International Workshop Agreement

IWA 3

Image safety — Reducing the incidence of undesirable biomedical effects caused by visual image sequences

Sécurité de l'image — Réduction de l'incidence des effets biomédicaux indésirables causés par des séquences d'images visuelles

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). ISO's technical work is normally carried out through ISO technical committees in which each ISO member body has the right to be represented. International organizations, governmental and nongovernmental, in liaison with ISO, also take part in the work.

In order to respond to urgent market requirements, ISO has also introduced the possibility of preparing documents through a workshop mechanism, external to its normal committee processes. These documents are published by ISO as International Workshop Agreements. Proposals to hold such workshops may come from any source and are subject to approval by the ISO Technical Management Board which also designates an ISO member body to assist the proposer in the organization of the workshop. International Workshop Agreements are approved by consensus amongst the individual participants in such workshops. Although it is permissible that competing International Workshop Agreements exist on the same subject, an International Workshop Agreement shall not conflict with an existing ISO or IEC standard.

An International Workshop Agreement is reviewed after three years, under the responsibility of the member body designated by the Technical Management Board, in order to decide whether it will be confirmed for a further three years, transferred to an ISO technical body for revision, or withdrawn. If the International Workshop Agreement is confirmed, it is reviewed again after a further three years, at which time it must be either revised by the relevant ISO technical body or withdrawn.

Attention is drawn to the possibility that some of the elements of this International Workshop Agreement may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Workshop Agreement IWA 3 was approved following consultations with and comments by interested parties on a draft framed based on discussions at a workshop organized jointly by the Japanese Industrial Standards Committee (JISC) and the National Institute of Advanced Industrial Science and Technology (AIST), and held in Tokyo, Japan, in December 2004. Appreciation is extended to the Japanese Industrial Standards Committee (JISC) and the National Institute of Advanced Industrial Science and Technology (AIST) for both organizing the workshop and preparing for this International Workshop Agreement.

Supplement

This proposal was prepared in Japan during the workshop held in Tokyo on image safety and was created under the leadership of the National Institute of Advanced Industrial Science and Technology (AIST) and the Japanese Industrial Standard Committee (JISC) with the participation of the following members:

— Takehiko Bando (Niigata University, Japan);

— Jelte Bos (TNO, Netherlands);

— Kazuhiko Ukai (Waseda University, Japan);

— Ken Sagawa (AIST/JISC, Japan);

— Atsuko Saruhashi (METI/JISC, Japan);

— Richard H.Y. So (Hong Kong University of Science and Technology, Hong Kong);

— Hiroyasu Ujike (AIST/JISC, Japan);

— Arnold Wilkins (University of Essex, United Kingdom).

Notable contributions to this document were also given by the following participants:

— Graham F. A. Harding (Aston University, United Kingdom);

— Tom Robson (CRS Ltd., United Kingdom);

— Takeo Takahashi (Yaotome Clinic, Japan);

— Robert S Kennedy (RSK Assessments, Inc., United States);

— Peter Howarth (Loughborough University, United Kingdom);

— Makoto Yoshizawa (Tohoku University, Japan);

— Tohru Kiryu (Niigata University, Japan);

— Naoki Kobayashi (NTT, Japan);

— Takayuki Ito (NHK Lab., Japan);

— Tony Carpenter (CRS Ltd., United Kingdom);

— Shigeru Chiba (Sharp, Japan).

Workshop resolutions

This International Workshop on Image Safety adopted the following resolutions on which the International Workshop Agreement is based.

a) This International Workshop on Image Safety (hereafter International Workshop 3) considers this International Workshop Agreement to be the first step in a process that may eventually lead to the development of ISO International Standards on image safety, which will supply guidelines intended to reduce the incidence of undesirable biomedical effects caused by visual image sequences. The process will continue to be open to the participation of all interested parties, according to the ISO procedures.

b) This International Workshop 3 defines concerns of stationary and moving images that are communicated through various media. It may therefore apply to several different types of image providers including internet providers, web page producers, graphic artists, video and motion picture production companies, computer/video game software developers and publishers, imaging device manufacturers, media companies and distributors.

