

GOPHER AND WORLD WIDE WEB GET WET: An Introduction to Internet Tools for Scientific Diving Professionals

Margaret A. Rioux

Woods Hole Oceanographic Institution
Woods Hole, MA 02543

ABSTRACT

The information and communication resources of the Internet are proving invaluable to many different professional groups including the scientific diving community. The "Information Superhighway", however, is noted for its lack of organization. Without the use of a few navigation tools, using the Internet can be as challenging as diving in zero visibility water: The treasure of the Atocha may be only a few feet away, but you'll never find it unless you're lucky. Gopher and the World Wide Web are the compass and navigation chart of the Internet. This paper provides a brief introduction to both gopher, a menu-based Internet organization tool, and World Wide Web, a hypertext-based method of navigating the Internet as well as a discussion of ways in which scientific diving professionals can make use of online resources. Also included are some of the resources of special interest to this group and a list of recommendations for further reading and investigation.

Just as the invention of the scuba regulator revolutionized diving, including underwater science, so has the invention of the computer led to the electronic/information revolution. In diving, we are taught always to dive with a buddy: never dive alone. In the information age, the Internet makes it possible for a scientific diving professional always to have electronic buddies while "desk diving" as well. The clichés can go on and on, but the point remains the same: The electronic communications revolution has arrived. The time has come for diving officers and other scientific diving professionals to join it along with the scientists they service. This paper will provide a starting place for that process.

The Internet is actually a network of computer networks. It was begun over twenty years ago by the U.S. Department of Defense to enable researchers with DoD projects to share the use of supercomputers for their number crunching. At that time it was called ARPAnet for the (Defense) Advanced Research Projects Agency.¹ In time, scientists discovered electronic mail and file transfers and the number of sites connected to the network kept growing, both in the United States and all over the world.

The Internet has now grown to the point where no one knows how many computers are actually connected to it, but the estimate is several million in almost all the countries of the world. Most academic and research institutions are connected in some way, and individuals can subscribe to commercial services (e.g., America Online and CompuServe) which provide a "gateway" to the "Net." Larger organizations have their own in-house local area networks (LANs). The organization as a whole then joins, or connects to, a regional network, which in turn provides the connection to the Internet. For example, Woods Hole Oceanographic Institution has an extensive network within the Institution called WHOINET which connects to NEARNET (Northeast Academic and Research Network). NEARNET provides the link to the Internet "backbone" and the rest of the world. Frequently the term Internet is used to mean a network connection to anywhere outside the confines of the local organization, whether or not the actual Internet backbone is involved.

There are three basic services provided via an Internet connection: remote login (sometimes referred to as telnetting), file transfer (or ftp) and electronic mail (email). Remote login allows the user to connect to a computer anywhere else in the world, just as if he or she were sitting at a terminal in the same room with it. It might be used to search holdings in a library catalog in a distant location, to check ship schedules in a central UNOLS database or to do computing on a specialized machine on which the user has an account. File transfer is used to connect to a remote computer and transfer files between the user and the remote site. It is often used to access an anonymous ftp site (where anyone is allowed to login with the username "anonymous") and download copies of articles or free software. Gopher and Mosaic software is distributed in this way. Electronic mail, or email, is probably the most widely known and used Internet service. Email allows the user to correspond immediately and informally with colleagues and friends all over the world. It is almost as fast as the telephone, but there is no need for the recipient to be waiting at the other end to complete the connection. Discussion or mailing lists allow persons with similar interests to exchange opinions, seek advice and information and share ideas with a whole group of people at the same time.

In its raw state, the Internet can be fun for users with a moderate amount of computer expertise and a sense of adventure. However for most users, who just want to find useful information without having to know everything about how it works, the Internet can be rather daunting. There is no master directory or organizational scheme; finding good resources can be a matter of luck. Also, the user has to have a working acquaintance with UNIX in order to use some of the commands and facilities, especially ftp. Gopher and the World Wide Web are ways of organizing Internet resources in order to make finding resources fairly easy, help users deal with protocols and commands, and also to provide a relatively simple way of viewing and listening to some of the non-text resources on the Internet.

