DESIGNING MAPS TO SUPPORT NATIVE TITLE
NEGOTIATION AND ARBITRATION IN AUSTRALIA

by

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Abstract
An understanding of the space around us (spatiality) is fundamental to our consciousness and in the explanation of heritage - the idea that a map represents both the world we live in and our experiences of it. For example, the visual language of Aboriginal maps represents a synergistic amalgam of the metaphorical, metaphysical and material worlds. Thus maps can be said to be representations that facilitate an understanding of things, concepts, conditions, processes or events in the human world and provide a way of ordering our knowledge of our environment.

Our research is concerned with the exploration of these concepts in the context of the design of maps and other graphics to support negotiations and legal proceedings regarding native title land tenure claims in Australia. This paper reports progress on the multidisciplinary research project at Murdoch University, involving the principal disciplines of information systems, cartography and law. The research project is examining how information systems may be best utilised to support the variety of (often competing) interests of the various parties involved in native title claims. It also addresses important methodological issues relating to the analysis, design and evaluation of information systems which accommodate users with different cultural backgrounds. Spatial representations of various kinds (including maps) can help bridge the cultural gap and support the empathetic process so critical to successful negotiation and arbitration.

The design of appropriate maps and other graphics to support negotiation and arbitration procedures related to native title claims needs to be considered within the context of the information systems in which they are used. In turn, the design of the information systems must be based on an understanding of the decision making environment within which they are situated and the characteristics of system users. This requires the detailed analysis of the procedures used and the roles of the various people involved. This process enables a clear understanding of the purpose of each graphic (or graphic sequence) to be developed and hence its design in the most cogent and effective manner. The paper reports on research findings regarding the use of traditional and innovative procedures for the design of information systems and maps and other graphic products. The relationship of these procedures to Aboriginal concepts of place and representational style is also explored.

1. Introduction
The following sections discuss the design of spatial graphics within the context of the application of information systems technology to support negotiations and legal proceedings regarding native title land tenure claims in Australia. The nature of native title is explained and the legal procedures applying in Australia are briefly described. The research methodology used to investigate the role of information systems in native title claims is discussed and the resulting design parameters identified.

Maps can play a very significant role in the negotiation as well as the arbitration of native title claims. The final sections of the paper explore some of the relevant map design issues and report on the procedures used to address them and the results of current research progress.

2. Background Concerning Native Title Claims in Australia

The resolution of conflict over land title claims by indigenous peoples is an important issue around the World. In Australia its prominence has greatly increased since the High Court case Mabo v State of Queensland (No. 2) [1]. The court found that although Australia is a settled colony it was not 'terra nullius' (vacant land) when European settlers arrived two centuries ago. Hence the international common law doctrine of 'native title' was applicable when British sovereignty was extended over Australia. The Crown could extinguish that native title providing the appropriate legislation or executive act embodied a 'clear and plain intention' to do so [2, 3]. The central question is whether the regime of land control established by the act in question, or the disposition/alienation of the particular land, was inconsistent with the continued enjoyment of native title. Hence a major aspect of the determination of a native title claim revolves around whether extinguishment has occurred with respect to the particular area of land under consideration. Information needs relevant to this issue include:

- What legislative and executive acts relate (and have ever related) to the land in question? Including: (i) Land Acts, Mining Act, Petroleum Act, Fisheries Acts, Acts relating to parks, reserves and forests, water usage, etc.; (ii) regulations made under those Acts; (iii) executive grants of land in fee simple (freehold title) or leases.
- The text of those Acts, regulations, grants and the text of leases.
- Information as to the actual administration and use of those lands.
- Information about the content, under traditional law, of native title in the land in question.
- Information (from historical and possibly anthropological sources among others) about the impact of the alleged dispositions/alienations on the continued enjoyment of native title.

Native title may also be lost by abandonment or voluntary surrender. The legal position with respect to this issue is still unclear, especially regarding changes in customary laws, forced abandonment and sharing of traditional responsibilities between Aboriginal groups. The determination of this aspect of a particular claim is likely to rely on evidence which addresses the following questions:

- What is the history of the Aboriginal group's occupation of the land?
- What is the current status of that occupation?
- Where occupation has been abandoned, how did that occur?
- What continuing connections are there with the land, with respect to Aboriginal law and custom?

