A.P.101B-0402-1A
A.L.207, Dec.77

SECTION 1

CONTROLS AND EXITS

LIST OF CHAPTERS OVERLEAF

SECTION 1

CONTROLS AND EXITS

LIST OF CHAPTERS

Note:- *A list of contents appears at the beginning of each chapter.*

Chapter 1 PILOT'S CONTROLS AND EQUIPMENT

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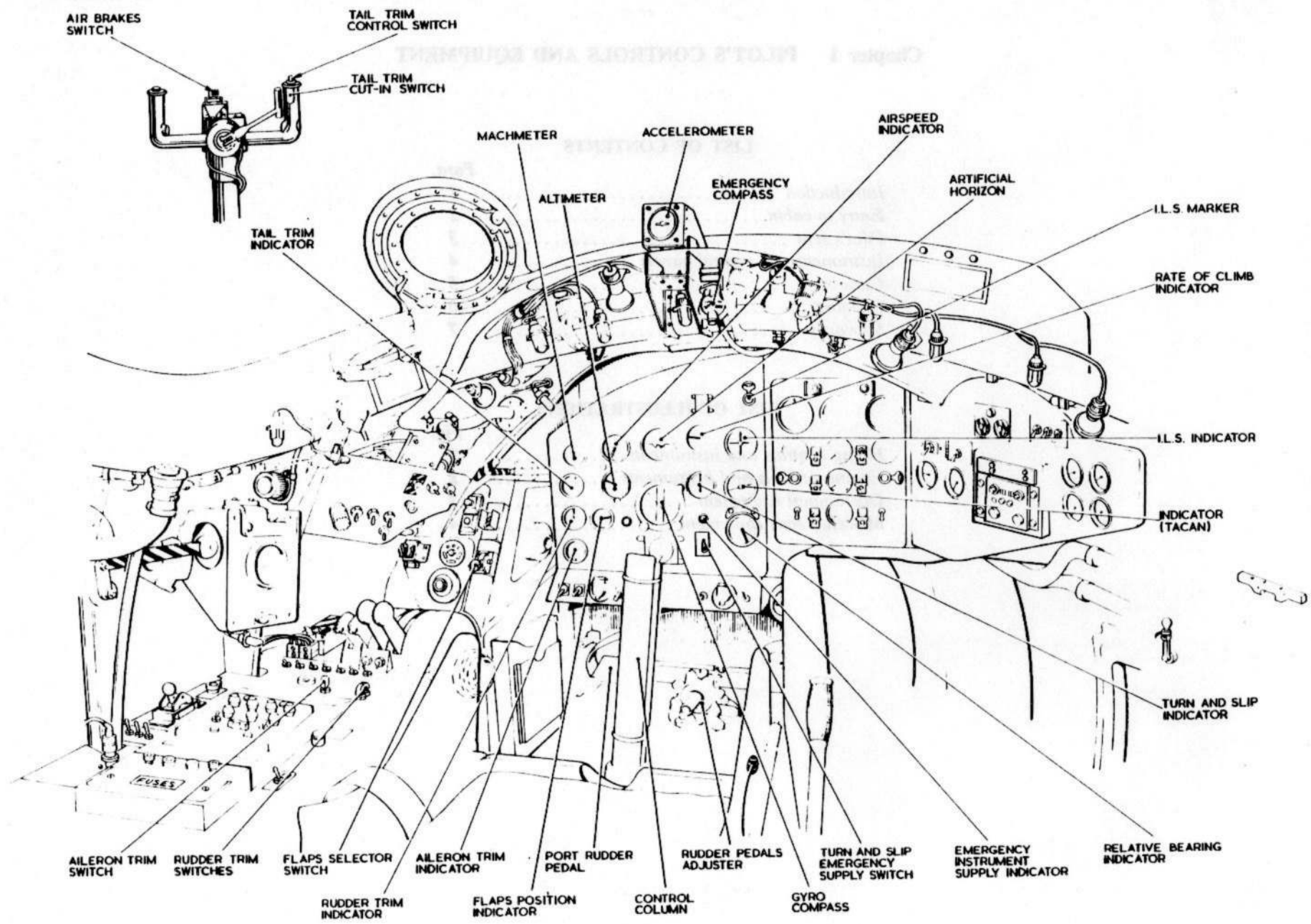

FIG.1. FLYING CONTROLS AND INSTRUMENTS

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WARNING

The relevant safety precautions detailed on the LETHAL WARNING marker card must always be observed before entering the cabin or performing any operations upon the aircraft.

Introduction

1. This chapter is intended to serve as a guide to the location of all the controls, equipment, and instruments at the pilot's station, together with the method of operating the controls where this is not obvious. To simplify reference to any particular control according to its purpose, four separate illustrations of the station are given.

Entry to cabin

2. Entry to the cabin is through the door in the starboard side of the fuselage aft of the nose fairing; it is hinged at its upper edge. To open the door from either inside or outside, press the red-painted knob adjacent to the latching handle and turn the handle in a counter-clockwise direction from the outside, clockwise from the inside; the door is supported in the open position by a hinged strut which is attached to the door and locates in a socket in the door aperture framing.

Pilot's seat

3. A Martin-Baker Type 2CA1 ejection seat with single-lever ejection facilities is installed. The seat is described in detail in A.P.109B-0101-1. The rudder pedals can be adjusted for leg reach by rotation of an adjuster wheel located in the centre of the rudder bar.

Instrument and control panels

4. The instruments and controls are mounted on panels positioned around the pilot's station, and are grouped, mainly, according to their function. Located directly forward of the ejection seat is the flying instruments panel, above and below of which, are the coaming and engine starting panels respectively. The engine instruments panel is located immediately to the right of the flying instruments panel while, to the left of the seat is the pilot's console. Above the forward end of the console, on the cabin wall, is the port switch panel and, immediately forward of the console, the sloping panel which mainly comprises the alighting gear controls. Locacted at the forward right-hand corner of the station, adjacent to the engine instruments panel, is the miscellaneous instruments panel.

