Intelligence Analysis in the Year 2002: A Concept of Operations

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A concept of future intelligence operations is offered here to help managers in government and industry move toward some shared expectations about the changes occurring in our business and the kind of new-technology applications that might be especially valuable.

Intelligence as it is done today will not serve US decision makers adequately in the years ahead. A new concept of operations is needed, with a focus on intelligence as it might be done ten years from now. The ten-year timing allows us to consider major improvements that can be made in our business using existing technology. At the same time, it helps to prioritize work on new information technologies now visible on the R&D horizon -- which is where today's R&D managers are having to make their investment choices.

Four major functions are addressed in this concept of intelligence operations -- collection of information, data interpretation, consumer support, and management. The concept postulates four related sets of changes in the way intelligence will operate in the future:

- Collection will be enhanced by allowing analysts and collectors to exchange more ideas and information at the working level.
- Data interpretation will be enhanced by extensive automated processing and correlating of information before the analyst sees it -- and by tools for rapid retrieval and visualization of information.
- Support to decision makers will be enhanced by using on-site intelligence officers and electronic networks to increase two-way communication between consumer offices and analytic components.
- Support to managers will be improved by automatically tagging and tracking information throughout the intelligence process -- giving managers measurable data on the contribution of particular collection and analysis to finished intelligence.

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A New Concept of Operations

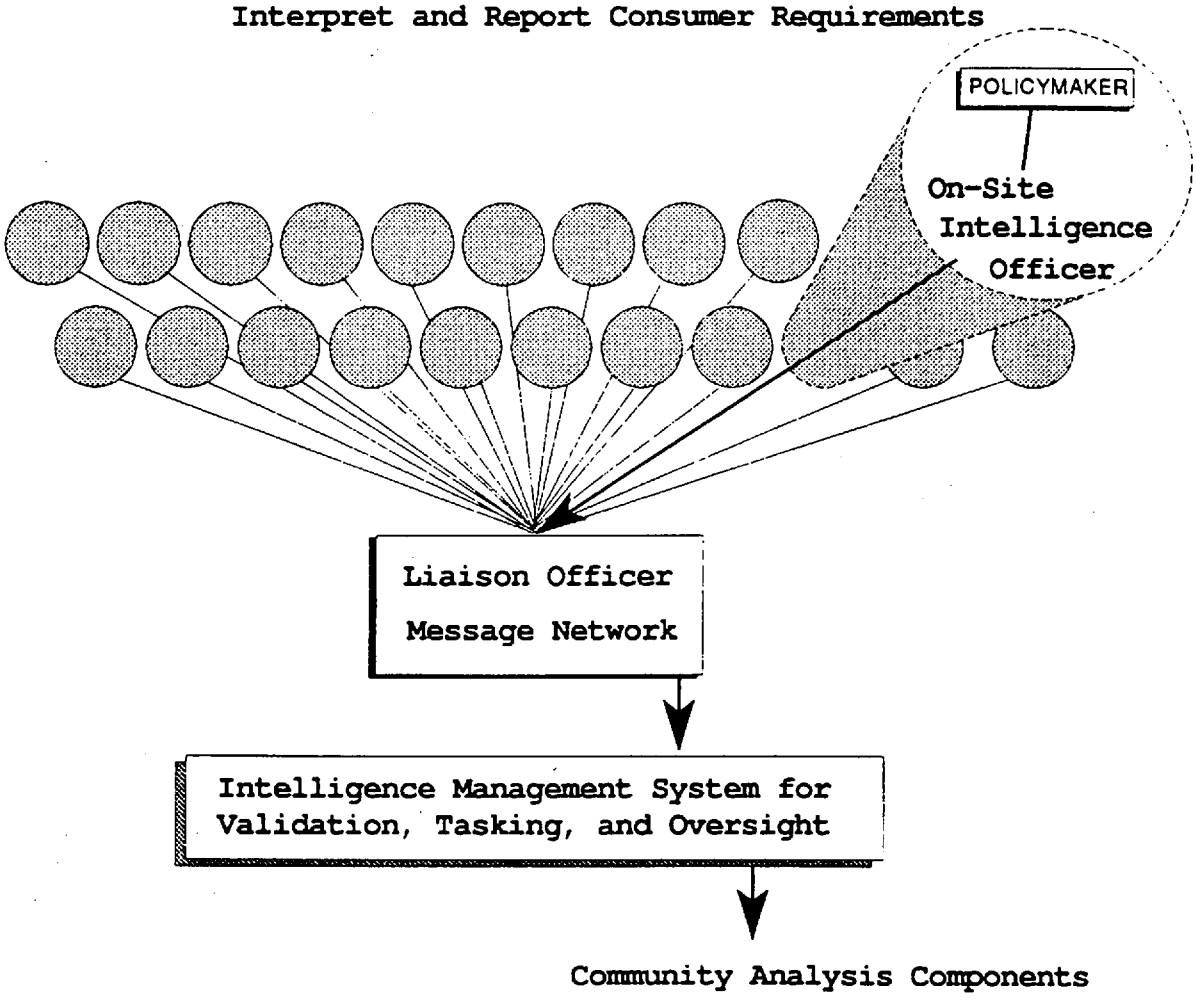
Our primary goals in redesigning intelligence will be to establish a new product line -- tailored services and information on demand -- and to greatly increase the productivity of employees, particularly collectors and analysts. These two goals are not achievable without an infusion of information technology into the intelligence process. Moreover, for the foreseeable future, they will not be achievable through the invention of tools that let *individual* employees continue doing their current jobs with greater efficiency. The goals require that we redesign intelligence operations to make optimum use of both human skills and machine capabilities.

