INTERNATIONAL STANDARD

ISO 6702-1

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Aircraft — Requirements for on-board weight and balance systems —

Part 1: General

Aéronefs — Prescriptions pour les systèmes embarqués de masse et de centrage —
Partie 1: Généralités

INTERNATIONAL ISO

Reference number
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 6702-1 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Sub-Committee SC 9, *Air cargo and ground equipment*.

This first edition of ISO 6702-1 cancels and replaces ISO 6702:1984.

Three classes of systems have been designated:

— class I systems, with a very high level of confidence and of high accuracy;

— class II systems, with a high level of confidence and of lower accuracy;

— class III systems, with a high level of confidence, and measuring and displaying only the aircraft balance condition.

ISO 6702 consists of the following parts, under the general title *Aircraft — Requirements for on-board weight and balance systems*:

— *Part 1: General*

— *Part 2: Design, performance and interface characteristics*

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Aircraft — Requirements for on-board weight and balance systems —

Part 1:
General

Section 1: General

1.1 Scope

This part of ISO 6702 specifies requirements for the function, characteristics and installation of an on-board weight and balance system for use on civil transport aircraft.

It not intended to specify design methods, mechanisms or material to fulfil the requirements specified.

1.2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 6702. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 6702 are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 6702-2:1991, *Requirements for on-board weight and balance systems — Part 2: Design, performance and interface characteristics.*[1]

ISO 7137:1987, *Environmental conditions and test procedures for airborne equipment.*[2]

ARINC 429, *Mark 33 Digital Information Transfer Systems DITS*, Aeronautical Radio Inc. (USA), 1987.

1.3 General requirements

1.3.1 The basic on-board weight and balance system (OBWBS) shall provide a direct, accurate measurement and display of the actual aircraft weight and centre of gravity under ground static conditions. Optional functions may be included.

The system shall function independently of any system external to the aircraft, with the exception of ground electrical power when aircraft power is not available.

1.3.2 This part of ISO 6702 specifies requirements for three classes of aircraft on-board weight and balance systems.

a) Class I systems shall be of high accuracy and performance, with a very high level of confidence, and shall be capable of measuring and displaying both the aircraft weight and aircraft balance condition.

b) Class II systems shall have a high level of confidence, without meeting the accuracy requirements of class I systems, while being capable of measuring and displaying both the aircraft weight and aircraft balance condition.

1) *De facto* ARINC 737, *On-board Weight and Balance System*, Aeronautical Radio Inc. (USA), 1985.

2) Endorsement, in part, of the publication EUROCAE ED-14B/RTCA DO-160B (a document published jointly by the European Organisation for Civil Aviation Electronics and the Radio Technical Commission for Aeronautics).

c) Class III systems shall have a high level of confidence, without meeting the accuracy requirements of class I systems, while being capable of measuring and displaying only the aircraft balance condition.

1.3.3 "Level of confidence", in the context of this part of ISO 6702, is intended to mean the overall measurement validity resulting from the following factors:

— measurement accuracy;

— statistical interval of confidence;

— probability of undetected system failure at dispatch (including the effect of any built-in redundancies or duplications).

1.4 Purpose of weight and balance systems

1.4.1 Class I systems

The purpose of class I OBWBS is to provide at least as accurate weight and balance information as can be provided by established ground procedures and equipment for aircraft weight and balance systems.

1.4.2 Class II and class III systems

The purpose of class II and class III OBWBS is to provide a reliable means of detecting major errors in the weight and balance condition determined by ground procedures and equipment, before aircraft take-off. Class II and class III systems should not be used to meet the requirements of class I systems.

1.4.3 Level of confidence

The general objective for the overall level of confidence (see 1.3.3) shall be:

— 99,7 % min. for class I OBWBS (very high level of confidence);

— 95 % min. for class II or class III OBWBS (high level of confidence).

Section 2: Class I on-board weight and balance systems

2.1 System requirements

The system shall determine the actual aircraft weight and location of the centre of gravity, as follows.

2.1.1 Range of operation

2.1.1.1 Weights

The system shall determine and display the aircraft weight at least throughout a range from 10 % below aircraft tare weight to 15 % above the maximum taxi gross weight. An overflow indication shall be provided if calculated weight exceeds maximum displayable value.

