

SFIM 146 AUTO-PILOT

FOR NAVY ALOUETTE III



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AUTO-PILOT DEPARTMENT

Ref. D5 - 44 146

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FOR NAVY ALOUETTE III

October 12th 1982



- INTRODUCTION -

To enhance the operational characteristics of the Alouette III, S.F.I.M. has tailored the SFIM 146 Autopilot to this helicopter with emphasis on :

Pilot workload

Mission reliability

Flight safety

This system was designed to give a significant reduction in the pilot's stickwork, thus allowing him to devote more attention to his flight and mission management tasks and reducing his stress and fatigue in long distance and/or poor weather flights.

The SFIM 146 Autopilot was developed as a solution to current Navy problems, namely :

- Flight in bad weather, day and night IFR,
- Flight at low altitude (about 200 feet) over the sea for all weather anti-submarine or anti-surface missions,
- Take-off and landing from frigates or destroyers in bad weather and heavy sea conditions.

The SFIM 146 Autopilot is used by the French Navy and many other foreign Navies.

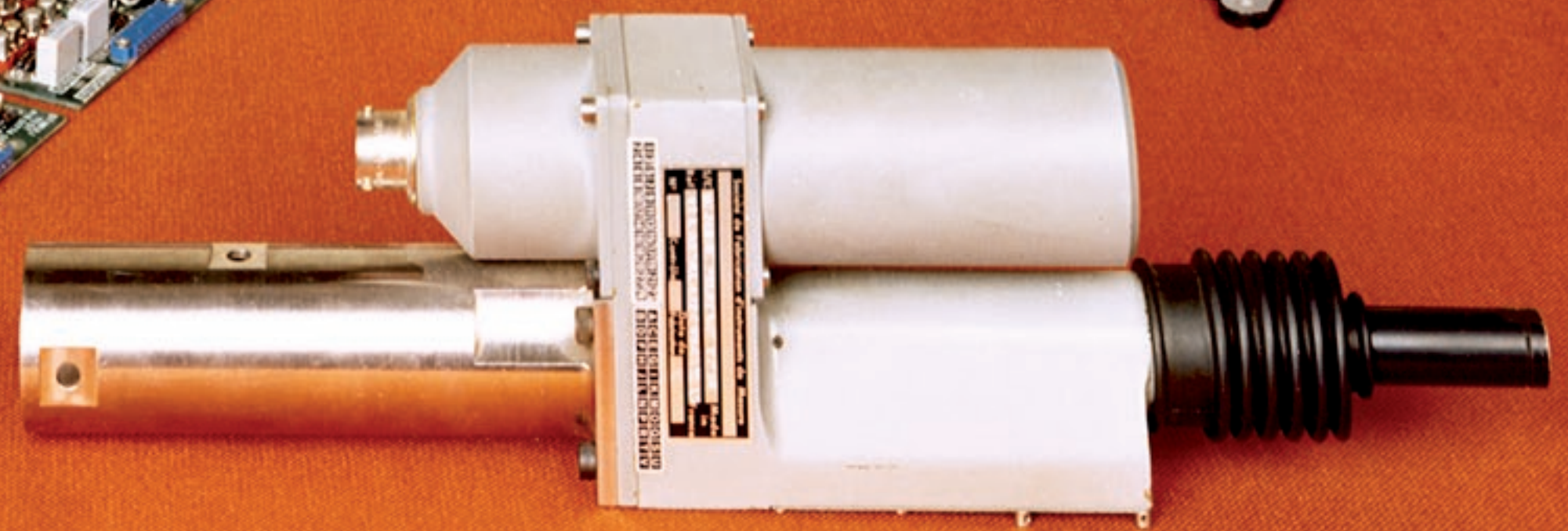
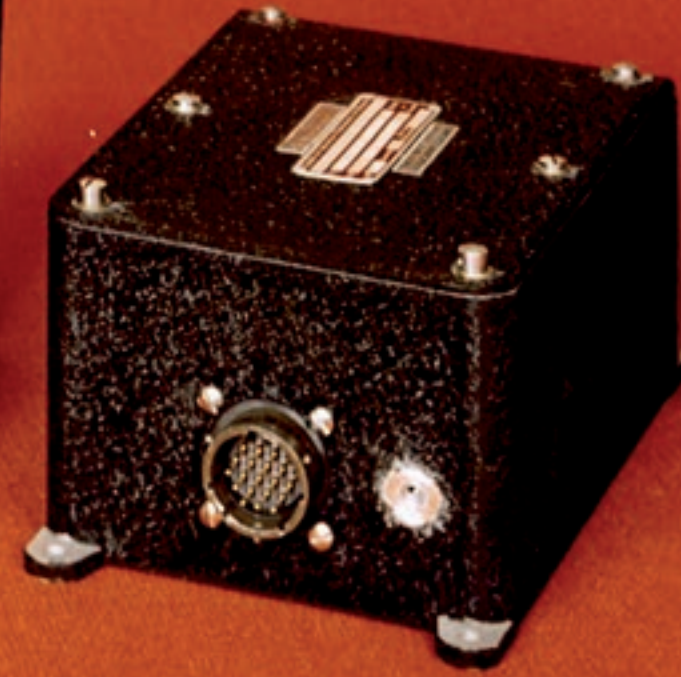
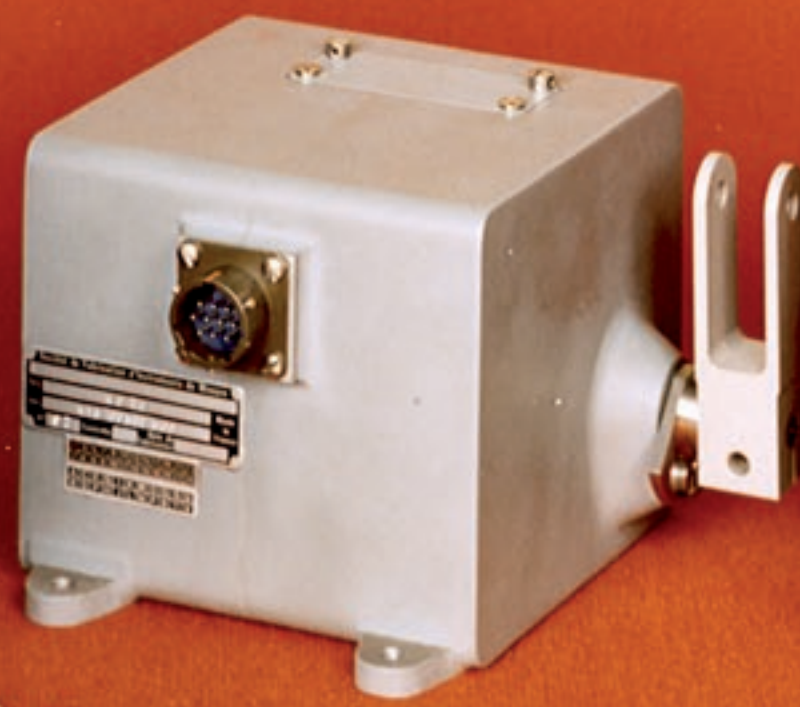
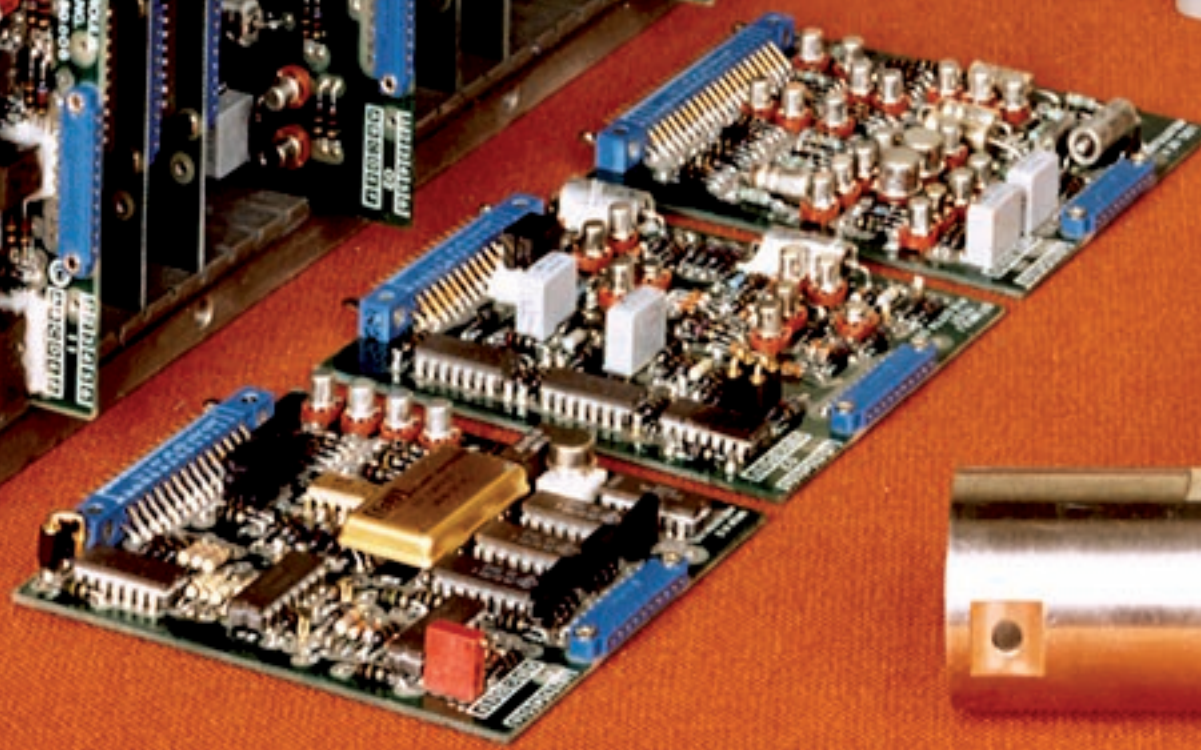
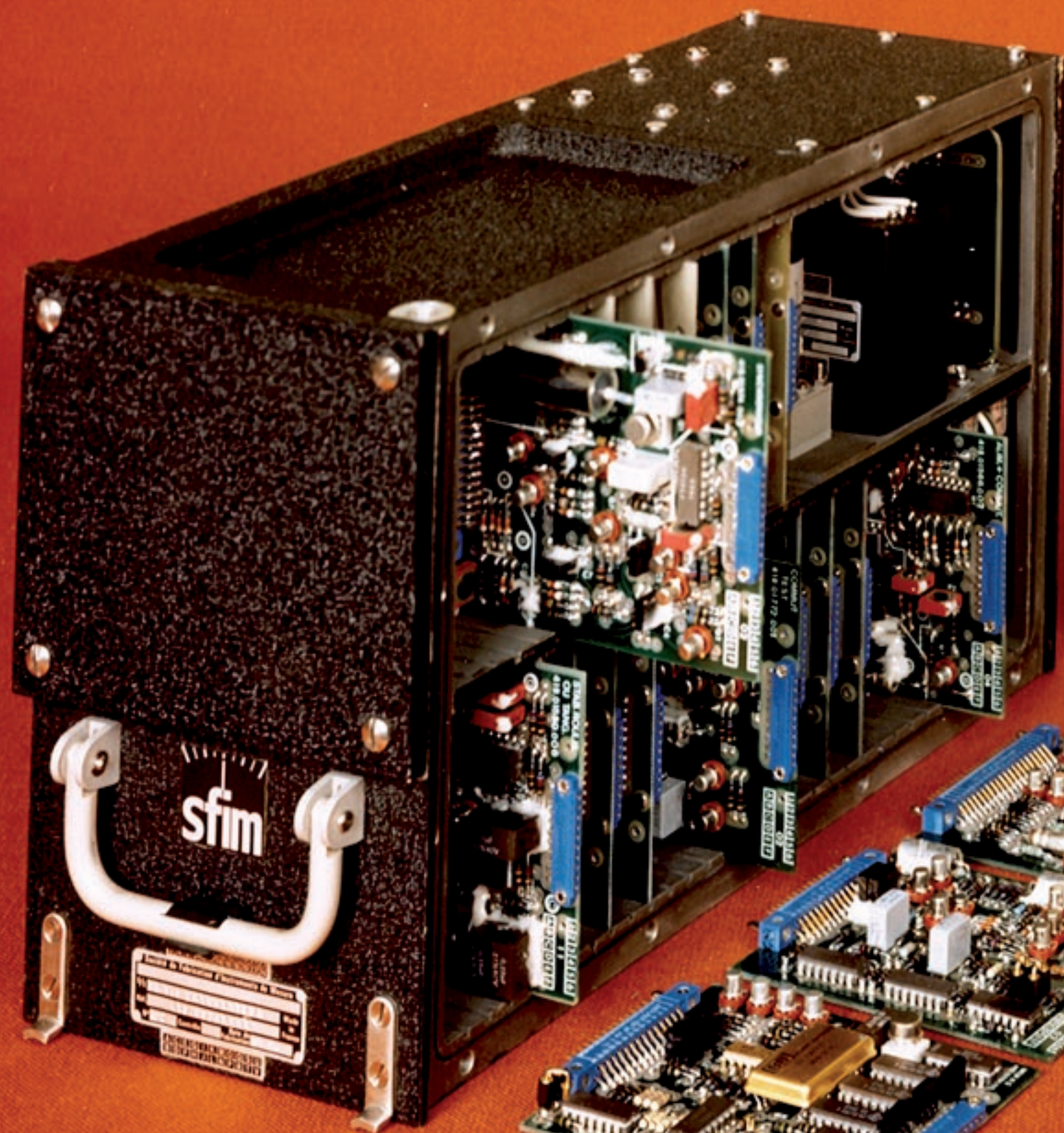


