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1.1. INTRODUCTION

The DANRISS Project titled - “Development of a common and legal framework for ship inspections for the common Bulgarian-Romanian stretch of the Danube river with interface to the national River Information Service (RIS)” is a project carried out within the INTERREG V-A Romania-Bulgaria Programme, Priority Axis 5 - an efficient region, with the specific goal of increasing cooperation capacity and the efficiency level in public institutions, in the context of trans-border cooperation.

The beneficiaries of this DANRiSS project are: on the Romanian side: the Romanian Naval Authority (ANR), and on the Bulgarian side: the Executive Agency “Maritime Administration” in Bulgaria (EAMA).

This project falls within the larger framework of the implementation measures taken for Directive 2006/87/CE, setting forth the technical requirements applicable to ships involved in inner navigation and the European Agreement for the international transport of hazardous goods , on inner navigation channels (ADN) - with the main goal of using the RIS services across border and achieving an operative data exchange along the Danube - in this case, on the joint Romanian-Bulgarian stretch of the Danube. The DANRiSS Project aims to transfer its cooperation concepts at regional level.

The current situation reveals that, without a proper exchange of information, the same types of resources are used on both Danube shores, to achieve the same goals - carrying out additional inspections on inner navigation ships. Thus, these inspections are carried out with double efforts from both administrations, and, in the end, they gather the same information related to a ship's technical state.

In this context, an increase of communication and a synchronisation of professional activities carried out by specialists on both sides of the Danube, are vital for a better trans-border cooperation. A common task schedule related to inner navigation ship inspections, would significantly reduce the resources consumed and the costs on both sides.

1.2. DRAWING UP A RISK ASSESSMENT METHODOLOGY FOR SHIP SURVEILLANCE AND INSPECTION

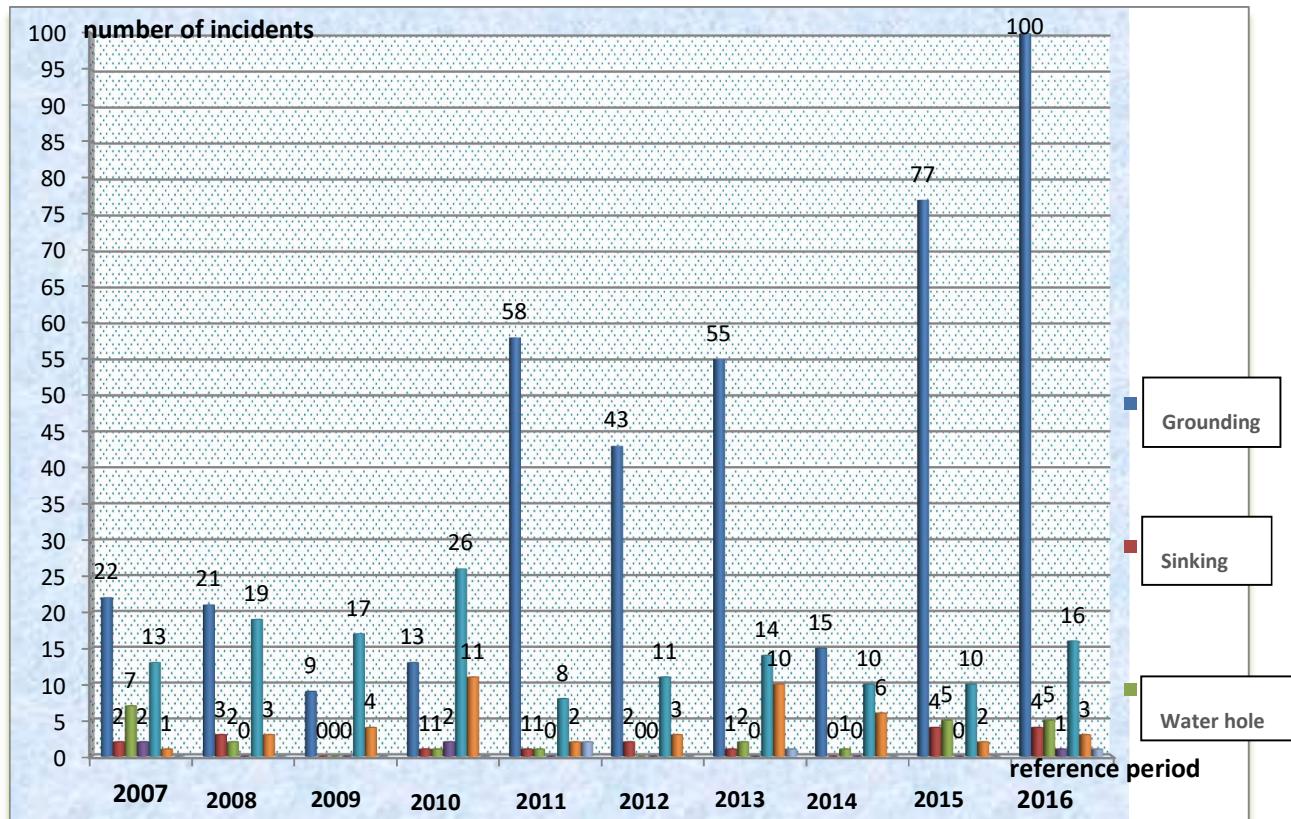
A statistic record has been drafted within activity A7, listing all the navigation incidents occurred on the joint Romanian-Bulgarian stretch of the Danube, between km. 374 and 845. This record covers a period of 10 (ten) years - from 2007 to 2016. Besides, common definitions have been agreed upon for navigation incidents and the causes generating them.

This statistic record of navigation incidents has been drafted based on the records kept by the Harbour Masters, for the analysed period of 10 years and it has been jointly agreed upon with the Bulgarian partners.

The record of navigation incidents occurred on the joint Romanian-Bulgarian stretch of the Danube, between km. 374 and 845, is presented in the table below.

Incidents /year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	TOTAL
Number of navigation incidents, of which :	47	54	34	53	73	63	85	34	101	137	681
Sinking	2	3	0	1	1	2	1	0	4	4	18
Ship to ship collisions	1	3	4	11	2	3	10	6	2	3	45
Collisions between a ship and a port facility or other constrictions	0	0	0	0	2	0	1	0	0	1	4
Fires	2	0	2	0	0	0	0	0	0	1	5
Running aground	22	21	9	13	58	43	55	15	77	100	412
Water hole	7	2	0	1	1	0	2	1	5	5	24
Work accidents	0	1	0	0	0	0	0	0	0	0	1
Other damages	0	5	2	2	1	4	3	2	3	7	29
Pollution	13	19	17	26	8	11	14	10	10	16	144

Table 1.1. Navigation incidents occurred on the joint Ro-Bg stretch of the Danube between km 374 and 845, in 2007 - 2016



We must specify that, the 144 cases of pollution recorded by our partners in Bulgaria had been reported via the 112 Emergency Services and recorded in this statistic, but they did not have any link to the navigation activity.

During the analysed period (2007 - 2016), the following instances occurred on the Romanian side of the Danube, between km . 374 and 87, when the navigation was halted and/or restricted due to extreme weather conditions.