2.1.1.2 Centre of gravity

The system shall determine and display the location of the centre of gravity throughout a system range determined as follows.

2.1.1.2.1 General

Determine the aircraft maximum centre of gravity range, expressed in percent of reference chord, using for example the mean aerodynamic chord (MAC) or equivalent, by subtracting the most forward limit from the most aft limit. Extend the most forward aircraft limit forward by 50 % of the aircraft range, or 20 % MAC forward of the forward design limit, whichever is further forward. Extend the most aft aircraft limit aft by 50 % of the aircraft range, or 20 % aft of the static aft tipping point, whichever is further aft.

2.1.1.2.2 Lateral centre of gravity

Where required for a specific aircraft usage, the system shall be capable of determining the location of the lateral centre of gravity of the aircraft within a symmetric envelope 10 % greater than the limits of aircraft certified lateral centre of gravity.

2.1.2 Mode of operation

The system shall determine the aircraft weight and the location of the centre of gravity in both the ground static mode and the taxiing mode and shall automatically compensate for the following factors.

2.1.2.1 Any combination of ramp slopes up to 3 % aircraft pitch and/or roll attitude changes up to 3° in excess of the established range of aircraft ground handling attitude excursion.

2.1.2.2 Aircraft brakes locked or released.

2.1.2.3 Landing gear steering set from zero to minimum turning radius.

2.1.2.4 Continuous aircraft brakes temperature variations from 20 °C above maximum temperature permitted for dispatch through cool down to ambient.

2.1.2.5 50 % variations of normal landing gear oleostrut pressure for any permissible degree of strut extension.

2.1.2.6 110 km/h (60 kt) wind, or aircraft maximum ground operations limit, whichever is lower, through an azimuth of 360°. The system shall provide steady weight and centre of gravity indications under wind gusts of up to at least 18 km/h (10 kt) differential. Manuel input of average wind and azimuth is acceptable.

2.1.2.7 Any combination of operating engines from zero to ground taxiing/or manœuvring thrust, over the aircraft's approved range of airport elevation.

2.1.2.8 Any effect of loading or unloading of the aircraft, or of transferring load or fuel on board.

2.1.2.9 Landing gear tilt hydraulic system on or off.

2.1.3 Accuracy

The system shall be capable of determining and displaying the actual aircraft weight and location of the centre of gravity to within ± 1 % of actual aircraft weight and ± 1 % of the reference chord (MAC or equivalent). If required, the location of the lateral centre of gravity shall be determined and displayed to within ± 3 % of the lateral centre of gravity range.

It shall be aimed to guarantee the above accuracy to within three standard deviations.

2.1.4 Response time

The system shall respond to a command to continuously display weight and the location of the centre of gravity within 1 min of the initial self-test.

2.1.5 System components

The system shall consist of the minimum components required to perform the functions specified in this part of ISO 6702. A typical system may comprise four subsystems, possibly duplicated, plus connecting lines or cabling: the display unit, the computer unit, the calibration unit and the sensors. No external equipment, ramps, stabilizers or temporary aircraft-to-ground supports shall be required.

2.1.5.1 Component description

2.1.5.1.1 Display unit

The display unit shall display a continuous digital readout of aircraft weight to the nearest 100 kg in four lighted digits of size 6,4 mm min. It shall display a continuous digital readout of the location of the centre of gravity to the nearest 0,1 % of the reference chord (MAC or equivalent) in three lighted digits of size 6,4 mm min.

The readout shall be visible under conditions of full sunlight to total darkness. Display unit lighting intensity shall be controlled by normal cockpit instrument lighting controls, unless individual controls are provided.

The display unit shall comprise all controls necessary to operate and self-test the system. If controls are required for in-flight adjustment, they shall be located on the display unit. The display unit shall provide separate indication when preset limits of weight and location of the centre of gravity are exceeded, or when the system is operating in degraded mode, if these options are exercised (see 2.2).

The display unit location, actuation and integration into flight deck controls shall comply with flight deck layout optimization requirements.

