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MEMORANDUM

From: Assistant Chief of Staff, Command and Control,
Communications, Computer, and Intelligence
To: Distribution List

Subj: INTELLIGENCE COMMUNITY OPEN SOURCE SURVEY

Encl: (1) Intelligence Community Open Source Survey, April 1992

1. The enclosure is forwarded for information. Mr. David Ross, the author, has produced a useful baseline for further discussion.
2. Following the recent announcement by the Director of Central Intelligence (DCI) of the appointment of Mr. Paul Wallner as the Open Source Coordinator for the Intelligence Community we anticipate the formation of a community working group and wish to ensure that all major Marine Corps consumer groups are represented as we articulate Marine Corps requirements and concerns in this area.
3. Addressees are requested to identify a point of contact for open source requirements and capabilities. HQMC POC is Mr. Robert Steele, voice (703) 693-5422, unclassified facsimile (703) 697-7216.

D. M. BLACK
By direction

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Intelligence Community Open Source Survey

**This study was prepared by David K. Ross
of the Office of Information Resources and
Kenneth E. Hughes of the Foreign Broadcast
Information Service. Comments may be
directed to CIA/OIR on (703) 482-3220.**

April 1992

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INTELLIGENCE COMMUNITY OPEN SOURCE SURVEY

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Note: This is a sanitized version of a classified report. The Executive Summary is entirely unchanged. This version does not include the Appendix, which is composed of excerpts of classified reports related to open source exploitation. The body of the report is generally unchanged.

INTELLIGENCE COMMUNITY OPEN SOURCE SURVEY

EXECUTIVE SUMMARY

1. During October 1991-February 1992 a team from CIA's Foreign Broadcast Information Service (FBIS) and Office of Information Resources (OIR) conducted a survey of selected Intelligence Community organizations to determine the Community's existing capabilities, projected requirements, and the perceived key issues and shortfalls for Open Source Intelligence (OSINT). A "pulsing" of the Community rather than a comprehensive study, the survey was designed to establish a baseline description of Community activities related to the collection, processing, analysis, and dissemination of openly available information. In the course of this effort, the survey team encountered a number of open source activities existing in relative obscurity or isolation both within the Community and in other parts of the Government. We have attempted to give visibility to these activities in the body of the report.

Key Findings

2. The survey identified two distinct categories of comment: remarks related to structural/organizational themes, and recommendations for specific actions deemed essential to open source exploitation. The greatest emphasis was on organization.

Structural/Organizational Issues

3. Community organizations almost without exception argued that the time has come to establish an appropriate Community body to facilitate, advocate, and develop a true Community-wide open source program. The consensus opinion was that what was needed was to establish a Community management office with resources and authority to implement near-term open source enhancement projects and to develop a long-term strategic plan for OSINT.

4. Throughout the Community there is a strong conviction that openly available information makes an increasingly significant contribution to each organization's mission. Nevertheless, despite new opportunities and efforts within various agencies, shortfalls identified in the mid-1980s regarding the Community's capability to exploit open sources remain. As a whole, open source exploitation is perceived to be uncoordinated and inadequate. During a period when virtually every organization contacted is under budget constraints, the need to coordinate activities is viewed as more essential than ever.

5. Most survey contacts saw the need to proliferate and integrate successful OSINT activities and systems throughout the Community, including programs and prototypes developed in non-Intelligence Community organizations and in the private sector. Survey participants frequently cited the need for vigorous and far-reaching coordination of existing OSINT operations and products beyond the informal or incomplete coordination that currently occurs.

6. Open source providers and users generally agreed that end-users should drive the OSINT effort and play central policy and management roles in an OSINT program. The consensus among survey participants was that the most tangible leverage that users could exert on day-to-day OSINT operations would be through a robust requirements and evaluation system, one that concerns itself not only with substantive collection priorities but also with functional requirements, i.e., the systems and procedures needed to make open source information accessible to users with precision and timeliness. The OSINT Subcommittee of the Scientific and Technical Intelligence Committee (STIC) has done considerable work to define and develop a prototype requirements system that would meet OSINT needs.

Specific "Capability Enhancement" Projects

7. Without question, the chief complaint of users of open source information centers on the data handling systems that are in place to deliver, store, and manipulate open source materials in a manner that is compatible with the analytical process. As a fundamental requirement, users cite the need for a comprehensive on-line open source directory that describes in detail what sources are available and how to gain access to them. Building on this cornerstone, users and collectors alike cite the need for a multifaceted communications architecture to link the various segments of the open source "exploitation chain" -- collection, processing, analysis, and dissemination -- into a flexible and responsive channel for information distribution, retrieval, and processing. While the overall design of this Community architecture is yet to be accomplished, a number of potential components of such a network are in operation, under development, or have been identified by open source organizations.

8. **Processing Technologies:** At the front end of the exploitation chain, two conversion processes stand out as critical enhancement requirements: the need to translate vernacular information into English; and the need to transform printed materials into electronic form.

Translation. There was a general consensus that human translation resources are inadequate for the needs of the Intelligence Community, particularly as the intelligence focus has changed from the Soviet Union and an overwhelming emphasis on Russian to other areas and languages. Current Community interest in machine translation (MT) centers on Russian and Japanese, with

active development efforts at other languages. The MITRE Corporation, in a study sponsored by CIA's Office of Research and Development (ORD), has conducted a comparative evaluation of government and commercial MT systems and has reached preliminary conclusions concerning the most promising technologies for further Community investment.

