# ISO/IEC JTC1/SC22/WG9 N 535

*Joyce L Tokar, Draft 4, 15 November 2013*

### Draft Meeting Minutes

### Meeting #64 of ISO/IEC JTC1/SC22/WG9

**Friday 14 June 2013 in Berlin, Germany**

In accordance with Resolution 63-5, the next meeting, meeting #64 was conducted in conjunction with the [18th International Conference on Reliable Software Technologies Ada-Europe 2013](http://www.ada-europe.org/conference2013), The meeting started at 09:28 on Friday 14 June 2013 in Berlin, Germany.

The detailed agenda for this meeting was circulated as [N534](#N534).

### AGENDA

[Opening Orders](#Opening)

[National Body Reports and Introductions](#_National_Body_Reports)

[Liaison Reports and Introductions](#LiasonReports)

* [Ada Europe: Dirk Craeynest](#AdaEurope)
* [SIGAda: Rick Sward](#SIGAda)
* [SC 23/OWGV: Erhard Ploedereder](#WG23)
* Fortran, INCITS/PL22.3: Van Snyder

[Convener's Report](#Convener)

[Project Editor Reports (as needed)](#PrjEd)

* IS 8652: Ed Schonberg and Randy Brukardt
* IS 15291: Bill Thomas and Greg Gicca
* TR 15942: Brian Wichmann
* IS 18009: Erhard Ploedereder
* TR 24718: Alan Burns

[Rapporteur Group Reports (as needed)](#RapRpt)

* [Report of Ada Rapporteur Group](#ARG): Jeff Cousins, Chair
* [Report of Annex H Rapporteur Group](#HRG): Alan Burns, Chair
* Report of POSIX Rapporteur Group: Stephen Michell, Chair

[Review of Open Action Items and Unimplemented Resolutions](#OpenAIs)

[Committee as a Whole](#CAAW)

* Update to Ada Annex and SPARK Annex to the WG 23 Technical Report on Vulnerabilities (Michell, Burns, Tokar) – OBE see HRG report
* SPARK as an ISO Standard (Dewar) – deferred until meeting #65
* Location of the WG 9 to be held in conjunction with Ada Europe in Paris in June 2014 (Rosen)

[Unfinished Business](#UBiz)

[New Business](#NBiz)

[Scheduling of Future Meetings](#NextMeet)

[Review of New Action Items](#NewActions)

[Administrative Actions](#Admin)

[Review of New Resolutions](#NewResolutions)

[Final Consideration of Resolutions](#final)

[Recess](#recess)

### Opening Orders, Joyce Tokar, Meeting Convenor

* Call to Order
* Appointment of Meeting Secretary
* Approval of [Agenda](#Agenda)
* Welcome and Administrative Arrangements
	1. All attendees are asked to register for the WG 9 meeting and ARG meeting. Today we have 16 attendees with only 8 showing as being registered. This has been a real problem today due to the need for additional seating. PLEASE remember to register for future meetings.
* Approval of [N532](#N532): Meeting #63 Minutes – Resolution [64-1](#r1)

[AGENDA](#A1)

### National Body Reports

#### Attendees:

##### National Body Representatives:

|  |  |  |
| --- | --- | --- |
| Canada  | Brad Moore (HOD), Stephen Michell | [Report](#Canada) |
| France | Jean-Pierre Rosen (HOD) | [Report](#France) |
| Germany | *TBA* (HOD)  | No Report |
| Italy | Tullio Vardanega (HOD) | [Report](#Italy) |
| Portugal | Miguel Pinho (HOD) – unable to attend | [Report](#Portugal) |
| Spain | Juan Antonio de la Puente (HOD) | [Report](#Spain) |
| Switzerland | Patrick Gautschi (HOD)  | No Report |
| UK | Jeff Cousins (HOD), John Barnes | No Report |
| USA | *TBD* (HOD), Randy Brukardt | [Report](#USA) |

**Canada**

Canada would like to take the opportunity to express its grateful appreciation to the WG9 Convenor for her leadership and to the editor of ISO/IEC 8652 Ada and the ARG for their dedicated perseverance in getting the Ada standard approved and published within calendar year 2012.

On the subject of massively parallel systems, Canada notes that two SC 22 working groups (WG 14, WG 21) are making significant progress towards the model and implementation of support for massive parallelism (many cores) within their languages. Canada formally requests that WG9 setup a project to add support for many core parallelism within the Ada language. The work of Michel, Moore, and Pinho may be a good starting point, but we leave it to the ARG to make that determination. We believe that it is important that such a mechanism be compatible with existing Ada concurrency and real time capabilities, if possible.

In addition, Canada believes that there should be a language independent model of massive parallelization (data-level parallelism and control-level parallelism) that underlies the work going on in individual languages. The justification for this is that virtually every system or application built today consists of multiple languages linked into a common image. To effectively implement any level of parallelism in such a system requires that a common and compatible approach be followed. To this end, Canada is proposing to SC 22 for its plenary in September, that SC 22 form a study group to determine if the creation of such a model is possible and if so, how it can be achieved and what the best vehicle would be to progress such work. We ask that WG 9 and WG 9 p-members be supportive of this initiative.

We recognize the suddenness of this request and are comfortable delaying a decision for a few weeks. We suggest a teleconference to discuss this issue in about 6 weeks would be reasonable.

**France**

AFNOR met on 2013-06-03 in preparation for the June WG9 meeting. The group reviewed the proposed AIs and had no special comments.

There used to be some activity related to C++ at AFNOR, which has ceased due to a change of position of its Convenor. As a consequence, the Ada group is the only remaining group in the field of programming languages, which is an issue because of low financial support. The group hopes (and needs) to find new sponsors to ensure continuing operation next year.

AFNOR would like the groups to represent industry. Hence, retired people and individual consultants are not welcomed. The French government decided that SMEs were not required to pay into the standards group. Now, this leaves one paying member, Telos. This leaves a hole in the AFNOR group. Need to find more industrial partners to participate in the AFNOR group. Presently, we are looking into the railway industry and Atrium to join the AFNOR group. Bottom line is, without more industry representation in the AFNOR group, the French delegation will no longer exist.

**Germany**

Contact Peter Dencker to find a person to represent the Germany delegation.

**Italy**

The little energy available in the reporting period was used to:

* Follow, mostly in read-only mode, the work of the ARG
* Act as needed on issues referred to the HRG or to the IRTAW group
* Use the Berlin opportunity to revive technical involvement in WG 23
* Liaise with representative of Italy at SC 22 level on the occasion of voting with bearing on the scope of WG 9 (and WG 23).

