

RESULTS ANTICIPATE of DEVELOPMENT RiS IN UKRAINE

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We are all and everything that surrounds us, is in movement i.e. in a dynamic condition. Therefore, all considered and studied processes should be considered in dynamics condition. However, dynamic processes can be "significant" and "insignificant" depending on the scale of the space and time where and when they occur.



We introduce the concept of "scale factor" to determine the degree of significance of the impact of dynamic processes in research. In order to explain why we needed to introduce this concept, let's try to answer a philosophical question. What primary is matter or consciousness? The answer is simple and both exist "always" (as for time) and "everywhere" (as for space), because both are "infinite". This leads to we have apparent proofs that mathematical regularity in different scales are displayed differently or not work at all with the approach to (+) or (-) infinity. The purpose of this work is to conduct research in the field of modeling of dynamic processes of the environment during the movement of the vessel, as well as to determine the qualitative characteristics of "significance" when using the proposed 5th element of the spatial dimension "**scale factor**".



Modern technologies allow us to derive an image of the vessel in dynamics way in interaction with the environment, taking into account the selected parameter "scale factor".

In determining the "significant" scale will be based on the parameters of the object of study, as well as the choice of "sufficient" amount of time required for this scale. These are the geometric dimensions of the vessel, sediment, deadweight, displacement, the area of interaction with the elements of the environment (wind, wave, current, depth, etc.) and the time interval at which you can set the characteristic patterns. In this paper we analyze the existing models of the environment in dynamics and try to find patterns of impact on a moving ship in this environment.

According to the principle of construction of mathematical models are divided into analytical and simulation. In analytical models, the processes occurring in the environment can be represented as functional dependencies, which are used:

- equations;
- approximation problems;
- optimization problem.

In the simulation by preliminary measurements, which are the initial data, it is possible to simulate the dynamics of the process at a certain period of time, but the prediction of the dynamics is very difficult.

DIFERENT SCALE OF TIME IN THIS MODELS

chart dynamic
model consist
from

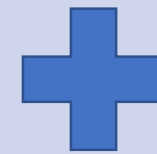
CDM

In real time

Sea/river bottom
dynamic model
& Sea/river
surface dynamic
model

S/R-BDM

per month



S/R-SDM

per minutes

Task 1.

Navier-Stokes is main equation for task 1.

Thermocapillary Marangoni effect, thermocapillary convection, Benard-Marangoni convection Investigation of the nonlinear Korteweg-de-Vries (KdV), Kuramoto-Sivashinsky equations (KS), Burgers, etc. evolution of the free surface of a liquid

Differential equations of fluid motion

The integral of Euler's equations of motion for a steady flow is the Bernoulli equation

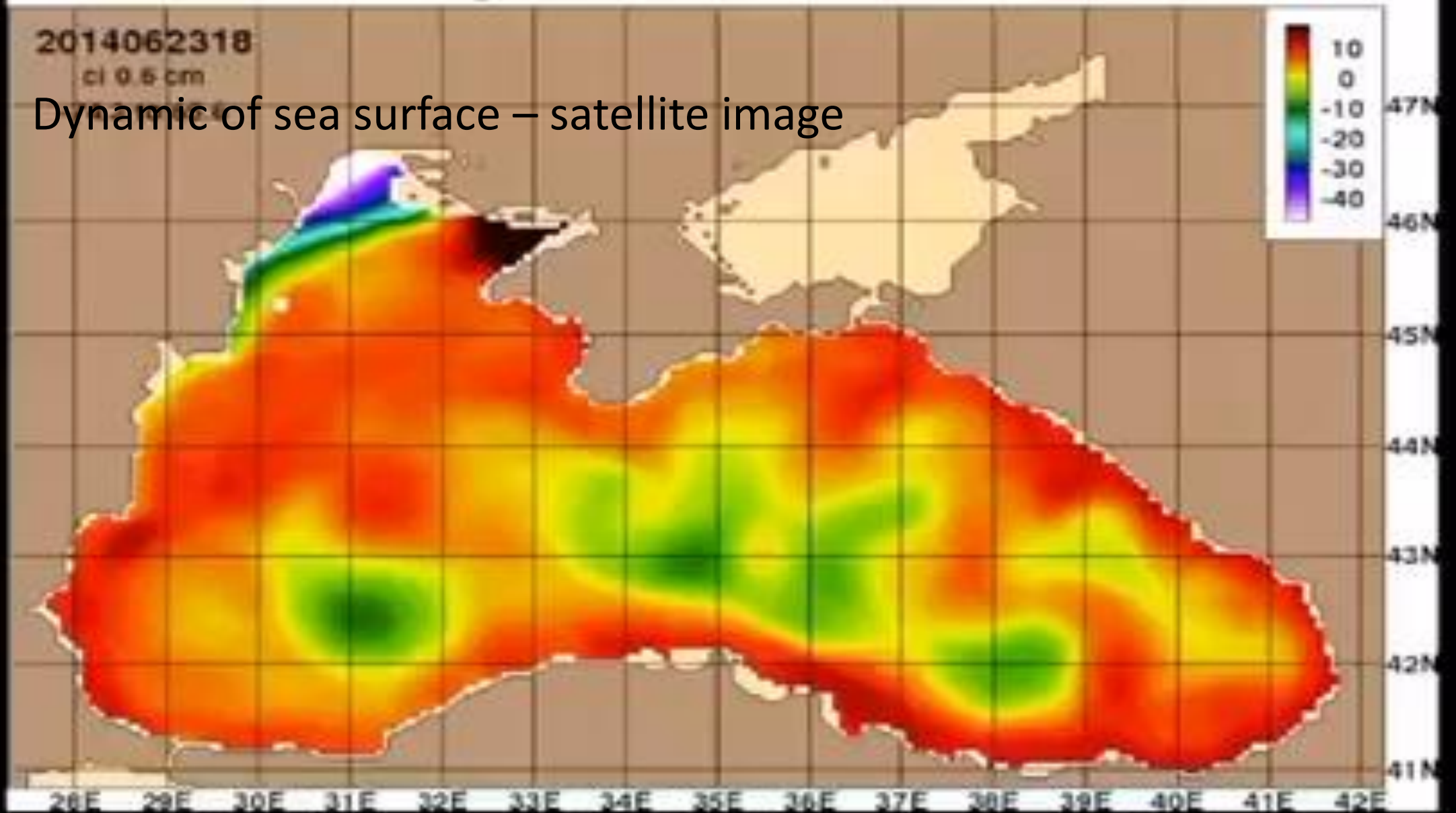
Frouda Criterion, Euler Criterion, Reynolds criterion

sea surf. height Jun 27, 2014 00Z [91.1H]

2014062318

cl 0.6 cm

Dynamic of sea surface – satellite image

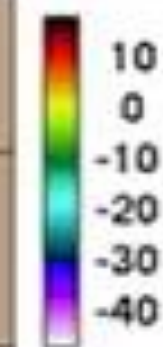


sea surf. height Jun 27, 2014 00Z [91.1H]

2014062318

cl 0.6 cm

-74.3 10 65.6



47N

46N

45N

44N

43N

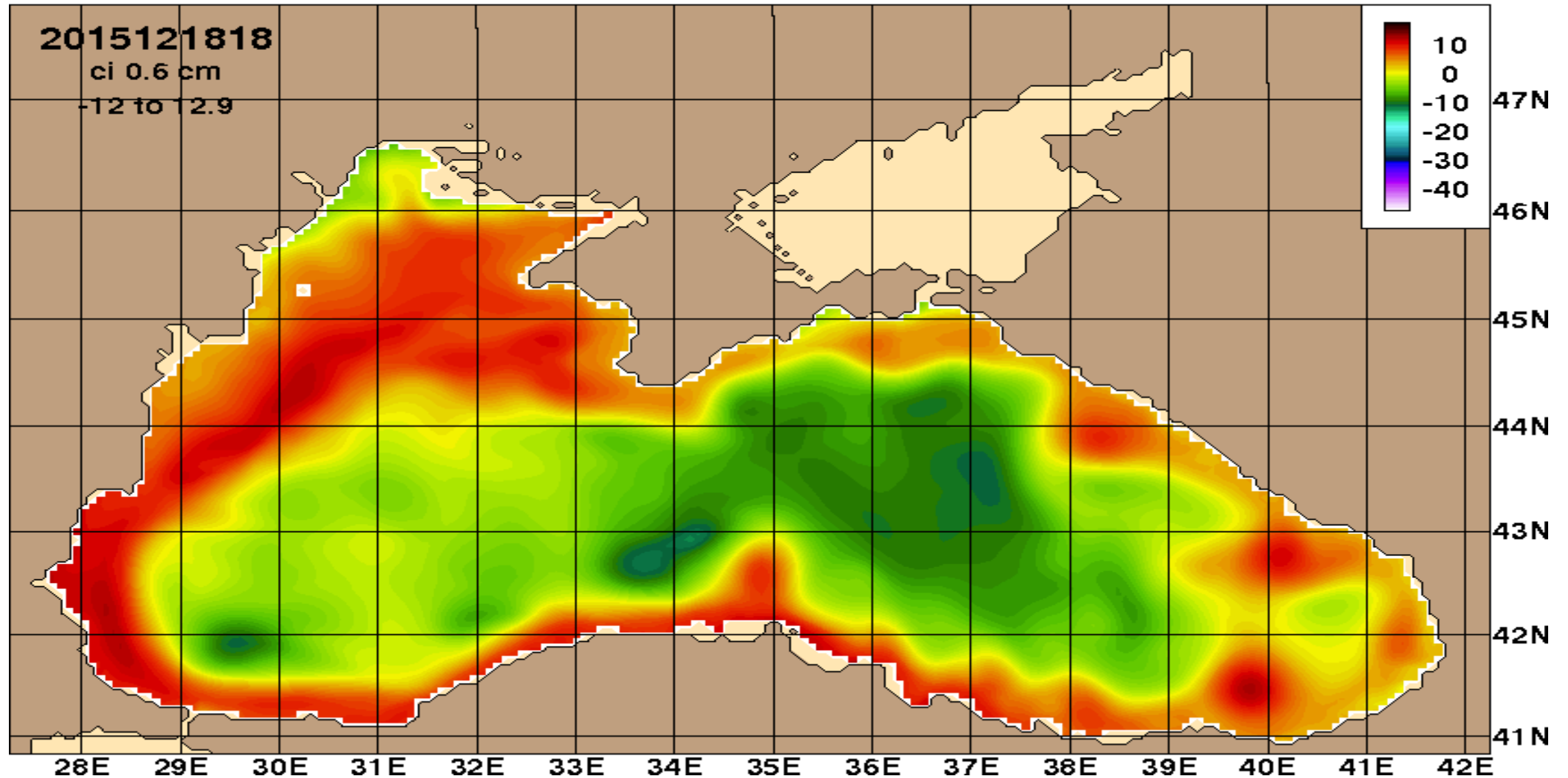
42N

41N

28E 29E 30E 31E 32E 33E 34E 35E 36E 37E 38E 39E 40E 41E 42E

Reference surface in dynamic

sea surf. height Dec 15, 2015 00Z [91.1H]



Task 2

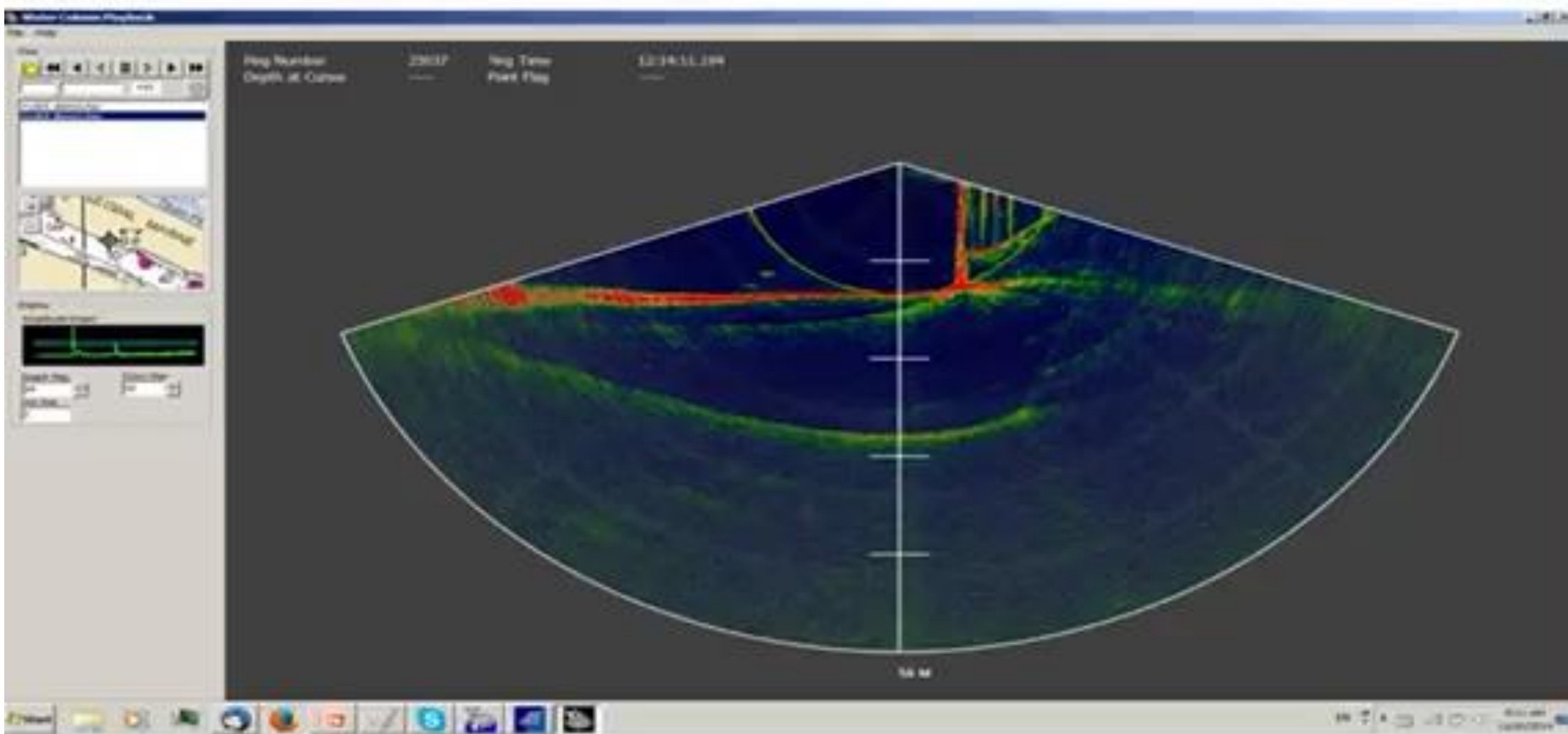
Kinematic Model, Hypothetic Model

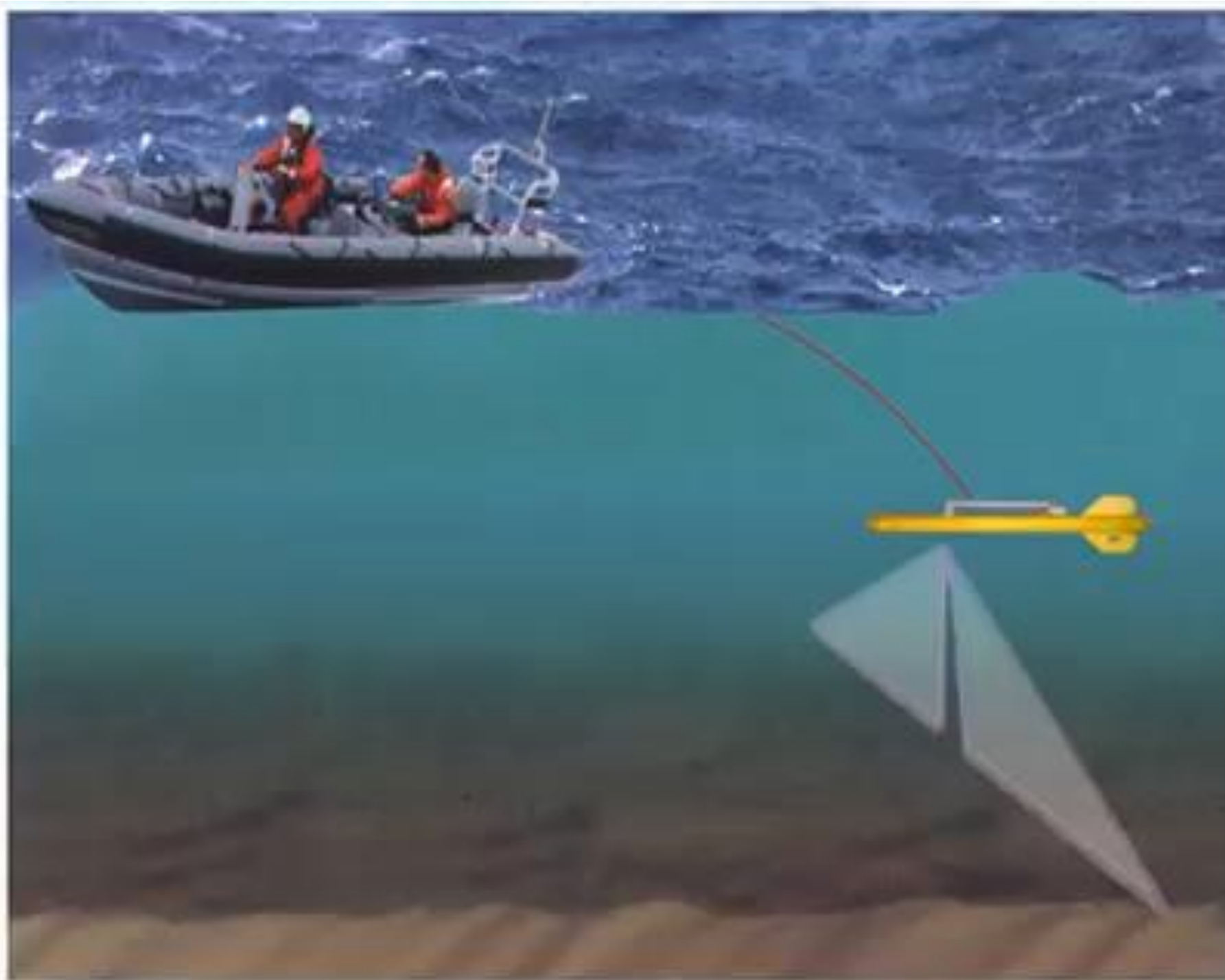
D - the model is deterministic; there is no (more precisely, it does not take into account)

