ENC are controlled by permits that determine how long they can be used for and by whom.
The majority of Electronic Navigation Chart (ENC) publishers encrypt their ENC using the International Hydrographic Organization (IHO) S-63 data protection standard. All ENC covering Australian, Papua New Guinea (PNG) and Australian Antarctic Territory waters, which are published by the Australian Hydrographic Service (AHS), are protected using this standard. This includes Australian and PNG ENC released under the banner of AusENC as well as those incorporated into other IC-ENC and PRIMAR services.

What is the IHO S-63 standard?
The IHO S-63 standard has two main components: encryption and authentication. Encryption is a means to make electronic data readable only to those possessing a key. A Data Server encrypts the data using a mathematical algorithm called a cipher. The recipient’s key decrypts or ‘unlocks’ the data making it readable again. Authentication is the process of verifying that data has not been tampered with in transit between the Data Server and the recipient.

How does the IHO S-63 encryption work?
Under the IHO S-63 standard, the AHS as the Data Server, encrypts AusENC and provides the mariner with a unique encrypted key for each ENC cell they have purchased a subscription for. These keys are known as a ‘cell permits’ and are unique to each IHO S-63 compliant navigation system. Cell permits also contain information about the duration of each subscription. The mariner loads the cell permits into the navigation system - the system then uses the cell permits to unlock subscribed ENC data to permit access and viewing.

Before the Data Server can create cell permits the mariner must supply the Data Server with another encrypted key called an ‘S-63 user permit’. The user permit is allocated by the system manufacturer and is an encrypted key which is unique to each navigation system sold. This is usually supplied with documentation accompanying the navigation system when purchased. On receipt of a valid S-63 user permit, the Data Server is able to decrypt the user permit, identify the manufacturer of the system and generate encrypted cell permits that will only work on the mariner’s navigation system.

How does the AusENC service work?
The AHS is the Data Server for AusENC. However, the AHS sells subscriptions for AusENC through a network of AusENC distribution agents listed on the AHS website at www.hydro.gov.au/webapps/jsp/agents/agents-list.jsp
Most importantly, prior to placing an order for AusENC you must check that your navigation system is configured for and compatible with IHO S-63. When purchasing an AusENC subscription, you must supply your IHO S-63 user permit (as provided by your navigation system manufacturer) and your contact details to your AusENC distributor. The distributor will then supply you with your ENC data (including updates) on CD while at the same time forwarding your system and contact details to the AHS. The AHS will then process the order and send you your cell permits, usually by email.

**How do I determine if my navigation system is IHO S-63 / AusENC compatible?**
To use AusENC your navigation system will need to be IHO S-63 compatible. As at early 2012, there were in excess of 200 IHO S-63 compatible navigation systems. If your system is compatible your system distributor/system manufacturer will be able to provide you with an ‘IHO S-63 user permit’. If not, your system is not compatible. In addition, your navigation system should be configured for use with the ‘IHO S-63 Scheme Administrator certificate’. This certificate relates to the ENC authentication process – see below. Systems configured for use with non IHO S-63 Scheme Administrator certificates may have difficulty loading AusENC. If this occurs, you should contact the AHS at hydro.techsupport@defence.gov.au for assistance.

**How many installations can I have on one ENC subscription?**
The AusENC service enables mariners to install up to five navigation system seats under the one subscription. An example of where this can occur is on large commercial vessels that use multiple ECDIS workstations. Generally there is a primary and backup system on the ship’s bridge and frequently additional systems at other locations on the vessel.

The limit of five seats per AusENC subscription also applies to networked workstations ashore.

**If I have several separate navigation systems, will I need multiple subscriptions?**
A separate S-63 user permit is required for each separate navigation system installation/site. For example, a shipping company wishing to use ENC on five vessels will require (at least) five ENC subscriptions and therefore at least five S-63 user permits.

**What happens if I load the wrong cell permits on my navigation system?**
Since ENC cell permits will only work with the navigation system installation with the matching S-63 user permit, it is important for mariners with multiple navigation systems to be able to distinguish systems easily so that cell permits can be loaded on the correct system. If the wrong user permits are loaded, the navigation system will report an error.

**When will I receive ENC cell permits?**
On first purchasing an AusENC subscription the AHS will dispatch AusENC cell permits within two working days of receipt of your system information and contact details from your AusENC distributor.

Each fortnight during your subscription the AHS will send you an email which will either contain new permits, or advice that no permits have been issued for your packs. New cell permits will be supplied to you if the AHS releases new editions of existing ENC already included in your packs, or if new ENC are added in the area covered by your packs. New editions are released when a cell is updated by large volumes of new information. New ENC are released to enhance coverage.

The fortnightly email will also include an ‘Update Report’ which lists the types of updates issued for your packs: NtM updates to cells, new editions of cells already included in your packs and or new cells added in the area covered by your packs.

