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## Secretariat of ISO/IEC JTC 1/SC 24

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## **BUSINESS PLAN FOR JTC 1/SC 24**

COMPUTER GRAPHICS, IMAGE PROCESSING, ENVIRONMENTAL DATA REPRESENTATION

### **PERIOD COVERED:**

July 2012 to June 2013. .

### **SUBMITTED BY:**

Prof.. Ha Jine Kimn ISO/IEC JTC 1/SC 24 Chairman

Dr. Charles. Whitlock ISO/IEC JTC 1/SC 24 Secretariat

## **1 MANAGEMENT SUMMARY**

### **1.1 CHAIRMAN'S REMARKS**

This version of the 2012-2013 Business Plan is the result of updates based on information provided at the SC 24 Plenary, Brussels, Belgium on 2011-08-24 and a subsequent review by the National Bodies, prior to being submitted to JTC 1.

### **1.2 JTC 1 SC24 SCOPE of WORK**

#### **1.2.1 SC24 Statement of Scope**

The current scope for JTC 1/SC 24 (Computer graphics, image processing and environmental data representation) was approved at the JTC 1 Plenary in San Diego on 7-12 November 2011 (see ISO/IEC JTC 1/N 10933 resolution 42), is as follows:

Area of Work: Standardization of interfaces for information technology based applications relating to:

- computer graphics,
- image processing,
- environmental data representation,
- support for the augmented reality continuum (ARC), and
- interaction with, and visual presentation of, information

Included are the following related areas:

Modeling and simulation, related reference models; virtual reality with accompanying augmented reality/augmented virtuality aspects, related reference models; application program interfaces; functional specifications; representation models; interchange formats, encodings and their specifications, including metafiles; device interfaces; testing methods; registration procedures; presentation and support for creation of multimedia, hypermedia, and mixed reality documents.

Excluded:

Character and image coding; coding of multimedia and hypermedia document interchange formats; JTC 1 work in user system interfaces and document presentation: ISO TC 207 work

on ISO 14000 environment management, ISO TC211 work on geographic information and geomatics; and software environments as described by ISO/IEC JTC 1 SC22.

## 1.2.2 SC 24 Working Groups

The scope of work for JTC 1/SC 24 is implemented by the following Working Groups;

### 1.2.2.1 *WG 6: Augmented reality continuum (ARC) presentation and interchange*

Terms of reference:

- Standardization of computer graphics functional specifications for application program interfaces to include support for ARC
- Standardization of techniques for presentation of ARC multimedia information, including its creation, and support for user interaction
- Standardization of interfaces for storage, retrieval and interchange of ARC multimedia objects
- Standardization for graphical information exchange, including computer graphics metafiles and computer graphics device interfaces
- Standardization of encodings and language bindings for standards developed within WG 6

### 1.2.2.2 *WG 7: Image processing and interchange*

Terms of reference:

- Development of Imaging Architecture to include support for use of images in ARC
- Processing of digital images with and without ARC components
- Interchange and storage of digital images
- Imaging techniques (components) in IT frameworks like multimedia, electronic mail, windowing, hypermedia, ARC objects, and documents
- Profiling of generic specifications for use in specific application domains

### 1.2.2.3 *WG 8: Environmental data representation*

Terms of reference:

- To define standards for environmental data elements, including presentation properties, and their relationships in the context of a data representation model.
- To define standards for data interchange between environmental data providers and consumers.
- To define standards for spatial referencing and environmental data identification, analysis and reuse.

### 1.2.2.4 *WG 9: Augmented reality continuum concepts and reference model*

Terms of reference:

- To identify the architectural elements of Augmented Reality Continuum (ARC)
- To study the relationships between ARC architectural elements and define appropriate interfaces between them
- To develop a general purpose reference model that shows the ARC architectural elements along with their interrelationships
- To study and identify one or more abstract levels that can support platform

independence over a wide variety of platform types

- To identify available standards that support one or more of the ARC architectural elements
- To provide a focal point for ARC discussions within SC 24.

## 1.3 PROJECT REPORT

### 1.3.1 Programme of Work

The current JTC1/SC24 Programme of Work, when approved by JTC 1, will be found at [http://isotc.iso.org/livelink/livelink/fetch/2000/2489/Ittf\\_Home/ITTF.htm](http://isotc.iso.org/livelink/livelink/fetch/2000/2489/Ittf_Home/ITTF.htm)

Pending JTC 1 approval, a brief summary of the SC24 projects, current and completed, is given in this sub-section and by the programme of work in Annex A.

### 1.3.2 Active current work:

18025:201x	EDCS Ed. 2
18026;201x	SRM Ed. 3
9973:201x	Registration Procedures Ed. 3
19775-1:201x	X3D architecture and base components
19775-2:201x	X3D scene access interface ED. 3
19776-1::201x	X3D encodings Ed. 3
19776-2:201x	X3D encodings—Classic VRML encoding Ed. 3
19776-3:201x	X3D encodings—Compressed binary encoding Rev. 3

### 1.3.3 Published standards

These are listed at the ISO web site.