COMPONENTS

AP SFIM 146

<u>Designation</u>	<u>Reference</u>	<u>Quantity</u>
Autopilot Computer	418.00343.000	1
Mode Controller	418.00354.000	1
Display Unit (Actuator positions indicator and failure alert)	418.00358.000	1
2-axis accelerometer unit	418.00351.000	1
Pedal movement detector	418.00404.000	1
Pitch trim actuator VC 20	418.00302.000	1
Pitch trim actuator control box	418.00372.000	1
<u>Peripheral Units</u>		
Vertical gyro VG 76-2	454.00162.000	1
Gyro-Compass CG 121	58 096 000	1
Radio-Altimeter Sensor	TRT AHV6	1

Nota : This list is valid for Alouette III's already fitted with SAS SFENA systems.





SYSTEM PERFORMANCE

• Pitch and Roll axis

In the autopilot function the computer generates a piloting law which is used to stabilize and to dampen the pitch and roll attitudes of the helicopter. For this purpose the computer works from data supplied by the remote vertical gyro. This function is particularly well adapted to flight in poor weather conditions, as it improves the static and dynamic stability of the helicopter, thus enabling the pilot to fly "hands off".

To change the reference of the autopilot the pilot can use :

- the trim release button
- or
- the 4-way cyclic trim button by "beeping" in the desired direction. When the pilot ceases his action the new reference is locked.

• Yaw axis

The heading data from the gyromagnetic compass is processed in the A.P. Computer then transmitted to the yaw actuator, thus ensuring stabilization of the heading fixed by the pilot.

If the " Turn coordination " mode (CR) is engaged with an airspeed of over 30 Knots, the yaw channel automatically co-ordinates the turn when the pilot moves the lateral cyclic stick. This mode is optimized for small (1 or 2 degrees) heading changes necessary for MAD patterns.



- Radio-altitude hold -

When the pilot engages the radio-altitude mode, the radio-altimeter supplies altitude deviation data to the autopilot. These data are used to control the pitch evolution of the helicopter.

A "swell effect filter" is used to decrease the effect of waves for comfort of stabilization and for the performances of the MAD.

- Flight Safety and Pre-Flight Test

In order to increase flight safety, especially when the radio-altitude hold mode is used (MAD missions at very low altitude), a monitoring and warning system is used to reduce the loss of altitude in case of failure or crippled mode operation of the flight control system.

In addition, a test system is used to check the validity of the autopilot, together with its safety systems, before each flight.



SUMMARY OF WEIGHT, DIMENSIONS AND POWER SUPPLY

<u>Designation</u>	<u>Weight</u>	<u>Dimensions</u>	<u>Power Supply</u>
A.P. Computer	6,6 Kg	335 x 190 x 125 mm	208 AC, 3-phase. 400Hz 40 VA per phase 27 V DC, 14 W
Flight Controller	0,570 Kg	145 x 56 x 130 mm	27 V DC, 15 W
3-Actuator position ind.	0,340 Kg	145 x 40 x 100 mm	27 V DC, 3 W
2-Axis accelerometer	0,850 Kg	80 x 100 x 100 mm	115 V AC, 1 phase, 400Hz
VC 20 Trim Actuator	2,200 Kg	140 x 140 x 100 mm	26 V AC, 400 Hz, 3 VA
VC 20 Control Box	0,750 Kg	180 x 98 x 75 mm	27 V DC, 17 W
