Call for Innovative Solutions (CFIS) for Smart Estates

Ascendas Singbridge (ASB) Problem Statements

Challenge Statement 1 – Data analysis and BI technology for Utility Management

Background of Current Process & Challenge Statement

Monitoring the utility consumption of buildings is now done at the building level and data entry is consolidated manually using excel spreadsheet for monthly analysis by the Engineering team. The current method is both prone to data entry errors and only allows analysis once a month when the data are consolidated for analysis. ASB is looking for a solution that allows the capturing of data for consolidation and use of data analytics to carry out trend studying and benchmarking by type and occupancy rate of the buildings, as well as devise preventive modelling of future utility consumption.

Desired Outcomes

To propose an **end-to-end utility management system**, with **data analytics capabilities**, that could study trends, do benchmarking and **predict the consumption patterns for forward purchase of utility**.

Requirements

- Digitalize the gathering work of utilities data from the buildings and allow consolidation for group-wide benchmarking.
- Use data analytics and business intelligence (BI) tools for setting benchmark and prediction of the consumption pattern.

Challenge Statement 2 – Early detection of underground water pipe leakage

Background of Current Process & Challenge Statement
Currently, incidents of underground water pipe leakage / seepage is only known after ASB is billed for surge of water consumption for the month. To prevent undue loss of water as a result of underground water pipe leakage, ASB is looking for smart devices that could track surge in water consumption real-time and at low cost, so that immediate steps can be carried out to address the underground water pipe leakage.

Desired Outcomes
An **end-to-end solution for detecting underground water pipe leakage** that is economical, accurate, and provide **real-time alerts**.

Requirements
• Minimal infrastructure preparation • Ability for installed devices (if any) to function continuously for extended periods of time • Ability to integrate into property's Building Management System • Approved by the PUB

Challenge Statement 3 – Predictive Maintenance for Lift (and other M&E equipment)

Background of Current Process & Challenge Statement
Currently, building owners rely on lift servicing companies to carry out periodic and ad-hoc maintenance to ensure lift breakdowns are kept to a minimum level. Very often, lift breakdowns are unpredictable and cause disruption of services to the lift users. With the advancement of IOT sensors and artificial intelligence, ASB is looking for solutions to carry out predictive maintenance for the lift systems so that ad-hoc repairs arising from lift breakdown could be minimised. Lift is given as an example but building owners are interested to have a predictive maintenance system for other M&E equipment as well.

Desired Outcomes
• The lift monitoring system should **reduce disruptive/emergency repairs**, improve the safety of lift users, **improve reliability of the lifts and reduce downtime** of the lifts. • Use the gathered data for analysis and development of **machine learning capability to predict lift failure**. • Similar metrics applicable for successful predictive maintenance solutions for other M&E equipment.

Requirements
• Minimal infrastructure preparation • Compatibility with existing lifts and building management system • Ability to assess lift status • Ability to predict breakdowns

Challenge Statement 4 – Automated External Façade Cleaning

Background of Current Process & Challenge Statement
Periodic external façade cleaning is carried out by manpower certified to work at heights, commonly with the use of a rope access, lift, gondola or scaffolding system. These methods mostly require the setting up of bulky equipment, clearance space for the equipment, training for the cleaners as well as on-site supervision. The cleaners manually assess the cleanliness of the façade, before deciding on the usage of designated cleaning products to address specific stains.

Desired Outcomes
Fully or semi-automated equipment for **external façade cleaning to eliminate or reduce manpower required, reduce cleaning time and cost, and allow for ad-hoc cleaning**.

Requirements
• Ability to assess cleanliness of façade • Ability to clean different façade materials • Ability to clean hard to reach areas • Ability to recognize and avoid obstacles • Ability to function in differing climates

Challenge Statement 5 – Sensor-based solution for workplace to maximize space utilization and operational efficiency

Background of Current Process & Challenge Statement
The traditional relationship between landlord and tenants is often limited to provision of space. Tenants have to rely on 3rd-party contractor to provide services such as facilities management, security and space utilization etc. ASB is exploring the use of various technologies like IoT for occupancy analytics, well-being monitoring on indoor air quality and temperature comfort, and geolocation tracking for wayfinding etc. to engage employees and offer value-added services to the tenants.

