ECDIS type approval process
OEM point of view

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Basis of type approval – Why ?

◆ IMO require compliance with the rules

◆ At installtion

 ➢ Flag country administration need evidence of compliance
 ➢ Classification society need evidence of compliance

◆ During operation

 ➢ Port state control need evidence of compliance
 ➢ Vetting inspector need evidence of compliance

◆ Result: Ship owner need evidence of compliance

◆ Solution: Type approval - Inspection of the product by third party

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Type approval – by who ?

- ◆ CIRM
  - ➢ A trade organization created by manufacturers of IMO enforced products
  - ➢ Represent manufacturers at IMO and various other forums
- ◆ IEC
  - ➢ A standardization organization
  - ➢ CIRM has proposed a committee to focus on navigation instruments => **IEC TC80**
  - ➢ CIRM is paying a part of the cost
- ◆ ISO
  - ➢ A standardization organization
  - ➢ Do some navigation instruments (Gyro, Speed log, etc.), but nothing directly ECDIS related

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Type approval – by who ?

◆ OEM select "by who" based on flag country administration

◆ European union

  ➢ Marine electronics directive (MED, "wheelmark") set the rules

  ➢ Government accredited test houses, independent from flag country administration

  ➢ Each test house had their own flavor which they accept and which not

  ➢ A feature is accepted as it is implemented by an individual OEM, if it is accepted by his test house

  ➢ Other test houses still have their own opinion, which they require from their own clients

  ➢ Test houses have their own forum (MARED) to act as an arbitrator of confliction opinions. In case of conflict:

    ◆ Try to agree common interpretation (this process behind the curtain, not known in detail by OEMs)
    ◆ Request IEC to make new edition of relevant standard to remove dispute amond MARED members

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Type approval – by who ?

- ◆ OEM select "by who" based on flag country administration
- ◆ Other than European union
  - ➢ Like "wild west", no common rules
  - ➢ Basic rule is that the flag country administration approve installation
  - ➢ Some countries accept evidence based on MED
  - ➢ Some countries accept partially MED, but require some own interpretations
  - ➢ Some countries require inspection by their own inspectors
  - ➢ A feature may pass in one country and fail to pass in another country

- ◆ Typical set of type approvals for worldwide sales
  - ➢ China, European union (MED), Japan, Russia, USCG

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Type approval by IMO or IEC/ISO ?

- ◆ It is all about common interpretation of IMO rule
  - ➤ It is possible to have certificate based on only IMO rule without IEC or ISO
    - ◆ In this case the test method and pass/fail is agreed between test house and OEM
    - ◆ Other test houses has no knowledge of the details
    - ◆ Flag country administration has no knowledge of the details
    - ◆ Requires high trust for the issuing test house
  - ➤ Certificate based on IEC or ISO standard
    - ◆ MED call IEC and ISO as "test standards"
    - ◆ Common interpretation of the test method and pass/fail criteria
    - ◆ Everybody knows the exact tests and how they have been executed

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SW and HW updates

◆ **Typical product life about 5 years**

  ➢ Life of computer HW components is shorter

  ➢ Need easily every second year some HW component replacement

◆ **The need for SW updates seems to be a fact of life**

  ➢ Customers need new or improved features

  ➢ Rules are changing, some examples for ECDIS

    ◆ IHO standards or their interpretation are changing: IHO CDS, IHO S-64, Maintenance documents, Amendments

    ◆ IEC infrastructure standards are changing: IEC 61162 for interfaces

    ◆ IMO rules are changing: introduction of AIS class B in addition to class A, introduction of AIS application specific messages, requirement to submit ECDIS screen to VDR

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SW and HW updates

◆ **MED – a concept of minor and major changes**
- ➤ Major: Need retest by test house and a new certificate
- ➤ Minor: OEM only testing and OEM himself issues Declaration of conformity (DOC)
- ➤ It is OEM who selects if his change is minor or major
- ➤ MED include also mandatory Quality system certification
  - ◆ All changes done by OEM are traceable and controlled by his Quality system
  - ◆ Quality system is audited by a accredited third party twice a year
- ➤ Note that MED is applied only for vessels bearing European Union flag

◆ **Other countries**
- ➤ "Wild west", no written rules, basically any change require retest and a new certificate
- ➤ In practice largely ignored although once and while as a big surprise something is required

