International Display Standards: Agenda for Reduction of Confusion

Green Blue

Black Red

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Customers‘ requirements

Numbers & terms, numbers & terms, numbers, numb....

- What do the terms & numbers mean ?
- How are they measured ?
- What is their significance ?

The escalating hype of dizzying “performance specifications” (specmanship) leaves the customers **confused** and the products often cause **disappointment** ...

What do customers want ?

- Acquiring electronic displays that are *fulfilling the performance requirements* as good as possible at an affordable price.

➔ Reliable (unbiased), understandable and meaningful specification as basis for purchasing decisions without hangover, regrets and disappointment.

Fulfillment of users’ requirements ➔ usability & satisfaction

Don Williams: “Debunking specmanship: Progress on ISO/TC42 Standards for Digital Capture Imaging Performance”, IS&T-PICS 2003

Edward F. Kelley: “What do the specifications mean ?”, 2004 SID ADEAC

Displays Standards Organizations & Activities

- **AAPM: American Association of Physicists in Medicine**
- **ANSI: American National Standards Institute**
- **ASTM: American Society for Testing and Materials (color & appearance)**
- **CIE: Commission Internationale de l'Eclairage** (***Colorimetry of Displays***)
- **CORM: Council for Optical Radiation Measurements (USA)**
- **EIA: Electronic Industries Association (USA)**
- **JEITA: Japan Electronics & IT Industries Association (former: EIAJ)**
- **IEC: International Electrotechnical Committee** (**LCDs, PDPs, OLEDs, etc.**)
- **IEEE: Institute of Electrical and Electronics Engineers**
- **ISO: International Organization for Standardization** (**Visual Ergonomics, etc.**)
- **NEMA: National Electrical Manufacturers Association**
  DICOM Grayscale Standard Display Function
- **NIDL: National Information Display Laboratory (USA)**
- **SAE: Society of Automotive Engineers**
- **SMPTE: Society of Motion Picture and Television Engineers**
- **VESA: Video Electronics Standards Association (USA)**
  Flat Panel Display Measurement Standard

Reversal of Effect

The variety of different standardization activities
- currently not properly synchronized -
provides more confusion than help !

- ➲ **contradictory terms and definitions**
- ➲ **contradictory measurement methods**

Approach of marketing divisions:
Choose the standard that provides the "best numbers" !

Who could support an international standards synchronization ?

SID ? (see J. Greeson: "Display Standards in Trouble", ID Magazine 12(1994), p. 24)

➲ ISO / IEC should take care of this !

IEC Technical Committees and Subcommittees
(total of approx. 180)

- **SC 62B**
  DIAGNOSTIC IMAGING EQUIPMENT

- **TC 100**
  AUDIO, VIDEO AND MULTIMEDIA SYSTEMS AND EQUIPMENT

- **TC 110**
  FLAT PANEL DISPLAY DEVICES

Former IEC SC47C became a Technical Committee in December 2003

IEC Electronic Display Standards - TC110

- **LCDs** IEC 61747- N, IEC 61966 - 4
- **PDPs** IEC 61988 *Plasma Display Panels*
  - Part 1 *Terminology and letter symbols*
  - Part 2.1 *Measuring methods – optical*
  - Part 2.2 *Measuring methods – opto-electrical*
  - Part 3 *Guidelines of mechanical interface*
  - Part 4 *Environmental, endurance and mechanical test methods*
- **OLEDs** IEC 62341-1/6 *Organic Electroluminescent Displays*
- **MEMs ...**

IEC TC110 - Flat Panel Displays

WG2 - Document Series 61747: LCDs (transmissve)

1 *Generic Specifications*
2 *Terminology and Letter Symbols*
3 *Sectional Specifications, Blank Detail Specifications*
4 *Essential Ratings and Characteristics*
5 *Environmental Endurance Tests*
6 *Visual Inspection*
7 *Measuring Methods*

- **New Work Item: MM for Reflective LCDs !**
- **New Work Item: Motion-artefact Measurement**

- **Joint WG for metrology across technologies !**

IEC 61747

MEASUREMENT METHODS FOR REFLECTIVE LCDs

Standard Measuring Conditions

- **Measurement and evaluation of reflectance**
  - **Introduction of the BRDF and its measurement**
  - **Basic illumination geometries** (according to CIE 38)
    - ***directional illumination***
    - ***conical illumination*** *(intermediate state)*
    - ***hemispherical illumination***

- **Standard measuring geometries**
  1. Directional illumination
  2. Ring-light illumination
  3. Conical illumination
  4. Hemispherical illumination

Such a set of illumination conditions, once established, introduced and accepted could be useful for any kind of display for evaluation of performance characteristics under well-defined ***ambient illumination*** and thus eventually fill an existing gaping vacancy.

IEC Standards for LCDs

- **TC110/WG2 IEC 61747- N:**
  Transmissive LCDs (cells, modules, matrix, segment, active & passive matrix, monochrome, color, ...)

