

CLAIMS

1. An airport stand arrangement (100) comprising:
 - a remote sensing system (110) configured to detect an aircraft (10)
 - 5 within a sensing area (112), wherein said sensing area (112) includes a stand area (140) of a stand (20), and
 - a controller (120) configured to:
 - determine, based on sensor data (111) received from said
 - remote sensing system (110), one or more estimated exterior surface
 - 10 positions (150a') on the aircraft (10), wherein each estimated exterior surface position is an estimated position of an associated real exterior surface position (150a) on the aircraft (10), wherein said real exterior surface position (150a) defines a limit of an extension of said aircraft in the sensing area (112),
 - 15 compare said one or more estimated exterior surface positions (150a') with one or more coordinates of the stand area (140) to determine if at least one from said one or more estimated exterior surface positions (150a') is outside of said stand area (140), and
 - in response to at least one from said one or more estimated
 - 20 exterior surface positions (150a') being determined to be outside of said stand area (140):
 - output an aircraft parking alert signal (195).
2. The airport stand arrangement (100) according to claim 1, wherein
- 25 said one or more estimated exterior surface positions on the aircraft comprises an estimated exterior surface position (150'a) of a tail portion (10a) of the aircraft.
3. The airport stand arrangement (100) according to claim 1 or 2,
- 30 wherein said remote sensing system (110) includes one or more from: a radar-based system, a laser-based system, and an imaging system.

4. The airport stand arrangement (100) according to any one of claim 1 to 3, wherein the airport stand arrangement further comprises a display (130), and

wherein the airport stand arrangement (100) is further configured,
5 based on data from said remote sensing system (110), to detect and track the aircraft (10) for parking at a parking position (160) within said stand area (140), and configured, based on said detection and tracking of the aircraft (10), to provide pilot maneuvering guidance information on said display (130) for aiding a pilot of the aircraft (10) in maneuvering the aircraft towards said
10 parking position (160).

5. The airport stand arrangement (100) according to any one of claim 1 to 4, wherein the controller (120) being configured to determine one or more estimated exterior surface positions (150') on the aircraft, comprises:

15 the controller being configured to:

- identify one or more characteristic features (170a-c) of the aircraft (10),
- determine, for each characteristic feature of said one or more characteristic features (170a-c), a respective characteristic
20 feature position, so as to define, on the aircraft (10), one or more characteristic feature positions (172a-c),
- receive aircraft dimension data (190;190') pertaining to the aircraft (10), or to an aircraft (10') which is expected to arrive at the stand (20), and
- 25 - calculate said one or more estimated exterior surface positions (150a') on the aircraft (10) based on said one or more characteristic feature positions (172a-c) and said aircraft dimension data (190;190').

30 6. The airport stand arrangement (100) according to claim 5, wherein a specific characteristic feature of said one or more characteristic features of the aircraft is a nose portion (170a) of the aircraft,

wherein a respective characteristic feature position of said specific characteristic feature is a position (172a) of said nose portion (170a) of the aircraft, and

wherein said one or more estimated exterior surface positions on the
5 aircraft comprises an estimated exterior surface position (150'a) of a tail portion (10a) of the aircraft.

7. The airport stand arrangement (100) according to claim 6,
wherein said received aircraft dimension data (190;190') includes a
10 length (L) of the aircraft (10), and
wherein the controller (120) is being configured to calculate said estimated exterior surface position (150a') on the tail portion (10a) of the aircraft (10) by adding said length (L) of the aircraft to said position (172a) of the nose portion (170a) of the aircraft in a direction out from said position
15 (172a) of the nose portion (170a) being parallel to an estimated direction (12') of a longitudinal extension of the aircraft.

8. The airport stand arrangement (200) according to any one of claim 5
to 7,
20 wherein said one or more characteristic features of the aircraft comprises two or more characteristic features of the aircraft (270a-c), and
wherein said one or more characteristic feature positions comprises two or more characteristic feature positions (272a-c).

25 9. The airport stand arrangement (200) according to claim 7, wherein said estimated direction (22') of the longitudinal extension of the aircraft is calculated based on at least two from said two or more characteristic feature positions (272a-c).

