



Use Cases

VELOCITY5D

PRESAGIS

A COLLECTION OF USE CASES WITH PRESAGIS' VELOCITY 5D

Worldwide Database

OVERVIEW

Content Creation for a Large National Defense Organization.

Need: simulation-ready database for fast jet aircraft needed to train the next generation of pilots.

In 2020, Presagis participated in a project with a large defense organization to create a simulation-ready database (synthetic environment) of the entire planet with special emphasis on the continents of Asia, Europe, and North America. To accomplish this, Presagis used Velocity 5D – its content creation solution. For training purposes, the client required both a **global view** of operations when flying at high altitudes, and **high-resolution** areas across the globe for when approaching an airport.





VELOCITY5D

Project requirements consisted of gathering high-resolution satellite imagery, building footprints, roads, and vegetation to generate a high-quality simulation database. Due to the complexity of the project, it was distributed into several phases. This allowed the client to properly test and familiarize themselves with the database and its integration within their systems. Depending on the type of area (global, regional or area of interest), the database specifications vary. For instance, Global areas required medium resolution satellite imagery with some extra features, and areas of interest normally required high-resolution imagery with geo-specific content models to help pilots familiarize themselves with their surroundings – especially airports.

Presagis understood that the scale and complexity of this project required an automated approach. A manual process for this project would entail years of work. The expertise of the Presagis engineering team and the robustness of the Velocity5D workflow reduced the delivery timeframe considerably, and permitted the rapid creation and automation of content. Moreover, many of the client's existing workflows were re-used, thereby eliminating the need to create new procedures "from scratch" in order to create a new CDB format database. Using Velocity5D, the generation of content can be timed in hours instead of weeks or months.

Despite the rapid creation of content in CDB, the project was not without challenges.

For example, some of the source data had missing information – such as entire city blocks. To overcome these common obstacles, Presagis leveraged our current AI and Machine Learning algorithms to extract building footprints from the missing areas. In addition to filling these data gaps, Presagis further enhanced

the database by adding additional data from other providers through further AI/ML extraction and validation.

This Worldwide Database is the foundation to Presagis' new Data as a Service (DaaS), where current or new customers can access a website and download available databases. Should you require specialized areas of interest, or highly detailed specifications, Presagis is ready to collaborate in order to create new content.



Madrid Database

Dense Urban Environment



Need: Produce a large-scale, dense, and complex urban environment.

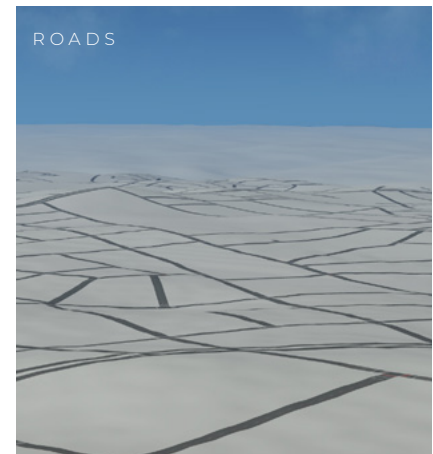
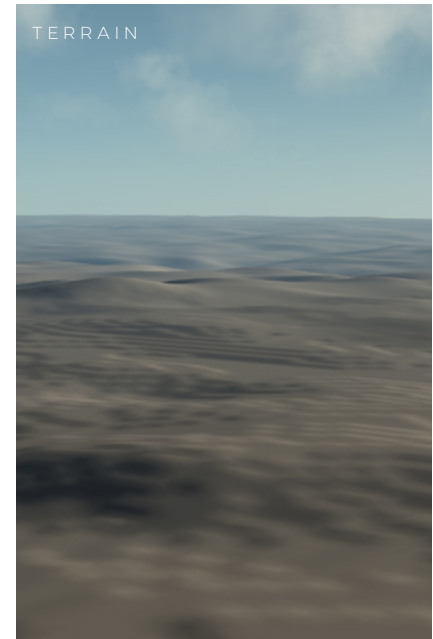
OVERVIEW

This project leveraged Velocity 5D's capabilities in automating large-scale dense and complex urban areas in a short time frame. Exploiting a wide array of data, Presagis was able to ingest the following formats:

- \ Elevation
- \ DTM
- \ DSM
- \ DHM
- \ Hydrography
- \ 3D Terrain
- \ Coastlines
- \ Waterways
- \ Roadways
- \ Road networks
- \ Lots & footprints
- \ Object Models
- \ GS Models
- \ 3D Mesh
- \ Point Clouds (Lidar)
- \ BIM
- \ Imagery
- \ Material Classifications
- \ Satellite Imagery
- \ Hyperspectral Imagery

The study area was a 112km by 112km located in the region of Madrid, comprising more than 630,000 buildings and more than 30,000 roads segments. Using Velocity 5D, the database was created in 48 hours.

An important element of this environment was the use of geo-specific templates that facilitated and improved the content visuals. This database was loaded into a game engine which showcased the full capabilities of Velocity 5D to produce high quality visuals in dense, urban environments.



03

USE CASE

Country-Wide Synthetic Environment



OVERVIEW

Need: Test bed for rapid production of a Synthetic Environment for GeoINT capabilities of a large-scale, dense environment with limited information.

Presagis was tasked to process data and generate a synthetic environment of a 60,000 km² European country. A GeoINT initiative from government officials to evaluate Velocity 5D's multiple advantages, the requirement was to complete the processing and generation of a virtual environment within 72 hours.

Creating a Digital Twin for an entire country was an excellent test for evaluating Presagis technology. Velocity 5D would demonstrate its capability to rapidly ingest new sources and create content for not only GeoINT, but also for analysis generation for emergency management evaluation and response.

PRESAGIS' MANDATE INCLUDED TWO CASES:

A. Creation of a CDB using open source data available

Source: *Imagery, Elevation, Trees and OSM buildings*

B. Creation of a CDB using AI/ML algorithms to extract building footprints from the provided satellite imagery. This case is typically for when vector data has not been updated and requires information extraction.

Source: *Imagery, Elevation and Trees*

Each case was completed in less time than required by the original mandate (72 hours), and with incredible results.

PRESAGIS WAS ABLE TO GENERATE:

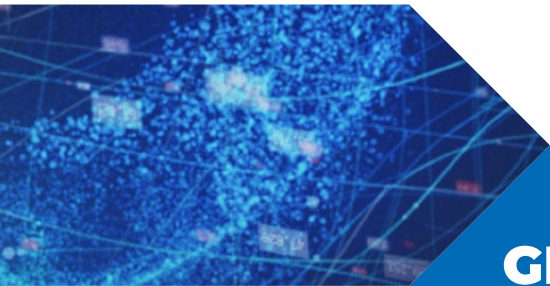
- 1. Case 1:** CDB in 7.5 hours – Included ingestion of source data, processing and CDB creation.
- 2. Case 2:** CDB total 68 hours – Included ingestion of source data, extraction of building footprints from satellite imagery using AI/ML, process and CDB creation
 - a. AI/ML Algorithm was able to extract 100k+ buildings compared to the OSM data in Case 1



It is important to highlight that for Case 2, using AI/ML feature extraction, it was possible to extract approximately 100,000 more building footprints compared to Case 1, which used OSM data as source. Although this amount of additional buildings may seem minimal for an entire country, it is significant when taking the age/date of the imagery source data into consideration. The satellite data was almost 8 years old. This means that the amount of new buildings that could be extracted using more up-to-date imagery would be drastically increased.

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