DQWG7-04.2B

Development of New Data Quality Representation in ENCs

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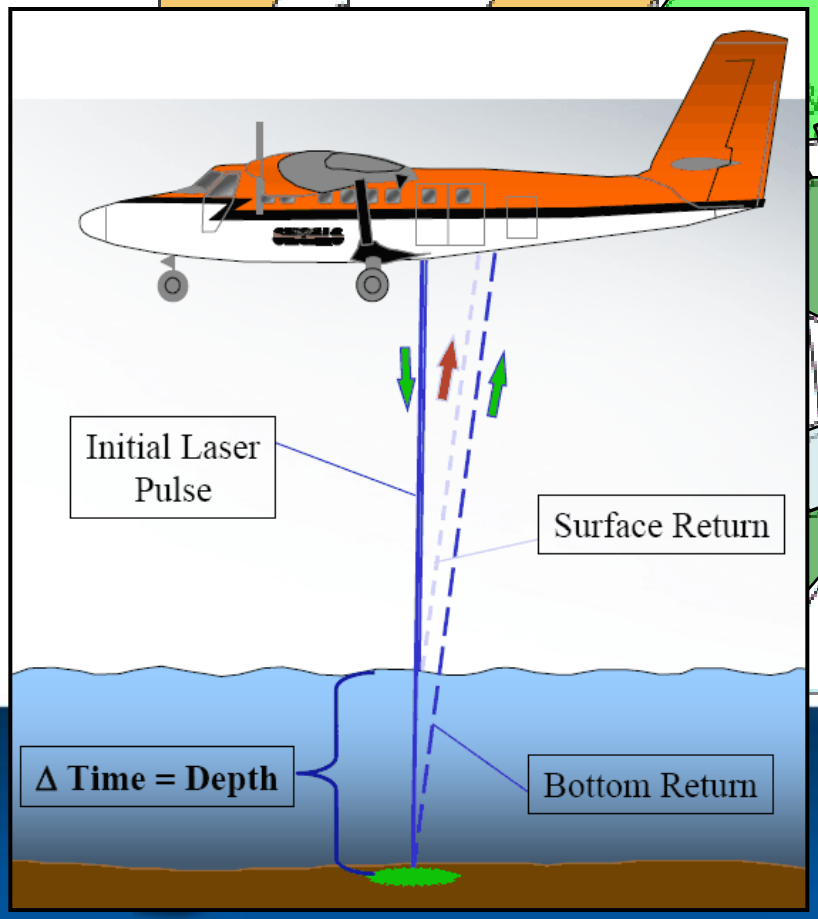
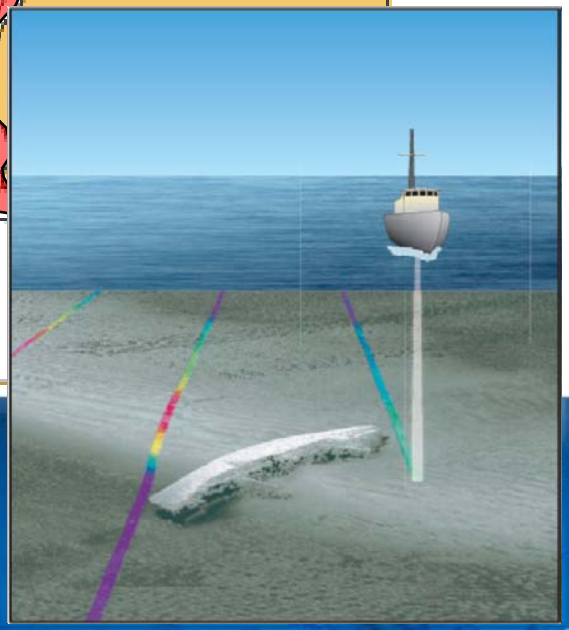
HYDROGRAPHIC OFFICE

