CLAIMS:

1. A support and release device (100) for releasably supporting a store~~,~~ (10), the store having at least one lug (15) for enabling selective removable engagement of the store with respect to the device, the device comprising a housing (110) accommodating:

- a lug engagement release system~~,~~ (300), comprising a hook element~~;~~ (320);
- an actuator system~~,~~ (600), operatively coupled to the lug engagement release system; and
- a safety system (700) comprising a safety lock~~,~~ (799), said safety lock being configured for selectively coupling or uncoupling with respect to at least the lug engagement release system to alternately provide a coupled mode and a ~~decoupled~~uncoupled mode, respectively,

wherein ~~:~~

the lug engagement release system (300) is configured for alternately providing:

- an engaged configuration, in which the lug engagement release system is capable of being in an engaged relationship with respect to the lug (15) via said hook element~~,~~ (320), and
- a disengaged configuration, in which the lug engagement release system is selectively disengaged with respect to the lug~~,~~ (15), responsive to selective operation of the actuator system ~~wherein the actuator system selectively provides pressurized gas to said lug engagement release system,~~(600) concurrent with the safety lock (799) being in uncoupled mode~~;~~, wherein the operation of the actuator system (600) is responsive to an actuation pressure (AP) applied within the actuator system (600) via gas provided by a pressurized gas source (690);

wherein:

- in the coupled mode the safety lock (799) is coupled with respect to the lug engagement release system (300) such as to prevent the lug engagement release system, in the engaged configuration, from providing the disengaged configuration, irrespective of operation of the actuator system~~;~~ (600); and
- in the ~~decoupled~~uncoupled mode the safety lock (799) is ~~decoupled~~uncoupled with respect to the lug engagement release system (300) enabling the lug engagement release system to provide the disengaged

configuration from the engaged configuration responsive to operation of the actuator system~~;~~ (600);

~~and~~ wherein said actuator system (600) comprises a fluid conduit (680) connectable to the pressurized gas source (690);

wherein said actuator system comprises an actuation piston (650) reciprocably mounted with respect a cylinder (620), the cylinder being in fluid communication with said fluid conduit (680), the piston being displaceable with respect to the cylinder responsive to said pressurized gas being applied to the piston and concurrent with the safety lock (799) being in uncoupled mode;

wherein the safety system (700) is configured for enabling venting of the pressurized gas from the actuator system (600) to an external environment under conditions where the actuation system is operated concurrent with the safety lock (799) being in coupled mode~~.~~;

~~2. The device according to claim 1, wherein said actuator system comprises a fluid conduit connectable to a pressurized gas source, the pressurized source configured for providing pressurized gas to said lug engagement release system during operation of said device,~~ wherein said safety system (700)~~and wherein said safety system~~ comprises a venting arrangement configured for providing fluid communication between said fluid conduit (680) and the external environment (E) when the safety lock (799) is in said coupled mode, and to prevent fluid communication between said fluid conduit (680;1680) and the external environment (E) when the safety lock (799) is in uncoupled mode~~.~~;

~~3. The device according to claim 2,~~ wherein ~~said actuator system~~the venting arrangement comprises ~~an actuation piston reciprocably mounted with respect a cylinder, the cylinder being in~~at least one fluid venting conduit (710), each said fluid venting conduit having at least one inlet (712) in free fluid communication with said fluid conduit~~, the piston being displaceable with respect to the cylinder responsive to said pressurized gas being applied to the piston~~ (680) and at least one outlet (714; 716) in selective fluid communication with the external environment (E);

and wherein ~~concurrent with~~

the respective said fluid venting conduit (710), the respective said at least one inlet and the ~~safety lock being in uncoupled mode.~~respective at least one outlet (714; 716) are

provided in said piston (650), and wherein said cylinder comprises at least one cylinder opening (112; 114) corresponding to each said outlet.

42. The device according to claim 31, wherein the piston (650) is operatively coupled to the lug engagement release system, (300), such that as the piston is displaced with respect to the cylinder (620) between a first position and a second position, the lug engagement release system goes from the engaged configuration to the disengaged configuration.

