الهيئة الملكية للجبيل وينبع
Royal Commission for Jubail & Yanbu

FIXED ASSETS INVENTORY BY DRONE

Fixed Assets Inventory Project Using Drones

General Presentation

Presentation Content

- Purpose of the presentation
- General introduction about Fixed Assets inventory & valuation project
- Project Challenges and solutions
- Deep comparison between inventory using the traditional method and inventory using technology
- Sustainability Solutions
- The Future vision for using artificial intelligence

Purpose of the presentation

- The main goal of this presentation is to share the Royal Commission for Jubail and Yanbu experience in fixed assets , real estate & infrastructure inventory by adopting innovative method (drones), which is one of the most effective and accurate new implemented technology guaranteed full monitoring and evaluation results.

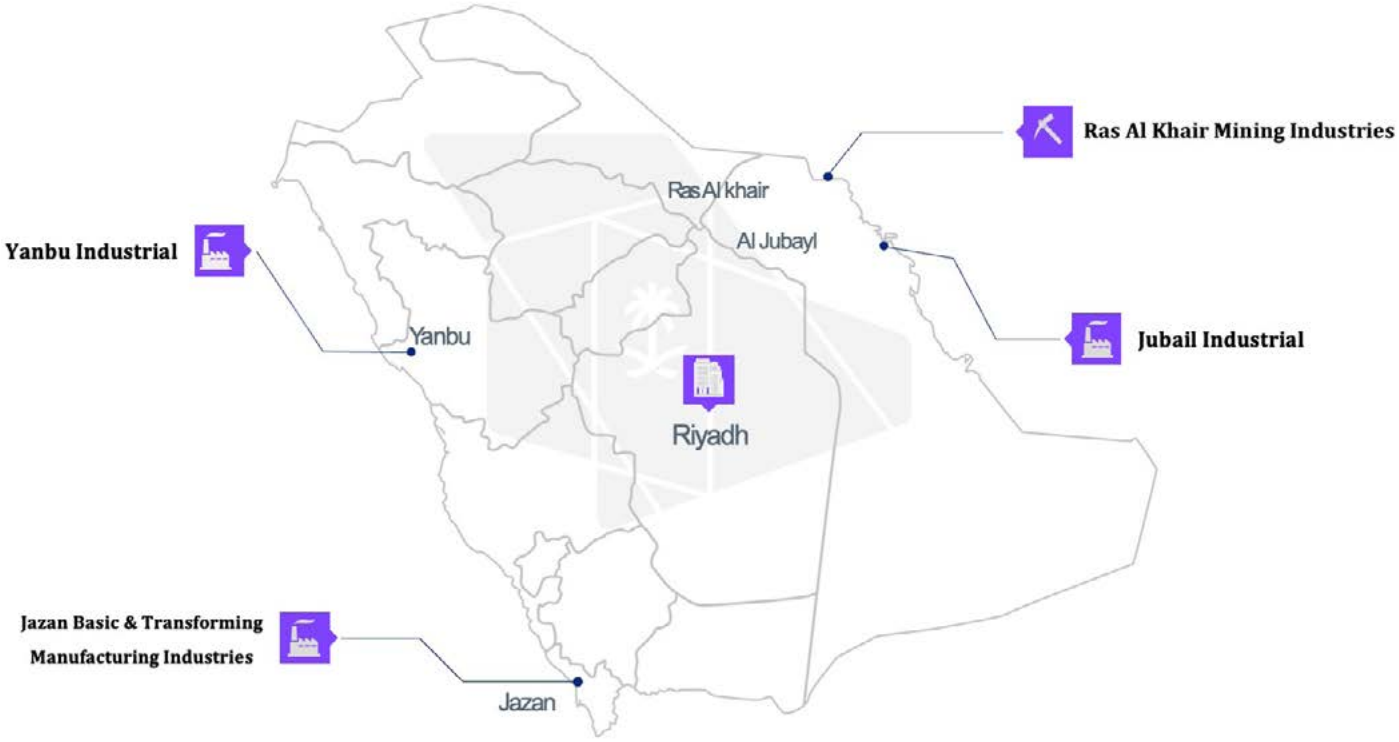
- comprehensive comparison between Drone method and the traditional method which requires a lot of time and effort

Project Overview

The beginning of the story:

- Saudi Arabia 2030 vision is the beginning of the story where the Ministry of Finance launched Cash to accrual project in accordance with IPSAS (international accounting standards in the public sector).
- One of the above project goals is to create a solid financial position for the whole governmental entities based on IPSAS in order to achieve Vision 2030 KPIs by improving the quality of the governmental financial data , enhancing transparency & improve the governmental accounting system and audit standards..
- Accordingly, the Royal Decree No. (13059) dated 16 Rabi› al-Awwal 1438 AH was issued approving the project of transforming all government entities from the cash basis accounting to the accrual basis accounting.
- The Royal Commission for Jubail and Yanbu began its journey of transition from cash to accrual basis & to complete this journey, it was necessary to complete the inventory of Royal Commission assets , create an accurate and comprehensive assets register & valuating assets in the current market price.

Fixed Assets Geographical scope



The Royal Commission's Assets Classification divided into 5 main groups.

Land

Exceeded
50,000
lots

Buildings

More than
11,500
buildings

Infrastructure

For the cities of the authority, including roads, bridges, rain drainage networkss, trees and others

About
350
thousand assets
Measured in different units

Movable Fixed Assets

It counted to more than one million movable assets distributed among cars, furniture, electronic and mechanical devices, etc.

About
1,101,341
Origin transferred

Intangible assets

Such as licenses, regulations, property rights..etc.

The big challenge for the Royal Commission was how to inventory such assets volume and quantity in a traditional way.
Therefore, the Royal Commission started to think outside the box and figure out the applicable creative solutions

Examples of above-ground infrastructure

1 Roads & Bridges

- Road Development Projects
- Paving the road layers of concrete, stone and asphalt
- Docks

2 Road Accessories

- Lighting poles
- Signage
- Traffic Signals and Signs
- Trees

3 Rain drainage networks

- Manholes and their covers
- Channels of rain drainage pipes
- Concrete rain drainage

4 Irrigation Network

- Lifting Stations
- Valves, valves and dividers

5 Utilities

- Dams & Water Reservoirs
- Public gardens, parks and beaches.

6 Gates and fences

- City entrances
- Main Gates
- Concrete walls and metal fences

7 Civil Works

- Public parking and umbrellas
- Flagpoles
- Water fountains

8 Gates and fences

- City Entrances
- Main Gates
- Concrete Walls and Metal Fences

Challenges and creative solutions

Fixed asset inventory challenges:

1. The magnitude of the Royal Commission›s assets on distant geographical scales
2. Shared ownership for some assets between the Royal Commission and other entities
3. Project time line (24) Gregorian months
4. The necessity of technical inventory for some assets to extracts the technical specifications which affect the assets valuation
5. Establishing a sustainability methodology that ensures periodic control of assets & monitor any changes that affect the asset record and value

Fixed Assets Procedure using traditional method

1

Deploying up to 100 manpower to cover all city roads and facilities

2

Manual Counting for all Assets Such as buildings, infrastructure , lighting poles and trees

3

Getting all infrastructure measurements Manually

4

Surveying buildings, roads and public facilities using specialized tools

Traditional Inventory method disadvantages:

1. Required long time and manpower effort, which lead to miss the prject timeline
2. High financial cost
3. Safety & risk factors could be accrued to workers and city residents to be
4. Poor data accuracy and high probability of errors
5. some assets cannot be accessed

To avoid the disadvantages of the traditional inventory method, the Royal Commission thought outside the box, the team started to search for alternative solutions and finally a new inventory method found

Using drones

For surveying lifting

Why Drones for Surveying ?

The answer of the above question is the following points::

1. Definition of drones for surveying.
2. The objectives of the surveying drones.
3. How to use drones in assets inventory.

Definition of the surveying drone

- The surveying drones is one of the latest technology, which relies on remotely controlled drones to carry out surveying work.

- Drones can be used to survey the urban area, areas under construction, sandy areas, sabkhas and sanitary landfills with Zero risk on human lives and equipment.

