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Agenda item [2]	8.4
Technical Domain / Task Number [2]	……
Author(s) / Submitter(s)	China MSA

Proposal for portrayal Method of Updated Data of S125 on ECDIS

1 SUMMARY

This input paper presents a testing experiment based on S125 (Ver0.0.3). This test includes the production of test data, the service establishment of S125 test server, the acquisition of S125 test data on ECDIS through 5G network and the portrayal of S125 on ECDIS. In this paper, the data acquisition on ECDIS and the realization of portrayal of S125 are described in detail. At the same time, we conducted experiments on the portrayal of S125 updated data on ECDIS when the anomalies of Aids to Navigation (AtoNs) data were released and restored to normal, and put forward suggestions based on the test results.

1.1 Purpose of the document

The ARM Committee is invited to consider our proposal for the portrayal of S125 updated data on ECDIS when the Aids to Navigation are released and restored to normal.

1.2 Related documents

[1] IHO S125 maritime navigation service 0.0.3

2 BACKGROUND

With the rapid development of science and technology, such as electronic technology, radio communication and network technology, new technology, new materials and new energy sources have been continuously utilized in the field of Aids to Navigation. The quality, effectiveness, and efficiency of Aids to Navigation maintenance have been continuously improved, and the capability and the level of navigation services have become higher and higher, which provides not only an effective service for the safety of ship navigation but also a more comprehensive, reliable, convenient, and efficient service for other maritime activities. With the development of navigation and the concept of intelligent shipping, Aids to Navigation have entered a new era of digitization, informatization and intelligence.

At present, the dynamic information such as the establishment, removal and change of Aids to Navigation is mainly notified to the chart production Authority by releasing the Aids to Navigation dynamics. The Authority composes and publishes the correction notice according to the dynamic information and then forms chart correction data according to the correction notice to update the chart data. This traditional data publishing method has some disadvantages such as long data updating process and inconvenient data application.

1Input document number, to be assigned by the Committee Secretary
2Leave open if uncertain

IALA ARM S-201 TG released S125 0.0.1 in March 2022, S125 0.0.2 in September of the same year and S125 0.0.3 in October 2022. IHO and IALA hope to standardize the dynamic information of by formulating S125 product specification to improve the timeliness of Aids to Navigation dynamic information, which is more conducive to ensuring the navigation safety of ships.

In the IALA committee work programme 2023-2027, it is planned that ARM and IHO NIPWG will continue the development of S125 product specification in depth and release version S125 1.0.0 as soon as possible. In order to respond to the project program of ARM, we conducted a practical application test for the current version S125 0.0.3, hope to find out the problems existing in the current specification and put forward relevant proposals to improve S125 product specification.

3 DISCUSSION

3.1 Overall framework of the practical application test system of S125 on ECDIS

The practical application test system of S125 on ECDIS mainly includes three modules: S125 test data production and release, S125 test data transmission and S125 test data application on ECDIS:

1 S125 test data production and release: Aids to Navigation maintenance personnel make basic test data and updated data of Aids to Navigation dynamic information based on S125 product specification (Ver 0.0.3), and upload the GML file of test data to S125 service test data publishing platform. The platform provides an HTTP service interface through which ECDIS can download S125 test data;

2 S125 test data transmission:ECDIS downloads S125 test data by HTTP service interface from S125 service test data publishing platform through 5G wireless network;

3 S125 test data application on ECDIS: After downloading S125 test data and updated data, ECDIS analyzes them according to S125 product specification and conducts overlay display on the electronic chart. Users obtain the dynamic information details of the S125 test data by moving their mouse pointer to the S125 symbol.

