

## EVALUATION OF ICT IN DRDO TECHNICAL INFORMATION CENTRES AT BANGALORE: A STUDY

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### **Abstract**

*The Defence Research & Development Organisation has come a long way since its modest beginning in 1958. DRDO Laboratories being scattered in different parts of our country, timely availability of information to the scientific personnel is very essential for the research activity. This study aims to investigate the extent of adoption of Information and Communication Technology (ICT) its use and barriers in selected DRDO Technical Information Centres located at Bangalore. Survey method is adopted and questionnaire is distributed among DRDO Technical Information Centres. However interviews and personal visit was made for collection and analysis of relevant data from the Technical Officers of DRDO Technical Information Centres. The result of the survey shows that among ten technical information centres, one technical information centre about to be computerized. The surveyed libraries have good ICT Tools, Infrastructure facilities. Only one library not fully automated and the government should increase the present level of funding to DRDO Technical Information Centres for sustainable adoption of ICT by TIC's. This paper proposes to develop suitable network among DRDO Technical Information Centres for effective resource sharing.*

### **KEYWORDS:**

DRDO, Information and Communication Technology, Internet, Library Automation, Digital Library.

### **1. INTRODUCTION:**

In recent years there has been an exponential growth in ICT and its impact on our professional lives. Development of more powerful computers with new methods of information processing, computer networks and integrated communication systems are of great relevance to the 21st century as these are basic and important information technologies responsible to bring drastic changes in our so called information society of tomorrow. Information Communication and Technology known as ICT is not a single technology, it is the complete system of technologies. In a library environment ICT are a set of technological tools and used to create, disseminate, store, and manage information. ICT includes acquisition, processing, storage, retrieval and dissemination of information by means of computers and communicating systems.

The Government of India has recognized the potential of Information Technology for rapid and all-round national development. The Department of Science and Technology (DST) as the National agency for strengthening the base of Science and Technology in the country have made several sincere

attempts to address the National concerns of declining competitiveness in basic Science Research. During the beginning years of DST launched Indian National Scientific Documentation Centre (INSDOC) laboratory exclusively for to information collection & dissemination through latest information communication technologies. INSDOC organization is the premier institution to use computer and its applications to serve the user requirements during the 1980's. Later ISRO, DRDO, BARC and other organizations libraries started using computers in libraries and to serve library users information requirements.

The Defence Research & Development Organisation has come a long way since its modest beginning in 1958. DRDO Laboratories being scattered in different parts of our country, timely availability of information to the scientific personnel is very essential for the research activity to effectively work and to achieve self-reliance in Indian Defence. The Defence Research & Development Organisation (DRDO) has over 45 libraries/ technical information centres (TICS) functioning in its laboratories/establishments. These laboratories/ establishments are located at different places across the country and the libraries in them are providing information services to their scientists, technologists, managers and others.

### **1. About DRDO Technical Information Centres**

Defence Research & Development Organization (DRDO) works under of Ministry of Defence. DRDO dedicatedly working towards enhancing self-reliance in Defence Systems and undertakes design & development leading to production of world class weapon systems and equipment in accordance with the expressed needs and the qualitative requirements laid down by the three services. DRDO is working in various areas of military technology which include aeronautics, armaments, combat vehicles, electronics, instrumentation engineering systems, missiles, materials, naval systems, advanced computing, simulation and life sciences.

It was formed in 1958 by the merger of the Technical Development Establishment and the Directorate of Technical Development and Production with the Defence Science Organization. Prof. DS Kothari was appointed as its Head and the Scientific Advisor to the Raksha Mantri. It was then a small organization with only 10 laboratories and the number increased to 21 by the end of 1961. Over the years, DRDO has seen multi-directional growth in terms of its Charter and projects, number of establishments, expertise in multidisciplinary areas, human resource, infrastructure, facilities, etc. During the decade 1958-68, many products, including small and medium weapons systems, explosives, communication systems and cipher machines were developed and during 1969-79 DRDO addressed major hardware systems, radar and communication equipment and aeronautical systems.

DRDO has a network of 52 laboratories which are engaged in developing defence technologies covering various fields, like aeronautics, armaments, electronic and computer sciences, human resource development, life sciences, materials, missiles, combat vehicles development and naval research and development. The organization includes more than 5,000 scientists and about 25,000 other scientific, technical and supporting personnel.

