

# AIR POWER PROJECTION OPTIONS

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The current situation of Britain with its commitments across the globe and operations in Afghanistan and Libya highlights the role of airpower in modern international power projection/intervention operations...however is Britain pursuing the correct course?

*The Logical Choice  
is Clear...if the  
proper evidence is  
presented*

THE PHOENIX THINKTANK 2011

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# Air Power Projection Operations

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Sandy Woodward and Sharkey Ward

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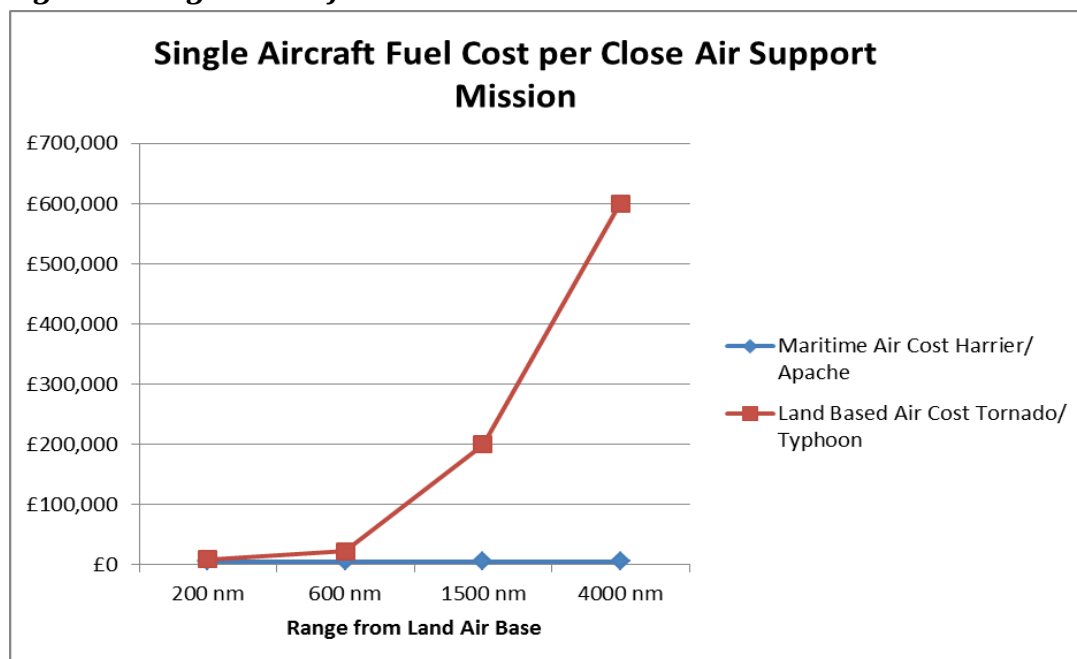
## 1.0: Introduction

1.0 Graphics are a simple way of demonstrating the major differentials in overall cost between Land-based and Sea-based air power for the Combat Air Support of Offensive Expeditionary Task Force Operations such as in Libya or beyond.

## 2.0: Aviation Fuel Costs

2.1: The graph below relates the cost of deploying specific aircraft types to the range of their deployment<sup>1</sup>. It is immediately apparent that Land-based aircraft (Tornado and Typhoon) start to become unacceptably expensive compared with Sea-based aircraft (Harrier and Apache) as soon as they are required beyond the immediate unrefuelled reach of their airbase – whether in the UK or abroad.

**Figure 1: Single Aircraft Fuel Costs**



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<sup>1</sup> The data presented at Figure 1 is drawn from the standard operating fuel capacity for each Fighter Ground Attack Aircraft and their dependence upon Air to Air Refueling Tankers – such dependence increasing logarithmically as range from the Land Air Base is increased. Fuel cost per gallon of aviation fuel is estimated at £4.00.

