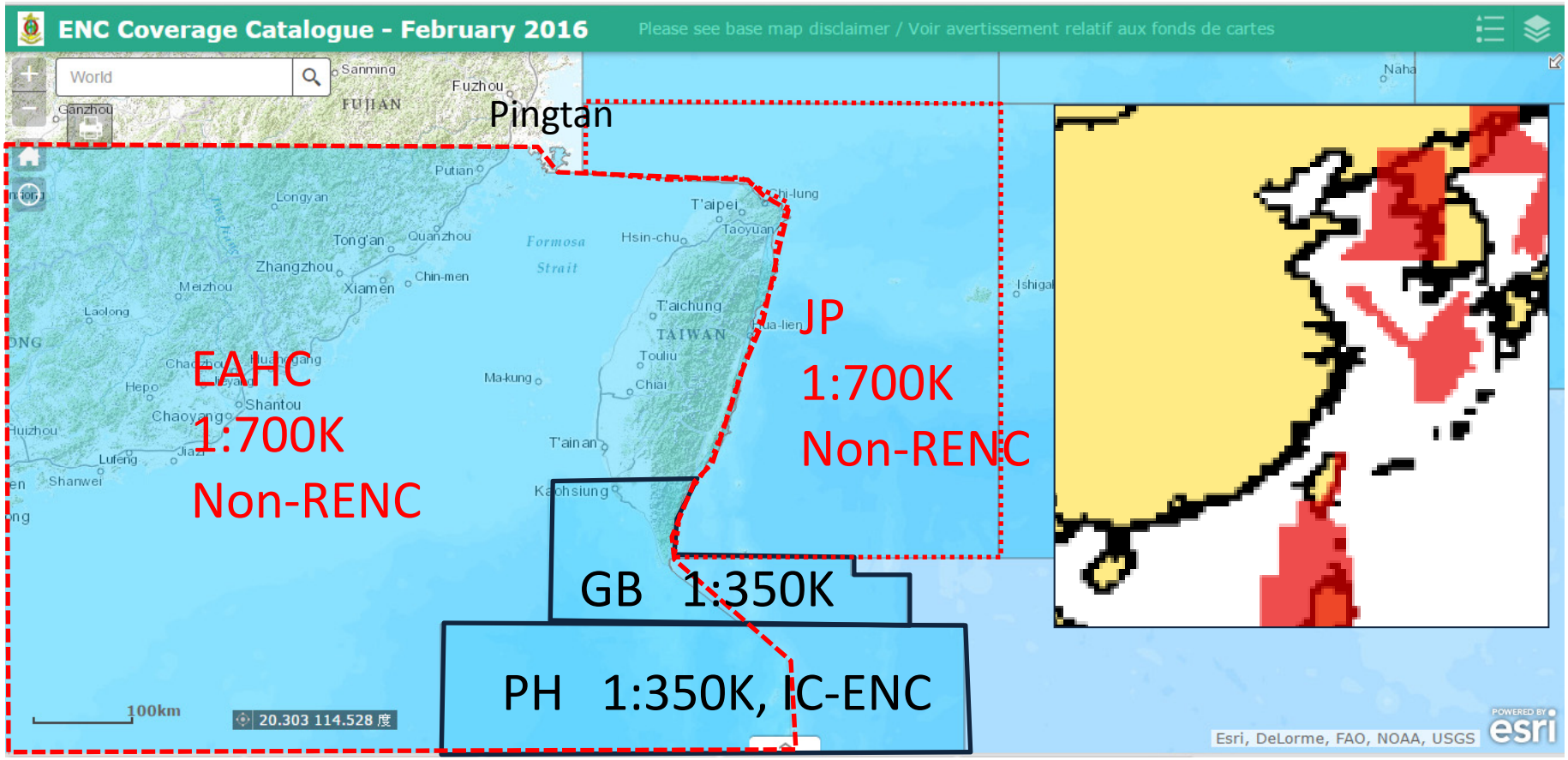
ENCs and NtMs for waters around Taiwan : real-world test cases of WEND, the risks and user needs

