

DEFENCE MOVEMENTS AND TRANSPORT PLANNING
- ITS RELEVANCE TO CONTINGENCY PLANNING AND TO
THE CIVILIAN TRANSPORT INDUSTRY

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ABSTRACT: *Defence research in the area of movements and transport planning is essential to contingency studies into the support of Australian Defence Force units involved in conflict situations. Such research must take cognizance of not only the assets operated by Defence but also the support available from the civilian transport industry. The paper discusses the current defence research projects in this area and their significance from a civilian transport viewpoint. It concludes with some recommendations on the areas suitable for future research.*

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INTRODUCTION

There is an old military adage that time spent in reconnaissance is never wasted. In times of peace the equivalent of reconnaissance in war is research - the scientific study or investigation into the various ways by which the Australian Defence Force develops its ability to discharge the trust placed in it by the citizens of Australia. The role, or objective, of Australia's defence machinery can be defined as:

"The objective of the Australian Defence Force (ADF) is to plan, develop and maintain forces for contingencies within Australia's area of direct military interest, to defend Australia and its interests at sea, on land, and in the air, or combinations of these." (1)

Defence outlays in 1987-88 amounted to \$7422 Million, or 2.5% of the GDP.(2) Such expenditure clearly requires informed and accurate decisions. As research is fundamental to the decision making process the Department of Defence must maintain considerable research facilities.

AIM

The aim of this paper is to discuss Defence movements and transport planning in the context of specific research projects, and to place these in a frame work of reliance on civilian transport infrastructure support.

DEFENCE RESEARCH ESTABLISHMENTS

Within Defence research is carried on in either Department or single Service (Navy, Army, Air Force) establishments or staff organisations. Such research can be either pure research-designed to develop new concepts, or applied research which involves enhancement or modification of in-service equipment or organisational arrangements.

Within the departmental structure research into transport and movement aspects is carried out by

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either the Defence Scientific and Technical Organisation (DSTO) or the Defence Logistics Organisation (DLO).

DSTO is Australia's second largest research organisation with a staff of about 4200, of whom 1000 are professional scientists and engineers. A list of the major DSTO establishments is at Appendix 1. The role of DSTO is to:

- . establish stronger links with industry including, where appropriate, sectors of industry not involved in defence work;
- . arrange for more DSTO work to be exploited commercially;
- . improve efficiency by streamlining project management; and
- . broaden its technology base by devoting more resources to applied research. (3)

The Defence Logistics Organisation (DLO) is responsible for advice on policy, resources and organisation of Defence logistics. It includes a Logistic Development Division responsible for the development of common supply, technical and movements policy and procedures in order to provide effective and economic logistics support to the ADF and the Department. The organisation within Logistics Development Division responsible for movements and transport research and planning is Movements and Transport Branch.

Transport and research planning in Navy, Army and Air Force is carried out either by Material or Logistics Branches of the various Services. Materiel Branch responsibilities involve the management of processes leading to research, development, design, testing, evaluation and procurement of new or improved equipment. Logistic Branch responsibilities, on the other hand, involve the formulation and implementation of policies concerning single Service logistic support and contributing to departmental policies on logistic support for the ADF as a whole.

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RESEARCH CARRIED OUT BY MOVEMENTS AND TRANSPORT BRANCH

Research within Movements and Transport Branch can be categorised as:

- .. research into transport aspects of contingency planning
- .. research into EDP systems suitable for ADF transport support operations
- .. research into management systems
- .. research into organisational improvements
- .. research into the carriage of dangerous or hazardous cargo.