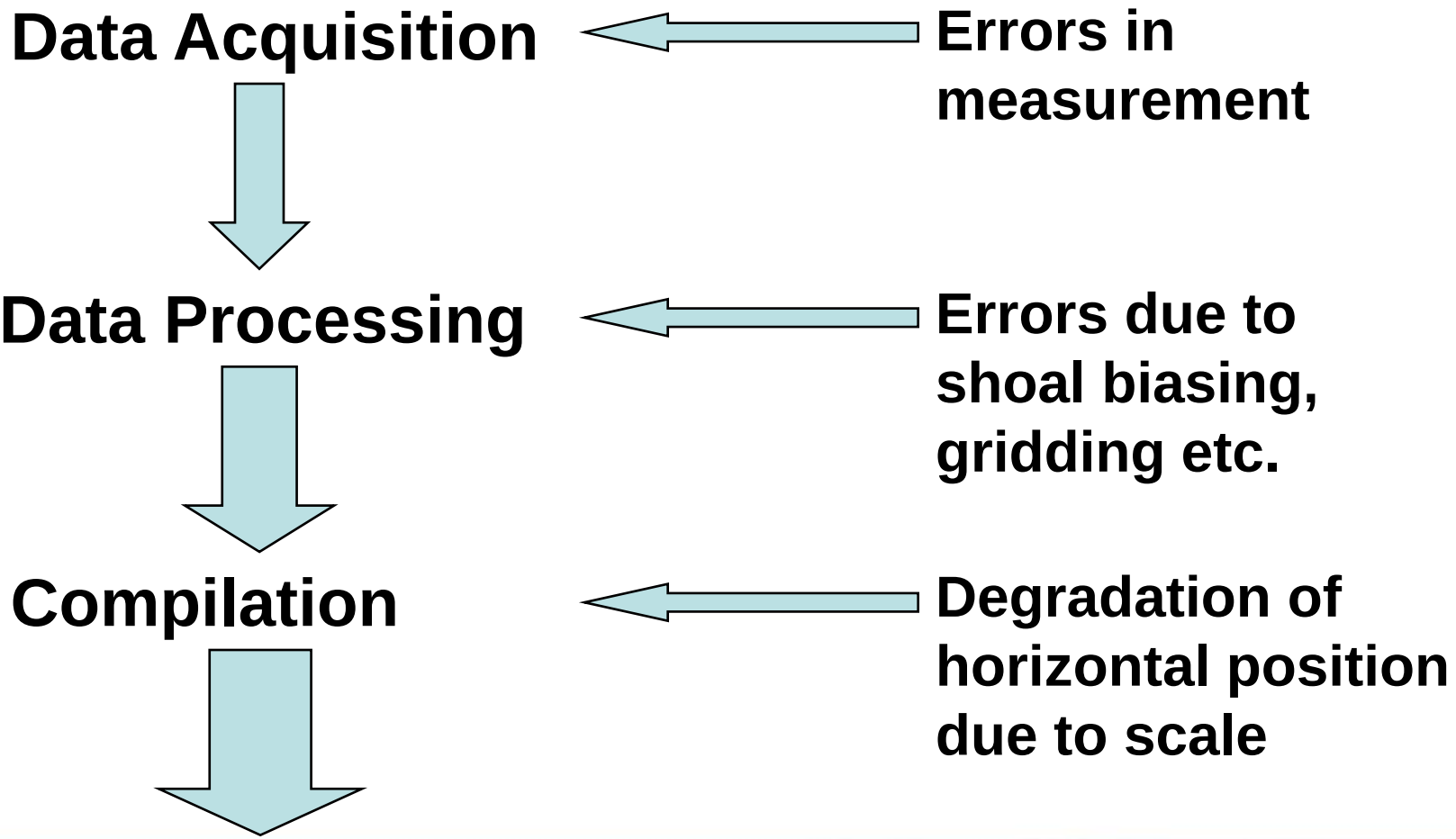
Introduction

20 Areas of Maintained Depth





Introduction

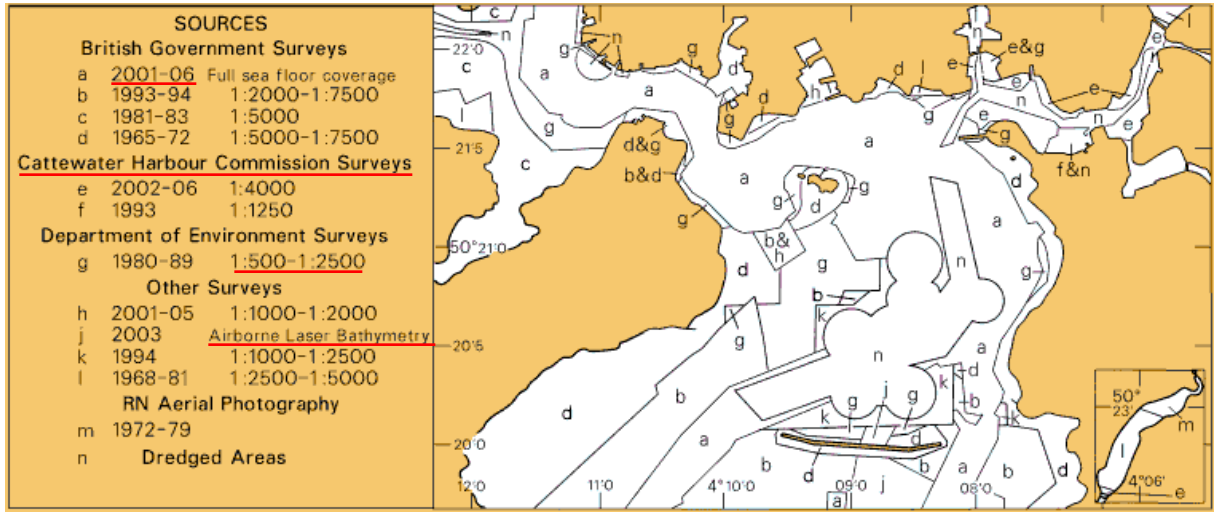


Introduction

Paper Charts – Source Diagram

Quality indicators

- Survey Date
- Survey Authority
- Scale
- Acquisition method

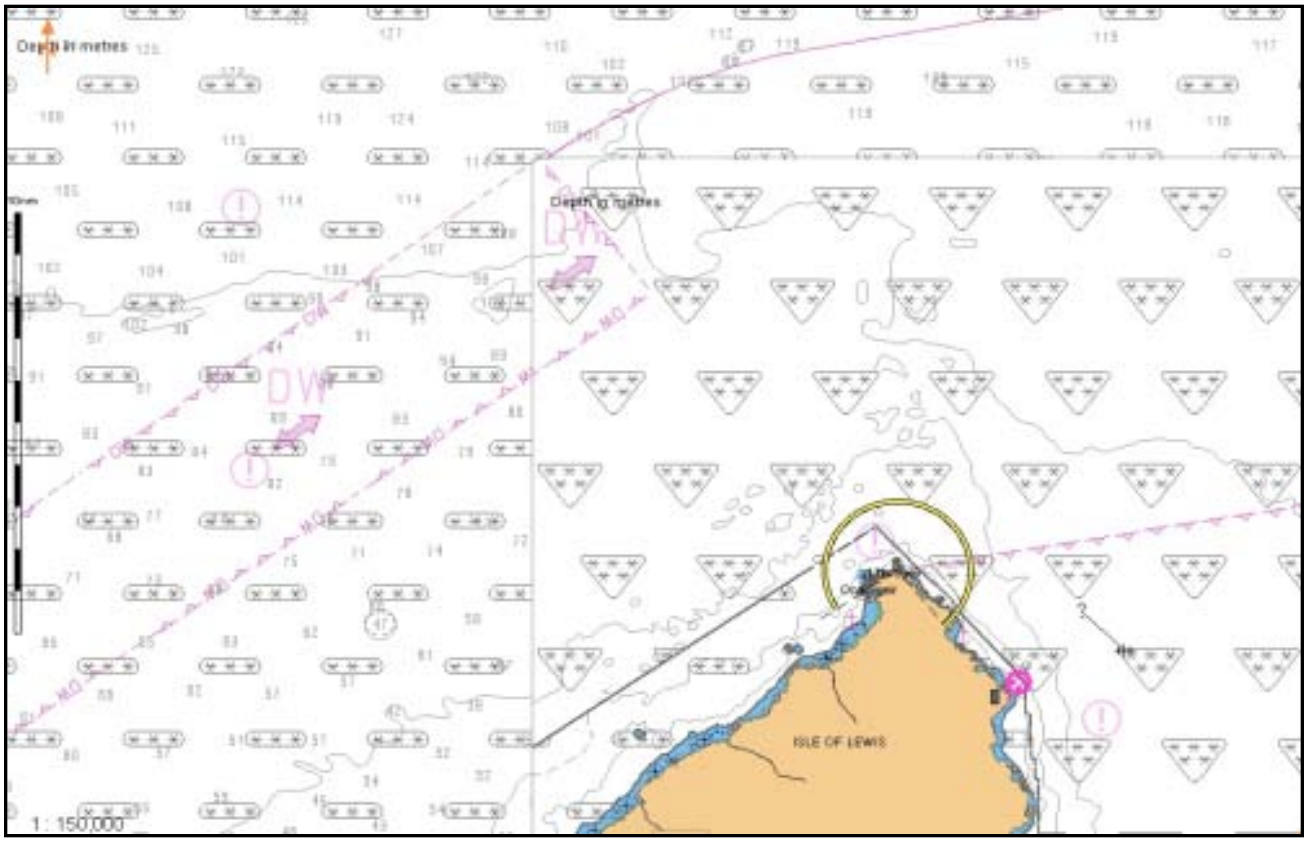


Source data diagram for BA chart 1697 Plymouth Sound

What is the difference between a 2001 British Government survey and a 1993 British Government survey?

Introduction

Electronic Navigational Charts (ENCs) – CATZOC Categories



Introduction

Electronic Navigational Charts (ENCs) – CATZOC Categories

ZOC	Position Accuracy	Depth Accuracy	Seafloor Coverage
A1	± 5m + 5% depth	0.5m + 1% depth	Full area search undertaken. Significant seafloor features detected and measured.
A2	± 20m	± 1m + 2% depth	Full area search undertaken. Significant seafloor features detected and measured.
B	± 50m	± 1m + 2% depth	Full area search not achieved; uncharted features, hazardous to surface navigation are not expected but may exist.
C	± 500m	2m +5% of depth	Full area search not achieved, depth anomalies may be expected.
D	Worse than ZOC C	Worse than ZOC C	Full area search not achieved, large depth anomalies may be expected.
U	Unassessed – The quality of the bathymetric data has yet to be assessed.		

