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| <b>Property of Oil Spill Response</b><br> | <b>Document Title</b><br><b>B727 Mobilisation and Logistics Plan</b> | <b>Document Number</b><br><b>OSRL-OPER-GUI-00192</b> |          |
|  |  | <b>Revision</b>                                      | <b>2</b> |



# *B727 Mobilisation and Logistics Plan*


REVISION HISTORY

| <b>Revision</b> | <b>Date</b>   | <b>Description</b>   | <b>Author</b> | <b>Reviewer</b>                   | <b>Approval</b> |
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| 0               | February 2017 | Creation of document | Matt Jeans    | Lee Prendergast                   | Dan White       |
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|                 |               |                      |               |                                   |                 |

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## 1. Introduction


Oil Spill Response Limited (OSRL) provide one Boeing 727 Aircraft (G-OSRA or G-OSRB) equipped with a TERSUS dispersant spray system. The aircraft is based at Robin Hood Airport – Doncaster, Sheffield, UK and is ready to be ‘wheels up’ 4 hours from mobilisation. The TERSUS system consists of 7 dispersant tanks, 1 pump module and 1 service pallet, with ancillaries and dispersant ground loading equipment. A stockpile of dispersant (Dasic Slickgone NS) is stored adjacent to the aircraft and can be loaded within the 4-hour mobilisation time.

### *Purpose*

This document is a guide to assist the planning and understanding of the processes for the mobilisation and operation of the Boeing 727 TERSUS dispersant delivery system.

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## 2. Technical Specification

|                      |  |
|----------------------|--|
| <b>Aircraft Type</b> |  <p>B727-2S2F(RE)</p> |
| <b>Tail Number</b>   | G-OSRA and G-OSRB  |
| <b>Operator</b>      | 2Excel Aviation Ltd  |
| <b>Base</b>          | Doncaster Sheffield Airport (DSA) EGCN   |
| <b>Call Sign</b>     | Broadsword 27A or 27B  |
| <b>Crew</b>          | 2 pilots, 1 flight engineer and 1 task specialist  |
| <b>Range</b>         | Approximately 2500nm unladen.  |
| <b>Communication</b> | Aviation VHF (OSRB also has HF <sup>1</sup> ), satellite phone   |

<sup>1</sup> G-OSRA does not have an HF radio and the aircraft maybe subject to some flight restrictions. (See Section 5 for more information).



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| <b>Other Information</b>  | Length  | 153ft                                |  |                     |   |
|   | Wingspan  | 108ft                                |  |                     |   |
|   | Height (fin)  | 34                                   |  |                     |   |
|   | Empty weight  | 97,471lbs                            |  |                     |   |
|   | Max payload   | 56,672lbs                            |  |                     |   |
|   | Max fuel load   | 54,304lbs                            |  |                     |   |
|   | Max Take-off weight   | 203,100lbs                           |  |                     |   |
| <b>Max payload</b>  | 56672 (lbs) 25,707kg  |                                      |  |                     |   |
| <b>Cargo Hold</b>   | Main deck volume 4667 ft <sup>3</sup>   |                                      |  |                     |   |
|   | Lower deck volume 1466 ft <sup>3</sup>  |                                      |  |                     |   |
| <b>Useable volume</b>   | Main deck consists of 12 freight bays: 11 fitted for 88" x 125" pallets, and 1 for a 60.4" x 125" pallet  |                                      |  |                     |   |
| <b>System installed</b>   | TERSUS 15000 litres   |                                      |  |                     |   |
| <b>Airport requirements</b>   | 6000ft 1,828m Concrete/Asphalt  |                                      |  |                     |   |
|   | For Aircraft Classification Number (ACN) and Pavement Classification Number (PCN) please contact OSRL.  |                                      |  |                     |   |
|   | Smaller airfields to be used will need to confirm the strength of the runway, associated taxiways and parking areas before operational spill use. |                                      |  |                     |   |
|   | The B727 requires Fire Category Cover Category 7 from the operational airport.  |                                      |  |                     |   |