## 1.4 CO-OPERATION AND COMPETITION

SC 24 continues its co-operative work with other JTC 1 SCs, ISO TCs and Industry Consortia and Fora that share common objectives within the scope of the SC24 work area. These include ISO TC 211, the Web3D Consortium, the World Wide Web Consortium (W3C), Open Geospatial Consortium (OGC) and the SEDRIS Organization.

The liaison organizations and their relationship to SC 24 are illustrated by the diagram shown in [Annex B](#).

### 1.4.1 Applicable to all SC 24

In order to support joint work between JTC 1/SC 24 and ISO TC 211 in the areas of metadata for imagery, gridded data and the IOS Geodetic Registry Network, SC 24 has authorized a number of its members to act as subject matter experts.

The Joint Task Force (JTF) established between ISO TC 211 and JTC 1/SC 24 in 2005 is currently inactive.

#### 1.4.2 WG 6: Augmented Reality Continuum (ARC) Presentation and Interchange

In co-operation with the Web3D Consortium, several Extensible 3D (X3D) projects have been advanced as transposed standards. Five of these standards are being revised and have been authorized for registration as DIS during the preceding year. Edition 3 of the following standards are either in preparation or in ballot: ISO/IEC 19775-1:201x, ISO/IEC 19775-2:201x, ISO/IEC 19776-1:201x, ISO/IEC 19776-2:201x, and ISO/IEC 19776-3.2:2011.

New Work Item Proposals and PDAM text for each part of ISO/IEC 19777 (X3D language bindings) is expected soon to correspond to changes introduced by the amendment to ISO/IEC 19775-2:201x and resulting from changes in the corresponding language standards.

#### 1.4.3 WG 7: Image Processing and Interchange

In direct co-operation with ISO TC 211, standards dealing with metadata are being developed. These are significant to the contribution of multi-consortia metadata harmonization and crosswalks and include the following TC 211 imagery content standards;

- ISO 19130-2 Geographic Information – Imagery sensor models for geopositioning, Part 2: SAR/InSAR, LIDAR and SONAR
- ISO 19139-2 Geographic Information – Metadata – XML Schema Implementation, Part 2: Extensions for Imagery and Gridded Data
- ISO 19159 Geographic Information – Calibration and Validation of Remote Sensing Imagery Sensors, Part 1: Optical Sensors

The North Atlantic Treaty Organization (NATO) Joint Capability Group for Intelligence, Surveillance and Reconnaissance (JCGISR) proves to be a primary user of the WG7 standards and employs them in data capture and exchange systems, generating interoperability architectures that can be adopted or adapted to other user applications. The ongoing relationship between SC24, TC211 and JCGISR serves to provide expert assistance and to assure the application of interoperable standards as a result of this three-way relationship.

Additional topics that are of interest to SC 24/WG 7 as co-operative efforts include:

- Development of standards that support data from spectral, optical, radar, laser, polarimetric and other advanced remote sensors that can be portrayed and fused with imagery. These elements also carry over into the developing work proposals for Augmented Reality in aspects of enriching imagery/sensed data that carry geospatial characteristics and can be enhanced by correlating synchronous or analogous information.
- Expanding and increasing application of satellite imagery and remotely sensed data, for power and site planning, assessment and monitoring purposes
- Application of remote sensing in non-stationary platforms such as Unmanned Aeronautical Vehicles (UAVs), hand-held devices such as mobile phones and digital cameras
- Environment management applications
- Application of image processing for home, social life, and industry, such as home security systems, intelligent robots, automated inspection systems and autonomous navigation systems.

SC 24/WG 7 continues to seek ways to co-operate with JTC 1/ SC 29. Work within this SC 24 reporting period includes incorporation of implementation of SC 29 JPEG 2000 standards used inside the BIIF standard. As new spectral data types are defined and formatted for dissemination and exploitation, compression of these data types is required; SC 24/WG 7 looks to SC 29 to conduct these standardization projects, including earth surface models

(terrain elevations), LIDAR, Synthetic Aperture Radar (SAR), hyper-spectral data and applications of International Standards Organization - Open Systems Interconnection Model (ISO/IEC 7498-1).

#### 1.4.4 WG 8: Environmental Data Representation

As part of the Co-operative Agreement with the SEDRIS Organization, standards relating to SEDRIS technology have been developed, published and are subsequently being enhanced.

ISO/IEC 18023 parts 1, 2 and 3 address the representation and interchange of environmental data. ISO/IEC 18025: Environmental Data Coding Specification (EDCS) provides unambiguous ways in which to specify environmental features and their attributes. ISO/IEC 18026: Spatial Reference Model (SRM) provides unambiguous ways in which to specify locations and their related data.

SEDRIS standards, either as a whole or as independent components, may be applied to work in other areas. Examples are WG 6 and in committees and organizations external to SC 24.