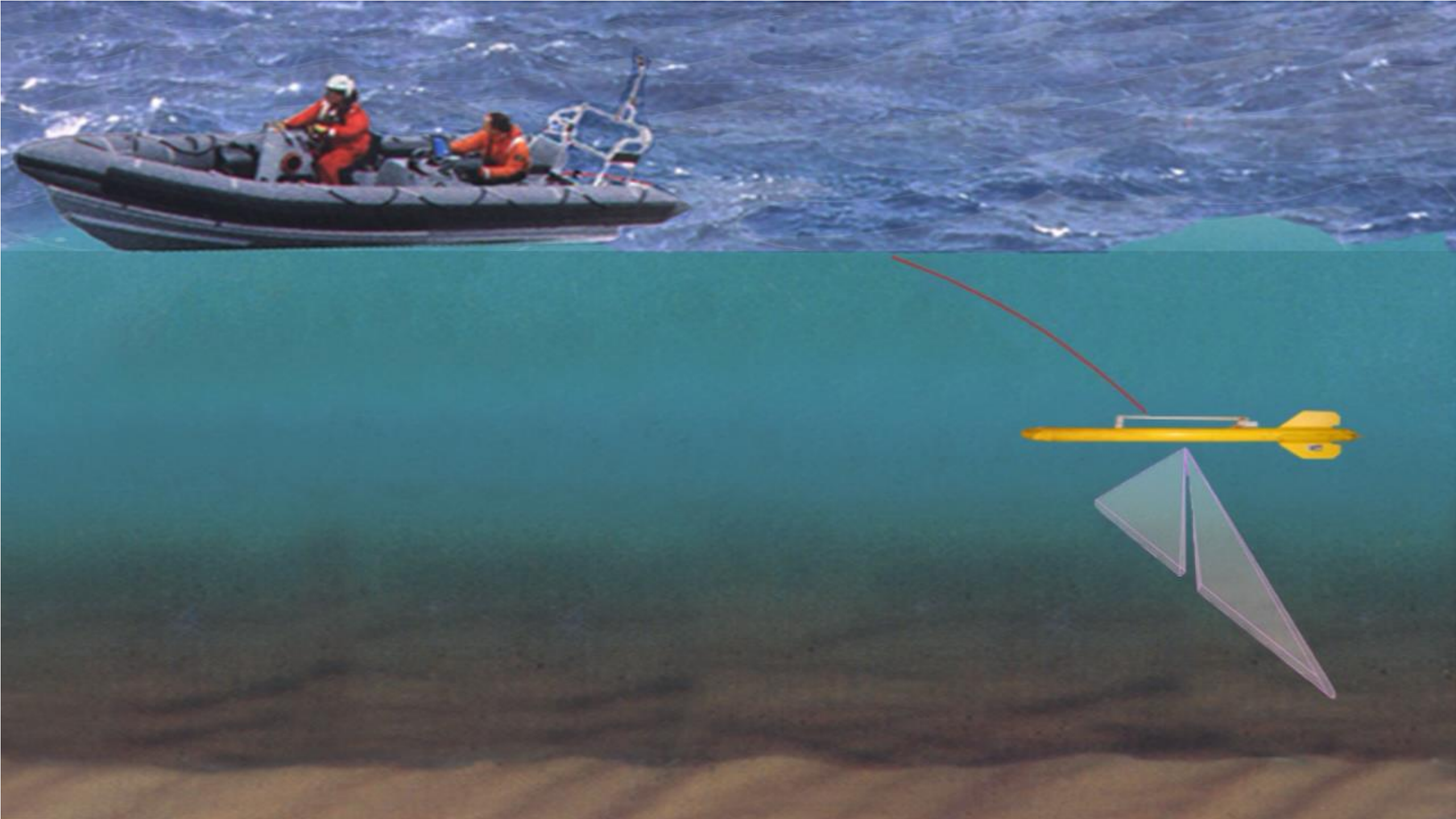
the influence of random processes.

H - model is continuous, information and parameters are continuous.

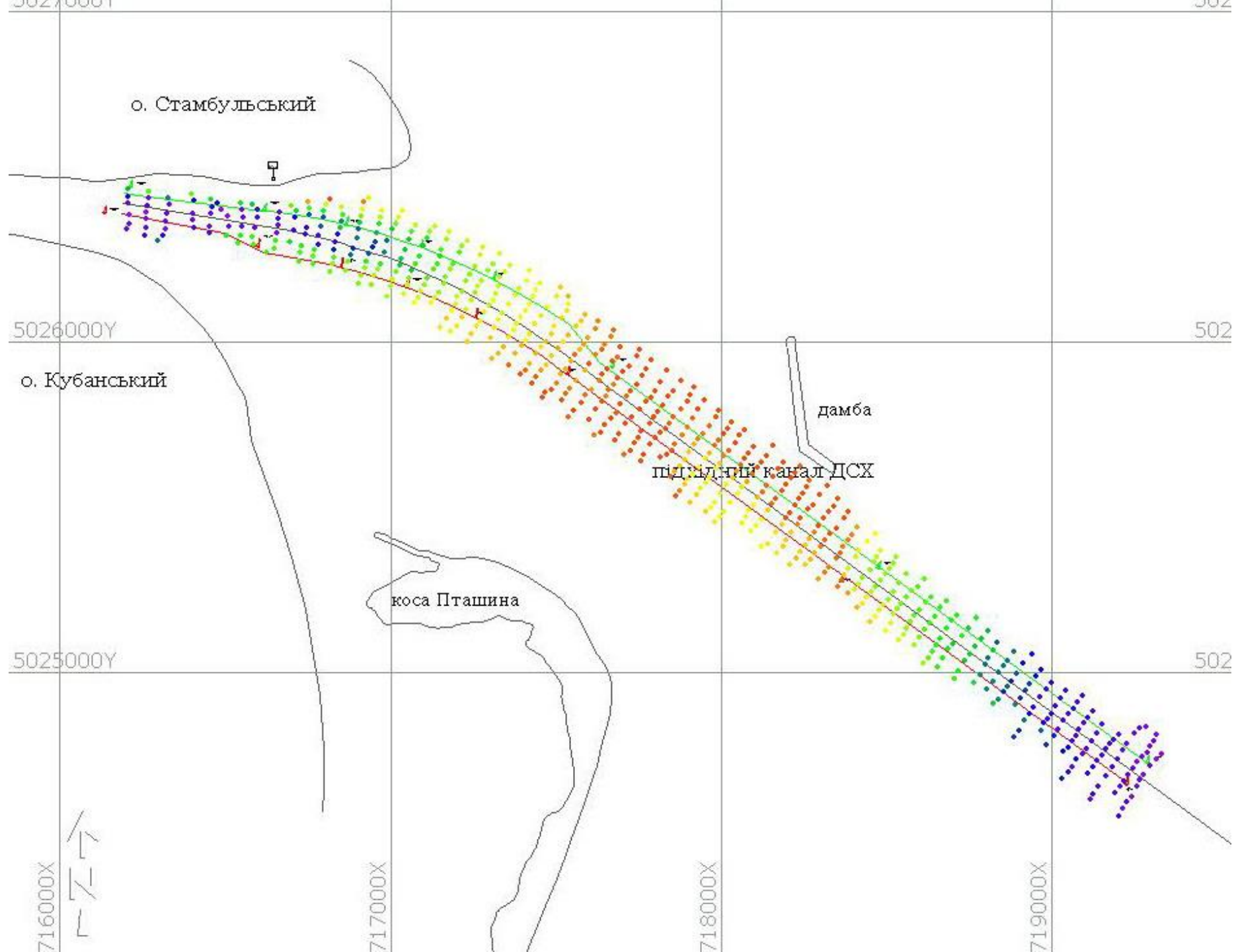
A - is an analytical model, the functioning of the model is described as equations (linear, non-linear, systems of equations, differential and integral equations)













МОНІТОРИНГ З ПОВІТРЯ



Загрузка...



Вспомогательная информация

045°24'34"N
028°15'57"E

1 km

45°24'N

45°23'50"N

28°16'E

28°16'50"E

28°17'E

28°17'50"E

28°18'E

28°18'50"E

28°19'E

45°24'N

45°23'50"N



wreck

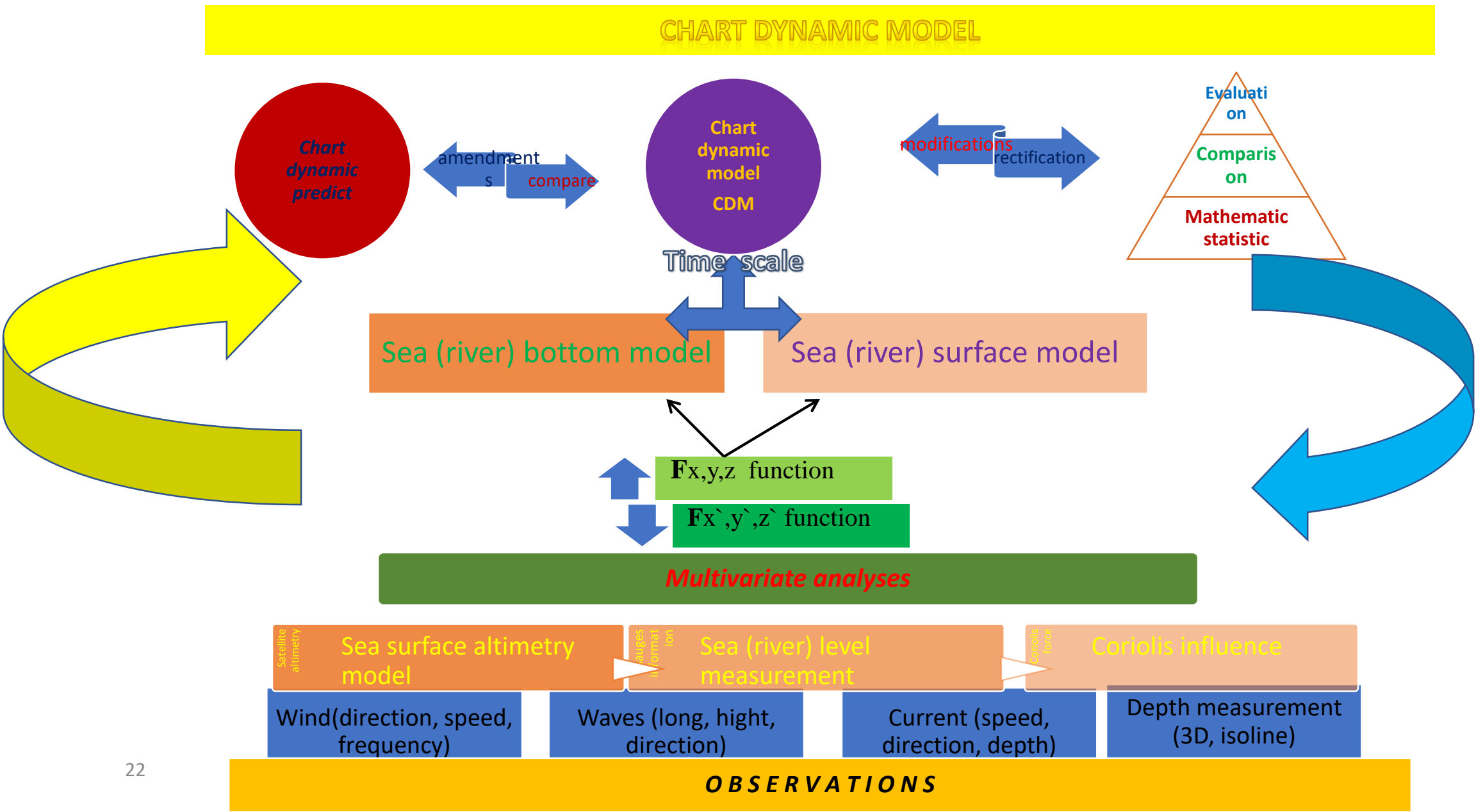


Kpanem

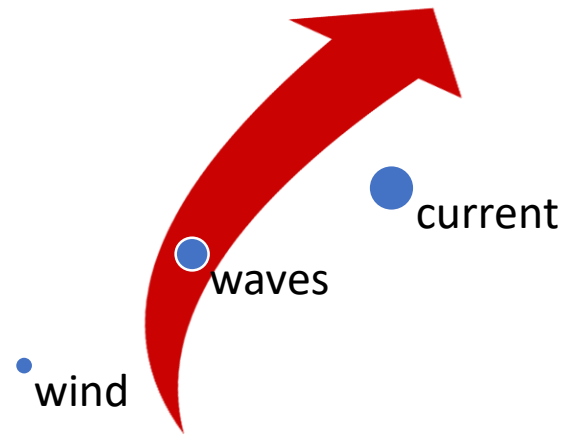
FX(R) 5s

FX(R) 5s

Chart Paper

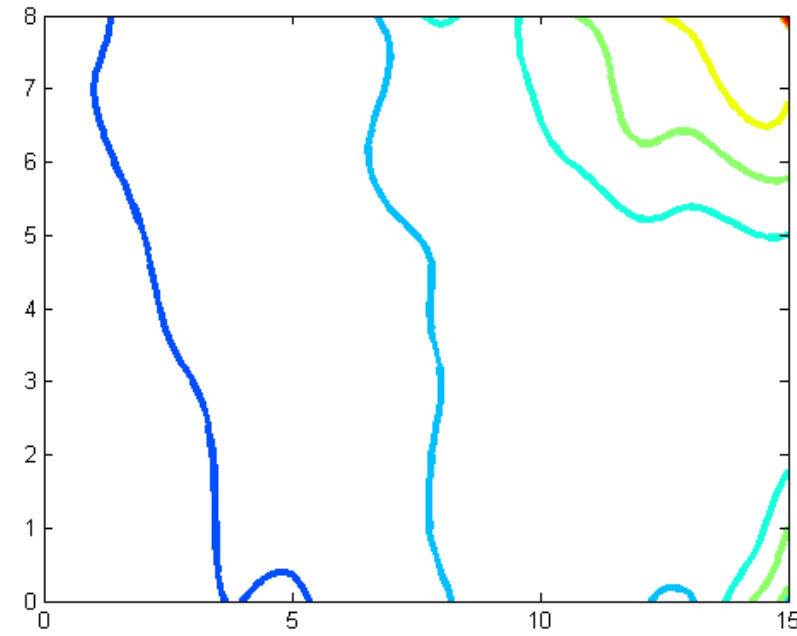
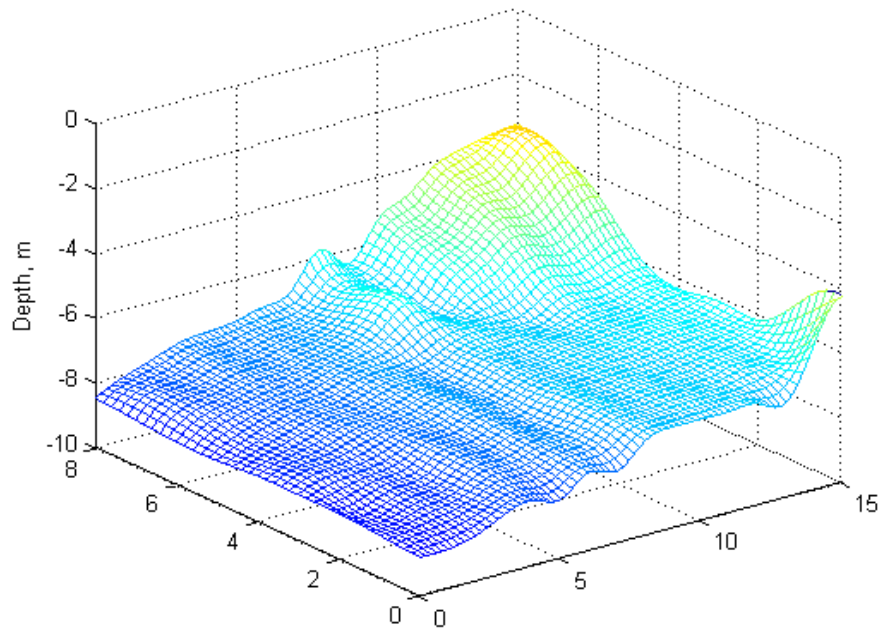


[illegible]

