

# CASE STUDY OF SPILL RESPONSES UNDERTAKEN BY AND PRACTICAL ISSUES OF IMPLEMENTING A TIER 2 AERIAL DISPERSANT AND SURVEILLANCE SERVICE IN WEST AND CENTRAL AFRICA<sup>1</sup>

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## ABSTRACT

*Following detailed investigation into the need and practical issues involved, The Global Alliance successfully implemented a cost effective solution to provide a Tier 2 regional aerial dispersant and surveillance service in West and Central Africa (WACAF).*

*The will paper provide a case study of*

- i) The practical issues concerned with the implementation of the project from conception, through development and implementation. Transboundary issues concerning the logistics and deployment of the service and location of depots are discussed along with the need for the oil community to work closely together and with national authorities are discussed.*
- ii) The solution and rationale adopted to enable an effective response and cost effective service.*
- iii) The response and lessons learnt by The Global Alliance following the deployment of the service to two live spills in the region.*

*Video footage of the aircraft trials and an actual spill response will be provided along with details of the aircraft and associated equipment.*

## INTRODUCTION

With the growth in oil exploration and production activity in West and Central Africa ('WACAF') the Alliance recognised that a significant gap existed between the risk and the response capability within the region. Whilst no legislative obligation existed or exists to increase the response capability, it was recognised that there was a need to improve the overall response preparedness in a cost effective manner. Having established that the oil type from this region is amenable to the use of dispersants, it became apparent that the optimum means of providing a versatile cost-effective response is by the provision of aerial surveillance and dispersant capability using an aircraft already based and undertaking commercial operations within the WACAF region. The aim was to implement a service capable of providing a low volume rapid reaction dispersant capability to 'fill the gap' before the Hercules and the ADDS (Aerial Dispersant Delivery System) Pack System

arrive on site or to remove the need to deploy the Hercules (Fig.1) for small spills.



FIG.1 - ONE OF TWO HERCULES AIRCRAFT OPERATED BY THE GLOBAL ALLIANCE.

## DEFINING THE REQUIREMENTS

### The equipment

An initial desk study was carried out to assess the key requirements and potential problems of the project. The technical and operational parameters were set to meet the need for a cost effective and rapid response service. The aircraft needed to be available on a 24/7/365 basis and mobilised for a response in dispersant and/or surveillance mode in six and four hours respectively. The spray and surveillance equipment therefore needed to be simple and rapid to fit to the aircraft. The design of the equipment had to be such that the aerial handling and performance characteristics of the aircraft including range and payload were maintained. A range of 200 nautical miles with 2 tonnes of dispersant was specified.

### Location

The targeted region for the operation of the aircraft was set as Ivory Coast to Angola (Fig.2). To minimise response times to any part of the region, the aircraft was required to be centrally located

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in the Cameroon / Equatorial Guinea area. To minimise transit and reloading times, stockpiles of dispersant were required to be positioned in three or four strategic locations. Each stockpile had to be stored in secure premises, which allowed rapid access to local airfields. Additionally, to eliminate reliance on local infrastructure, the stockpiles needed to be self-contained for loading of dispersant. The service would be required to operate 365 days a year and thus backup aircraft would be required to cover for maintenance and downtime periods.

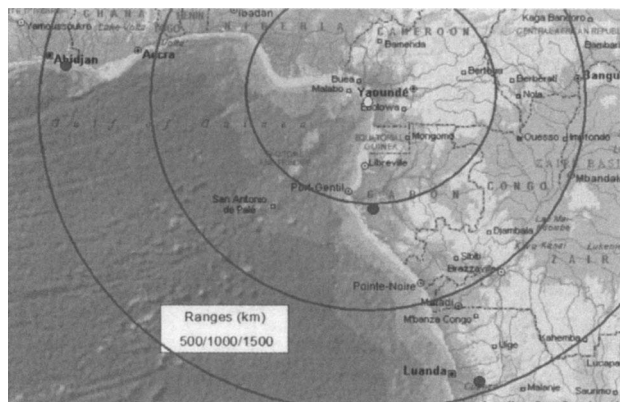


FIG.2 - MAP OF THE WACAF REGION.

