PART E – SECTION 1
AIRCRAFT DOCKING GUIDANCE SYSTEM

1. **Overview**

1.1 The aircraft docking guidance system (ADGS) is a proven product which operates with a high degree of safety, readability and operational efficiency. The docking system is installed at most of the frontal and remote stands at the Passenger Apron and at the West Cargo Apron to display to the pilot on a large LED board regarding aircraft type, azimuth guidance and distance-to-go information to position arriving aircraft accurately to the pre-set aircraft stop position in the parking stand. The docking system unit is installed for the main centreline of all frontal stands.

ADGS is also connected to Airport Operation Database (AODB) and Airport Collaborative Decision Making (ACDM) to provide front-end display of Time-of-day Clock, flight numbers, registration marks, port of origin and estimated times of departure.

1.2 The aircraft docking guidance system consists of:

- an LED board to display real time docking guidance information facing pilot;
- a microprocessor control unit;
- a laser scanning unit; and
- an operator control panel with pre-defined aircraft profiles and emergency button.
- a Stand Number Indicator (SNI)

1.3 The operation of the system is illustrated in the schematic at Appendix 1 of this Part.

2. **System Operation**

2.1 The docking system is activated by the operator control panel located at the marshalling platform or the gantry of the docking guidance system at the frontal stand. At NSC, the control panel is installed adjacent to the starboard side high mast floodlight of each parking stand. At the remote stands, the control panel is located at the gantry of the docking guidance system.

2.2 The aircraft docking guidance system operates according to the following sequence:

2.2.1 **Start of docking**

- ADGS self test begin when aircraft type was selected on control panel. “WAIT” will be on display.
2.2.2 Capture

- A floating arrow with the selected aircraft type will be on display which indicated the system has been activated and in capture status. The laser scanning unit will be automatically activated to scan the pre-defined docking area in the parking stand to detect and capture the arriving aircraft.

2.2.3 Tracking

- The floating arrow will be replaced by a yellow centre line indicator when the aircraft nose wheel position is about 80 metres from the stop position.
- Once the aircraft is captured, information of its lateral position relative to the stand centreline is displayed on the LED board together with indication on the direction of turn to guide the aircraft to the centreline.

2.2.4 Closing Rate

- The aircraft closing rate will be displayed with the distance-to-go information shown on the LED board commencing from 20 metres (shown per meter) and when the aircraft is less than 2 meters from its stopping position, the closing rate display will be shown per 0.5 meter while the aircraft is less than 5 meters away from the designated stopping position and 0.1 meter at the last 2 meters. (20 meters – count per 1 meter, 5 meters – count per 0.5 meter and the last 2 meters – count per 0.1 meter)

2.2.5 Stop Position Reached

- A red “STOP” will be displayed on the LED board once the correct stop position is reached.

2.2.6 Docking Completed

- A yellow “OK” will be displayed on the LED board.
3. **LED Board Display Information**

3.1 **Wait**

The display of “WAIT” indicates proper activation of the unit and correct functioning of the system.

3.2 **Activation**

The display of a set of “floating” arrow heads indicates proper activation of the unit and in capture mode.

3.3 **Aircraft Type**

The aircraft type is displayed in large alphanumeric characters (e.g. A350) on the upper part of the LED board.

3.4 **Azimuth Guidance Indicator**

- The azimuth guidance display consists of a yellow arrow “ ↑ ” to represent the aircraft nose wheel and a yellow LED centreline symbol “ T ”.

- The yellow arrow is displaced to the left side or the right side in relation to the centreline “ T ”.

- A flashing red arrow head symbol “ > ” on either side of the “ T ” centreline symbol indicates the direction of turn to bring the aircraft to the centerline.

3.5 **Distance-to-go Indicator**

- Display of distance-to-go information commences when the aircraft position is tracked at 20 metres away from the stop position. The closing rate indications consist of:
  - gradual shortening of the “ T ” centreline symbol when the aircraft is 20 metres away from the stop position; and
  - distance (in metre) of the aircraft nose wheel from the stop position, displayed below the aircraft type on the LED board. The display of closing rate are as follow:
    - 20m to 5m from stop position shown at 1m interval
    - 5m to 2m from stop position shown at 0.5m interval
    - 2m to stop position shown at 0.1m interval
### 3.6 Stop Position Indicator

The STOP information indicates the exact location of the aircraft nose wheel from the stop bar marking on the ground.

