Dock-Stands LSZH

Aircraft Docking Guidance System „ Safedock"

1.   System description

The system is based on a laser scanning technique which tracks the lateral and longitudinal position of the aircraft.
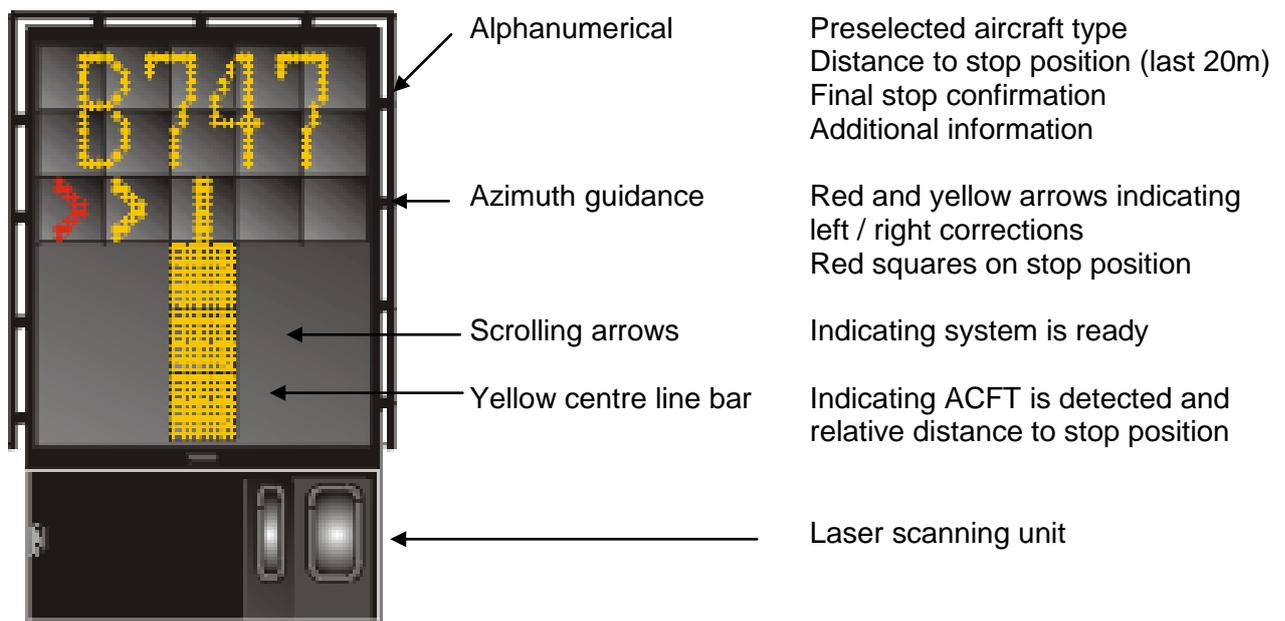The system will recognise the incoming aircraft and check it against the one selected by the operator.
The system is operated on a Automatic Mode.
If the system fails, the aircraft must be positioned by a Marshaller.

Azimuth guidance, continuous closing rate information, aircraft type etc. are shown on a single display visible for pilot and co-pilot.

Display and Laser Scanning Unit are mounted on the terminal in front of the aircraft stand.

Alphanumerical	Preselected aircraft type Distance to stop position (last 20m) Final stop confirmation Additional information	
Azimuth guidance	Red and yellow arrows indicating left / right corrections Red squares on stop position	
Scrolling arrows	Indicating system is ready	
Yellow centre line bar	Indicating ACFT is detected and relative distance to stop position	
Laser scanning unit		

2. Docking procedure

Start Up-Mode The system is started by APRON CONTROL, selecting the appropriate aircraft type on the Operator Panel. **WAIT** will be displayed together with red stop light squares during the system start-up phase.	
Capture-Mode The floating arrows indicate that the system is activated and in capture mode, searching for an approaching aircraft. • Check for correct aircraft type on display. (ICAO Designator) • Follow the lead-in line. • Do not proceed beyond the bridge unless the floating arrows have been superseded by the yellow centre line bar.	
Tracking-Mode / Azimuth guidance Caught by the laser, the floating arrow is replaced by the yellow centre line bar. The flashing red arrow indicates the direction to turn. The yellow arrow shows position in relation to the centre line. This indicator gives relative position to the centerline and azimuth guidance. The absence of any direction arrow indicates the aircraft is on centre line.	

