

# **SEA POWER CENTRE AUSTRALIA**

The Timor Sea Joint Petroleum Development Area  
Oil and Gas Resources: The Defence Implications

**Working Paper No. 13**

Matthew W. Flint

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## Abstract

This working paper has been written to highlight some of the key defence issues concerning the hydrocarbon resources present in the Joint Petroleum Development Area (JPDA) located in the Timor Sea between Australia and East Timor. The region, and the JPDA in particular, has undergone significant changes in recent years, the most significant being the emergence of East Timor, formerly the twenty-seventh province of the Republic of Indonesia, as the world's newest nation. This led to Australia and Indonesia rescinding the 1989 Timor Gap Treaty, which was replaced by the Timor Sea Treaty on 20 May 2002.

The region has also experienced changes in the area of strategic planning, in response to increases in illegal immigration and illegal fishing and also the threat to the area from terrorism. Discoveries of significant hydrocarbon reserves in the Timor Sea have resulted in increased interest from the petroleum industry and the emergence of several different proposals for the development of the infrastructure necessary to exploit these resources. These include a plan to build an undersea gas pipeline from the JPDA to a processing plant in Darwin. All of these changes have a direct impact on the JPDA and will be discussed in the body of the paper.

This paper will divide its discussion of the JPDA facilities, into several key issues. The first chapter discusses maritime boundary delimitation issues, the current Australian government policy on the oceans, and the background to the establishment of the JPDA, including the United Nations Convention on the Law of the Sea (UNCLOS), the now defunct Timor Gap Treaty, East Timor's independence and the recently implemented Timor Sea Treaty. The second chapter describes the hydrocarbon resources themselves, their exploitation and associated infrastructure developments and their importance to the Australian economy. The third chapter details current patrol and surveillance capabilities including the National Civil Surveillance Program (NCSP). It also investigates recent capability developments such as the Jindalee Operational Radar Network (JORN) and the Royal Australian Navy's decision to replace the Fremantle Class Patrol Boat (FCPB). The fourth chapter discusses the vulnerability of the resources and associated facilities to natural and mechanical disasters, attack from a hostile state or maritime terrorists, and agents of trans-national crime. It will also discuss the cost to Australia, and the broader impact on industry and the economy should such an attack occur.

In conclusion, this paper will argue that, due to the value of the resources and facilities, their vulnerability to attack from air or sea and their importance to the Australian economy, there is a need for dedicated surface patrols of the Timor Sea JPDA.



# THE LEGAL AND POLITICAL DIMENSIONS

The Timor Sea is an area rich in natural resources including fish, sea cucumber, oil and gas. For this reason there has been much political and legal debate over the allocation of exploitation rights to the area with Australia, Indonesia and East Timor all claiming rights to a proportion of the resources. This chapter begins by discussing the Australian Oceans Policy, which underpins Australia's approach to its marine territories. It follows this brief discussion of marine policy and maritime zones by describing the legal and political dimensions of the JPDA, including relevant treaties and other international agreements and the political history of the area.

## Australia's Oceans Policy

In 1998, the Australian government released *Australia's Ocean Policy* to establish a 'framework for integrated and eco-system based planning and management for all of Australia's marine jurisdictions'<sup>1</sup>. The policy describes the state of Australia's current marine territories and details strategic directions for a range of policy areas including ocean planning and management, ecologically sustainable practices and marine science, and technology and industry issues.

The policy promotes 'ecologically-sustainable development of the resources of our oceans and the encouragement of internationally competitive marine industries, while ensuring the protection of marine biological diversity'<sup>2</sup>. In reference to Australia's offshore oil and gas industry, the policy proclaims Australia's current strengths and the need to continue to improve strategies to 'maintain relevant and effective access to exploration acreage'<sup>3</sup>. The policy devotes a section to Marine Science and Technology and Marine Industries and the relevant statements will be included in the discussion of current practices in the current capability section.

Before beginning a detailed description of the process that led to the establishment of the JPDA, it is necessary to discuss the issue of maritime zones. These zones represent the legal framework establishing Australia's marine areas. Australia has established a number of maritime zones and enshrined them in Commonwealth legislation through the passing of the *Submerged Lands Act 1973*<sup>4</sup>. The five zones are all measured from the territorial sea baseline, which is usually the low water line along the coast, and are as follows:

- **The Territorial Sea** – the area of sea over which Australia may claim complete sovereignty. It extends from the territorial sea baseline to a distance of 12 nautical miles (nm).
- **The Contiguous Zone** – the area over which Australia can take limited measures to enforce customs, fiscal, sanitary and immigration regulations. It extends from 12nm to 24nm from the baseline.
- **The Exclusive Economic Zone (EEZ)** – the area within which Australia has the right to explore and exploit living and non-living natural resources and also the responsibility to conserve the marine environment. The EEZ extends from 12nm to 200nm from the baseline.
- **The Continental Shelf** – this area covers the majority of the EEZ and any areas of continental shelf that extend between 200nm and 350nm from the baseline, or 100nm from the 2500m isobath. Australia has the same rights to the resources located on or under, the continental shelf as it does the EEZ, but not to resources in the water column.

- **The Australian Fishing Zone (AFZ)** – this zone was established in 1979, prior to EEZs being established under international law, and is now maintained under the *Fisheries Management Act 1991*. It extends from 3nm to 200nm from the baseline and comes under Commonwealth jurisdiction.<sup>5</sup>

The Commonwealth's jurisdiction over Australia's offshore territories was established in The Offshore Constitutional Settlement (OCS). This agreement between the States and the Commonwealth is implemented in the *Coastal Water States, Power and Title Act 1982*. Through the OCS 'the Commonwealth agreed to give the States responsibility over coastal waters (out to three nautical miles). Beyond that the Commonwealth retains primary responsibility'<sup>6</sup>.

## Maritime Boundary Delimitation

The United Nations Convention on the Law of the Sea (UNCLOS) provides for the establishment of maritime boundaries between countries with adjoining marine territories. Articles 55 and 57 of UNCLOS allow States to declare an Exclusive Economic Zone (EEZ), extending no more than 200nm from the state's territorial sea baseline. Article 59 states that conflict over claims to an EEZ, that is, between two countries with maritime boundaries less than 400nm apart, must be resolved 'on the basis of equity and in the light of all the relevant circumstances'<sup>7</sup>. The delimitation of the maritime boundary between Australia and East Timor 'represents one of the longest and most convoluted sagas in maritime boundary delimitation'<sup>8</sup>.

The difficulties in the process of delimitation arise from East Timor's varied political history. Australia and Indonesia began maritime boundary negotiations in the 1960s and formulated a number of agreements, including the 1971 and 1972 Seabed Agreements. The 1971 agreement determined the boundary from west of Cape York to south of the eastern tip of the island of Timor. The 1972 agreement extended the boundary to a point north-west of the Australian territories of Ashmore and Cartier Islands. These two agreements, however, were not exhaustive and a gap of approximately 130nm was left in the boundary opposite the coast of East Timor<sup>9</sup>. This break in the Australian-Indonesian maritime boundary became known as the Timor Gap.

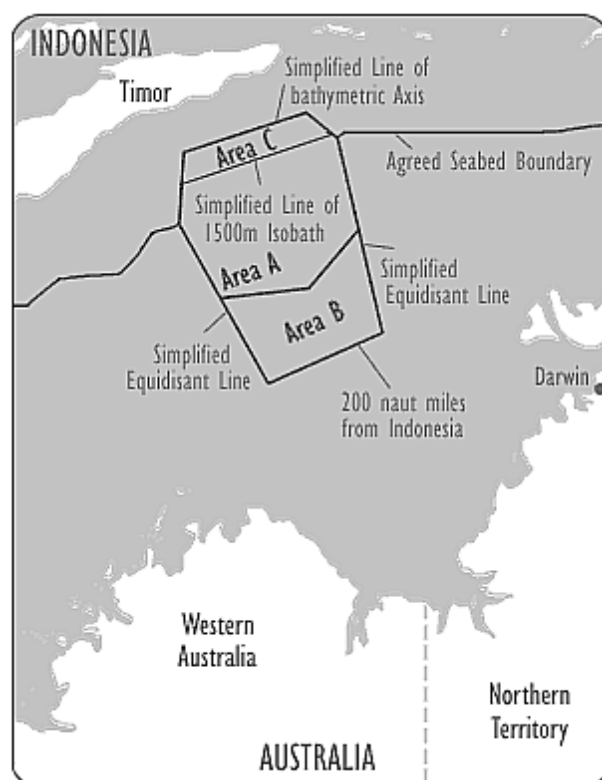
At the time of these negotiations between Australia and Indonesia, East Timor was a Portuguese territory. Australia sought negotiations with the Portuguese government to determine a maritime boundary with respect to the Timor Gap, however, the Portuguese government declined the offer to undertake negotiations<sup>10</sup>. The 1974 Portuguese revolution saw the newly established democratic regime withdraw all claims to the country's colonial territories. The withdrawal of Portuguese claims to East Timor resulted in civil war and ultimately Indonesia's annexation of East Timor, declaring it to be the twenty-seventh province of the Republic of Indonesia in 1976.

Despite international pressure and a United Nations resolution requiring Indonesia to withdraw, East Timor remained under Indonesian control for the next twenty-five years. Australia still wanted to determine the maritime boundary in the Timor Sea. Pursuing negotiations with the Portuguese government would be futile, as it had relinquished its claims in the region. On the other hand, Indonesia's annexation of East Timor was not recognised by the United Nations. Despite initially protesting Indonesia's annexation of East Timor, Australia took a pragmatic approach to the predicament and, by initiating negotiations with Indonesia to determine the remainder of the Australian-Indonesian maritime boundary, became the only state to recognise Indonesia's annexation of, and title to, East Timor<sup>11</sup>.



Negotiations lasting ten years then took place between Australia and Indonesia. Australia campaigned for delimitation in accordance with the principle of natural prolongation from the continental shelf, a concept that entered into international law in 1969 and favours ‘the use of submarine features to represent the natural prolongation of land territory to determine continental shelf boundaries’<sup>12</sup>. The Timor Trough is the only substantial geological feature between Australia and the island of Timor. It is approximately 3,500 metres deep at its deepest point, compared to depths of only 200m in the Timor Sea. The trough is also significantly closer to Timor than it is to Australia, therefore delimitation based on this feature would favour Australia’s interests. Indonesia, on the other hand, negotiated in terms of a line 200nm from East Timor’s coastline<sup>13</sup>. After lengthy negotiations, agreement was finally reached under the Timor Gap Treaty 1989, creating a three part Zone of Cooperation (ZOC) (see figure 1).

The eastern and western limits of the (ZOC) were determined by the existing agreements



*Figure 1: Timor Gap Treaty Zones of Cooperation*

between Indonesia and Australia. The northernmost line is the limit of the maximum Australian claim represented by the centre line of the Timor Trough. The line between Area A and C is the 1500m isobath. The line dividing Area A and B is the line of equidistance between Australia and East Timor. The southernmost line is the maximum claim made by Indonesia, that is a line 200nm from the East Timorese coast. The Treaty established a Ministerial Council and a Joint Authority to oversee the exploitation of the resources in Area A of the ZOC, with revenue raised from the sale of resources to be shared equally. Areas B and C of the ZOC were subject to Australian and Indonesian domestic law, respectively, with 10% of the taxes collected in the areas to be paid to the other country<sup>14</sup>. The Treaty, which was signed by the Australian and Indonesian Foreign Ministers in a plane circling above the ZOC, was intended to be a provisional agreement in lieu of a permanent agreement, in accordance with Article 83(3) of UNCLOS. It was to

remain in force until February 2031 and, with the agreement of both parties, could be extended for periods of 20 years<sup>15</sup>. It included an article specifying that the treaty did ‘not prejudice the position of either Party with respect to delimitation of a permanent continental shelf boundary, and the Parties shall continue to attempt to reach agreement on such a boundary (Article 2[3])’<sup>16</sup>.