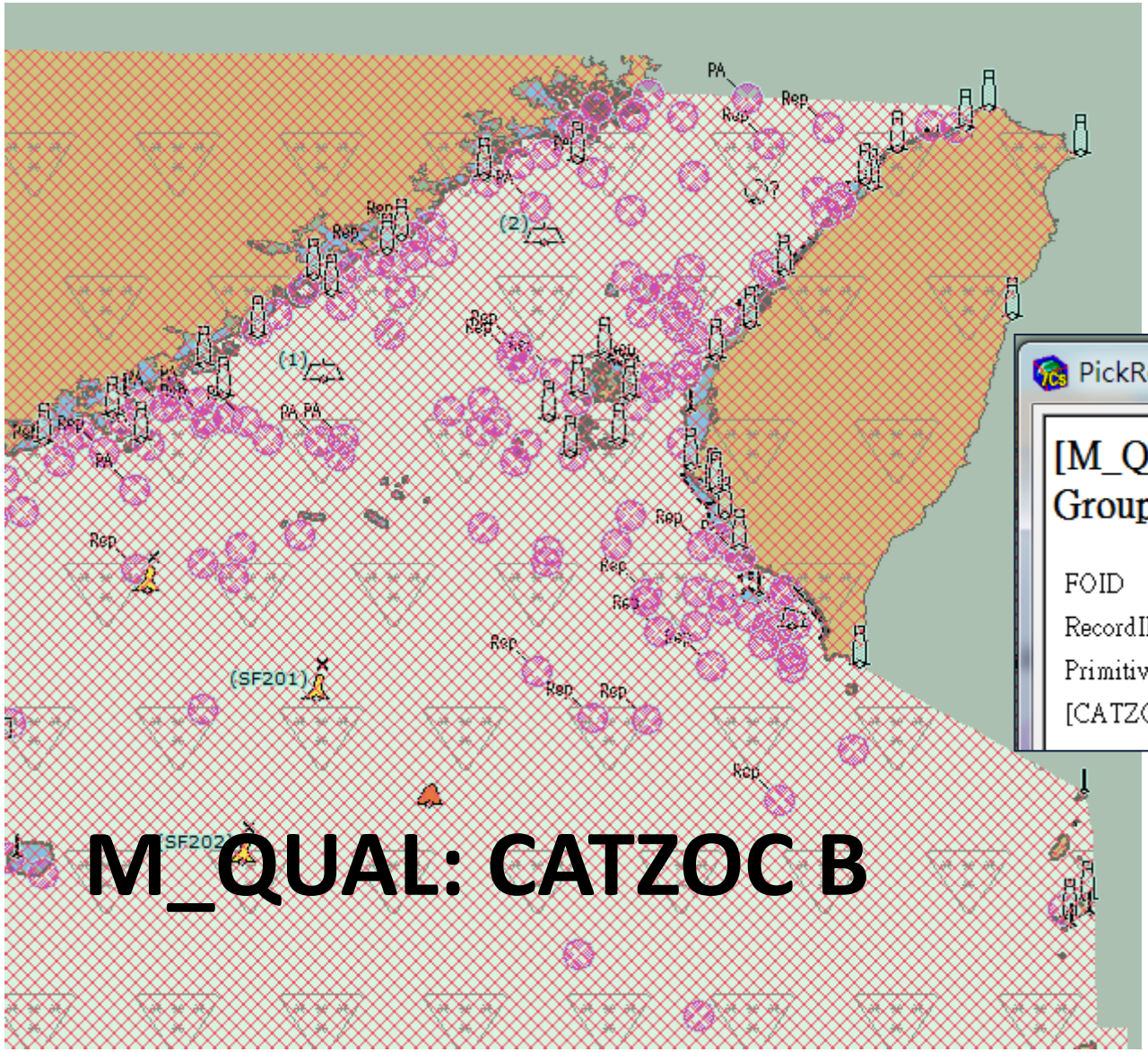
SHWU-JING CHANG

National Taiwan Ocean University

Overlap in UB2 and the Meta-Data



Data Quality : EA200001.000 (EAHC)



