

EIGHTH EUROPEAN ROTORCRAFT FORUM

Paper No. 12-10

THE AS 332 L SUPER PUMA HELICOPTER
IN OFFSHORE TRANSPORT AND SAR MISSIONS

G. TEMIME

AEROSPATIALE - HELICOPTER DIVISION
LA COURNEUVE - FRANCE

August 31 through September 3, 1982
AIX-EN-PROVENCE, FRANCE

ASSOCIATION AERONAUTIQUE ET ASTRONAUTIQUE DE FRANCE

THE AS 332 L SUPER PUMA HELICOPTER
IN OFFSHORE TRANSPORT AND SAR MISSIONS

BY Gérard TEMIME

AEROSPATIALE - HELICOPTER DIVISION

ABSTRACT

The Super Puma AS 332 L, a twin-engined, 19 to 22 passenger, medium weight helicopter has been selected by most of the world's leading operators for offshore transportation, particularly in the North Sea.

Its cabin size, baggage area and comfort features make it very well adapted to the transport missions.

The risks connected with offshore drilling in rough seas have led the oil companies to ask for a fast means of search and rescue.

Aérospatiale proposes the AS 332 L for transport and SAR missions integrating the latest avionic technologies for navigation, detection and autopilot coupling to ease the pilot workload in the worst atmospheric conditions.

SUMMARY

- FOREWORD
- TRANSPORT MISSION
- SEARCH AND RESCUE MISSION
- CONCLUSION

FOREWORD

The AS 332 Super Puma over the forthcoming years will be the twin-engined medium weight helicopter of the new generation which will be the most used over offshore oil fields. (Fig. 1)



Fig. 1

Indeed, over 100 units of this helicopter have already been ordered by the leading world operators. (Fig. 2). More particularly, it has been selected by most of the North Sea operators. (Fig. 3).

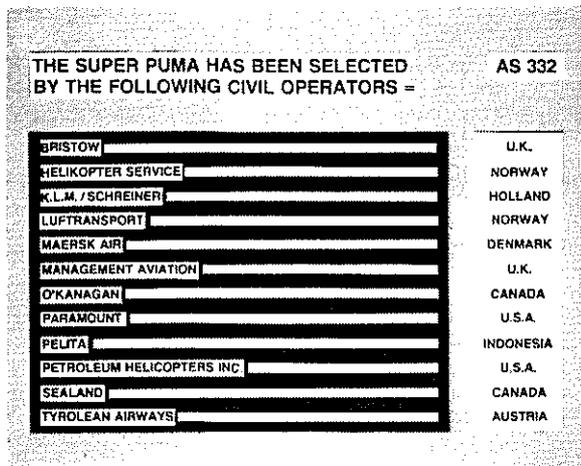


Fig. 2

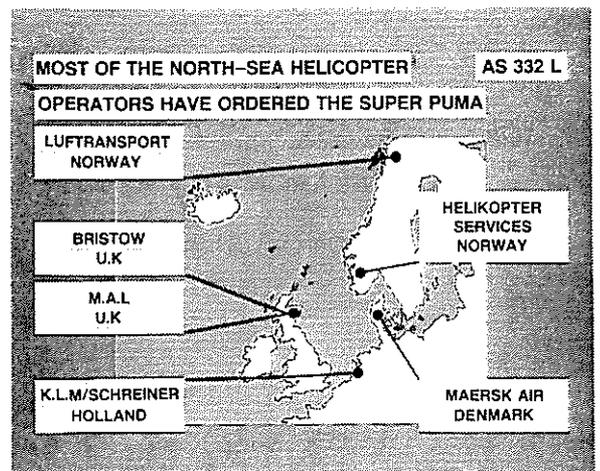


Fig. 3

In its stretched version, the AS 332 L, this helicopter can carry 19 passengers with a radius of action of 150 n.m. with IFR reserves. (Fig. 4). Its fast cruising speed is 145 kts.

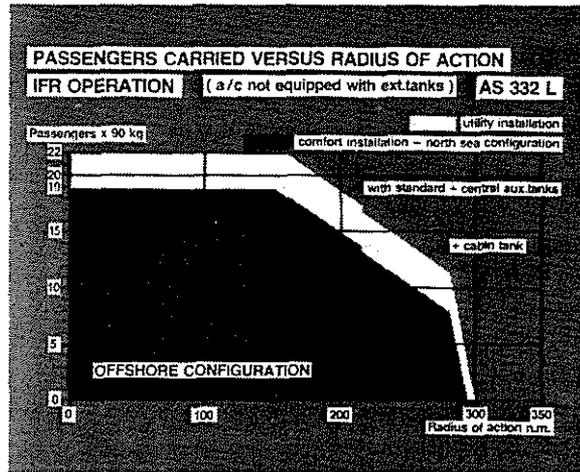


Fig. 4

Spearhead technologies, high level of safety and brilliant performance are the chief characteristics of this aircraft which, as a matter of fact, benefits from the operational standpoint from the experience acquired over 12 years with nearly 700 Pumas flying under every clime. (Fig.5).