Table 1: Technical Specification

|  |  |  |  |          |
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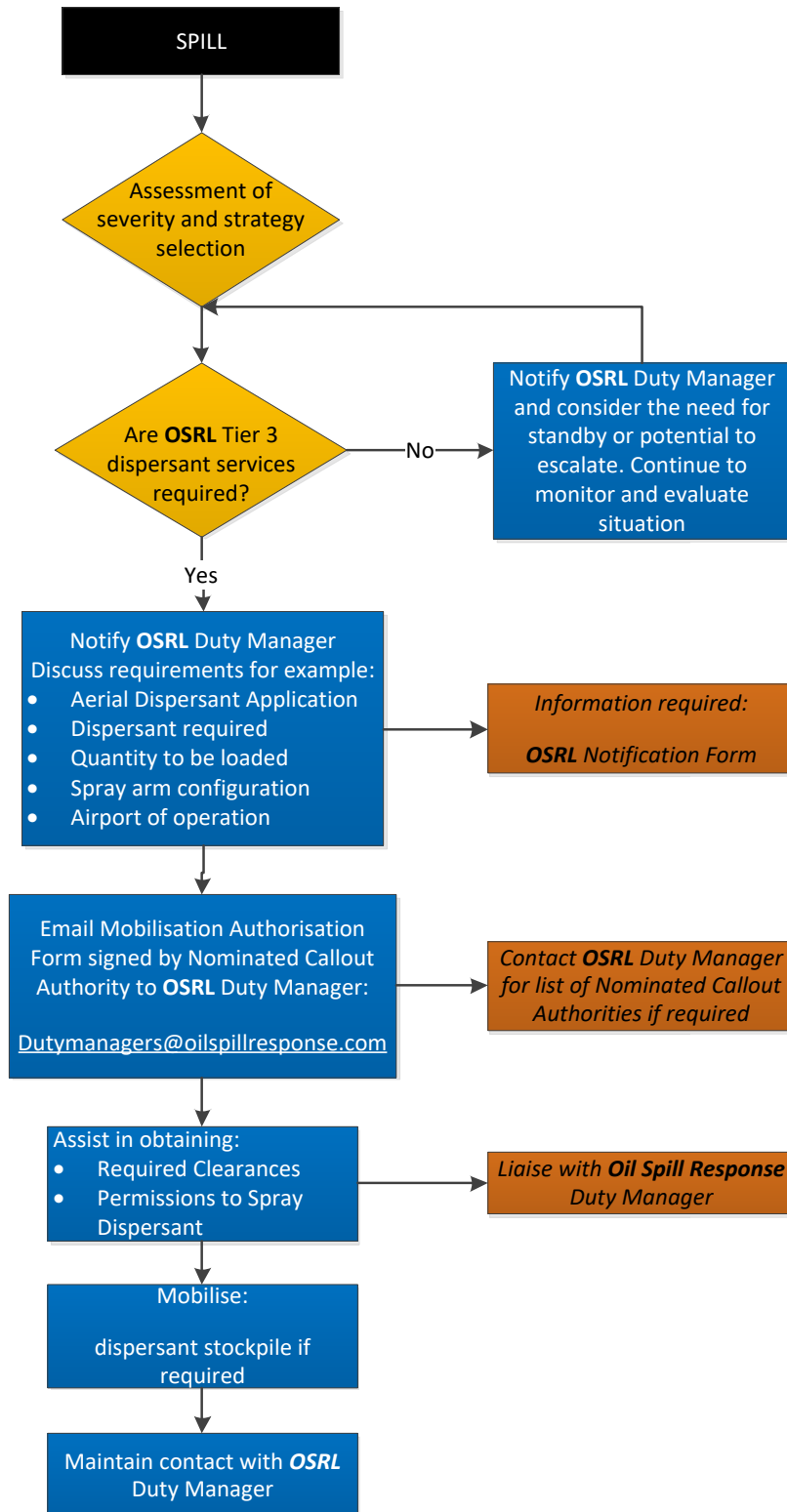
|                      | Empty      | Full       | Dispersant configuration       |
|----------------------|------------|------------|--------------------------------|
| <b>Maximum Range</b> | 2500Nm     | 2250Nm     | 1400Nm with spray booms fitted |
| <b>Transit speed</b> | 480kts TAS | 480kts TAS | 250kts                         |
|                      |            |            | Spray speed ~150kts            |

Table 2: B727 Range

**Note:** Table 2 is indicative only, all ranges and speeds depend upon several variables including location, Forward Operating Base location, temperature, altitude, weather, payload etc. Contact the OSRL Duty Manager for precise timings if required. The spray booms will be fitted upon arrival in country before first spray operations.

