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2018-03-16

**Abstracts and Selected Full Text Documents**  
**on Radio Direction Finding (1899 - 1995)**  
**Collection Finding Aid**

Goncalves, George

Monterey, California. Naval Postgraduate School

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<http://hdl.handle.net/10945/57364>

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**411 Dyer Road / 1 University Circle**  
**Monterey, California USA 93943**

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**HMC-005**  
**ABSTRACTS AND SELECTED FULL TEXT DOCUMENTS**  
**ON RADIO DIRECTION FINDING**  
**1899 - 1995**



**February 15, 2018**

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## Collection Summary

Accession Number: HMC-005

Collection Title: Abstracts on Radio Direction Finding / Full text documents on Radio Direction Finding

Dates: Range 1899-1995

Extent: Bibliography stored in one CD-ROM and as data extracted into Excel, text and PDF files. Full text collection equals 63.25 linear feet, originally stored in 36 boxes.

Language: The materials in the abstract collection are in English. The documents in the full text collection are in various languages.

Abstract: This is a legacy collection transferred to the Naval Postgraduate School's (NPS) Dudley Knox Library (DKL) from the Southwest Research Institute (SwRI). The collection, originally created by SwRI, is composed of two parts. A bibliography on Radio Direction Finding and closely related topics, containing approximately 16,300 abstracts. The abstracts cover publications from 1899 through 1995. In addition to the abstracts, there are 20-30 biographies of leading scientists and engineers who helped create direction finding as well as a glossary of terms. The second half of the archive is a collection of full text documents on this topic, presumably gathered by SwRI. The full text collection comprises only a portion of the documents listed in the bibliography.

## Administrative Summary

Access Restrictions: The collection is open to all researchers.

1. The bibliography portion is accessible in the following ways:

- a. Downloaded from Calhoun at the following URL (<https://calhoun.nps.edu/handle/10945/57321>) as
  - *RDFA\_CompleteBibliography\_xls.zip*, containing the files:
    - *RDFA\_CompleteBibliography.xls*: Metadata for the complete bibliography, in Excel 97-2003 Workbook format
    - *RDFA\_Glossary.xls*: Glossary of terms, in Excel 97-2003 Workbook format
    - *RDFA\_Biographies.xls*: Biographies of leading figures, in Excel 97-2003 Workbook format
  - *RDFA\_CompleteBibliography\_csv.zip*, containing the files:
    - *RDFA\_CompleteBibliography.TXT*: Metadata for the complete bibliography, in CSV format
    - *RDFA\_Glossary.TXT*: Glossary of terms, in CSV format
    - *RDFA\_Biographies.TXT*: Biographies of leading figures, in CSV format
  - *RDFA\_CompleteBibliography.pdf*: A human readable display of the bibliographic data, as a means of double-checking any possible deviations due to conversion.

The Excel, CSV and PDF files represent the various databases that compose the data on the CD-ROM issued by SwRI.

Note: SwRI gave Naval Postgraduate School/Dudley Knox Library a non-exclusive, limited license to translate *Abstracts on Radio Direction Finding 2<sup>nd</sup> Edition CD-ROM* into a contemporary searchable format and make the reformatted information available for public searching, printing, downloading, and sharing via the NPS Library's website for perpetuity (effective November 2017).

- b. The CD-ROM originally issued by SwRI. Researchers seeking a copy of the bibliography on CD may request one from the Special Collections and Archives Manager (<https://library.nps.edu/special-collections>). (See Technical Access, below, for more information regarding use of the CD-ROM.)
2. The full text documents are accessible by appointment (<https://library.nps.edu/special-collections>). Researchers without access to NPS should contact the Special Collections and Archives Manager at least two weeks in advance to arrange campus access.

**Physical Access:** The collection is maintained on the grounds of a restricted access federal government facility.

**Technical Access:** The bibliography on CD-ROM was designed to be run on a 486/33 PC running Microsoft<sup>(R)</sup> Windows<sup>(R)</sup> 3.1, WindowsNT 3.51, or Windows95. In order to access the bibliography users must run an installation file. The file will not install on 64-bit versions of Windows. In order to continue to make the bibliographic data available to current and future audiences, the various databases contained in the CD-ROM have been exported and converted into two formats: Excel (.xls) files and text (comma separated, .txt) files.

