Shipboard Calibration Network Extension Utilizing COTS Products

Author: Tan Min Yan

Thesis advisor: Yun Xiaoping
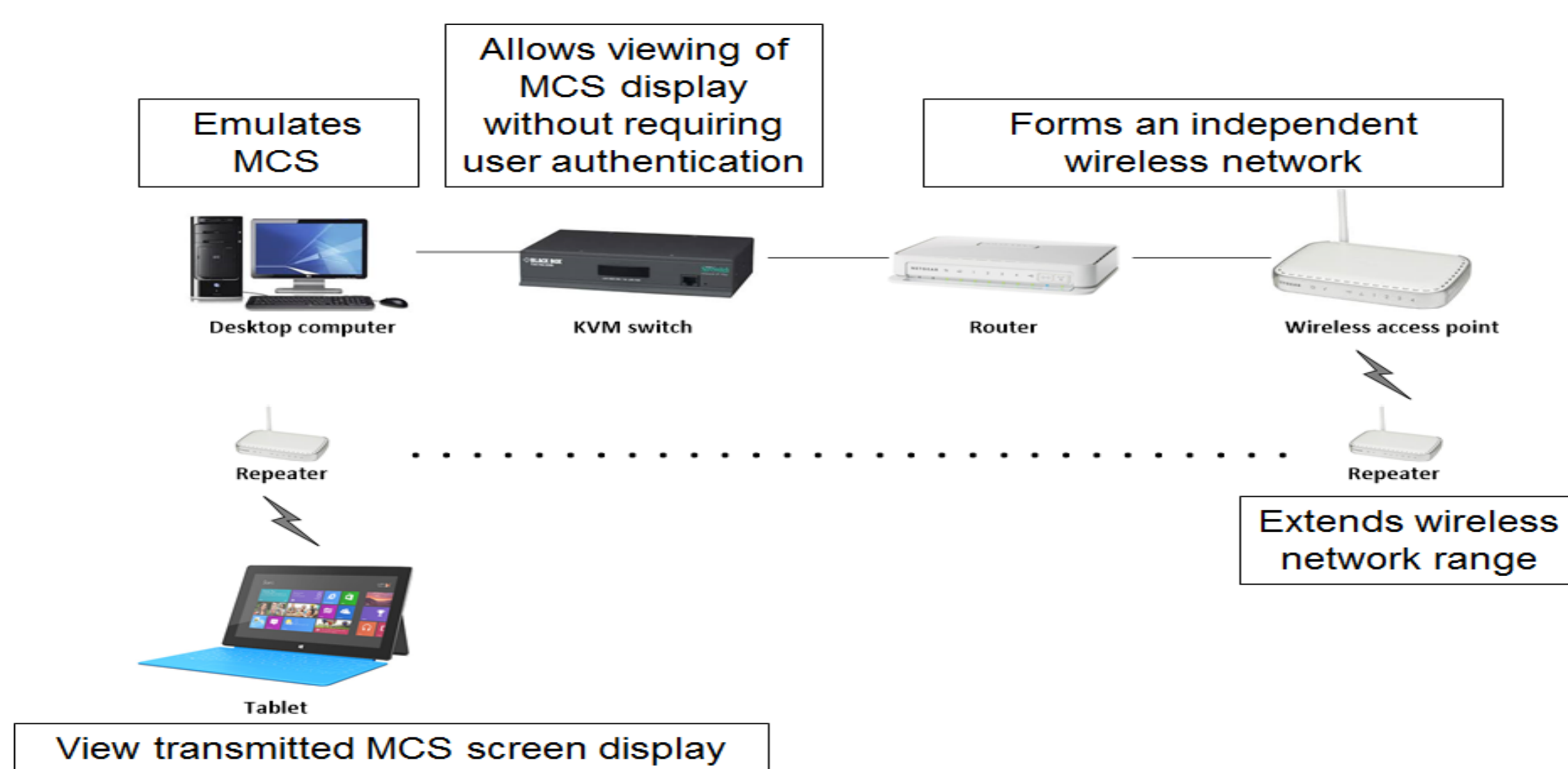
Figure 1. Hardware used in proposed concept of operation

Objective:

To investigate the feasibility of using Commercial off-the-shelf (COTS) components to reduce the manpower required for shipboard calibration.

Proposed concept of operation:

The current calibration process for shipboard sensors like temperature and pressure sensors, require at least two technicians. One technician will be located on the main deck, at the Machinery Control Station (MCS) where the sensor's readings are displayed, while the other technician will be located in the engine room where the reference sensor's readings are displayed. These readings are exchanged via hand-held communicating devices like walkie-talkies, for a single technician to consolidate both readings in order to calculate calibration constants for the sensors.

The proposed concept of operation aims to reduce the need for a technician to be stationed at the MCS, by adopting the hardware shown in Figure 1, taking into consideration the security concerns and layout of the ship. The success of this proposed concept of operation is dependent on the achievable network range. This is tested with different permutations of locations and numbers of repeaters.

Experimental results:

The experimental setup was limited to a maximum three repeaters in non clear line-of-sight, due to location constraints. The experimental results showed that when three repeaters were used, it was on par with the best configuration of two repeaters used and better than one or no repeaters were used. It also showed no signs of degradation. By inference, this setup is not limited to just three repeaters for this application's throughput requirements.