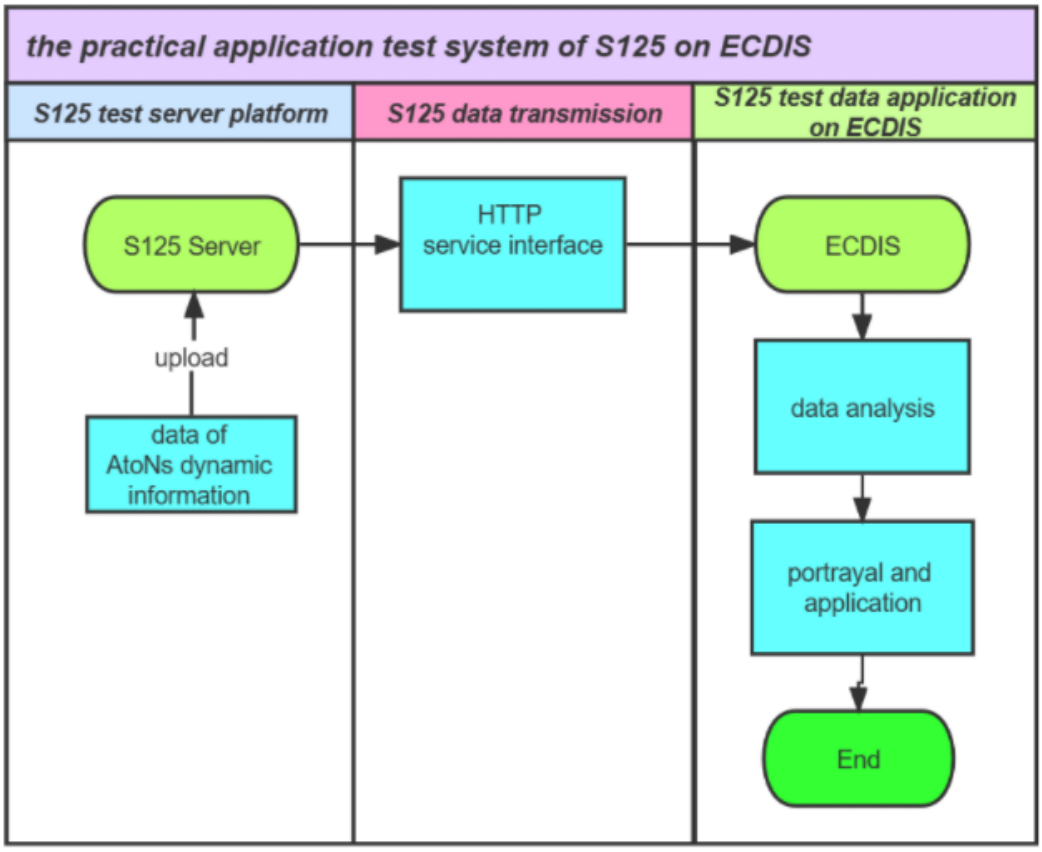

Figure 1 Framework diagram of application test system of S125 on ECDIS

3.2 S125 test data

We selected the Yuanyuan Sha LightVessel and No. S10 Lighted Buoy at estuary area of the Yangtze River of Shanghai, China as the basic data for production of test data.

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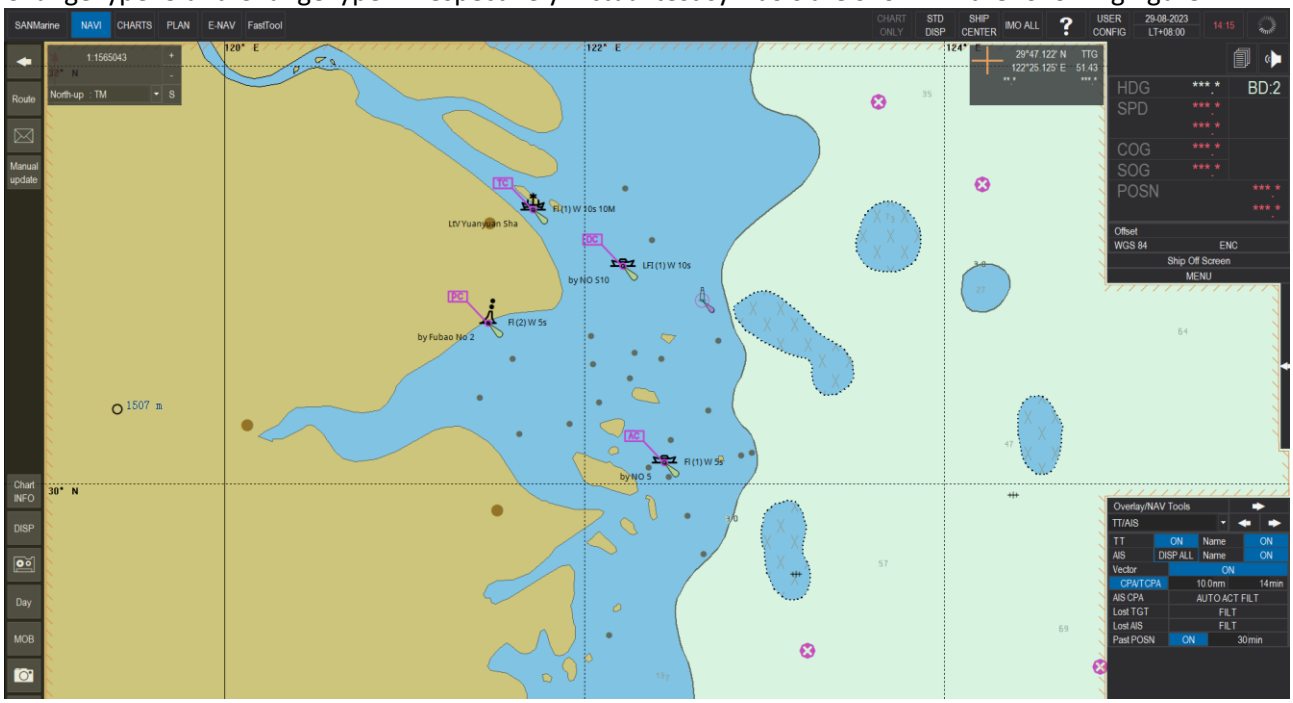
Figure 2 S125 test data- temporary dynamic information GML file content when light unlit of the Yuanyuan Sha LightVessel

