



PROJECT: ECOLOGICAL AND INNOVATIVE TECHNOLOGIES FOR RECOVERING  
INDUSTRIAL AREAS FROM LCA AND ENERGY EFFICIENCY POINT OF VIEW  
2020-1-RO01-KA203-080223

# PRACTICAL APPLICATIONS OF STEREOPHOTOGRAMMETRY IN CONSTRUCTION



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## 1. What is stereophotogrammetry?

This is a method to measure objects in one or multiple photos.

**The device** has a **calibrated stereo-camera**, which takes two simultaneous images of the same scene from two different positions. This is analogue to the left and right eye in human 3D stereo vision.

The combination of the stereo camera with **Electronic Distance Measurement (EDM)** technology, advanced algorithms and real-time edge computing automates the complex processing and therefore simplifies the whole process and makes it real-time



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## 1. What is stereophotogrammetry?

In-house processing solutions eliminate the need for an internet connection or cloud processing services. This allows information to be obtained quickly, anywhere. Plans can be created for levels, facility sizes can be estimated and as-built documentation can be created.

Measurements are easy to make on site. Quantities of materials required/consumed can be measured in real time: volumes, surfaces, pipe lengths, electrical wiring.

The data obtained can be processed in the office, downloaded to a PC, edited with other design and management software.

The software of the device is easy to use and intuitive, easy to use by anyone with an medium level of construction skills.



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## 2. Practical applications

The practical application is realized in an industrial hall, located in the industrial area of Brasov, it was built in the 60's. It is part of a bigger building. It is to be renovated and will have a new destination.



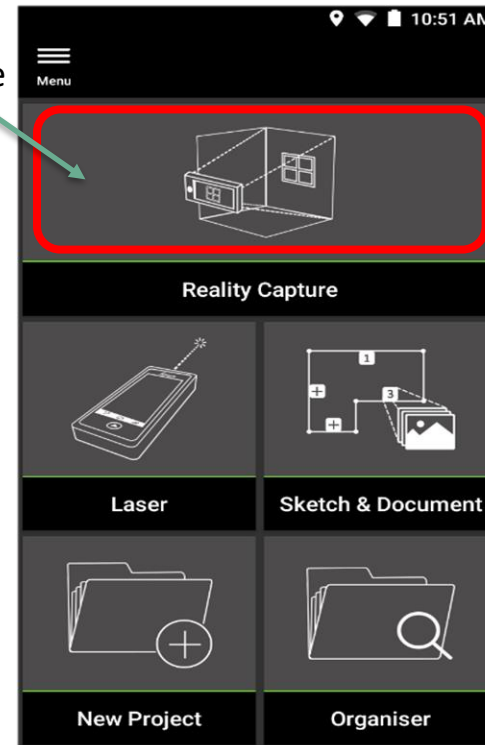
## 2. Practical applications

We need information on the geometrical and constructive elements of the industrial hall and we will take photos that can be accessed whenever needed. From the basic menu we choose the option to photograph.

Several factors can influence the accuracy of measurements:

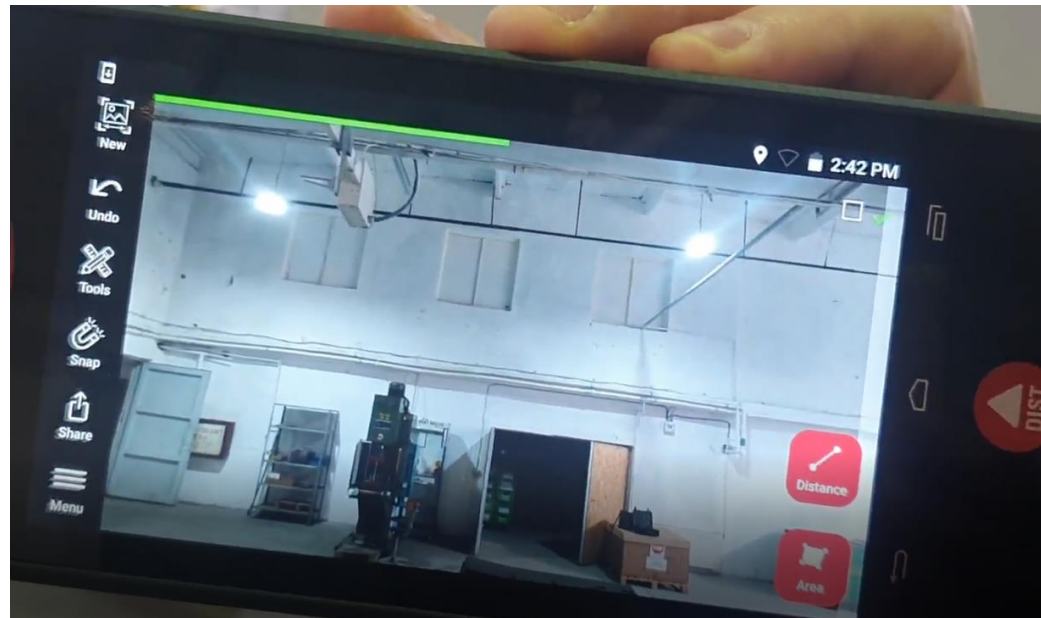
- Angle of intersection.
- Distance from the object being measured - to increase the accuracy, is recommended to Take the photo from a short distance.
- Baseline between the 3D images .
- Orientation of the camera to the object being measured.
- Light conditions, structure and texture of the object.

Reality capture



## 2. Practical applications

The elements of interest are photographed and the images taken are processed afterwards. Measurements can be made directly in the field or based on stored data, can be made the next day, next week or next year. It is not necessary to return to the field to retrieve this data.

