C-MAP CM-93/3 Real Time updating service:
Regulations and security

> **SOLAS V Reg. 20**
> *All ships shall carry adequate and up-to-date charts, Sailing Directions, Lists of Lights, Notices to Mariners, Tide Tables and all other nautical publications necessary for the intended voyage. (SOLAS V 20)*

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1.Background

In November 1996 the IHO (the International Hydrographic Organization) issued a new version of the international standard for the exchange of digital chart data, S-57 Edition 3.0, which was followed by another edition (3.1) in November 2000.

The most significant new feature introduced with Ed. 3.0/3.1 is the updating mechanism, which should enable to keep ENCs (Electronic Nautical Charts) up-to-date by means of sequential update files of relatively small size and containing change instructions.

Although update files can be distributed to mariners in many different ways, their small size makes them particularly suitable for telecommunications, where data volume remains a critical factor.

Following the issuing of S-57 Ed. 3.0, C-MAP has developed a new System ENC (SENC) format, which is fully compatible with the new edition of the standard and has been type-approved by Det Norske Veritas (DNV) as a format suitable for ECDIS (DNV certificate A-8182). In order to fully exploit the capabilities of the updating mechanism introduced with Edition 3.0, C-MAP has also developed and put into operation an Update Server from which mariners can download (via HTTP connection or e-mail) updates for official ENCs and C-MAP electronic charts. The C-MAP Update Server has been inspected by DNV as part of the SENC distribution service implemented by C-MAP and found compliant with requirements specified by the Norwegian Hydrographic Service (DNV certificate A-8634).

The updating mechanism is the single most important innovation introduced with CM-93/3.

Some shipping companies and system manufactures have expressed concerns about the convenience of connecting their equipment (ECS or ECDIS) to the C-MAP Update Server via HTTP, either directly or through an external device (e.g. an INMARSAT terminal). Most concerns fall in either one of the categories below:

- The standards and regulations affecting the ECDIS would forbid connecting the equipment to the Internet and/ or to a communication device.
- Internet connections are not secure and would be intrinsically dangerous due to viruses.

The following document aims to demonstrate that both types of concern above have no reason to exist.

2.ECDIS and Internet: what the regulations say

The prime regulatory standard on ECDIS is the **IMO (International Maritime Organization) Resolution A.817(19) - *Performance Standards for ECDIS***. This standard only contains a generic recommendation in chapter 12 *(Connections with other equipment)*:

> *12.1 ECDIS should not degrade the performance of any equipment providing sensor inputs. Nor should the connection of optional equipment degrade the performance of ECDIS below this standard.*

The IMO Performance Standards for ECDIS contain no reference to the Internet or to communication devices.

The **IHO Publication S-52 - *Specifications for Chart Contents and Display Aspects of ECDIS*** is more specific. Appendix 1 Chapter 3 (Specific Updating Guidance) contains the following guidance for ECDIS manufacturers:

> *3.4.2 Automatic Update*
>
> *(a)Interface*
>
> *(i) Fully Automatic Updates. The ECDIS should be capable of being interfaced to an INMARSAT-C EGC SafetyNET-capable receiver for direct data transfer of ENC Updates.*
>
> *(ii) Semi-automatic Updates. The ECDIS should be capable of receiving ENC Updates in standard IHO format by 3.5" high density diskette and through a telephone network.*

It is evident how connection to INMARSAT and/ or telephone networks is not only allowed but even encouraged for the purpose of automatic and semi-automatic updating.

The third regulatory standard on ECDIS is **IEC (International Electrotechnical Commission) 61174 – *ECDIS Operational and Performance Requirements, Methods of Testing and Required Test Results***. This is mostly a compilation of requirements from the previous two standards (including the ones quoted above), and contains no prohibition whatsoever about Internet, INMARSAT or connectivity in general.

Last but not least, C-MAP is not aware of any national regulation (issued by Maritime Safety Administrations, Coast Guards or equivalent Authorities) prohibiting connection between the ECDIS and a communication device.

3.The C-MAP Update Server and Internet Security

Security of the Update Server is of utmost importance for C-MAP.

The Update Server is structured in such a way as to provide mariners with secure, unfettered access to update services. The integrity of all data stored on the Server is guaranteed by a combination of hardware devices and software tools. The Server is protected by the most recent and advanced anti-virus technologies and it is located behind a secure system of hardware firewalls.

The Update Server transmits only update files, i.e. data, whereas viruses can only spread through executable code. The Server never sends executables or Java scripts – only plain data. In addition, the client part of the updating engine (which is part of the CM-93/3 Software Development Kit, and therefore embedded in the manufacturer's system) would reject any data other than update files received during the updating transaction.

4.What other authorities says about chart updating:

The **OCIMF (Oil Companies International Marine Forum) - Ship Inspection Report (SIRE) Programme** is very specific about updating.
Their **Vessel Inspection Questionnaire for Bulk Oil, Chemical Tankers and Gas Carriers** (Second Edition 2000) ask:

> *4.5 Has a system been established to ensure that nautical publications, charts and information are on board and current?*
>
> Ref: SOLAS V Reg. 20
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> *An on-board chart and publication management system is recommended to ensure that records are kept of which charts and publications are carried, and when they were last corrected. (BPG 4.9.1)*
> *Record keeping of corrections should be reviewed, and random checks made to ensure that recorded corrections to charts and other nautical publications have been made, and that **charts and publications in use are fully corrected and up to date**. The last Notice to Mariners on board should be dated within the previous two months.*

Furthermore:

> 4.5.1 Are fully corrected charts provided for the intended voyage?
>
> *Record in the Comments the **type of chart correcting system,** which is used, and whether the charts are corrected for the normal trading area or just for the voyage.*

As C-MAP is told, these questions concern Electronic Chart Systems as well as ECDIS.