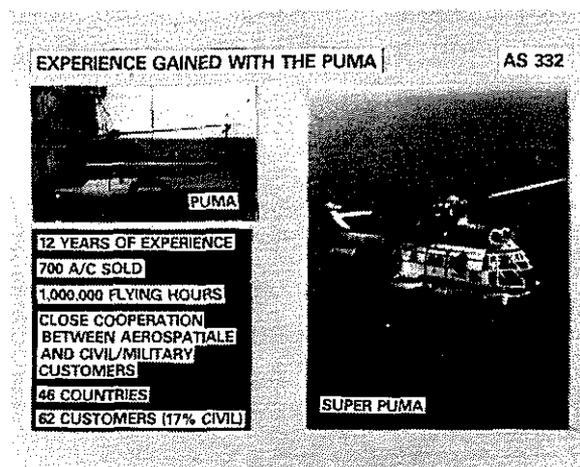


Fig. 5

A new request was made to us regarding offshore operations by the Norwegian Company, Helikopter Services on behalf of Philips Petroleum. The problem is to perform a search and rescue mission with an aircraft embodying the most up-to-date piloting and navigational equipment. (Fig. 6). Other operators have also shown interest in this type of utilization whether the aircraft is offshore based or not.

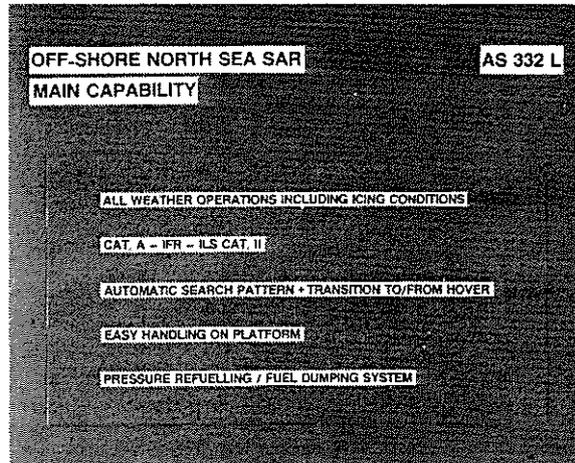


Fig. 6

There are indeed throughout the world many possibilities for an SAR aircraft to intervene in offshore oil-fields :

- Rig accident : fire, explosion, capsizing (Fig. 7)
- Ditching of helicopters
- Casualty evacuation etc.

These possible occurrences justify the requirements of oil companies with respect to the supply of specialized helicopters embodying the very latest technology.

The mission for such a type of aircraft is twin-fold :

- Daily passenger carrying
- Rescue

We are therefore going to examine the characteristics and equipment of the Super Puma in these 2 uses.

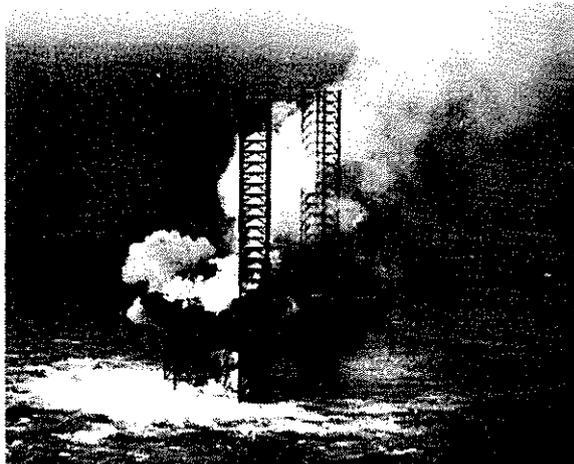


Fig. 7

TRANSPORT MISSION

The AS 332 L is a helicopter which is perfectly suited to passenger transport missions through its cabin volume (13.42 m³ with no protuberance) capable of carrying 19 passengers (Fig. 8) together with their luggage in a vast rear compartment of over 2.3 m³. (Fig. 9).

