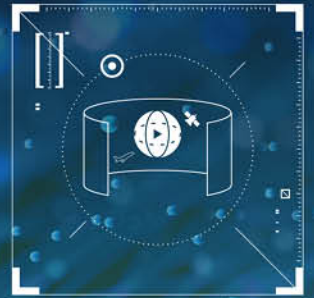# AVIATION AND AVIONICS

STM

# STM Savunma Teknolojileri, Mühendislik ve Ticaret A.Ş.

STM was established in 1991 for the provision of project management, system engineering and consultancy services to the Defense Industry Agency (SSB) and the Turkish Armed Forces (TAF).

The SSB continues to be the majority shareholder in the company, which has a workforce of 850 people, 63 percent of whom are engineers.

STM is among the leading companies operating in the defense sector, and is engaged in projects, particularly in the fields of naval platforms, tactical mini UAV systems, cybersecurity and IT services, command and control projects, satellite technologies, military aviation, radar and electronic warfare, and procurement and consultancy services.

Aside from its involvement in many national projects being conducted by the Turkish defence sector, STM is also engaged in export and business development activities for NATO with operations in more than 30 countries.

In addition to acting as the main subcontractor in the MiLGEM Project for the development of Türkiye's first national corvette, STM is also carrying out the detailed design as the main contractor in the project for the construction of TCG İSTANBUL (F-515), Türkiye's first national frigate.

STM has undertaken important tasks in submarine modernization and construction projects for the Turkish Navy, and is also responsible for Türkiye's first submarine modernization export, taking the lead role in the Pakistan AGOSTA 90B project.
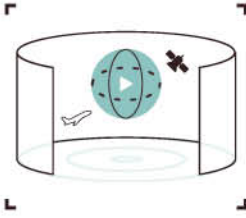
STM developed KARGU, Türkiye's first indigenous attack UAV System, and launched Türkiye's first Cyber Fusion Center in 2016.

Through the INTEL-FS2 Project, STM ensures the flow of intelligence between all NATO headquarters around the world, and is successfully engaged in one of Türkiye's largest software exports to the Organization.

STM diversifies its technology-based activities to meet the needs of the public and private sectors – in particular those related to the Turkish defense sector.

STM is headquartered in Ankara, the capital of Türkiye, and continues its operations out of nine facilities, located in İstanbul, Gölcük and Ankara, as well as Pakistan.

STM was for three consecutive years listed on the Defense News Top 100 list of the world's top 100 defense companies.

# HAVESİS

## Hybrid Avionics Emulator System

The Hybrid Avionics Emulator System (HAVESİS) is the pioneering next generation Generic Avionic System Integration Laboratory concept in Turkey.

Avionic System Integration Laboratories are widely developed by assuming a predefined target system and a common data bus protocol. This assumption requires a different configuration for each new target system, thus redesigning the existing infrastructure according to the new requirement.