Four decades of experience is available to help intelligence managers guide the design of new approaches. It is clear, for example, that intelligence has had considerable impact on US decisionmaking when analysts have had close contact with the relevant decision makers. Conversely, intelligence has often been unfocused and irrelevant when produced without an accurate sense of the consumer needs. Similarly, many collection successes can be attributed to close interaction between collectors and interested analysts, while many wasteful efforts could have been avoided if collectors had had access to information in certain analyst files. Reviews of intelligence failures sometimes point to important raw information that was not collected or given due regard. Management throughout the intelligence process has suffered from a lack of quantifiable performance measures and institutional data on intelligence usage. The list of lessons learned from experience is long.

Based on past experience, this paper looks at information technologies that are being applied today, and postulates a number of improvements that can be made in the way we operate. The concept outlined here has several key elements. A brief description is sufficient to guide discussion:

I. To focus intelligence activities more productively, we need to know our customers better. We envision a corps of intelligence officers who are on rotation to our consumers' staffs and who specialize in anticipating information requirements (see Figure 1). Information technology would be used to enable these liaison officers to send consumer-requirements messages to an intelligence management system at Headquarters. A management team there would oversee the assignment of due dates and lead responsibilities for addressing validated consumer requirements, sent in by individual liaison officers, and would assess overall patterns of intelligence demand. Equally important, the system envisioned in this concept would promote extensive informal communication between analysts and liaison officers, to help analysts understand what is needed and to help liaison officers know what is possible. (Today we have only informal systems for monitoring consumer requirements and for ensuring the coordination of responses among analytic components in the Community, so there are fairly immediate gains in productivity that can be expected from the proposed arrangements.)

Figure 1. On-Site Intelligence Representatives Interpret and Report Consumer Requirements