SC 24/WG 8 liaises with the NATO Modelling and Simulation Group (NSMG), the Simulation Interoperability Standards Organization (SISO) and the Defence Geospatial Information Working Group (DGIWG). It remains current with the publications of the World Meteorological Organization (WMO) and International Hydrographic Organization (IHO).

#### 1.4.5 WG 9: Augmented Reality Continuum Concepts and Reference Model

This new Working Group, established at the 2011 SC24 Plenary on 2011-08-26, will cooperate with the Mixed Reality Study Group, the Web3D Consortium, other SC 24 working groups and appropriate ISO and ISO/IEC Committees in the areas of virtual, augmented and mixed reality.

## 2 PERIOD REVIEW

In the Business year 2012 to 2013, the achievements of JTC1 SC24 were principally related to the advancement of published standards.

### 2.1 MARKET REQUIREMENTS

The Information and Communication Technology (ICT) fields that are addressed by the standards developed in SC 24 are summarized as:

- mediation of environmental data exchanged among multiple users and producers;
- intelligence and information systems which utilize high resolution imagery formats supporting a variety of applications, including modeling and simulation (M&S) environments and displays;
- geospatial and geopolitical applications with metadata and data layering;
- web and document graphics technologies that utilize 2-D and 3-D imagery files for presentation and exchange;
- and “virtual” or 3-D environments that incorporate imagery, content concepts and interaction with virtual or synthetic environments applications in modelling and simulation.

Market requirements where SC 24 can play a major role in standards development are identified as:

- The development of effective multi-vendor, cross-platform cross-application data interchange formats that combine data objects and metadata for interchange. Our work with ISO TC 211, Geographic information/Geomatics, and NATO establish applications of BIIF, CGM, and SEDRIS technology standards. We are meeting existing market requirements in national security, satellite and airborne imaging

communities. Expansion into electronic or intelligent documents, biometrics, and medical imaging communities is still within the objectives for SC 24.

- SC 24 recognizes that the market for commercially available, remotely sensed imagery is now tangible and available to the general public. Satellite imagery based on ISO/IEC 12087-5 Basic Imagery Interchange Format (BIIF) is produced commercially by three companies and can be purchased on the Internet.
- Spectral sensing and fusion of collected information with imagery is an emerging segment in the market sector of Information and Communications Technology. SC 24 establishes and maintains correspondence with sensor developers and the user community through its national and liaison bodies. This concept appears to be present in the concepts of Augmented Reality/Mixed Reality which SC 24 is beginning to build into its Programme of Work.
- Application of remote sensing in non-stationary platforms, such as Unmanned Aeronautical Vehicles (UAVs), have strong application requirements to incorporate metadata into the imagery/sensed data files. This will enable the incorporation of not only the location, dates and times of the collected image, but also features of the image.
- Increased use of satellite and remote imagery will offer improvements for environment management applications in resource development, for human and natural environments and for modeling climate change and assessing its impact.
- Opportunities exist for the application of image processing for home, social life, and industry uses, such as home security systems, intelligent robots, computer vision systems and automated inspection systems.
- Opportunities exist for the application of autonomous navigation systems to intelligent robots and unmanned vehicles.
- Imagery exploitation methods need to be able to process terabytes of collected imagery and remotely sensed data that generate requirements to automate exploitation and analysis capabilities. SC 24 is developing links to research enterprises in the light of developing standardization projects in this area of image processing.
- Continue the standardization of Internet protocols and interfaces to provide effective 2D and 3D graphical interaction. Widespread commercial adoption of VRML, Humanoid Animation, and X3D technologies is evident in both large and small companies. Our continuing work on VRML and X3D are examples where SC24 has been successful. These forms of standards work are the highest of objectives held by the SC24 National Bodies.
- Continue to support the Web3D Community by working in partnership with the Web3D Consortium to evolve the base X3D standard and to advance other specifications of 3D and interactive web-based techniques. Over the past five years SC 24 has progressed a number of Web3D initiatives including revised X3D functional specifications to add new functionality; X3D encodings and X3D language bindings. Work is underway to revise X3D to add additional functionality to support additional CAD, Geospatial, Medical, and Augmented Reality requirements.
- Continue to work in co-operation with the SEDRIS Organization and similar groups to recognize areas that can benefit from standards for the representation of environmental data. The aim is to bring applications that were once specialized technologies developed for military and government applications into widespread commercial use.
- It is accepted that the market no longer recognizes any distinction between environmental data for the real world and environmental data for a virtual world. This requirement is addressed by SC 24 standards for environmental data, which are applicable equally to data for live, virtual and constructive situations.



