CLAIMS

1. Aircraft (1) capable of changing over from air travel to space travel, comprising a single-deck provided with at least one manned cabin (3) and comprising:

- aerobic propulsion means (10) and steerable anaerobic propulsion means (12);
- a system (21) for controlling the environment of the manned cabin, powered by the aerobic propulsion means (10), and
- a store of breathable survival gas (10A), which store is only capable of temporarily supplying said manned cabin (3) with breathable gas in the event of said system (21) for controlling the environment of the cabin malfunctioning at high altitude,

characterised in that said aircraft comprises an additional store of breathable gas (25), which is activated only during a stage of flight when the aerobic propulsion is interrupted, and which is capable of supplying said system (21) for controlling the environment of said manned cabin by replacing the aerobic propulsion means (10).

2. Aircraft according to claim 1,
characterised in that said additional store of breathable gas (25) is formed by pressurised gas cylinders.

3. Method for automatically adapting the configuration of an aircraft (1), the mission of which makes it change over from air flight to space flight, said aircraft comprising a single deck provided with at least one manned cabin (3) and comprising:

- aerobic propulsion means (10) and steerable anaerobic propulsion means (12),
- aerodynamic piloting surfaces (5, 7, 9),
- a system (21) for controlling the environment of the cabin, supplied by the aerobic propulsion means (10),
- a store of breathable survival gas (10A), which store is only capable of temporarily supplying said manned cabin (3) with breathable gas in the event of said system (21) for controlling the environment of the cabin malfunctioning at high altitude,

- an electrical power supply system (29) which is actuated by said aerobic propulsion means (10),
- electrical energy storage means (31), and
- a system (32) for producing piloting commands,

characterised by carrying out the following operations:

- installing an additional store of breathable gas (25) on-board said aircraft, which store is capable of supplying said system (21) for controlling the environment of the manned cabin,
- determining, prior to said mission, the conditions required at the end of the air flight in order to change over to the space flight, and
- detecting said conditions during the air flight, and, when they are achieved:
- supplying the system (21) for controlling the environment of the cabin by means of the additional supply of breathable gas (25) in place of the aerobic propulsion means (10),
- verifying that the environment of the cabin (3) resulting from being supplied by the additional store of breathable gas is correct and then, if this is the case,
- powering the electrical power supply system (29) via the electrical energy storage means (31) in place of the aerobic propulsion means (10),
- verifying that the electrical power produced by said electrical power supply system powered by said electrical energy storage means is correct and then, if this is the case,
- transmitting piloting commands generated by said system (32) for producing piloting commands to the steerable anaerobic propulsion means (12) in place of said aerodynamic piloting surfaces.

4. Method according to claim 3,

characterised in that, in order to supply the system for controlling the environment by means of the additional store of breathable gas (25), first said store is activated, then said system for controlling the environment is switched from the aerobic propulsion means to said additional store of breathable gas (25), and the supply from the aerobic propulsion means is deactivated.

5. Method according to either claim 3 or claim 4,

characterised in that at least one alarm is emitted in the event that the environment of the cabin resulting from being supplied by the additional store of breathable gas (25) is not correct.

6. Method according to any of claims 3 to 5,
characterised in that, in order to power the electrical power supply system by means of the electrical energy storage means (31), first said means are activated, then said electrical power supply system is switched from the aerobic propulsion means to said electrical energy storage means, and the power from the aerobic propulsion means is deactivated.

7. Method according to any of claims 3 to 6,
characterised in that at least one alarm is emitted in the event that the electrical power produced by said electrical power supply system powered by said energy storage means is not correct.

8. Method according to any of claims 3 to 6,
characterised in that, in order to transmit piloting commands generated by said system (32) for producing piloting commands to the steerable anaerobic propulsion means (12), first the process of steering the anaerobic propulsion means is checked, then the transmission of the piloting commands is switched to said means, and the piloting control by said aerodynamic surfaces is deactivated.

CLAIMS

1. Aircraft (1) capable of changing over from air travel to space travel, comprising a single-deck provided with at least one manned cabin (3) and comprising:

- aerobic propulsion means (10) and steerable anaerobic propulsion means (12);
- a system (21) for controlling the environment of the manned cabin, powered by the aerobic propulsion means (10), and
- a store of breathable survival gas (10A), which store is only capable of temporarily supplying said manned cabin (3) with breathable gas in the event of said system (21) for controlling the environment of the cabin malfunctioning at high altitude,

characterised in that said aircraft comprises an additional store of breathable gas (25), which is activated only during a stage of flight when the aerobic propulsion is interrupted, and which is capable of supplying said system (21) for controlling the environment of said manned cabin by replacing the aerobic propulsion means (10).

2. Aircraft according to claim 1,
characterised in that said additional store of breathable gas (25) is formed by pressurised gas cylinders.