The purpose of using the surveying drone:

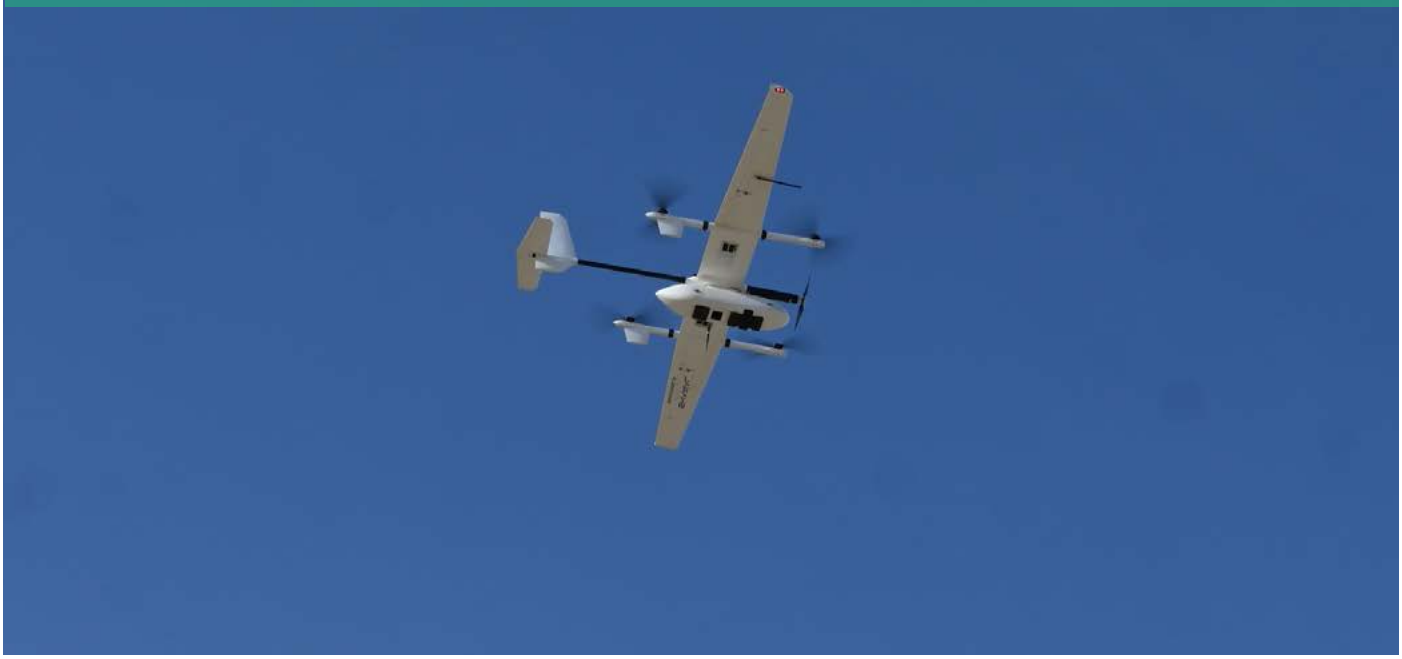
- Providing accurate surveying data for the landmarks and natural terrain for the whole Royal commission cities.

- Providing full topographic databases for concern users in order to be used for planning and engineering design purposes.

Using surveying drones in asset inventory:

The Royal Commission was one of the first governmental entities who used the drone technology for surveying, the first use was in Yanbu Industrial City where the Royal commission got a unique experience , Later on the Royal Commission developed this experience by using the drones in fixed assets , real estate & infrastructure inventory , and it was the first & only government entity who implemented this method in SAUDI , the inventory process was as follows::

- Counting and Assets inventory by cadastral images.
- Calculating & providing accurate technical data for all areas, lengths of real estate (land and buildings) ,infrastructure (roads, utilities, lighting poles, etc.).
- Calculating the areas of all offshore islands owned by the Royal Commission.
- Accurately determine the coordinates and locations of assets. Identifying complex assets such as identifying lands and building assets based on them.
- Reflecting all inventory data results on GIS system to achieve sustainability in asset data.



The methodology of using Drones in Assets Inventory :