## 2.2 ACHIEVEMENTS

In the period since July 2011, SC24 has published three International Standards

-Documents published:

18023-1:2006/Am1:2012	SEDRIS functional specification
18023-3:2006/Am1:2012	SEDRIS transmittal format binary encoding
18024-4:2006/Am1:2012	SEDRIS language binding to C

### 2.2.1 Documents approved for publication:

None	
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### 2.2.2 Documents approved for progression to FDIS/FDAM in the current planning year:

ISO/IEC 9973:2012	Procedures for registration of items
18025 Ed. 2	Environmental Data Coding Specification (EDCS)
18026 Ed. 3	Spatial reference model (SRM)
19775-1 Ed. 3	Extensible 3D (X3D)—Part 1: Architecture
19775-2 Ed. 3	Extensible 3D (X3D)—Part 2: Scene access interface
19776-1 Ed. 3	Extensible 3D (X3D) encodings—Part 1: XML
19776-2 Ed. 3	Extensible 3D (X3D) encodings—Part 2: Classic VRML
19776-3 Ed. 3	Extensible 3D (X3D) encodings—Part 3: Compressed binary

### 2.2.3 Documents approved for progression to DIS/FPDAM in the current planning year:

19775-2 Ed. 3	Extensible 3D (X3D)—Part 2: Scene access interface
19776-1 Ed. 3	Extensible 3D (X3D) encodings—Part 1: XML
19776-2 Ed. 3	Extensible 3D (X3D) encodings—Part 2: Classic VRML
19776-3 Ed. 3	Extensible 3D (X3D) encodings—Part 3: Compressed binary

### 2.2.4 Documents approved for progression to CD/PDAM in the current planning year

19775-2 :2010/Am1	X3D Scene Access Interface (SAI) Rev. 2 Amd. 1
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19776-1 :2009/Am1	X3D Encodings XML encoding Rev. 2 Amd 1
19776-2 :2008/Am1	X3D Encodings Classic VRML encoding Rev. 2 Amd 1
19776-3 :2011/Am1	X3D Encodings Compressed binary encoding Rev. 2 Amd 1

### 2.2.5 Registration Actions:

- The BIFF profile for Computer Graphics Metadata (BPCGM) was registered to replace US MIL\_STD 2301A, Computer Graphics Metafile establishing reference to civil standards.
- *EDCS Register Submissions.* One batch of EDCS submissions (2011-Q1), consisting of 2 ECs, 2 EAs and 19 EEs, has been evaluated by the Rapporteur Group during the year. The evaluation is not complete, as feedback is still awaited from the submitter. Five other submission batches whose evaluation processing has been completed will be balloted during Q4 2011.

### Approved Register Classes:

Acknowledgment Type	Linetype
Annotation Style	Markertype
Application Structures	Measure Format Identifier
Colour Model	Modeling Clipping Operators
Compression Type	Patterns
Echo Type	Prompt & Echo
EDCS (set of classes)	Prompt Type
Edge Type	Selection data type selector
Error	Set data type member
Escape	SRM (set of classes)
GDP	Textfont
GDP-3	BIIF Profile
Generalized Structure Element	CGM Profile
Hatchstyle	EDCS Profile
Interpolated Interior Style	PIKS Profile
Line Caps	SRM Profile

### Classes with approved entries, and number registered:

Colour Model, 3 registered items  
 Compression Type, 3 registered items  
 EDCS (set of classes), see following section  
 Error, 11 registered items  
 Escape, 47 registered items  
 GDP, 5 registered items  
 GSE, 9 registered items  
 Hatchstyle, 19 registered items

Linetype, 16 registered items

Markertype, 26 registered items

BIIF Profile, 4 registered profiles

CGM Profile, 2 registered profiles

SRM (set of classes), see SRM classes section

SEDRIS - Part 1 (set of classes), see SEDRIS classes section

**EDCS classes and number registered:**

EDCS classification (EC) (51 registered items)

EDCS attribute (EA) (55 registered items)

EDCS attribute enumerant (EE) (86 registered items)

EDCS attribute value characteristic (EV) (0 registered items)

EDCS unit (EU) (0 registered item)

EDCS unit equivalence class (EQ) (0 registered items)

EDCS organizational schema (EO) (0 registered items)

EDCS group (EG) (0 registered items)

EDCS Profile (0 registered items)

EDCS References (11 registered items)

**SRM classes:**

SRM Abstract coordinate system (CS)

SRM Temporal coordinate system

SRM Reference datum (RD)

SRM Object reference model template (ORMT)

SRM Object reference model (ORM)

SRM Reference transformation (RT)

SRM Object binding rule set (OBRS)

SRM Spatial reference frame template (SRFT)

SRM Spatial reference frame (SRF)

SRM Spatial reference frame set (SRFS)

SRM Designated spatial surface (DSS)

SRM Profile

There are currently no registered items for SRM classes, nor have any been submitted to the Registry.

**SEDRIS classes:**

Selection data type selector

Set data type member

There are currently no registered items for SEDRIS classes, nor have any been submitted to the Registry.

