PRESAGIS

White Paper

VELOCITY: Automated Geospatial Data Analysis and Modeling Solution

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ABSTRACT

Whether organizations are tasked with the creation of synthetic 3D environments, decision-making, or mission planning, they will soon be forced to rethink how they operate. Demands for higher quality and improved correlated data are now commonplace. Moreover, as the amount of geospatial and geo-located intelligence drastically increases, organizations that leverage it are on the brink of being overwhelmed with too much data, too many data types, update demands, and the need to publish to multiple targets and platforms.

By bringing an automated solution to the traditional manually-intensive process of building synthetic environments, organizations will be well positioned to receive, process, fuse, and publish the petabytes of geospatial data they are facing, as well as deal with the challenges of creating realistic and correlated environments.

This automated solution is VELOCITY.

In this paper, we will describe the characteristics and benefits of a potential solution – VELOCITY – to overcome these geospatial data processing challenges. The solution will need to enable the coexistence of both centralized and decentralized approaches while still converging towards an integrated foundational geospatial system.

Leveraging artificial intelligence and computer vision, and by supporting a wide range of industry-standard data formats, image generators, and network simulation standards, VELOCITY is ideal for the automated building or reusing of virtual environments for a wide range of applications including defense and security, GEOINT, and smart cities.

CHALLENGES OF GEOSPATIAL MODELING

Whether producing synthetic environments for mission rehearsal, training, or battle planning, there are three common challenges that are frequently met by those creating, processing, publishing and using these environments: Low or inconsistent quality of the synthetic environment, correlation difficulties, and too much data. To a larger or lesser extent, each of these problems have an impact on the capacity in which the synthetic environment will be used.

	Quality of Environment	Correlated Environment	Data Processing
Training	••	•••	•
Pre-Deployment Training	•••	•••	•
Mission Planning	•••	•••	••
Mission Rehearsal	•••	•••	•••
Situation Analysis	•••	•••	•••
Military Modernization	••	••	•••

The impact of common database creation challenges across different roles of synthetic environments.

Quality of Synthetic Environment

The immediate challenge for those producing synthetic environments is a realistic 3D representation that adheres to reality as much or as little as required by the user. Depending on the purpose of the resulting environment, the process will require a mix of geo-specific or geo-typical elements, as well as various data sources that are available at different qualities and costs.

Generating high quality 3D environments relies greatly on geospatial data. The more data one has, the more precise the environment will be. However, what level of precision is actually needed? Of course, this depends on the intended use of the database. For example, if a synthetic terrain is to be used for training purposes, then it is likely not important that a city street corner is accurately represented as it is in real life; buildings can be of different colors, houses may not have the right number of windows, etc. If, however, the purpose of the database is to perform mission rehearsals, then the degree of accuracy is critical and all representations should match reality as closely as possible – right down to accurate door placements, building materials, and line of sight (LOS).

To achieve this level of accuracy – especially on a large scale – organizations require automatically generated 3D environments based on (multiple) sources of geospatial data that may not always have the accuracy needed for such a role.

More and More Geospatial Data

We are witnessing an explosion in the amount of geographical and geo-located information collected on a daily basis. Today, the task of providing the vast majority of all geospatial data necessary for government use is becoming unsustainable as the amount of geospatial data increases (e.g.: aerial/UAV data or public and commercial data sources), and more demands are placed on these organizations (e.g.: merging sensor imagery with satellite imagery). Their ability to quickly adapt or scale their processes, or integrate new data or data streams are at risk, thereby making them vulnerable to delays, mistakes, bottlenecks and inefficiencies.