**Copyright Statement:** The status of copyright for the compilation of abstracts and all documents, published or unpublished, is governed by the Copyright Law of the United States (Title 17, U.S.C.).

**Custodial History:** The CD was created by the Signal Exploitation and Geolocation Division of the Southwest Research Institute (SwRI) as a continuation of bibliographic work they had done for the Department of the Navy since 1965. No evidence remains as to how the documents were transferred to NPS other than anecdotal. NPS Professors Richard Adler and Ray Vincent were practitioners in this area and learned that SwRI would no longer be supporting this work. Afraid that the collection would be lost and not available to future generations of researchers, they had the materials sent to them. (The date in Appendix II seems to suggest this transfer occurred in late 2003). As they neared retirement, Prof. Adler approached the DKL and asked us to retain these materials due to their research interest and importance.

**Acquisition Source:** Professor Richard Adler arranged the transfer of this collection to the Dudley Knox Library.

**Accruals:** This collection will not have future acquisitions.

**Related Materials:** N/A

Other Finding Aids: N/A

Original Locations: N/A

Preferred Citation: Abstracts and Selected Full Text Documents on Radio Direction Finding, Special Collections & Archives, Dudley Knox Library, Naval Postgraduate School, Monterey, California [day, month, year].

Processing Information: Full text collection was unboxed and shelved retaining the accession number order of the documents. CD-ROM data was exported into 13 Excel files, 13 text files and 10 PDF files using the Toolbook application created by SwRI for querying the database. Some Excel, text and PDF exports were concatenated into single files, as appropriate, for ease of delivery.

Creation: Finding aid created by George Goncalves, 2018.

Standard Followed: Finding aid prepared using local templates based on *Describing Archives: A Content Standard*, 2<sup>nd</sup> ed.

### **Historical Note**

See Appendix I

### **Biographic Note**

N/A

### **Scope and Content Note**

The CD contains approximately 16,300 abstracts, arranged in chronological order by date of publication, searchable by key words, author's surname, sequence number and date intervals using a variety of search strategies. The cutoff date is approximately June 1995, although a small number of later dated citations are included. The abstracts include information on unclassified documents, to include technical reports, formal publications from technical journals, plus other formats (some quite informal). In some cases, the abstract was derived from a citation, rather than the original article, in which case the abstract may be nothing more than the citation.

The full text collection contains a variety of documents and represents a very small subset of the materials indexed in the abstracts

See Appendices I – III for additional information on the CD-ROM

### **Arrangement**

Full text collection is arranged in accession number, as established by SWRI.

## **Appendix I**

The following description was included with the materials received:

### **The Southwest Research Institute Radio Direction Finding Abstracts (Revised through June 1995)**

Prepared by Staff in the Signal Exploitation and Geolocation Division  
Southwest Research Institute  
San Antonio, Texas 78228-0510

#### **CONTENTS**

Summary  
Locating the Original Documents  
Origin of the Direction Finding Abstracts  
Limitations of the Text Retrieval Program  
Future Editions

#### **Summary**

This CD contains approximately 16,300 abstracts, including some duplications, on Radio Direction Finding and closely related topics. The abstracts begin with the earliest significant document found, with no intent to exclude anything earlier than some arbitrary date. The abstracts are arranged in chronological order by date of publication, are fully indexed, and can be searched for key words, author's surname, sequence number and date intervals using a variety of search strategies.

If an intended search word appears in an abstract, that abstract will be included in a group returned to the searcher as a list of titles. In some cases, additional key words have been added to abstracts (in a key word field) to increase the number of hits in searches where modern terms and descriptors differ from words of similar meaning often found in early abstracts. The cutoff date for this version collection is approximately June 1995, although a small number of later dated citations have been included.