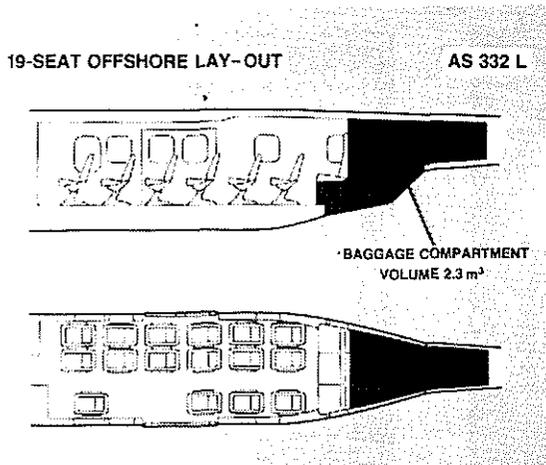


Fig. 8

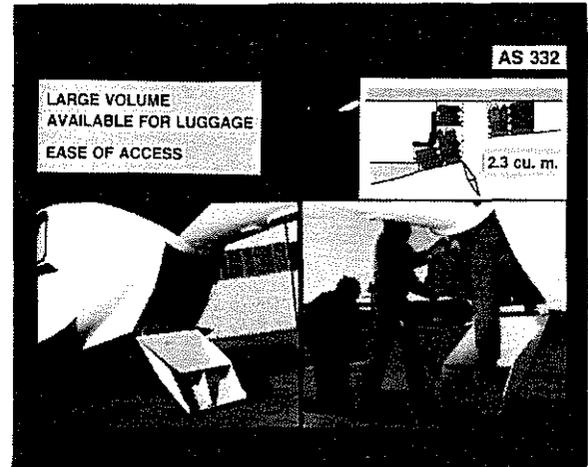


Fig. 9

A helicopter which can be used for transport and SAR does not mean that it ought to be in the uncomfortable utility configuration. A new type of seat has been launched in production for fitment to the Super Puma. These are twin-place and single-place seats of a high level of comfort the additional characteristic of which is being immediately foldable against the walls to provide a large volume quickly in the event of load carrying and rescue missions. (Fig. 10).

The high density configuration with utility seats makes it possible to offer, in the event of rescue, 22 seats for rescuees + 3 cabin crew + a crew of 2 in the cockpit.

Passenger comfort is also good external visibility with wide windows (Fig. 11), airline type internal upholstery with indirect ambient lighting (Fig. 12).

It is also a noise level which has been reduced through the use of a suitable sound-proofing and a low vibration level of about 0.15 g at cruise speed.

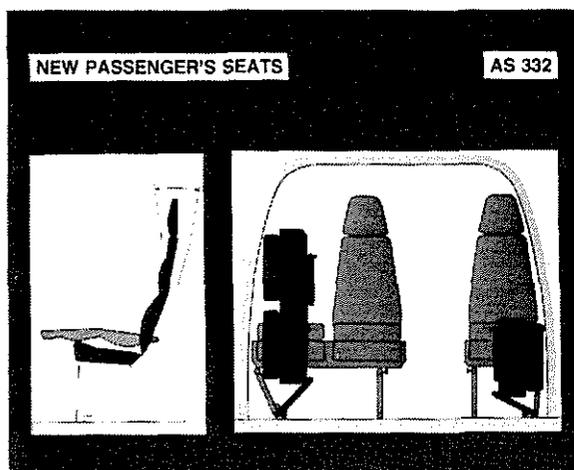


Fig. 10

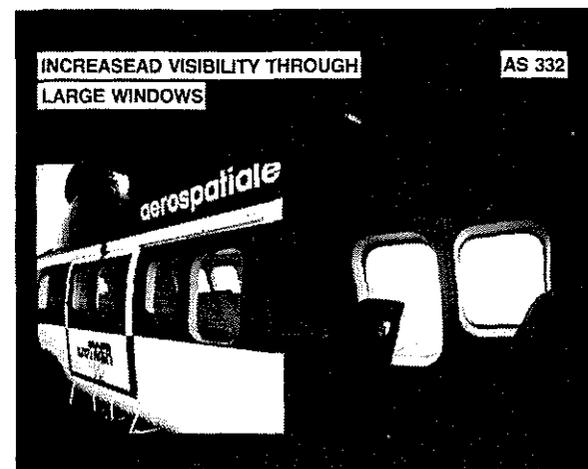


Fig. 11

Safety when flying over the sea has led us to provide for the fitment of equipment such as emergency floatation gear, floating anchor etc, but, also dinghies mounted externally in the main landing gear fairings making it possible to ensure quick and practical evacuation in the event of ditching yet without cluttering the cabin in folded position. (Fig. 13).