Moreover, the sources of geospatial data are producing more data than ever before. As the table below illustrates, the trend is only growing:

Satellites	Since the early 2000s, an increasing number of commercial imaging satellites have been launched to make up for the absence of, or to complement NTMs at national levels. The constellation of commercial satellites will continue to grow and provide increasing resolution and update frequency. With the more recent increase of commercial spaceflights and small satellites, this trend will multiply many fold. Carolyn Belle, senior analyst at Northern Sky Research, stated that “Overall, 2017 was a very good year for smallsat launch rates”, with the industry orbiting 329 smallsats (between 1 and 500 kg) in total. This is the highest number launched in one year to date, easily outstripping the mere 130 orbited in 2016. Belle believes the growing smallsat trend is here to stay[i].
Inexpensive sources of commercial and crowd-sourced data	Geospatial Open Source data is also more widely available thanks to declassified GIS data as well as crowd-sourcing. A good example of crowd-sourced GIS data is the Open Street Map (OSM) project that was created in 2004 as a collaborative effort to create a free editable map of the world. Today, there are hundreds of these public GIS data sources available. In addition, the commercial vendors frequently update the quality of their offerings.
UAVs	It is believed that today, the United States alone operates close to 3000 Unmanned Aerial Vehicles (UAV) for Intelligence, Surveillance and Reconnaissance (ISR) purposes. With a 2017 budget of over USD $4B invested in Research & Development[ii], Procurement, and Operations and Maintenance, this trend is likely to continue.

As quantity and sources grow, so does the decentralization of geospatial data. Further exacerbating the trend of a decentralized source data is the inclination of individual defense, intelligence and security organizations to seek more independence from these central geospatial agencies in order to gain agility and autonomy to reduce the time between the collection and exploitation of geospatial data.

Correlated Data

Common – or correlated – data is essential in order to ensure that everyone is looking at the same thing, at the same time, on the same platform (i.e.: simulator, tablet, mobile device, etc.). Whether it be for decision-making purposes, planning, or rehearsing, it is paramount that all stakeholders are looking at and using the same data, the most recent data, and the same source data.

Correlated data problems are encountered at the two following stages:

- **Pre-Publishing:** Common obstacles to obtaining correlated data that occur before producing a synthetic environment are mostly related to human factors such as duplicate information, fusion workflow, publishing rights, or multiple one-way updates.

- **Publishing:** Whether accomplished in run-time or offline, publishing consists of taking the authoritative master data and turning it into something that is digestible by the consuming system. The way the environment is consumed on different platforms (such as tablets, simulators, desktops, or mobile devices), may require editorial decisions to ensure all users have the same correlated dataset once it is thinned for a specific platform or device.

Once again, automation is the key to resolving these problems. Once the human-in-the-loop decisions are made, automated workflows can be built to streamline operations in order to achieve consistently correlated environments. Automation can then provide the mechanism and capability to enforce publishing and thinning workflows that reflect operational needs.

Consequences of Not Automating

So what are the consequences of the problems discussed above? How will they affect an organization's ability to deliver synthetic environments?

Specifically, the volume of data and the inability to consume it and publish it in a systematic, logical, and repeatable manner can lead to a range of problems:

Errors and Delays	Currently, organizations are faced with too many data sources and too many data types. By adding new sources (e.g.: drone-based sensors) and new data types (e.g.: point clouds) into an established workflow, users risk introducing /workflow/personnel/publishing errors and/or triggering costly delays.
Mis-Correlation	Mis-correlation can occur when two or more datasets for the same geographical coordinates are either incompatible, erroneous, or unsynchronized. In a perfect world, each dataset would contain the same buildings, trees, and rivers. However, it is common for geospatial datasets to contain differing levels of detail that might make them more difficult to correlate. It is critical that each geographical area's datasets are correlated so that features or buildings are displayed consistently across all environments – and not just when building databases, but when publishing them too.
Outdated Information	Given the proliferation of UAVs, mobile phones, satellites, and hundreds of other sources that provide up-to-the-minute geospatial and sensor data, how often should a map be updated? Yearly? Hourly? Depending on an environment's purpose or function, it is very possible that most databases are outdated in the time it takes to make them – especially with regard to dense, urban environments. Add to this the increasing demand for real-time or "fresh" information and the result is an organization that, at best; cannot keep up with demand, and at worst; is completely bottlenecked.
Inconsistent Quality/Content/Production	When it comes to publishing content from a centralized (or curated) source, it is likely that organizations will need to publish multiple qualities for multiple purposes, and a range of stakeholders. By publishing to multiple targets, organizations run the risk of delivering inconsistent databases as the frequency of data updates is increased