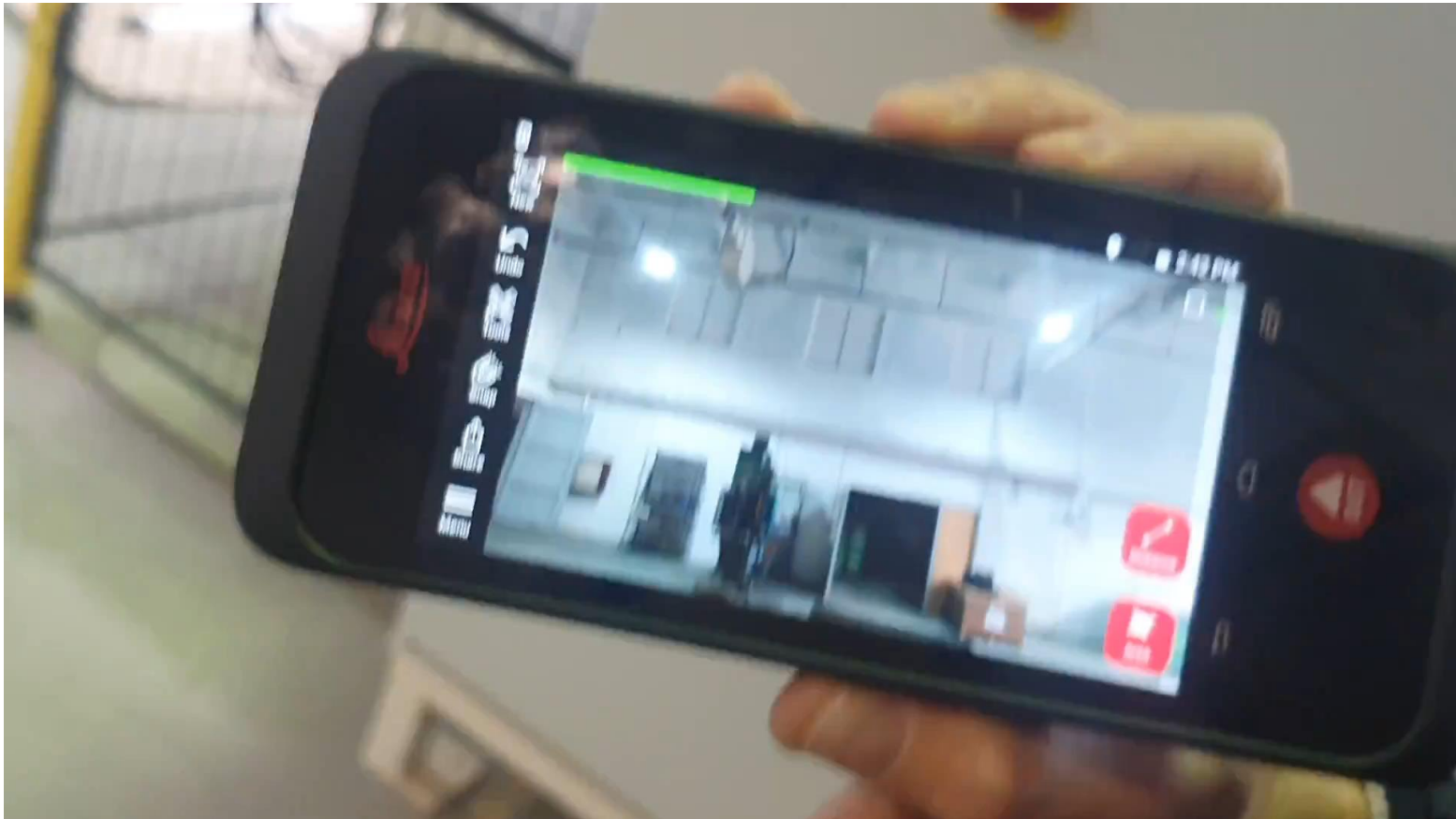


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## 2. Practical applications

In this case we will have real time measurements.(video)

