Australia's Maritime Boundaries

Bill Hirst, AUSLIG
PO Box 2 Belconnen ACT 2616
Phone: 02 6201 4348 Fax: 02 6201 4366

INDEX

Abstract
Introduction
What are Maritime Boundaries?
Extended Continental Shelf Claim
AUSLIG's Maritime Boundaries Data
Co-operative Project
Related Laws and Conventions
Defining the Territorial Sea Baseline (TSB)
Determining Lowest Astronomical Tide
Some Additional Complexities
Conclusion
References

ABSTRACT

Under the United Nations Convention on the Law of the Sea (UNCLOS) Australia is entitled to claim an area in excess of 11 million square kilometres. Australia's rights within this area vary according to different maritime zones as described in the convention. The Australian Surveying and Land Information Group (AUSLIG) is working with the Australian Geological Survey Organisation (AGSO) and others to define these boundaries and comply with UNCLOS requirements. The location of maritime zone boundaries is particularly significant to geoscience industries involved in offshore exploration. AUSLIG is developing the Australian Maritime Boundaries Information System (AMBIS) as a GIS database for all information related to the position of Australia's maritime boundaries. This paper describes the different maritime boundaries, how they are being defined, and their importance to Australia and the geoscience industry. It also describes the AMBIS data.

INTRODUCTION

A 1988 cabinet decision assigned the Australian Surveying and Land Information Group (AUSLIG) with the responsibility of determining Australia's maritime boundaries and providing related advice to government. This charter was reaffirmed in the 1996 budget. The recent restructure of AUSLIG led to the establishment of AUSLIG's Maritime Boundaries Program. This paper briefly describes the tasks and challenges involved in the establishment of the Australian Maritime Boundaries Information System (AMBIS) and the data held within it. This data will form part of the Australian Spatial Data Infrastructure.

WHAT ARE MARITIME BOUNDARIES?

In late 1994, Australia ratified the United Nations Convention on the Law of the Sea (UNCLOS) and the convention officially came into force in November 1994. UNCLOS is a very significant agreement providing international conditions and limits concerning the use and exploitation of the earth's oceans. Included in UNCLOS are rules on how member States (countries) define their maritime jurisdictional boundaries. Under UNCLOS there are a number of maritime zones defined by their distance from the

land, or more precisely, the Territorial Sea Baseline (TSB). Australia's maritime zones are:-

- Territorial Sea (0-12 nautical miles). Australia has almost full rights although must allow innocent passage.
- Contiguous Zone (12-24 nautical miles). Australia may exercise control to prevent or punish infringements of customs, fiscal or sanitary regulations.
- Exclusive Economic Zone (EEZ) (12-200 nautical miles). Australia has the right to explore and exploit sea bed and water column.
- Continental Shelf (12-350 nautical miles). UNCLOS allows for a country to claim seabed rights on continental shelf areas to a limit (usually 350 nautical miles from the TSB) where a physical continental shelf exists beyond 200 nautical miles.

