

## COMPANY

Falconviz

## LOCATION

Jeddah, Saudi Arabia

## SOFTWARE

Autodesk® AutoCAD®

Autodesk® Recap

Autodesk® 3ds Max

Autodesk® Revit

# How technology that is shaping cities of the future is helping save an ancient one.

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— Khaled Abd El-Gawad,  
**Director of Business Development,**  
**Falconviz**

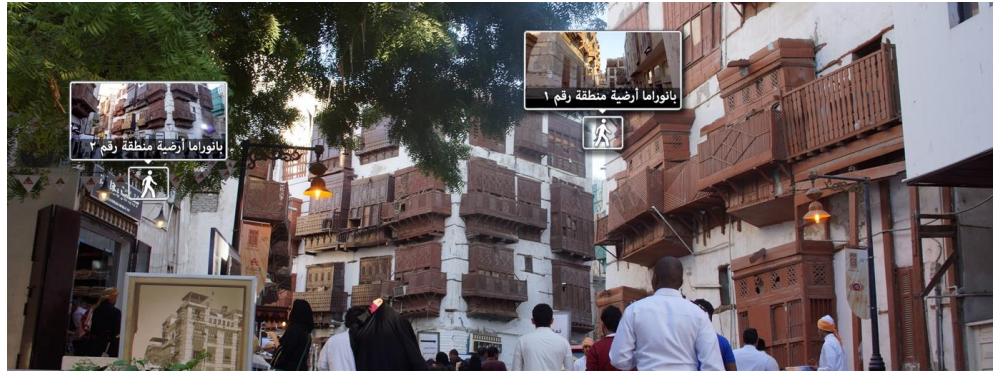


Image of Al-Balad area in Jeddah, Image courtesy of Falconviz

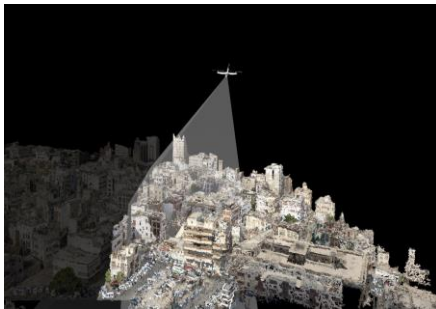
## Introduction

Juxtaposed with developments of gleaming new towers and modern urban infrastructure, Jeddah's ancient port centre of Al-Balad is a UNESCO Cultural Heritage Site that has largely stood the test of time. Although many of Al-Balad's historical buildings have been lost to dilapidation and fires, in the last 50 years its UNESCO status has provided the impetus to preserve this important remnant of Hijazi architecture. Making these efforts count is Falconviz, a Saudi-based 3D surveying and mapping firm that uses state-of-the-art drone technology and Autodesk tools to document and register these historical buildings for future generations.

Founded in 7th century C.E., the ancient town of Al-Balad served as the centre of commerce and trade for the city of Jeddah. After more than 19 centuries, the ancient walls that surrounded this historic town, and the souk within, were torn down. As oil wealth flowed into Saudi Arabia, many moved out of the cramped spaces of Al-Balad, leaving its homes and buildings to slow dilapidation.

Al-Balad embodies traditional Hijazi architecture, with its unique use of cut coral stones and intricately hand-carved Rawashin protruding latticed windows. It is one of the few places left where such architectural styles can be seen first-hand, and as such, are of intangible cultural and historical importance.

Khaled Abd El-Gawad, Director of Business Development at Falconviz explains that archeologically and architecturally, Al-Balad has a unique value proposition. "It is a very important place, one that needs to be preserved for future generations. It is a cultural symbol that can serve both as a tourist attraction and an invaluable memory of an era of Saudi Arabia before oil." However, preserving ancient buildings in this historic quarter comes with its own challenges, particularly with new, more modern and contemporary developments becoming the top choice for current consumers.



Drone capturing images from Al-Balad area.  
 Image courtesy of Falconviz.

“We can do in a day what it would take a number of teams at least a month to complete thanks to drone technology and the capabilities Autodesk allows us” explains El-Gawad.

### Tackling ancient buildings from new angles

One of the biggest challenges in Al-Balad is the proximity of buildings to each other.

“Using typical methods would take a long time, require several teams of people, many man hours and would also not be precise or accurate,” explains El-Gawad. Traditionally, hundreds of architects would be employed to physically sketch and model individual unique features of the buildings. With several buildings sharing walls and roofs, this task would take months to complete. “This method has been the norm for most projects in Saudi Arabia until maybe 20-30 years ago,” according to El-Gawad.

With the advent of laser scanning technology and photogrammetry, this procedure has become exponentially more efficient. Together with drones – an area of expertise for Falconviz – previously inaccessible areas of Al-Balad can be documented for more accurate preservation. “Using photogrammetry and Structure from Motion (SfM), we can create highly accurate 3D renderings of the buildings, which can then be easily converted to scaled models,” says El-Gawad. These renderings include details from roofs and passages that would be difficult to model using laser scanners.

### Breathing new life into the old with Autodesk

Each drone sweep in an extensive aerial and terrestrial 3D scan of Al-Balad produces dozens of images of a building, and hundreds of these images create a complex point cloud of data. Every point provides

accurate coordinates and true colour markers for all facets of the buildings, from its complex Hijazi façades to its structural nodes. Unlike the common method of point cloud meshing – which can be inaccurate, overloads rendering and creates unnecessarily large files – Falconviz directly imports the point cloud into AutoCAD, enabling for a detailed 3D model that preserves even the minutest structural details.

“Autodesk tools like ReCap, Revit and 3ds Max provide us with accurate drawings of sections, elevations, and structures of buildings,” explains El-Gawad. When combined with BIM tools and processes, he adds, it gives them previously unavailable unique capabilities. “We can use these models to run various stress tests and simulations, like fire safety. We can plan for emergency response teams, evacuation routes, and many other scenarios due to the high accuracy of the models.”

The team at Falconviz can make use of the highly accurate point cloud to take measurements and accurately extract a CAD solid model of the building. Since all measurements are accurate to 1cm, final as-built plans can be generated for any of the modelled buildings from the original SfM scan.

Autodesk tools also significantly reduce the amount of time spent on documenting these buildings. Efficiency in the documentation process goes up by 80 percent when using Autodesk 3ds Max, compared to more traditional methods. Productivity gets a

boost of 30 percent with ReCap, combined with the cutting-edge capabilities of modern drones and imaging tools.

“We can do in a day what it would take a number of teams at least a month to complete thanks to drone technology and the capabilities Autodesk allows us. This has a positive domino effect on costs, manpower and efficiency. It also gives the Saudi authorities in charge of restoring and maintaining the Al-Balad area a comprehensive model to refer to when necessary. For example, there was a fire that destroyed some very old buildings in Al-Balad some months ago. Without the accurate models we helped construct, these buildings would be lost forever. Now, they can still be restored,” adds El-Gawad.

### Documenting the past for the future

Falconviz is focused in its mission to “digitally document the world”. “We provide the technology that will help countries to improve and accelerate the process of documenting its most valued cultural assets,” says El-Gawad. “This project was one of our first, and one of the first in Saudi Arabia, and we are very proud to be a part of this renewed effort to carefully restore these cultural treasures that are an intangible part of human culture and history.”

El-Gawad is particularly focused on preserving these past icons for future generations – a marker, of sorts, that carry lessons from the past for the future. It is a beautiful thought, not without a touch of irony, especially when the same technology that is used in modern urban infrastructure planning and construction is helping save these ancient structures and restore them to their former glory.



Image courtesy of Falconviz