Appendix G
Laboratory Directorship at SRI—Engelbart's Experience

The following account is based on SRI project files and interviews with a number of SRI staff members directly involved, including Dave Brown, Roy Amara, Bonnar Cox, Jerre Noe, Don Scheuch, Jack Goldberg, John Wensley, Earle Jones, and Bert Raphael.

Although Doug Engelbart's two decades at SRI saw monumental innovation and accomplishment, the environment was not always to his liking. In interviews and some articles about him, he relates his struggles with his administrative responsibilities and, at times, his SRI management.[1] Simplistically put, Doug believed that in some cases his SRI supervisors either didn't subscribe to his vision or perhaps didn't trust his ability to pursue it within the SRI framework. On the other hand, the sizable (at least for SRI) early funding that he received from SRI could not possibly have come from a set of uniformly disgruntled or skeptical managers. By way of partial explanation, he freely admits never having had a good grasp of the responsibilities lab directors face at SRI. So, partly to explore how such duties constitute a diversion for such visionaries and partly to provide a record of his dealings with his SRI peers and managers, we will explore this aspect of his stay at SRI. Beyond the personality differences one might find in any organizational experience, Engelbart's discomfort may come down to this: enjoying an environment that can offer a long-term opportunity to pursue one's goals, contrasted with the need to find and manage the resources necessary to carry them out. This process became critical as his group gained laboratory status. He called his lab the Augmentation Research Center or ARC.

Understanding Engelbart's position, first as a project leader and then as a lab director, requires understanding SRI's culture, which gives staff members who seek research contracts great freedom, but also heavy responsibilities, primarily for attracting sufficient outside funding to support their work. While SRI tries hard to tide its people across their natural funding gaps, its narrow profit margins mean that only limited funds are available to provide that protection. Also, research project leaders are responsible for defining projects, both technically and financially, and administering or managing them to the client's satisfaction. If a project leader does all of that well, a supportive, almost collegial role with his managers usually results. On the other hand, clear evidence of technical or financial trouble invites management participation at any stage of a project.

To understand the management issues surrounding Engelbart, it is helpful to divide his time at SRI into three parts: a gestation or investment period (1959–1964), a laboratory or operational period (1965–1975), and the termination period (1976–1977). This staging could apply to any growth area at SRI and a typical manager's role varies across such stages. According to Engelbart's account, the initial phase was characterized by a couple of disconcerting situations. As Engelbart embarked on pursuing his vision, his first manager suggested to him that he needed to become more practical or down to earth. It is hard to know just how appropriate this guidance was, but clearly Doug's future progress would depend on defining how his augmentation concepts could be realized and in this formulation stage, they were often hard to voice. In any case Engelbart did not appreciate such advice and solved this first problem by transferring to another laboratory. His second manager, again according to Doug, created a more serious problem, the unsolicited imposition onto Engelbart's newly won ARPA project of a colleague with a more traditional view of software and computing. Given Engelbart's singular view of how things were to be done, plus his strong desire to lead his own effort, an immediate and substantive conflict arose. Imposing a project team member with or

[1] Stanford and the Silicon Valley–Oral Histories, Engelbart interviews, Nos. 2 and 3. Found at http://www-sul.stanford.edu/depts/hasrg/histsci/ssvoral/engelbart/engfmst3-ntb.html.

above a project leader was contrary to the culture at SRI, where a new project is almost always led by the person who won it. Engelbart thought this second manager's action was important enough to recount over 20 years later.[2]

A review of SRI records and conversations with those directly involved suggests that Doug may not have been able to express his vision in a way that captured the imagination of his supervisors, or at times even his clients. The title of his first 1963 ARPA project was "Computer Facilitation of Computer Programming," not exactly the rubric under which Doug's dream could find full expression and one that might lead a supervisor to decide the client wanted a narrow interpretation. For example, when project leader Engelbart wanted a computer of his own, his supervisor thought ARPA's offer of connection with a remote timeshare host was possibly good enough. Moreover, by early 1964 the ARPA program manager insisted on demonstrable progress,[3] almost certainly before Doug's larger notions of "computer-aided work" had relevant functionality.