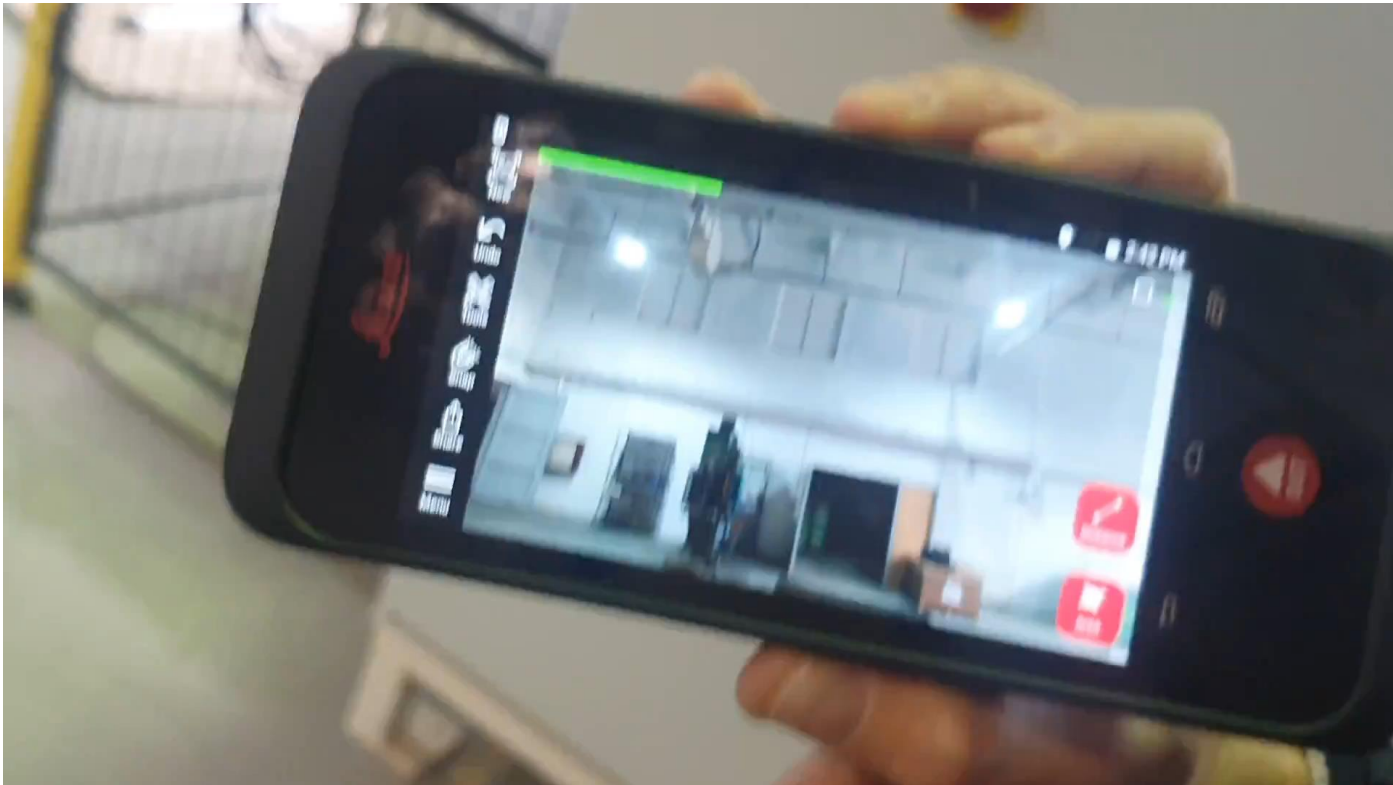


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## 2. Practical applications

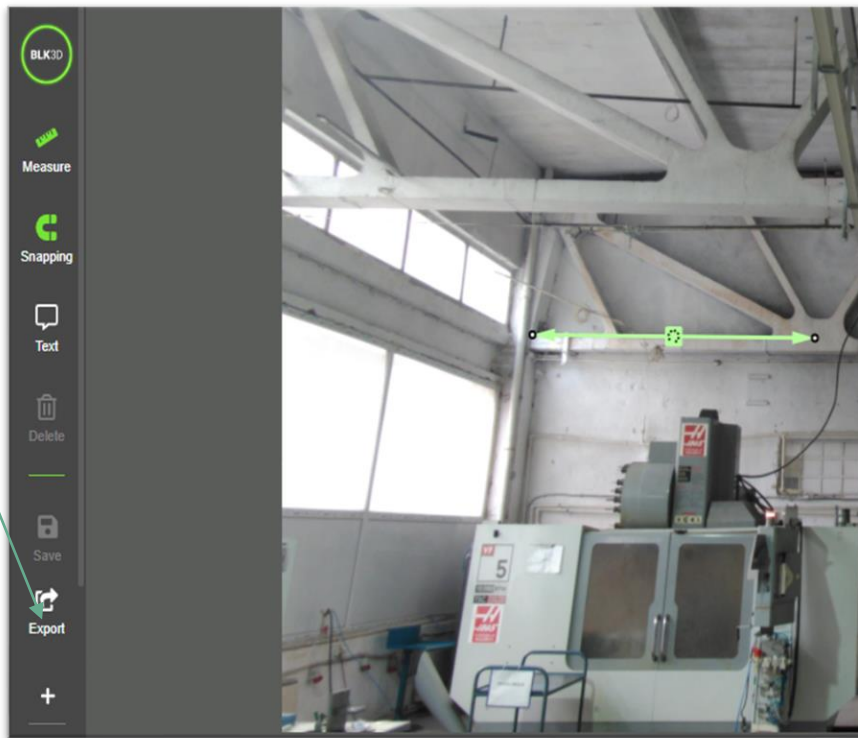
These operations can be carried out by a skilled worker, a technician, a foreman or an engineer. The data obtained can be exported in pdf, jpg or we can get a link.(video)



## 2. Practical applications

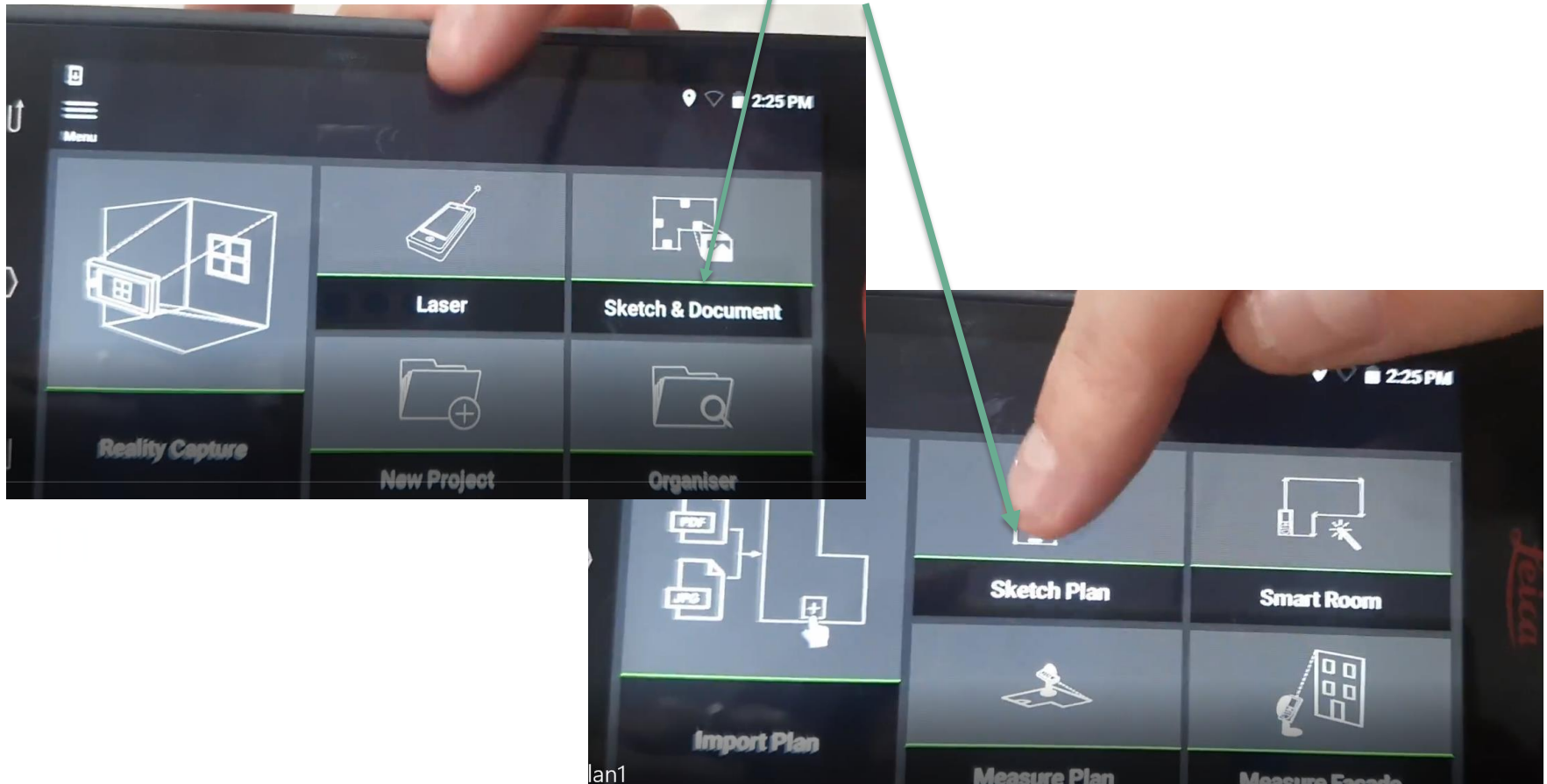
In order to obtain details about the construction elements, measurements can be made on the photos taken. These videos / photos can be downloaded to the drive and the details of the building can be drawn at the office.

