## Temasek Defence Systems Institute

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## An Arctic Environment Readiness (AER) Model for Quantifying The Impact of Extreme Arctic Weather on System Readiness

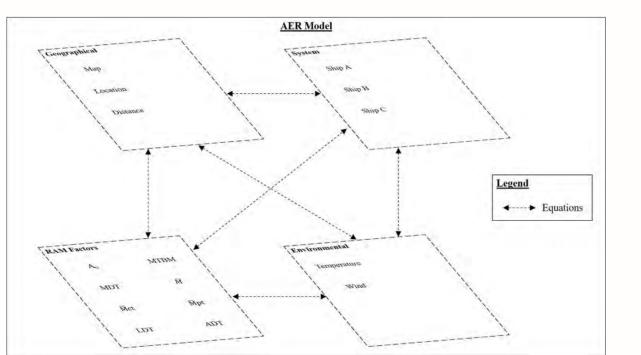
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Objective of thesis	Case Study										
This thesis proposes a model that quantifies and plot the	To illustrate how the AER model is used to predict										
fleet readiness along the route to enhance decision	readiness and determine the effectiveness of building an										
making. The model provides insights to (1) managing a	additional port										
fleet readiness, (2) examining the impact of	<ul> <li>A 10 by 10 square matrix is used to represent a</li> </ul>										
infrastructure development, and (3) investigating	100-cells mini map										
requisite capabilities at the port.	<ul> <li>The starting port and destination port are</li> </ul>										

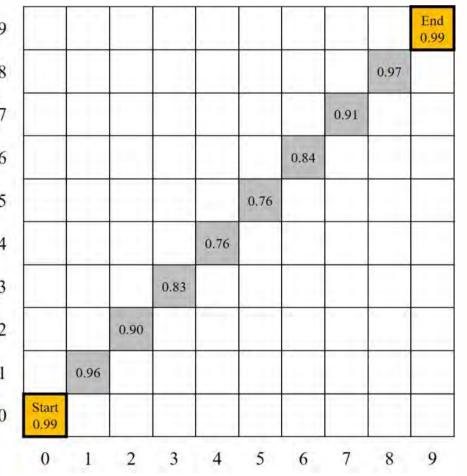
## Methodology

- 1. Development Of AER Model
  - Define Design Structure Matrices (DSMs)
  - Build sublayer matrices
  - Connect interaction between the different
    - matrices



- 2. Application of the AER model for different weather and operating conditions.
  - Collect data
  - Examine additional factor(s)
  - Perform DSM Result Analysis and Optimization
- 3. Assessment of AER model
  - Result is a DSM with the daily readiness shown 3. on the route taken by the fleet
  - Impact due to environmental factors and infrastructure development

- highlighted in orange, represented by cell coordinates (0, 0), and (9, 9) respectively
- The fleet was simulated to travel from the start point to the end point
- The fleet's readiness
   is plotted on the mini
   map
  - The initial result set 4 the datum for 3 comparison against 1 different weather and 0 operating conditions



## **Results & Conclusion**

- 1. AER model is flexible and scalable
- 2. By changing the variables and finetuning the requisite capabilities at the port, the accuracy of the model can be improved and an optimized solution for the problem can be achieved
  - . The true potential of the AER model can be achieved with a larger map

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24												0.00	0.00	
24												0.98	0.99	1