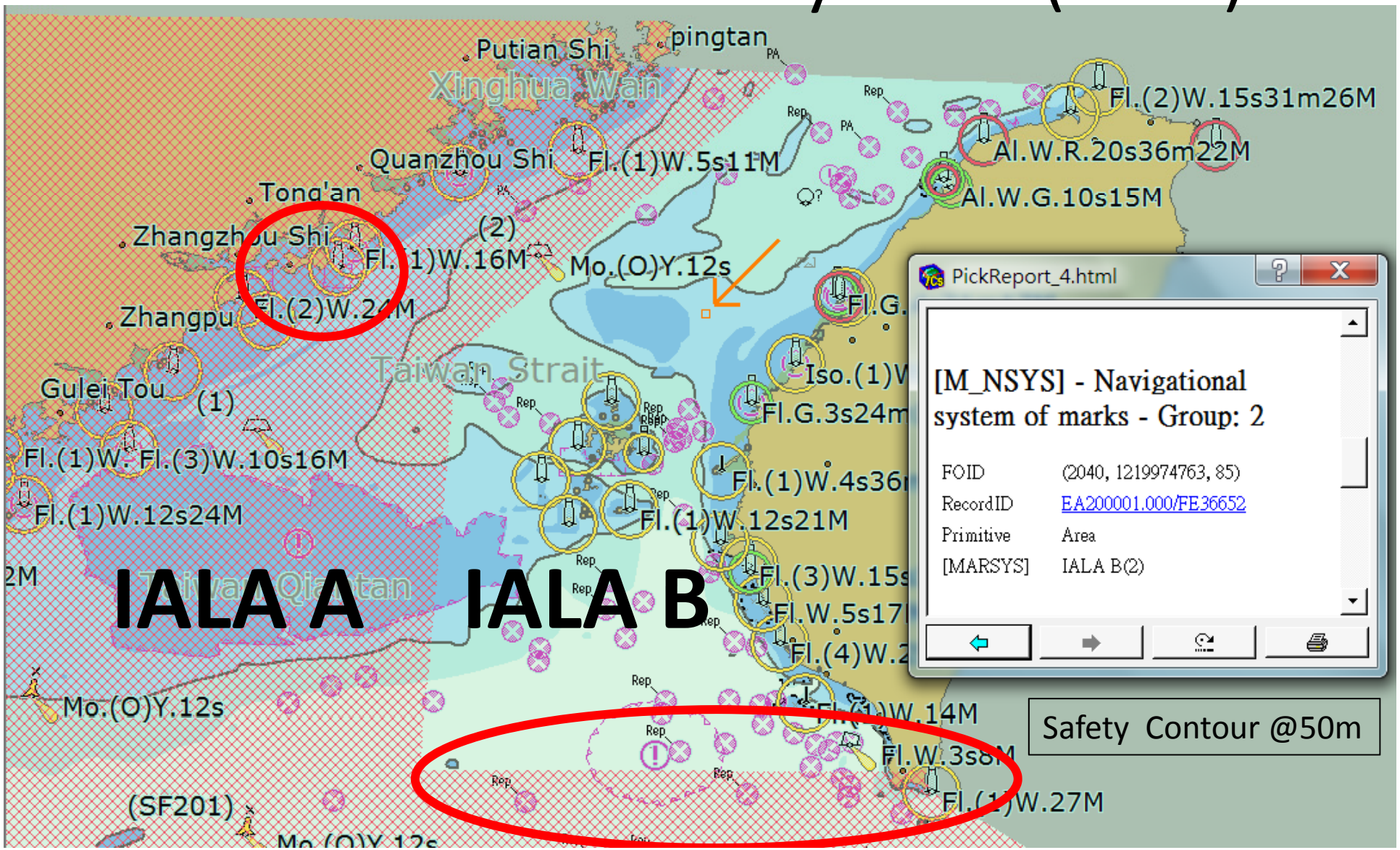
PickReport_0.html

[M_QUAL] - Quality of data - Group: 2

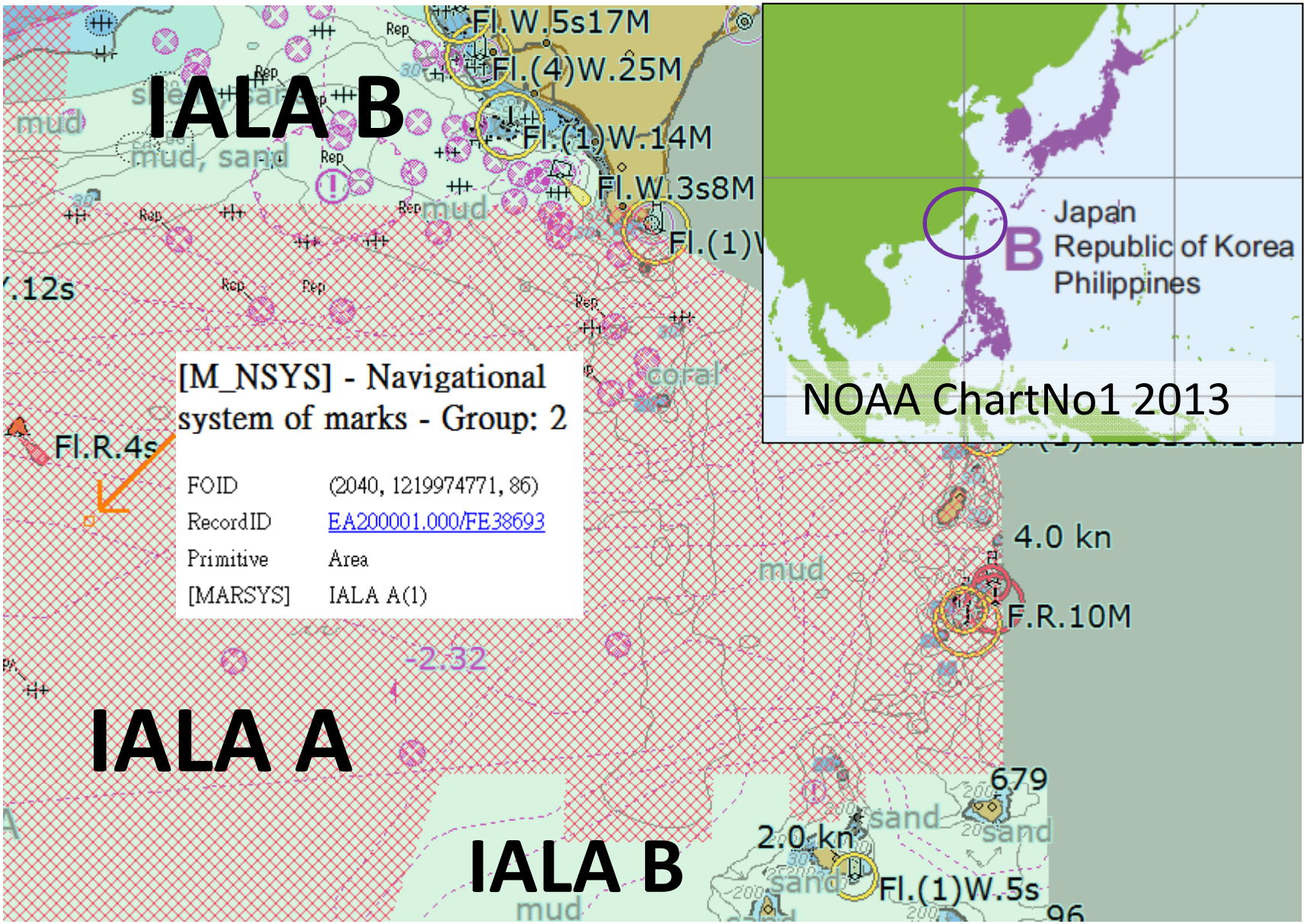
FOID	(2040, 1219974745, 18)
RecordID	EA200001.000/FE31995
Primitive	Area
[CATZOC]	zone of confidence B(3)

M_QUAL: CATZOC B

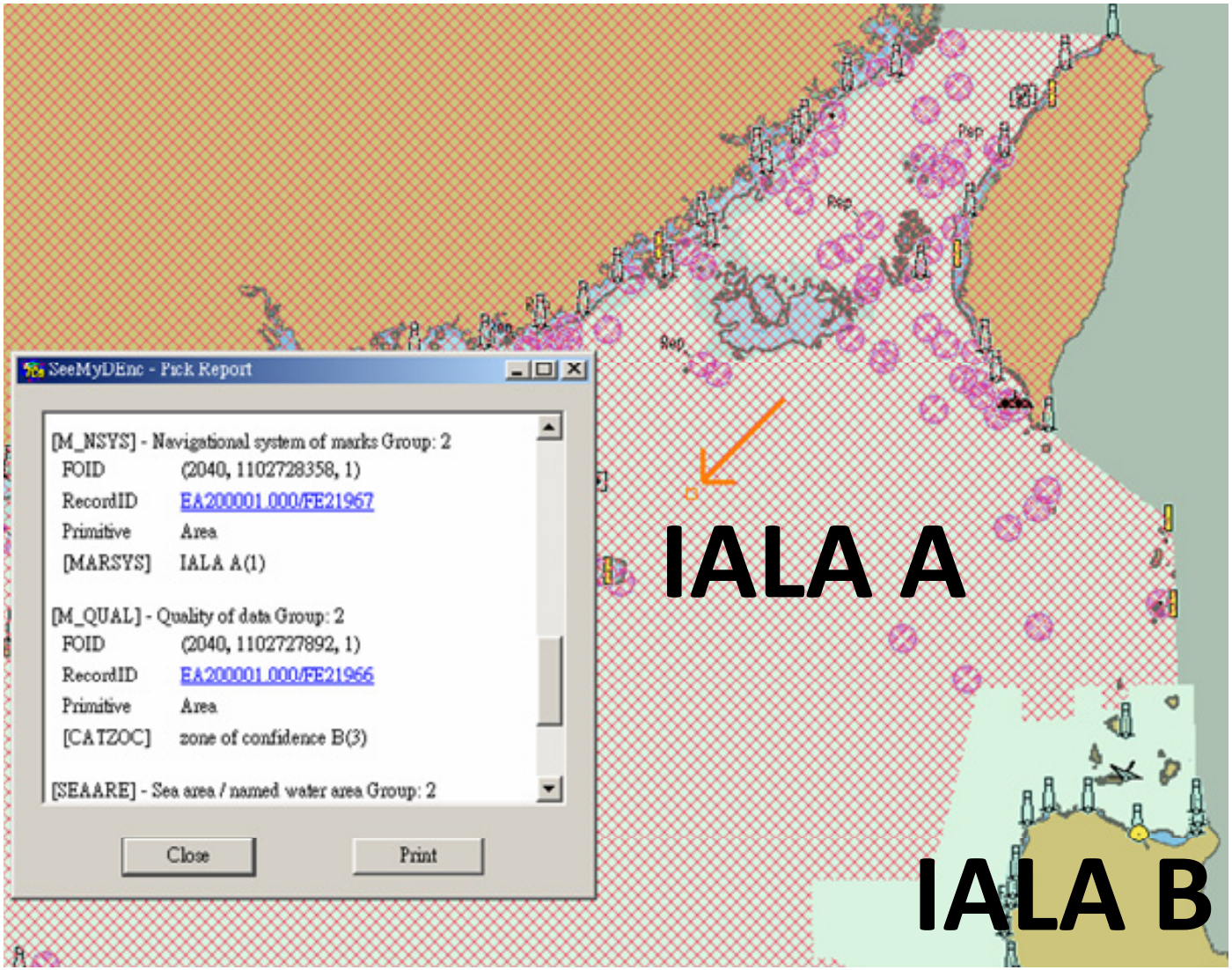
M_NSYS: Navigational System of Marks EA200001.000 ed2 by EAHC (2012)