c) This International Workshop 3 recognizes that there are certain undesirable biomedical effects associated with visual images. Although incidences of the effects may be low, the effects may be considerable. Therefore, accurate knowledge of the biomedical effects is important for all categories of image providers as well as those who view images.

d) This International Workshop 3 recommends that the issue be handled with an appropriate balance between the varying interests of viewers, and the interests involved in the provision of images including not only image providers' interests but also society's interest in promoting freedom of expression and artistic creativity, the balance being settled on the basis of scientific knowledge.

e) This International Workshop 3 recognizes that viewers and image providers may benefit from information about image safety, both generally and as concerns individual products. Such information is likely to be of most use before viewers are exposed to visual images. It is recognized that any proposed guidelines should be comprehensive and easily interpreted so that they can be applied without difficulty.

f) This International Workshop 3 considers the scope of this agreement to cover all aspects of image safety while recognizing that the International Telecommunications Union (ITU-R, SG6) has considered the image safety issues in relation to TV broadcasting.

g) This International Workshop 3 collected scientific information from experts with respect to three undesirable biomedical effects:

— photosensitive seizures,

— visually-induced motion sickness, and

— visual fatigue.

Scientific knowledge will be critical in the development of any guidelines in the ISO International Standards on image safety, particularly any involving numerical guidelines. Such guidelines will require research that is designed to consider the effects of various image properties in the various visual media.

h) This International Workshop 3 recognized that the workshop participants could not fully represent the various interests involved and expressed the desire for greater participation of stakeholders in the process outlined in a) above.

Introduction

0.1 General

Computerized systems that create and edit moving images enable us to enjoy attractive and stimulating screen images, such as movies, videogames and video pictures on Internet communications. This innovative technology, bringing in a new era of digital visual amusements and arts, creates novel effects of lights and sounds, and also immersiveness through stereoscopic images and dynamic movements of viewpoint. Moving image technology not only provides amusement, but expands the possibility of educational and business communication. Recent developments of many new kinds of image-recording media and of new types of display devices and systems allow people to enjoy dynamic images on demand and on an individual basis.

Along with the broad diffusion of the innovative image technology, the incidence of undesirable biomedical effects on human health may increase. Those effects include photosensitive seizures, visually-induced motion sickness and visual fatigue. These biomedical effects depend on individual susceptibility and general health. In 1997, an incident occurred with a TV animation program in Japan. Approximately 685 medical episodes occurred, and more than 150 children required at least transient hospitalization [1]. Some of these episodes may have been migraines or other forms of disequilibrium [2], but most of them were seizures. Approximately three-quarters of the children had no prior history of epilepsy [3]. The main cause of this incident was reported to be alternate flashing of red and blue lights dominating most of the screen area, which was a component of the animation. Apart from this dramatic incident, it is also known that certain individuals suffer from visually-induced motion sickness occasionally when playing videogames that include frequent changes of viewpoint, or when watching movies that include footage shot by a hand-held camera shaken unpleasantly in order to indicate tension. Moreover, people can sometimes suffer from visual fatigue, or eyestrain, with symptoms of headache and nausea when they watch certain images, particularly those containing geometric patterns and those of stereoscopic images.

The opportunity of watching a variety of moving images can enrich our lives, and the creation of images is a necessary aspect of cultural activities, especially for education, business and the leisure industry. Moreover, freedom of expression and artistic creativity should be respected as far as is consistent with human health. We should avoid the undesirable biomedical effects not by prohibiting developments of the technologies but by providing the necessary information both for the people who make images and those who view them, particularly those who are vulnerable.

The primary purpose of this International Workshop Agreement is

— to raise awareness of the risks of the undesirable biomedical effects caused by moving images, effects such as photosensitive seizures, visually-induced motion sickness and visual fatigue,

— to encourage studies on technical issues for the development of International Standards on this issue, and

— to be the first step in a process that will eventually lead to the development of International Standards on this issue, which will supply guidelines intended to reduce the incidence of the biomedical effects.