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### 3. Mobilisation




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Figure 1 Mobilisation Flowchart

OSRL Members mobilise the aerial dispersant Service by calling **Oil Spill Response**



The OSRL Duty Manager (DM) will request all relevant information plus the ‘Mobilisation Authorisation Form’ **signed by a nominated authority**. A delay in providing these forms may delay the response.

Upon receipt of the signed mobilisation form, the DM will notify and/or mobilise the aircraft. An email will be sent to the member, confirming mobilisation of the aircraft and the aircrafts Estimated Time of Arrival (ETA).

### **Mobilisation Type**

In the case of a potential incident the OSRL Duty Manager has two options regarding the aircraft.

**Notify:** Mobilise all resources and apply for over flight clearances but does not call the crew (crew hours do not start counting down)


**Scramble:** Mobilise all resources (including air crew) – immediate mobilisation where over flight and landing permits are unlikely to cause a delay.

The B727 is ready to be wheels up within 4 hours of mobilisation which includes fuelling and if required, dispersant loading.<sup>2</sup>

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<sup>2</sup> Slickgone NS is the only dispersant held at Doncaster, any other dispersant would need to be freighted to the to the aircraft in Doncaster or Forward Operating Base



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### **Flight Clearances**

Before leaving the UK, OSRL will produce the flight tasking for the aircraft from the information gathered by the client and mission parameters. The aircraft has permissions for low level flying to enable spraying operations. The aircraft operator or its nominated agent will file flight plans and request necessary permits by liaising with the appropriate aviation authorities.

Overflight permits will be required for the B727 which will be attained by the aircraft operator/ nominated agents, for transit to the spill location.


Landing permits and authorisation to operate in-country will be required upon arrival and it is expected that the client/local subsidiary will liaise with the relevant authorities to assist with the necessary permits where possible.

### **Crew**

The Aircraft crews are on standby 24-hours a day. In a mobilisation, the primary aircrew would transit to the spill location with the B727 without the requirement for a visa initially under a General Declaration which lasts for 72 hours from the time of arrival. After this period the aircrew may require visas to remain in-country, support may be requested from the client to expedite the visa process. All crew members possess two passports to expedite visa applications.

The EASA Flight Time Limitations stipulate that aircrew can work 12 hours and then must have 12 hours rest before re-commencing work. The crew can work this pattern for a maximum of seven days before they are required to have one day rest. Having a second crew available will allow for unbroken service to continue. The second aircrew could be mobilised and travel on a commercial flight to the designated location.

There is no charge for the mobilisation of a second crew. However, a Member requiring a second crew will be charged for their travel, accommodation and subsistence.


|   |                                |                                      |                     |          |
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#### 4. Indicative Flight Times