HAVESİS enables to combine the avionic equipment that provides integration over different protocols and interfaces with DDS-based integration architecture. Avionic equipment developed with different bus protocols can thus be easily integrated. In this way, the integration behavior of the related equipment defined in the HAVESİS configuration file is sufficient to be included in the rest of the system.
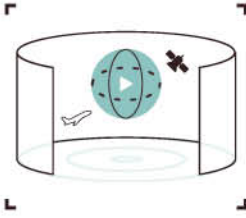
Therefore, the dependency of the bus protocol for integration tests is eliminated. In addition to its unique architectural design, HAVESİS creates an integrated solution with the subsystems we have developed for the integration laboratory concept. Sub-systems that may be needed in an Avionic System Integration Laboratory, such as HOTAS, MFD emulators, tactical environment, radar simulation software, have also been developed within the concept.
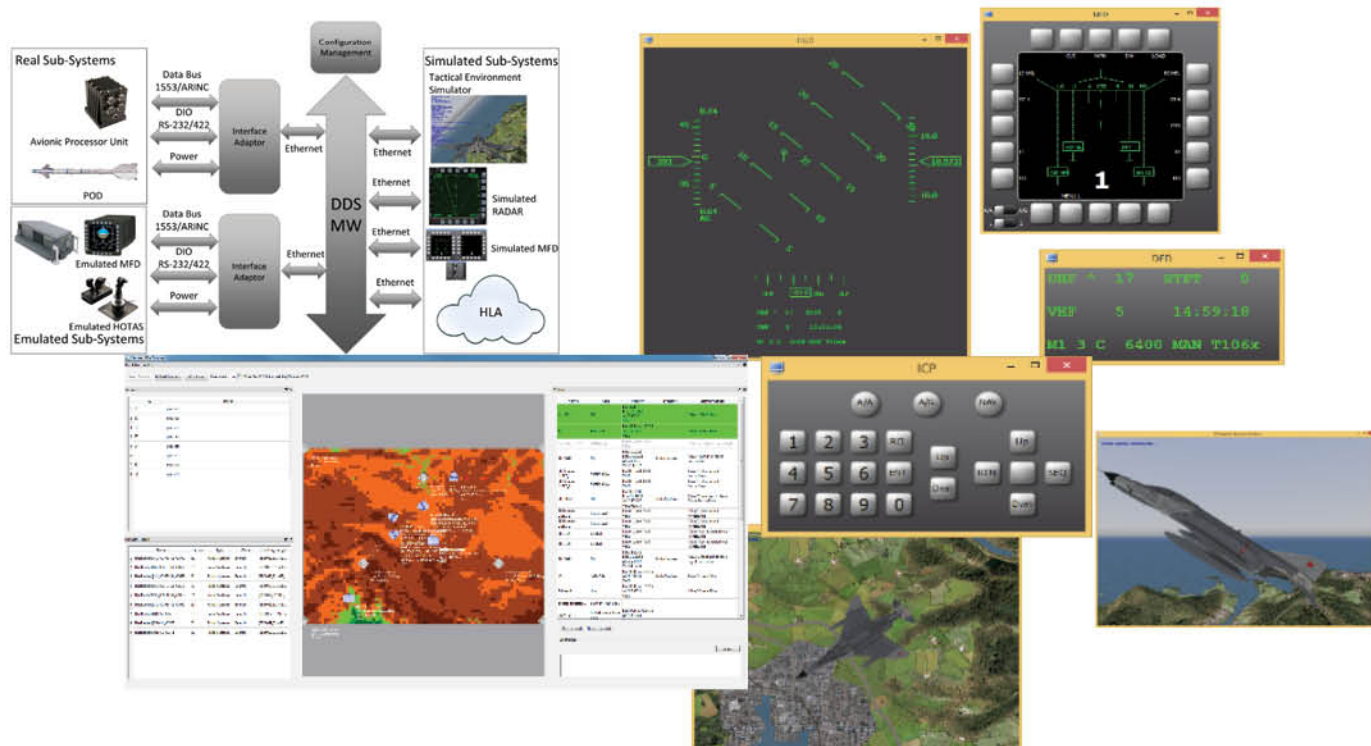
## TECHNICAL CAPABILITIES

| | |
|---|---|
| DDS-Based Architecture | DDS-based distributed architecture is designed, optimized for real-time execution. |
| Bus Emulator | It is a complete set of driver hardware/software and gateway software between different bus standards and DDS that provides two-way conversion between avionics and DDS topic space. |
| Configurability | Thanks to the flexible design of the Bus Emulator software, buses and shared information in the system can be configured in two ways via XML-based configuration files. |
| Tactical Environment Simulation | It is a DDS-based distributed simulation software developed to imitate the target platform in interaction with virtual elements in a virtual operational environment within a pre-defined scenario. |
| HLA Compatibility | Tactical Environment Simulation is designed HLA compatible for integration with possible simulation software. |
| Multiple Bus Support | Bus emulator supports MIL-STD-1553, ARINC-429, ARINC-629, ARINC-664, RS 232/422 protocols. The architecture is flexible and additional protocols can be added within the framework of motherboard capacity, driver hardware/software, and technical specifications. |
| HLA-DDS Gateway | It is a configurable two-way protocol conversion software developed to integrate HLA-based simulation software/systems directly into HAVESİS via DDS. |

# AVIOPRO

## Avionics Processor Unit

Avionics Processor Unit has been designed taking the minimised volume, weight and power consumption criteria into consideration in order to meet the intensive processing and performance power required by the flying platforms or other systems containing electronic components used in the field of defence and aviation. Besides the LRU configuration, the Avionic Processor Unit can be used inside an onboard external load (POD) and similar systems.