~~5. The device according to any one of claims 3 to 4, wherein said safety system comprises a venting arrangement comprising at least one fluid venting conduit, each said fluid venting conduit having at least one inlet in selective fluid communication with said fluid conduit, and at least one outlet in selective fluid communication with the external environment.~~

3. The device according to claim 1 or 2,

~~6. The device according to claim 5,~~ wherein for at least one said fluid venting conduit, and concurrent with the safety lock being in said coupled mode, the respective said at least one inlet (712) is in free fluid communication with said fluid conduit and said at least one outlet (714; 716) is in selective fluid communication with the external environment.

~~7. The device according to claim 5 or claim 6, wherein for the respective at least one said fluid venting conduit, and concurrent with the safety lock being in said uncoupled mode there fluid communication is prevented between said at least one inlet and said fluid conduit.~~

84. The device according to any one of claims 51 to 7,3,

- wherein for the respective said at least one said fluid venting conduit, and wherein concurrent with the safety lock being in said uncoupled mode, fluid communication is prevented between said at least one outlet (714, 716) and the external environment. (E).

95. The device according to any one of claims 52 to 8, wherein4, including at least one of the following:

- wherein said cylinder openings (112, 114) are located on the cylinder (620) at respective ~~said~~positions such as to be in registry with said outlet openings (714, 716) when said piston (650) is at or close to said first position thereby providing free fluid communication between the external environment (E) and the fluid conduit (710), via the fluid venting conduit~~, the~~ and cylinder openings;

- wherein said cylinder openings (112, 114) are located on the cylinder (260) at respective positions such as not to be in registry with the outlet openings (714, 716) when the piston (650) has moved significantly away from said first position in a direction towards said second position, and until said second position to thereby block fluid communication between external environment (E) and the fluid conduit (680).

6. The device according to ~~said at least one inlet, and the respective at least~~any one ~~outlet are provided in said piston, and~~of claims 1 to 5, wherein said cylinder comprises at least one cylinder opening (112, 114) corresponding to each said outlet~~.~~

~~10. The device according to claim 9~~, and, wherein said cylinder openings are located on the cylinder at respective positions such as to be in registry with said outlet openings when said piston is at or close to said first position thereby providing is free fluid communication between the external environment and the fluid conduit, via the fluid venting conduit and cylinder openings~~.~~

~~11. The device according to claim 9 or claim 10~~, and, wherein said cylinder openings are located on the cylinder at respective positions such as not to be in registry with the outlet openings when the piston has moved significantly away from said first position in a direction towards said second position, and until said second position to thereby block fluid communication between external environment and the fluid conduit.

~~12~~7. The device according to any one of claims ~~5~~1 to ~~11~~,6, including at least one of the following:

- wherein said venting arrangement further comprises a plunger member (1850) reciprocably mounted with respect to plunger casing~~,~~ (1820), the plunger member being reciprocably displaceable with respect to the plunger casing between a nominal first plunger position (S1') and a second plunger ~~positon.~~ position (S2');

~~13. The device according~~- wherein said venting arrangement further comprises a plunger member (1850) reciprocably mounted with respect to ~~claim 12~~plunger casing

(1820), the plunger member being reciprocably displaceable with respect to the plunger casing between a nominal first plunger position (S1') and a second plunger position (S2'), and, wherein a second said fluid venting conduit, a respective second said at least one inlet~~,~~ (1812), and a respective second at least one outlet (1714, 1716) are provided in said plunger member, and wherein said plunger casing comprises at least one casing opening (1814, 1816) corresponding to each said second outlet~~.~~;

~~14. The device according to claim 13,~~ wherein said venting arrangement further comprises a plunger member (1850) reciprocably mounted with respect to plunger casing (1820), the plunger member being reciprocably displaceable with respect to the plunger casing between a nominal first plunger position (S1') and a second plunger position (S2'), and, wherein a second said fluid venting conduit, a respective second said at least one inlet (1812), and a respective second at least one outlet (1714, 1716) are provided in said plunger member, and wherein said plunger casing comprises at least one casing opening (1814, 1816) corresponding to each said second outlet, and wherein said casing openings are located on the plunger casing at respective positions such as to be in registry with said second outlet openings when said plunger member is at or close to said first plunger position thereby providing ~~is~~ free fluid communication between the external environment and the fluid conduit, via the second fluid venting conduit and casing openings~~.~~;