**Portugal**

The restructuring of the standardization activities in Portugal, in what concerns information technologies is still ongoing. Nevertheless, Portugal has now P-member status of SC 22.

National work related to WG 9 continues to be in direct connection with the NB. In that regard, a request was made to the NB to confirm ISO/IEC 15291:1999.

**Spain**

The new Ada 2012 standard has been publicized at national level. There was a dedicated keynote at the Ada-Spain annual meeting.

**Switzerland**

No report.

**UK**

The UK would be reluctant to see another amendment on the scale of Ada 2012. Future work may instead rather lay with restrictions to the language and subsets such as SPARK.

Held a successful meeting on 28 May 2013.

**USA**

The American delegation congratulates the ARG, and most specially its editor-in-chief Randy Brukart, for the successful completion of the Ada 2012 Reference manual; congratulations to WG 9 as well for speeding up the ISO standardization so effectively that for once the ISO approval came in the same year as the publication of the standard. Members of the American delegation continue to participate in the maintenance of the language through the ARG.  An effort that involves a number of members is the design of Spark 2014, a substantial upgrade of the Spark language that is adapted to Ada 2012.

[AGENDA](#A2)

### Liaison Reports

**Ada-Europe Liaison Report:**

**Ada-Europe Liaison Representative, Dirk Craeynest**

Ada-Europe would like to inform the WG 9 Convenor that it will send a 2 person Ada-Europe liaison delegation to Meeting #64 in Berlin, Germany, on Friday 14 June 2013.

The delegation consists of:

* Erhard Ploedereder
* Dirk Craeynest (presenter)

Ada-Europe is pleased that, in addition to WG 9, WG 23 also accepted the invitation to schedule their meeting in conjunction with our 2013 conference.

The next Ada-Europe conference will be held on June 23-27, 2014, in Paris, France, and we confirm our usual hospitality agreement for WG 9 and ARG.  Both are of course invited on the usual terms, as well as WG 23.

Ada-Europe reconfirms its commitment to support the Ada standardization effort, and Ada language maintenance in general.  In 2012 we supported the WG 9 Convenor, and we continue to do that.  Over the past two years we have published the Rationale 2012 series in the Ada User Journal: the June 2013 issue includes the penultimate installment.

We mentioned before that we plan to publish the Rationale and Reference Manual as books in the Springer series.  We are currently looking into producing e-books for each document.  We are unsure whether we will be able to publish either or both also as printed books in Springer's LNCS series, as was done for all such documents from Ada 80 on.  This will primarily depend on finding (financial) collaboration with other parties, such as vendors interested to promote the language. (12000 euros for 300 copies of the Ada Language Reference Manual).

Finally, an update on the "Ada Way" student programming contest: As part of their price, two members of last year's winning team participate in this conference, and all members received their Ada book of choice.  The "Try and Beat Me" follow up challenge is still open: a poster is available on Ada-Europe's Ada Way web-site to promote it. The start of the new academic year is the ideal moment to support this initiative by getting academics and student teams interested.

**SIGAda Liaison Report:**

**SIGAda Liaison Representative, Alok** **Srivastava (Vice Chair)**

**Background**

SIGAda is a Category C Liaison to WG 9 (See N414)

**Report**

The next SIGAda High Integrity Language Technology (HILT) conference will be held in Pittsburgh, Pennsylvania from Nov 10 – 14, 2013. Jeff Boleng from the SEI has agreed to be the Conference Chair and Tucker Taft has agreed to be the Program Chair.

In November, the ACM Executive Committee (EC) approved our reorganization of the SIGAda EC. The SIGAda EC will now consist of a Chair, Vice Chair, Secretary-Treasurer and International Representative.

SIGAda officer elections are currently being conducted by the ACM. The deadline for submitting votes is June 14, 2013. Results will be officially announced once all the candidates are notified of the results.

SIGAda officer candidates:

CHAIR: Alok Srivastava and David A. Cook

VICE CHAIR: Gregory A. Gicca and S. Tucker Taft

SECRETARY-TREASURER: Eugene W. P. Bingue and Clyde Roby

INTERNATIONAL REPRESENTATIVE: Mario Aldea-Rivas and Dirk Craeynest

**WG 23 Liaison Report:
WG 23 Liaison Representative, Erhard Ploedereder**

Since HILT, WG 23 had a teleconference meeting during December 12-14, discussing remaining issues on the Code Signing Document. TR 24772 was still in ballot at the time.

Further, WG 23 met in New York at the ANSI offices during March 13-15. I was unable to attend this meeting. Discussion topics were a set of seven new vulnerabilities in the realm of trusted code bases, and the future developments for TR 24772. A schedule of approximately 3 years is envisaged. Meanwhile a Fortran annex has come into existence. A C++ Annex would be desirable, but is very unlikely to appear, since the WG is very busy tracking language problems. C# or Objective-C are more hopeful candidates. Also, Java is desired, but nobody is working on these languages as yet.

WG23 met again before the Ada-Europe conference during June 8-10. The prime topic was the comment resolution on the Revised Working draft 17960, Code Signing for Source Code. The WD had failed its ballot with two "No"-votes, in the case of Japan because the Work Item description and the Scope (and content) of the document did not match up. Repairs to the document to address the comments were decided upon. The main objection by Japan will be solved by revising the Work Item text somehow, apparently a difficult process. The issue was that the Work Item promised a specific API and data formats.

There was no progress on TR 24772 at the meeting, since no submissions had been made.

Now, with Ada 2012 completed, would be a good time for WG9 to work on extending the main body of the TR as well as updating the Ada annex to track the main body.

The next WG23 meeting will be in Tokyo (September) and presumably mostly by teleconference as will be the meeting in December.

**FORTRAN, INCITS/PL22.3 Liaison Report:**

**FORTRAN, INCITS/PL22.3 Liaison Representative, Van Snyder**

I have submitted suggestions for revision of subclause B.5, Interfacing with FORTRAN.  Randy has given the suggestions an AI number, which I have forgotten.  It was mentioned in the ARG draft agenda that Randy circulated.

With respect to Canada's national body report remarked on parallelism in C and C++, it should not be overlooked that FORTRAN since 2008 has standardized a facility for SPMD parallelism called "coarrays."  This is based upon facilities provided by Cray and others since the mid 1990's.  Cray's FORTRAN coarray facility is being used on systems with more than 100,000 processor cores.

The UPC proposal is similar in spirit to FORTRAN coarrays.