Conversion from hardcopy to softcopy. The use of scanners and optical character readers (OCRs) in the Community is widespread, but largely uncoordinated. An abundance of commercial scanner/OCR systems exist and are being used in various configurations around the Community. The prevailing opinion among those surveyed regarding these technologies is that they are useful but immature; they are limited by error rates, by their inability to handle the full range of existing fonts, alphabets, and paper formats, and by heavy labor requirements for input and editing. However, CIA/ORD has recently conducted a study of OCR systems, which indicates that OCR technology is developing rapidly and soon it may be feasible to economically convert large quantities of hardcopy materials into electronic form. (U)

9. **Data Bases:** As another critical element in an overall Community architecture, data base creation and linkage is perceived to be a high priority by nearly all interviewed organizations. Numerous Intelligence Community components maintain electronic archives, but as a rule these are not freely accessible to all potential users and many exist for the exclusive use of small segments of the Community. Other data bases of open source materials exist exclusively as hardcopy collections, while some materials collected are not systematically cataloged or maintained in a data base at all. Solutions offered by survey participants to the problems of data base accessibility include the construction of communications "gateways" to remote and distributed data bases, in the large scale digitization of hardcopy materials, and in the creation of Community archives designed to provide permanent storage for otherwise perishable data. A plethora of data base models and systems exist within and outside government, one of the most prominent of which is the Defense Technical Information Center (DTIC) Defense Gateway Information System (DGIS), which allows access to several data bases with a single connection. (U)

10. **Analytical Tools:** The processing, delivery, and storage of open source information leads to the point at which data is manipulated and analyzed to generate an intelligence product. A universal concern expressed was that improvements at the collection and processing end of the open source cycle would lead to the user being overwhelmed with data. Consequently, open source users were unanimous in their call for ADP tools that will support information sifting, prioritization, collation, visualization, and product generation. A number of prototypes and working models exist in the Community, most notably the ASAP system developed by the Foreign Science and Technology Center (FSTC) and the CATALYST system developed by CIA's Office of Scientific and Weapons Research (OSWR). A variety of other profiling and sorting capabilities are

featured on numerous Community ADP systems, but the thrust of user comment was to design a uniform data manipulation "toolbox" that could be exported throughout the Community. (U)

Other Open Source Issues

11. Despite the emphasis given information handling concerns, open source issues do not begin and end with the analyst workstation. Timeliness of collection and delivery was considered an urgent issue by virtually every organization. Subsumed under structural/organizational themes was the issue of developing a Community collection plan -- essentially, a coordinated strategy for what open source information is collected, and by whom. This was perceived to be particularly important for three increasingly important open sources, gray literature, foreign television, and commercial data bases. (U)

12. Another key issue being faced by all organizations surrounds copyright and intellectual property rights. These legal restrictions on the use of many open source materials have the potential, at the very least, of inflating the cost of Community open source exploitation as more open sources are tapped and of complicating the free exchange of information within and among government organizations. Many of those surveyed would like to see a coordinated Community approach to dealing with copyright. (U)

13. Another urgent task viewed by most organizations is a liaison role, the need to integrate Community open source efforts with those of other government agencies and the private sector. Obviously, exploitation of openly available information is not limited to the Intelligence Community. Non-intelligence organizations are involved in the same fundamental issues that face the Community, and there is agreement by intelligence and non-intelligence components alike that redundant activities should be limited and experiences and capabilities shared whenever possible. (U)

MSI

BACKGROUND

14. This survey of open source exploitation issues in the Intelligence Community was undertaken during October 1991-February 1992 and was commissioned by then DDCI, Richard Kerr. As indepth studies of the Intelligence Community and within the Central Intelligence Agency had been completed in 1986 and 1991 respectively, the decision was made to pulse the Community to determine if the issues identified in those studies accurately described the current situation, rather than initiate another comprehensive study. The purpose of this effort was to identify issues and make general observations, rather than to make recommendations to deal with those issues.

15. The two aforementioned studies used to establish the survey's baseline were the Intelligence Community study Exploitation of Open Source Information (DCIC 10012-86, March 1986), and the internal Central Intelligence Agency study, The Strategic Planning Working Group Task Force on Open Source Collection and Exploitation (September 1990). The first study was prepared by the Executive Steering Group for the Exploitation of Overt Information. The culmination of efforts initiated in 1983-84 by the Scientific and Technical Intelligence Committee (STIC) and the HUMINT Committee to address needs for scientific and technical intelligence, this report was the result of working groups composed of members across the Intelligence Community examining specific open source issues. The report identified key issues and made several organizational and budget recommendations to rectify identified shortfalls.

16. The second study identified several key issues/gaps in open source exploitation within CIA and made recommendations to deal with those issues. An Open Source Program Management Team (OSPMT) emerged from the process, comprised of the deputy directors of the Foreign Broadcast Information Service (FBIS) and the Office of Information Resources (OIR), the two offices in CIA most involved in open source collection and processing. The OSPMT was charged with managing the report recommendations and producing a strategy for developing CIA's open source capabilities.

17. The Community open source survey was managed by the OSPMT, and the actual survey team was composed of an officer each from FBIS and OIR. The team visited primary Intelligence Community components to interview them on their open source activities and the issues or problems they perceived, using a standard questionnaire. The survey results were highly dependent upon who represented the organizations, those contacts' background and interests, and when the contact took place. The survey was not a scientific polling.

18. In addition, recognizing that open source information issues are not limited to the Intelligence Community, the team also met with non-Intelligence Community government organizations which

are prominent in collecting, handling or providing information services, including the Library of Congress, Defense Technical Information Center (DTIC), Department of Commerce/National Technical Information Service (NTIS), and National Aeronautics and Space Administration/Scientific and Technical Information Program. Had there been more time for a more comprehensive polling, other intelligence units and particularly other non-Intelligence Community government and non-government organizations could have been identified and contacted. Two

19. The pace and relative significance of the survey evolved over the course of the four-month period it occurred. The key development was the December 1991 creation of a Joint Open Source Task Force under the chairmanship of CIA's Deputy Director for Science and Technology, James Hirsch. The Task Force included representatives from NSA, DIA, State/INR, and CIA, as well as the National Intelligence Officer for Science, Technology, and Proliferation. Chartered by the new DCI, Robert M. Gates, the Task Force's mandate was "to assess how better to coordinate the US effort to collect, process, store, analyze, and disseminate open source intelligence," with a report deadline of 15 January 1992. The Deputy Director of FBIS, Niles Riddel, was appointed chairman of the working group under the Task Force. That working group included representatives of the above-named agencies, plus participants from the Air Force Foreign Aerospace Science and Technology Center (FASTC), the Intelligence Handling Committee, and the HUMINT Committee. The partial results of the Community survey were used as a basis for identifying the primary issues for the Task Force members and were in general confirmed by the Working Group's discussion of open source issues. When the Task Force's recommendations were forwarded, the Community survey effort continued.

Definitions

For the purposes of the survey **Open source information** was defined as *publicly available information appearing in print or electronic form*. Open source may be transmitted through radio, television, newspapers, maps, and books/journals, or it may be distributed by commercial data bases, electronic mail networks, or electronic media. It may be disseminated to a broad public, or to a more select audience. Whatever form it takes, open source exploitation involves no information that is classified at its origin or is acquired through covert means.