We can export the data obtained. Use the device application



## 2. Practical applications

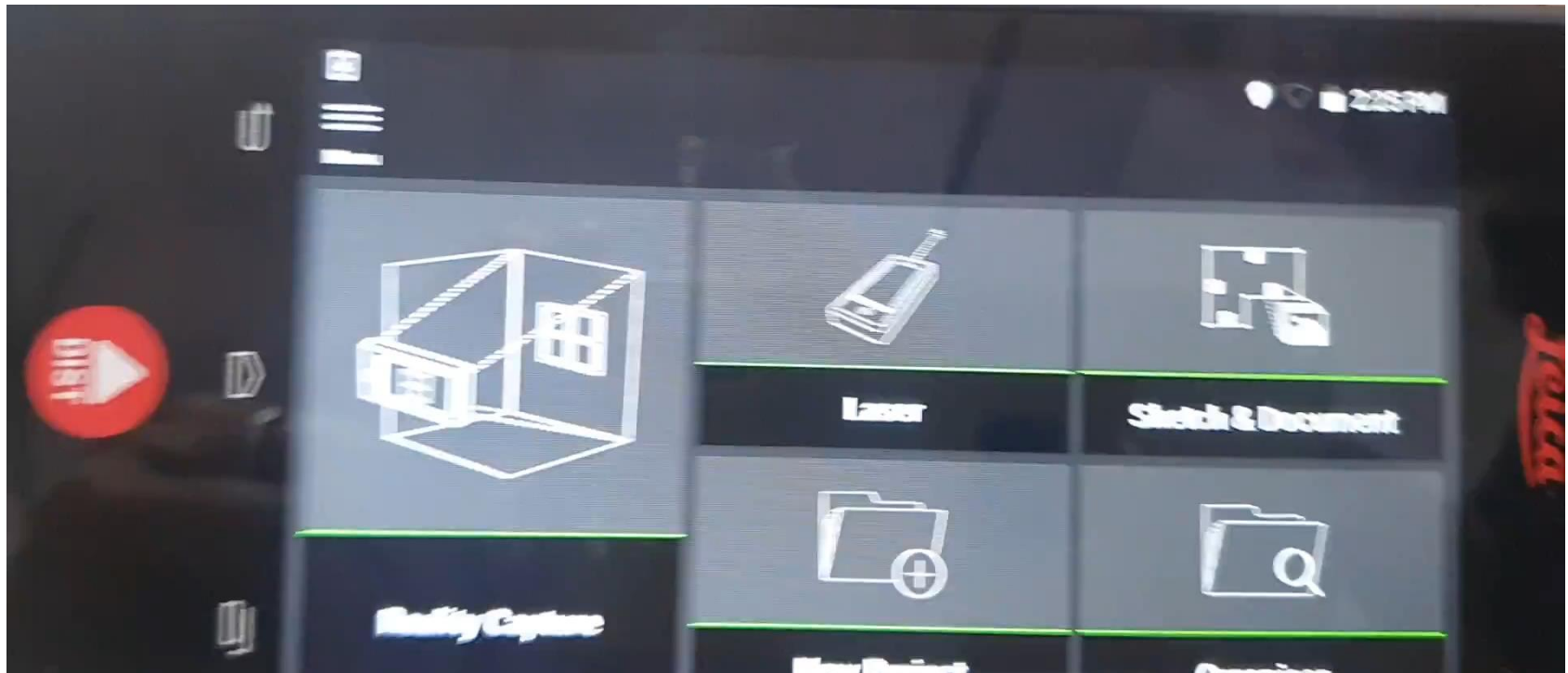
To obtain the industrial hall plan we use the device drawing application.(video)





## 2. Practical applications

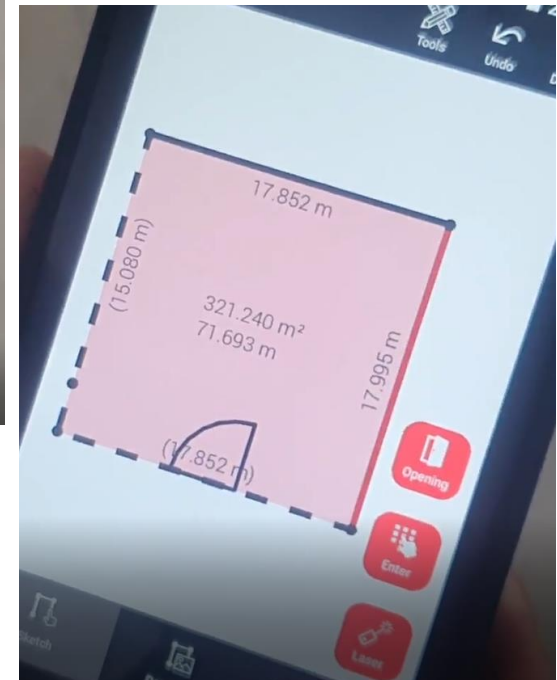
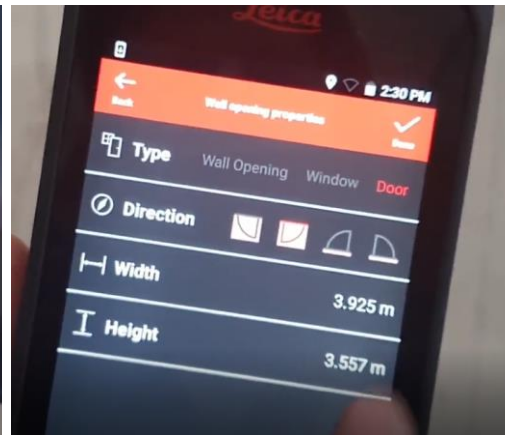
We will sketch the industrial hall plan directly on the device and measure with the laser. For measurements we will use the laser meter option. (video)