The coarray features of FORTRAN 2008 are described unofficially in <http://ftp.nag.co.uk.sc22wg5/N1801-N1850/N1824.pdf>.  A project is underway as an ISO Technical Specification, number 18508, to expand the facilities.

If there is interest to pursue this, either within WG 9, or at the SC22 level, the most useful contact would be Bill Long at Cray <longb@cray.com>.

[AGENDA](#A3)

### Convener's Report

### Activities since the Last Session

The US National Body has endorsed of Dr. Joyce Tokar as the US candidate for Convenor of JTC 1/SC 22.WG 9 - Ada, for consideration at the September 2013 JTC 1/SC 22 Plenary in Japan.

ISO has developed a simplified Word template (described [here](https://connect.iso.org/pages/viewpage.action?pageId=1214190)) which lets authors concentrate more on content and less on formatting.  ISO is interested in getting feedback on the use of the new template.

In a more general context, ISO is also interested in working with any Technical Committee/Working Group interested in trying out some other collaborative drafting tool such as wikis, Google Docs, Office 365 with Skydrive. Contact Jeff Poulin POULIN@iso.org.

**Welcome**

We are happy to have a new liaison with FORTRAN, INCITS PL/22.3, Van Snyder. Welcome.

#### Goals for this Meeting

The major objectives for this meeting are:

1. Ada Rapporteur Group Leadership
2. Ada Conformance Assessment
3. Update to the Appendices to the WG 23 Technical Report on Vulnerabilities – discussion during the Committee as a Whole session
4. Consideration of initiating a new work item to make SPARK an ISO standard – discussion during the Committee as a Whole session – deferred to the meeting #65
5. Parallelization proposals from Canada
6. Where do we go now with respect to the next edition of the Ada Standard?

[AGENDA](#A4)

### Project Editor Reports

### ISO/IEC 15291 (ASIS)

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

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

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

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

[AGENDA](#A5)

### Rapporteur Reports

**Rapporteur Report ARG:**

The recently published Ada 2012 standard has already generated ~77 Ada issues, and the ARG has started examining them. 40 of them are candidate amendments, either errors that need repairing, or suggestions for language enhancements targeted to the next version of the language.

A number of AI's have completed editorial review and are ready for approval by WG 9. The list follows. As usual, full text of the AI's can be found at [www.ada-auth.org/ais.html](http://www.ada-auth.org/ais.html) (this list was distributed 8 May 13):

AI12-0022-1/05   2013-05-08 –  Raise expressions
AI12-0027-1/06   2013-05-08 –  Access values should never designate unaliased components
AI12-0028-1/03   2013-01-02 –  Import of variadic C functions
AI12-0037-1/03   2013-05-08 –  New types in Ada.Locales can't be converted to/from strings
AI12-0039-1/03   2013-05-08 –  Ambiguity in syntax for membership expression removed
AI12-0040-1/03   2013-05-08 –  Resolving the selecting\_expression of a case\_expression
AI12-0043-1/02   2013-01-02 –  Details of the storage pool used when Storage\_Size is specified
AI12-0045-1/03   2013-05-08 –  Pre- and Postconditions are allowed on generic subprograms
AI12-0046-1/02   2012-12-27 –  Enforcing legality for anonymous access components in record aggregates
AI12-0047-1/06   2013-05-08 –  Generalized iterators and discriminant-dependent components
AI12-0048-1/03   2013-05-08 –  Default behavior of tasks on a multiprocessor with a specified dispatching policy
AI12-0049-1/03   2013-05-08 –  Invariants need to be checked on the initialization of deferred constants
AI12-0051-1/03   2013-05-08 –  The Priority aspect can be specified when Attach\_Handler is specified

Work on the ASIS standard has been more-or-less non-existent, although there is one partial implementation of ASIS for Ada 2012, and there is a general consensus on the kind of queries that ASIS 2012 should support.

**Discussion**

The ARG needs to submit a single report for meeting #65.

There was some discussion on AI12-0051-1 but all in attendance were happy to go forward with the list of AIs as presented.

ARG has a plan to proceed with work on ASIS and needs to continue to move forward on the execution of this plan.

**Resolutions**

ISO/IEC JTC 1/SC 22/WG 9 Approval of AIs: Resolution [64-7](#r7).

ISO/IEC JTC 1/SC 22/WG 9 appointment of a new Rapporteur of the Ada Rapporteur Group: Resolution [64-6](#r6).

##### ISO/IEC JTC 1/SC 22/WG 9 appreciation to Ed Schonberg (US) the Rapporteur of the ARG: Resolution [64-13](#rD).

ISO/IEC JTC 1/SC 22/WG 9 continuation of the ARG: Resolution [64-2](#r2).

**Rapporteur Report HRG:**

Since the last meeting of WG9, HRG has been concerned with the language vulnerabilities report from WG 23.

Four items of work with respect to the Vulnerabilities report from WG 23 were identified:

Item 1 - In section 8 of the report six new vulnerabilities are identified (mainly
to do with concurrency). HRG needs to review these and pass comments to WG 23 (via WG 9).

Item 2 - Our Annexes need to be updated to reflect Ada 2012 and any issues we
have with the current wording.

Item 3 - Additions to our Annexes are needed to reflect the new vulnerabilities.

Item 4 - Any non-Ada specific issues that are noticed in sections 6 and 7 need to be
passed to WG 23 (again by WG 9).

HRG asks WG 9 to set a timetable for Items 2 and 3.

**Discussion**

WG 23 will not be publishing an update to the Technical Report for about two or three years. However, this should not provide a wide scope for the HRG to prepare a preliminary update to the Annexes.

ISO/IEC JTC 1/SC 22/WG 9 recommends that the HRG to conduct a meeting in conjunction with the HILT conference in Pittsburgh, PA, USA in November.

Resolution: ISO/JTC 1/SC 22/WG 9 directs the HRG to produce a draft update to the Ada Annex and SPARK Annex to be presented to ISO/JTC 1/SC 22/WG 9 at Meeting #65 in Nov 2013.

The following concerns Item 1:

HRG Response to Vulnerabilities Report

Item 1 involves looking at the new vulnerabilities in Section 8 of the report and commenting on their accuracy and completeness.

The background for assessing these new vulnerabilities is the paper by Burns and Wellings in the proceedings of IRTAW14 (Language Vulnerabilities – Let’s not forget Concurrency).

8.3 [CGA]
Covers the problems that arise if a created task does not actually become fully active.