The collection includes technical reports, formal publications from technical journals, plus other formats (some quite informal), and refers to no currently classified documents. In some cases, the abstract was derived from a citation, rather than the original article, in which case the abstract may be nothing more than the citation. This is particularly true of abstracts from the WWII period.

The user is encouraged to view the HELP section of the program for more information regarding the collection, its use, and information on search procedure. This collection is an ongoing project and a revised version is planned for release in 1999. Users are invited to submit information, comments, or additional abstracts which may improve and extend future versions of the OF abstracts. This CD is a second edition and is an extension of the collection of over 5200 abstracts published in 1966, in book form, by Southwest Research Institute.

#### **Locating the Original Documents**

The original documents consist of formal publications in technical journals, technical reports (some foreign), published articles, some patents, and in a few cases internal government agency documents. In some cases the original is another abstract collection or list of citations. Individuals needing assistance

are urged to contact their local technical library, or the author before contacting Southwest Research Institute. Copies of publications will not be provided by the Institute.

Difficulty may be encountered locating many documents, especially technical reports, even after a diligent search. This was found to be typical of technical reports from foreign sources and from the WWII period. The value of such abstracts (or just the citation) may be more in the content of the citation, which often reveals important information such as date, names of equipment manufacturers, authors and the purpose of specific equipments.

Some government DF and intercept document collections from the WWII period, and immediately afterward, were transferred to certain laboratories in the 1940s and 1950s. Some of these survive but many have been lost in government or corporate moves over the years. A number of foreign exchange documents from this same period originated in the UK and Canada and were available in various U.S. government laboratory files in the 1950s. In some cases, copies were made to assist contractors pursuing special problems but many were lost in government agency moves out of the central Washington DC area. A few UK documents on Naval DF topics from the 1930s and 1940s were preserved in this manner but a review of citations suggests many others were lost and are probably no longer available. In the case of UK and Canadian documents, however, the subject matter (if deemed important enough) was often published after the war in various British technical journals. This was especially true of the period from 1946 to 1948 when some of the most important work done in the UK was published.

Searchers concerned with WWII technology, or related historical questions, are recommended to search The Journal of The Institution of Electrical Engineers, for the years 1946 to 1948, or later, especially with respect to Naval topics. The Journal, usually abbreviated as IEE, or JIEE, was published in three parts, part III being Radio and Communications Engineering topics, issued in alternate months (in 1946). Searchers should be aware that during this period some special sections were also published one or two times only, designated as part IIIa, which dealt specifically with radiolocation topics, and radio direction finding technology. It is among these publications one will find formal published versions of many of the lost technical reports mentioned earlier. Not all collections of the IEE journals obtained by some libraries include these additional issues.

## **Origin of the Direction Finding Abstracts**

In 1950 the US Navy Department established the beginnings of a radio direction finding laboratory at newly formed non-profit Southwest Research Institute. Work was initiated with contracts emphasizing high frequency land based and shipboard radio direction finding research and system development. The early work included applied research with emphasis on DF error reduction related to ionospheric factors and local site imperfections. However, these early contracts strongly encouraged research toward new direction finding concepts and new antenna systems. The Navy Department also started work on DF problems at other laboratories including the University of Illinois (1947) and a number of labs internal to existing government laboratories (NEL, NRL, etc.). For the most part DF problems given to these labs were derived from the experience of World War II, particularly German submarine activity in the Atlantic.

About 1960 the Navy asked Southwest Research Institute to collect all DF reports and literature with the aim of publishing abstracts in book form with a suitable index. The resulting publication, *Abstracts of the Available Literature on Radio Direction Finding, 1899-1965*, was issued in late 1966 and contained 5224 numbered abstracts plus a few from 1966 inserted just before printing. Later, the publication was made available from the government Defense Documentation Center. As a result, the final distribution exceeded several hundred copies. Now, 30 years later, Southwest Research Institute offers over 16,000 abstracts relevant to DF technology on CD-ROM, fully indexed, plus other information, including a glossary and biographical data on a few of the authors.