3. Aircraft according to any one of claims 1 or 2,

characterized in that it further comprises:

- a detector (20) capable of detecting a change-over point from the air flight phase of said spaceplane (1) to the space flight phase, defined using navigation information thereof, such as kinematic conditions of altitude, speed, outside pressure, etc.;

- an electrical power supply system (26) for the various apparatuses (27) of the spaceplane (1), said system (26) being supplied with power by means of switching means (28), or by means of an electrical generator 29 driven by the aerobic propulsion means (10), or by an electrical power generation device (30) powered by batteries (31), and

- a system (32) for producing piloting commands for the spaceplane (1) from orders which are created by the pilot by operating the control stick and the rudder bar and which are directed to the input (32A) of said system (32), the piloting commands of said system (32) being transmitted, by means of switching means (33), either to an air flight control system (34) controlling the flight of

the spaceplane (1) by means of aerodynamic flaps and control surfaces (5, 7, 9), or to a space flight control system (35) by steering the rocket engine (12),

the system (21) for controlling the environment inside the cabin (3) of the spaceplane (1) being capable of being supplied with air by means of switching means (22), or by means of an air bleed device (23) on the aerobic propulsion means (10), or by means of an air distribution device (24) supplied by an additional store of air (25) formed for example by compressed air cylinders;

the store of breathable survival gas (10A), which is capable, in the event of said system for controlling the environment (21) malfunctioning at high altitude, of only supplying said manned cabin (3) with breathable gas for the time the aircraft (1) takes to return to a sufficiently low altitude at which the pressurisation and heating of said cabin are no longer required, said store of breathable survival gas (10A) being put into operation by a controller (10B).

4. Aircraft according to any one of claim 1 to 3,

characterized in that it further comprises:

- a device (36), between the switching means (22) and the switching means (28), for verifying the operation of the air distribution device (24) supplied by the store of air (25), said verification device (36) being connected to the switching means (28) by means of switching means (37);

- a device (38), between the switching means (28) and the switching means (33), for verifying the operation of the electrical power generation device (30) powered by the batteries (31), said verification device (38) being connected to the switching means (33) by means of switching means (39); and

- a control line (40) between the detector (20) at one end, and the verification device (36) of the air distribution device (24) and the verification device (38) of the electrical power generation device (30) at the other end.

5. Method for automatically adapting the configuration of an aircraft (1), the mission of which makes it change over from air flight to space flight, said aircraft comprising a single deck provided with at least one manned cabin (3) and comprising:

- aerobic propulsion means (10) and steerable anaerobic propulsion means (12),
- aerodynamic piloting surfaces (5, 7, 9),

- a system (21) for controlling the environment of the cabin, supplied by the aerobic propulsion means (10),
- a store of breathable survival gas (10A), which store is only capable of temporarily supplying said manned cabin (3) with breathable gas in the event of said system (21) for controlling the environment of the cabin malfunctioning at high altitude,
- an electrical power supply system (29) which is actuated by said aerobic propulsion means (10),
- electrical energy storage means (31), and
- a system (32) for producing piloting commands,

characterised by carrying out the following operations:

- installing an additional store of breathable gas (25) on-board said aircraft, which store is capable of supplying said system (21) for controlling the environment of the manned cabin,
- determining, prior to said mission, the conditions required at the end of the air flight in order to change over to the space flight, and
- detecting said conditions during the air flight, and, when they are achieved:
- supplying the system (21) for controlling the environment of the cabin by means of the additional supply of breathable gas (25) in place of the aerobic propulsion means (10),
- verifying that the environment of the cabin (3) resulting from being supplied by the additional store of breathable gas is correct and then, if this is the case,
- powering the electrical power supply system (29) via the electrical energy storage means (31) in place of the aerobic propulsion means (10),
- verifying that the electrical power produced by said electrical power supply system powered by said electrical energy storage means is correct and then, if this is the case,
- transmitting piloting commands generated by said system (32) for producing piloting commands to the steerable anaerobic propulsion means (12) in place of said aerodynamic piloting surfaces.

6. Method according to claim 5,

characterised in that, in order to supply the system for controlling the environment by means of the additional store of breathable gas (25), first said store is activated, then said system for controlling the environment is switched from the aerobic propulsion means to said additional store of breathable gas (25), and the supply from the aerobic propulsion means is deactivated.

7. Method according to either claim 5 or claim 6,

characterised in that at least one alarm is emitted in the event that the environment of the cabin resulting from being supplied by the additional store of breathable gas (25) is not correct.

8. Method according to any of claims 5 to 7,
characterised in that, in order to power the electrical power supply system by means of the electrical energy storage means (31), first said means are activated, then said electrical power supply system is switched from the aerobic propulsion means to said electrical energy storage means, and the power from the aerobic propulsion means is deactivated.

9. Method according to any of claims 5 to 8,
characterised in that at least one alarm is emitted in the event that the electrical power produced by said electrical power supply system powered by said energy storage means is not correct.

10. Method according to any of claims 5 to 8,
characterised in that, in order to transmit piloting commands generated by said system (32) for producing piloting commands to the steerable anaerobic propulsion means (12), first the process of steering the anaerobic propulsion means is checked, then the transmission of the piloting commands is switched to said means, and the piloting control by said aerodynamic surfaces is deactivated.