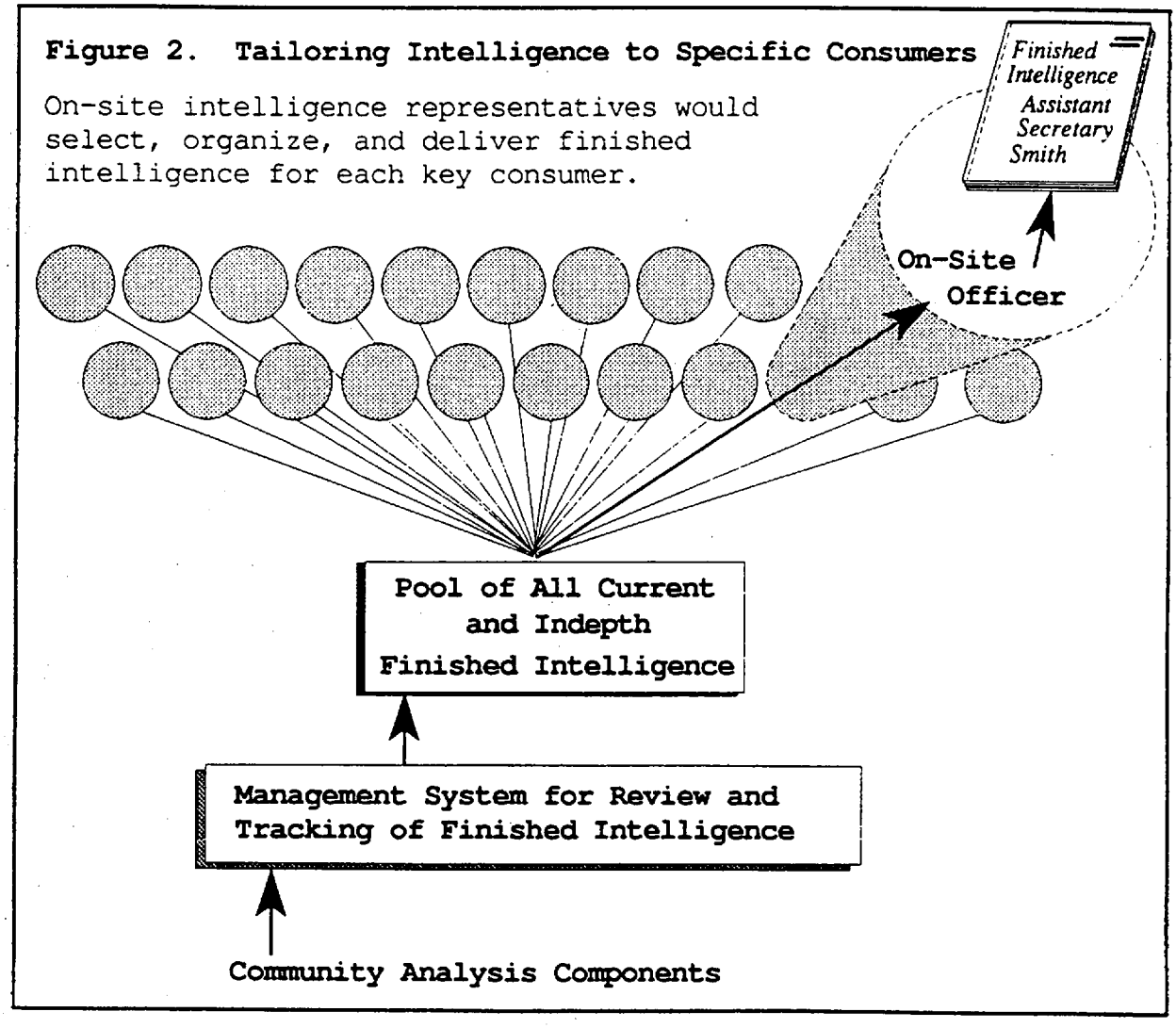


To focus intelligence activities more productively, we need to know our customers better. We envision a corps of intelligence officers who are on rotation to our consumers' staffs and who specialize in anticipating information requirements.

II. To tailor routine intelligence to particular consumers' interests, we need the ability to produce different presentations for each key customer. We envision final assembly and delivery of routine finished intelligence at the "point of sale," by the liaison officers most familiar with particular consumer needs (see Figure 2). Information technology would be used to provide an on-line pool of finished intelligence, in which each article contains a one-sentence synopsis, a one-paragraph summary, and more detailed text, graphics and other supporting information (such as biographies, maps, possibly video footage, selected raw traffic). Each liaison officer, on a schedule convenient to the particular consumer, would

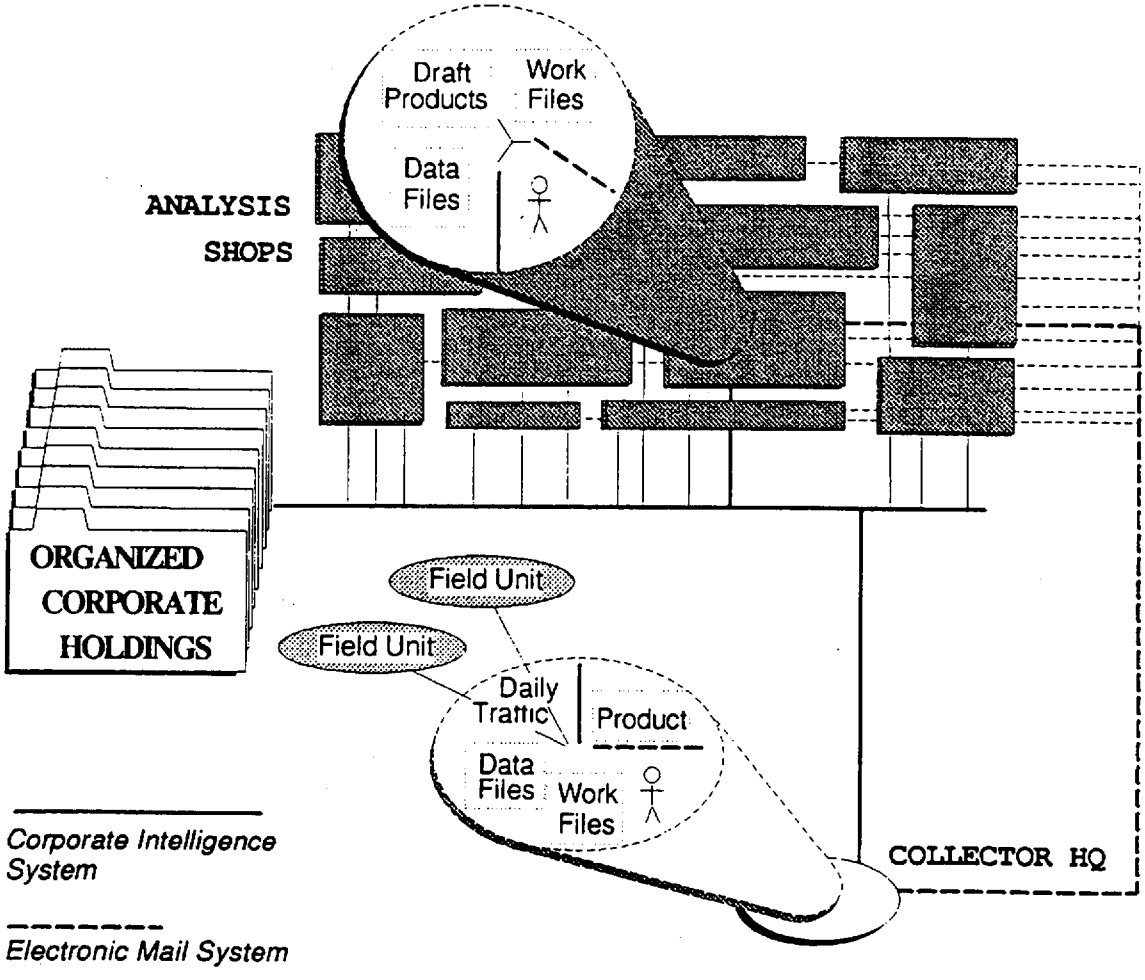
prepare a tailored collection of intelligence articles -- selecting the topics of interest, the amount of detail appropriate, and the order of presentation in the overall book. (The book can be printed on site or, for certain consumers, the "book" may be a multimedia presentation on an electronic display.)