Information concerning the nature of the occupancy claimed by a group of Aboriginal people will also be necessary to prove that the 'claimant group' is the one with native title rights. Hence a large variety of information types must be analysed and the results presented during the claims process. Maps may be used extensively to collate and communicate this information. Indeed; very similar procedures have been used for over ten years in the Northern Territory (NT) under the Land Rights Act where a set of procedures have been established for the collection and representation of relevant historical, anthropological and cultural information.

In theory the Aboriginal claimants under common law (Mabo) land claims should be in a much stronger position than under the NT Land Rights Act since the onus of proof should lie with the parties seeking to establish extinguishment of native title. In practice, however, it is still necessary for Aboriginal claimants to put forward as evidence a considerable amount of cultural information, much of which may be secret/sacred. Many claimants are understandably reluctant to do this.

Where native title claims are processed through the courts under common law (relying on the Mabo judgement) the claimant group is likely to need to supply a considerable amount of cultural information. The procedures and map designs used in cases under the NT Land Rights Act can form the basis for deciding how this information can be collected, represented and assessed. It should be noted, however, that the maps under the previous NT procedures do not make extensive use of innovative design features or Aboriginal forms of representation. They rely on traditional two dimensional paper products and do not utilise GIS or multimedia approaches to information collection, analysis or display.

3. Role of the National Native Title Tribunal

In addition to the common law position, partly clarified by the "Mabo" decision, new Federal native title legislation was passed late in 1993. This established the National Native Title Tribunal (NNTT),and a set of procedures and criteria for negotiation of claims [4]. The Federal Government's desire was to avoid the costly and time consuming court cases necessary for common law title claims, while not significantly diminishing the rights of any party. Aboriginal groups can lodge a claim with the NNTT. Once its prima facie basis has been established the relevant stakeholders can be identified and notified. The tribunal then facilitates negotiations between the parties in the hope than an agreement can be reached. The NNTT does not have the power to decide any claim but can authorise an agreement mutually accepted by the parties. If agreement is not reached then the claim will need to proceed within the court system or be abandoned.

Aboriginal claimant groups normally enter into negotiations in the hope that this will be a more rapid and less costly path to native title. They also expect that they will not have to put forward the same extent of cultural information that would be required in a court case. However, it may be necessary to provide a considerable amount of such information in order to encourage the other parties to enter into meaningful negotiation and to assist them to understand and empathise with the Aboriginal position.

There is considerable scope for information systems to facilitate the resolution of conflict over native title claims. They can assist in the preparation and presentation of claims and act as a repository of information for relevant tribunals. Geographic information systems (GIS) technology can be very useful since much of the relevant information is spatially referenced [5, 6]. There is also great potential for the use of text-based data storage and retrieval systems. Multimedia presentation methods are an attractive option because of the nature of some of the information to be stored and the cultural diversity of potential users.

In particular, spatial information can be used to support the negotiation processes carried out under the auspices of the NNTT. GIS can facilitate the identification of stakeholders in a particular native title claim and assist in the preparation of maps to support specific phases of negotiation. However, these maps need to be designed in a manner which ensures that they are able to be clearly understood by all participants in the negotiation process. These design should also embody the aspects of Aboriginal culture relevant to the nature of native title and may incorporate representational forms and styles used in traditional Aboriginal maps.

4. Research Project Aims and Procedures

The research project is investigating how information systems technology may be best utilised to support negotiation/arbitration of native title claims. It is being undertaken at a variety of integrated levels of abstraction ranging from the building of working prototype information systems to the development of a conceptual understanding of differences between alternative land claim criteria and procedures. Its focus is on developing information systems technology and procedures to support the operation of the NNTT; however, proceedings under common law and under state legislation are also being considered.

The basis of decision making within the NNTT processes is being examined from legal, cultural, psychological and information processing perspectives. The research is using established and novel information systems analysis and design procedures to identify what information should be used in which ways to enable decisions to be made in a logical, understandable, consistent and equitable manner. This requires that the concepts embodied in the claims assessment criteria be explored in the context of the decision environment, i.e. the manner in which the Tribunal proceedings are actually being undertaken. This involves an examination of how evidence may be assembled and presented and how the Tribunal itself will accumulate, store and assess material relevant to each claim.

The research methodology utilises information systems development procedures for the identification of user requirements, task analysis, system design, prototype implementation and usability evaluation. The approach

adopted integrates formal design specification techniques and "soft systems" procedures involving extensive participation by potential system users [7]. Several new approaches to addressing human factors aspects are being used. These toolkits and procedures have been developed recently under the ESPRIT Project funded by the Commission of the European Communities. They include the "HUFIT" and "ORDIT" toolkits (from HUSAT and others) and the socio-technical systems analysis and definition procedures known as the Mohawc Taxonomy (from RISO in Denmark) [8, 9].

