

Bravo5

**Post-operational
safety analysis
and replay tool**

austro
CONTROL

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DataBeacon Confidential



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Victor5 is an end-to-end platform designed to deliver data services to aviation stakeholders, leveraging the power of historical datasets and real-time data fusion. Victor5 functions as a digital assistant for a variety of aviation applications. Victor5 focuses on reliability, scalability, and maintainability, enabling the deployment of highly redundant data services that reside simultaneously on on-premises equipment and edge or cloud resources. The platform leverages cutting-edge information technologies and is built on a solid data strategy that is ready for Artificial Intelligence (AI) developments. Victor5 displays traffic data from any surveillance data sources (e.g. terrestrial or satellite ADS-B, radar tracks) and displays it in an ATC-friendly interface.

Based on Victor5, DataBeacon has developed Bravo5 (databeacon.aero/bravo5), a Post-operational safety analysis and replay tool, which can process surveillance data at a high speed rate, capable of ingesting historical positions and processing them without introducing latency, providing the user with a coherent picture of traffic scenarios. Bravo5 may be used by safety managers for post-operational replay and safety analysis.

Bravo5 is deployed in the cloud and does not require a particular local infrastructure. Any computer equipment that can run a modern browser will be able to display Bravo5 UI. Some of the Human-Machine Interface characteristics of the en-route version are:

- Airspace layout with static sectorization as provided by the customer.
- Search tool: enabling search of traffic scenarios by date and time.
- Replay control including play/pause.
- Air traffic target with a 1-minute speed vector
- Air traffic label including callsign, real flight level, selected flight level from mode-S where available, ground speed in knots. If required, other fields from the extended squitter can be added to the label such as Mach number or wake turbulence category, if available from the data provider.
- Zoom: Zoom in and out.
- Traffic altitude filter: Lower and higher filters for the traffic.
- Tool to display a 5NM circle around a plane.
- Tool to measure distances and minimum distances between two traffics to provide the same information the automatic interaction detection displays (current distance, minimum distance, and time of crossing).



Bravo5 excels at performing calculations over the data, thanks to its computational engine. For instance, our Medium-Term Conflict Detection process can identify potential flight conflicts at a rate of 50,000 flight pairs comparisons per minute, and the infrastructure is capable of updating more than 12,000 flight statuses of non-conflicting flights per minute. This computational capability is also used to identify traffic that will be cleared for a significant part of their flight plan ahead, as no conflicts are detected. This makes Bravo5 a very complete tool for post-operational safety analysis.

Using this computational capability, the user interface provides visual artefacts to classify traffic into 3 groups:

1. Interacting traffic: Traffic that would "interact" with other traffic by crossing with it below 9NM at the same level or crossing levels (using mode-S information). These aircraft will automatically be displayed with an orange segment providing the users the current distance in NM, minimum distance in NM at the crossing, and time to minimum distance if such is above 5NM or time to 5NM if the minimum distance is below 5NM (time to lost separation). Additionally, the target of the aircraft who passes first at the crossing will be marked in orange to facilitate identifying a potential vectoring to the tail.
2. Cleared traffic: Traffic that would require no instruction before crossing a sector plus some time buffer afterwards, unless the pilot requests it. The algorithm takes into account that these traffics are not near destination, flying at cruise FL, are not blocking the descents of others, and other traffic interactions. The display shows them in green color. As the evolution of traffics is dynamic, the "cleared status" could change, and therefore an ACFT considered "green" at a certain stage could change for different reasons - a pilot request, for instance. The system acknowledges that and advises with an automatic halo when losing the green stage ahead of time.
3. Other types of traffic: They are not interacting, but the traffic situation is dynamic enough so it is not classified as cleared.

As an air traffic replay tool, Bravo5 is capable of processing historical data streams from surveillance data and generate a historical dataset stream (i.e. from the last 30 days) that can be used to analyse previous scenarios.

In order to provide a complete operational picture, Bravo5 can also ingest additional third-party data services. Those data services may complement the analysis tool and may be integrated into the cloud infrastructure if open APIs are available and displayed in the UI. For instance, additional data sources could include flight plans and other information, as available from EUROCONTROL NM services.

Terms and Conditions

1.1 Application

1. The purpose of these General Terms and Conditions is to establish the agreement about the replay tool solution known as "Victor5-replay" as a service between the Parties ("Terms & Conditions").
2. AustroControl ("the Customer") will purchase the Services from DataBeacon and Innaxis Research Institute ("the Supplier") to support post-operations safety analysis.
3. These Terms & Conditions will take effect immediately upon the completion of certain deployment steps ("Commencement Date").