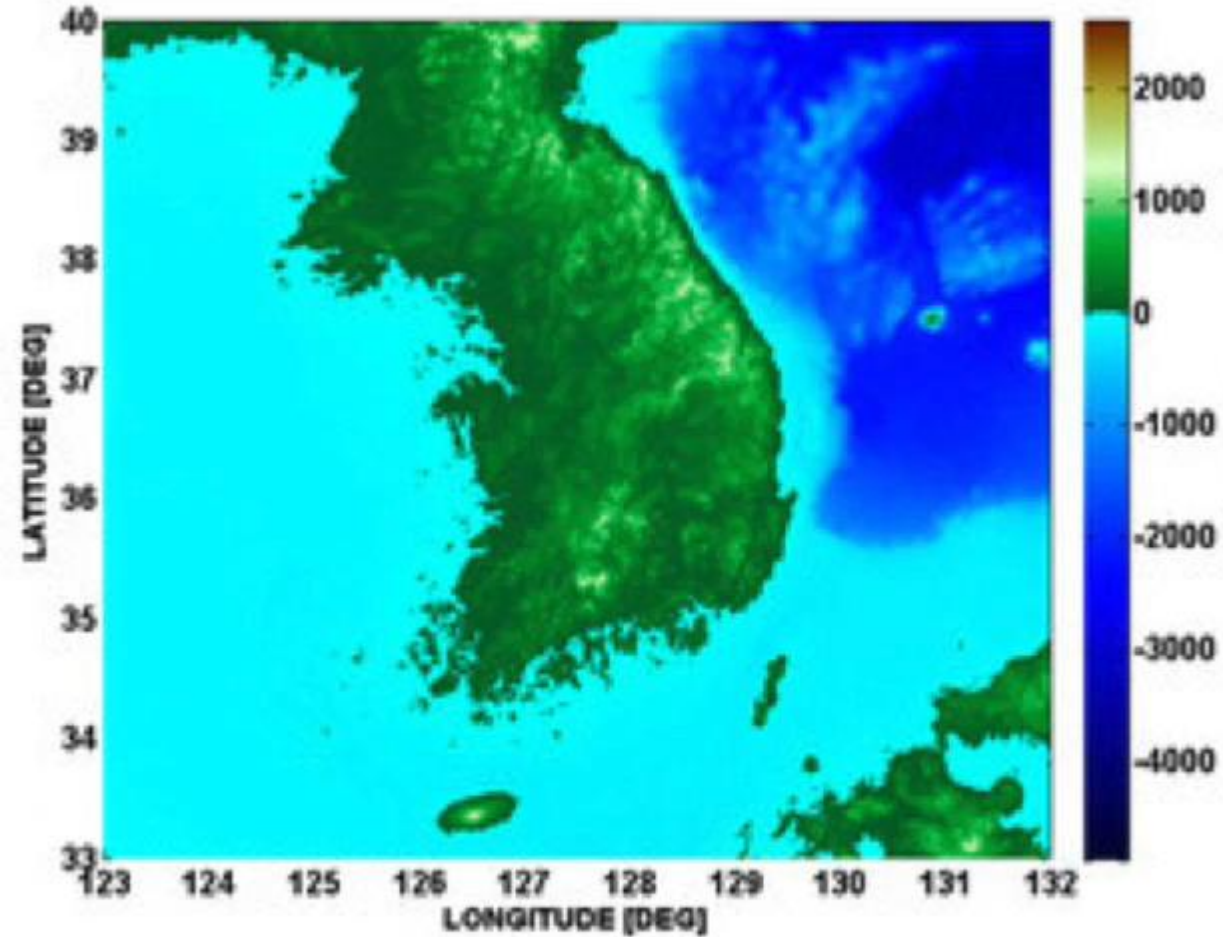


**Depth contours dynamic in
chart**

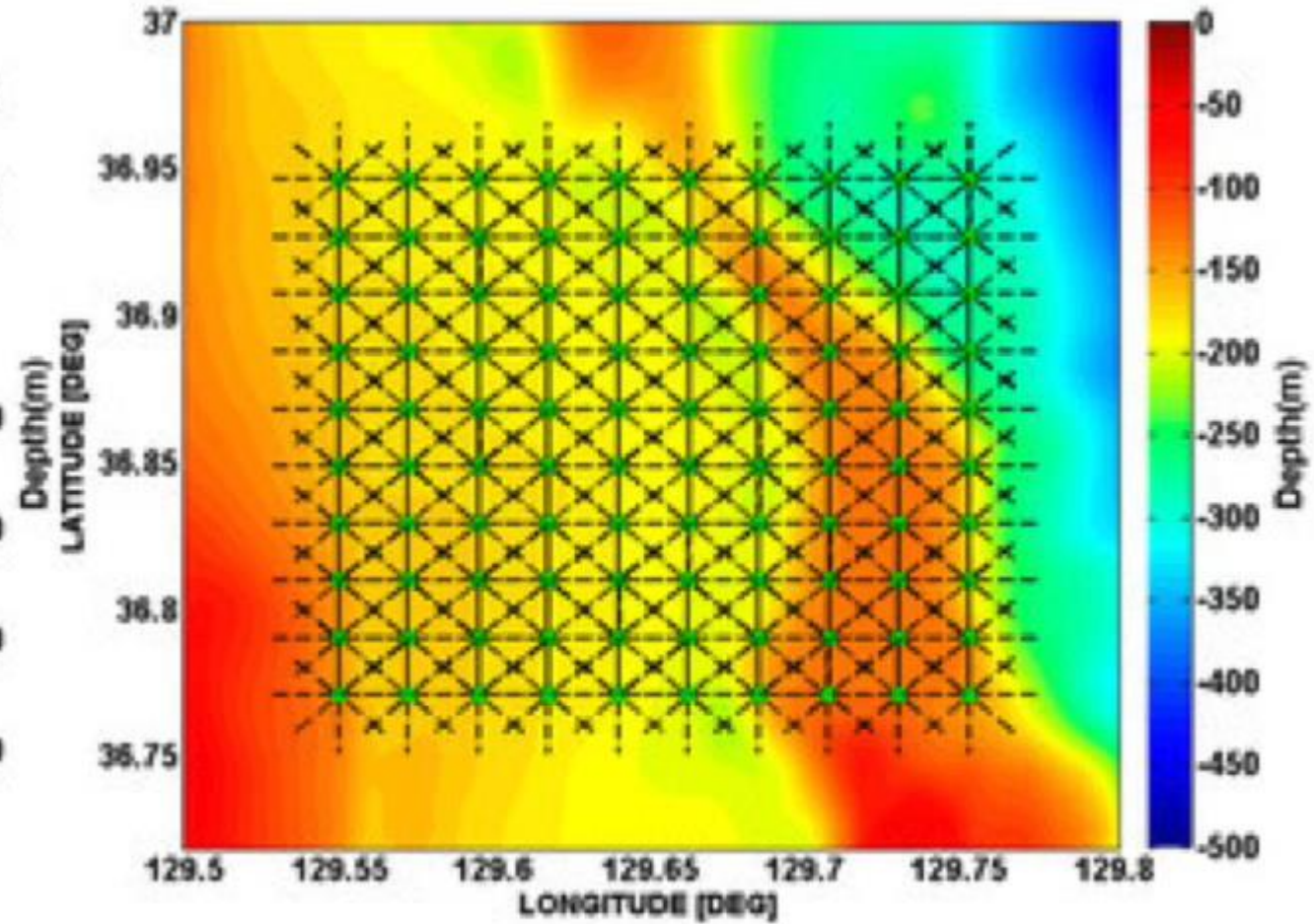
2013-2016 years observations



27 May 2019



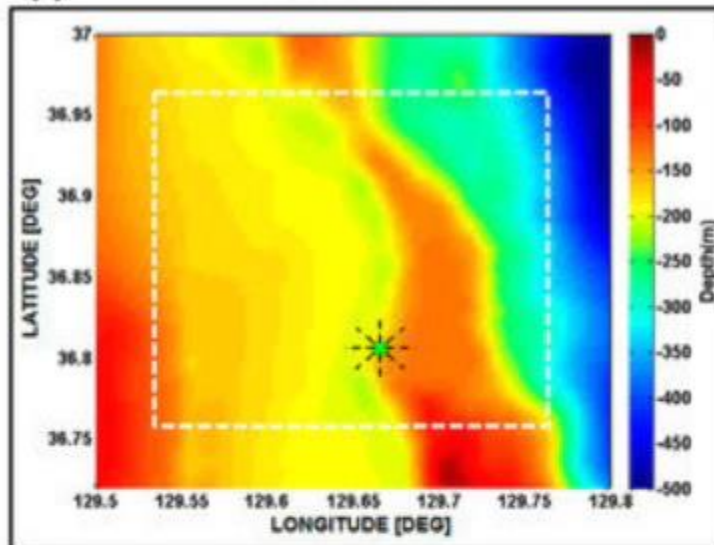
(a)



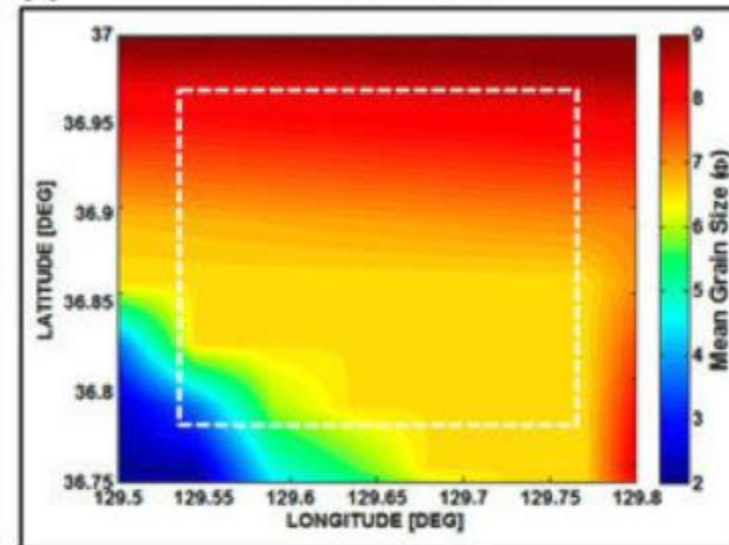
(b)