The concept of tailored support to consumers includes the possibility that some consumers (or their staff) will want direct access to the pool of finished intelligence. The fraction of major consumers who are comfortable and proficient in the use of computer-aided information systems is likely to be small ten years from now, but a large fraction of their staffs will be quite capable of using the system we envisage for our liaison officers. The concept also embraces the expectation that there will continue to be multiple forms of contact between producers and users of intelligence, as is the case today.



III. To help analysts in their role of supporting and guiding collectors, we need improved communication at the working level and shared access to institutional knowledge. We envision information systems that give collectors easy access to all-source institutional knowledge on the targets of their efforts (see Figure 3). All-source reporting and refere information on people, organizations, events, etcetera, would be available to collection officers engaged in planning and assessing operations. In addition, electronic communicati systems would give collection officers easier access to analysts, and vice versa. Collector would be able to send preliminary findings to analysis components for comment, and anal would be able to send queries to the collection community. Communication would be refereed by management teams where appropriate, to maintain security, assess overall collection requirements, and prioritize collection efforts.

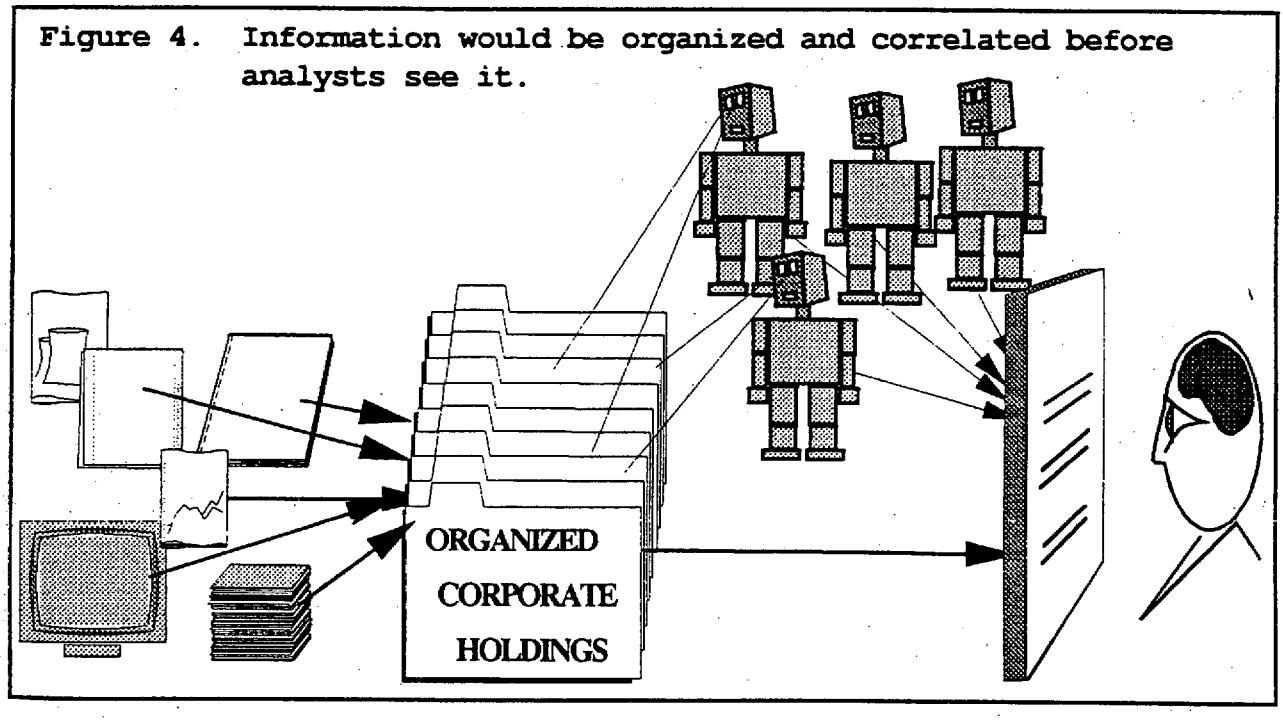
Figure 3. Collectors would have access to all-source institutional knowledge, through communication with analysts and corporate data holdings.