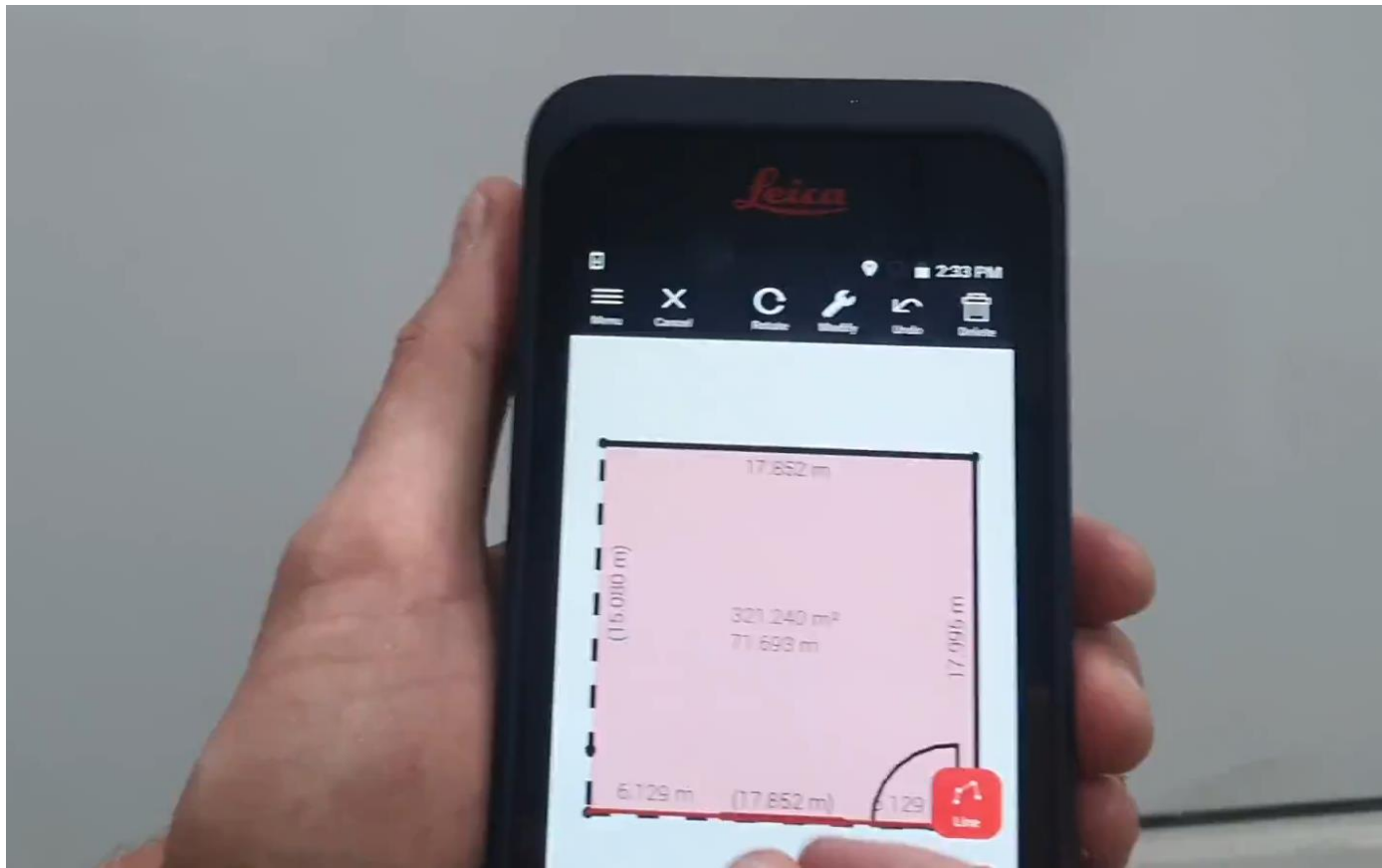
## 2. Practical applications

The device will work as a laser meter and will transfer the values obtained on the plan (doors, window, walls)



