

GLOBAL ASSET TRACKING AND MANAGEMENT SYSTEM

CONTEXT

For industries like the Fast-moving Consumer Goods and Energy, high capital is typically locked up in business assets and inventory to run operational processes. Ensuring proper asset tracking not only optimises the utilization and manages overheads, it can also improve workers productivity when they have the right tools to work. When an equipment breaks down, it is also easy to locate the replacement parts, saving time and removing unnecessary bottleneck in the workflows. For a company, corporate theft, while common and unnoticed, can be curbed, minimizing loss and damage to the company's assets. It is thus imperative to have a holistic approach in managing business assets even though it is a huge operation – starting from procurement, through its lifecycle, till formally retired.

Traditionally, assets are tracked using technologies such as RFID and microchips. However, they have their limitations. They are passive technologies that requires a human to scan and trace, do not work well over long distances and are tricky to deploy in harsher industrial environments. Till date, industrial asset tracking has largely been a manual procedure performed periodically without a standard, centralised database. Such information is often hosted on general enterprise resource planning (ERP) software, which only allows the user to capture and search for basic asset information with no real-time status updates.

The inability to accurately track and locate assets results in:

- **Inaccurate Data On Asset Availability And Usage** – Especially for assets deployed in sites with extremely harsh conditions (e.g. extremely high/low temperature), the low visibility on asset condition hinders project teams from utilising the optimal mix of assets for each project.
- **Lower Employee Productivity** – Employees work more productively with the right tools and working equipment. Productivity is lowered when an employee uses the time to search for replacement parts or have to manage an unplanned maintenance, facing downtime that will propagate delay down the production chain.
- **Limited Ability To Track And Trace Asset Efficiently** - Manual asset tracing are done via emails and phone calls as and when assets are required, or during the bi-annual large-scale audit checks, which are very time-consuming and unproductive. Projects often have a delayed timelines as significant time is spent tracking the needed assets.
- **Higher Procurement Cost** – As asset repairs and maintenance are currently not recorded either, there is no clear view of the status and condition of the asset. Also, when the replacement parts are required urgently, these are typically procured at a high rate due to the immediate needs. Hence, resources are often spent to procure, replace and repair existing assets without a clear indication of whether there is an actual need. This results in possible asset and material duplicates due to over-ordering, wastage due to expired materials and unnecessary asset replacement and repairs.

Hence, there is interest to better track and manage these assets with greater accuracy, accessibility and reliability. By enabling data analysis of asset usage, asset owners can optimise asset and resource utilisation rates while improving productivity and minimising wastage. This would also allow asset owners to forecast future demand for equipment and potentially isolate potential workflow bottlenecks for improved productivity. It would be ideal for these technologies to actively prompt the asset owners on activities such as abnormal utilisation rate, to pre-empt possible breakdowns and maintenance needs based on analysis of historical data.

The second run of **ARTC Startup Challenge 2021** is organised by the Advanced Remanufacturing and Technology Centre (ARTC) in partnership with IMDA and A*StartCentral. The theme for ARTC Startup Challenge 2021 is “**IIoT for Advanced Manufacturing**”, and there are three challenges launched.

The Advanced Remanufacturing and Technology Centre (ARTC) is led by the Agency for Science, Technology and Research (A*STAR), in partnership with the Nanyang Technological University, Singapore (NTU Singapore), with a membership consortium with over 80 members.

PROBLEM STATEMENT

How might we create an automated real-time asset tracking and management system to maximise asset utilisation and support business process better using IIoT solutions?

WHAT ARE WE LOOKING FOR?

An automated asset tracking and management system for industrial usage, capable for real-time data transmission.

The solution should be able to provide:

- **Real-Time Data Capture:** Solution must be able to capture and transmit accurate data of the asset in real-time and send to respective data centres and/or cloud database. It must have pin-point location tracking, even when assets are on the move.
- **Asset Tracking:** Solution must be able to keep track of any asset's location and condition, thus reducing the need for manual audits like making phone calls and sending emails. This would include capturing and uploading images of the assets as they move from one checkpoint to another (e.g. from port to site), in order to create a visual database of the conditions of the asset and keep track of its status as the asset is deployed between job and location sites. Each asset would have a comprehensive record database including its repair and maintenance history, providing a holistic assessment of the asset's life cycle and remaining net book value.
- **Asset Management:** Solution must be able to give users a comprehensive track record of the asset with full traceability, including who is the current owner/user of the asset, who was the last person to maintain it, history of usage and maintenance, its conditions, its locations, etc. for scheduling purposes. Good if the solution can recommend asset reallocation to maximise asset utilisation.
- **Accessible And Collaborative:** Solution must be highly accessible, user-friendly and collaborative in nature, to allow frontline personnel, asset managers and back-end teams to use and monitor different assets for different use cases. It must have a portable mobile

and/or tablet version, to allow frontline personnel to assess the database out in the field and in harsh site conditions (e.g. extreme weather, muddy environment).

