NATO JOINS FORCES WITH IEEE
First Standard Transfer Ever
NATO to a Civilian Standards Organization:
Some Lessons Learned

DMSMS & Standardization Conference
Orlando, FLA
23 October 2009

Dr. B. Jon Klauenberg
Senior Research Physiologist
Human Effectiveness Directorate
Air Force Research Laboratory
OUTLINE

1. Personnel Safety Standards for Electromagnetic Fields
2. Why Use Civil Standards?
3. The Transition From NATO to Civil Standards Process
4. Selection Of Standards Developmental Organization
5. Lessons Learned
6. Way Ahead
WHY DOD and NATO NEED EMF SAFETY STANDARDS?

• Military are the world’s largest users
  – 1000s of emitters & anti-electronic devices
    • Many unique to the military
    • Some classified

• Well known bioeffects
  • Thermal effects
  • Electrical effects (Shock, Electro-Stimulation)

• Hazards are the reason for safety standards!
“shall Integrate EMF protection principles into DoD acquisitions and USD(AT&L) strategic planning. For those systems that have the potential to expose personnel to EMF above the action levels, manage the risk pursuant to DoDI 5000.02 (Reference (g)) for all phases of the system life cycle.”

DoDI 6055.11 Protecting Personnel from Electromagnetic Fields, 19 Aug 2009

Based on Institute of Electrical and Electronics Engineers standards C95.1 and C95.6

• Designated “Essential STANAG”
• USA Custodian 1993-present
• Based on IEEE C95.1
• Last revision 13 Feb 2003
• Triennial review: reaffirm, revise, cancel
• Revision stalled due to proposed EU Worker Safety Directive
INTEROPERABILITY THREATENED BY PROPOSED EU DIRECTIVE

• Survey of NATO nations showed operational impact from new EU Worker Safety Directive action limits on contact currents.

• Operations impacted (non-mitigatable)
  • HF communications often lasting 6 – 8 hrs
  • Vertical replenishment operations
  • Man-Overboard & Search-And-Rescue
  • Ship to ship supply transfers
  • Fuel transfer
  • Armaments test and transfer

• Entire deck of ship “off limits”
EXCLUSION ZONES AT 100mA

HNLMS Oblong

Representation of Measurements on Netherlands frigate
EXCLUSION ZONES AT 40mA

HNLMS Oblong

Representation of Measurements on Netherlands frigate

No space on deck is open to workers! A new risk to safety
SHIFTING RISKS
CREATING NEW RISKS

Sorry. EU Directive doesn’t permit man overboard operations during HF transmission.
We have to protect our personnel you know.
Can you wait 8 hours?

However in reality......
NONCOMPLIANCE
SLIPPERY SLOPE

Of course Man Over-Board Operations are underway !!! (even it EU Directive doesn’t permit man overboard operations during HF transmission)

We have to protect our personnel you know.

Thank you!

Ignoring One Safety Standard Will Lead To Ignoring Others
Most EU nations are already working to the “action levels” in Directive 2004/40/EC

USA, CAN and some Non-EU Nations military unlikely to adopt similar standard

EU and Non-EU cooperation needed for interoperability

Possible NATO - EU coordination in the civil standards area

NATO Civil Initiative
• Use suitable civil standards to the maximum practicable extent

• Develop NATO standard only when no applicable civil standard is available

• Promote existing NATO standards to civilian use
  – Make available to a maximum number of users
  – In accordance with NATO security rules

• Promote interoperability

NATO/EAPC(NCSREPS)D(2006)0001)
Drivers for Military Use of Civil Standards


- DoD 4120.24M “DoD Standardization Program (DSP) Policies and Procedures”, March 9, 2000

- NATO Framework For Civil Standards (C-M(2004)0009)

- “Participation in Non-Governmental Standards Bodies is a ‘good business model’” G. Saunders DSP Journal Jan/Mar 2009.
BENEFITS OF "GOING CIVIL"

- Reduction in cost of maintaining standards
- Leverage resources
- Avoid duplication of effort: *Don’t remake the wheel*
- Gain access to wider spectrum of standards
- Make available to a maximum number of users
- Remain abreast of industry advancements
- Use the experts: SDOs focus on drafting standards
• Develop standards that are widely recognized and used in NATO and PfP Nations

