Development of a Public Domain *High Performance Fortran* Translation System

1 Summary

High Performance Fortran (HPF) is a newly defined programming language, designed for development of "scientific" programs to run on distributed memory supercomputers. It consists of a set of extensions to Fortran 90. We propose to develop a portable HPF translation system which would be made freely available to higher education establishments.

Research on HPF and precursor systems has been pursued for several years in the University's Department of Electronics and Computer Science (ECS). Building upon expertise and existing software from ECS we can credibly produce a prototype "Subset HPF" system—to a standard usable within HEIs—in the academic year 93/94. Follow-on funding would allow the prototype to be developed to near product standard, and thereafter improved and maintained.

The outputs of the project will consist of a translator from HPF to Fortran 90, a run-time library which encapsulates all platform dependencies of the translation system, and associated documentation.

The resources required for the project are funds to employ one experienced programmer (recruited from ECS).

2 Background

2.1 Distributed Memory Supercomputers

During the past few years advocates of distributed memory supercomputers have been able to demonstrate impressive cost and performance figures for their machines, across a broad range of applications. But these machines have so far failed to make an impact on mainstream scientific computing commensurate with these successes. The reason, of course, is the large investment required to develop quality software for specialised architectures. HPF is a promising new approach to tackling this problem—its claim is that it will enable efficient *portable* (architecture-independent) parallel programming.

2.2 *High Performance Fortran*

In the last year the High Performance Fortran Forum (HPFF), a coalition of many leading industrial and academic groups in the field of parallel processing,