Gopher is a menu-driven system for organizing resources on the Internet and easily navigating to them. It began at the University of Minnesota in April of 1991 as a user-friendly way to help campus users find answers to common questions and problems regarding their computing.² The World Wide Web is actually older than Gopher, having been launched in 1989 at CERN, the European high-energy physics laboratory in Switzerland.³ In contrast to Gopher, it is hypertext-based and uses graphics intensively. Both systems provide a "virtual" structure to the Internet, giving it the appearance of order and organization. Both systems also provide ways for the user to set up his or her own sets of bookmarks, menus and lists of especially useful resources, making it easy to remember and return to locations which have proved valuable. The two systems are also user-friendly in cost. Both Gopher and WWW client software are made available by the developers at no charge. Any other "helper" applications which might be needed are available as low cost shareware.

Both Gopher and the Web are what is called client-server systems. In this type of system, two computers are required. The server is a remote computer "somewhere else" which dishes up the information the other computer requests. The client is the user's computer, which runs software enabling it to connect to a server, request information and bring it back to you, the user. The client might be thought of as the customer. The client software can retrieve information from anywhere in the world as long as you or another server has given it an address. While this sounds confusing, it is much simpler in practice, with most of the operation taking place behind the scenes transparent to the user. Another major advantage to client-server Internet navigation is that each client only has to stay connected to a server for a few seconds at most, thus enabling many more users to get the same piece of information than would be possible if longer connections were needed, as in regular remote login.

There are a several references listed in Appendix A which give more information about navigating the Internet, including using Gopher and the Web. Any of these references, as well as the innumerable other books and articles which have been written about the Internet will help you get started. The remainder of this paper will deal with ways in which scientific diving professionals and institutional diving programs might use the Internet, specifically Gopher and World Wide Web to disseminate and receive useful information. Ways in which AAUS might participate will also be suggested.

The first and most obvious way in which scientific divers and diving programs can use

the Internet is to exchange electronic mail. Email is an easier way to send information which might otherwise be sent by letter in the regular mail (sometimes called snail mail) or by telephone. Electronic mail is faster than regular mail, but doesn't require both parties that be available at the same time as does the telephone. It also provides something in writing for the record, if necessary. If a diving officer's records are computerized, email can even be used to transmit complete individual or project dive logs anywhere in the world in minutes. Newsletter articles, annual AAUS statistical reports, almost anything can be transmitted quickly and easily by email. Electronic mail is also the mechanism behind Internet (or Bitnet) mailing lists which provide forums for interest groups through which they can ask questions, receive advice and share ideas and opinions. Some mailing lists which are relevant to scientific diving programs are included in Appendix C.

Diving is sometimes referred to as an "equipment-intensive" activity. It should also be called an "information-intensive" activity. A great deal of information is needed to dive safely, especially when it is being done professionally: medical information, scientific information, information about the diving environment where the operation is to be conducted, policies and procedures of the institutions involved, etc. The Internet provides an easy way for diving safety officers and individual divers to both make available important information and to obtain it. Some of this information exchange is not really occurring over the Internet, since it is within institutions, but the software and protocols are the same whether it is intra- or inter-institution.

Many institutions throughout the world, some of which are involved in marine science and scientific diving, have Gopher or World Wide Web servers (or numbers of servers). These not only help the average "Net surfer" locate information through their system of menus and pointers, they are also an excellent mechanism for diving programs and divers to make available and find important information. For example, at the University of Delaware, the OCEANIC program has UNOLS research ship information and cruise schedules accessible to both Gopher clients and Web browsers. The University of Miami Rosenstil School of Marine and Atmospheric Sciences has a Web server with a campus map, telephone book and weather information. Aquanaut, which is available both via Gopher and the Web, is primarily intended for recreational divers; however, it includes the archives of Techdiver, a wreck database, information on training agencies and, on the Web, a database of underwater photographic images. For less diver-specific information, there's the University of Illinois at Urbana-Champaign's WeatherWorld, with up-to-the-minute weather information (including satellite images) and forecasts. A number of local Gophers and Web sites include local weather information, water temperatures, etc.

