

## **Business plan and convenor's report: ISO/IEC JTC1 SC22/WG20 - INTERNATIONALIZATION**

### **PERIOD COVERED:**

September 2001 – August 2002

### **SUBMITTED BY:**

Convenor WG20  
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## **1. MANAGEMENT SUMMARY**

### **1.1 SCOPE**

Identification of elements relevant to the work of SC22 that may be affected by differences in language, culture, customs and habits; and for these elements, develop standards that enable applications to be portable across differing cultural practices; and develop a Technical Report that describes a framework for nations to provide those elements

### **1.2 PROJECT REPORT**

#### **Project number**

#### **Description**

#### **Editors**

#### **22.13 (published)**

**Second edition of TR 10176: "Guidelines for the preparation of programming language standards".**

An amendment has been approved to align Annex A to ISO 10646. (see project 22.13.1)

**Akio Kido and Makoto Noda**

#### **22.13.1 (published)**

**Amendment #1 to TR 10176: "Guidelines for the preparation of programming language standards" to align Annex A with ISO 10646. The TR has been published in 2001, not as an amendment but as the 3<sup>rd</sup> edition of the Technical Report .**

**Arnold F. Winkler**

#### **22.13.2**

TR 10176, 4<sup>th</sup> edition: "Guidelines for the preparation of programming language standards" to align Annex A with ISO 10646.  
Arnold F. Winkler

**22.30.01 (published)**

**TR 11017: "Framework for internationalization"**

**T.K. Sato**

22.30.02.01 (umbrella project - no standard associated)  
Functionality of the internationalization of applications  
Keld Simonsen

**22.30.02.02 (published)**

**ISO/IEC 14651: International string ordering. This standard has been approved and published.**

**Alain LaBonté**

22.30.02.02.1

Amendment #1 to ISO/IEC 14651: International string ordering, to align the template table with the rapidly growing repertoire of ISO/IEC 10646.

Alain LaBonté

22.30.02.03

ISO/IEC 14652: Specification method for Cultural Conventions. This project has changed to produce a TR.

Keld Simonsen

**22.15435 (withdrawn)**

**ISO/IEC 15435: Internationalization API. This project has been withdrawn.**

**Keld Simonsen**

**22.15897 (published)**

**ISO/IEC 15897: Procedures for registration of cultural elements.** This project was created through the fast track process from EN 12005 and assigned to WG20 for maintenance.

**Keld Simonsen**

**22.15897 revision**

**ISO/IEC 15897: Procedures for registration of cultural elements.** An US contribution to align the registration process with the process for character set registrations in ISO/IEC 2375 was prepared and submitted to the editor.

**Keld Simonsen**

For details see later discussion of projects in section 5.

### **1.3 COOPERATION AND COMPETITION**

Internationalization is considered a high priority issue by many groups that develop standards, most important amongst them are:

- \* Unicode Consortium
- \* Subcommittees and individual working groups of JTC1, e.g. SC22/WG4 - COBOL
- \* ISO TC46/SC2
- \* CEN, CDSG, CEN/TC304, various working groups
- \* W3C, the World Wide Web Consortium

WG20 is cooperating with the above mentioned groups, either through already existing liaisons, or through individual contacts.

## **2. PERIOD REVIEW**

### **2.1 MARKET REQUIREMENTS**

WG20 believes that through the proliferation of PCs in homes world-wide, and the ubiquitous World Wide Web, internationalization has become a very important factor in the creation of applications and thus all programming languages.

### **2.2 ACHIEVEMENTS**

ISO/IEC 14651 has been approved and is published on CD.

ISO/IEC TR 10176, Amendment #1 has been published as the third edition of TR 10176.

### **2.3 RESOURCES**

Please see 6.1.2 for the general resource situation. WG20 has to prioritize its work to make best use of the scarce resources available.

