

The Revolution Of Advanced Technologies As a Platform For Mapping, GIS And Autonomous Vehicles

Yoav Coller, Ori Cohen and Rabinovitch Eyal (Israel)

Key words: Engineering survey; Geoinformation/GI; GNSS/GPS; Land management; Laser scanning; Photogrammetry; Positioning; Remote sensing; Urban renewal

SUMMARY

The use of advanced technologies as platform for GIS, mapping and autonomous vehicles

Kav Medida is a firm of registered land surveyors, engineers and pilots, providing nation-wide coverage for projects of all sizes. We specialize in land surveys, geodesy, photogrammetry, mobile mapping, construction layouts, topographical boundaries, subdivision design, title and boundary surveys, geodetic control surveys, digitizing, map reproduction and preparation, GIS, laser scanning and 3D modeling services.

In 2020, Kav Medida LTD, a Land Surveyors company, has started facing the most challenging situations land surveyors can meet – COVID19 lock downs, mobility limitations and office workspace shutdown.

The objective was to measure, map and deliver the field without setting foot into it. The secondary important objective was to publish the data to the new home-office for their employees and not less important – to add some extra visual and data richness for their clients, dealing with a new digital Zoom arena. All in all – COVID19 crisis pushed Kav Medida to positive thinking in ways that would have benefitted them even prior to the pandemic.

After major technological adaptations, many projects started running digitally, more efficiently, yielding better results and allowing the basic digital product infrastructure to be implemented directly into the most demanding BIM projects in the country.

Moreover, after winning Israel's most demanding GIS road mapping project, Kav Medida had made enormous technological leap. The project demands were strict – mapping half of Israel's road at a rate of 200km per month, delivering all in highly detailed GIS specifications + pdf sheets. These

The Revolution Of Advanced Technologies As a Platform For Mapping, GIS And Autonomous Vehicles (11591)
Yoav Coller, Ori Cohen and Rabinovitch Eyal (Israel)

FIG Congress 2022

Volunteering for the future - Geospatial excellence for a better living

Warsaw, Poland, 11–15 September 2022

demands, never seen before in any other project in Israel, made Kav Medida think outside the box and come up with advanced and creative technological strategy.

In the full article, we will further discuss the collaboration between mobile mapping, drone photogrammetry and open-source GIS platforms and how Kav Medida developed a system which overcame tremendous difficulties in the field such as GPS spoofing and jamming, severe flight restrictions and in the office - major bottlenecks such as massive QA and mapping productions with 0 errors which producing 200km of maps per month.

Also, using advanced mobile methods, all RTK GNSS & IMU equipped, Kav Medida was able to complete its tasks with minimal on-field personnel presence – critical at times of pandemic, and even safer for the staff in general.

On top of all the methods, Kav Medida acquired a server and developed GIS multi-user platform in order to serve the mass with all the digital benefits and data we gathered – giving access to 3rd party users to 3cm absolute accuracy products of more than 4,000km of public roads. In addition to that, a full visual publication system was established from scratch, combining aerial imagery, mobile mapping data, 1cm per pixel orthophotos and more.

Thanks to the immense road data gathering from both aerial and mobile mapping methodology combined with 3cm global accuracy on all datasets – Kav Medida pushed the surveyor role to the front of the Israeli hi-tech industry – publishing its mass production maps to the autonomous automotive industry.

The impact on other projects in the office was immediate – 64% increase of UAV usage in projects, 56% increase of mobile mapping platforms in other projects, 85% increase of GIS 3D mesh and orthophoto publishing and sharing access to clients and the public.

The results were outstanding, it's almost unbelievable we are still in a pandemic stage:

- Less employees on the roads, safer.
- Employees' promotion from field to office work.
- Better products – more QA thanks to visual richness in the background of every map, and in 3D. Products are more accessible to the mass – more eyes on the product = less errors.
- Better overall infrastructure projects planning design and efficiency.
- 30% increase in gross

The Revolution Of Advanced Technologies As a Platform For Mapping, GIS And Autonomous Vehicles (11591)
Yoav Coller, Ori Cohen and Rabinovitch Eyal (Israel)

FIG Congress 2022

Volunteering for the future - Geospatial excellence for a better living
Warsaw, Poland, 11–15 September 2022

revenue.

- Increased demand for surveyor involvement in projects which aren't mapping focused – such as 3D modeling, visual animations of urban infrastructure projects, construction site GIS monitoring, virtual tours, architecture visualization and more.

Our conclusions are concrete –

- A land surveyor should invest in the latest tech and also in a suitable staff to operate it.
- Combination of advanced mobile mapping and SFM UAV tools yield superior results and redundancy.
- Create your own systems and methodologies, think outside the box for solution which suits your company's DNA – invent and program.
- Publish your work in a smart way – collaboration and accessibility are key.
- Less field work, more remote sensing – do the field work in the office.

The Revolution Of Advanced Technologies As a Platform For Mapping, GIS And Autonomous Vehicles (11591)
Yoav Coller, Ori Cohen and Rabinovitch Eyal (Israel)

FIG Congress 2022

Volunteering for the future - Geospatial excellence for a better living
Warsaw, Poland, 11–15 September 2022