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The IET's new Guide on EMC for Functional Safety

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The IET's new Guide on EMC for Functional Safety

Keith Armstrong explains the ramifications of this latest publication

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This new Guide (180 pages, August 2008) replaces the IEE's 2000 Guide and is available for free download from: www.theiet.org/factfiles/emc/index.cfm, and as and as a reasonably-priced (£27) colour-printed-book from www.emcacademy.org/books.asp.

The continuing increases in electronic complexity, and the continuing shrinking of the feature sizes in silicon integrated circuits, has made the normal testing-based approach to EMC inadequate where safety is concerned. So the new discipline of "EMC for Functional Safety" has recently been developed to help maintain tolerable levels of safety risks.

To demonstrate that the design of a product, system or installation will be safe enough despite the reasonably foreseeable EM disturbances that could occur during its lifecycle, we must now use *Risk Management* methods as described by the new Edition 2 of IEC TS 61000-1-2* (due to be published before the end of 2008).

The IET's new Guide is a detailed and practical application of IEC TS 61000-1-2 Ed.2, which is written in the language of IEC 61508 (the IEC's basic standard on Functional Safety) so that it can be used as 61508's "missing EMC Annex".

But other functional safety standards such as ISO 14971 (medical) or the draft ISO 26262 (automotive) use different 'languages' to describe the same basic principles – so the IET's Guide has been written to be *universally applicable*, regardless of which Functional Safety standard (or none) is applied.

The figure on the next page shows the nine basic steps employed by the Guide, which includes checklists to aid project management, design and compliance assessment.

Many EMC and safety engineers still think that as long as the normal immunity tests are passed, that is all that is needed where safety risks are concerned. Some go further and apply the normal tests with an increased higher level, which they often (confusingly) say provides a "safety margin". But relying on such EMC testing alone is much too simplistic for modern electronic control systems, because it ignores most of the EM interference issues that can influence safety risks.

This same 'untestability' problem has already been faced by the safety-related software industry, which adopted risk management procedures and developed the necessary design, verification and validation techniques (including *some* testing) during the 1990s. Now we are seeing a similar development in the new discipline of "EMC for Functional Safety", and the IET's new Guide provides detailed and practical assistance.

Manufacturers and system integrators who apply this Guide should benefit from lower financial risks, because improved immunity to EMI should significantly reduce the number of warranty returns/repairs and product liability lawsuits. And because the Guide's procedures require the use of EMC expertise from project start, instead of the usual approach (design/assemble with little attention to EMC, then fiddle around until the EMC tests are passed) this will also help manufacturers get to market more quickly with lower overall manufacturing costs. So, real financial savings can generally be expected when this Guide is correctly applied.

* IEC TS 61000-1-2 Ed.2 "*EMC – Part 1-2: General – Methodology for the achievement of functional safety of electrical and electronic systems including equipment with regard to electromagnetic phenomena*"

Overview of the EMC for Functional Safety process for a 'Simple' EFS

An EFS is any entity employing electrical and/or electronic technologies that provides one or more functions having a direct impact on safety