Curtains

5. A curtain, fitted to the canopy coaming cross tube, when lowered blacks-out and divides the rear crew stations from the pilot's station.

Lighting

6. Dimmer switches located on the coaming above the instrument panel and on the port side of the cabin, control the red and U/V lamps which provide the illumination for all instruments and controls in the cockpit. Two amber emergency lights, one at each side of the main instrument panel, are controlled by a switch on the radio panel. The cabin lighting is fully described in A.P.101B-0402-1B, Sect.5, Chap.1, Group L.

Stowages

7. The locking pins for the flaps and bomb bay doors switches are stowed in a bag *(Sect.2, Chap.1)* located on the inner face of the entrance door; the aircraft entrance door key is also stowed in this bag. A divided container situated at the forward end of the console on the inboard side provides stowage for the pilot's maps and notes. The detachable handle of the hydraulic system hand-pump has a stowage on the starboard wall of the cabin, aft of the entrance door. The stowage for the pilot's ejection seat safety pins is located above the entrance door. The undercarriage and control surface locks are stowed within a container located on the inside of the battery compartment hatch (SEM/CAN/0136/STC).

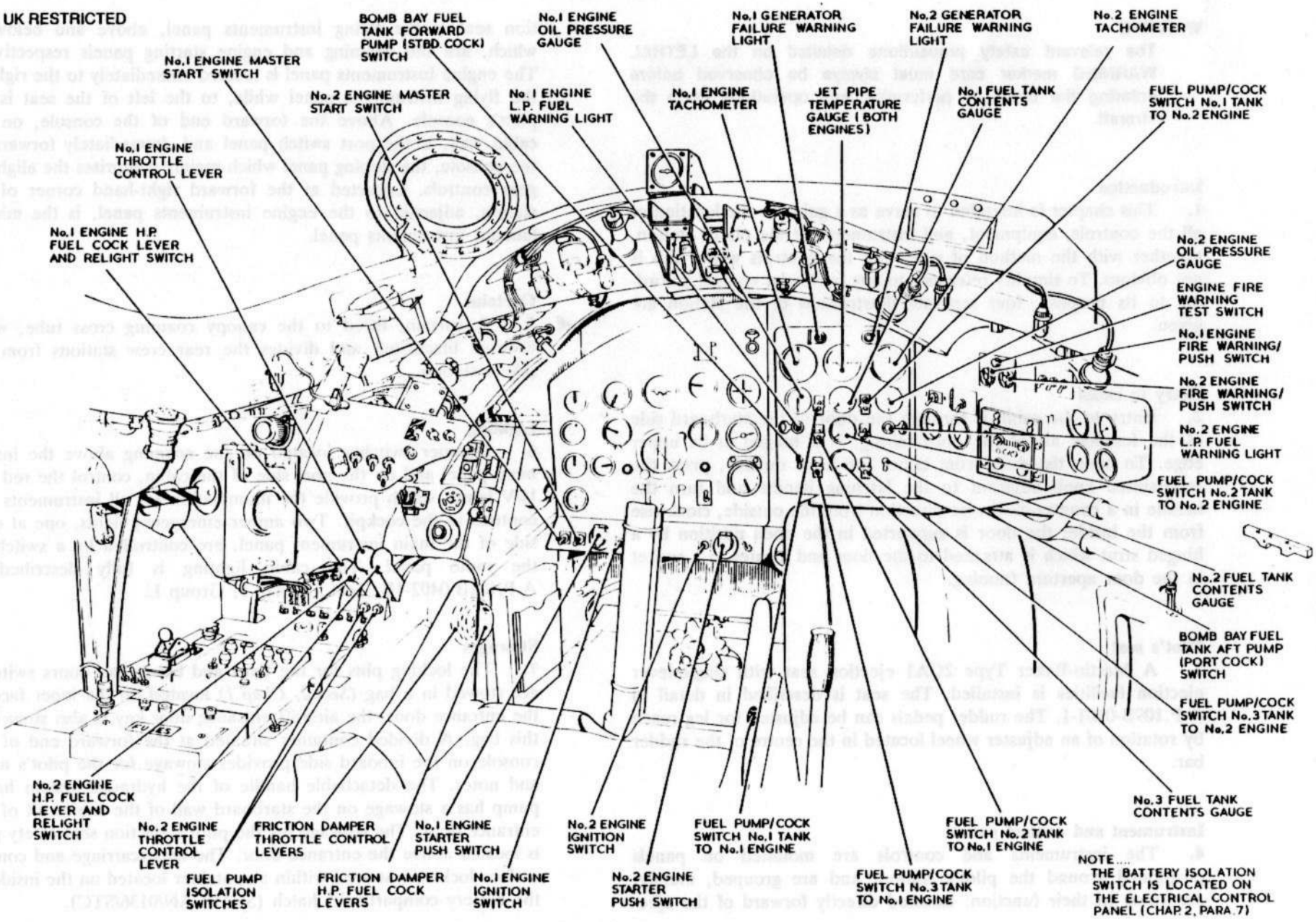

FIG.2. ENGINE CONTROLS AND INSTRUMENTS

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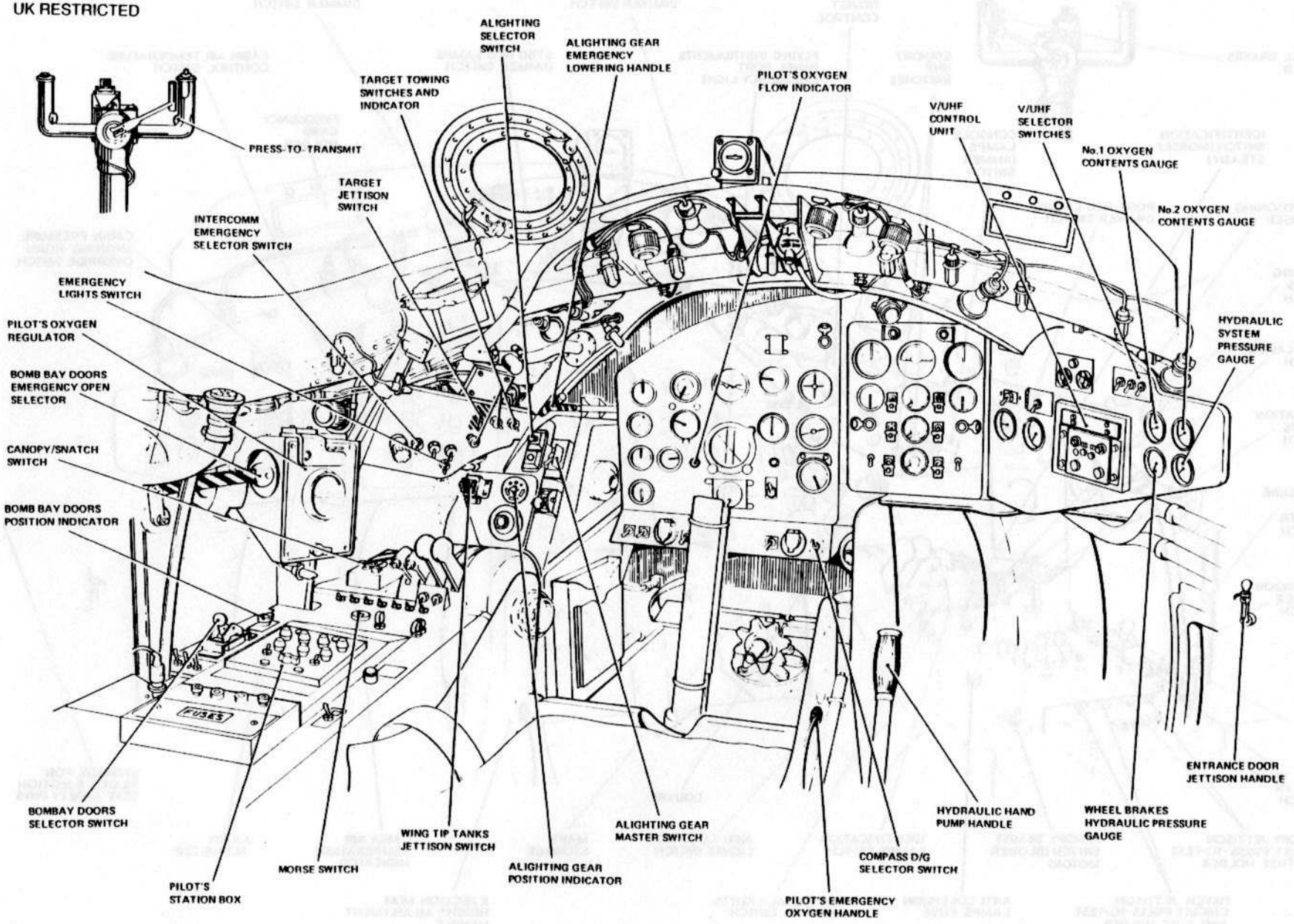

FIG.3 OPERATIONAL EQUIPMENT

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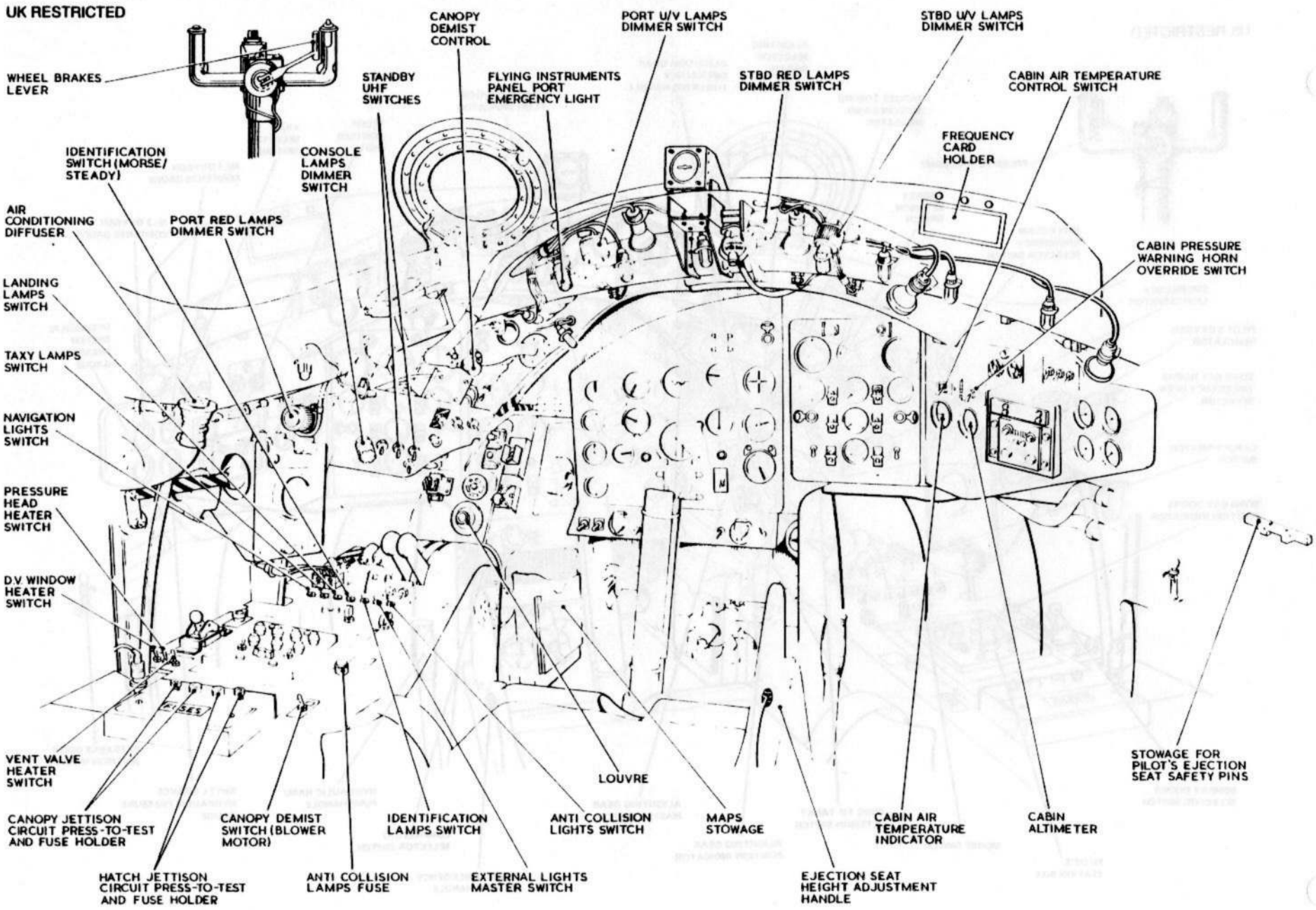