Year: 2009,

- On 21.02.2009, the Bechet - Oriahovo ferry crossing point was closed due to extreme snowfalls
- On 30.11.2009, all navigation activities were suspended on the stretch between km. 793 - 800, due to dense fog.

Year: 2011,

- Between 09.09.2011 and 21.10.2011 (for 42 days), navigation was very difficult on the Danube stretch between km. 373 and km . 602 and some convoys ceased to move due to some very shallow depths of water - such convoys being stuck in the following areas: km. 373, km.378-km. 379, km. 382, km. 390, km. 396, km. 400 - km. 425, km. 496-km. 497, km. 515- km. 526, km. 543 - km. 553 and km. 602.

Year: 2012,

- Between 08.02.2012 and 02.03.2012, all navigation was halted on the Danube sector between km 975 and km 375, due to ice chinks that made any navigation impossible.
- From 19.06.2012 till 25.06.2012, between 08.00 - 12.00 hours, and between 15.00 - 19.00 hours, all navigation as halted between km 671 and km. 688, due to a set of works carried out to dismantle the electric line crossing the Danube.

After assessing the risks - as a consequences of navigation, materialised in the navigation incidents described here and their causes, we tried to determine the measures that should be taken to manage and mitigate these types of risks.

The risk assessment and methodology and the risk assessment integration methods used, serve the following goals:

- Drawing up a set of unique definitions for the terms used in risk assessment activities.
- Identifying and assessing the main risks and evaluating the capacity to manage and mitigate them.
- Providing a risk assessment analysis framework, for the authorities operating in this field.
- Generating a solid foundation for ranking and mitigating risks, in order to tackle the needs identified.

Navigation incidents and their causes - definitions:

Navigation incident - any event occurred on a stationary or moving ship, located on the navigable national waters, during or in connection to any loading/unloading, waiting, preservation or repair operation, which happens due to/ is generated by a breach of the navigation rules, committed by the personnel onboard, or due to other circumstances, and leads to a person's death, injury, or health impairment, generates a temporary or permanent work incapacity, leads to the complete loss of a vessel, damages the vessel and the port facilities, damages the environment by polluting it or disturbs the use of the navigation channels, etc.

No ..	Navigation incident's name		Definition	
1	Sinking		With pollution	The disappearance or the act of making a ship disappear below the waterline (after being damaged).
			Without pollution	
2	Collision	Ship to ship	With pollution	A violent impact between two objects (two ships, a ship and another floating material located on the navigation channels) moving towards each other, or between one moving object and a stationary one; clash, bump.
			Without pollution	
		Between a ship and a port facility, other constructions	With pollution	A violent impact between a vessel and a port facility, a hydro-technical construction or other facilities and constructions placed along the navigation channel; clash, bump.
		Without pollution		
3	Fires		With pollution	Fire started aboard a ship, which spreads further, causing serious material damages.
			Without pollution	
4	Running aground		With pollution	Pulling the vessel on dry land, in an unusual place (a channel edge, a rock, a sandbank, etc.), in a dangerous position, following an accident or in unusual circumstances and maintaining the vessel in this position for a certain period of time. Hitting the seabed with the vessel.
			Without pollution	
5	Water hole		With pollution	An excavation or a fissure the ship's hull, allowing water to enter inside.
			Without pollution	
6	Work accident	NA	A violent bodily harm or an acute professional intoxication suffered during the working process, aboard a ship, or while the worker is carrying out his/her professional tasks, leading to a temporary work incapacity of at least 3 calendar days, a disability or death.	

7	Other damages	With pollution	Everything that has not been mentioned in the definitions stated above
		Without pollution	
8	Pollution	NA	Contaminating water, air, the environment with residual substances, waste, etc. Spilled by ships.

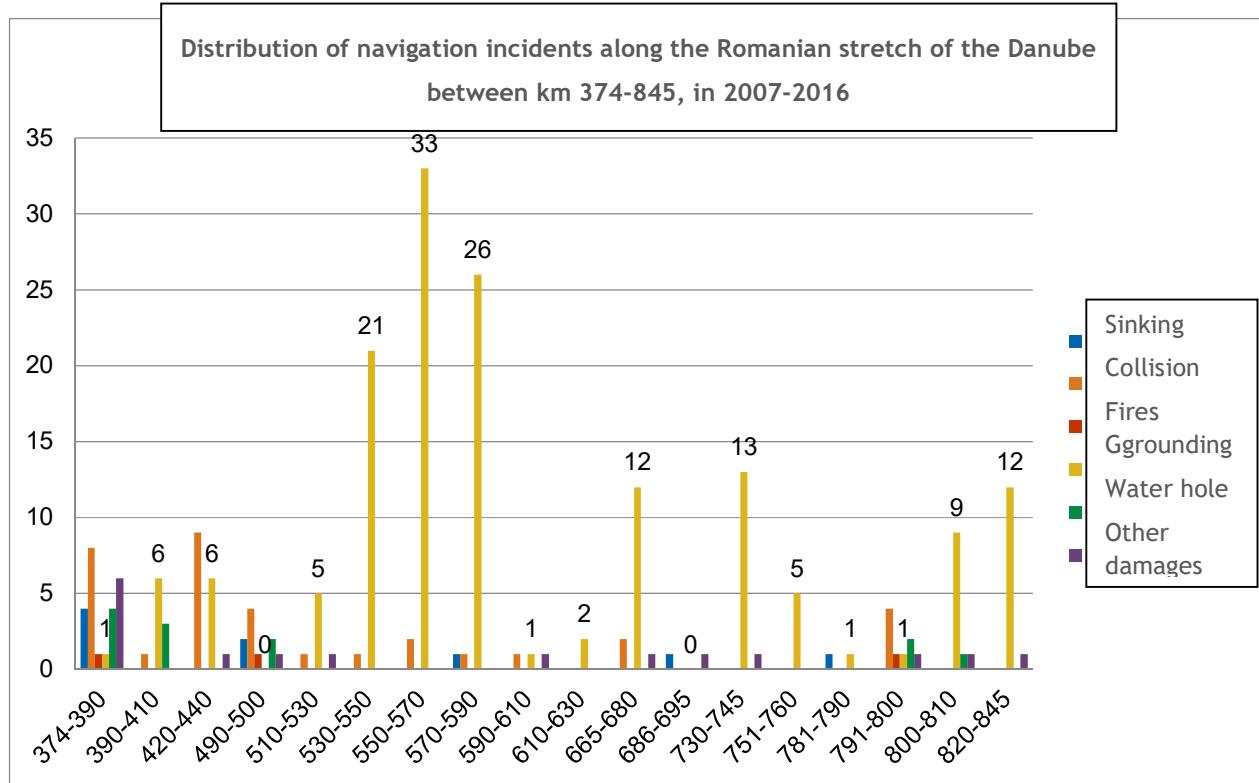
Defining the causes that led to the navigation incidents:

No ..	Cause leading to the navigation incident	Definition
1	Navigation error	The ship's deviation from its set course, undiscovered on time and left uncorrected in an efficient manner, which can lead to accidents, running aground incidents, an unjustified extension of the trip's duration.
2	Wrong steering	A set of inappropriately executed operations to make a vessel move in the desired direction, especially during docking, anchoring and during the port entry and exit operations.
3	Weather conditions	Bad weather conditions that do not create a safe environment for inner navigation. In case of storm warnings, one shall take into account the recommendations issue by the Danube Commission .
4	Breakdown of the managing installation	Breakdowns of the managing installation caused by human factors or resulted from the continuous operation of the system.
5	Breakdown of the propulsion system	Breakdown of the propulsion system caused by human factors or resulted from the continuous operation of the system.

