrival information of GMBs through TD's mobile application "HKeMobility". The relevant data is also released in machine-readable format for free public use via "DATA.GOV.HK". Furthermore, GMB operators may utilise the relevant data for fleet management so as to enhance their operational efficiency, while the Government may also make use of the data for traffic management, transport planning and complaint handling purposes.

8. In late 2020, TD first conducted a test-launch of the GMB Real-time Arrival Information System ("the System") on three Hong Kong Island GMB routes (Nos. 69, 69A and 69X). TD then further disseminated the real-time arrival information of another 72 GMB routes in March 2021. Passengers can check the estimated time of arrival of the next three GMBs in three simple steps (i.e. select "Green Minibus" at the "HKeMobility" mobile application, then input the route number and choose the stop) (see [Annex 1](#)). TD will continue to closely monitor the operation of the System, and liaise with the trade on details of the phased implementation of the System for the remaining GMB routes with a view to covering all GMB routes by 2022.

(b) Low-floor wheelchair accessible PLB

9. To promote the concept of "Transport for All", the Government introduced the Low-floor Wheelchair Accessible PLB Trial Scheme ("the Trial Scheme") in January 2018, and has deployed such PLBs to two GMB hospital routes respectively [i.e. Hong Kong Island Route No. 54M (Kennedy Town – Queen Mary Hospital) and New Territories Route No. 808 (Kam Ying Court – Prince of Wales Hospital)] for trial by phases since the first and second quarter of the same year.

10. TD has reviewed the effectiveness and performance of the two low-floor wheelchair accessible PLBs under the Trial Scheme. The review assessed the operational efficiency of the relevant light bus model, financial implication of the Trial Scheme on the relevant routes, repair and maintenance situation, views of operators and passengers, etc. The preliminary outcome of the review showed that both the public and trade

agreed that in view of the aging population and to promote the “Transport for All” concept, there was indeed a need for wider application of the low-floor and/or wheelchair accessible PLB. However, we also understand that the GMB operators encountered various operational issues during the Trial Scheme. For instance, the journey time was extended or unstable as compared with other GMBs of the same route in order to accommodate the boarding and alighting of wheelchair passengers, and the operational expenditure and repair and maintenance cost was higher for the new light bus model, etc.

11. Based on the above preliminary outcome, TD will work with the vehicle manufacturers further to identify appropriate vehicle models, and consult stakeholders on how to implement and promote the “Transport for All” concept in PLBs, thereby formulating the future development and way forward for the relevant PLB service.

12. While taking forward the above Trial Scheme, TD has received requests from the public urging the Government to expedite the promotion of low-floor wheelchair accessible PLBs on hospital routes. Thus, starting from August 2018, TD has required the operators running new hospital routes to undertake to deploy one low-floor wheelchair accessible PLB within one year of operating the relevant routes. As such, the operator of New Territories GMB Route No. 413 (Tsing Yi Public Pier – Princess Margaret Hospital) deployed one low-floor wheelchair accessible PLB in running the route in late February 2021; while the operator of another group of routes involving Kowloon GMB Route No. 90A [Yau Tong (Yau Lei Estate) – Hong Kong Children’s Hospital] and No. 90B (Sau Mau Ping – Hong Kong Children’s Hospital) will deploy one relevant PLB to run the group of routes by September 2021. In addition, the operator of the new GMB route plying between Queen’s Hill and North District Hospital (expected to commence operation from the third quarter of 2021) undertook to deploy one low-floor wheelchair PLB running the route within one year of operation.

Enhancing the application of technology on PLBs

(a) Passenger Safety

13. The Government has been placing high emphasis on passenger safety of PLBs. TD is open-minded about any innovative technologies that could effectively improve road and driving safety, and welcomes vehicle manufacturers to introduce new driver assistance systems for such purpose for all classes of vehicles. TD will continue to closely monitor the

development and application of technology in the automotive industry worldwide, and wherever relevant technology is widely applicable for commercial vehicles, TD will introduce such technological requirement as appropriate to enhance the standard of vehicle safety.

