

Temasek Defence Systems Institute

## A SYSTEMS APPROACH TO ADOPT PERFORMANCE-BASED LOGISTIC (PBL) FOR MILITARY SYSTEMS, A SINGAPORE ARMY CONTEXT

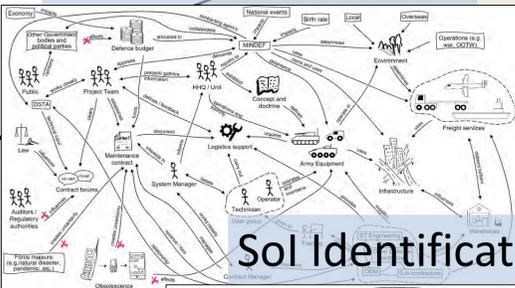
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### 1. Objectives of Thesis

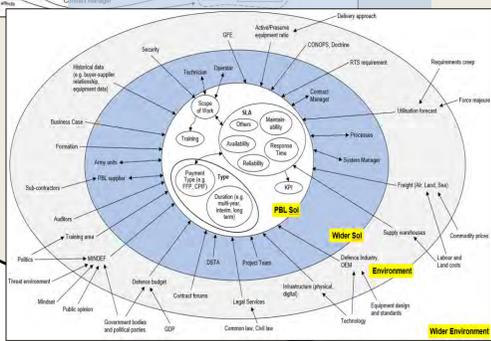
With the scrutiny faced by the Ministry of Defence on the prudent use of public monies, a cost-effective approach needs to be taken to sustain the fleet of Army equipment at a high operationally ready state. The use of Performance-Based Logistics (PBL) was explored using a combination of soft and hard systems modelling techniques to determine its applicability in a Singapore Army context.

### 2. Systems Approach Application and Results

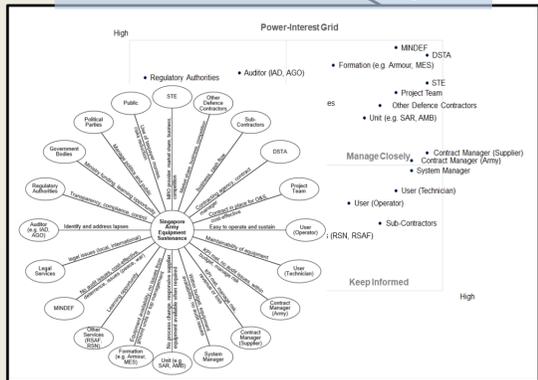
#### Problem Exploration



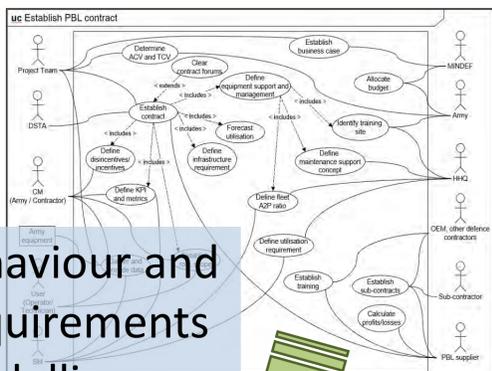
#### Sol Identification



#### Stakeholder Analysis

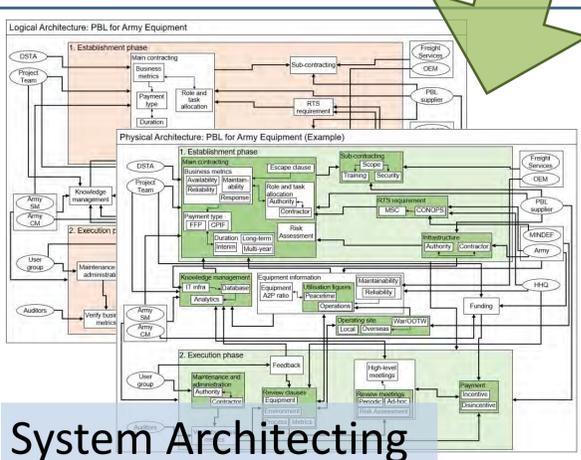


#### Behaviour and Requirements Modelling



#### Focus System's Purpose

S/No	Perspective view	Root definition (using 6Q)	CATWOE analysis
1	MINDEF	A system owned by MINDEF and PBL supplier (O), executed by Army and/or contractor personnel (A) to achieve cost-effective and manpower efficient sustenance of Army's equipment (X), by means of establishing a PBL contract (Y), for the benefit of the Singapore Army (C), within the constraints of budget, skill sets, security, regulations and risks (E).	C: Singapore Army A: Army and/or contractor personnel T: Achieve cost-effective and manpower efficient sustenance of Army's equipment W: Establishing a PBL contract O: MINDEF and PBL supplier E: Budget, skill sets, security, regulations, and risks
2	Army CM and SM	A system owned by MINDEF and PBL supplier (O), executed by Army and/or contractor personnel (A) to achieve cost-effective and manpower efficient sustenance of Army's equipment at a high availability during peacetime and	C: Singapore Army and PBL supplier A: Army and/or contractor personnel T: Achieve cost-effective and manpower efficient sustenance of Army's equipment at a high availability during peacetime and



#### System Architecting

#### Gap Identification

Lifecycle stage	Scenario condition			
	1 Peacetime (OTS system)	2 Peacetime (Local D&D system)	3 War	4 OOTW
1 New (Acquisition)	Scenario 1.1 (Scenario A)	Scenario 1.2	Scenario 1.3	Scenario 1.4
2 In-service (Infant)	Scenario 2.1	Scenario 2.2 (Scenario B)	Not applicable	Not applicable
3 In-service (Use-life)	Scenario 3.1	Scenario 3.2	Scenario 3.3	Scenario 3.4 (Scenario C)
4 In-service (End-life)	Scenario 4.1	Scenario 4.2	Scenario 4.3	Not applicable

### 3. Findings and Limitations

- SE uses a **structured and flexible** approach to explore the problem space and understand the **big picture issue of the situation**.
- It allows understanding **perspectives and motivations** of key stakeholders (e.g. Army, Contract/ System Manager, Technician, Operator)
- Iterative** system comprehension is advocated before applying the engineering process to select an **optimal** solution to the problem.
- All modelling are **abstract, not a one-size-fits-all approach** and need to be tailored to suit the application context.
- PBL is **applicable in Singapore Army context**, but need to consider 9 areas: (a) contracting approach, (b) payment type, (c) prime and sub-contractor, (c) RTS, (d) infrastructure, (e) operating sites, (f) utilisation, (g) maintenance and administration, (h) knowledge management, and (i) effective engagement and relationships.

### 4. Future Work and Application

The output generated from the study could be further expanded and applied in real-life scenarios, with the following areas proposed for in-depth studies:

- The models should be presented to and discussed with the relevant stakeholders before use.
- Future work could explore other methodologies or techniques to determine the feasibility to adopt PBL in the Singapore Army context.
- Need to consider the CONOPS and doctrine of the respective formations.
- A trade-off analysis could be conducted to determine the optimal PBL solution for the identified scenarios.