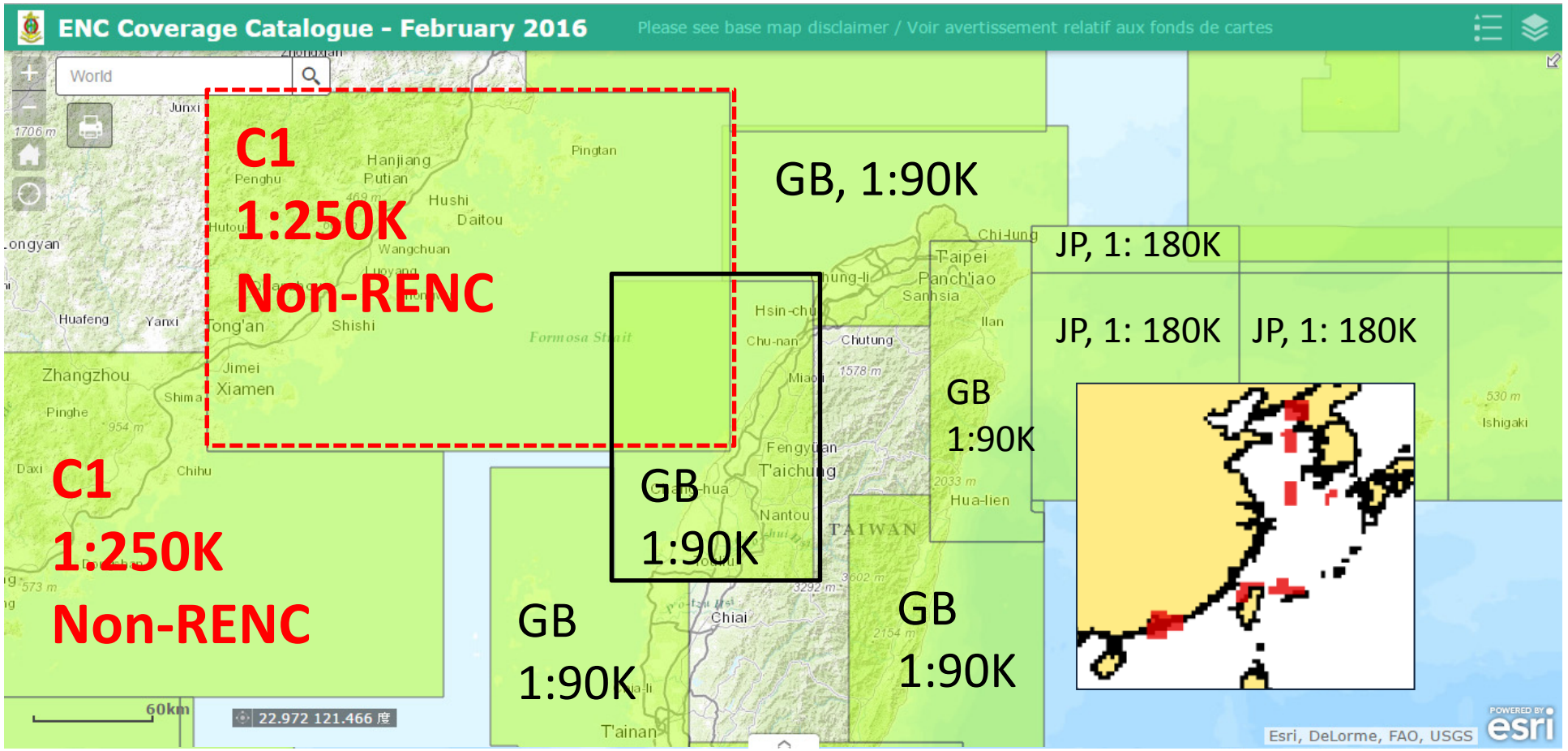
EA200001.000 ed2 by EAHC (2012)



M_NSYS: Navigational System of Marks EA200001.000 by EAHC (2006)



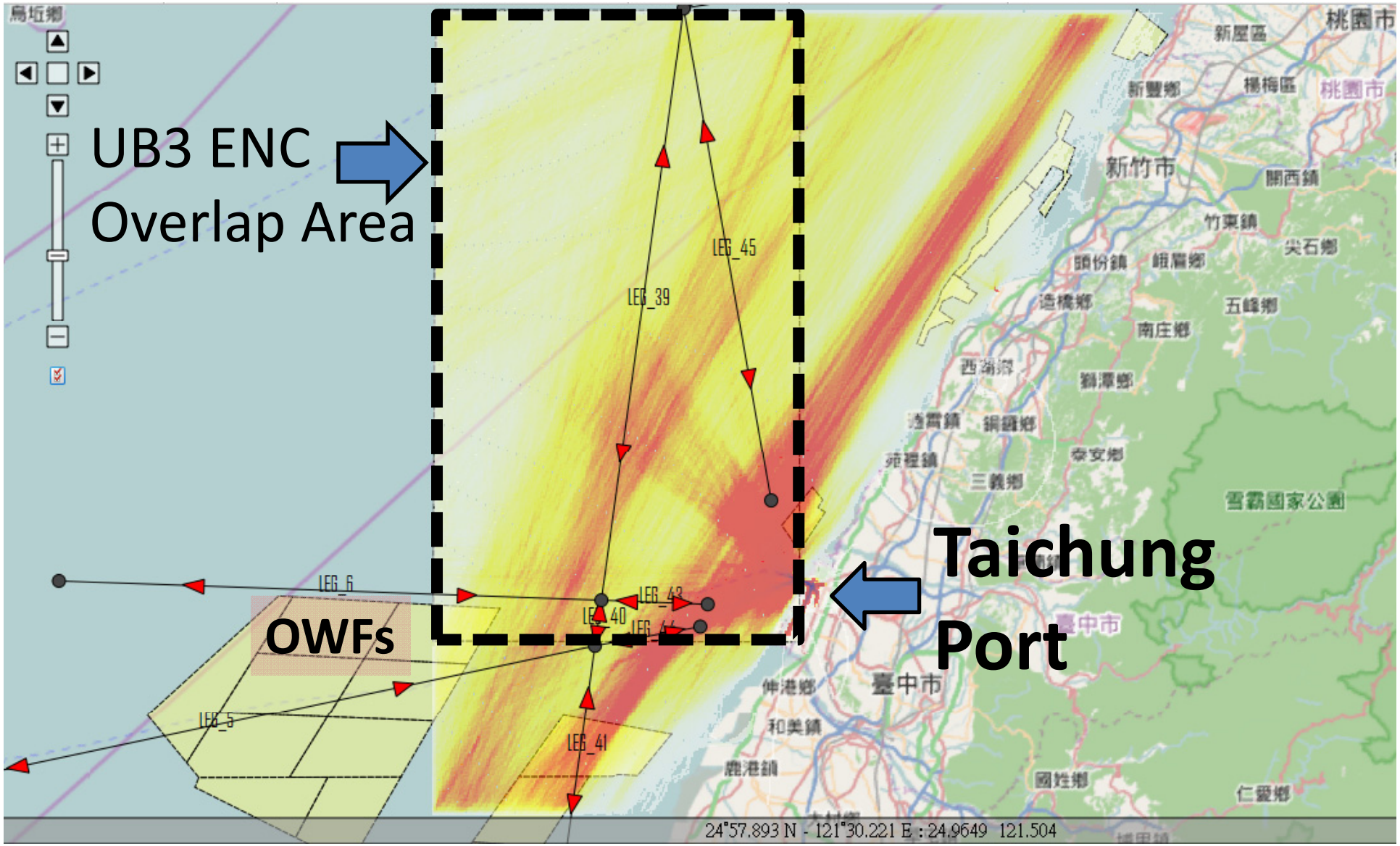
Overlaps in UB3
(source: IHO ENC coverage catalogue)