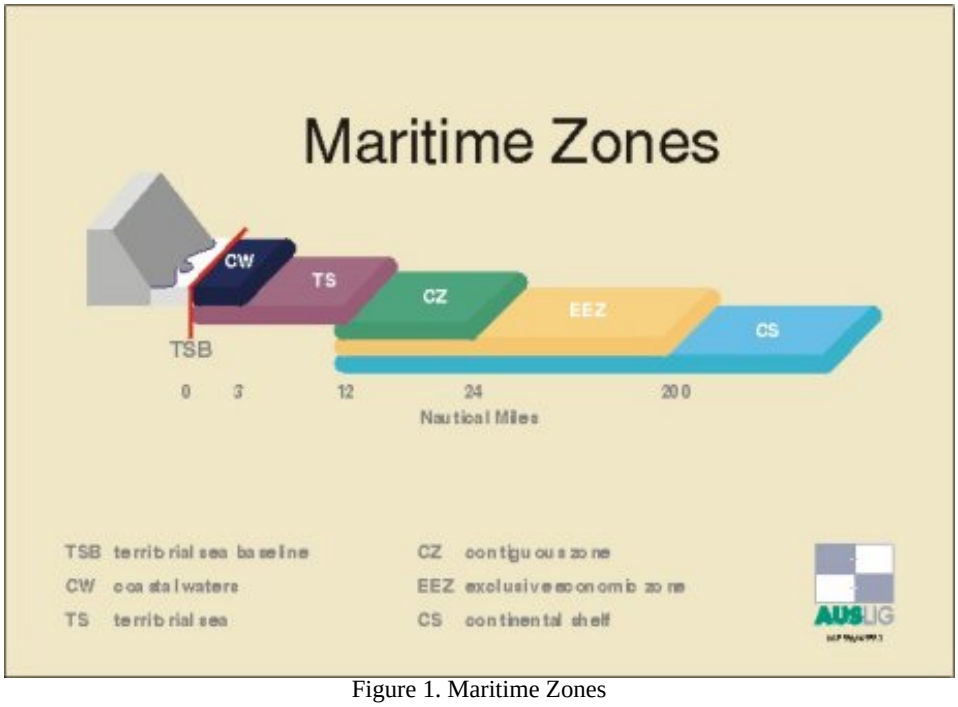

Figure 1. Maritime Zones

Other zones relevant to Australian legislation are:

- Coastal Waters (from the constitutional limits of the States and the Northern Territory to 3 nautical miles from the TSB). States and the Northern Territory have certain jurisdictional rights [This zone was agreed in the 1980 Offshore Constitutional Settlement and is defined in Coastal Waters legislation].
- Australian Fishing Zone (3-200 nautical miles). In most cases, the outer limit of this zone is identical to the EEZ boundary. (Defined by Fisheries Management Act 1991 (FMA) including the amendments to that Act made by the Maritime Legislation Amendment Act 1994.)

Figure 2. Australia's EEZ and Continental Shelf Areas (Preliminary)

EXTENDED CONTINENTAL SHELF CLAIM

For Australia to claim areas of extended continental shelf beyond 200 nautical miles, a claim must be submitted to the UN Commission on the Limits of the Continental Shelf by November 2004. The approximate area Australia is entitled to claim is shown on Figure 2. The determination of the physical limits of the continental shelf is the responsibility of the Australian Geological Survey Organisation (AGSO).

AUSLIG'S MARITIME BOUNDARIES DATA

AUSLIG currently has preliminary data available for all of the boundaries of the zones described above. This data is based largely on the original unvalidated territorial sea baseline with the jurisdictional boundaries being computed using an ArcInfo buffering routine. More reliable and accurate data is planned to be available from the end of 1999. This new data will be based on spheroidal computations rather than less rigorous algorithms which work on data transformed to a flat projection. The actual spheroidal calculations are complex and require the development of specialised software. The development of the software is being performed by the University of Melbourne's Department of Geomatics under tender to AUSLIG. The specifications are based on the UNCLOS requirements and restrictions. Urgent projects requiring accurate boundary determination should be referred to AUSLIG's Maritime Boundaries Program. In most cases we can provide recomputed boundaries over local areas using the latest and most accurate data. There is a steadily increasing demand for information on Australia's maritime boundaries. As well as marine exploration, the data has been used for applications such as native title claims, Customs, fisheries and environmental applications.

CO-OPERATIVE PROJECT

The Maritime Boundaries Program relies on the continued support of the State and Territory governments and a number of Commonwealth Government agencies. The state and territory mapping agencies supply the Maritime Boundaries Program with coastline mapping data, and other information, to assist in the determination of the TSB. Commonwealth agencies assist as follows:

- Australian Hydrographic Office provides digital charting information, bathymetric surveys of critical areas, Laser Airborne Depth Sounding (LADS) data and charting advice and
- The Australian Geological Survey Organisation (AGSO) provides information on the determination of Australia's continental shelf.
- The Attorney General's Department provides advice on national and international law and assistance with international treaty negotiations.

- The Department of Foreign Affairs and Trade provides guidance on diplomatic and United Nations issues and also has the lead role in international treaty negotiations.

RELATED LAWS AND CONVENTIONS

UNCLOS provides the framework for the Maritime Boundaries Program work. Also relevant are a number of Australian Acts including the Seas and Submerged Lands Act (1973) and the Petroleum and Submerged Lands Act (1967). The Offshore Constitutional Settlement (1980) is also relevant.

DEFINING THE TERRITORIAL SEA BASELINE (TSB)

Critical to the determination of all maritime boundaries is the determination of the TSB around Australia and its offshore international territories. Essentially, the TSB is the line of Lowest Astronomical Tide (LAT) however UNCLOS allows for the TSB to jump across bays (bay closing lines) and rivers (river closing lines) and between islands and along heavily indented areas of coastline (straight baselines) under certain circumstances. The TSB was originally determined in the early 1970s by AUSLIG's predecessor (Natmap) based on small scale mapping supported by some aerial photography. The Maritime Boundaries Program is now validating this data and carefully attributing the data quality, including lineage (history), to create a comprehensive GIS database known as the Australian Maritime Boundaries Information System, AMBIS.

