

GCloud Service Definition Document

Digital Advantage - ANPR Integration & Management

Digital Advantage - Sensor Integration

Sensor Management

Data Exploitation - AI

Data Exploitation - Large Language Models

Data Visualisation

Secure Cloud

Secure Digital Platforms

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Digital Advantage - ANPR Integration & Management

Full end to end solution from Camera to Intelligence as well as modular offerings across the capability. High resolution camera feed images into the Leonardo Virtual Plate Hunter on the edge. Software enables dashboarding and integration with Insurance, MOT and tax data. The full service provides integration and technical support for integrators to assist in development, testing and approval of any application that is intended to integrate with the ANPR system, including solutions on premises or cloud hosted deployments.

The system can be used to capture ANPR or ingress and egress from sites, flag cloned plates and provide journey analysis and highlight suspicious behaviours. A range of metadata is captured at the edge which once combined with Leonardo (or third party) visualisation and analytical tools, can provide insight not captured from single data sources in isolation. Data includes:

- The VRM – derived by Optical Character Recognition (OCR)
- Date and Time
- Location (Latitude, Longitude)
- Camera Identifier
- Images:
 - ‘Patch’ image of the number plate – InfraRed image so works in the dark
 - ‘Overview’ image of the whole vehicle – normal colour image

The ANPR Enterprise Operations Centre assists in the interface of APIs from 3rd parties to provide a further holistic intelligence picture from additional data sources.

Optional additions to the ANPR Integration include Vehicle Electronics Signal Recognition. This includes a set of passive sensors that sit alongside ANPR to capture data broadcast (Bluetooth and WiFi MAC addresses, RFID numbers, and GPS jammers) from mobile devices associated with a vehicle. Placement of several sensor systems at strategic positions on the road network to help resolve data noise, improve correlation, and enable better detection of anomalies associated with criminal activity.

General competency inclusive of the capability:

- Project Management,
- Lifecycle Management,
- System Analysis and Design,
- Data Analysis, and migration
- Testing and Test Management,
- System Accreditation Management and support
- Training Solutions including Training Course Design and Training Delivery
- On-Boarding/implementation of solution



Digital Advantage - Sensor Integration

Pulling siloed datasets together, enabling a single, unified layer; Leonardo's integration and management methods allow users to access and efficiently utilise multiple data sources, in one single interface, which is built to enable ease of use. This solution is environment agnostic and so applicable to both the Defence environment and National Security.

In the context of National Security, we provide a configurable and integrated sensor capability including radio-nuclear, X-Ray and Human Presence detection for land borders. Examples of where this capability is already in use is in a Border Control Context. The Product delivers sensing and detection integrated to a command-and-control suite which is optimised to protect both controlled and uncontrolled borders covering air, land and sea domains, using best of breed and emerging sensor technologies to achieve high accuracy and effectiveness.

Sub-Products within this capability are:

- Border Security Command and Control
- Radio-Nuclear Detection
- Human Detection
- X-Ray Scanning
- Coastal Acquisition Surveillance System
- Vessel Traffic Management Systems
- Port Management Information Systems

Another example of sensor integration is within the Defence environment. A variety of sensors including radar, hyperspectral cameras, portable and remote controlled devices. Combining Leonardo and third party sensors in a Combat Cloud specific to the needs of the battle space.

General competency inclusive of the capability:

- Cloud technology roadmap development and support
- Technology strategy aligned to Government strategic plans and departmental goals
- Assess candidate solutions without vendor bias
- SC/DV cleared staff with military and intelligence domain knowledge
- Bridge agile and waterfall, establishing governance across project lifecycles
- Secure by Design
- Enhances user experience through adoption of flexible, user-centric cloud services
- Delivers open architecture (ITILv4, TOGAF) for flexible, low cost integration