Introduction

IHO Data Quality Working Group, Re-established in 2007 to answer the question:

Are the current methods of representing data quality good enough?

Overview

- DQWG background research
- Current focus of the DQWG
- DQWG – USM collaboration

DQWG Background Research

Three main research activities:

- Investigation into what S-57 data quality attributes are populated by ENC producing IHO member states
- Investigation into how ENC producing IHO member states populate CATZOC
- Study into the Mariner's current perception of data quality

DQWG Background Research

Mariners Questionnaire

2011 DQWG study into the current perception of data quality

Aims of the study:

- Gain informed understanding of how professional mariners use data quality information
- Understand what can be done to improve current methods
- Identify preferences for data quality representation and develop a specification for new methods

DQWG Background Research

Mariners Questionnaire

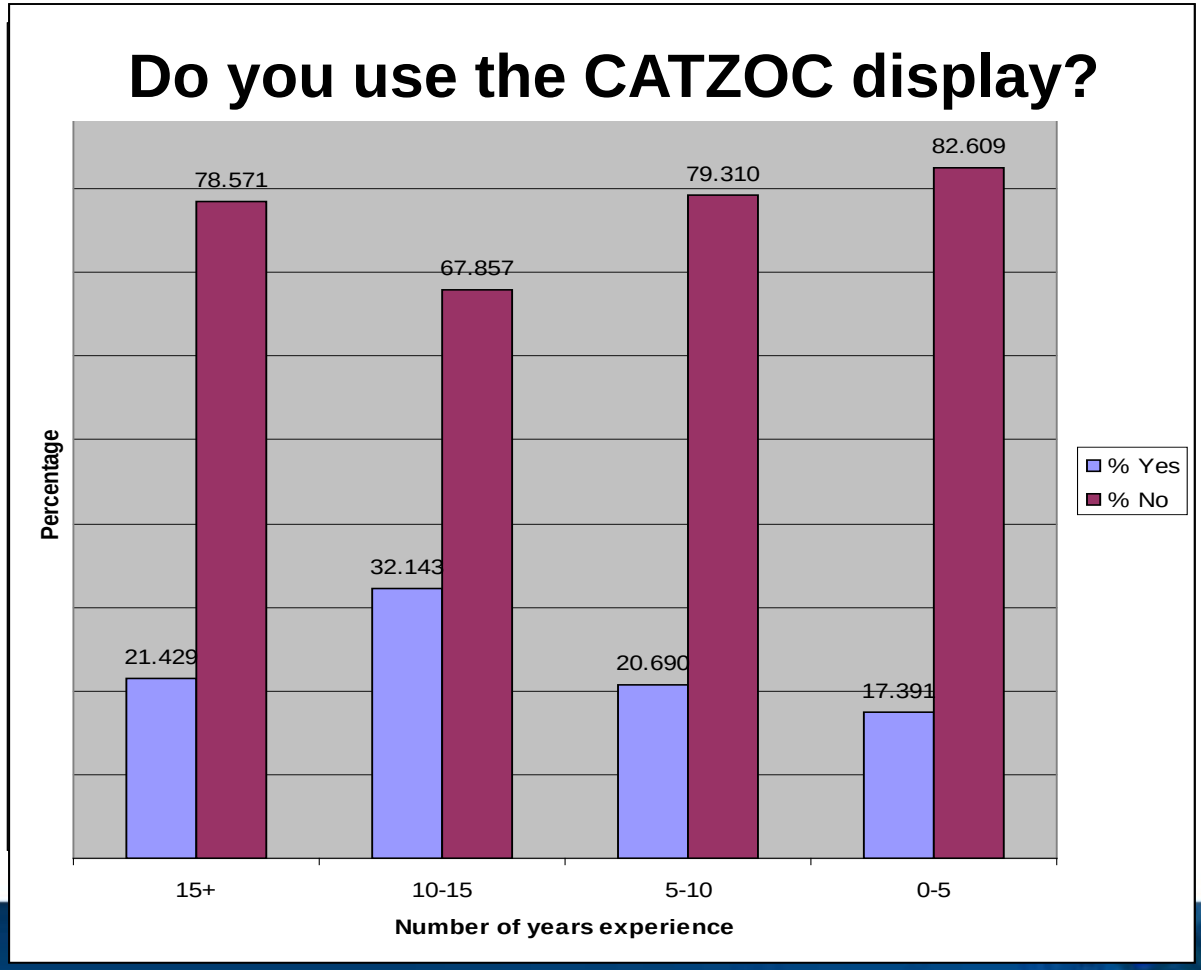
Questionnaire Sections:

1. Demographic information
2. Existing methods of representing data quality
3. Wider data quality issues
4. Future methods of representing data quality

- Mixed methods approach
- In total 60 multi part questions
- Analysis is based upon 574 responses

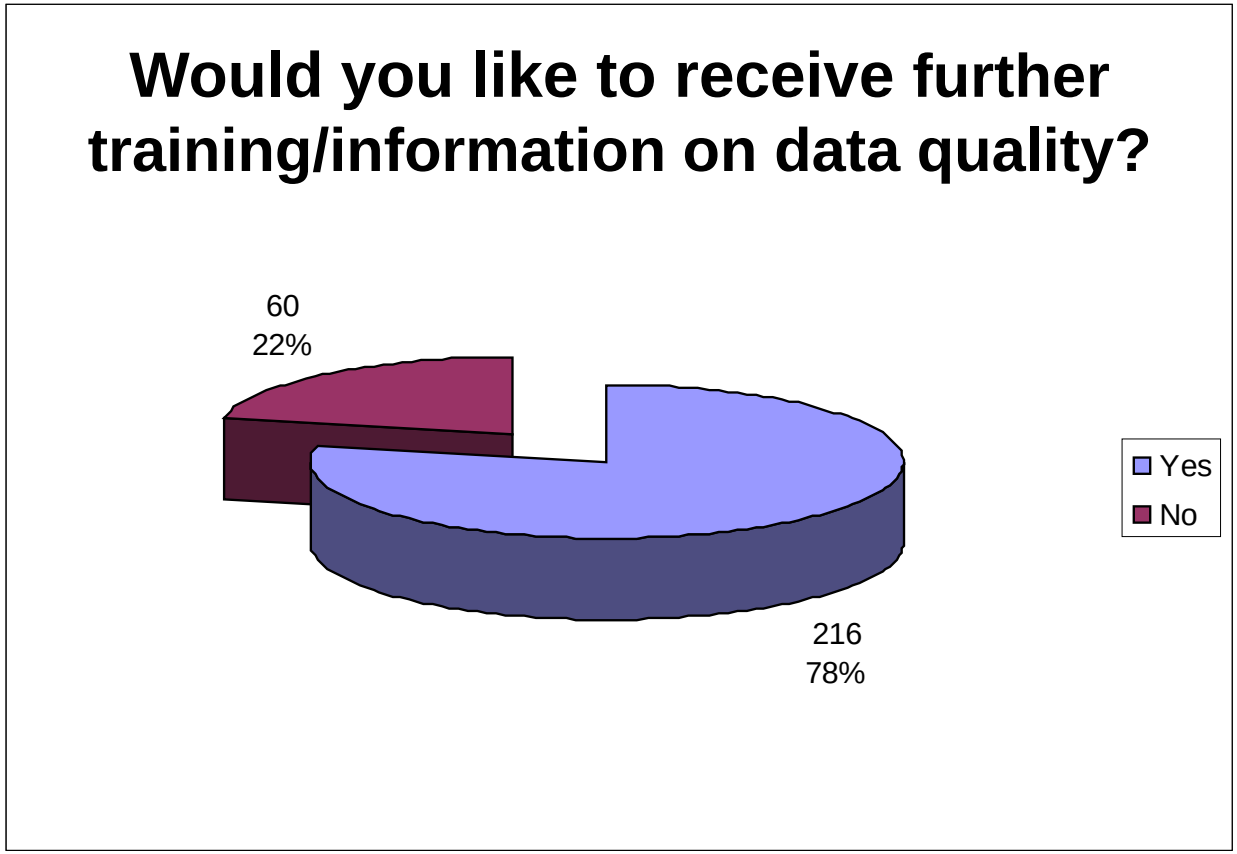
DQWG Background Research

Mariners Questionnaire – Key Results



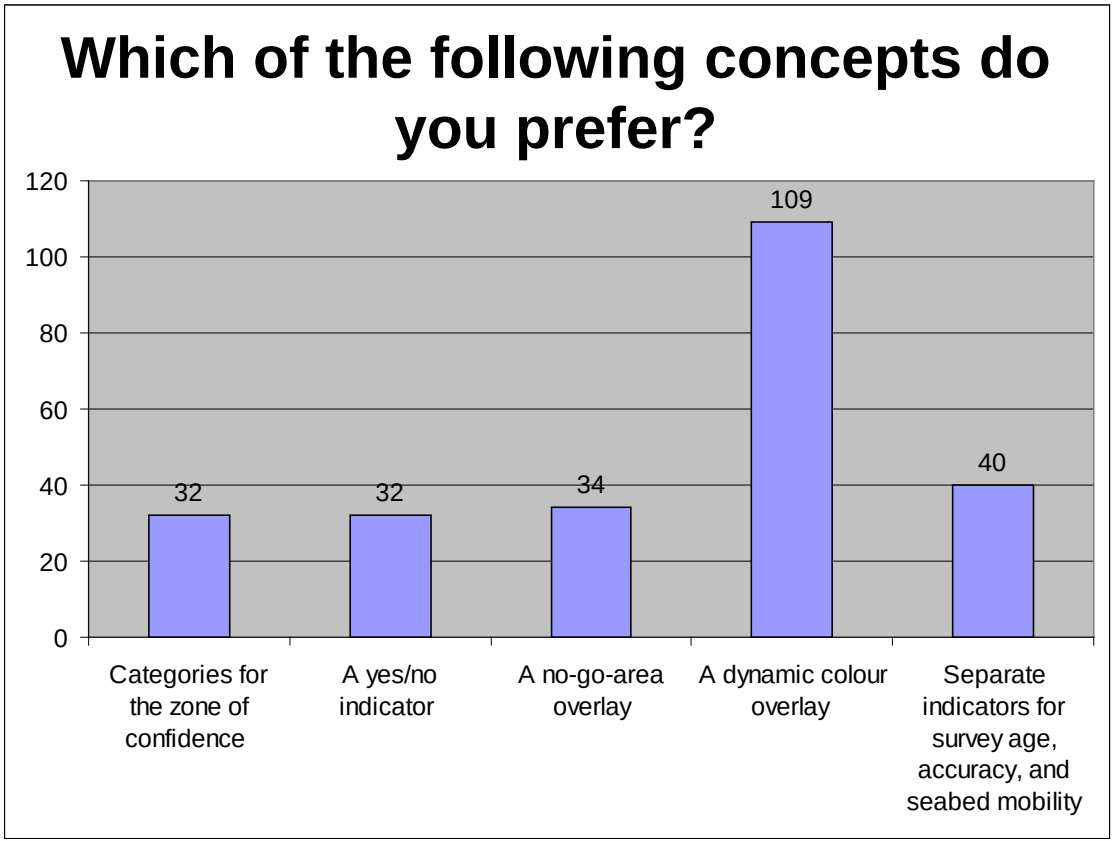
DQWG Background Research

Mariners Questionnaire – Key Results



DQWG Background Research

Mariners Questionnaire – Key Results