### 3.0. Offensive Expeditionary Task Force Operations

#### – *Such as Libya - Cost Issues.*

3.1: If Operation Ellamy were to continue for six months as suggested by the Chief of the Air Staff, Land-based air operations (Tornado/Typhoon) would cost at least £900 million (£0.9 billion) for that period (see detailed estimates at Annex A<sup>2</sup>). In contrast, carrying out the same job through Sea-Based air (HMS Ocean, HMS Illustrious, Royal Navy Harrier GR9 aircraft and Army air Corps Apaches) would cost approximately £100 million (£0.1 billion).

3.2: **Figure 2**, (On the next page), gives some but not all of the various requirements/costs associated with Land-based air deployment. The boxes in orange represent items/costs that are essential to Land-Based Air. The boxes in red represent some very serious shortfalls of Land-Based Air. It should be emphasised that Logistic Support aircraft, AAR tankers and Tornado aircraft require a protected runway at least 6,000 feet in length in order to operate safely (this is a severe strategic limitation that does not affect Harrier/Apache operations). Such runways are not necessarily going to be available for Task Force Operations away from the European theatre.

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<sup>2</sup> Treasury Chief Secretary Danny Alexander, 19th June 2011, Sky News, Murnaghan: *"The cost of Britain's military operations in Libya could run into the hundreds of millions. The campaign is costing tens of millions, potentially into the hundreds of millions as it goes on, but that money is coming from the reserve that we have set aside, precisely for contingencies such as this."* Pressed on the exact cost of operations in Libya, Mr Alexander said: *"I don't have the precise figures to hand for this interview."* It would appear that Mr Alexander is not being kept up to date on the real cost of the Land-Based Air contribution to Operation Ellamy.

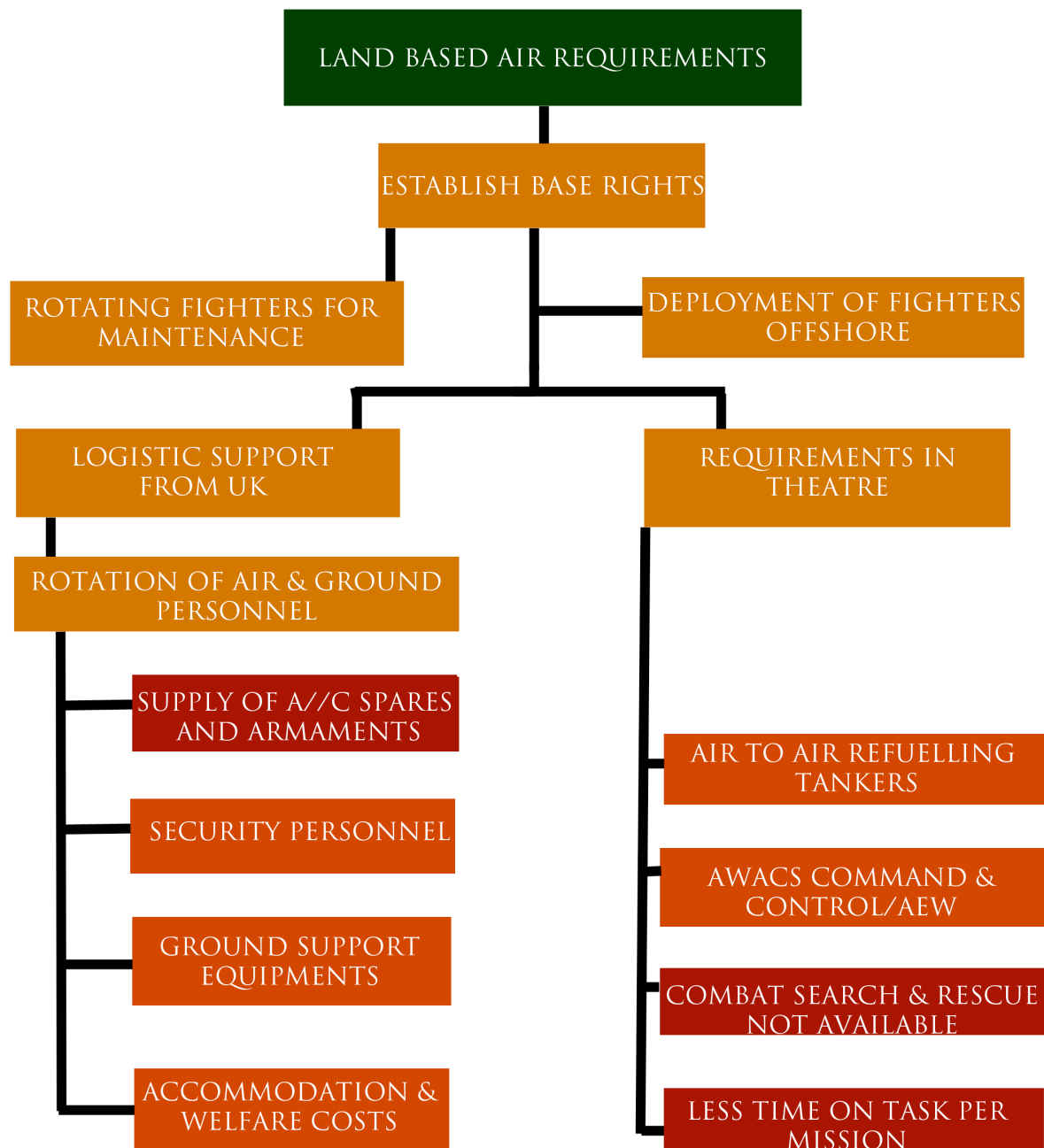
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**Figure 2: Land-Based Air Deployment: Up to £1 billion for six months.**