14. To facilitate passengers' commuting and enhance their awareness of wearing seat belts, TD launched the technical study in 2020 on seat occupancy and seat belt fastening detection for GMBs to test the applicable technical solutions. Since late September 2020, TD has been conducting the proof-of-concept on-site trial ("POC Trial") of technical solutions by phases on eight GMB routes, for example to test the effectiveness of the pressure-sensitive switch and infrared sensor in seat occupancy detection, and the performance of various magnetic sensors in detecting seat-belt fastening by passengers, etc. Furthermore, through the POC Trial, TD will also explore and review the effectiveness of different ways of reminding passengers to buckle up, including the installation of light signals above passengers seats, and display screens adjacent to the driver's seat and/or passenger entrance, and setting audio alarm system, such that when the seat belt of an occupied seat is not fastened, the audio devices will alert the passenger through emitting sounds or broadcasting reminders. The technical study is expected to complete by the third quarter of 2021. TD and the technical specialist will analyse the data collected from the POC Trial, and further consider applying such technical solutions to GMBs, subject to the outcome of the technical study, impact of applying the relevant technology on GMB operations and passenger feedback. Details and illustration of the technical study are at [Annex 2](#).

(b) Electronic Payment System

15. With the advent of new technologies, different electronic payment systems have become increasingly common in Hong Kong. The Government welcomes the introduction of new technology to facilitate passengers in paying transport fares. At the same time, the Government would need to ensure that apart from complying with the requirements under the laws of Hong Kong for operating the electronic payment systems, such systems would also have to be reliable, user-friendly, and would not cause disruption to the operation of public transport. According to the 2019 PLB Market Usage Survey, more than 82% of PLBs in Hong Kong offer Octopus payment method, and as of April 2021, QR-code payment system was introduced by operators of 91 GMB routes (with a total of 492 GMBs). The Government will continue to maintain close liaison with the trade, and encourage public transport operators to introduce new electronic payment systems, in order to provide, besides cash or Octopus, other reliable, easy-

to-use and highly efficient options for paying transport fares, with a view to facilitating and benefiting the general public.

CONCLUSION

16. Members are invited to note the aforementioned in respect of the upgrading of the passenger ancillary facilities and the application of technology on PLBs.

**Transport and Housing Bureau
Transport Department
June 2021**

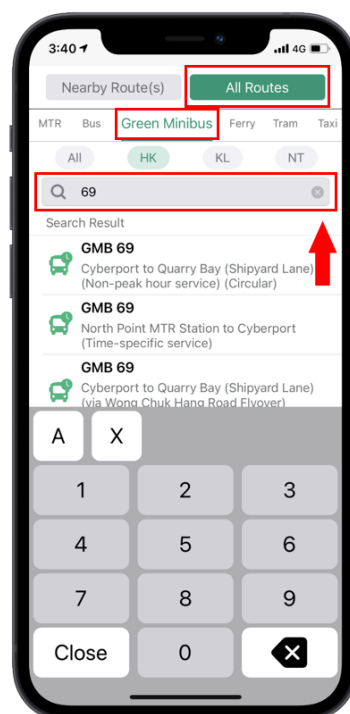
Checking the Real-time Arrival Information of Green Minibuses

Passengers can check the estimated time of arrival of the next three green minibuses (“GMBs”) through the Transport Department’s mobile application “HKeMobility” in just three steps:

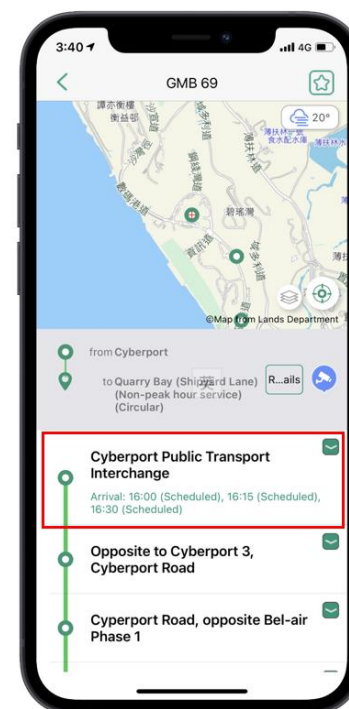
Step One:
Click “Public Transport”



Step Two:
Select “All routes” and “Green Minibus”, and input the GMB route number