6	Breakdown of the navigation devices	Breakdown of the navigation devices caused by human factors, by inappropriate operation or as a result of their continuous operation.
7	Inappropriate loading and stacking of merchandise aboard the ship	Breaching the instructions issued in relation to loading, unloading, stacking and tying the merchandise onboard the ship, inappropriate handling of such merchandise aboard the vessel, with negative effects on the ship's stability.
8	Ties breaking	The ropes breaking for unforeseen reasons
9	Shallow waters	Sailing through shallow waters, foreseen and communicated to navigators, by the navigation channel administrator.
10	Act of God	An event that cannot be foreseen or prevented by the person who would have been held liable, had the event not occurred.
11	Force Majeure	An extreme, unpredictable, absolutely invincible and inevitable event.
12	Wrong marking	The wrong marking of the sailing line, due to unverified and unmarked route changes, moving buoys from their positions, non-functional coast signals, etc.
13	Installation and equipment tear and wear	Old installations and pieces of equipment, that have not been checked according to the requirements.
14	Other causes	Any other causes not listed in the definitions stated above.

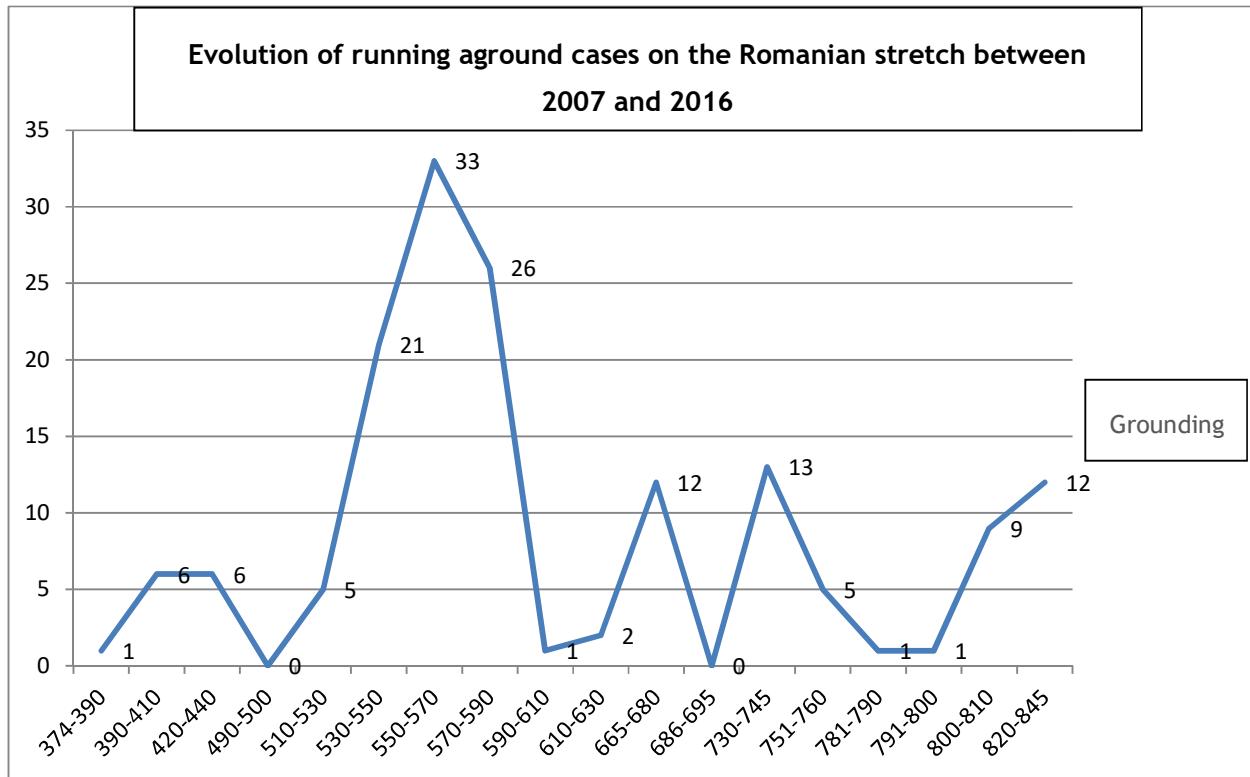
1.3. DISTRIBUTION OF NAVIGATION INCIDENTS ALONG THE DANUBE STRETCH BETWEEN KM 374 AND 845

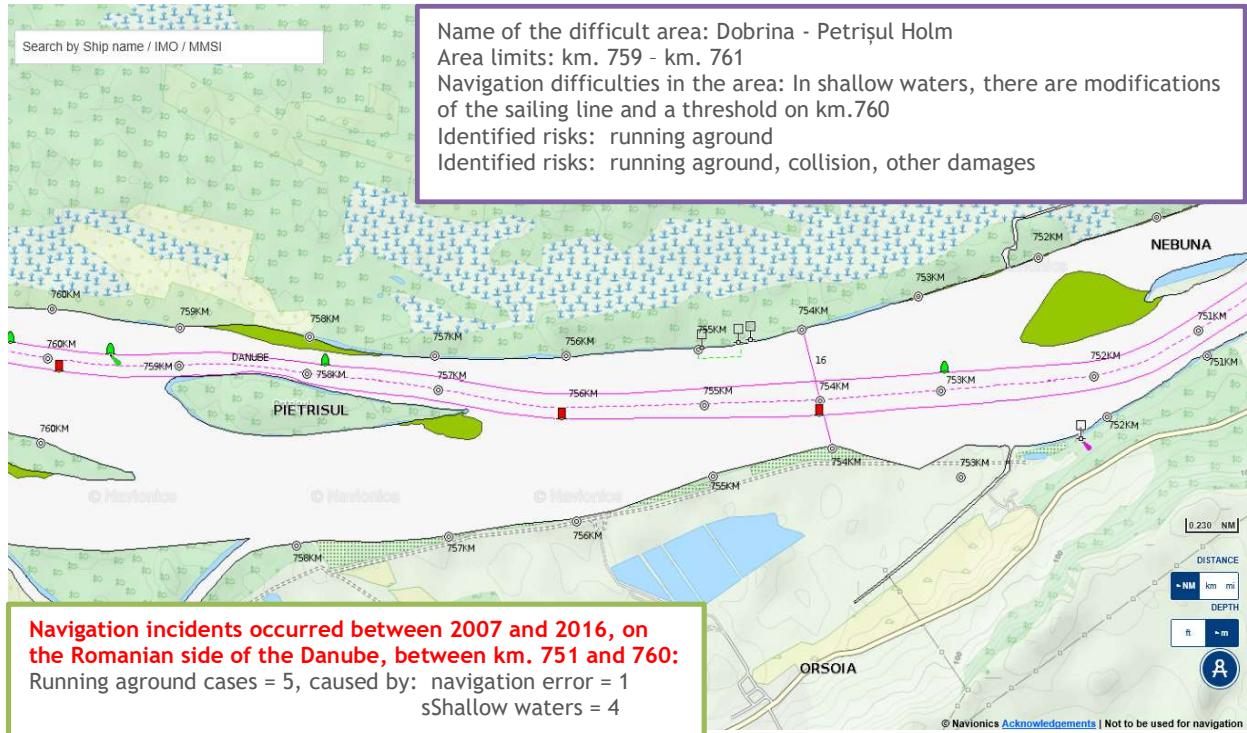
The navigation incidents counted and used to draw up the methodology have been distributed by sectors, depending on the Danube stretch they had occurred on. Those areas were also difficult navigation areas, being briefly explained on the navigation map.