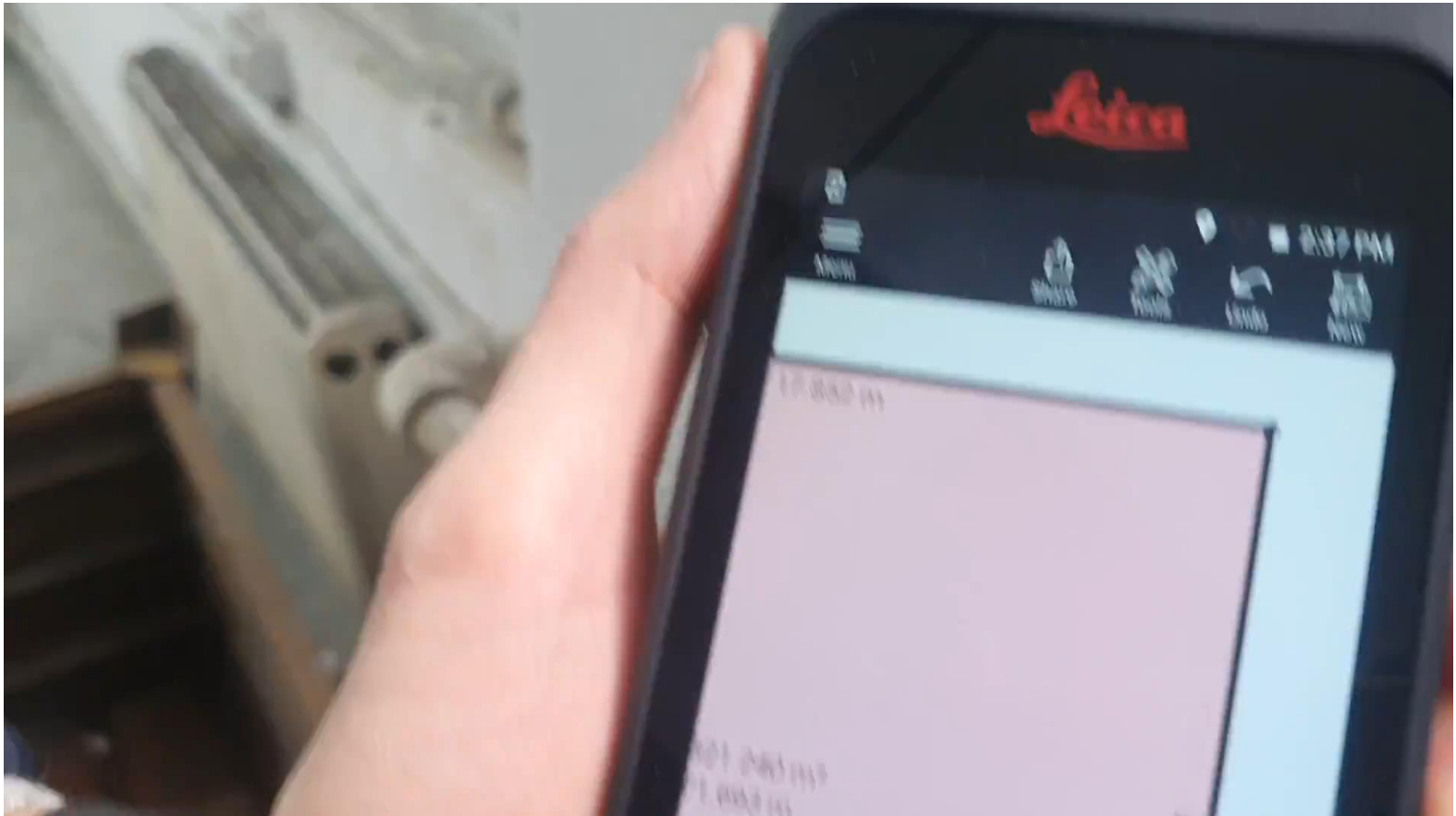
## 2. Practical applications

Measurement of construction elements. We measure the window and place it on the sketched plan: distance from the door, parapet height.(video)



## 2. Practical applications

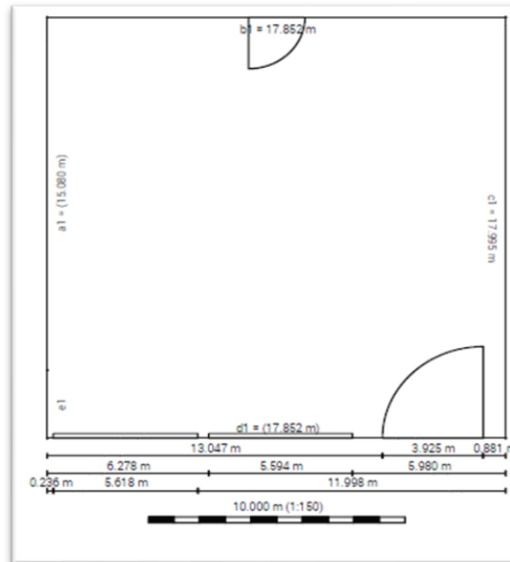
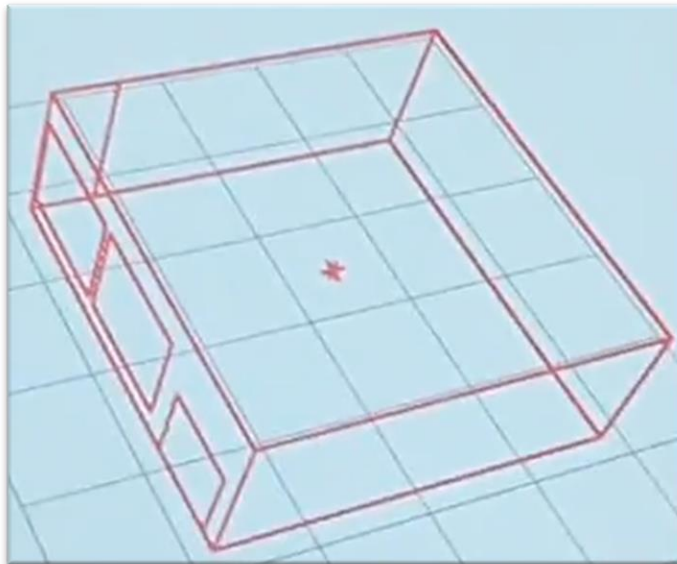
In addition to the 2D plan, a 3D version of the industrial hall can be drawn.(video)



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## 2. Practical applications

The information obtained can be exported in .pdf or .dxf format. The obtained files are automatically scaled to a convenient value set by the user. Can be further processed in Autodesk and BIM 360.