27 May 2019

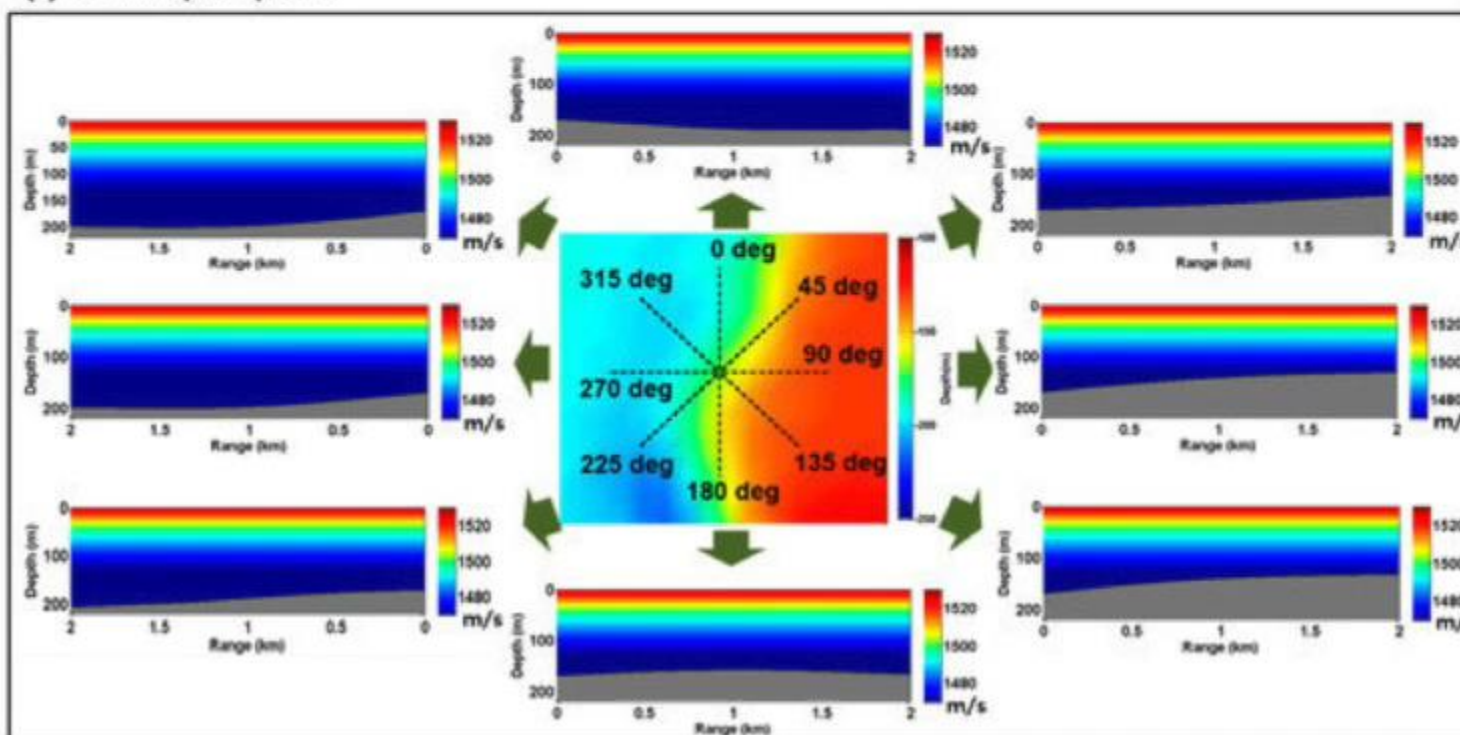
(a) Bathymetry

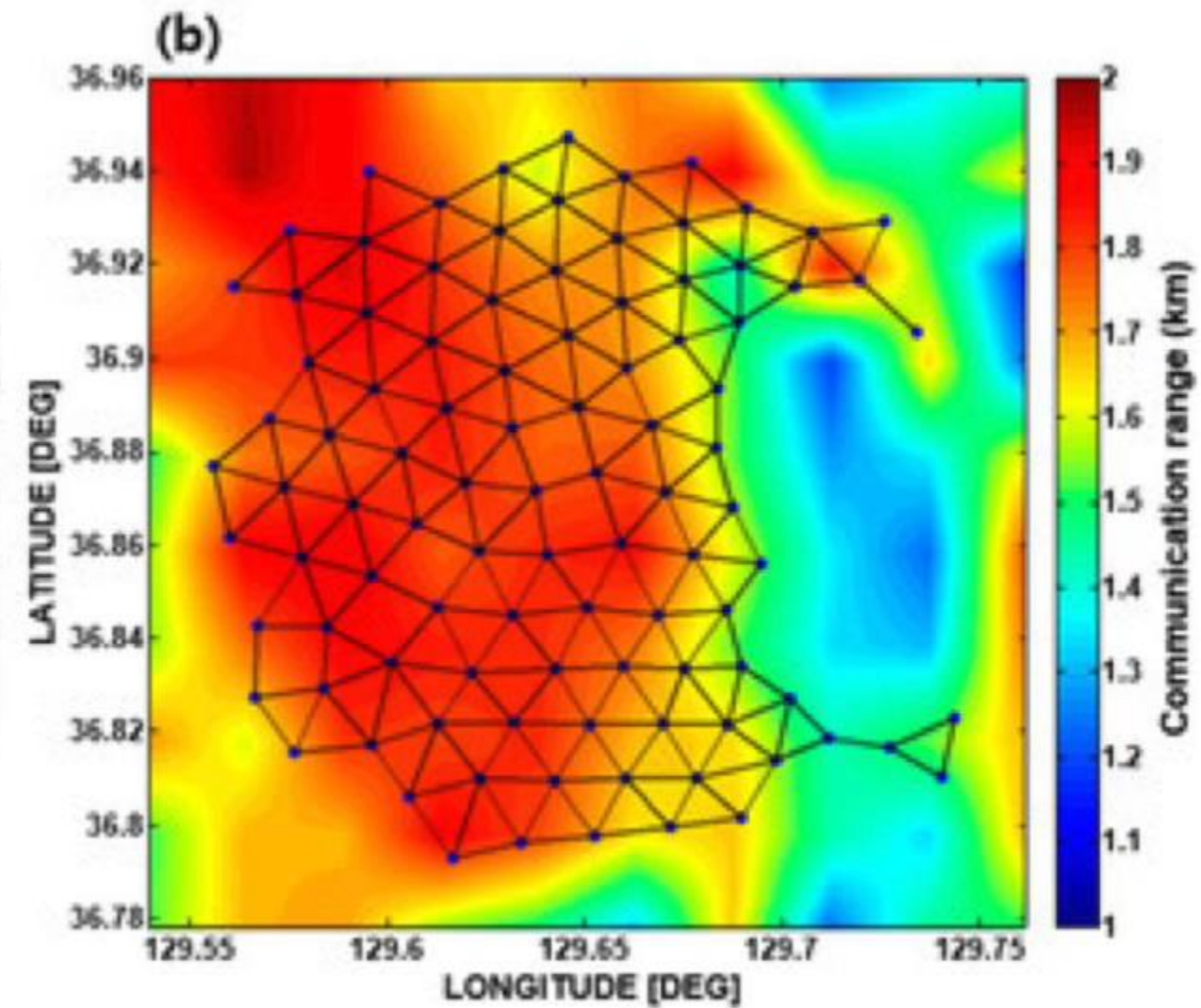
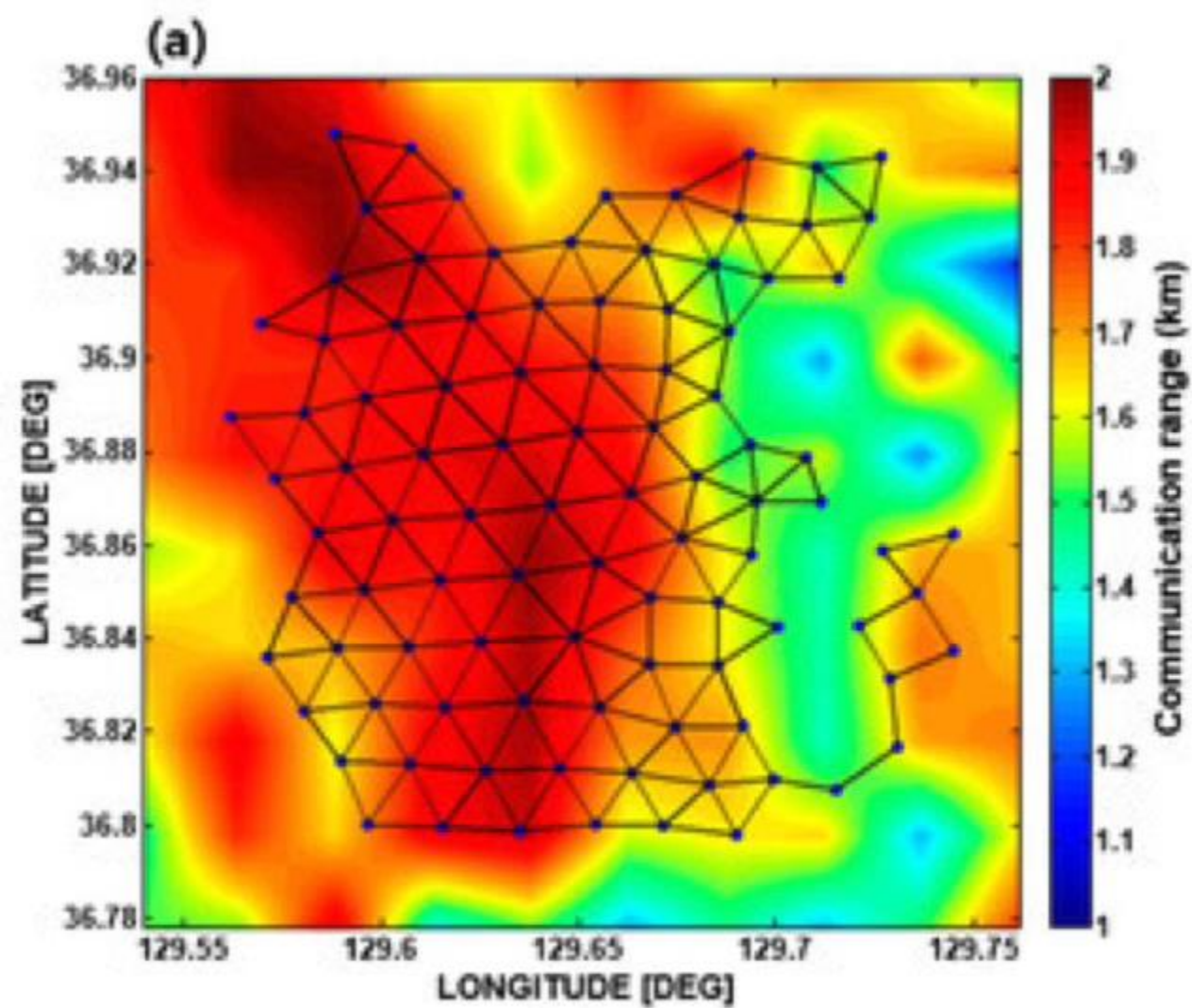


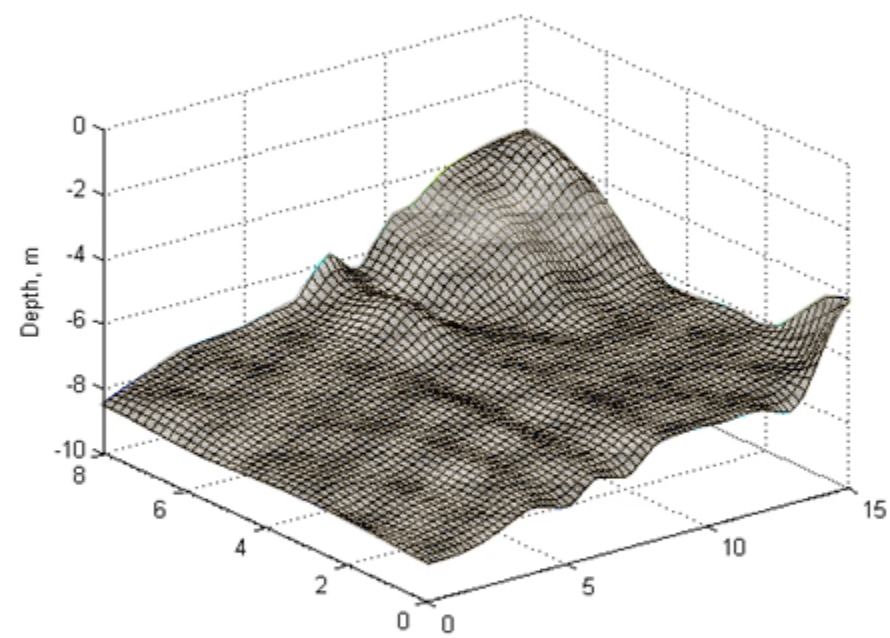
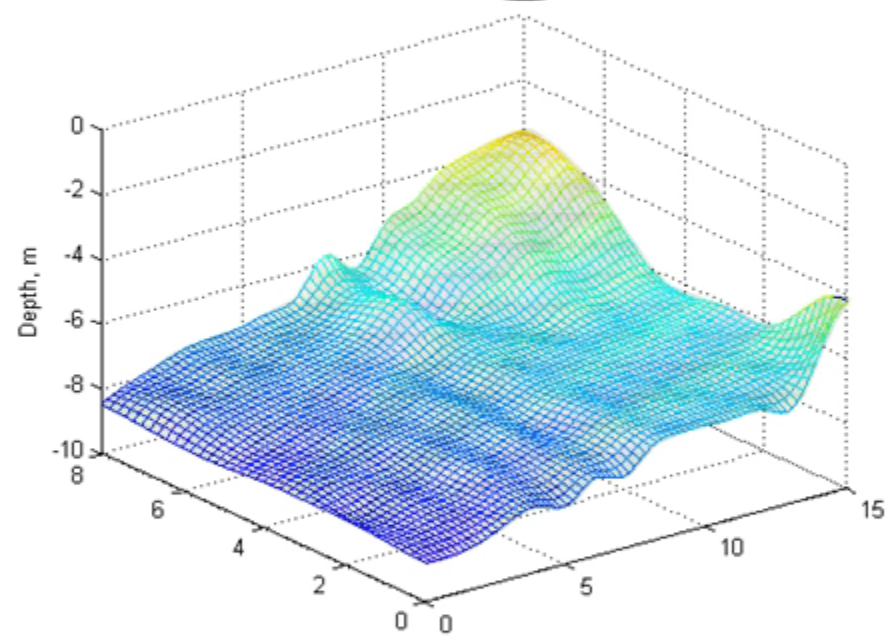
(b) Mean Grain Size of Surficial Sediment

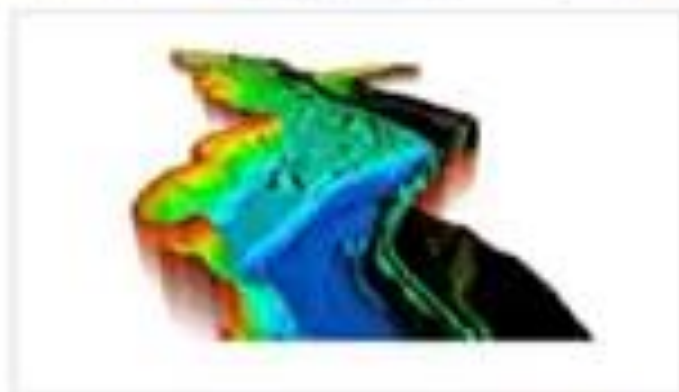


(c) Sound speed profile







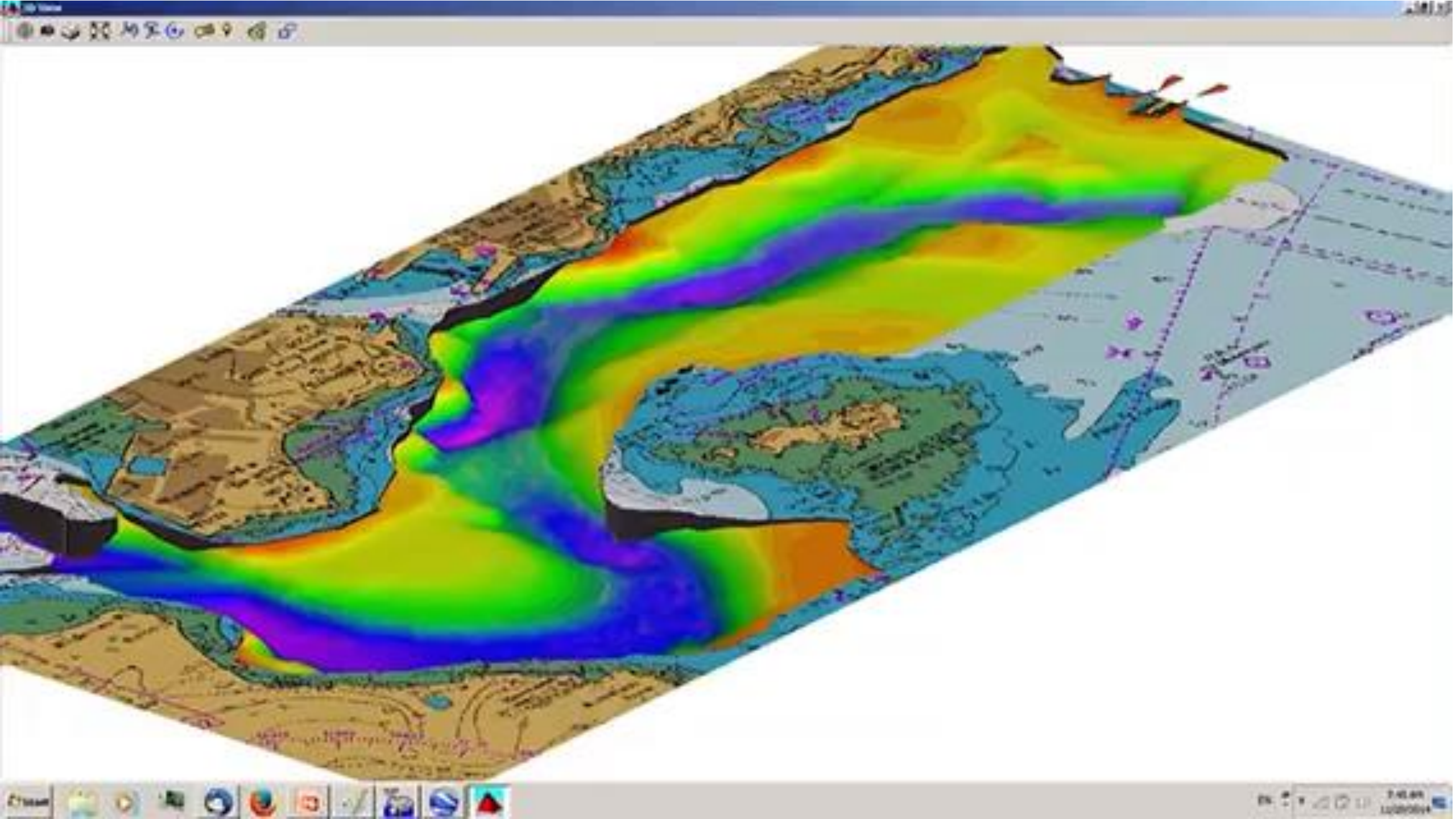


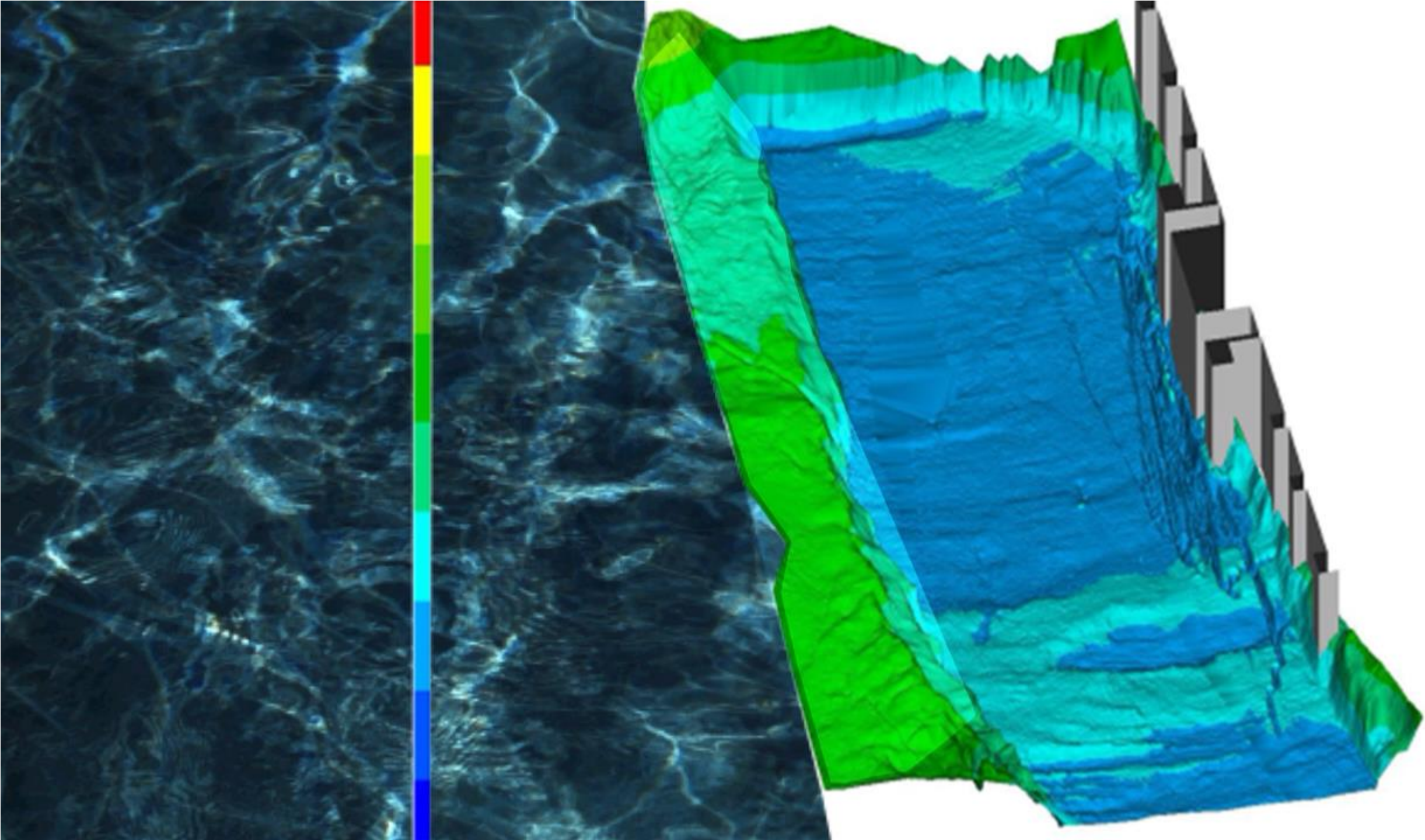
Вспомогательная информация:
 ООО «Марин Ресерч»
 Тел.: +40 733 308 208
 Email: office@marine-research.com
 www.marine-research.com