The following ten years of maritime boundary negotiations between Australia and

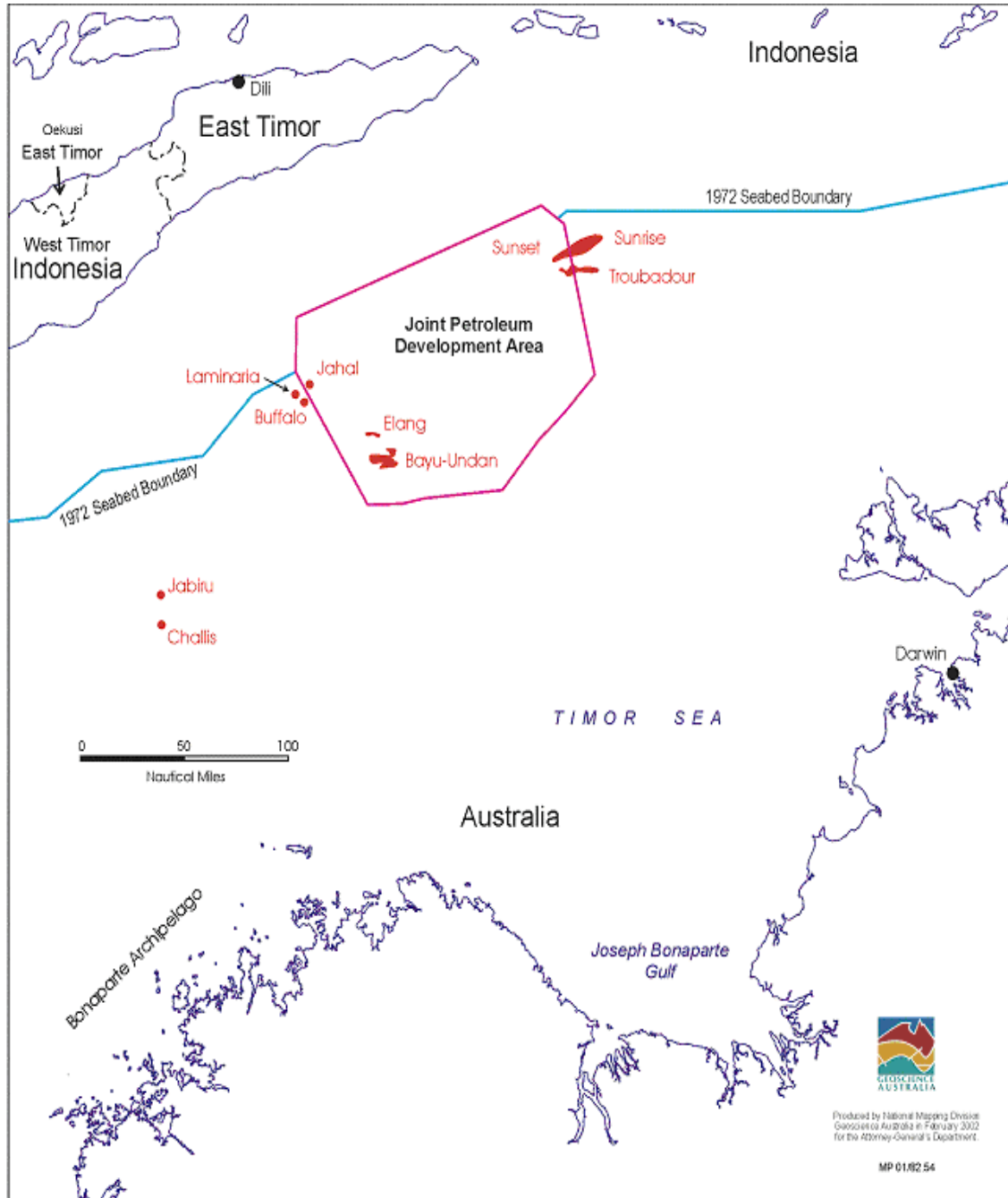


Figure 2: Timor Sea Joint Petroleum Development Area

Indonesia saw the resolution of the entire seabed and EEZ boundary between their territories. The important characteristic of this agreement, enshrined in the Perth Treaty of 1997, is that it creates areas of overlapping jurisdiction. Australia successfully campaigned to have the existing continental shelf agreement maintained and, as a result, the Perth Treaty establishes an area ‘in which Indonesian EEZ (water column) overlays

the Australian continental shelf<sup>17</sup>. This complex arrangement represents Australia's commitment to maintaining control of its claims to offshore hydrocarbon resources.

In 1999, the United Nations (UN), with the agreement of the governments of Indonesia and Portugal, sponsored a popular consultation in which the East Timorese people overwhelmingly chose to secede from the Republic of Indonesia. Indonesia subsequently gave up its claim to East Timor and withdrew its troops. This event, and the destruction that followed, had two major implications for the Timor Sea resources. Firstly, the Timor Gap Treaty between Australia and Indonesia no longer had any relevance since Indonesia had rescinded its sovereignty over East Timor. Secondly, the devastation resulting from the violence associated with the withdrawal of Indonesian troops from East Timor increased the importance to East Timor of any revenue that might be gained from the Timor Sea resources. Negotiations to establish a new agreement between Australia and the United Nations Transitional Administration in East Timor (UNTAET) were undertaken to resolve the issue as quickly as possible. It was agreed that the existing Timor Gap Treaty would remain as the interim agreement, pending the formulation of a new treaty between Australia and East Timor<sup>18</sup>.

The Timor Sea Treaty was signed in Dili, East Timor, on 20 May 2002, the first day of East Timor's independence. It was based primarily on the former Timor Gap Treaty, however, there was a significant change in the revenue sharing arrangements pertaining to the three ZOCs. Areas B and C were abolished and were placed under the exclusive jurisdiction of the coastal state and Area A of the ZOC was renamed the Joint Petroleum Development Area (JPDA) (see Figure 2).

The division of taxation revenues arising from the sale of resources in the JPDA was also changed, with East Timor to receive 90% and Australia 10%. As in the Timor Gap Treaty, the Timor Sea Treaty stipulates that the JPDA will be jointly administered by a 'three-tiered joint administrative structure consisting of a Designated Authority, a Joint Commission and a Ministerial Council'<sup>19</sup>. The Timor Sea Treaty was ratified by East Timor in December 2002 and by Australia in March 2003 and is effective from the date of signing.

Although the Timor Sea Treaty was signed in May 2002, passing into effect when the Australian government ratified it on 7 March 2003, the debate over the boundaries of the JPDA continues. In fact, Article 2 of the Treaty specifies:

Nothing contained in this Treaty and no acts taking place while this Treaty is in force shall be interpreted as prejudicing or affecting Australia's or East Timor's Position on or rights relating to a seabed delimitation or their respective seabed entitlements.<sup>20</sup>

This issue and the exact boundaries of the JPDA were at the heart of parliamentary debate immediately prior to the treaty's ratification. The debate was at times impassioned and discussed how ratification of the Treaty might serve both Australia's and East Timor's national interests. Those opposed to the current boundaries of the JPDA insist upon the Treaty allowing for future delimitation negotiations, as it indeed does. It has also been argued that, during future negotiations, the Australian government needs to place a higher priority on East Timor's national interests than its own because it is in Australia's interests for East Timor to become a secure and prosperous neighbour.

The various arguments regarding the delimitation of the JPDA are best summed up by the Joint Standing Committee on Treaties (JSCOT):

Delimitation based on the principle of median distance would move significant hydrocarbon reserves that currently fall within the JPDA and Australian jurisdiction to the possession of either East Timor or Indonesia. These resources include the Greater Sunrise, Elang Kakatua and Bayu-Undan oil and gas fields that are partially or entirely within the JPDA as well as the Laminaria and Buffalo oil and gas fields that are currently completely within Australian jurisdiction.

The suggestion that Australia and East Timor should settle their maritime boundary along a line of equidistance not only ignores Australia's continental shelf claim but also East Timor's Exclusive Economic Zone (EEZ) claim that extends 200nm from its coastline.<sup>21</sup>

The submissions that dispute the legitimacy of the JPDA argue that the northern line should be removed because natural prolongation no longer has currency in international law. They argue that Australia and East Timor should agree to a seabed boundary at the median distance between the two countries as they have opposite or adjacent coastlines that are less than 400nm apart, as per Article 15 of UNCLOS.

## **Conclusion**

The above discussion illustrates that maritime boundary delimitation between Australia and East Timor is not only influenced by international law, but also by political, economic and regional development issues. The importance, to both Australia and Indonesia, of the oil and gas fields, will continue to result in convoluted negotiations between the two countries. Regardless of when these negotiations are resolved, and a permanent delimitation agreement can be reached, it must be acknowledged that the development and exploitation of the JPDA oil fields will continue for some time under this temporary agreement, whilst at the same time the potential for change still exists.

## THE RESOURCES

The then Portuguese administration first recognised the Timor Sea as an area rich in hydrocarbon resources in 1965 when it granted an exploration concession to an American oil company. The concession in an area that covers much of the now JPDA was granted to the PetroTimor Company. This section begins by describing the resources contained in the JPDA, their current development status and future development proposals. The second part of the section will discuss the importance of the resources to the Australian and East Timorese economy.

### The JPDA Resources

Located in the JPDA are the producing oil fields of Elang-Kakatua, Buffalo, Laminaria and Corralina as well as the Jahal and Kuda Tasi oil fields, which are currently undeveloped. A number of gas fields have been discovered in the JPDA, including Bayu-Undan, Hingkip, Chuditch and the Greater Sunrise area, which includes the Sunset, Sunrise, Loxton Shoals, Bard and Troubadour fields. These areas are awaiting development in the near future. Table 1 provides a brief overview of the fields.

The Elang-Kakatua group of oil fields is located approximately 500 kilometres north west of Darwin, in the JPDA licence area 91-12. These oil fields began producing in July 1998, the first in the then Timor Gap Zone of Cooperation Area A (ZOCA). Production is through four sub-sea wells connected to a Floating Production, Storage and Offloading Facility (FPSO), *Modec Venture 1*, moored near the Elang field<sup>22</sup>.

Production at the Buffalo oil field first began in late December 1999 and, due to the relative size of the oil field, is expected to be a short term project. Facilities at Buffalo are similar to those at Elang-Kakatua, the main difference being that Buffalo uses a series of five unmanned drilling platforms, located on the surface and operated remotely from the FPSO *Buffalo Venture* via an umbilical line<sup>23</sup>. Due to their proximity and similar small size, the Jahal and Kuda Tasi oil fields may be linked to the FPSO *Northern Endeavour*, located at the Laminaria oilfield, in the near future for development and production. These two small oil fields are unlikely to be exploited as stand alone projects. Crude oil from the Buffalo field has been sent to both the domestic and export markets during 2002 and 2003<sup>24</sup>.

The Laminaria and Corralina oil fields are located 550 kilometres north west of Darwin. Oil is produced in the same manner as at Elang-Kakatua with remote under-sea wells linked to the FPSO *Northern Endeavour*, the only surface infrastructure associated with the Laminaria fields. Sub-sea infrastructure consists of three wells at Laminaria and two at Corallina (see Figure 3).

The development of gas production from fields in the JPDA is at an earlier stage than oil production. Bayu-Undan, Greater Sunrise and Chuditch, the three oil fields in the JPDA still under licence, are all still yet to reach production status. The exploration licences for Hingkip and Kelp fields have been relinquished by their respective oil companies due to small size of the fields and their distance from current planned developments<sup>25</sup>. There are no existing plans to develop these oil fields, however, they may be linked to either an undersea gas pipeline to be built from Bayu-Undan to Darwin for onshore gas processing, or a Floating Liquid Natural Gas (FLNG) facility to be built at Greater Sunrise.