30 10. The airport stand arrangement (200) according to claim 8, wherein the controller (220) being configured to determine one or more estimated exterior surface positions on the aircraft, comprises:
the controller being configured to:

compare said two or more characteristic feature positions (272a-c) with an aircraft dimension database (122) which includes aircraft dimension data for a plurality of aircraft types and/or models, and
in response to a match being found between said two or more
5 characteristic feature positions (272a-c) and specific aircraft dimension data (190;190') from the aircraft dimension data in the database (222):
determine said one or more estimated exterior surface positions (250a') on the aircraft (10) based on said two or more characteristic feature positions (172a-c) and said specific aircraft dimension data
10 (190;190').

11. The airport stand arrangement (100) according to any one of claim 1 to 10, wherein the controller (120) is further configured to:
in response to said one or more estimated exterior surface positions
15 (150a') being determined to be inside of said stand area:
output a stand area clearance signal (S).

12. The airport stand arrangement (100) according to any one of claim 1 to 11, wherein the controller (120) being configured to output the aircraft
20 parking alert signal (195), comprises:
the controller (120) being configured to transmit said aircraft parking alert signal to one or more from:
neighboring aircrafts in a vicinity of the sensing area,
an airport operational database,
25 ground control, and
receiving units carried by stand personnel.

13. A method implemented in an airport stand arrangement (100), wherein said stand arrangement (100) comprises a remote sensing system
30 (110) configured to detect the aircraft (10) within a sensing area (112), wherein said sensing area (112) includes said stand area (140) of a stand (20), said method comprising:

receiving, from the remote sensing system (110), sensor data (111) pertaining to an aircraft (10) detected within the sensing area (112),

determining, based on said received sensor data (111), one or more estimated exterior surface positions (150a') on the aircraft (10), wherein each
5 estimated exterior surface position is an estimated position of an associated real exterior surface position (150a) on the aircraft (10), wherein said real exterior surface position (150a) defines a limit of an extension of said aircraft in the sensing area (112),

comparing said one or more estimated exterior surface positions
10 (150a') with one or more coordinates of the stand area (140) to determine if at least one from said one or more estimated exterior surface positions (150a') is outside of said stand area (140), and

in response to at least one from said one or more estimated exterior surface positions (150a') being determined to be outside of said stand area
15 (140):

outputting an aircraft parking alert signal (A).

14. The method according to claim 13, wherein determining one or more estimated exterior surface positions on the aircraft comprises:

20 identifying one or more characteristic features (170a-c) of the aircraft, determining, for each characteristic feature of said one or more characteristic features (170a-c), a respective characteristic feature position, so as to define, on the aircraft, one or more characteristic feature positions (172a-c),

25 receiving aircraft dimension data (190;190') pertaining to the aircraft (10), or to an aircraft (10') which is expected to arrive at the stand (20), and calculating said one or more estimated exterior surface positions (150a') on the aircraft (10) based on said one or more characteristic feature positions (172a-c) and said aircraft dimension data (190;190').

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15. The method according to claim 14,

wherein a specific characteristic feature of said one or more characteristic features of the aircraft is a nose portion (170a) of the aircraft,

wherein a respective characteristic feature position of said specific characteristic feature is a position (172a) of said nose portion (170a) of the aircraft,

wherein said one or more estimated exterior surface positions (150a'-
5 c') on the aircraft comprises an estimated exterior surface position (150a') of a tail portion (10a) of the aircraft,

wherein said received aircraft dimension data (190;190') includes a length (L) of the aircraft, and

wherein the step of calculating said one or more estimated exterior
10 surface positions on the aircraft comprises:

calculating said estimated exterior surface position (150a') on the tail
portion (10a) of the aircraft (10) by adding said length (L) of the aircraft to said
position (172a) of the nose portion (170a) of the aircraft in a direction out from
said position (172a) of the nose portion (170a) being parallel to an estimated
15 direction (12') of a longitudinal extension of the aircraft.

16. A computer-readable medium comprising computer code
instructions which when executed by a device having processing capability
are adapted to perform the method according to any one of claim 13 to 15.