FIG. 4. MISCELLANEOUS EQUIPMENT

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WARNING

The relevant safety precautions detailed on the LETHAL WARNING marker card must always be observed before entering the cabin or performing any operations upon the aircraft.

Introduction

1. This chapter provides information regarding the disposition, function, and operation of controls and equipment, at the crew stations. The general equipment is illustrated in fig.1 and 2.

Entrance to stations

2. Entry to the stations is through the doorway in the starboard side of the fuselage aft of the nose fairing *(Chap.1)*.

Seating

3. Two Martin-Baker Type 2 CA.2 ejection seats with single-lever ejection facilities are installed. The seats are described in detail in A.P.109B-0101-1. A folding seat for occasional use, hinged to the starboard cabin wall at the pilot's station, can be folded upwards against the cabin wall when not in use.

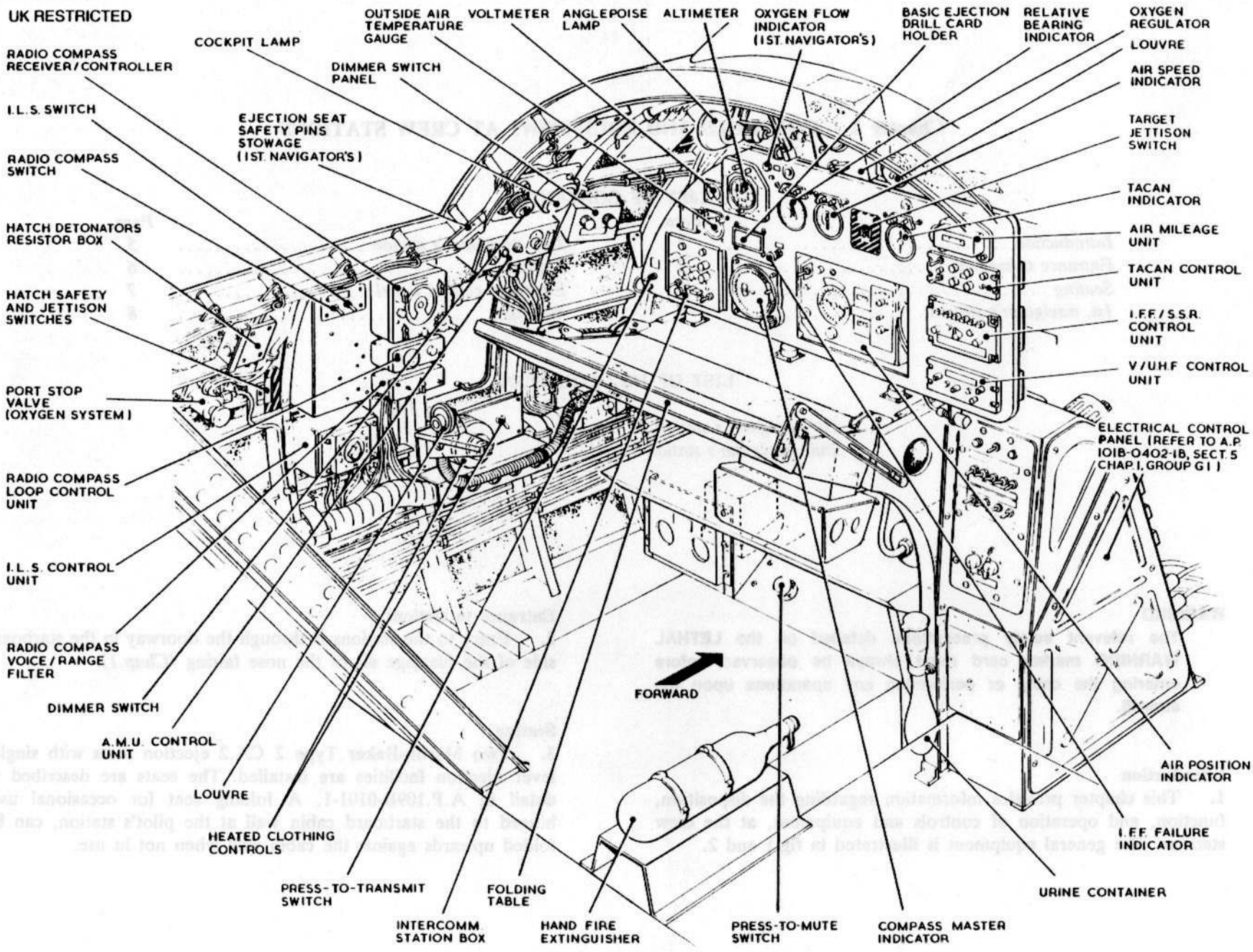

FIG. 1. 1ST. NAVIGATOR'S STATION

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1st. navigator's station *(fig.1)*