24.2N ~ 25N, 120E~120.5E

UB3 Overlap vs. AIS Traffic Density

Cross-Strait Direct Shipping Links & Potential Offshore Wind Farms



Taichung Port : ranked #50 (DNV,2008)

Cross-Strait traffic increasing since 2008

DET NORSKE VERITAS

Report No: 2008-0048 , rev. 01

TECHNICAL REPORT

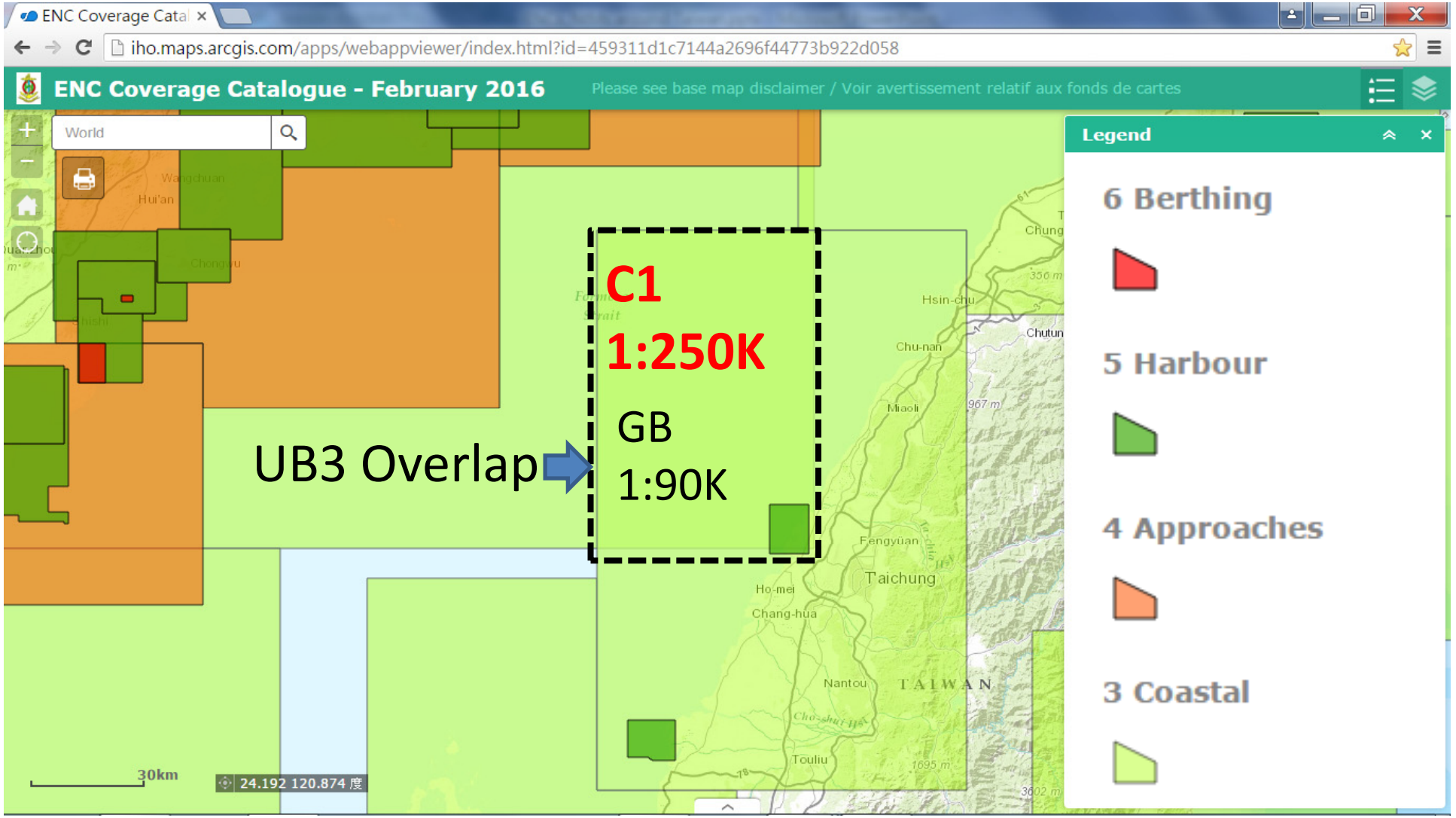
APPENDIX 1: MOST IMPORTANT PORTS WORLDWIDE

#	PORT	COUNTRY
1	Singapore	Singapore
2	Gibraltar	Gibraltar
3	Hong Kong	China
4	Istanbul	Turkey
	Fujairah	United Arab
5	Anchorage	Emirates
6	Rotterdam	Netherlands
7	Port Said	Egypt
8	Kaohsiung	Taiwan

#	PORT	COUNTRY
46	Ulsan	Republic of Korea
47	Newcastle	Australia
	Jebel Dhanna	United Arab
48	Termina	Emirates
49	Los Angeles	USA
50	Taichung	Taiwan
51	Durban	South Africa
52	Felixstowe	United Kingdom
53	Oakland	USA