	and the number of platforms grows. Without tight controls on formats, level of detail and thousands of other variables, the likelihood of producing uncorrelated or inconsistent environments rises – either from badly processed data, human error, or both.

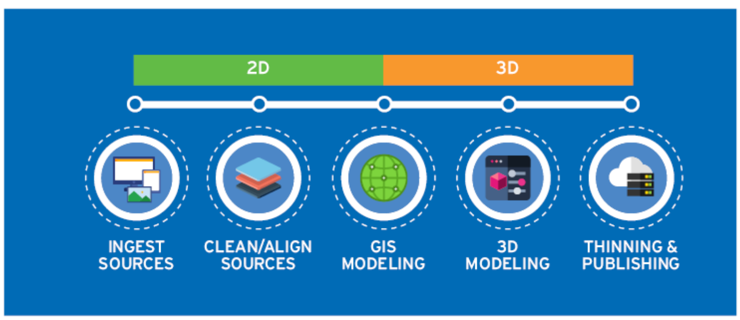
AUTOMATION IS THE ANSWER

In his GEOINT 2017 allocution, Robert Cardillo, former Director of the National Geospatial-Intelligence Agency, stated, “We intend to automate 75% of the repetitive tasks our analysts perform so they have more time to analyze that last play and more accurately anticipate the next one. And then they can look much harder at our toughest problems — the 25% that require the most attention.”

Simply put, automation is the key to managing, processing and publishing massive amounts of geospatial data.

VELOCITY was designed to respond directly to challenges such as the ones facing the NGA.

By automating some or all aspects of the end-to-end workflow in the creation of synthetic environments, organizations will be equipped to manage any amount of data, from a wide variety of sources in a scalable, repeatable, and sustainable manner.



Each aspect of the end-to-end workflow in the creation of synthetic environments can be automated.

Introducing automation into the production of synthetic environments can have the following benefits:

Faster Data Processing	Automated process allows users to treat geospatial data almost immediately.
Increased Production and Efficiency	By automating one or several processes in the production of synthetic terrains, organizations are able to offload work or tasks from teams or personnel so that they can be assigned other tasks.
Improved Decision-Making	Faster and better decision-making is achievable when employing up-to-date geospatial information in a timely and actionable manner.
Scalability	With automation, it is possible to scale a workflow to thousands of machines, making results available in minutes instead of days.

Correlation	Automation enables the correlation of outputs as well as multiple outputs with the same inputs.
Quality Assurance	By automating QA processes, workflow is executed in a deterministic way, that is, a given workflow will yield exactly the same outputs given the same inputs. Moreover, automation lets organizations identify inefficiencies in their process that could be corrected using new automated workflows.
Unbiased	An advantage to automation is the negation of variability from one human to another – for better or worse. Subjective interpretation is replaced by authoritative pre-established rules-based processes. Human bias (intended or not) inherently leads to inconsistencies. It would be counter-productive to have different biases deciding what a map's characteristics and qualities should be.
Repeatability and Traceability	Stay up-to-date with source updates. By automating data cleanup on input and formalizing transformation processes, organizations can gain traceability and repeatability and drastically reduce manual operations. Even if manual processes are necessary, as they often are, traceability meta-data permits managers to know who and when data has been modified.
Reliability	Workflows, by their nature, are standardized in an automated process to ensure reliability.
Expand Workflows	Automation also allows organizations to leverage interesting powerful workflows. For example, users can enable fusion workflows where partial data updates can be integrated into existing databases.