The basis for the first abstract collection was a collection of government reports furnished to Southwest Research Institute about 1953 and also a set of Navy sponsored reports written at the University of Illinois



which emphasized technical reports, patents, formal papers, and foreign publications. These reports from the Illinois collection, prepared under sponsorship of the Office of Naval Research have been included in the present collection. The report by J. J. Myers titled, *Bibliography of Classified and Unclassified Reports on Radio Direction Finding, dated 1Feb1944* (abstract 2912) stated:

"Every domestic laboratory where any appreciable amount of direction finding research or development is being done was visited in order that the bibliographic listing might be as complete as possible. It is believed that this bibliography lists every significant report available from domestic sources issued to approximately 1 January 1948 with the possible exception of very early reports (prior to 1940). The listing of British reports is believed nearly complete, but necessarily the list of German documents is incomplete. With the exception of some test reports, no report on radio direction finding was intentionally omitted, although many instruction books are known to be missing."

Some other bibliographic lists were included in the current collection, even where it is clear that the original sources are no longer in existence. In all cases, all available source detail has been included in the modern citations. Browsing the abstracts, or briefly scanning titles, provides much more than technical detail. It may be a surprise to some to find very early investigation of certain ideas to improve DF practice long predates the perceived view that World War II stimulated the real advances in OF design. This is especially true of the WWI period and the early 1920s when propagation theory was developed, the ionosphere was understood, and the classic OF errors (polarization error, lateral deviation, and wave interference) were identified and pursued experimentally. The British work was particularly important in this period, within which one can find the antecedent of virtually every important development in direction finder design. The work was completed without computers, virtually no phase meters, with poor receivers and instrumentation, and in spite of the endless vagaries of HF propagation.

As the SwRI collection, grew it became clear that distinctions based on the kind of publication, or the source, were complex and tended to eliminate items with more obscure origins. However, the latter were seen as important to an historical overview of the subject, even where individual published items were lacking in detail. Some were not available (contrary to the title) but from the title, the author, or even just the country of origin, some sense of how the development of OF technology was growing became apparent. To sustain this overview aspect and to avoid emphasis on a particular publication, no source was omitted from the collection when it was expanded to include the post-WWII period. As a result, the collection is comprised of private publications, magazine articles and even a few newspaper clippings.

Included are papers which are relevant to OF as it is developing today, even though they were written long before DF became a reality, or even before radio. It is interesting to note that as some of this was being written in 1995, it was the 200th anniversary of the de Prony paper which eventually became the basis of various new methods in superresolution direction finding.

## Limitations of the Text Retrieval Program

There are a number of text and font limitations in the present text retrieval software. These have necessitated changes in the text format of the abstracts:

Some math formulas have been modified or eliminated to remove Greek characters or other special math symbols. It is anticipated that future editions of this CD will be able to remove this limitation.

Scientific notation is expressed in the following manner:

"ten to the minus 8" 1 E-08

"ten to the eighth" 1 E+08

The indexing system is at present unable to search for numbers, a limitation which may be removed in the future. The index was created in a precomputed all word search of all portions of the abstracts, including the source names and the authors, except that very common words were eliminated in advance. However, the search is not phonetic (such as a SOUNDEX system might provide) so the researcher is

responsible for most spelling variations. The retrieval program allows certain logic operators as outlined in the help screens.

### **Future Editions**

A future edition of this Abstract collection on CD-ROM is planned for release in two years. It is anticipated this revision will contain more recently discovered abstracts as well as tutorial material, including graphics from some of the earlier publications.

## Appendix II

The following packing manifest was included with the materials turned over to the Library. Please note that, for the full text documents, while the order of the numbering system was retained, the contents of the boxes were unpacked and shelved. The inclusion of the manifest gives a sense of what full text documents might be available in the collection. The four boxes of CDs referred to below represent boxes containing multiple copies of the CD, all the same.