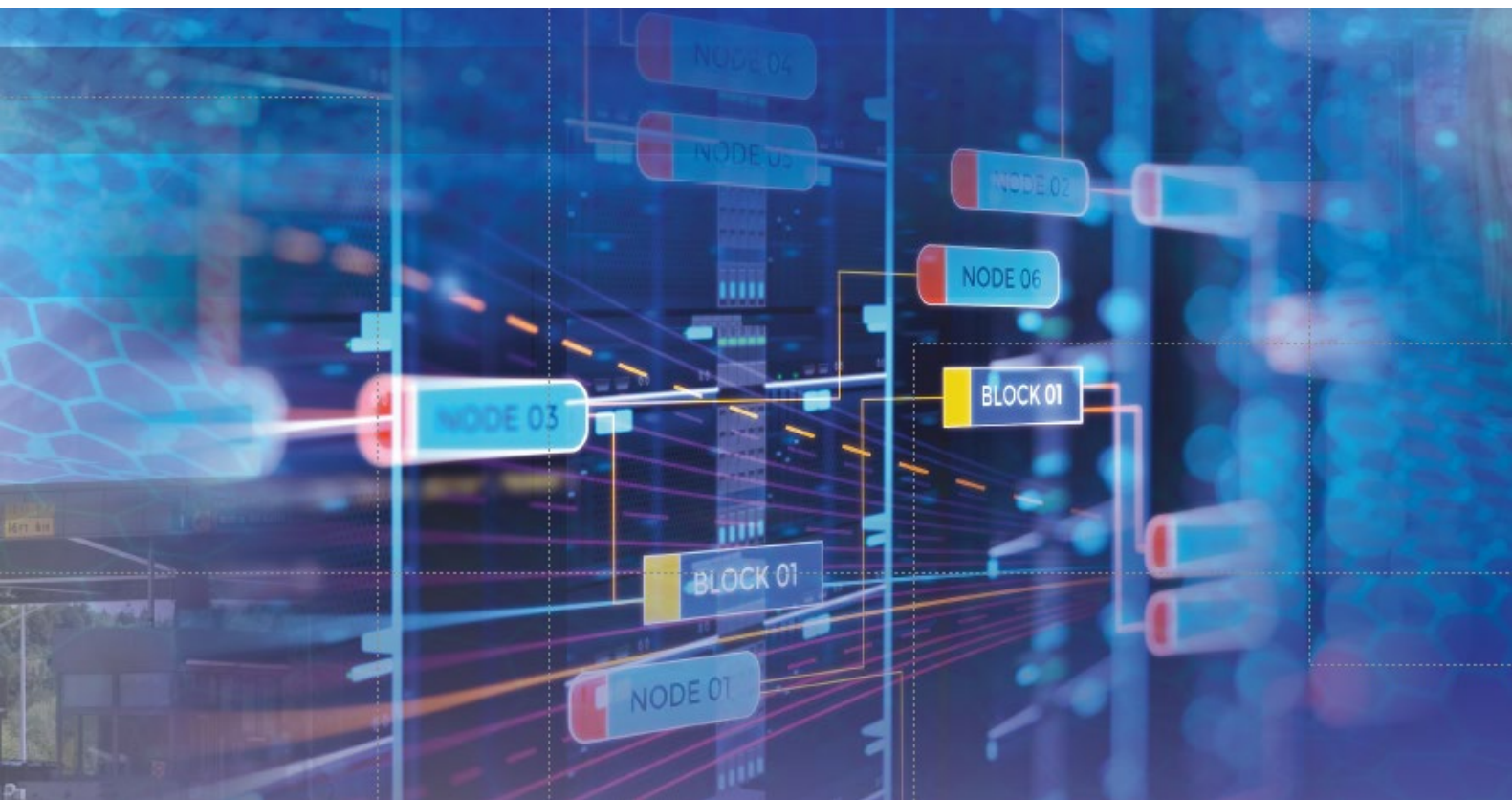
Sensor Management

Capability in sensor management covers the Engineering spectrum, including, but not limited to; Radio-Nuclear, Hardware (Mechanical and Electrical), Software, Firmware.

As sensor capability becomes more digital, the need to connect and align the output from those sensors becomes more critical. Leonardo's expertise in this area combines skilled and qualified personnel, combined with products built to deploy quickly and enable easy administration across the wider system.

Environment agnostic with key expertise in National Security Organizations, Defence and critical services and infrastructure. Whether it is transportation in smart cities, or increasingly complex and challenging border control at the next generation Megaports; our management and integration solutions are at the heart of some of the most complex infrastructure and transportation capabilities globally.

Services include the provision of technical support for 3rd party integrators and suppliers, assisting in development, testing and approval of applications / equipment intended to integrate with the existing system.