Fig. 12

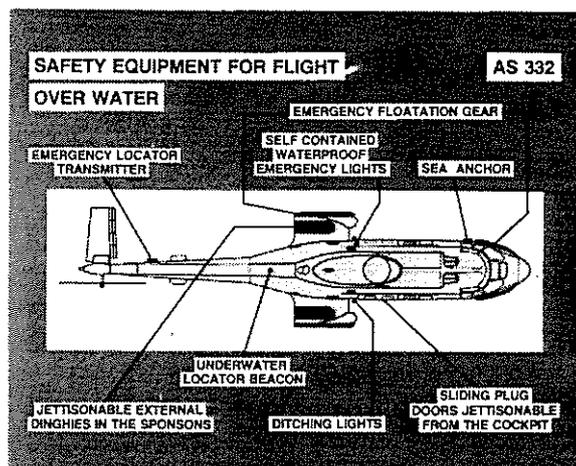


Fig. 13

In the case of a transport/SAR helicopter, the permanent fixture of a hoist is essential. The Super Puma is then fitted with a hydraulic hoist whose capacity is 275 kg. This equipment is mounted outside the aircraft and does not interfere with the passenger transport mission. (Fig. 14).



Fig. 14

SEARCH AND RESCUE MISSION

In the event of an alert being sounded, the aircraft with its folding seats, its hoist etc. is at once ready in the SAR configuration.

We are therefore going to examine what the various navigation and piloting equipment is which makes it possible to conduct this mission successfully in all weathers and reduce the crew's workload.

The SAR system of the Super Puma is modular and incorporates the most recent technology. It comprises chiefly a DECCA RACAL navigation system, a BENDIX radar, a multifunction display and a flight management system. Piloting aid is performed through a SFIM flight director coupler.

■ NAVIGATION - THE DECCA RACAL R-NAV. SYSTEM

The system consists of a navigation computer unit and a control display unit. It accepts navigational data from the following sensors :

- VOR/DME
- DECCA/RACAL MK 32 receiver
- DOPPLER EMD CINA B
- Air Source (MARCONI LASSIE air data system).

It has a capacity of 100 waypoints and upto 30 stored routes (assembled waypoints). Connected to the flight director coupler, it also provides automatic leg change with turn anticipation. It can generate SAR patterns.

The display can indicate the present position, the heading to steer to reach the selected waypoint and ETA, desired track, ground speed, wind speed and direction, bearing and distance to any waypoint etc. (Fig. 15).

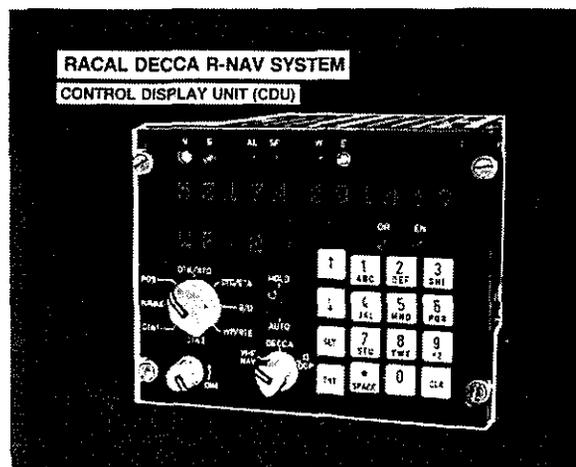


Fig. 15

■ DETECTION - THE BENDIX 1501 RADAR

The BENDIX 1501 radar is especially suited to SAR missions. Its signal processing capacity allows the interface unit to detect small echos in strong seaclutter.

The BENDIX 1501, a direct derivative of the 1301 which was selected by the US Coast Guards for fitment to the Dauphin 2, possesses in addition a marker beacon function.

It is fitted with an 18" antenna (Fig. 16). It is employed in weather mode and for detecting large echos with a pulse duration of 2.35 microseconds or 0.1 microseconds for the accurate detection of small echos.

