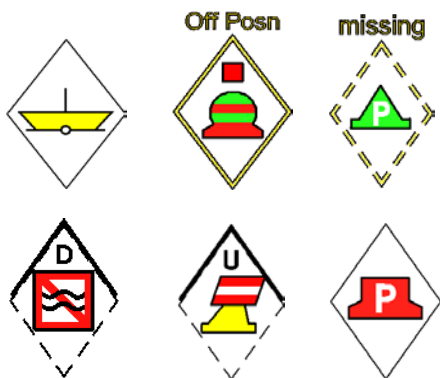


Aids to Navigation (Inland AtoNs)

Status quo, Pilot application at the river Elbe



Aids to Navigation (Inland AtoNs)

Content

- AtoN concept (VTT and Inland ECDIS)
 - "Real AtoNs", "Virtual AtoNs"
 - Maritime <> Inland
- AtoN pilot project at the River Elbe (RIS COMEX)
 - Elbe-Weser Corridor
 - AIS infrastructure in Germany
 - Technical realization in the frame of RIS COMEX
 - Tests and applications

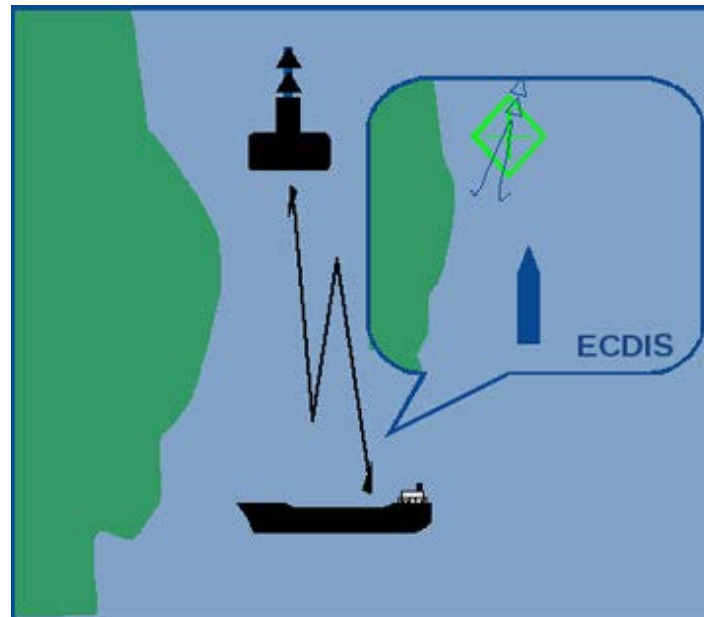
Two groups of AtoNs have to be distinguished, "Real AtoNs" and "Virtual AtoNs" :

„Real AtoNs“:

- Buoys and beacons:
 - Existing as real objects along the waterway,
 - Equipped with transponders that regularly send the condition and position via AIS.
- Purpose: marking durable situations and/or dangerous spots
- Inland ECDIS charts: have to be encoded (e.g. via incremental updates)
- Visualization in Inland ECDIS:
 - Case „on position“: point object with current position and status
 - Case “off position”:
 - "missing" – symbol at required position and
 - "off position" – symbol at actual position

Real AIS AtoN message

- AIS AtoN message for an „Real AtoN“ transmitted by an AIS transponder at the buoy

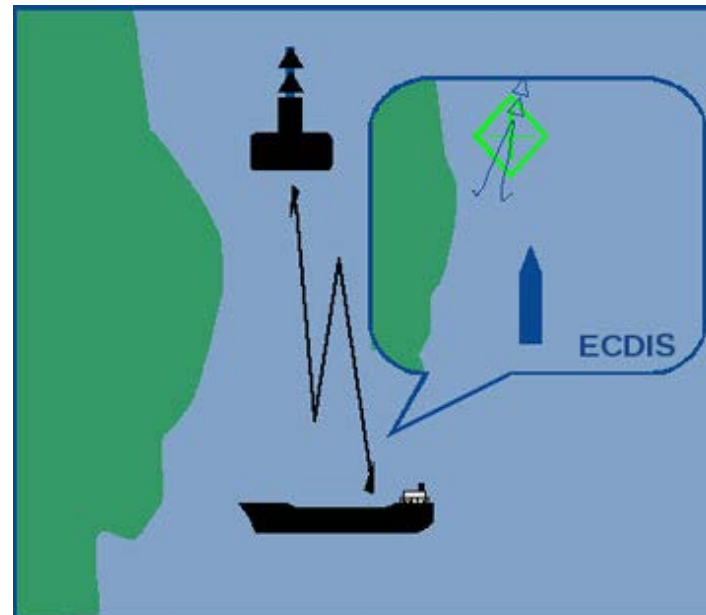


„Virtual AtoNs“:

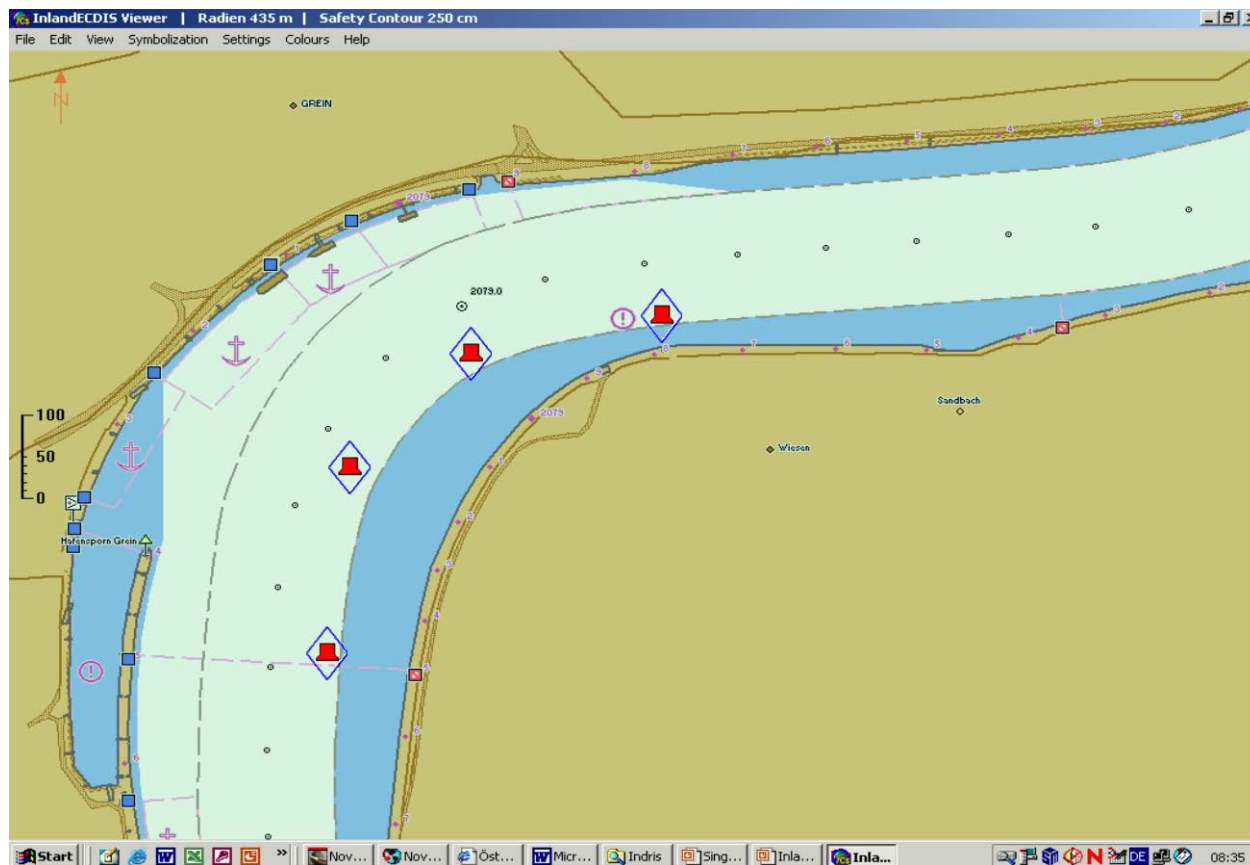
- Buoys, beacons, lines and areas, transmitted via AIS land infrastructure:
 - Only digital objects, not existing as real objects along the waterway
- Purpose: marking temporary situations (restrictions) and/or dangerous spots
- Inland ECDIS charts: no chart update intended with this objects
- Visualization in Inland ECDIS:
 - AIS point object at position
 - Should be oriented, when there is an direction of impact
 - Lines and areas at position