## **3. FOCUS FOR THIS PLANNING PERIOD**

### **3.1 DELIVERABLES:**

- A. WG20's focus for 2002 and 2003 will be to amend the international string ordering standard ISO/IEC 14651 to align the character repertoire with the rapidly growing repertoire of ISO 10646, parts 1 and 2 .
- B. TR 14652 – Specification methods for cultural conventions, will be published asap.
- C. WG20 works on amending ISO/IEC 15897 – Registration of cultural elements, to align the registration process with the process for character set registrations in ISO/IEC 2375.
- D. WG20 will ballot the 4<sup>th</sup> edition of TR 10176 to align the table in Annex A with the repertoire of ISO/IEC 10646.
- E. WG20 starts collecting contributions for a potential new work item on the functionality of APIs for internationalization.

### **3.2 STRATEGIES:**

WG20 has 2 principle strategies:

- A. Technical excellence
- B. Liaisons with all interested parties

#### **3.2.1 RISKS**

The risks with the chosen strategies are:

- A. The quest for technical excellence slows down the process
- B. Liaisons with individual interests create complex requirements which are harder to meet
- C. Lack of resources slows down the process

#### **3.2.2 OPPORTUNITIES**

- A. Technical correctness of the WG20 work ensures that resulting standards can and will be implemented immediately after publication, sometimes even before.
- B. WG20 develops standards and Technical Reports with contributions and requirements from many liaisons. This ensures comprehensive standards that provide excellent service to a wide variety of users.

- C. Unique opportunities present themselves to reference versioned data files of the Unicode Character Database instead of copying derivative tables into JTC1 standards, e.g. the identifier table in Annex A of ISO/IEC 10176.

### 3.3 WORK PROGRAM PRIORITIES

Culturally correct processing is important for all facets of data processing. Culturally correct ordering of data is one of the most complex tasks due to contradicting requirements from various parts of the user community. WG20 was using most of its resources to complete IS 14651, a standard that allows international string ordering with the option to tailor the output to satisfy specific user communities (e.g. geographic areas, cultural groups, businesses). Amending the template table that defines the sort order with new characters from the rapidly growing repertoire if ISO/IEC 10646 is time critical. In light of the extensive use of international search engines this task deserves highest priority in the work of WG20.

The registry of cultural elements is helpful for design and implementation of internationalized applications. To ensure reliable quality of registrations, WG20 is putting priority on amending the registration process to allow independent review of submissions.

## 4. Membership of SC22/WG20

### 4.1 Liaisons and representatives to and from SC22/WG20

#### 4.1.1 Liaisons from WG20

| Liaison from WG20 | Organization | Subject                        |
|-------------------|--------------|--------------------------------|
| open              | SC2/WG2      | Character Sets                 |
| Keld Simonsen     | SC22/WG15    | POSIX                          |
| open              | SC22/WG5     | Fortran                        |
| Keld Simonsen     | SC22/WG14    | C                              |
| Keld Simonsen     | SC22/WG21    | C++                            |
| Keld Simonsen     | CEN/TC 304   | I18n, character set technology |
| Alain LaBonté     | CEN/TC 304   | I18n, character set technology |
| Alain LaBonté     | SC35         | User System Interface          |
| Keld Simonsen     | TC37/SC2/WG3 | Alphabetic ordering            |
| Ken Whistler      | Unicode      | Character sets and I18N        |
| Keld Simonsen     | W3C I18N     | I18N for the WWW               |
| Keld Simonsen     | TC46/SC2     | Transliteration                |
|                   | SC32/WG3     | SQL                            |

#### 4.1.2 Liaisons to WG20

| Liaison to WG20 | Organization | Subject                        |
|-----------------|--------------|--------------------------------|
| open            | SC2/WG2      | Character Sets                 |
| Keld Simonsen   | SC22/WG15    | POSIX                          |
| Ann Wallace     | SC22/WG4     | COBOL                          |
| open            | SC22/WG5     | Fortran                        |
| Jim Melton      | SC32/WG3     | SQL                            |
| Keld Simonsen   | SC22/WG14    | C                              |
| Keld Simonsen   | SC22/WG21    | C++                            |
| Marc Küster     | CEN/TC 304   | I18n, character set technology |
| Ken Whistler    | Unicode      | Character sets and I18N        |
| open            | W3C I18N     | I18N for the WWW               |
| open            | SC35         | User interface                 |
| John Clews      | TC46/SC2     | Transliteration                |

I would like to emphasize that 2 very important liaisons are currently open, namely the liaisons to and from SC2/WG2.

