The Potential Role of Canada in the European Communities ESPRIT Project

by

Randy Goebel

Department of Computer Science
University of Waterloo
WATERLOO, Ontario, Canada
N2L 3G1

Research Report CS-85-26
August 1985

The potential role of Canada in the European Communities ESPRIT project

Randy Goebel

Logic Programming and Artificial Intelligence Group
Computer Science Department
University of Waterloo
Waterloo, Ontario
Canada N2L 3G1

ABSTRACT

A recent meeting of Canada and the Commission of the European Communities included a presentation on ESPRIT, the recently initiated European Communities programme designed to accelerate research and development in IT. This brief paper reports some observations on the ESPRIT programme and the potential for Canada to take a cooperative role.

Background

On February 28th 1984, the European Strategic Programme for Research and Development in Information Technology (ESPRIT) was approved by the European Communities. The program has budgeted 750 million ECUs (with an equal amount contributed by industry) for the first five years of the project's intended 10 year life.†

The ESPRIT project is one of several recently initiated projects that has the mandate of accelerating research and development in the area of information technology (IT). Others include the Japanese Fifth Generation Computer Systems Project [ICOT84a], and the British Alvey Project [Industry82] These programs acknowledge the vital importance of information technology to the nations involved, and represent national (and, in the case of ESPRIT, international) concern for the anticipated IT product market.

On December 12, 1984, Canadian and European Communities delegations met in Brussels to review cooperation on science and technology programmes. As the ESPRIT programme had been announced since the last such meeting, the agenda included a special presentation on ESPRIT. Reported here are my personal

† A February 29, 1985 news release from the Delegation of the Commission of the European Communities Press and Information Service in Ottawa reports that the total budget (including both government and industry support) for the first five years is approximately 1.5 billion Canadian dollars.

opinions on the ESPRIT project and the potential for some form of Canadian participation. These opinions are based on a preliminary meeting on December 11th with Maurice English of the Commission of the European Communities Information Technologies Task Force Intelligence Unit, as well as discussions at the formal meeting of December 12.

The ESPRIT programme

The ESPRIT programme is a Commission of the European Communities (CEC) administered IT research programme. The programme subject areas are specified in a detailed work plan [CEC83]. The work plan provides the details that potential programme participants require to submit contract proposals. The topic areas of the work plan are broadly classified into the following categories:

(1) microelectronics [1,670]
(2) software [1,440]
(3) advanced information processing (i.e., AI, knowledge engineering) [1,695]
(4) office systems (i.e., office automation) [1,450]
(5) computer integrated manufacturing [944]

The figures in brackets indicate the approximate expenditure of resources in terms of man-years, over the first five year phase of the project.

There are several noteworthy aspects about both the work plan and the CEC's proposed administration of it:

(1) The work plan was drafted with the cooperation of both industrial and academic experts.

(2) The work plan was drafted with knowledge of Britain's Alvey report [Industry82]; I understand that contributors to the Alvey document were consulted as regards errors, improvements, omissions, etc.

(3) The administration of the ESPRIT programme explicitly requires a yearly evaluation and revision of the work plan in order to accommodate yearly progress and possible change of focus and emphasis.

There are some plausible inferences that one can make from these observations. First, the topic areas of the ESPRIT work plan are less well integrated than the Japanese Fifth Generation proposal [Moto-oka84] but more detailed and integrated than the topics of the Alvey report [Industry82]. This suggests that something was learned about those projects and their application in the European setting. One might assume that the logistics of international cooperation, even within CEC, would explain why a highly integrate work plan was not produced. However, it also suggests that the the British project could have been more integrated than it appears.

Second, the ESPRIT programme is the only one, to my knowledge, that has scheduled an explicit review of the work plan. In contrast, the Japanese "work plan" merely becomes more vague as it draws closer to the end of the ten year plan. For example, Its first phase was quite well detailed, and has just recently been completed [ICOT84b], but the next two phases will apparently be "reshaped" along the way. This acknowledges that the FGCS second phase will require some progress in

fundamental research. The Alvey project does specify the development of demonstrator projects, but it is unclear how such projects will affect subsequent years of the programme.

Administration of ESPRIT projects

Contract proposals to ESPRIT are required to be one of two kinds: Class A projects are those "...that require large infrastructure and resources, both human and financial, as well as clear and constant strategic perspective to ensure continuity of actions and the breadth necessary to reap the long-term benefits." [CEC83, p. 52] These projects are expected to account for 75% of the five year budget. They are relatively structured, with regular progress reports and thorough evaluation. Class B projects "...rely mainly on flexible infrastructure and on individual thinking rather than on a system approach, and require relatively much smaller resources." [CEC83, p. 52] These projects are expected to account for the other 25% of the budget. They are not subject to regular progress reports, and seem to be directed at basic research. Funding for both kinds of projects are in terms of "advances" which may be withdrawn for lack of performance.

The subject area of class A and class B projects is specified in the work plan. For example, Submicron MOS is a class A project [Note: the goal is to reduce the feature size of metal-oxide semiconductor circuits to below 1 micron, thus increasing componenent density. While sub-micron circuits have been produced in research labs, the problem of transferring these results to production are significant. See [Burger84]]. An example of a class B topic is the representation and use of real-world knowledge. Note that all areas define both class A and class B topics, although more speculative areas suggest a larger scope of "class B" work, cf. submicron MOS versus advanced information processing (AIP).