General competency inclusive of the capability:

- Reporting cycles, quality management and the escalation process for issues that cannot be resolved
- Includes the provision of a Computer Based Training package for general users and a Train the Trainer package, with documentation
- Interface documentation
- Technical advice / support / review / design documentation
- Test systems for integration testing of 3rd party applications/equipment
- Training Development
- A single point of accountability across delivery partners
- Technology strategy aligned to Government strategic plans
- SC/DV cleared staff with military and intelligence domain knowledge

Data Exploitation - AI

Either bespoke or COTS, and using the customer's preferred cloud infrastructure; Leonardo creates deep learning modes to solve complex customer scenarios. Through a toolbox of containerised digital technologies including through the use of Artificial Intelligence and Machine Learning, the software pulls insight from fused data in secure and complex environments.

Able to deliver complete AI solutions, or partner with existing capability providers, to deliver resource provision manpower to MoD so will require teaming with a collaborative team.

Solutions are able to automate processes and ingest digital information so as to analyse, visualise and derive intelligence that can make it possible to predict future outcomes. These can be deployed at COTS solutions for build ad hoc for specific use cases.

General competency inclusive of the capability:

- Uses standard components including Tensorflow, H2O, Spark, Cognitive Toolkit, DataBricks, Hadoop, HDInsight, Cloudera, BigQuery, Hive, hBase.
- Develop data pipeline and Machine learning/Deep Learning model
- Develop AutoML model and API integration
- Can create Clustering and Classification model
- Use Text analysis, Keyword extraction, Sentiment analysis, Entity relation
- Use Network analysis algorithms, identification of centrality and page rank
- Algorithms for anomalies discovery based on history data
- Forecast analysis algorithms ARIMA, ANN, logistic regression, and deep learning
- Can use structured and unstructured data
- Anomaly detection
- Secure by Design
- Use distributed engine to scale training phase
- Modelling and simulation of complex system



Data Exploitation - Large Language Models

Utilising LLMs to aid in Email Threat Detection through monitoring email classification at OFFICIAL and OFFICIAL SENSITIVE.

Leonardo AI Text Classifier utilises the cutting-edge technology of Large Language Models (LLMs) combined with a keyword approach to instead create a classifier that is able to identify sensitivity in text by more than just the inclusion of keywords. This is much more robust against malicious intent, as it is not as easily bypassed by the avoidance of using specific acronyms, phrases and words.

By harnessing the power of an LLM, contextual information in the text helps the trained model to identify common patterns in text that pertain to damaging information. The inclusion of a keyword approach in conjunction with the use of an LLM ensures a second layer of text security. Leonardo AI Text Classifier differentiates text by the level of damage a data leak would cause before classification - this makes it agnostic to specific security classifications, making bespoke implementation to specific classification requirements far more achievable.

Not only is Leonardo AI Text Classifier agnostic to specific security classifications, but text input too. It can be tailored to any type of specific text use case needed – whether that be documents containing text or emails.

At a glance:

- Predominantly uses BERT (bidirectional encoder representations from Transformers) – open source LLM, locally deployed.
- Accepts any unstructured text – documents, emails etc.
- Requires bespoke training on text pertaining to specific use-case.
 - For example – to classify emails it needs to be trained on emails.
- Multifaceted combination approach allows for high performing multi-class classification.
 - Keyword algorithm + BERT classification,
- Agnostic deployment/hosting (e.g. cloud, on-prem).
- Secure by Design.
- Can be integrated into existing system for real-time classification.

Secure by Design:

Since LLMs are still relatively new, there is little in the public domain surrounding the mitigation of security threats directly associated with their use. As a result, Leonardo have developed a novel threat model to accurately assure LLM usage. By adapting the OWASP top 10 and mapping to existing common software and hardware weaknesses/vulnerabilities we have created an essential framework to assure both the Leonardo AI Text classifier and any future LLMs based solutions are Secure by Design. Therefore, potential threats, risks and overall security have been considered and formed fundamental considerations throughout the product lifecycle – from concept to development and through to secure deployment.