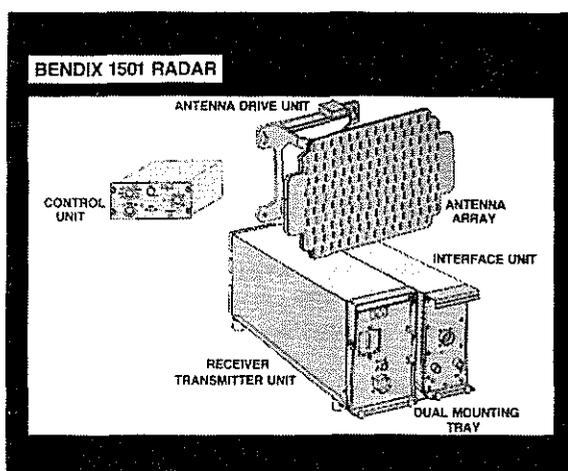


Fig. 16

■ THE BENDIX MULTI-FUNCTION DISPLAY SYSTEM

This unit (Fig. 17) comprises two independent subsystems each receiving information from different pick-ups.

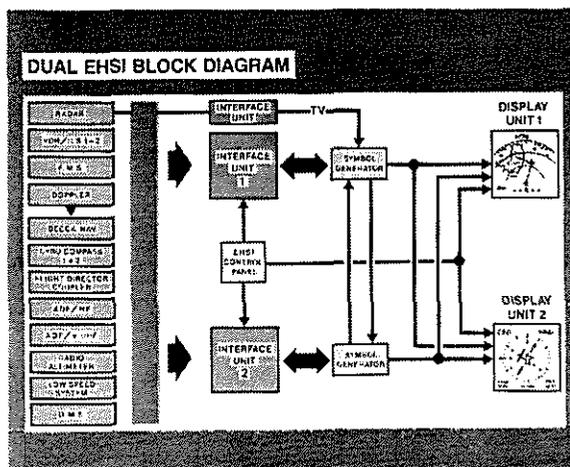


Fig. 17
12-10 8

Each sub-system comprises :

- a box for adapting and processing the information (interface unit)
- a symbol generation box
- a video screen

The display in the Super Puma cockpit, on the instrument panel, is therefore ensured through 2 screens each located in front of a crew member.

A flight controller (Fig. 18) allows the following functions to be obtained.

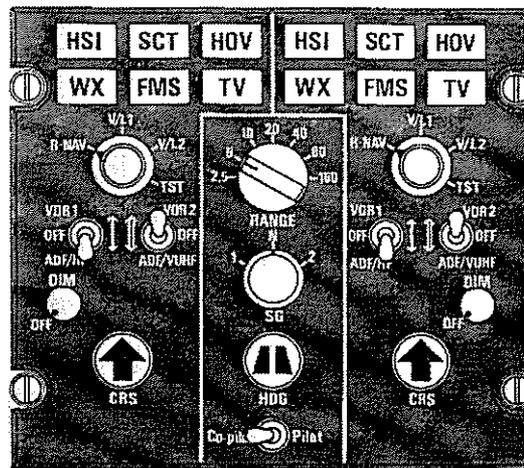


Fig. 18

- E HSI (Fig. 19)
- Segmented HSI/radar (Fig. 20)
- Hover display
- Weather radar
- Radar (TV mode)
- Flight management system.

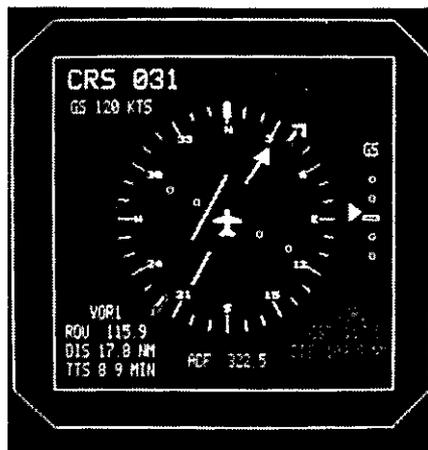


Fig. 19



Fig. 20

The Flight management system functions are divided into fuel management, performance pilot aids, engine health monitoring and CG computations.

■ PILOTING AID

To reduce the pilot's workload in flying the aircraft, the Super Puma is fitted with a SFIM 155 duplex type autopilot with CDV 155 flight director coupler (4-axis autopilot assembly). (Fig. 21)

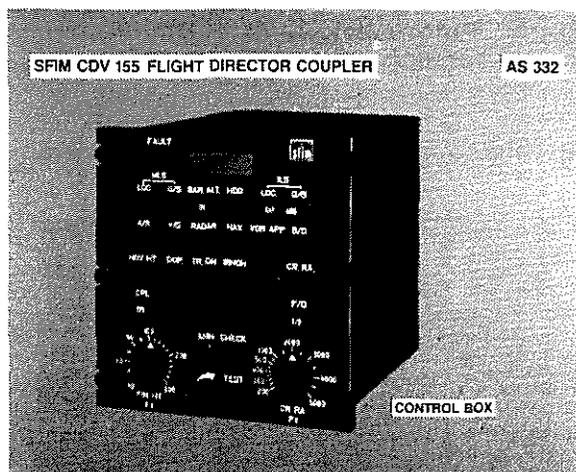


Fig. 21

Over and above conventional functions of an autopilot regarding the control of the flight :