VELOCITY: AN AUTOMATED SOLUTION

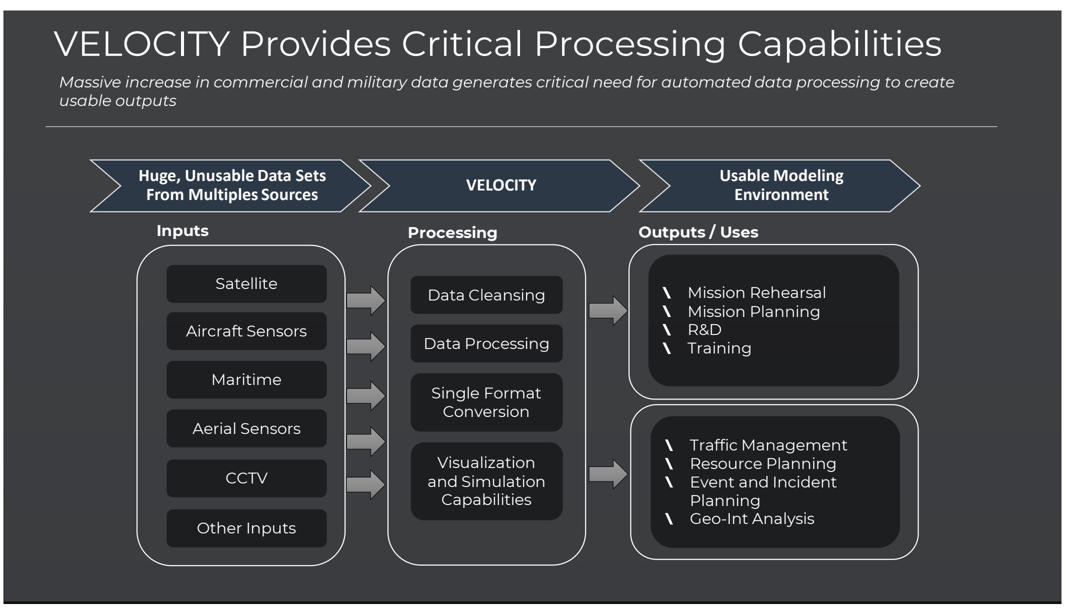
To solve these automation challenges, Presagis created VELOCITY.

	Simulation Database	Rapid Updates	AI
Training	• • •	•	Coming soon
Pre-Deployment Training	• • •	• •	Coming soon
Mission Planning	• •	• •	•
Mission Rehearsal	• •	• • •	•
Situation Analysis	• •	• • •	• •
Military Modernization	• • •	•	• • •

VELOCITY features and their value to common synthetic environment deliverables.

Automation is at the core of VELOCITY. Leveraging our 20 years of experience providing geospatial processing tools and services to the defense and security industry, Presagis developed VELOCITY, a software solution that supports the continual automated processing of geospatial data, environments and 3D terrain. Uses range from geo-intelligence analysis and critical mission planning, to defense and security training.

As previously stated, the challenge of producing synthetic environments has increased as the data sources become more numerous and updates more frequent. Merging imagery, using aerial/UAV data, or including public and commercial data requires a robust production workflow that can accommodate this geospatial data.



Fusing Geo-Located Data into 3D synthetic Environment: *New data collection, emerging data types, and sheer volume overwhelm the creation process of 3D synthetic environments; VELOCITY is specifically designed to address this processing challenge.*

Through automation, VELOCITY streamlines the production of rich and complex terrains and can help organizations:

a) With the continual automated ingestion of geospatial data and sensor data,
b) Maintain a centrally curated foundation data repository from which the majority of derivative geospatial 2D and 3D synthetic environments and simulation databases can be produced,
c) Produce derived synthetic environments in hours rather than weeks or months.