3.3 Practical Application of S125 on ECDIS

3.3.1 Portrayal on ECDIS

Basic test data include the Yuanyuan Sha Light Vessel, No. S10 Lighted Buoy from the south channel of the Yangtze River Estuary, No.5 Lighted Buoy from the deep-water channel of the Yangtze River Estuary, and Fubao No.2 Isolated Danger Mark. Their ChangeTypes are defined as ChangeType=1, ChangeType=4, ChangeType=3 and ChangeType=2 respectively. Actual test symbols are shown in the following figure:



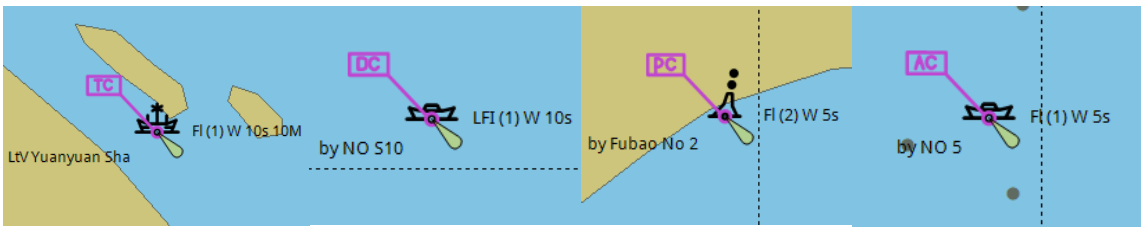


Figure 3 Portrayal of S125 test data on ECDIS

3.3.2 Detailed display of dynamic changes of AtoNs

When users move their mouse pointer to the symbol of S125, ECDIS will display the detailed AtoNs dynamic information corresponding to S125 data, as is shown in the following figure:

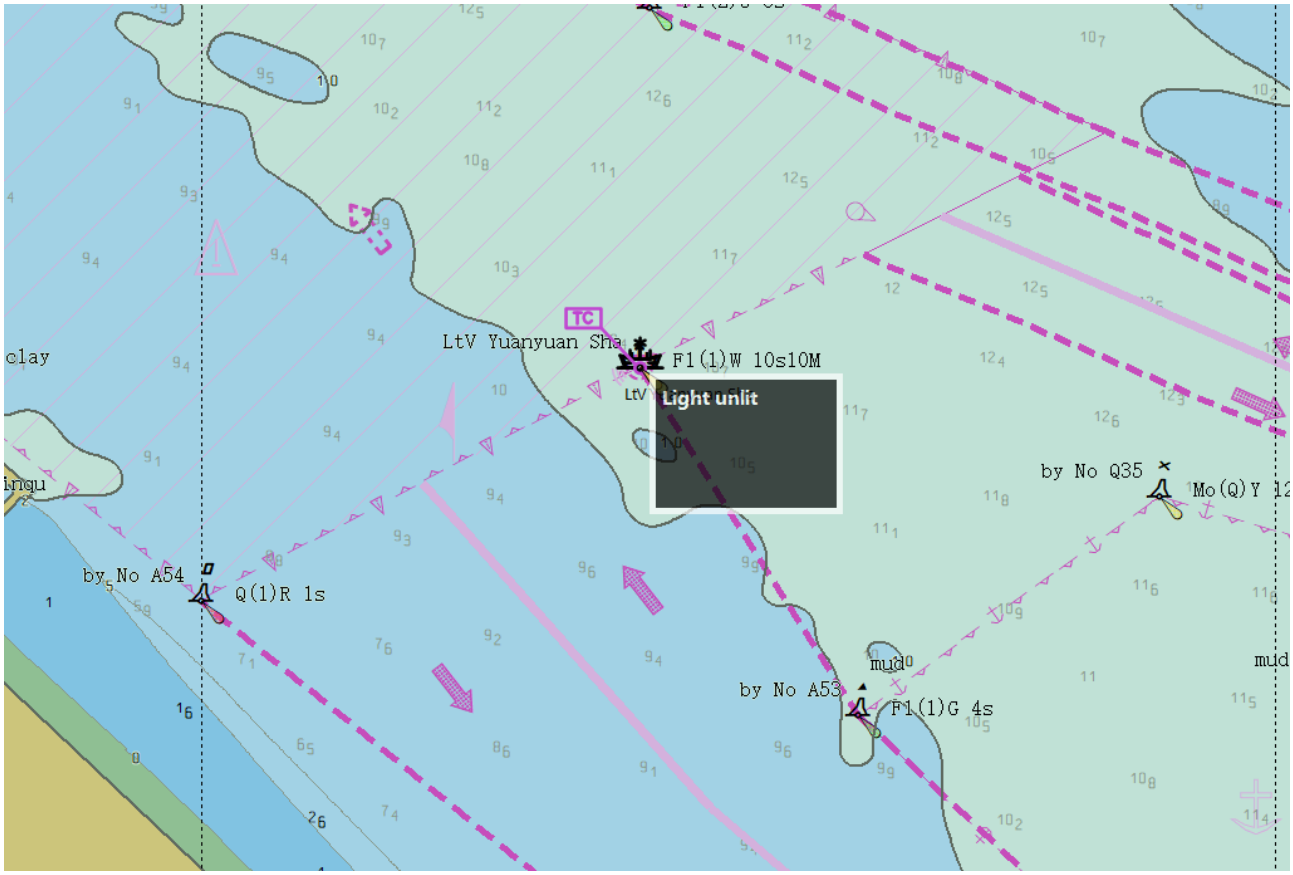


Figure 4 Dynamic information of Yanyuan Sha LightVessel is Light unlit

3.4 Proposal for the portrayal of Updated S125 Data on ECDIS

3.4.1 S125 Data Update Scheme

S125 data updates will be made by new editions or updates in S125 specification version 0.0.3. When a new edition of a dataset is received, the system must replace the previous edition with the new edition of the dataset to portray and apply. Updated datasets should contain replacements, deletions, and additions of whole feature instances or information instances. It means that when a feature or information instance is updated, the new version must contain all the attributes of the old instance, including any inline spatial attributes (i.e., inline geometry), except those attributes that are being removed.

Therefore, when ECDIS receivs a new edition of a dataset, the system clears the previous edition dataset first, and then loads the new edition of the dataset; When received the updated dataset, based on the ID of the AtoN, clears the AtoN information of the same ID in the previous edition dataset and fill it in with the element instance information from the updated dataset.