- Heading select
- Airspeed hold
- Bar-alt. hold, vertical speed select.

or the coupling with various navigation systems :

- NAV. route intercept and track
- LOC or ILS automatic capture and track (Category 2 operation)
- ILS-LOC back course coupling
- Go-around,

this equipment is capable for the SAR missions of the following modes :

- Nav. pattern automatic following (SAR pattern)
- Automatic transition to/from hover with or without Nav. aid (Fig. 22 and 23)
- Automatic doppler speed hold
- Automatic radio-height hold
- Automatic hovering
- Winch joy-stick operation

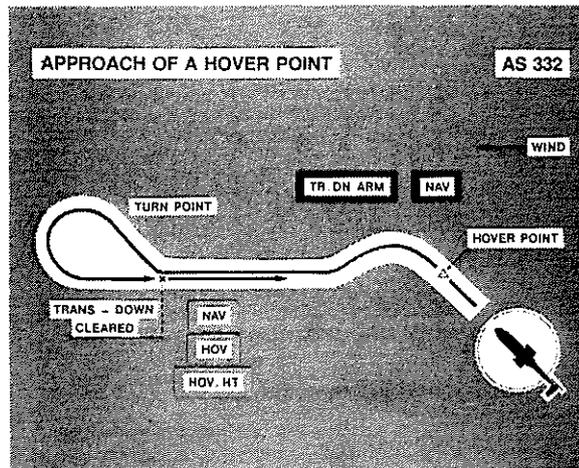


Fig. 22

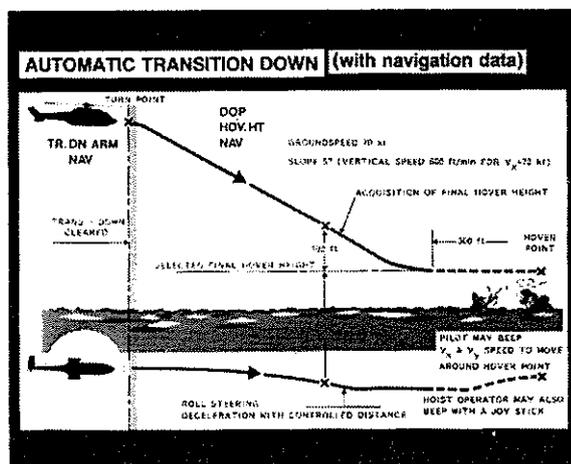


Fig. 23

CONCLUSION

Aérospatiale with the AS 332 L Super Puma in its offshore transport/SAR version has therefore strived to propose an aircraft meeting the requirements of operators as regards offshore liaison work under the very best safety and performance conditions.

It has also attempted, with a view to meeting the growing preoccupation with fast rescue, to embody the most recent technologies to ensure this mission, the aircraft being particularly well suited to these two requirements taking into account its cabin volume, its power plant and useful load.

These avionics therefore provide a maximum number of functions for piloting assistance.

The Super Puma's useful load is such that it permits, taking as an example the Ekofisk area (Fig. 24) i.e. a totally equipped aircraft including rotor de-icing, the rescue :

- in VFR of 20 people from the whole area (90 n.m. + 90 n.m. for return on rig)
- in IFR in the most unfavourable case 14 people with return to Stavanger (206 n.m. from the rescue area).

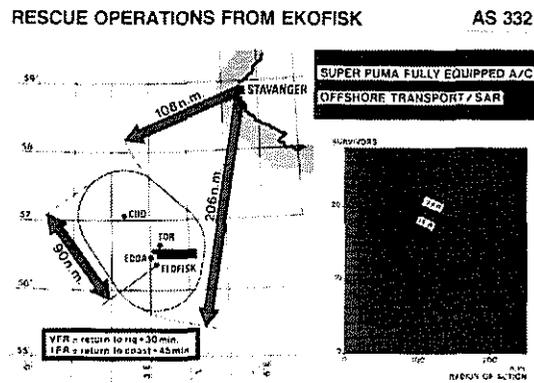


Fig. 24