DETERMINING LOWEST ASTRONOMICAL TIDE (LAT)

Article 5 of UNCLOS defines the baseline as "the low-water line along the coast as marked on large scale charts officially recognised by the coastal State". "Low-water" is not more clearly defined and Australia has elected to use the Lowest Astronomical Tide (LAT) as this is the datum used on hydrographic charts. The use of lowest astronomical tide also maximises the area Australia can claim under UNCLOS. Hydrographic charts are primarily concerned with navigational hazards and water depth but not specifically the line of lowest astronomical tide. Topographic mapping typically defines the coastline as the line of high tide (usually mean high water). Accurate determination of lowest astronomical tide can, therefore, present some difficulties, particularly in areas of large tide range and gradually sloping foreshores. Such areas are common in the north of Australia and some of these areas are also largely uncharted.

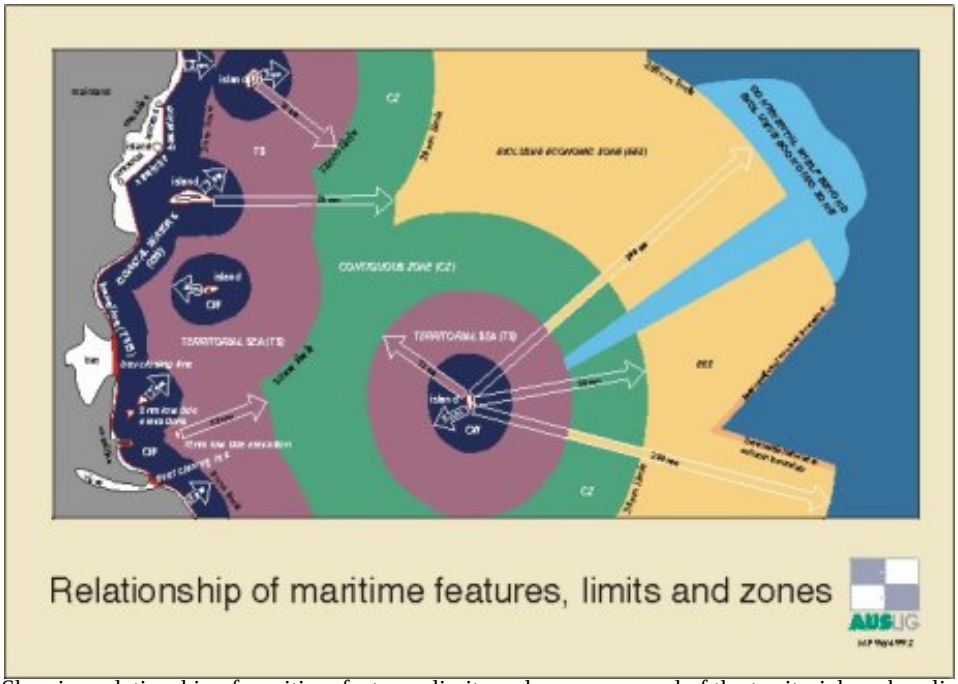

Figure 3. Showing relationship of maritime features, limits and zones seaward of the territorial sea baseline. (Not to scale)

SOME ADDITIONAL COMPLEXITIES

Co-ordinate Datum

Current data is available in both AGD66 and GDA (WGS84) datum. The use of AGD for remote

offshore areas is theoretically invalid and, if used for international negotiations, raises the issue of transformation parameters. This issue has arisen in the negotiations with Indonesia and has resulted in some of the original 1971 boundaries defined in AGD66 and the newer 1997 boundaries expressed in WGS84.

Antarctic Boundaries

At the time of writing no firm decision has been made regarding whether or not Australia will submit a claim for extended continental shelf areas off our Antarctic Territories. Defining the TSB in Antarctica will be a significant task and preliminary investigations suggest that the use of Synthetic Aperture Radar (SAR) may be of great assistance. The problem is made more complex by uncertainty as to whether the grounding line, the limit of the continental ice shelf, or the limit of permanent sea ice should be used to determine the TSB.

AMBIS

As previously mentioned, the Maritime Boundaries Program is establishing all the necessary data into a GIS system known as AMBIS, the Australian Maritime Boundaries Information System. The original AMBIS database was developed in GEOVISION however this is now being migrated into ARCINFO. This migration process is being used to fully validate the data and ensure that all features carry the relevant attributes. The size and complexity of the database makes this a significant task which is not due for completion until the end of 1999.

Database structure

AMBIS is a vector Geographic Information System. The coverages can be classified into three groups as follows: 1. Major coverages are those that directly relate to the determination of the Territorial Sea Baseline and the Zone boundaries determined from it.
2. Related coverages are other maritime boundaries which are stored in AMBIS as required.
3. Reference coverages show the extent of different types of data used in the determination of the Territorial Sea Baseline.