Although this information is currently available, very little of it is diving-specific. The author knows of no Gopher or Web site which actually has information which was put into it by a diving safety officer or which is specific to a scientific diving program. This is true even though many of the institutions which are most heavily involved in providing information via the Web and/or Gopher have diving programs. In a VERONICA search on Gopher, several diving items were found, but all pertained to physical education course offerings or recreational scuba groups.

This is a situation which needs to be changed. Generally, institutional computer centers are looking for additions to their local Gopher or Web servers and will make it easy for a diving safety officer to add information which should be disseminated both within the institution and outside it. Publishing of important information is their reason for providing the servers. Examples of information which a diving safety officer could easily make available are the policy and procedures manual of the institution's diving program, schedules of courses, a roster of institution divers, information on local dive sites, etc. Those persons providing the weather information could be encouraged to add local water temperature. This would be of interest to divers as well as to those planning pier trials of instruments where water temperature might affect the outcome. Local tide and current information would also be helpful. If one institution provides this information on its Gopher or Web server, it automatically becomes available to the divers and diving officers at any other institution with an Internet connection. This would be very useful not only to another diving safety officer, but also to a diver who expected to be a visiting diver at the institution with this server.

In addition to individual diving programs using the Internet and its resources, AAUS itself should consider what uses it might make of the Net as a resources. There is a great deal of information which needs to be disseminated to local scientific divers and diving programs and this could be done much more efficiently and effectively once the initial startup had been completed. Examples are the current AAUS Standards document, templates for standard forms, meeting and seminar announcements, minutes of board meetings and the current membership directory. Information about each current organizational member (number of divers, name and email address of diving safety officer, etc.) would be very useful. Issues of the Slate could be published electronically as well. Another possibility would be a series of electronic mailing lists for all members, the board of directors and various committees. Other organizations of similar size and geographic dispersion have found this a valuable method for improving communications.

The major difficulty with these suggestions is that AAUS does not own a computer which has the capability to provide such Gopher and mailing list services. Nor does the organization have a staff member with the necessary expertise to be the system manager. This has been a problem for other similar organizations, which have solved it in one of two ways. The first alternative is to have one of the organizational members volunteer to have the AAUS services on one of its institutional computers. For example, the International Association of Marine and Aquatic Sciences Libraries and Information Centers has its mailing list on a computer at the University of California at San Diego, specifically Scripps Institution of Oceanography. This is a donation by UCSD which was obtained by the Scripps Librarian. While IAMSLIC does not yet have a Gopher or Web server, it undoubtedly will soon, and it will probably also be housed at Scripps. Another alternative is to get a grant to pay for another organization to provide services. The North American Serials Interest Group has gopher and mailing list services provided by the American Mathematical Society. AMS received a grant specifically to provide computer services to small organizations which wanted them, but could not afford the hardware. In both cases, the system manager is a staff person of the institution providing the service, but the work of cleaning mailing lists and keeping the gopher information current is done by volunteer members of the organization. Because everything is on the Internet, the volunteers

don't have to be anywhere near the computer site, but do all the work via remote login.

Diving safety officers operating scientific diving programs, individual scientific divers in institutions without staff support for their diving and AAUS itself should look closely at the opportunities provided by the Internet, and particularly by the Gopher and World Wide Web systems, for the dissemination and obtaining of information desirable and necessary for scientific diving. While there is some effort required to get started, for individuals, institutions and AAUS as an organization, the benefits of joining the information revolution will far outweigh the costs.

Notes

- ¹ Paul Gilster, *The Internet Navigator* (New York: John Wiley & Sons, 1993), 14-16.
- ² Daniel P. Dern, *The Internet Guide for New Users* (New York: McGraw-Hill, 1994), 310.
- ³ Keith W. Porterfield, "WWW (What's a WorldWideWeb?)," *Internet World* 5:3 (May 1994): 20.

Appendix A

Selected References for Later Investigation

Copley, Thomas P., and Barbara L. Copley. *Go-pher-it! Workshop*. An eleven part online tutorial first offered in the spring of 1994. Contact the authors via email at ror@netcom.com for further information.

Dern, Daniel P. *The Internet Guide for New Users*. New York: McGraw-Hill, 1994. 0-07-016511-4.

