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Australia's Maritime Boundaries

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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), the Attorney General's Department, the RAN Hydrographic Office, Department of Foreign Affairs and Trade and State and Territory Governments to define these boundaries and comply with UNCLOS requirements. AUSLIG is developing the Australian Maritime Boundaries Information System (AMBIS) as a 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. A brief description of the technical problems associated with the boundary definition will also be included.

KEYWORDS:

AUSLIG, Maritime Boundaries, Maritime Boundaries Program, AMBIS, UNCLOS

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 describes the tasks and challenges involved in the establishment of the Australian Maritime Boundaries Information System (AMBIS) and the on-going determination of Australia's maritime boundaries. The maritime boundaries within AMBIS 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.)

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 assistance. ? 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. The use of remote sensing data in these areas is being investigated. In particular satellite radar imagery has been shown by some studies to clearly delineate between water and land. The process requires capture of radar data as close to lowest astronomical tide as possible.

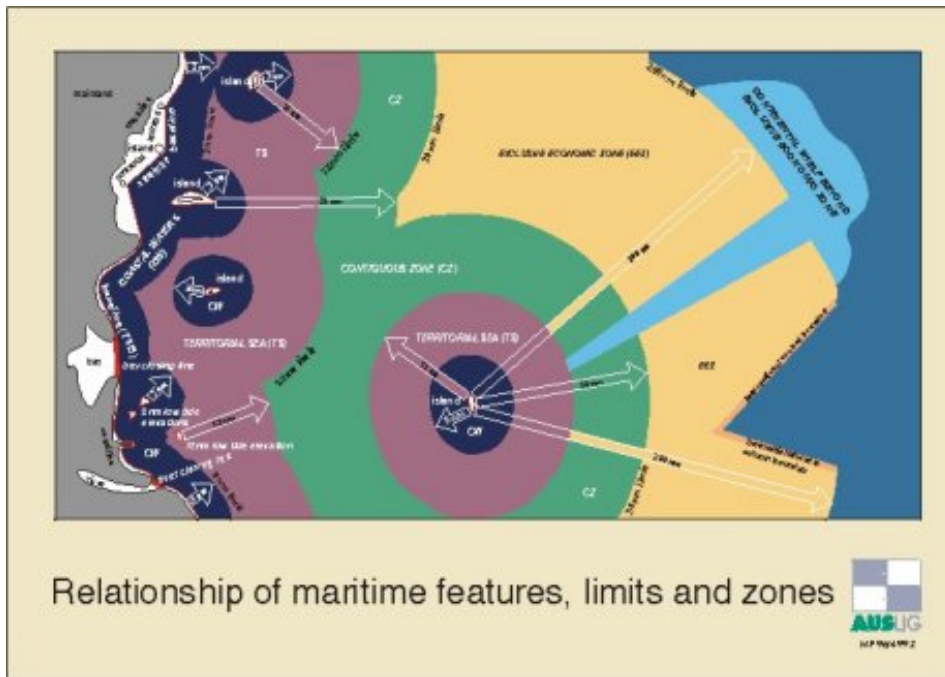


Figure 3. Showing relationship of maritime features, limits and zones seaward of the territorial sea baseline. (Not to scale)

Straight baselines

Under Article 7 of UNCLOS, outer points of deeply indented coastlines, or fringing islands, may be linked by straight baselines. There are approximately 400 straight baselines around Australia and its offshore territories. The co-ordinates of the terminal points of these baselines were proclaimed in 1983, for the Seas and Submerged Lands Act (1973). Many of these coordinates were based on small scale topographic maps (the best available information at the time). The Maritime Boundaries Program is validating these baselines against more recent and accurate information supplied by the State and Territory mapping agencies as well as the Australian Hydrographic Office and other Commonwealth agencies. In some cases remotely sensed imagery is also being used. This process has revealed some discrepancies in the original coordinates. In some instances gazetted coordinates are several nautical miles out of position. While the relevant proclamation has a self-correcting mechanism (i.e., the nearest point on the coastline), there would appear to be merit in defining the points accurately.