Site	Operator	Resource	Gas Reserves	Petroleum Reserves	Facilities	Production
Bayu-Undan	Conoco Phillips Aust Oil Co,	Gas	3.4 Tcf	400 MMbbl	26 wellhead platforms (WHP) CUQ Platform DPP Platform FSO Facility 25.2km of pipeline	110,000bbl/ day (2004)
Buffalo	Nexen	Oil	-	32 MMbbl (original)	5 wellhead platform (WHP) FPSO Facility 6km of pipeline	23,600bbl/day (Nov 2002)
Chuditch	Shell Dev	Gas		-	-	Undeveloped
Elang Kakatua	Conoco Phillips Aust Oil Co.	Oil	-	29 MMbbl (October 2002)	4 sub-sea wells FPSO Facility Shuttle Tankers	20,000bbl/day (Nov 2000)
Greater Sunrise	Woodside	Gas	8.35 Tcf	320 MMbbl	Sub-Sea pipeline Onshore LNG Facility FLNG Facility (proposals undecided)	Undeveloped
Hingkip	Woodside	Oil	-	2 MMbbl	-	Undeveloped
Jahal	Woodside	Oil		10 MMbbl	Proposal to run pipelines to FPSO <i>Northern Endeavour</i>	Undeveloped
Kuda Tasi	Woodside	Oil		10 MMbbl	Proposal to run pipelines to FPSO <i>Northern Endeavour</i>	Undeveloped
Laminaria Corallina	BHP Petroleum	Oil	-	178 MMbbl	5 sub-sea wells FPSO Facility Northern Endeavour (in Australian waters) pipelines	170,000bbl/ day (designed maximum production)

Table 1: JPDA Hydrocarbon Resources

Bayu-Undan is located 500km north west of Darwin, in JPDA licence areas 91-12 and 91-13. The gas field which is approximately 25 by 15 kilometres in size will be developed using up to twenty-six wells throughout its lifetime. Other associated infrastructure include a Compression Utilities and Quarters Platform, a Drilling,

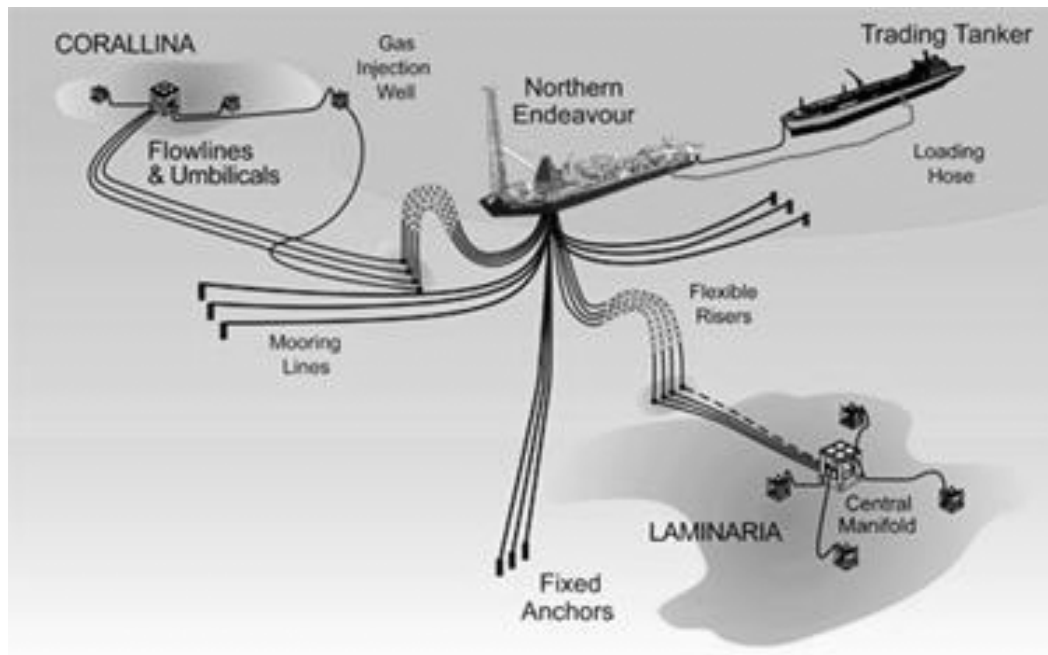


Figure 3: Diagram of Laminaria/Corralina Facilities

Production and Processing Platform and a Floating Storage and Offloading Facility, the latter to be purpose-built, including accommodation for sixty people<sup>26</sup> (see Figure 4).

Production at this facility is planned for late 2003. The operator, ConocoPhillips, has signed a Heads of Agreement (HOA) statement with two Japanese based power companies which establishes arrangements for the shipping of three million tonnes of Liquid Natural Gas (LNG) per year, beginning in late 2005. This agreement accounts for

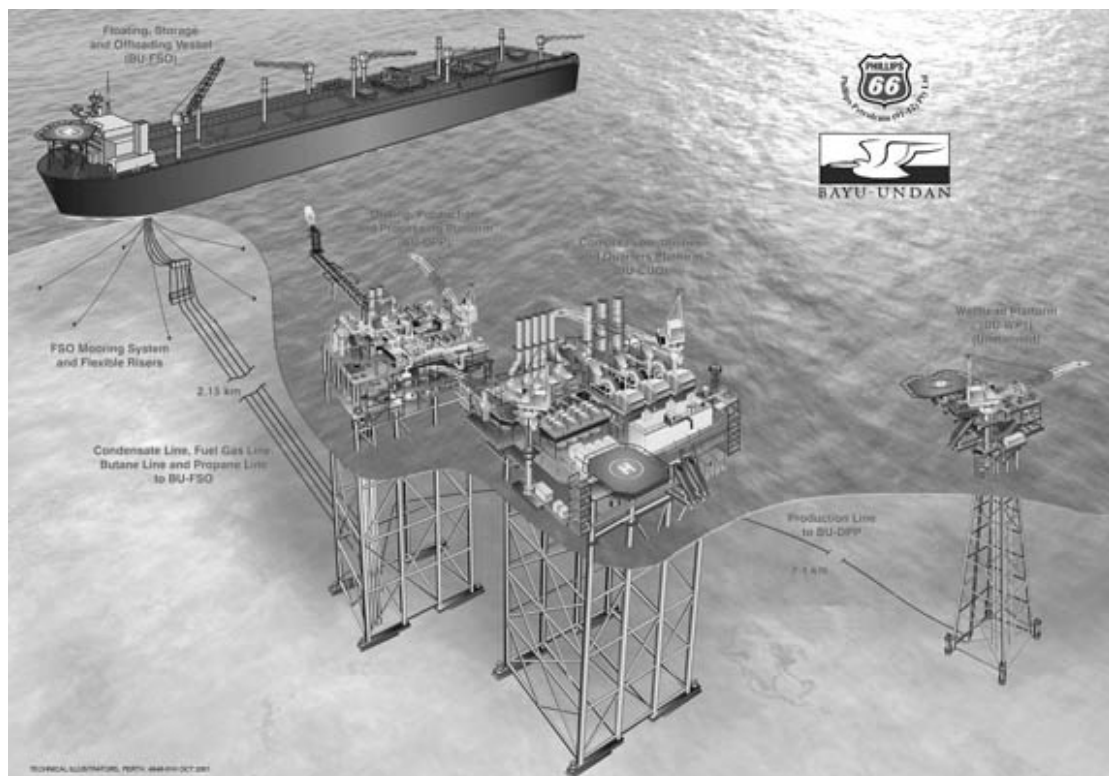


Figure 4: Bayu-Undan Facilities

almost 100% of the proposed production from Bayu-Undan<sup>27</sup>. This LNG will be sent to Darwin for processing via an under sea pipeline. A tanker at the Bayu-Undan field will directly take off Liquid Petroleum Gas (LPG) and condensate<sup>28</sup>.

The Greater Sunrise area is by far the largest gas field in the Timor Sea. It is located on the eastern border of JPDA, 480km north west of Darwin. Although the Sunrise and Troubadour fields were first discovered in 1974, the lengthy political negotiations discussed in the previous chapter delayed development until 1995. Because part of the field lies in the jointly administered JPDA and part of it in exclusively Australian waters, Greater Sunrise is subject to an International Unitisation Agreement (IUA) between the governments of Australia and East Timor Under Article 9 of the Timor Sea Treaty. The essence of this agreement is that the JPDA Joint Authority and Australia must exploit this resource as a single unit, rather than both sinking wells at opposite sides of the boundary and pumping until the gas reserves are exhausted. The agreement between Australia and East Timor to unitise the Greater Sunrise Field is in accordance with Annex E of the Timor Sea Treaty. Revenue from Greater Sunrise will be divided between Australia and East Timor on the grounds that 20.1% of the field lies within the JPDA and 79.9% lies within Australian waters<sup>29</sup>. East Timor is therefore entitled to 18.09% of the total revenue from Greater Sunrise, with Australia being entitled to the remainder, that is 81.91%. The IUA was a major part of the negotiating process in the lead up to Australia's ratification of the Timor Sea Treaty. Despite current agreement, the Treaty states that it will be affected by any subsequent changes to the maritime boundaries of both Australia and East Timor.

There are currently two proposals for development: linking the area to the planned sub-sea pipeline from Bayu-Undan, and also a Floating Liquid Natural Gas (FLNG) plant. Developments were awaiting the ratification of the Timor Sea Treaty by East Timor and Australia, finalised on 7 March 2003, and a decision determining whether development will proceed through onshore processing at Darwin or via FLNG processing should be made in the near future.

## **The Importance of the JPDA Resources to the Australian Economy**

Regardless of the result of any future negotiations between Australia and East Timor to permanently determine maritime boundary delimitations, the resources contained within the JPDA are of significant economic importance to the Australian economy. In fact, the economic importance of the resources is so great that it was one of the major issues for debate during the passing of the *Petroleum (Timor Sea) Act 2003*, which ratified the Timor Sea Treaty.

The majority of the revenue that Australia is set to gain from the JPDA will be in the form of taxation, regulated by the taxation code that forms a part of the Timor Sea Treaty. Bayu-Undan and Greater Sunrise are the most lucrative of the projects planned for the JPDA and are therefore the most economically important. Australia will gain an estimated \$2 billion dollars in direct revenue from the resources in the Bayu-Undan gas field throughout the field's lifespan. In addition, the onshore LNG processing plant will provide the Northern Territory with 100 direct and 300–500 indirect jobs over a period of 20 years. As previously mentioned, Bayu-Undan gas is to be sent directly to overseas customers<sup>30</sup>.

The revenue from Greater Sunrise's 8 trillion cubic feet of gas and 300 million barrels (MMBBL) of condensate will provide a total of \$30 billion in export revenues and \$8



billion in taxes, of which Australia is entitled to \$3.8 billion. Additional downstream benefits from the Greater Sunrise gas field are dependent on the type of development that proceeds. The current processing proposal preferred by the operators, Shell and Woodside, is a FLNG facility located offshore. Should this proposal go ahead, the additional benefits to Australia would be in the order of \$1 billion. If the gas is brought onshore to a processing plant near Darwin, the proposal favoured by the Northern Territory (NT) Government, the estimated indirect financial benefit to Australia would be around \$22 billion, as well as the generation of up to 20,000 new jobs in the Darwin area<sup>31</sup>.

Australia, and Darwin in particular, is already experiencing downstream benefits from oil and gas resources in the JPDA.

Darwin is the logistics base for the majority of Timor Sea operations. Supply vessels, helicopter support and other servicing facilities such as maintenance and rig refit capacity are available in Darwin. The new East Arm Port improves Darwin's capacity to service offshore facilities. The Northern Territory receives 15% of exploration expenditure and 50% of operational expenditure from Timor Sea projects, currently about \$70 million per annum.<sup>32</sup>

The immediate long-term benefits of an onshore LNG processing plant being located in the Darwin area are significant. They are, in fact, so significant that in the light of Shell and Woodside investing \$11 million to investigate and develop FLNG technology for use at Greater Sunrise<sup>33</sup>, the NT government began a concerted lobbying campaign to demonstrate to the Federal government that the onshore processing of LNG is in the national interest. According to the report commissioned by the NT government:

The total annual economic benefits to Australia from Sunrise and Bayu Undan gas coming onshore, with related onshore developments, are forecast to be:

- An increase of 46% to Northern Territory GDP and, for the whole of Australia, an increase of over \$4 billion in GDP.
- A permanent employment boost of 5,156 in the NT and over 10,600 for Australia as a whole.
- Increase in revenues to the NT Government of \$27 million and \$210 million to the Commonwealth.<sup>34</sup>

Such an increase in revenue at both the state and federal levels proves the economic importance of the Timor Sea oil and gas resources. The office of the Chief Minister of the Northern Territory again highlights this importance:

A government commissioned report from ACIL Consulting predicts that without Sunrise gas onshore, South Australia and the East Coasts would not have enough gas to meet a moderate increase in commercial and industrial demand, from approximately 2008.

By contrast, if Sunrise were fed into the national grid, there would be certainty of supply, increase in competition, and reduced gas prices resulting in jobs and training.<sup>35</sup>

Furthermore, the Federal Joint Standing Committee on Treaties (JSCOT) was told that such an increase in competition 'could actually reduce the price of gas in various states in real terms by 10 or 20 cents per gigajoule'<sup>36</sup>.

The benefits to East Timor are proportionally larger than those to Australia and 'will underpin the economic wellbeing of ... East Timor'<sup>37</sup>. The development of the Bayu-Undan field will see East Timor receive royalties and taxation revenue amounting to between \$US2.5 and \$US3 billion dollars. In addition to this direct revenue, petroleum industry participants have promised \$US13 million of investment for 'associated project

training and community infrastructure, such as port, airport and health facilities<sup>38</sup>. Revenues to East Timor from Greater Sunrise could be in the order of \$A100 million a year<sup>39</sup>. Associated development opportunities for East Timor are unclear at this stage due to the preliminary nature of development proposals, however, Woodside Petroleum, one of the participating companies stated that it 'would support training and development on both the Australian and East Timor side'<sup>40</sup>.