### **2. NEED FOR THE STUDY**

In recent times many developments have taken place in the library activities, quite a few numbers of DRDO Technical Information Centers started using the new technologies. Use of ICT in library housekeeping process has been on the increase. The Defence Science Library (DSL) of DESIDOC is the nodal point which provides current information in defence science and technology to the project leaders, top management, and scientist working DRDO HQs. and at various labs/ estts. of DRDO across the country. Though information is considered as an important resource, the use of ICT tools to collect and disseminate information has been in a slow pace in major DRDO Libraries / Technical Information Centres. The study will be particularly of great help to take policy decisions and corrective measures, if necessary. So there is a need to evaluate the status and effectiveness of ICT in DRDO Libraries / Technical Information Centres. Such a study is helpful for the following reasons.

- The information on the availability of IT-related infrastructure, hardware/software and also networking will help in planning and improvement of information services.

The awareness of the librarians about ICT will help policy/decision makers to take necessary steps for coping up with the digital/virtual libraries of the future.

Understanding the benefits of the ICT will help in improving the existing infrastructure for providing quality information services.

Many libraries are in transition and are taking steps to switch over from their traditional roles and routines into modern centres embracing new technologies.

### 3. OBJECTIVES OF THE STUDY

The main objectives of the study are as below.

To know the professional strength of the DRDO Libraries.

To identify the existing ICT Infrastructure in DRDO Libraries.

To identify the technical treatment of the (Classification, Cataloguing, etc) DRDO libraries to retrieve the information.

To identify the different services available in the DRDO Libraries.

To know the barriers in the use of ICT in DRDO Libraries.

### 4. METHODOLOGY

Based on the objectives of the study survey method is adopted and questionnaire is distributed among DRDO Technical Information Centres. However interviews and indirect studies of records were adopted for collection and analysis of relevant data to supplement the data collected through questionnaires. The research scholar visited selected ten DRDO libraries in Bangalore and interview the library professional of TIC's to collect the data.

### 5. DRDO TECHNICAL INFORMATION CENTRES

The Defence Research & Development Organisation (DRDO) has over 45 libraries/ technical information centres (TICS) functioning in its laboratories/establishments across the country and listed below are located at Bangalore. These Libraries / TICs are expected to provide library and information services to their scientists, technologists, managers and others. Data were collected through structured questionnaire to the Technical Officer / Technical Officer in Charge of below mentioned each DRDO Technical Information Centre. Given below are the details of analysis of data regarding the ten DRDO Technical Information Centres.

**Table 1.**  
**DRDO Establishments located in Bangalore**

Sl. No	Name of the Establishments	Year
1.	Aeronautical Development Agency (ADA)	1986
2.	Aeronautical Development Establishment (ADE)	1959
3.	Centre for Air Borne Systems (CABS)	1986
4.	Centre for Artificial Intelligence and Robotics (CAIR)	1986
5.	Centre for Military Airworthiness and Certification (CEMILAC)	1958
6.	Defence Avionics Research Establishment (DARE)	1986
7.	Defence Bio-Engineering and Electromedical Laboratory (DEBEL)	1982
8.	Electronics and Radar Development Establishment (LRDE)	1958
9.	Gas Turbine Research Establishment (GTRE)	1959
10.	Microwave Tube Research and Development Centre (MTRDC)	1985

### Professional Staff Strength

Human resources in any organization are the most valuable resource. The success and progress of most effective services of any library depend on those who run it. Library's image and services depend upon them. Only with capable, trained, dedicated and satisfied staff, the library can achieve its goal. The library services can be increased or decreased just on the availability of the staff. DRDO library have the following categories of staff:

Scientists (Librarians)

Technical Officers (To provide technical services)

Technical Assistants (Consisting of clerks, peons and attendants).

**Table 2**  
**Strength of Professional Staff**

Designation	ADA	ADE	CABS	CAIR	CEMILAC	DARE	DEBEL	LRDE	GTRE	MTRDC
Scientist C	-	-	1	-	-	-	-	-	-	-
Technical Officer A	-	-	1	-	-	1	-	1	1	-
Technical Officer B	-	-	-	-	-	-	-	1	-	-
Technical Officer C	-	2	-	1	1	1	1	1	1	1
Technical Officer D	-	1	-	1	-	-	-	-	1	-
Senior Technical Assistant B	-	2	1	1	-	1	-	2	2	-
Senior Technical Assistant C	-	4	-	-	-	-	-	-	-	-
Junior Scientific Officer	3	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>3</b>	<b>9</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>3</b>	<b>1</b>	<b>5</b>	<b>5</b>	<b>1</b>

The comparative of professional staff strength among the DRDO Technical information Centres is described in the above table. To know the Professional Staff detail among the Technical Information Centres questions asked related to designation, qualification and pay scale of the staffs. The data shows that there are several vacant positions in DRDO TIC's, the present status shows ADE has the highest number of Professional staff followed by LRDE & GTRE has five professionals, ADA,CABS, CAIR & DARE having 3 Library Professionals. The lowest in CEMILAC followed by DEBEL and MTRDC. Table also reveals that majority of DRDO TIC's are in the grade of Technical Officer C.

