Business Plan and Convener's Report

ISO/IEC JTC 1/SC 22/WG 14 (The Programming Language C)

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SUBMTTED BY:

Convener
David Keaton
Keaton Consulting
848 N. Rainbow Blvd. #4499
Las Vegas, NV 89107
USA

Phone: +1 702 518 8192
E-mail: dmk@dmk.com

1. MANAGEMENT SUMMARY

1.1. JTC 1/SC 22/WG 14 STATEMENT OF SCOPE

Development and maintenance of ISO/IEC Standards related to the programming language C.

1.2. PROJECT REPORT

1.2.1. COMPLETED PROJECTS

JTC 1.22.20.01 – Programming Language C (Minor Revision of ISO/IEC 9899:2011), this project was delivered by the publishing of ISO/IEC 9899:2018.

JTC 1 NP 18037, Extensions for the programming language C to support embedded processors. This is a Technical Report type II.

JTC 1 NP 19769, Specification for Additional Character Data Types to the Programming Language C. This is a Technical Report type II.

JTC 1 NP 24731, Extensions to the C Library, — Part I: Bounds-checking interfaces. This is a Technical Report type II.

JTC 1 NP 24731, Extensions to the C Library — Part 2: Dynamic Allocation Functions. This is a Technical Report type II.

JTC 1 NP 24732, Extensions for the programming language C to support decimal floating point arithmetic. This is a Technical Report type II.

JTC 1 NP 24747, Extensions for the C Standard Library to Support Mathematical Special Functions. This is an International Standard.

JTC 1 NP 17961, *C Secure Coding Rules*. This is a Technical Specification.

JTC 1 NP 18661-1, *Floating-point extensions for C – Part 1: Binary floating-point arithmetic*. This is a Technical Specification.

JTC 1 NP 18661-2, *Floating-point extensions for C – Part 2: Decimal floating-point arithmetic*. This is a Technical Specification.

JTC 1 NP 18661-3, *Floating-point extensions for C – Part 3: Interchange and extended types.* This is a Technical Specification.

JTC 1 NP 18661-4, *Floating-point extensions for C – Part 4: Supplementary functions.* This is a Technical Specification.

JTC 1 NP 18661-5, *Floating-point extensions for C – Part 5: Supplementary attributes*. This is a Technical Specification.

JTC 1 TS 17961:2013/COR 1, *C Secure Coding Rules.* This is a Technical Corrigendum for a Technical Specification.

1.2.2. PROJECTS UNDERWAY

Study groups studying the possibility of future revisions to IS 9899, TS 17961, and TS 18661.

1.2.3. CANCELLED PROJECTS

JTC 1 NP 21938-1, *Programming language C — Extensions for parallel programming — Part 1: Thread-based parallelism.* This was a technical specification. The resources devoted to this project were not able to continue, as their corporate sponsors changed directions.

1.2.4. COOPERATION and COMPETITION

Where appropriate, WG 14 has established active liaisons with other SC 22 working groups. A category C liaison has been established with the MISRA C working group. There is no apparent direct competition with any other current SC 22 working group.

2. PERIOD REVIEW

2.1. MARKET REQUIREMENTS

WG 14 is responding to the C user community concerns and to the C implementers' issues. The ISO/IEC 9899:2011 standard was updated in 2018.

The ISO/IEC 9899:2018 standard answered many requests for interpretation and keeps the International Standard for the C programming language current.

The maintenance of TS 17961 addresses important security issues that affect the entire C community. The document is in active use in the industry, and resulting valuable feedback has led to a Technical Corrigendum. WG 14 has a Study Group to investigate further updating this document based on feedback from the community.

The WG 14 Floating Point Study Group is investigating the possibility of incorporating TS 18661, a C binding to the 2008 IEEE Floating-point standard, into a future edition of the C standard. The group is also studying the possibility of updating TS 18661 to the 2019 IEEE Floating-point standard.

WG 14 has a Study Group to investigate whether the C memory object model would benefit from any adjustments.

WG 14 is currently working on how best to deal with the mandated ISO (Live Link/Open Text) e-committee package.