Exploitation of open source materials within the Intelligence Community context was defined as *use of open source information to support intelligence analysis or operations*. Although much of the open source material collected and processed by Intelligence Community members has significant use in other military, government or private applications, the emphasis of the survey was on exploitation to support intelligence requirements.

20. Throughout the survey, the team was generally well-received and found that most organizations were eager to speak on open source issues. That interest was accelerated by the creation of the Joint Task Force. The issue of open source exploitation was obviously a current topic of high interest on many organizations' agenda, and many had been involved in ongoing efforts to address open source shortfalls, either internally or as a part of a broader effort. Both NSA and DoE were engaged in internal reviews related to open source exploitation. Several organizations were participating in the Open Source Intelligence (OSINT) Subcommittee of the Scientific and Technical Intelligence Committee, under the chairmanship of FASTC. Created about the same time as the survey team initiated its efforts, the OSINT Subcommittee has been an important force working to raise and deal with open source issues. Also, many contacts made during the survey had been involved in the effort that led to the publication of the 1986 Exploitation of Open Source Information and were consequently well-aware of the main issues and recommendations from that report.

21. The survey team met with some skepticism during the survey. Several contacts pointed to the effort in the mid-1980s and noted that none of the significant recommendations had occurred on a Community-wide basis. Many noted that something had to be done more than simply identifying issues. Some contacts thought that a survey conducted by "providers" would be less likely to identify shortfalls of providers or adequately represent "user" interests. Moreover, some contacts were critical that the current survey was being done by CIA, and not under the auspices of the Intelligence Community Staff.

GENERAL OBSERVATIONS [1]

22. Despite considerable differences between organizations in the sophistication of their use of open source materials, several consistent themes emerged in the survey. In general, the survey discovered that the primary issues identified by various organizations had changed little since the 1986 Exploitation of Open Source Information, and that the issues identified internal to CIA were generally consistent with issues across the Intelligence Community. The major difference between the two baseline studies and this survey was a greater sense of urgency; Community organizations almost without exception argued that it is essential that something concrete be done to improve open source exploitation within individual organizations and the Intelligence Community. There was also the perception that open source had come into its own.

New Open Source Environment

23. There was basic agreement among the survey's contacts that the open source arena had continued to expand since those reports had been completed, and that the potential value to the Intelligence Community of open source information was greater than ever. Technological change and improvements in the worldwide information architecture had resulted in more information being produced and marketed in a variety of useful forms: more is being published and broadcast, more commercial data bases are emerging, and new types of information are proliferating.

24. Worldwide political changes have also made a tremendous impact since previous studies were completed. The collapse of Communism, the end of the Cold War, and the subsequent opening of East Europe and the former Soviet Union has had an enormous impact on the value of openly available information from those and other areas. On one hand, the opening of former closed societies has made more information, and particularly more information of intelligence value, available. On the other hand, intelligence focus has changed from an overwhelming emphasis on the former Soviet Union and its allies to a greater emphasis on a broader variety of issues, particularly those dealing with the Third World, proliferation, and economic competitiveness, on which high-value open source information is available. This change in focus has had an enormous impact on Department of Defense organizations. FASTC's mission, for example, has been greatly impacted by this change in focus: they reported that they are moving from a 90% Soviet emphasis to a 50% focus on "Rest-of-World" issues, which has an immense impact on their open source needs and processing. Other organizations reported similar shifts.

1 The observations in this section are based on the survey team's experience and were not an explicit part of the survey effort.

25. With these changes, the relative importance of open source information in comparison to other sources has increased. The 1986 Exploitation of Open Source Information noted that open source information was identified as a key source at that time by analysts, but that it tended "to take a back seat" to other information sources. The current survey reflected a perception by many that no longer was open source information secondary to other sources.

User/Analyst Emphasis

26. A central theme that emerged in the survey was the need to focus on the end-user to ensure that the entire open source exploitation effort will be responsive. This was naturally the focus by analysts/users, who complained that too often providers imperfectly determined users' needs and often did not consult users before making programmatic decisions. As one user put it, too often service is at the inclination of the provider, not according to the needs of the user. However, even those who represented providers -- collectors, ADP professionals, librarians -- generally accepted the premise of a user-driven system. Much of the focus on the need for better organization of OSINT at the national level related to the need to help formalize user input into the entire process.

Cooperative Efforts

27. There is a broad spirit of cooperation across both Intelligence Community organizations and others like DTIC, NASA, NTIS and the Library of Congress. Most organizations engaged in open source exploitation are eager to share experiences and if possible resources. In general, the greater an organization was involved in trying to solve some of the issues in open source exploitation, the better the survey team's reception was and the more interested the organization seemed to be in establishing cooperative alliances. Many, if not all, of the organizations surveyed are under budget constraints that encourage such resource sharing. One reason why many contacts thought that some sort of OSINT national manager was needed was to formalize the "clearinghouse" function that is incompletely served by the combination of formal and informal alliances and organizations that currently exist. Some of the primary non-Intelligence Community organizations involved in open source exploitation (e.g., DTIC, NTIS, and FRD) are self-sustaining; like many Intelligence Community agencies, they see part of the key to their continued existence to be broadening their customer base and expanding their "market."

28. Some existing organizations serve as models for trying to coordinate open source-related activities:

--The STIC, in addition to the creation of the OSINT Subcommittee, has sponsored issues-driven working groups related to open source exploitation that have been vehicles to identify

problems and suggest or develop solutions. The S&T community in general and the STIC in particular have long-recognized the value of open source materials and the need for more systematic exploitation efforts. In many ways, S&T analysts have been the primary catalysts for improvements in information handling of open source materials. Other ICS committees, such as the Information Handling Committee, have also played important roles in coordinating open source activities.

--In March 1991 an Intelligence Community Librarian's Committee (ICLC) was established. Initially focused on working-level cooperation on systems and technical services, the ICLC quickly expanded to incorporate issues such as copyright, data base and information sharing, and customer service. The ICLC includes representatives from most libraries in the Intelligence Community, and all IC librarians are welcome to join. The effort has grown rapidly and is a model of a low-cost, cooperative program that identifies problems and implements solutions.

