# 1. Introduction

## Current Anaesthesia Delivery Method in U.S. Military

The Draw-over vapourizer (DOV) is used to deliver anesthetic agents to patients in combat situations.

**Disadvantages:**
1. Anesthetic agent that is breathed out is wasted
2. Prone to imprecise and variable anesthetic concentration levels
3. No integrated monitor

![Diagram of the Draw-over Vapourizer](http://asevet.com/resources/circuits/drawover.htm)

**Problem Statement**

Thornhill Research Inc. develops and manufactures medical products that address a wide variety of issues. They developed two devices which are portable and can be used in combat situations:

1. **Mobile Anaesthesia Delivery Module (MADM)**
2. **Monitoring Oxygen Ventilation and External Suction (MOVES™) portable life support system**

The MADM was developed to potentially replace the DOV and can be used with any vent, such as the one provided in the (MOVES™) portable life support system. For implementation in the U.S. Military, it needs the approval of the U.S. Food and Drug Administration (FDA) by undergoing Human Factors testing.

## Advantages of MADM and the MOVES™

1. Anaesthetic agent that is breathed out can be scavanged and reused
2. MADM can automatically calibrate the to anaesthesia to a specific level and has a monitor that shows this level
3. MOVES™ portable life support system has a monitor that shows the patient’s physiological parameters
4. MOVES™ portable life support system eliminates the need for oxygen bottles, making transportation in combat situations less cumbersome.

![Patient connected to MOVES™ portable life support system](http://www.thornhillresearch.com/)

## 2. Goal

Human Factors testing for both the MADM and the MOVES™ to get approval from the U.S. Food and Drug Administration (FDA) for use as a portable integrated system for delivering anaesthesia and ventilation.

**Scope:**

1. Study the interface of the system
2. Study the interaction between user and system
3. Exclude patients from the study (animal and human)

## 3. Method: Usability Study

**Heuristic Evaluation**

Heuristic Evaluation is a usability engineering method that is inexpensive and that requires fewer resources. User testing is another method that demonstrates how real users would use the system. Using 5 users would uncover about 80% of the usability problems.

**User Test Preparation**

- Use Jakob Nielsen’s principles for interface design to analyze the interface of both the MADM and the MOVES™ device for fast and inexpensive analysis
- Prepare consent forms, NDA, training material, test script with tasks, surveys, testing environment and data collection methods.
- Recruit 5 participants

**User Testing**

- Signs consent forms, NDA and receives training
- Executes a set of tasks
- Completes exit survey and debriefed

**Analysis**

- Test administrators analyze the data collected

**Recommendations**

- Test administrators provide recommendations to improve the interaction between the user and the interface based on the data analysis

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