Challenge Statement Form

A. Challenge Statement/Title:

Alternative Vertical Mobility Solutions for Direct Access to Lifts at Multistorey Apartments

B. Background of the Problem:

With an ageing population in Singapore, there is a greater need for direct lift access. While the Lift Upgrading Programme (LUP) was introduced in 2001 to provide direct lift access, there remains about 140 blocks without direct lift access as it was not feasible to be offered under the LUP, due to the high cost per unit and/or technical constraints on-site. Thus, the Housing & Development Board (HDB) constantly looks out for alternative means to provide cost-effective direct access, whether via conventional lift solutions or other innovative solutions.

Till date, HDB had tested out vertical platform lifts and pneumatic vacuum elevators but found them not ideal for wider scale implementation due to space constraints within the existing buildings. HDB has also piloted the motorised stairclimbers but these solutions posed multiple challenges as follow:

a) Although it is technically feasible to use the stairclimbers within old HDB estates, it takes much effort to manoeuvre the device within such tight spaces.
b) The stairclimber needs an operator to work and the operator must be physically fit and cognitively alert, which means the solution is only applicable to households with non-elderly full-time caregivers or domestic helpers.
c) Storing a stairclimber can be a challenge within smaller HDB flats.
d) The numerous steps, the need to adjust many components and the need for proper alignment at various steps make the operation of a stairclimber complicated and time-consuming.
e) The stairclimber lacks automation.
f) A wheelchair with compatible dimensions must be used with the stairclimber.
g) The stairclimber may be heavy to operate.
h) The upfront cost of a stairclimber is generally too high for the average HDB resident household.
i) The experience of using the stairclimber can be scary for the passenger.
j) The use of the stairclimber may put the passenger at a great risk of serious injuries if not operated properly.
k) Operators may require multiple training sessions to learn how to operate the device properly.

C. Technical Requirements / Performance Criteria:

The proposed solution should be user-friendly and adhere to the following critical requirements by Singapore Civil Defence Force (SCDF) and Building and Construction Authority (BCA):

SCDF and BCA Compliance Requirements:

- No encroachment into escape path during operation, i.e. minimum 1m staircase width must be maintained for escape staircases;
- Minimum 2m headroom from landing floor; and
- Not introduce pipe/duct installations within the protected staircases

The above requirements are non-exhaustive and participants are to check the codes and standards of SCDF, BCA and/or any other relevant agencies for any other possible requirements. Besides agencies' requirements, the proposed solution should be as inclusive as possible, i.e., cater to all age demographics and users (e.g. wheelchair users, frail individuals, grocery carts, baby prams, etc.).

D. Conclusion

Multiple vertical mobility devices have been evaluated, but the devices either do not meet SCDF and BCA regulations or are not well received by users. A new, innovative, and cost-effective solution is required to ensure compliance and enhance daily accessibility for residents.