

THE METHOD OF USING AUTOCAD FOR MEASURING THE AREA OF PLOTS OF COMPLEX SHAPE ON THE SURFACE OF THE EARTH

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***Abstract** - the article considers a method of quickly determining the area of an object based on Google maps. A comparative analysis of the dimensions of a known object and its dimensions on a Google map is carried out.*

***Keywords** - Google map, scaling, error, central projection, terrain relief.*

Formulation of the problem. Modern design cannot do without innovative approaches. With the advent of virtual and augmented reality, constructors have more and more tools to expand their capabilities in various areas of engineering.

Analysis of the latest research. Humanity's constant interest in developing new tools for determining the area of large land objects, structures, roads, etc. is caused by practical considerations. Such measurements are carried out in the traditional way by highly qualified specialists with a mandatory trip to the area [1].

Formulation of goals. The method of determining the area of an object using Google Maps data with drawing scaling in AutoCAD speeds up this process without significant error.

Main text. The task of working with graphic and geometric information is solved with the help of modern software tools - Google maps and AutoCAD graphic editor. Let's consider the essence of the proposed method of preliminary measurement of the area and perimeter of the land plot and objects on the example of the building of the Palace of Culture of the Igor Sikorskyi Kyiv Polytechnic Institute.

To solve this problem on the Google map, you need to select the necessary object, copy it together with the scale ruler. Insert a raster image into AutoCAD, scale the ruler together with the measurement object. Repeat (indicate) the shape of the object, combine with the Region command and determine the area and perimeter of the object (Fig.1).

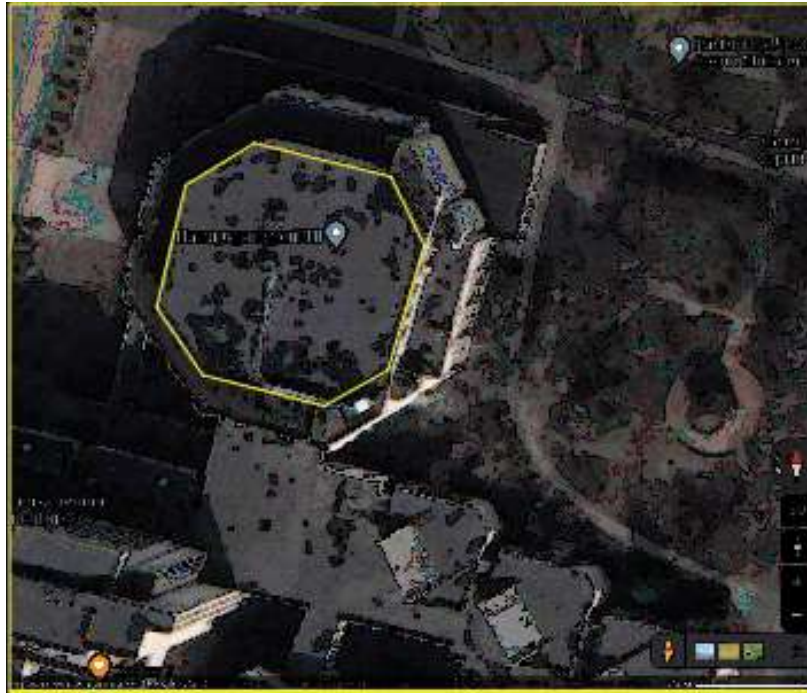


Fig.1. Palace of Culture of the Igor Sikorskyi Kyiv Polytechnic Institute

To determine the measurement error, we compared the dimensions of the known object with their measurements on the Google map. For example, the error of measuring the wingspan of the An-2 aircraft on the drawing (Fig.2), located in the museum of the Igor Sikorskyi Kyiv Polytechnic Institute and on the photo from Google Maps in the open space (Fig.3), is only one percent. The same error of one percent was obtained when comparing the wingspan of the Yak-40 plane in the drawing (Fig.4) with a photo of the plane from Google Maps in the museum of the Igor Sikorskyi Kyiv Polytechnic Institute (Fig.5).