4. The navigator's seat is at the rear of the cabin on the port side. The chart table, forward of the seat, is constructed in two sections; the aft section may be initially raised then lowered between guides to rest against the lower port wall of the cabin. The panel carrying the navigation instruments is forward of the chart table and the various controls are conveniently located around the station. The observation window on the port side and the two hatch windows are fitted with blackout curtains.

2nd. navigator's station *(fig.2)*

5. The navigator's seat is at the rear of the cabin on the starboard side, the floor level here being slightly higher than at the 1st. navigator's position. A panel on the starboard cabin wall carries various controls conveniently placed for the 2nd. navigator's right hand. The 2nd. navigator's prone position is in the nose, where a sighting panel is provided in the transparent nose and an observation window is fitted in the bottom skin of the fuselage just aft of the nose.

Lighting

6. An anglepoise lamp and dimmer switch are provided above the oxygen regulator on the starboard side of the cabin at the 2nd. navigator's station. The rear cabin is illuminated by a Mk.1A dome lamp situated on the forward roof structure at the port side, and an anglepoise lamp and dimmer switch are situated above the 1st. navigator's instrument panel. Illumination at the prone position is provided by a Mk.1A dome lamp in the roof structure aft of frame A, and a hand lamp in the nose, controlled by a dimmer switch mounted on top of the oxygen regulator.

Electrical control panel

7. The electrical control panel, mounted to starboard and slightly aft of the pilot's seat, carries on its rear face the switches and circuit-breakers for the main generators and A.C. power supplies, and on its forward face the fuel pump and cock circuit-breakers. The electrical control panel is fully described in A.P.101B-0402-1B, Sect.5, Chap.1.

Stowages

8. A container with a hinged lid forms part of the fixed section of the chart table and is the stowage for the navigator's instruments. The navigator's valise is stowed and secured by straps, in a recess aft of the electrical control panel between the two floor levels, and the visor stowage is secured to the chart table pedestal support. An inspection lamp and lead is stowed just aft of the entrance door on the starboard side.