Virtual AIS AtoN message

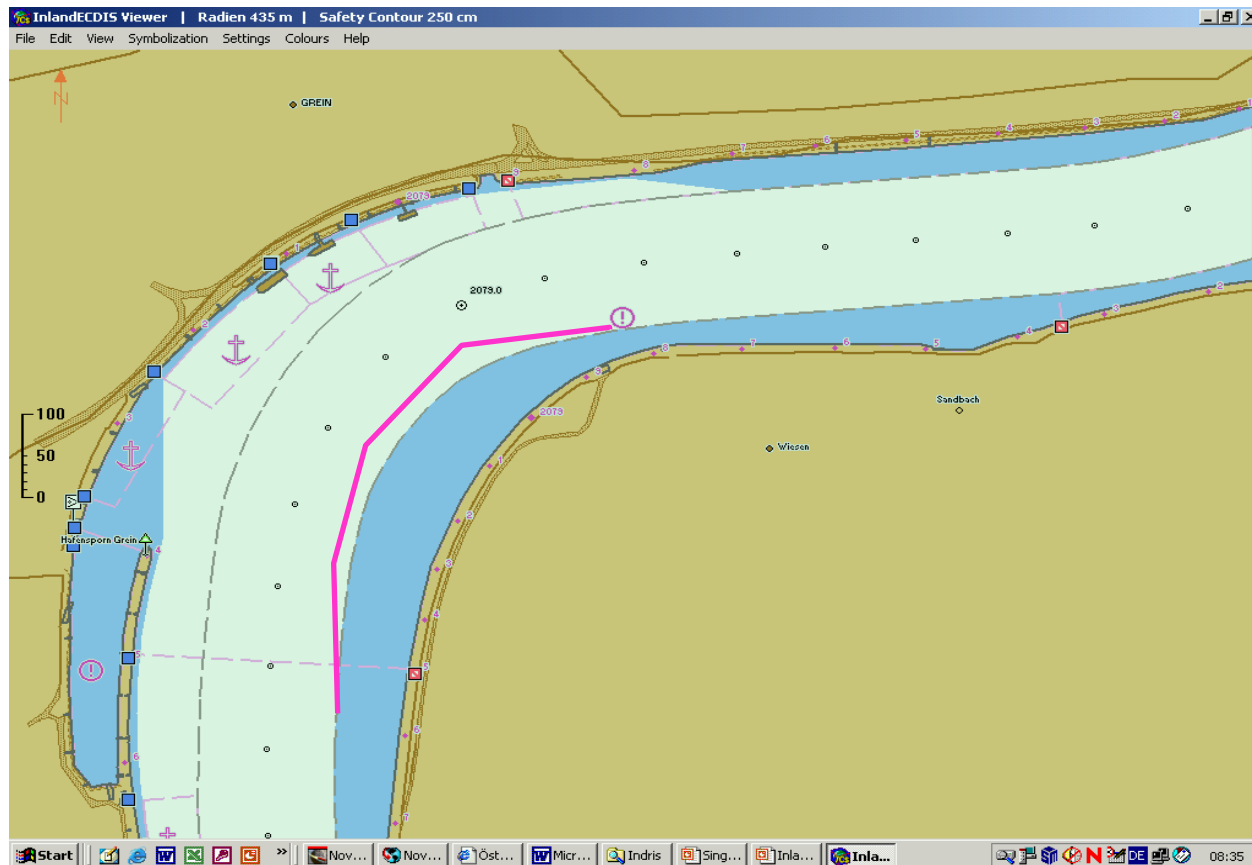
- AIS AtoN message for an „Virtual AtoN“ transmitted by an AIS base station



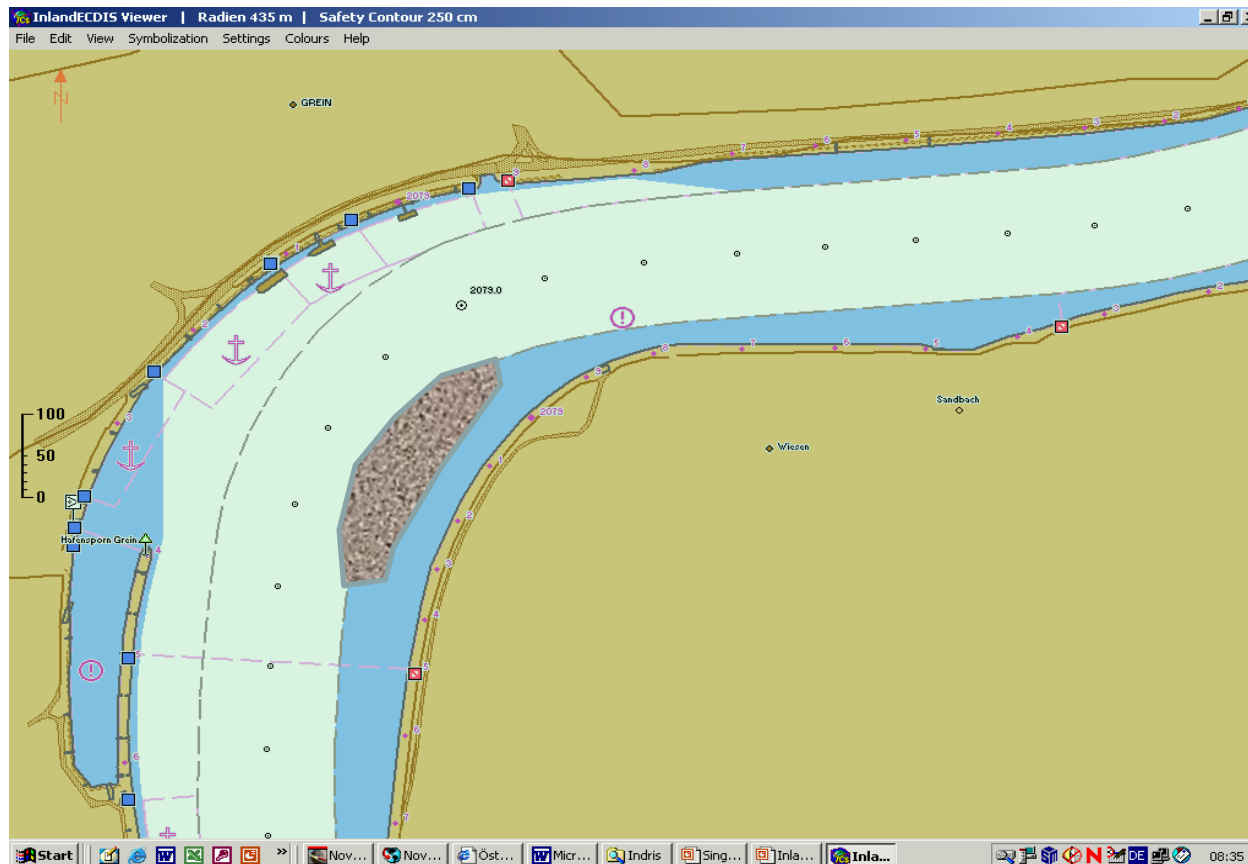
Virtual AIS AtoN dedicated point messages