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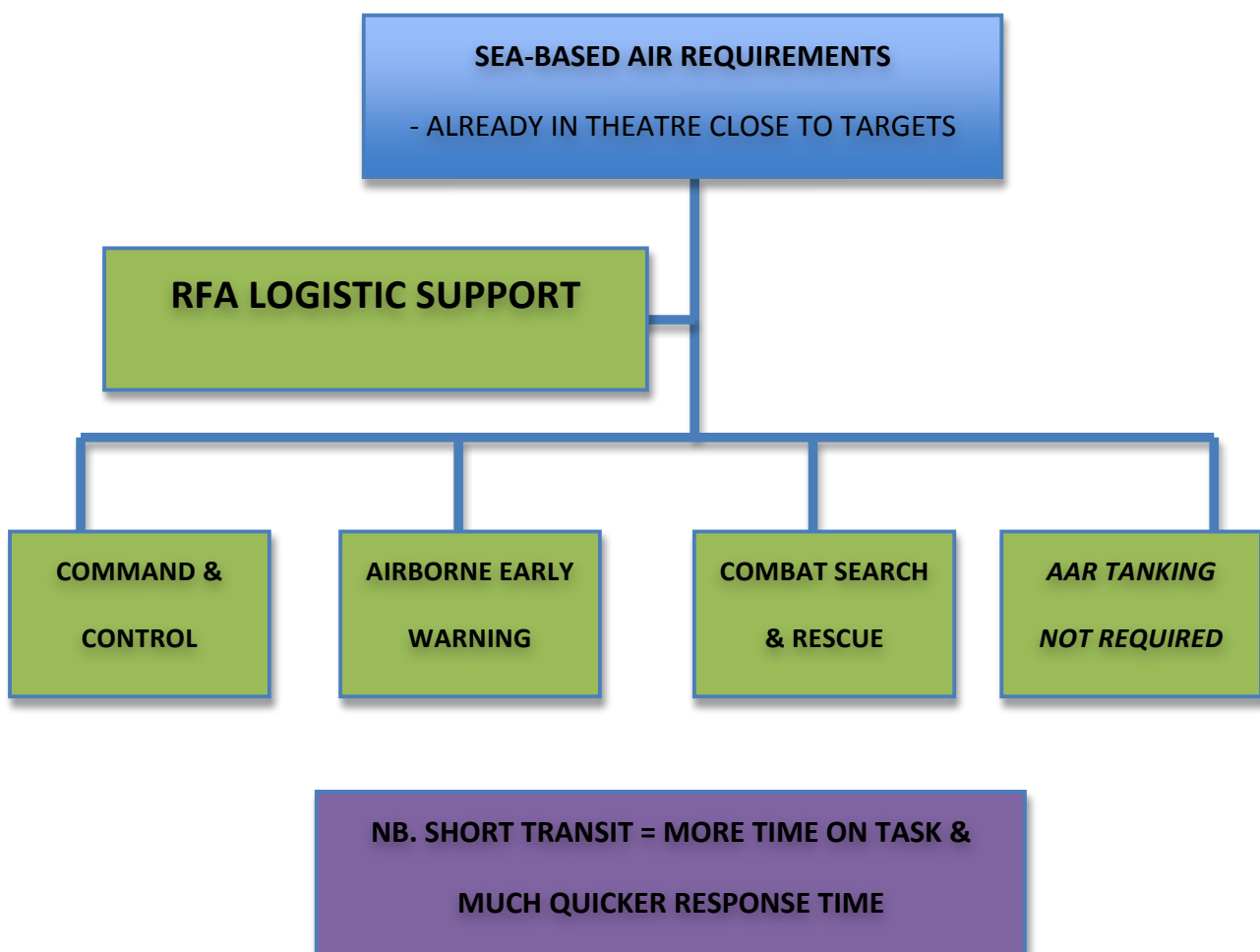
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3.4: **Figure 3**, below, demonstrates the simplicity and cost effectiveness of Sea-Based air support. The boxes in green demonstrate that an aircraft carrier already has all the necessary support for the conduct of operations. Resupply functions are conducted by accompanying Royal Fleet Auxiliary (RFA).