10/1/03

### DOCUMENTS FOR THE ABSTRACTS ON RADIO DIRECTION FINDING

<u>Box Number</u>	<u>Document #</u>	<u>Box Number</u>	<u>Document #</u>
Box 1 of 36	#5 – 181	Box 19 of 36	6066 - 6377
Box 2 of 36	#209 – 1461	Box 20 of 36	6380- 6745
Box 3 of 36	#1475 – 2191	Box 21 of 36	6754- 7208
Box 4 of 36	#2203 – 2769	Box 22 of 36	7239 - 7543
Box 5 of 36	#2771 – 2993	Box 23 of 36	7547 - 7838
Box 6 of 36	#2994 - 3317.1	Box 24 of 36	7847 - 8040
Box 7 of 36	#3318.1 – 3443	Box 25 of 36	8041 - 8226
Box 8 of 36	#3443.1 – 3616	Box 26 of 36	8227 - 9294
Box 9 of 36	#3620.1 – 3926	Box 27 of 36	9295- 9409
Box 10 of 36	#3931-4449	Box 28 of 36	9414 - 9566.
Box 11 of 36	#4455 -4648	Box 29 of 36	9567 - 10058
Box 12 of 36	#4651 - 4826.1	Box 30 of 36	10059-15660
Box 13 of 36	#4834.1 – 5015	Box 31 of 36	15715 - 20431
Box 14 of 36	#5016.1 – 5144		Univ of Illinois (1 of 3)
Box 15 of 36	#5148.2- 5229.1	Box 32 of 36	Univ of Illinois (2 of 3)
Box 16 of 36	#5233 - 5271.8	Box 33 of 36	Univ of Illinois (3 of 3)
Box 17 of 36	#5271.8	Box 34 of 36	Miscellaneous (1 of 3)
Dex 18 of 36	#5271.8 – 6062	Box 35 of 36	Miscellaneous (2 of 3)
Box 36 of 36	Miscellaneous (3 of 3)		

### CD OF THE ABSTRACTS ON RADIO DIRECTION FINDING

4 Boxes

### Appendix III

The following is the Read.me file included with the CD. It provides additional information on the indexing and search capabilities of the finding aid created by Southwest Research Institute. Note, however, that the program will only install in machines running 32 bit versions of Windows.

Abstracts on Radio Direction Finding  
Douglas N. Travers, Editor  
2nd Edition / CDROM Version 1.0

(c) Southwest Research Institute, 1996  
All Rights Reserved

#### ABOUT THE ABSTRACTS ON RADIO DIRECTION FINDING

This CD contains approximately 16,300 abstracts, including some duplications, related to Radio Direction Finding and closely related topics. The abstracts begin with the earliest significant document found, with no intent to exclude anything earlier than some arbitrary date. The abstracts are arranged in chronological order by date of publication, are fully indexed, and can be searched for key words, author's surname, sequence number and date intervals using a variety of search strategies. If an intended search word appears in an abstract, that abstract will be included in a group returned to the searcher as a list of titles. In some cases, additional key words have been added to abstracts (in a key word field) to increase the number of hits in searches where modern terms and descriptors differ from words of similar meaning often found in early abstracts. The cutoff date for this version collection is approximately June 1995, although a small number of later dated citations have been included.

The collection includes technical reports, formal publications from technical journals, plus other formats (some quite informal), and refers to no currently classified documents. In some cases, the abstract was derived from a citation, rather than the original article, in which case the abstract may be nothing more than the citation. This is particularly true of abstracts from the WWII period.

The user is encouraged to view the HELP section of the program for more information regarding the collection, its use, and information on search procedure. This collection is an ongoing project and a revised version is planned for release in 1999. Users are invited to submit information, comments, or additional abstracts which may improve and extend future versions of the DF abstracts. This CD is a second edition and is an extension of the collection of over 5200 abstracts published in 1966, in book form, by Southwest Research Institute.

#### MINIMUM SYSTEM REQUIREMENTS

The recommended minimum configuration for this CD is:

486/33 or better PC  
Microsoft(R) Windows(R) 3.1, WindowsNT 3.51, or Windows95  
8 MB RAM (16MB RAM, or greater, is recommended)  
VGA display with 256 colors or greater  
Mouse or other compatible pointing device  
Hard disk drive with 5MB to 80MB available disk space. (The disk space actually used will depend on the installation options selected.)