|                   |                | Sector 1  |               |          | Sector 2      |               |          | Sector 3      |              |          | Sector 4 |                |          | Total Time, mobilisation call to arrival at ADEST |
|-------------------|----------------|-----------|---------------|----------|---------------|---------------|----------|---------------|--------------|----------|----------|----------------|----------|---|
| GOSRA             |                | ADEP      | ADEST         | Time     | ADEP          | ADEST         | Time     | ADEP          | ADEST        | Time     | ADEP     | ADEST          | Time     |   |
| Bahrain           | Bahrain        | Doncaster | Heraklion     | 03:40:00 | Heraklion     | Bahrain       | 03:40:00 |               |              |          |          |                |          | 12:20:00  |
| Nigeria           | Lagos          | Doncaster | Fuerteventura | 04:20:00 | Fuerteventura | Lagos         | 05:00:00 |               |              |          |          |                |          | 14:20:00  |
| Tanzania          | Dar es Salaam  | Doncaster | Hurghada      | 05:00:00 | Hurghada      | Dar es Salaam | 05:20:00 |               |              |          |          |                |          | 15:20:00  |
| South Africa      | Johannesburg   | Doncaster | Hurghada      | 05:00:00 | Hurghada      | Dar es Salaam | 05:20:00 | Dar es Salaam | Johannesburg | 03:00:00 |          |                |          | 19:20:00  |
| Kazakhstan        | Atyrau         | Doncaster | Atyrau        | 04:55:00 |               |               |          |               |              |          |          |                |          | 08:55:00  |
| Sakhalin          | Sakhalinsk     | Doncaster | USNN          | 05:30:00 | USNN          | Sakhalinsk    | 05:30:00 |               |              |          |          |                |          | 16:00:00  |
| USA               | Miami          | Doncaster | Goose Bay     | 05:10:00 | Goose Bay     | Miami         | 04:20:00 |               |              |          |          |                |          | 14:30:00  |
| Canada            | Vancouver      | Doncaster | Iqaluit       | 04:40:00 | Iqaluit       | Vancouver     | 05:10:00 |               |              |          |          |                |          | 14:50:00  |
| Brazil            | Rio de Janeiro | Doncaster | Goose Bay     | 05:10:00 | Goose Bay     | Miami         | 04:20:00 | Miami         | Manaus       | 04:40:00 | Manaus   | Rio de Janeiro | 03:30:00 | 36:40:00  |
| Republic of Congo | Point Noire    | Doncaster | Fuerteventura | 04:20:00 | Fuerteventura | Point Noire   | 05:30:00 |               |              |          |          |                |          | 14:50:00  |
| Angola            | Luanda         | Doncaster | Casablanca    | 03:05:00 | Casablanca    | Lagos         | 04:00:00 | Lagos         | Luanda       | 02:35:00 |          |                |          | 15:35:00  |

Table 3: B727 Example Flight times

The flight times detailed in Table 3 are for **guidance purposes only** and are subject to obtaining flight clearances, landing permits, ground handling time, local security situation, adverse weather conditions or any other unforeseen circumstance which could delay the flight. As with any response there will be factors outside of our control which could affect the response times and every endeavour will be taken to ensure a timely mobilisation.

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## 5. Dispersant

TERSUS has a capacity of 15m<sup>3</sup> and can fly fully laden to the spill location. The weight of the dispersant reduces the overall range from 2500nm to 2250nm, transit air speed is not affected.

To ascertain whether it is more efficient to fly with dispersant or to send dispersant as cargo on a chartered aircraft will depend upon several variables, during a mobilisation the OSRL Duty Manager will advise the most appropriate means of mobilising dispersant to the spill location.

### Dispersant Approval List


TERSUS is approved to spray 9 types of dispersant. Any dispersants other than those listed will **not be permitted** to be loaded into the TERSUS system.

|                 |                    |
|-----------------|--------------------|
| Agma DR379      | Slickgone LTSW     |
| Corexit EC9527A | Slickgone NS       |
| Corexit EC9500A | Superdispersant 25 |
| Finasol OSR 51  | Inipol IP80        |
| Finasol OSR 52  |                    |

Table 4 Dispersant approved for use with TERSUS

### Aerial dispersant Authorisation

OSRL will endeavour to provide assistance with regulatory approval for dispersant operations by providing technical support, documentation and logistics.

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### Dispersant Supply Chain (Logistics)

For an extended response and to ensure the availability of dispersant for ongoing aerial spraying operations, a continual supply of dispersant will be required to be sourced in-country or through OSRL SLA stockpiles (additional OSRL stockpiles are available for subscribers i.e. GDS). This can be organised by OSRL through the charter of a cargo aircraft.

OSRL work closely with our air charter broker to ensure that equipment can be mobilised around the world as quickly as possible, this is regularly tested through drills, exercises and spills. OSRL have a global contract with an aircraft charter broker with agreed charter terms, this means that OSRL can respond when an aircraft is available, and the client has given written authorisation for the aircraft. The broker would be expected to deliver flight options in a spill in six hours.

Although it is subject to fluctuating aviation markets and aircraft availability, we would expect to have an aircraft available and loaded with dispersant within 24-48 hours of approval. During this time, all necessary freight documentation would be completed. Support maybe required for some locations where supplementary documents are required such as translated documents and certified certificates of origin, this could potentially impact the mobilisation time.