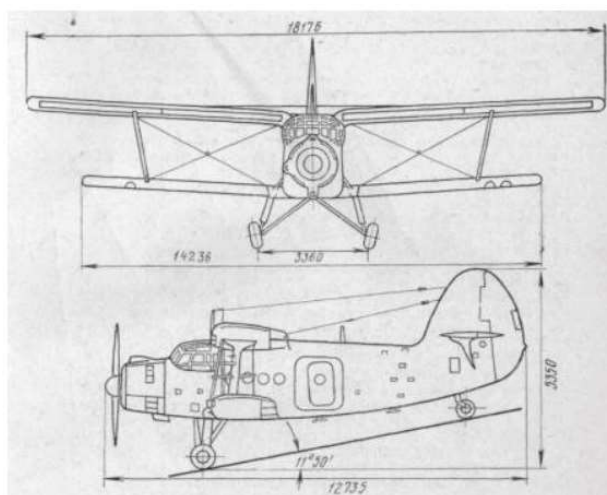


Fig.2. An-2 aircraft drawing



Fig.3 An-2. in a photo from Google Maps

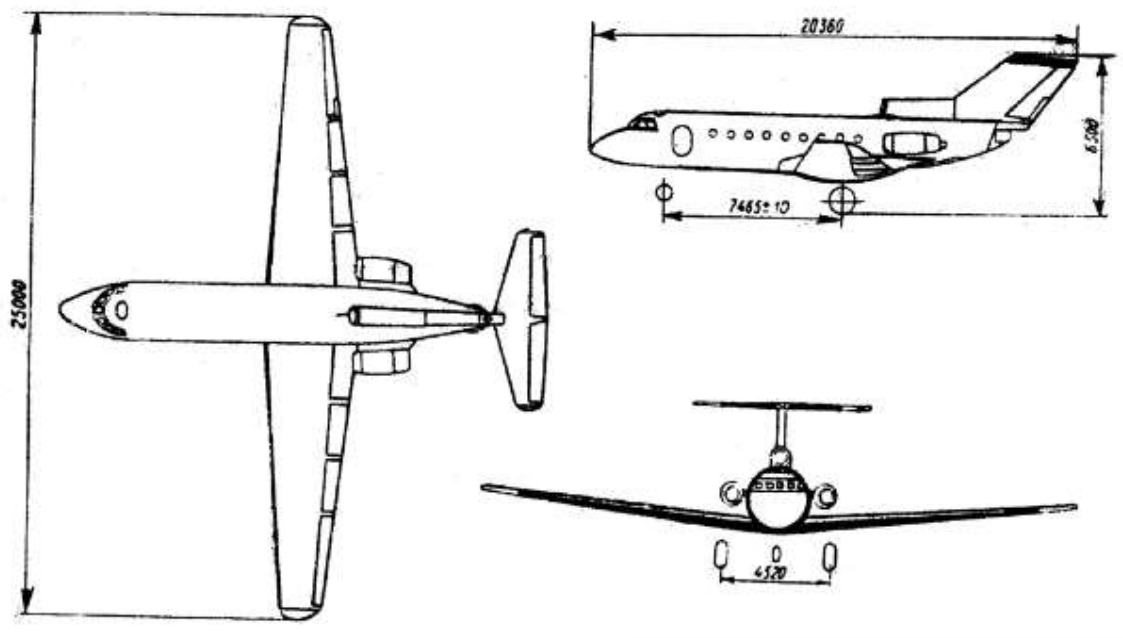


Fig.4. Yak-40 aircraft drawing



Fig.5. Yak-40 in a photo from Google Maps

Despite the fact that when building in AutoCAD from Google maps, spatial objects are displayed with a change in relative sizes, which is due to the use of the central projection method and the specificity of the transfer of relief images, the resulting error satisfies the requirements for preliminary measurement of the area and perimeter of objects by the proposed method [2,3].

Conclusions. The proposed method meets the need for accurate and relatively simple determination of the area of a land plot or other object on a map for various branches of engineering activity.

References

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