  status: accepted

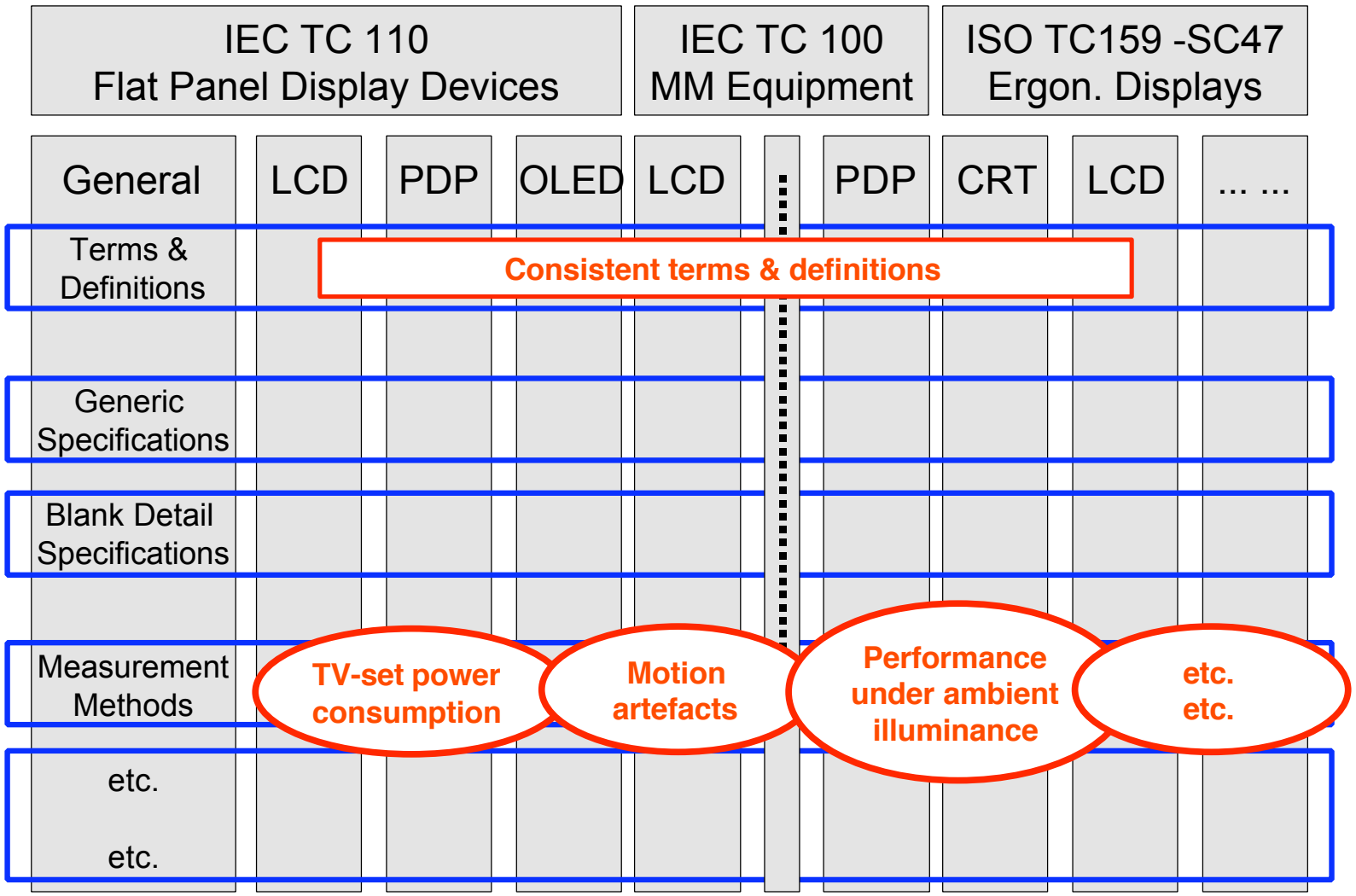
  Urgent need for harmonization of different parts ...
  (during regular revision process)

- **TC100** *Multimedia systems & eqpmnt.* **IEC 61966**
  Colour measurement and management – Part 4: Equipment using liquid crystal display panels

  status: accepted

  Need for alignment with IEC 61747-N (during revision)

Synchronisation of Standards



Action Proposals

Corporate customers

- Take an active part in standardization processes as a service to the customers.

Working-group members

- Synchronize your acitivities on an individual level with other standards-bodies active in the same field.

Display manufacturers

- Make sure that the customers get reasonable ratings and characteristics for their purchasing decsions.
- Stay away from specmanship.
- Make sure that the applied standards are up-to-date.
- Provide experts with hands-on experience.

Action Proposals

Public Opinion Makers

- Get some solid education before spreading your “wisdom” !
- Your function is important, be aware of that & act responsibly !

Governmental Organizations (e.g. EU)

- Support the ergonomics aspects (i.e. minimum performance requirements) in order to protect public health.
- Support the protection of *citizens of the information society*.

Standards Organizations (IEC - ISO)

- Actively support synchronization of the various TCs and WGs to reduce and avoid confusion ! This will also increase the inherent value of standards.

Standards Organizations (IEC - ISO)

- Actively support synchronization of the display related activities in both organizations and their various TCs and WGs to reduce existing and avoid future confusion !

  This will also increase the inherent value of display standards.

- Creation of a "*pool for display metrology methods*" that can be shared by the various standards organizations, by their working-groups (i.e. display standards) and by their experts.

  A braod and solid basis for such a pool could be the existing Vesa Flat Panel Display Metrology Standard.

At the same time, the contents of this pool is fed and stimulated by the needs and requirements of the working-groups and the display technologies they are taking care of.

Benefits of a joint IEC/ISO *display metrology pool*

a toolbox for *basic metrology approaches* and for *terms&definitions*

- reduced efforts and time for the creation of standards,
- reduced "time to market" and thus better synchronization with the appearance of products on the market.
- improved management of *terms & definitions* for display devices, of basic measurements and complex measurement procedures, improved efficiency in the process of prompt maintenance.
- improved transparency of standards, their contents and objectives,
- improved trust and confidence in display standards and reduced confusion of the customer.

Thank you very much for your active support !