Advantages of Automation in VELOCITY

By automating data cleanup and formalizing transformation processes for all data sources, VELOCITY gives organizations the ability to produce 2D or 3D environments for a wide range of applications while providing the required traceability and repeatability. It also allows the drastic reduction – and sometimes the outright removal – of some manual operations which can lead to more consistent environments that are less prone to error.

Our focus on automation allows VELOCITY to excel in the following areas:

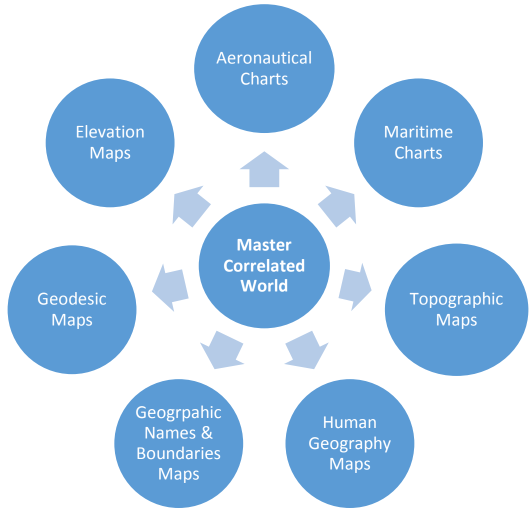
- Scalability
- A Master Correlated World (One World)
- High-Quality 3D Representations
- Data Fusion
- Publishing
- Open Standards
- Personnel Efficiency

Scalability

Automated and deterministic workflows are the key to massive scalability in the cloud. With automation, it is possible to scale a workflow to thousands of machines, making results available in minutes instead of days. Integration of cloud computing permits distributed processing for any sized project on public or private cloud.

A Master Correlated World: One World

VELOCITY enables and streamlines the continuous and automated consumption/ingestion of geospatial and sensor data to a single master geospatial representation of the world. The data repository or dataset may or may not be centralized, but there is only one correlated world. From this repository, organizations could very quickly generate and deliver nearly all 3D synthetic environments, and derivatives to the point of need.



This one-to-many/many-to-one organization of data and workflows ensures correlation between the multiple derived datasets as they are all published from a single correlated master representation of the world.

High Quality 3D Representations

Aside from the obvious visual appeal of realistic 3D representations, 3D terrains give the ability to represent and navigate complex datasets and concepts. Whether it be the trajectory of an aircraft, line of sights, electro-magnetic signals, or the verticality of a dense urban environment, 3D environments are extremely effective at helping visualize space and relativity in an intuitive, immersive and natural way.

Instrumenting 3D terrains also opens the door for simulation. The instrumentation of roads and lanes allows the simulation of ground vehicles on streets, the identification of sidewalks and pathways permits the simulation of crowds, adding airport runways, signage and navaid let virtual aircraft take off and land, while material definitions of terrain and features allow physics-based sensor simulations, such as IR, or night-vision. The possibilities are virtually endless.

Fusion: Many-to-One

To address the challenge of fusing a wide range of data types or sensors in a large-scale automated and incremental fashion, VELOCITY can create, augment and constantly maintain a current, integrated central geospatial data repository that can be used to create a number of geospatial products to be used by geospatial, defense and intelligence organizations.

Publishing: One-to-Many

By publishing these geospatial products from a central repository in an automated manner, users can avoid the redundancies, discrepancies and inconsistencies that occur when these products are created in a non-collaborative manner or independently. In addition, this approach allows for much better productivity and scaling.

Open Standards

Data comes from anywhere and everywhere – from public, commercial, or private, all the way to government and secret. Using open standards brings a high level of inter-operability and exchange at both the data and modeling levels. Because the types and sources of data increase, along with the outputs and their platforms, VELOCITY is built to ingest and publish using open, internationally accepted standards in order to allow interoperability of different types of systems developed at different times – all in an automated manner.