## 2.3 RESOURCES

The strategies adopted by SC 24 are based on a co-operative philosophy of working with consortia. Many of the projects within SC 24 are introduced into the programme following the accomplishment of early-stage work by the consortia. Experience in SC 24 has demonstrated that co-operative partnering with consortia, whose work is consistent with the SC 24 scope of work, has contributed greatly to both the technical content and SC 24's ability to develop applicable and relevant International Standards. As a result, many consortia members continue to serve as project co-editors, resulting in an increased base of SC 24-trained ISO editors. Improving and expanding this expertise continues to be a priority for SC 24. We are grateful for the continued expert assistance provided by the BSI Secretariat. SC 24 benefits from the cross-cultural interplay that demands a more worldwide view of our work and ideology. Continued support from BSI on this part of the resource equation is critical to the continued high quality endeavors of SC 24.

## 2.4 ENVIRONMENTAL ISSUES

The work of SC 24 has no negative impact on the environment in terms of resource consumption, pollution or waste generation. SC 24 standards will continue, however, to provide facilities beneficial to the environment, where possible. The following examples are given of SC 24 facilities considered to be beneficial to the environment.

SC 24 standards, such as ISO/IEC 12087-5 format (BIIF), are routinely used to capture and exchange imagery of the Earth, making such data a tangible commodity and subsequently allowing the data to be shared within the general consumer sector in various formats.

Resource consumption patterns are also reduced by the application of SC 24 standards in the depiction, development, and sharing of virtual and simulated environments and integrated humanoid interactions. Modeled and simulated environments, using various SC 24 standards, such as the SEDRIS related standards ISO/IEC 18023, 18024-4, 18025, 18026, 18041-4 and 18042-4, facilitate training events with minimal or no expenditure of equipment or environmental degradation. Training facilities and technologies can be reused and enhanced in localized sites. Networked facilities support training engagements that link capabilities and prove the interoperability of applied standards implementations. Simulation thus allows training exercises to be performed without the need to drive vehicles over the terrain, fly aircraft through the air, consume fuel, deploy ammunition or utilise other effects that are harmful to the environment.

The net result from implementation of the SC24 standards provides a positive means of aiding environmental solutions and reducing resource consumption.

## 2.5 PARTICIPATION METRICS

There are 9 "P" members of SC 24 and 23 "O" members. Of these, the following NBs actively participate;

- Australia
- China
- Korea
- Japan
- United Kingdom
- United States

The other "P" members are;

- Egypt
- Portugal
- Russia

The 50% voting requirement has been met on all ballots.

### 3 FOCUS FOR NEXT WORK PERIOD

SC24 will focus on the progression of the following projects;

- Assist Working Group (WG 9) in developing a reference model standard for the physical reality to virtual reality continuum (also referred to as the Virtual Reality Continuum)
- X3D standards and amendments (WG 6)
- Revision of ISO/IEC 18026 Spatial Reference Model (WG 8).
- Revision of ISO/IEC 18025 Environmental Data Coding Specification (WG 8)
- Revision of ISO/IEC 18023 parts 1 and 3 SEDRIS (WG 8)
- Revision of ISO/IEC 18024-4 SEDRIS Language Binding (WG 8)
- Registration of items by WG 6, WG 7 and WG 8

#### 3.1 DELIVERABLES

The following table contains the major deliverables for the period August 2012 to July 2013 :

Deliverable	Standard	Estimated Registration or Publication Date
FDIS/IS	18025 Environmental Data Coding Specification ED. 2	November 2012
FDIS/IS	9973 Registration Procedure	November 2012
FDIS/IS	18026 Spatial Reference Model Ed. 3	January 2013
FDIS/IS	19775-1 X3D architecture Ed. 3	December 2012
FDIS/IS	19775-2 Scene Access Interface (SAI) Ed. 3	March 2013
FDIS/IS	19776-1 2 X3D encodings—XML encoding Ed. 3	February 2013
FDIS/IS	19776-2 X3D encodings—Classic VRML encoding ED. 3	February 2013
FDIS/IS	19776-3 X3D encodings—Compressed binary encoding Rev. 3	February 2013

#### 3.2 STRATEGIES

Our mission is to apply our resources effectively to assist all segments of the worldwide computer graphics, image processing and environmental data representation communities in the development of International Standards.

To achieve this mission we employ the following strategies:

- explore means to facilitate the use and implementation of existing SC 24 standards

- seek out those consortia and other organizations that follow open processes as our partners;
- manage our work effectively, applying measures of effectiveness that include timeliness and window of market opportunity as well as technical quality;
- maximize our contribution by seeking out those new and innovative projects where we can add substantial value; and
- continue to seek ways to co-operate with other JTC 1 SCs and ISO TCs, especially SC 29 and TC 211.

These strategies are in keeping with the JTC 1 Business Plan, which has identified two distinct categories of standards that are needed:

- those where stability and ongoing maintenance are not an issue
- standards which establish a longer-term system and interface concept to achieve interoperability and to secure investment into individual products and where, as a result, stability and maintenance are of great importance.