The primary function of Movements and Transport Branch is to plan for the operational deployment of the ADF ie contingency planning. In this area considerable research has been carried out into the interface between Defence and the civilian transport industry in times of conflict. This is in accordance with the present Defence policy which is that:

"Future defence infrastructure planning will emphasise longer term options for developing, rationalising and in some cases relocating defence facilities throughout Australia and the greater use of civil infrastructure." (4)

In this area a significant study was completed for the Defence Industry Committee in 1988. This study - The Review of the Civilian Transport Infrastructure - had as its principal aim the determination of the capacity of the civilian transport industry to support Defence operations in times of credible contingencies while, at the same time, maintaining support to the economic and commercial sectors of the nation. Accordingly the study researched the spare capacity available in industry to provide support for a number of specific scenarios. The conclusion of the study was that capacity did exist but that some lead time to marshal support would be required. Shortcomings were identified in the maritime industry and in the movement of bulk fuel and water but adequate capacity exists in the road and aviation industries. The study has now been endorsed by the Minister for Defence and

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is available for distribution to interested areas of the industry.

EDP systems research is assuming a very high profile in all areas of Defence. In the transport area this parallels the development of Electronic Data Interface (EDI) in the commercial sector. A problem which has arisen is the need to control, or at least provide guidelines for, the fragmented development of systems which either duplicate each other or, in the worst case, are not interoperable. Research has been conducted on two broad fronts:

Geographic Information. The difficulty of accessing data bases on varying geographic and infrastructure facilities has been a problem in both civilian and military transport operations. Under the sponsorship of Headquarters ADF (HQADF) the Central Studies Branch of Defence undertook research into Australia's capability to deploy and maintain forces in Northern Australia as well as maintaining the resident civilian population when those forces were operating. As part of the study a considerable amount of infrastructure data on road, rail, air and sea modes has been collected. The EDP system which evolved from this research, the Movement Planning Support System (MPSS), is designed to assist military planners in strategic and tactical movement and support of operations in Australia, its offshore territories and adjacent seas.

Movement Planning Systems. Each of the Services is developing EDP systems peculiar to its own mode operations. In some cases these overlap eg. both Army and Air Force are developing systems for aircraft load planning. In other cases there is a need for the various systems to interface, such as the Army Movement and Transport Operations System (AMTOS) and the Air Force aircraft load planning systems. This need underlines the requirement for such systems research to be carried out within some form of uniform framework. The development of such a framework is still a problem in the ADF, as indeed it is in other larger armed forces such as the USA.

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Management research has been driven by the changing command and control requirements of ADF joint force operations and the impact of such developments on movement planning. Essentially the changes have seen the move away from single Service controlled operations towards a more functionally oriented system based on Maritime, Land and Air Commands which incorporate elements of some or all Services. However the traditional single Service movements systems remain in place and this can cause organisational difficulties. The question to be resolved is whether or not it would be better to have a single organisation, controlled by HQADF and responsible for planning and implementation of operational movement, instead of the present arrangement which allocates responsibilities to one of the Services for the implementation of the movement plan. This dilemma is similar to the situation facing some of the large civilian transport organisations in the road and rail industries, and Defence can learn from their experience.

Organisational research flows from the contingency planning and management research mentioned above. Defence studies in this field have been aimed at producing movements and transport organisations which are structurally sound and which can interface smoothly with industry and with other Government departments. Given the Federal system of Australian politics this latter requirement is not always easy to achieve.

The final area of Movement and Transport Branch research involves the contentious area of the movement of dangerous and hazardous goods. Given the nature of Defence operations this is an important aspect of transport management and is assuming greater importance in Defence planning. Within each Service considerable research is carried out into better and safer ways of storing and transporting explosives and ammunition, and into the types of vehicles on which they are carried. Movement and Transport Branch works closely with the Department of Transport and Communications through the Commonwealth Explosives Transport Committee and has been a major contributor to the recent revision of the Commonwealth Explosives Regulations. In the other categories of dangerous goods (Classes 2-9) research is now being conducted in conjunction with civilian industry bodies into more appropriate methods of training supervisors and drivers involved in road transport tasks, and personnel involved in the packing and certification of goods for movement by air.

SPECIFIC RESEARCH PROJECTS

Over recent years there have been specific research projects carried out by Defence which have relevance in the civil as well as the military environment. Some of these projects are discussed below.