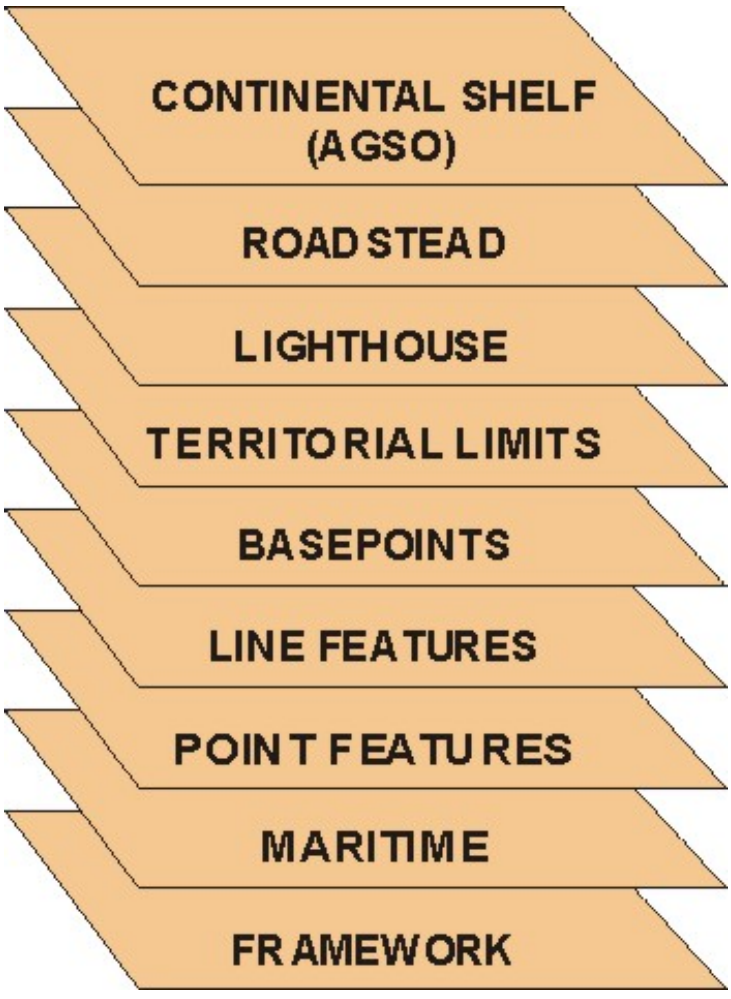

Figure 4: AMBIS major coverages

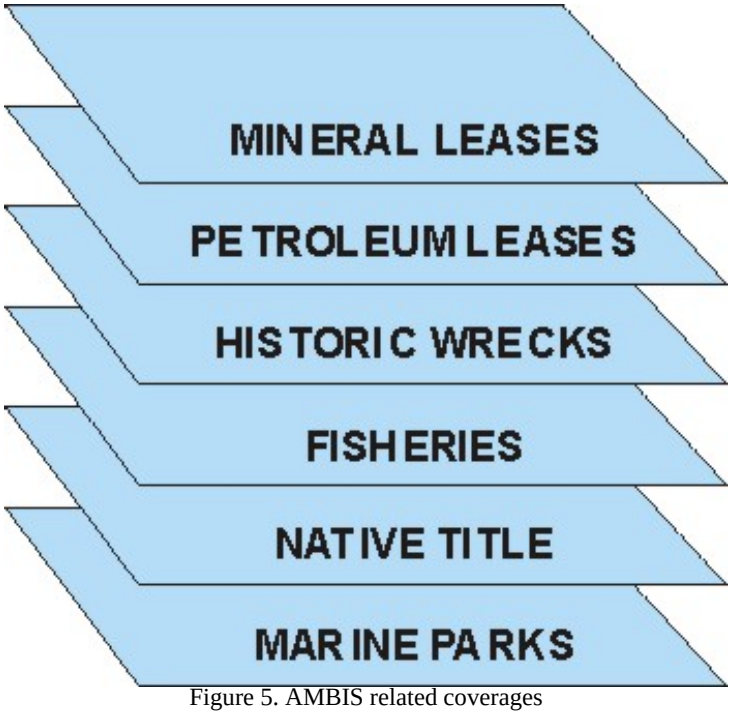

Figure 5. AMBIS related coverages

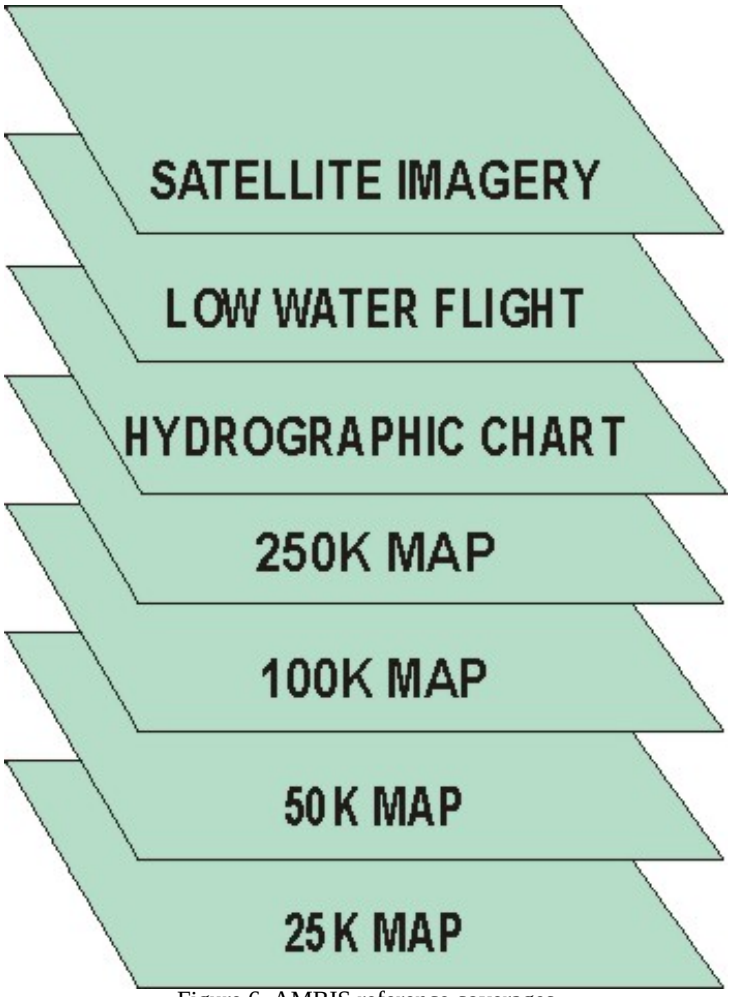

Figure 6. AMBIS reference coverages

Quality Information

Comprehensive attributes are linked to each feature. In particular, it is necessary that detailed quality information on all data used to define the Zone Boundaries is recorded. Attribute information stored in AMBIS includes:

- Source of the data (map, co-ordinate, remote sensing, aerial photograph, etc.)

- Details of source material (name and number of map, scale, source agency, etc.)
- Accuracy (estimated planimetric accuracy, or other, were available)
- Datum (horizontal and vertical)
- Data capture methods (screen digitising, stereograph etc.)
- Details on data capture (transformations used, number of control points, residuals, digitising agency, etc.)

CONCLUSION

The United Nations Convention on the Law of the Sea (UNCLOS) provides a vital basis for international co-operation and provides essential guidelines for boundary determination. Protecting Australia's interests over the vast area to which we have a legitimate claim requires careful application of these guidelines. Complexities arise in the definition of the territorial sea baseline, the limits of the continental