Permit emails are sent on the first working day after each Australian NtM edition is published (Monday fortnight except public holidays). They are a convenient reminder to download your updates from the AHS website. Even when you have not been issued new permits, you should still load each fortnightly update because navigationally critical information in the form of NtM updates could still be issued for the ENC in your packs.

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What do I load first, the cell permits or the ENC data?
To determine whether cell permits or ENC data should be loaded first, you should consult your navigation system manual. Once this has been ascertained, you should remember that AusENC cell permits are specific to a particular fortnightly update. It is important to not load new permits until you have received or downloaded the corresponding ENC update data. Failure to follow this advice may remove access to previously installed ENC cells. AusENC installation instructions are supplied with each AusENC Base CD (at initial subscription purchase and when subsequent six monthly base CDs are released). They can also be accessed any time from the Product Downloads page on the AHS website at: www.hydro.gov.au/software/products/products.jsp

What happens when my cell permits are about to expire?
IHO S-63 compliant navigation systems should issue warnings prior to ENC cell permit expiry to provide sufficient lead time for you to purchase new subscriptions. It is important to renew your subscription before it expires to guarantee continued access to your ENC data. Once permits have expired it will not be possible to load updates.

How do I extend the duration of my subscription?
The AusENC service offers 12 month subscriptions for Port and Coastal Packs and for Voyager and Australia Packs. When you wish to extend your subscriptions you will actually be purchasing a new subscription for the nominated duration.

Can I use AusENC if I have ENC from other services installed on my system?
You can use AusENC if you have ENC from other services installed. However, your navigation system may behave unpredictably if ENC with identical file names have been loaded from two or more ENC services. All ENC covering Australian, Papua New Guinea and Australian Antarctic Territory waters are published by the Australian Hydrographic Service. They are included in the AusENC service as well as in a number of ENC services offered by the IC-ENC distribution network (such as AVCS, ChartCo, ChartWorld, Datema, Jeppesen, Maris, Navtor) and PRIMAR. ENC covering Australian, Papua New Guinea and Australian Antarctic Territory waters will have exactly the same file names regardless of the ENC service. They will start with ‘AU’ and have the same coverage and scale. However, because most ENC services sell ENC in packs, you may not be aware that your packs contain AU cells.

If you are intending to use the AusENC service in combination with other ENC services we recommend that you identity the AU cells that you will receive as part of your AusENC service and remove any matching AU cells from other services from your system. This should be done prior to loading AusENC however before taking this step you should ensure that you have backup copies of your other service’s ENC data and permits. For more information see the ‘Guide to Installing Your AusENC Service’.

How does S-63 authentication work?
The IHO S-63 data authentication process relies on your navigation system having access to a particular ‘certificate’ which contains a list of S-63 Data Servers. When you load ENC data (including ENC updates) on to an IHO S-63 compliant navigation system, the system will check that the ENC data is authentic and coded correctly for a particular Data Server by referring to the certificate. If not, the system will issue a warning that the authentication check has failed.

To use AusENC a navigation system must have access to the certificate called the ‘IHO S-63 Scheme Administrator certificate’ (IHO.crt) since this includes the AHS in the Data Server list. Note that the ‘PRIMAR certificate’ (PRIMAR.crt) will not work with AusENC. Some manufacturers supply the ‘IHO S-63 Scheme Administrator certificate’ with their software or provide a web-site link to the certificate in their system documentation. To assist mariners who do not have access to the Internet whilst at sea, a copy of the IHO S-63 Scheme Administrator certificate is included on each AusENC base and update CD under the root directory (top level directory). However, if you wish to independently download the IHO S-63 Scheme Administrator (SA) certificate the URL is: www.iho.int/iho_pubs/standard/S-63/S-63_SA_Certificate.htm.
Why is data authentication important?
Mariners using authenticated ENC can navigate safe in the knowledge that their ECDIS or ECS contains ENC information from an authorised data server and is as the data publisher intended.

What happens if the S-63 authentication check fails?
If the S-63 authentication check fails, your navigation system will issue a warning that you will be required to acknowledge. This will occur prior to loading any ENC data (including updates) in to the navigation system’s internal system ENC (SENC) database. At this stage you can choose to halt the loading process or continue. If the authentication check fails the AHS encourages mariners to contact their ENC distributor. However, if you choose to load the ENC data the warning will not be re-issued because the navigation system will then convert the ENC data into its own proprietary or SENC format. Once loaded into the SENC, the data that failed the authentication check will be undistinguishable from the other ENC data viewable in the navigation system. Adding non authenticated data to the SENC is potentially dangerous. The decision to do so should only be made after risks are thoroughly assessed as its quality and integrity cannot be assured.