The human factors and cognitive aspects of systems use are also being investigated through the design, prototyping and usability evaluation of maps and multimedia user interfaces. The impact of a user's cultural background is being studied, especially in the case of members of the legal profession and representatives of Aboriginal communities.

5. Design of Appropriate Maps and Other Graphics

Maps and other graphics will be used in information systems supporting native title negotiation and arbitration. If these visualisations are to be optimised it is necessary to address rationally the relationship between communication objectives and the nature of the display, within a user-centred, cognitive ergonomics framework [10, 11, 12, 13]. This may be achieved by the use of cognitive task analysis procedures. The means-ends structure of any GIS-based decision process defines the cognitive task requirements and the sets of potential mental strategies which may be used. A cognitive ergonomics analysis enables the identification of representation and interpretation requirements. The interaction of these requirements with the viewers' roles and characteristics may be analysed to infer the visualisation design parameters. Thus, visualisation design may be undertaken as a formal procedure which implements a user-GIS interaction model through a user/task analysis procedure. This must be integrated with the other aspects of information systems design within a socio-technical methodology.

It is critical that the information systems and maps/graphics design procedures reflect the fundamental nature of native title. The products produced must be connected with the Aboriginal and Torres Strait Islander traditions which form the basis of native title. Those who are from other traditions can, at best, have only a vague understanding of these matters, however, a general framework may be described.

Mr. Justice French, President of the NNTT, quotes the definition of native title at common law provided by Brennan J (in Marbo, 1992), and the joint judgement of Deane and Gaudron JJ regarding changes in traditional law and custom, as follows:

"The term "native title" conveniently describes the interests and rights of indigenous inhabitants in land, whether communal, group or individual, possessed under the traditional laws acknowledged by and the traditional customs observed by the indigenous inhabitants."
"The traditional law or custom is not... frozen as at the moment of establishment of a Colony. Provided any changes do not diminish or extinguish the relationship between a particular tribe or other group and particular land, subsequent developments or variations do not extinguish the title in relation to that land."
[4, p. 2 - emphasis added]

The fundamental ingredients of native title may thus be summarised as an integrated relationship between:

places -	not just an arbitrary configuration of physical locations but an assemblage of places connected by meanings associated with traditional belief systems;
people -	the specific group/s of people who possess the meaningful relationship with (and are responsible for) those particular places;
procedures -	the laws and customs which link the people to the places and sustain their unique relationship (and hence native title);

presentations - the practices and physical manifestations by which the laws and customs and meaning relations between the people and places are expressed (and hence maintained), such as ceremonies and paintings.

Design of effective negotiation-support graphics must therefore utilise procedures, techniques and tools which address these matters in an integrated way.

6. Supporting the Mediation Process

The HUFIT and ORDIT analysis of the operation of mediation/negotiation processes within the NNTT has identified the key groups involved, their characteristics, roles and responsibilities and, hence, their information processing requirements. Map design must be based on the required cognitive tasks and user characteristics. The map use tasks specific to native title claim mediation/negotiation that need to be supported include:

- participation - provide 'evidence' that addresses the real issues to be negotiated;
- comprehension - enable interpretation and therefore understanding of the significance of key aspects of the landscape, land use and cultural features;
- empathy - aid in the understanding of the other persons point of view, including respect for the notion of two sets of laws ('western' and Aboriginal) and the cultural significance of places in the landscape;
- review of options - depict meaningful choices between alternative solutions to points of disagreement;
- compromise - reach a fair, just solution, acceptable to all, so that both sides have 'won';
- expedition - carry out processes in an efficient, effective and timely manner.

The research program has concentrated, in the first instance, on defining user needs for maps and other information systems components to support these mediation/negotiation requirements.