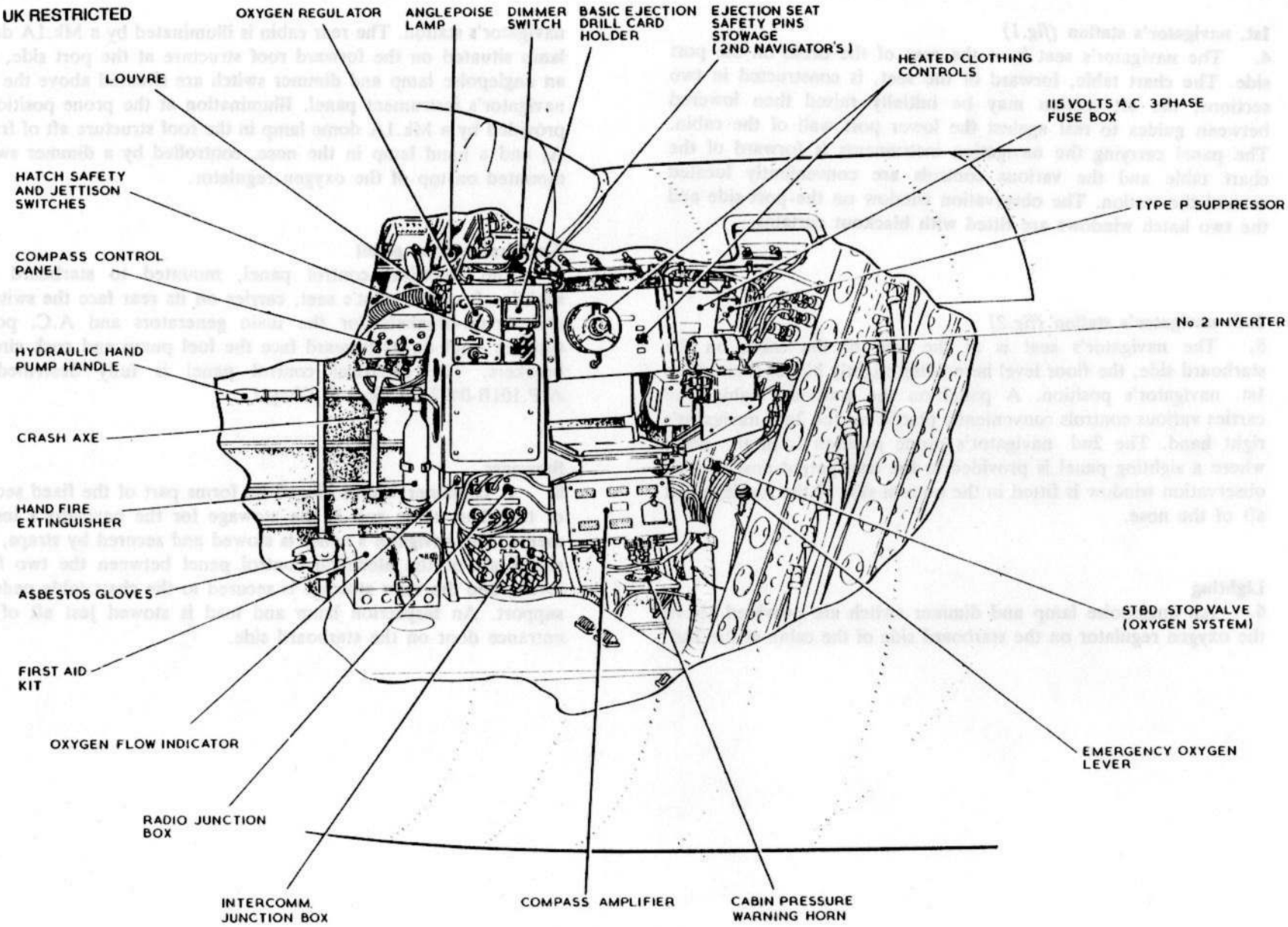

FIG. 2. 2ND. NAVIGATOR'S STATION

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Chapter 3 EMERGENCY CONTROLS, EQUIPMENT AND EXITS – METHOD OF OPERATION

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LIST OF ILLUSTRATIONS

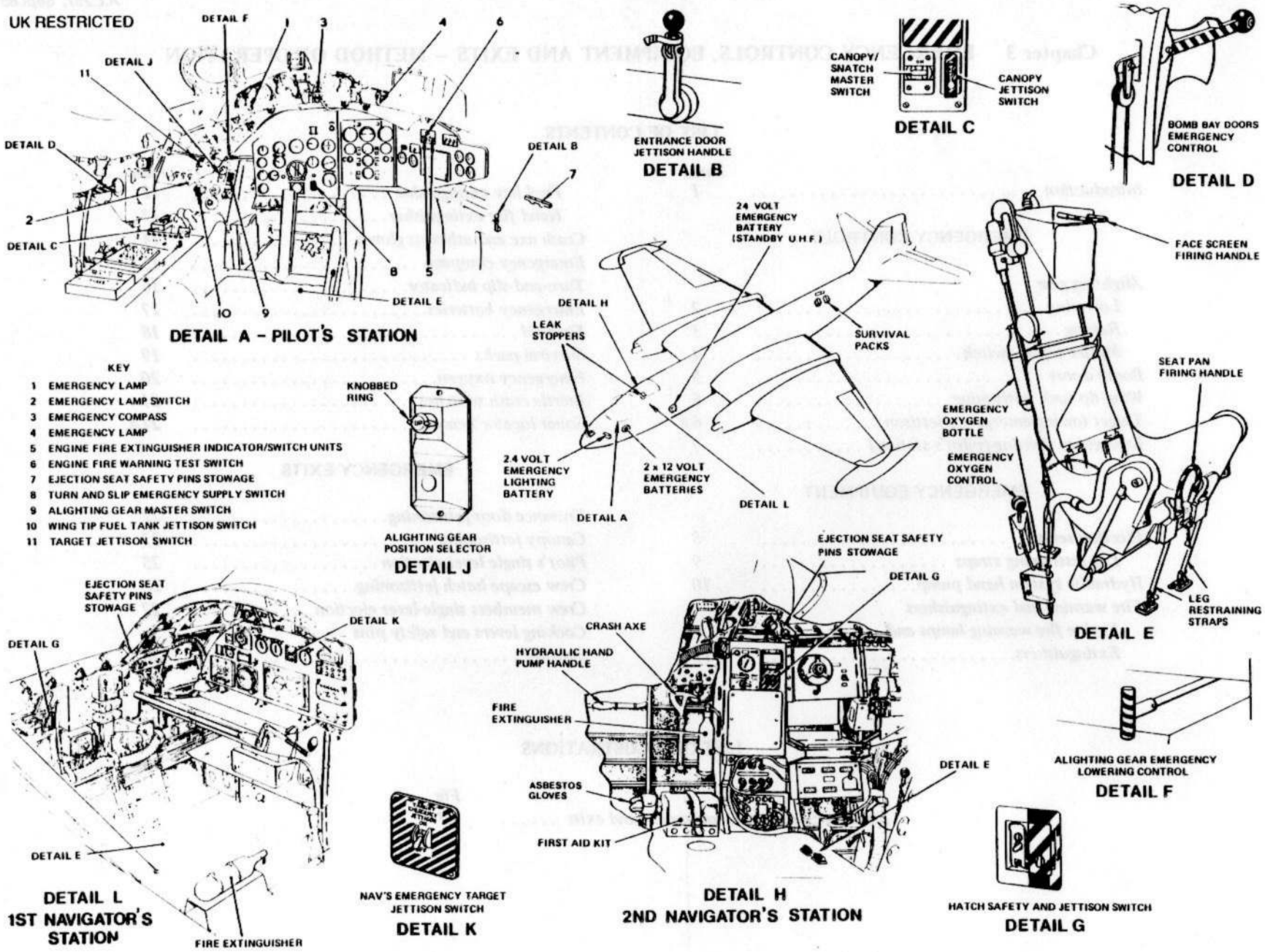

FIG.1. EMERGENCY CONTROLS, EQUIPMENT AND EXITS

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WARNING

The relevant safety precautions detailed in the LETHAL WARNING marker card must always be observed before entering the cabin or performing any operations upon the aircraft.

Introduction

1. This chapter describes the location of the emergency controls, equipment, and exits, and indicates methods of operation where this is not obvious. A full description of the systems employed, and the servicing procedure, is given in Sect.3, Chap.11.