Personnel Efficiency

Finally, the advantages VELOCITY brings to personnel issues cannot be overlooked – at all levels.

- **No additional resources:** VELOCITY does not require any additional personnel. In fact, the automation it brings allows managers to maximize the efficiency of the personnel they do have by integrating with their existing workflows.
- **Enhance what you have:** Users will benefit from the automated creation of realistic environments that do not require additional tools or applications that may interrupt established workflows or distract dedicated teams.
- **Improved efficiency:** VELOCITY is not designed to eliminate personnel or positions. Instead, it serves as a tool to help organizations maximize team efficiency by performing automatable tasks, thus liberating personnel to concentrate on high-level or decision-making tasks.

LEVERAGING THE LATEST TECHNOLOGY FOR AUTOMATION

Because of its modular open architecture approach, VELOCITY's automated workflows can be customized to meet any internally- developed or third party commercial software. VELOCITY can be integrated to produce all sorts of geospatial products to be used by various intelligence, defense and security organizations.

Technology: By leveraging cloud computing and artificial intelligence, in particular computer vision and machine learning, the herculean task of quickly processing, ingesting, and transforming multiple geospatial data sources into time-sensitive, useable, actionable intelligence is possible with VELOCITY.

Architecture: VELOCITY is an open architecture solution that is built to be accessible (through Python scripting, for example), and support a wide array of open standards (legacy and new), as well as streaming services, while remaining format agnostic.

Technology – Automation, Augmentation, and AI (AAA)

Organizations responsible for the creation of synthetic environments are increasingly adopting the "triple-A strategy" of Automation, Augmentation, and AI[iii]. Because VELOCITY is designed to be integrated with existing technology and workflows, it is perfectly aligned with this AAA approach.

Automation

By automating data cleanup and formalizing transformation processes for all data sources, VELOCITY gives organizations the ability to produce 2D or 3D environments for a wide range of applications while providing the required traceability and repeatability. It also allows the drastic reduction – and sometimes the outright removal – of tedious or manual operations which allows analysts to focus on critical tasks that require their attention and expertise.

Augmentation

By leveraging cloud computing and computer vision, the herculean task of quickly processing, ingesting, and transforming multiple geospatial data sources into time-sensitive, useable, actionable intelligence is now possible with VELOCITY. Computer vision allows for the acquisition, processing, analyzing and understanding of digital images, and extraction of high-dimensional data. The combination of Computer Vision and AI algorithms opens one of the most interesting avenues to automate the processing, integration and analysis of GEOINT data. Thanks to the emergence of massive storage and processing capabilities in the cloud, the field of Machine Learning is progressing more rapidly than ever and can help with the automation of numerous tasks once relegated to human manual interventions. These tasks include:

- Digital Terrain Model (DTM) extraction
- Road network extraction
- Building footprints, height and rooftop extractions
- Vegetation extraction
- Land use classification
- Temporal Change Detection
- GIS data and Sensor fusion

Artificial Intelligence (AI)

VELOCITY automation and workflows can be enhanced using both artificial intelligence, and machine learning. As such, Presagis is building a number of AI capabilities within VELOCITY with regard to Computer Vision/Pattern Recognition. These capabilities include:

- Automating the building footprint extraction process from geo-referenced data (satellite imagery).
- Automating the ground classification of entities from geo-referenced data (satellite imagery), with emphasis on buildings, roads, vegetation, other types of terrain and entities above ground.
- Automating road extraction from incomplete meshes in geo-referenced data, including satellite imagery, but also publicly available geospatial data.

In implementing these capabilities, VELOCITY significantly improves automation by:

1. Helping annotate assets if they are not already annotated, or fill in for meta-data if there are is only partial information,
2. Correlating geo-referenced data to align them in one uniform model, insuring proper mappings,
3. De-conflicting data in the case of misalignments in geo-referenced data, and/or noisy data, and/or incomplete data, etc.