**Note:**

CEN/TC304 is now called European Localization Requirements, the TC is presently without a secretariat and thus "dormant".

WG20 also maintains contacts with CEN CDSG, the Cultural Diversity Steering Group, through Marc Küster, member of WG20 and chair of the CDSG.

### 4.1.3 Liaison requests

None at this moment.

### 4.1.4 Representatives

None at this moment.

## 4.2 Meetings of SC22/WG20

|                          |                |            |                |
|--------------------------|----------------|------------|----------------|
| 1                        | November 1991  | Sunnyvale  | USA            |
| 2                        | April 1992     | Paris      | France         |
| 3                        | October 1992   | Québec     | Canada         |
| 4                        | April 1993     | Copenhagen | Denmark        |
| 5                        | October 1993   | Tokyo      | Japan          |
| 6                        | April 1994     | Oxford     | United Kingdom |
| 7                        | October 1994   | Cupertino  | USA            |
| 8                        | May 1995       | Paris      | France         |
| 9                        | September 1995 | Copenhagen | Denmark        |
| 10                       | April 1996     | Kyoto      | Japan          |
| 11                       | September 1996 | Vienna     | Austria        |
| 12                       | Spring 1997    | Québec     | Canada         |
| 13                       | November 1997  | Cairo      | Egypt          |
| 14                       | June 1998      | Dublin     | Ireland        |
| 15                       | October 1998   | Tel Aviv   | Israel         |
| 16                       | May 1999       | Malvern    | USA            |
| 17                       | November 1999  | Copenhagen | Denmark        |
| 18                       | May 2000       | Québec     | Canada         |
| 19                       | Oct. Nov. 2000 | Malvern    | USA            |
| 20                       | May 2001       | Tübingen   | Germany        |
| 21                       | October 2001   | Malvern    | USA            |
| 22                       | June 2002      | Tromsø     | Norway         |
| <u>Planned meetings:</u> |                |            |                |
| 23                       | Spring 2003    | Busan (?)  | South Korea    |
| 24                       | Autumn 2003    | California | USA            |

### 4.3 Convener of WG20

Arnold Winkler is the convener of SC22/WG20 until the SC22 plenary in August of 2002.

## 5. Projects of SC22/WG20

### 5.1 Status of active projects

#### 5.1.1 TR 11017: Framework for internationalization (published)

a Framework for internationalization

- b JTC1 22.30.01
- c A type 3 Technical Report
- d T. K. Sato
- e The TR 11017 has been published in English and French. The project is completed.

### **5.1.2 Second edition of TR 10176 (published)**

- a Guidelines for the preparation of programming languages standards
- b JTC1 22.13
- c A Type 3 Technical Report
- d A. Kido and M. Noda
- e The TR has been published. The project is completed.

### **5.1.3 Third edition of TR 10176 (published)**

- a Amendment to "Guidelines for the preparation of programming language standards"
- b JTC1 22.13.1
- c According to ITTF this is a new edition of the Type 3 Technical Report.
- d Arnold F. Winkler
- e Update was needed for Annex A due to the rapid additions to the repertoire of ISO 10646. The new Annex A has been approved, the TR has been published as the third edition of the TR (there were no amendments to TRs until 2002). This project is completed.

### **5.1.4 Fourth edition of TR 10176 (in DTR ballot)**

- a Amendment to "Guidelines for the preparation of programming language standards"
- b JTC1 22.13.2
- c A new edition of a type 3 Technical Report
- d Arnold F. Winkler
- e Update was needed for Annex A due to the additions to the repertoire of ISO 10646. The fourth edition has been submitted for DTR ballot.

### **5.1.5 ISO/IEC 14651 - International string ordering (published)**

- a International string ordering (Method for Comparing Character Strings and Description of the Common Template Tailorable Ordering)
- b JTC1 22.30.02.02
- c International Standard ISO/IEC 14651
- d Alain LaBonté
- e The standard has been approved and is published on CD as requested by WG20.