There is an advisory on all Boeing aircraft for a limit of 42% of total cargo on liquid cargo. Not all operators are adhering to this advisory and OSRL will identify the most appropriate aircraft to freight dispersant. If the available aircraft are only capable of a 42% liquid cargo and the member requires additional response equipment, OSRL will utilise the remaining space with equipment.


Table 5 below gives an indication of dispersant quantities that can be carried in various cargo aircraft:

| Aircraft Type    | Estimated Number globally for Cargo | Estimated short notice spill availability | Cargo Capacity (Tons) | Capacity following Service Letter (Tons) | World Coverage (Potential)        |
|------------------|-------------------------------------|---|-----------------------|--|-----------------------------------|
| Boeing 747 / 777 | 150                                 | 10  | 100-130               | 42-50                                    | Global                            |
| Antonov 124      | 24                                  | 2-3                                       | 100                   | 100*                                     | Global                            |
| Antonov 225      | 1                                   | 1   | 250                   | 250*                                     | Global                            |
| Ilyushin IL 76   | 7**                                 | 1-2                                       | 45                    | 45                                       | Global – Shorter Transit Distance |
| MD11             | 9                                   | 1-2                                       | 85                    | 85                                       | Africa centric – some US based    |

Table 5: Air cargo carrier global availability indicative estimates

\* Figures may reduce due to volume constraints and are subject to an ongoing investigation into pressurisation of holds

\*\* Number that can land in the UK

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## 6. Operations

Upon arrival at the nominated forward operating base, an area of the airfield will be requested from the ground agent(s)/airfield operator for the storage and subsequent loading of dispersant. The area and facilities required for the 727 to operate will vary on a number of factors, predominantly the intended time spent at the FOB.


Once the aircraft and dispersant have arrived in country, the aircraft will be configured for spray operations by the flight crew, supported by additional OSRL responders if required. If the spray arms have been removed for transit, they will be re-fitted on arrival in country upon landing by a member of the flight crew, connection takes approximately 1 hour. A tasking document will be issued by the DM to the flight crew for the spray mission.

The TERSUS system must not be modified or operated by anybody except the flight crew or a qualified engineer.

Support may be requested from the client to expedite the visa process where possible for aircrews, as this a determining factor in getting the crew and aerial dispersant in-country and ready to respond.

There is no provision for passengers to travel onboard the aircraft, CAA licensing prevents carriage of any personnel not acting as a member of the aircrew. The aircrew consists of two pilots, one flight engineer and a Task Specialist.

The Task Specialist is to assist with dispersant loading, point of contact for the OSRL EOC (Emergency Operations Centre) team and to produce the Dispersant Application Report.

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### Spotter Aircraft

The B727 can complete spray sorties without a spotter aircraft, but as the spray runs need to be conducted at 150ft it is challenging for the crew to judge the point to commence spraying. A spotter aircraft will increase the efficiency of the spray runs as it will assist in reducing overspray.


The use of a light aircraft is the primary option for use as a spotter due to the difficulties with vessels observing oil on the water. The main requirements for a spotter aircraft is that there are sufficient communications between the two aircraft. Spotter aircraft will require enough endurance for a single spray operation before needing to refuel and space onboard for an OSRL trained observer. The aircraft will communicate on normal Aviation Band VHF 118.0-136.975 MHz. Both aircraft will operate in accordance with the B727 Spray/Spotter Mission Operating Procedures.

If available a spotter aircraft could be used to direct the B727 into location which would increase the effectiveness of the dispersant runs and ensure the B727 is on target. The client would need to provide this in country were possible. Unless they are a subscriber to the WACAF or UKCS service. Before conducting any joint operations, the B727 crew would complete a face-to-face briefing with the spotter aircraft crew

### Dispersant reload and aircraft Refuelling

Upon conducting a spray run if there is dispersant available at the airport the aircraft can be reloaded in 40-60 minutes if being filled by individual IBCs, but this will depend on the location of the dispersant stockpile and ground handling assistance. The B727 crew with support from the Task Specialist will reload the dispersant and refuel the aircraft if necessary. It is expected that the B727 would normally achieve three sorties a day, but this is dependent upon dispersant supply, ground handling facilities, distance to the spill site from the runway, airport traffic, weather etc.

In the event that all the dispersant has not been used in a spray sortie it is possible for the B727 to land with the remaining dispersant without contravening its operating licence and permits.

