

# PARALLEL RISK ASSESSMENT FOR MARITIME DOMAIN AWARENESS

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# RISK

- Definition: the effect of uncertainty on objectives (ISO 31000)
- A number between  $[0,1]$  where 0=no risk and 1=high risk
- Classic formula:  
$$\text{Risk}(A) = \text{probability}(A) * \text{impact}(A)$$

# MARITIME DOMAIN AWARENESS

- Definition: Situational understanding of activities that impact maritime safety, economy, or environment (Abielmona)
- Risk management is an activity in maritime domain awareness



# RISK MANAGEMENT IN THE MARITIME DOMAIN

- Objective: monitoring and managing conditions that can lead to disasters at sea in order to:
  - Prevent disasters
  - Respond to disasters
- Examples of risk factors:
  - Sea conditions
  - Proximity to nearby vessels
  - Regional Hostility

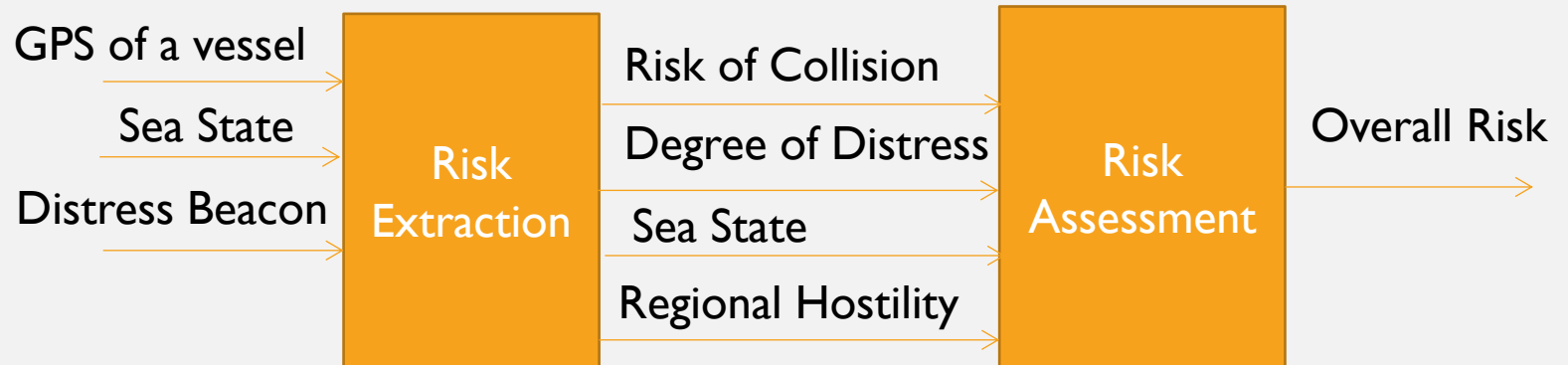
## RISK MANAGEMENT FRAMEWORK

- Ref: *An evolving risk management framework for wireless sensor networks*. Falcon et al. 2011
- Modular system for monitoring risk in generic wireless sensor networks
- Each sensor sends raw data which is used to determine risk

# PARTIAL RISK MANAGEMENT FRAMEWORK



# RISK ASSESSMENT FOR ONE SHIP



## THE PROBLEM

- Risk Extraction and Risk Assessment must be performed for thousands of vessels in real time
- Lets see how fast we can get the calculation using parallel computing!



## THE APPROACH

- MPI
- If there are  $n$  processors and  $m$  vessels, each processor calculates risk for  $\approx m/n$  vessels
- We hope to see linear speedup

## CONCERNS

- Communication overhead