2.1.5.1.2 Computer unit

The computer unit shall perform the operations required by the system functions. The unit shall have provisions for signal outputs to additional remote display units and signal outputs when preset limits of weight and location of the centre of gravity are exceeded. The computer shall provide a malfunction warning indication at the display unit or through a centralized display system whenever a system failure occurs or the error on either aircraft weight or location of the centre of gravity exceeds preset limits. It shall include controls or provisions for malfunction troubleshooting. The unit shall have provisions for ARINC 429 outputs for use by external monitoring equipment such as AIDS (Airborne Integrated Data System).

It shall be possible to replace the computer unit without requiring system recalibration.

2.1.5.1.3 Sensors

The sensors shall dectect changes in aircraft weight and attitude and transmit them to the computer unit. Number, mounting and location of sensors shall be determined by the specific aircraft and system design. Devices designed to overcome landing gear system friction, if used, and attitude sensors shall be considered part of the sensor subsystem.

2.1.5.1.4 Calibration unit

All calibration data shall be stored in a calibration unit, which shall remain with the aircraft when other components are replaced, to preclude the need for recalibration. The calibration unit shall contain the controls necessary to adjust the system to read within the specified accuracy limits on a particular aircraft; they shall be protected against unauthorized or inadvertent use.

2.1.5.2 Component dimensions, compatibility and interface

The OBWBS components shall meet the dimensions, compatibility, interface and interchangeability requirements specified in ISO 6702-2.

2.1.5.3 Power supply

The system shall operate from aircraft electrical power, 115 V a.c. 400 Hz. The system shall also operate when the aircraft is powered from a ground power source, and shall continue to operate without interruption after normal system transients or power interruptions (for example, changeover from ground power to aircraft power).

2.1.5.4 Weight

System weight shall be minimized consistent with function, maintenance and reliability requirements. The design objective of the system weight, less connecting lines or cables, shall not exceed 22,7 kg.

2.1.6 Environmental and functional requirements

The system shall meet the requirements of ISO 7137, as follows.

2.1.6.1 All components within the pressurized fuselage shall meet the requirements of ISO 7137 for class A-2 equipment for temperature and altitude.

2.1.6.2 All other components shall meet the requirements of ISO 7137 for class D-2 and E-2 equipment for temperature and altitude.

2.1.6.3 All components shall meet the requirements of ISO 7137 for category B "Severe humidity" conditions.

2.1.6.4 All components shall meet all other requirements of ISO 7137 except that components within the pressurized fuselage are exempt from the "Waterproofness" and "Fluids susceptibility" requirements.

2.1.6.5 The system shall withstand an aircraft weight range from zero weight to 150 % greater than maximum taxi gross weight, without damage or loss of calibration. The sensors shall be capable of withstanding the stresses resulting from the maximum hard landing specified for a particular aircraft type without damage.

2.1.6.6 The system shall withstand a centre of gravity range 100 % greater than the aircraft ground operating centre of gravity range without damage or loss of calibration.

2.1.6.7 The sensors shall withstand, without damage or fatigue, the stresses and deflections of the landing gear during take-off, landing, taxiing, braking and loading operations for a period equal to 15 000 landing cycles or a predicted number of cycles compatible with 10 000 flight hours, whichever is the larger. The sensors shall be capable of withstanding at least 150 % of aircraft maximum taxi gross weight.

2.1.7 Maintainability and reliability

2.1.7.1 Construction

Standard parts, fittings and fasteners shall be used wherever possible.

2.1.7.2 Component replacement

No special tools shall be required to remove and replace system components, except that special tools may be required for the installation of sensor mounts. The replacement of system components shall require the minimum dismantling of other aircraft systems or components. It shall be a design objective to be able to replace any system component, adjust as required, and test the system within one hour. Sensor and sensor mounting design shall minimize the possibility of sensor damage during removal or replacement.

2.1.7.3 Malfunction troubleshooting

Self-test of the system shall be carried out by one person at the display unit. The computer shall be equipped with a test connector or controls for malfunction troubleshooting of its functions. The system design shall permit isolation and testing of individual sensors. The equipment shall be designed so that failure of the self-test feature cannot cause the system to malfunction.

2.1.7.4 Calibration

The system's components shall be designed so that calibration is not required at intervals of less than the equivalent of 10 000 flight hours.

2.1.7.5 Adjustment

The system shall be designed so that zero adjustments are automatically performed on each flight.