7. Progress on Design of Graphics to Support Native Title Negotiation

There are two distinct scenarios for the use of maps in native title land claims. When a claim is processed through the court (common law) system, maps are required to establish a valid nexus between the relevant 'country' and the claimants. Typically these are planimetric line maps displaying such things as tribal 'boundaries', sacred sites, Dreaming tracks, economic sites and historical information, with sufficient topographic and cadastral detail to provide appropriate context. The reports of the various NT Land Rights Act claims provide good examples of such maps. The second scenario deals with maps to aid mediation/negotiation under (statute law) NNTT procedures. Their objective is to informally reveal enough information for engagement of the parties in negotiation of the claim, with a view to avoiding the time and expense of a court case. Maps supporting negotiation should be designed to infuse understanding and empathy. In order to overcome base myths which negotiators bring to the table, it is firstly necessary to change the nature of the discourse. By employing a range of differing cartographic representations, the discourse can be legitimately and effectively enlarged to address the key issues of the nature of Aboriginal identification with specific 'country' (i.e. the land over which they have native title rights and cultural responsibilities).

The cartographic techniques employed may range from formal conventional planimetric maps to purely topological and/or metaphorical spatial representations, in the style of traditional Aboriginal graphics (Dreamtime maps) [14]. The use of images (e.g. orthophoto or satellite images) can provide an effective background for layers of vector information. Three-dimensional displays and multi-media interfaces using animations, morphing and/or hyper-links, can also be utilised [15, 16].

The types of maps used should illustrate the dynamic relationship existing between Aboriginal groups and their 'country'. For example, a Dreamtime map would optimally represent places of ancestral importance, the reasons for that importance and the spiritual significance of locations. Icons could be used to depict the totem of the ancestral beings that visited/created a particular site, as well as the associated action or event that took place

This paper has briefly described research being carried out to investigate these objectives, in the context of native title mediation/negotiation processes. The results so far indicate that there is great potential for effective, innovative map design which reflects the attitudes, aspirations and cultural traditions of Aboriginal people while fulfilling the requirements of Australia's dominate 'western' legal system.

10. References
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there. The nature of the spiritual significance could be depicted by icons of differing geometric shape e.g. a square border denoting commonality whereas a triangle defines exclusivity of access (i.e. the site relates to men's or women's 'business'). The use of colour could then indicate the ranking of a site's significance.

Each site also has associated rituals and ceremonies. Further icons could represent these relationships, graphically depicting the nature of the commitments that the custodians have for their land. Consultations with the relevant Aboriginal people would be essential in establishing the purpose and design of the maps and before valid information could be obtained or legitimately used. There are many restrictions on the use of cultural information and symbols and it is for the claimant group to decide what information is used and in what ways.

The ethnographic significance of these sacred sites must not be underrated. Aboriginal people regard the land as the source of their social, ceremonial, spiritual and material existence. As such, individual components of this relationship cannot be observed/depicted in isolation. Although complex, such interactions may be assessed more readily when viewed in a graphical form. Rundstrom [17] uses the concept of "reciprocal appropriation" [18] to explain the process of integration between indigenous peoples and their physical landscape.

A number of example maps are being designed, prepared and evaluated as part of the research project. This will aid our understanding of the effectiveness of differing representational styles and formats in displaying Aboriginal cultural information within the format of the mediation/negotiation of native title claims.

8. Summary of Relevant GIS and Map Design Issues
The design of information systems to provide efficient, effective and equitable support for native title negotiation and arbitration procedures requires the resolution of many complex issues. Those of particular relevance to map design include:
- how sharing of spatial data may be maximised without compromising the confidentiality of secret/sacred information or inhibiting legitimate negotiation/arbitration strategies;
- equitable access to meta-data and spatial information by all stake holders;
- ways to depict traditional concepts in computer systems, including claim boundaries;
- the way in which traditional mapping techniques used by Aboriginals and Torres Strait Islanders may be used and/or the interpretation and representation of information contained in traditional maps and other graphics;
- ways of interpreting and representing evidence based on existing documents, such as anthropologists notes and maps;
- ways of integrating multimedia material and traditional map presentations, including animation;
- the admissibility of maps and graphics in legal procedures, where the rules of evidence apply;
- appropriate map quality criteria (including positional accuracy) and how quality assessments may be made, certified and communicated;
- procedures for effective storage and retrieval of case-based information;
- the role of knowledge-based systems in selection and interpretation of data.

The central theme of this paper is that these issues cannot be effectively addressed except in the context of the procedures used for native title negotiation and arbitration and the analysis and design of information systems to support those procedures. This may be facilitated through the use of formal user requirements determination and task analysis techniques and procedures for human-computer interaction and graphics design. The challenge for cartographers involved in producing maps related to native title claims is to integrate their design procedures with those relating to the broader design of information systems and legal procedures. For this to be successful it is also critical that the design be grounded in the fundamental nature of native title and hence connected with the concepts, traditions and needs of indigenous Australians.