- **Asset Evaluation:** Good for solution to allow frontline staff to perform a condition assessment at different checkpoints (e.g. once at the port upon arrival, once at the site at the arrival, etc.), allowing asset managers to easily record and track the asset condition through the various movements, usages and deployments.
- **Data dashboard:** Good to include a dashboard to provide asset managers with a clear (global) overview of their assets, such as whether they are in use (active), under maintenance (inactive), expiring and/or out-of-use assets, and other relevant statuses
- **Compatible:** Solution must be able to integrate with other existing systems, such as the SAP Enterprise Resource Platform (ERP), in order to allow for efficient asset tracking, management, planning and job allocation through a combination of different systems.

There are no restrictions on the geographical location of the problem solvers who may choose to apply to this challenge. However, the POC/prototype must be demonstrated in Singapore.

POSSIBLE USE CASES

1. Adam is an equipment coordinator of twenty oil rigs, managing assets of different sizes across various locations. The solution is able to accurately capture and transmit essential asset data (such as identifying the asset's last and current user, when it was last maintained or repaired, its current location, its current status and condition, and any other historical and relevant data of the asset, etc.) to the centralised data centres and/or cloud database in real-time. Based on these data, Adam is able to identify assets that are no longer in use and advise Finance on the remaining asset net book value for next year's budget planning. This information is more accurate than the bi-monthly visual inspections his team has do previously, reducing duplicate assets and possible thefts.
2. Alice is a lab researcher and needs to procure new equipment and/or materials on a daily basis for the team's various projects. Using the solution, she is able to view a comprehensive record of the available assets and material inventory, including utilisation rate and possible expiry dates. Based on resource availability, Alice can quickly book or procure the needed resources, minimising any procurement delay and ensuring that there will be no wastage or duplicates.
3. Sam is a frontline leader and needs to plan the resources needed for on-site works. Using the solution, he is able to easily identify the assets needed and can allocate it to the respective field engineers. Ideally, the solution would also be able to recommend an optimal mix of assets to base on the asset condition, geographical location and utilisation rate. This increases Sam's productivity as he no longer needs to make manual calls to get the needed assets, and is able to give clear instructions to the field engineers.

WHAT'S IN IT FOR YOU

- SGD 50,000 of prize money for each winner of this challenge (see Award Model)
- 2 Year Tier 3 ARTC Membership
- SGD 30,000 ARTC Project Credit

- 4-month Accelerator Programme
- Gain access to IMDA's Technology resources and facility for prototyping
- Co-innovate with ARTC with access to their expertise in developing the solution
- Opportunity to commercialise solution for deployment and adoption by ARTC industry members

EVALUATION CRITERIA

The Applicants shall be evaluated in accordance with the evaluation criteria set out below.

Solution Fit	<ul style="list-style-type: none"> • To what extent does the proposed solution address the problem statement effectively?
Solution Readiness	<ul style="list-style-type: none"> • How ready is the proposed solution to go to the market? • Is there any evidence to suggest capacity to scale?
Solution Advantage	<ul style="list-style-type: none"> • Is the solution cost effective and truly innovative? • Does it make use of new technologies in the market, and can it potentially generate new IP? <p><u>Optional</u></p> <ul style="list-style-type: none"> • To share estimated cost for pilot trial, deployment and software support.
Company Profile	<ul style="list-style-type: none"> • Does the product have user and revenue traction? • Do the team members possess strong scientific/technical background?

Problem Solvers are required to submit a proposal in the form of a PDF presentation with no more than twelve (12) slides during the Submission Challenge period (the "Submissions") for judging by IMDA & ARTC.

AWARD MODEL

30% of the prize money will be awarded to each selected finalist at the start of the POC/prototype development process, with the remainder 70% to be awarded after completion of the POC/prototype solution, based on milestones agreed between Problem Owner(s) and the solver.

Note that a finalist who is selected to undertake the prototype development process will be required to:

- Enter into an agreement with Problem Owner(s) that will include more detailed conditions pertaining to the prototype development;
- Complete an application form with IMDA that will require more financial and other related documents for the co-funding support.

Teams with public research performers are required to seek an endorsement from their respective innovation and enterprise office.

DEADLINE

All submissions must be made by **4th January 2021, 1600 hours (SGT/GMT +8)**. Problem Owner(s) and IMDA may extend the deadline of the submission at their discretion. Late submissions on the OIP, or submissions via GeBIZ, will not be considered.