### **5.1.6 ISO/IEC 14651, Amendment #1 - International string ordering (FDAM ballot)**

- a International string ordering (Method for Comparing Character Strings and Description of the Common Template Tailorable Ordering). Amendment #1 revises the Common Template Table to account for the expanded repertoire of ISO/IEC 10646.
- b JTC1 22.30.02.02
- c International Standard ISO/IEC 14651
- d Alain LaBonté
- e The standard has been approved and is published on CD as requested by WG20.
- f WG20 initiated work to align the repertoire of characters with the expanded repertoire of ISO 10646, parts 1 and 2. The FPDAM #1 ballot resulted in approval of the FPDAM. The editor has prepared the disposition of comments and the new text for the FDAM ballot. WG20 is submitting N938 (disposition of comments) and N939 (final text for DAM ballot) to SC22 for DAM ballot processing. WG20 has started work on a new amendment #2 in its task to deal with the additions to the repertoire of ISO/IEC 10646.

### **5.1.7 Cultural convention specification TR (ISO/IEC TR 14652)**

- a Specification method for cultural conventions
- b JTC1.22.30.02.03
- c Technical Report ISO/IEC TR 14652
- d Keld Simonsen
- e WG20 changed the document type from Standard to a Type 1 Technical Report, due to the fact that this document is extremely contentious.
- f The disposition of comments from the second DTR ballot and the final text of TR 14652 have been prepared by the editor for publication. The document visibly identifies sections as “**controversial**” for which no agreement could be reached in the working group.

### **5.1.8 Internationalization API standard - ISO/IEC TR 15435 (project withdrawn)**

- a Internationalization API standard
- b JTC1 22.15435
- c International Standard ISO/IEC 15435
- d Keld Simonsen
- e Project is withdrawn.
- f The SC22 N3328 letter ballot resulted in withdrawal of project 22.15435, the ballot results are in SC22 N3362.

### **5.1.9 ISO/IEC 15897 - Procedures for registration of cultural elements (published)**

- a European registration standard
- b JTC1 22.15897
- c International Standard ISO/IEC 15897
- d Keld Simonsen
- e This international standard is the result of a fast-track processing of EN 12005 to become an international standard. SC22 assigned the maintenance of this standard to WG20.

### **5.1.10 ISO/IEC 15897 - Procedures for registration of cultural elements – revision #1**

- a European registration standard for cultural elements
- b JTC1 22.15897
- c International Standard ISO/IEC 15897
- d Keld Simonsen
- e This international standard is the result of a fast-track processing of EN 12005 to become an international standard. SC22 assigned the maintenance of this standard to WG20.
- f A first draft of the revision has been balloted, the editor is preparing a disposition of comments for the many objections to the new text. The US has prepared an extensive contribution to align the registration process with the process in ISO/IEC 2375, used successfully in SC2. The contribution has been given to the editor for consideration in the revision of 15897. A new draft document is being prepared by the editor.  
It is discouraging to see that National Bodies show little interest in this standard. According to SC22 N3341 only 5 NBs approved the CD, 2 disapproved, 1 abstained, and 13 did not vote at all. This shows that many NBs don't care, and only ¼ approve.

## **5.2 Candidate projects**

### **5.2.1 Functionality of Internationalization (no future work is anticipated)**

- a Functionality of the internationalization of applications
- b JTC1 22.30.02.01
- c A number of standards, see subproject descriptions below
- d Keld Simonsen
- e This is an umbrella project

This project is the umbrella project for the development of specific standards for functionality of the internationalization of applications, such that users can specify their cultural requirements, and obtain consistent behavior across system platforms and applications.

### **5.2.2 TR on the functionality of I18N-APIs and current practices:**

SC22 resolution 2001-26 from Hawaii: "SC22 further requests that SC22/WG20 develop an NP for a Type 2 TR, or a Type 3 TR, which addresses the functionality of 15435 and addresses current practice in existing programming languages."

Following this request, WG20 assigned action items to all interested NBs to provide input for a type 3 TR – Pat Hall from the UK will act as the collector and temporary editor until WG20 decides in the next meeting, if it wants to prepare a NP for such work.

## **6. Conclusions and requests**

### **6.1 Issues**

#### **6.1.1 Cultural and linguistic adaptability and user interfaces (CLAUI)**

The CLAUI meeting, planned for Malvern, USA, in 2001 was cancelled due to a total lack of contributions and agenda items. As the convener of one of the involved committees, I refuse to accept the notion, that a face to face meeting needs to be conducted without documented subjects to discuss.