### Library Users

Users of the library can be grouped into the following categories. The DRDO TICs are expected to provide library and information services to their users belongs to scientists, technologists, managers and others.

### Library Collection

Books and other reading materials are the essence of libraries and backbone of library services. Their strength and quality determines the level of services and the level of user's satisfaction. Following types of information resources are available in the DRDO libraries under the present survey. Most of the libraries are traditional in their stock as these mostly contain books. Number of such books varies depending upon the age of the library. New establishment libraries have fewer books while old establishment libraries have more print and electronic collection. These can be categorized as print & electronic collection.

### Print Collection

As a Technical Information Centre, especially for scientists the emphasis is on current information. Here, the librarian plays a vital role to build up a healthy collection to meet the requirements of the community. Technical Information Centres of DRDO have a broad collection of paper based resources.

**Table 3**  
**Print Based Collection**

Collection	ADA	ADE	CABS	CAIR	CEMILAC	DARE	DEBEL	LRDE	GTRE	MTRDC
Books	7614	26500	6000	5000	5655	663	5100	24000	9294	3470
Bound Vol. of Jl.	4373	15295	3000	3500	865	Nil	2000	10000	9789	1863
Reports	6536	26000	500	120	1200	Nil	900	10200	11539	284
Patents	-	-	-	-	-	2	-	-	-	-
Standards	Online MIL, BS, DIN, ASTM, SAE	2300	250	50	1400	6	600	300	3444	-
Preprints / Reprints	500	-	10	50	-	-	-	-	-	-
Newspaper Clippings	3000	-	500 (Digital Form)	-	-	-	-	2600	-	-
Manuscripts	-	-	-	-	-	-	-	-	-	-
Any other	3128 (LCA) Reports	-	-	-	54 (Current Journals)	-	-	-	771 (Microfiche)	-

Libraries/TICs are expected to provide efficient service to its users on demand as well as in anticipation. Different libraries/TICs having various types of documents i.e., books, reports, journals, CD-ROMs, standards/ specifications, patents, manuscripts etc. ADE Library possess the largest number of collection as shown in the table 3 with more than 26500 Books, 15295 Back Volumes of Journals, 26000 Reports, LRDE, GTRE, ADA TICs are also having good collection followed by ADE. ADA is having the highest number of collection of News paper Clippings. GTRE is having highest 3444 standards and 771 microfiche collection compared to other DRDO TIC's. ADA subscribes to online MIL, BS, DIN, ASTM, SAE, also 6536 number of Reports and with addition 3128 LCA Reports are available. No TICs is having the Manuscripts Collection, also DARE is the only TIC to have 2 Patent and also it is having least number of collections.

### Electronic Collection

Information and Communication Technology has revolutionized the concept of libraries. Technical Information Centres of DRDO are slowly getting digitized. Some scholars and technologists feel that soon print and paper library will vanish. Internet and other specialized networks are gaining importance in libraries. An electronic library is a library in which collections are stored in electronic media formats such as microform, CD ROM, DVD, E Books, E Journals, aggregated resources and online journal databases and accessible via computers. Electronic Library provides excellent opportunities for a broad range of patrons to find appropriate research materials all in one place also access to information is not dependent on the user being in one location

**Table 4**  
**Electronic Collection**

Collection	ADA	ADE	CABS	CAIR	CEMILAC	DARE	DEBEL	LRDE	GTRE	MTRDC
E Books	815	1245	750	535	931	251	153	894	914	98
E Journals	553	750	555	457	352	-	-	541	557	351
E Thesis & Dissertation	-	-	-	-	-	-	-	-	-	-
E Standards & Specification	225	556	318	145	254	156	247	127	518	82
E Journal Database						E Journal Consortia 10 Suppliers				
CD ROM / DVD	235	365	150	90	142	38	87	92	311	76
VCD	112	94	42	16	71	14	24	34	64	19
Microforms	97	98	113	65	41	-	-	34	46	21

