FEATURES

- **Powerful inference engine** that can be miniaturized and scaled to address speed, size and complex use cases
- Deployed on one GPU box at the edge (laptop, drone, Worldview Legion satellite) and scales infinitely with minimal performance degradation across cloud, hybrid and on-premise GPU clusters
- Inference for speed size or complexity, including sensor to shooter, satellite to RGT, thousands of daily 50+ GB imagery strips, different imagery repositories, and such algorithm types and analysis use cases as broad area search and rare object detection

100+ CV and ML models deployed in DeepCore to date via

- Frameworks including Caffe, Caffe2 via an Open Neural Network (ONNX) packaging format, TensorFlow and PyTorch via Torch Script
- Network types like canonical classifiers (Resnet), segmenters (Mask-RCNN) and object detectors (RetinaNet, Faster-RCNN, Yolo)

- **Wide support and interoperability with other external frameworks**
  - Broad direct framework support
  - Improvements to interpret additional model types
  - Ability to upload and deploy third-party models as zip files or ONNX

**AI accessibility for anyone.** Maxar data science teams worked with government and industry to build easy-access, mission-sensitive operational models. Customers don’t need extensive data science experience to create training data, deploy models and manage large-scale CV model runs. The DeepCore Suite includes components to assist in these tasks.

**Capabilities with compatibility.** DeepCore has deployed more than 100 models to detect 130+ object types using multiple machine learning models, frameworks and networks against multiple satellite, airborne, drone and terrestrial sources. It has also been deployed in commercial and government clouds, as well as bare metal and hybrid environments scaling from a machine with a Nvidia GPU that supports CUDA to an infinitely scalable cluster.

With DeepCore, users can leverage the services and experience of the Maxar team or mix and match training data, models and visualization capabilities within DeepCore or other repositories and tools.
What does DeepCore provide?

Tagging and validation. DeepCore provides a quick and efficient tagging and validation environment to build ML models. This enables customers to evaluate how a model performs against ground truth data for a given set of images and identify model performance issues.

Training data and model catalogs. DeepCore training data and model catalogs allow users to search, filter, compare, upload, export and geospatially and temporally visualize training data and models respectively. The training data catalog is mapped to the xView data schema and ontology, a database of over 3 million training samples created by Maxar. The catalog not only provides a place for users to view and compare models but will continue to be updated through a model run feedback loop. Users will be able to compare model selection, model performance and other data analysis metrics.

DeepCore Vision analytical UI. The DeepCore Vision UI visualizes object detections within a user’s programs and projects plus any publicly shared detections. By showing them geospatially and temporally, users can validate model outputs, conduct basic data analysis and investigate more details about the object detected. This allows users to see what models would have detected at lower or higher precision and recall. Vision addresses broad area search, rare object and trend analysis use cases. Vision is written in React.js, a modular JavaScript framework completely compatible with today’s modern browsers. Our back-end services use PostgreSQL databases with the enabled PostGIS extension for easy geospatial calculations and support. The microservices were developed on various web technologies, including Java Spring Boot, Node.js and Python.

Easy compatibility without hardware requirements. DeepCore has supported over 100 accessible algorithms available from such sources as Caffe, Caffe2 via ONNX, TensorFlow and PyTorch via Torch Script. Since the web components require no hardware, DeepCore uses standard hardware and networks that can be cloud-based, on-premise or a hybrid of the two.

Diverse imagery sources. DeepCore imagery services have connected to select AOIs for iSpy, OMAR, NCL and ODS to provide clients scalable ML processing for imagery (airborne, satellite, hand-held) and signals. DeepCore performs inferencing that allows collection managers to specify a location on Earth, objects to find and start/end dates for processing to support the CV model development process. The U.S. government retains SBIR data rights for DeepCore Suite, making it scalable and free of cost.