This seems to cover the issue appropriately. There are many reasons why a task could fail during activation, most are covered.
Avoiding strategies seem fine. OK for Ada.
Cross references (8.3.2) seem inappropriate, model checking etc. would not help; this is a clear language design issue (that Ada gets right).

8.4 [CGT]
Covers delayed termination - an aborted task does not terminate immediately.
This is arguable a less important vulnerability than having abort in the language at all. Abort is a vulnerability; it is open to abuse - as Tony Hoare said years ago, if abort is in the language so that a good task A can abort a bad task B, then it could be used by B to abort A!
Description is basically fine. But misses the issue that Ada had that the implementation was given too much implementation freedom - terminate as soon as practical was misused. If a task is in a loop with no synchronization point then abort can be postponed indefinitely; but this is just the situation where abort might be useful. It seemed hard to specify in the language what is required. And this is even harder with multiprocessors.
Cross references (8.4.2) again seem inappropriate. Proof schemes (static analysis) will have no impact on implementation freedom.

8.5 [CGX]
Covers misuse of shared variables
Seems to cover the issue appropriately.
Avoiding strategies seem fine. Mostly OK for Ada

8.6 [CGS]
Covers silent (premature) termination of tasks.
This seems to cover the issue appropriately.
Avoiding strategies seem fine. OK for Ada with new signalling facility.
Cross references (8.6.2) again seem somewhat inappropriate. Yes model checking can do some level of checking, but premature termination is more likely to be from an unhandled exception.

Typo in 8.6.3 Mechanism of failure, para 1
'will never be received' --> 'never being received'.

8.7 [CGM]
Covers locking errors.
This is a widely scoped issue. Many different protocols exist with a number of different failure modes. Reasonable coverage.
In 8.7.4 first bullet should really have 'with some form of suspension facility' added; there cannot be locking errors if there are no locks.
Avoiding strategies could be improved. Synchronous protocols may be easier for some forms of analysis, but they lead to much more synchronization and hence are more vulnerable. Asynchronous protocols such as monitors (POs in Ada) are much less error prone. Note CSP has interleaving semantics, so parallel execution of tasks could undermine static analysis. I feel more should be said about priority ceiling protocols which are deadlock free on single processor (or partitioned multiprocessor) systems.

Typo - last bullet in 8.7.5 is actually two, 'Place all locks ...' is the start of a new bullet.

The document needs to make it clearer that 8.4 and 8.7 have some direct contradictions. If a task is aborted while it holds a lock then one cannot have both immediate termination and safe lock usage. There needs to be some way that the programmer can indicate what they need - the use of abort-deferred regions, or controlled (lock) types being example approaches well supported by
Ada.

8.8 [CGY]
Covers secure communications.
This is more a systems rather then language vulnerability.

This the full set of new vulnerabilities. What is missing?

Most of the pure concurrency issues raised in the Burns & Wellings paper are covered. As indicated above 'abort' could have been brought out be vulnerability in its own right.

Perhaps the report should now look to add vulnerabilities that derive from real-time and scheduling issues. Issues to do with clocks (drift etc) and time (zones and leaps), priority inversion and static parameters such as a task's period and deadline (and  affinity).

Update Annexes: Resolution [64-8](#r8)

Generate new vulnerabilities: Resolution [64-9](#r9)

Continuation of the HRG: Resolution [64-3](#r3).

**Report of POSIX Rapporteur Group (PRG):**

Trying to pay attention on the usage of the POSIX interface; it appears to be almost non-existent. Eurocontrol uses some of it. There is a layer over the POSIX interface that Eurocontrol continues to use.

There is a recommendation to end the PRG.

Termination of the PRG: Resolution [64-4](#r4)

Acknowledgement of the PRG work: Resolution [64-14](#rE), Resolution [64-15](#rf), Resolution [64-16](#rG).

[AGENDA](#A5)

### Open Action Items and Unimplemented Resolutions

This is the "To Do" list for WG9. Some are informal action items assigned to various participants. Some are formal resolutions, which are not yet implemented. Some items are simply in suspense awaiting action by other groups.

#### Action Item 50-1

Investigate the possibility that ANSI might be willing to sell the revised ASIS standard ISO/IEC 15291:200x inexpensively, i.e. at a price similar to that of programming language standards -- $18.

*Status:* Open.It has been surprisingly difficult to obtain the appropriate contact information.

*Discussion:* Bill Thomas will look into this further and get back to us at the next meeting (#54).

ANSI does not set the prices. If they get a standard from ISO, then ISO sets the price and ANSI must conform to the prices set by ISO. ANSI could designate another organization to sell an ISO standard, but the ISO price must still be satisfied.

Is there an alternative to investigate here to distribute non-standard materials? Also look into the steps that John Benito has taken to distribute the C standard.

Bill Thomas will investigate further and report back at meeting #63.

Stephen Michell will investigate further and report back at meeting #65.

**Action 62-2:**The editor of ISO/IEC 18009 (Conformity Assessment of an Ada Language Processor) will review the entire document to find all occurrences of the implication of a physical presence for testing and certification. And report back to WG 9. (Erhard Ploedereder)

Status: *Closed*

*Discussion:* There is one place that is discussion on “presence” in the standard. It is up to WG 9 to tell the editor what to do. It would be possible to add a sentence to clarify the meaning “presence”. Alternatively, it would be possible to leave this as the interpretation of the meaning of “presence” to include “telepresence”.

The meaning of telepresence, as found on Wikipedia (http://en.wikipedia.org/wiki/Telepresence), Telepresence refers to a set of [technologies](http://en.wikipedia.org/wiki/Technologies) which allow a person to feel as if they were present, to give the appearance of being present, or to have an effect, via [telerobotics](http://en.wikipedia.org/wiki/Telerobotics), at a place other than their true location.

Meaning of “presence”: Resolution [64-10](#ra)

Direction to update ACAA Procedures: Resolution [64-11](#rb)

**Action 63-1**

Get the template for a corrigendum to publish the update to ISO/IEC 18009. (Joyce Tokar)

*Status: Closed*

*Discussion:* Contacted Marisa Peacock from ISO and was informed that there is no standard format for ISO Corrigendum.