#### Cost

For the project to be viable the service had to be cost effective. This required the use of an aircraft which when not being utilised for oil spill activities was able to undertake normal commercial aviation activities. The standby costs and the initial investment in the surveillance and spray equipment development and purchase would be substantial and required the commitment from several operators to subscribe to the service for a minimum period of three to five years.

#### Logistics

The rationale for the project was based upon a rapid response to the WACAF region. This region has some substantial transboundary issues that would need to be overcome to ensure that the aircraft and associated equipment and personnel were not delayed or detained by customs and immigration authorities. Whilst The Global Alliance could assist in facilitating access, the responsibility for ensuring transboundary movement had to rest with the oil companies and their host nations. Additionally, the aircraft operators need to be well versed in obtaining flight clearances.

#### THE SOLUTION

The requirements outlined above lead The Global Alliance to enter discussions with Naturelink; a South African based aviation company that has extensive experience of aviation operations in West Africa. As well as being experienced operators, Naturelink own and operate three Embler Bandeirante ENB 110 P1 which are fitted with a large aft cargo door. The door enables a portable 2000 litre dispersant tank to be fitted internally. Range is 200nm radius with a full tank of dispersant and the aircraft has transit and spraying speeds of 200 knots and 120 knots respectively.

Naturelink designed, manufactured and obtained South African Civil Aviation Certification approval for fitting the portable internal tank (Fig.3), wing mounted spray booms (Fig.4) and associated pump and control units (Fig.5). Certification approval was aided

by the modifications requiring limited structural changes to the aircraft. The safety of the aircraft was a priority and a dump valve was fitted to enable the dispersant to be rapidly discharged in the event of an aborted takeoff.



FIG.3 - THE SPECIALLY DESIGNED DISPERSANT TANK AND PUMP UNIT.



FIG.4 - VIEW FROM BELOW OF THE WING MOUNTED SPRAY BOOMS IN ACTION.



FIG.5 - MODIFICATIONS ENSURED THAT THE EQUIPMENT COULD BE EASILY FITTED INTO THE AIRCRAFT.

Following completion of the modifications extensive flight tests were conducted to check the aircraft flight characteristics and to establish firm procedures for operating the aircraft in surveillance and spray modes. The Global Alliance and Naturelink undertook training of the flight crews in the procedures and techniques of aerial surveillance and dispersant application. Following completion of the flight tests a second and third aircraft were modified to take the equipment.

To enable coverage of the area from Cote d'Ivoire to Angola, dispersant stockpiles were located to Luanda, Port Gentil, Malabo and Abidjan. Each stockpile was delivered in a secure 20ft container and of a dispersant loading system for the aircraft, consisting of pump, hoses and the necessary connections and a minimum of 4 tonnes of dispersant. Each container is stored by a subscribing

oil company who hold the container lock key and also provide maintenance and activation assistance.

To enable a rapid response it is essential that the surveillance and spray equipment is located at the operational base of the aircraft. Initially the aircraft was based at Malabo and latterly at Douala.

In order to satisfy the cost effective criteria the aircraft is free to undertake commercial services provided the response times of four and six hours for surveillance and dispersant spraying respectively are maintained.

### IMPLEMENTATION SCHEDULE

Contracts were signed in July 2003 between The Global Alliance and Naturelink for the development and production of the dispersant spray system and modifications to the aircraft. Commencement of operations in West Africa was set as no later than the end of October 2003.

Concurrently with the work undertaken by the aircraft owner, The Global Alliance signed contracts with ten of its members to subscribe to the service and procured and shipped equipment and dispersant to the four stockpiles. The latter was on the critical path of the project due to the long shipment and custom clearance times in the targeted locations.

Following completion of trials (Fig. 6&7), training and incorporation of callout procedures the service went live on October 23rd 2003.



FIG.6 - FIRST TEST FLIGHT OF THE DISPERSANT SYSTEM.



FIG.7 - FLY-BY OF TANKER DURING ACCEPTANCE TRAILS IN SOUTH AFRICA.