--Outside the Intelligence Community the CENDI group of information agencies (Commerce/NTIS, DOE/Office of Scientific and Technical Information, NASA/STIP, DTIC, and the National Library of Medicine) provide a model for cooperative arrangements. Engaged in providing information to a specific set of customers, CENDI agencies meet regularly to discuss issues of interest, share software and expertise, and work together to address similar information handling problems.

Internal Information Infrastructure

29. Having a solid internal infrastructure to handle information appears to be essential for effective OSINT exploitation. Such a requirement is not purely an open source issue, but the massive volume of data involved in open source information underscores the importance of infrastructure. Those agencies that have invested in their libraries and library services and that have a robust automated data processing infrastructure better exploit materials now and are better poised to exploit growing volumes and different types of open source information in the future than those organizations that have not made such investments. The latter organizations tend to have limited access to open source information, have a limited number of "expert intermediaries" inhouse to help locate and filter information, and tend overall to have the least knowledge of what information is available. What open source information they receive is limited to relatively few sources and often is received in hardcopy form, which is not easily digested or manipulated. Such organizations tend to be most wary of getting access to more information.

Beyond the Intelligence Community

30. The need to effectively exploit openly available information is not an issue limited to the Intelligence Community, as other organizations inside and outside of government are

involved in the same task. Unconstrained by some of the limitations of the Intelligence Community, such as strict security procedures, and accustomed to operating within a culture that often encourages the free exchange of information, many of those organizations have exploited the information explosion better than Intelligence Community organizations have.

31. The Intelligence Community would benefit by establishing cooperative and contractual alliances with non-Intelligence Community organizations to support Intelligence Community requirements, by sharing when possible with them, and by exploiting their experiences and services. In the open source arena, the boundary between what is and what is not the Intelligence Community makes little difference, except in relation to ensuring that classified information does not pass that boundary. The potential payoff of establishing closer connections would appear to be high: some external organizations are, for example, better poised to collect gray literature than the Intelligence Community because they have existing relationships or are not "tainted" with an intelligence agency label. Such organizations could provide information of intelligence value that would be costly, if not impossible, for the Intelligence Community to collect. For example, NASA has access to foreign aerospace information through long-standing organizational and personal relationships. The Library of Congress' Overseas Operations Division, which operates field offices in six overseas locations, benefits from institutional exchanges, long-standing field collections, and its standing as the world's greatest library. The volume collected, while including much of no interest to the Intelligence Community and with not the same urgency associated with the intelligence mission, greatly outstrips Community collection efforts in volume. Many government and non-government organizations have invested heavily in developing means to sort, access, and deliver such information once it has been collected. An organization such as DTIC, for example, is by definition in the information exploitation business, geared to meeting the specific information demands of its customers.

ISSUES AND SHORTFALLS**Community Organization**

32. The primary purpose of the survey was to identify shortfalls in OSINT exploitation throughout the Community, as well as to identify innovative efforts to deal with those problems. The issues and shortfalls the survey identified fall into two categories: those of an overarching philosophic structural/organizational nature, and those that are more specific, either focused in one part of the exploitation cycle (collection, processing, delivery and use) or impacting the entire cycle. The fundamental overarching issue identified in the survey was the need for OSINT to be organized as a separate discipline at the national level. [2] The survey's preliminary results on this topic were confirmed by the Joint Open Source Task Force's emphasis on organizational issues.

33. While the existing distributed architecture for open source exploitation worked relatively well for some organizations, from an overall point of view the Community is disorganized and not well-positioned to fully take advantage of the intelligence opportunities afforded by the new open source environment. The reasons given for the necessity of a Intelligence Community organization that managed open source exploitation were several:

--Although open source intelligence nominally falls under HUMINT and other Intelligence Community Staff committees (such as the Information Handling Committee, the Scientific and Technical Intelligence Committee, and the Economic Intelligence Committee) are interested in the collection and use of open source information, none of these committees focuses on OSINT. OSINT needs a manager who can integrate the entire range of activities required to solve problems and who can serve as an advocate to ensure that its requirements are met and that, in a declining resource environment, it get an appropriate share of resources. While the perceived value of OSINT had risen, there was concern that open source exploitation activities, largely because of their distributed and uncoordinated nature, were vulnerable to disproportionate budget cuts. [3]

2 One contact believed that an Intelligence Community focus was too narrow, and that what was required was a national effort that would encompass the Intelligence Community, other US government organizations, and private industry.

3 Despite the sense that open source information's availability and general value had grown significantly during the past few years, most organizations noted that their efforts to exploit such information had been limited by budget constraints within their organizations.

--OSINT needs to coordinate activities to ensure that resources and experiences are appropriately shared and unnecessary duplication is avoided. Essential to such coordination is a Community-wide open source information architecture that would link the Intelligence Community together. Also, a Community organization could play an important role as a formal "clearinghouse" for ideas as well as sponsor efforts of potential Community-wide value.

--Some contacts perceived that collection and processing activities with an ostensible Community focus were too parochial in how they operated, i.e., collection and processing organizations favored customers within their own agency at the detriment of those outside of their agency. Those contacts believed that a Community body is needed to help "level" the playing field.

34. The perceived need for Community organization is not new. The 1986 Exploitation of Open Source Information report had recommended the creation of a formal Open Source Information Exploitation program, managed under the auspices of the Executive Steering Group for the Exploitation of Overt Information, within the Intelligence Community Staff (ICS) structure. The STIC "OSINT Subcommittee" was created in large part to serve that organizing function for the S&TI community, and its avowed purpose at the time of its creation was to eventually evolve into a full ICS Committee equal to other committees. The STIC effort was partially as a result of the frustration related to the failure of the 1986 recommendations to be enacted. Some contacts favored a committee on the ICS model, others a strong program manager, while others were concerned that such a strong manager would inevitably add to parochialism, depending on what organization that manager came from. While survey contacts disagreed on the details of how open source ought to be organized, there was overwhelming agreement that some sort of organization was essential.

35. The need for some kind of overall Community organization was largely founded on the need for an open source information architecture, an integrated communications network that would effectively tie the distributed collectors/processors to their customers. The Joint Open Source Task Force, in fact, recommended that as the first priority of any Community organization that would be established. Many contacts did not see such a need limited to the open source environment, but more as an information-sharing issue that should encompass all classification levels and source types.