Coverage of Taichung Port, listed

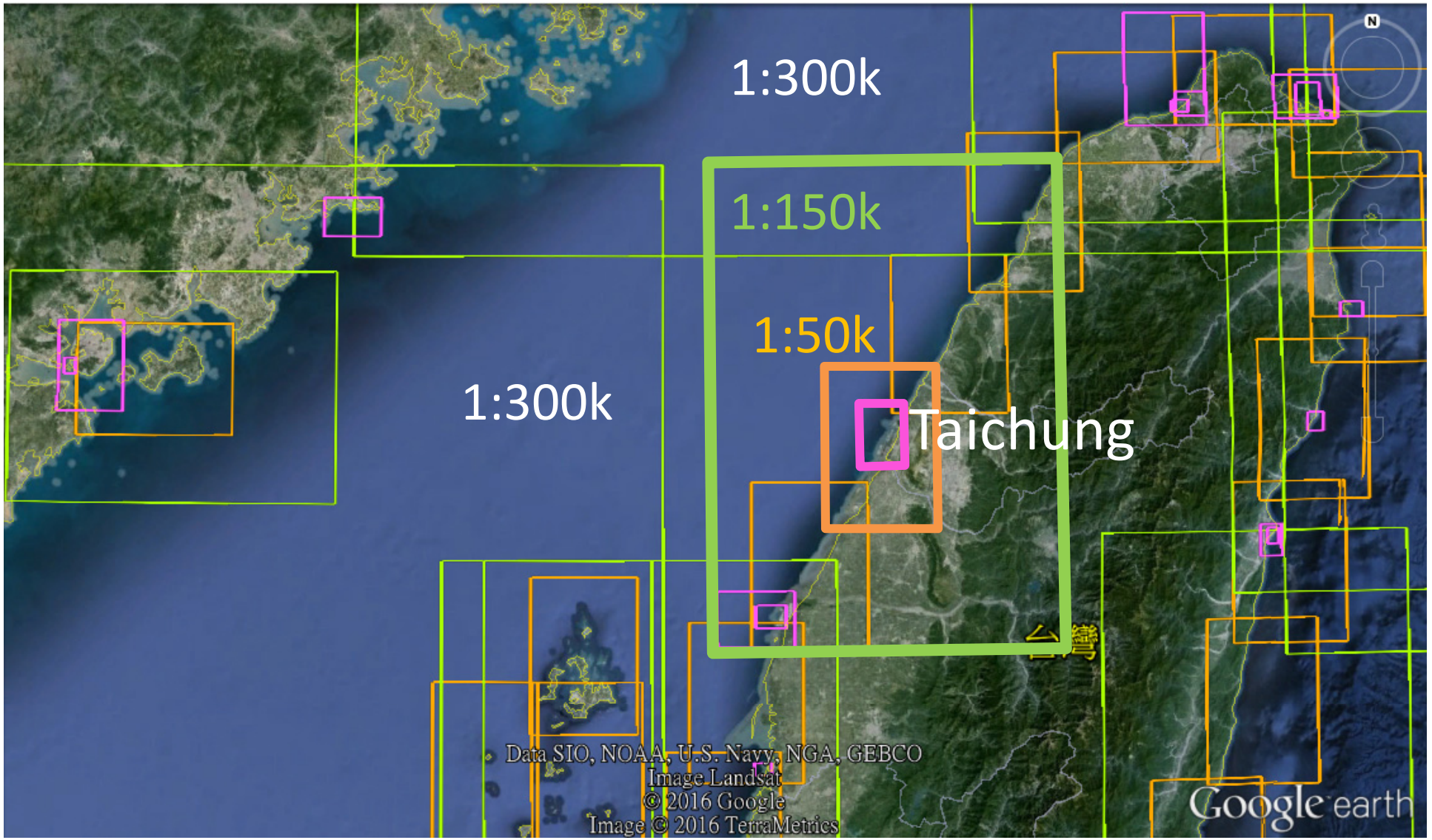
Coastal(GB, C1), Approach(x), Harbour(GB), Berthing(x)



Data Source of these “ENCs” Production & Updating

- No agreement or any official contact regarding source data provision or ENC production.
- ENC production (GB & C1)
  - Taiwanese paper charts and nautical publications
  - Are these enough for producing ENCs ?
- ENCs updates (according to UKHO NMs)
  - Taiwanese notices (collected from the website)
  - Taiwanese paper charts covering the same area
  - UKHO (& Hydro. Notes)
- No feedback (to Taiwan)

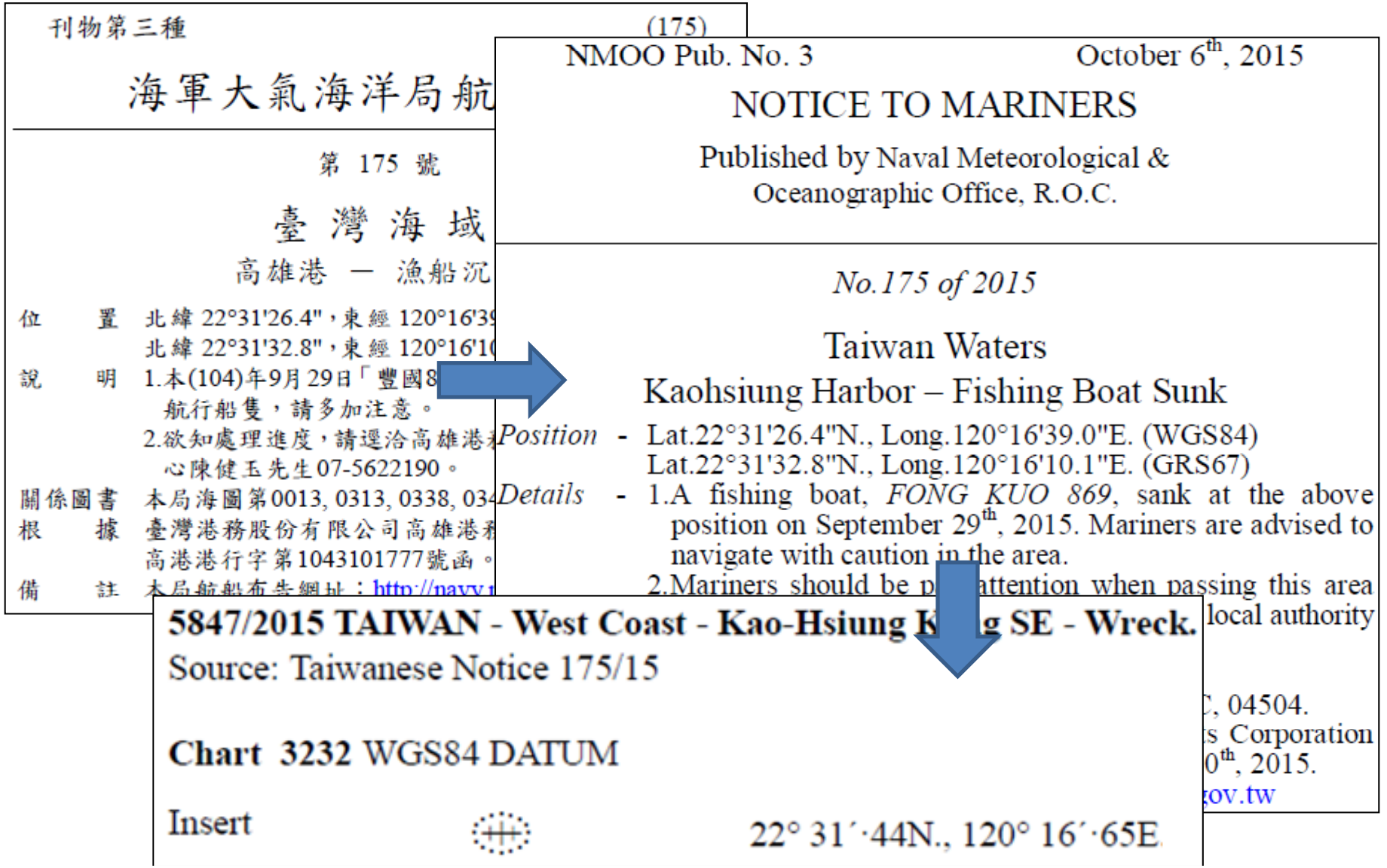
Taiwanese Paper Chart Catalogue



TW NMs → UKHO Chart Updates

- Delay (usually 1 month, paper chart update, 2015)
  - Kaohsiung RACON response code altered on Sep. 9
    - TW/Navy notified on Sep.14, published NM on Sep.17
    - UKHO published NM in Wk43(Oct. 22) / website (Oct.12)
  - Fishing vessel sank in anchorage area outside Kaohsiung in Sep.29
    - TW/Navy notified on Sep.30, published NM on Oct.6
    - UKHO published NM in Wk47(Nov. 19) / website (Nov.9)
- Wrong/Different Interpretations
  - Move the light and the racon or just the light ?
  - Many examples…..