As you can see above, the highest share comes from navigation incidents occurred on the Romanian stretch of the Danube located between km 550 and 570 (the Belene and Liuta areas) which led multiple vessels and convoys to run aground, due to the shallow depth of the water.

Graphic representation of running aground cases, which weigh heaviest in the share of incidents occurred during the above mentioned and analysed period.





You can find, enclosed with this report, a graphic representation of the incidents of running aground, sinking, water hole, ship to ship collision, collision between a ship and port facilities, fires and accidental pollution, recorded on the joint Romanian -Bulgarian stretch of the Danube, between 2007 and 2016.

1.4. SHIP'S RISK PROFILE

A ship's risk profile is the score granted to an inner navigation vessel by the Integrated System for Ship Inspection. All the vessels showing in the River Information Service (RIS) are granted a certain risk factor, e.g., high, standard (average) or low (reduced) determined based on general and historic parameters.

Within our project, the risk profile of an inner navigation vessel has been determined based on the existing legal provisions in place in the field of maritime navigation, e.g. the Paris Agreement Memorandum of Understanding on Port State Control, dated 26.01.1982 and the Memorandum of Understanding on Port State Control on the Black Sea, dated 13.04.2016.

When adapting the provisions of these regulations to the risk profile of an inner navigation vessel, one has taken into account the applicable legislation in place in the field of inner channel navigation, e.g.:

(EU) Directive 2016 / 1629, issued by the European Parliament and Council on 14.09.2016,, setting forth the technical requirements for inner navigation vessels, modifying Directive no. 2009/100/CE and repealing Directive no. 2006/87/CE, the European Agreement on the transport of hazardous materials on inner navigable channels (ADN), adopted in Geneva on the 26th of May 2000 (A.D.N.), with its subsequent rectifications, OMT 1447/2008 approving the technical requirements applicable to inner navigation vessels and R.N.D. (Navigation regulation on the Danube - Edition 2013).

The risk profile shall be implemented in a software application which shall automatically generate the risk level of each ship.

The risk profile of a ship shall be recalculated every day, taking into account the changes occurred in its ore dynamic parameters, such as its age, its history in the past 12 years and the company performances. A new recalculation will also take place after each inspections and when the known applications of the performance tables for pavilions are changed.

Factors that can determine an additional inspection, regardless of the ship's risk profile:

- Vessels involved in navigation incidents such as: collision, running aground, pollution, fire aboard.
- Vessels that breached the navigation rules, the notifications sent to the navigators or the Navigation Regulation on the Danube.

- Vessels reported by another state.
- Vessels that cannot be found in the Inspections Database
- Vessels operated in a dangerous manner, that puts their safety at risk
- Vessels making up the object matter of a report or a complaint.

Table 2. The risk profile of an inner navigation ship:

Generic parameters		Risk profile						
		High risk profile ships (NRR)			Standard risk profile ships (NRN)		Low risk profile ships (NRS)	
		Criteria		Weight (in points)	Criteria	Weight (in points)	Criteria	Weight (in points)
1.	Ship type	Naval constructions holding an approval certificate to transport hazardous merchandises on inner navigation channels (according to the A.D.N. provisions)	Passenger ships (Directive 2016/1629)	2	Naval constructions bearing a length of at least 20 meters and a capacity of at least 10 cubic meters, carrying out towing operations, including self-propelled transport ships.	1	All the other naval constructions sailing alone/ tug boats/ push boats sailing alone/ floating installations	0
2.	Ship's age	All types > 20 years			2			
		All types, max. 20 years and min. 10 years			1			
		All types, max. 10 years			0			
3a.	Pavilion	The pavilion country (vessel's pavilion) implements certification systems for navigation companies operating on inner navigation channels (Ex. ISO 9001/2008 Certifications)	No	1	Yes	0	Yes	0
3b.		The vessel holds an authorisation certificate issued by the classification company (a recognized organisation)	No	1	Yes	0	Yes	0
3c.		The ship holds union certificates issued by a recognized organisation	No	1	Yes	0	Yes	0
4.	Navigation Company	Performance	High	-	-	-	High	0

Average	-	-	Average	1	-	-
Low	Low	2	-	-	-	-
Very low	Very low		-	-	-	-

Ship's historic parameters :

5.	Number of deficiencies discovered during each inspection over the past 12 months	Deficiencies	≥ 3	1	Neither NRR nor NRS	≤ 3 (and at least one inspection carried out during the past 3 months)	0
6.	Number of retentions in the last 12 months	Retentions	≥ 2 retentions	1	Neither NRR nor NRS	No retentions	0

1.5 PARAMETERS OF A SHIP'S RISK PROFILE:

1. Vessel type name - in line with the provisions of (EU) Directive 2016 / 1629, issued by the European Parliament and Council on 14.09.2016, setting forth the technical requirements for inner navigation vessels, modifying Directive no. 2009/100/CE and repealing Directive no. 2006/87/CE, the European Agreement on the transport of hazardous materials on inner navigable channels (ADN), adopted in Geneva on the 26th of May 2000 (A.D.N.), with its subsequent rectifications, OMT 1447/2008 approving the technical requirements applicable to inner navigation vessels and R.N.D. (Navigation regulation on the Danube - Edition 2013). The definitions listed in the table and accepted by both parties (Ro-Bg) shall taken into account
2. Ship's age (how old it is) - shall be calculated based on the construction year stated in documents (reference, Directive no. 2016/1629, art. 10)

3. Company Certification for inner channel navigation - the navigation company has implemented a management programme, and it has and can produce a certification with this regard (a copy of that certification and the procedures implemented, can also be found aboard the ship).

4. Authorisation Certificate - class certificate,

5. Company performance - To be assessed by both parties (Ro - Bg), one calendar year after the implementation of the DANRiSS project.

The information obtained this way shall be used for an automatic calculation of the ship's risk profile for the following year.

Obs. 1. The inspectors carrying out the inspection/ check, do not determine the level of performance. This will have to be a pre-set criterion. The risk assessment profile must be drawn up before the inspection starts.

Obs. 2. The starting point for the Company performance are the 2016 PSC Memorandum and the MOU 1982 Paris Memorandum.