General competency inclusive of the capability:

- Integration of LLMs into text classification workflows
- Ability to accurately classify emails according to government or business sensitivities
- Allows for a wide range of classification tasks with minimal effort
- Scaled to handle large volumes of data
- Once set up it, can run automatically

Data Visualisation

Custom or COTS UI/Ux solutions ranging from dashboards to information dissemination tools. Displaying KPIs or decision support metrics in clear and user-friendly formats.

Solutions can be COTS or build ad hoc for specific use cases and customers and can be cloud based or web-based applications which allows the display, manipulation, analyse and management of images, text, or video to detect potential threats, aid in strategic decisions or connect the right people across the wider picture.

Built to enable knowledge sharing while also to conform to classification access protocols. Our team of data engineers, scientists and analysts support exploitation of data derived from a wide range of systems to deliver intelligence and insight. The insight delivered by the team informs wider activities and enables effective tactical and operational decision making, at the speed of relevance.



General competency inclusive of the capability:

- Interactive data visualization
- Analytics and discovery within the visualization
- Identify trends, outliers, and correlations
- Event analysis and management platform
- Reports through triage to be able to perform detailed investigations
- Graphic analysis
- Interactive flexible data visualization solution
- Aligned to user needs

Secure Cloud

Leonardo's Cloud solutions are built to join diverse public and private sources securely. Solutions are optimised to support customer business goals while meeting relevant compliance and security requirements. Factors such as portability and interoperability are considered to avoid vendor lock-in, ensuring the architecture can respond to future requirements.

In order to deliver enhanced and shared intelligence across the enterprise, secure cloud is built to open architecture standards to enable third parties Apps and APIs to fully integrate. Leonardo's cloud solutions are designed to support developing strategy, architectural and data governance approaches, for business enterprise or operational use. In order to remain agile and adaptable in an uncertain world, cloud architecture can adapt as business requirements change, while still delivering the desired outcomes and services.

To ensure security at the highest classifications Secure by Design principles are inherent and a data centric approach enabling confidence in data integrity and security. Cyber assurance can be carried out across the wider picture so that the overall cloud solution is secure, complete, and efficient, even with third party elements.



General competency inclusive of the capability:

- Adopts practices to meet ISO 27001 and cloud security principles
- Supports integration and test to ensure solution performs as expected.
- Provides a risk assessment of cloud assets, prioritised by criticality/value.
- Identifies controls to ensure effective security for cloud-based data.
- Supports the decommission planning and disposal of legacy systems.
- Secure by Design
- SC/DV cleared staff with military and intelligence domain knowledge
- Objective assessment of architecture components' suitability and their integration requirements.
- Clients can maximise capability within their programmes and projects through spiral upgrades.
- Understand information management across and within cloud security boundaries.

Secure Digital Platforms

Deliver platforms that enable effective ingestion and exploitation of data combined with specialist capability in integrating complex information solutions into secure environments. Leonardo can enable the secure use of Public Cloud, and specializes in Secret and Above data platform design, build and operation and so enabling disparate organisations to share sensitive information.

The product can function as a "Data Lake-House" - combining the features in practice of both data lakes and data warehouses. The platform provides interfaces across the data hierarchy allowing access via APIs at any level meaning that third party elements can be integrated with ease, and vice versa. Microservices can be implemented to allow reproducibility of operations and automation of certain outputs.

The complete platform can be offered with end-to-end provision of services i.e. providing the digital backbone connecting sensor data in a secure manner up to the delivery of intelligence through visualisation APIs or AI/ML analytical tools. Alternatively, depending on the customer needs and existing infrastructure, modular elements of the digital platform can be supplied to fill in gaps or enhance capability across existing digital solutions.

Use cases include:

- Delivery of Predictive Maintenance through analytics and digital twins
- Connections Large Language Models and other AI based platforms
- Connecting multiple digital tools together to reduce the volume of dashboards and individual information sources required to inform decisions.

General competency inclusive of the capability:

- Easy integration into business systems
- Refinement based on live operational data.
- Data discovery, Data visualisation & dashboards
- SC/DV cleared staff with military and intelligence domain knowledge
- Multifunctional analysis on a unified platform that eliminates silos
- Deliver actionable insight from structured and unstructured data
- Shared data experience that uniformly applies security, governance and metadata.
- Enable data driven decision making
- Hybrid architectures with support for public cloud, multi-cloud and local distributions.