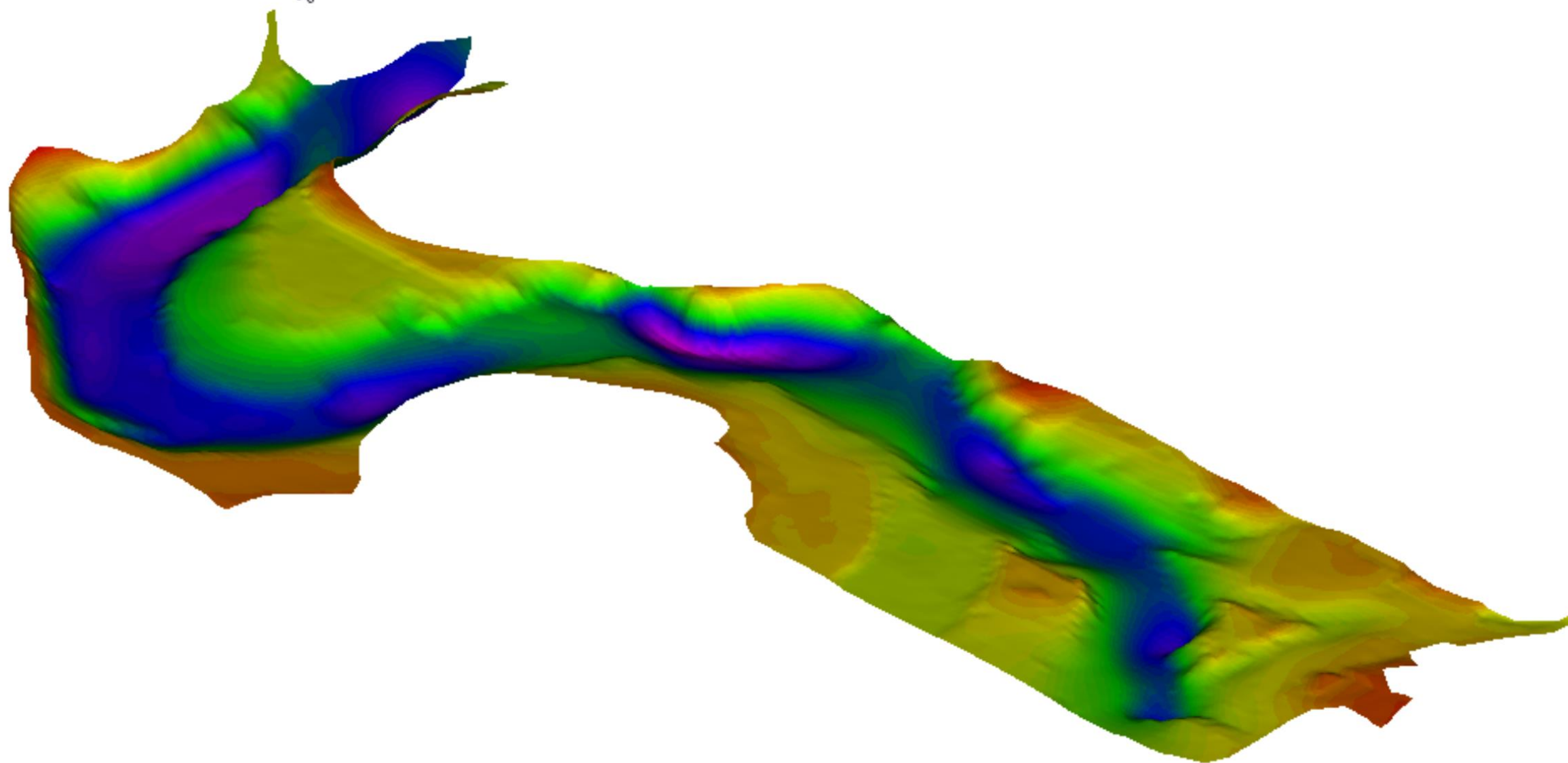


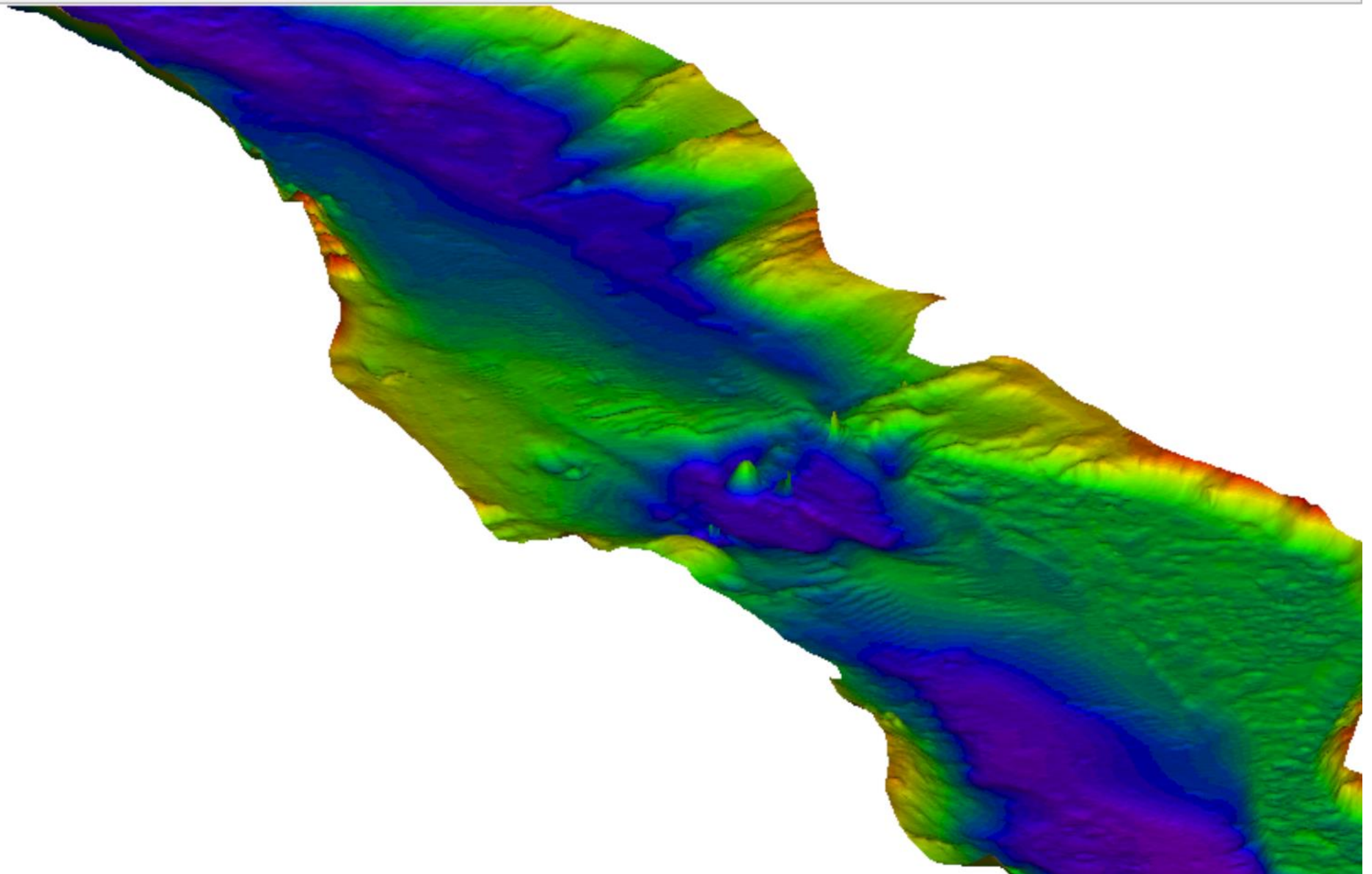
Legendă

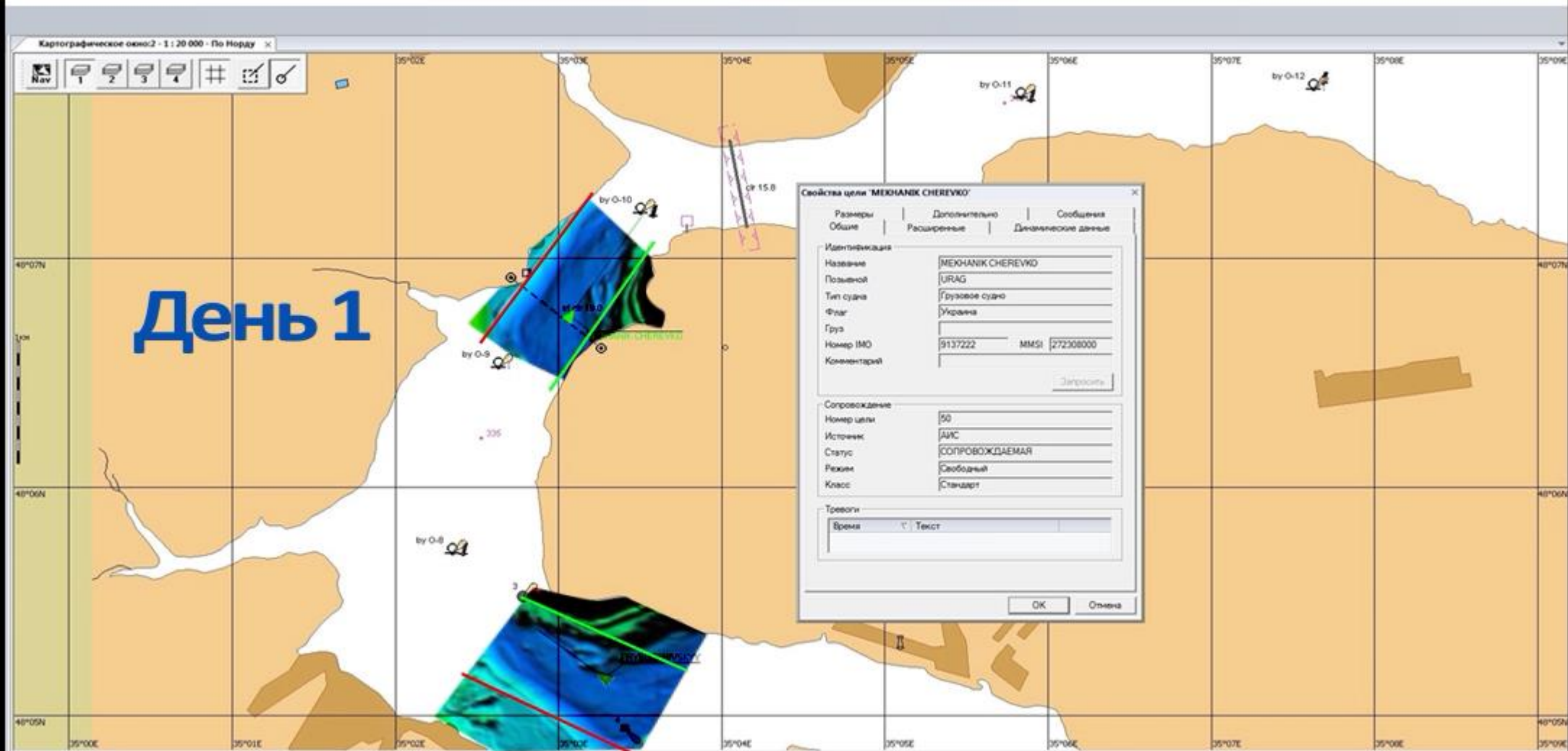












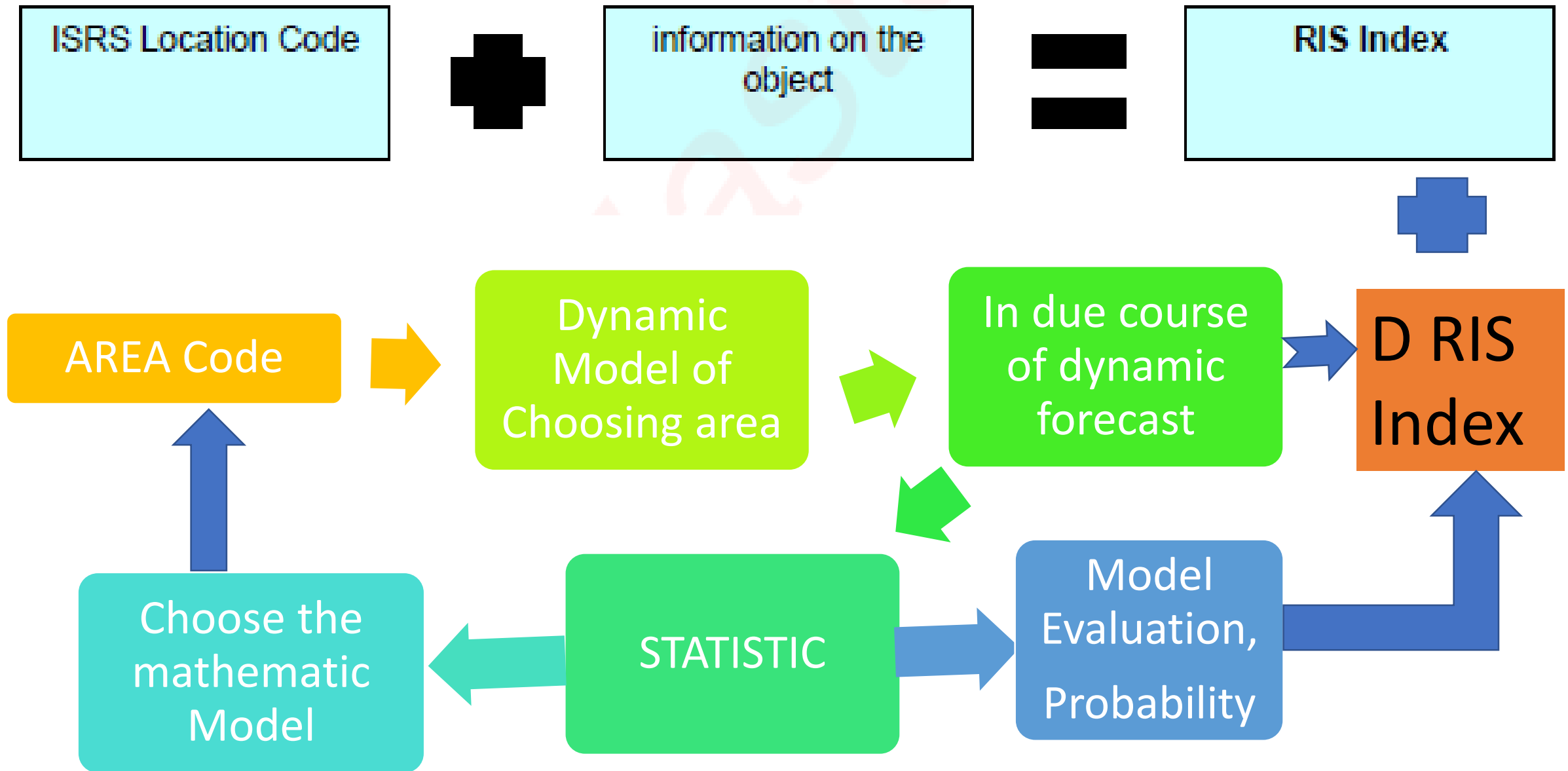
Task 3

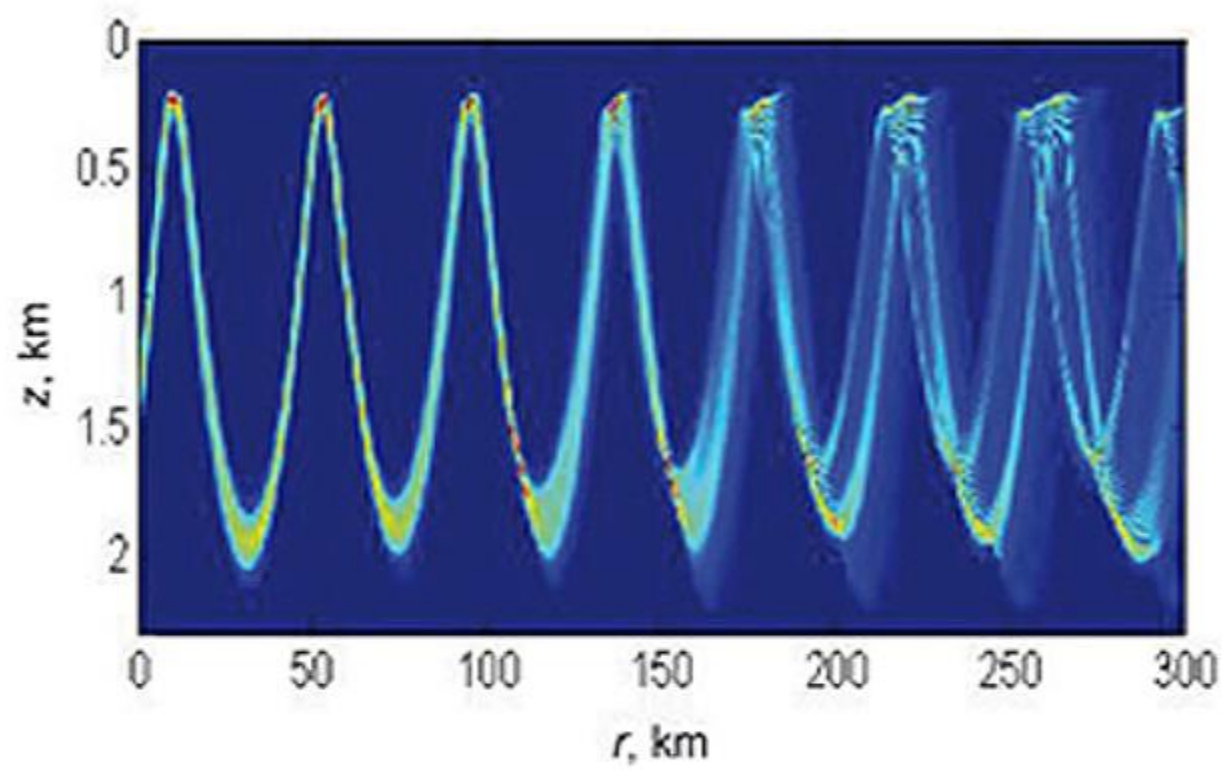
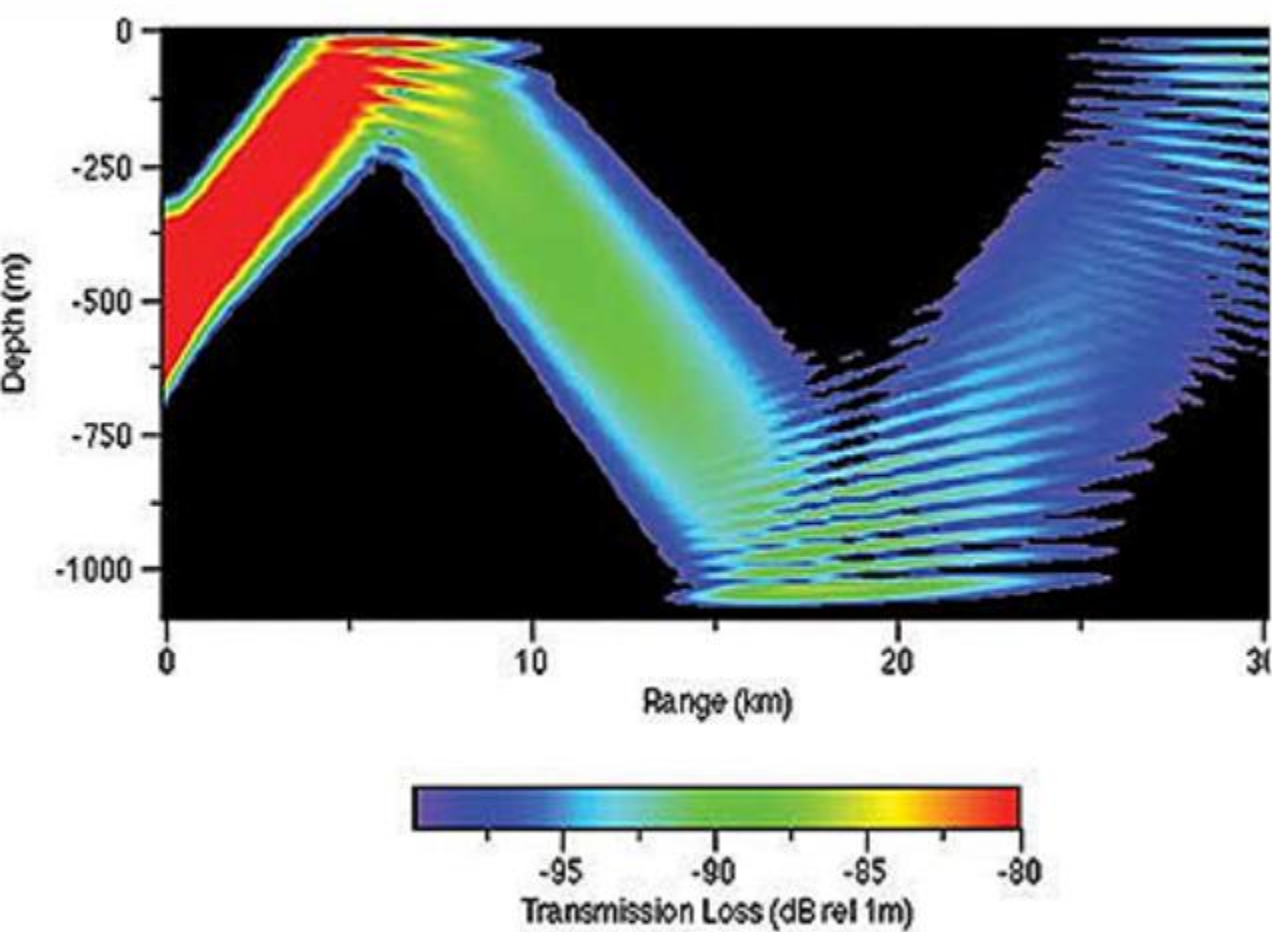
All existing mathematical models of ship motion can be divided into three categories:

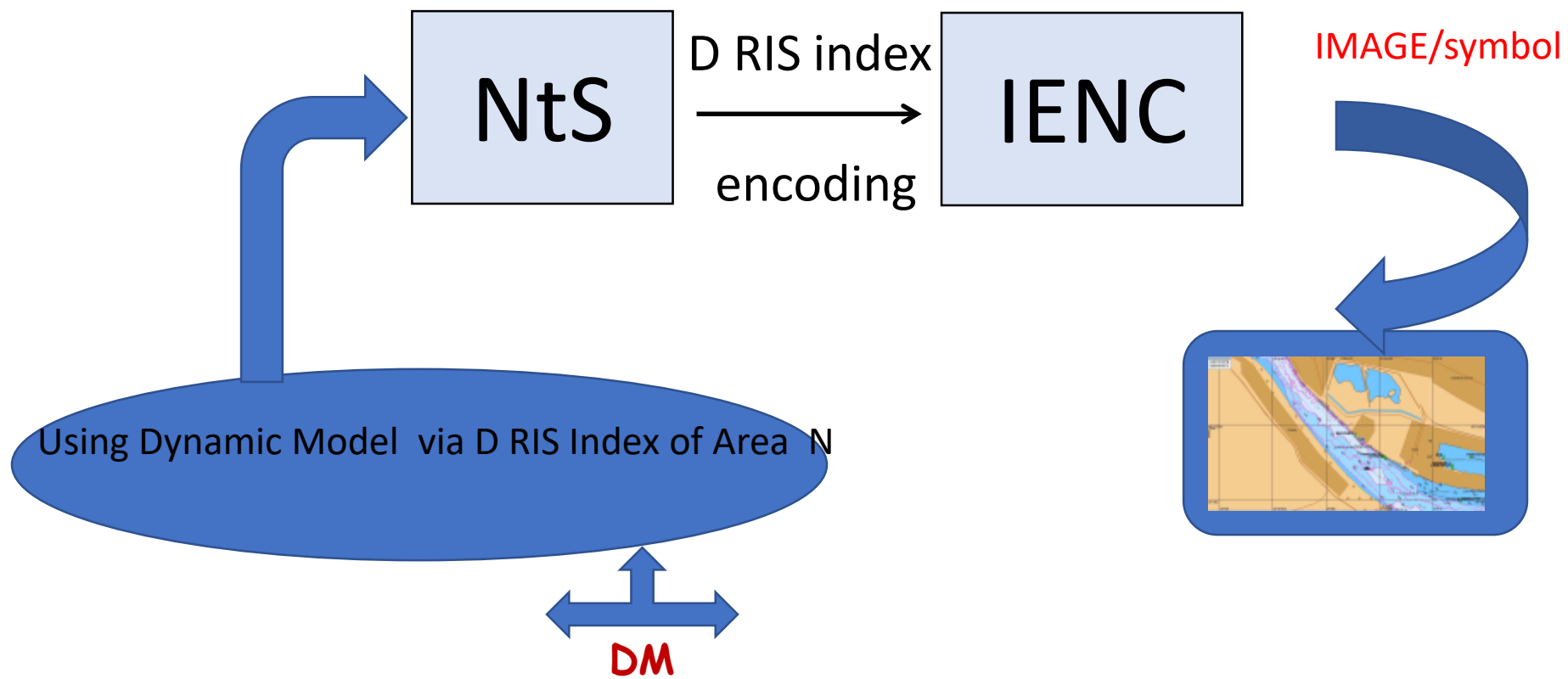
- a) linear models;
- b) partially linearized models;
- c) nonlinear models.

No model is absolutely perfect, none always provides acceptable accuracy! There is need take into account "*scale factor*"

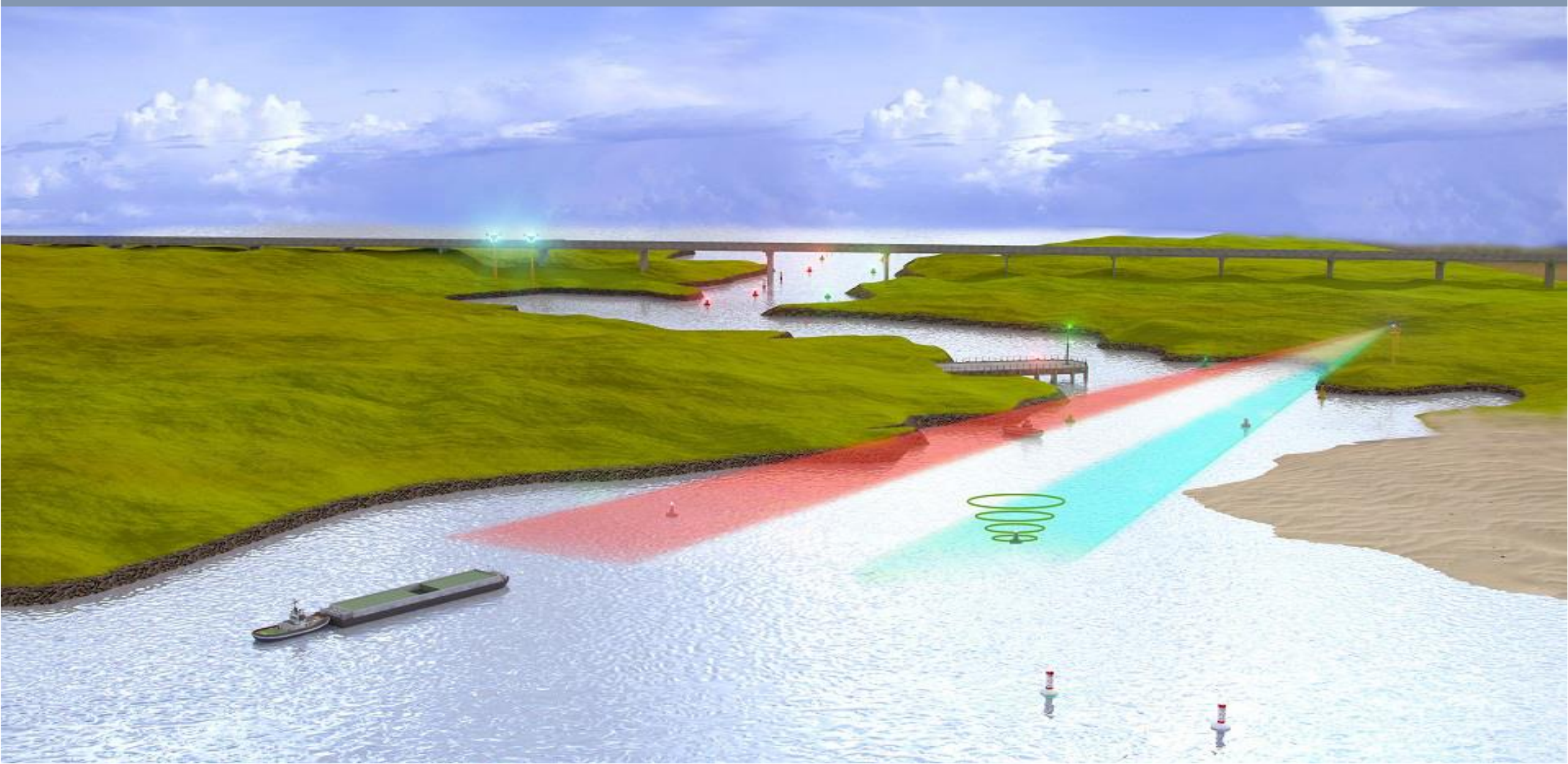
.