As external sponsorship increased in the early to mid-1960s, Doug himself would be promoted to first program and then laboratory leadership. Through the first two phases of Engelbart's career mentioned above, three themes consistently appeared in the comments on his performance by all five of his managers. One was Engelbart's outstanding creativity—"perhaps the most original thinker at SRI." Another was recognition of the value of what he was doing to realize the potential of the "man-computer research area." The third was the nearly unanimous opinion that Engelbart had difficulty with a variety of administrative and managerial roles. In spite of written assessments of such deficiencies, in August 1963 his second boss promoted Engelbart to SRI's first level of management, a program manager, albeit with a stipulation that he be responsible mainly for technical direction. Though carrying out that stipulation was not just Doug's responsibility, it was roundly ignored.[4]

Engelbart's relationships with his supervisors were certainly not all negative. One of the most telling aspects about how he was helped by his managers during the formative phase of the ARC was the consistent SRI investment funding that Engelbart received to help him hone his ideas and display them to potential sources of outside funding. Managers at least two levels above Engelbart must agree to commit discretionary funds. Engelbart would never have received $120,000 in internal funds, as well as some capital equipment, if there were any major concern about the recipient or what he was trying to promote.[5]

In the meantime Engelbart's ideas gained acceptance and outside support sufficient for forming a laboratory began to arrive in about 1964. Doug was promoted to lab director, and over the next decade NASA, ARPA, and others funded Engelbart's work and gave him the computers he needed to literally bootstrap his operation. For directors of successful labs, an SRI manager tends to offer only limited oversight. Management gives the program or laboratory director as much independence as possible, but holds him or her responsible for meeting technical and financial goals. Oversight emphasizes financial matters unless technical failure or undue risk seems likely. Good managers also make sure that all clients' needs are being met. In 1965 Doug's supervisor praised him for his growing involvement in the ARPA and NASA communities and by late 1967 that same manager proclaimed his insight, understanding, and expression of man-computer systems architecture, warning only that, because of Doug's inflexibility in his technical preferences, he may find it difficult to hold on to good people. But at this point, and for the following 4-5 years, Engelbart had empathetic division managers.

But Engelbart's role as laboratory director didn't ameliorate his dislike for his own administrative or managerial work. His staff turnover rate was also high. He was clearly aware of this limitation and admitted in interviews at Stanford that he might not have had the capability or inclination to be both a visionary and a manager. In those interviews he

[2] Stanford Interview No. 2, op. cit.

[3] See the account of the 1963-1964 time frame in Chapter 2.

[4] While their exact date is uncertain, some of Doug's internal problems involved inadequate computer access. According to his account given in the Stanford oral history interviews, even when he did convince SRI management to buy a machine for his use, he soon found himself having to substantially share it with others. Since it wasn't a timeshare machine, his people's allocated time that got down to just 13 hours per week. This constraint was relieved only when the government gave him his own timeshare machine.

[5] At the time, this probably amounted to about 7 person-years of labor.

also mentioned requesting administrative help but it was denied, he said, since lab directors were expected to fill both technical and managerial roles.[6] But records indicate that his SRI managers also wanted him to get administrative support. Importantly, given the size of the ARC, Engelbart was free to acquire additional administrators on his own initiative and didn't. By 1972, to help lighten his load and to deal with criticisms of his staff about his inability to set short-term objectives, he approached his manager for help in delegating. That manager affirmed Doug's critical value to SRI and set up a small management committee to help. Toward the end of that year, when the ARC had over 40 people, Engelbart delegated some control to two assistant managers. While the move no doubt helped administratively, it didn't materially reduce the turnover that had characterized the lab since the early 1970s. And within a couple of years, other dragons appeared at the door to provoke the third and final SRI phase of Engelbart and his laboratory.

In a late 1975 discussion regarding his division's budget for the coming year, Engelbart requested that his Center be given an easier income budget to meet because of some new capabilities they wanted to develop. If agreed to, such decisions normally result in the other laboratories of the division picking up the slack, and they agreed to do so here. But 1976 didn't turn out to be a very a good year for a couple of the labs that had agreed to try to meet a higher than normal budget. As a result all the labs faced pressure to perform better or to cut costs. Engelbart's lab, despite its lower budget, became vulnerable, along with the other weakened labs, to the overall need for cost reduction. Such points of vulnerability are not uncommon at SRI since there is only a limited amount of money available to carry an unprofitable unit very long.