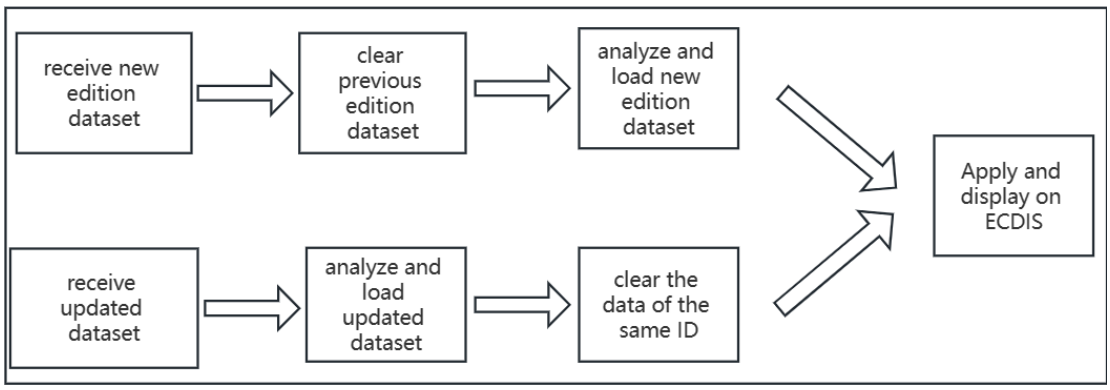


Figure 5 General processing of S125 new edition data and updated data on ECDIS

3.4.2 Problems of S125 updated data display process

If the light of Yuanyuan Sha LightVessel has changed from the unlit state previously released to Light operating properly, then we can release this information as an updated dataset.

After received updated S125 data, the process is to determine whether there is any update information in S125 data currently displayed on ECDIS. If so, clear the original display symbol and redraw symbol according to the updated data. For example, the status type of Yuanyuan Sha LightVessel in original S125 basic data was light unlit (lightChangeType=1). In updated data, it is changed to Light operating properly (lightChangeType=8). The display before and after the update is shown in the following figure:

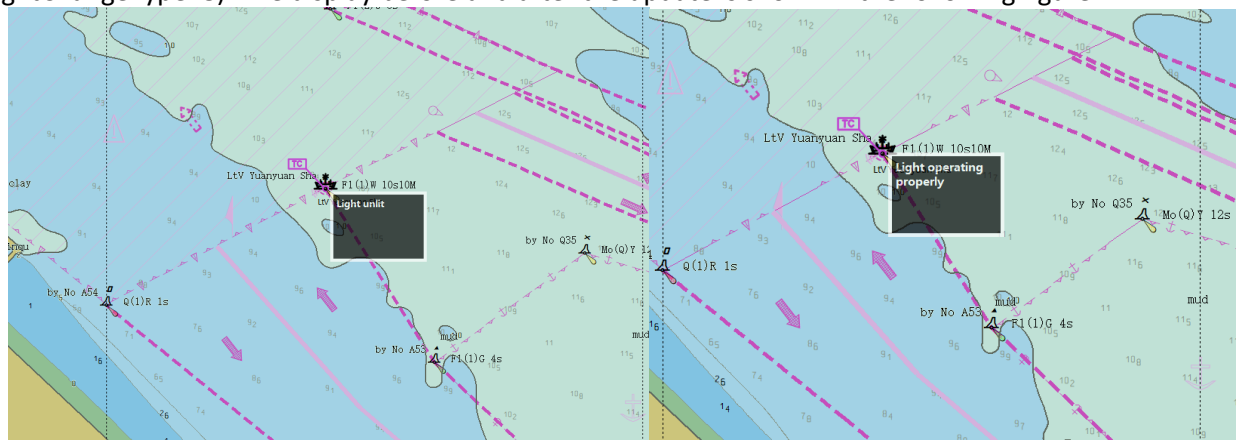


Figure 6 Dynamic information of Yuanyuan Sha Light Vessel is Light unlit before update and light operating properly after update

If we release this information as a new dataset edition, when ECDIS receives S125 data of the new edition, first clear the original display symbols, meanwhile, parse the new dataset edition to redraw the symbols. The final display effect is consistent with the display effect of updated data.
It has been noticed that when the dynamic information of AtoN is restored to normal (for example, beaconChangeType = 11、buoyChangeType = 10)its symbol display overlap on ECDIS increases the information burden on mariners instead of any practical effect.