The Avionics Processor Unit we have developed consists of a high-performance multi-core processor, input-output interfaces, carrier cards, data recording/memory units and power distribution electronic components.
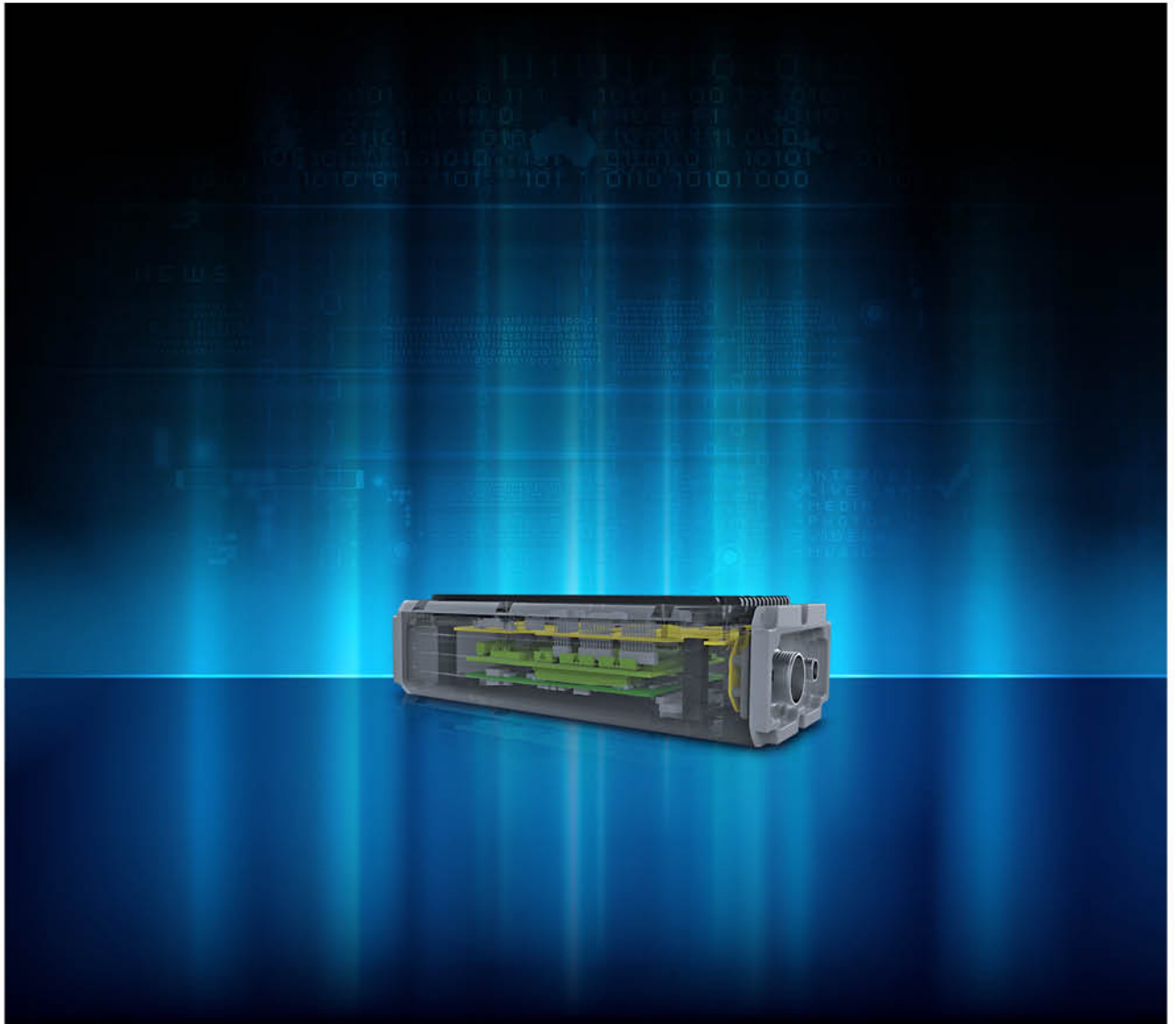
## MAIN FEATURES