In part because of this uncertain funding situation and the associated internal pressure and in part because of the wanderlust of creative people, ARC staff members continued to leave. As mentioned, PARC was the biggest beneficiary. Richard Watson, who had been one of Doug's first assistant directors and who had helped develop the early roles for the Network Information Center (NIC), left for a government lab in Livermore, CA. Jon Postel, who had taken his place, soon left himself.[7] By 1976 there were perhaps 15 or so professionals left in the Center, with a somewhat smaller number of research analysts providing the NIC services.

Another threat was a decline in external funding. By the beginning of 1975 the ARC had maintained its total size of over 40 people and had revenues of about $2 million annually. But that support would soon begin to wane. For some time the ARPA program managers who were funding Engelbart had often been critical of his rate of progress. Because of this problem, combined with the informal limits on the duration of ARPA programs, support started to decline. Although the critical role of the NIC continued to be supported, the decrease in research funding made it difficult to keep momentum.

There is no more important danger at SRI than an extended loss of external support and consequently no more important responsibility for a laboratory director than to somehow deal with it. SRI has only a limited capacity to underwrite any operation, particularly one as large as the ARC, so that meant either finding more work or reducing staff. Barring either of those, management has to act; either by helping restore funding or seeing that expenses are controlled. To the myopic visionary, this requirement may seem harsh, unsympathetic, and even arbitrary.

To find the needed income and still maintain his research directions, Engelbart started to sell NLS *services* on his timeshare host to government agencies. In the SRI accounting system, this income was hard to reconcile, especially as its volume became unpredictable, primarily as a result of the uneven acceptance of NLS. Accordingly, Doug's division director sought to have him divide the ARC into two parts, research and applications, and then seek normal research funding for what would become a smaller group. When this strategy didn't bear fruit, for whatever reason, he chose to replace Engelbart as director toward the end of 1976. That obviously didn't sit well with Doug and did little to alter the situation.

To understand the specific act by the division director and his new lab manager, it is

[6] Stanford interview No.3, op. cit.

[7] Postel, who had worked on communications protocols in the ARC, including TCP (see Chapter 3), went to USC's Information Sciences Institute, where he became one of the founding figures of the Internet.

important to understand their assessment of where the ARC and its NLS functionality stood. Although they saw the value of what Doug and the ARC had created in the 1960s, they also saw the world catching up in certain aspects of those innovations that had high market appeal, such as text editing. Though such new, competing functionality was but a small part of the total NLS package, they still thought Doug's directions were not adapting to the changing technology and his inflexibility was hampering his retention of creative staff. From this viewpoint, then, and with a technical leader they thought was unwilling to work with them to improve the lab's chances of succeeding, they decided to put the ARC up for sale.

Several firms were approached and even Engelbart, together with his NLS development staff, decided to bid. According to the new lab manager, that bid was a symbolic $1. But sometime in 1977, SRI's overall director of research operations learned of the interest of Tymshare Corporation of Cupertino, California, in providing new functionality for its users. At that time it was one of the largest providers of time-sharing services in the world. Since such services were the company's core business, and it used machines similar to those in the ARC, Tymshare believed that providing some of the unique features of NLS would give it a competitive advantage over other companies beginning to offer time-sharing service. Overall, the negotiations went on for over 6 months and, in an unprecedented move, SRI sold the ARC and its intellectual property to Tymshare on January 20, 1978. SRI and Tymshare signed an agreement transferring the rights to NLS for $200,000 plus royalty stipulations. In order to stay with his created world of NLS and its nascent offerings, Engelbart and many of his researchers left for Tymshare. About a half-dozen decided to remain at SRI and transferred into existing labs such as the Telecommunications Sciences Center (TSC). The NIC and its perennial leader, Elizabeth "Jake" Feinler, also relocated to the TSC.

In short, Engelbart had to weather some tough storms at SRI, but the most important were the ones that face almost all innovators there. Engelbart's ability to develop his vision, at least to the extent that it laid the foundations of personal computing, clearly benefited from the freedom that SRI provides. But that freedom also carries the responsibility to gather the necessary resources, whether you are a project leader, a lab director, or higher. If that is impossible, for whatever reasons, the technical content, no matter how innovative, is of far secondary importance. While turnover of valuable staff members had been a problem in the ARC through the 1970s, the group's termination at SRI was thus governed more by external causes, by a funding world with its own limited capacity to persevere. Engelbart, with his vision firmly intact, now found himself immersed in the constraints of a profit-making organization, while the continuing development of personal computing took on a life of its own elsewhere.