Gilster, Paul. *The Internet Navigator*. New York: Wiley, 1993. ISBN 0-471-59782-1.

John, Nancy Regina, and Edward J. Valauskas. *The Internet Troubleshooter: Help for the Logged-On and Lost*. Chicago: American Library Association, 1994. ISBN 0-8389-0633-8.

Krol, Ed. *The Whole Internet: User's Guide & Catalog*. 2nd ed. Sebastopol, Calif.: O'Reilly & Associates, 1994. ISBN 1-56592-063-5.

LaQuey, Tracy, and Jeanne C. Ryder. *The Internet Companion: A Beginner's Guide to Global Networks*. Reading, Mass.: Addison-Wesley, 1992. ISBN 0-201-62224-6.

LaQuey, Tracy, and Jeanne C. Ryder. *The Internet Companion Plus: A Beginner's Start-up Kit for Global Networking*. Reading, Mass.: Addison-Wesley, 1993. ISBN 0-201-62719-1.

Let's Go Gophering. Free online gopher course available from several ftp and gopher sites. 1) Via anonymous ftp on ubvm.cc.buffalo.edu in the gopher directory (URL: <ftp://ubvm.cc.buffalo.edu/gopher>). 2) On the gopher at the University of Illinois/Chicago in the first subdirectory UIC/ADN.

Petrusha, Ron. The Mosaic Handbook for Microsoft Windows. Sebastopol, Calif.: O'Reilly & Associates, 1994. ISBN 1-56592-094-5.

Petrusha, Ron, and Paula M. Ferguson. The Mosaic Handbook for the Xwindow System. Sebastopol, Calif.: O'Reilly & Associates, 1994. ISBN 1-56592-095-3.

Strangelove, Michael. Directory of Electronic Journals, Newsletters and Academic Discussion Lists. Washington, D.C.: Association of Research Libraries, Office of Scientific and Academic Publishing. 1st edition issued in July 1991; current edition is the 4th (July 1994). Also available via anonymous ftp, along with a number of other great internet guides and tutorials from [ftp.cni.org](ftp://cni.org) in the directory [pub/net-guides/](ftp://pub/net-guides/).

Appendix B

Interesting Gopher Resources

Aquanaut

USA/General/Aquanaut (SCUBA Diving Forum)

Information primarily of interest to recreational divers. Includes a wreck database, archives of rec.scuba, equipment reviews, a technical diving forum, image files, etc.

ASCII Images

USA/Texas/Texas Tech University, Computer Sciences

- Art & Images - ASCII Clipart Collection

Food, cartoon characters, you name it - all created with text. Other image and sound files also on this gopher.

Campus Newsletters

USA/Louisiana/Louisiana Tech University Journalism Server

- On-Line College Papers

Collection of pointers to college and university newspapers available online via gopher. Arranged by state.

Catalog of gophers by subject

USA/California/USC

- Other Gopher Information Resources - Gopher Jewels

Gophers arranged by subject for easy browsing and exploring. Three subject categories of special interest to serialists are Books, Journals, Magazines, Newsletters and Publications; Patents and Copyrights; and Technical Reports and Special Collections.

Clearinghouse for Subject-oriented Internet Resource Guides

USA/Michigan

Sponsored by the University of Michigan Libraries and the School of Information and Library Sciences. Useful training and reference tools for yourself as well as for classes and orientation sessions. Guides are produced by the Internet user community and SILS students.

Comprehensive Access to Library Catalogs Available on the Internet

USA/Connecticut/Yale University

- Research and Library Services - More Research and Library Services ...

- Library Catalogs beyond Yale (via the Internet)

Each library has both a telnet link and an "about" file. There is a search item to search the "about" files by keyword. There are also files with instructions for searching each major vendor's software and a file of updates made recently to the list of libraries. This gopher service is an active electronic version of the Billy Barron List.

CYAMUS Union List of Serials

USA/California/UC Santa Cruz InfoSlug

- The Library - Other Libraries - Marine & Aquatic Sciences Serials List

31,140 records from 21 institutions. Telnet connection plus related files. See overview file for instructions

Electronic Newsstand

USA/General/Electronic Newsstand, The

Tables of contents and excerpts from a broad selection of periodicals and also some books. There are also a number of periodicals listed directly under USA/General.