Requirements

36. Closely related to the perceived need for an Intelligence Community body devoted to OSINT issues is the need for a more formal requirements system specifically designed to deal with open source collection issues. Even when not viewed as a Community issue, but as an issue for their own organization, open source

requirements were seen as needing some sort of formalization. The impression of many of those surveyed was that open source issues were handled in a haphazard way within individual organizations, that collection had been largely driven by perceived needs rather than by close coordination with the end-user, that there had not been a structured review of what precise prioritized needs existed, and that there was no systematic evaluation of the quality of what was collected. Moreover, A related theme on which many contacts commented was the need to task low-cost, low-risk collection mechanisms prior to tasking more sensitive and costly clandestine or technical systems. The recommendations of the Joint Open Source Task Force echoed this emphasis on requirements, as did the DCI's response.

37. Because of the volume of material inherent in exploiting OSINT materials, the STIC OSINT Subcommittee's position on requirements was broader. In addition to substantive collection requirements, "functionality requirements" -- the ADP tools necessary to effectively manipulate the large volumes of data inherent in the OSINT world -- also needed to be systematized in their opinion. The need for analyst tools is discussed in more detail below.

Broad Issues

Information Handling

38. Information handling, being able to handle a growing amount of information without overwhelming the collection infrastructure, processing capabilities, and especially the user, was universally seen as the key substantive issue related to improving open source exploitation. Every organization contacted expressed concern with their ability to handle the volume of open source information currently available. Some of the large Intelligence organizations, such as CIA, DIA, NSA, and FASTC have relatively robust information handling infrastructures, and yet they still viewed the increased requirements and information associated with comprehensive exploitation of open source information as a primary challenge. Smaller organizations with less robust infrastructures have trouble dealing with the amount of information they receive now in a coherent manner. Virtually every agency expressed the fear of overwhelming the user, reflecting the common view that the primary problem was not collecting more, but sorting through materials to sift out the right information for the end user.

39. Information handling as an issue was closely identified in the survey with the need for a Community-wide architecture linking collection, processing, utilization and dissemination. Information handling issues impact every aspect of the open source cycle. Large amounts of data need to be collected, preferably in a form that simplifies eventual use. Processing that information, particularly putting it into forms that can be utilized -- using

machine translation to get from the vernacular to English, converting into softcopy format, or putting into a data base -- is another part of the issue of allowing the end-users to have access to the information they need in the form they need it. Developing automated tools for analysts to exploit large volumes of information and developing strategies for library automation are other important elements of the information handling problem. Effective information handling also requires an overall architecture necessary to then disseminate data.

Timeliness

40. Nearly every organization surveyed stressed the growing importance of timeliness of collection and delivery. While the need for timely information has always been a key requirement, that requirement has emerged as being of even greater significance in the changing world environment. Many of the survey contacts passed on anecdotes about how they were under pressure to respond to a wider variety of questions faster. The need for more timely information has been underscored by events in the former Soviet Bloc, where in the past "news" that was a week or two old was often adequate because such "news" was controlled by the central apparatus and was often of relatively limited value. Furthermore, the control of information was so centralized that most information came from a single location, Moscow. Now, with a more open press and broadcast industry, and with former provincial cities now national capitals, intelligence analysts need as current possible information on the emerging states and developments in them; the "news" is of relatively high value.

41. Likewise, within the economic, scientific and technical intelligence arena timeliness is of growing importance. One contact gave the example that in the past a typical S&T analyst might be engaged in evaluating the development of a Soviet weapons system, which typically took a long time to develop and was incrementally based. For such a study, "old" information was of high value, and often information collected that was a year old was perceived as being "new" information. Intelligence focus is shifting to issues where product or weapons development cycles are much faster, and it is essential that OSINT supporting such analysis is collected and processed in a more timely manner than in the past. If information on an emerging technology is not collected immediately, translated quickly if necessary, and disseminated to the appropriate analyst, it may be too late to have an impact.

Security

42. Security concerns related to OSINT exploitation took three different forms in the survey. One, voiced by such organizations as NSA or CIA, was the need for OSINT exploitation to be accomplished in such a way that protected sources and methods and did not reflect an agency's specific intelligence mission. Another security concern voiced related to computer and

communications security, the risk inherent in attempting to create a network between organizations to share data that met the security requirements of the Intelligence Community and individual agencies.

43. Another, quite different, concern was voiced by organizations such as DOE and military intelligence components where only a portion of the organization was engaged in an intelligence function. Such organizations wanted to ensure that unclassified information was not delivered in a "classified envelope" which reduced access to the information or the information's utility to other components within the organization. For example, if unclassified information was transmitted through classified channels, was an annex to a classified intelligence report, or could only be accessed in a SCIF, its utility was reduced for such organizations. They did not want security constraints, designed to protect classified data, to limit the utility of unclassified, open source data. *

Copyright

44. Copyright limitations were perceived to have an important impact across the open source spectrum in limiting how information can be used and shared. Not only is the cost of obtaining copyrighted information a critical consideration, but copyright law may limit how such information once collected can be stored, shared and manipulated -- key issues when an overall strategic goal for most Intelligence Community organizations is to integrate open source data with other sources, create appropriate data bases, and share that data across organizational boundaries. Many agencies contacted indicated that their legal counsels were reviewing copyright limits. A recurrent suggestion was that one potential benefit of creating a Community OSINT body was that such an organization may be in a good position to negotiate with some data providers, such as commercial data base vendors, on adjusting normal copyright limitations and costs. [4]

Collection Issues

45. The need for improved collection of open source materials was an area of broad concern across the Intelligence Community and is closely related to overall Community program management and requirements. There was a consensus that a Community collection plan needed to be developed, coordinating what needed to be collected and which collector should do the collecting. Although there organizations with the charter to some types of collection for the Community, most organizations also rely on their own collection efforts and information provided from other US

4 *Some organizations, such as CIA's Office of Resources, Trade, and Technology (RTT) are actively involved in negotiations with data base vendors to amend current costs and limitations. It is unclear whether negotiating purchase of such data from a broader Intelligence Community point of view would be advantageous.*

Government (e.g., Library of Congress, NASA, DTIC, NTIS) or commercial organizations (hardcopy vendors, commercial data base vendors, etc.) to meet their needs. Within this distributed open source collection environment three general issues emerged:

--The need for **dedicated, expert collectors** to focus on OSINT requirements for the Intelligence Community.