- High performance COM express processor unit
- Scalable carrier card and interface configuration
- No-cable design
- Minimised volume and weight (~ 250 Mm X 110 Mm X 60 Mm, ~ 1.9 Kg)
- Low power consumption (~ 25 W)
- Windows/Linux/Vxworks operating system support
- Extensible Data Storage
- Fanless contact (Conduction-Cooled) cooling
- LRU and external load configuration
- MIL- STD- 1553B interface (2 channels)
- ARINC- 429 interface (6 channels)
- Gbps ethernet interface (2 units)
- RS232/ RS422/RS485 interface (5 units)
- RS-170 analog video output interface (1 unit)
- RS-170 video input interface (2 units)
- GPIO I/ O interface (2 units)
- Audio output (2 channels)
- USB 2.0 interface (2 units)
- 1 TB storage area

AVIOPRO
avionic processor unit
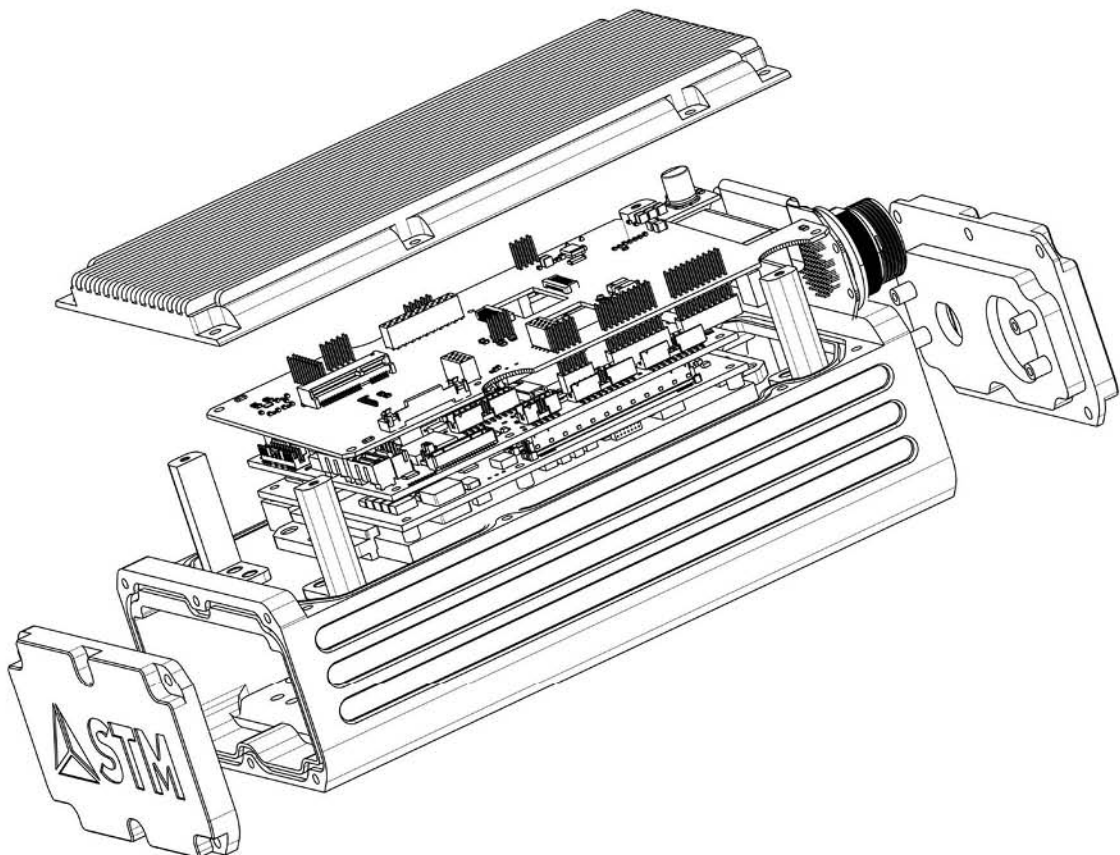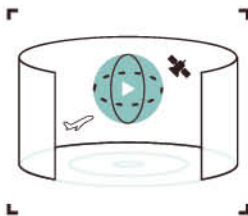
# AVIONICS POWER SUPPLY UNIT

The Avionics Processor Unit has been designed taking into account the minimised volume, weight and maximised efficiency criteria to meet the voltage/current power required by systems containing vehicles or other electronic components used in the field of defence and aerospace. It can be used inside or outside the on-platform external load (POD) and similar systems.

