International Journal of Academic and Applied Research (IJAAR)
ISSN: 2643-9603
Vol. 10 Issue 4 April - 2026, Pages: 8-11

Analysis of SAS Planet Image using Remote Sensing and GIS for Civil Engineering Works

Samir Saify

Civil engineering dept. College of Engineering
University of Babylon
Hilla- Babel-Iraq
Samir.saify@uobabylon.edu.iq,

Abstract: *The use of remote sensing (R.S) and geographic information systems (GIS) has become crucial, especially in civil engineering projects that require rapid preliminary analysis and calculations using satellite and aerial imagery. This research focuses on mapping river sedimentation upstream of the Kufa barrage in Iraq. This was achieved by analyzing images extracted from the SAS software developed by the Russian SAS organization, employing remote sensing for image analysis and GIS software for map creation. The ERDAS software, a key program for analyzing satellite and aerial imagery, was used in this research and yielded highly significant and realistic results compared to the actual site survey. Previous studies on sedimentation have utilized different analytical software and satellite imagery from different sources than those used in this research. The research findings demonstrate a high degree of accuracy in matching the river sedimentation locations identified through image analysis with the actual site. This finding facilitates the use of the Russian SAS imagery in other engineering applications, such as architectural and environmental engineering.*

Keywords—Remote Sensing; Erdas; SAS Image; Gis; Sedimentation

1. INTRODUCTION

Is it possible to use cropped images from aerial imagery compilation programs like Google Earth or archived and updated images from the Russian SAS organization? To demonstrate the feasibility of using such images, this research utilized cropped images from the SAS.org website and analyzed them using the ERDAS program. These images were used in the field of water resources engineering (civil engineering). Many previous studies have used satellite imagery (Landsat, Senatel, etc.) and various analytical methods, as mentioned in [1, 2, 3]. The reasons for using these images are their up-to-date nature, free availability, geometric correction, and ease of downloading and analysis. The Kufa barrage was chosen as the study area because it is an alluvial plain with river deposits present upstream of the barrage. Image analysis can provide a preliminary study of the area, reducing time and cost because calculating changes from images annually eliminates the need for field calculations requiring annual engineering surveys. The results yielded the identification of deposit locations, the creation of necessary maps of these sites, and the calculation of the surface area of these deposits. The research demonstrated the feasibility of using SAS imagery by matching the results with the actual situation through on-site verification.

2. Study area

Downstream of the Babylon Governorate, on the Kifil-Shanafiyah branch of the Euphrates River, the Kufa Barrage was built in 1986 for irrigation purposes. (Ministry of Water Resources) The Barrage regulates the flow for the downstream regulator in the middle Euphrates region. Shown in fig (1).

Fig (1) Location of Kufa Barrage by SAS program.

International Journal of Academic and Applied Research (IJAAR)
ISSN: 2643-9603
Vol. 10 Issue 4 April - 2026, Pages: 8-11

3. Software and Image Sources

3.1 Software

The ERDAS IMAGINE software was used in this research to process and analyze images. The ERDAS IMAGINE program included the functions of both image processing and GIS. These functions have importing, viewing, altering, and analyzing raster and vector data sets. ERDAS Imagine is a raster-based software program created especially for the purpose of extracting data from imagery. A full range of tools are provided by ERDAS IMAGINE® to provide precise base imagery that can be used in GIS and ESRI geodatabases. A number of capabilities, including image orthorectification, mosaicking, reprojection, classification, and interpretation, are available in ERDAS IMAGINE®, allowing users to study image data and present it in formats including printed maps and 3D models (ERDAS User's Guide, 2022) [4].

3.2 Image Sources

Analyzing the combined aerial images through the SAS Planet program approved by the Russian organization (SAS, 2025). SAS Planet is designed for downloading and viewing high-resolution satellite image and maps submitted by such services as Google Maps, Digital Globe, etc.

4. Processing and Analysis of Image

In this research four satellite images were downloaded from the SAS program for the year 2025, as they are available on the site. As mentioned, the purpose of the morphology study is to determine changes in the actual nature of the land. Fig. (2) explain Flow chart of processing and analysis of image.

Fig. (2): Flow chart of processing and analysis of image

(A) Insert Image

Insert the origin image in Erdas software as shown in Fig (3)- (A) for year 2025.

(B) Processing (unsupervised classification)

This step refers to unsupervised classification, where Unsupervised classifiers make classification decisions without using training data. Instead, this family of classifiers uses algorithms to analyze the unknown pixels in an image and classify them according to the naturally occurring clusters or groups in the image data, see figures from Fig (3)-(B). Hence, it is also called clustering (ERDAS User's Guide, 2022) [4]. This process was used to identify each feature present in the image and separate it from others by extracting a special package for each feature. That means each feature will be shown in one layer, like water, agriculture, sediment, etc.

(C) Result of processing

The final image shown represents all the features in image and their values, represented by histogram, see Figures from Fig (3)-(C) and Fig (3)-(D). A histogram is a data distribution graph or a table of the number of pixels for each conceivable value in a data file. (ERDAS User's Guide, 2022). The word "pixel" is short for "image element." The smallest component of a computer image is a pixel. Pixel is a grid that a Raster image data are divided by it, in which each cell of the grid is represented by a pixel. A pixel is also called a grid cell, each pixel refers to 0.3 meter in the images of the study area, as shown in fig. (4)

