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National Defence
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DEFENCE RESEARCH ESTABLISHMENT ATLANTIC

1994 STRATEGIC PLAN

**Defence
Research
Establishment
Atlantic**



**Centre de
Recherches pour la
Défense
Atlantique**

Canada

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DEFENCE RESEARCH ESTABLISHMENT ATLANTIC

Mission

The Defence Research Establishment Atlantic conducts research and development (R&D) in undersea warfare and marine vehicle technology, to enhance the operational effectiveness of Canada's naval and maritime air forces.

Vision

DREA will build upon its reputation as the leading Canadian centre for sonar technology, torpedo defence, and naval platform research and development. We will support the operational requirements of MARCOM and MAG with world-class programs in active and passive sonar, and in torpedo detection and countermeasures. We will support the design, acquisition, operation and maintenance of the Canadian Navy's ships and submarines with internationally recognized programs in noise, dynamics, structures and materials.

**DREA is the leading
Canadian center for sonar
technology, torpedo defence,
and naval platform research
and development.**

Values

In carrying out our mission, we are guided by certain fundamental values, which we express as commitment to our clients (the Canadian Forces), our work and our people.

Commitment to Clients

- We strive to understand our clients' requirements and to ensure that our technical program is directly pertinent to them.
- We respond promptly to requests for advice and technical assistance.
- We complete projects on schedule.
- Our dealings with our clients are characterized by integrity and respect.

Commitment to Work

- We strive to advance the frontiers of scientific knowledge in undersea warfare and marine vehicle technology.
- We promote innovation in defence research and development.
- We are committed to excellence and timeliness in all aspects of our work.

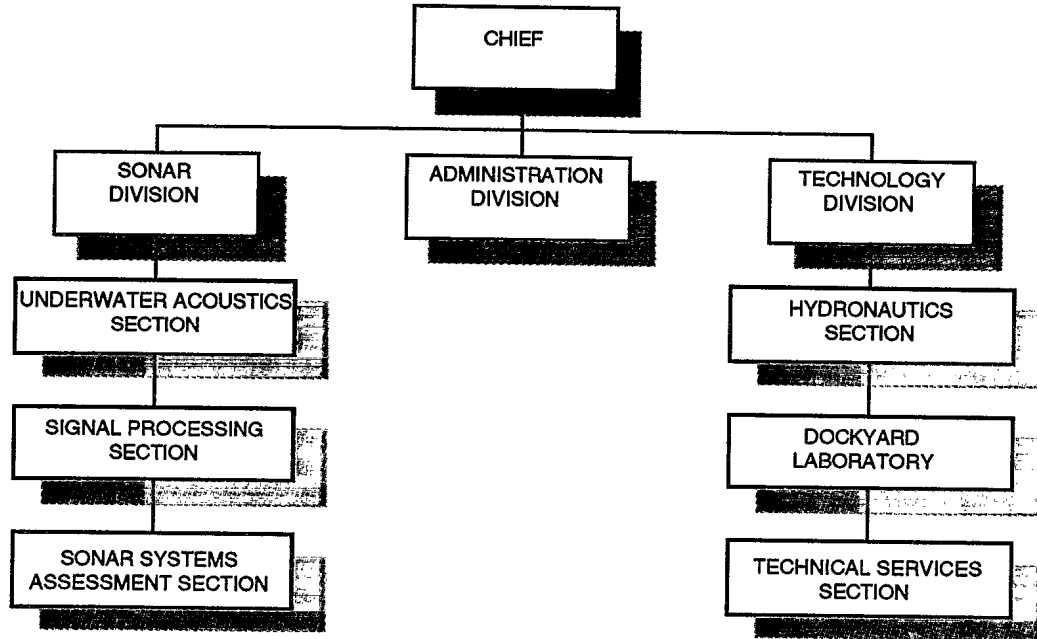
Commitment to Employees

- We recognize that our employees are our greatest asset.
- We seek to maintain a healthy, challenging and productive working environment.
- We recognize merit and achievement.
- We respect the opinions of others.
- We are committed to staff development.
- We are committed to communications and involvement in our employee/management relations.