DRDO Libraries have vast collection of Electronic Resources of information the above table 4 shows the types of information resources are available in the DRDO libraries. The above table reveals the data regarding Electronic Collections available in DRDO Libraries. ADE Library having the largest number of Electronic Collection as shown in the table 4 with more than 1245 E Books, 750 E Journals, 556 E Standards and Specifications, 365 CD ROM / DVD Collection, 94 VCD and 113 Microforms. LRDE, GTRE, ADA TICs are also having good collection followed by ADE. GTRE is having highest 518 standards & Specifications, CD ROM / DVD collection and 46 microforms collection compared to other DRDO TIC's. All DRDO libraries subscribes to E Journal Database from E Journal Consortia from DESIDOC E Journal Consortia, TIC/s subscribes to common journals which is having the common mission. DARE and DEBEL is in developing stage also they have minimum number of E Collections. No TICs is having the E Thesis and Dissertations.

#### **DRDO E Journal Consortia**

DRDO E Journal Consortia facilitates sharing resources and improving access to information. The resources are shared among DRDO libraries that have common mission, goals and users and act on those commonalities. DESIDOC is the administrator and monitor the access and DESIDOC subscriptions on behalf of DRDO. DESIDOC will collect the Feedback from all the participating laboratories in terms of availability of Service. DESIDOC is Pay Centrally for Online Journals under Consortium, on behalf of DRDO. Defence Rapid Online Network Access is known as DRONA is a Wide Area Network covering all DRDO Laboratories, establishments & Work centres geographically spread across India. The benefits of DRDO E Journal consortia are as follows:

Greater Legal Resource Sharing amongst DRDO Laboratories  
 Provides increased resources base – more e-journals  
 Access to latest R&D development by R&D community on their Desktop  
 All DRDO Laboratories are part of the DRDO Consortium with at least 3 Publishers for accessing.

#### **Library Budget**

DRDO libraries /TIC'S are fully funded by the government. Their major objective is to provide relevant information at the right time to the scientists working on various projects in the parent laboratories/establishments and organise information services for this purpose. Financial authorities may accept responsibility to provide sufficient funds to DRDO libraries to meet their financial requirements. In DRDO which is the largest R&D organization in S&T field in India the expenditure of libraries is below one percent of total funds allocated which is quite unfortunate. It is recommended to allocate at least 2.5% to the library out of the total grant of DRDO.

#### **Status of ICT among Technical Information Centres**

Dr. S.R. Ranganathan, the father of library and information science, formulated the five famous

laws of library and information science. The fifth law- "Library is a growing organism" is now being challenged by the tremendous progress of ICT and its speedy application in all fields, especially in the field of library and information science. Information and Communications Technology (ICT) is an umbrella term that includes all technologies for the manipulation and communication of information. The first and foremost ICT component, which can be adopted in the libraries, is the computer for library automation and to have an in-house database of library holdings in electronic form. As many primary journals are being published in CD form, it becomes necessary to equip the libraries to optimize the use of information. E-mail, online retrieval networking, multimedia and internet are the other important technologies, which can be used for faster access to information. ICT enables one:

- To capture, store, manipulate, and distribute information;
- To provide need-based, browsing and retrospective search services to the users
- To have large number of databases in CDs;
- To utilize the staff for providing better information services;
- To encourage networking and resource sharing at local level;
- To digitize the documents for preservation and for space saving;
- To support library functions such as circulation, serials control, acquisition control, stock maintenance and other routine office works and developing in-house database;

### **ICT Tools in Technical Information Centres**

A Comparative study of the use of Information handling tools / utilities / Devices in DRDO TIC's is shown in table 5. The data reflects that every DRDO Technical Information Centers having computer work stations for library activities. On the other side CD ROM facility available with ADA have the infrastructure facilities like CD Rom, VCD, Printer, Scanner, Laptop, Telephone, Fax, Photocopy Machine, FTP, Telnet, List Serve, Usenet/ Newsgroup, Library Website, OPAC and Web OPAC. ADE also having similar infrastructure facilities compared to ADA except Laptop, Fax, Photocopy Machine, FTP, Telnet, List Serve, and Newsgroup. CABS also use most infrastructure facilities to its user services except VCD, Smart Card and Telnet. CAIR uses CDROM, Printer, Telephone, Internet and Web OPAC. CEMILAC uses CD Rom, VCD, Printer, Scanner, Telephone, Fax, Photocopy Machine and Web OPAC. DARE having Library's Website and Web OPAC. As table indicate DEBEL do not uses facility. LRDE also uses Infrastructure facilities for Information handling tools except Smart Card, WWW, Telnet, List Serve and OPAC. GTRE TIC giving the infrastructure facilities like CD Rom, VCD, Printer, Scanner, Telephone, Fax, Photocopy Machine Internet, FTP, Library Website and Web OPAC. MTRDC uses Telephone, Email, Internet, Photocopy Machine, Library Website and Web OPAC. Thus the adoption of ICT should not be considered as a luxury, but as an added tool to provide the information services, effectively to fulfil the complex needs of the users.1

