

Harmonization ideas for Navigation & Aviation Aids

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Current status

- Different regulations from country to country
- Same regulations for onshore and offshore
- No clear decision if WTG is considered a moving object or a non-moving object

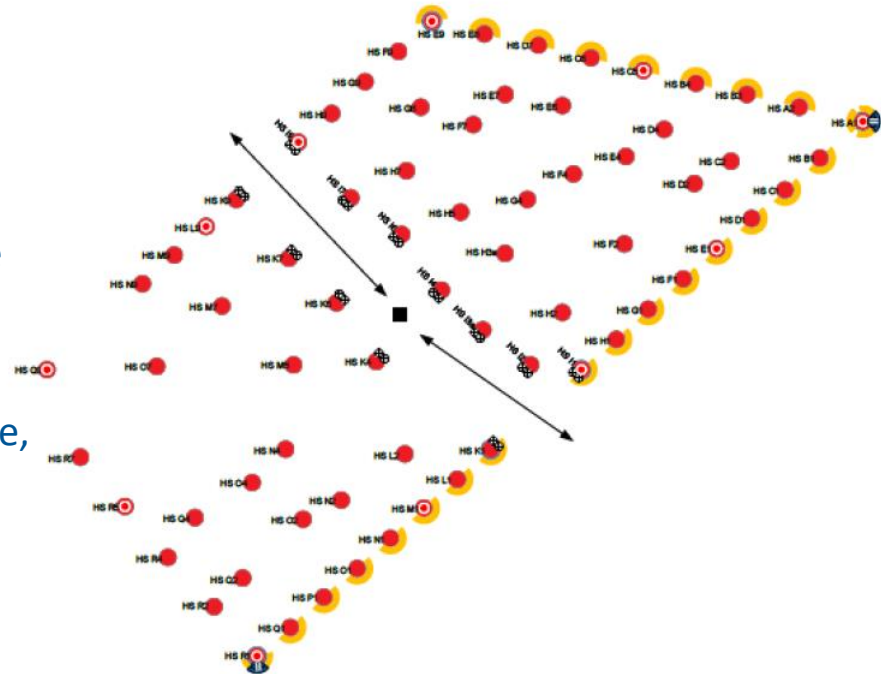
<i>Marine</i>		UK	D	B/NL	DK	TW
Marine (navigation) aids usually follow IALA O-133 recommendation Client can have different requirements. It is more or less requirement in Germany. If IALA not followed, then the Customer may be held responsible if something happens.	ID signs (Illuminated or reflective)	3	3	3	3	3
	SPS 5NM Lanterns	3	3	3	3	3
	IPS 2NM Lantern	3		3	3	3
	IPS 5NM Lantern		1			
	Fog horn with visibility meter					
LIPS		As a standard 36h provided (acc. IALA O-133)				
	Racon (Radar beacon)	Country and site specific (ML clarification needed)				
Dependent on wind farm layout	AIS carbon (transmitter on WTG)	1 for 4 WTGs	1 for 4 WTGs	1 for 4 WTGs	1 for 4 WTGs	1 for 4 WTGs
	AIS (redundant in OSS) TX/RX	1 for wind park	1 for wind park	1 for wind park	1 for wind park	1 for wind park
	Helicopter corridor lights. ALS500NA	Project specific (max 4 lights on WTG)	Project specific (max 4 lights on WTG)	Project specific (max 4 lights on WTG)		
<i>Tower</i>	10/32 od red steady		All WTGs 4 lights	Option 1. Periphery 4 lights Option 2. All WTGs 4 lights	Periphery (3/4)	
	<i>Aviation</i>					
	Visibility meters	Project specific				Project specific
	visibility meter in radius of 1500 on periphery?		Yes			
	Obstruction lights (inner)	2 Project specific	2	Option 1. - 2 beacons Option 2. - No beacons Refer to [1]		
	Obstruction lights (perimeter)	2 MoD infra red clarification needed	2	2	2	2
	Low intensity lights (inner WTGs) also referred as SAR	2 project specific			2	
	Low intensity lights (perimeter WTGs) also referred as SAR				2	
	UPS (Inner turbines)	0 ≤ x ≤ 96 Standard 96h	Standard 96h	0 ≤ x ≤ 96	0 ≤ x ≤ 96	0 ≤ x ≤ 96
	UPS (Perimeter turbines)	0 ≤ x ≤ 96 Standard 96h	Standard 96h	0 ≤ x ≤ 96	0 ≤ x ≤ 96	0 ≤ x ≤ 96
	Heli hoist light	CAP437 rev. 8 B750N LS50-HHS	Customer to clarify Standard	Customer to clarify Standard	Customer to clarify Standard	Customer to clarify Standard

