**Scope of research activities under the Singapore MoU**

Rev 0.0, 20250108

IWRAP is a software tool used for risk assessment based on AIS data. It is a part of the IALA Risk Management Toolbox. IWRAP is based on a simple algorithm where the number of annual collision and grounding candidates in a given waterway are calculated based on the geometrical distribution of vessel in the waterway and their speed and headings.

This total number of possible candidates is then subject to thinning, using a so-called Causation Factor (Pc) which then yields the estimated number of annual collisions and groundings in a statistical sense.

It can be challenging to estimate the value of Pc due to its complexity. Pc depends on several factors such as waterway complexity, the condition of the navigator (fatigue, mental condition), vessel quality etc.

The International obligations of Coastal States as stipulated in SOLAS chapter V, regulations 12 and 13, include the obligation to provide AtoN and VTS services in accordance with volume of traffic and degree of risk.

Of particular interest to IALA is

When changes are made to a waterway (changes in AtoN provision or routing measures etc), both the geometrical distribution of vessels and Pc.

Some research has been done into the factors influencing Pc , but

it is quite challenging to estimate the value there is still he

as Some research has been done on the factors influencing the causation factors a