**Table 5**  
**Use of ICT Tools**

Information handling Tools	ADA	ADE	CABS	CAIR	CEMILAC	DARE	DEBEL	LRDE	GTRE	MTRDC
Computer	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CD – Rom	Yes	Yes	Yes	Yes	Yes	-	No	Yes	Yes	-
DVD / VCD	Yes	Yes	No	No	Yes	-	No	Yes	Yes	-
Printer	Yes	Yes	Yes	Yes	Yes	-	No	Yes	Yes	-
Scanner	Yes	Yes	Yes	No	Yes	-	No	Yes	Yes	-
Smart Card	-	Yes	No	No	-	-	No	-	Yes	-
Laptop	Yes	No	Yes	No	-	-	No	Yes	-	--
Telephone	Yes	Yes	Yes	Yes	Yes	-	No	Yes	Yes	Yes
Fax	Yes	Yes	Yes	No	Yes	-	No	Yes	Yes	-
Photocopy Machine	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	-
Internet	Yes	Yes	Yes	Yes	-	-	No	-	Yes	Yes
FTP	Yes	No	Yes	No	-	-	No	Yes	Yes	-
Telnet	Yes	No	No	No	-	-	No	-	-	-
List Serve	-	No	Yes	No	-	-	No	-	-	-
Newsgroup	-	No	Yes	No	-	-	No	-	-	-
Library's Website	Yes	Yes	Yes	No	-	Yes	No	Yes	Yes	Yes
Web OPAC	Yes	Yes	Yes	Yes	-	Yes	No	Yes	Yes	Yes

#### ICT Infrastructure in TIC

Technical Information Centers of DRDO have been using ICT based resources and services to satisfy the diverse information needs of their users. A Comparative study of the ICT Infrastructure in DRDO Technical Information Centers is shown in table 6. As evident from the table there is no shortage of computer workstations in all TIC's. The ICT Infrastructure shows that ADE has better facilities than other TIC's. ADE has 28 computers followed by, LRDE 20, GTRE 16, ADA 11, CAIR 8, CABS 7, DARE 6, MTRDC 5 and CEMILAC and DEBEL have each 1 computers. In case of Printers ADE has highest 15 numbers of printers, ADA, DARE, GRRE & MTRDC have each 3 Printers, CABS, CEMILAC, DEBEL have each 1 Printers. Table explains that ADE & LRDE have 3 Scanners, followed by ADA, CABS, CEMILAC, DARE; GTRE & MTRDC have 1 Scanners in their library. CAIR and DEBEL not having Scanner Facility. Concern to Bar Code Printer / Scanner ADE have 1 Barcode Printer and 4 Bar Code Scanners, LRDE having total 6 no's of Bar Code Printer / Scanner, ADA, CABS, CAIR, DARE have each 1 Barcode Printer / Scanner and GTRE have 1 Barcode Printer and 2 Bar Code Scanners. Only in ADA & GTRE Libraries have Fax facility available and rest all the library do not have the fax facility. The entire libraries have reprographic service except DEBEL. Apart from this ADE has 1 Laminating Machine & 1 Spiral Binding. CABS have the Server for Digital Library, CEMILAC and MTRDC gives Binding facility for users.

**Table 6**  
**ICT Infrastructure in TOI**

ICT Infrastructure	ADA	ADE	CABS	CAIR	CEMILAC	DARE	DEBEL	LRDE	GTRE	MTRDC
Computers	11	28	07	08	01	06	01	20	16	05
Printers	03	15	01	01	01	03	01	06	03	03
Scanners	01	03	01	-	01	01	-	03	01	01
Barcode Printer / Scanner	01	01+04	01	01	-	01	-	06	1+2	
Fax Machine	01	-	-	-	-	-	-	-	01	
Reprography Machine	04	01	01	01	01	01	-	05	02	01
Any Others	-	01	Server Digital Library	-	Binding	-	-	-	-	Binding

### Operating System

An operating system (OS) is a collection of software that manages computer hardware resources and provides common services for computer programs. The operating system is an essential component of the system software in a computer system. Application programs usually require an operating system to function. Different types of operating system are used by DRDO TIC's, table 7 indicates that All DRDO TIC's using Windows 98/2000/XP Operating System for their library management. ADA uses Windows Netware and Windows Operating System. ADE, CAIR, CEMILAC, LRDE, MTRDC uses Windows operating System. CABS, DARE & GTRE uses Linux operating system Linux, Windows Netware and Windows.