1. Determine a reference to correct the coordinates and stabilize the cadastral points.

2. Fly the plane and photograph the work area with a high-resolution camera.

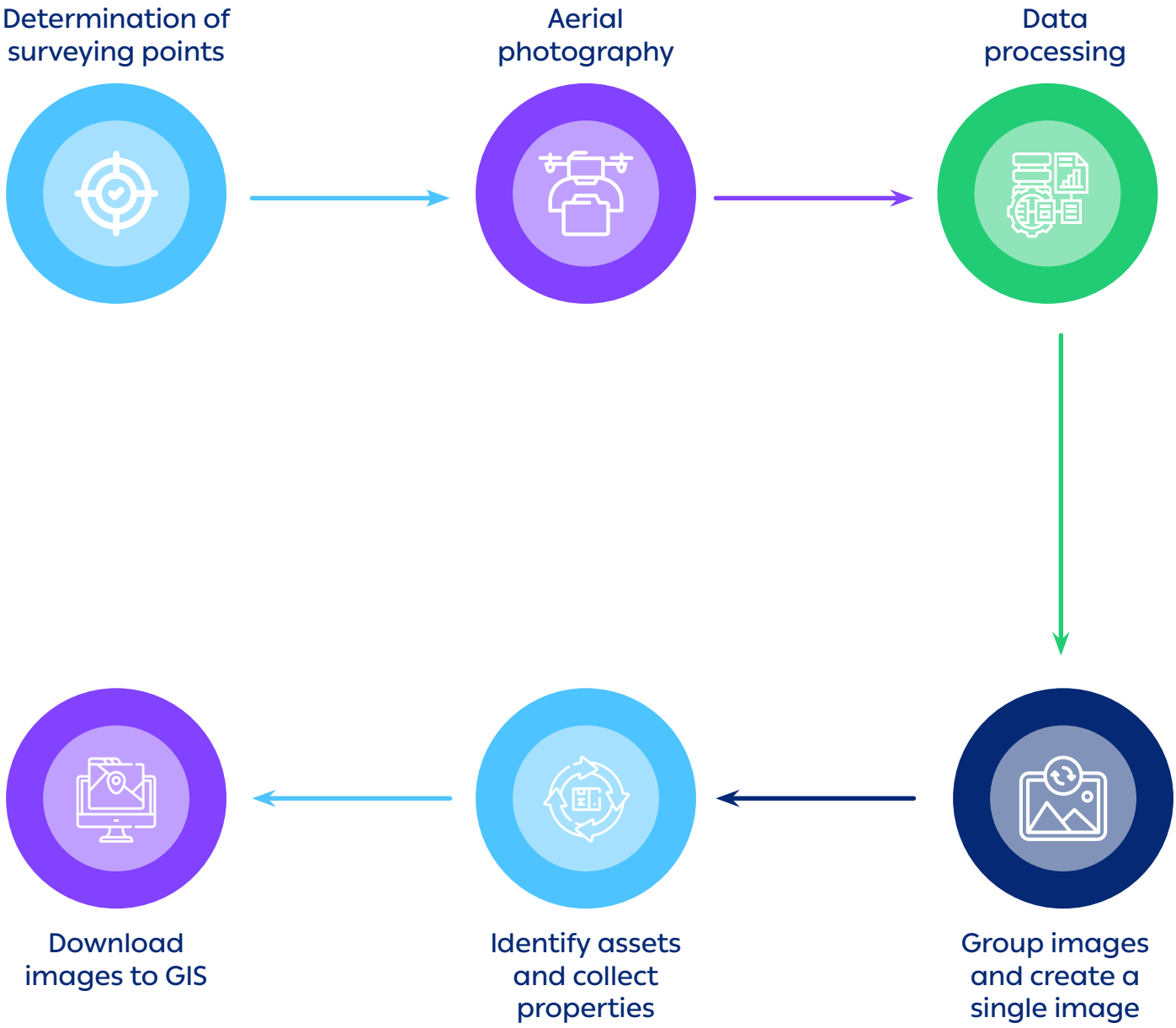
3. Correct the images resulting from the scanning process and link them to the point cloud using the drone software program.

4. Collect images resulting from the scanning process using PIX4D software to create a single, high-resolution collage of the scanned location.

5. Through the collage resulting from the PIX4D program, it is possible to identify the asset classes, collect characteristics such as length, location, coordinates and area, and define the asset types on the resulting map manually by a specialized engineering team.

6. Download aerial photographs on GIS software saving all asset data for sustainability purposes.

The methodology of using Drones in Assets Inventory :



Comparison in Figures

- The Royal Commission has conducted a comprehensive comparison between the traditional method of real estate, assets & infrastructure inventory, which requires a lot of time and effort, and inventory by drone technology, which is one of the most effective and accurate new technological developments in the field of monitoring and evaluation.
- This research aims to achieve additional benefits and capabilities for the asset inventory and valuation project provided by the Royal Commission in Jubail and Yanbu, which contributes to improve the efficiency and reducing costs.
- This study was conducted in the Laayoune neighborhood of the industrial city of Naea, which is considered one of the important areas in urban development.