2.2. ACHIEVEMENTS

- WG 14 processed requests for interpretation of IS 9899:2011 and TS 18661 parts 1-5.
- WG 14 has a Study Group to investigate incorporating TS 18861 into a future edition of the C standard, and investigate updating TS 18661 to the 2019 IEEE Floating-point standard.
- WG 14 has a Study Group to investigate updating TS 17961 based on community feedback.
- WG 14 has a Study Group to study possible adjustments to the C memory object model.
- WG 14 has incorporated ISO e-committee into its workflow, and is committed to making this system work.

2.3. RESOURCES

WG 14 meets two times per year in co-located technical sessions with the US Task Group INCITS PL22.11.

Over the last several years WG 14 has made Web conferencing capabilities available for those that are finding it difficult to travel. WG 14 would like to thank ISO for the Web conferencing support, which is especially helpful in this time of increasing restrictions on international travel.

In past years, sixteen countries have participated by attending these meetings or by being involved in the technical discussions that take place over the e-mail reflector. The countries are: Australia, Canada, China, Denmark, France, Germany, Italy, Ireland, Japan, the Netherlands, Norway, Russia, Spain, Sweden, the UK, and the US. However, with the new system mandated by ISO, only six of

the fifteen will be able to participate: Canada, Denmark, Germany, Italy, the UK, and the US.

WG 14 liaison appointments are:

Group	Name/Type	Person(s) assigned
WG 21	C++	Group liaison assigned[1]
FSG	Free Standard Group	Nick Stoughton
WG 23	Vulnerabilities	Clive Pygott
MISRA-C	Category-C Liaison	Andrew Banks

3. FOCUS NEXT WORK PERIOD

WG 14 will focus on:

- Discussing potential future improvements to the security of C, such as in Annex K, Bounds-checking interfaces, and in updating TS 17961.
- Investigating the incorporation of the Floating Point Technical Specifications into a future edition of the C standard.
- Investigating whether the C memory object model should be adjusted.

The Committee has discussed several other possible new work items for the future.

3.1. DELIVERABLES

None for this period.

3.2. STRATEGIES

WG 14 believes that routine handling will suffice to complete the progress desired.

3.3. RISKS

- A decrease in participation due to being forced to comply with a mandate from ISO, see JTC 1/N 12032.
- A troubling trend where ISO CS has begun enforcing undocumented rules that are approved neither by the TMB nor by the WG 14 editors, leading to a decrease in the usefulness of standards documents.

3.4. OPPORTUNITIES

None.

3.5. WORK PROGRAM PRIORITIES

WG 14 will work on studying possible improvements to floating-point, security, and the memory object model.

[1] Intel, Oracle, Plum Hall, and Perennial.

4. OTHER ITEMS

4.1. POSSIBLE ACTION REQUESTS AT FORTHCOMING PLENARY

None.

4.2. PROJECT EDITORS

The following individuals have been appointed project editors and backup project editors:

JTC 1.22.20.01, *Programming Language C (Revision of ISO/IEC 9899:2018)*
Larry Jones (Project Editor), Jens Gustedt (Backup Project Editor)

JTC 1 NP 18037, *Extensions for the programming language C to support embedded processors*.
Willem Wakker (Project Editor) [2]

JTC 1 NP 19769, *Specification for Additional Character Data Types to the Programming Language C*.
None. Incorporated into the C standard and not intended to be maintained.

JTC 1 NP 24731, *Extensions to the C Library – Part I: Bounds-checking interfaces*
None. Incorporated into the C standard and not intended to be maintained.

JTC 1 NP 24731, *Extensions to the C Library – Part 2: Dynamic Allocation Functions*.
David Keaton (Project Editor)

JTC 1 NP 24732, *Extensions for the programming language C to support decimal floating point arithmetic*
None. Incorporated into TS 18661 and not intended to be maintained.