--**Efficient collection**, i.e., the need to ensure that there is no unnecessary duplication in collection efforts, and conversely that all organizations have appropriate access to collection mechanisms.

--**New source exploitation**, the need to systematically exploit new sources, whether those new sources have emerged because of the opening of formerly closed societies or because new types of valuable information sources have become available.

Dedicated, Expert Collectors

46. A recurrent theme expressed by those surveyed was the notion that open source collection needs collectors who are both expert and dedicated. Many contacts complained that too much collection in the open source arena is performed by those who do not have the training to appreciate open source collection as a discipline and who lack the training in specialized disciplines to effectively collect against technical requirements, or is assigned to those whose focus on open source collection is a secondary duty at best.

47. Collection expertise is partially a function of experience in the field, of having established a collection infrastructure founded on knowledge of sources and methods, and of long-established contacts and exchanges. Such primary OSINT collectors as FBIS, the Foreign Maps and Publication Procurement Program, NTIS, and the Library of Congress' Overseas Operations Division all have this kind of expertise. Continuity, especially continuity at overseas sites, appears to play a significant role in the success of these programs. Collectors also must be experts in the kinds of information they need to collect. Expert collection requires a thorough knowledge of requirements, especially in technical areas; it is much more than a straightforward logistical function. NASA uses collectors with appropriate technical education backgrounds to select foreign information for their collection. Expertise by collectors can also make a significant impact on the pre-sifting function, of ensuring that only information of value is collected. Information collected of no intelligence value negatively impacts the entire open source cycle, as it requires collection resources, processing resources, can overwhelm information handling systems and, most importantly, submerge the user with unwanted materials.

48. The consensus was that collectors also need to be dedicated, that open source collection should be their primary

duty. In those instances where open source collection was not the primary responsibility -- or, in some cases, a formal responsibility at all -- collection suffered. Many open source materials are perishable, and dedicated collection is required for timeliness; other materials, such as gray literature, may only be available for collection during a limited window.

Efficient Collection

49. Many survey contacts noted that separate collection mechanisms often make sense. If materials are collected commercially, there does not need to be one central mechanism: dealing directly with the data base vendor or commercial vendor may be the most efficient and timely means to meet individual agency requirements. Some collection meets specific organization requirements and may have only peripheral value to other organizations. Those agencies may have the right expertise to target their organization's precise requirements and the use of a centralized collection mechanism makes little sense.

50. Nevertheless, if duplication of effort is unwarranted those surveyed agreed that it is a waste of resources. Their concern directly related to the need for a Community organization and especially a Community requirements mechanism, to ensure that efforts are not unnecessary and that, when appropriate, various organizations have access to collection mechanisms or what is collected by others.

New Sources

51. "New" sources may be sources that existed in the past but have changed in intelligence value (e.g., foreign television, newspapers from cities that were provincial capitals but are now national capitals), materials that have not been collected in the past (e.g., economic data, certain types of gray literature), or new kinds of information based on technological developments (e.g., electronic networks, commercial imagery, geographic information systems, foreign commercial data bases, or other softcopy, electronic materials). The basic issue as identified by those interviewed was the need for a means of evaluating such sources and, if appropriate, collecting those materials in a systematic, comprehensive way. Some of the key new sources include:

--Foreign commercial data bases. The number of foreign commercial data bases, especially in Europe and Japan, has steadily increased in recent years. Use of such data bases may provide more effective, and cheaper, collection than current hardcopy procurement, as the material is in electronic format, has sometimes been translated into English, and specific items of value may be selected without screening entire journals or documents. Evaluation of these sources, especially as they proliferate, have important implications for hardcopy and overseas-based collection

efforts, as well as on conversion of hardcopy materials to electronic form. [5]

--**Foreign television.** In many countries television has become an important agenda-setter, and, as demonstrated by television coverage of the Gulf War, the coup in the Soviet Union, and the Yugoslav civil war an essential source on fast-breaking developments. The value of foreign television is especially of interest to those engaged in political analysis.

--**Foreign geographic information systems (GIS).** GIS put map and geographic data in forms that is much more easily manipulated, stored and shared than hardcopy materials. GIS has the potential for significantly impacting the relative value of geographic information to analysis.

--**Commercial imagery.** Strides in commercial imagery may make a significant impact on support applications, such as map-making. While of greatest interest to end-users, such as military units, unclassified maps are much more useable than classified maps.

--**Gray literature.** Gray literature has relatively high specific value because of its focused, and often detailed, nature. Gray literature's relative value has grown while it has proliferated in a variety of forms.

Gray Literature

Gray literature deserves special attention, as it is an area of collection concern to virtually every agency. Current efforts in collecting these materials are decentralized and in general uncoordinated. Increasingly, gray literature is available in commercial data bases or through networks, such as INTERNET. Organizations outside of the Intelligence Community, such as the NASA STI Program, DOE/OSTI, DTIC, and the Library of Congress, have significant roles in gray literature collection and processing, although much of it does not get accessed into data bases and is largely untapped. For example, gray literature collected by the Library of Congress through a Russian national in Moscow is not currently systematically evaluated for intelligence use. A Community requirements and tasking organization could help make a big difference in coordinating this important arena.

5 Despite the value of commercial data bases, many materials will continue to require hardcopy collection because of the value of graphics that are not available in electronic form. OIR/CIA Library completed a Foreign Commercial Data Base Study in April 1991 and is in the process of producing a study on electronic delivery of journals. In 1991 over 3,000 journals were available full-text online from commercial data bases.

Processing Issues

52. Increased volumes and types of open source materials have resulted in greater challenges to the effective processing of that data, especially in terms of dealing with the need for timely delivery of that information to the user. During the survey three key processing issues were identified:

--Translation of foreign language materials into English in a timely manner, either using human translators or machine translation.

--Conversion of hardcopy materials into softcopy electronic format.

--Processing of information into a data base that can be shared across Intelligence Community boundaries.