IV. To increase the productivity of the analyst corps, we need to reduce redundancy in overlapping analytic accounts, and facilitate collaboration on finished intelligence. We envision direct lines of communication across agency boundaries, enabling analysts with overlapping responsibilities to share drafts and supporting data. Intelligence on multinational and multidisciplinary issues -- which requires the involvement of many analysts -- would be drafted and coordinated more quickly and efficiently by installing tools for drafting, notation, and data linkage that are compatible with each other throughout the analytic community. Connectivity and compatibility would require the adoption of standards that might render much of our currently installed and planned information systems inappropriate -- a significant bureaucratic challenge.

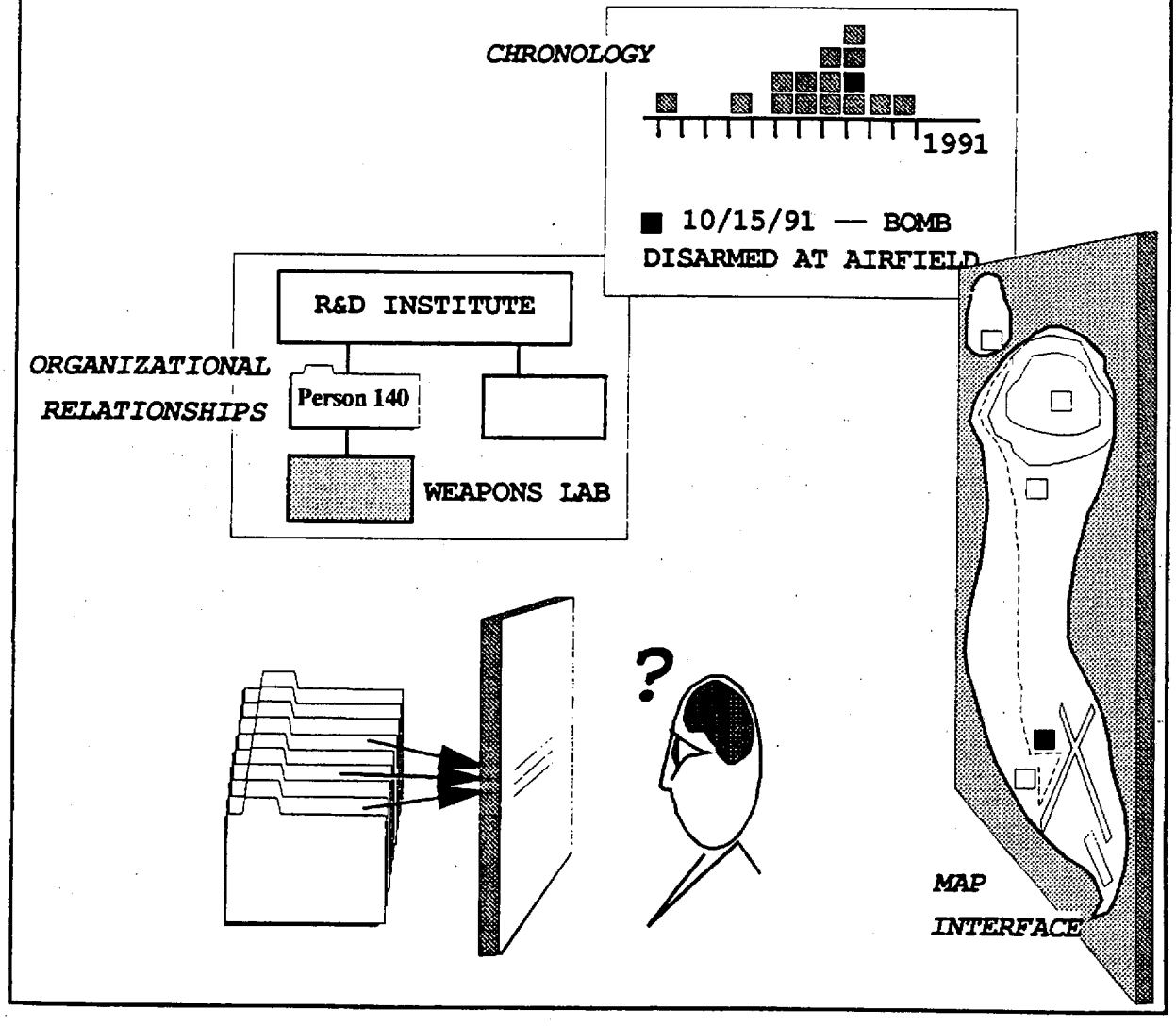
V. To vastly increase the exploitation of raw information, we need incoming data to be extensively processed before the analyst ever sees it. We envision a new system of document processing to organize and correlate raw data on behalf of users throughout the collection and analysis communities (see Figure 4). The most basic information (people, places, dates, and organizations) would be extracted and organized in a widely accessible corporate intelligence file. From there, raw information and extracted data elements would pass to more sophisticated processing operations within analysis components, where topic-specific organization and correlation would occur. In this way, analysts would receive raw information in a highly structured form, permitting more efficient use. Information technology would be used in two ways: to minimize the human labor involved in corporate and local processing, and to equip analysts with automated agents that would continually search among the unseen data for important patterns of information. This approach to data monitoring would greatly extend the reach of analysts beyond the small fraction of raw documents they can read each day.