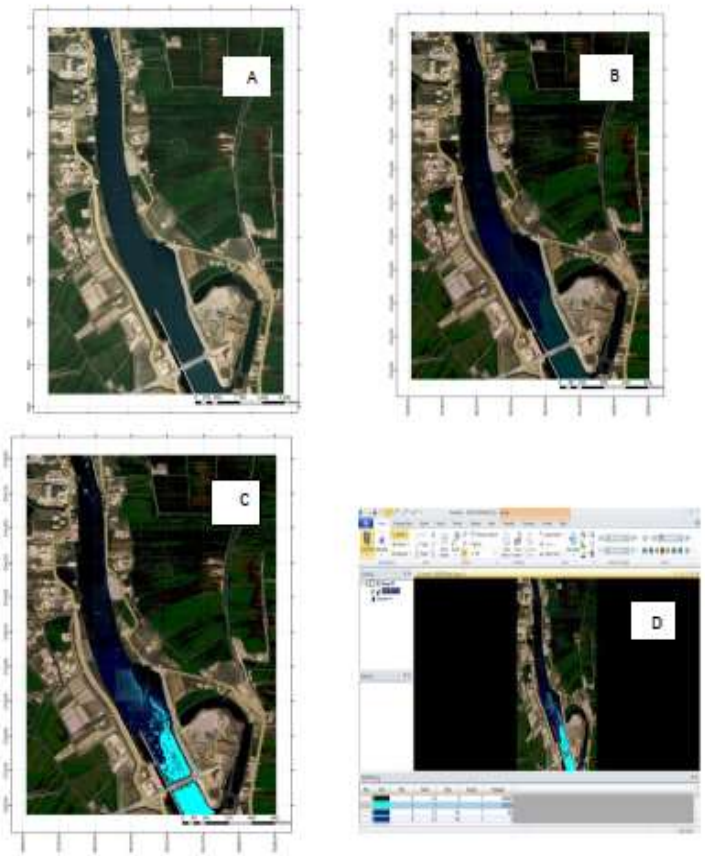

Fig (3) Stage (A),(B),(C)&(D)of processing and analysis of image for year 2025

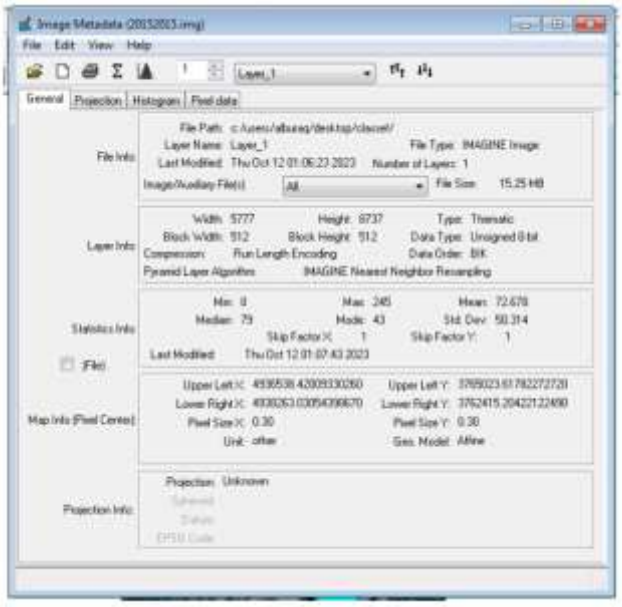

Fig (4) Image Metadata

(D) Map produce

The other program used in this research is GIS, where the image was inserted into the GIS program after being corrected and analyzed in the ERDAS program in order to produce final maps representing the study area and also the locations of river sediments. Shown in figures (1) and (3)

5. RESULT

The use of programs in processing and analyzing satellite images reduces the time and cost factor because calculating changes from images every year eliminates the need for on-site calculations that require conducting an engineering inspection every year. From the ERDAS Imagine software results, histogram quantities for each feature were obtained as shown in Fig.(3)-(D).The results showed in the year 2025 had the lowest amount of water, which represents the highest amount of sediments, for checking the histogram quantity from the software with the field results for the year 2025, The area of water is 111800 m² according to ERDAS IMAGINE software calculator.

6. GROUND TRUTH

The field survey of the study area was conducted and data was collected in cooperation with the Water Resources Department. The data indicated the amount of surface water area over several years and the extent of the difference in these areas as a result of the effect of river sediments, as shown in Table (1).

Table 1: surface water area over several years

Year	Area (m^2)
2010	403320
2015	585236
2020	88578
2025	111800

4.CONCLUSION

- The study proved that it is possible to use SAS planets images from the Russian organization and analyze them in remote sensing and GIS programs by comparing the results of the analysis with the result of field surveying works.
- The variation in basin area in the river is found through the use of satellite or aerial images. The images are processed and analyzed in the ERDAS program. It is noted from the analysis of satellite images, and field investigation the results showed the convergences of surface water area in specified period due to accumulation of sediment.
- The use of programs in processing and analyzing satellite images reduces the time and cost factor because calculating changes from images every year eliminates the need for on-site calculations.
- This Image can be use in the application of civil engineering department (water resource, Environmental, etc.)

4 REFERENCES

[1] Weynshet Tesfaye,Eyasu Elias,Bikila Warkineh,Meron T ekalign and Gebeyehu Abebe,(2024). Modeling of land use and land cover changes using google earth engine and machine learning approach: implications for landscape management, Tesfaye et al. Environmental Systems Research. https://doi.org/10.1186/s40068-024-00366-3

[2] Jyoti and Amba Shetty. (2022). An Evaluation of Land Use Land Cover Classification Techniques using Google Earth Engine. Conference paper.

[3] Thanh Noi Phan *, Verena Kuch and Lukas W. Lehnert (2020). Land Cover Classification using Google Earth Engine and Random Forest Classifier—The Role of Image Composition, Remote Sens. 2020, 12, 2411; doi:10.3390/rs12152411

[4] ERDAS User's Guide, (2022), " Imagine spectral analysis™", guide book