3.5: It should be noted that by sailing close in theatre to the target area transit times are shortened allowing either much quicker reaction to a call for fire support or a longer time loitering on task waiting for a call. The savings in lives of troops, friendly civilians, equipment and the boost to morale is incalculable.

**Figure 3: Sea-Based Air Deployment: Approximately £0.1 billion for six months.**



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### **4.0: Conclusions**

4.1: Figure 1 demonstrates a dramatic and alarming difference in cost between Land-Based and Sea-Based Close Air Support missions.

4.2: Figures 2 and 3, if placed side-by-side, are a telling and very clear demonstration of which of the two must be the most flexible, cost effective and operationally effective Air Power Projection option. Land-Based Air Power is increasingly problematic outside the European NATO region.

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### Annex A.

#### Cost of Land-Based Air Operations - Libya - Includes the following:

##### Close Air Support Aircraft Missions per Week (Estimate)

	No.	Fuel Cost	Airframe cost*	Weapons Cost**	Sub Total	6 months
Tornado	40	£900,000	£4,200,000	£4,000,000	£9,100,000	£236,600,000
Typhoon	20	£450,000	£4,500,000	£2,000,000	£6,950,000	£180,700,000
* See Note 2, below, for calculation basis.						
** MoD statement gives the cost of weapons delivered per week to be £6 million.						