High	No retention measures have been implemented for any of the company's vessels over the last year
Medium	There have been retention measures implemented for less than 50% of the company's inspected vessels amounting to at least 1 retention/ship/year
Low	There have been retention measures implemented for more than 50% of the company's inspected vessels, amounting to at least 1 retention/ship/year
Very low	There have been retention measures implemented for all of the company's inspected vessels, amounting to at least 1 retention/ship/year

There is a three level assessment scale for risk occurrence probability:

High - Occurrence probability >25% , high complexity and frequent changes

Medium - Occurrence probability (5.....25)% , average complexity and reduced changes

Low - Occurrence probability < 5%, low complexity and high process stability

The navigation incident with the highest occurrence probability is running aground - with a number of 412 instances.

The navigation incidents with an average occurrence probability are: water holes - 24, ship to ship collisions - 45 and sinking - 18.

The navigation incidents with a low occurrence probability are: fires aboard a ship - 5, collisions between a ship and a port facility or a hydro*technical construction - 5 and work accidents aboard a vessel - 1

The risk impact assessment scale has the following levels:

Insignificant - the ship hasn't been damaged at all, the merchandise loaded and the crew are unaffected.

Low - small damages suffered by the ship and the loaded merchandise, the crew, unaffected. This is usually the case with running aground incidents and other damages.

Medium - Significant damages suffered by the ship and the loaded merchandise, requiring the vessel's withdrawal from circulation and the transfer of the merchandise elsewhere. The crew is unaffected. This is usually the case with ship to ship collisions, or collisions between ships and port facilities or hydro-technical constructions.

High - Partial destruction of the ship, more than half of the transported merchandise is damaged, the crew is unaffected. This is usually the case with fires, water holes and work accidents.

Major - Total loss of the ship and the merchandise transported onboard, loss of human lives, major pollution.

1.6 RISK REACTION APPROACH

The Authorities' approach to risk reaction, may be the following, depending on the type of risk involved:

- Updating the Navigation Regulations on the Danube, to include new provisions related to the ship captains' obligations to be informed on the navigation conditions applicable to the sector they are about to go through, as well as an overall improvement of the navigating staff's professional training.
- Permanently supervising the vessels' operations/manoeuvres in the RIS -VTMIS supervision area.
- Drawing up and updating the local plans for coordinating intervention activities in their area of responsibility.
- Permanently informing the ship captains via the available RIS-VTMIS centres, on the evolution of water depths on the Danube sector about to be covered, changing the markings in critical areas as quickly as possible and communicating such changes in real time.
- Checking the way the installations and equipment aboard the ship function, on the procedural column (1 check/ ship/ every 3 months).
- Proposing the initiation of a procedure to identify a possible pollutant, by carrying out check along the flux, consulting with those who repair ships, etc.
- The ship owners operators' ship captains working on inner navigation vessels may have the following approach to risk reaction, depending on the type of risk involved:
 - Drawing up working procedures meant to keep people informed on the weather and the navigation conditions, drawing up working procedures designed to prevent collisions, managing the information received from the RIS-VTMIS centres.
 - Drawing up working procedures to manage emergency situations - fires - aboard the ship; drawing up revision and maintenance schedules for all the installations and pieces of equipment aboard a ship, and making them available to the ship captain.
 - Checking the observance of the labour health and safety requirements and the fire extinguishing measures.
 - Correlating the gauge of a ship/ convoy with the navigation area; staying up to date with all information related to the water depth and the marking in the navigation area.
 - Drawing up working procedures designed to prevent pollution, as well as procedures for handling, loading and storing hazardous goods.

1.7 CONCLUSIONS

The draw-up of this risk assessment methodology for ship surveillance and inspection, within the DANRISS project - *Development of a common and legal framework for ship inspections for the common Bulgarian-Romanian stretch of the Danube river with interface to the national River Information Service (RIS)* aims to support the drafting of a set of special navigation rules on the joint Romanian-Bulgarian Danube Stretch, and a naval inspection methodology.

The purpose is to identify all vessels sailing under foreign pavilions, that pose a threat to themselves, to their crew, their passengers or the merchandise they carry, as well as to the environment.

By fixing the deficiencies found, all states of danger should be removed.

Drawing up a ship risk profile, shall help identify all the vessels that might pose a threat to the safety of the navigation.

One calendar year after the implementation of the methodology and the risk profile in the joint Danube stretch, they must be assessed again.

Besides, one must also take into account that, during the analysed period, 2007 - 2016, both states located on the Danube banks - Romania and Bulgaria - started implementing the RIS services. Thus, during this time, the number of navigation incidents dropped significantly compared to the period between 1997 and 2006.

The ship risk profile, in its current form, may be changed following a risk assessment and after the implementation of this model.

ANNEXES :

ANNEXE 1 - The Danube km. 736 - 739, Linovo Calafat

ANNEXE 2 - The Danube km. 759 - 761, Ostrov Dobrina

ANNEXE 3 - The Danube km. 783 - 785, Bogdan - Secian

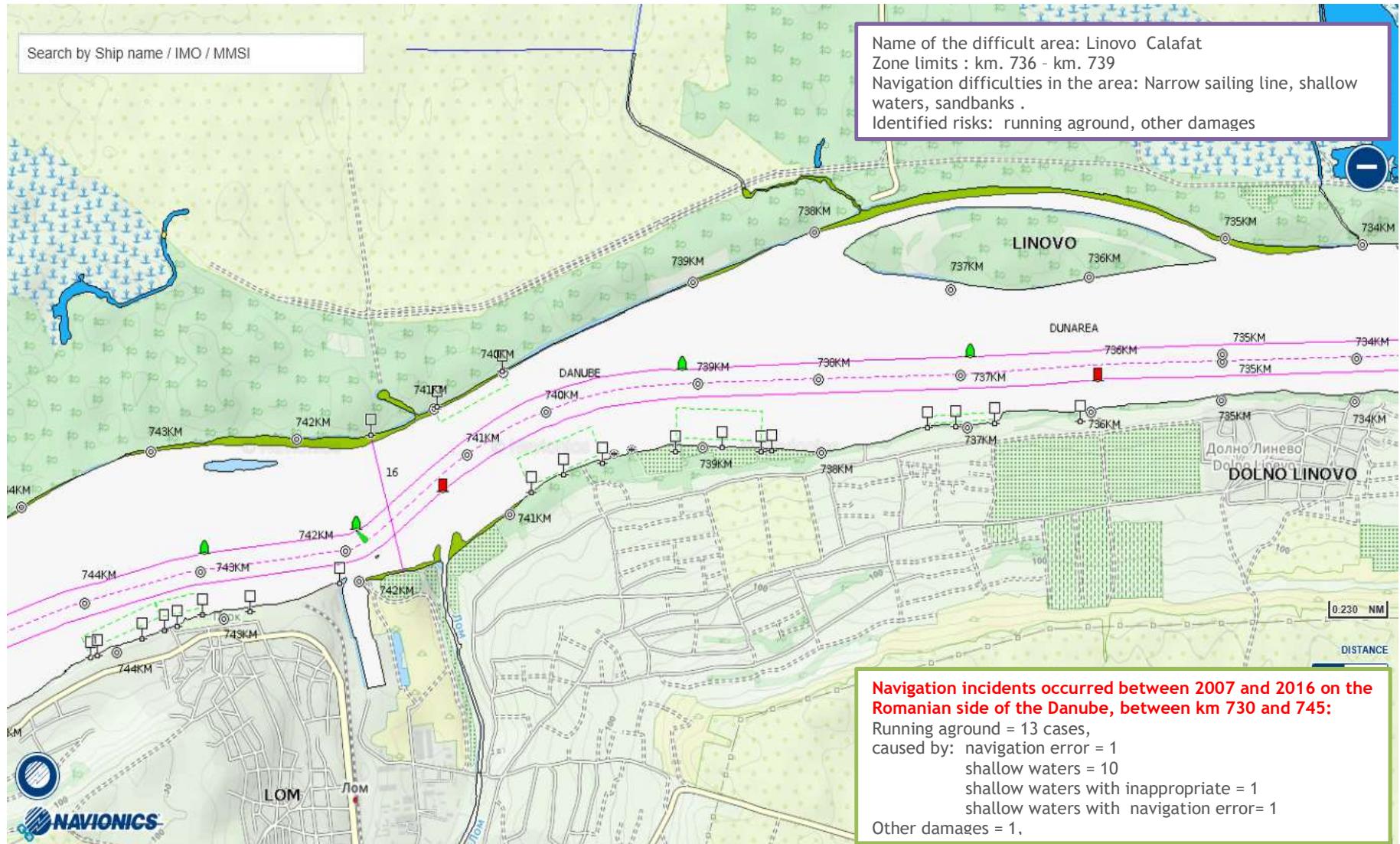
ANNEXE 4 - The Danube km. 791 - 800, Calafatul Mare