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### Aircraft Tracking

OSRL utilise the programme 'Spidertrack' to track the B727 aircraft(s). The OSRL Duty Manager will issue a link to the client enabling the client to observe the aircraft's flight path.

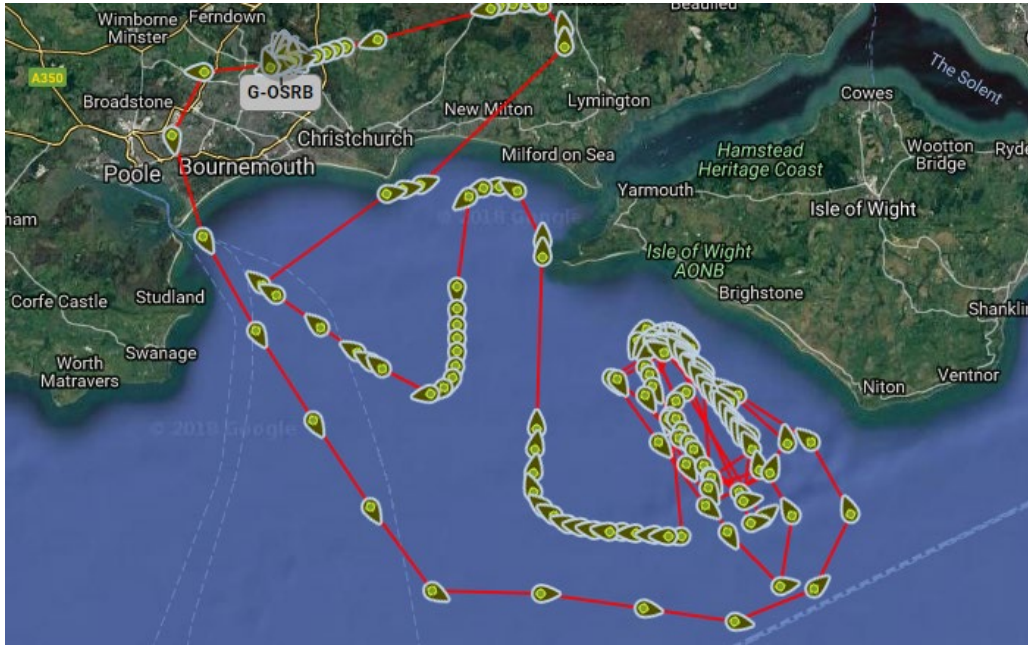



Figure 2: Example spider track of an aircraft on a sortie

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## 7. Responsibility Matrix

|                              |                                   |                                |
|------------------------------|-----------------------------------|--------------------------------|
| <b>Has no responsibility</b> | <b>Assistance may be required</b> | <b>Has full responsibility</b> |
|------------------------------|-----------------------------------|--------------------------------|

| Task  | OSRL | Subscriber |
|---|------|------------|
| Completion of Notification & Signed mobilisation form                 |      |            |
| Generate flight tasking and aircraft work order                       |      |            |
| Over flight clearances/landing permits                                |      |            |
| Issuing of Letters of Invitation (LOI)                                |      |            |
| Applying for necessary visas and work permits                         |      |            |
| Assistance with expediting visa applications                          |      |            |
| Airport handling & refuelling   |      |            |
| Chartering aircraft for dispersant resupply                           |      |            |
| Maintenance of aircraft   |      |            |
| Formal Reporting  |      |            |
| Air crew accommodation / travel booking                               |      |            |
| Spotter aircraft  |      |            |
| Authorisation to operate in country                                   |      |            |
| Demobilisation from the incident including signed demobilisation form |      |            |

Table 6: Responsibility Matrix



|  |  |  |          |
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## 8. Costs

In the event of a mobilisation fees will be charged in accordance with the OSRL Scale of Fees, these costs are:

- Response flights - applicable on days where flights are carried out - charged on an hourly basis (excluding fuel). Subject to a minimum charge of the daily standby fee
- Standby fee - applicable on days where flights are not carried out - charged on a daily basis (cost increases after 10 days)


The above fees apply in respect of 'normal' response operations where the aircraft is deployed and utilised for up to a maximum of 10 days. Daily charges for non-flying standby periods of greater than 10 days duration where the aircraft flies on average for less than 2 hours per day during that period will require special consideration. Additional requirements may be placed on users in these cases. This option is only available to Members.