Some causes: language and format



刊物第三種 (175)

海軍大氣海洋局航

第 175 號

臺灣海域

高雄港 — 漁船沉

位　置　北緯 22°31'26.4"，東經 120°16'39
　　北緯 22°31'32.8"，東經 120°16'1(
說　明　1.本(104)年9月29日「豐國8
　　航行船隻，請多加注意。
　　2.欲知處理進度，請逕洽高雄港務
　　心陳健玉先生07-5622190。
關係圖書　本局海圖第0013, 0313, 0338, 03
根　據　臺灣港務股份有限公司高雄港務
　　高港港行字第1043101777號函。
備　註　本局航船布告網址：http://navy.

NMOO Pub. No. 3　October 6th, 2015

NOTICE TO MARINERS

Published by Naval Meteorological & Oceanographic Office, R.O.C.

No.175 of 2015

Taiwan Waters

Kaohsiung Harbor – Fishing Boat Sunk

Position - Lat.22°31'26.4"N., Long.120°16'39.0"E. (WGS84)
Lat.22°31'32.8"N., Long.120°16'10.1"E. (GRS67)

Details - 1.A fishing boat, *FONG KUO 869*, sank at the above position on September 29th, 2015. Mariners are advised to navigate with caution in the area.
2.Mariners should be p attention when passing this area

local authority

, 04504.
s Corporation
0th, 2015.
gov.tw

5847/2015 TAIWAN - West Coast - Kao-Hsiung K g SE - Wreck.

Source: Taiwanese Notice 175/15

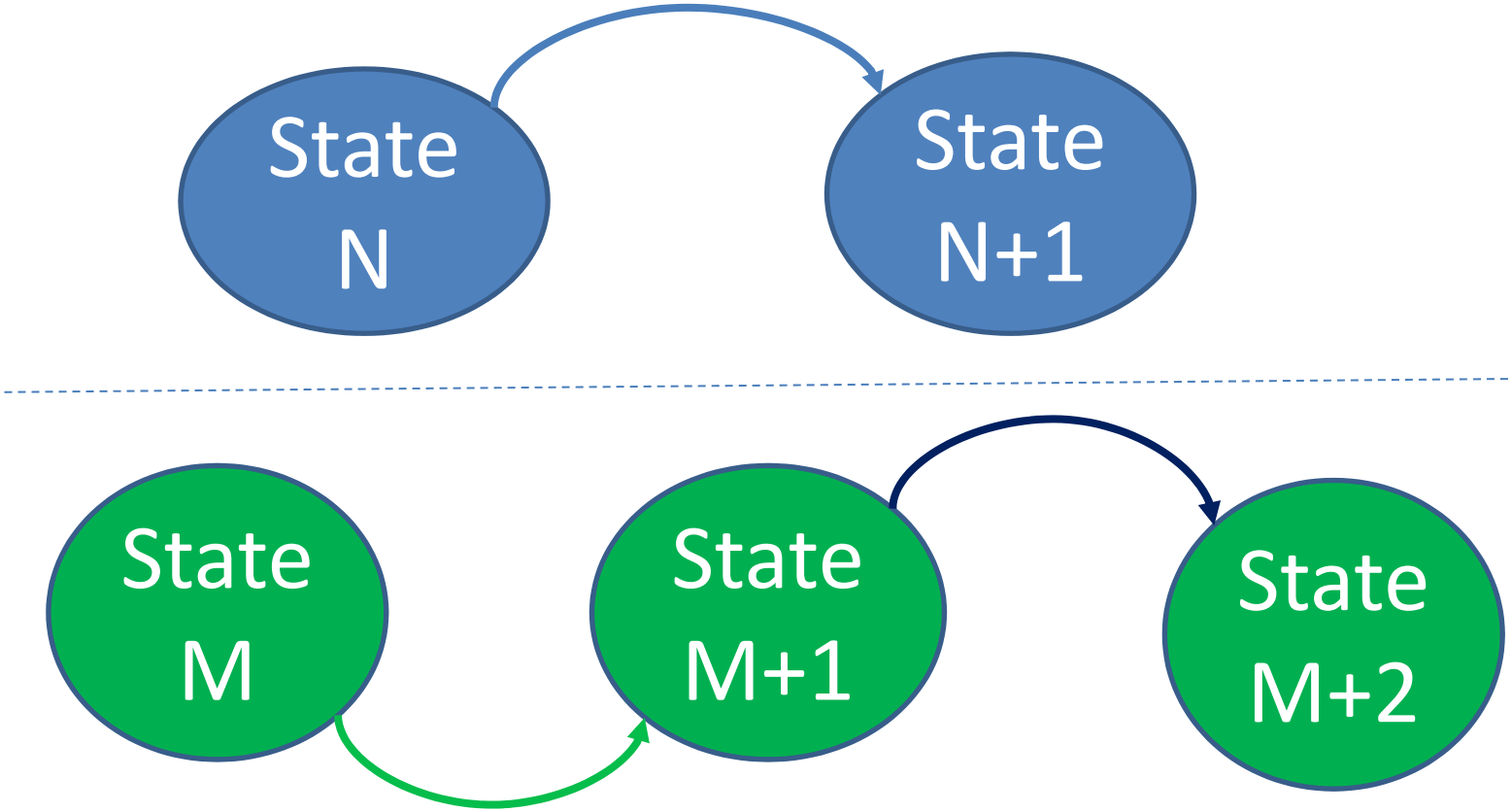
Chart 3232 WGS84 DATUM

Insert

22° 31´·44N., 120° 16´·65E

Long Term Effects ?

- Different versions of the real situation….
  - different states / triggers to state transitions



IMO NAV54/14, 2008

- Development of Carriage Requirements for ECDIS

- DNV's report: "ECDIS and ENC Coverage.."

In addition to these regions where IHB have indicated the ENC coverage, other countries are also known to have extensive coverage of ENC even if not included in the dataset received from IHB. For example, Taiwan has extensive ENC coverage according to the website of Taiwan ENC Center[4]. The coverage of usage bands 3 – 6 around Taiwan according to Taiwan ENC Center is illustrated in Figure 8, and as can be seen, the complete Taiwanese coastline is covered.