1.2 Prices, Invoices, Payment, and Termination

1. The prices provided are agreed upon and do not include any applicable value added tax or duties.
2. DataBeacon will cover the costs of historical datasets, storage, and cloud computation for the use of Victor5-replay. Both parties will agree on a data provider with guaranteed quality and cost before the contract begins.
3. The price for the Services is 2,000€ per month, excluding any value added tax or duties. Payment must be made within 15 days of the monthly billing.
4. The initial contract period is 48 months. Either party can cancel the subscription and terminate the contract with a written notice period of 2 months. This license includes support for up to 5 simultaneous users.

1.3 Deployment and Support

1. The deployment of Victor5-replay requires several steps, including obtaining flight planning access authorization from Eurocontrol. The deployment process will take approximately 3-4 weeks, depending on data provision from data providers.
2. The Parties will agree on the data to be displayed on Victor5-replay to meet the Customer's requirements and the terms and conditions of this Contract. This may involve the Customer providing certain data, such as airspace sectorization.
3. The Customer will provide authorization to access flight plans (Eurocontrol NM) or any other third-party data that requires integration.
4. Support will be provided during office hours on labor days. Support will be provided online through email and telephone, focusing on tool usage and potential software modifications, as Victor5-replay is not a safety-critical service.
5. If necessary, the Supplier will deploy any patches, updates, new releases, or similar applications for Victor5-replay to the Customer as soon as reasonably possible. This may require temporary downtime for Victor5-replay, which will be coordinated with the Customer and kept to a minimum necessary to update the software.
6. Victor5-replay, as a non-real time safety-critical system, is required to maintain a Service Level Agreement (SLA) of 90%. It is important to note that external data feeds, such as surveillance data providers, EUROCONTROL NM, and external weather data, may experience occasional downtime for maintenance or due to outages. These external data feeds may have different SLAs in place.

1.4 Responsibilities

1. The Supplier shall:
 - a. Promptly provide all necessary information, basic training, and documentation to enable the Customer to use the tool properly.
 - b. Provide all necessary software to ensure the tool is fully operational and meets the Customer's requirements.
 - c. Obtain relevant warranties for third-party products or services incorporated into the Service.
 - d. Ensure that all Services are defect-free and comply with regulations, laws, and Customer requirements.
 - e. Not make any alterations or additions to the Service without prior agreement with the Customer.
 - f. Keep the Product and its components up to date.
 - g. Provide any necessary patches, updates, or new releases to the Customer promptly.
 - h. Roll out new functions specified by the Customer and agreed upon with the Supplier progressively.
2. Each Party shall be responsible for:
 - a. Any loss or damage on the Customer's premises caused by their acts or omissions, including associated repair costs.
 - b. The conduct of their respective employees, staff, and personnel while on the Customer's premises.
 - c. Complying with any security passes issued by the Customer.
 - d. Ensuring that their employees, staff, and personnel comply with access requirements and instructions from the Customer.
3. The Supplier shall provide documentation and guidelines to the Customer at no additional cost. If necessary, the Supplier shall provide additional training to enable the Customer to operate, maintain, support, update, and reconfigure the Service. Additional services may be quoted separately based on time, travel, and materials.
4. The Parties agree to indemnify and hold harmless each other and their respective directors, officers, agents, and employees from any third-party claims arising from defects in the Service, negligence, or failure to fulfill tax obligations. However, this indemnification does not apply if the negligence is caused by the other Party.

1.5 Intellectual Property Rights

1. The Customer does not acquire any rights to the Intellectual Property Rights of the Parties or their licensors, including DataBeacon's Software, third-party software, third-party intellectual property rights, and either Party's background intellectual property.
2. Intellectual Property Rights created specifically for this contract, including database schematics and safety case evidence, belong to the Supplier. The Supplier is authorized to exploit these rights with third parties.
3. The Customer is granted a non-exclusive license to use Victor5-replay for post-operational safety analysis and any related purposes. The Customer may use the Service at their premises where it will be delivered.
4. The Customer is prohibited from licensing the rights granted to a third party, reverse engineering, copying, or emulating the software and service provided.
5. This license will remain valid as long as the agreement is in effect and the contract has not been terminated by either party. If the contract is terminated, all Intellectual Property Rights necessary for the other party will be transferred, and all license rights will terminate as well.

1.6 Non-disclosure

1. The Parties agree to maintain confidentiality regarding the contract and treat all corporate, commercial, or technical information provided by the other Party as confidential.
2. The Customer acknowledges that it may need to contact designated data suppliers specified by the Supplier to fulfill its obligations under this agreement. Any communication with data suppliers must comply with the terms of this Agreement, including confidentiality obligations.
3. The Supplier is authorized to include the Customer's logo on its website as a general indication of the business relationship between the parties. However, the Supplier agrees not to disclose specific details about the contract or any other confidential information without prior written agreement.
4. The Parties will agree on any external communication or press-releases in written as needed.

To validate the authenticity of this offer, it is hereby signed and dated by the offering company DataBeacon.
Paula López-Catalá, COO.