H³ Dynamics

Executive Summary

Our Vision

H3 Dynamics envisions a world where free-roaming robots carrying sensors, cameras and equipment will support challenging, dangerous, or cumbersome activities and provide support during crisis situations, across various industries and applications. These mobile robots, aerial, marine, or ground are connected to a data communication network through small stationary shelter stations that manage the data they acquire, and recharge their energy systems.

As support systems for critical infrastructure inspections, the deployments of such robots and their base station systems can be applied to large-scale solar PV farms, wind farms, hydropower dams, water reservoirs, pipelines, and urban areas to support large-scale built environment inspections and other shared services in tomorrow's smart cities.

H3 Dynamics is building towards this end-game piece by piece, and has already started to commercialize a small number of products and services separately, while it continues to converge its software and hardware products into a seamless and bundled service offering.

Our Starting Point: High Rise Buildings in Singapore

H3 Dynamics was started in 2015 Singapore, a modern and future facing nation known for its efficiency and as the world's most competitive economy. A product of its environment, H3 Dynamics applied itself to challenges faced by the city-state in scaling up dangerous, expensive and slow high rise safety inspection processes, with a starting point focused on external facades.

In the last 3 years, over 90 pieces of debris fell from buildings, and a new passed earlier this year has made it mandatory to inspect all buildings over 12 stories high – and there are several tens of thousands of buildings that meet that criteria in Singapore. JTC Corp, the agency in charge of all commercial and industrial infrastructure in Singapore took interest in our AI and robotics capability in support of façade inspection automation and digitization.

After 3 years of development, we launched a safer, faster, cheaper, and all-digital solution that modernizes the current manual method applying ropes, boom lifts and gondolas. It makes use of drone technology to scan outside surfaces at heights, and relies on an algorithm that helps any drone controller in the world to acquire a precise and automated HD or Thermal image acquisition flight plan across any complex structural shape. The drones fly themselves, meaning pilots don't experience as much fatigue in city work, helping to scale the solution in cities. The company has already inspected over 300 buildings in Singapore this way and is on its way to scan thousands yearly, while expanding its offering to an increasing number of cities around the world. This is the first step towards full automation in urban drone flights.

Monetization and Revenue Model

The company's revenue model is aiming to sell reports as a subscription service (SaaS model). They are sold directly via H3 Dynamics' proprietary APP center named "H3 Zoom" or indirectly via third party APP centers such as SAP, Schneider and Oracle.

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H3 Dynamics' services can also be sold as a white label solution via API link to traditional companies looking to digitize their service offering. Ultimately the following range of software solutions could be sold indirectly through any company's web interface. These can be inspection services companies, test and certification companies, facilities management services companies, even sensor equipment companies.

The company has a sales pipeline of USD $28M which is growing daily as more enquiries from around the world are being received and converted to quotes and purchase orders. To serve H3 Dynamics' clients globally, the company has set up a network of local partners covering Australia, Brazil & Latin America, Mexico, Europe, and US, so that client discussions can be further scaled and localized.

The company's plans to transfer its capability to other use cases all over the world. Early stage work has started to create solutions for oil storage tank inspections, hydropower dam inspections, ship crane inspections and more. Ultimately the goal is a cloud based "app center" that deploys hundreds of use-case specific inspection analytics services across multiple industries.

Digital services being commercialized today:

- **FAÇADE INSPECTOR** – an industry-standard digital/interactive version of today's paper-based inspection reports pertaining to building façade surface inspections. The AI system maps up to 30 different defect types across 4 different surface textures and 3 levels of safety severity. The solution includes a cloud-based certified professional engineer validation and digital endorsement portal, which is incorporated into a final report. Another feature provides portfolio view of all structures, inspection progress across a portfolio, and combined insights generated from multiple buildings.

- **INDOOR INSPECTOR** – a responsive web application on mobile devices which adheres to the NeN 27267 global standard for condition monitoring of indoor and outdoor inspections. The solution leverages a common backend core technology for conditional monitoring of internal objects on floor plans.

- **CONQUAS CHECKLIST** – same core technology as FAÇADE INSPECTOR, except presented in a different format (checklist format) according to BCA (Building and Construction Authority) standards. The solution is used at delivery of new buildings, to ensure construction quality according to a BCA rating system, and is targeting construction companies specifically.

New digital services being built:

- **CRANE INSPECTOR –** solution analyses cranes in the marine sector (Ships). Partner/client (Huisman) is one of the leaders globally in this sector. It will open the maritime vertical on the H3 Zoom digital services marketplace.

- **DAM INSPECTOR –** solution applies FAÇADE INSPECTOR methodology to digitize the inspection process of hydropower dams. It is being developed in Brazil with H3 Dynamics' partner team on

location, which is involved in hydro power dam inspections and safety. There are 3,000 dams in Brazil, typically in remote areas - many of which are at high risk of collapse.

Next step - data acquisition robots and their communication/charging hubs.

Over the past few years H3 Dynamics developed and recently started commercialisation of the first robotics shelter systems for remote installations around the world. The first version of the system is a home base station open to accommodate various professional drones already available on the market. The shelter system can be independent of the power grid (installed anywhere), and acts as an autonomous charging station, edge computer and tele-communications system. As such, aerial drones no longer need human support, can be deployed anywhere just like a remote sensor. Their field-based shelters can connect to the company's broad software applications platform, closing the loop on data acquisition, transmission, interpretation, and results visualization.

The shelter comes with a weather station able to remotely assess conditions for deployment, and can stop a deployment in case of poor conditions, alerting the user remotely. The shelter also comes with its own computer, and communication system. The drone to shelter communication link covers a range of 10km and the shelter to cloud connection can use 4G, 5G and satellite communication networks, similar to SCADA communication systems used in oil & gas. DBX, together with H3 Dynamics' cloud services platform (H3 Zoom) is important development for 5G network suppliers looking to provide bundled 5G services to enterprise clients.

DBX has started sales into the first responder incident management market and has already been shipped to Mexico, Brazil, Australia, US and Europe (France). Meanwhile client deployments are also starting in Singapore with government clients.

In the context of COVID-19, H3 Dynamics has also re-purposing its DBX for medical delivery systems as a rooftop DBX drone hangar network, to carry out safe distancing monitoring using video analytics, communicate via loudspeakers, and transport medical packages from hospital to hospital in Singapore.

Go To Market Partners include large tech MNCs with complementary solutions

AVAYA, as a specialist in emergency services communications, is H3 Dynamics' first DBX go to market partner targeting incident response. H3 Dynamics has integrated AVAYA's video streaming communications system into the DBX drone shelter system as a global standard. H3 Dynamics is also an ORACLE partner since early 2020; H3 Dynamics has joined their industrial innovation lab in Chicago which will be launched in January 2021. ORACLE and H3 Dynamics will work together to connect a number of DBX robotics installations in different countries to the Oracle's showcase command center for live demonstrations in different environments and use cases to their clients. H3 Dynamics has partnered with THALES on the topic of unmanned traffic management, with Hewlett Packard Enterprise on the topic of edge computing, and Singtel on sales of 5G services.