EMERGENCY CONTROLS

Alighting gear

Lowering

2. A mechanical selector for lowering the alighting gear in an emergency is situated just above the alighting-gear panel to port of the instrument-flying panel. It is normally secured in the unoperated position by a sealed aluminium wire loop. The T-shaped handle is identified with black-and-yellow stripes and labelled U/C EMERGENCY. To operate, the handle is pulled to its full extent, and is retained in that position by a spring lock incorporated in the handle. This control is used in the event of an electrical fault rendering the normal alighting-gear control inoperative, and functions irrespective of the position of that control.

Raising

3. The alighting gear may be raised in an emergency, if the normal method of retraction fails to operate owing to the wheels being on the ground, or to an electrical malfunction. Turn the knobbed ring encircling the UP push-button on the alighting gear position selector, mounted on the port sloping panel, clockwise through 60 deg (or 90 deg according to type of switch) and then depress the UP push-button in the normal manner. Once this emergency selection has been made UP and DOWN operations may be carried out normally, but until the switch is reset there is no protection to prevent accidental retraction on the ground other than the U/C MASTER SWITCH. To reset, lightly depress the DOWN selector button and insert into the hole in the face of the UP selector button, a Dowty resetting tool Part No.ST1567 or 18 s.w.g. stiff wire. Exert sufficient pressure on the tool or wire to overcome internal spring tension until the knobbed ring rotates counter-clockwise to its normal position (the knobs horizontal to the switch body) under internal spring pressure.

WARNING

Under no circumstances should the knobbed ring be turned past the 60 deg or 90 deg stop as such action will damage the switch and may result in inadvertent retraction of the alighting gear, similarly the switch must only be reset as detailed in main para.

Master safety switch

4. A U/C MASTER SWITCH marked LIVE-SAFE is situated on the port sloping panel. The switch prevents inadvertent retraction of the alighting gear on the ground by isolating the circuits to the actuators. On the ground the switch must be at SAFE at all times, except when retraction tests are being made with the aircraft jacked.

Bomb doors

5. A control for opening the bomb doors in an emergency is situated on the port wall of the pilot's cockpit, and is held in the unoperated position by a sealed aluminium wire loop. It consists of a black-and-yellow striped lever labelled BOMB DOOR EMERGENCY CONTROL, which is moved down to operate, and is retained in that position by a spring lock. This control is used in the event of an electrical fault rendering the normal control inoperative, and operates irrespective of the position selected on that control.

Wing-tip tank jettisoning

6. The wing-tip tanks may be jettisoned by pressing a push-button switch situated on the pilot's sloping panel beneath a hinged cover which is marked FUEL TANK JETTISON and identified by black-and yellow diagonal stripes. This action detonates the charge in the three explosive bolts by which each tank is attached to the wing tip, and severs the bolts.

Target towing – emergency jettison

6A. An emergency jettison switch is fitted on the pilot's port switch panel.

6B. An emergency jettison switch is also fitted on the 1st navigator's instrument panel, between the A.S.I. and the TACAN indicator.

Emergency lighting (pilot's station)

7. Two amber emergency lamps, one at each side of the instrument panels, are controlled by a switch mounted on the pilot's radio panel and supplied with power from a 2.4-volt alkaline battery. Luminous identification marks on the switch mounting plate reveal the position in the dark.

EMERGENCY EQUIPMENT

Ejection seats

8. Martin-Baker ejection seats are installed at the pilot's and crew's stations *(Chap.1 & 2)*, the Type and Mark numbers of which are related to the aircraft modification standard. The seats are described in detail in A.P.109B-0101-1. Servicing of the seats is detailed in A.P.109B-0101-5. Stowages for the safety pins from each crew member's seat are provided in convenient locations.

Leg restraining straps

9. To prevent leg injury to crew members during ejection, leg-restraining straps are provided on each seat. These are anchored to brackets on the cabin floor; the straps then pass through snubbing units on the front of the seat pan and are connected to the safety harness straps. During ejection, the restraining straps are pulled down through the snubbing units to move the occupant's legs close to the seat pan. At a predetermined force the rivets anchoring the brackets secured to the cabin floor shear, freeing the straps from the brackets.

Hydraulic system hand pump

10. This is situated on the starboard side of the pilot's seat; its detachable handle is stowed on the starboard wall of the fuselage, aft of the entrance door. In the event of a failure of the engine-driven pumps or of the associated supply circuit, the hand pump will, after the appropriate selection has been made, operate the alighting-gear and bomb-bay doors and provide pressure for the wheel brakes. Before resorting to the use of the hand pump for lowering the alighting-gear or opening the bomb doors, operate the associated emergency control *(para.2 or 5)*. If the fault is electrical this will operate the system and render recourse to the hand pump unnecessary.

Fire warning and extinguishers

Engine fire warning lamps and extinguishers

11. Two warning lamps, one for each engine, operated by self-resetting detector switches, are located on the miscellaneous instrument panel integrally with their respective push-buttons. Two extinguishers, located one in each main wheel bay and serving the adjacent engine bay, are operated manually from the cabin or, automatically when the inertia switches *(para.21)* are tripped. When Mod.5 or 2523 is embodied, the respective "ENGINE AIR TO CABIN" gate valve switch must be set to off before the fire push-buttons are pressed.

Fuel bay extinguisher

12. A fire extinguisher is mounted on frame 27A and will discharge its contents into the fuel bay of the fuselage when the inertia crash switches *(para.21)* are tripped. There is no manual control of the fire extinguisher and no indication of conditions in the fuel bay.

Hand fire extinguisher

13. Two Type 34H B.C.F. hand operated fire extinguishers *(A.P.107E-0400-1A)* are stowed in the pressure cabin. One is clipped to the starboard cabin wall aft of the entrance door, and the other, in a raised position between the navigator's seats.