The Defence Commercial Vehicle Management Study

This study has just been completed and involved research into more appropriate management methods for the Defence Commercial vehicle fleet of some 5600 vehicles ranging in size from small sedans to heavy transport vehicles. It should be understood that Defence classifies its vehicles as commercial type, used for normal day-to-day administrative functions, and operational vehicles used for combat purposes. The study was a far-reaching one carried out by a Defence review team and an industry consultant. The major findings of the study are still to be endorsed by Defence but include the need for changes to the way vehicles are procured and disposed of, the concept of fleet management in either a centralized or decentralized mode and the evident need for a more uniform fleet management information system. In many ways the results of this study were similar to the results of a similar study into the Telecom fleet in March 1987.⁽⁵⁾

The Coastal Shipping Study

The Naval Forward Planning Branch has been involved in extensive research on the economic importance of Australia's maritime environment. This has included trade and shipping, offshore oil and gas extraction and fishing. Clearly it is only through a proper understanding of the nature and importance of offshore economic activities that the priority for their protection can be determined.

As a result of this research the following important studies have been produced:

An Analysis of Trends in Trade and Shipping (David McFie, 1986). This report presents a number of papers providing mostly statistical information on Australia's overseas and coastal trade, the merchant marine, Australian ports and energy and strategic minerals;

The Role and Importance of Coastal Shipping in Australia: A Defence Perspective (Neil Orme, 1986). In the context of the Dibb "Review of Australia's Defence Capabilities", this report examines in detail the composition and importance of Australia's coastal trade. Emphasis is placed on major commodities and ports in northern Australia.

Coastal Shipping: Its Importance to the Economy (Martin Dunn, 1987). This report complements the previous report. Issues examined include: the value of commodities moved by sea, the availability of alternative transport modes, the cost structure of various transport modes, the economic importance of coastal shipping and the impact of closing selected northern ports.

The last two works will soon be republished as a consolidated volume by the Australian Government Publishing Service.

In a period when Australia's maritime trade, both shore based and sea, is coming under increasingly critical scrutiny it is suggested that these studies have much to contribute to the current debate on the issue.

Cargo Visibility System

The problems of tracking cargo in transit have become pressing as the trend towards containerisation has accelerated. This has obvious importance in the maritime area in locating containers and tracking them through terminals but is as applicable in any distribution system moving large quantities of freight. In a Defence context the accurate location of essential stores can be a matter of survival for troops in combat and the Australian Army has devoted considerable research into the development of a Cargo Visibility System (CVS). This research has been conducted in conjunction with Australian industry and an Australian Army officer led the Australian delegation to the International Standards Organization Working Party meeting dealing with such systems.

As a result of this research a CVS has been developed based on transponder technology utilising infra-red emissions. The equipment includes transponder tags,

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reader and logger devices for both transponder and barcode tags, intelligent terminals, barcode label printers, revelational database software and a supermicro-computer. The system is considered to be state-of-the-art technology and has enormous potential not only for Defence but also for export earnings. In FY89/90 Defence has allocated \$490,000 for the purchase of electronic tags, reader and logger devices. Phase 2 involves the contracting for a civilian consultancy to develop the database software and for the purchase of terminals and a computer. The Defence Industry Development Division has played a prominent role throughout the project.

Air Transport Study

An air transport study is currently underway in Defence to provide a quantitative background to the development of fixed and rotary wing air transport forces to meet the requirements set out in the 1987 White Paper. Such a study involves research into airfield infrastructure, climate and terrain conditions, current and future aircraft capabilities and the airlift requirements needed in credible contingencies. It is a vital study and involves many areas of the Department under the overall guidance of Central Studies Branch. Phase 1 is almost complete but much work still remains to be done to produce the final options.

Trials Conducted by DSTO Trials Directorate

In addition to the DSTO laboratories mentioned earlier, DSTO has a Trials Directorate established to act as an independent agency for the conduct of test and evaluation. Although the activities of this organisation fall within the applied research area it is one of the very important Defence research assets.

