

ISO/IEC JTC 1/SC 22/WG 9 N602

Convenor's Report, 2018-19, ISO/IEC JTC 1/SC 22/WG 9 (Ada)

Prepared by: Patrick Rogers, PhD, rogers@adacore.com, 18 July 2019

Business Plan For JTC 1/SC 22/WG 9 (Ada)

Period Covered:

1 July 2018 - 1 July 2019

Submitted By:

Convenor of ISO/IEC JTC 1/SC 22/WG 9
Patrick Rogers, PhD
Ada Core Technologies
150 West 30th Street
New York, NY 10001

1 MANAGEMENT SUMMARY

The focus of WG 9 over the year was to conduct the various items of work. This work was conducted with the following priorities:

1. (highest priority) Respond to Defect Reports on ISO/IEC 8652
2. Prepare the draft for the next revision to the Ada Standard, ISO/IEC 8652
3. Develop Technical Reports or Standards improving the Ada libraries
4. Moving documents to Live Link

1.1 JTC 1/SC 22/WG 9 Statement of Scope

JTC 1/SC 22 WG 9 is responsible for the development and coordination of ISO standards and Technical Reports for Programming Language Ada.

1.2 Project Report

1.2.1 Completed Projects

Update to the Ada Part to WG 23 Technical Report on Language Vulnerabilities. The Ada Part (ISO/IEC TR 24772-2) was updated and submitted to WG 23 for joint submission with the revised language independent Part (ISO/IEC TR 24772-1): Technical Report Guidance to avoiding vulnerabilities in programming languages. These Parts passed their ballots and are in final editing for publication.

Update to TR 24718, Guide for the Use of the Ravenscar Profile in High Integrity Systems. The required reformatting was completed and the draft revision is out for balloting.

Update to the Ada Conformity Test Suite (ACATS). Development of a new set of tests for the Ada Conformity Assessment Test Suite that are in alignment with the new edition of the standard. ACATS 4.1 was released on 29 June 2016; it contains 134 new tests for Ada 2012 along with an experimental set of grading tools for the ACATS to characterize ACATS test results.

ISO/IEC 8652:2012/Cor.1: 2016 Programming Languages – Information Technology – Ada Technical Corrigendum

The resolution of Defect Reports on ISO/IEC 8652:2012, published in January 2016.

ISO/IEC 8652:2012 (Ed 3), Information technology – Programming languages – Ada

The new edition of the Ada Standard includes the content of the Amendment ISO/IEC 8652:1995 and the Technical Corrigendum ISO/IEC 8652:1995. The ISO/IEC 8652:2012 Standard was published in December 2012 and is known as Ada 2012.

22.10.01 -- IS 8652:1995 Programming Languages: Ada and ISO/IEC 8652:1995/Cor.1:2001 Technical Corrigendum

The Standard was published in 1995 and a Technical Corrigendum was published in 2001. WG 9 determined that the best strategy for updating the standard was to develop an Amendment. SC 22 approved the project subdivision in N3310.

22.10.01.01 -- IS 8652:1995 Programming Languages: Ada and ISO/IEC 8652:1995/Amendments to ISO/IEC 8652:1995

Subdivision of project 1.22.10.01 approved per JTC 1 N6567. N 4051- FPDAM ballot passed. Published 9 March 2007 as Ada 2005.

22.15291-- IS 15291:1999 Ada Semantic Interface Specification (ASIS)

WG 9 voted in June 2003 to confirm this standard upon its reaching the five-year review point. SC 22 endorsed the request in its 2003 plenary meeting. The Status shown on the ISO web site is 90.93 (confirmed).

22.15942 -- TR 15942:2000 Guidance for the use of the Ada Programming Language in High Integrity Systems

WG 9 has requested that this Type 3 Technical Report be made freely available on an appropriate web site. The request was approved by SC 22 and JTC 1 and was implemented.

22.18009 -- IS 18009:1999, Ada Conformity Assessment

WG 9 voted in June 2003 to confirm this standard upon its reaching the five-year review point. SC 22 endorsed the request in its 2003 plenary meeting. The status is shown on the ISO web site as 90.93 (confirmed).

22.24718 -- TR 24718:2005, Guide for the Use of the Ada Ravenscar Profile in High Integrity Systems

A Type 3 Technical Report, ISO/IEC TR 24718, Guide for the use of the Ada Ravenscar Profile in high integrity systems, was completed during 2005. The status shown on the ISO web site is 60.60 (published). Although the normal process was used to approve the report, the document is an adoption of a report developed by the University of York, UK. Both the University of York and the UK National Body have agreed to cooperate with JTC1 if any revisions are made to the report.

