Air Drop Life Raft Capability
And
Ramform Beach Recovery
Introduction

The Team - IHTTOML

Team: I’ve Had The Time Of My Lifeboat (And I Owe It All To Rescue)

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Introduction
The Problem

01 International Organization for Migration (IOM) estimates that more than 1 million migrants arrive by sea every year.

02 Of which more than 4,000 migrants are reported to have died trying to cross the Mediterranean.

03 Migrants are primarily from Syria, Afghanistan, and Africa.

04 It costs governments millions of pounds every year to patrol these areas and rescue migrants from unseaworthy boats.
Lifeboat Logistics

Launch

An example of the air deployable life rafts are the UNI-PAC and UNI-PAC 2 from Life Support International.

They are already in use worldwide and come in a range of sizes and internal configurations.

Deployable from dedicated bomb bays, side doors or tail ramps giving versatility with aircraft choice.
Concept of Operations (CONOPs)

Options

Option 1:
Life rafts are deployed from fast boats, close to shore, direct assistance can be rendered to casualties. The rafts will then be towed by the raft deployment vessel to the nearest port.

Option 2:
Life rafts and small assistance RHIB’s are deployed from Chinook helicopters, severe casualties can be retrieved via RHIB and winch while the remainder await recovery by tow from appropriate vessel.

Option 3:
Same as option 2, however utilising a dedicated rescue vessel for raft retrieval with a recovery “beach” and casualty sorting area, and facilities for care and accommodation.
Lifeboat Logistics

Recovery

Lifeboats can be manhandled by RHIBs into recovery “beach”

Rafts can be towed to shore or recovery vessel

Priorities can be recovered to Chinook
Concept of Operations (CONOPs)

Critical areas of operation, by deaths at sea

Source: UNITED for Intercultural Action, European network against nationalism, racism, fascism and in support of migrants and refugees. Documentation on 06-05-2009
Concept of Operations (CONOPs)

Likely areas of operation

As an example, the distance from Malta International Airport to the point furthest from shore is approximately 350km. In this worst case scenario, many aircraft could reach the scene in under an hour, enough time to respond to a sinking vessel and deploy life rafts.

A ship only response doing 20 knots will take 17 hours, plenty of time for people to drown or die of exposure.
The Costs
Build and Maintenance Costs

<table>
<thead>
<tr>
<th>Bronze</th>
<th>Just Life Rafts</th>
</tr>
</thead>
<tbody>
<tr>
<td>£</td>
<td>Build- £30k</td>
</tr>
<tr>
<td></td>
<td>Maintain-£4k per use</td>
</tr>
<tr>
<td></td>
<td>+ use of £60m Aircraft</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Silver</th>
<th>Life Rafts With co-ordination 8m RHIB</th>
</tr>
</thead>
<tbody>
<tr>
<td>££</td>
<td>Build- £60k</td>
</tr>
<tr>
<td></td>
<td>Maintain- £6k per use</td>
</tr>
<tr>
<td></td>
<td>+ use of 2 x £60m Aircraft</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gold</th>
<th>Full Package with Ramform Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>£££</td>
<td>Build- £250m</td>
</tr>
<tr>
<td></td>
<td>Maintain- £30m</td>
</tr>
<tr>
<td></td>
<td>Cost estimation using formulas from Spar USA (2017)</td>
</tr>
</tbody>
</table>
## Manning

Manning Requirement Across 3 Options

<table>
<thead>
<tr>
<th>Bronze</th>
<th>Just Life Rafts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5 Personnel</td>
</tr>
<tr>
<td></td>
<td>In either Aircraft or Fast Boats</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Silver</th>
<th>Life Rafts With co-ordination 8m RHIB</th>
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</thead>
<tbody>
<tr>
<td>2</td>
<td>10 Personnel</td>
</tr>
<tr>
<td></td>
<td>For 2 x helicopter and personnel for RHIBs</td>
</tr>
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</table>

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<tr>
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<tbody>
<tr>
<td>3</td>
<td>50+ Personnel</td>
</tr>
<tr>
<td></td>
<td>Full crew for Rescue vessel to include Deck Crew, Engineers, Hospital Staff, Crew etc.</td>
</tr>
</tbody>
</table>
**Stability and Seakeeping**

**Basic Calculations and Estimates**

<table>
<thead>
<tr>
<th>Life Raft</th>
<th>Ramform</th>
</tr>
</thead>
<tbody>
<tr>
<td>- ISO 9650-1:2005 specifies the design and performance characteristics;</td>
<td>- Very High Stability &gt;6m GM untreated;</td>
</tr>
<tr>
<td>- Sea Anchors to stabilise motions in water;</td>
<td>- Stern Sections sectioned off for increased damage stability.</td>
</tr>
<tr>
<td>- Some Designs Self Righting</td>
<td>- Length added to the vessel for Improved Seakeeping</td>
</tr>
</tbody>
</table>
Stability and Seakeeping

Principal Particulars

Length: 100m
Beam: 40m
Draught: 6m
Displacement: 12000 Tonnes
GM: ~2m
MCTC: 117 tonnes m/cm
Effective Recovery - Sea State 5
Structures

Initial Calculations

Full Package with Ramform Design

Considerations:

- Longitudinal Strength
  - Still Water Bending Moment
  - Wave Induce Bending Moment

- Transverse Strength
  - Abnormally wide hull

- Long slender sponsons
Structures

Initial Calculations

- Most of the buoyancy is forward as sponsons provide little buoyancy
- Majority of weight is midships
- Required second moment of area calculated from maximum bending moment = 32m^4
- Hybrid framing system
Embarkation

“The Beach”

- Easy to recover either life rafts or casualties in the water
- Sheltered area created by aft sponsons
- Meshed recovery area to allow drainage of water and dampening effect on waves
- Soft surface to avoid impact injuries on
- Casualty treatment area just forward of the beach.
Concept of Operations (CONOPs)

Passenger Arrival
Concept of Operations (CONOPs)

Passenger Arrival
**Durability and Disposal**

**Durability**

**Option 1**

Lowest durability of all options as life rafts are just inflatables.

**Option 2**

Option also includes RHIBs – high durability and easily repaired.

**Option 3**

Steel ship – very durable with a long life.
Durability and Disposal

Disposal

Option 1
Life rafts can be reused and materials recycled at end of life.

Option 2
RHIBs can be stripped down and useful parts recycled.

Option 3
Rescue vessel can be sold onto other operators and have its life extended. When it’s eventually scrapped, most parts can be reused/recycled.
Thank You For Listening

IHTTOML
Chinook Details

- Max Lift 11 Tonnes
- Internal Size 3x3x12m
- Range: 400 nmi (450 mi, 741 km)
- Life raft System is 2.4m x 1m Dia
- 300kg per raft