DREA's Values

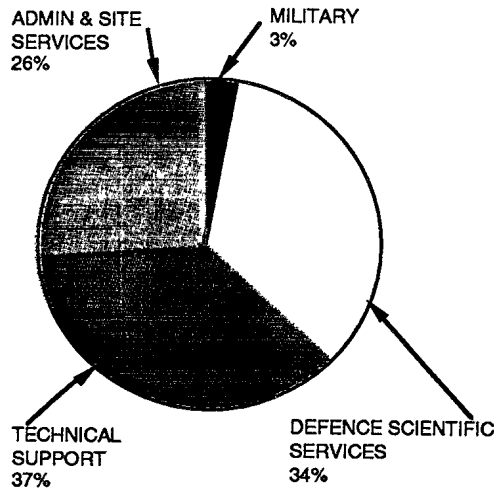
- **Commitment to Clients**
- **Commitment to Work**
- **Commitment to Employees.**

Organization

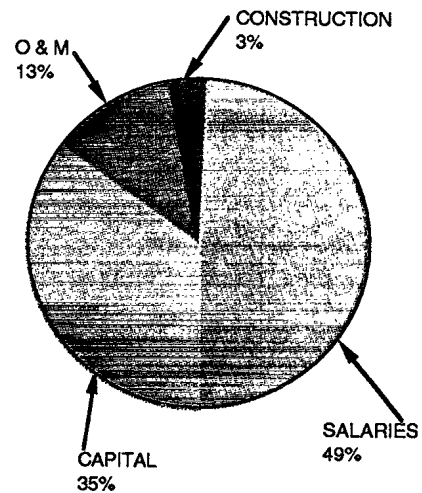


Resources

Personnel (190 total)



Financial (18.8M\$ total)



Capabilities

Expertise

DREA maintains an 'end-to-end' capability to specify and demonstrate sonar systems that can exploit the environment and threat characteristics to the fullest extent in operating areas of interest. We also place high priority on supporting the capability to design and construct warships in Canada. We maintain a solid base of expertise in the following areas:

- shallow- and deep-water environmental acoustics
- acoustic sensor systems
- acoustic transducer technology
- sonar signal processing
- sonar information management
- sonar performance assessment
- torpedo countermeasures
- ship noise
- ship dynamics
- ship structures
- naval materials

Provision of expert advice to our CF clients and to a lesser extent Canadian industry is strongly emphasized throughout the establishment. Of particular note are the Service Projects Unit which supports MARCOM and MAG on operational undersea warfare problems, and the Dockyard Lab which provides MARCOM with consulting services to solve a range of metallurgical, chemical, and environmental problems.

Strengths

- highly-motivated and capable staff
- broad base of expertise in undersea warfare and in naval hydromechanics and materials
- ability to conduct longer-term research as well as to solve immediate problems
- excellent working relationship with CF
- excellent international reputation and strong collaborative ties with allied research organizations
- good links with Canadian universities
- close ties with Canadian industry
- excellent appreciation of CF requirements
- end-to-end capability in sonar system design and demonstration
- proven capability to respond rapidly to new operational needs (e.g. Operation Friction)
- strategic location
- excellent facilities, including CFAV Quest which was purpose built for acoustic research
- proven capability to conduct sea trials

Facilities

Quest

DREA's research ship, the 2200 tonne CFAV *Quest*, was specifically designed for open-ocean acoustic research. Special measures were taken to reduce the transfer of sound from her machinery to the sea, preserving the low-noise environment essential for making sensitive acoustic measurements. Well set-up laboratories, excellent accommodation (crew of 34 plus 15 scientific personnel), good deck space, winches, cranes and other handling equipment combine to make her one of the most effective vessels for acoustic research in service today.

Acoustics Barge

DREA operates an underwater acoustic calibration facility on a barge moored in Bedford Basin. This facility is unique in Canada, and one of only several such facilities in the world. The main work area, including the 9 m by 18 m rectangular well, is covered by a deckhouse to permit all weather operation. Loads up to 5 tonnes can be moved anywhere within the deckhouse; transducers can be mounted and rotated at depths from 2 to 40 m. Using a variety of standard transducers, computer-controlled acoustic calibrations can be performed from 10 Hz to 200 kHz.

High Pressure Vessel

DREA's high pressure vessel can be used to simulate ocean depths of up to 5975 metres of water, a pressure of 58,600 kPa. The tank is a single forged billet of HY80 steel, and will accept a test specimen up to 91 cm diameter by 224 cm long. There are electrical feedthroughs in both the cover and the bottom of the tank so that test specimens may be monitored or powered as required for test and calibration purposes, while pressurized.

DREA's Acoustics Barge and High Pressure Vessel are available for use by Canadian industry, universities and other government departments on a cost-recovery basis.

