*Most executive summaries are very disappointing—
writers seem unable to recognize the key ideas in their
own reports. They allocate space in the executive sum-
mary in the same proportion as in the original docu-
ment, whereas they ought to focus only on the* essential
*items, the* results. *Always think to yourself, "I'm likely
to lose my readers unless I get their attention* here.*"*

—NAVAL WAR COLLEGE PROFESSOR

# 9

# Technical Reports, Executive Summaries, and Abstracts

Naval personnel must often work with industry, or with reports and other documents prepared by industry. Those doing research at naval labs, naval test centers, or naval schools must help generate technical reports while others will just have to use them.

Specifically, naval personnel will often encounter technical reports when they work on staffs that monitor military contracts, perhaps while working for an O-5 or O-6 project officer or program manager. That officer may have requested an analysis, a proposal, or a progress report of some kind. Perhaps the Navy wants to build a helicopter engine that will operate effectively in deserts. The program manager might have contracted for a report that details what such a design would look like, how reliable the engine would be, and how much it would cost.

In the latter case, the company with the contract would respond with a feasibility report, which Navy officials would use to guide them. The report would first help them decide whether to build the engine. Then, having decided to build it, they would use the report to persuade senior officers and other government officials to award them the funds.

If the company with the contract were to do its work well, it would organize the report so everyone could use it intelligently. Who would likely readers be? First, the *technical experts* on the program manager's staff. These engineers, technicians, accountants, weapons experts, tacticians, and so forth (some of them military, some civil servants) would be tasked by their boss to examine the design, the engine's capability, and the costs in great detail. Possessing the technical background to understand all kinds of charts, tables, diagrams, and descriptions, they would expect detailed technical explanations.

However, many others who might read this document would not be experts, among them the most important audience—*decision makers*. These readers would probably

not understand all the technical parts of the report, nor would they need the detail that experts require. The project manager, for example, might be generally knowledgeable in tactics and weapons systems but would not necessarily be an engineer. This person would need a semi-technical explanation, one emphasizing conclusions and recommendations.

Senior military officials would also need a semi-technical discussion of key, summary information (rather than a highly technical discussion of all the details). So would elected government officials and their staffs. Still, at any point an official up the line might need to examine—usually by assigning staff members to examine—the specific technical features of the project.

So both highly technical and semi-technical discussion must be present in the same report. Moreover, usually *one document* must satisfy both experts and decision makers. Similarly with the many other kinds of documents needed if the government were to go ahead with the project. Each report would have to address readers with very different backgrounds and needs. Whether a later document were

- a formal proposal by a firm to build the engine;
- a progress report submitted by the contracted firm;
- a research report used in the technical design;
- an instruction manual designed for operators; or
- a final report submitted upon the project's completion,

it would still have to address multiple audiences.

We can't go into each kind of report mentioned above; refer to one or more of the references on technical writing mentioned at the end of this chapter for thorough discussions of various technical writing genres. What we *can do*, however, is to discuss the organizing and summarizing techniques industry has used for decades to satisfy such diverse audiences. In the process, we will mention some of the other naval uses these methods have come to serve.

> *"Technical reports* are meant to be skimmed! *Hence the frequent occurrence of executive summaries, abstracts, section summaries, appendixes, frequent headings, even summaries* of summaries."
>
> —TECHNICAL WRITING EXPERT

## ORGANIZATION OF TECHNICAL REPORTS

Following are several proven methods of designing technical reports so they reach their multiple audiences (1) with the right kind of information, (2) at the necessary reading level, and (3) with the appropriate detail. (Actually, you can apply these methods to a variety of complex naval documents, not just technical reports.)

### Present Conclusions before Rationales

Of course, when investigators have a problem to solve, they typically begin by assessing the problem, then they conduct the investigation or research, and eventually they come to conclusions. Sometimes investigators write up their reports following this same order—with conclusions last.

However, as we've seen before in other contexts, the chronological order of the investigation may be backward to the reader's needs. Just as naval readers habitually glance at the action paragraph of a document before reading the whole document through (sometimes *instead* of reading it through), decision makers typically look for the conclusions and recommendations first. Often they only skim the rest of the report—they don't need to read it all.