2.1.7.6 Operational reliability

The system shall be designed to have a minimum dispatch reliability of 99 % of operational flight departures, taking into account all detected system failures and degrade mode operation, if provided.

2.1.7.7 Interchangeability

All components shall be designed so that they can be interchanged with any identical component without adjustment. Components tailored for a particular aircraft type shall be interchangeable with similar components for other aircraft types with minimum adjustment of the system. There shall be no requirement for calibration or recalibration in either case.

2.2 Optional functions

The following options have been identified as potentially desirable additional functions to be individually specified and mutually agreed upon between manufacturer and user as required. Optional functions shall have no adverse effect on basic system functions, characteristics or installation.

2.2.1 In-flight weight and balance

The system should be able to accept inputs such as fuel flow, fuel quantity and fuel transfer monitors and angle of attack or pitch attitude from the navigation system and should be able to calculate and display in-flight weight and the location of the centre of gravity based upon the last static reading.

2.2.2 In-flight fuel usage planning

The system should be able to forecast the effect on aircraft weight and balance due to a proposed fuel usage or transfer schedule.

2.2.3 Remote displays

The system should provide remote display(s) of aircraft weight and balance.

2.2.4 Tail tip audible alarm

The system should provide a signal for an audible alarm to indicate a potential aircraft tail tip condition. In convertible or Combi cargo aircraft the same alarm signal should provide a resettable output signal to interrupt power to aircraft cargo-loading systems.

2.2.5 Flat tyre or strut indication

The system should provide an indication or method of sensing a flat aircraft strut or low tyre pressure.

2.2.6 Hard landing indication

The system should provide a resettable indication of any landing which experiences landing loads equal to or exceeding that specified as a hard landing for a particular aircraft.

2.2.7 Remote display of preset weight and balance limits

The system should indicate on remote display units when preset weight and balance limits are met or exceeded.

2.2.8 AIDS outputs

The system should provide signals to an AIDS or flight recorder. Signal values shall be in accordance with the requirements of a particular AIDS or flight recorder, but in any case shall be compatible with the relevant interface specifications.

2.2.9 Degrade mode

The degraded capability should be maintained within accuracy limits of 2 % of actual weight or MAC in the event of one or more sensors failing, by providing complementary replacement sensors. An equivalent degraded capability should be maintained in the event of one of any redundant or duplicated system components failing. Positive indication at the display unit that the system is operating in the degraded mode should be provided.

2.2.10 Printed display

The system should be capable of providing final weight and balance data to an on-board printer, or of transmitting this information to a remote printer through ACARS, AIRCOM or equivalent data transmission systems.

2.2.11 Lateral centre of gravity (if not a basic requirement)

The system should determine the lateral location of the centre of gravity of the aircraft within a symmetrical envelope 10 % greater than the aircraft certified limits of lateral location of the centre of gravity and should display the location of the lateral centre of gravity within 3 % of the aircraft lateral centre of gravity range.

Section 3: Class II on-board weight and balance systems

3.1 System requirements

The system shall determine the actual aircraft weight and location of the centre of gravity as follows.

3.1.1 Range of operation

3.1.1.1 Weights

The system shall determine and display the aircraft weight at least throughout a range from 10 % below aircraft tare weight to 15 % above the maximum taxi gross weight. An overflow indication shall be provided if calculated weight exceeds maximum displayable value.

3.1.1.2 Centre of gravity

The system shall determine and display the aircraft location of the centre of gravity throughout a system range determined as follows.

Determine the aircraft maximum centre of gravity range, expressed in percent of reference chord, using for example the mean aerodynamic chord (MAC) or equivalent, by subtracting the most forward limit from the most aft limit. Extend the most forward aircraft limit forward by 50 % of the aircraft range, or 20 % MAC forward of the forward design limit, whichever is further forward. Extend the most aft aircraft limit aft by 50 % of the aircraft range, or 20 % aft of the static aft tipping point, whichever is further aft.

3.1.2 Mode of operation

The system shall determine the aircraft weight and the location of the centre of gravity on the ground, in at least the taxiing mode, or preferably both the taxiing and the static modes, and shall compensate for the following factors.

3.1.2.1 Automatic compensation

3.1.2.1.1 50 % variations of normal landing gear oleostrut pressure for any permissible degree of strut extension.