ANNEXE 5 - The Danube km. 800 - 810, Basarabi

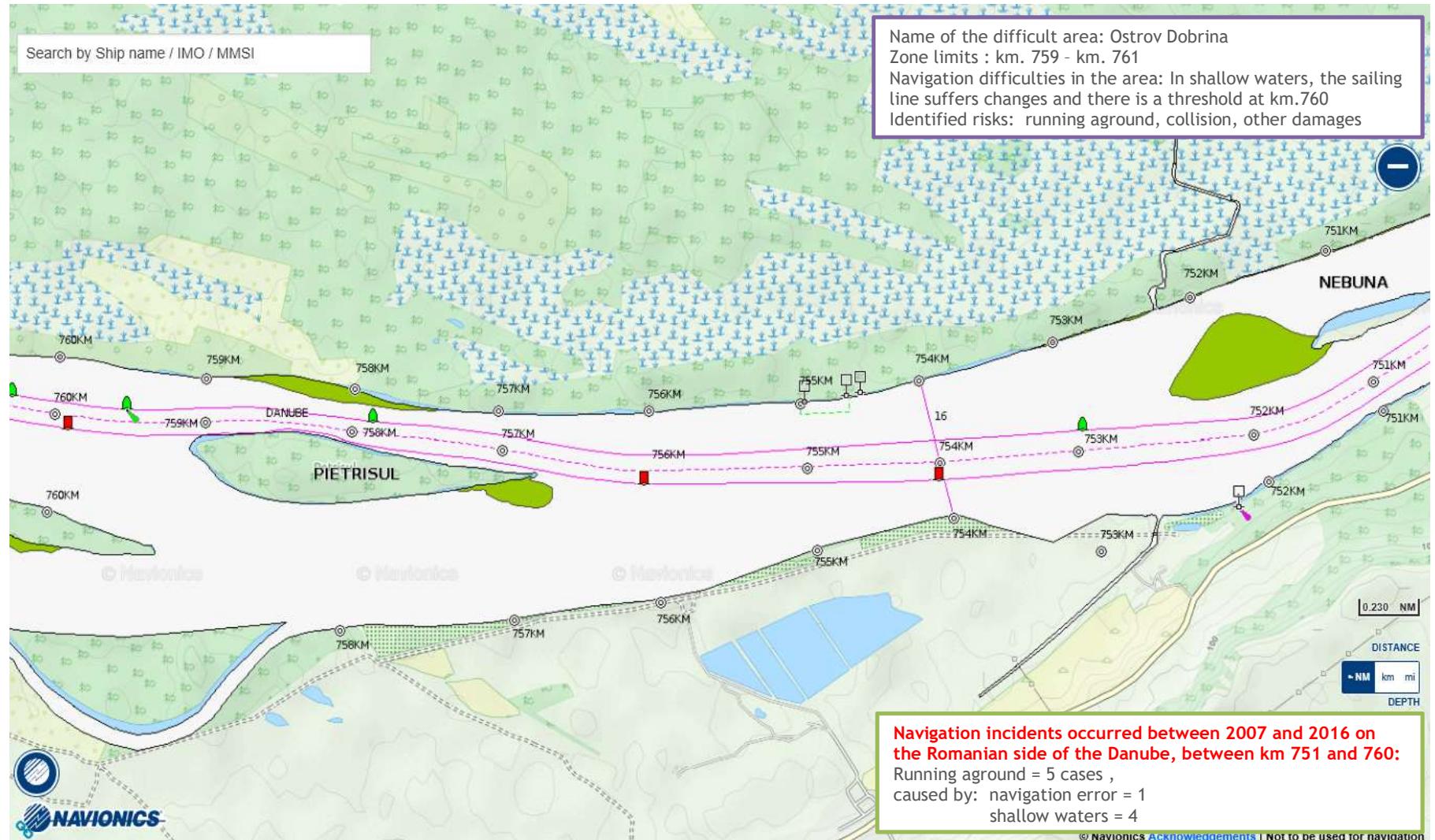
ANNEXE 6 - The Danube km. 820 - 823, Salcia