On March 7, 2005, JTC 1 recommended that the Technical Report should be made freely available. This request was approved by SC 22 and JTC 1 and was implemented.

1.2.2 Projects Underway

Maintenance of ISO/IEC 8652:2012, Information technology – Programming languages – Ada. Continued work on Defect Reports on ISO/IEC 8652:2012.

Draft for next revision to the Ada standard, ISO/IEC 8652. The bulk of the draft revision is nearly complete, with a few additions and refinements remaining. Work on these additions and refinements continues.

Originally WG 9 planned to submit the draft to SC 22 in the latter part of 2019. However, at the request of the compiler vendor AdaCore, we have voted to postpone submitting the draft so that some of the new capabilities can be reviewed and prototyped. These capabilities are primarily concerned with lightweight parallelism.

The prototyping and review effort will be performed by the WG 9 design team and AdaCore personnel. AdaCore has dedicated sufficient resources to that end. Note that the Convenor and many of the design team are employed by AdaCore, but that the compiler implementation within AdaCore involves a largely distinct set of people.

The prototyping and review period will last for one year, ending 1 June, 2020.

At the end of the review/prototyping year, we intend to complete a new draft of the Ada standard by 1 June, 2021. The new draft will take the results of the review and prototyping effort into account in whatever manner WG 9 as a whole considers best.

Update to the SPARK Part to WG 23 Technical Report on Vulnerabilities (ISO/IEC TR 24772). The role of WG 9 is to facilitate and consult on the effort as needed. WG 23 has produced a draft and coordinated with AdaCore (the primary source of expertise on SPARK), but final touches are needed and a few sections need to be completed before this Part can be considered ready for balloting.

Update to TR 15942:2000 Guidance for the use of the Ada Programming Language in High Integrity Systems. The editor identified last year was unable to perform the work and is no longer available. We have re-initiated activities within the working group to identify the resources necessary.

1.2.3 Projects Withdrawn

None in this period.

1.2.4 Standards and Technical Reports Withdrawn

None in this period.

1.2.5 Cooperation and Competition

There are two major professional societies in this area: Ada-Europe and the Special Interest Group on Ada (SIGAda) of the Association for Computing Machinery (ACM). The semi-annual meetings of WG 9 are typically scheduled to coincide with the conferences and workshops organized by these two groups. Officials of both organizations are active participants in the work of WG 9. Both groups have the status of Category C liaison with WG 9.

There is one major vendor consortium, the Ada Resource Association (ARA). Informal liaison with ARA is maintained via the US TAG.

As requested by SC 22, WG 9 has designated a liaison to SC 22/WG 23, Erhard Ploedereder, former president of Ada-Europe, and has invited WG 23 to collocate meetings with WG 9.

WG 9 has a liaison with Fortran, INCITS PL/22.3, Van Snyder (Caltech Jet Propulsion Laboratory (JPL)) is the representative from INCITS PL/22.3. JPL is an FFRDC.

2 PERIOD REVIEW

2.1 Market Requirements

Ada is the language of choice for important parts of the real-time, embedded systems community as well as aerospace and defense segments. For example, Ada is used extensively in commercial airplanes and regional airspace control. Ada is also being used in other market segments, such as railway and banking. WG 9 has completed the update to the language standard by means of a Revision to meet the needs of the current market.

2.2 Achievements

- Updated TR 24718, Guide for the Use of the Ravenscar Profile in High Integrity Systems, for the latest version of the language. The draft revision is under ballot.
- Developed bulk of the draft revision of ISO/IEC 8652, the Ada Standard.
- Worked on Defect Reports on ISO/IEC 8652.

2.3 Resources

Given the guidance provided in the ISO directives, National Bodies designate experts to participate in WG 9. WG 9 has representatives from Canada, Italy, Spain, Switzerland, Portugal, UK, and US. There has been a continued slight increase of support from Spain and Switzerland. Germany's support continues to be intermittent. Belgium is still working on resuming their support.

Implementation of the Category C Liaisons with Ada-Europe and ACM SIGAda has broadened the base of technical review and support for language standardization. Similar results have occurred due to the liaison with the Fortran Working Group.

All new work item suggestions are screened by the requirement for active support from five national bodies. This has worked well, resulting in explicit commitments from national bodies supporting a possible project.

WG 9 uses Rapporteur Groups to perform the drafting of its technical documents. This allows WG 9 itself to meet only twice per year – for approximately one-half-day at each meeting. When appropriate, WG 9 delegates initial drafting to national bodies working with Rapporteur Groups. (For example, the US contributed the draft of the revision to ISO/IEC 8652.)