### 3.2.1 Risks

Work in newer areas of technology under tight time constraints inherently involves substantial risks. One such risk is that a standard may become irrelevant due to changes in market direction. At present, due largely to the volunteer nature of our organization, we lack an effective way to redirect resources. It is mitigated to some extent by having a sufficient number of experts and countries who remain willing to continue work on a project.

There is a risk that a standard will not be able to adapt to keep pace with new requirements in a sufficiently short timescale. To address this risk, SC 24 has developed a Register of Items for the identification of dictionary items, implementation profiles and data coding profiles. This is currently supported by the ISO MA/RA web-site and is publically accessible at;

<http://www.iso.org/jtc1/sc24/register>

A further risk is of the lack of support for a co-operative development because a partner has a change of objectives and direction. We mitigate this risk by attempting to establish co-operative agreements that ensure that standards projects are well-evolved, hold the commitment of the commercial community and provide valid standards for information and communications technologies.

### 3.2.2 Opportunities

SC 24 is leveraging its work programme with government agencies to increase government investments into Standardized Commercial Off the Shelf (COTS) technologies. Government agencies recognize that they must participate at the development level in order to ensure that government level requirements are addressed and incorporated as appropriate.

Topics of technical interest to SC 24 that support government policies include:

- Development of standards that describe data from spectral, radar, laser, polarimetric and other advanced remote sensors that can be portrayed and fused with imagery;
- Application of standardized metadata in support of data archival, discovery and retrieval
- Exploitation capabilities to apply to imagery and remotely sensed data, which includes methods of augmented reality and mixed reality.
- Application of standards for the representation, development, search, and sharing of integrated environmental data.
- Development of standards that help achieve interoperability amongst heterogeneous applications using environmental representations.

- Development of standards that promote the unambiguous, loss-less and non-proprietary interchange of environmental data.

In keeping with the JTC 1 objective to anticipate technology trends, SC24 follows developments from its cooperative agreements to build ISO standards from mature consortia recommendations. The following examples are given of such cooperative opportunities:

- The SEDRIS Organization, with which we sustain a well-established and productive co-operative relationship;
- The Web3D Consortium, with which we sustain a well-established and productive co-operative relationship;
- The WWW Consortium (W3C) with which we sustain a well-established and productive co-operative relationship;
- The military, aerospace and defense community world-wide, with which we have a well established and productive co-operative relationship, including: NATO Air Force Armaments Group (NAFAG) Joint Capability Group for Intelligence, Surveillance and Reconnaissance (JCGISR); the Digital Geographic Information Working Group (DGIWG); US NITFS Technical Board (NTB) for US Military National Imagery
- Transmission Format Standards, based on the imagery file formats, metadata, and implementation of compression methodologies adopted from ISO/IEC JTC 1/ SC 29, and other imagery formats are being evaluated for work within SC 24;
- Image processing for home, social life, and industry such as home security systems, intelligent robots, biometric systems, computer vision systems, and automated inspection systems
- Autonomous navigation systems for intelligent robots and unmanned vehicles
- ISO TC 211 Geographic information/Geomatics. This technical committee produces standards which are complementary to those of SC 24 and with whom we have established a Joint Task Force.
- The Simulation Interoperability Standards Organization (SISO). This organization has established an Environmental Data Representation Standards Product Support Group (EDRS PSG) to represent the modelling and simulation community interest in the SEDRIS and other standards involving the representation and mediation of environmental data. It is SISO's intention to work closely with SC 24 in the areas of maintenance and implementation of the SEDRIS standards. SISO was previously active in the development and approval of ISO/IEC 18025.
- The Khronos Group, based on authoring and playback of dynamic media in WG 6, with which we have initiated a co-operative relationship, and based on mutual interest in the Augmented Reality Continuum work in WG 9;
- Specific work will consist of;
- X3D (SC24 transposition of Web3D Consortium specification in cooperative agreement): This work will augment the capabilities already provided by X3D (and previously by VRML). WG6 anticipates proposals to develop standards for augmenting X3D by standardizing facilities for defining the volume rendering, annotation, interfacing with medical imagery, enhanced geospatial capabilities (based on WG8 work), multi-user virtual environments, support for CAD B-Rep structures, and enhanced compatibility with the Khronos Group Collada products, all work to be coordinated through Web3D.
- Releases from Web3D are yielding growth in the business community, continuing to expand the capabilities of 3D on the Web while establishing Standards-based Commercial Off-The-Shelf models for Web3D and SC24. X3D is also highly configurable so that conformant profiles can be created that adapt readily to the



requirements of particular data domains. Web3D has completed Edition 2 of ISO/IEC 19775 Parts 1 & 2, and Edition 2 of ISO/IEC 19776 Parts 1, 2 & 3 and is working on a revision to each part of ISO/IEC 19775 and ISO/IEC 19776. Amendments to each part of ISO/IEC 19777 are also anticipated.

