

Integrated bridges

For some time new tanker builds have been increasingly fitted with integrated bridges. Not unnaturally, these have been getting more sophisticated with each new generation. The trend will be for integrated bridges to become a set of displays and controls accessing multiple but identical processors that are running software, which interrogates multiple sensors and data sources. The sensors are the 'front-ends' of existing stand alone equipment such as radar, GPS, logs and gyros, etc; the data sources include electronic chart data, digital lists of navigational information (For example, list of lights, planned route, port information, etc). Increasingly the displays will be flat panel, rather than cathode ray tubes.

There are many potential advantages to this architecture but in particular it reduces the possibility of catastrophic failure. A failed screen being used as a radar display can be semi-automatically 'replaced' or windowed with a screen being normally used for less demanding work, perhaps passage planning. Similarly a failed processor being used for ECDIS could be switched to another that was occasionally used for loading calculations and other port related activities. It is clear that such systems need to be carefully designed, tested and approved if they are to be safe in use.

A common difficulty with the use of integrated bridge system today is that the effective use of many installations diminishes with time. Initial crews are well-trained but, because of the logistical and cost problems of training replacement crew members, operational knowledge can gradually reduce with time.

Additionally, it is being found that increased automation of tasks creates different training requirements. When an automatic system is observed working infallibly day after day the operator begins to rely on it and takes less frequent checks and maybe even forgets what these checks should be. There is evidence to support the fact that well-trained users using automatic systems will make better decisions but the converse is true for those who are poorly trained.

One aspect of particular concern is the increased possibility of mariners becoming overloaded with the information that is available on a modern bridge. A common symptom of information overload is when the mariner becomes fixated with collecting more and more data from the bridge system in the event of a developing situation, rather than concentrating on the basics and actually solving the problem.

Research, legislation and development work is ongoing to improve the situation in order to improve both technology and standards of training. The new SOLAS Chapter V has an entirely new section (Regulation 15) entitled, 'Principles relating to bridge design, design and arrangement of navigational systems and equipment and bridge procedures'.

For a SOLAS regulation it is surprisingly weak, as it talks about 'aims' rather than including any 'shalls', the latter being IMO-speak for 'must'. Nevertheless it is a good start and is particularly making marine administrations think more deeply about the integrated functions of a bridge, rather than it just being considered as a collection of separate equipment. Surprisingly, but perhaps because it is included in Chapter V (Safety of Navigation), it confines itself to the navigation functions of a bridge and therefore even leaves out GMDSS and other radio communication equipment, let alone other bridge functionality.

Interestingly, it makes several references to the 'bridge team and the pilot', recognising the importance of the system being designed to facilitate this interaction. Aims include 'preventing or minimising excessive or unnecessary work' and 'minimizing the risk of human error and detecting such error'. It importantly requires the system to indicate the operational status of automated functions.

In connection to the requirement of having 'continuous access to essential information which is presented in a clear and unambiguous manner, using

standardized symbols' IMO have asked the International Electrotechnical Commission (IEC) to prepare draft recommendations on this matter. Because navigation equipment standards have evolved from separate starting points in time and technology, differing requirements have emerged for the display of symbols, colours, units and even abbreviations. On a standard bridge this is distracting but on an integrated bridge, with adjacent and physically identical screens having to use different display parameters, the possibility of mental confusion is greatly increased.