ENVIRONMENT

External Factors

- Canada's defence policy is in a transitional stage
- end of Cold War, resulting in ill-defined risks and greater chance of involvement in regional conflicts
- shift of naval operational emphasis from blue water to complex shallow water environment
- proliferation of capable diesel submarines equipped with modern torpedoes, and the limited capability of existing undersea warfare systems in shallow water
- large increase in the inventory of mines maintained by potentially hostile countries
- introduction of CPF and related systems into service
- emphasis on maintaining and increasing the capability of existing systems
- more even distribution between Atlantic and Pacific fleets
- future reduction in ship manning levels, and associated increase in the importance of operator machine interface issues and of autonomous systems
- rapid changes in technology
- closure of DREP and consolidation of the undersea warfare and naval platforms programs at DREA
- increased importance of partnerships with Canadian industry and of dual-use technologies
- move to operate CRAD on a more business-like basis, including return on investment
- increased importance of bilateral exchange agreements, as allied partners move to protect their intellectual property
- diminished public support for defence and increased concern for environmental issues
- large federal deficit and attendant reduction in available resources for defence
- Public Service 2000 (PS 2000)
- work force adjustment
- employment equity

Clients and Stakeholders

DREA's primary clients are MARCOM, MAG and NDHQ requirements and engineering directorates, to whom we provide expert scientific and technical support in the areas of undersea warfare and marine vehicle technology. In addition, we conduct applied R&D in these areas, including the development of concept demonstration systems.

DREA stakeholders include:

- our employees
- Chief Research and Development (CRAD)
- ADM (Mat)
- Canadian industry, who carry out much of our program under contract
- Canadian universities
- other government departments (OGD)
- allied research labs, who provide vital information exchange, thus permitting extensive leveraging of our resources.

Challenges and Opportunities

Tremendous changes are in store for DREA, CRAD, and the entire Federal Government. While this state of flux will undoubtedly lead to problems in the short term, it is already clear that it will result in increased flexibility and significant opportunities to deliver our program in new and more cost-effective ways. The challenge facing the Establishment is to identify and aggressively pursue these opportunities in order to build upon our reputation in undersea warfare and marine vehicles, and to continue to provide excellent service to our CF clients. We must ensure that the Navy's critical requirements for expertise are satisfied in the face of announced and anticipated future program reductions.

- We should continue to nurture our already excellent links with the CF engineering and operational communities in undersea warfare and naval platform technology, while raising the visibility of DREA beyond these constituencies.
- We must identify areas to improve the efficiency of our operations. Where possible, we should identify the costs associated with various aspects of our operations, and ensure that the 'value-added' is commensurate with the cost.
- We must explore meaningful partnerships with industry to: reduce the cost of program delivery; to ensure timely transfer of technology to the private sector in order to improve the competitive position of Canadian industry and to contribute to wealth-generation; and, to promote dual-use of DREA-developed technologies.
- When cost-effective, we must continue our active participation in international collaboration, since our links with allied research labs can greatly leverage our resources.
- We must continue to link our development strategy closely with planned future acquisitions. Where possible, we must actively promote DREA developed solutions to operational problems, to ensure as much as possible that the products of successful development projects are acquired.
- When appropriate, we must pursue opportunities for joint development of our key technologies with our international partners.
- We must identify and pursue opportunities for contracting-in work from OGDs, from Canadian industry, and from international sources. Contracting in will be undertaken only in areas within our mandate and we will avoid direct competition with Canadian industry.
- We must take advantage of opportunities for NSERC postdoctoral fellowships and for exchange postings with allied research labs and Canadian industry, in order to inject 'new blood' into the scientific programs during the down-sizing era.
- We must support the CFAV *Quest* mid-life refit to the fullest extent possible, in order to ensure that the acoustic health of our primary experimental facility is restored.
- We must capitalize on opportunities to raise our profile in the local community.