- Humanoid Animation (SC24 transposition of Web3D Consortium specification in cooperative agreement): This specification provides an important element of Modeling and Simulation technology by establishing a standardized representational set of humanoid models which can be interchanged and reused among modeling, authoring and run-time applications. H-Anim technology is already embedded in a variety of commercial projects. Additional work is underway to facilitate the sharing of avatars, providing exportable standard behaviours for the avatars, the migration of avatars between virtual environments and improved compatibility with avatar design applications. Work is also underway to enhance the H-Anim specification to standardize support for motion capture information in a manner that will allow the interchange of motions to different avatars.
- Expanding the functionality of the Spatial Reference Model (ISO/IEC 18026) to include a comprehensive treatment of the concepts of orientation, rotation, and vector quantities, along with the corresponding additions to the SRM API. Also included will be the provision of similarity transformations and a more in-depth treatment of the geodesic concept and its measurement.
- Enhancing the usability of the EDCS (ISO/IEC 18025) to include pictures in the dictionaries where they would ease the understanding of concepts.
- Electronic document archiving, discovery and retrieval: This work will establish sets of parameters by which digital documents can be stored in their native format and, using consensus-based xml schemas compliant with ISO TC 211 metadata standards, discovered and retrieved. Topics of standardization in imagery and environmental data archiving and distribution continue to hold interest for SC 24.
- Data Encapsulation: Using sensed data formats and metadata profiles, this work continues as a means to collect data in various formats and multi-sensors. This work requires collaborative development with multiple data domains and types. Commercial producers of remotely sensed data (satellite imagery), NATO JCGISR and the NITF Technical Board will also act as technical resources to progress this work.
- Biometrics: This work is being taken on in a variety of JTC1 efforts, most importantly with SC 37. The establishment of SC 37 is considered by SC 24 as a positive step for ICT standards and recognized as a high potential for cooperative work, as SC 24 continues to engage in the development and application of imaging perspectives of this technology.
- Spectral data: SC 24 recognizes that spectral sensing and its fusion with imagery are an ever more important part of Information and Communications Technology.
- Imagery exploitation methods: Increased volumes of collected imagery establish the requirement to automate exploitation and analysis of imagery. SC 24 is developing links to research enterprises in the light of developing standardization projects.
- Registry of items: With the commercial adoption of standards produced within SC 24, there is an expansion of application of registries for data and implementation profiles. This is reflected in the on-going activities of the various SC 24 registries.. For example, this year SC 24 has processed many proposals for the registration of new concepts in the EDCS (ISO/IEC 18025:2005).
- Adaptation of compression algorithms: SC 24 also works to leverage the wavelet compression capabilities standardized within JTC 1/SC 29.



### 3.3 WORK PROGRAMME PRIORITIES

SC 24 leverages its work programme with government policies that increase government investments into Standardized Commercial Off the Shelf technologies. Government agencies recognize that they must participate at the development level in order to ensure standardization requirements are addressed and incorporated as appropriate.

Work programme priorities for SC 24 are those that support government policies and include:

- To provide a forum for a consolidated approach to the Augmented Reality Continuum, due to the fact that the current technologies within the realm of ISO/IEC JTC 1/SC 24 are closely related,
- Development of standards that process and describe data from spectral, optical, radar, laser, polarimetric and other advanced remote sensors that can be portrayed and fused with imagery;
- Application of standardized metadata in support of data archival, discovery and retrieval
- Exploitation capabilities to apply to imagery and remotely sensed data.
- Revisions to the Humanoid Animation standard, ISO/IEC 19774.
- Revisions to the X3D standards, ISO/IEC 19775, 19776, and 19777.
- Implementation of enhancements to the SEDRIS technology standards ISO/IEC 18023, ISO/IEC 18025 and ISO/IEC 18026 and their associated language bindings, ISO/IEC 18024-4, ISO/IEC 18041-4 and ISO/IEC 18042-4.
- Development of a reference model standard for the physical reality to virtual reality continuum, also referred to as the Augmented Reality Continuum.

#### 3.3.1 Archival Policy

The archival policy of SC 24 is administered by the UK Secretariat in accordance with BSI policy, as defined by BS 0, which conforms to the JTC 1 and ISO policies for archiving.