<table>
<thead>
<tr>
<th>Aircraft Location</th>
<th>Indication</th>
<th>Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) The aircraft reaches its correct stop position</td>
<td>“STOP” and red LED lights will be lit.</td>
<td><img src="image" alt="STOP" /></td>
</tr>
<tr>
<td>(2) The aircraft stops within the acceptable tolerance stop position</td>
<td>“OK”</td>
<td><img src="image" alt="OK" /></td>
</tr>
<tr>
<td>(3) The aircraft over-shoot the stop position</td>
<td>“TOO FAR”</td>
<td><img src="image" alt="TOO_FAR" /></td>
</tr>
<tr>
<td>(4) The aircraft under-shoot the stop position and stay for 20 seconds within 1m</td>
<td>“STOP OK”</td>
<td><img src="image" alt="STOP_OK" /></td>
</tr>
<tr>
<td>Aircraft Location</td>
<td>Indication</td>
<td>Display</td>
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<tr>
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</tr>
<tr>
<td>(5) The laser scanning unit of the ADGS system is obstructed by foreign object within 2.5m</td>
<td>“WAIT VIEW BLOCK”</td>
<td><img src="image1" alt="Display Image" /></td>
</tr>
<tr>
<td>(6) The laser scanning unit of the ADGS detected there is obstruction between 2.5m away from the ADGS scanning unit and the aircraft nose wheel</td>
<td>“WAIT GATE BLOCK”</td>
<td><img src="image2" alt="Display Image" /></td>
</tr>
<tr>
<td>(7) The laser scanning unit detects that the approaching aircraft type does not match the selected profile in the last 15 meters away from the stop position</td>
<td>“STOP ID FAIL”</td>
<td><img src="image3" alt="Display Image" /></td>
</tr>
</tbody>
</table>
4. **Pilot Procedures**

4.1 Except for the ADGS at North Satellite Concourse, the relevant flight information and the aircraft profile will be shown on the operation panel and the LED display. At 15 minutes before the Estimated Time of Arrival (ETA), the arrival flight information including flight number, registration mark, port of origin and the ETA will be displayed when the ADGS is activated. For flight departure, flight number, registration mark and Target Off Block Time (TOBT) will be shown 40 minutes prior to TOBT.

4.2 In case the docking system is not available, pilots should follow the signal of the marshaller.

4.3 Pilots must not enter the parking stand and should seek assistance from GMC if the marshaller is not present.

4.4 Check aircraft type displayed is correct.

4.5 Pilots are advised to maintain the aircraft taxiing speed at 3m per second (6 knots) throughout the entire aircraft docking.

4.6 Follow the taxilane lead-in ground marking to initiate the turn into the parking stand. The docking system will capture the aircraft about 20 meters from the centreline. Follow the azimuth guidance on LED Board which shows the relative position of the aircraft (†) from the centreline (T). A flashing red arrow (>) on the LED Board indicates the direction of turn to align the aircraft nose wheel with the centreline of the parking stand.

4.7 Aircraft type and “T” centerline symbol will be shown on the LED display when the aircraft is recognized by ADGS. When the aircraft is 20 meters away from the stop position, distance-to-go information and gradual shortening of “T” centerline symbol will be displayed until the docking activities are completed. Slow down the aircraft speed to halt at the “STOP” position.

4.8 When the aircraft nose wheel reaches the correct STOP position, distance-to-go reading reaches zero and the “STOP” signal and red lights are displayed on the LED board halt the aircraft from any further movement.

4.9 The “STOP” will change to an “OK” signal on the LED Board to indicate the aircraft is correctly parked. If the aircraft has overshot the STOP position, “TOO FAR” signal will be displayed on the LED Board.
5. **Operator Procedures**

Details of the operator procedures are described in Para.3 of Part D, Section 3.

6. **Authorization of Use**

The aircraft docking guidance system shall be operated only by personnel trained and authorized by the Airport Authority (AA).

7. **Fault Reporting**

7.1 Upon detecting any irregularity on the calibration of the aircraft docking guidance system during aircraft pre-arrival inspection:

   7.1.1 The Operation Officer, Airfield shall immediately report to IAC-ACC. IAC-ACC will reassign the aircraft to another stand or arrange for aircraft marshalling to be performed by Operation Officer, Airfield.

   7.1.2 IAC-ACC should liaise with Ground Movement Control (GMC) to inform the pilot to follow marshaller signals.

   7.1.3 IAC-ACC will report the fault to FRTMO for recovery. In order to retrieve the electronic data from the ADGS unit for fault investigation, the particular system to be suspended until maintenance is completed and calibration is conducted with satisfactory result.

7.2 Malfunction / Irregularities of the system occurring during aircraft docking:

   7.2.1 The Operation Officer, Airfield should immediately activate the Emergency Stop button located at the control panel and inform IAC-ACC.

   7.2.2 IAC-ACC should liaise with Ground Movement Control (GMC) to inform the pilot to follow marshaller signals.

   7.2.3 IAC-ACC should report the fault to AA Fault Response Team (FRT).

   7.2.4 The Airfield Duty Manager or his delegate is responsible to coordinate with FRT to identify the cause of the fault and to arrange for urgent repair. In order to retrieve the electronic data from the aircraft docking guidance system for fault investigation, the faulty system shall not be used until the necessary data is secured by FRT because the data will be erased in the next parking.

   7.2.5 When assigning aircraft to a parking stand where the aircraft docking guidance system has been withdrawn from operation, IAC-ACC should make sure that an Operation Officer, Airfield is assigned to provide marshalling service to the arriving aircraft.