Crash axe and asbestos gloves

14. A crash axe and asbestos gloves are stowed in clips on the starboard cabin wall forward of the fire extinguisher.

Emergency compass

15. An emergency compass is situated on the coaming tube above the flying instrument panel.

Turn-and-slip indicator

16. A switch located below the turn-and-slip indicator, on the flight instrument panel, is marked NORMAL/EMERGENCY and when set to EMERGENCY will supply power from the emergency batteries to maintain the function of that instrument.

Emergency batteries

17. Two 12-volt batteries are situated below the pilot's console on the port side to provide emergency power for the operation of the detonator circuits and the turn-and-slip indicator. A 2.4-volt battery situated in the floor well near the rudder pedals operates the pilot's instrument panel emergency lighting. An emergency power supply for the stand-by radio (U.H.F.) is provided by a 24-volt battery located in the port equipment bay.

First-aid

18. A first-aid outfit is stowed in a fire-resistant stowage on the starboard side of the cabin aft of the entrance door.

Survival packs

19. Survival packs, one for each crew member, are located in stowage crates secured to the roof of the rear fuselage, between frames 31 and 36. The position of the stowages is suitably marked on the outer surface of the fuselage.

Emergency oxygen

20. Each member of the crew is provided with an emergency oxygen supply, from a cylinder attached to the starboard side of his seat, for use when abandoning the aircraft using the ejection seat. The cylinder is connected to the main supply tube at the tube quick-release socket, and is operated on ejection by a cable attached to the aircraft structure. This emergency supply may be made available to the crew member, in the event of a failure of the main oxygen system, by pulling up on the knobbed control cable at the starboard side of the seat.

Inertia crash switches

21. In a crash landing the inertia switches are automatically operated, this results in the operation of the engine and fuel tank bay fire extinguishers and the isolation of all electrical services except those to the detonator circuits of the canopy, elevator controls, and crew hatch. Each engine fire extinguisher will discharge its contents into its respective engine bay and into the fuel bay. The inertia switches are fitted, one in both the port and starboard equipment compartments.

Sonal locator beacon

21A. The Sonar locator beacon, type 17638 is an emergency locator beacon specifically designed to withstand and operate after the impact of the aircraft crashing into the sea. When submerged, the locator beacon is automatically switched ON, transmitting acoustic signals continuously for at least 240 hours. These signals can be received by shipborne or airborne equipment. The locator beacon derives its power from a two cell lithium sulphur-dioxide battery pack. The Sonar locator beacon can be function tested by manually operating the switch via the raised area of the diaphragm on the end cap, and listening for the clear acoustic pulses

EMERGENCY EXITS

WARNING

The relevant safety precautions detailed on the LETHAL WARNING marker card must always be observed before attempting to carry out any operation or inspection on the control column release and canopy and hatch jettison controls.

Entrance door jettisoning

22. The entrance door may be jettisoned by turning the cranked handle, situated in the coaming above the entrance door, in a clockwise direction as far as possible and striking the top of the door. The handle, which is marked DOOR EMERGENCY RELEASE, is normally secured against inadvertent operation by a strap. It is not necessary to operate the normal door-locking mechanism when preparing to jettison the door.

Canopy jettisoning

23. To abandon the aircraft when ditching or during a crash landing the canopy is freed by the fracturing of 32 attachment bolts which contain explosive detonators. The system is controlled by a CANOPY/SNATCH MASTER switch, and a CANOPY JETTISON switch both situated on a switch unit mounted on the console adjacent to the throttle quadrant. The CANOPY JETTISON switch is enclosed by a hinged flap identified by black-and-yellow stripes.

24. The CANOPY/SNATCH MASTER switch must be set to ON before the commencement of flight, the canopy, is then jettisonable by operating the CANOPY JETTISON switch. The CANOPY/SNATCH MASTER switch also controls the electrical supply to the elevator control tube severance unit *(para.25).*

Pilot's single lever ejection

25. To abandon the aircraft during flight the pilot ejects through the canopy by pulling the face screen or seat pan firing handle on his ejection seat. This initially fires a cartridge in the time-release and breech unit, fitted to the top of the ejection seat guide rail, from which the resultant gas pressure is arranged to operate the switch and snatch unit *(Sect.3, Chap.11).* Operation of the switch and snatch unit will fracture the elevator control tube and move the control column forward against the instrument panel, clear of the pilot's knees. Approximately one second later the main ejection gun is fired to eject the pilot in his seat through the canopy.

Crew escape hatch jettisoning

26. The crew escape hatch is secured to the fuselage structure in a similar manner to the pilot's canopy. Identical hatch jettison controls, located one on each side of the fuselage at the crew station are identified by black-and-yellow diagonal stripes and the words DANGER DETONATORS – SAFETY – JETTISON – HATCH. Each control consists of two switches, one marked SAFETY and the other JETTISON, the latter being held by a hinged clip to prevent accidental operation. The SAFETY switch must be ON before the corresponding JETTISON switch becomes operative. Operation of either set of hatch jettison controls will result in the hatch only being jettisoned; as may be required when ditching or crash landing.

Crew members single-lever ejection

27. The hatch is automatically jettisoned when either rear crew member operates the face-screen, or seat-pan firing handle of his ejection seat. A safety-catch, positioned in the restrictor of the breech type time-delayed firing unit of the ejection gun, ensures that the seat ejection of the crew member initiating the ejection is delayed until the hatch is jettisoned *(Sect.3, Chap.11).* The remaining crew member may then eject by operating either firing handle on his seat. The hatch jettisoning SAFETY switch must be ON prior to rear crew ejection.

Cocking levers and safety pins stowage

28. Situated on the centre-line on the front of the pressure bulkhead is a stowage for the cocking levers (post Mod.3960). These tools are used to cock the hatch jettisoning mechanism. Stowages are also provided in the cabin for the ejection seat safety pins together with their integral tallies *(Chap.1, fig.4 and Chap.2, fig.1 and 2).*