I also believe, that the CLAUI business can easily be dealt with in electronic form, there is no justification for expensive travel around the world for a 1-2 day meeting (especially without contributions).

#### **6.1.2 Resources for standards development**

The biggest issue in SC22/WG20 - as in many other standards developing organizations - is that companies can not afford to make enough resources available for the support of the infrastructure of formal standards development. For some participants in our meetings, the meeting time is the only time they can spend on the projects. Additionally, travel budgets are tight, especially after the economic downturn since 2000, thus restricting the participation even further. WG20 has currently stable participation from 4 NBs and sometimes participants from other NBs. Meeting participation varies between 5-8 people.

#### **6.1.3 WWW home page for SC22/WG20**

The home page address is <http://www.dkuug.dk/JTC1/SC22/WG20/>

The web site contains:

- \* Introduction and explanation of SC22/WG20 activities
- \* Working drafts of standards from SC22/WG20
- \* SC22/WG20 documents for electronic distribution

Keld Simonsen maintains the home page, Arnold Winkler as the convener provided most WG20 documents in web-ready form.

#### **6.1.4 Document distribution**

SC22/WG20 has distributed documents in paper form to an extensive distribution list for many years. With advise and help from the SC22 secretariat, the distribution method has been switched to mainly web based distribution. The need for paper copies has gone from 85 to less than 10 - quite a success.



## **6.2 Requests to the SC22 plenary**

- 6.2.1 Forward WG20 N927 for DTR ballot for TR 10176, fourth edition.  
[Resolution R2002-06-02]**
- 6.2.2 Approve Marc W. Küster as the future editor for project 22.13 - TR 10176.  
[Resolution R2002-06-03 and attachment #1]**
- 6.2.3 Forward WG20 N939 for FDAM ballot for ISO/IEC 14651, Amendment #1, together with the disposition of comments in WG20 N938.  
[Resolution R2002-06-04]**
- 6.2.4 Support the WG20 request that Amendment #1 to ISO/IEC 14651 be published on CD.  
[Resolution R2002-06-05]**
- 6.2.5 Forward N960 as the disposition of comments to the DTR2 ballot, and N961 as the text for TR 14652 for publication to ITTF.**

CETERUM CENSEO WGXX ESSE DELENDUM

## Attachment #1: N934 – Current list of project editors

| Number                   | Description  | Current Editor           | Proposed Editor                |
|--------------------------|--|--------------------------|--------------------------------|
| 22.13<br>published       | Amendment of TR 10176<br>Guidelines for the preparation of programming<br>language standards | Akio Kido<br>Makoto Noda | Akio Kido<br>Makoto Noda       |
| 22.13.1<br>published     | Amendment #1 to TR 10176<br>Correction of Annex A  | Arnold F. Winkler        | Arnold F. Winkler              |
| 22.13.2<br>published     | TR 10176 third edition   | Arnold F. Winkler        | Arnold F. Winkler              |
| 22.13.x                  | TR 10176 fourth edition  | Arnold F. Winkler        | Marc W. Küster *               |
| 22.30.01<br>published    | TR 11017: Framework for internationalization<br>This project is completed                    | T.K. Sato                | T.K. Sato<br>Arnold F. Winkler |
| 22.30.02.01<br>no output | Functionality of the internationalization of<br>applications (umbrella project)              | Keld Simonsen            | n/a                            |
| 22.30.02.02<br>published | ISO/IEC 14651: International string ordering   | Alain LaBonté            | Alain LaBonté                  |
| 22.30.02.02.1            | ISO/IEC 14651: International string ordering,<br>Amendment #1 for 10646-2                    | Alain LaBonté            | Alain LaBonté                  |
| 22.30.02.03              | ISO/IEC TR 14652: Specification method for cultural<br>conventions                           | Keld Simonsen            | Keld Simonsen                  |
| 22.15435<br>withdrawn    | ISO/IEC 15435: Internationalization API  | Keld Simonsen            | Keld Simonsen                  |
| 22.15897                 | ISO/IEC 15897: Procedures for registration of cultural<br>elements                           | Keld Simonsen            | Keld Simonsen                  |