• Use Open, Transparent, Consensus procedures

• Use due process in adjudication of comments or complaints from materially affected parties

• Develop standards that are relevant to NATO standardization requirements

• Be recognized as developing standards of high technical quality and global relevance
• Sep 07: Initial meeting Custodian & Civil Standards Coordinator

• Oct 07: European Committee for Electrotechnical Standardization Comité Européen de Normalisation Electrotechnique (CENLEC) contacts NSA and offers to form partnership

• Dec 07 and Mar 08: NATO - CENELEC exploratory meetings
  • CENELEC suggests it is only EU authorized SDO for EMF

• Custodian wants to skip marketing survey

• Chairman of NATO Civil Standards Management WG wants to follow trialing plan and “establish the track record”.

• May 08: CENELEC: “Cannot set exposure limits”
  • Lesson Learned: follow the entire plan, no short cuts
Technical Cooperation Agreement not a firm requirement
CHRONOLOGY OF TRANSFER TRIAL

- June 08: First Market survey limited to SDOs with Technical Cooperation Agreements (TCA)
- July 08: Response not sufficient
- Sep 08: Second survey: IEEE included at Custodian request
- Oct 08: Two SDO respond: IEEE and International Electrotechnical Commission (IEC)
  - Second Lesson Learned:
    - Include Custodian or Technical Expert in each step
    - Technical experts are usually informed on SDOs
  - IEC also prohibited from setting exposure limits
  - Third Lesson Learned: Most appropriate SDO may not have a TCA
IEEE/ICES operates under the extensive rules, requirements, and audit procedures of the IEEE Standards Association to ensure openness, transparency and due process at every level.

IEEE/ICES only SDO that has charter for setting EMF exposure limits and assessment.

Members of ICES participated in previous editions of NATO STANAG 2345 as well as AFRL directed NATO Advanced Research Workshops on RF standards.

Chair of IEC TC106; Secretary of IEEE/ICES; IEEE Board

Chair NATO NSA CSMWG; IEEE Board of Governors
IEEE/ICES SELECTION FACTORS

• IEEE International Committee on Electromagnetic Safety (ICES) operates under the extensive rules, requirements, and audit procedures of the IEEE Standards Association to ensure openness, transparency and due process at every level

• ICES meets NATO requirements for openness and consensus

• ICES members participated in prior editions of STANAG 2345 and NATO Advanced Research Workshops on RF standards

• Chair of IEC TC106 is also Secretary of IEEE/ICES high frequency subgroup and a member of the IEEE Board

The Bottom Line

IEEE/ICES: The only Civil Standards Developmental Organization that has a charter to set EMF exposure limits
A NO BRAINER!

IEEE/ ICES!!

CENELEC?

IEC?

IEEE?
NATO Standardization Agency
Technical Cooperation Agreements
NATO Standardisation Agency (NSA) and the Institute of Electrical and Electronics Engineers (IEEE) Standards Association signed a Technical Cooperation Agreement (14 May, 2009).

• Share knowledge of standards development activities
• Avoid duplication whenever possible
• Exchange information about standards development activities in the electrical, electronics, computer, and related fields.
• Exchange technical data and information regarding standards, standards development and standards revisions in areas related to human health and safety
• Covers all IEEE standards
TECHNICAL COOPERATION AGREEMENT NSA-IEEE SIGNED
"I am very glad to establish this new relationship with IEEE, which constitutes the basis for the very first transfer of a NATO STANAG to a civil Standards Developing Organization," said Vice Admiral Juan A. Moreno, Director NSA. "For the first time in NATO’s 60 year-old history, a STANAG will be converted into a civil standard that will meet civil and military requirements." NATO News 15 May 2009
“New IEEE Military Workplace Standard” signed 30 July 2009

- IEEE shall develop, maintain, revise, and update a new IEEE military workplace standard that will address normative military occupational/workplace-specific exposure limits to electric, magnetic and electromagnetic fields.