Desired Outcomes
An integrated platform that is able to deliver added facilities services with the following features: - **Occupancy analytics** – enabling data driven analytics to improve space utilization - **Well-being analytics** – assess the comfort level through the monitoring of environment such as IAQ, temperature etc. and to use these data to improve the workplace - **Integrated user experience** – apply for season parking, ordering of meals, notification of events, reporting of crisis like fire emergencies etc. with landlord - **Geo-location and wayfinding** – digitized floor plans for locating workplace/meeting rooms and locating fellow colleagues

Requirements
Solution should be mobile friendly and scalable as new services can be added readily.

Challenge Statement 6 – Interactive Meeting Solutions

Background of Current Process & Challenge Statement

Traditional meeting spaces today mainly provide basic facilities such as projectors and screens. Some newer meeting spaces are equipped with digital whiteboards and conference phones. Such facilities often require maintenance and updates of hardware and software, and a compatible space setup for installation. Existing equipment also do not support integration with other systems. As a result, preparation time is often required prior to a meeting. Remote participants have less interactions due to geo-location limitation. Post-meeting, the process of sharing of minutes and meeting materials is also time-consuming.

Desired Outcomes

Meeting spaces that allow for effective meetings to start quickly and punctually, equipped with technology to **improve meeting participant engagement**, physically and remotely, including the sharing of materials during and after the meeting.

Requirements

Technology that support cross platforms and cross operating systems so that participants can directly or remotely access the display, communication and materials for a meeting.

- Interactive digital board that allow access for remote or in-room participants to perform input to be displayed during a discussion concurrently.
- Interactive digital board that allow participants to refer materials stored within cloud to be amended on the board during the discussion, real-time.
- At the end of the meeting, meeting notes, materials, drawing and video/voice recording to be stored and shared online automatically at a single location for easy access later on.

Challenge Statement 7 – Traffic Monitoring System

Background of Current Process & Challenge Statement
Current estimation of traffic flow targets only vehicles, based on counting the number of vehicles passing through a road section at a time. There is insufficient information about the traffic patterns which can include tenants, visitors, pick-up/drop-off vehicles, and vehicles going through the park as part of their driving route. Without specific information on the classifications and volume of various types of vehicles contributing to the traffic flow, redevelopment efforts of the current and new initiatives cannot solve the root issues.

Desired Outcomes
A clear **overview and analysis of traffic patterns in a science park to aid in the design of effective car-lite initiatives** for the appropriate target groups.

Requirements
Ability to count, segment and analyse vehicles coming into and through the park • Ability to detect congestion • Optimisation of resources, deployment and employment of container recognition and transmission systems to reduce and minimise human engagement and errors. • A Centralised Complimentary Parking System(CCPS) on an e-platform that can be integrated with the ASB current ACCESS (Ascendas-Singbridge Centralised Carpark Electronic System) that will be able to purchase, create, disseminate/issuance, account and reconcile complimentary parking activities. • A Video Parking Guidance and Enforcement System (VPGES) that is able to guide motorists to the nearest available parking lots efficiently while identifying indiscriminate parking with the use of analytics and escalating such violations automatically in accordance to escalation rules.

Challenge Statement 8 - Virtual/Augmented Reality AR/VR in Real Estate

Background of Current Process & Challenge Statement
AR/VR can be used for construction design as well as for the visualization of estate property for clients. There are several companies in the market implementing VR/AR to view residential estate properties. However, there is still a need for commercial estate developers to employ these technologies at a larger scale. The use of VR/AR technology in commercial properties will be highly advantageous for its construction and sales services. However, high costs and adoption effort are the current deterrence for use of VR/AR in commercial estates.

Desired Outcomes
VR/AR in the visualization, design and sales of real estate development to provide an enhanced, **interactive viewing experience for construction design workers and potential property tenants**. A **cost-effective** solution that also allows overseas clients to view the properties.