WG 9 has been using Web conferencing capabilities to make access to our meetings available to those members that are unable to attend our meetings in person.

2.4 Environmental Issues

(Not applicable)

2.5 Participation Metrics

Seven to eight national bodies regularly send designated experts to participate in the work of WG 9; most of them regularly attend meetings. Each of the experts typically vote at the WG 9 level. Those that are P-members of SC 22 typically vote at that level.

3 FOCUS NEXT WORK PERIOD

3.1 Deliverables

The following deliverables are anticipated during the next 12 months:

- Continue to address Ada Defect Reports
- Complete the draft standard review/prototyping effort.
- Update TR 15942, Guidance for the Use of Ada in High Integrity Systems
- Update the SPARK Part of WG 23 Technical Report on Vulnerabilities (ISO/IEC TR 24772).
- Move WG 9 materials to Live Link

3.2 Strategies

We delegate technical work to the Rapporteur Groups. We collaborate with professional societies via liaison relationships. We achieve full consensus within Rapporteur Groups prior to initiating formal balloting.

3.2.1 Risks

- Unexpected technical comment at the SC 22 level has the potential to delay the work of WG 9. WG 9 mitigates this risk by providing mechanisms for full treatment of NB technical concerns at the RG and WG level. Although we observe all requirements of the directives, we view SC 22 and JTC1 level balloting as approval of documents that have already been completed.
- Several members of WG 9, along with the experts specifically working on the Ada language design, are approaching retirement. That status change will affect their funding, therefore their participation, especially at on-site meetings. To preclude this issue becoming problematic, we have decided to pursue an “outreach program” in which the Convenor will contact Ada compiler vendors’ customers to find potential new members.
- The Ada language standard is composed of a “core” and optional annexes. The core is intended to be fully implemented, subject to a general escape clause about implementability on a given platform (e.g., I/O on an embedded target). Of the handful of Ada compiler vendors, only one (AdaCore) now implements the entirety of the core for the latest version of the language (informally known as “Ada 2012”). The other vendors implement the core for the previous version along with individual features of Ada 2012 requested by their customers.

3.2.2 Opportunities

With the increased interest and concern with software and systems safety, WG 9 has been working with WG 23 on the development of guidance for the prevention of software vulnerabilities.

3.3 Work Program Priorities

- (Highest) Address Ada Defect Reports
- Develop the next revision to the Ada Standard, ISO/IEC 8652
- Update the SPARK Part of the WG 23 Technical Report on Vulnerabilities
- Update and release TR 15942 (Guidance for the Use of Ada in High Integrity Systems)
- Develop Technical Reports or Standards improving the Ada libraries

4 Other Items

4.1 Possible SC 22 Plenary Actions Related to WG 9

- None at this time

5 ADMINISTRATIVE INFORMATION

5.1 Project Editors

5.1.1 IS 8652 (Information Technology--Programming Languages—Ada)

Steve Baird and Randy Brukardt

5.1.2 IS 15291 (ASIS Standard)

Bill Thomas and Greg Gicca

5.1.3 TR 15942 (Guidance for the Use of Ada in High Integrity Systems)

To be identified. (Formerly Ben Brosgol). We are looking for volunteers.

5.1.4 ISO/IEC 18009 (Conformity Assessment of an Ada Language Processor)

Erhard Ploedereder

5.1.5 TR 24718 (Guide for the Use of the Ravenscar Profile in High Integrity Systems)

Alan Burns

5.1.6 ISO/IEC TR 24772-2:201X(E) (Information Technology — Programming languages — Guidance to avoiding vulnerabilities in programming languages – Vulnerability descriptions for the programming language Ada)

Joyce Tokar

5.2 WG 9 Liaisons

WG 9 has two Category C liaison relationships.

5.2.1 Category C Liaison with ACM SIGAda

SIGAda is a Special Interest Group of the Association for Computing Machinery (ACM). Its 80,000 members make ACM one of the world's premier technical professional organizations related to computing.

SIGAda is one of the world's largest organizations serving the needs of professionals interested in the Ada language. SIGAda is a powerful resource for the software community's ongoing technical and scientific activities concerning the usage, education, standardization, and implementations of the Ada language and related Ada technologies.

In the past, SIGAda members have played an important, but individual, role in the standardization work of SC 22/WG 9. For example, ISO/IEC 15291 is largely based upon technical material originally developed by individuals acting under the auspices of SIGAda. SIGAda has also played an important role for Ada language improvements in the areas of performance, real-time, numerics, and distribution.