Virtual AIS AtoN line message



Virtual AIS AtoN area message



























Maritime- and Inland code tables

























Maritime AtoNs (IALA)





































Code	Definition Maritime
0	Default, Type of AtoN not specified
1	Reference point
2	RACON
3	(NOTE 1 – This code should identify an obstruction that is fitted with an AtoN AIS station)
4	Emergency Wreck Marking Buoy
8	Leading Light Rear
9	Beacon, Cardinal N















Inland AtoNs (CEVNI)

	Code	CEVNI code	on pos-o	miss-m	off pos-f	virt-v	Name
fixed aids, landmarks	0						Default, Type not specified
	1	4.A + 4.B					Channel near the right bank
	2	5.A + 5.B					Channel near the left bank
	3	4.C + 4.D					Cross-over right bank
	4	5.C + 5D					Cross-over left bank
	5	8.C - 8.C2					Bridge pillar
	6	8.C3 + 8.C4					Overhead cable

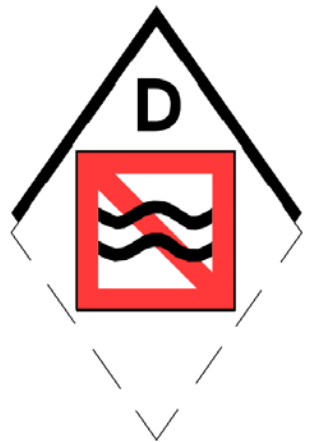
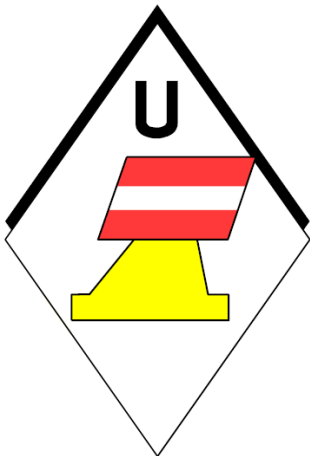
Inland AtoNs

	Code	CEVNI code	on pos-o	miss-m	off pos-f	virt-v	Name
	0						Default, Type not specified
fixed aids, landmarks	1	4.A + 4.B					Channel near the right bank
	2	5.A + 5.B					Channel near the left bank
	3	4.C + 4.D					Cross-over right bank
	4	5.C + 5D					Cross-over left bank
	5	8.C - 8.C2					Bridge pillar
	6	8.C3 + 8.C4					Overhead cable

	Code	CEVNI code	on pos-o	miss-m	off pos-f	virt-v	Name
floating aids	7	1.A - 1.D					Buoy right-hand side
	8	2.A - 2.D					Buoy left-hand side
	9	3.A - 3.D					Bifurcation
	10	3.E1 + 3.F1					Bifurcation, pass right-hand side
	11	3.E + 3.F					Bifurcation, pass left-hand side
	12	1.F + 1.F1					Danger point or obstacle right-hand side
	13	2.F + 2.F1					Danger point or obstacle left-hand side
	14	-					Berth right-hand side
	15	-					Berth left-hand side