ANNEXE 7 - The Danube km. 835 - 845 , Gîrla Mare

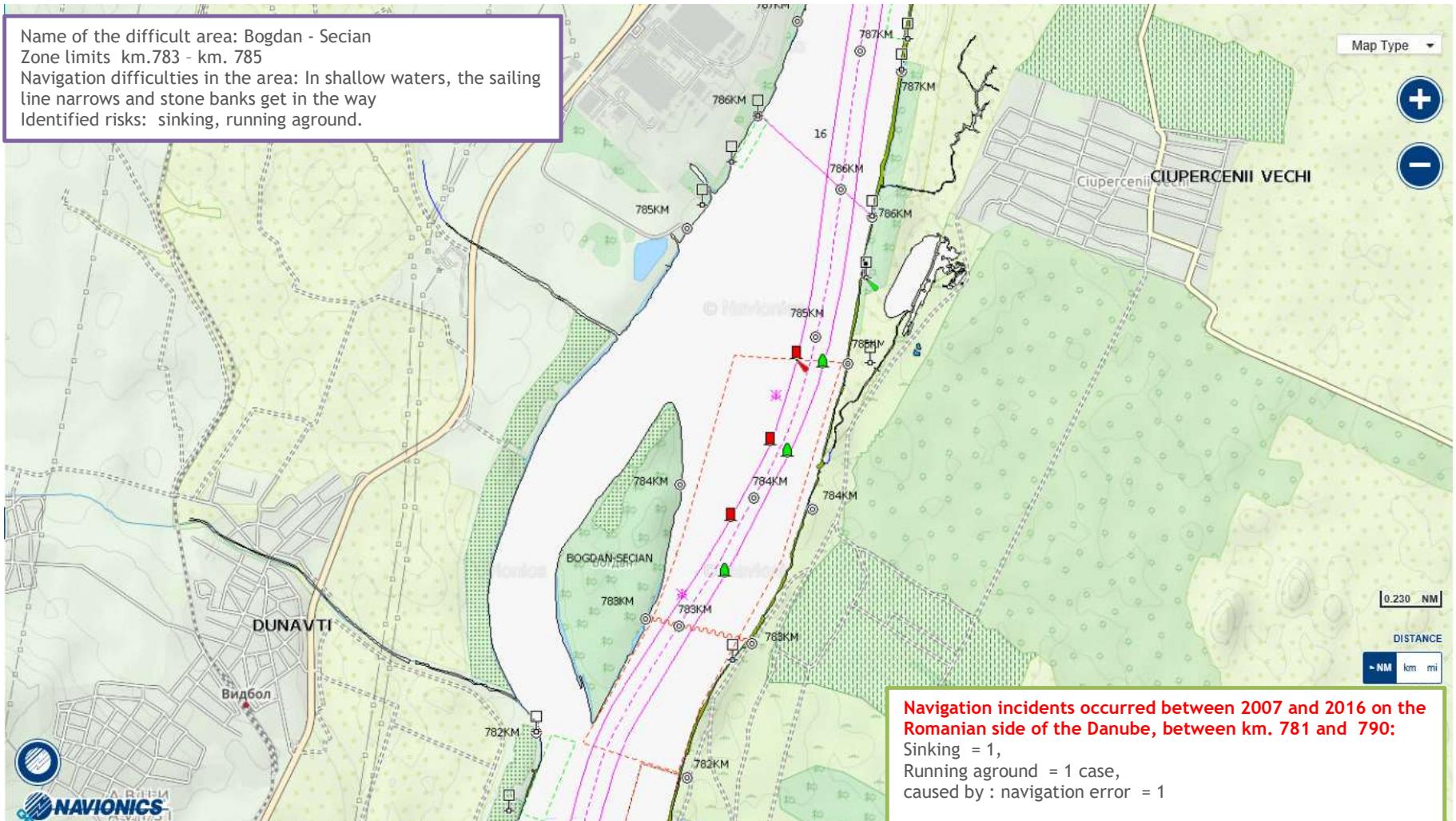
The Danube km. 736 – 739, Linovo Calafat,



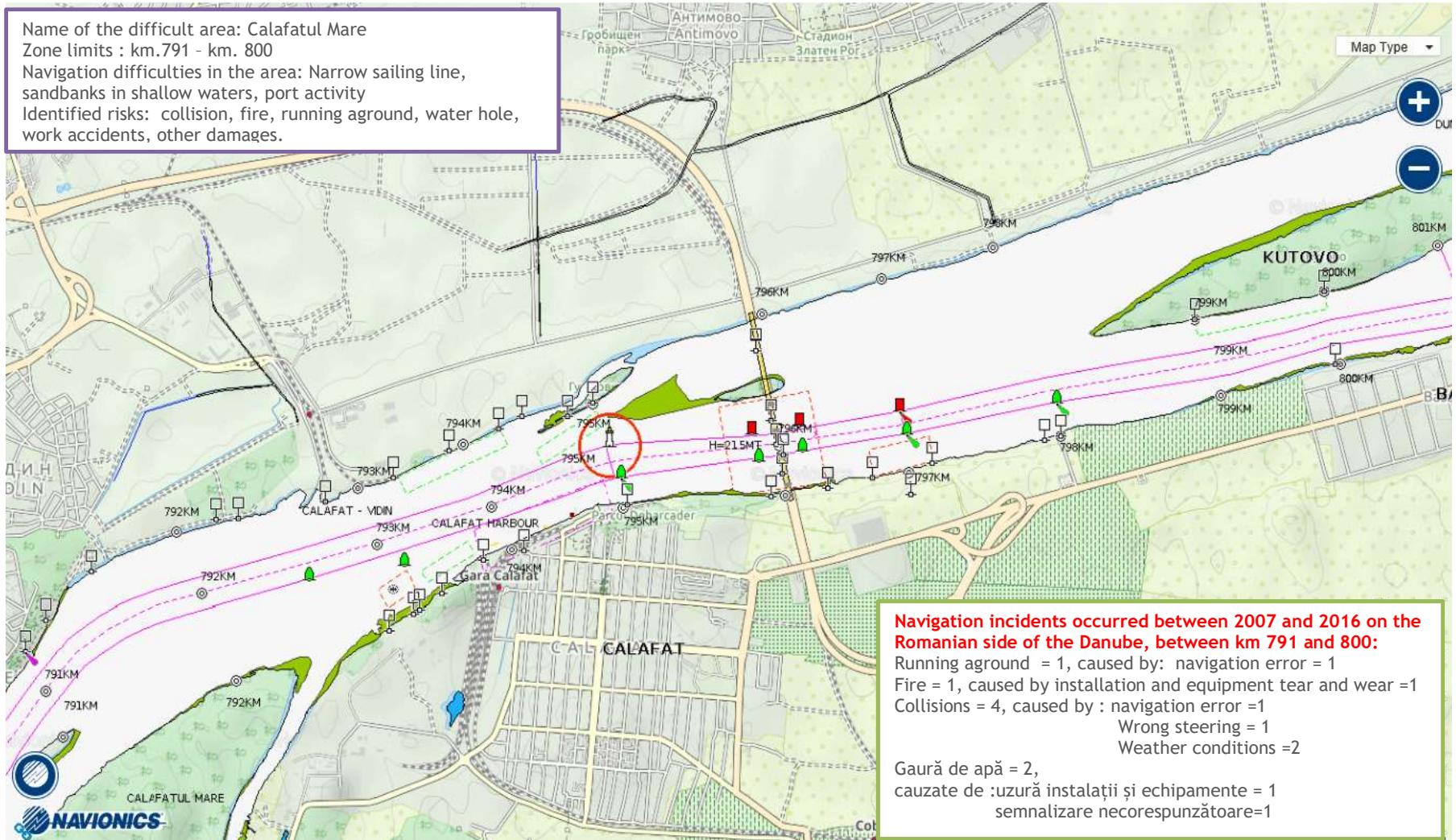
The Danube km. 759 – 761, Ostrov Dobrina,