## INSTALLING THE ABSTRACTS ON RADIO DIRECTION FINDING

Before you can use the Abstracts on Radio Direction Finding (RDFABS), you must run the setup program from Windows. The setup program installs optionally selected portions of the program on your hard disk and inserts initialization information into the WIN.INI file. To install RDFABS, do the following:

1. Start Windows.
2. Place the RDFABS CDROM into the CDROM DRIVE.  
(If the computer has more than one CDROM drive, select one for installation and use it consistently. Attempting to install the abstracts via two or more CD drives may lead to unpredictable results and the need to edit certain windows files to achieve satisfactory operation.)
3. Activate Program Manager or Task Bar.
4. Open the Run Dialog Box
5. Enter the Command Line: d:\SETUP.EXE where d: is the appropriate CDROM drive letter.
6. The setup program will prompt you to provide information needed to properly install the application. During the setup you will have an opportunity to install any or all of three essential components of the application and data to your hard disk. Alternatively, any or all may be left on the CDROM. Your choices here will trade off subsequent operating search speed for hard disk space. However, the CD must be in the appropriate drive for program operation for all variations of the installation options. The three components are:  
  

Program Files	(requires up to about 10MB)
Index Files	(requires up to about 41MB)
Database Files	(requires up to about 55MB)

As stated, the user may select none, any one, or all of these components to install to the hard disk. The recommended best compromise (and the default selection) is to install the Program and Index files, but leave the database on the CDROM. In any event, it is recommended the selection to the hard disk be made in cumulative order as shown above. For example some possible choices will have the following results:

- a. Selecting none of the components will require no appreciable disk space in which case the application will execute completely from the CDROM; however, search performance will be perceived as relatively slow.
- b. Selecting program files only will require about 5 to 10 MB of hard disk space but will run the application faster, however searching for abstracts will still be perceived as relatively slow. This is the recommended minimum installation for reasonable execution speeds.
- c. Selecting both program and index files will require at least 32 MB of hard disk space, but searches will run much faster. This is the default choice.
- d. Selecting all three components will require perhaps 90MB or more of hard disk space total but the application will have optimum performance.

7. You will be asked if you would like to add a program manager group (a windows icon display box). This choice will not affect search speed. The new group will contain an uninstall option. If at some future time the abstracts are uninstalled and then again reinstalled later (same or future versions), it is recommended that in the event the user has more than one CD drive, the same drive be used for the later installation.
8. The setup program will report when the installation is complete and will inquire if the operator wishes to read this README.TXT file now.

#### SEARCHING THE ABSTRACTS ON RADIO DIRECTION FINDING

The Radio Direction Finding Abstract Collection full-text search pertains to most words in the title, author, keyword and abstract fields. Abstract users can quickly find a word or phrase in the Radio Direction Finding Abstract Collection by using the built in full text search capability. Using full-text search, users can enter any term (for example, "marconi") and see in which abstracts it is contained. Users can search by word, phrase, partial word, or a combination of words, and can limit searches to subsets of either the abstracts or the search data. However, certain common words are ignored.

About 190 common words generally accepted as lacking significant content have been excluded from the index. This provides a faster more efficient search by ignoring all such words when entered as isolated search terms. However, when any single common word is imbedded within a valid search string, even as the initial word, the search will proceed normally and the common word will be highlighted along with the main search text (even though it was not part of the search).