## Annex A

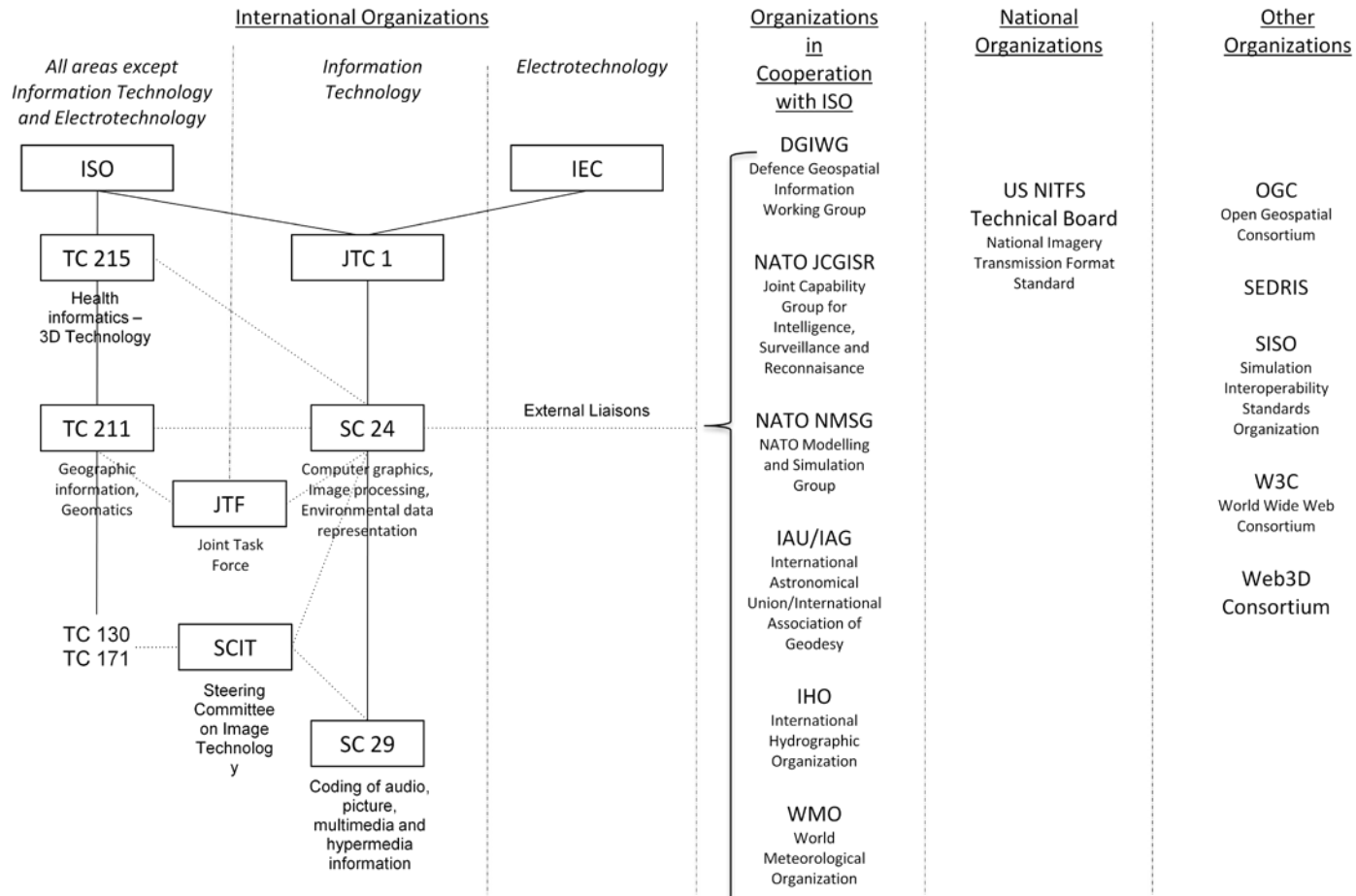
Work programme for ISO/IEC/JTC 1/SC 24

Secretariat : BSI

2012-09-28

Short Title	Reference	WG	Editor	CD/PDAM/ PDTR	DIS (FCD)/ FPDAM	FDIS/FDAM/ DTR	IS*/TR
EDCS Ed.2	ISO/IEC 18025:201x	8	Cox, Hembree, Worley	5/11	4/12	11/12	5/13
SRM Ed. 3	ISO/IEC 18026:201x	8	Berner, Toms, Trott	6/11	5/12	1/13	7/13
Registration Procedures Ed. 3	ISO/IEC 9973:201x	8	Puk	10/11	6/12	11/12	5/13
X3D Architecture Ed. 3	ISO/IEC 19775- 1:201x	6	Puk, Lee, Brutzman (Web3D)	7/11	4/12	12/12	5/13
X3D Scene Access Interface (SAI) Ed. 3	ISO/IEC 19775- 2:201x	6	Daly (Web3D), Puk	3/12	10/12	3/13	9/13
X3D Encodings XML encoding Ed. 3	ISO/IEC 19776- 1:201x	6	Brutzman (Web3D), Puk	9/11	9/12	2/13	8/13
X3D Encodings Classic VRML encoding Ed. 3	ISO/IEC 19776- 2:201x	6	Puk, Daly (Web3D)	8/11	9/12	2/13	8/13
X3D Encodings Compressed binary encoding Rev. 3	ISO/IEC 19776- 3:201x	6	Puk, Brutzman (Web3D)	9/11	9/12	2/13	8/13

## Annex B



Relationship of ISO/IEC JTC 1/SC 24 Liaison Organizations