Towards a Holistic Framework for Threat Modelling in Defence

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Context

In cybersecurity, threat models such as **STRIDE** help identify **threats** by asking how adversaries could impact the **confidentiality**, **integrity**, or **availability** of **assets**. However, **most models do not** consider **cyber**, **physical**, and **human factors**, which are **interconnected**, especially in **Defence** and other **sociotechnical** sectors where **threats propagate** through **multiple dimensions**. **Therefore, a holistic approach is necessary.**

TEPIDOIL

TEPIDOIL (**T**raining, **E**quipment, **P**ersonnel, **I**nfrastructure, **D**octrine, **O**rganisation, **I**nformation, and **L**ogistics) is an **MoD-based** framework, covering more than just **cyber**, **physical**, and **human factors**. Compromise in one dimension affects the others.

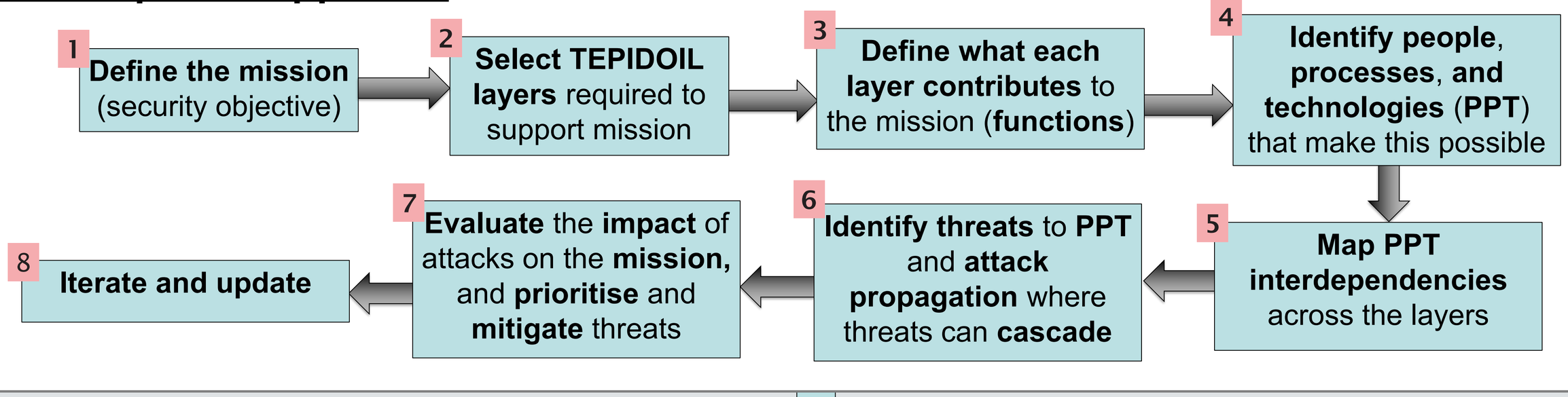
Aim

This research aims to develop a **multidimensional threat model framework** using the **TEPIDOIL layers** to identify how **threats propagate**, rather than **analysing threats** in **isolation**, to support the deployment of **holistic countermeasures**.

Methodology and Results

Creating a **multidimensional threat model** will involve **surveying**, **synthesising**, and **extending** existing techniques. We have surveyed **91 papers** and identified techniques (e.g., **attack trees**, **dynamic graphs**, **data flow diagrams**, **Monte Carlo simulations**) that can guide the development of our model. The following is a **high-level overview** of the **proposed** approach.

The Proposed Approach



Original Contribution

Most threat models focus on **one dimension** of security (**cyber**, **physical**, or **human)**. Our **proposed approach analyses threats** that span **multiple**, **interdependent dimensions** (e.g., **TEPIDOIL**). We focus on the **cascading effect** in **determining attack propagation** across layers. This also has **scope outside** of **Defence**, where **multidimensional threat analysis** is **crucial**.

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