~~15. The device according to claim 13 or claim 14,~~ wherein said ~~casing openings are located on the plunger casing at respective positions such as not to be in registry with the second outlet openings when the plunger member has moved significantly away from said first plunger position in a direction towards said second plunger position, and until said second position to thereby block fluid communication between external environment and the second fluid conduit.~~

~~16. The device according to any one of claims 12 to 15, wherein said plunger member comprises a plunger head and lower projection.~~

~~17. The device according to any one of claims 12 to 15, wherein the~~ venting arrangement further comprises a ~~biasing spring that biases the plunger member in a direction towards an extraction axis of the safety lock.~~

~~18. The device according to any one of claims 12 to 17, wherein in said first plunger position, and an upper end of said plunger member projects out of the plunger casing and~~

~~into the fluid conduit, such as to allow free fluid communication between the second said inlets and the fluid conduit.~~

~~19. The device according to claim 18, wherein in said second plunger position, the upper end is retracted into the plunger casing, thereby sealing off the plunger casing from the fluid conduit, and such as to prevent fluid communication between the second said inlets and the fluid conduit.~~

~~20. The device according to any one of claims 5 to 8, wherein said venting arrangement comprises a plunger member~~plunger member (1850) reciprocably mounted with respect to plunger casing~~,~~ (1820), the plunger member being reciprocably displaceable with respect to the plunger casing between a nominal first plunger position (S1') and a second plunger ~~positon.~~

~~21. The device according to claim 20~~position (S2'), and, wherein a second said fluid venting conduit, a respective second said at least one inlet~~,~~ (1812), and ~~said~~a respective second at least one outlet (1714, 1716) are provided in said plunger member, and wherein said plunger casing comprises at least one casing opening (1814, 1816) corresponding to each said second outlet~~.~~

~~22. The device according to claim 21, wherein said at least one outlet are provided in said plunger member such as to be in registry with said outlet openings when said plunger member is at or close to said first plunger position thereby providing is free fluid communication between the external environment and the fluid conduit, via the fluid venting conduit,~~ and ~~said casing openings.~~

~~23. The device according to claim 21 or claim 22~~, wherein said casing openings are located on the plunger casing at respective positions such as not to be in registry with the second outlet openings when the plunger member has moved significantly away from said first plunger position in a direction towards said second plunger position, and until said second position to thereby block fluid communication between external environment and the second fluid conduit~~.~~;

~~24~~- wherein said venting arrangement further comprises a plunger member (1850) reciprocably mounted with respect to plunger casing (1820), the plunger member being reciprocably displaceable with respect to the plunger casing between a nominal first plunger position (S1') and a second plunger position (S2'), and, wherein a second

said fluid venting conduit, a respective second said at least one inlet (1812), and a respective second at least one outlet (1714, 1716) are provided in said plunger member, and wherein said plunger casing comprises at least one casing opening (1814, 1816) corresponding to each said second outlet, and wherein said casing openings are located on the plunger casing at respective positions such as to be in registry with said second outlet openings when said plunger member is at or close to said first plunger position thereby providing free fluid communication between the external environment and the fluid conduit, via the second fluid venting conduit and casing openings, and, wherein said casing openings are located on the plunger casing at respective positions such as not to be in registry with the second outlet openings when the plunger member has moved significantly away from said first plunger position in a direction towards said second plunger position, and until said second position to thereby block fluid communication between external environment and the second fluid conduit.

8. The device according to ~~any~~claim 7, including at least one of ~~claims 20 to 23,~~the following:

- wherein said plunger member (1850) comprises a plunger head (1858) and lower projection~~.~~ (1859);

~~25. The device according to any one of claims 20 to 24,~~- wherein the venting arrangement further comprises a biasing spring (1810) that biases the plunger member in a direction towards an extraction axis of the safety lock~~.~~;

~~26. The device according to any one of claims 20 to 25,~~- wherein in said first plunger position~~,~~ (S1'), and an upper end (1852) of said plunger member projects out of the plunger casing (1820) and into the fluid conduit~~,~~ (1680), such as to allow free fluid communication between the second said inlets (1812) and the fluid conduit~~.~~;

~~27. The device according to claim 26,~~- wherein in said ~~second~~first plunger position~~, the~~ (S1'), and an upper end (1852) of said plunger member (1850) projects out of the plunger casing (1820) and into the fluid conduit (1680), such as to allow free fluid communication between the second said inlets (1812) and the fluid conduit, and, wherein in said second plunger position (S2'), the upper end (1852) is retracted into the plunger casing~~,~~ (1820), thereby sealing off the plunger casing from the fluid

conduit, and such as to prevent fluid communication between the second said inlets (1812) and the fluid conduit.