Proposal for common rules

- Applicable to all EU countries
- Applicable to OFFSHORE WT
- Applicable to new installations only (not retroactive)
- No distinction between floating or non-floating

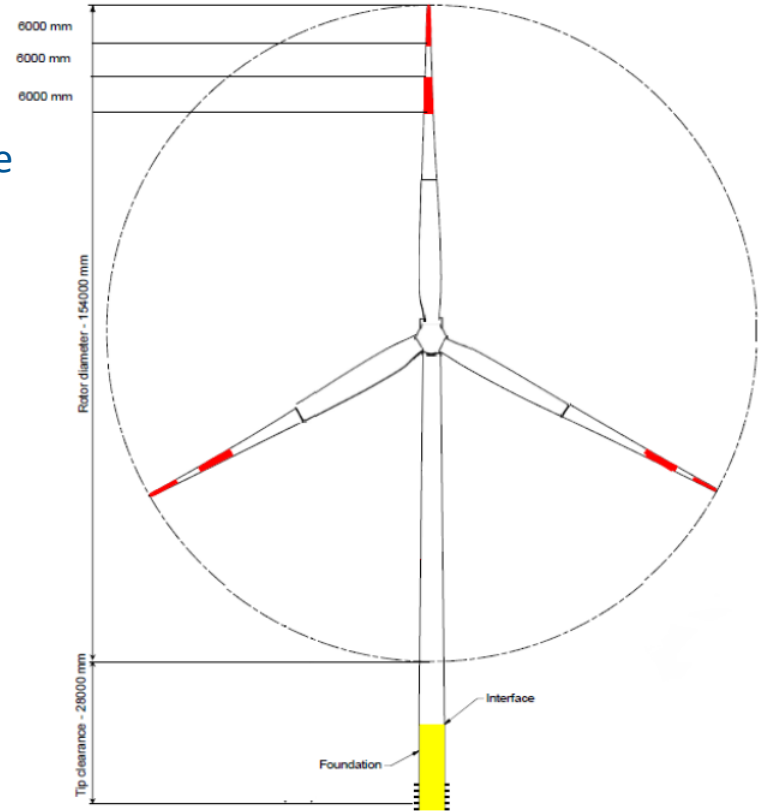
Voice of the Industry-Lights

- There shall be **no obstruction lights on the tower**
- There shall be **no blade-tip-lights**
- Only periphery to be illuminated
- Possibility to combine the helicopter lights and the search and rescue lights
- General allowance that **lights are only turned on when an aircraft approaches**. (especially nearshore, might raise permitting issues)
- Only one obstruction light on the nacelle with two bulbs included for redundancy reasons
- Possibility to regulate the intensity of the lights



Voice of the Industry-Marking

- **Only the TP** shall be marked in yellow not the tower
- **No marking** of tower and nacelle with a red/orange stripe
- Blades shall be marked with red/orange stripes or **not be marked at all**. (as in Finland or Sweden)
- **Same inspection method** , interval & design lifetime (e.g. Initial inspection, 4 years and then every 2 years)



Voice of the Industry–General

- The lights shall be equipped with a photocell so that they can turn them selves on and off (decentralized & automatically, environmental conditions to be considered)
- Reduction of **back up down to 36h** or/and allowance of solar panels for UPS