Figure 4. Information would be organized and correlated before analysts see it.



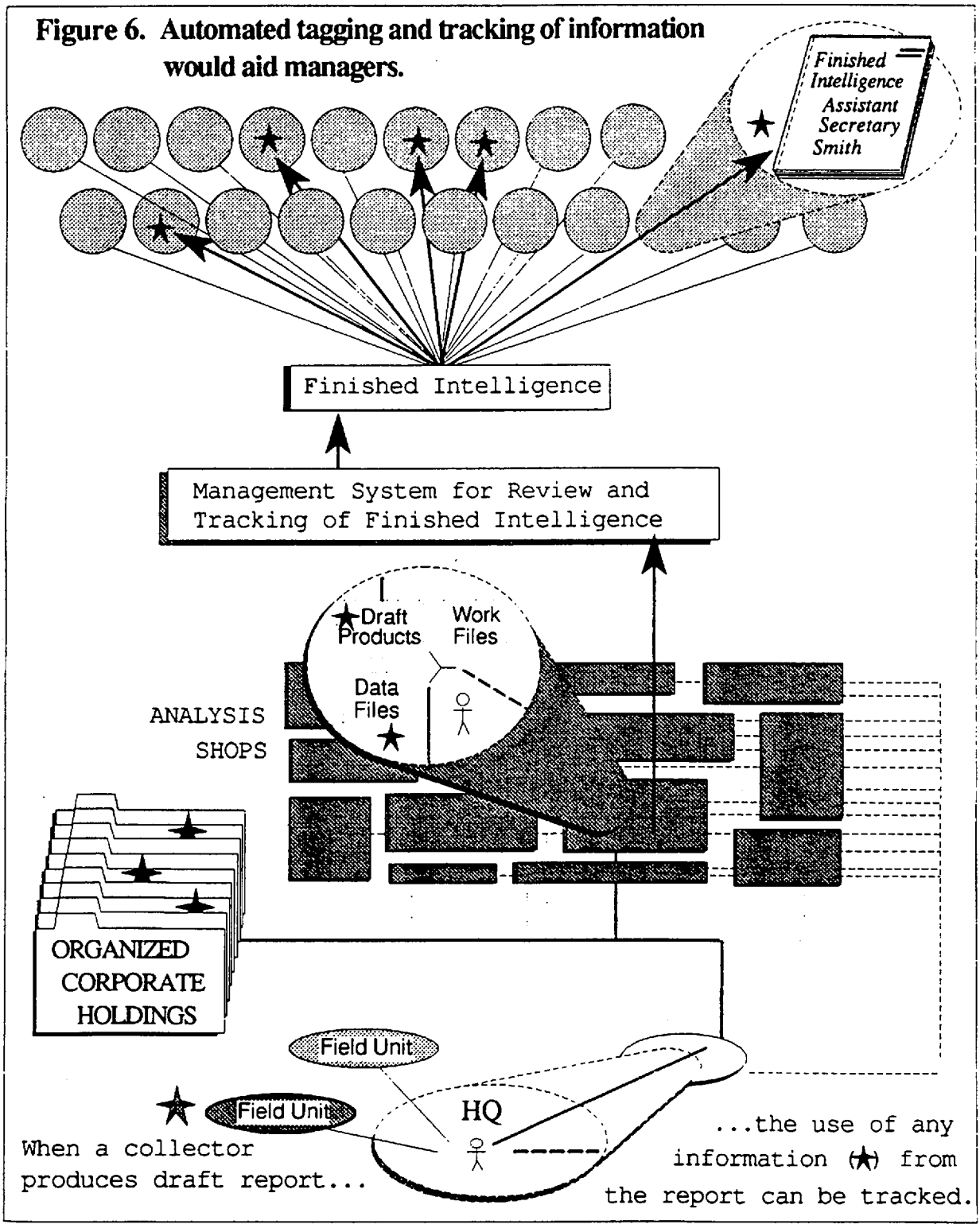
VI. To improve analysis of available information, we also need to make the retrieval and display of older corporate data more efficient. We postulate widespread use of desktop analysis tools that permit rapid search and retrieval of both documents and reference information, with multiple options for displaying results in ways that help analysts spot patterns and anomalies quickly (see Figure 5). Such tools have already been demonstrated in small-scale applications. Information technology would be used to speed and simplify the search, retrieval, and display of data -- so that analysts can follow their train of thought without computer-related distractions. Technology also would be used to expand the options available for information visualization.

Figure 5. Reference information would be easy to retrieve, with options for displaying patterns of information.



VII. To improve management of intelligence, we need concrete information on operations at every level of the process, available to managers at those levels. We envision automatic tagging and tracking of information throughout intelligence, as suggested in Figure 6.

Figure 6. Automated tagging and tracking of information would aid managers.