So help these readers out. As the author of "Just Plain English" points out, "Avoid Mystery Stories . . . Put requests before justifications, answers before explanations, conclusions before discussions, summaries before details, and the general

before the specific." Here's an example of what this guidance might mean for a standard investigative or research report:

| Instead of | Organize This Way |
|---|---|
| Statement of Problem | Statement of Problem |
| Procedures | Conclusions and Recommendations |
| Methodology | Support |
| Analysis |    Methodology |
| Results |    Analysis |
| Discussion of Results |    Results |
| Conclusions |    Discussion of Results |
| Recommendations | |

Sometimes you might have to write your report in a rigidly specified format, and that format may resemble the one in the left column (though even this report will usually begin with an executive summary to include conclusions and recommendations in a brief form; see the following section). If not, put the conclusions and recommendations at the beginning to give readers a head start on the vital information. That's just plain English.

## Use Appendixes

Relegate to appendixes material only specialists need. Don't let numbers, designs, and other data overburden the text of the report. Full-length reports, like operation orders, often have many appendixes.

## Subdivide into Short Sections with Many Headings and Tabs

You can help the reader immensely by organizing your reports into sections. Use care in carving sections out—design your sections and headings with the *readers' needs* in mind.

On hard-copy documents, add paper or plastic tabs to make sections readily visible. On very long documents, consider adding indexes too. With online documents, provide links for the longer report sections.

## Use Reviews, Surveys, and Summaries throughout the Report

Summaries aid everyone. Remember that even those few reviewers who read a report straight through will seldom be able to avoid all interruptions from meetings, office visits, and phone calls while they read. Actually, in the Navy and Marine Corps, you are almost always writing for the distracted reader. Hence, at strategic locations in your text (such as the beginnings or ends of major sections), review topics that you've presented before, and summarize the information that follows after. Above all, after you've written the whole report from introduction to the conclusions and recommendations. . . .

## Carefully Compose an "Executive Summary"

The executive summary is a summary of vital information, described in the following section.

## THE EXECUTIVE SUMMARY

Design the executive summary so that by reading it—perhaps along with a couple of other key sections of the report, but not much more—an executive will have enough

information to proceed to a decision. Actually, whoever picks up a report with a good executive summary can use it to get a quick feel for the report's contents, and almost all readers begin with the executive summary if one is provided. Still, the main purpose of an executive summary is to *provide executives with what they need to make decisions.*

The length of an executive summary varies—it may run twenty pages for a book-length document but only a page or two for a twenty-page report. Here is a common rule of thumb: Keep the executive summary no more than *one-tenth the size* of the report it summarizes. Sometimes summaries are a great deal shorter than that.

Place an executive summary at the beginning of a report, soon after the title page. Some Navy labs make sure a reader can immediately locate the summary by printing it on blue or green paper. A tab, of course, would serve the same purpose. The point is to set off the summary from the rest of the document because everyone is likely to read this section. The summary identifies the gist of the report, its overall import.

You've probably seen many an executive summary before, even if you didn't recognize it at the time. An email that introduces a lengthy attachment can be an executive summary—telling you the gist of the document so you'll know whether to open it and read further. A briefing memo for a correspondence package on a staff is a kind of executive summary because the briefing memo also enables a superior to understand the matter at hand quickly without having to page through the whole package. Submarine patrol reports typically begin with executive summaries because here, as well, not everyone needs all the details. When a personnel board convenes in Millington, Tennessee—the Retired Personnel Board, for example—an executive summary begins the board's report.

Often, when a naval command issues a change to a major instruction, authorities will draw attention to the essence of that change by sending an executive summary in message format. Figure 9.1 is the message that introduced the 1983 change to the Correspondence Manual, noting in particular its stress on Naval Writing Standards or "Just Plain English." As you can see, the message is extremely brief but it very effectively (by example) gets across its central summary. Figure 10.1 (in the next chapter) is a condensed version of yet another message that summarized the change to a major naval manual; in effect, it too is an executive summary.