##### Air to Air Refuelling Tanker Missions per Week (Estimate)

	No.	Fuel Cost	Airframe cost	Weapons Cost	Sub Total	6 months
	20	£300,000	£1,800,000	£0	£2,100,000	£54,600,000

##### Sentinel R1 Aircraft Missions per Week (Estimate)\*

	No.	Fuel Cost	Airframe cost	Weapons Cost	Sub Total	6 months
	8	£120,000	£1,200,000	£0	£1,320,000	£34,320,000

##### AWACS Aircraft Missions per Week (Estimate)

	No.	Fuel Cost	Airframe cost	Weapons Cost	Sub Total	6 months
	8	£120,000	£1,600,000	£0	£1,720,000	£44,720,000

<b>Sub- Total for 6 months</b>	<b>£550,940,000</b>
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### Accommodation and Allowances per Week (Estimate)

		No. Personnel		Accommodation	Sub Total	6 Months
Gioia Dell Colle *		550+		£250,000	£250,000	£6,500,000
Trapani		150		£75,000	£75,000	£1,950,000
Naples		50		£15,000	£15,000	£390,000
Poggia Renatico		50		£35,000	£35,000	£910,000
Akrotiri **		400		£40,000	£40,000	£1,040,000
Longer Separation Allowance					£150,000	£3,900,000
Local Overseas Allowance					£12,000	£312,000
* MOD, MA, 15 June 11: <i>"The average monthly cost of all UK personnel at Gioia dell Colle is around £1m."</i>						
** Akrotiri already has an RAF personnel establishment in excess of 1500 to support aircraft operating through there or from there (AAR tankers, Sentinel, AWACS and logistic support aircraft). A further 100 personnel have been deployed for Operation Ellamy (MA, 14 June 11) - Ellamy costs should therefore include a proportion of standing personnel. Only this will give a reliable overall cost estimate.						
*** Minister for Armed Forces costs in Parliamentary answer to Jim Murphy, MP. (Hansard/Commons/bydate/20110614/writtenanswers/part007).						

<b>Sub-Total for 6 months</b>	<b>£15,002,000</b>
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### Logistic Supply Air from UK - Materials, Spares, Ordnance (Estimate)

	No. Return Flights	Fuel Cost	Airframe cost		Sub Total	6 months
	14	£350,000	£2,400,000		£2,750,000	£71,500,000

### Logistic Supply Land from UK (Estimate)

Per Week	6 months
£50,000	£1,300,000

<b>Sub- Total for 6 months</b>	<b>£72,800,000</b>
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### Personnel Transport and Change-over - 6 months (Estimate)

	No. Return Flights	Fuel Cost	Airframe cost		Sub Total	6 months
	80	£2,000,000	£19,200,000			£21,200,000

<b>Sub- Total for 6 months</b>	<b>£21,200,000</b>
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### Additional Costs e.g. Basing Rental, Rotation of Fighters for maintenance, etc.

<b>Sub- Total for 6 months</b>	<b>£100,000,000</b>
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<b>Estimated Total Bill for 6 months Land-Based Air Deployment</b>	<b>£759,942,000</b>
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**Notes:**

1. Aviation Fuel cost estimated to be £4.00 per gallon - as for civil airlines.
2. Airframe cost given = Government Figures per hour (e.g. Tornado: £35,000, Typhoon: £70,000 per hour) multiplied by length of mission multiplied by the number of missions.
3. Weapons cost per week taken from MoD news release: £6 million.
4. The estimated number of missions flown by Tornado per week (40) equates to one mission per aircraft every two days. United States Marine Corps Harriers were flying two missions per aircraft per day (four times as many as the Tornado). MoD reports would appear to indicate a higher flying rate (and therefore, greater expense): *Tornado and Typhoon flew numerous patrols over Libya during the past two days.* (MoD, 18 Jun 11.)
5. Various MoD statements/statistics as given by Defence News Analysis.