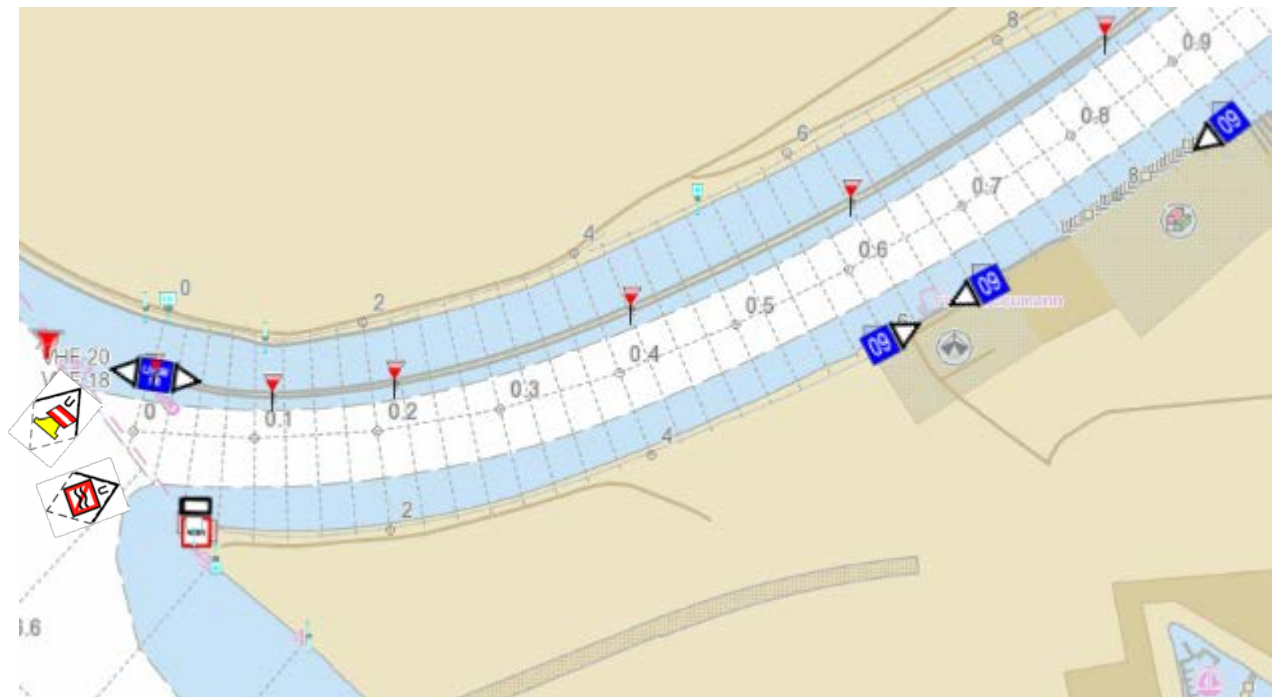
	Code	CEVNI code	on pos-o	miss-m	off pos-f	virt-v	Name
other	16	A.1					No entry upstream
	17	A.1					No entry downstream
	18	A.9					Do not create wash upstream
	19	A.9					Do not create wash downstream
	20	C.2					Headroom limited
	21	-					Signal float

Inland AtoNs, special cases



Point objects with direction of impact

- Need orientation (special AIS message?)