Translation

53. Nearly every organization contacted commented on the need for quick translation of foreign language materials into English, underscoring the lack of qualified human translators to meet that need. This issue has been a long-standing problem with what was a former emphasis on Russian-language materials, but it emerged as an even greater problem after the Soviet Union collapsed and former "minor" languages became national languages for successor states and non-Soviet areas (the Middle East and particularly the Far East) have become of greater intelligence interest. Several organizations bemoaned the lack of qualified Japanese translators available for the Community. High-quality translation and fast translation services were universally cited as important current shortfalls. [6]

54. Related to the shortage of qualified personnel to translate materials is the need to ensure that those personnel are utilized efficiently, and that in particular translations are shared across the Community and no duplication of effort occurs. FBIS manages a Central Translation Service (CTS), a data base of what has been translated or is in the process of being translated, but every organization engaged in translation thought that CTS needed to be upgraded to achieve its mission. There was a widespread perception that, even with a shortage of translation resources, some materials have been and are being translated by multiple organizations.

6 *While translation is a high priority, some contacts noted that the translation process should not interrupt the timeliness of delivery of materials in the original language to those with the language skills; others noted that they wanted to see the vernacular, particularly to pickup subtleties often difficult to translate. In many cases, users want the information in both the vernacular and English.*

55. Another important aspect of translation is the development of machine translation (MT) systems to reduce the need for human translators, or at least serve as a sifting mechanism to determine where scarce human translation resources should be used. MT efforts are focused at two organizations, FASTC and FBIS. For nearly 25 years FASTC has invested in and used SYSTRAN MT technology. The Community's interest in MT extend well beyond Russian and Japanese, and a number of individual MT efforts are working on Arabic, Chinese, German, French, Spanish and other languages. SYSTRAN is not the only -- and perhaps not even the most promising -- MT system under development. The MITRE Corporation, in a study sponsored by CIA's Office of Research and Development (ORD), has conducted a comparative evaluation of government and commercial MT systems and has reached several preliminary conclusions concerning the most promising technologies for Community investment. The MITRE final report is expected to be published in 1992.

56. FASTC makes extensive operational use of current MT output in Russian and, along with FBIS, is focusing on development of a workable SYSTRAN process for Japanese. Other organizations surveyed indicated that, in their opinion, the current quality of MT was insufficient to support analysis, although in some cases it is used to help scan materials by translating book or article titles, tables of contents, or citations. PC-based MT systems are already available, and as the technology continues to develop MT has the potential of serving as an analytical tool as well as make a critical contribution to dealing with the full-text translation load. [7]

Softcopy Conversion

57. In order for open source information to be useable and easily manipulated, most organizations involved in intelligence analysis put a high priority on the need to convert hardcopy materials into to softcopy, electronic form. Increasing amounts of information is available in electronic format (commercial data bases, electronic publishing, networks, geographic information systems), but a high percentage of published information, particularly foreign-source information, is and will remain for the foreseeable future in hardcopy. Often information in data bases is only abstracted and indexed, and not available in full-text. The use of scanners and Optical Character Readers (OCRs) in the Community is widespread, but largely uncoordinated. The interest in maintaining the graphics associated with original hardcopy items further complicates the issue; images can be stored, but are difficult to integrate with text that is converted to ASCII format. Only the text can be interactively searched. Overall, the

7 *MT is most useful for scientific, technical, legal or economic articles that deal with precise vocabularies. According to one contact, some analysts preferred MT to human translation precisely because of the precision in translating technical terms.*

prevailing opinion regarding scanner/OCR technology is that it is useful, but is limited by error rates, by its inability to handle the full range of existing fonts or alphabets/characters, and by heavy editing requirements.⁸ However, this currently immature technology is rapidly developing and OCR capabilities will continue to significantly improve in the future.

Data Base Creation

58. Closely related to conversion into some sort of softcopy format is the issue of the creation of data bases that can then be used across organizational lines. Most of those surveyed noted that they would like to see collected materials of value put into a data base format and then have access to such data bases created by others if appropriate. Whether in full-text formats, or abstracted and indexed (with hardcopy full-text originals available), data bases institutionalize and broaden information utility. Many data bases are available commercially or from such non-IC agencies as DTIC, NTIS, NASA, the Library of Congress, or DOE. But few data bases within the Intelligence Community that are primarily composed of open source materials are easily available to others, with the exception of FASTC's CIRC data base and FBIS/JPRS materials. Some hardcopy materials are processed into libraries, but such material is usually only accessible internally. Often, as in the case of attachments to intelligence reports, open source material is difficult to retrieve and is merged with classified holdings. More importantly, much material that is collected is not systematically cataloged. It may go to a single requester, or, as in the case of gray literature collected by entities like the Library of Congress, may simply be stored without processing. Once collected, the material is often "lost", simply because it is not put into any sort of central repository and cannot be easily identified or retrieved. Virtually every organization surveyed wants a more systematic approach to data base creation and then for such data bases to be shared across the Community.

Support to Users

59. Repeatedly in the survey the team encountered the basic assumption that open source exploitation needed to be user-driven, that every facet of the open source exploitation cycle needed to have its ultimate focus on serving the end-user. To be of use, open source information needed to be collected in response to user requirements, it generally needed to be translated into English,

⁸ Error rates are highly dependent on the quality of the material converted: high-quality originals scan well, but materials that have been copied, faxed, or filmed do not. For illustration purposes, a 1991 study indicated that a high-end OCR system converting 1.5 million pages a year would require a staff of 21 just to edit documents for accuracy. Those figures have been reduced by more technical advances.

and it needed to be delivered in a timely fashion. Once available to the user, other issues emerged as well:

--The need for an on-line catalog of open source data bases and sources.

--The continued need for "expert intermediaries," information specialists, to assist the user in getting the right data.

--The need for delivery of that data in a form useable to the user at the user's workstation, and the tools to access, sort, and manipulate the data.

On-line Catalog

60. A recurrent complaint voiced during the survey was uncertainty of what is available around the Community. In many ways this was perceived as both a subset of the need for a Community communications architecture and a Community requirements system. While a problem even within organizations with a robust ADP and information infrastructure, many potential users at smaller organizations were not aware of what is currently available, even from major sources. While occasional hardcopy directories of open source materials have been produced, these directories have in general not been disseminated widely or maintained as current documents.[9] In general, classified materials are relatively easy to identify and access, and it is easy to find out what is available on any issue. However, a complaint about open source materials was that one does not know what is and what is not really available. A catalog, accessible electronically at a user's workstation, that would describe what is available and where it is available was considered a significant open source requirement by many in the survey.