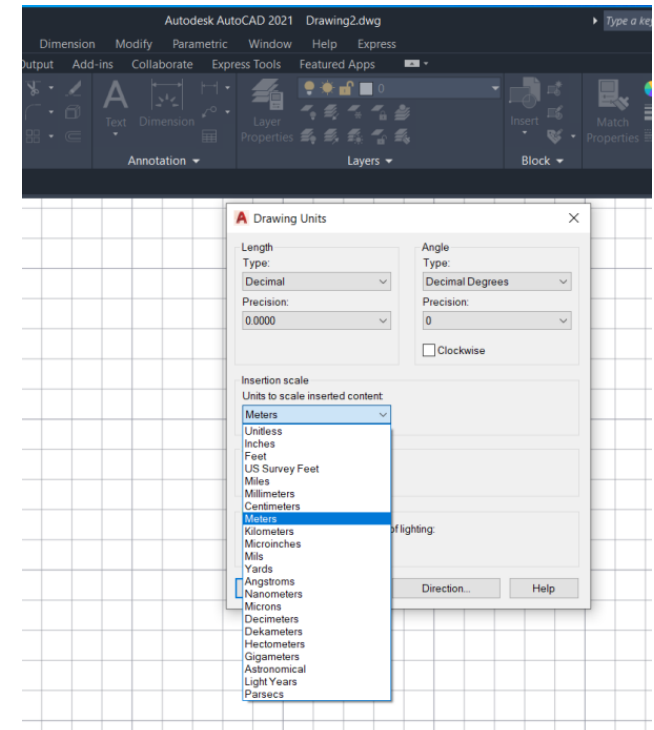
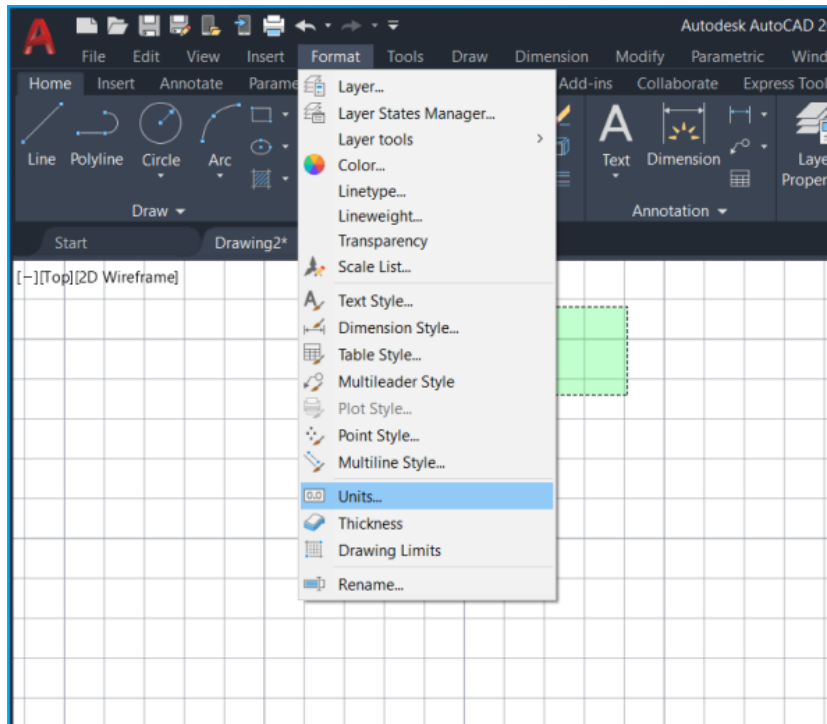


| Shape 1                   |      |             |            |             |
|---------------------------|------|-------------|------------|-------------|
| Type                      | Name | Value       | Wall Area  | Description |
| <b>Summary</b>            |      |             |            |             |
| Floor Area                |      | 321,240 m²  | -          | -           |
| Wall Area                 |      | 473,262 m²  | -          | -           |
| Opening Area              |      | 65,598 m²   | -          | -           |
| Wall Area Net             |      | 407,564 m²  | -          | -           |
| Volume                    |      | 2120,570 m³ | -          | -           |
| <b>Distance</b>           |      |             |            |             |
| b                         |      | 17,852 m    | 117,845 m² |             |
| c                         |      | 17,995 m    | 118,785 m² |             |
| Circumference             |      | 71,693 m    | 473,262 m² |             |
| Height                    |      | 6,601 m     | -          | -           |
| <b>Openings</b>           |      |             |            |             |
| <b>Door 1 on line b</b>   |      |             |            |             |
| Width                     |      | 2,200 m     | -          | -           |
| Height                    |      | 1,900 m     | -          | -           |
| <b>Door 2 on line d</b>   |      |             |            |             |
| Width                     |      | 3,925 m     | -          | -           |
| Height                    |      | 3,557 m     | -          | -           |
| <b>Window 1 on line d</b> |      |             |            |             |
| Width                     |      | 5,594 m     | -          | -           |
| Height                    |      | 4,232 m     | -          | -           |
| Distance                  |      | 0,899 m     | -          | -           |
| <b>Window 2 on line d</b> |      |             |            |             |