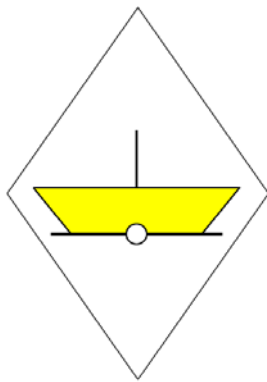


Inland AtoNs, special cases

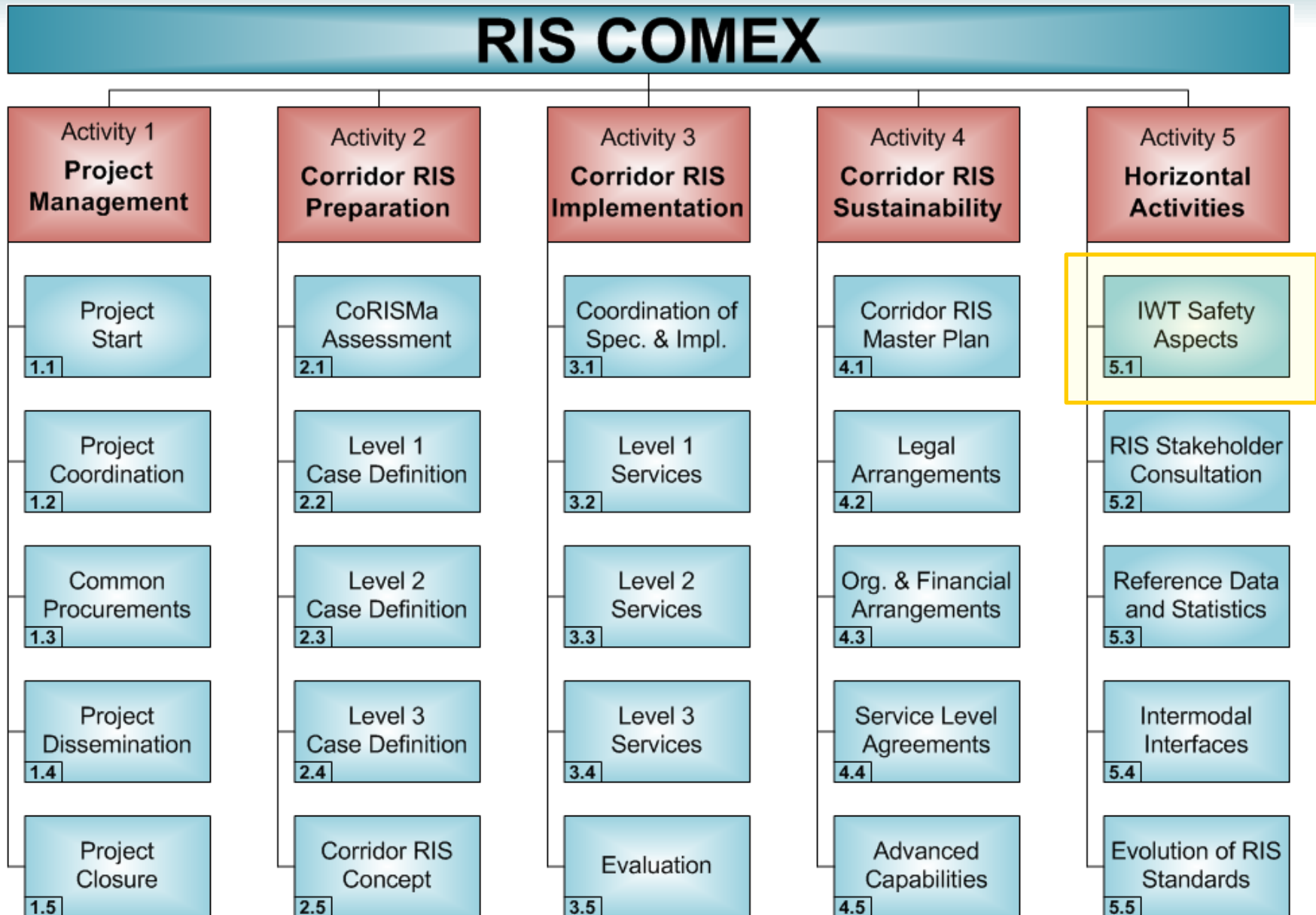
Signal float

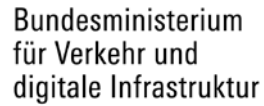
Is only the basis for other signs and signals

- How to provide this information?