For Australia, the significance of the economic benefits to East Timor arising from the resources located in the JPDA are linked to the security benefits of East Timor quickly becoming a secure and economically viable country. Senator Stott Despoja raised the issue in her speech during debate on the ratification of the Timor Sea Treaty. She quoted the Oxfam Community Aid Abroad submission to the JSCOT, which said:

For Australia, an economically unviable East Timor could threaten national security and that of the region. An unstable East Timor could lead to a flow of refugees to Australia with associated costs. The Australian and international community would expect the Australian government to bear much of the responsibility for increased humanitarian aid and assistance, and the provision of continued peacekeeping and security assistance to East Timor<sup>41</sup>.

This strategic importance of a stable East Timor will be discussed further in the vulnerability to risk section.

## **Conclusion**

This section illustrates the extent of the resources located in the JPDA, the manner in which subsequent revenues are to be shared between Australia and East Timor and finally the associated benefits for each of the countries. This discussion shows that the Timor Sea is an immense natural resource and will be a significant player in the future world energy market. Regardless of which of the two proposed development options for Greater Sunrise eventuates, the economic importance of the JPDA requires that the area is subject to constant surveillance.

## THE CURRENT SITUATION

The previous section argued that the hydrocarbon deposits in the JPDA represent a valuable resource to both Australia and East Timor. The protection of such a resource, in order that it can be exploited to the benefit of Australia and East Timor, is clearly in the national interest. Australia claims the right to conduct patrols of both its territorial waters and its EEZ for craft that may be in breach of national legislation. This section discusses the current systems in place to protect the JPDA resources. It begins with a discussion of UNCLOS, the international agreement forming the basis for Australia's legislation with respect to maritime zones, and the legislation through which UNCLOS is implemented. The second part of the section looks at previous and existing patrols of Australia's maritime zones in order to gain an understanding of previous and existing patrol and surveillance priorities, and possible future priorities. Particular attention will then be paid to Coastwatch, the body established within Customs to protect Australia's maritime jurisdiction. This will necessitate, and lead into, a description of Australia's current capabilities and their relevance to patrols of offshore installations. The section will conclude with a brief discussion of two emerging surveillance capabilities: High Frequency Surface Radar and the Wedgetail Airborne Early Warning and Control Aircraft.

### UNCLOS and its Implementation in Australia

UNCLOS provides the international basis for legislation with respect to maritime zones. A number of Articles regarding maritime boundary delimitation have been discussed under the legal and political dimensions. Relevant to this section are Articles 60 and 111, relating respectively to artificial islands, installations and structures in the EEZ and the right of hot pursuit of vessels in breach of legislation.

Article 60 of UNCLOS provides for the establishment of offshore installations in the EEZ and places them under the jurisdiction of the coastal state. All of the offshore installations in the JPDA are located in the EEZ. Paragraphs 4, 5, and 6 of Article 60 provide the basis for the establishment of safety zones around offshore installations. Safety zones may be established around any offshore installation, and may extend to a distance of 500 metres from the installation<sup>42</sup>. Paragraph 6 states that 'all ships must respect these safety zones'<sup>43</sup> and is therefore the basis of any system which protects offshore installations from ship borne risks such as damage from accidental collision with fishing craft, and intentional damage from pirates or other maritime terrorists. The *Petroleum (Submerged Lands) Act 1967* establishes this article of UNCLOS in Commonwealth law, specifying that:

Where a vessel enters or remains in a safety zone ... the owner and the person in command or in charge of the vessel are each guilty of an offence against this section and are punishable, upon conviction, by imprisonment for not more than 10 years.<sup>44</sup>

The prohibition of vessels entering safety zones is further supported by Section 124A of the same Act, which makes it an offence to interfere with offshore petroleum installations or operations.

Section 111 of UNCLOS provides for the right of hot pursuit of vessels believed to be in contravention of the laws and regulations of the coastal state. Paragraph 2 of the section specifies that:

The right of hot pursuit shall apply *mutatis mutandis* to violations in the exclusive economic zone or on the continental shelf, including safety zones around continental shelf installations.<sup>45</sup>

The right of hot pursuit allows for military ships or aircraft, or other authorised vessels of a coastal state, to pursue a ship across the high seas in order to detain it in relation to a suspected violation of the state's laws or regulations. To be deemed hot pursuit, the pursuit must commence within the state's waters and continue uninterrupted, and hot pursuit ends when the suspect vessel enters the territorial waters of another state. Its application to the EEZ means that it is the legal basis for ships or aircraft patrolling offshore installations in the JPDA to pursue and arrest vessels in violation of safety zones.

The other international agreement relevant to offshore resources is the Protocol for the Suppression of Unlawful Acts against the Safety of Fixed Platforms Located on the Continental Shelf. The Protocol arose out of a need for the Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation to also apply to fixed platforms, and entered into force in March 1992. Article 2 of the Protocol prohibits a number of acts relating to platforms fixed to the sea bed for economic purposes. Under the Protocol, a person commits an offence if that person unlawfully and intentionally:

- (a) Seizes or exercises control over a fixed platform by force or threat thereof or any other form of intimidation.
- (b) Performs an act of violence against a person on board a fixed platform if that act is likely to endanger its safety.
- (c) Destroys a fixed platform or causes damage to it which is likely to endanger its safety.
- (d) places or causes to be placed on a fixed platform, by any means whatsoever, a device or substance which is likely to destroy that fixed platform or likely to endanger its safety.
- (e) Injures or kills any person in connection with the commission or attempted commission of any of the offences set forth in sub-paragraphs (a) to (d).<sup>46</sup>

Threatening to commit or aiding and abetting of the commission of any of the prohibited acts is also an offence under the protocol<sup>47</sup>. The protocol is a legally binding instrument to which Australia is a party and has been implemented by Article 124A of the *Crimes (Ships and Fixed Platforms) Act 1992* and the *Petroleum (Submerged Lands) Act 1967*.

## Patrols and Surveillance

Australia has been surveying and patrolling its maritime zones since the end of World War Two. Activities in Australia's northern waters have been primarily concerned with deterring fishing vessels, principally of Indonesian and Taiwanese origin. Attack Class Patrol Boats were located in Darwin in 1974 when *HMAS Arrow* was lost as a result of Tropical Cyclone Tracy.<sup>48</sup> During the East Timorese Civil War in 1975, the Daring Class destroyers *HMAS Vendetta* and *HMAS Vampire* were temporarily located in the area to respond to potential emergencies, after the exercise they were originally to take part in was cancelled due to the increased tension in the area. Arrests of vessels breaching the 12 nautical mile territorial limit continued throughout 1976, to the extent that RAAF Lockheed Neptune patrol aircraft were deployed to operate patrols out of Darwin. In 1977, three RAN Grumman Tracker aircraft were based in Darwin to survey Australia's northern approaches, 'primarily to detect the many vessels carrying boat people who were making their way south'<sup>49</sup>. Fremantle Class Patrol Boats (FCPBs) have been permanently based in Darwin since August 1980.

The objectives of recent maritime surveillance are varied. For example, FCPBs:

... have been working in consort with the Australian Fisheries Management Authority (AFMA) to catch vessels fishing illegally within the Australian Fisheries Zone. They also help in the arrest of vessels exploiting areas or species which are protected under the national parks and Wildlife Act, such as turtles and certain molluscs. FCPB presence in the areas nearest the AFZ boundary helps to deter Foreign Fishing Vessels (FFV) from entering the zone in the future.<sup>50</sup>

The objectives and status of selected surveillance operations conducted in the period 2001–2002 are included in Table 2.

The current arrangement represents an increased emphasis on Australia's northern approaches compared with previous years, as well as a tailoring of northern patrols, in accordance with perceived and actual threats. Operations Mellin and Estes, in particular, were suspended in 2001–2002 due to other operational demands. The establishment of Operations Relex I and Relex II in September 2001 illustrate this change in operational focus.

Patrols of the Timor Sea area are currently conducted under Operation Cranberry, the operation through which the ADF contributes to the civil surveillance program. Operation Mencari, which specifically focussed on Timor Sea patrols under the now defunct Timor Gap Treaty, was ceased due to the annulment of the Treaty between Australia and Indonesia. It has not yet been replaced with a similar surveillance operation under the Timor Sea Treaty. The Treaty provides, however, for surveillance patrols to be tasked by the Designated Authority, in cooperation with the governments of both Australia and East Timor, and such an operation may be established in the near future. Any operation is likely to include a surface component, an air component and also a radar component, likely to be supplied by the RAN Patrol Boat Force Element Group (FEG), the RAAF Maritime Patrol Group (MPG), and the Jindalee Operational Radar Network (JORN), respectively.

Operation Estes, which has been undertaken since 1980, is an example for future surveillance operations of offshore installations. Ships undertaking Bass Strait oil rig surveillance are required to 'assist radar fitted oil platforms in the detection and tracking of vessels that move towards the Area to be Avoided; and respond to vessels that encroach, or appear likely to encroach, illegally upon the Area to be Avoided',<sup>51</sup>

Surface vessels patrolling the Bass Strait are required take the following response actions:

Any unauthorised vessel over 200 gross tons which has entered the Area to be Avoided is to be advised that it has done so, and is to be requested to leave the Area by the quickest and safest means.

Any unauthorised vessel on a course which would take it inside a 500 metre Safety Zone it will be reported to the Commonwealth Government and, if convicted, the Master is liable to a fine of up to \$A100,000 under the *Petroleum (Submerged Lands) Act*.

The track and identity of any unauthorised vessel which enters the Area to be Avoided, including the 500 metre Safety Zones is to be monitored and recorded.<sup>52</sup>

The Area to be Avoided is an area surrounding the Bass Strait oil rigs which serves as a guideline for surface vessels undertaking surveillance patrols. As discussed earlier in this section, the safety zone is a legally enforceable restricted area.

<b>Operation</b>	<b>Objective and Status</b>
<p><b>Relex I and Relex II</b> September 2001 – continuing <u>Forces</u> ADF</p>	<p><b>Objective:</b> To conduct air and surface patrols across Australia’s northern approaches to deter unauthorised boat arrivals.</p> <p><b>Status:</b> Current. Operation Relex I ceased on 14 March 2002 to enable information concerning the operation to be declassified for the Senate Select Committee on a Certain Maritime Incident.</p> <p><b>Contribution:</b> The ADF commitment has included two frigates, one amphibious ship, one survey ship configured for patrol operations, up to six RAN patrol boats, two P-3C maritime patrol aircraft and a Sea King helicopter detachment.</p>
<p><b>Gaberdine</b> August 2001 – continuing <u>Forces</u> ADF</p>	<p><b>Objective:</b> To provide support to the Department of Immigration and Multicultural and Indigenous Affairs (DIMIA) to manage any increase in unauthorised boat arrivals.</p> <p><b>Status:</b> Current.</p> <p><b>Contribution:</b> Defence assisted DIMIA with contingency planning and provided emergency facilities, security and medical personnel and transport support. A number of Defence sites were developed to provide emergency facilities. Preparation of these sites included upgrading existing facilities and providing accommodation stores. DIMIA did not request or utilise these Defence sites.</p>
<p><b>Mencari</b> Ceased – November 2001 <u>Forces</u> Navy</p>	<p><b>Objective:</b> To patrol the Timor Gap Zone of Cooperation.</p> <p><b>Status:</b> Ceased on 12 November 2001.</p> <p><b>Contribution:</b> No activity has occurred since the annulment of the treaty by the Indonesian Government in May 2000.</p>
<p><b>Estes</b> 1980 – continuing <u>Forces</u> Navy</p>	<p><b>Objective:</b> To conduct surface patrols in Bass Strait.</p> <p><b>Status:</b> Dormant.</p> <p><b>Contribution:</b> Due to other operational commitments, Operation Estes patrols were not conducted in 2001-02.</p>
<p><b>Mistral</b> 1998 – continuing <u>Forces</u> Navy and Air Force</p>	<p><b>Objective:</b> To support Australian sovereign rights and fisheries law enforcement in the Southern Ocean by contributing to the Southern Ocean fisheries patrols.</p> <p><b>Status:</b> Current.</p> <p><b>Contribution:</b> Operation Mistral is the overarching plan to support Australian sovereign rights and fisheries law enforcement. Operations are ongoing and cyclical.</p>
<p><b>Mellin</b> 1995 – continuing <u>Forces</u> Navy and Air Force</p>	<p><b>Objective:</b> To contribute to Torres Strait and Timor Gap patrols.</p> <p><b>Status:</b> Dormant.</p> <p><b>Contribution:</b> Due to other operational commitments, Operation Mellin patrols were not conducted in 2001-02.</p>
<p><b>Cranberry</b> 1997 – continuing <u>Forces</u> ADF</p>	<p><b>Objective:</b> To conduct military surveillance and response in northern Australia and coordinate ADF support to the civil surveillance program within the area of operation</p> <p><b>Status:</b> Current.</p> <p><b>Contribution:</b> The ADF continues to conduct military surveillance in northern Australia and to contribute to the civil surveillance program.</p>

Table 2: ADF Surveillance Operations<sup>53</sup>

It is unlikely that a similar Area to be Avoided will be declared around oil and gas installations in the JPDA as it is in international waters and ‘in accordance with international law, freedom of sea and air movement is permitted by all parties’<sup>54</sup>. The 500 metre safety zone was, however, enforced under the former Timor Gap Treaty with Indonesia and policed by the ADF under Operation Cranberry. For these reasons, and also because safety zones are enshrined in Commonwealth legislation, they will almost certainly be enforced under the newly ratified Timor Sea Treaty.