3.1.2.1.2 The system shall provide steady weight and location of the centre of gravity indications under wind gusts of up to at least 18 km/h (10 kt) differential.

3.1.2.1.3 Any effect of loading or unloading of the aircraft, or of transferring load or fuel on board.

3.1.2.1.4 Other compensation factors may be taken into account using correction charts or equivalent means, but may also be taken into account automatically if the system design allows this without additional cost or complexity.

3.1.2.2 Compensation using correction charts or other means

3.1.2.2.1 Any combination of ramp slopes up to 3 %, aircraft pitch and/or roll attitude changes up to 3° in excess of the established range of aircraft ground handling attitude excursion.

3.1.2.2.2 Aircraft brakes locked or released.

3.1.2.2.3 Landing gear steering set for zero to minimum turning radius.

3.1.2.2.4 Aircraft brakes temperature between ambient and 20 °C above maximum temperature permitted for dispatch.

3.1.2.2.5 110 km/h (60 kt) wind, or aircraft maximum ground operations limit, whichever is lower, through an azimuth of 360°.

3.1.2.2.6 Any combination of operating engines from zero to ground taxiing/or manœuvring thrust, over the aircraft's approved range of airport elevation.

3.1.2.2.7 Landing gear tilt hydraulic system on or off.

3.1.3 Accuracy

The system shall be capable of determining and displaying the actual aircraft weight and location of the centre of gravity to within $\pm$ 2 % of the aircraft maximum taxi gross weight and $\pm$ 3 % of the reference chord (MAC or equivalent).

It shall be aimed to guarantee the above accuracy to within two standard deviations.

3.1.4 Response time

The system shall respond to a command to continuously display weight and the location of the centre of gravity within 1 min of the initial self-test.

3.1.5 System components

The system shall consist of the minimum components required to perform the functions specified in this part of ISO 6702. A typical system may comprise four subsystems, normally unduplicated, plus connecting lines or cabling: the display unit, the computer unit, the calibration unit and the sensors. No external equipment, ramps, stabilizers or temporary aircraft-to-ground supports shall be required.

3.1.5.1 Component description

3.1.5.1.1 Display unit

The display unit shall display a continuous digital readout of aircraft weight to the nearest 100 kg for aircraft with maximum taxi gross weight below 100 000 kg, or to the nearest 1 000 kg for aircraft with maximum taxi gross weight over 100 000 kg, in three lighted digits of size 6,4 mm min. It shall display a continuous digital readout of the location of the centre of gravity to the nearest 1 % of the reference chord (MAC or equivalent), in two lighted digits of size 6,4 mm min.

The readout shall be visible under conditions of full sunlight to total darkness. Display unit lighting intensity shall be controlled by normal cockpit instrument lighting controls, unless individual controls are provided.

The display unit shall comprise all controls necessary to operate and self-test the system. The display unit shall provide separate indication when preset limits of weight and location of the centre of gravity are exceeded, if this option is exercised (see 3.2).

The display unit location, actuation and integration into flight deck controls shall comply with flight deck layout optimization requirements.

3.1.5.1.2 Computer unit

The computer unit shall perform the operations required by the system functions. The unit shall have provisions for signal outputs to additional remote display units and signal outputs when preset limits of weight and location of the centre of gravity are exceeded. The computer shall provide a malfunction warning indication at the display unit or through a centralized display system whenever a system failure occurs. It shall include controls or provisions for malfunction troubleshooting. The unit shall have provisions for ARINC 429 outputs for use by external monitoring equipment such as AIDS (Airborne Integrated Data System).

It shall be possible to replace the computer unit without requiring system recalibration.

3.1.5.1.3 Sensors

The sensors shall detect changes in aircraft weight and attitude and transmit them to the computer unit. Number, mounting and location of sensors shall be determined by the specific aircraft and system design. Devices designed to overcome landing gear system friction, if used, and attitude sensors shall be considered part of the sensor subsystem.

3.1.5.1.4 Calibration unit

All calibration data shall be stored in a calibration unit, which shall remain with the aircraft when other components are replaced, to preclude the need for recalibration. The calibration unit shall contain the controls necessary to adjust the system to read within the specified accuracy limits on a particular aircraft: they shall be protected against unauthorized or inadvertent use.