**Table 7**  
**Use of Operating System**

Network Operating System	Linux	Unix	Windows Netware	Novel Netware	Windows 98/2000/XP
<b>ADA</b>	No	No	Yes	No	Yes
<b>ADE</b>	No	No	No	No	Yes
<b>CABS</b>	Yes	No	Yes	No	Yes
<b>CAIR</b>	No	No	No	No	Yes
<b>CEMILAC</b>	No	No	No	No	Yes
<b>DARE</b>	Yes	No	No	No	Yes
<b>DEBEL</b>	No	No	No	No	Yes
<b>LRDE</b>	No	No	No	No	Yes
<b>GTRE</b>	Yes	No	No	No	Yes
<b>MTRDC</b>	No	No	No	No	Yes

### Use of Library Management Software

Library management or automation software provides centralized management and processes for different types of libraries and library activities such as acquisition, cataloguing, circulation, administration, reporting and patron records. Some prominent soft ware's successfully installed in many DRDO libraries. While selecting the automation software it is important that it has all the modules required to carry out all routine works of the university library. It should also have Online Public Access Catalogue (OPAC) and UNICODE module for handling all the Indian and foreign languages other than English. Over and above, the software should be user friendly..

DRDO Libraries / TICs started automation before 1990 to 2010. ADA, CABS, GTRE have started automation before 1990, ADE started its automation between 1990 – 1999, CARI, CEMILAC, LRDE, MTRDC libraries stared automation in recent years. As it is evident from the table 8 that most of DRDO TIC's uses different Automation Software. CAIR is the only centre to use LibSys Software for the Library Automation Purpose. ADA uses the in house developed software LIBAPP (MIS), followed by ADE, LRDE & MTRDC uses Libsuite automation software. GTRE uses Integrated Software called Suchika. CABS, CEMILAC uses In House Developed Software but they not mention the name. DARE uses Libex Net and CAIR and DEBEL does not uses the automation Software.

**Table 8**  
**Use of Library Management Software**

Library Automation Software	ADA	ADE	CABS	CAIR	CEMILAC	DARE	DEBEL	LRDE	GTRE	MTRDC
CDS/ISIS	-	-	-	-	-	-	-	-	-	-
Libsys	-	-	-	Yes	-	-	-	-	-	-
Alice for Windows	-	-	-	-	-	-	-	-	-	-
SLIM++	-	-	-	-	-	-	-	-	-	-
WINISIS	--	-	-	-	-	-	-	-	-	-
Winsoft	-	-	-	-	-	-	-	-	-	-
WinL is	-	-	-	-	-	-	-	-	-	-
Libsoft	-	-	-	-	-	-	-	-	-	-
Limsoft	-	--	-	-	-	-	-	-	-	-
EasyLib	-	-	-	-	-	-	-	-	-	-
Chronicles 2001	-	-	-	-	-	-	-	-	-	-
Any Other	In house Developed software LIBAPP (MIS)	Libsuite 8.0	Inhouse Development		Inhouse Software	LIB ex.Net	-	LIBSUITE	Suchika	Libsuite

#### Areas of Automation

Researcher asked about the Areas of Automation for various activities of DRD libraries, as data showed in Table 9. It is clear that all the libraries have used library automation software for the automation of library operations, the software not adequate to support all the activities in a library. Except DEBEL all DRDO TIC's automation for various operations. Acquisition module used by ADA, ADE, CEMILAC, LRDE, GTRE and MTRDC uses automation software in all the areas like Acquisition, Cataloguing, Circulation Serial Control and OPAC. CABS used automation software in all activities of library except Serial Control. CAIR have not adopted software in Acquisition and Serial Control Module. DARE library using Automation software in all areas except the acquisition. In some Libraries, the investigator found that some of the modules were not used properly or the library professionals were not aware of its function.