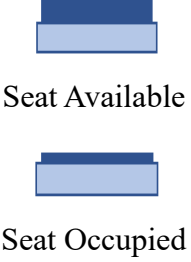



Step Three:
Click a specific GMB stop to show the estimated arrival time



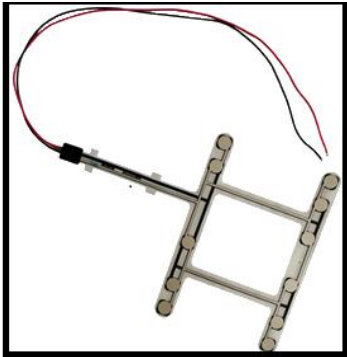



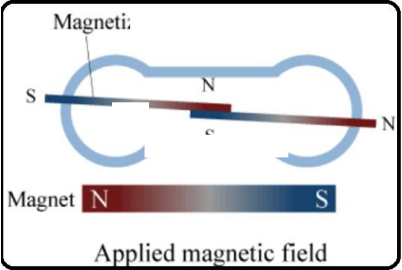

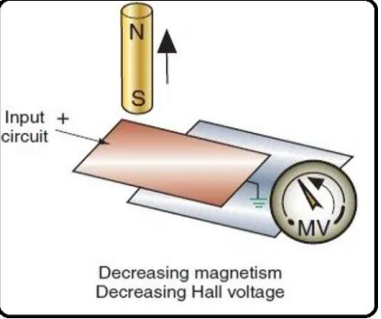

Technical Study on Seat Occupancy and Seat Belt Fastening Detection for Green Minibuses

Technical Solutions

In the proof-of-concept on-site trial (“POC Trial”), the Transport Department (“TD”) will test the effectiveness of the pressure-sensitive switch and infrared sensor for occupancy detection, and the performance of the reed switch and hall effect sensor for passenger seat belt fastening detection.


Seat occupancy detection			Seat belt fastening detection		
Solution	Name of technical solution	Illustration	Solution	Name of technical solution	Illustration
1	Pressure-sensitive switch		1	Reed switch	
2	Infrared sensor		2	Hall effect sensor	

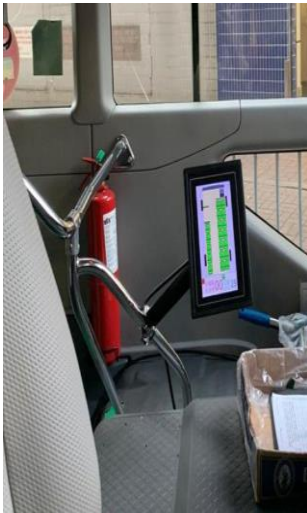
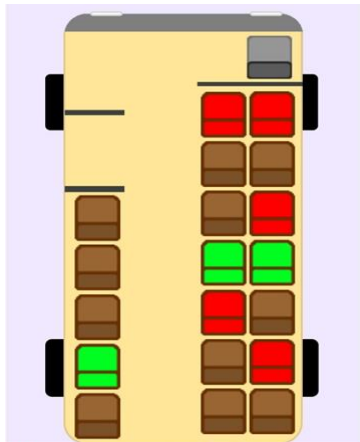

Position of Installation

Seat occupancy detection		Seat belt fastening detection	
 	 	 	 
<p>Pressure-sensitive switch shall be placed on the seat to detect any change of pressure on its surface.</p>	<p>Infrared sensor shall be placed between the back and seat of the chair. The transmitter will transmit an infrared wave which will be reflected back to the receiver once it hits an object.</p>	<p>Reed switch shall be fixed on seat belt buckle to detect if the magnet fixed on the tongue of seat belt is in close proximity to the reed switch (i.e. seat belt is fastened).</p>	<p>Hall effect sensor shall be fixed on seat belt buckle to detect the voltage difference produced when the magnet fixed on the tongue of the seat belt is approaching / leaving the sensor.</p>

Display methods and audio device

With the detected seat occupancy and seat belt fastening status, the information can be disseminated in the respective GMBs. TD will explore and review the effectiveness of the following different display methods in the POC Trial, and will test the audio device or in-vehicle broadcast to remind passengers to wear the seat belt.

Display method	Details	
<p>(1) LED signal installed above passengers seats</p>	<div style="display: flex; justify-content: space-around; align-items: center;">    </div> <p>The LED signal shall display seat occupancy and seat belt fastening status of each seat.</p> <p>A green light signal will be displayed if a seat is not occupied. A red light signal will be displayed if a seat is occupied but the seat belt is not fastened. All light signals will be off if a seat is occupied with seat belt fastened.</p>	

Display method	Details	
(2) LCD screen installed adjacent to driver's seat (for driver's information)		
(3) LCD screen installed adjacent to passenger entrance (for passengers' information)	 <p data-bbox="373 836 730 990"> ■ 05 ■ 03 Seat belt not buckled Seat not occupied </p>	 <p data-bbox="1501 315 2005 613"> The LCD screen shows a GMB floor plan with individual seats indicated to show the seat occupancy and seat belt fastening status of each seat, with the total corresponding numbers presented. </p> <p data-bbox="1501 657 2005 998"> A green seat will be indicated if the seat is not occupied. A red seat will be indicated if the seat is occupied but the seat belt is not fastened. A brown seat will be indicated if the seat is occupied with the seat belt fastened. </p>