These ignored common words are:

about	abstract	according	accordingly
agree	agrees	all	already
also	although	always	am
an	and	any	appear
appeared	appearing	appears	are
at	author	authors	available
be	become	been	before
being	between	both	brief
but	by	can	cannot
cause	claim	claims	contain
contains	could	define	defined
depend	depended	depends	describe
described	describes	desirable	desire
desiring	disagree	disagrees	discuss
discusses	discussion	does	each
ed	either	explain	explained
explains	feel	feels	felt
find	follow	following	follows
for	formal	found	from
ft	given	gives	has
have	he	however	if
in	include	included	including
into	is	its	kc
km	know	know	led
like	literature	long	made
may	miscellaneous	mm	more
most	much	must	nd
neither	new	no	nor
not	note	noted	now

old	on	only	or
other	out	particular	pb
pp	present	presented	proceed
proceeded	proceeds	provide	provided
provides	providing	publication	publish
published	rd	refer	reference
refers	review	see	seem
seemed	seems	seen	she
should	show	showed	shown
since	so	st	such
take	taken	terms	than
th	that	the	their
therefore	these	this	through
until	upon	used	version
very	viz	vol	was
were	when	which	who
whom	whose	will	with
within	without	would	writer
written	you		

To use the full text index, the user enters a search term (or a string of contiguous words) in the abstract search dialog box in the line labeled "query." The program examines the index, identifies abstracts in which the search term appears and displays a list of the matching abstracts by title. The user may then select one of the abstracts to view.

Search terms may be entered in lowercase or uppercase, regardless of how words appear in the abstract. Search terms take the following forms:

- A single word or phrase
- A part of a word, such as < spectr\* > (in order to find both < spectral > and, say, < spectrum >)
- Multiple search terms, such as < antenna > and < hf > on the same page
- Multiple words in some specified degree of proximity to one another

The user can also combine terms to narrow or broaden a search so as to find abstracts in which more specific conditions are met. For instance, with two search terms, the user can find abstracts in which

- Both terms must appear
- Either term may appear alone or both may appear
- A term does not appear

Multiple search terms may be combined using one or more of the following operators:

Operator	Name	Meaning
+	And	Searches for abstracts in which BOTH terms appear (tends to narrow the search). Example: < antenna + hf > (antenna AND hf are found anywhere in the same abstract).
,	Or	Searches for abstracts in which EITHER term (or both) appears (tends to broaden the search). Example: < marconi, radio > (marconi, or radio, or both, in the same abstract).
-	Not	Searches for pages in which the search term does not appear (tends to broaden or narrow the search depending on how a prior

search was done). Example: < antenna - hf >  
(antenna without hf).

- \* Any Searches for pages in which the: ANY (or wildcard) operator is substituted for one or more characters. While a very powerful search operator, the \* (ANY) will increase the search time.

The user may combine any number of search terms to narrow or broaden the search. If multiple operators are included in a particular search, the expression is processed from left to right. To ensure THAT the search interprets the expression as intended, parentheses should be included to group elements, as shown in the following example searches. When parentheses are nested, the innermost parentheses are evaluated first.

Some examples of search precedence:

Search expression	Finds
hf, vhf + antenna	hf antenna, or vhf antenna, or both
hf + antenna, vhf	hf antenna or (any reference to) vhf
antenna + (hf, vhf)	antennas that are either hf or vhf (as in the first example)
antenna + (hf, vhf, - monopole)	antennas that are either hf or vhf, but not monopole
antenna + (vhf, (hf - monopole))	antennas that are vhf or, hf but not monopole

In addition, the application can perform proximity searches. A proximity search finds words that are near one another to a specified degree. For example, the user wants to search not just for the word "antenna" and "hf", but for the word "antenna" within five words of "hf".

A search can be conducted for terms that are separated by an exact number of words or by a range of words. The search can also be specified to indicate whether the first term can appear before or after the second. To search for one term near another, enter the two terms separated by the double slash operator (/) enclosing a distance parameter.

The following table summarizes how to use the slash operator in proximity searches.

Example	Finds
antenna /3/ hf	"antenna" exactly three words in front of "hf"
antenna /2,5/ hf	"antenna" between two and five words before "hf"
antenna /-5,5/ hf	"antenna" anywhere within five words of "hf" (before or after)
antenna // hf	"antenna" anywhere within the same abstract containing "hf"

#### PROGRAM USAGE HINTS

##### FULL TEXT SEARCH AND PUNCTUATION:

The full text search capability of the program does not include punctuation marks. With the exception of punctuation marks used as query operators (e.g. "+" for "and"), the user should avoid entering punctuation marks as part of the query. Such entries may result in non-fatal errors and the query is processed.