Expert Intermediaries

61. Even such catalogs were perceived by users to be of limited value. Users could not expect to be able to know all available resources, when a particular source would meet their needs on a specific project, or how to best tap such resources. Even for those users who might have such capabilities, the issue of timeliness could be a problem. The vast majority of contacts noted the need for specialists who could effectively tap open source information sources for the users. For most organizations such expert intermediaries were both part of the analytical function, in the form of research or intelligence assistants or technical information specialists, or resided as a part of the organization's library services.

9 The most recent Intelligence Community-wide directory was A Compendium of Open Source Data Bases (IPC 91-10001) produced in May 1991.

62. The library was seen as an important part of the information infrastructure, both as a repository for information itself and as a repository for information retrieval skills. The ideal expressed by many users was for all information, open source and classified, to be available at a user workstation for those who had the inclination and skill to utilize those resources, but also there was a recognition that analysts may or may not have the time, ability, or inclination to tap all data sources. One contact noted that analysts were paid to think and analyze, not to retrieve information. A related observation was that to be most effective, such expert intermediaries needed to be as close as possible to the end-user.

Tools

63. Users wanted information at their workstations, at their desks, in forms that they could use. In most cases, particularly where the emphasis was on all-source analysis, survey contacts noted that it is also essential that such information be integrated with classified materials. In general, users can be relatively certain that they have access to appropriate raw classified materials at their desks: they want the same certainty when dealing with unclassified sources. The survey team often heard that when producing analytical products, users felt that the actual source -- except as a measure of credibility -- was often unimportant, that in terms of information requirements to do their work there was no difference between classified and unclassified materials.

64. To ensure that users have the "right" information, much of what has been discussed previously must occur. Open source requirements based on user needs must be developed, responsive and timely collection must occur, and the information must be processed and accessible. However, many contacts believed that such "delivery to the doorstep" was insufficient, as there is usually a multiplicity of appropriate data sources, and even with expert intermediaries helping locate and sift such data, the sheer amount of information may still be overwhelming. The key in the opinion of most open source users is the requirement for the development of automated analytical tools:

--a "gateway" to gain access to a number of data sources with a single connection, using a single protocol. Some data base managers and vendors already employ basic gateways to a limited number of data bases; ideally such a gateway could give access to all appropriate data bases, classified and unclassified, simultaneously. DTIC's Defense Gateway Information System (DGIS) is the best-developed such gateway, and DTIC is engaged in upgrading capabilities. Other gateways are also being developed.

--automated tools to further sift materials, sort data in priority order, cluster like data together, provide automatic links between records and facilitate relational analysis, integrate various sources, and provide visualization tools. Several

commercial products provide some capabilities, but most contacts believed that much work is necessary to develop and integrate many of the tools.

65. The importance of tools for dealing effectively with open source materials is one of the key issues of OSINT; many contacts argued that without such improved capabilities, improvements to collection and processing would be of marginal value. Particularly within S&T organizations work has been performed to develop needed tools. FSTC has developed the ASAP set of tools, which are used increasingly by several organizations. Within CIA, the Office of Scientific & Weapons Research (OSWR) has developed the CATALYST concept of tools, and currently the Office of Resources, Trade and Technology (RTT) is developing the TIES system to deal with the issue of effectively manipulating information within the user's environment. Part of the overall requirements system advocated by the OSINT Subcommittee of the STIC is an emphasis on "functional requirements" and the need to formalize, integrate, and proliferate tools throughout the Community and in effect create an analyst "toolbox." Some of those surveyed emphasized that information requirements and functional requirements have a symbiotic relationship: without the right information, tools, no matter how elegant, are useless for answering analytical questions; without the right tools much of the information, no matter how rich its content, may be useless because it cannot be exploited.

Dissemination

66. The timely dissemination of open source information throughout the Intelligence Community was also a concern for users. Part of the key to effective dissemination has been discussed above in relation to processing (i.e., making sure that information is processed in a way to make it broadly accessible across the Community), part in terms of support to analysis (i.e., ensuring that users are aware of such resources), and part in terms of creating an overall architecture that ties the system together in a coherent way.

67. Dissemination was not viewed as merely ensuring that users have access to the same raw information, but also ensuring that users could share the various value-added activities that individual organizations may perform. Many organizations perform significant value-added functions, such as translation of foreign language material, publication of collections of translated items, abstracting of full-text items, sifting of massive amounts of collected material to meet collection requirements on select issues, and even, as in the case of FBIS' Analysis Group, publishing analysis based wholly on open source materials. While some activities are routinely shared across organization lines, such as FBIS/JPRS selection and translation, or FASTC processing of materials into the CIRC data base, not all such activities are. Many of the survey contacts indicated that such value-added activities should be shared as much as possible.

LIST OF COMMUNITY SURVEY CONTACTS

Below is a list of contacts made during the survey. In some cases, only the primary points of contact are listed and the survey team met with others within the organization. As the primary purpose of the survey evolved to support the Joint Open Source Task Force, some agencies primary input on open source issues occurred during the task force process, rather than during the survey.

AIR FORCE FOREIGN AEROSPACE SCIENCE AND TECHNOLOGY CENTER

(formerly Foreign Technology Division)

Tom Pedtke, DX
James Canfield, DX
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AIR FORCE CHIEF OF STAFF FOR INTELLIGENCE

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DEFENSE INTELLIGENCE AGENCY

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Ruth Mullane, Library
George Thompson, ODT

DEPARTMENT OF COMMERCE

Robert Gallagher, Office of Intelligence Liaison
David Shonyo, National Technical Information Service
Fred Haynes, National Technical Information Service
Phyllis Genther, Japan Technology Program

DEPARTMENT OF ENERGY

Art Haagsma, Office of Intelligence
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DEPARTMENT OF STATE/INR

Phil Wilcox

DEPARTMENT OF THE TREASURY

Michael Romney, Intelligence Support Office

INFORMATION HANDLING COMMITTEE

Fred Harrison

NATIONAL SECURITY AGENCY

John Kelly, T5
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LIST OF COMMUNITY SURVEY CONTACTS, cont.

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LIBRARY OF CONGRESS

James Armstrong, Overseas Operations

Louis Mortimer, Foreign Research Division

DEFENSE TECHNICAL INFORMATION CENTER

Kurt Mulholm

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

John Wilson, Scientific and Technical Information
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