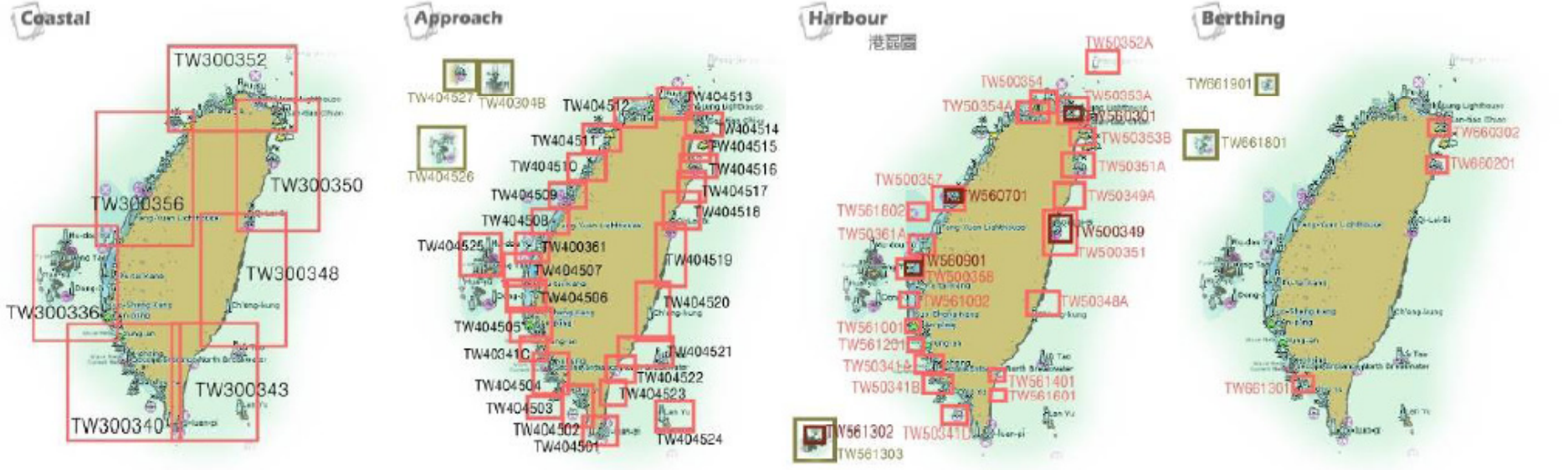
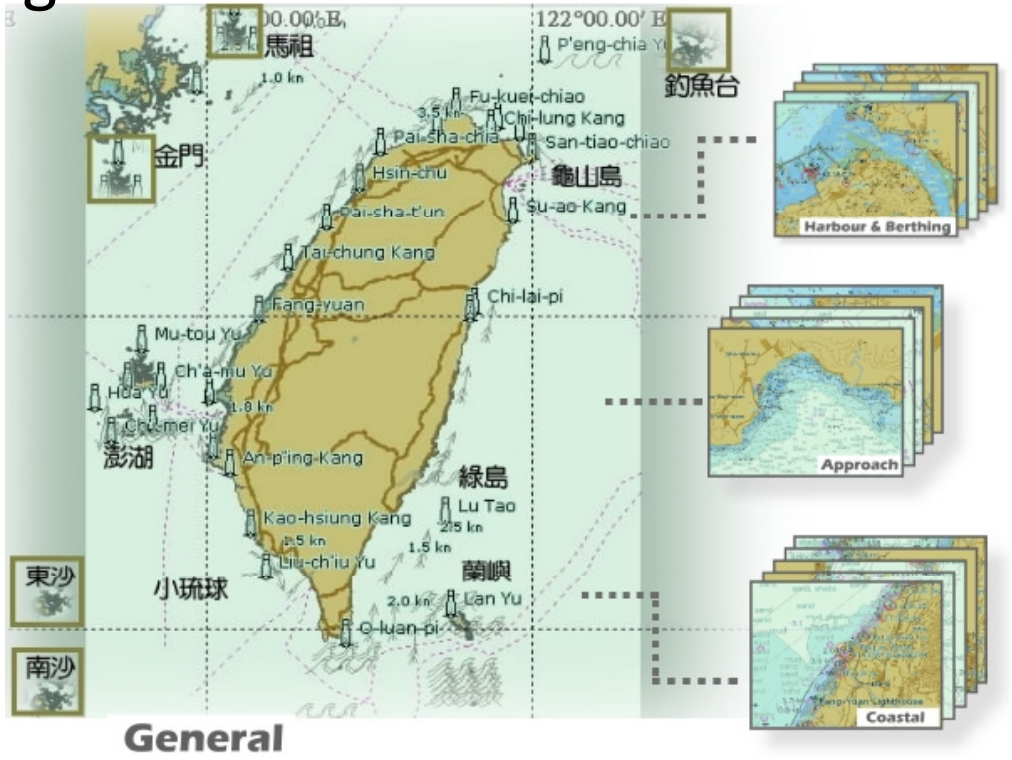


Figure 8: ENC coverage for Taiwan, from left: Coastal, Approach, Harbour and Berthing

1st Generation Taiwanese ENCs

- Producer Code: TW/1435, not listed in S-62
  - produced by 2008 (digitized from paper charts)
  - added national language attributes
  - added grid-schemed ENC datasets



Official vs. Unofficial

(source: http://www.admiralty.co.uk/Pages/FAQ-Industry-Facts.aspx)

- 'Official' is shorthand for 'compliant with SOLAS carriage requirements‘
  - “issued officially by or on the authority of a Government, authorized Hydrographic Office or other relevant government institution and is designed to meet the requirements of marine navigation (Ch V, Reg. 2.2)”.
- Private sector produced charts are not official,
  - because they do not meet the definition of nautical charts in SOLAS (not authorized, even if licensed)

Some Facts

- ENCs produced by GB & C1 are not accepted as “official” in Taiwan waters→ SOLAS vessels have to use paper charts for navigation
  - Indicated in the case of OR5 accident (The NT$ 1.5 billion 3-year-old RV hit underwater rocks and sank on 2014/10/10, using AVCS)
- IEC61174 Ed.4 no longer use producer codes to test the symbolization of non-official data.
- Domestic ECDIS users often failed when trying to load TW ENCs (due to S-62 & S-63).

2nd Generation Taiwanese ENCs

- Using extensive new hydro. surveys
- Expanded ENC coverage (beyond paper charts)
- Responding to user needs and requests
  - Domestic as well as international ones
  - SOLAS & non-SOLAS
- Accelerated, more determined and better funded
  - OR5 accident
- Organization issues will be resolved (this year)
- Will be available to international users via RENC

Regarding the Boundaries

- Participation of Taiwan and TW ENCs will help
  - to resolve the issues of overlaps and gaps
  - to improve the quality and consistency
  - to enhance safety of navigation
- There are already some lines, agreements, and cooperation between Taiwan and the neighbors
  - Security, search and rescue, shipping, fisheries

Summary

- ENCs and NMs for waters around Taiwan provide good test cases for the WEND principle and guidelines.
- Safety concerns keep increasing
  - more traffic and activities, less navigation space
    - Offshore wind farms, etc.
- ENC overlaps may be inevitable
  - Need to serve domestic users, and other purposes

Recommendations

- Take the facts into account
  - Minimize unnecessary political “terms” which pose barriers to WEND
- Investigate the feasibility of using new metadata objects (attributes & updating) to manage overlaps and SOLAS compliance
  - UB0 ?
  - Require producers to split feature objects at the specified grid or cartographic-boundaries ?
  - Facilitate transition to next-generation ENCs