You can construct the executive summary in various ways. What usually sets this document off from other summaries is its emphasis on *results, conclusions,* and *recommendations.* Executive summaries differ in how much they discuss background, procedures, and methodology (some treat each of these items briefly while others don't discuss them at all). But the best of them focus mostly on *what all the factors lead to,* that is,

*"You have one chance to get to the decision makers —emphasize the key ideas, the key findings."*
—NAVAL WAR COLLEGE PROFESSOR

- what results show,
- what conclusions you can draw, and
- what action your audience should take.

Don't try to cover everything in an executive summary, but include only the most essential information. Also, remember not to write the executive summary until you have written the whole report in its final form, or it may not do justice to the actual report.

Here's an example of a formal executive summary. Released in 1993 by the Center for Naval Analyses, it summarizes a report that had two phases and ran to fifty-six pages of very tight, small type. This summary appeared in a four-page glossy that

Figure 9.1 An Executive Summary in Message Format. It introduced the 1983 revision to the Navy Correspondence Manual.

```
FROM:  SECRETARY OF THE NAVY
TO:    THE NAVY AND MARINE CORPS

SUBJ:  REVISED NAVY CORRESPONDENCE MANUAL, SECNAVINST 5216.5C

1.  SECNAVINST 5216.5C, NOW IN DISTRIBUTION, IS MORE THAN JUST
ANOTHER EDITION OF THE OLD CORRESPONDENCE MANUAL; THIS EDITION
REVISES THE MANUAL THROUGHOUT.  THE BIGGEST IMPROVEMENT IS THE
NEW FIRST CHAPTER, WHICH SETS NAVAL WRITING STANDARDS.  WHETHER
YOUR DUTIES REQUIRE YOU TO WRITE OR REVIEW THE WRITING OF
OTHERS, READ THIS CHAPTER AND APPLY IT.  SOME OF THE CHAPTER'S
MAIN POINTS ARE:

     A.  START YOUR WRITING WITH THE MOST IMPORTANT INFORMATION,
AS NEWSPAPERS DO.  AVOID MERE CHRONOLOGY.

     B.  USE SPOKEN ENGLISH, I.E., EVERYDAY WORDS, SHORT
SENTENCES, AND PERSONAL PRONOUNS.

     C.  PRUNE YOUR WRITING.

     D.  PREFER THE ACTIVE VOICE, "WEAR APPROPRIATE CLOTHING" FOR
"APPROPRIATE CLOTHING SHALL BE WORN" AND "WE REQUEST" FOR "IT IS
REQUESTED THAT."

2.  WITH EFFORT BY WRITERS AND ENCOURAGEMENT FROM REVIEWERS,
THESE TECHNIQUES WILL IMPROVE OUR CORRESPONDENCE.  THE RESULT
WILL BE GREATER PRODUCTIVITY FOR US ALL.

                           --062047Z APR 84 (ALNAV 048/84)
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was distributed to select naval and other governmental audiences. Interested readers could order the whole report or simply become better informed by reading the summary itself.

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The Future Russian Navy—Final Report
Summary

### Background and approach

CNA undertook the Future Russian Navy study at the request of the Director of Naval Intelligence. We were to evaluate the historical, current, and future interests and constraints that will help shape any future Russian Navy, and to derive a range of potential naval force postures and their implications for the United States Navy.

The study had two phases. Phase I examined current and near-term constraints on existing Commonwealth of Independent States naval forces and potential future foreign policy, economic, and security interests of the Russian state that would support a need for naval forces. Phase II evaluated competing interests and constraints and derived a range of possible Russian naval postures and their likelihood. Capsule descriptions of phase I findings follow.

## Key findings

***Historically,*** the Russian and Soviet navies were linked to the political leadership's assessment of the threat from the sea. They depended on Western technology, designs, and personnel. Internal political changes affected the navy more than the other services. And through most of Russian history, the United States was seen as a natural ally.

***Sociopolitical factors*** have resulted in draft-dodging and lost prestige of military service. Life in the military has deteriorated through shortages of consumables and a breakdown in supply lines. The military have thus had to allocate more resources to personnel welfare, to engage in commercial activity in an effort to become self-sustaining, and to increase their activism at the local level on which they have become economically dependent.

***Economic constraints at the national level*** have caused the military and defense industry to compete with the civil sector for resources. The shift from autocracy to democracy has strengthened the position of those favoring the civil sector. Economic upheaval has severed the links between central government, local industry, and military installations. Recovery will likely spring from the local sectors, further isolating the central government and diminishing its authority.

***At the fleet level,*** commanders focus their resources on the newest platforms with highest priority missions. They have been disposing of "surplus" equipment to get funds for housing and other necessities. Even newer units have been deteriorating rapidly. There's hard evidence that only ships with high-priority missions are fully operational.

***Military interests . . .***

***Economic interests . . .***

***Foreign policy interests . . .***

## Conclusions

These phase I results provided us with the context for the phase II synthesis. This synthesis led to the following conclusions:

- Through the 1990s, the Russian Navy will decline in both numbers and capabilities.

- Economics will force it to focus on the seas contiguous to Russia.

- The Ministries of Defense and Foreign Affairs will use the navy to integrate Russia into the Western Security system.

- Cooperation and deterrence will compete for scarce operating funds; cooperation may win some of those competitions.

The Russian Navy of the next century will wind up in one of four different configurations (or a mixture of two or more):

- Niche navy—high technology, regional focus, globally deployable specialty, assessed at a .15 probability

- High-tech deterrent navy—globally deployable but regionally oriented navy with a strategic nuclear deterrent responsibility, assessed at a .3 probability

- High-tech warfighting navy—globally oriented, conventional and nuclear-capable navy designed to contest the seas with any other navy, assessed at a .05 probability

- Obsolescent, residual navy—survivors of the late 1980s Soviet Navy plus a few newer coastal patrol ships, assessed at a .5 probability.

### Implications for the Navy

For the United States Navy, defusing the adversarial relationship that exists between U.S. and Russian naval forces and influencing the future Russian Navy are the most important opportunities that this new situation has created. Naval cooperation is the most effective means of seizing this opportunity.

### References

Documentation of this work appears in CNA Research Memorandum 93-115, *The Future Russian Navy Final Report,* by Floyd D. Kennedy, Jr. et al., September 1993, and its supporting research memoranda.

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## TWO KINDS OF ABSTRACTS

Another kind of summary device for technical reports is the "abstract," which may preface a report whether or not the report also has an executive summary. The abstract differs from an executive summary primarily in function and audience. That is, where an executive summary is a synopsis of a report's conclusions/recommendations and is meant for decision makers, an abstract is a *screening tool* that is usually intended for researchers. Also, where the executive summary is designed so the decision maker can read it *instead of* reading the whole report, the abstract helps a researcher decide *whether to read the report at all.*

Writers compose abstracts for professional articles as well as technical reports. But whatever documents they summarize, abstracts have certain standard features:

- They often include much technical detail in a very condensed and highly technical discussion that a layperson will have trouble following.
- They are typically short—from a couple of sentences to about three hundred words (but they still use full sentences, not fragments or bullets).
- They usually are written as one paragraph.
- They don't focus on conclusions or recommendations but either give equal value to every part of a report or concentrate on a project's results, quickly letting the expert reader see the scientific or *technical significance* of the research.

Write each abstract so it makes sense as a separate document. You have two different styles to choose from.

### The Informative Abstract

The informative abstract is meant to *reproduce the report in small,* mirroring all its essential features. In fact, some texts recommend that to write such an abstract you should first identify the topic sentence from every major section in the report, and then simply string all these key sentences together, just smoothing out the wording. Others suggest you work from an outline. However you proceed, include in the informative abstract a brief discussion of the background of the research project, its intent, the way you set it up, the procedure you used to carry it out, and the results.

Reading such a summary will tell the researcher whether to order the whole report or not. Here's an example of an informative abstract put out at the Naval Academy in 2003 titled "Fracture Toughness Characterization of HSLA-100 Steels for Carrier Crack Arrestor Applications."

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HSLA-100 steel is being considered as a replacement for HY-100 in aircraft carrier crack arrestor applications. The various compositions of HSLA-100 were evaluated and

compared to 1.25 in. thick HY-100. Tests were conducted to measure tensile properties, Charpy impact energy, dynamic tear energy, fracture toughness and the reference temperature. The two alloys compared favorably on all tests except the fracture toughness tests at −40°F. HSLA-100 in the T-L orientation exhibited fracture by cleavage after ductile crack growth, whereas the HY-100 remained ductile. This result was unexpected since it is commonly believed that fracture behavior can be correlated with impact tests and the reference temperature. At −20°, fracture remained ductile in the HSLA-100. Consequently, it is recommended that HSLA-100 in the T-L orientation only be used where the minimum service temperature is above −20°F.