JTC 1 NP 24747*, Extensions for the Standard Library of the Programming Language C to Support Mathematical Special Functions*
David Keaton (Project Editor)

JTC 1 NP 17961, *C Secure Coding Rules*
Robert Seacord (Project Editor)[2]

JTC 1 NP 18661, parts 1-5, *Floating-point extensions for C*
James Thomas (Project Editor)

[2] Currently not listed in the ISO global directory.

4.3. ELECTRONIC DOCUMENT DISTRIBUTION

WG 14 has conducted some of its detailed technical discussion using an e-mail reflector provided by the Danish UNIX Users Group, Copenhagen University College of Engineering and Keld Simonsen.

WG 14 also has an ftp and Web site provided by courtesy of the Copenhagen University College of Engineering, Danish UNIX Users Group and Keld Simonsen. WG 14 has placed its N documents on the ISO mandated site, and updates the site with each new N document.

WG 14 is providing all the appropriate committee documents on the Committee Web site, eliminating the need for paper mailings.

WG 14 also now provides Web conference capabilities allowing technical experts that are not able to travel to participate.

WG 14 has previously reported the following issues with the e-committee system. The Working Group keeps the system up to date with all N documents and is committed to switching to it once these issues are resolved.

- The URLs of documents in e-committee are neither static nor predictable. The agendas and document log need to point to easily predictable and understandable URLs to keep errors to a minimum. They also need to point to unchanging URLs to prevent bit rot in the committee's records.
- The e-committee documents are not searchable by search engines. The C community has benefited greatly from WG 14 documents being available as search results.
- The document names and descriptions are truncated. On the external WG 14 site, this problem is avoided by having a document log with the description of each document and the name of its submitter. The file names are the N numbers of the documents, making the URLs predictable and simple.
- Corrupted files are difficult to replace, requiring intervention from ISO.

4.4. ISO CS ACTIONS

ISO CS has made unauthorized changes to ISO/IEC 9899:2018 due to new undocumented rules that do not derive from the Directives Part 2 and have not passed approval from either the TMB or the WG 14 editors. The changes diminish the readability and usefulness of the standard. This is part of a larger troubling trend with ISO CS becoming out of control and arrogating to themselves determinations that must be left to the people who understand the material, the WG editors.

4.5. RECENT MEETINGS

26-30	Oct 2009	Santa Cruz, CA, USA	ANSI, Plantronics
19-23	Apr 2010	Florence, Italy	Università Firenze
01-05	Nov 2010	Batavia, IL, USA	ANSI, Fermi Lab.

14-18	Mar 2011	London, UK	BSI
24-28	Oct 2011	Washington, DC, USA	ANSI, Blue Pilot
13-17	Feb 2012	Kona, HI, USA	ANSI, Bloomberg LP
11-13	Jun 2012	Web Conference	ISO, Blue Pilot
22-26	Oct 2012	Portland, OR, USA	ANSI, Intel
23-26	Apr 2013	Delft, NL	NIN, ACE
30-03	Sep/Oct 2013	Chicago, IL, USA	ANSI, DRW Trading Group
07-11	April 2014	Parma, IT	UNINFO, Univ. of Parma
27-30	Oct 2014	St. Louis, MO, USA	ANSI, Seymour
13-17	April 2015	Lysaker, NO	SN, Cisco
26-30	Oct 2015	Kona, HI, USA	ANSI, Plum Hall
11-14	Apr 2016	London, UK	BSI
17-21	Oct 2016	Pittsburgh, PA, USA	ANSI, CERT
03-06	Apr 2017	Markham, ON, Canada	SCC, IBM
30 Oct-03 Nov 2017		Albuquerque, NM, USA	ANSI, Keaton Consulting
23-26	Apr 2018	Brno, CZ	Red Hat
15-18	Oct 2018	Pittsburgh, PA, USA	ANSI, CERT
29-03	Apr/May 2019	London, UK	BSI

4.6. FUTURE MEETINGS

30-04	Sep/Oct 2019	Ithaca, NY, USA	ANSI, GrammaTech
30-03	Mar/Apr 2020	Freiburg, DE	DIN (tentative)
TBD	Fall 2020		
TBD	Spring 2021	Strasbourg, FR	AFNOR (tentative)