DQWG Background Research

Mariners Questionnaire – Specification

1. All data quality information should be discoverable

2. A minimum of the constituent elements of CATZOC should be encoded in ENCs for depth areas

3. Temporal degradation of data quality attribute should be indicated

DQWG Background Research

Mariners Questionnaire – Specification

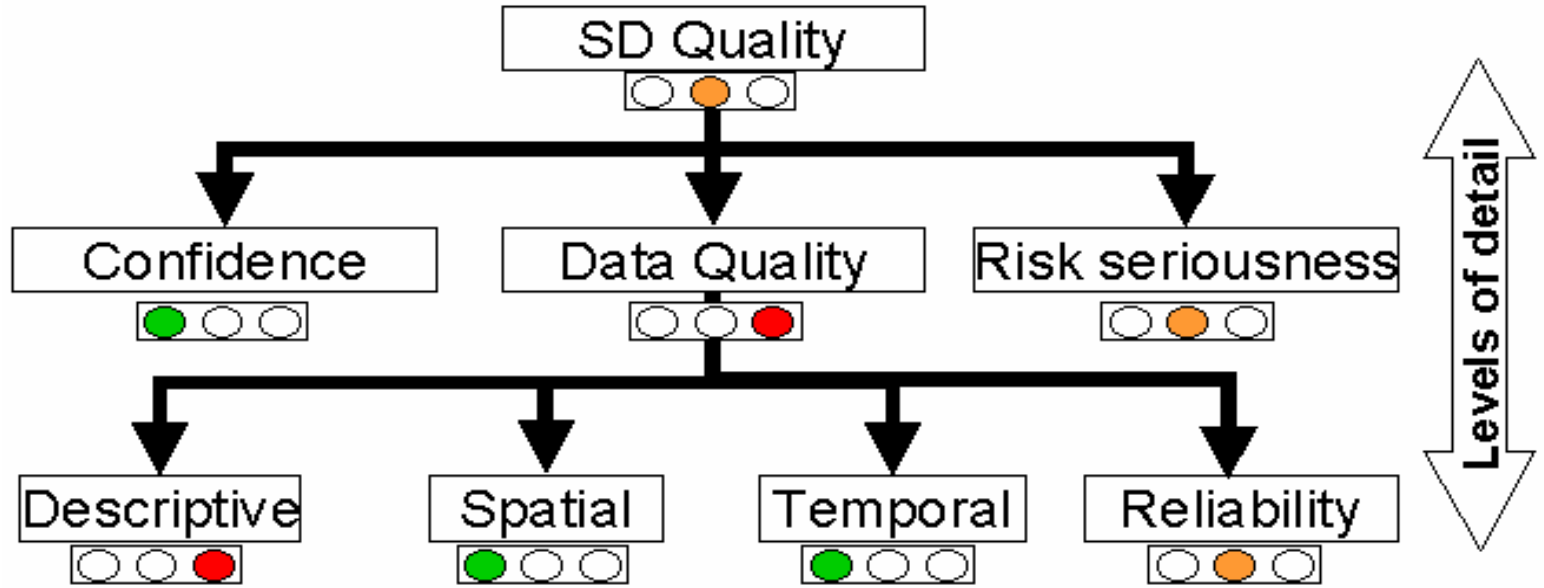
4. New representation methods should be able to accommodate dynamic inputs from new developments such as dynamic tides, UKC and vessel specific parameters