> —Graham, Stephen M., Assistant Professor, Mercier, G. P., L'Heureux, B. P., and Waskey, J. P. NSWCCD-TR-2003/11 August 2003.

Clearly, the emphasis here is not on conclusions/recommendations but rather on faithfully representing the whole report. By using this abstract, researchers looking for information on HSLA-100 steel, on fracture toughness tests, or on steel performance at low temperatures might find information enough to decide whether to read the whole report.

The description of a safety intervention that had been carried out at a navy mail center (found in a 2006 Naval Safety Center's online listing of "1,001 Safety Success Stories") is another good example of an informative abstract—although the Naval Safety Center terms it an "executive summary" (note the fungibility of naval titles for technical summaries).

**"Ergonomics Intervention at COMNAVREG SW San Diego Mail Center Prevents Injuries"**—A routine industrial hygiene survey identified several physical risk factors at the Commander Navy Region Southwest (COMNAVREG SW) San Diego Dockside Mail Center. Heavy lifting and working in awkward postures while processing the large volume of mail handled at NAVSTA San Diego Dockside Mail used to put its mail handlers at risk for work-related musculoskeletal disorders (WMSDs). Funding was provided through the Navy's Hazard Abatement and Mishap Prevention Program (HAMPP) to revamp the mail room service area and purchase ergonomically designed equipment. The estimated savings to the Navy are $41,433.00 every year for a return on investment in 519 days, or approximately one year and five months.

## The Descriptive Abstract

A descriptive abstract simply describes from *an outside point of view* what the report contains. The descriptive abstract is a kind of prose table of contents. It serves the same general purpose as the informative abstract, but rather than reproducing the original report in small (like an informative abstract), the descriptive abstract *describes what the report contains*.

Here's an example of a descriptive abstract for an interim report that the Naval Postgraduate School at Monterey issued in 1987. The report is titled "Opportunities for Tropical Cyclone Motion Research in the Northwest Pacific Region" (author Scott A. Sandgathe).

Tropical cyclone track prediction problems in the Northwest Pacific region that need to be researched are reviewed from the perspective of the operational forecaster. This information is provided as background for the upcoming Office of Naval Research field exper-

iment on tropical cyclone motion. A short-term climatology of the frequency and spatial distribution of tropical cyclones is provided. Seven classes of operationally interesting track forecast situations are described. Each cyclone from 1982 through 1985 is tabulated in terms of these classes.

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Government and industry widely use both descriptive and informative abstracts. The informative abstract is generally more helpful, for it gives a reader more information. However, some kinds of research do not lend themselves easily to informative abstracts. Whichever kind you write, wait to compose the abstract (as you wait to draft your executive summary) until you have completed the final draft of your report. That way, you'll be sure you summarize only what is *actually in* the report.

## Abstracts for Articles

Many technical journals require that authors submit abstracts along with the articles they submit for publication. These abstracts are used in abstract databases but also often preface the articles themselves. Following is an example of an abstract published in the PubMed online database, an abstract that prefaced an article published in 2004 in the journal *Military Medicine*. The article was titled "Viral gastroenteritis: The USS THEODORE ROOSEVELT experience."

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Although the spread of disease on board Navy ships is not a novel concept, the medical department of the USS THEODORE ROOSEVELT recently experienced a significant outbreak of viral gastroenteritis while at sea. The impact on the crew and medical department is reviewed in this case report. The use of the Navy Disease Non–Battle Injury tracking system was validated. Furthermore, we proposed the placement of waterless, isopropyl alcohol-based hand-cleaning systems in strategic locations throughout the ship to help prevent and minimize the spread of future disease. Finally, more stringent recommendations regarding sick-in-quarters status and careful utilization of consumable resources are necessary components of an effective outbreak management strategy.

—Whittaker, D. R., Campbell, J. T., McCarten, M. N. D.,
Medical Department, USS THEODORE ROOSEVELT; report