Under the current operational climate, it is unlikely that a dedicated operation to patrol offshore installations, similar to Operation Estes, would be undertaken in the JPDA. Coastwatch aerial surveillance aircraft, supported by Customs National Marine Unit (NMU) vessels, currently perform surveillance. As part of Operation Cranberry the RAN patrol boat force also conducts patrols of Australia’s northern waters, including the JPDA, to fulfil requirements for the prevention of illegal fishing and people smuggling activities. At this stage, the Department of Industry Tourism and Resources (DITR), the department responsible for offshore installations, has not requested that Coastwatch conduct patrols of JPDA oil and gas facilities. David Rendell, the Manager of Planning, Liaison and Evaluation, Coastwatch, suggests that in the case of Coastwatch receiving a request from DITR for such patrols, they could be conducted in conjunction with existing illegal fishing patrols<sup>55</sup>. Existing arrangements already provide for a significant RAN presence in the AFZ and EEZ. Patrol Boat activity for the 12 months to 31 March 2003 included up to six FCPBs undertaking continued patrols of the AFZ on every day of the year, except one<sup>56</sup>.

## **Coastwatch**

Coastwatch is the division of Customs responsible for providing a ‘civil maritime surveillance and response service to a range of government agencies’<sup>57</sup>. Key clients include the Department of Immigration, Multiculturalism and Indigenous Affairs (DIMIA), the Australian Fisheries Management Agency (AFMA), Environment Australia (EA), the Australian Customs Service (ACS), the Australian Quarantine and Inspection Service (AQIS) and the Great Barrier Reef Marine Park Authority (GBRMBA)<sup>58</sup>. The Director-General Coastwatch is a serving member of the RAN and is directly responsible to the head of the ACS.<sup>59</sup> Surveillance assets available to Coastwatch will be detailed in the following section and include Coastwatch aircraft, Customs NMU vessels, RAN FCPBs and AP-3C Orion aircraft from the RAAF Maritime Patrol Group.

The role and functions of Coastwatch have come under significant review in the last four years. This review has included the reports of the Prime Minister’s Coastal Surveillance Task Force in 1999 and the Review of Coastwatch undertaken by the Joint Committee of Public Accounts and Audit, tabled in Federal Parliament on 22 August 2001. These reports highlight the changing pressures on government policy in the area of maritime surveillance.

Throughout the review process, and indeed the broader debate on the function and role of Coastwatch, the current Federal government has continued to support Coastwatch in its current form, recommending that improvements, rather than wholesale changes, be made within the existing system. The broader Coastwatch debate requires a more detailed discussion than is available in this paper, which will touch on only a few issues which have led to Coastwatch’s current operations.

The Report of the Prime Minister's Coastal Surveillance Task Force, completed in June 1999, emphasises illegal immigration as the most important issue for coastal surveillance. It recommended that:

A strengthened Coastwatch would be more cost effective than an Australian coastguard or transfer of coastal surveillance to Defence. But Coastwatch needs a higher and more distinctive profile, closer cooperation with Defence and an effective national surveillance centre.<sup>60</sup>

This recommendation echoes one of Derek Woolner's major themes in his paper concerning the policy pressures in coastal surveillance, which was highly critical of the lack of coordination between the various bodies responsible for coordinating Coastwatch during the 1990s<sup>61</sup>. Furthermore, Woolner argues the Task Force's report focussed too heavily on the issue of illegal immigration and people smuggling and 'did not consider other issues of policy on coastal surveillance and certainly did not assess the cumulative impact of environmental factors on the total requirement for surveillance'<sup>62</sup>. Some of these broader 'environmental factors' will be considered in the following section, which will discuss the vulnerability of offshore installations to a variety of threats.

One of the most significant changes that the government has implemented as a direct result of the recommendations of the Task Force is the establishment of the National Civil Surveillance Centre (NCSC). The NCSC, which became operational in January 2000, monitors all of Coastwatch's operational activities, which are a part of the National Civil Surveillance Program (NCSP). Intelligence analysts in the centre provide 'an internal capacity to analyse and disseminate information received'<sup>63</sup> and inform client agencies. Should a response be requested by a client agency, the NCSC 'arranges for the most appropriate vessel, usually a naval patrol boat or a customs vessel, to undertake the response'<sup>64</sup>.

The bulk of Coastwatch's two major forms of surveillance operations, wide area planned (WAP) and tactical surveillance, are conducted by its fleet of contracted aircraft. WAP surveillance constitutes the majority of Coastwatch operations and involves the translation of planned tasking by client agencies into flying programs. WAP flying programs aim to produce a strategic picture of Australia's marine territories, from which tactical surveillance operations can be developed. Tactical surveillance is the result of specific operational intelligence and is, by its very nature, coordinated with little notice and is normally given a higher priority than WAP surveillance. Customs NMU and RAN surface vessels are tasked in response to both WAP and tactical surveillance and take the form of forward air support for operations. For example, if aerial surveillance identifies a foreign fishing vessel headed for Australian waters, suspected of not having the appropriate fishing licence, a vessel can be deployed to intercept the vessel, board and make the necessary inspection.

## **Current Capabilities**

There are four categories of aircraft and surface vessels that comprise Australia's current surveillance and patrol capability. Firstly, Coastwatch contracts a fleet of 15 fixed wing aircraft and two helicopters. Secondly, the RAAF Maritime Patrol Group provides 250 hours of aerial patrols. Thirdly, the Customs National Marine Unit operates eight Bay Class Customs Vessels. Finally, the RAN Patrol Boat FEG comprises fifteen FCPBs, which support the NCSP. The range, surveillance capabilities and armaments of these aircraft and vessels are contained in Table 3.



<b>Asset</b>	<b>Owner</b>	<b>Total</b>	<b>Range/Speed</b>	<b>Capabilities</b>	<b>Armaments</b>
Britten-Norman Islander PBN2B	Coastwatch (contracted)	6	Five hours	Day, visual	None
Shrike Commander AC500	Coastwatch (contracted)	1	Seven hours	Day, visual	None
Dash-8 Series 200	Coastwatch (contracted)	5	Seven hours	Day and night, visual, radar, infra-red and HDTV	None
Reims F406	Coastwatch (contracted)	3	Five hours	Day and night, visual, radar, night vision goggles	None
Bell 412 EP	Coastwatch (contracted)	1	360 nm	Visual, infra-red, TV, night vision	None
Bell Longranger IV	Coastwatch (contracted)	1	324 nm	Visual, TV, night vision	None
Bay Class Vessel (BCV)	Customs NMU	8	3000 nm 24 knots (max)	Visual, radar	None
Fremantle Class Patrol Boat (FCPB)	RAN	15	1450nm 30 knots	Visual, radar	1 x 40mm Bofors Gun, 120rds/min to 10km. 3 x 12.7mm MGs
Orion AP-3C and P-3C	RAAF	5 (each type)	2,200nm (mission radius) 608km/h	Visual, radar, infra-red.	AGM-84 Harpoon Missile 500 & 2000lb aerial mines Mk 46 Torpedoes.

*Table 3: Air and Sea Surveillance Platforms*

Customs aircraft are based at Broome, Darwin, Cairns and Horne Island in the Torres Strait. The RAAF Maritime Patrol Group is based at RAAF Edinburgh, South Australia, but can also operate from RAAF forward bases at Darwin, Tindal, Derby and Scherger. The RAN Patrol Boat FEG is located in Darwin and Cairns. These assets provide Coastwatch with a surveillance area capability of 83 million square nautical miles and 19750 flying hours in 2000-01<sup>65</sup>.

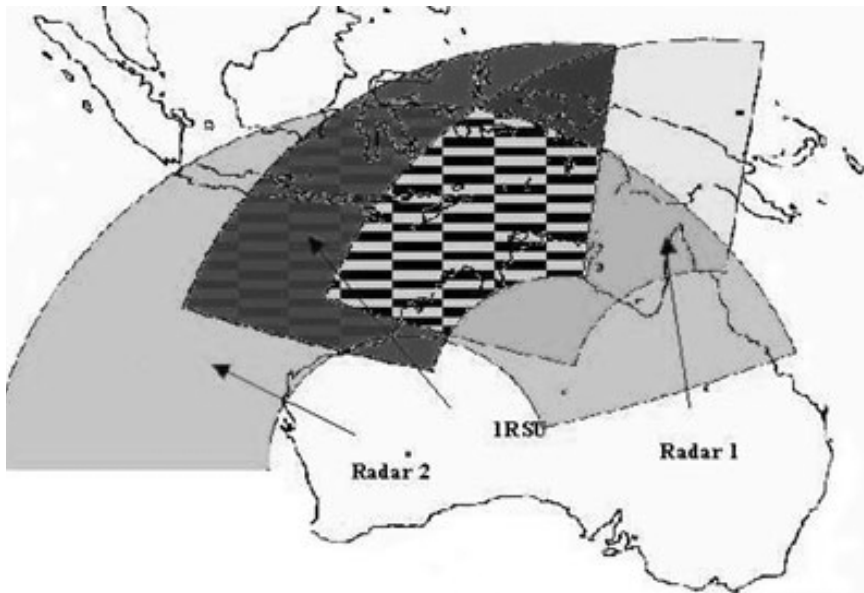
The RAN is currently undertaking an upgrade of their Patrol Boat Capability. The FCPB has reached the end of its life of type and will be replaced by a similar patrol boat capability, which will be known as the Armidale Class Patrol Boat (ACPB). The ACPB's mission is essentially the same as that of the FCPB:

The [ACPB] system mission will be to undertake surveillance, patrol and response operations and other military tasks in order to contribute to the national effort to protect the integrity of Australia's territory, territorial sea and EEZ, and to the defence of Australia.<sup>66</sup>

The ACPB's tasks are in accordance with this mission and primarily focus on patrol, response, surveillance and the enforcement of regulations against illegal fishing, illegal immigration, anti-smuggling operations and measures to protect the marine environment<sup>67</sup>. Despite the fact that a number of the ACPB's other operations, such as drug interdiction and the enforcement of fisheries regulations, will require it to patrol areas adjacent to the JPDA, the specific requirement for surveillance of offshore installations is notably omitted from the operational concept document. The ACPB capability will be required to provide 3,000 boat days per year in service of the NCSP, a significant increase to the current 1,800 boat days provided by the FCPBs<sup>68</sup>. Taking this increase in surveillance and patrol capability, it is not unreasonable to expect that future ACPB operations in the future could incorporate patrols enforcing safety zones around offshore oil and gas rigs.

## Radar Surveillance Capabilities

The Jindalee Operational Radar Network (JORN) provides wide area surveillance of Australia's north and north western approaches. It is designed to cast a security shield across Australia's northern maritime territory and reduce the need for conventional aerial and surface patrols<sup>69</sup>. On completion, the network will comprise radar sites at Alice Springs in the Northern Territory, Laverton in Western Australia and Longreach in Queensland. The three radars will operate simultaneously to provide a surveillance arc reaching from Geraldton in Western Australia to Cairns in Queensland, at a range of up to 3000 kilometres. The Alice Springs radar has been operational since 1992 and the Laverton and Longreach radars are currently in the Operational Testing and Evaluation (OT&E) phase<sup>70</sup>. Figure 5 shows the JORN coverage when fully operational.



*Figure 5: Operational Range of the JORN Network*

The Over the Horizon Radar (OTHR) technology employed by JORN uses transmitter arrays that are almost one kilometre long, generating a 20 kilowatt signal. This signal is stronger than most radio station signals, and nearby re-fuelling depots have been surrounded by metal faraday shields to protect them from accidental sparks which can cause explosions. Signals are aimed at the ionosphere and are reflected over the horizon towards targets within JORN's range. The returning signals are received by antenna

arrays 3.4 kilometres long, consisting of 960 individual antenna masts<sup>71</sup>. The ionosphere, upon which JORN depends, is reliant on solar radiation. Its thickness builds during the day and degrades during the night, and is also affected by the occurrence of sunspots. The significant distance between the three radar sites therefore serves a dual purpose. Firstly, it increases the range of the system, and secondly it maximises the average thickness of the ionosphere over the three sites, therefore minimising the amount of time JORN is not operational<sup>72</sup>.