0.2 Image safety

The introduction of the notion of “image safety” is important in raising awareness of the risks of the undesirable biomedical effects caused by moving images. “Image safety” is a concept that has as its purpose the protection of vulnerable persons from the undesirable biomedical effects on human health, particularly those caused by moving images presented on electronic displays.

0.3 Background to image safety issues

Our everyday life already benefits from a wide variety of electronic images and the use of such images is likely to increase. During the growth of the electronic images, there have been several news reports of undesirable events traceable to visual images.

In 1993, in the United Kingdom, three persons watching a TV commercial suffered from photosensitive seizures. In 1997, in Japan, approximately 685 people, who were watching a TV animation program, were treated in hospitals because of uncomfortable symptoms and photosensitive seizures. In July 2003, again in Japan, a total of 36 out of approximately 300 junior high-school students experienced motion sickness while watching a homemade movie in a class, and were sent to a hospital.

A large variety of visual image products, such as videos and videogames, are being sold in a global market as popular consumer goods. The consumers enjoy watching a variety of screen images, often without sufficient information about the contents of the products or the risks of their biomedical effects. Therefore, a safety standard on image products is needed in the global market, to establish appropriate methods of avoiding or reducing the incidence of the biomedical effects.

0.4 Special considerations for vulnerable persons

It is recognized that there are large individual differences in the susceptibility to the undesirable biomedical effects. For example, the incidence of the photosensitive seizures is known to be approximately one per 100 000 per annum [4]. Susceptibility to visually-induced motion sickness is higher in females [5][6][7]. Therefore, there needs to be special consideration for vulnerable persons, the minority who are susceptible to the biomedical effects.

0.5 Previous recommendations relevant to image safety

Recommendations for image providers to reduce incidence of precipitating photosensitive seizures are already published in broadcasting industries both internationally and domestically in some countries; some of those recommendations are listed below.

a) International Telecommunication Union: Recommendation ITU-R BT. 1702 *Guidance for the reduction of photosensitive epileptic seizures caused by television* [8]

b) Independent Television Commission in United Kingdom (ITC). *Guidance note for licensees on flashing images and regular patterns in television* [9]

c) Japan Broadcasting Corporation (NHK) and National Association of Commercial Broadcasters in Japan (NAB). *Guidelines for picture techniques involved with animation programs, etcetera*. [10]

Image safety — Reducing the incidence of undesirable biomedical effects caused by visual image sequences

1 Scope

This International Workshop Agreement establishes the concept of image safety for all categories of image providers as well as for those who view moving images, such as computer/video games, movies, videos and video pictures on websites. It also defines the following undesirable biomedical effects caused by moving images:

— photosensitive seizures;

— visually-induced motion sickness;

— visual fatigue.

This International Workshop Agreement supplies viewers as well as image providers with recommendations as to how to reduce the biomedical risks to which they may be susceptible.

This International Workshop Agreement does not have any contents intended for regulatory use.

NOTE ITU-R SG6 considers the image safety issues in relation to TV broadcasting. Some of these are described in ITU-R Recommendations.

2 Terms and definitions

2.1
moving image
The visual images that are presented by a sequence of images on visual display devices, which usually but not invariably produce temporal change of the visual image. A moving image not only gives the appearance of motion but also includes flashing and flickering visual images and sometimes images that appear to be still.

2.2
image providers
Persons or parties who are involved in providing moving images, including internet providers, webpage producers, graphic artists, video and motion picture production companies, computer/video game software developers and publishers, imaging device manufacturers, media companies and distributors.

2.3
viewers
Persons who watch moving images distributed by image providers.

2.4
undesirable biomedical effects
This IWA 3 is concerned with photosensitive seizures, visually-induced motion sickness, and visual fatigue, all of which are undesirable.

2.5
biomedical risks
The risk relates both to the likelihood of the occurrence of a biological effect, and its severity.