published in *Military Medicine* 169 no. 9 (September 2004): 747–50.

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This abstract focuses on the medical department's conclusions about the experience they went through. Half descriptive abstract and half executive summary, it typifies abstracts that preface articles in military journals.

## "Key Words": Abstracts and Computers

Where will an investigator see an abstract? Now that libraries and researchers are making great use of computers, a researcher will typically turn to a computer abstracting service for online researching. The articles themselves may or may not also be available online.

If a researcher types in a key word or phrase in one of these computerized indexes, perhaps the term "missile detector radar," then the titles of all the recent articles on such radars will appear on the screen. The researcher can select some of these articles to investigate further, and the computer will put their abstracts on the screen as directed. By reading each abstract, the researcher decides whether to order the articles represented. By using computer links, researchers now have access to technical information from throughout the world.

On the Department of Defense "Report Documentation Page" (Standard Form 298), you'll not only supply an abstract, but you will also fill out a section called "Key Words." List there the terms that best indicate the substance of your report, both the subjects that it addresses directly and others that it touches on significantly. Take some care in selecting terms; don't make them too complex. In some cases, you'll have to conform to a printed list of standard terms.

For example, the documentation page for the article on tropical cyclone motion research (whose abstract appears above) listed "tropical cyclone motion," "tropical meteorology," "tropical cyclone path prediction," and "typhoon motion" as its key words.

## PASSIVE VOICE AND NOUN STRINGS IN TECHNICAL WRITING

One other matter is noteworthy in the abstract on tropical cyclone motion reproduced above: It is written in the *passive voice*. Indeed, in that abstract *every sentence* is passive, the main verbs being "are reviewed," "is provided," "is provided," "are described," and "is tabulated." Because principles of plain English insist that you avoid the passive voice as a general rule, such heavy dependence on the passive calls for comment.

Passive voice is widespread in technical writing. Why? Mainly because scientists have purposely used passive voice for decades. Instead of stating, "the chemist observed the experiment," scientists have usually written, "the experiment was observed," not only writing in the passive voice but also omitting all mention of the person doing the observation. The rationale is that (1) normally the results of the scientific investigation are much more important than the investigator, and (2) passive verbs make the sentence more "objective."

*"Passives are generally weak because they place a mushy emphasis on the thing done rather than on the doer. 'The battle was won by the Marines' is a flabby way of saying, 'The Marines won the battle.' 'I love you' is far more likely to get results than 'You are loved by me.'"*

—Argus Tresidder, former professor of English, MCDEC, Quantico

This rationale is only *half* right. Using passive verbs does focus attention on the receiver of a sentence's action. Often the object of the action is more important than the actor and deserves more attention. To say, "The feasibility of ocean surveillance platforms in detecting submarines has repeatedly been demonstrated" focuses attention on that feasibility rather than on who demonstrated it, and that focus may be perfectly appropriate, depending on your purpose.

But realize that such a statement is in no way more objective than a statement that identifies who did the demonstrating. Changing a statement to say "it *was concluded* that low-flying aircraft would not cause mines to detonate" is no more objective than saying "*we concluded* that low flying aircraft would not cause mines to detonate." The way you write the sentence doesn't change the facts or the objectivity; someone must have drawn the conclusion in either case.

Understanding this concept, modern technical writing experts recommend much less use of the passive voice than they once did. So should you rigorously correct the passive voice in technical documents you have to chop or sign off on? That depends. In circumstances where such rewriting won't make much difference, or where it will be highly controversial (say, where your boss was trained to use the passive voice and deems doing otherwise unprofessional), the improvement probably will not be worth the effort. However, wherever passive voice adversely affects the readability of a document in a major way or when you anticipate that the document will have very high visibility, you should at least put the executive summary into mostly active voice and perhaps go on to rework the "Conclusions" and "Recommendations" sections as well.