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Type approval – ECDIS is not alone

◆ **In practice very few ECDIS are totally stand-alone with only minimum performance required by IMO**

  ➢ Such an ECDIS would miss for example:

    ◆ Interface with AIS and display of AIS based information
    ◆ Interface with Radar and display of Radar based information
    ◆ Interface with VDR, who should record what is going on
    ◆ Interface with BNWAS, who should detect operator inability
    ◆ Interface with BAM, who should collect and remotely handle all bridge alarms

◆ **In practice most ECDIS are having optional add-on features**

  ➢ Typically such features are controlled by another IMO rule
  ➢ Typically such features are tested by another IEC or ISO standard
  ➢ Typically the type approval certificate list all such additional standards
  ➢ A retest of such an ECDIS means retest of every standard up to their current edition
  ➢ Many times passing this retest of everything is impossible, as it requires hw changes

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Type approval – typically already a modular process

◆ Very seldom the type approval test of an ECDIS is done by one single test person or authority

◆ Common case is that one perform separate tests by authorized, competent and/or recognized test laboratories

◆ Each separate test produces a test report, which describes in detail how the tests were performed and what were the results

◆ Then the type approval body, who issues the ECDIS certificate, typically perform some test of their own and inspect for the rest the separate test reports submitted by the OEM

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Type approval – challenges for OEM

◆ Typically the first time pass of the type approval is just normal work for an OEM

◆ A change in IMO rule is also manageable for the OEM as IMO always have a declared transition period

◆ The challenges are around changes required for a product

➢ MED specify no transition period for a change of "test standard"

- ◆ already on the day of publishing of a new edition of an IEC or ISO standard the OEM should have a new type approval certificate signed by his test house
- ◆ IEC standard goes trough transparent voting system. Mandatory phases are CDV voting, changes based on voting results, FDIS voting, publishing of the voting results and publishing of the IS. => this works actually as a time period for OEM to prepare for change as the final content is known from the begin of the FDIS voting.

➢ IHO change rules

- ◆ There is no clear day when a product shall be compliant => assume same as MED, no transition period
- ◆ IHO standards goes though a process which is not transparent in all details to OEMs
- ◆ What is latest IHO rule ? S-57 Ed 3.1 or Ed.3.12 including all maintenance, etc.

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Type approval – challenges for OEM

◆ **The challenges are around changes required for a product**

➢ The ECDIS standard (IEC 61174) may remain unchanged but some other standard requiring compliance changes

➢ The ECDIS standard (IEC 61174) is changed but also other standards has changed since previous type approval

➢ The flag country administration require new certificate which state compliance with some newer rule

   ◆ Test house can only issue a certificate for current standards of the day of signature

   ◆ New rule compliance may require faster operation, more or different functionality or new interfaces => many times the old HW is not capable to scope

   ◆ Product could be SW only upgraded for change of IHO rule, but cannot be SW only upgraded for newer Radar, newer Track Control, etc.

   ◆ DEADLOCK as the ship owner should retrofit his complete bridge installation

      ➢ Ship owner is reading IMO MSC.1 Circ.1221 which specifies once installed, forever accepted

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Type approval – ideas hanging in the air

◆ **Proposal to perform all tests by the OEM himself**
  ➢ Many sees this as a solution
  ➢ BUT, how to get uniform interpretation
  ➢ BUT, how to get required trust and acceptance by all parties

◆ **Proposal to perform type approval of SW and HW separately**
  ➢ Do not work without "standardized HW and SW platform"
  ➢ A PC is not such a platform, because it may have different processing capacity, RAM size, display generator etc.
  ➢ Also firmware such as BIOS and operating system should be in such case part of the standardized platform

Type approval – ideas hanging in the air

◆ **Proposal to perform type approval of sub-components separately**

➢ Typical idea is separate Monitor, Computer, Control panel and Interfaces as they could be separate HW sub-components in their own boxes

➢ In such case "all interfaces between the separate sub-components" and "functionality/performance of each sub-component" should be standardized

➢ BUT, if there is a need to change a standard related to such an interface or component, then we are back in the old dilemma

➢ BUT, this model can only help a "sub-component only manufacturer" if the interface, functionality or performance of his subcomponent stays unchanged

➢ BUT, this model does not help the challenges of the "final ECDIS OEM" who should deliver the complete ECDIS product to his customer

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