The information on process operations would give managers an improved set of quality control measures -- allowing management to assess responsiveness to requirements, the status of work in progress, support services, and other factors. Personal or organizational identifiers attached to the completed work would allow managers to track and compare different areas of work within the intelligence process, supporting more informed judgments about possible ways to improve the use of intelligence resources. Information would be available in real time, to support daily decisions by low level management. It would also be available in retrospect, for strategic planning -- informing decisions on collection priorities, reductions in analytic coverage or preservation of competitive analyses, and planning for flexibility and surge capability.

The infrastructure required to improve the analyst's interaction with consumers, collectors and each other will also support a wide variety of management aids. For example, we can postulate the assignment of analysts and collectors (and even liaison officers) to task forces addressing a particular intelligence problem -- without removing the participants from the surroundings in which they are most productive.

Implications for Developers of Systems and Technologies

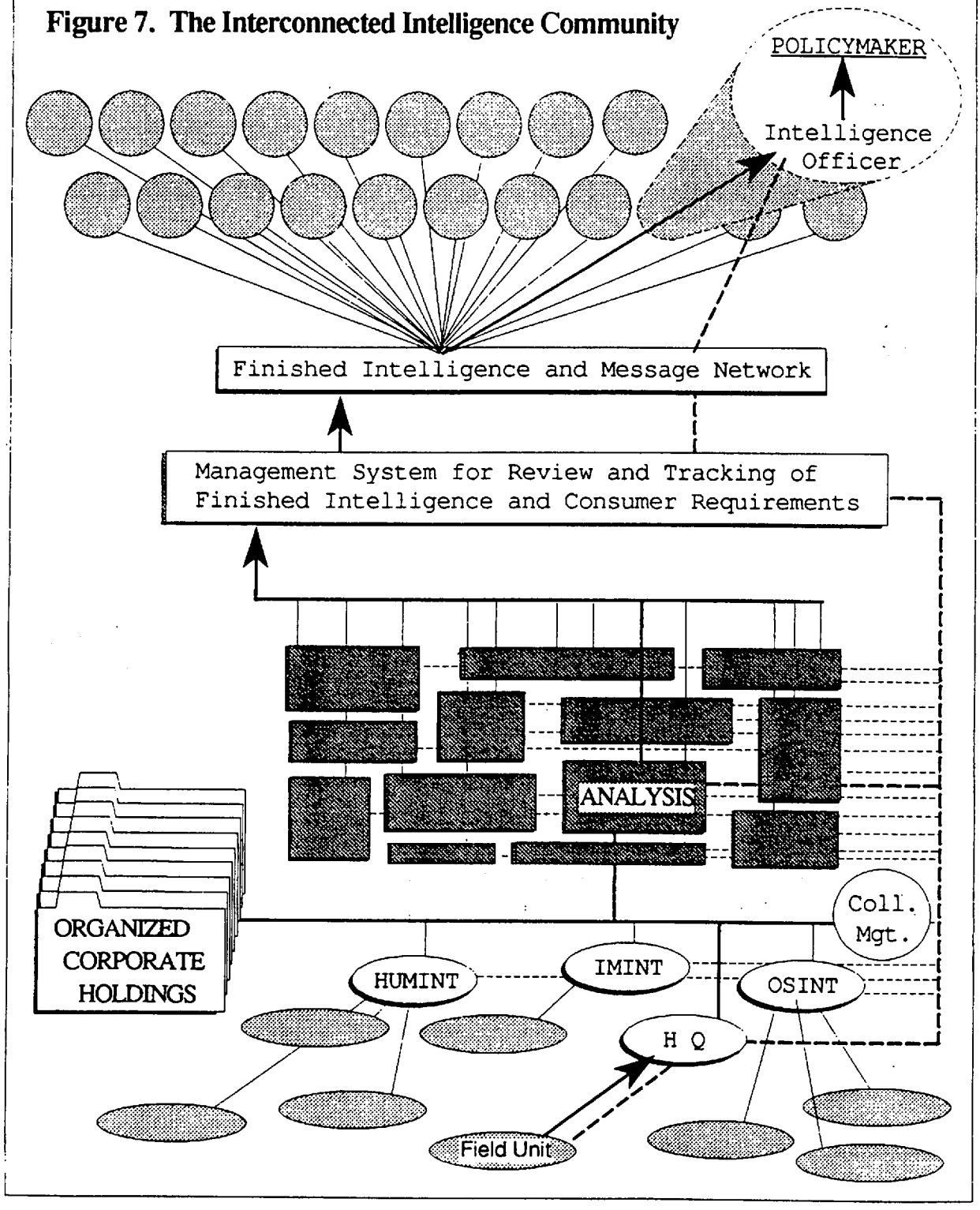
The concept described here is based primarily on existing technology. The research and development needed for implementing this concept is primarily applications research (prototyping) and system development (engineering). Nevertheless, there are several elements of the proposed operations that will need every possible improvement that can be wrung out of technology developers in time for application:

- Joint word processing capabilities for simultaneous users would help address the coordination and collaboration problem. There would be a ready market for technology that allows a number of contributors to nominate changes to a shared draft, to see the changes nominated by others, and to track the final acceptance or rejection of those changes.
- Technology for automated tagging and tracking of information may advance further before we have to freeze our designs for a new intelligence architecture. Progress made in the private sector for process control and inventory management probably provides adequate technology for a very good data management system, but this is such a critical element in our effectiveness that it warrants the best possible effort.
- Security will necessitate the best available technology for protection of information during transmission across widely dispersed components, and for ensuring limited access to personal work files, sensitive data files, and management data -- on a need-to-know basis. Existing technology probably will support an acceptable initial environment, but some improvements may be needed to provide greater flexibility for accommodating assignment changes and fluctuating need-to-know conditions.