Direct operating costs will be charged as incurred to Members, including but not limited to fuel and handling charges. Non-members will be charged an additional 15% administration fee to these direct operating costs.

To give indicative costs for each sortie with dispersant, September 2018 prices, the client would be charged approximately:

Corexit 9500 - US\$ 177,000

Slickgone NS - US\$ 47,500

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## 9. Additional Information

### Table Top Exercises

Service Subscribers are encouraged to exercise the mobilisation of the service during any table top exercise. By calling the duty manager, real time mobilisation and flight times can be obtained to any location free of charge. OSRL can also arrange for actual participation of the B727 in a client exercise at published response rates.


### Training

OSRL are responsible for the training of their contractors and OSRL conduct operational training sessions each year to simulate aerial dispersant spraying. The training includes:

- Aerial dispersant spraying (using fresh water)
- Use of surveillance equipment
- Coordination with spotter aircraft(s)
- Coordination with vessel operations
- Production of reports
- Data management

The training is supported by 6 monthly scheduled exercises and no notice drills to ensure the appropriate level of competence is maintained and to ensure that OSRL fulfils the mobilisation times and standards expected from our members.

In addition to the scheduled training, the B727 crews complete a minimum of one spray experience flights each month and three annual overseas training flights to retain route flying proficiency. Twice a year the spray experience flights are replaced by 16 hours of simulator training to ensure crews are proficient in handling in-flight emergencies and the contingency procedures surrounding spray operations.


|  |  |  |          |
|--|--|--|----------|
| <b>Property of Oil Spill Response</b><br> | <b>Document Title</b><br><b>B727 Mobilisation and Logistics Plan</b> | <b>Document Number</b><br><b>OSRL-OPER-GUI-00192</b> |          |
|  |  | <b>Revision</b>                                      | <b>2</b> |

## 10. Example 727 Operations

The OSRL SLA dispersant stockpile contains 700m<sup>3</sup> of dispersant. Under the Service Level Agreement, the client has access to 50% of this stock. The B727 system is able to hold 15m<sup>3</sup> of dispersant per sortie and the table below shows an example mobilisation of dispersant to the Republic of Congo and availability of SLA dispersant.

| Day | Operation (subject to timings)  | Dispersant used              | Dispersant available |
|-----|---|------------------------------|----------------------|
| 1   | Notify OSRL of spill, Client signs charter agreement B727 mobilised to Congo  |                              |                      |
| 2   | Mobilisation and loading of cargo aircraft (B727 arrives in Congo)  |                              |                      |
| 3   | Arrival of 42 m <sup>3</sup> of dispersant in Congo, 1 x spray sortie with B727 and mobilisation of a second aircraft for transport | 1 sortie - 15m <sup>3</sup>  | 27 m <sup>3</sup>    |
| 4   | Mobilisation of third aircraft for dispersant transport   | 2 sorties - 27m <sup>3</sup> | 0                    |
| 5   | Second aircraft arrives in Congo with 42 m <sup>3</sup> of dispersant   | 2 sorties - 30m <sup>3</sup> | 12 m <sup>3</sup>    |
| 6   | Third aircraft arrives in Congo with 42 m <sup>3</sup> of dispersant. Mobilisation of fourth aircraft.                              | 2 sorties - 30m <sup>3</sup> | 24 m <sup>3</sup>    |
| 7   | Mobilisation of fifth aircraft  | 2 sorties - 24m <sup>3</sup> | 0                    |
| 8   | Fourth aircraft arrives in Congo with 42 m <sup>3</sup> of dispersant. Mobilisation of sixth aircraft.                              | 2 sorties - 30m <sup>3</sup> | 12 m <sup>3</sup>    |
| 9   | Fifth aircraft arrives in Congo with 42 m <sup>3</sup> of dispersant  | 2 sorties - 30m <sup>3</sup> | 12                   |
| 10  | Sixth aircraft arrives in Congo with 42 m <sup>3</sup> of dispersant. Mobilisation of seventh and eighth aircraft                   | 2 sorties - 30m <sup>3</sup> | 24                   |