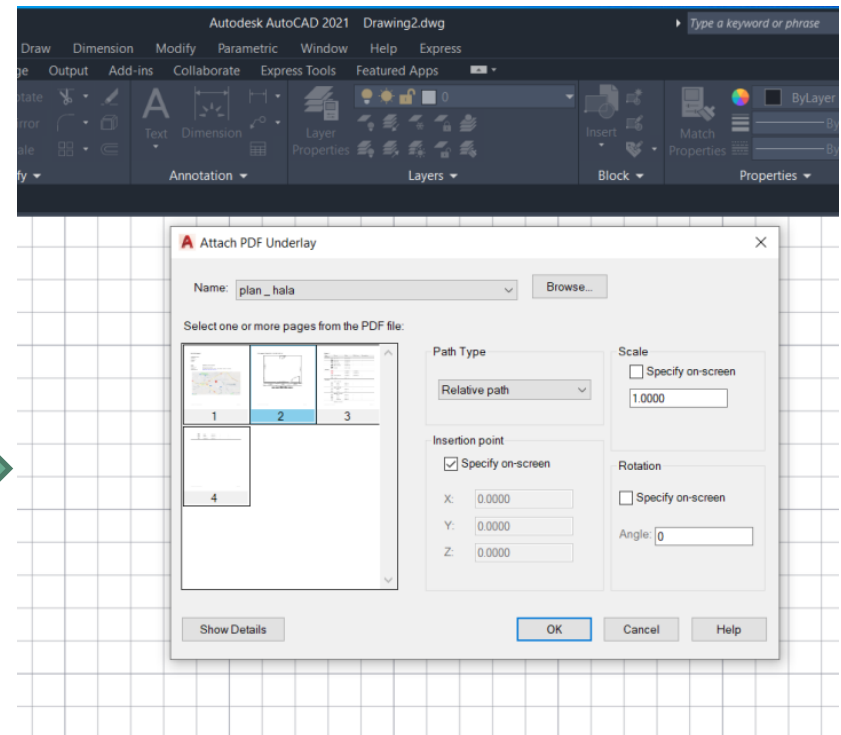
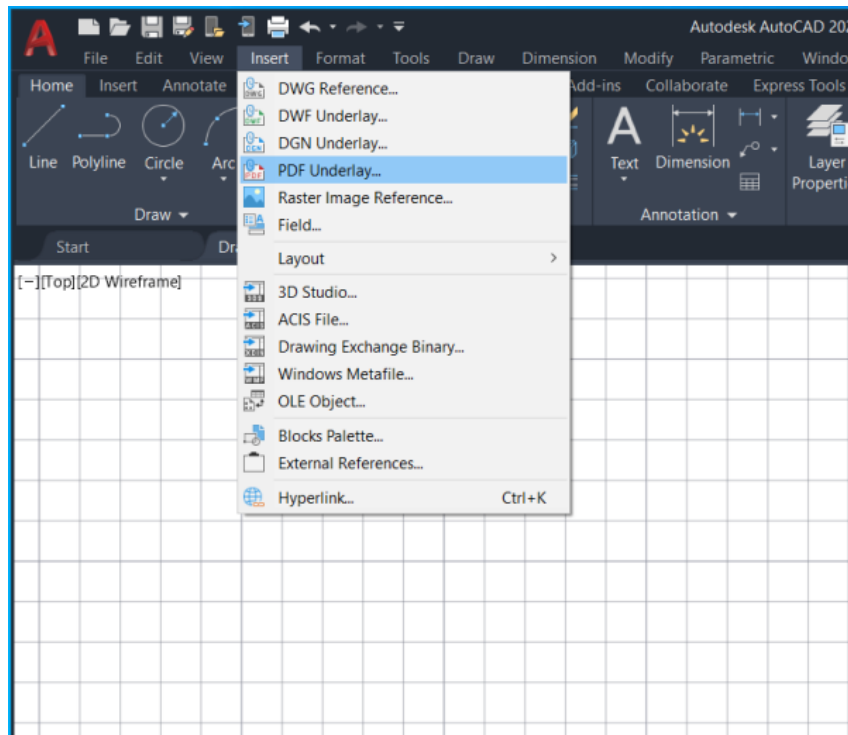
## 2.1 Processing the plan obtained in Autocad

The unit of measurement adopted for the measurements was the metre. The plan obtained was scaled and exported at a scale of 1:150. It is important to set the unit of measurement in the autocad worksheet.



## 2.1 Processing the plan obtained in Autocad

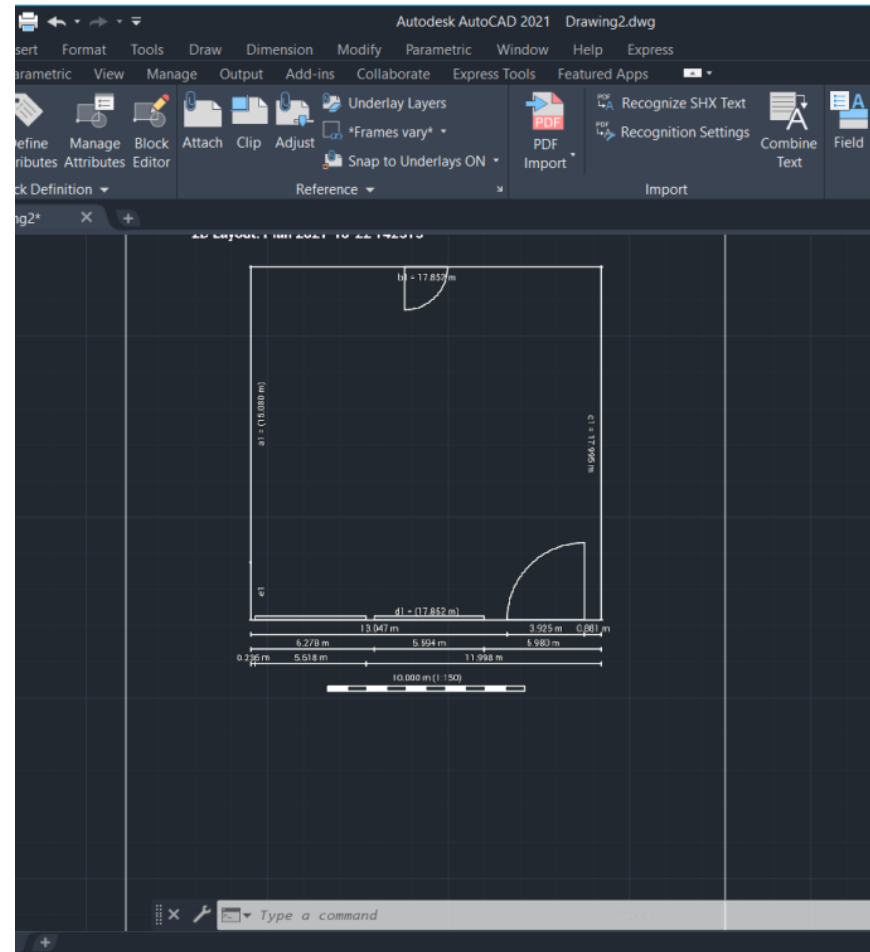
Import the file with the pdf extension, select the page(s) of interest and OK.



## 2.1 Processing the plan obtained in Autocad

Plan with extension.dxf opens directly in Autocad.

The plan can be brought to 1:1 scale and then be processed using 2D or 3D drawing commands.



### 3. References

- [www.topgeocart.ro](http://www.topgeocart.ro)
- Leika Geosystems



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[www.recoverind.eu](http://www.recoverind.eu)



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