STRATEGIC ISSUES

DREA has identified the following seven strategic issues as the most critical ones to address in order to build upon our reputation as the leading Canadian centre for sonar technology, torpedo defence, and naval platform research and development, and to position the Establishment to provide the support required by our CF clients:

- identify and pursue key technological thrusts to address CF requirements
- consolidate the undersea warfare and naval platforms programs at DREA
- identify and pursue opportunities for cost-sharing and partnerships
- identify and pursue opportunities for revenue generation
- continue current emphasis on public relations
- identify products and technologies for civilian applications
- improve internal communication efficiency through use of electronic media

Strategic Issues

- **Key Technological Thrusts**
- **Program Consolidation**
- **Cost-Sharing and Partnerships**
- **Revenue Generation**
- **Public Relations**
- **Products and Technologies for Civilian Applications**
- **Internal Communications using Electronic Media**

Key Technological Thrusts

Although the Cold War has been won, the Canadian Navy still faces formidable challenges. The Federal Government has not been hesitant to commit the CF to out-of-area deployments, and so the chances of involvement in a regional conflict have increased. With the proliferation of capable diesel submarines equipped with modern torpedoes, and the large inventories of mines held by potentially hostile countries, the possibility of our vessels coming under attack is very real. We have already shifted the emphasis of our program from blue water to complex shallow water environments, in response to the shift in naval operations. Unfortunately, the capability of existing undersea warfare systems in shallow water is limited, and much work remains to be done. The current rapid changes in technology present both an opportunity for us, and a potential threat if exploited by our opponents.

With the reduced budgets available for R&D and for acquisition, we must focus our efforts in order to ensure that the critical needs of our clients are met. We must emphasize research and development to support maintenance and enhancement of the capabilities of existing systems, and be very selective in our development of new systems. The following have been identified as our key technological thrusts:

- build on our end-to-end capability in sonar design and concept demonstration. This will require expertise in environmental acoustics, transducer technology, acoustic sensor systems, sonar signal processing, sonar information management and sonar performance assessment.
- develop a towed integrated active passive sonar (TIAPS) to provide an excellent capability against modern diesel submarines. TIAPS will be developed with a view to providing an evolutionary upgrade to CANTASS during the mid-life refit for CPF.
- exploit DREA's marine vehicle technology base to support reduction of through-life costs of existing and future CF vessels, giving particular emphasis to supporting the structural maintenance initiatives of the Naval Structural Maintenance Plan.
- develop technology to enable the design of CF vessels and platform systems for realistic service conditions and environments, rather than ideal regimes.

Detailed project plans including milestones for implementing these thrusts are contained in the DREA Program Review.

- maintain our advisory capability in all aspects of active and passive sonar; surface ship torpedo defence; ship noise, dynamics and structures; and naval materials.

Program Consolidation

As a result of Cyclical Review 90 (CR 90), the Undersea Warfare Program at DREA was reduced by 25% (19 PY), the Naval Platforms Program by 10% (4 PY) and Management and Operations (M&O) by 7 PY. With the announced closure of DREP at the end of fiscal year 94/95, the Undersea Warfare and Naval Platforms Programs will now be consolidated at DREA. Indications are that the PY allocations for Naval Platforms and M&O will be roughly the same as under CR 90 plans, but the

allocation for Undersea Warfare will be reduced slightly from these plans. A 'transition' team will be named to direct the activities resulting from the closure of DREP. The team will have representation from DREP, DREA and DRDM and will be managed by Headquarters. Key aspects of the transition team's activities will be the development of a reduced Undersea Warfare Program using CR 90 plans as a basis, and managing the associated staffing actions.

Cost-Sharing and Partnerships

In order to offset as much as possible the reduced internal resources available for our programs, we must aggressively pursue partnerships with Canadian industry, and with allied R&D organizations in order to reduce the cost of program delivery. We must be open to suggestions from industry to increase the marketability of our developments, in return for meaningful contributions from industry. We will

carefully control our Intellectual Property to ensure that the Canadian economy and the Department realize an appropriate return on our investment.

We will pursue opportunities for joint development of our key technologies with our international partners, in order to help minimize costs.

Revenue Generation

With announced and anticipated program reductions, DREA is in danger of permanently losing capability in areas that remain important to meeting the requirements of the Canadian Forces. Before canceling any programs, DREA must consider other options for retaining our capabilities. In many areas, DREA has developed an international reputation for excellence, and marketing of our R&D services at some level appears to be a viable option. By supplementing our block-funding from the Department, DREA will be able to maintain its programs at a

higher level and retain capability in certain areas which would otherwise be lost. The net result will be better and more cost-effective service to our CF clients, who will continue to be able to draw on the intellectual resources of the entire Establishment, but without having to pay all of the costs.

DREA will conduct a pilot contracting-in exercise in FY 94/95 in order to gain experience in this area and start to develop a business base. DREA will also prepare a business plan.