**Table 9**  
**Areas of Automation**

Areas of Automation	ADA	ADE	CABS	CAIR	CEMILAC	DARE	DEBEL	LRDE	GTRE	MTRDC
Acquisition	Yes	Yes	Yes	No	Yes	-	-	Yes	Yes	Yes
Cataloguing	Yes	Yes	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes
Circulation	Yes	Yes	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes
Serial Control	Yes	Yes	No	No	Yes	Yes	-	Yes	Yes	Yes
OPAC	Yes	Yes	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes

#### Use of Internet for various library activities.

Internet has become a part of library environment today. Internet is playing an important role in transforming the library system and the way in which we view the library resources and the library services. Many libraries are in transit from the traditional towards the digital library. Not only recent publications, but also many historical library holdings are being digitized. These digital collections allow users from anywhere at any time to consult the material without doing any harm to the fragile documents. The following listing will give an idea of which various functions of libraries may take advantage from Internet and Web technologies.

Acquisition  
Classification  
Cataloguing

Collection Development  
 Cataloguing:  
 Circulation:  
 OPAC  
 Resource Sharing:  
 User Education  
 Services (ILL, Document Delivery Service, Reference / Inf. Services, SDI, CAS,)

DRDO Libraries make effective use of OCLC, WordCat, LCSH for their Acquisition and Technical processing activities. All the Libraries / TICs using Internet for various Library Operations and Services like acquisition, Classification, Cataloguing, SDI, CAS etc., as evident from table 10. ADA, CABS, CEMILAC, DEBEL, GTRE, MTRDC are using internet facility for all aspects of library operations and services ADE uses internet only for Bibliographic Databases and E Journal Subscription, CAIR not use internet for Cataloguing and SDI, DARE is using internet only for Cataloguing and SDI purpose. LRDE is not implemented internet use in library operations and services.

**Table 10**  
**Use of Internet for various library operations and services**

Library Operations & Services	ADA	ADE	CABS	CAIR	CEMILAC	DARE	DEBEL	LRDE	GTRE	MTRDC
Acquisition	Yes	No	Yes	Yes	Yes	-	Yes	No	Yes	Yes
Classification	Yes	Yes	Yes	Yes	Yes	-	Yes	No	Yes	Yes
Cataloguing	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes
Collection Development										
Circulation										
OPAC										
Resource Sharing										
User Education										
SDI	Yes	No	Yes	-	Yes	Yes	Yes	No	Yes	Yes
CAS	Yes	No	Yes	Yes	Yes	-	Yes	No	Yes	Yes
Reference Services										
Etc (Pl. Specify)		E-Journal								

#### Internet based Services provided by the Libraries

Researcher collected the data on services provided by a DRDO TIC's, services depends on large extent facilities available, the detail given below.

#### ICT based Library Activities:-

ICT based library activities in DRDO Laboratories include

Data processing,  
 Circulation,  
 Cataloguing,  
 Bibliography,  
 Prepared in house database.

**Library services through ICT are •Access online Database**

Access online Database  
Audio-visual service,  
Bibliographic Database  
Book Reservation  
Bulletin Board Services (BBS)  
CD –ROM searching,  
Current Awareness Service  
Current List of Journal  
Data Resources on Military Airwathesis  
DESIDOC and DRONA consortia  
Database aggregators  
database searching service,  
Demand book requisition form  
Discussion groups  
E-Book aggregators  
E-journal on DRDO Consortia – online  
Email Request for Demand Articles  
E-newsgroups  
Free Standards / Specifications Download  
Institutional Digital Repository  
Institutional digital repository services  
Internet access and E-query services  
Library Automation Partial  
Library web-portal  
Networked CD-ROMs services  
Online bibliographic databases  
Online CAS/SDI  
Online full text articles  
Online inter library loan  
online networking,  
Online reference books  
ON-line reservation service,  
Online tutorials  
photocopying,  
Standards and Specification Databases  
Subject Gateways  
Technical Reports Database  
Various web EIS (Reference materials)  
Web OPAC

**Digital Library Setup**

Digital Library is a repository where any digital resource related to Library and Information Science domain can be archived by anybody across the world. The above table explains the digital library setup made by DRDO libraries. It is evident from the table 11 that Digital Library services are provided by all libraries except CAIR and DEBEL. There is a definite improvement in the digitization of documents in DRDO TICs. DRONA was implemented to improve digital library services in DRDO Tics.

