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## SCREENING AND TRIAGE CUBICLE (S.A.T CUBE) FOR COVID-19

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**Highlights:** The SAT Cube is an idea borne out of a need to assist and provide a safe and convenient space for health care personal during screening and triage phase of the patients suspected of COVID-19. It is also designed in consideration of any future similar air-borne pandemic predicted by scientists.

**Key words:** Covid-19 Screening Booth, Healthcare, virus isolation room, ergonomic, anthropometric, pandemic

### Introduction

When the Coronavirus Disease 2019 (COVID-19) pandemic occurred worldwide in March 2020, it has intensified global health care institutions to execute screening methods to identify the virus, along with means to contain the spread. While there is still ongoing research to learn about the variants of COVID-19, the screening protocols remain the same. Until now, studies have shown that the spreadability of COVID-19 share similarities with other coronaviruses, infecting primarily from person to person via respiratory droplets among close contacts under a specific period. Therefore, the healthcare personnel, especially doctors and nurses, as the first defences of the front lines of caring for patients with possible or confirmed infection with COVID-19, have an increased risk of exposure to this virus every day in the field.

As the cases of COVID-19 in Malaysia continues to rise, a large number of daily COVID-19 screening continues nationwide. However, the combination of local climate, paired with extended hours working in personal protective equipment (PPE) suits, has resulted in extensive mental and physical exhaustion reported among healthcare workers. In addition, the hospitals were also facing other issues with medical supplies shortage in the personal protective equipment (PPE) suits.

Was there a way to accommodate safer screening space for doctor and nurse to reduce this risk during screening? What is the feasibility of designing a portable "cleanroom" that reduces the PPE use inside the cube? These are just the early driving questions that researchers from University Malaysia Kelantan to collaborate with several local health facility experts in assisting the aforementioned issues. In this proposal, the product development strategies are presented.

### S.A.T. Cube Design Strategies

The S.A.T Cube has specific functionality aims in which it plans to achieve with the following objectives:

Table 1: Aims and approaches

Objectives	Design Strategies
To provide safer space for doctors/nurse/healthcare personnel to conduct screening test for COVID-19	S.A.T Covid designed with enclosed space for health personnel with waterproofed wall and indoor circulated air conditioned.
To provide safe platform and isolation between doctor and patient to conduct swab test	1. Half transparent wall designed slanted at suitable angle with 2 holes wrapped with long plastic gloves to make doctor easier to reach seated patient while conducting the swab test 2. Both sided are provided desk to put the related documents and equipment 3. Space for patient are covered with overhanded roof which also as cover to close the counter from outside.
To avoid test sample exposed to health personnel and the other patient during the swab test	S.A.T Cube has a 'tunnel' at the middle of the cube which allows the test sample to be insert will be insert into a small 'window' attached to patient counter to bring it to the back of the booth by sliding through roller inside the tunnel. This strategy is to avoid health personal exposed to the positive COVID-19 patient at the front counter so they can collect the sample from the behind of the cube.
To create a portable outdoor screening test cube	This cube designed to be light weight by using aluminium panel as the structure and acrylic panel as the walls so it can be use outdoor and easily can be remove to any suitable outdoor place.
To create an affordable screening test cube	The structure, wall and electrical dan mechanical fitting of the cube are

design using affordable material.

The figure below shows the spatial organisation, the sampling operational and the design of the S.A.T Cube:

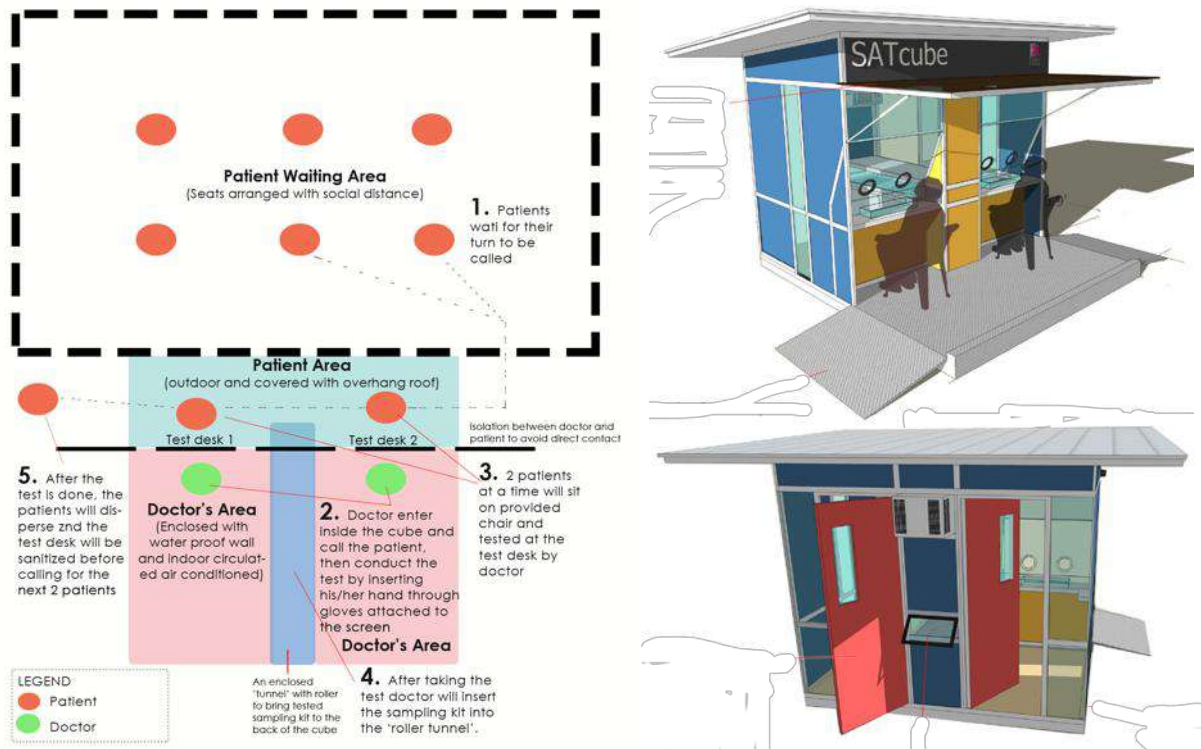


Figure 1: Spatial organisation, the sampling operational and the outer look of the S.A.T Cube

To conclude, the S.A.T Cube is still in its early the design phase and is planned for further development toward a buildable prototype. The potential of this product design lies in its purpose to alleviate the physical burden of donning long hours of PPE suits which health workers when larger quantity of COVID 19 screenings take place. Subsequently, the cube can also be commercialised for further custom design features that would be of use to interested institutional parties.

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