The contrast in project types acknowledges the difference between industrial cooperation on pre-competitive development for products, and on more speculative long-term research typically done by academics. For example, I was told that Siemens (Germany) and Philips (The Netherlands) were to cooperate on a type A project to produce 1 megabit static RAM chips and 4 megabit dynamic RAM chips [Note: IBM and the Japanese major manufacturers are currently racing to produce the first commercial 1 megabit dynamic RAM chip].

ESPRIT participants

Every ESPRIT project requires industrial partners from at least two different CEC countries [CEC83, p. 42]. We were advised that two industrial and one university partner was common. Otherwise, the question of who may participate seems quite flexible: "In order to be eligible for aid, projects will have to be proposed by companies or organizations established and, as a rule, currently carrying out R & D work in the Community and will have to be carried out in the community." [CEC83, p. 34]

ESPRIT is suppose to be a program of "pre-competitive" research and development, and therefore encourages cooperation between possible competitors. It has been noted that part of this "pre-competitive slogan" is posturing to avoid conflict

with the CEC Directorate in charge of monopolies.

The ESPRIT programme does not exclude the participation of corporations whose ownership is outside the boundaries of the ten CEC nations. For example, a Canadian company with a subsidiary within the CEC could be eligible, given that they fall under the participation guideline quoted above.

ESPRIT weaknesses?

It is rather premature to comment extensively on the weaknesses of the ESPRIT programme, as can not be seriously evaluated until at least after completion of the first five year phase. At that time one might observe changes in the market position of ESPRIT project participants, especially those whose projects were directed at product engineering (e.g., the Philips/Siemens project noted above).

Despite this caution, one interesting observation can be made about the initially approved projects. Of the initial 200 project submissions, approximately 90 were approved in principle. Those contract descriptions will be publically announced sometime in the near future (in the CEC official journal, sometime early in 1985). CEC officials were asked if there were any surprises in the distribution of the first proposals, and they replied that there were surprisingly few projects directed at "Software technology." They expressed caution that this may have been a result of the demanding nature of proposals. However, note that industrial and academic experts did participate in the drafting of the ESPRIT work plan. The conclusion that the development of software technology (e.g., software engineering) is weak seems plausible.

Cooperation at the federal level

There is much to be gained from international cooperation on any IT venture. IT is changing so rapidly that a mere cataloging and exchange of public domain information would be a benefit to both participants. Both the Japanese and the CEC projects have demonstrated that, to be poised for success, one requires a well-organized organ for acquiring and disseminating information about the state of current research and development. The initiation of any such project first requires a commitment to acquire and organize information about the current state of world IT projects, plans, and resources. The CEC has done this.

The embarrassing situation is that, despite the CEC indication that cooperation in some regard would be welcome, *there is no organization in Canada to cooperate with.* The CEC has established an organization to encourage the expansion of IT research and development, but Canada has no counterpart that could initiate any form of cooperation. The only organizations that come to mind are the National Research Council (NRC), and perhaps the newly form Canadian Society for Fifth Generation Research (CSFGR). Neither is currently appropriate as neither is nationally representative of Canada in any coherent sense (e.g., NRC excludes private industry; CSFGR is largely academic, and is still in an embryonic stage).

Concluding remarks

There is much that Canada could learn from ESPRIT. Perhaps most important is the recognition that Canada's potential in IT must be seriously considered at the national level. ESPRIT and related projects (e.g., Fifth Generation, Alvey) are currently relatively accessible, and will remain interested in cooperation for the immediate future. However, as these projects gain momentum their investments in pre-competitive development will bear products as fruit; this will create a more reluctant cooperative atmosphere. I believe that Canada will place itself in a "third world" IT position unless it initiates some kind of programme that can cooperate with those that have been initiated by developed nations. It is obvious that a well-coordinated information center is immediately necessary, perhaps concurrent with the establishment of a focused programme.

What could happen?

Before we can understand and apply what is to be learned from ESPRIT and similar programmes, we must be convinced that IT is important. Each such project requires some dynamic core of individuals who have both the knowledge and the political power to deliver such a programme.

Those with the commitment and knowledge exist. They are scattered within the computer science community, and the industrial community, and within federal and provincial governments. How they will be focussed remains a mystery.

References

[Burger84] R.M. Burger, R.K. Cavin III, W.C. Holton, and L.W. Sumney (1984), The impact of ICs on computer technology, *IEEE Computer* **17**(10), 88-95.

[CEC83] CEC (1983), Official documents on the ESPRIT programme, *Official Journal of the European Communities* **26**(C321), November.

[ICOT84a] ICOT (1984), Outline of research and development plans for fifth generation computer systems, third edition, Insitute for New Generation Computer Technology, Tokyo, Japan, April.

[ICOT84b] ICOT (1984), Proceedings of the Internation Conference on Fifth Generation Computer Systems, Institute for New Generation Computer Technology, Tokyo, Japan, November 6-9.

[Industry82] Department of Industry (1982), *A programme for advanced information technology–the report of the Alvey Committee*, Her Majesty's Stationery Office, London, England.

[Moto-oka84] T. Moto-oka and H.S. Stone (1984), Fifth-Generation computer systems: a Japanese project, *IEEE Computer* **17**(3), 6-13.