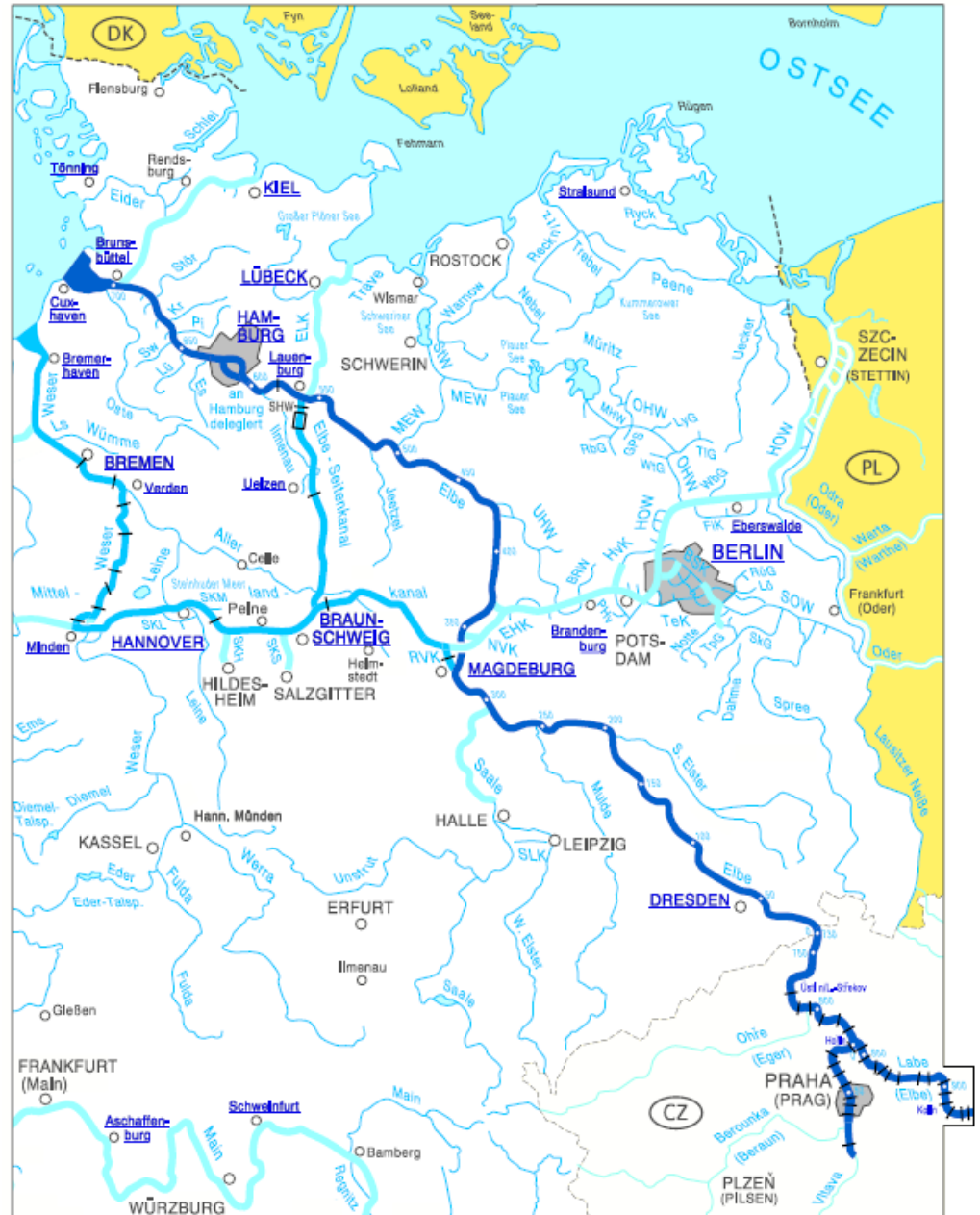


Work Breakdown Structure





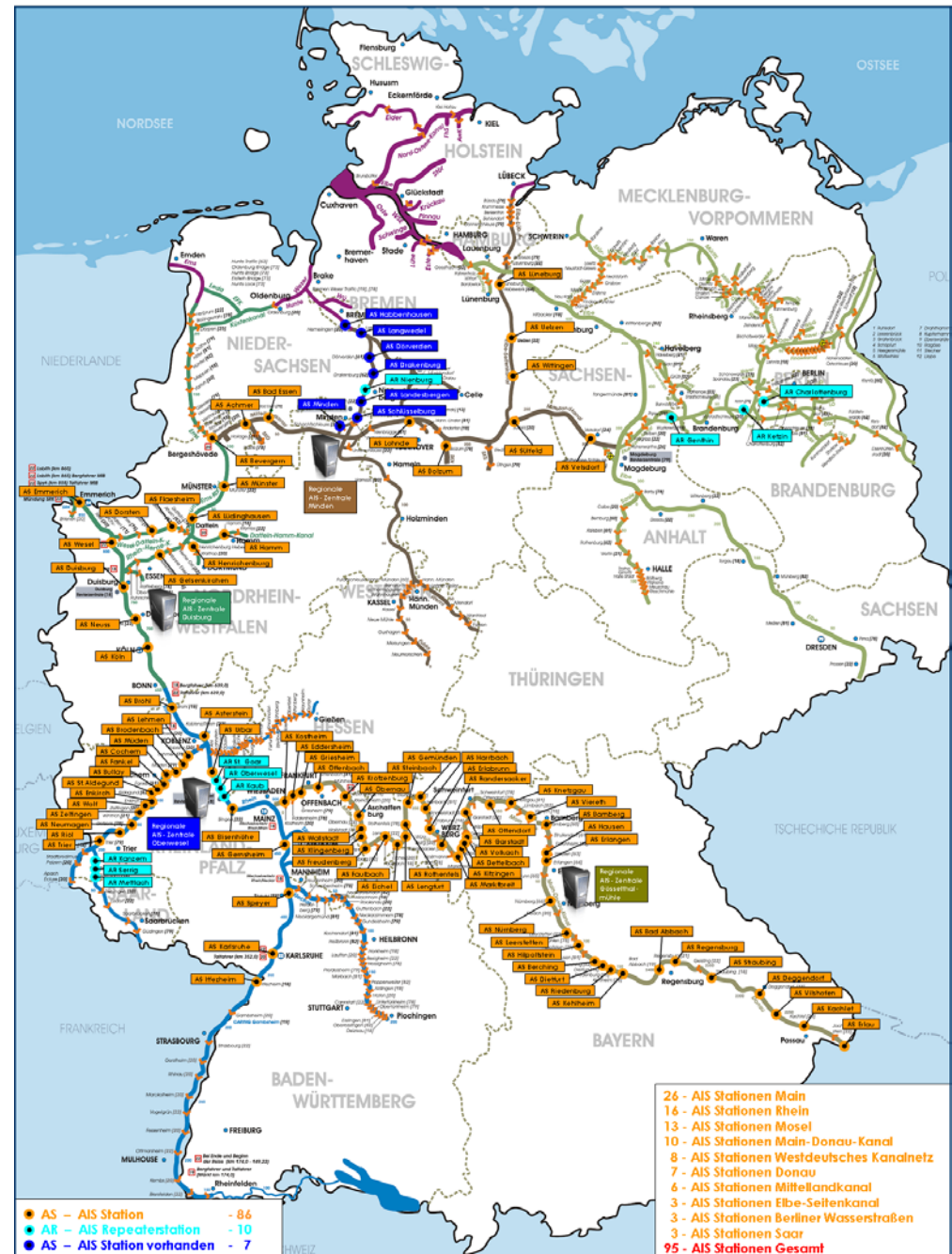
RIS COMEX
Corridor "Elbe-Weser"