**Action 63-2**

Contact Jeff Cousins to determine if he is willing become the ARG Rapporteur. (John Barnes)

*Status: Closed*

*Discussion: Jeff has agreed to become the ARG Raporteur and is appointed to this position during this meeting (see Resolution* [*64-6*](#r6)*).*

**Action 63-3**

Determine if the IRTAW group is willing to update the ISO/IEC 15942 standard to be in alignment with Ada 2012. (Tullio Vardanega)

*Status: Open*

**Action 63-4**

Contact Alan Burns for an update to the HRG membership. (Joyce Tokar)

*Status: Closed*

*Discussion: Alan Burns provided an update to the HRG membership list (see Resolution* [*64-3*](#r3)*).*

**Action 63-5**

Contact Steve Michell to determine if the POSIX/Ada Rapporteur Group (PRG) should continue. (Joyce Tokar)

*Status: Closed*

*Discussion: The PRG has been discontinued (see Resolution* [*64-4*](#r4)*).*

**Action 63-6**

Dan Eilers will work with JP Rosen to provide a preliminary list of the issues that prevent public packages, libraries, and bindings from working on all compilers and provide this to Tucker Taft.

**Action 63-7**

Find out what compilers are validated against what versions of the Standard (Randy Brukardt, Dirk Craeynest).

[AGENDA](#AA)

### Committee as a Whole

* Update to Ada Annex and SPARK Annex to the WG 23 Technical Report on Vulnerabilities (Michell, Burns, Tokar) – see HRG Report
* SPARK as an ISO Standard (Dewar) – deferred until meeting #65
* Location of the WG 9 to be held in conjunction with Ada Europe in Paris in June 2014 (Rosen)

**Discussion**
AFNOR would be very happy to host the meeting of WG 9 in June 2014. Ada Europe would also be very happy to host the meeting of WG 9. AFNOR facilities en-route to the Charles de Gaulle airport. ARG could meet at the AFNOR meeting for the Friday session but will need to move the remainder of the meeting back to the Ada Europe facility for Saturday and Sunday.

Overall view of WG 9 is to conduct the meeting at AFNOR – see Resolution 64-5 Meeting schedule

**Action 64-1:** JP Rosen (France) will investigate the possibilities of conducting Meeting #66 at AFNOR and report back to WG 9 no later than Meeting #65.

* Canada formally requests that WG9 setup a project to add support for many core parallelisms within the Ada language.

**Discussion**

Perhaps an AI should be written for the ARG to examine. Or should this be a resolution from WG 6 to direct the ARG to do the investigation? Canada could submit an AI to the ARG on this topic to initiate the discussion. Then the ARG may start a subgroup to work on this topic, or it may be the focus of the entire ARG. In the future, we may want to consider establishing a Parallelism Rapporteur Group.

* Proposal to ask SC 22 to set up a working group to develop a language independent model of massive parallelization (data-level parallelism and control-level parallelism) that underlies the work going on in individual languages (Canada).

**Discussion**

Does it make sense to have a common, ISO approved, approach to parallelism? Would it be possible to join the efforts of the C Parallel Language Extensions (CPLEX) group that is under the auspices of the Open Standards Group (see: Send Cplex mailing list submissions to
cplex@open-std.org, To subscribe or unsubscribe via the World Wide Web, visit
<http://www.open-std.org/mailman/listinfo/cplex> or, via email, send a message with subject or body 'help' to cplex-request@open-std.org).

Need to talk with John Benito to see how much interaction the C Parallel group is interested in getting from other programming languages.

Coordination Efforts with CPLEX: Resolution [64-12](#rc).

Unfinished Business

**New Business**

Scheduling of Future Meetings

The next meeting will be held in conjunction with [High Integrity Language Technology 2013 (HILT 2013)](http://www.sigada.org/conf/hilt2013), Friday morning 15 November 2013 in Pittsburgh, USA.

The following meeting of WG-9 will be held in conjunction with the [19th International Conference on Reliable Software Technologies Ada-Europe 2014](http://www.ada-europe.org/conference2013), Friday morning 27 June 2014 in Paris, France.

Resolution [64-5](#r5)

[AGENDA](#AC)

#### Review of New Action Items

[AGENDA](#AD)

**Resolutions**

**Administrative Actions**

#### Resolution 64-1:

The minutes of Meeting #63 contained in document [N532](#N532) are approved.

##### Resolution 64-2:

ISO/IEC JTC 1/SC 22/WG 9 continues its Ada Rapporteur Group (ARG) until the next plenary meeting and expresses its grateful appreciation to the Rapporteur and the members for their continuing service.

The membership of the ARG is designated to be: Steve Baird (SIGAda), John Barnes (UK), Geert Bosch (US), Randy Brukardt (US), Alan Burns (UK), Jeff Cousins (UK), Robert Dewar (US), Gary Dismukes (US), Robert Duff (US), Pascal Leroy (France), Brad Moore (Canada), Erhard Ploedereder (Ada-Europe), Jean-Pierre Rosen (France), Ed Schonberg (US), Tucker Taft (US), and Tullio Vardanega (Italy).

The Convenor of WG 9 is authorized to act for WG 9 between meetings in appointing additional members of the ARG. In doing so, she shall consult with the Rapporteur and the National Body or Liaison Organization nominating the member.

Rapporteurs are permitted to allow other individuals to observe the deliberations of the Rapporteur Group. The admission of observers and the extent of participation permitted to observers are at the discretion of the Rapporteur with the concurrence of the membership of the Rapporteur Group.

##### Resolution 64-3:

ISO/IEC JTC 1/SC 22/WG 9 continues its Annex H Rapporteur Group until the next plenary meeting and expresses its grateful appreciation to the Rapporteur and the members for their continuing service.

The membership of the HRG is designated to be: Steve Baird (US), John Barnes (UK), Alan Burns (UK), Robert Dewar (US), Gary Dismukes (US), Michael Gonzalez Harbour (Spain), Peter Hermann (Germany), Stephen Michell (Canada), Brad Moore (Canada), Miguel Pinho (Portugal), Erhard Ploedereder (Ada-Europe), Juan Antonio de la Puente (Spain), Jean-Pierre Rosen (France), Jorge Real (Spain), S. Tucker Taft (US), Joyce Tokar (US) and Tullio Vardanega (Italy).

The Convenor of WG 9 is authorized to act for WG 9 between meetings in appointing additional members of the HRG. In doing so, she shall consult with the Rapporteur and the National Body or Liaison Organization nominating the member.

Rapporteurs are permitted to allow other individuals to observe the deliberations of the Rapporteur Group. The admission of observers and the extent of participation permitted to observers are at the discretion of the Rapporteur with the concurrence of the membership of the Rapporteur Group.

##### Resolution 64-4:

ISO/IEC JTC 1/SC 22/WG 9 discontinues its POSIX/Ada binding Rapporteur Group (PRG).