The list of published Defence trials reports is voluminous and ranges through weaponry, clothing, vehicles, engineering equipment, communications, facilities and personal equipment.(6)

RELEVANCE OF DEFENCE MOVEMENT AND PLANNING RESEARCH TO THE CIVILIAN INDUSTRY

The range and nature of the projects discussed in this paper are evidence of the amount of Defence effort that goes into research on equipment and procedures

for the ADF. Transport research is only one facet of a very complex machinery that has as its aim the development of an efficient defence system. However it is in the transport area that Defence research and civilian industry requirements have much in common. This commonality is accentuated by the need for the ADF to rely on civilian transport support in times of conflict.

An additional bonus to the linking of Defence and Civilian research is the development of transport equipment and, to some extent, organisations that can satisfy the needs of either the commercial or the military user. There are obvious advantages in cost and in the improved support for such equipment when both parties are required to work together.

There have been increasing efforts made to bring closer together the military and civilian research establishments. Foremost amongst these have been the DSTO initiatives in the Defence Laboratory area and the work of the Defence Industry Division. On the organisational interface side Movements and Transport Branch has worked closely with industry over a number of years on research into Defence use of civilian transport and this work is now starting to show signs of a much better understanding of each other's unique requirements. Defence is an important aspect of Australian research and its relevance is to be measured not only in industry support for Defence operations but, equally, in the potential such work has to provide very useful data for commercial operations.

CONCLUSION

This paper has covered in very broad terms, a most important aspect of Defence development. It has described some projects which have relevance to commercial as well as military operations and has stressed the need for close and continuing contact between Defence and civilian researchers. In a time of economic constraint it is important that research on the national level be as cost-effective as possible. The Department of Defence, with its wide range of research capabilities, has much to offer in this regard.

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APPENDIX 1

DSTO LABORATORIES

DSTO Aeronautical Research Laboratory, Fishermens Bend, Melbourne, VIC

Functions

Provides research in such fields as aerodynamics, aircraft materials, structural integrity and efficiency of aircraft, analysis and integration of systems, and on air breathing propulsion systems and engine airframe integration and performance. Also assists civil aviation in some of these fields.

DSTO Electronics Research Laboratory, Salisbury, Adelaide, SA

Functions

Provides research in the fields of electronic warfare, information technology, communications and command and control.

DSTO Materials Research Laboratory, Maribyrnong, Melbourne, VIC

Functions

Provides research into organic and inorganic materials, metallurgy and behaviour of composites, explosives and explosive munitions, mines and underwater ordnance, camouflage and other forms of protection of personnel and equipment and the design and construction of land and sea platforms.

DSTO Materials Research Laboratory, Scottsdale, TAS

Functions

Determines the energy and nutrient requirements of servicemen under all conditions in which they may be expected to operate and translates these needs into ration scales for static mess feeding and ration packs for emergency and combat conditions. Also researches the storage and packaging of food.

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DSTO Materials Research Laboratory, Innisfail, QLD

Functions

Investigates the effects of tropical environments on materials, equipment and electromagnetic wave propagation, and on mechanisms and measurement of degradation. Also classifies and studies tropical environment reference sites. Part of its program is jointly sponsored by the United Kingdom.

DSTO Materials Research Laboratory, Sydney, NSW

Functions

Researches underwater weapons and countermeasures systems.

DSTO Surveillance Research Laboratory, Salisbury, Adelaide, SA

Functions

Provides research into HF radar, microwave radar and optoelectronics for electromagnetic surveillance.

DSTO Weapons Systems Research Laboratory, Salisbury, SA

Functions

Researches aeroballistics aspects of weapons and weapon systems, combat data and display systems, guidance and control systems for weapons, underwater detection systems and their integration with other military equipment. The laboratory also has staff based at Pyrmont, Sydney, NSW who analyse maritime warfare, maritime exercises and research underwater acoustics, oceanography and sonars.

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