Requirements
• Ability to render an accurate visual representation of the equipment and facility • User friendly • Cost-effective

Challenge Statement 9 – Digitalized 2D/3D Floor Plans for Space Management

Background of Current Process & Challenge Statement
For buildings constructed decades ago, the as-built layout and floor plans were in physical copies, with no digital building information modelling (BIM). When there were updates to the floor plans on site, the inputs would have to be redrawn laboriously on the blueprints. Thus, accuracy is a huge challenge. The blueprints have been reproduced countess times and there is often no effective solution to verify the precision of the drawings. If the traditional method of site survey and drafting the plans is employed, a system of checking will have to in place to ensure that the drawings accurately depict the most current site conditions. Currently, there is no effective system to convert existing building into a useable digital form, especially for buildings that were built decades ago. BIM appears to be the closet proxy, but putting existing buildings on BIM model is a labour-intensive and expensive process. The benefit will also be evident in the market and leasing of spaces. Prospective tenants and buyers looking to lease and buy a unit respectively are presented with very basic 2D plans, which could be a hindrance in visualisation of the space. Having a digitalised 3-Dimension copy of the layout plans, which could be updated easily, would minimise spatial inaccuracies, enhance visualisation and improve service levels with tenants and buyers.

Desired Outcomes
An **accurate, digitalised, 3-Dimension representation of the tenant space** which can benefit the various stakeholders such as asset owners, service providers, marketeers, tenants, and buyers.

Requirements
• Scalable, user friendly, cost efficient, quick turnaround time, and provides accurate representations.

Challenge Statement 10 - Digitalization and Process Integration for Construction projects

Background of Current Process & Challenge Statement
Construction projects are largely managed manually. Technical challenges specific to the construction sector have a role in the slow adoption of digital solutions. Given the varying sophistication levels of smaller construction firms that often function as subcontractors, building new capabilities at scale is another challenge. However, none of this is going to get easier as projects are becoming more complex and larger in scale. The growing demand for environmental-friendly construction means traditional practices must change. Moreover, the shortage in skilled labour and supervisory staff is expected to get worse. These issues require new innovative solutions.

Desired Outcomes
Better construction **project performance in term of time, cost and quality**. Technologies are needed to improve specific processes in the development project cycle and integration is needed for better performance in project time, cost and quality.

Requirements
Effective solutions to current & future challenges of construction industry. Some of key processes may include: 1) Design tools that allow **smoother and quick design formulation and collaboration** 2) **Procurement solutions that allow buyers to get the best possible vendors** and prices 3) **Digitalize construction site management and monitoring** 4) **Better integration of design/procure/construction**

Challenge Statement 11 – Mesh Wi-Fi

Background of Current Process & Challenge Statement
The scale of existing Wi-Fi networks is limited to indoor buildings and its immediate perimeters. In an outdoor environment, the network is limited to a definite range of unobstructed area. Wi-Fi signals that extend out from building Wi-Fi routers are usually too weak for optimal usage, especially when there are obstructions in sight. Mesh Wi-Fi networks are a more reliable way of securing a wireless network as they contain several nodes that allow for multiple access points within a certain range. Keeping costs in mind however, the current methods are not applicable for large areas like industrial business parks.

Desired Outcomes
To be able to provide **seamless park-wide Wi-Fi** using a cost-effective mesh network method.

Requirements
• To be able transit Wi-Fi network at a park level • Able to build future applications with the network

Challenge Statement 12 – Cybersecurity

Background of Current Process & Challenge Statement
Digital technology solutions have been commonly introduced as part of the real estate industry, including cloud solutions, IoT devices, mobile applications, etc. These technologies could potentially expose several end points to external security threats.

Desired Outcomes
Digital technologies implemented as part of the real estate solution for **protection from cyber threats**.

Requirements
• Ability to detect cybersecurity threats or attempts to attack the system • Ability to provide overall cybersecurity risk assessments • Ability to provide recommendations and resolutions to cybersecurity threats