Phase 1 Statement Theme	Automation and Productivity
Statement number	3
Launch Date	23 June 2020
Closing Date for submission	03 August 2020

Title:	Augmenting Safety Inspections for Building and/or Infrastructure Construction Sites
Background	Construction industry is one of the most high-risk work environment, with higher fatality rate than most industries. According to the published ***Workplace Safety and Health Report*** from MOM, 13 workplace fatal injuries and 596 major injuries occurred in the Construction Industry in 2019.
Challenges	Although site safety is of paramount importance, it remains a challenge for continuous site **monitoring on the work activities and workers in the construction sites at all time**. The construction industry needs non-traditional solutions to plug the gap of inadequacies of existing safety inspection limitations.
Desired Outcomes	We envision an affordable cloud-based AI-enabled computer vision empowered cameras to identify and flag out potential safety hazards by providing **predictive and timely alerts** to the relevant construction sites' stakeholders. The stakeholders would be able to assign the most appropriate response party to intervene and take appropriate actions to remove or mitigate the potential threats.
Requirements	The solution should go beyond identifying a worker without appropriate Personal Protective Equipment (PPE) and also able to: (a) recognise potential risks such as un-barricaded or uncovered holes, openings and gaps in fencing leading to falling from heights (b) identify and predict threats in fire hazards prone areas and activities such as overfilled bins, material stockpile areas and flammable storage near hot works (c) recognise and predict unsafe actions by workers and situation that seem likely to lead to an accident (d) Alert, intervene and track the safety breaches, near misses and its associated response and action taken to the identified safety risks (e) Develop comprehensive platform to capture, store & organise data to facilitate data analytics, predictive intervention, performance evaluation and assist better decision making and reporting to the Project Safety Committee. (f) Identify Workers working in different zones, mixing with other teams and not maintaining 1 m safe distancing. This solution is part of the BCA COVID-19 Safe Worksite requirement.
Possible Solutions	The proposed solutions can encompass more than one mode of visual data capturing so as to **ensure full coverage** for the entire building

	and/or infrastructure construction site **over the 24/7 period** throughout the project duration. 1. High resolution AI cameras mounted on tower crane to oversee the whole construction site and identify safety hazard 2. AI enabled cameras carried drones/mobile robots 3. Adding AI layer to current CCTV monitors 4. System should have some form of alert such as sound/lighting/ text messages/etc. to activate timely human intervention. 5. Any other approaches
Development Timeframe	Applicants are encouraged to propose phases of development and delivery. The total project delivery period shall not exceed 12 months. A proposed timeline is as follows: 1. 4 months: Prototyping and data collection. 2. 8 months: Training & field deployment at JTC appointed building or infrastructure construction site
Additional Info	(a) The solution must allow all day (24/7), all weather safety inspection to take place (b) The computer vision should be able to operationalise in natural day lighting, rain and night operations (c) It should be noted that infrastructure construction has vast project boundaries compared to building construction. (d) All visual data and information captured and used for training of the Al shall belong to JTC Corporation. Solution provider shall categorise the data into appropriate library files and hand over to JTC at the completion of the project. (e) System should have some form of alerting featured i.e. sound/light/text messages to allow human intervention to take place when danger is predicted and detected. (f) Provide remote access for on-line live data monitoring via internet connectivity.