Category	Quantity/Number
Neighborhood Area	2100 m^2
Buildings	1378
Roads	29011 m
Trees	2356
Lighting poles	1497
Rainwater drainage channel	5204 m
Parks & Playgrounds	5

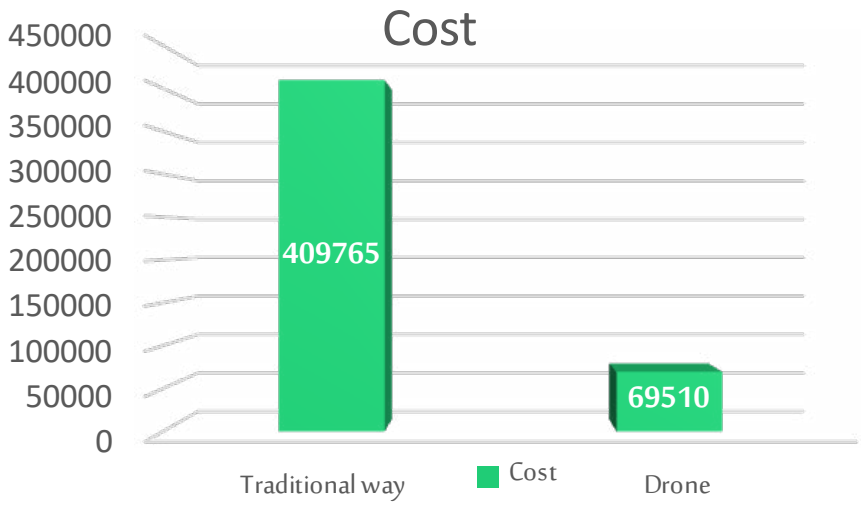
Yanbu Industrial City Oyoun District

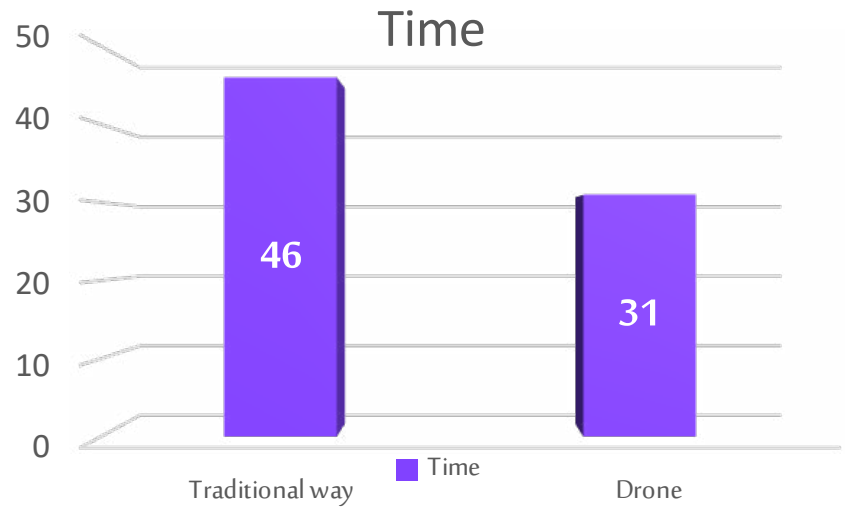
Comparison results between the two methods:

	Traditional method	Drone	Cost savings
Working days	46	31	33%
Cost	409,765	69,510	83%

Results of the comparison between inventory of assets by the traditional method and inventory by drones:

Work	Traditional method	Drone
Severity level	High (handicrafts)	Low (use of technology)
Accuracy	Medium	High (accurate detailed images)
Efficiency	Low	High
Suitability for large spaces	Limited	Very convenient





Sustainable solutions:

1. Download images to GIS
2. Save aerial imagery and asset data on GIS software
3. Flying the drone periodically to monitor any changes in asset value (additions, removals, wear and tear)
4. Using a panoramic scanner, which is mounted on top of a car to scan assets horizontally and monitor any changes in a more accurate way.
5. Updating the asset register and values

monitoring any changes the asset by a panoramic scanning device

AI to future vision

- The Royal Commission is currently working on attracting the best artificial intelligence technologies to manage assets in a more effective and efficient manner
- Feed the asset register with more detailed data, such as taking more accurate asset measurements and reading the text of road signs.Monitoring changes to completed assets and assets in progress. Technical assessment of assets, such as monitoring road cracks.

Automatically highlight the changes to assets

Getting all Assets measurements

reading road sign text