Another major problem plaguing technical writing is the wide use of noun stacks or noun strings. Noun strings longer than three or four words such as "aircraft car-

rier crack arrestor applications" (from one of the abstracts above) or "Commander Navy Region Southwest San Diego Dockside Mail Center" (from another one) frequently occur in technical writing. Although scientists are accustomed to the use of noun stacks, when present in great numbers or stretched out at length, noun strings can also help to make a document almost unreadable and unclear as well. Keep an eye out for this tendency, and if you find many noun strings in your own writing, consider breaking some of them up by the use of prepositional phrases ("crack arrestor applications *in* aircraft carriers," for example, or "the San Diego Dockside Mail Center *of* Commander Navy Region Southwest").

For more on these and other problems that affect technical writing, see the section on Plain English in the opening chapter of this book.

## OTHER TECHNICAL DOCUMENTS

Much of the writing in industry and business is very much like the writing in the naval services—letters, memos, and directives prevail in almost all organizations. While formats and styles differ from firm to firm, and one organization may use full-block style and another semi-block for its letters, a writer can usually recognize a letter anywhere and adapt to the required format quickly.

However, some technical documents differ greatly from standard naval correspondence or staff work. Such documents can be very troublesome for those naval personnel who have to compose them. Supply officers and others, for example, often have to write "specifications" for contracts. Also involved in the contracting process are "statements of work," which shipboard officers frequently have to write. While on staffs, many naval personnel will have to draft or revise "position descriptions," and then try to get those positions funded. Naval personnel will have to write many other technical documents from time to time.

You may find the office or lab you work with has put out a style guide to help you. If not, seek guidance for writing such documents from knowledgeable professionals, or from standard technical writing texts and sourcebooks such as those listed below.

## REFERENCES ON TECHNICAL WRITING

The following are two very helpful civilian textbooks on technical writing. Both of them cover the basic kinds of technical reports (reports, proposals, progress reports, etc.) as well as abstracts, executive summaries, technical illustrations, and so on. Each has gone through several editions.

- Mike Markel, *Technical Communication* (New York; Bedford: St. Martin's, current edition).

- Paul V. Anderson, *Technical Writing: A Reader-Centered Approach* (New York: Harcourt Brace Jovanovich, current edition).

  Another useful text is this dictionary of technical-writing terms and concepts:

- Charles T. Brusaw, Gerald J. Alred, and Walter E. Oliu, *Handbook of Technical Writing* (New York: St. Martin's, current edition).

  An excellent guide to technical editing is

- Anne Eisenberg, *Guide to Technical Editing: Discussion, Dictionary, and Exercises* (New York: Oxford University Press, current edition). This is a very practical workbook, filled with examples and exercises.

A terrific workbook on editing in general (providing practice on all those rules about punctuation, grammar, and style that we all once learned and but often have forgotten) is

- *The Copyeditor's Guide to Substance & Style* (Alexandria, VA: EEI Press). The third edition of this text (published in 2006) includes almost fifty pages on electronic editing.

Finally, a technical style guide especially designed for those who work as online technical editors is

- *The Microsoft Manual of Style for Technical Publications* (Redmond, WA: The Microsoft Press, current edition).

Beyond this, many naval or other military offices have their own research guides, which can be very helpful. Some of these are oriented specifically toward historical research while others are more technically or operationally oriented. Good ones are put out by the Marine Corps Historical Center, the Naval War College, and the Naval Air Test Center.

An excellent research source for researching military articles is the *Air University Index of Military Periodicals* (its database includes naval as well as general military journals). This index is available online. Also online is the "Staff College Automated Military Periodical Index" (SCAMPI), an index of military periodicals put out by the Joint Forces Staff College.

Finally, one should also become familiar with the resources used widely by naval and defense researchers, specifically the abstracting services put out by the National Technical Information Service (NTIS), the Defense Technical Information Center (DTIC), and (for logistics) the Defense Logistics Agency (DLA). Depending on the topic, there are literally hundreds of abstracting services upon which naval researchers might call. Librarians and subject-matter experts are proficient in this kind of data retrieval.