**Table 11**  
**Digital Library Setup**

Name	ADA	ADE	CABS	CAIR	CEMILAC	DARE	DEBEL	LRDE	GTRE	MTRDC
Digital Library Setup	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes

#### **Electronic Documents available in Digital Library**

DRDO TIC's have digitized documents like meeting paper, journals, standard & specifications, conference proceedings, technical reports, eBooks etc. ADA has digitized the AIAA Meeting papers, IEEE Journals, Standard & Specifications, SPIE Proceedings, and AGARO Reports. ADE has digitized research articles, and Conference papers. In similar to CABS also have Books, Journal Articles, Conference Papers. DARE has the collection of EBooks, Trade Literature, Reference Manual and LRDE has the resources on IEEE, NTIS, Elsevier Journal, IET Journal. Data indicates that CAIR and CABS & DEBEL are not having the Resources as they don't have digital library. All DRDO Labs are part of the DRDO Consortium with at least 3 Publishers for accessing collections. DESIDOC is the central agency for all DRDO labs through consortium following publishers providing E journal access to library they are,

Association of Computing Machinery (ACM)  
 American Chemical Society (ACS)  
 Elsevier (Science Direct)  
 Institute of Electrical & Electronics Engineering (IEEE/IEL)  
 Jane's  
 Science (AAAS)  
 Nature Publishing Group (added in 2010)  
 JCCC (Informatics India Ltd.)

#### **Barriers with the application of ICT**

Researcher list out some lack of use in ICT application, librarians feels some barriers with effective utilization of ICT, those factors indicated in Table 12. ADE, CABS, CEMILAC feel there is still inadequate ICT Infrastructure in the libraries it should be overcome in coming years. ADA and GTRE library states there is no dissatisfaction with the application of ICT. All the DRDO TICs feels there good computer literacy among users. ADE feels users should be trained for ICT based services. CAIR & DARE feels there is an inadequate in publicity for the ICT based resources and services. TIC's not feel there no Rigid ICT use policies and discouraging attitude by library professionals towards their users. ADE feels users shows discouraging attitude towards using ICT and CABS says there is problem of Network which failure frequently. DEBEL TIC express that ICT Infrastructure is Inadequate and Computer literacy among user, training about ICT based information services , publicity about ICT, policies about ICT and supporting attitudes by library staff is good.

**Table 12**  
**Librarians Dissatisfaction with the application of ICT**

Reasons for Dissatisfaction	ADA	ADE	CABS	CAIR	CEMILAC	DARE	DEBEL	LRDE	GTRE	MTRDC
Inadequate ICT Infrastructure	No	Yes	Yes	No	Yes	-	Yes	-	No	-
Limited Computer Literacy among Library User	No	-	-	No	-	-	No	-	No	-
User are not Trained for ICT – based information Services	No	Yes	-	No	-	-	No	-	No	-
Inadequate Publicity for the ICT – Bases resources and Services	No	-	-	Yes	-	Yes	No	-	No	-
Rigid ICT use policies implemented by the library	No	-	-	No	-	-	Yes	-	No	-
Discouraging attitude of library professionals towards their –users	No	-	-	No	-	-	No	-	No	-
Etc (Pl. Specify)	-	Discouraging attitude of users towards ICT	Network Failure	-	-	-	-	-	-	-

#### **FACTORS INFLUENCING EFFECTIVE ADOPTION OF ICT**

The factors influencing effective adoption of ICT in DRDO Technical Information Centres are as follows;

Opportunities to deploy innovative methodologies with the application of ICT in the Technical Information Centres.

Enables better management of library by librarian thereby improving the productivity of the tutor as well as the taught.

Enables the librarian to concentrate on other tasks such as research and good practice.

Enables optimum utilization and sharing of resources among institutions thereby reducing the costs of implementing ICT solutions.

#### **CONCLUSION AND RECOMMENDATION**

Information and communication Technologies (ICTs) play an important role in enhancing efficiency in development of library services. The survey reveals a pathetic picture of ICT Infrastructure by DRDO Technical Information Centres. Information and Communication Technology (ICT) is a universal concept. In DRDO organization where research and development are the essential aspects it

has become a boon to researchers. Introduction and adoption of ICT is inevitable for the benefit of the information Professionals. Research being a continuous process of DRDO, access to information available at their place and also in other knowledge centres becomes a must. Definitely ICT enables both researcher and the information professionals to carry out their work effectively and efficiently. It is clear from the study that Technical Information Centres are not lag behind in adoption of ICT for accessing the need based information also there is a need to overcome existing problems. Researcher recommends that Library and information services are to be enhanced using newer techniques and facilities based on ICT. ICT helps the information professionals provide qualitative, value added information services to its users by providing on line access to all types of information resources.

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