3.1.5.2 Component dimensions, compatibility and interface

The OBWBS components shall meet the dimensions, compatibility, interface and interchangeability requirement specified in ISO 6702-2.

3.1.5.3 Power supply

The system shall operate from aircraft electrical power, 115 V a.c. 400 Hz. The system shall also operate when the aircraft is powered from a ground power source, and shall continue to operate without interruption after normal system transients or power interruptions (for example, changeover from ground power to aircraft power).

3.1.5.4 Weight

System weight shall be minimized consistent with function, maintenance and reliability requirements. The design objective of the system weight, less connecting lines or cable, shall not exceed 13,6 kg.

3.1.6 Environmental and functional requirements

The system shall meet the requirements of ISO 7137, as follows.

3.1.6.1 All components within the pressurized fuselage shall meet the requirements of ISO 7137 for class A-2 equipment for temperature and altitude.

3.1.6.2 All other components shall meet the requirements of ISO 7137 for class D-2 and E-2 equipment for temperature and altitude.

3.1.6.3 All components shall meet the requirements of ISO 7137 for category B "Severe humidity" conditions.

3.1.6.4 All components shall meet all other requirements of ISO 7137 except that components within the pressurized fuselage are exempt from the "Water proofness" and "Fluids susceptibility" requirements.

3.1.6.5 The system shall withstand an aircraft weight range from zero weight to 150 % greater than maximum taxi gross weight, without damage or loss of calibration. The sensors shall be capable of withstanding the stresses resulting from the maximum hard landing specified for a particular aircraft type without damage.

3.1.6.6 The system shall withstand a centre of gravity range 100 % greater than the aircraft ground operating centre of gravity range without damage or loss of calibration.

3.1.6.7 The sensors shall withstand, without damage or fatigue, the stresses and deflections of the landing gear during take-off, landing, taxiing, braking and loading operations for a period equal to 15 000 landing cycles or a predicted number of cycles compatible with 10 000 flight hours, whichever is the larger. The sensors shall be capable of withstanding at least 150 % of aircraft maximum taxi gross weight.

3.1.7 Maintainability and reliability

3.1.7.1 Construction

Standard parts, fittings and fasteners shall be used wherever possible.

3.1.7.2 Component replacement

No special tools shall be required to remove and replace system components, except that special tools may be required for the installation of sensor mounts. The replacement of system components shall require a minimum dismantling of other aircraft systems or components. It shall be a design objective to be able to replace any system component, adjust as required, and test the system within one hour. Sensor and sensor mounting design shall minimize the possibility of sensor damage during removal or replacement.

3.1.7.3 Malfunction troubleshooting

Self-test of the system shall be carried out by one person at the display unit. The computer shall be equipped with a test connector or controls for malfunction troubleshooting of its functions. The system design shall permit isolation and testing of individual sensors. The equipment shall be designed so that failure of the self-test feature cannot cause the system to malfunction.

3.1.7.4 Calibration

The system's components shall be designed so that calibration is not required at intervals of less than the equivalent of 10 000 flight hours.

3.1.7.5 Adjustment

The system shall be designed so that zero adjustments are automatically performed on each flight, or so that controls are available on the display unit for any required minor adjustment to the system basic zero reference. The adjustment procedure shall be simple and brief and shall be possible without using tools.

3.1.7.6 Operational reliability

The system shall be designed to have a minimum dispatch reliability of 95 % of operational flight departures, taking into account all detected system failures.

3.1.7.7 Interchangeability

All components shall be designed so that they can be interchanged with any identical component without adjustment. Components tailored for a particular aircraft type shall be interchangeable with similar components for other aircraft types with minimum adjustment of the system. There shall be no requirement for calibration or recalibration in either case.

3.2 Optional functions

The following options have been identified as potentially desirable additional functions to be individually specified and mutually agreed upon between manufacturer and user as required. Optional functions shall have no adverse effect on basic system functions, characteristics or installation. Special consideration should be given to adding no unnecessary sophistication or complexity to a class II OBWBS.

3.2.1 Remote displays

The system should provide remote display(s) of aircraft weight and balance.

3.2.2 Tail tip audible alarm

The system should provide a signal for an audible alarm to indicate a potential aircraft tail tip condition. In convertible or Combi cargo aircraft the same alarm signal should provide a resettable out-