- We need new products from the private sector for word processing, note-taking, filing, search and retrieval, graphical display, etcetera -- all the things information workers do in the process of adding value to a data stream -- with the specific feature of interoperability. If an information worker cannot link notes and raw data to draft products without rekeying or separately transmitting them, he is going to be much less efficient. Today's technology supports the necessary integration of separate tools, in principle, but improvements could help to speed and simplify their use.
- Considerable improvement is needed in technology for automated processing of documents (text, images, or sound). Today's technology supports some initial procedures for automatically extracting place names, person names, dates, and a few other entities from raw text -- enough to make the establishment of the proposed corporate processing service feasible -- but the procedures would be imperfect and substantial human labor would be needed to establish the linkages among extracted entities. Moreover, the technology does not yet support much automated processing of audio or video data. There will be a great demand for technology that can permit automated extraction of additional information and better recognition of events and the relationship of people and dates to these events -- especially to permit analysts to quickly readjust their local extraction and correlation rules as intelligence issues change.
- Improved technology for paper document conversion will be valuable. Our backlog of hard-copy information is considerable, but existing conversion techniques are too expensive to permit much of this data to be incorporated into our most useful files. In addition to the backlog problem, there will be a continuing paper stream of incoming data that analysts need to use efficiently. We will need technology to be applied in scan-and-file devices that are as accessible and simple as copying machines.
- Technology for automated translation is needed at several steps in the proposed concept, if we are to make use of abundant and valuable open source information. We will be able to begin operations without automated translation, but will want to add it to our automated processing as extraction and correlation becomes possible in more languages. We will want to store raw information in original language, so that improvements in automated translation can be applied to previous holdings. And we will want to give employees the capability to retrieve foreign language information and review an automated translation of it -- imperfect though it may be -- to facilitate the identification of important data.

An important consideration in the development of the technologies and applications described here is that they should be almost intuitively usable when delivered. To a large degree, this will depend on smart application of existing technology, but there may also be a role for new technology -- particularly if it helps us bridge the gap between today's systems and the concept of a closely interconnected Intelligence Community, as shown in Figure 7. To make the transition to such a new operational concept most efficient, employees will need considerable training -- including off-hours assistance and self-help programs. There is likely to be a role for new technology that would permit efficient creation and continual updating of on-line training aids that are tailored to the specific responsibilities of individual users.

Figure 7. The Interconnected Intelligence Community



Looking Beyond 2002 -- More Changes to Come

The above concept of operations -- while helping to focus on possible near-term changes in the intelligence business -- probably represents only the beginning of a lengthy evolution. There are many upgrades to this basic concept that will need to be made, as better technology becomes available:

- Natural language understanding will be an important area for research using today's large computers, with the expectation that comparable computing power will be embedded in cheap workstations of the next decade.
- Similarly, speech recognition will be important as an easy means of communication with automated information aids. Analysts will need to pose queries to their files and reference data, dictate notes on their own or others' drafts, and teach their automated traffic monitors what to be looking for over the weekend.
- Automated correlation algorithms will be able to consider many more variables, and will be able to operate faster on far more data -- allowing automated agents to become more independent of the local data holdings. At the same time, storage technology will allow much greater volumes of information to be held locally. A new kind of analysis -- multi-database element correlation, of the sort done today by direct market advertisers at considerable expense -- might become simple and cheap using 2002-era technology.
- Communication technology will have considerable impact, connecting data and users around the world -- in cheap, commercially available services. It may also lead to the development of more efficient office infrastructures -- including such things as personal file access at the conference table, and smart calendars that remind the owner of employee birthdays, client phone message followups, etcetera.

The new technology developed during the 1990s may force us in the future to come up with more new concepts of operations, to guide planning efforts in the next decade. The pace of change affecting intelligence is expected to be enormous, as computing and telecommunications technology make a greater impact on commercial information services. We will find ourselves in competition with these increasingly global services, as they become more convenient to our own consumers and to foreign governments as well. We will have to remain near the leading edge of information manipulation, if we are to give the US Government a strategic advantage in the "Information Age." The most difficult challenge, in this fast changing environment, may be to accurately forecast the implications of the technologies evolving around us, with enough lead time to let us prepare appropriate policies and capabilities. Our best hope lies in an ongoing partnership with the private sector, to maintain a steady stream of prototyping activity that is always a generation ahead of the current operational systems.

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