Support for Fortran Standards Development - Report September 2018

Introduction
Fortran is still the language of choice for much scientific, engineering, and economic programming, particularly for use on supercomputers and for very large programs that have evolved over many years. The development of most major programming languages is now undertaken by standards committees and BCS has supported the UK contribution to the development of international Fortran standards since 2003. The initial case from 2002 is at www.fortran.bcs.org/2003/devrep03.htm and subsequent annual reports are linked from www.fortran.bcs.org/standards/stanhome.php.

UK members participate in the ISO Fortran committee (SC22/WG5), the BSI Programming Language committee (IST/5) and its Fortran panel (IST/5/-/5), and the US Fortran committee (PL22.3 aka J3). BCS has contributed to the costs of members attending BSI and international meetings while much discussion of development work takes place continuously on email. The BSI Fortran panel and the BCS Fortran Specialist Group make every effort to represent the UK as a whole at international meetings.

Activity 2017-2018
This has been a busy year for Fortran development. As reported last year, a second Committee Draft was issued for formal ISO ballot in July 2017. After considerable discussion the BSI panel recommended a vote of 'approval' and submitted 15 comments; there were 77 comments in all. The comments were delegated to the US Fortran committee for detailed processing and their decisions were referred back to WG5 for approval. Amongst the changes agreed by WG5 was the decision to use the informal name Fortran 2018, in order to bring the language into line with other SC22 languages, that is to use the year of publication rather than the year in which the final major technical changes were agreed.

These changes were incorporated into a document which was forwarded to SC22 for processing as a Draft International Standard, the ballot for which opened in March 2018.

Again there was considerable discussion in the BSI panel about the UK vote. Although at this stage of development the document should in theory be converging onto a publishable standard with minimal changes, the UK produced 38 technical and editorial comments out of a total of 84. Processing these comments occupied almost all of the time at the WG5 meeting in Berkeley, CA, in June; this meeting incidentally attracted the largest number of participants at a WG5 meeting for over 20 years.

All but two of the UK comments were accepted, sometimes after minor modification. The most contentious item concerned control of pseudo-random number generation in a program with multiple images, that is: to control to what extent the generators on the images should be aligned or independent and whether executions should be repeatable. The ambiguities in this regard in the second CD were resolved after much discussion. The updated draft was then submitted for ballot as a Final Draft International Standard. The ballot is still open at the time of writing. Assuming there are no major last-minute problems the anticipated publication date of the revised standard is November or December 2018.

Future Development of the Fortran Standard
Fortran users worldwide are being asked about which features they consider to be still missing from Fortran, particularly in comparison with other languages (v. wg5-fortran.org). It is proposed next year to select the issues that still need attention and then to develop the necessary technical content over the following two years. The eventual publication of the standard is likely to be in or around 2023.

TR 24772-8 (Guidance to Avoiding Vulnerabilities in Programming Languages through Language Selection and Use, Part 8 Fortran)
UK members have participated in developing the Fortran part of this Technical Report. Recently, this work has been given low priority but the next edition of the document is scheduled to be completed during the coming year.

Conclusion
The UK continues to play a major role in the development of the Fortran language. Following his retirement after 18 years as WG5 convenor, John Reid remains as an active member of the group. The UK continues to provide the project editor, a major undertaking, and the email administrator, plus (usually, but appointed on an ad hoc basis) the minutes secretary and the editor of the Technical Corrigenda. At the most recent WG5 meeting in Berkeley, California, BCS supported two of the UK participants.

Fortran development papers, other than draft standards, are open to all interested. Minutes of the most recent WG5 meeting are in WG5-N2158 and the resolutions are in WG5-N2152. WG5 documents are available at https://wg5-fortran.org/documents.html. J3 papers are obtainable from https://j3-fortran.org/.

The Group is extremely grateful for the continuing BCS contribution to this project.

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BSI Fortran Convenor
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