##### Resolution 64-5:

ISO/IEC JTC 1/SC 22/WG 9 schedules future meetings as follows:

Meeting #65, in conjunction with [High Integrity Language Technology 2013 (HILT 2013)](http://www.sigada.org/conf/hilt2013), Friday morning 15 November 2013 in Pittsburgh, PA, USA.

Meeting #66 in conjunction with the [19th International Conference on Reliable Software Technologies Ada-Europe 2014](http://www.ada-europe.org/conference2014), Friday morning 27 June 2014 in Paris, France.

**Resolution 64-6:**

ISO/IEC JTC 1/SC 22/WG 9 appoints Jeff Cousins (UK) as Rapporteur of Ada Rapporteur Group.

[AGENDA](#AD)

### Work Programme

**Resolution 64-7:**

ISO/IEC JTC 1/SC 22/WG 9 approves the following AIs, which have been previously approved by the ARG:

AI12-0022-1/05   2013-05-08 –  Raise expressions
AI12-0027-1/06   2013-05-08 –  Access values should never designate unaliased components
AI12-0028-1/03   2013-01-02 –  Import of variadic C functions
AI12-0037-1/03   2013-05-08 –  New types in Ada.Locales can't be converted to/from strings
AI12-0039-1/03   2013-05-08 –  Ambiguity in syntax for membership expression removed
AI12-0040-1/03   2013-05-08 –  Resolving the selecting\_expression of a case\_expression
AI12-0043-1/02   2013-01-02 –  Details of the storage pool used when Storage\_Size is specified
AI12-0045-1/03   2013-05-08 –  Pre- and Postconditions are allowed on generic subprograms
AI12-0046-1/02   2012-12-27 –  Enforcing legality for anonymous access components in record aggregates
AI12-0047-1/06   2013-05-08 –  Generalized iterators and discriminant-dependent components
AI12-0048-1/03   2013-05-08 –  Default behavior of tasks on a multiprocessor with a specified dispatching policy
AI12-0049-1/03   2013-05-08 –  Invariants need to be checked on the initialization of deferred constants
AI12-0051-1/03   2013-05-08 –  The Priority aspect can be specified when Attach\_Handler is specified

##### Resolution 64-8:

ISO/JTC 1/SC 22/WG 9 directs the HRG to produce a draft update to the Ada Annex and SPARK Annex to be presented to ISO/JTC 1/SC 22/WG 9 at Meeting #65 in Nov 2013.

**Resolution 64-9**:

ISO/JTC 1/SC 22/WG 9 directs the HRG, upon the completion of the updates to the Ada Annex and SPARK Annex, to begin work on identifying new vulnerabilities.

**Resolution 64-10:**

ISO/JTC 1/SC 22/WG 9 defines the interpretation of the meaning of “presence” as found in ISO/IEC 18009 (Conformity Assessment of an Ada Language Processor) to include “telepresence” by means of modern tele-communication technology.

**Resolution** **64-11:**

ISO/JTC 1/SC 22/WG 9 instructs ACAA Technical Agent to update the ACAA Procedures to specify the meaning and realization of telepresence with respect to witness testing.

**Resolution** **64-12:**

ISO/JTC 1/SC 22/WG 9 will contact ISO/JTC 1/SC 22/WG 14 to enquire about developing a cooperative effort on parallel programming models, e.g., CPLEX, and report back to ISO/JTC 1/SC 22/WG 9 at Meeting #65.

[AGENDA](#AD)

### Final Consideration of Resolutions

#### Appreciation

##### Resolution 64-13:

##### ISO/IEC JTC 1/SC 22/WG 9 expresses its grateful appreciation to Ed Schonberg (US) for his leadership of the ARG.

##### Resolution 64-14:

##### ISO/IEC JTC 1/SC 22/WG 9 expresses its grateful appreciation Stephen Michell (Canada) for his leadership of the PRG.

**Resolution 64-15:**

ISO/IEC JTC 1/SC 22/WG 9 expresses its grateful appreciation to the membership of the PRG: Ted Baker (SIGAda), Matt Gingell (US), Michael Gonzalez Harbour (Spain), Stephen Michell (Canada), Brad Moore (Canada), Ronald Price (SIGAda), Luke Wong (Canada) for their efforts in creating and maintaining the POSIX Ada Standard.

**Resolution 64-16:**

ISO/IEC JTC 1/SC 22/WG 9 expresses its grateful appreciation to Randy Brukardt for setting up and maintaining the PRG website.

**Resolution 64-17:**

ISO/IEC JTC 1/SC 22/W 9 expresses its grateful appreciation to Ada Europe for their gracious accommodations in hosting Meeting #64.

**Resolution 64-18:**

ISO/IEC JTC 1/SC 22/W 9 expresses its grateful appreciation to Clyde Roby for his continuing service in maintaining the WG 9 Web Page.

##### Resolution 64-19:

ISO/IEC JTC 1/SC 22/W 9 expresses its grateful appreciation to Stephen Michell for acting as secretary for Meeting #64.

##### Resolution 64-20:

ISO/IEC JTC 1/SC 22/WG 9 expresses its grateful appreciation to Joyce Tokar for convening Meeting #64.

[AGENDA](#AF)

Recess –

The meeting ended at 11:50 The Convenor recessed the meeting subject to her call. HODs may anticipate email ballots to be conducted during the months between this meeting and the next one.

[AGENDA](#AG)

## REFERENCES

### Relevant WG9 Documents

[ISO/IEC 8652:1995](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=22983) Information Technology--Programming Languages—Ada

[ISO/IEC 8652:1995/COR.1:2001](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=35451), Technical Corrigendum to Information Technology--Programming Languages—Ada

[ISO/IEC 8652:1995/AMD.1:2007](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=45001), Amendment to Information Technology--Programming Languages--Ada

[N388](http://www.open-std.org/jtc1/sc22/wg9/n388.htm), Request for Subdivision of Project ISO/IEC 8652:1995

[N406](http://www.open-std.org/jtc1/sc22/wg9/n406.pdf), Procedures of the Ada Rapporteur Group

[N412](http://www.open-std.org/jtc1/sc22/wg9/n412.pdf), Instructions to the Ada Rapporteur Group from SC22/WG9 for Preparation of the Amendment to ISO/IEC 8652, 10 October 2002

[N414](http://www.open-std.org/jtc1/sc22/wg9/n414.pdf), Notification of Approval of Category C Liaisons between SC22/WG9 and Ada-Europe and SIGAda

[N416](http://www.open-std.org/jtc1/sc22/wg9/n416.htm), Charter of the Annex H Rapporteur Group (HRG)

