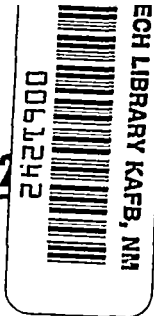


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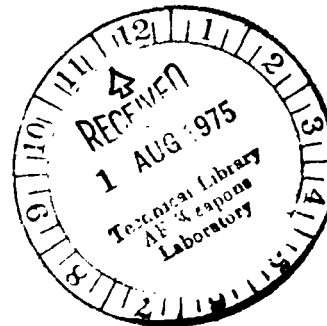


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## LASER APPLICATIONS TO ATMOSPHERIC SCIENCES - A BIBLIOGRAPHY

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# LASER APPLICATIONS TO ATMOSPHERIC SCIENCES - A BIBLIOGRAPHY

by

Franklin S. Harris, Jr.<sup>1</sup>

This report contains a bibliography of 1460 references on the applications of lasers to atmospheric sciences.

## Subjects Covered

The subjects covered include: aerosols; clouds; the distribution and motion of atmospheric natural and man-made constituents; winds; temperature; turbulence; scintillation; elastic, Raman and resonance scattering; fluorescence; absorption and transmission; the application of the Doppler effect and visibility. Instrumentation, in particular LIDAR, is included, also data handling, and interpretation of the data for meteorological processes. Communications (see IEEE, 1970), geodesy (see Berger, 1973) and rangefinding are not included as distinct areas. The application to the atmosphere is covered, but not the ocean or its surface.

## References Included

Owing to the nature of the material, the references are of widely varying value. Books and/or monographs (example, Derr, 1972) are best, critical review articles (examples, Collis, 1969c;

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Hall, 1974) are very useful, followed by regularly refereed articles, letters, abstracts, titles only, and news articles. Inclusive pages give the length of the article.

### Usefulness

For a person interested in a scientific field, there are several questions for which he would like answers:

1. Who are the people active in the field?
2. Where have they reported their work?
3. Where can I obtain some detail on an article to help determine where it would be useful or of interest?
4. How can I obtain a copy of the article?

This bibliography answers the first two questions in reasonable detail, though it is not complete for some of the more productive individuals, and certainly some persons and items have been missed. For the third question the abstract journal references will be helpful, though not all articles are so indicated, and some articles are found in more than one abstract journal. For the fourth question there is no simple universal answer.

### Conferences

Conferences devoted to a single subject are excellent. However, the amount of printed material for a given conference varies enormously, from carefully edited articles in the published proceedings or special issues of journals, to preprints and long abstracts made available at the conference, to a program of titles only. In many cases, a conference report may be published later

in a regular journal but sometimes it is in the nature of a progress report and is only published much later after further research. In some cases the talk is never published, and the title or abstract (or the verbal memory of a listener) is all that is available. Some material is available in report form only or it may be the same as a later journal article, or it may be much longer than the published journal article giving additional details.

The six conferences on laser studies of the atmosphere serve as an example of assembling people interested in the application of laser techniques to atmospheric problems. The first conference was an informal discussion, but the sixth meeting in 1974 had become a major international conference. Reports have been published of the 1st (Goyer, 1968), 2nd (Brown, 1969), and the papers of the 3rd, 4th, 5th, and 6th are listed here under the authors' names. To save space, the Sixth Conference on Laser Atmospheric Studies (1973 Laser Radar Conference, 3-6 Sep 1973, Sendai, Japan) is abbreviated under each author, e.g., LAS6, Paper 7-7.

### Abstract Journals

Four useful abstract journals are often referenced, giving where an abstract of the reference can be found, with more complete bibliographic information in most cases and information on how to obtain a copy. The abstract journals are particularly helpful for material not readily available in the major journals, or if the material is in a foreign language. Square brackets, [ ],

with letters and a number indicate a journal and the abstract number. The "N" numbers represent a listing of report literature in the National Aeronautics and Space Administration *Scientific and Technical Aerospace Reports (STAR)*, which is obtainable from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. The "A" numbers refer to books and journal articles listed in the *International Aerospace Abstracts*, published by the American Institute of Aeronautics and Astronautics (AIAA), 750 Third Ave., New York, NY 10017. IAA is coordinated with STAR. "MGA" refers to *Meteorological and Geostrophysical Abstracts*, published by the American Meteorological Society, 45 Beacon St., Boston, MA 02108. The "APA" refers to *Air Pollution Abstracts*, published by the Environmental Protection Agency, and is also obtainable through the Superintendent of Documents. All four of these have been useful indeed, but an abstract system selects only those articles deemed by some editor or reviewer as within the special interest of the journal, and hence, no one, nor indeed all four, abstract journals cover completely the fields of this bibliography.

The abstract journals indicate libraries where the material is found (MGA), or how it can be obtained for each article. "A" and "N" numbers can be obtained from AIAA, New York. Almost all "N" numbers can be obtained from the National Technical Information Service, Springfield, VA 22151; this also applies to "PB" numbers (government document numbers). The "AD" refers to Defense Documentation Center, Cameron Station, Alexandria, VA 22314 and these

documents are available from DDC to qualified people and are usually also available from NTIS. Some publications are obtainable from the Superintendent of Documents, Government Printing Office, Washington, DC 20402. Ph.D. theses in the United States can generally be obtained from University Microfilms, 300 North Zeeb Rd., Ann Arbor, MI 48106, and the order number is given.

The advantage of the abstract journal notes is that they indicate how to obtain a copy. In some cases recourse must be made to a friendly librarian to obtain a copy by interlibrary loan or other means, and sometimes even the author has to be asked for a copy.

The same limitations on completeness applied to abstract journals also applies to various computer information retrieval systems. They give rapid access to large bodies of information but even if the article in the system has been key-worded, it is not necessarily for the special interest of the searcher.

#### Completeness and Duplication

Neither this bibliography nor any other can be "complete", but it should be "useful". Not all publications of all workers are included, but it is hoped that there are not many serious omissions through oversight. An examination of the references will disclose that some active leaders have presented somewhat similar material in several places within a year or two. Though this may result in considerable duplication of material, it reaches a wider audience and makes the material more easily available.

The inclusion of author's name and title only, in some cases, is justified because it indicates that personnel are involved with some of the problems and the area of activity, even if detailed results are not given.

Following up references from the articles listed and making personal contact with authors enables one to locate significant material not included here.

### Languages

The titles generally are in English, although the original may not be. Many of the Russian journals are available in complete translation, and if so, the reference is usually to the translation journal. Some articles have been especially translated, and are so given with appropriate numbers. Names are found in the literature with varied spellings because of different transliteration systems in use, for example with Russian.



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