Issues:

- The Commonwealth Attorney General's Department and all State and Territory Solicitors General are aware of this situation and have expressed a desire to be involved in any process of amendment.
- AUSLIG acknowledges that frequently altering these coordinates must be avoided due to considerable effort and costs involved and the possibility of adverse effects on Australia's international credibility. Nevertheless the new source data is generally more than one order of magnitude more accurate than the original data used to define the baselines. This new data has also revealed some physical changes in the coastline.
- AUSLIG plans to have all straight baselines reviewed by 2000 and to use this opportunity to update the coordinates proclaimed under the Seas and Submerged Lands Act (1973) to GDA coordinates. Coordinates will still be available in AGD.
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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. Regardless of this decision it is reasonable to assume that the Maritime Boundaries Program will, at some stage, be required to define the Antarctic TSB. This will be a significant task and preliminary investigations suggest that the use of Satellite Airborne 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.

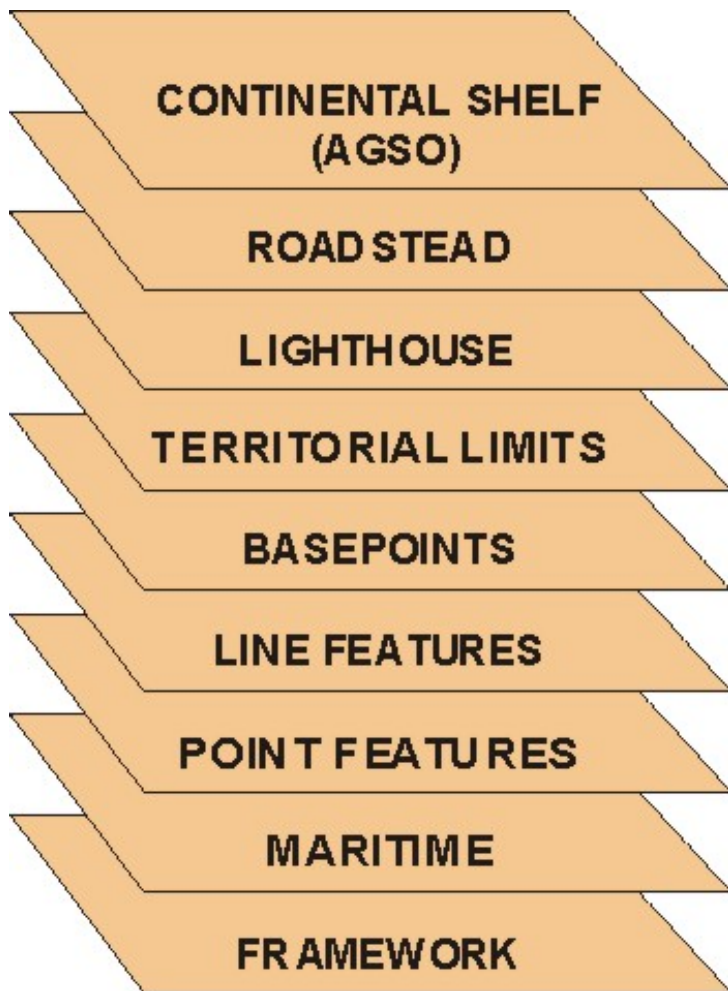


Figure 4: AMBIS major coverages

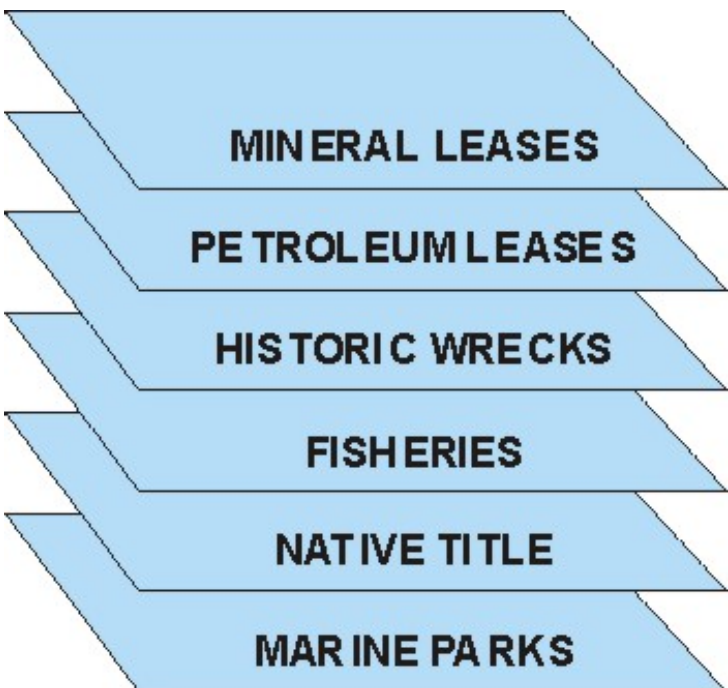


Figure 5: AMBIS related coverages

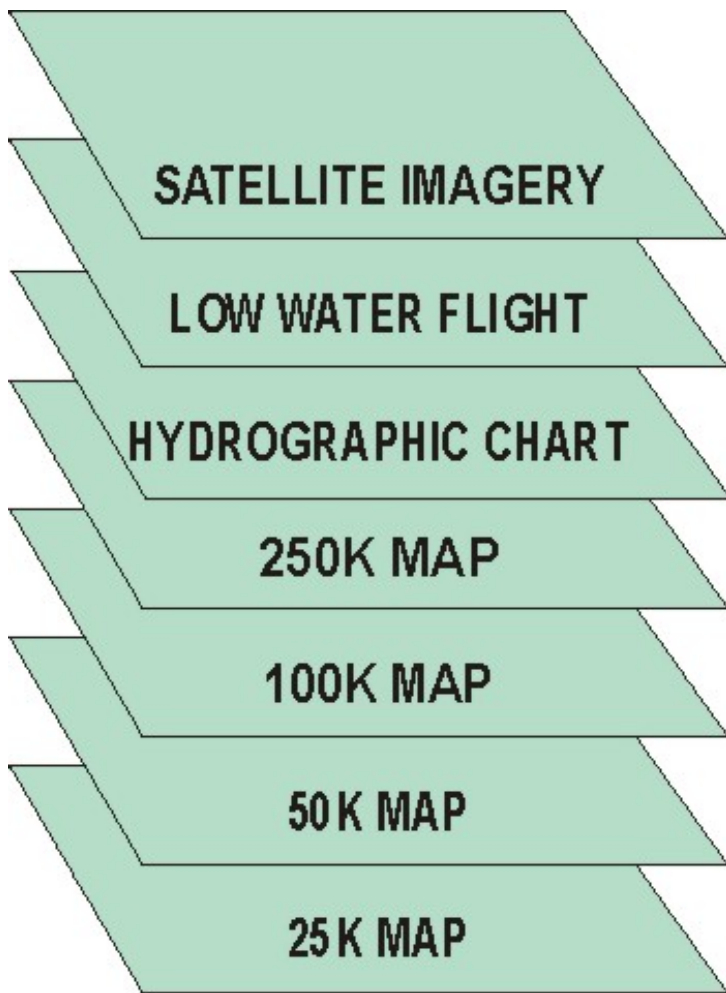


Figure 6. AMBIS reference coverages

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. To date the Maritime Boundaries Program has been a significant example of how well different Commonwealth and State government agencies can work together. The success of this program is dependent upon continuation of this co- operation. More information on Australia's Maritime Boundaries can be found through the AUSLIG Web site at <http://www.auslig.gov.au/marbound/ambis.htm>

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<http://www.auslig.gov.au/techpap/hirst.htm>

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