- Seven pages, 24 Sections
  - Introduction
  - General Provisions
  - Grant and Reservation of Rights
  - Outline of Action Plan
THE NATO STANDARDS TRANSFER PROCESS

- Selection of NATO standardization documents for transfer
- Market survey (1st Jun 08, 2nd Sep 08)
- SDO response (1 Oct 08) and selection of the SDO (22 Jan 09)
- Specific Agreement for standard (1 August 2009)
- SDO accepts NATO standard
- SDO forms technical group (1st meeting 22-23 July 2009)
- Revise or draft new (expected in 9 months)
- Publish (additional year)
- NATO adoption / recognition of civil standard (6-12 months)
2009
• 22 Jan: NATO Medical WG approved transfer to IEEE
• 24 Apr: Delegated Tasking Authority, Medical Board approves
• 14 May: Technical Cooperation Agreement NSA-IEEE signed
• 30 Jul: Specific Agreement with IEEE signed
• 22-23 Jul: 1st meeting of IEEE TC95 NATO Working Group
• 10 Sep: Project Authorization Request (PAR) to IEEE New Standards Committee (NesCom)
• 28-29 Sep: 2nd meeting of IEEE TC95 NATO Working Group

2010
• 13-15 Jan: 3rd meeting of IEEE TC95 NATO Working Group
WAY AHEAD FOR TRANSITION OF STANDARD UNDER STANAG 2345

• SDO Technical Committee coordinates with the Custodian

• Custodian coordinates with other NATO subject matter experts

• SDO publishes the “New IEEE Military Workplace Standard”

• Nations subject matter experts determine if the standard meets NATO requirements (and National requirements)

• Custodian, on behalf of the Tasking Authority (TA), works to develop a document to formally adopt the civil standard.

• The NATO Standardization Agency supports the development of the adoption notice/document

• TA (Custodian) develops a covering STANAG 2345

• NATO nations ratify/agree to the document, and NSA promulgates the document
DOOR OPENED FOR NATO INVOLVEMENT IN EU COMMISSION

- 3 Feb 09: Director NATO Standardization Agency letter to EU
  - Requests NATO participation in EC Directive review
  - Cites potential impacts to military operations and interoperability and safety concerns

- 18 Feb 09: Custodian invited brief to EU Commission WG; Ljubljana, SLO

- 21 Apr 09: Director General European Union Commission invites NATO to participate in future stakeholder meetings

- 9 July 09: Briefing on impacts to EU Commission WG: Luxembourg, LUX

- 6-8 Oct 09: Umea, SWE: Invited guest speaker to EU Presidency Conference on electric and magnetic fields (EMF) worker safety
SUMMARY

- Medical Standards Board approves transfer to IEEE
- Technical Cooperation Agreement NATO/IEEE signed
- Specific Agreement signed
- IEEE working group formed
- NATO custodian on IEEE TC95 NATO Working Group
  - DoD on editorial working group for new IEEE C95.1
  - NATO standard template for new IEEE C95.1
  - IEEE C95.1 basis by reference for DoDI6055.11, 21 Aug 09
- EU Commission invites NSA to working group: A Door Opened
- New IEEE Mil Standard in 9-12 months
- Transfer-conversion ON TRACK
EU and Non-EU Standards
Harmonization?

Close..... But Work Still to Be Done for Interoperability
QUESTIONS?

Thank you for your attention!

B. JON KLAUENBERG, Ph.D.,
AFRL 711 HPW/RHDR
Air Force Research Laboratory
711 Human Performance Wing
Human Effectiveness Directorate
Directed Energy Bioeffects Division
Radio Frequency Radiation Branch
bertram.klauenberg@us.af.mil
210-536-4837
“If not totally suitable: include defence needs in the body of the civil standard or as an Annex;”

“If not totally suitable: include military options or ‘grading’ to cover defence needs in the Civil Standard.”

NATO/EPAC (NCSREPS)D(2007)0001

“…there are circumstances that require unique defense specifications and standards because of the nature of the system and in these cases a “defense unique standard” may be the better option…”

G. Saunders, NATO  Policy on Civil Standards, 7 Mar 2009