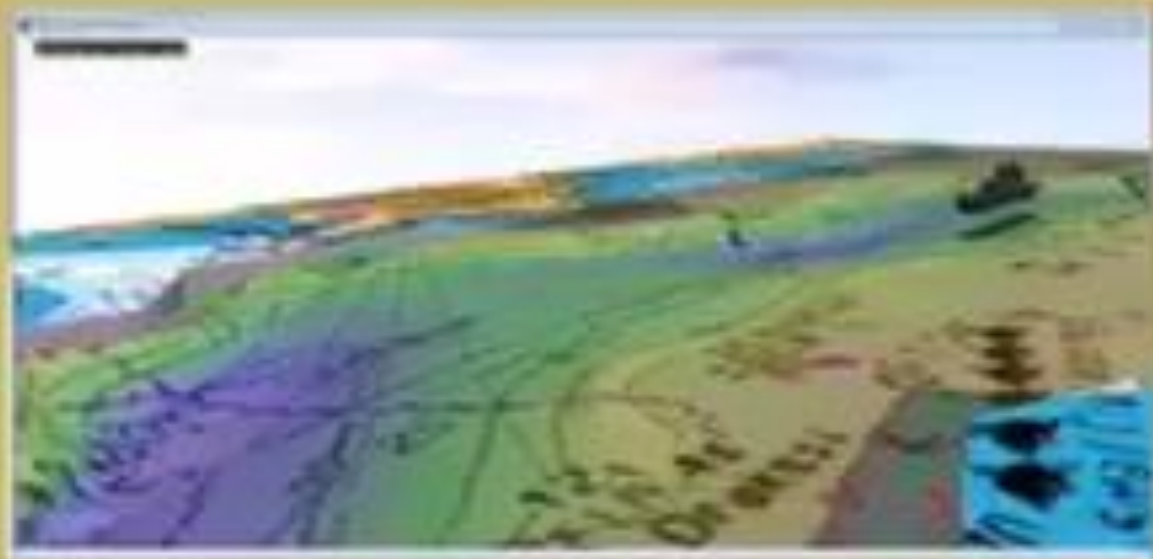


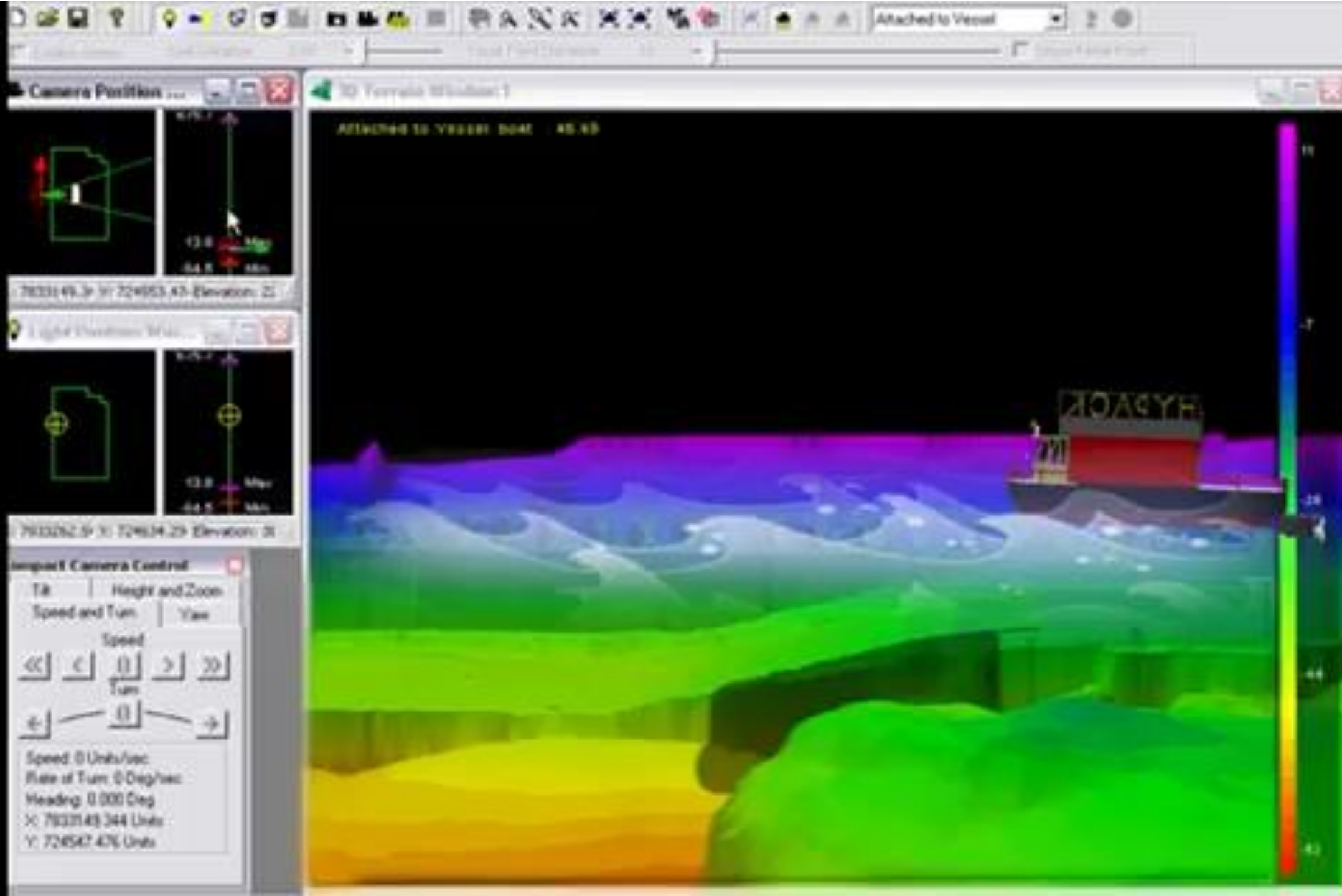


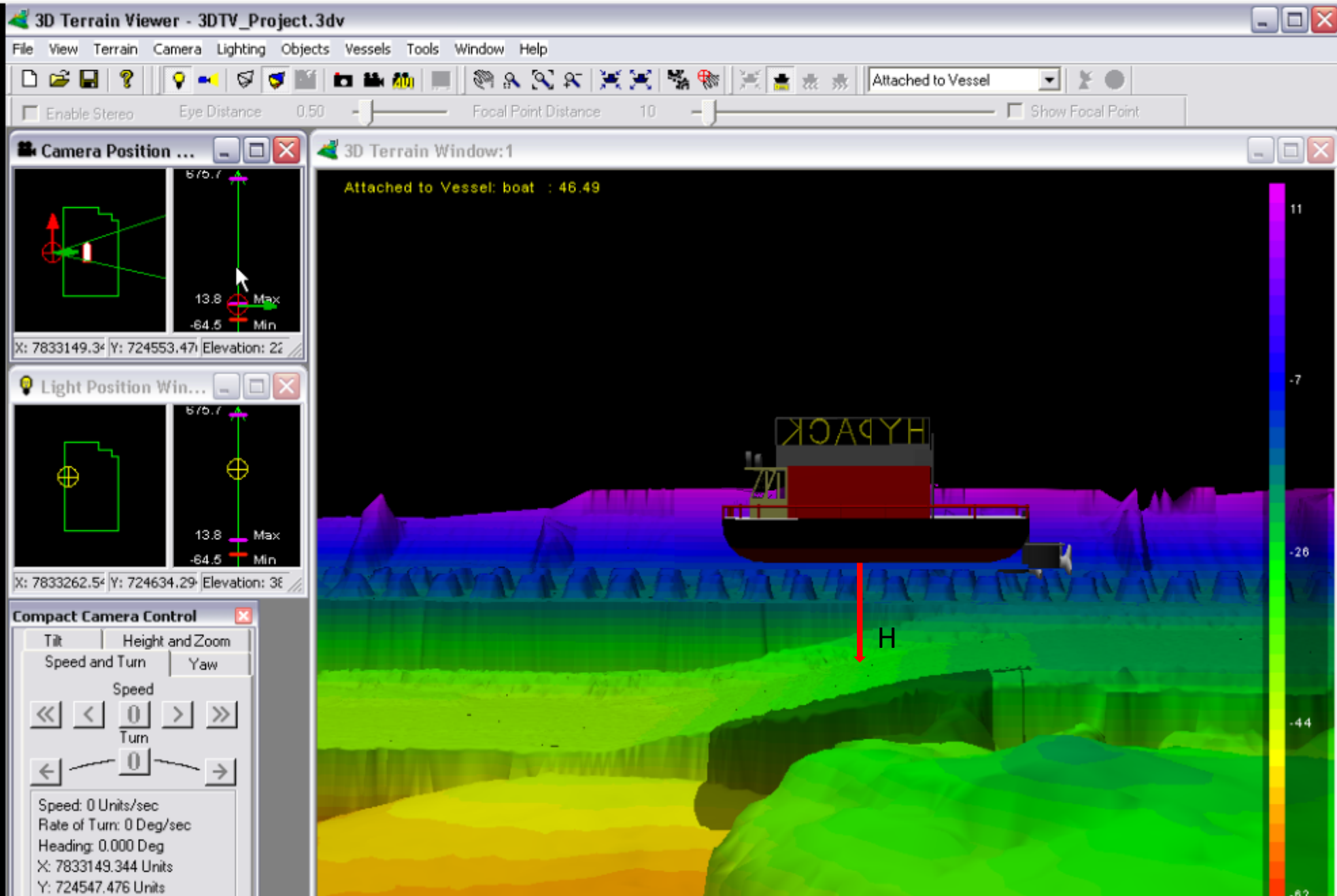


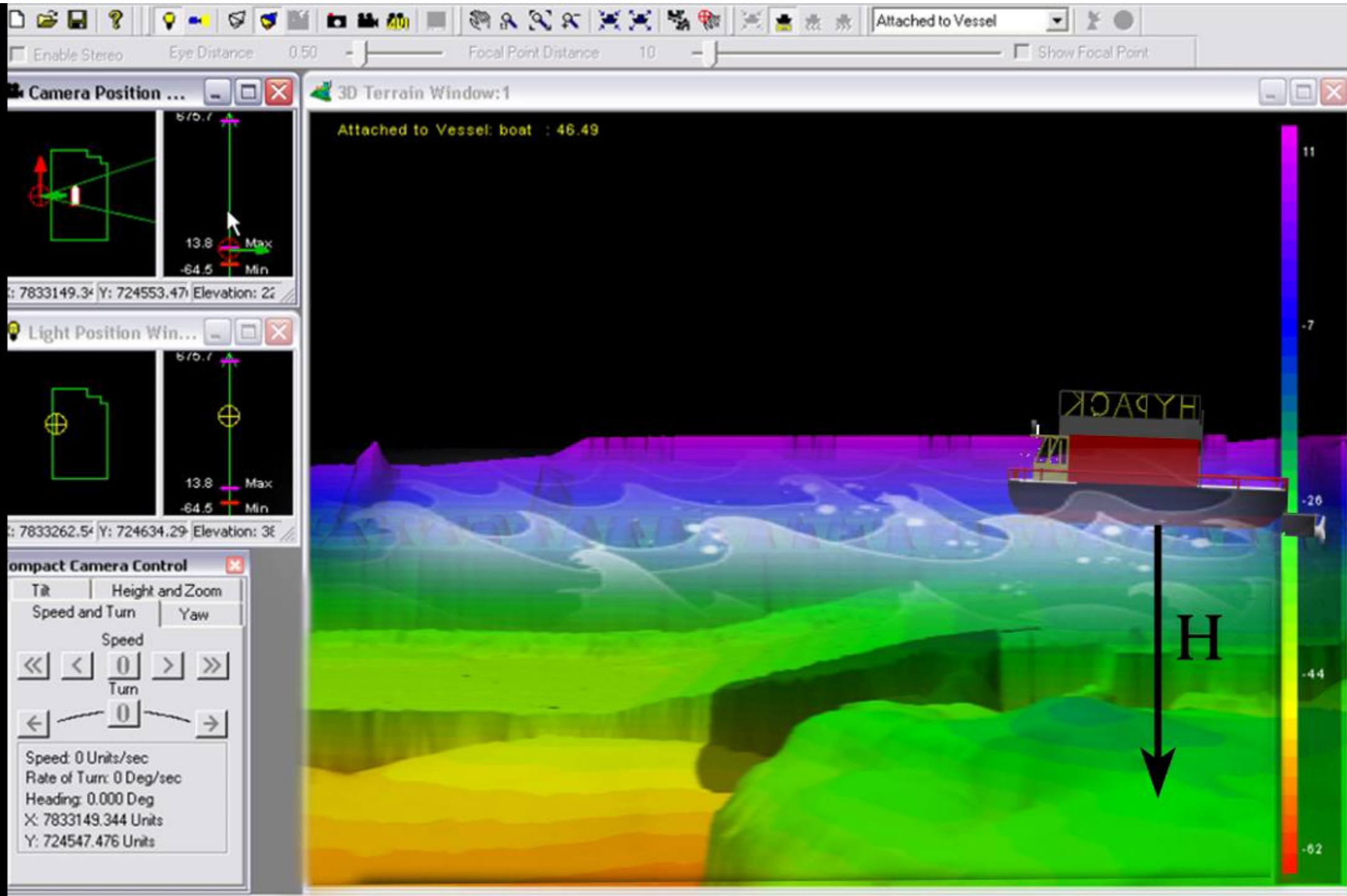
Inland Aids to Navigation











Unmanned Surface Vessels (USVs)

- HYPACK working with:

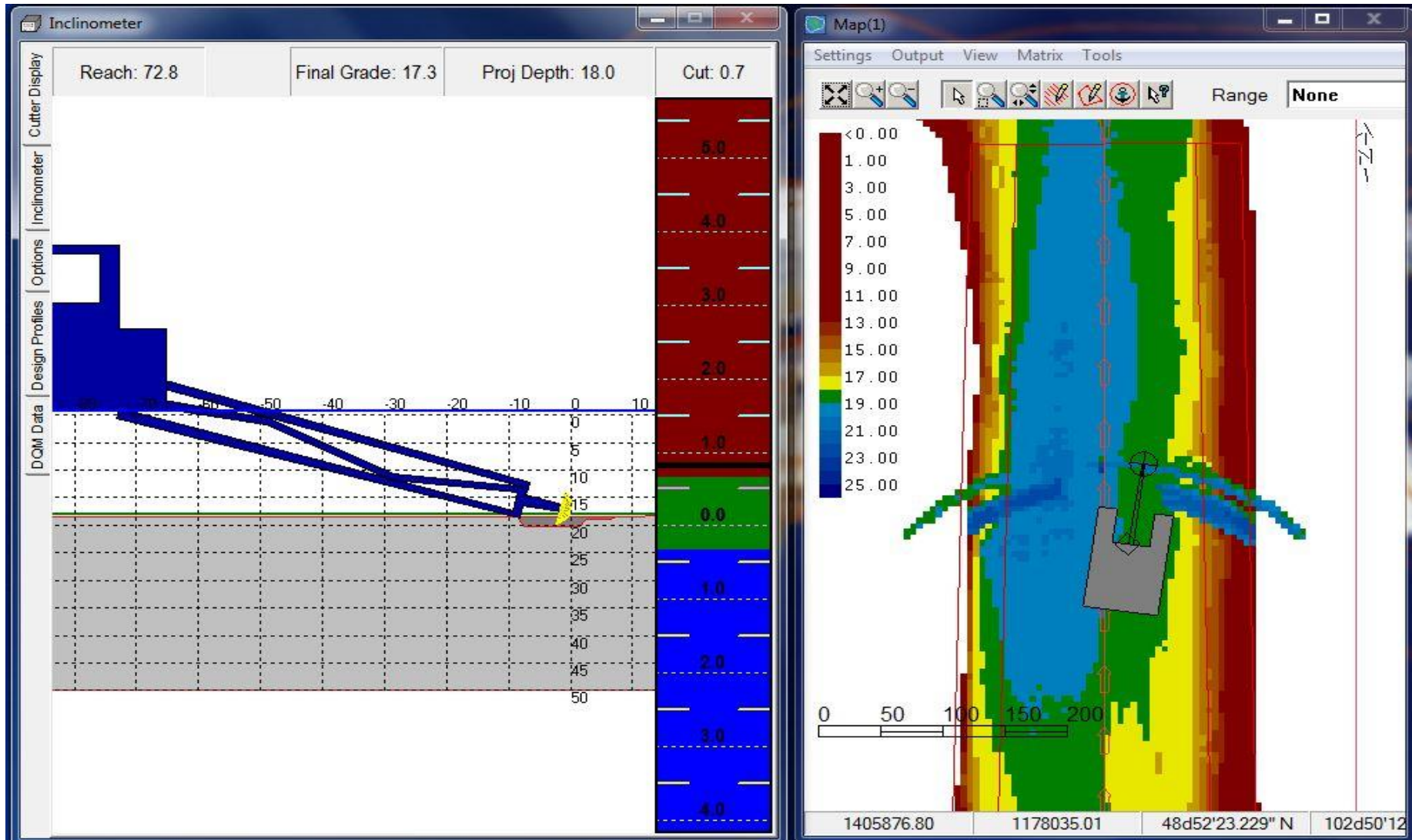
- Teledyne Oceanscience Z Boat
- Searobotics
- ASV, Ltd.



- 1) Collect on vessel with Autopilot (Ready!)
- 1) Collect on vessel, control from shore (Ready!)
- 2) Collect on shore, control from shore (working on it....)

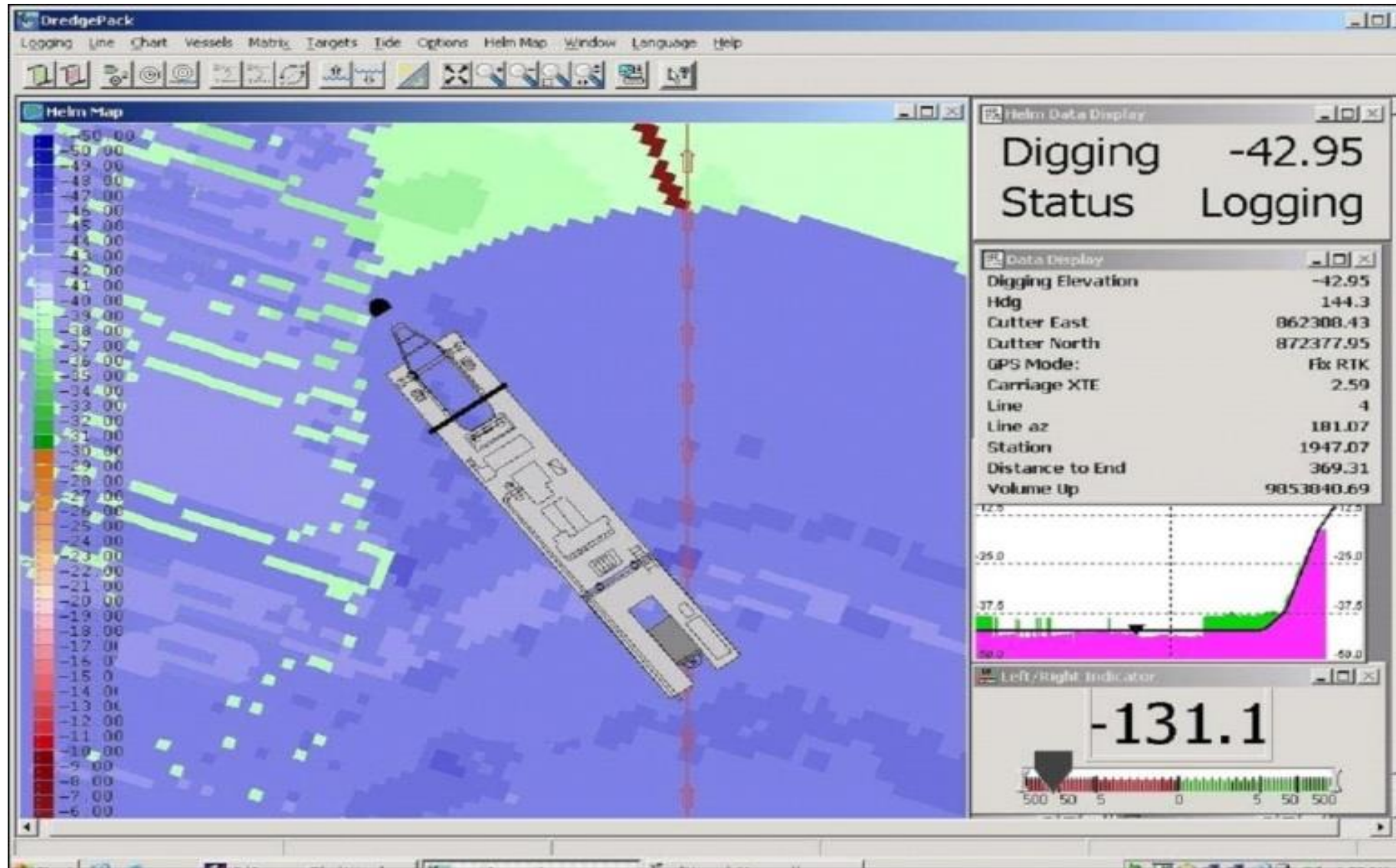


DREDGEPACK®



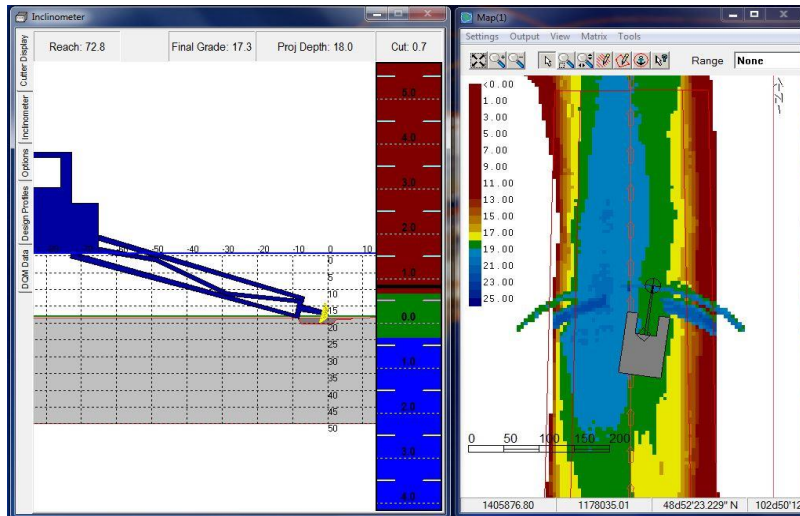
Monitor, economize and provide reports for trailing hopper, cutter suction, excavator and bucket dredges. NOT FOR SURVEY.

DREDGEPACK®

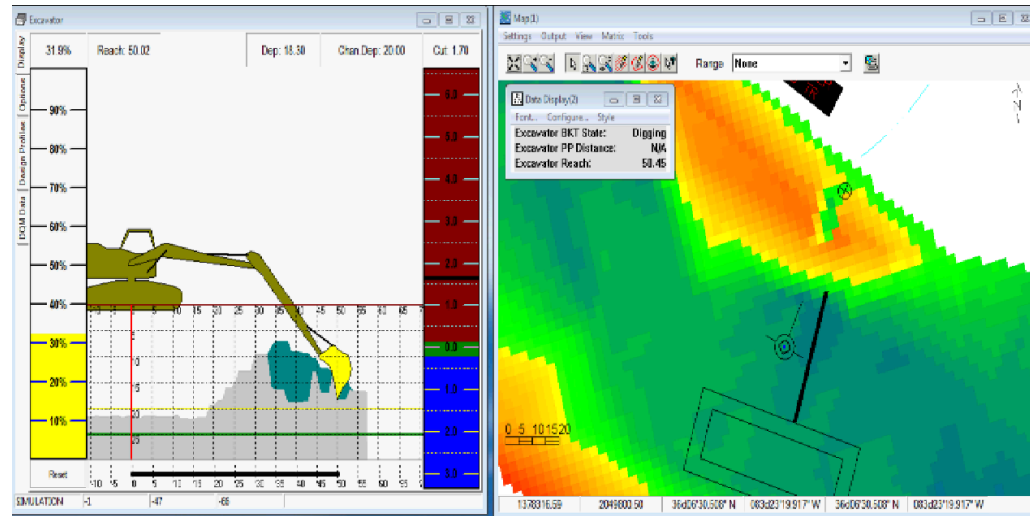


Real time dredging software to show you where is the digging tool, how deep is the design depth, and keep a history of the digging operation.