Federal Register and Current Legislation Information

USA/Washington, DC/LEGI-SLATE Gopher Service (Prototype)

Prototype only until 1 July 1994. Federal Register documents and 103d Congress bills and resolutions searchable in a variety of ways. After the complete version is launched, subscription will be required for full access, but some information will be open to free access. See the "About" files for further current information.

Health Information

USA/Illinois/University of Illinois at Urbana-Champaign

- UIUC Campus Information - Campus Services & Facilities

- Health Services, McKinley Health Center - Health Information

USA/Montana/University of Montana Student Health Services HEALTHLINE

Both gophers have extensive text files of health information written for college undergraduates which would be of interest to divers and diving safety officers as well.

Library of Congress

USA/Washington, D.C./LC MARVEL

All of LC's catalogs, copyright information, everything you ever wanted to know from and about the Library of Congress. Also provides an excellent gateway to other federal government gophers.

Library without Walls

USA/North Carolina/North Carolina State University Library Gopher

- NCSU's Library without Walls

Includes Reference Desk, Study Carrels arranged by subject discipline, and a collection of electronic journals and books.

Local Times throughout the World and World Telephone Code Information

Pacific/Austin Hospital, Melbourne, Australia

- General Information and Resources

This is the home gopher for this information. It is also available as a menu item on many other gophers. Local date/time at the gopher site is also a common gopher menu item.

OCEANIC: The Ocean Information Center

USA/Delaware

Includes UNOLS ship schedules, information on major inter-institutional research projects (e.g., WOCE), name and email directories of marine scientists, etc.

U.S. Government Gophers (A Very Small Sample)

USA/Washington, D.C.

- United States Bureau of the Census

Information about the Census Bureau plus some reports and press releases. Some of the files are in Postscript format.

- U.S. House of Representatives Gopher

Information about members and committees of the House.

- United States Senate Gopher

Gopher interface to electronic documents distributed by Senators and Senate committees.

WAIS Searching of Gopherspace

Sweden/UB2:Lund University Library

- All WAIS database for searching (simple version)

- Experiment with automatic classification of WAIS databases

Allows searching based on keywords within the target files. Using the original subject breakdown makes the search more efficient.

Appendix C Additional Interesting Internet Resources

Mailing Lists

HYPBAR-L@technion.technion.ac.il - Discussion group for hyperbaric medical issues, primarily diving related.

TECHDIVER@opal.com - Discussion of "technical diving" issues, including deep and mixed gas diving. Send subscribe message to techdiver-request@opal.com.

SCUBA-D@brownvm.bitnet - Digest redistribution of the Usenet group rec.scuba (see below).

SCUBA-L@brownvm.bitnet - Scuba diving discussion list intended for recreational divers.

Usenet News Groups

rec.scuba - discussion group for all manner of recreational diving questions. Also available as a mailing list digest via scuba-d@brownvm.bitnet (see above). The level of diving knowledge of the participants varies widely. Most discussion threads seem to deal with equipment and diving destinations.

sci.med, **sci.med.occupational**, **sci.med.pharmacy** - three medical discussion groups of possible relevance to hyperbaric medicine and professional scientific diving.

World Wide Web Sites

Aquanaut - <http://www.opal.com/aquanaut/>. The WWW version of the Aquanaut gopher site. Includes a file of underwater photographs.

Scripps Institution of Oceanography - <http://sio.ucsd.edu/>.

University of Delaware College of Marine Sciences - <http://www.cms.udel.edu/>. Includes the WWW version of the OCEANIC gopher site with research vessel information and cruise schedules.

University of Miami RSMAS - <http://www.rsmas.miami.edu/>.

WeatherWorld - <http://www.atmos.uiuc.edu/wxworld/html/top.html/>. Current satellite imagery, forecast maps and weather forecasts and conditions. Includes both graphics (.gif) images and video (.mvp).

Woods Hole Oceanographic Institution - <http://www.whoi.edu>