\* per resolution R2002-06-03 from Tromsø

**Attachment #2: Table of meeting participants in WG20 since November 1991**

| Country     | Name               | 91<br>11 | 92<br>04 | 92<br>10 | 93<br>04 | 93<br>10 | 94<br>04 | 94<br>10 | 95<br>05 | 95<br>10 | 96<br>04 | 96<br>09 | 97<br>05 | 97<br>11 | 98<br>06 | 98<br>10 | 99<br>05 | 99<br>11 | 00<br>05 | 00<br>11 | 01<br>05 | 01<br>11 | 02<br>06 |
|-------------|--------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
|             |                    | US       | F        | CA       | DK       | J        | UK       | US       | F        | DK       | J        | A        | CA       | EG       | IE       | IL       | USA      | DK       | CAN      | USA      | D        | USA      | N        |
| Belgium     | René Haentjens     |          | x        |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| Canada      | Alain LaBonté      | x        | x        | x        | x        | x        | x        | x        | x        | x        | x        | x        | x        | x        | x        | x        | x        | x        | X        | x        | x        | x        | x        |
| Canada      | Milos Lalovic      |          |          | x        |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| Canada      | Baldev Soor        |          |          |          |          |          |          |          |          |          |          |          | x        | x        | x        |          | x        | X        | X        |          | x        |          |          |
| Denmark     | Keld Drube         |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          | X        |          |          |          |          |          |
| Denmark     | Isaak Korn         |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          | x        |          |          |          |          |          |
| Denmark     | Keld Simonsen      | x        | x        | x        | x        | x        | x        | x        | x        | x        | x        | x        | x        | x        | x        | x        | x        |          |          |          |          |          |          |
| Egypt       | Alaa Ghoneim       |          |          |          |          |          |          | x        |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| Egypt       | Khaled Sherif      |          |          |          |          |          |          |          |          |          |          |          |          | x        | x        |          |          |          |          |          |          |          |          |
| Egypt       | A.T. Ahmed         |          |          |          |          |          |          |          |          |          |          |          |          | x        |          |          |          |          |          |          |          |          |          |
| France      | Rafik Belhadj      | x        | x        | x        |          | x        |          |          | x        |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| France      | Michel Suignard    |          | x        |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| Germany     | Wolfgang Giere     |          |          | x        |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| Germany     | Mark Küster        |          |          |          |          |          |          |          |          |          |          |          |          |          | x        |          | x        | X        | X        |          | x        |          | x        |
| Ireland     | Christian Cooke    |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          | x        |
| Ireland     | Michael Everson    |          |          |          |          |          |          |          |          |          |          | x        |          |          | x        |          |          |          |          |          |          |          | x        |
| Ireland     | Tom Garland        |          |          |          |          |          |          |          |          |          |          |          |          |          | x        |          |          |          |          |          |          |          |          |
| Israel      | Stefan Fuchs       |          |          |          |          |          |          | x        |          |          |          |          |          |          |          | x        |          |          |          |          |          |          |          |
| Israel      | Jonathan Rosenne   |          |          |          |          |          |          |          |          |          |          |          |          |          |          | x        |          |          |          |          |          |          |          |
| Japan       | Tatsuhito Ito      |          |          |          |          | x        |          |          |          |          | x        |          |          |          |          |          |          |          |          |          |          |          |          |
| Japan       | Akio Kido          |          | x        | x        |          | x        | x        | x        | x        | x        | x        | x        |          | x        |          |          |          |          |          |          |          |          |          |
| Japan       | Makoto Noda        |          |          |          |          | x        | x        |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| Japan       | Takayuki K. Sato   |          | x        | x        | x        | x        | x        | x        | x        | x        |          | x        |          | x        |          |          |          |          |          |          |          |          |          |
| Japan       | Kohij Shibano      |          |          |          |          | x        | x        |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| Japan       | Syunsuke Uemura    | x        | x        | x        | x        |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| Japan       | Hiroataka Yoshioka | x        |          |          |          | x        |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| Japan       | Koreaki Fujimura   |          |          |          |          |          |          |          |          |          |          |          | x        |          | x        |          |          |          |          |          |          |          |          |
| Japan       | Masayuki Takata    |          |          |          |          |          |          |          |          |          |          |          |          |          | x        | x        | x        | X        | X        | x        |          |          |          |
| Korea       | Kim Kyongsok       |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          | x        | x        | x        |
| New Zealand | Robert H. Barbour  |          |          | x        |          |          | x        |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| Norway      | Keld Simonsen      |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| Sweden      | Kent Karlsson      |          |          |          |          |          |          |          |          |          |          |          |          |          |          | x        | (t)      | X        |          |          | x        | x        | x        |
| Switzerland | Jürgen Bettels     |          | x        | x        |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| UK          | Jon Diamond        |          |          |          |          |          | x        |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| UK          | Miles Ellis        |          |          |          | x        | x        | x        | x        |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| UK          | David Joslin       |          | x        |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| UK          | Bruce Paterson     |          |          |          |          |          | x        |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| UK          | John Clews         |          |          |          |          |          |          |          |          |          |          |          |          |          | x        | x        | x/2      | X        | X        | x        | x        |          |          |
| UK          | Pat Hall           |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          | x        |