Public Relations

Public relations was identified in the Establishment's 1992 Strategic Plan as a priority. Since then, considerable progress has been made in this area, including the formation of a Public Relations Committee which oversaw the development of new DREA promotional material, the organization of an open house for our CF clients entitled 'MARLANT Day', the hosting of an Industrial Seminar, the completion of the history of the Naval Research

Establishment (1940-1967), and the development of a portable DREA exhibit. The requirement to maintain awareness of our programs in the CF engineering and operational communities is if anything stronger than in 1992, and it is also necessary to increase knowledge of DREA's unique capabilities and facilities beyond these constituencies. We will continue to emphasize public relations.

Products and Technologies for Civilian Applications

Through the prosperity initiative and other means, the government has strongly emphasized the requirement for a return on its investment in R&D in terms of spin-off benefits for the Canadian economy. In the past, DREA has been particularly successful at technology transfer, and companies such as Hermes, Sparton, Iotek, Seimac, and Martec are

strongly dependent on the transfer of our technology. Virtually all of this technology has been aimed at satisfying military requirements, but some of our technologies could have significant civilian applications. We will actively promote the use of our technology for non-defence applications.

Internal Communications using Electronic Media

DREA has a modern computer network to which about 80 per cent of Establishment personnel are connected. Many staff make heavy use of EMAIL for informal communication both inside the Establishment and with the outside world. For a small additional investment, it will be possible to provide network access to all staff and to remove the requirement to distribute paper copies of many internal memoranda. The net result

will be savings in secretarial time and a reduction in the amount of paper generated. It will also be possible to implement an electronic filing system for Central Registry, which will greatly reduce the requirement for paper file storage, and will also speed up file retrieval by providing on line access for authorized users. We will pursue these initiatives to improve the efficiency of our internal communications.

ACTIONS

Short-Term Actions

	Action	OPI	Completion
Cost-Sharing and Partnerships			
	Organize a meeting with local industry to discuss possible partnering arrangements	TTRGC	Jun 1994
	Investigate opportunities for joint development of a tactical low-frequency active sonar	D/SD	Dec 1994
Revenue Generation			
	Prepare a proposal for conducting a pilot contracting-in exercise	TTRGC	Jan 1994
	Develop a DREA Business Plan	TTRGC	Dec 1994
	Conduct a contracting-in pilot study	TTRGC	Jul 1995
Public Relations			
	Develop and implement a new Communications Plan for the Establishment	PRC	Dec 1994

D/SD: Director/Sonar Division
TTRGC: Technology Transfer and Revenue Generation Committee
PRC: Public Relations Committee

Short-Term Actions - continued

Action	OPI	Completion
Products and Technologies for Civilian Applications		
Identify one DREA technology with dual-use potential, and actively promote its exploitation	TTRGC	Mar 1995
Internal Communications using Electronic Media		
Provide EMAIL access to all staff	H/SSA, GL/CS	Sep 1994
Design and implement an electronic information system	H/SSA, GL/CS	Jan 1995

H/SSA: Head/Sonar Systems Assessment
GL/CS: Group Leader/Computer Systems

Long-Term Goals

In order to realize our vision for the future of DREA, the Establishment has identified the following long-term goals:

- We will continuously improve our technology base in areas critical to our program
- We will provide our employees with the training, resources, and authority necessary to optimize their contribution to the Establishment.
- We will continuously improve our efficiency by running our program on a more business-like basis, and by exploring and utilizing management techniques such as strategic planning.
- We will maintain our close ties with the CF operational and engineering communities, while expanding our links with Canadian Industry, other government departments, and Canadian Universities.
- We will obtain maximum leverage of our program through collaboration and information exchange with our allies.

Performance Indicators

DREA will monitor a number of performance indicators on an annual basis, making comparisons with previous years in order to assess progress in meeting our strategic objectives.

Technological Thrusts

- achievement of milestones in the DREA Program Review
- number and nature of publications and presentations
- requests for DREA assistance and products by clients
- number and nature of CF taskings
- awards

Cost-Sharing and Partnerships

- number and type of partnerships
- estimated savings achieved through partnership
- participation in collaborative trials

Revenue Generation

- achievement of goals in the DREA Business Plan
- amount of revenue generated through contracting in
- amount billed for use of DREA facilities
- royalty income

Public Relations

- number and type of promotional material produced
- number and type of visits to DREA
- outside requests for speakers and presentations
- outside requests for services and advice
- participation in trade shows etc.

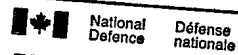
Products and Technologies for Civilian Applications

- use of DREA technology in civilian applications
- royalties generated through civilian use of DREA technology

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