Despite these atmospheric limitations, JORN has already proven itself to be highly effective. It was used to track aircraft movements at Dili airport in East Timor, during INTERFET operations in September 1999. The images were displayed on radar screens in Adelaide and Melbourne and were 'accurate enough to show aircraft turning on their landing approach Dili Airport'<sup>73</sup>. The Commonwealth government has also utilised JORN to scan for maritime intruders. This tasking resulted in more than 500 illegal immigrants being arrested in the weeks leading up to March 2000, using information provided by JORN to border protection authorities.

JORN is capable of detecting aircraft equivalent in size to a Hawk fighter trainer or larger, that is, aircraft with a fuselage length and wingspan of approximately ten metres. Although JORN is capable of detecting aircraft anywhere within a 3,000 kilometre arc, its detection ability is most effective at a range between 1,000 and 2,000 kilometres. The surface detection ability of JORN is most effective between 2,000 and 3,000 kilometres and is capable of detecting surface craft as small as Type III fishing vessels.

The JORN system achieves its results and multi-tasking capability by employing a 'step scan' surveillance method whereby sectors of the arc are scanned according to operational requirements. Scanning is then tailored to search for a possible target by conducting a more detailed scan over a smaller area. JORN's current capability allows for up to 15 different tasks to be undertaken simultaneously, depending on the detail required. Ships can be tracked at up to two-minute intervals and aircraft, which travel much faster, can be tracked at up to 30-second intervals.

As the above discussion shows, the JORN system is well positioned to undertake surveillance of the JPDA oil and gas installations. As the JPDA is within the arc of all three radar units, surveillance capabilities are at the optimal level over the area. The future applications of JORN are twofold. In the first instance it can be employed to conduct general strategic surveillance at a lower cost than conventional aerial or surface patrols. Secondly, it can act as a trigger for Australia's northern surveillance system, enabling response craft to be assigned to possible targets earlier and with more accuracy than current conventional microwave capabilities.

## **Emerging Surveillance Capabilities**

High Frequency Surface Wave Radar (HFSWR) and Airborne Early Warning and Control (AEW&C) aircraft are two surveillance systems currently being developed by the Department of Defence that have the potential to significantly alter the way Australia patrols its maritime zones.

Staff from the Defence Science and Technology Organisation first trialed HFSW technology in 1998<sup>74</sup>. The high-frequency signals of HFSW radar have a longer wavelength than conventional microwave radar and can therefore bend around the curvature of the earth. The differences between the technology employed by both JORN and HFSW radars have the potential to provide Australia with two complementary radar systems. Although HFSW radar has a much shorter range than JORN, approximately 300

kilometres, it is capable of operating in all conditions, whereas JORN is dependent on favourable ionospheric conditions. Furthermore, HFSW radar technology is sufficiently compact to have ‘considerable potential for developing both shore and ship-based radar systems with over the horizon capability’<sup>75</sup>. Funding was provided in the 2002–03 Budget to allow further trials of HFSW radar to be undertaken by the Department of Defence and the Australian Customs Service. Successful trials resulting in the system’s implementation will provide Australia with ‘24-hour wide area coastal surveillance, protection of fisheries resources, protection of offshore oil and gas assets, smuggling deterrence [and] illegal entry deterrence’<sup>76</sup>.

Under Project AIR 5077 Wedgetail AEW&C aircraft are planned to enter into RAAF service in 2005. They will provide the ADF with an OTHR capability, in addition to that provided by JORN and HFSW radar, as well as increased communication and image relay capability. AEW&C will primarily enhance air operations, although its benefits will also improve other areas, including surveillance and patrol capabilities. Enhancements that may be made to the RAAF MPG, for example, include increased situational awareness. The Orion AP-3C is the slowest and most defenceless combat aircraft in the RAAF. As a result, they will ‘benefit most from the ability to passively share in the expanded picture of the battlespace’ increasing the aircraft’s survivability<sup>77</sup>. This expanded surface awareness will also benefit naval vessels as it will increase the warship’s surface picture and low level air picture from a circle of 40–60 kilometres radius to one of ‘at least 200 kilometres radius’<sup>78</sup>.

In the context of surveillance patrols, AEW&C craft will allow individual vessels improved real-time information about potential targets and potential threats. Furthermore, the mobility of Wedgetail aircraft and their sophisticated electronic equipment has the potential to increase the effectiveness of maritime surveillance:

American operations in the Caribbean and elsewhere have proven that AEW&C can significantly enhance law enforcement activities to prevent a range of illegal practices... Criminals often outgun the police and sometime have better intelligence than the police, but no criminal organisation can counter the electronic sophistication of state-of-the-art AEW&C.

Aircraft or boats engaged in criminal activity are unlikely to be fitted with [electronic support systems] or radar warning receivers. A Wedgetail in support of a Coastwatch operation could loiter a great distance (beyond visual range) from the suspected aircraft or boat, monitor the suspect with the primary sensor, and coordinate shadowing and interception. AEW&C could use its powerful communications capability to coordinate Coastwatch surveillance of huge areas of remote regions<sup>79</sup>.

Notwithstanding the significant improvements available through AEW&C, HFSW and other OTH radar capability, the requirement for a response capability will always remain, as radars can only detect but not identify targets that do not carry identification friend or foe (IFF) transponders. Although increased surveillance of Australia’s maritime zones will become available through developing technologies, it will serve to focus surface response capabilities, rather than reduce their requirement.

## **Defence Practice Areas**

Defence owns a number of exercise and practice areas (DPAs) in various locations across Australia. Defence uses these areas to conduct personnel training and perform capability testing. DPAs are located both on land, including central South Australia, and offshore, for example near Exmouth, Western Australia and also off the Northern Territory coast. Some offshore petroleum fields, including Petrel and Tern in the Bonaparte Gulf, are located within or near DPAs. The JPDA itself is not located within a DPA, however,

several different DPAs lie between it and Darwin. This will have implications for vessels and aircraft travelling between the JPDA facilities and Darwin, the area's major point of resupply.

Defence policy takes very seriously the need for continued and uninterrupted access to its DPAs, in order to maintain the level of preparedness necessary to protect Australia and its interests. Defence requires mining license holders to comply with the following:

'notify the Royal Australian Navy (RAN) Hydrographic office of any suspended well heads or proposed infrastructure developments'

'liaise with the Department of Defence during the planning phase of operations and to provide information on the proposed location of any drilling rigs for inclusion on the register of structures database that is maintained by the Royal Australian Air Force Aeronautical Information Service (RAAF AIS).'<sup>80</sup>

Licensees are also advised that:

'the Minister for Defence has the authority...to order the evacuation of a defence practice area at short notice ... As training exercises can take place at any time and may involve the use of live fire, the permit holder should consult regularly with the Department of Defence to minimise their own risk.'<sup>81</sup>

It is clear that Defence places the onus on licensees and operators to comply with its regulations which are derived from legislation and thus have legislative force. A service chief can authorise the installation of equipment and infrastructure in a DPA. Such authorisation is current for a period of two years.

The construction of gas pipelines between the JPDA and Darwin will also be affected. At this stage there are definite plans to build a gas pipeline from the Bayu-Undan field to Darwin. There are also proposals for other gas pipelines in the area, including the possibility of linking the Greater Sunrise field to Darwin. As shown in Figure 6, the

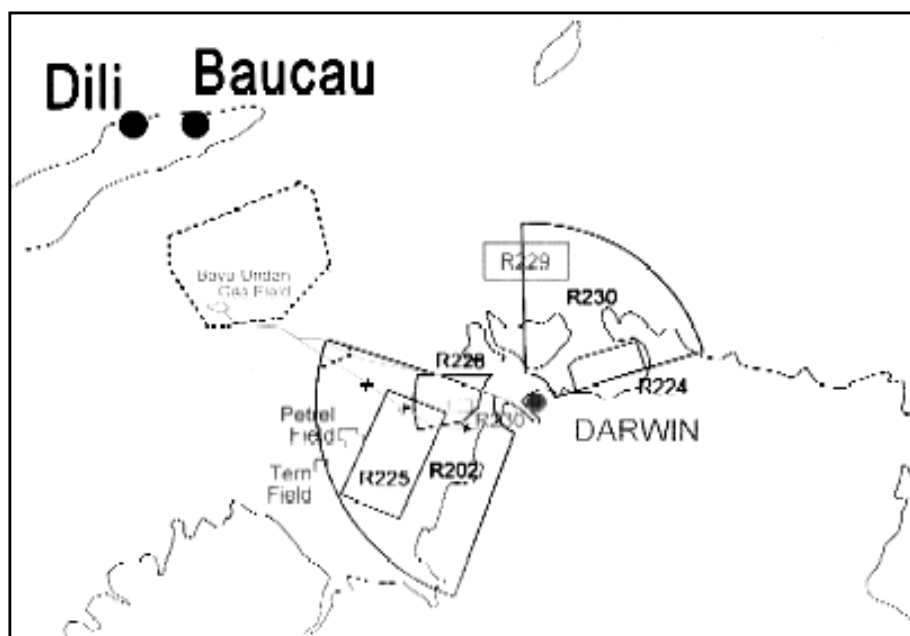


Figure 6: The JPDA and Offshore DPAs

pipeline will potentially intersect DPAs R202 and R225 or R228. R202 is a Military Restricted Airspace and when exercises are taking place it can 'operate down to low altitudes including, at times, to sea level'<sup>82</sup>. This will affect, therefore, not only supply aircraft, but also vessels travelling between the JPDA and Darwin. Areas R225 and R228

are used for air to air weapons firings, and would require the evacuation of the area. Unexploded ordnance that may lie in the area poses a significant risk to the pipeline when it is being installed and maintained. Figure 6 illustrates the relationship between the JPDA and the offshore DPAs.

This issue has already arisen with respect to the operator of Petrel and Tern fields, who also wishes to connect the offshore installation to an onshore processing plant via a sub-sea pipeline. Negotiations between Defence, the Department of Industry Tourism and Resources, and industry representatives are still continuing to resolve the matter. The issue's significance is reflected in a letter from the Minister for Defence to the Prime Minister that requested the establishment of an Interdepartmental Committee to investigate the issue and provide advice on policy formulation. The development of the JPDA in the near future will further complicate this issue. Due to the importance of the JPDA to the Australian economy, a compromise will need to be reached. Two options present themselves, either diverting the pipeline around the DPA or changing the conditions of the DPA. The first option will involve an increased cost to industry, the second a decrease in the level of control Defence has over its DPAs. At this stage it is likely that Defence will have to make some significant concessions to industry. The safety of both ADF personnel and sub-sea infrastructure will need to be considered very carefully.

## **Conclusion**

This section has discussed the current situation in which the issue of JPDA surveillance is located. Several key points in this discussion require further emphasis. Firstly, Australia's legislative framework, and specifically legally enforceable safety zones, is currently not being fully implemented. Safety zones represent a valuable legislative tool, enabling Australia to prohibit all unauthorised vessels from sailing within 500 metres of an offshore installation. Their lack of enforcement is due to limited resources and emphasis on other operational tasks, such as patrols for illegal fishing and people smuggling vessels.

Secondly, the current strategic situation has reduced the emphasis on the Timor Sea and the JPDA. Regardless of the validity of this assessment, the developments planned for the JPDA will necessitate a reconsideration of patrol force deployment, if not a more general change of strategic focus. Patrols of the ZOCA were undertaken by Australia under the former Timor Gap Treaty, and were ceased when the treaty was rescinded. Since the Timor Sea Treaty has been ratified, and negotiations between Australia and East Timor to re-establish surface patrols of the Timor Sea begun, it will again become necessary for Australia to regard the Timor Sea as a major surveillance priority.

Thirdly, advances in surveillance technology such as JORN and HFSW radar will greatly increase Australia's surveillance footprint. A greater range of vessels and aircraft will be able to be detected, over a greater area of Australia's northern and north-western approaches. This increased surveillance footprint may, therefore, increase the requirement for surface patrol vessels and aircraft to identify detected craft and intercept when necessary. Although the ACPB will increase the number of patrol boat days per year from 1,800 to 3,000, it is intended to be a similar capability to the FCPB. Australia has therefore chosen to replace, rather than augment, its current patrol capability. Although the additional patrol days available through the ACPB will increase Australia's ability to patrol its northern and north-western approaches, the increase in Australia's surveillance footprint will demand a general increase in surface patrols. If Australia is to

guarantee the safety of the JPDA, it needs to develop a protection regime specific to the region.