##### FULL TEXT SEARCH AND NUMBERS:



The full text search capability of the program does not include numerals (i.e. 1, 2, ...). Attempting to query on terms which include numerals will generally result in failed queries or other unpredictable results. The only exceptions are abstract numbers and year of publications which are internally encoded to permit access via numeric entries.

#### INCLUDING AN ABSTRACT NUMBER IN A QUERY:

In the abstract search dialog box, type the letter "A" immediately followed by the abstract number to be retrieved (e.g. A1234) in the QUERY window and click QUERY. The abstract will be returned to the search match window. View the abstract by double clicking the title. An abstract number search may also be included in more complicated queries as one of the search parameters.

#### INCLUDING A YEAR OF PUBLICATION IN A QUERY:

In the abstract search dialog box, type the letter "Y" immediately followed by the year of publication (e.g. Y1955) to be retrieved in the QUERY window. Including the year of publication in a query is often useful in narrowing the scope of a query. The program does not support entering a range of dates, however the use of the "\*" wildcard permits decade searches. For example, an entry of Y196\* will narrow the search to abstracts published in the 1960's. Combining decade searches using the "," (OR) query operator permits multiple decades to be included. For example, an entry of (Y195\*,Y196\*,Y197\*) will include abstracts published between 1950 and 1979.

#### FINDING AN AUTHOR:

Type the author's name, last name followed (without comma) by first initial or first name in the SEARCH window. The title of each abstract authored or co-authored under this name will be returned to the search match window in chronological order. To view each abstract, highlight the title and double click the selection.

To ensure that the proper author initial combination is found it is recommended that the last name and first initial be used, separated by a space. For example: Smith J instructs the query engine to return abstracts with the word "Smith J". This is particularly useful on abstracts which have several authors.

Some abstracts may contain an author's complete first name. In this case, using the first initial in a query may not return all of the entries for an author. If the user wants to ensure that all entries for an author are returned, the "\*" wildcard may be used in conjunction with the first few characters of an authors name. For example, the query parameter Smith Jo\* will return only authors who are included in the collection as last name "Smith" and first name beginning with "Jo" such as "Smith, John" or "Smith, Joe".

NOTE: Using only the author's surname in the SEARCH window will return matches which include not only authored papers, but also any abstract in which this name appears.

#### GENERATING A LIST OF CITATIONS:

To save a list of citations, click the PRINT or FILE button on the SEARCH window after the search is complete. Each citation returned will be read to the printer or to a file, including authors, title, and bibliographic reference.

#### EDITING A LIST OF CITATIONS:

Use the FILE function to acquire a file of citations resulting from a search query. Edit the citations in the file accordingly using a text editor or word processing program.

#### USING THE PRINT/ FILE FUNCTION:

The PRINT/ FILE function transfers the contents of the active window to the printer or to a disk file as specified by the user. This function permits storage of the results of queries to the database of abstracts. When a large number of query results are returned, it may not be possible for the program to print or display the entire query result set, however, the entire set can be saved to disk and can be edited or viewed using a word processor.

#### OBTAINING A LIST WHICH EXCEEDS THE MAXIMUM NUMBER LIMIT:

Due to memory and resource constraints, the number of query results returned has been limited to 250 at the initial program installation. The maximum number of query results allowed is controlled by the MaxMatchesAllowed entry in the RDFABS section of the WIN.INI file. This entry may also be changed using the OPTIONS button on the Abstract Collection Help screen.

#### HIGHLIGHTING THE SEARCH TERMS IN THE ABSTRACT DISPLAY:

The program has the ability to highlight query terms when displaying the abstract entry. This option can be used or not used by selecting the YES or NO "Highlight Terms" button in the query results dialog box. The highlight terms option is also controlled by HighlightTerms entry in the RDFABS section of the WIN.INI file. This entry may also be changed using the OPTIONS button on the Abstract Collection Help screen.

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