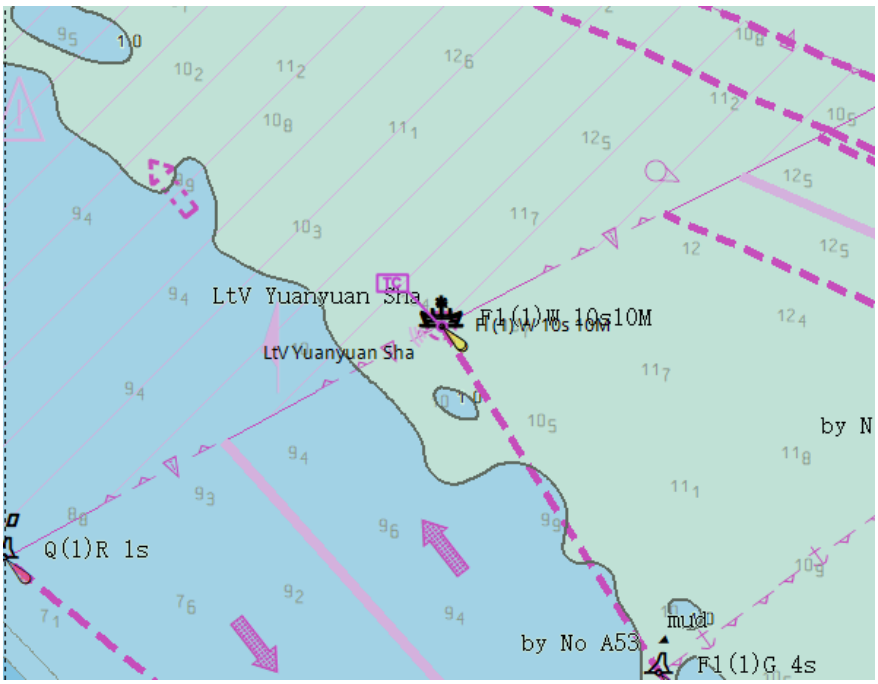


Figure 7 The symbol of light operating properly increases the information burden on mariners

3.4.3 Suggested process for updated data display

It is suggested that when displaying updated data of S125 with symbols, an analysis should be added on its corresponding state category. If the corresponding state category is restored to normal, new symbols will not be drawn after clearing the original symbol display. The suggested process for updated data display is shown in the following figure:

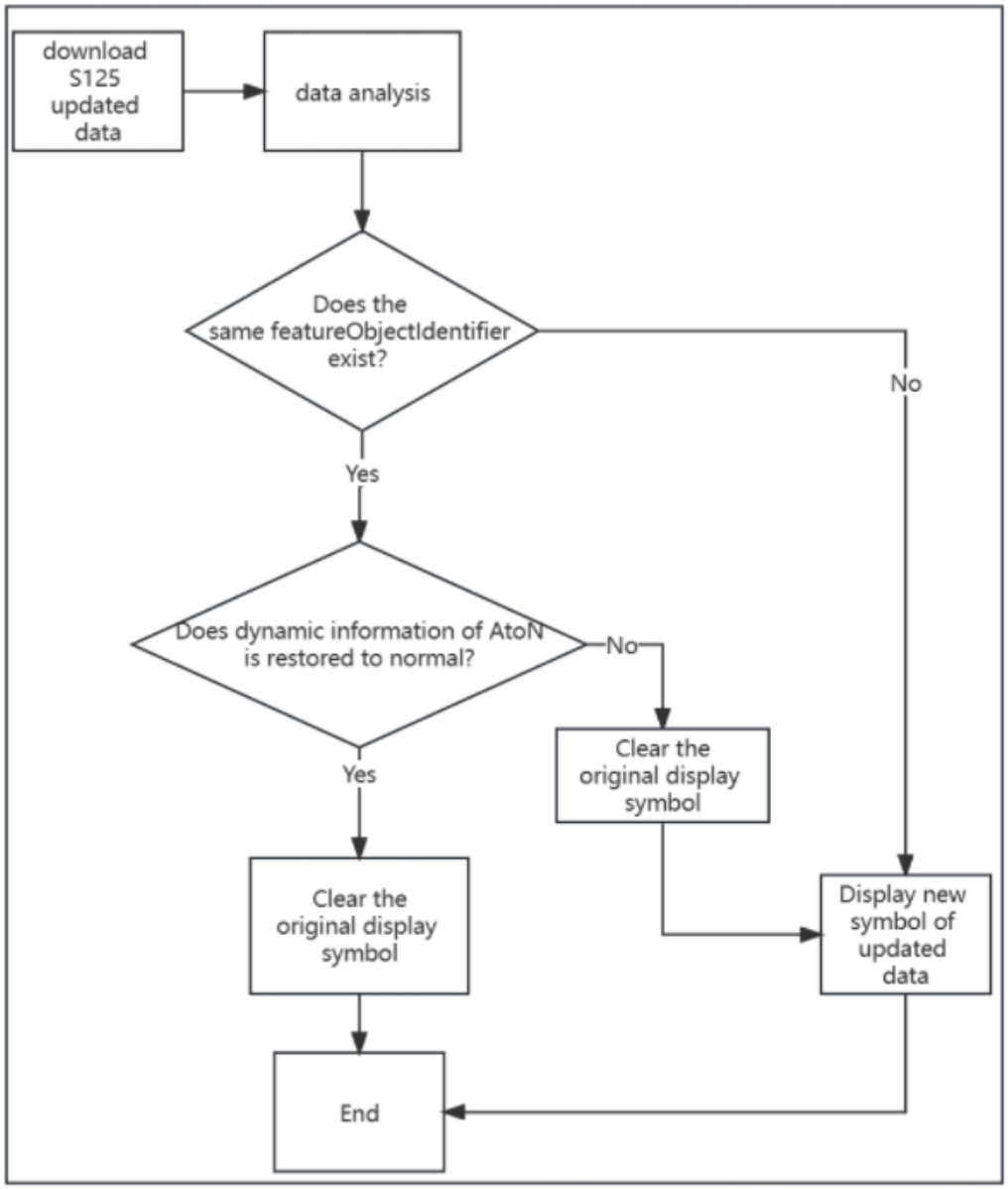


Figure 8 Suggested process for updated data display on ECDIS

After adopting the new process, the original S125 symbol of Yuanyuan Sha LightVessel has been cleared and there isn't any new symbol displayed, as shown in the following figure:

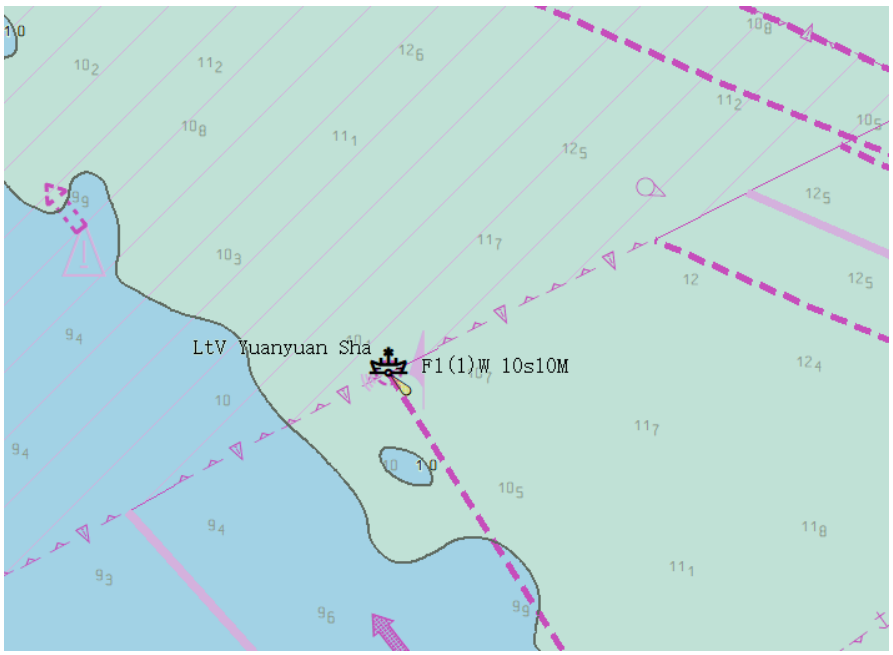


Figure 9 Display of S125 updated data after adopting the new process

4 REFERENCES

IHO NIPWG9-05.1A Rev1

Report of the Joint IALA/IHO workshop on S-100/200 development and portrayal

5 ACTION REQUESTED OF THE COMMITTEE

The Committee is requested to consider the proposal for the process of S125 updated data displayed on ECDIS and take actions as appropriate.