## VULNERABILITY TO RISK

Without the presence of a perceived or actual threat against the offshore oil and gas resources and facilities in the Timor Sea, there is no requirement for a surveillance and response capability to protect the area. Similarly, the significance of such threats is directly linked to the cost of potential losses to Australia. The first part of this section will discuss the vulnerability of the JPDA to such threats and the need for offshore installations to be patrolled and protected. A variety of threats will be considered, including attack from a hostile state or maritime terrorists, and the damage which may be caused as a result of trans-national criminal activities and natural or mechanical disasters in the area. The second part will discuss the cost of damage to the JPDA as a result of one of the threats eventuating. The final part will compare the current patrol and surveillance regime protecting Australia's northern maritime jurisdiction with the threat assessment for the JPDA to highlight any requirements for a change in the regime.

Before detailing the specific aspects of the regional security situation as they are relevant to the JPDA, it is necessary to discuss broader strategic issues as they relate to the Timor Sea. According to one commentator on strategic issues:

The creation of stability in maritime strategic terms and the evolution of any kind of coherent maritime regime depends much more directly upon the future of the domestic environment in both East Timor and Indonesia than it does upon the questions at issue on, over or under the sea.<sup>83</sup>

This assessment considers the domestic stability of neighbouring states to have a far greater influence upon maritime security issues (such as refugee flows, trans-national crime, maritime terrorism and people smuggling) than any surveillance and patrol regime, regardless of its effectiveness. It highlights the importance of 'the achievement of legitimate, stable and effective government in East Timor and its maintenance in Indonesia'<sup>84</sup> as the fundamental strategic issue facing Australia at the moment, emphasising it over the resolution of maritime boundaries and sharing arrangements. Notwithstanding the importance of this argument, it must be understood that this issue cannot be pursued successfully without development also occurring in other areas, such as cooperative surveillance and enforcement regimes<sup>85</sup>.

### Vulnerability of Installations

The offshore oil and gas installations in the JPDA are located at a great distance from the shores of both Australia and East Timor and, in most cases, are also remote from other installations. Due to their remote location, and their physical structure—FPSOs are typically modified tankers—they are 'potentially vulnerable to sabotage extortion or terrorism'<sup>86</sup>, as well as attack from a hostile state, and damage from accidental collision with ships or small vessels moving through their location.

### Attack from a Hostile State

Despite the significant damage that would potentially be caused to offshore installations and associated shipping vessels and port infrastructure as a result of a coordinated air or sea attack from a hostile state, this type of attack is very unlikely, given the current political situation in the region. East Timor's Defence Force (ETDF) currently comprises a land army of 650 soldiers, two modified Albatross Class patrol boats donated by the Portuguese government, and no current plans for an Air Force<sup>87</sup>. The Papua New Guinea Navy is made up of four patrol boats and one landing craft heavy, with an Air Force comprising one transport unit located in Port Moresby. Therefore, neither country has the

capability to mount a credible strike on the JPDA, even if there were an intent to do so. Furthermore, the revenue share allocated to East Timor from JPDA hydrocarbon production means that it has a vested interest in the facilities remaining operational.

Indonesia's navy is significantly larger than either of Australia's other two northern neighbours. However, Indonesia's acceptance of East Timor's independence means that it is unlikely that Indonesia would launch an attack on the JPDA. Unlike East Timor and Papua New Guinea, Indonesia does have the military capability to attack the JPDA. Its nearest naval bases, located in Makassar, South Sulawesi and Surabaya, East Java, have the potential to deploy ships towards the Timor Sea. However, given the significant distance between these two naval bases and the JPDA, any major ship movements would be detected by Australia's existing surveillance and intelligence capabilities, including JORN. Indonesia's nearest major airbase is located in Makassar, South Sulawesi. Several smaller airfields are located closer to the JPDA, the closest being Kupang, West Timor. Therefore, the Indonesian air force is potentially capable of launching an attack on JPDA resources and facilities, although it is unlikely in the foreseeable future given the improving relationship between Australia and Indonesia.

## Maritime Terrorism

The risk posed by terrorist organisations to the facilities in the JPDA is unpredictable. The amount of resources contained in the area, and their importance to Australia, East Timor, and also indirectly Northeast Asia and the United States, means they are potential targets for organisations wishing to interrupt the petroleum supplies of either country. Maritime terrorism became a reality with the attack on the *USS Cole*, on 12 October 2000, and the *MV Limburg* on 6 October 2002. In both cases, Qaeda operatives rammed a small boat packed with explosives into the ships' hulls while they were in the Gulf of Aden, one of the Middle East's busiest shipping lanes. The attack on the *USS Cole* blew a six by twelve metre hole<sup>88</sup> in the port side of the destroyer, killing seventeen crewmembers and injuring another thirty-nine<sup>89</sup>. In the attack on the *MV Limburg*, one of the tanker's crew was killed and 90,000 barrels of oil were released into the waters off the Yemeni coast<sup>90</sup>. These attacks herald the beginning of maritime terrorism against the petroleum industry. An audio tape claimed to be the voice of Usama bin Laden was released hours after the attack on the *MV Limburg* said:

"I call on you to understand the lessons of the New York and Washington raids ... the youth of Islam ... will target key sectors of your economy until you stop your injustice and aggression"<sup>91</sup>

A statement purportedly from bin Laden released after the attack said that:

'By exploding the oil tanker in Yemen, the holy warriors hit the umbilical cord and lifeline of the crusader community, reminding the enemy of the heavy cost of blood and the gravity of losses they will pay as a price for their continued aggression on our community and looting of our wealth'<sup>92</sup>

The presence of Qaeda cells, or other sympathetic terrorist groups in Southeast Asia has been widely discussed, especially since the terrorist attack in Bali on 12 October 2002, which has been widely attributed to Jemaah Islamiyah (JI). JI remains a threat as it has also been conducting surveillance on several other potential land based targets in Southeast Asia, including the Caltex Oil Company offices in Singapore<sup>93</sup>.

The importance of the petroleum industry appears to be understood by Southeast Asian terrorist organisations. The Moro Islamic Liberation Front (MILF) and Abu Sayyaf are two terrorist organisations that have been active in the Philippines region since 1991.

MILF in particular has undertaken several attacks on Philippines shipping, 'mainly by placing bombs on domestic inter-island ferries'<sup>94</sup>. In an incident with direct implications for future offshore petroleum developments in Southeast Asia, a supply ship was hijacked while underway near a North Sumatra Oil Field operated by Exxon Mobil. The pirates, believed to be members of the Free Aceh Movement (*Gerakan Aceh Merdeka* - GAM), boarded the ship from two fishing vessels, hijacked it, took the eleven crewmembers ashore and held nine of them hostage<sup>95</sup>. The threat of maritime terrorism in the wider Southeast Asian region, and in Indonesia particularly, should therefore be considered a reality rather than a possibility.

The related issue of piracy illustrates the potential for an increase in maritime terrorism in Southeast Asia. Indonesia alone accounted for 103 of the 307 reported attacks in 2002, the majority of which occurred when ships were either in port or steaming at slow speed when navigating narrow straits between islands<sup>96</sup>. There are similar narrow passages in the eastern end of the Indonesian archipelago, which lie in a direct line between the JPDA and North-East Asian export markets, which would require ships to steam at very slow speeds, increasing their vulnerability to attack. The International Maritime Bureau (IMB) believes that attacks similar to that on the *MV Limburg* are difficult to prevent:

No shipboard response or action can protect the ship... they are slow vessels and their manoeuvrability restricted. It is therefore impossible for the vessel to avoid a fast moving boat intent on a ... collision<sup>97</sup>.

For this reason, and also because the majority of piracy attacks happen when a ship is near port, the IMB recommends the coastal state ensures the approaches to their ports are made secure. The development of the JPDA, and the resulting presence in the area of several FPSOs, fixed wellheads and associated transport ships, will create a system of offshore ports. The increase in the number of ships needing to travel at low speeds whilst manoeuvring to dock at the facilities make the IMB recommendation on port security also relevant to the JPDA. Although it is unlikely that Australia will become a direct target of maritime terrorism, trans-national terrorism may involve Australia and the nearby region. Oil tankers and floating facilities are vulnerable to attack<sup>98</sup>, therefore the need for improved shipping security needs to be carefully assessed.

The remote location of offshore facilities in the JPDA has a complex impact on their vulnerability to terrorist attack. On the one hand, the distance needed to travel to execute an attack is significant, reducing the likelihood that the installations themselves would be threatened. An attack on a tanker transporting oil or gas from the offshore installations to export markets travelling through the Indonesian archipelago would be more easily executed and still result in a significant, although lesser, impact on the petroleum industry. It is the responsibility of the Indonesian government to guard against this type of attack. The Malaysian effort to decrease piracy in the Malacca Straits through an increased patrol presence appears to have proven effective. The annual number of attacks in the Straits has decreased from 75 in 2000 to only 16 in 2002<sup>99</sup>. The high level of piracy in Indonesia and the current lack of any plan to develop an anti-piracy program, suggests that an increase in tanker traffic through the eastern areas of the Indonesian archipelago will also result in an increase in piracy. On the other hand, the JPDA's remote location means an increased time between a response to a potential attack being requested and vessels reaching the offshore installations. This issue is exacerbated by the fact that the majority of ocean traffic enters the area from Indonesia and East Timor, significantly closer than patrol and response surface vessels steaming from Darwin. The terrorist attacks on the *USS Cole* and the *MV Limburg* prove that it is possible to bring a small,

explosive laden, boat alongside a large tanker, or even a war vessel, in a suicide attack resulting in significant damage and loss of life. The attack on the *USS Cole* blew a six by twelve metre hole in the side of the guided missile destroyer. The boat responsible was “participating in the mooring of the *USS Cole* for refuelling in Aden harbour”<sup>100</sup>. Fishing boats regularly approach offshore installations in the JPDA and pose the same potential threat to tankers and FPSOs. This potential threat will increase in the future as tanker traffic in the JPDA increases.

Given the increase in installations and associated transport vessels, their vulnerability to attack and the increasing value of the JPDA due to its planned development in the near future, the requirement for surface vessels to patrol the waters within the JPDA and enforce safety zones will also increase. The small size and wooden construction of the fishing vessels which currently frequent the Timor Sea mean that they are difficult to detect using JORN based surveillance methods, again highlighting the need for surface patrols of the area.

## **Trans-National Crime**

Piracy is the form of trans-national crime to which the installations in the JPDA are most vulnerable. Piracy includes a number of sea-based crimes ranging from theft of ships’ stores and crews’ possession to ship high jacking. As mentioned above, piracy attacks in Indonesia account for almost one third of attacks worldwide. Any increase to the amount of general shipping in the Timor Sea has the potential to result in an increase in piracy. The following section will discuss the existing rates and forms of piracy in Indonesian waters and use them as a guide for possible future piracy patterns in the Timor Sea.

Of Indonesia’s 103 piracy incidents, 74 were boardings, 7 were hijackings, 19 were unsuccessful attempts, two involved ships being fired upon and one ship is still missing. The majority of successful attacks (61) occurred while the ship was at anchor, 12 were while the ship was in port and 9 were while steaming. As a comparison, all of the 13 successful attacks in the Malacca Straits, where ships move at considerably slower speeds, occurred while the ship was underway<sup>101</sup>. Ships underway are often boarded from small fishing boats, similar to those prevalent in the Timor Sea. Access to ships either anchored or at port is gained through the use of ropes or long bamboo poles, and in many instances pirates climb the ship’s anchor chain. Pirates in Indonesian waters are typically armed with knives or swords, although there has been an increase in the use of firearms. Money, stores and spare engine parts are among the items targeted by pirates. In one instance in September 2002, a tanker travelling through the Malacca Straits was hijacked while under way and her cargo of 3,000 million tonnes of diesel was transferred onto another tanker<sup>102</sup>.

It also should be noted that a percentage of piracy attacks in Indonesia are facilitated by poorly paid police, port officials and defence force personnel seeking to supplement their income. It is possible that East Timor, and the fledgling ETDF, will experience funding issues similar to those in Indonesia and that piracy will move into East Timorese waters. The phenomenon of piracy assisted by state agencies has implications for the enforcement of anti-piracy laws in the region. In addition, Australia cannot rely on Indonesia adequately controlling the flow of pirates through its archipelago. This increases the need for Australia to develop a system of surveillance and patrols aimed at protecting the JPDA, particularly as it increases in importance in the near future.

Weapons smuggling and narcotics trafficking are two forms of trans-national crime that have the potential to impact, albeit indirectly, on the Timor Sea. JPDA ships and facilities

could feasibly become a secondary target for smugglers seeking spares and supplies without wanting to risk a port visit. An increase in shipping in the area may make it a lucrative side-trip for smugglers. Illegal fishing operations will continue in the JPDA in much the same way as they do now. Again, these operations do not directly threaten offshore installations, however, an increase in sea traffic in the area increases the likelihood of an accident occurring, especially during adverse weather conditions.