The Danube km. 783 – 785, Bogdan - Secian,

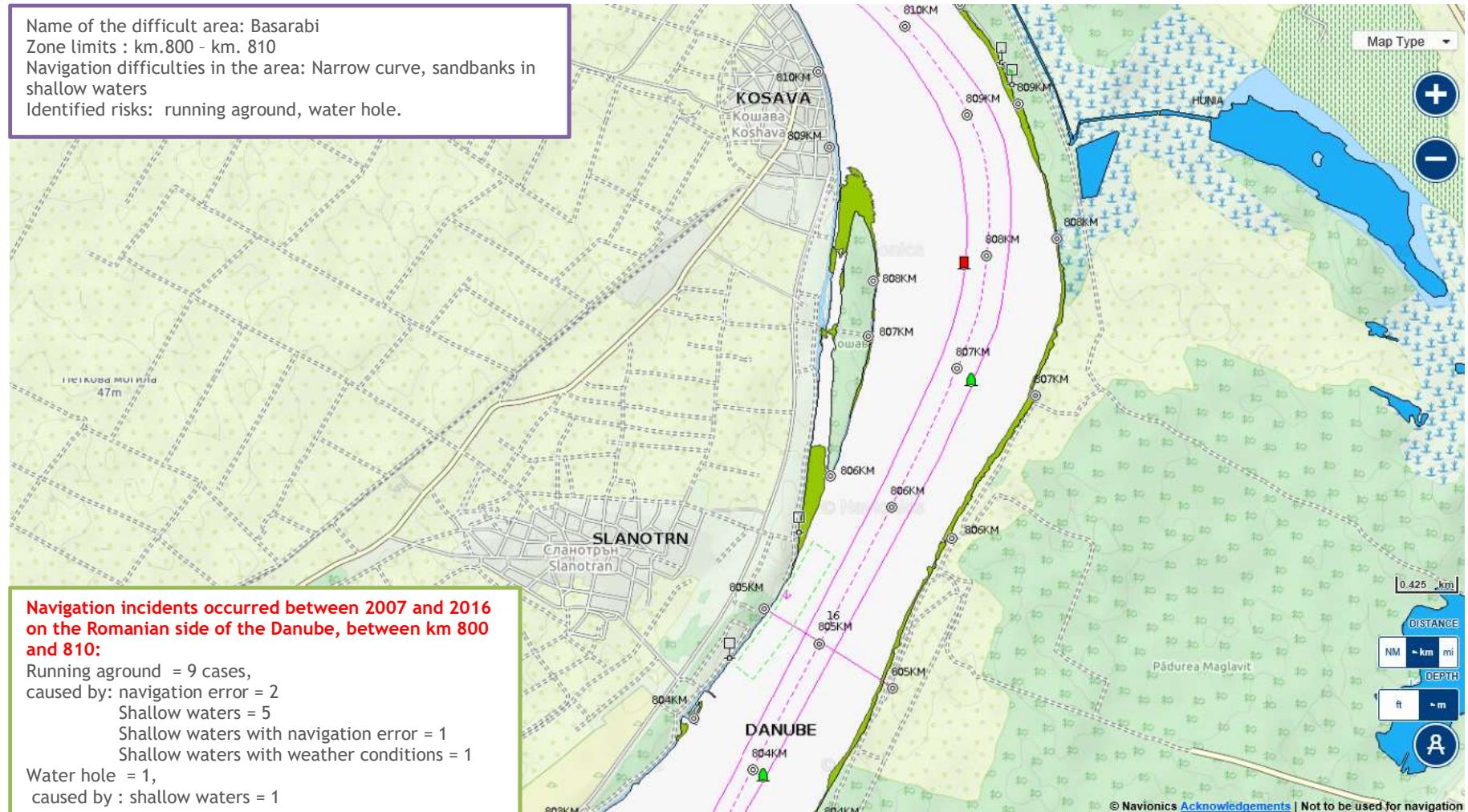


The Danube km. 791 – 800, Calafatul Mare,

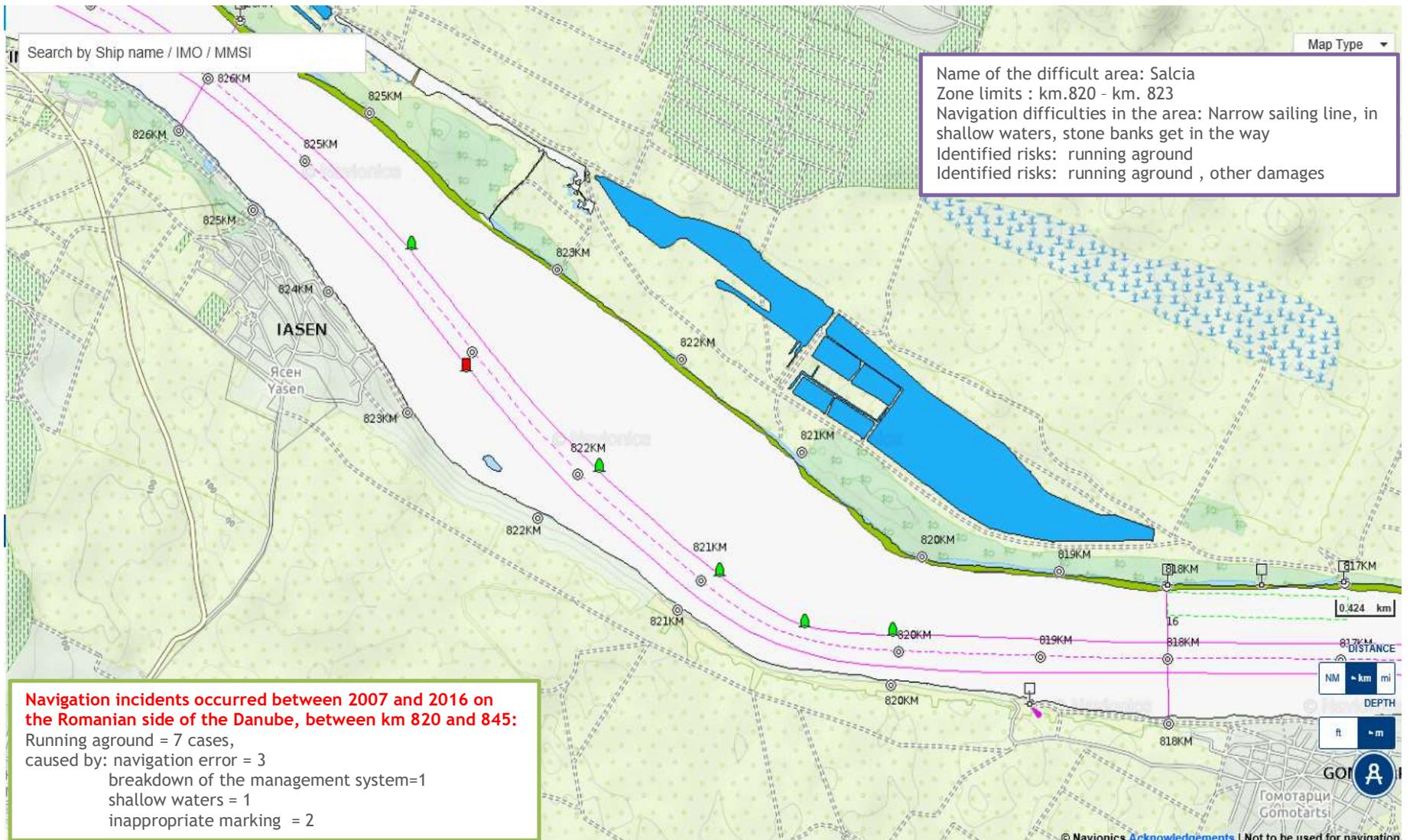


The Danube km. 800 – 810, Basarabi,

Name of the difficult area: Basarabi
 Zone limits : km.800 - km. 810
 Navigation difficulties in the area: Narrow curve, sandbanks in shallow waters
 Identified risks: running aground, water hole.



The Danube km. 820 – 823, Salcia,



The Danube km. 835 – 845 , Gîrla Mare,