| Country  | Name                   | 91<br>11 | 92<br>04 | 92<br>10 | 93<br>04 | 93<br>10 | 94<br>04 | 94<br>10 | 95<br>05 | 95<br>10 | 96<br>04 | 96<br>09 | 97<br>05 | 97<br>11 | 98<br>06 | 98<br>10 | 99<br>05 | 99<br>11 | 00<br>05 | 00<br>11 | 01<br>05 | 01<br>11 | 02<br>06 |
|----------|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
|          |                        | US       | F        | CA       | DK       | J        | UK       | US       | F        | DK       | J        | A        | CA       | EG       | IE       | IL       | USA      | DK       | CAN      | USA      | D        | USA      | N        |
| USA      | Antoni Drudis          |          | x        | x        | x        | x        | x        | x        |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| USA      | John McConnell         | x        | x        |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| USA      | P.J. Plauger           |          |          | x        |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| USA      | Mike Vermeulen         | x        |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| USA      | Arnold F. Winkler      | x        | x        | x        | x        |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| USA      | Michael Kung           |          |          |          |          |          |          |          |          | x        |          | x        |          | x        |          |          |          |          |          |          |          |          |          |
| USA      | Ken Whistler           |          |          |          |          |          |          |          |          |          |          |          |          |          | x        | x        | x        | X        | X        | x        | x        | x        | x        |
| USA      | Mark Davis             |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          | x        |          |          |          |          |          |          |
| USA      | Tex Texin              |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          | x        |          |          |          |          |          |          |
| USA      | Ed Hart                |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          | 1 d      |          |          |          |          |          |          |
| USA      | Nelson Ng              |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| USA      | Gail Yamanaka          |          |          |          |          |          |          |          |          |          |          |          |          |          | x        |          |          |          |          |          |          |          |          |
| USA      | Mike Ksar              |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| Liaisons | Dean Adams             |          |          | x        |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| Liaisons | Vic Goddard            |          |          |          |          |          |          | x        |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| Liaisons | Jim Melton             |          |          |          |          |          |          |          | x        |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| Liaisons | Gary Miller            |          | x        | x        | x        | x        |          | x        |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| Liaisons | Ann Wallace            |          |          |          | x        |          |          |          |          | x        |          |          |          |          |          |          |          |          |          |          |          |          |          |
| Liaisons | Þorvaður Kári Ólafsson |          |          |          |          |          |          |          |          | x        |          | x        |          |          |          |          |          |          |          |          |          |          |          |
| SC22     | John Hill              |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          | 1 d      |
| Convenor | Richard Weaver         | x        | x        | x        | x        |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| Convenor | Arnold F. Winkler      |          |          |          |          | x        | x        | x        | x        | x        |          | x        | x        | x        | x        | x        | x        | X        | X        | x        | x        | x        | x        |
| Convenor | T.K. Sato              |          |          |          |          |          |          |          |          |          | x        |          |          |          |          |          |          |          |          |          |          |          |          |
|          | Meeting #              | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        | 10       | 11       | 12       | 13       | 14       | 15       | 16       | 17       | 18       | 19       | 20       | 21       | 22       |

End of document