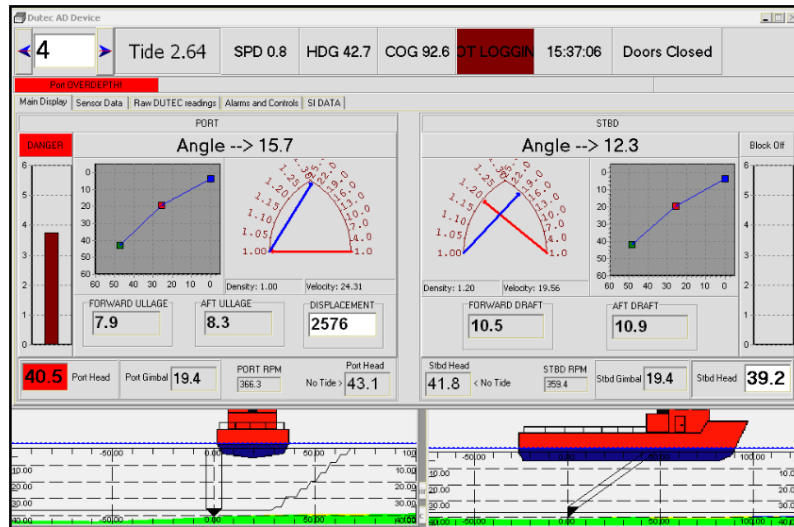
DREDGEPAK®



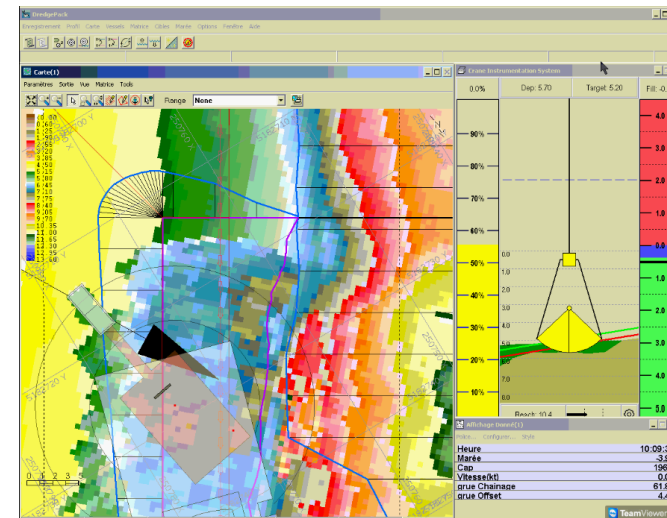
Cutter Suction Dredges



Excavators



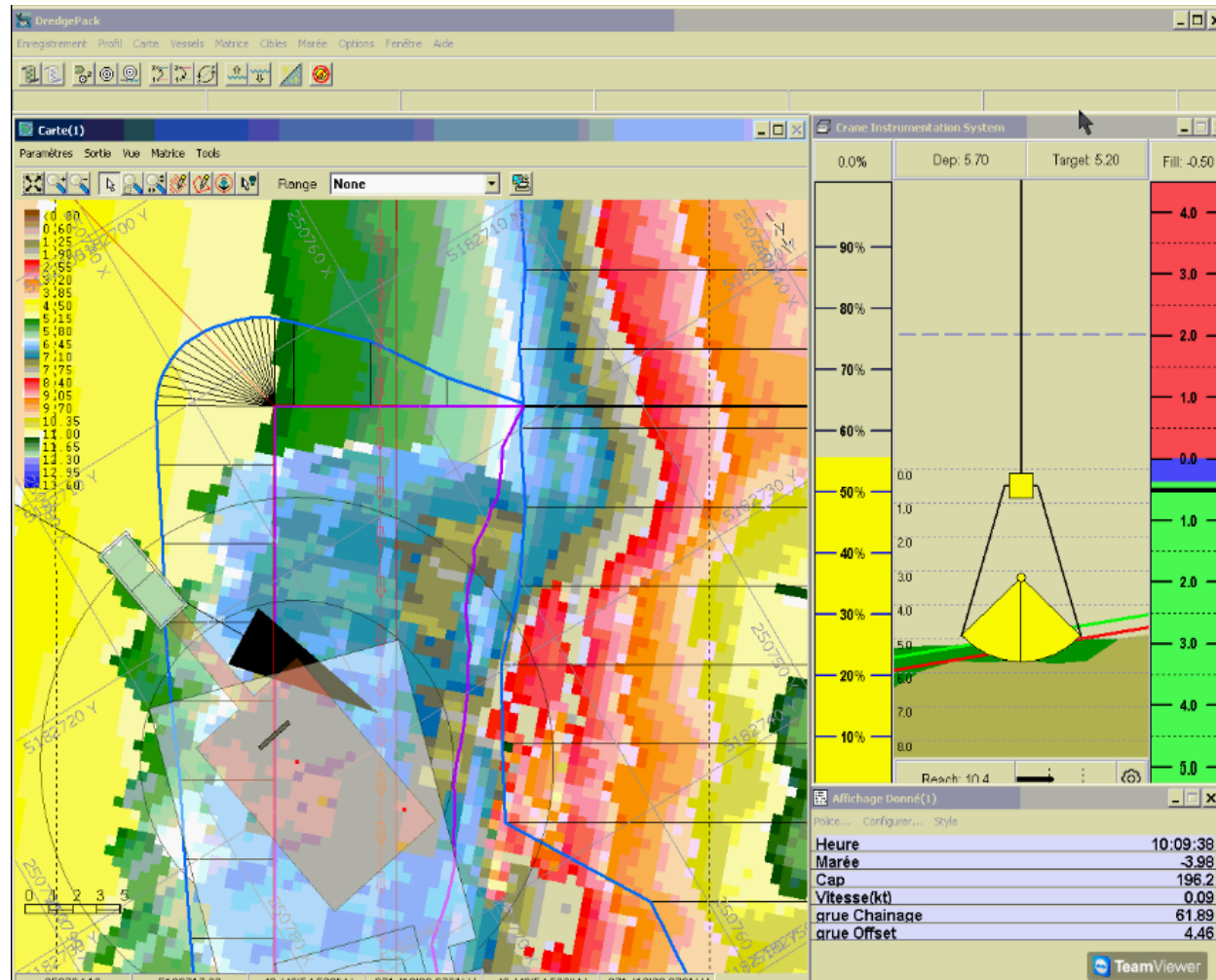
HopperDredges



Bucket Dredges

DREDGEPAK is compatible with cutter suction, hopper, crane and excavator operations. The Silent Inspector routines meet USACE reporting guidelines.

DREDGEPACK®

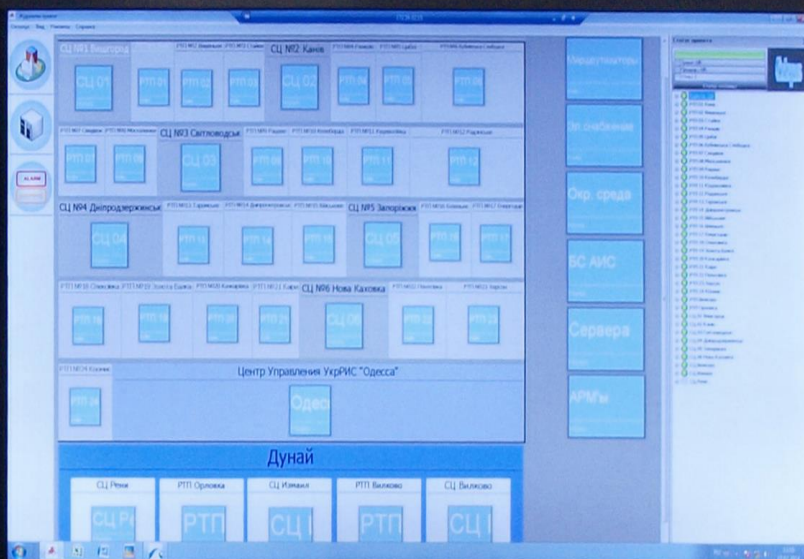


Monitor, economize and provide reports for trailing hopper, cutter suction, excavator and bucket dredges. NOT FOR SURVEY.

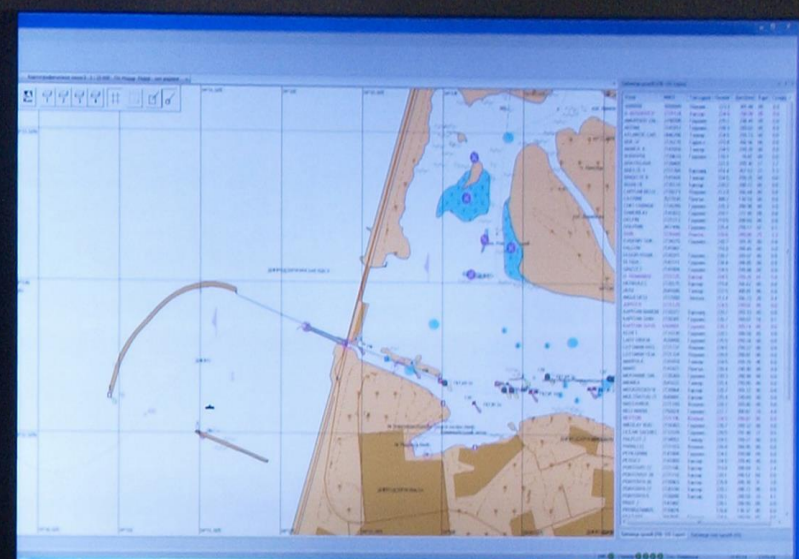




НОВА КАХОВКА



ЗАПОРІЖЖЯ

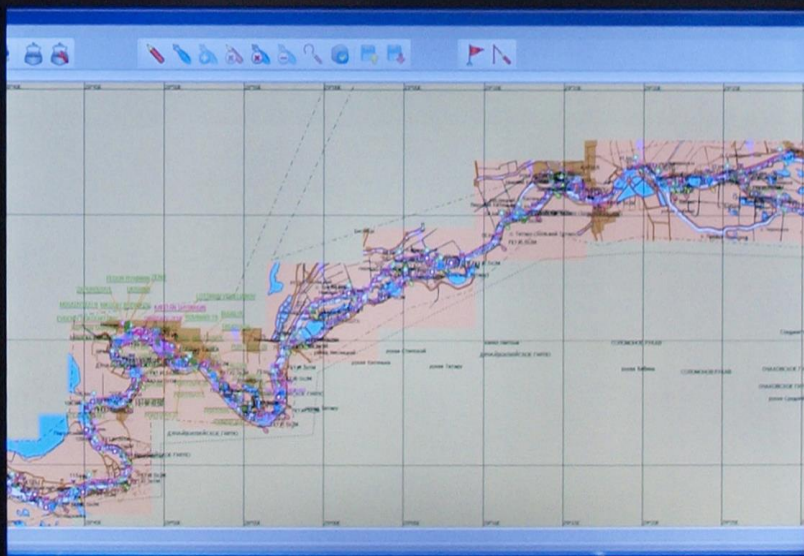


ЛГ

ЗАПОРІЖЖЯ



ЛГ



ЛГ



ЛГ

Центр РИС
Украины



Единое окно
доступа службы
СПАС

Сервер распознавания и
документирования
вызовов

Mobile+SMS

Web+e:mail

Оператор службы
СПАС

Информация
о развитии ЧС

Служба Движения -
AIS-Net

Служба путевой
информации

Информация о рейсе

Уточненная информация о
местоположении

Уточненная информация о
состоянии водного пути

Уточненная информация о
судне, грузе и пассажирах

Видеостена
(Карты ECDIS)



Судоводители
на водном пути

Спасательные и
экстренные
службы

МСКЦ
Украины

Администрация
региона

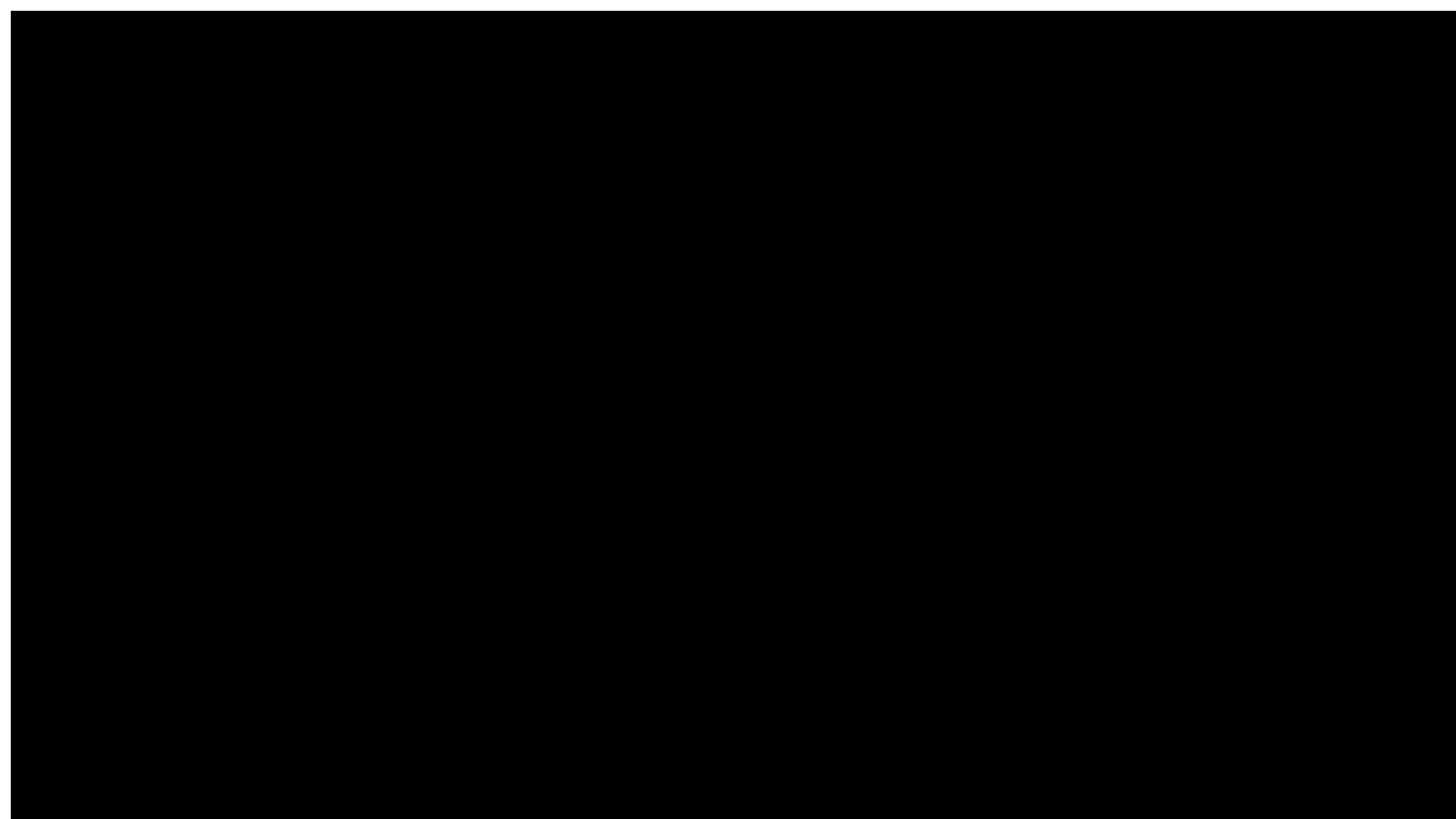
БДНСИ

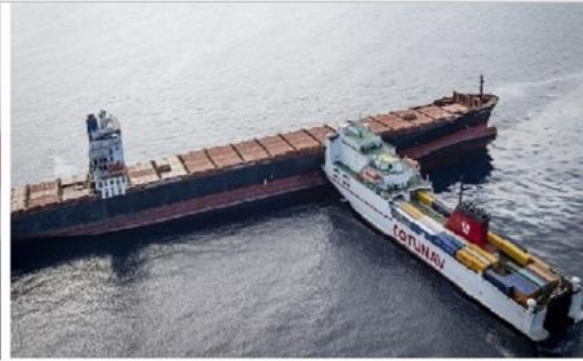
Уточненная информация для заинтересованных служб согласно аварийного расписания

Информация о
происшествии



Экстренные оповещения
согласно аварийного
расписания





There is to hard
discussion about
remote handling
vessels

Our opinion:
We have to be
ready to take into
account for
toward of
progress

Because as we see
above, safety
navigation
challenges exist
and now too



Заметки к слайду

Рабочее место оператора главного центра РИС





СЦ Канев



СЦ Светловодск



СЦ Днепродзержинск



СЦ Запорожье



СЦ Вышгород



СЦ Новая Каховка

Субцентры РИС



ПРДС Вилково



ЦРДС Измаил



ПРДС Рени