Table 7: Example mobilisation of dispersant to the Republic of Congo

|  |  |  |          |
|--|--|--|----------|
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|  |  | <b>Revision</b>                                      | <b>2</b> |

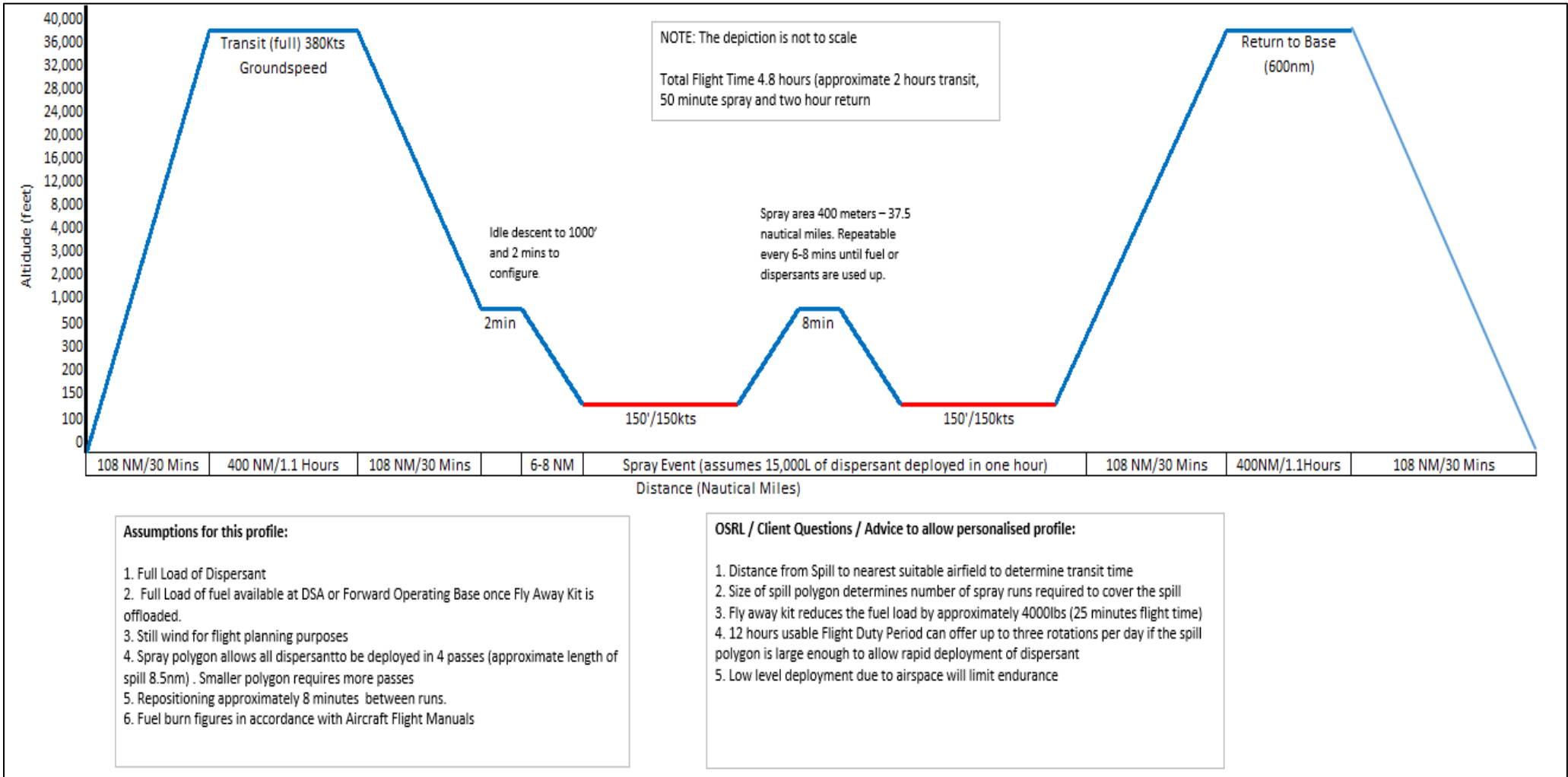


Figure 3 – Example Spray Mission from a Forward Operating Base