### TRAINING

Training in all aspects of the service is critical to the success of the project. The Global Alliance undertakes activation and call out exercises as well as ensuring that the aircraft operators are regularly trained and updated in the use of the surveillance and spray equipment. With the location of the stockpiles and the need for the local operators to be able to deploy and use the loading equipment, The Global Alliance undertakes regular visits, training and audits of the equipment and personnel. A key issue is to ensure that sufficient personnel are trained to cover the rotation of key oil company personnel.

The aircraft operator undertakes regular deployment exercises to ensure that its personnel can rapidly fit the equipment to the aircraft (Fig. 8&9). The ultimate exercise is an unannounced exercise callout from one of the subscribers. This tests all aspects of the service and involves all parties. The Global Alliance encourages its members to undertake such callouts. Following implementation of the service in late October 2003, it was planned to undertake a real time exercise in early November 2003 to test the notification, mobilisation, loading procedures and the logistics of the service. However, a week before this event a real call-out was received which almost exactly mirrored the proposed exercise.



FIG.8 - PREPARATION OF THE AIRCRAFT FOR DEPLOYMENT IS REGULARLY REHEARSED DURING TRAINING.



FIG.9 - THE RESPONSE CREW PRACTICE LOADING THE DISPERSANT INTO THE TANK.

### LIVE CALLOUTS

#### Spill 1

In mid November '03 The Global Alliance was contacted by one of the subscribers to the WACAF service. The oil company, operating offshore Gabon, reported a leak from a sub-sea pipeline with an estimated loss of several hundred barrels of oil (Fig.10). Following an activation call to The Global Alliance the Naturelink aircraft was mobilised in Malabo and loaded with dispersant for

the flight south. Surveillance was undertaken on the mobilisation flight to identify and quantify the extent of the slick. Upon arrival at the spill site the aircraft, using a helicopter to assist with pinpointing the areas to spray, applied dispersant to the site. The aircraft was refilled with dispersant in Port Gentil and operations continued until the next day, when the aircraft was stood down.



FIG.10 - AERIAL PHOTOGRAPH OF THE SCENE FROM SPILL 1.

### Spill 2

Two weeks later a second response was required for an incident in Nigeria. Initial estimations indicated that several thousand barrels had been lost due to a valve failure onshore. The oil had escaped from a tank banded area and flowed through a storm drain, over the beach and into the sea. A slick had formed along the coast approximately five km long and up to 3 km wide and the environmental risk was large. The Naturelink aircraft was put on standby and at the same time preparations were being made at The Global Alliance Southampton base as it was thought that this incident could escalate into a Tier 3 incident. Naturelink was requested to remain on stand-by overnight but not to commence operations until they received notification in the morning. Early morning surveillance by the Client helicopter showed that the extent of the pollution was not as severe as had been feared. However, the WACAF aircraft was activated to undertake surveillance operations. Reports indicated that there was little oil at the given location and the aircraft remained on stand-by until the following day when operations were stood down.

Both of the above spill responses demonstrated:

- The response capability and logistics of the WACAF aircraft;
- The value of having access to a local, rapid and cost effective aerial response service in the region. The cost differential of deploying the WACAF aircraft compared to the Hercules aircraft is substantial. The relatively low cost of activating the WACAF aircraft makes the decision of the oil company response team much less arduous.

As with all operations lessons were learnt and improvements made to procedures and ways of working.

### THE FUTURE

The WACAF aircraft will continue to provide a rapid and cost effective aerial surveillance and dispersant spray service to the region. Political issues in Equatorial Guinea required the aircraft operating base to relocate from Malabo to Douala in Cameroon in early 2004. Relocating an aircraft is relatively easy compared to moving the equipment across international borders in West Africa. For this reason The Global Alliance has procured a second spray package and will augment the equipment stockpiles in the near future.

### Future developments

The second spray set will be strategically located in the region to provide a faster and more flexible response service.

The Global Alliance is seeking to attract companies engaged in exploration activities to subscribe to the service. As well as boosting membership in the WACAF area research is now being conducted into whether the service can be successfully extended into the southern and eastern African coastal region.

### BIOGRAPHY

Simon joined OSRL in early 2003 as Manager of Business Projects. He is responsible for managing and developing the new Business Projects department and generating new commercial projects. He has extensive business development and project management experience as well as being a Naval Architect and Chartered Engineer.