shelf, and in the rigorous computation of the various jurisdictional limits. The development of AMBIS is a vital component in the management of Australia's Maritime Boundaries. Provisional maritime boundaries data is available from AUSLIG's National Data Centre. Revised data,which has been rigorously computed and fully attributed, will become progressively available from the end of this year with all Australian data available by June 2000. More information on Australia's Maritime Boundaries can be found through the AUSLIG Web site at http://www.auslig.gov.au/marbound/ambis.htm

REFERENCES

Seas and Submerged Lands Act
(1973), Australian Government Publishing Service.
United Nations
(1983) The Law of the Sea, United Nations Convention on the Law of the Sea (UNCLOS).
United Nations Office for Ocean Affairs and the Law of the Sea
(1989), Law of the Sea - Baselines - An examination of the Relevant Provisions of UNCLOS.
AMBIS Technical Specifications
(1997) AUSLIG, Quality Controlled Document

http://www.auslig.gov.au/techpap/geoambis.htm

TOP ▲

AUSTRALIAN SURVEYING & LAND INFORMATION GROUP Department of Industry, Science and Resources
Scrivener Building, Dunlop Court, Fern Hill Park, Bruce ACT 2617
PO Box 2 Belconnen ACT 2616 Freecall (Within Australia): 1800 800 173
International Phone: +61 2 6201 4201 Fax: +61 2 6201 4266