Closing Rate Display of digital countdown will start when the aircraft is 20 metres before stop position. When the aircraft is less than 12 metres before the stop position, the closing rate is indicated by turning off one row of the yellow centre line bar per 0.5 metres covered by the aircraft.	
Stop position reached When the correct stop-position is reached, the display will show **STOP** together with red stop light squares.	
Docking completed When the aircraft has parked, **OK** will be displayed.	
Bad weather condition During heavy fog, rain or snow, the visibility for the docking system can be reduced. When the system is activated and in capture mode, the display will show the floating arrows and display **SLOW** and the **Aircraft Type**. As soon as the system detects the approaching aircraft, the yellow centre line bar will appear. • Do not taxi beyond the bridge, unless the display shows the yellow centre line bar	

3. Fault messages and safety procedures

Taxi speed too fast If the aircraft is approaching too fast for the system, **SLOW / DOWN** will alternately be displayed. • Taxi slow	
Detection lost during docking If the detected aircraft is lost during docking, the display will show **WAIT** together with red stop light squares. • Hold position The docking will continue as soon as the system detects the aircraft again.	
Stop too far If the aircraft has overshot the stop-position, **TOO FAR** will be displayed. • Request a Marshaller to check aircraft position	
Stop too short If the aircraft is found to be at a standstill a short distance from the stop position, the docking procedure will end with a **STOP OK** message together with red stop light squares. • Keep engines running • Request a Marshaller to check aircraft position	

Aircraft verification failure If aircraft verification is not made 12 meters before the stop-position, the display will alternately show **STOP, ID** and **FAIL** together with red stop light squares. • Keep engines running • Request a Marshaller	
Gate blocked If an object is found blocking the view from the DGS to the planned stop position for the aircraft, the docking procedure will be halted with a **GATE / BLOCK** message. The docking procedure will resume as soon as the blocking object has been removed. • Do not taxi beyond the bridge, unless the **WAIT** message has been superseded by the yellow closing rate bar	

View Blocked If the view towards the approaching aircraft is hindered, for instance by dirt on the window, the DGS will report a **VIEW / BLOCK** condition. Once the system is able to see the aircraft, the message will be replaced with a closing rate display • Do not taxi beyond the bridge, unless the **WAIT** message has been superseded by the yellow closing rate bar	
SBU-stop Any unrecoverable error during the docking procedure will generate a **S**afety **B**ack **U**P (SBU) condition. The display will alternately show **STOP / SBU** together with red stop light squares. • Keep engines running • Request a Marshaller	
Too fast If the aircraft approaches with a speed higher than the docking system can handle, the message **STOP** and **TOO / FAST** will be displayed together with red stop light squares. The docking system must be re-started or the docking procedure completed by manual guidance. • Keep engines running • Request a Marshaller	

Error If a system error occurs, the message **ERROR** is displayed with a code, together with red stop light squares. The code is used for maintenance purposes. • Keep engines running • Request a Marshaller	
System failure In case of a severe system failure, the display will go black, except for the red stop light squares. • Keep engines running • Request a Marshaller	
Power failure In case of a power failure, the display will be completely black. • Keep engines running • Request a Marshaller	

4.   Departure Information

Around 30-40 minutes before departure, the system displays the **IATA flight number** and the foreseen **T**arget **O**ff **B**lock **T**ime **TOBT** (CDM approach for handling staff and flight deck crew).
The time is shown in UTC and indicated with the letter z.

As soon as the ATC clearance is given, the display shows the **ICAO flight number**, the **T**arget **S**tartup **A**pproval **T**ime **TSAT** and the **T**arget **T**ake **O**ff **T**ime **TTOT**. These information's, however, may change during the display period due to re-planning of the sequence.