Through projects with various universities, governments and private partners, Presagis is actively involved in leveraging artificial intelligence and machine learning algorithms for the integration of Lidar, WAMI and FMV sensor data as well as a number of feature extraction processes to allow VELOCITY to further the automated curation of 3D geospatial data repositories.

Architecture

VELOCITY's open architecture brings speed, agility and innovation when adapting solutions for a new purpose. Its architecture allows it to evolve over its life cycle leveraging new technologies. VELOCITY's architectural approach is to not only integrate 3rd part software, but to embrace it.

Rather than attempt to "reinvent the wheel", Presagis believes in trying to find an existing technology in order to solve a particular problem, and integrate it in our solution. To achieve this, VELOCITY is specifically designed for easy integration with third party technologies.

Virtualization & Cloud Computing

The emergence of virtualization has had a profound impact on many businesses by allowing a departure from the paradigm of processing capabilities being limited by the computing capabilities available on an individual, departmental or corporate organization basis.

Virtualization began in the 1960s, as a method of logically dividing the system resources provided by mainframe computers between different applications and has since then, been broadened to the pooling of hardware, storage, networking, and software resources to create economies of scale through on-demand utilization.

Cloud computing allows for the storage of massive amounts of data and externalization of resources and allow leveraging of virtualization to massively scale up operations when timing is imperative. Today, computing clouds have become ubiquitous to most individual and commercial users and is rapidly coming to government users either through private, secured, restricted or public clouds depending on the sensitivity of their data and operations.

A cloud computing approach facilitates the integration and deployment of large "System of Systems" and the integration of complex Business Processes based on a wide array of technology from a disparate set of vendors that can evolve over time.

The emergence of the World Wide Web and companies such as Google™, Microsoft™ and Amazon™ have paved the way to define technologies and software architectures that facilitate the integration of System of Systems. Service-Oriented Architecture (SOA) is one of those important innovations.

SOA

SOA is a style of software design where various software services are connected through logical graphs through a communication protocol over a network.

Service-oriented architectures integrate distributed, separately maintained and deployed software components - known as Services – which can be used in conjunction to provide the functionality of a large software application but with much better ability to:

- Integrate components from multiple vendors
- Integrate components written in different computer languages or running on different operating systems
- Upgrade or replace components to fix defects or bottlenecks without having to retest the whole system
- Centrally manage Security and Governance
- Scale up processing, storage and networking as needs evolve

- Leverage mobile, browser-based or thin client applications since all the complexity and performance requirements are being handled in a centralized fashion to be shared with all users

VELOCITY has been designed from the ground up to seamlessly integrate into Service-Oriented environments allowing custom replacement and integration of new software components into VELOCITY services as well as allowing the integration of VELOCITY itself into larger business processes supporting optimal operations.

Game Engines

The ubiquity of GPU and mobile computing hardware is fueling innovation in video games as well as virtual-reality and augmented-reality (VR/AR) applications. Integrating game technology – such as Epic Games' Unreal Engine™ – into VELOCITY enables users to benefit from the innovations in 3D photorealistic real-time rendering, character animation and environmental effects as well as innovations in virtual reality (VR) and augmented reality (AR).

Moreover, defense modernization programs, such as France's SCORPION, can gain many benefits with regard to the use of AR in embedded simulation training platforms by leveraging VELOCITY and its integration with game engine technology.

CONCLUSION

Whether it be from satellites, drones, mobile phones, autonomous vehicles, or open and commercial sources the amount of geospatial and geo-located intelligence data grows on a daily basis. Defense and security organizations are at a crossroads and need to introduce automation to the manual processes that exist as soon as possible.

The problems facing the organizations that build synthetic environments and simulation databases are growing:

- Increased demands for environment quality
- Too many data sources and types
- Mis-correlation of sources and outputs
- Unmanageable frequency of updates
- Need to publish to multiple targets/platforms/devices

Through its ability to continually combine geospatial data and **fuse** various data types and sensor information into a central 3D geospatial data repository, VELOCITY is able to support the automated production of synthetic environments and simulation databases in hours rather than weeks or months.