[N417](http://www.open-std.org/jtc1/sc22/wg9/n417.htm), Charter of the ASIS Rapporteur Group (ASISRG)

[N423](http://www.open-std.org/jtc1/sc22/wg9/n423.pdf), Convener's Comments on Instructions to the Ada Rapporteur Group from SC22/WG9 for Preparation of the Amendment to ISO/IEC 8652, December 2002

[N437](http://www.open-std.org/jtc1/sc22/wg9/n437.pdf), ARG Rapporteur's Proposal for Defining Scope of Amendment to ISO/IEC 8652:1995, 9 April 2004

[N456](http://www.open-std.org/jtc1/sc22/wg9/N456.pdf), Convener Proposal for the Revision of the ASIS Standard, ISO/IEC 15291

[N457](http://www.open-std.org/jtc1/sc22/wg9/n457.pdf), Approved Plan for the Revision of the ASIS Standard, ISO/IEC 15291

[N459](http://www.open-std.org/jtc1/sc22/wg9/n459.txt), Disposition of Informal Comments Received on Editor's Draft of Amendment, 23 March 2006

[N460](http://www.open-std.org/jtc1/sc22/wg9/n460.pdf), Editor's Draft, Amendment 1 to ISO/IEC 8652, March 2006

[N462](http://www.open-std.org/jtc1/sc22/wg9/n462.pdf), JTC1 Directives, 5th edition, Version 2, April 2006 (JTC001-N-8122)

[N463](http://www.open-std.org/jtc1/sc22/wg9/n463.pdf), ISO/IEC Directives, Part 2, Rules for the structure and drafting of International Standards

[N464r](http://www.open-std.org/jtc1/sc22/wg9/n464r.pdf), 2nd Preliminary draft New Work Item Proposal for the Revision of ISO/IEC 15291, ASIS

[N465](http://www.open-std.org/jtc1/sc22/wg9/N465.pdf), Response of ISO/IEC JTC1/SC22/WG9 to SC22 Resolution 5-15

[N467](http://www.open-std.org/jtc1/sc22/wg9/n467.pdf), Submission of ISO/IEC 8652:1995/FPDAM 1 to SC22 for FPDAM ballot

[N468](http://www.open-std.org/jtc1/sc22/wg9/n468.pdf), Example approach for structuring the revised ASIS Standard

[N472](http://www.open-std.org/jtc1/sc22/wg9/n472.pdf), Proposal to Revise ISO/IEC 15291, Information technology - Programming languages - Ada Semantic Interface Specification (ASIS)

[N477](http://www.open-std.org/jtc1/sc22/wg9/n477.pdf), Canadian Contribution, Initial Work Scope Summary for updating Ada POSIX Bindings IS 14519:2001 to POSIX Draft IS 9945:2008 and Ada 2005.

[N479](http://www.open-std.org/jtc1/sc22/wg9/n479.pdf), SIGAda contribution, Clyde Roby, Notes of Birds-of-a-Feather session on POSIX-Ada Binding, conducted at SIGAda 2006, November 15, 2006, Albuquerque, NM, USA.

[N489](http://www.open-std.org/jtc1/sc22/wg9/n489.ppt), OWGV Summary 2008

[N490](http://www.open-std.org/jtc1/sc22/wg9/n490.htm), Minutes, Meeting #54 of ISO/IEC JTC1/SC22/WG9, Friday, 20 June 2008, Venice, Italy

[N491](http://www.open-std.org/jtc1/sc22/wg9/n491.htm), Convener's Report, 2008, ISO/IEC JTC 1/SC 22/WG 9 (Ada)

[N492](http://www.open-std.org/jtc1/sc22/wg9/n492.rtf), Announcement and Draft Agenda, Meeting #55 of ISO/IEC JTC 1/SC 22/WG 9, Thursday, 30 October 2008, Portland, Oregon, USA

[N493](http://www.open-std.org/jtc1/sc22/wg9/n493.htm), Detailed Draft Agenda, Meeting #55 of ISO/IEC JTC 1/SC 22/WG 9, Friday, 30 October 2008, Portland, Oregon, USA

[N494](http://www.open-std.org/jtc1/sc22/wg9/n494.htm), Draft Meeting Minutes, Meeting #55 of ISO/IEC JTC1/SC22/WG9, Thursday, 30 October 2008, Portland, Oregon, USA

[N495](http://www.open-std.org/jtc1/sc22/wg9/n495.htm), Draft Agenda, Meeting #56 of ISO/IEC JTC 1/SC 22/WG 9, Friday, 12 June 2009, Brest, France

[N496](http://www.open-std.org/jtc1/sc22/wg9/n496.doc), Detailed Agenda, Meeting #56 of ISO/IEC JTC 1/SC 22/WG 9, Friday, 12 June 2009, Brest, France

[N497](http://www.open-std.org/jtc1/sc22/wg9/n497.doc), Meeting Minutes, Meeting #56 of ISO/IEC JTC-1/SC-22/WG 9, Friday, 12 June 2009, Brest France

[N498](http://www.open-std.org/jtc1/sc22/wg9/n498.pdf), Instructions to the Ada Rapporteur Group from SC 22/WG 9 for Preparation of Amendment 2 to ISO/IEC 8652

[N499](http://www.open-std.org/jtc1/sc22/wg9/n499.doc), Announcement and Draft Agenda, Meeting #57 of ISO/IEC JTC1/SC22/WG9, Thursday, 5 November 2009, Tampa Bay, Florida

[N500](http://www.open-std.org/jtc1/sc22/wg9/n500.doc), Convener's Report, 2009, ISO/IEC JTC 1/SC 22/WG 9 (Ada)

[N501](http://www.open-std.org/jtc1/sc22/wg9/n501.doc), Detailed Agenda, Meeting #57 of ISO/IEC JTC1/SC22/WG9, Thursday, 5 November 2009, Tampa Bay, Florida

[N502](http://www.open-std.org/jtc1/sc22/wg9/n502.doc), Meeting Minutes, Meeting #57 of ISO/IEC JTC-1/SC-22/WG 9, Thursday 5 Nov 2009 in Tampa Bay, Florida.