Current trends in people smuggling and illegal fishing have seen patrol resources moved away from the JPDA to other areas, particularly Christmas Island and Ashmore Reef. Changes in these trends may necessitate the redeployment of patrol vessels to other areas. If East Timor's economic conditions fail to improve, for example, the potential exists for both legitimate refugees and illegal immigrants to transit the JPDA heading for the northern Australian coast. Despite the distance of more than 400 kilometres between East Timor and Australia, it is unlikely that East Timorese refugees will prefer to move into nearby Indonesian provinces such as Southern Maluku, East Nusatenggara, or West Papua, given Indonesian's past relationship with East Timor. Similarly, Indonesia's uncertain economic future makes Australia a preferred destination for both refugees and people smugglers.

The development of the JPDA will, in the long term, lead to an increase in the number of ships and FPSOs travelling through or located within the area. The Timor Sea therefore has the potential to become a profitable hunting ground for pirates. It is important to note that FPSOs in the JPDA are all tied to the sea bed by a system of mooring lines and are therefore constantly 'at anchor'. Examples of piracy in the rest of Southeast Asia prove that anchor lines are easily accessed by pirates. FPSOs are especially vulnerable to attack, as the crews, who are small in number, have no authority to carry weapons. As East Timor does not yet have the capability to conduct surface patrols, Australia will, de facto, primarily be responsible for the protection of the area in the foreseeable future.

Navigation safety zones prohibit unauthorised vessels from travelling within 500m of offshore installations and are already enshrined in Australian legislation. Safety zones have been established around all existing offshore oil and gas installations, including the JPDA. However, due to a lack of resources, they are currently not patrolled<sup>103</sup>. These zones should be utilised as a major form of protection for offshore installations, second only to WAP surveillance. Patrols in the JPDA may be incorporated into the ACPB capability of 3,000 sea days per year, or may come at additional cost. Nevertheless, this issue needs to be considered in the light of increasing petroleum activities in the JPDA, and Australia's responsibility to protect the area.

## **Natural and Mechanical Disasters**

Australia's response to natural and mechanical disasters in the JPDA will be at the request of the Designated Authority, as established under the Timor Sea Treaty. Responses will vary given the circumstances and a variety of surface vessels and aircraft, including Coastwatch and RAAF aircraft are likely to be used. In the case of a natural disaster, such as tropical cyclone, the adverse weather conditions would render both Customs NMU boats and the FCPB or ACPB inoperable due to their size. The RAN, however, may be called upon to undertake rescues, as major vessels are capable of operating in higher sea states than the patrol boats. In the unlikely case of a mechanical disaster occurring, any of the aircraft and vessels currently tasked with patrols may be called upon to conduct search and rescue missions.

The Australian Maritime Safety Authority (AMSA), the government agency responsible for maritime search and rescue, is a minor user of Coast-watch's services. As would be expected, it uses Coastwatch services for specific search and rescue missions. The frequency of these tasks is extremely difficult to predict. However, since they normally only require a short-term allocation of resources they will not greatly affect the ADF's current responsibilities. The development of the JPDA will only impact on the ADF in as much as it will increase Australia's area of patrol responsibility. Any additional responsibilities for the ADF as a provider of search and rescue capability will be handled in a similar fashion to current requirements.

## Cost of Losses

The above discussion has shown that offshore oil and gas is vulnerable to attack from both the air and sea. The potential cost to Australia of either an attack or major disaster is dependent on two factors. Firstly, the damage to offshore installations and associated surface vessels and, secondly, the destination market of the petroleum resources.

All of the oil produced at the Laminaria facility is currently exported to Singapore and Northeast Asia. Damage to this installation would therefore include the cost of replacing the FPSO, the loss of revenue, the cost of cleaning up an associated environmental disaster, as well as a loss in confidence from foreign buyers. Current development plans for the Bayu-Undan facility include the construction of a pipeline to transport LNG onshore to Darwin for processing before it is exported to Japan. A successful attack on Bayu-Undan would therefore impact on the viability of the onshore processing plant, which, the NT claims, will underpin its economic future. The resources of the Greater Sunrise gas field will probably be sent to both the domestic and export markets, therefore any attack to these facilities has the potential to interrupt domestic gas supplies. Such an interruption would have ramifications not only for industries reliant on natural gas, such as the mining sector, but also Australian households.

Of the three FPSOs in the JPDA, the *Modec Venture 1* and the *Buffalo Venture* are modified tankers, while the *Northern Endeavour* is purpose built. FPSOs share many of the same characteristics of a large tanker, and the damage caused to them by an air or sea attack would be very similar to an attack on a tanker. The case of the *MV Limburg*, discussed above, illustrates that a small attack on a vessel can result in a great deal of damage. Although the *MV Limburg* was not sunk, both of its twin-hulls were ruptured and the vessel's internal tanks were breached. The attack killed one of the ship's crew and caused 90,000 barrels of oil to spill into the Gulf of Aden<sup>104</sup>.

The cases of the Kuwaiti oilfields at the end of the 1990-91 Gulf War and the Longford plant gas fire in Victoria in 1998 illustrate the differing costs resulting from the destruction of oil and gas facilities. Although the level of industry development in these two cases are of differing magnitude to the developments planned for the JPDA, they are valuable as an illustration of the lasting impact that can result from damage to facilities and an interruption to gas supplies.

At the end of the Gulf War, retreating Iraqi troops set alight more than 700 oil wells and installations. The Kuwaiti oil industry accounts for '75% of government revenue and 95% of the country's total export earnings'<sup>105</sup>. After the first Gulf War, Kuwaiti oil exports stopped for approximately five months<sup>106</sup>. The fires cost Kuwait approximately \$US75 billion and the recovery drained almost 70% of the country's savings. Kuwaiti oil production currently stands at 1.9 MMbbls of oil per day, with 94 billion barrels of reserves. Although oil and gas production in the JPDA facilities will not reach the scale

of the Kuwaiti oil industry, they have the potential to play an important role in Australia's economic standing. The NT is being heralded as a future centre for petroleum production in the region, and significant investments have already been made into the industry. A cease in production, similar to that which occurred in Kuwait, in the fully operational JPDA could result in significant economic losses, putting at risk the return industry is expecting on their investment.

An explosion and fire at the Longford processing plant in 1998 interrupted gas supplies in Victoria for two weeks. The fire burned for two and a half days and losses are estimated to have been in the order of \$200 million dollars. In addition to the initial gas losses, the two week long gas crisis was estimated to have cost gas users \$1.3 billion. The rebuilding of the gas processing plant cost an additional \$500 million. This means that the total cost of the disaster, which was caused by operator error, was \$2 billion<sup>107</sup>. In addition, the Longford disaster had a social impact on a large section of the community, which was forced to operate without hot water and heating facilities during a cold period in September. Furthermore, such a disaster also has health effects and other flow on issues resulting from the interruption of a basic service. The Longford disaster is a very good example of the potential impact of an interruption to the gas that will be supplied to Australia's domestic market by the JPDA, primarily from the Greater Sunrise area. The impact has the potential to affect not only industry, but also domestic customers, and could be caused by either a maritime terrorist attack or a natural or mechanical disaster.

## **Conclusion**

Although offshore oil and gas installations in the JPDA are not yet a target of maritime terrorism, the above discussion has shown they are vulnerable to such an attack. The impact on a fully developed and producing JPDA has the potential to be very damaging. An attack on the JPDA facilities has the potential to impact on Australia financially, in terms of the cost to rebuild damaged facilities, economically, in terms of losses in export revenue and the wider impact on industry if gas supplies are interrupted, and socially, in terms of disrupted utilities services and potential job losses.

Piracy is widespread in Southeast Asia, and is particularly prevalent in Indonesia. Pirates have shown a preference for attacking vessels when they are at anchor. Offshore installations are constantly 'at anchor' and are therefore susceptible to attack. The case of the *MV Limburg* has shown that even a small vessel, if carrying sufficient explosives, can cause serious damage to a large tanker. Small fishing vessels of the type used by pirates across Indonesia also frequent the JPDA and it would be very difficult to identify a hostile vessel sufficiently early to request the support of RAN surface vessels.





## CONCLUSION

This paper has argued that due to the value, vulnerability to attack and the potential costs to Australia of an attack, the offshore resources in the JPDA require an increased level of protection. This required level of protection will further increase as the JPDA reaches full production. Early detection and neutralisation of hostile craft remains the most effective way to guarantee the safety of the JPDA. Surveillance, therefore, either by sea or air, combined with an adequate response capability, is the primary defence option for the JPDA. There is not sufficient space in this paper to develop a complex cost-benefit analysis model to determine the potential increase in funds required for sufficient patrols of the JPDA. What needs emphasis here is that, regardless of the cost, an efficient solution needs to be determined to provide an acceptable measure of protection to the facilities of the JPDA.

The value of the resources contained within the area has already been proven by the diplomatic effort expended by the Australian government over the negotiation of the Timor Sea Treaty, and the UA for Greater Sunrise. The NT government places a great deal of emphasis on the ongoing importance of the JPDA facilities to Australia's economic interests. It has also been demonstrated in this paper that offshore installations are, by virtue of their very nature and location, vulnerable to attack. It has been similarly demonstrated that, although the Timor Sea Treaty provides for joint surveillance and protection arrangements for the JPDA, because East Timor is such a young country it will not be able to make a significant contribution to joint surveillance efforts in the foreseeable future. As a result it will be Australia's responsibility to patrol and defend the JPDA. Furthermore, it can be argued that it is Australia's duty, as one of the region's established nations, to provide a degree of support and assistance to developing nations such as East Timor.

Many of the key issues raised by this paper are yet to be considered by the relevant agencies: ACS, the DITR and the ADF. For example, DITR has not yet tasked Coastwatch with a requirement for patrols of the JPDA, and the ADF has not developed a policy to resolve the issues of industry access to oil and gas resources in DPAs. Furthermore, safety zones, a simple legislative tool capable of preventing all unauthorised shipping, including illegal fishing vessels and possibly pirates and maritime terrorists, from approaching offshore installations, are not enforced. It is necessary for Australia to implement existing protection systems with respect to the JPDA, and develop necessary systems where they do not exist. This process needs to be undertaken before the JPDA undergoes further development, or Australia risks falling further behind the issue.

Terrorism has become a significant strategic issue in the wake of the attacks on New York and Washington in 2001, and Bali in 2002. It has already impacted on Australia's strategic outlook, manifested in ADF involvement in coalition operations in Afghanistan and the Persian Gulf. Despite the focus on terrorism in Southeast Asia, the region's archipelagic nature, and therefore the potential for maritime terrorism to become prevalent, it is yet to enter the debate. Attacks by maritime terrorists with a domestic focus have been occurring in the Southeast Asian region for the last 10 years. Organisations such as MILF and GAM are not linked to international terrorism, however, domestic focussed attacks in eastern Indonesia may have security implications for the Timor Sea. The JPDA could itself become a target, particularly if the Free West Papua Organisation (*Organisasi Papua Merdeka* - OPM) decide to employ terrorist methods to pursue its goal of independence from Indonesia.

The prevalence of piracy in the region also has specific implications for the safety of the JPDA. Pirates often employ small boats similar to fishing vessels to execute their attacks, and as these vessels are common in the JPDA, they already pose a safety risk to offshore installations. The connection between piracy and maritime terrorism is yet to be sufficiently emphasised in the debate. Although terrorists and pirates have greatly differing motivations for their attacks, a terrorist needs only to employ pirate tactics to achieve a successful attack. In practice, it would be very difficult to distinguish between a fishing vessel commanded by fishermen and one commanded by pirates or terrorists without dedicated surface patrols. This is a key point, which will need careful consideration when developing a system to protect the JPDA.

The increased level of protection required by the JPDA may necessitate an increased allocation in resources. Some of these resources, such as JORN and HFSW radar, are high priority developments due to their application in strategic surveillance and the general defence of Australia. Other capabilities, especially surface response vessels, could require either an increase or reallocation of funds and patrol hours to enable dedicated patrols of the JPDA to be undertaken. The re-allocation of ADF resources from other tasks to JPDA patrol and response will obviously be a decision for Government in the context of wider national security requirements.

There is scope for further research into this debate in a number of areas. Firstly, a more detailed study of the role Coastwatch has the potential to play in protecting the JPDA will yield a greater understanding. Secondly, the potential for Southeast Asian terrorist organisations to undertake maritime operations needs to be investigated to better understand the risk posed to Australia and the Timor Sea. Thirdly, the link between piracy and terrorism, both in the region and across the globe, needs to be explored in more depth in order to make accurate predictions about the likelihood of terrorists employing pirate tactics in the Timor Sea.

## Notes

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