The Avionics Processor Unit we have developed consists of a power inverter board that converts the power from the AC power supply to DC power, connector cards providing communication with the input/output external interfaces, and a mechanical case and produces 0.5 kW of power.

The AC / DC converter modules on the Power Inverter Board are designed modularly according to the voltage requirement of the units to be connected to the Avionic Power Supply Unit. In this way, different variations (+12VDC, +24VDC, +28VDC) of the Avionic Power Supply Unit can be produced without changing the connection interfaces or dimensions.

# MAIN FEATURES

- Input Channel 1: 115VAC @400Hz
- Input Channel 2: 220VAC @50Hz
- Output Channel - Controlled Units (2 Channels): + 28VDC @9A (~ 250 Watt)
- Output Channel - Controlled Units (4 Channels): + 28VDC @9A (~ 250 Watt) (With On/Off feature)
- Power Factor: ≥ 0.99
- Efficiency: 90%@115Vrms / 92%@230Vrms (Full load)
- Power output options: +28VDC, +24VDC, +12VDC
- Protection Functions: Opening current limiting, thermal shutdown, high/low voltage shutdown, high current protection
- Fanless contact (Conduction-Cooled) cooling
- MIL- STD- 810G, MIL- STD- 461(A- F), MIL- STD- 1399, MIL- STD- 704-2/ 4
- GPIO I/ O interface (3 units)
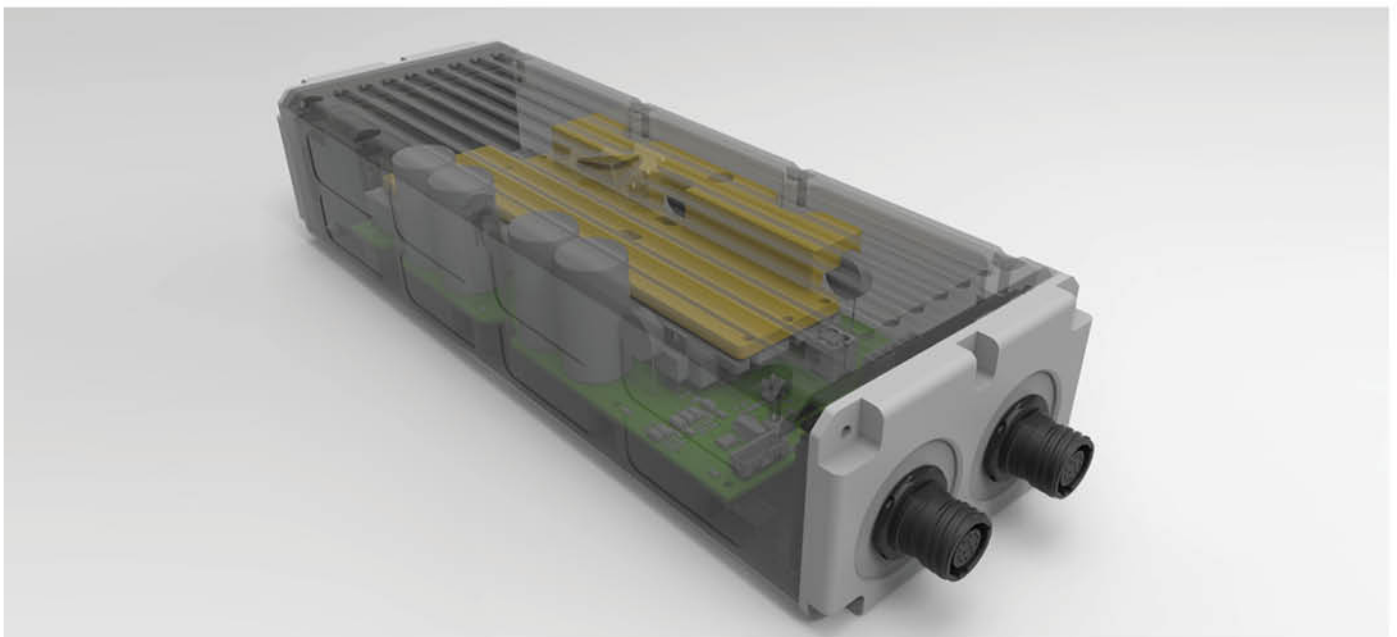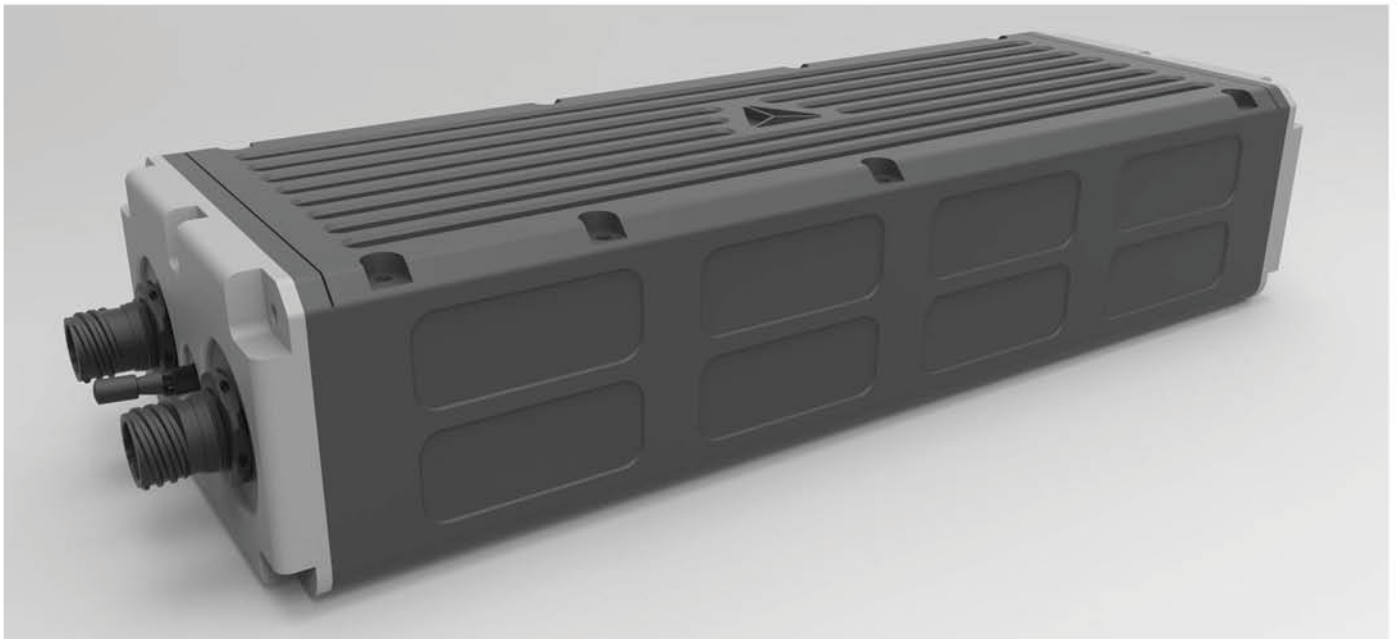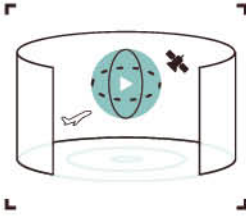
# ENGINEERING SERVICES

• Program Management for the procurement and/or development of aviation systems

• Systems Engineering in compliance with the SAE ARP 4754A Standard

• RMST Engineering in compliance with MIL-HDBK-217F, MIL-HDBK-338B, MIL-HDBK-470A, MILHDBK-2165 and MIL-STD-1629A Standards

      o Reliability,

      o Maintainability,

      o Testability,

      o Safety (including "Failure Mode Effects And Criticality Analysis (FMECA)" and "Failure Path Analysis (FPA)" analyses)

• Providing field of expertise in engineering for the certification of avionic subsystems/equipment in compliance with DO-254 and AMC 20-152A Standards

• Development of software products and/or providing field of expertise in software engineering

• Providing field of expertise in Modelling and Simulation:

      o Model Development and integration

      o Simulation infrastructure support:

            • Evaluation of operational concepts

            • Tactical Analysis and Decision Support