[N503](http://www.open-std.org/jtc1/sc22/wg9/n503.doc), Announcement and Draft Agenda, Meeting #58 of ISO/IEC JTC1/SC22/WG9, Friday, 18 June 2010

[N504](http://www.open-std.org/jtc1/sc22/wg9/n504.doc), Detailed Agenda, Meeting #58 of of ISO/IEC JTC1/SC22/WG9, Friday, 18 June 2010

[N505](http://www.open-std.org/jtc1/sc22/wg9/n505.doc), ARG Rapporteur’s Proposal for Defining Scope of Amendment 2 to ISO/IEC 8652:1995, 4 June 2010

[N506](http://www.open-std.org/jtc1/sc22/wg9/n506.doc), Draft Letter to the Community

[N507](http://www.open-std.org/jtc1/sc22/wg9/n507.doc), Annex Ada to ISO/IEC JTC 1/SC 22/WG 23 N0238, Guidance to Avoiding Vulnerabilities in Programming Languages through Language Selection and Use, Draft 1, 20 June 2010

[N508](http://www.open-std.org/jtc1/sc22/wg9/documents.htm), Draft Minutes, Meeting #58 of ISO-IEC JTC-1 SC-22-WG 9, Friday, 18 June 2010, Valencia, Spain

[N509](http://www.open-std.org/jtc1/sc22/wg9/documents.htm), Convener's Report, 2009, ISO/IEC JTC 1/SC 22/WG 9

N510, Request for Subdivision of Project ISO/IEC 8652:1995

[N511](http://www.open-std.org/jtc1/sc22/wg9/documents.htm), Announcement and Draft Agenda, Meeting #59 of ISO/IEC JTC 1/SC 22/WG 9, Thursday afternoon, 28 October 2010, Fairfax, VA, USA

[N512,](http://www.open-std.org/jtc1/sc22/wg9/n512.doc) Ada Annex for the WG23 Technical Report on Software Vulnerabilities, Draft 2.

[N513](http://www.open-std.org/jtc1/sc22/wg9/n513.doc), Draft Detailed Agenda, Meeting #59 of ISO-IEC JTC-1 SC-22-WG 9, Thursday, 28 October 2010, Fairfax, VA

[N514](http://www.open-std.org/jtc1/sc22/wg9/n514.doc), Draft Minutes, Meeting #59 of ISO-IEC JTC-1 SC-22-WG 9, Thursday, 28 October 2010, Fairfax, Virginia, USA

[N515](http://www.open-std.org/jtc1/sc22/wg9/n515.doc), Announcement and Draft Agenda, Meeting #60 of ISO/IEC JTC 1/SC 22/WG 9, Friday morning 24 June 2011, Edinburgh, UK.

[N516](http://www.open-std.org/jtc1/sc22/wg9/n516.doc), ISO/IEC JTC 1/SC 22/WG 23 N0296 – Ada Annex to WG23 TR on Software Vulnerabilities.

[N517](http://www.open-std.org/jtc1/sc22/wg9/n517.doc), ISO/IEC JTC 1/SC 22/WG 23 N0275 – SPARK Annex to WG23 TR on Software Vulnerabilities.

[N518](http://www.open-std.org/jtc1/sc22/wg9/n518.doc), Draft Detailed Agenda, Meeting #60 of ISO-IEC JTC-1 SC-22-WG 9, Friday, 24 June 2011, Edinburgh, UK.

[N519](http://www.open-std.org/jtc1/sc22/wg9/n519.doc), Draft Minutes, Meeting #60 of ISO-IEC JTC-1 SC-22-WG 9, Friday, 24 June 2011, Edinburgh, UK.

[N520](http://www.open-std.org/jtc1/sc22/wg9/n520.doc), Convenor's Report, 2010, ISO/IEC JTC 1/SC 22/WG 9 (Ada).

[N521](http://www.open-std.org/jtc1/sc22/wg9/n521.doc), Announcement and Draft Agenda, Meeting #61 of ISO/IEC JTC 1/SC 22/WG 9, Thursday afternoon, 10 November 2011, Denver, CO, USA.

[N522](http://www.open-std.org/jtc1/sc22/wg9/n522.doc), Draft Minutes, Meeting #61 of ISO-IEC JTC-1 SC-22-WG 9, Thursday, 10 November 2011, Denver, CO, USA.

[N523](http://www.open-std.org/jtc1/sc22/wg9/n523.xls), Responses to JTC 1/SC 22/WG 9/National Body Comments on Draft revision of the Ada Standard

[N524](http://www.open-std.org/jtc1/sc22/wg9/n524.doc), Detailed Agenda Meeting #62 of ISO/IEC JTC1/SC22/WG9 Friday 15 June 2012 in Stockholm, Sweden.

[N525](http://www.open-std.org/jtc1/sc22/wg9/n525.doc), Draft Minutes, Meeting #62 of ISO-IED JTC-1 SC-22 WG-9. Friday 15 June 2012, Stockholm, Sweden.

[N526](http://www.open-std.org/jtc1/sc22/wg9/ISO_IEC_JTC1_SC22_WG9_N526-8652-DIS.pdf), ISO/IEC JTC 1/SC 22 N Date: 2012-03-30 ISO/IEC CD 8652.

[N527](http://www.open-std.org/jtc1/sc22/wg9/ISO_IEC_JTC1_SC22_WG9_N527-8652-DIS.pdf), ISO/IEC JTC 1/SC 22 N Date: 2012-05-18 ISO/IEC WD 8652.

[N528](http://www.open-std.org/jtc1/sc22/wg9/ISO_IEC_JTC1_SC22_WG9_N528-8652-DIS.pdf), ISO/IEC JTC 1/SC 22 N Date: 2012-06-06 ISO/IEC DIS 8652.

[N529](http://www.open-std.org/jtc1/sc22/wg9/n529.doc), Convenor's Report, 2011, ISO/IEC JTC 1/SC 22/WG 9 (Ada).

[N530](http://www.open-std.org/jtc1/sc22/wg9/n530.doc), Meeting #63 Announcement and Draft Agenda.

[N531](http://www.open-std.org/jtc1/sc22/wg9/n531.doc), Detailed Agenda, Meeting #63 of ISO/IEC JTC 1/SC 22/WG 9, Friday 7 Dec 2012, Boston, USA

[N532](http://www.open-std.org/jtc1/sc22/wg9/n532.doc), Meeting Minutes Meeting #63 of ISO/IEC JTC 1/SC 22/WG 9 Friday 7 December 2012 in Boston, USA

[N533](http://www.open-std.org/jtc1/sc22/wg9/n533.doc), Meeting #64 Announcement and Draft Agenda, Friday 14 June 2013, Berlin, Germany.

[N534](http://www.open-std.org/jtc1/sc22/wg9/n534.doc), Detailed Agenda Meeting #64 Friday 14 June 2013, Berlin, Germany.