5. Visualisation should take advantage of the mariner's preference for a on demand colour overlay

6. Any new representation method should be accompanied by an appropriate education strategy

DQWG Background Research

Hierarchical Data Quality Representation



Example of Spatial Data Quality Indicators hierarchy [Devillers et al. 2002]

Current Work of the DQWG

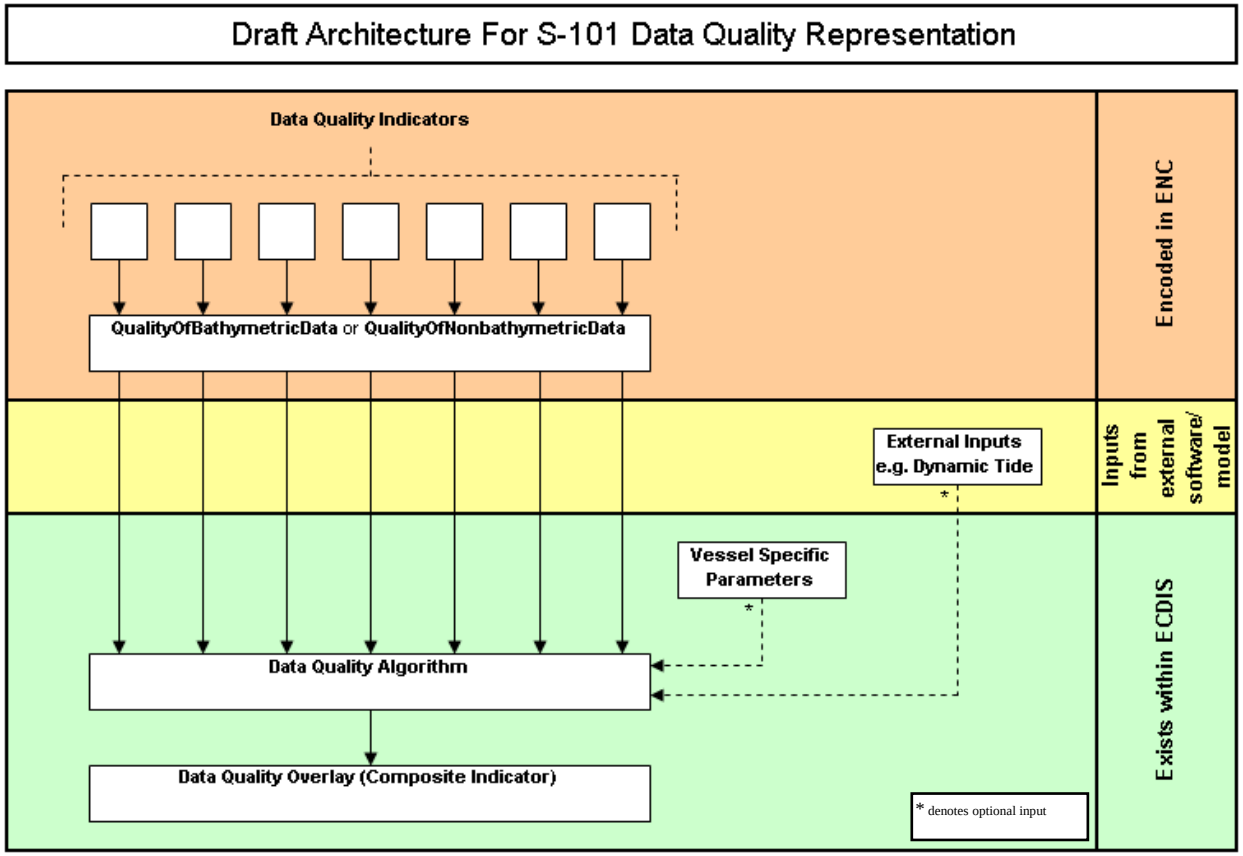
Analysis of CATZOC

DQWG have come to the following conclusions:

- Hides information from the mariner
- Difficult to understand
- No consistency in population
- Has very poor symbology attached
- No allowance for temporal degradation of data quality
- Not vessel specific

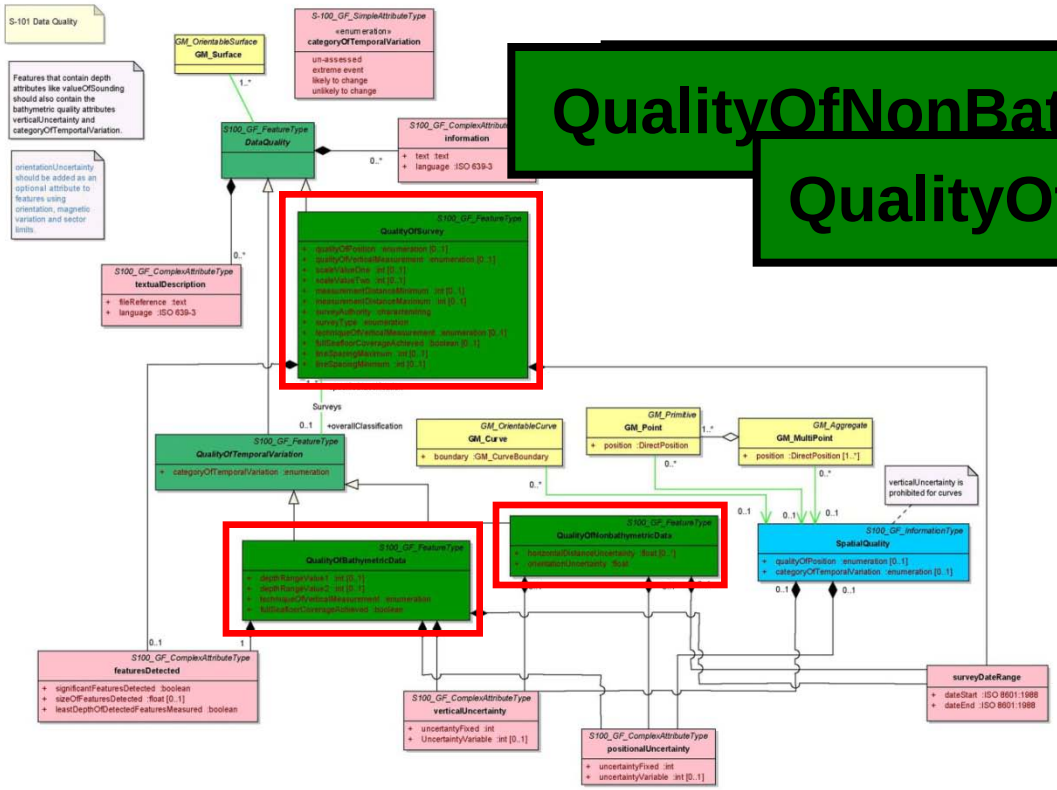
Current Work of the DQWG

Ideal Future ENC Data Quality Structure



Current Work of the DQWG

S-101 ENC Data Quality Structure – UML Model



Current Work of the DQWG

S-101 ENC Data Quality Structure – Benefits

Benefits of the new structure include:

- Intuitive naming – CamelCase
- Hierarchical structure
- More flexibility for describing data quality
- Allows for a flexible approach for encoding
- Sufficient detail to drive intelligent visualisation

DQWG – USM Collaboration

Research Scope

DQWG, together with USM, identified the following research aim;

Aim:

Build upon the results of the Mariners' questionnaire to develop an optimum method of representing data quality to ENC users

DQWG – USM Collaboration

USM Initial Insights

USM have offered the following initial insights:

- The purpose of nautical charts is to *facilitate informed decision-making* by mariners and other chart users**.**
- It is **NOT** the purpose of charts and ancillary information complementing charts to replace the mariners' and other end users as decision-makers.
- There is an opportunity to continue a dialogue with mariners about quality components immediately, using S-57 compliant ENCs.

DQWG – USM Collaboration

USM Research Stage 1

Research collaboration has been broken into two stages

Stage 1 of USM's research will focus on:

- Developing a data quality indicator test bed based on an S-57 Marine Information Object

USM Research Stage 2

Stage 2 of USM's research will focus on:

- Developing more sophisticated means of representing data quality

DQWG – USM Collaboration

Expected Outcomes

The expected outcomes of the research are:

- Test the viability of a hierarchical data quality structure
- User response to **Red Amber Green** indicators (both as individual and composite indicators)
- Establish the optimum representation method for ENC source data quality

Thank You for Listening