5.2.2 Category C Liaison with Ada-Europe

Ada-Europe is an international organization, set up to promote the use and knowledge of Ada, and to promote its introduction into industrial, academic, and research establishments. It aims to spread the use and the knowledge of Ada and to promote its introduction into academic and research establishments. Above all, Ada-Europe intends to represent European interests in Ada and Ada-related matters.

In its current form, Ada-Europe was established in 1988. Because there is no European legal framework to govern such organizations, it was established according to Belgian Law. Currently, national member organizations are: Ada-Belgium, Ada-Denmark, Ada-Deutschland, Ada-France, Ada-Spain, Ada in Sweden, and Ada in Switzerland. Individual members of these organizations can become indirect members of Ada-Europe. Direct membership is available to individuals in countries without national member organization.

The best-known of Ada-Europe's activities is its annual conference, first held in 1994, which provides an international forum for researchers and users of Ada and other technologies geared towards reliable systems (see <http://www.ada-europe.org/conf/ae>). Ada-Europe publishes the Ada User Journal quarterly magazine to keep its members and others abreast of the latest developments related to Ada.

In the past, Ada-Europe members have played an important, but individual, role in the standardization work of SC 22/WG 9. For example, ISO/IEC 18009 and ISO/IEC TR 24772-1 and -2 incorporate technical material provided by Ada-Europe members.

5.2.3 Liaison with WG 23

The main work of the WG 23 is to identify vulnerabilities in programming languages. For language addressed, the WG focuses on how those vulnerabilities are to be handled specifically for that language. WG 9 maintains a liaison relationship with WG 23 to stay apprised of the findings of WG 23 and how they apply to Ada.

5.2.4 Liaison with Fortran INCITS PL/22.3

The main work of Fortran INCITS PL/22.3 is on the programming language Fortran. The liaison relationship with WG 9 is to ensure that the content of the Ada Standard section on interfacing with Fortran is correct and to coordinate efforts on parallel programming.

5.3 Meetings of WG 9

5.3.1 Future Meetings

- Meeting #77 of WG 9 will be held the morning of Saturday, 5 Oct 2019 in Lexington, Massachusetts.
- Meeting #78 of WG 9 will be held in conjunction with the [25th International Conference on Reliable Software Technologies Ada-Europe 2020](#), the morning of Friday 12 June 2020 in Santander, Spain.

5.3.2 Recent Meetings

- Meeting #76 of WG 9, held in conjunction with the [24th International Conference on Reliable Software Technologies Ada-Europe 2019](#), the morning of Friday, 14 June 2019 in Warsaw, Poland.
- Meeting #75 of WG 9, held the morning of Friday, 22 Oct 2018 in Lexington, Massachusetts.
- Meeting #74 of WG9, held in conjunction with the [23rd International Conference on Reliable Software Technologies Ada-Europe 2018](#), the morning of 22 June 2018 in Lisbon, Portugal.
- Meeting #73 of WG 9, held the morning of Friday, 13 Oct 2017 in Lexington, Massachusetts.
- Meeting #72 of WG 9, in conjunction with the [22nd International Conference on Reliable Software Technologies Ada-Europe 2017](#), the morning of 16 June 2017 in Vienna, Austria.
- Meeting #71 of WG 9, in conjunction [ACM HILT 2016](#) in the morning of 8 Oct 2016 in Pittsburgh, PA.
- Meeting #70 of WG 9, in conjunction with the [21th International Conference on Reliable Software Technologies Ada-Europe 2016](#), Friday morning 17 June 2016 in Pisa, Italy.
- Meeting #69 of WG 9, in conjunction with the Ada Rapporteur Group (ARG) Meeting, Friday morning 15 Oct 2015 (06:00-10:00 PDT) in Bennington, VT.
- Meeting #68, in conjunction with the [20th International Conference on Reliable Technologies. Ada-Europe 2015](#) on the morning of Friday, 26 June 2015.
- Meeting #67, in conjunction with [High Integrity Language Technology 2014 \(HILT 2014\)](#), on the morning of 20 Oct 2014 (07:00-10:00 PDT) in Portland OR, USA.
- Meeting #66, a teleconference Friday morning 27 June 2014. Some attendees were collocated with the [19th International Conference on Reliable Software Technologies Ada-Europe 2014](#).
- Meeting #65, in conjunction with [High Integrity Language Technology 2013 \(HILT 2013\)](#), Friday morning 15 November 2013 in Pittsburgh, PA, USA.
- Meeting #64, in conjunction with the [18th International Conference on Reliable Software Technologies Ada-Europe 2013](#), Friday morning, 14 June 2013 in Berlin, Germany.