289. The device according to any one of claims 1 to 278, further configured for selectively ejecting forcibly the store therefrom, the device comprising one of the following:

- an ejector system (500) comprising at least one ejection module, (560), each ejection module configured for providing an ejection force generated under action of gas pressure provided by the actuation system. (600; 1600);

29. The device according to claim 28, an ejector system (500) comprising at least one ejection module (560), each ejection module configured for providing an ejection force generated under action of gas pressure provided by the actuation system (600; 1600), each ejection module comprising a tubular housing (562) accommodating a telescopic plunger element (564) comprising an end wall at a first longitudinal end thereof having a small opening, the telescopic plunger element being closed at a second longitudinal end thereof.;

30. The device according to claim 29 an ejector system (500) comprising at least one ejection module (560), each ejection module configured for providing an ejection force generated under action of gas pressure provided by the actuation system (600; 1600), each ejection module comprising a tubular housing (562) accommodating a telescopic plunger element (564) comprising an end wall at a first longitudinal end thereof having a small opening, the telescopic plunger element being closed at a second longitudinal end thereof, wherein said second longitudinal end comprises a padded abutment element, (566), configured for abutting against the stores (10) when this is engaged with the device.

31. The device according to any one of claims 1 to 30, further comprising at least one sway braces.

3210. The device according to any one of claims 1 to 31,9, further comprising at least one sway braces (570).

11. The device according to any one of claims 1 to 10, including at least one of the following:

(i) wherein said lug engaging and releasing mechanism comprises a first kinematic chain (A) and a second kinematic chain. (B);

~~33. The device according to claim 32,~~(ii) wherein said ~~first~~ lug engaging and releasing mechanism comprises a first kinematic chain (A) and a second kinematic chain (B), and including at least one of the following:

- wherein said first kinematic chain (A) comprises a first stressed link~~,~~ (340), a coupling plate~~,~~ (360), a first link~~,~~ (350), and said hook element. (320);
- ~~34. The device according to claim 33~~wherein said first kinematic chain (A) comprises a first stressed link (340), a coupling plate (360), a first link (350), and said hook element (340), and, wherein said second kinematic chain (B) comprises an anvil member~~,~~ (380), a second link~~,~~ (390), a pivoting member~~,~~ (370), and a second stressed link. (240);
- ~~35. The device according to claim 34~~wherein said first kinematic chain (A) comprises a first stressed link (340), a coupling plate (360), a first link (350), and said hook element (320), and, wherein said second kinematic chain (B) comprises an anvil member (380), a second link (390), a pivoting member (370), and a second stressed link (240), and, wherein said coupling plate and said anvil member are pivotable mounted to said housing coaxially about a pivot axis.

~~36~~12. An air vehicle comprising at least one support and release device as defined in any one of claims 1 to ~~35~~11.

~~37~~13. A method for releasably supporting a store~~,~~ (10), the store having at least one lug~~,~~ (15), the method comprising:

(a) providing at least one support and release device as defined in any one of claims 1 to ~~35~~11; and

(b) engaging the lug (15) with respect to the lug engagement release system (300; 1300) to thereby urge the lug engagement release system to the engaged configuration;

(c) coupling the safety lock (799; 1799) with respect to the device to provide the coupled mode.

~~38~~14. A method according to claim ~~37~~13, further comprising:

(d) ~~decoupling~~uncoupling the safety lock (799; 1799) with respect to the device to provide the ~~decoupled~~uncoupled mode;

(e) selectively operating the actuator system to thereby actuate said lug engagement release system (300; 1300) to enable the lug engagement release system to adopt the disengaged configuration, thereby enabling the lug engagement release system to release the lug therefrom.