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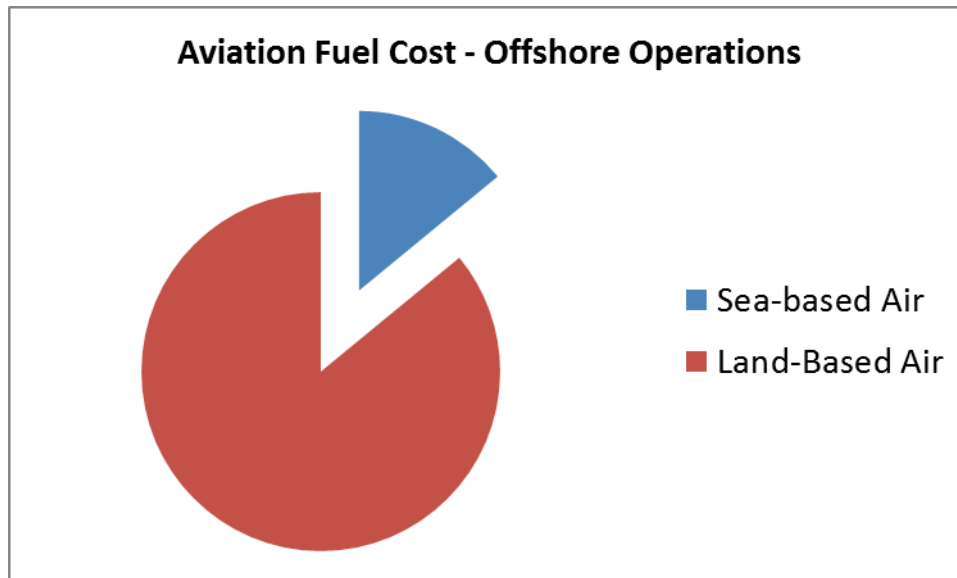
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### Annex B.

Sea Based Air versus Land Based Air Aviation Fuel costs – Libya



**Table 1.**

(Table 1 Aviation fuel costs for Libya conflict)

### Land-Based Air Aviation Fuel Costs - Operation Ellamy Close Air Support Aircraft Missions (Estimate)

	Missions per Week	Fuel Cost per Week	Fuel Cost per Month	Fuel Cost per 6 Months
Tornado	40	£900,000	£3,600,000	£21,600,000
Typhoon	20	£450,000	£1,800,000	£10,800,000

### Air to Air Refuelling Tanker Missions (Estimate)

	Missions per Week	Fuel Cost per Week	Fuel Cost per Month	Fuel Cost per 6 Months
	20	£300,000	£1,200,000	£7,200,000

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### Sentinel R1 Aircraft Missions (Estimate)\*

	Missions per Week	Fuel Cost per Week	Fuel Cost per Month	Fuel Cost per 6 Months
	8	£120,000	£480,000	£2,880,000

### AWACS Aircraft Missions (Estimate)

	Missions per Week	Fuel Cost per Week	Fuel Cost per Month	Fuel Cost per 6 Months
	8	£120,000	£480,000	£2,880,000

### Logistic Supply Air from UK - Materials, Spares, Ordnance (Estimate)

	Missions per Week	Fuel Cost per Week	Fuel Cost per Month	Fuel Cost per 6 Months
	14	£350,000	£1,400,000	£8,400,000

### Personnel Transport and Change-over - 6 months (Estimate)

	No. Return Flights	Fuel Cost	Sub Total	6 months
	80			£2,000,000

### TOTALS

		Fuel Cost per Week	Fuel Cost per Month	Fuel Cost per 6 Months
		£2,240,000	£8,960,000	£55,760,000

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**Table 2.**

Table 2 below demonstrates the equivalent aviation fuel cost for Sea Based Air.

### **Sea-Based Air Aviation Fuel Costs - Operation Ellamy Close Air Support Aircraft Missions (Estimate)**

	Missions per Week	Fuel Cost per Week	Fuel Cost per Month	Fuel Cost per 6 Months
Harrier	40	£230,000	£920,000	£5,520,000
Apache	20	£60,000	£240,000	£1,440,000

### **AEW Aircraft Missions (Estimate)**

Sea King	30	£ 90,000	£ 360,000	£2,160,000
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### **TOTALS**

		Fuel Cost per Week	Fuel Cost per Month	Fuel Cost per 6 Months
		<b>£380,000</b>	<b>£1,520,000</b>	<b>£9,120,000</b>