By **automating** data cleanup on input and formalizing transformation processes, VELOCITY provides traceability and repeatability and allows a significant reduction in manual operations.

By leveraging **AI**, VELOCITY is able to employ automated workflows of geo-referenced data that permits the learning and tuning of Computer Vision/Pattern Recognition capabilities, the creation of autonomous agents and vehicles in dynamic environments, and the conducting of experiments in constructive simulations.

Finally, VELOCITY allows organizations to **publish** how, where, and when they want. Users have complete freedom and control to modify scenarios, edit or update environments, respond to emergencies, requests, or attempt new tests or studies.

The benefits of VELOCITY's automated approach are multiple:

- **Increase Quality and Accuracy** through the fusion of multiple sources, automated synthetic environments can provide better situational awareness through access to the latest picture of the mission theater. For example, special forces teams will have the most recent information to plan a HVT mission, or air traffic control can more accurately plan flight paths through contested areas.
- **Common Vision:** A common vision amongst organizations, branches, and combatants is indispensable. Specifically, correlated data sources and 3D synthetic environments are essential to the interconnectivity needed for the digitization of the battlefield.
- **Faster Production** with the application of these technologies will allow for augmented throughput of geospatial data and allow organizations to provide a better quality of service to its stakeholders. Tasks that once took weeks or months can now be accomplished in hours.
- **Less Expensive:** This new approach requires less manual intervention, thereby permitting a strategic uses of your workforce. Additionally, the automation of tasks renders synthetic environments less prone to errors and ensures a more consistent quality.

- **Scalable:** The evolution of operational needs is inevitable. Thus, VELOCITY's integration of cloud computing permits distributed processing for any sized project on public or private cloud. VELOCITY is infrastructure agnostic and makes use of scripting and virtualization.
- **Integrates** with customer technology, processes, workflows, and data by using SOA.
- **Supports** all major industry formats and open standards.

From its inception, VELOCITY was designed with an emphasis on automation. Presagis also prioritized VELOCITY's ability to support third party software in order to directly address the challenges present in the field today and provide a solution that has no equal in the industry.

By leveraging widely used and recognized automation technologies[iv] such as Python™ and HTCondor™, and by integrating market best solutions from the geospatial, simulation, gaming, architecture and entertainment industries such as GDAL, Terra Vista™, Unreal Engine™, CityEngine™ and Cinema4D™, VELOCITY promises important productivity gains through automation and scalability and the assurance of coherent situational awareness at the point of need. VELOCITY supports all standards (legacy and new) – CDB, VBS, FBX, OFT/MFT, OBJ as well as the new streaming services from ESRI (I3S) and Cesium (3D Tiles).

If you are interested in learning more about VELOCITY and how automation can help your organization cope with the surge in geospatial data, Presagis would be pleased to schedule a call with you in order to ascertain your project needs, scope, and deliverables.

Whether you would like try VELOCITY to build a specific, localized area, or an entire continent, Presagis stands at the ready.

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[i] Russell, K. (2018), "2018 Could Be a Revolutionary Year for Smallsats". Retrieved from https://www.satellitetoday.com/innovation/2018/01/10/2018-revolutionary-year-smallsats/

[ii] United States Secretary of Defense (2017), "Unmanned systems integrated roadmap FY2017-2042". Retrieved from http://cdn.defensedaily.com/wp-content/uploads/post_attachment/206477.pdf

[iii] Sandra Erwin, "NGA official: Artificial intelligence is changing everything, 'We need a different mentality", SpaceNews magazine, May 2018. Retrieved from https://spacenews.com/nga-official-artificial-intelligence-is-changing-everything-we-need-a-different-mentality/

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