Existing AIS landinfrastructure

Covered stretches 2.400 km

- 95 base stations
- 10 repeaters
- 4 regional AIS Servers





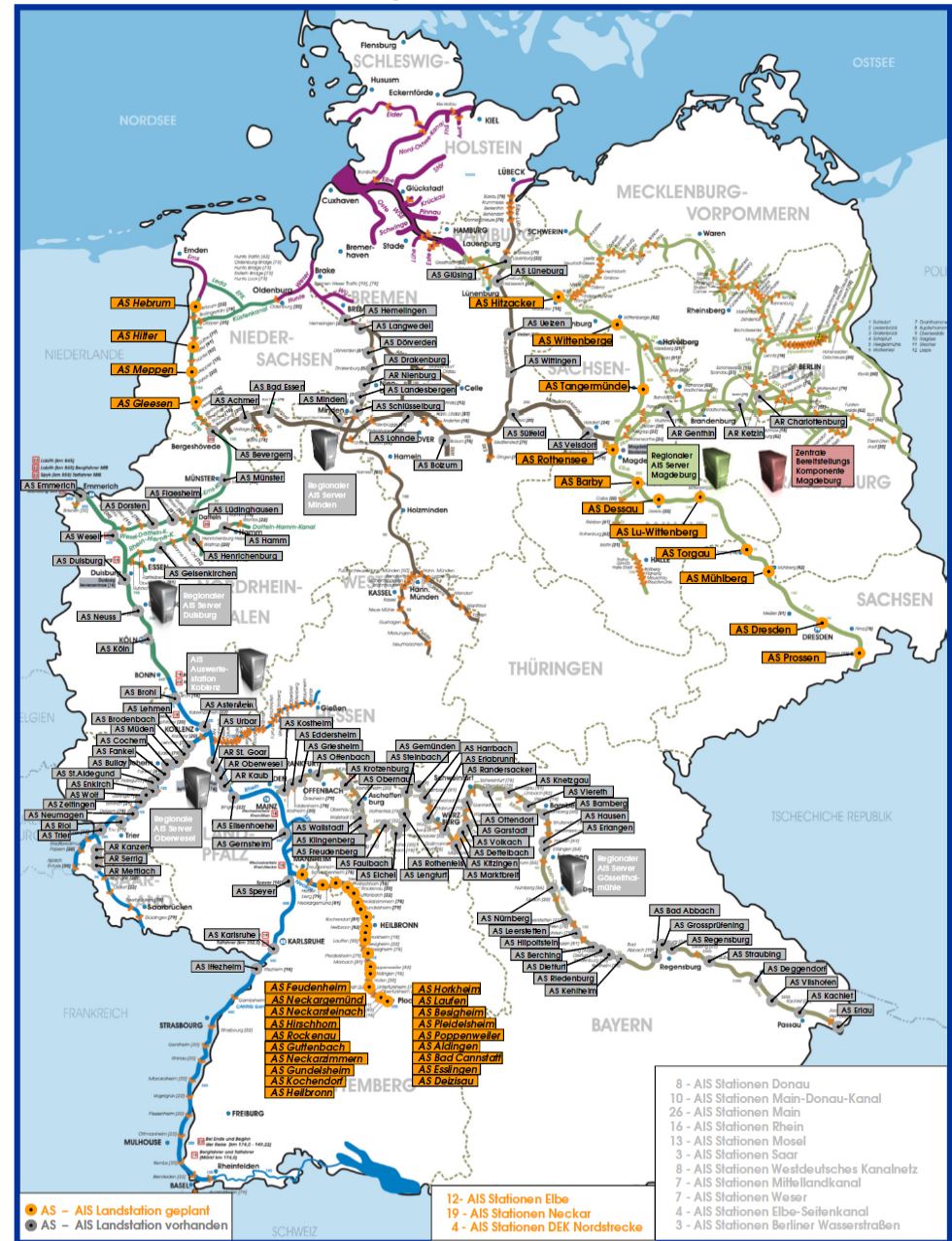
Future AIS landinfrastructure

extended to
Covered stretches 2.800 Km

- 130 base stations
- 10 repeaters
- 5 regional AIS Servers
- 1 central server (Koblenz)
- 1 testserver (Elbe)

Inland AIS - Landseitige Ausstattung an Binnenwasserstraßen

Planungen - Stand Februar 2017



Technical realization in the frame of COMEX



Extension of the AIS software system in Germany:

- Implementation of AIS data exchange with the Waterway Authority of the Czech Republic and the Port Authority of Hamburg, in accordance with the rules for the protection of personal data
- Extension of the internal AIS functionality for monitoring
- Implementation of an Interface to provide AtoN related AIS data for an public AtoN Web Map Service

Technical realization in the frame of COMEX



Preparation of the Pilot application at the river Elbe

- Extensions of the national software which provides the necessary user environment for the responsible staff, with the functionality to administer and publish AtoNs
- The AIS infrastructure has to be extended along the Elbe river
- The AIS data exchange has to be realized
- The ECDIS producers have to be included for realizing the AtoN visualisation at the Inland ECDIS systems on board
- Shipping companies will also take part in the pilot phase
- For recreational navigation, which are not obliged to have an ECDIS system on board, a public Web Map Service (WMS) is planned in combination with a public IENC WMS

The AIS Infrastructure and the software environment should be ready until April 2018.

Afterwards the pilot application phase can start. End of project is end of 2020.

Tests and applications

Questions to be answered during the pilot phase:

- Can AtoNs improve the safety of navigation?
 - What does this mean for the services and systems?
 - How can all user groups be reached?
 - What is the benefit for the users? Are efforts and costs acceptable by them?
 - Are there also some benefits for the administrations?
- Can the demands regarding availability and reliability of the provided services be fulfilled in an economic sense?
- How fits the Inland AtoN concept into existing regulations?
- Are other standards affected, e.g. the radar standard?
- ...

At the end of the project we should have a solid base for the further decisions regarding prospects of the use of AtoNs (real and virtual) in future. Simultaneously should the standardization of the feasible be prepared.

Wir machen Schifffahrt möglich.

**Vielen Dank für
Ihre
Aufmerksamkeit!**

Wieland.Haupt@wsv.bund.de



WSV.de

Wasser- und
Schifffahrtsverwaltung
des Bundes