



TXT GROUP

Corporate Overview

Focus on Aerospace & Defence

May 2024



Your Global
Digital Enabler

Company Overview

Creative thinkers who make innovative
solutions to face complex challenges



TXT has always been a **pioneer in Digital Innovation**. Founded in 1989, since 2000 it has been listed in Milan Stock Exchange, Star Segment. In 2018 a new course has been started, with a plan of accelerated and sustainable growth.

TXT is an **Ecosystem of vertical excellences and digital competences**. With a proprietary **smart solutions portfolio** and deep expertise in vertical domains, TXT support its customers in understanding the business paradigm that the new digital world requires, enabling their transformation.

TXT is expanding across **different markets**, with a growing footprint in Aerospace, Aviation, Defense, Industrial, Telco, Government and Fintech, by leveraging more than 2000 experts, competence centers in AI, cybersecurity, XR, IoT. International business is 30% growing, with particular focus in North America and DACH region.



Your Global Digital Enabler



Where we are

€200m Revenues FY 2022
Solid Financial structure

Guaranteed by operating excellence & innovation

July 2000
Listed on the Italian Stock Exchange

STAR segment (TXT.MI)

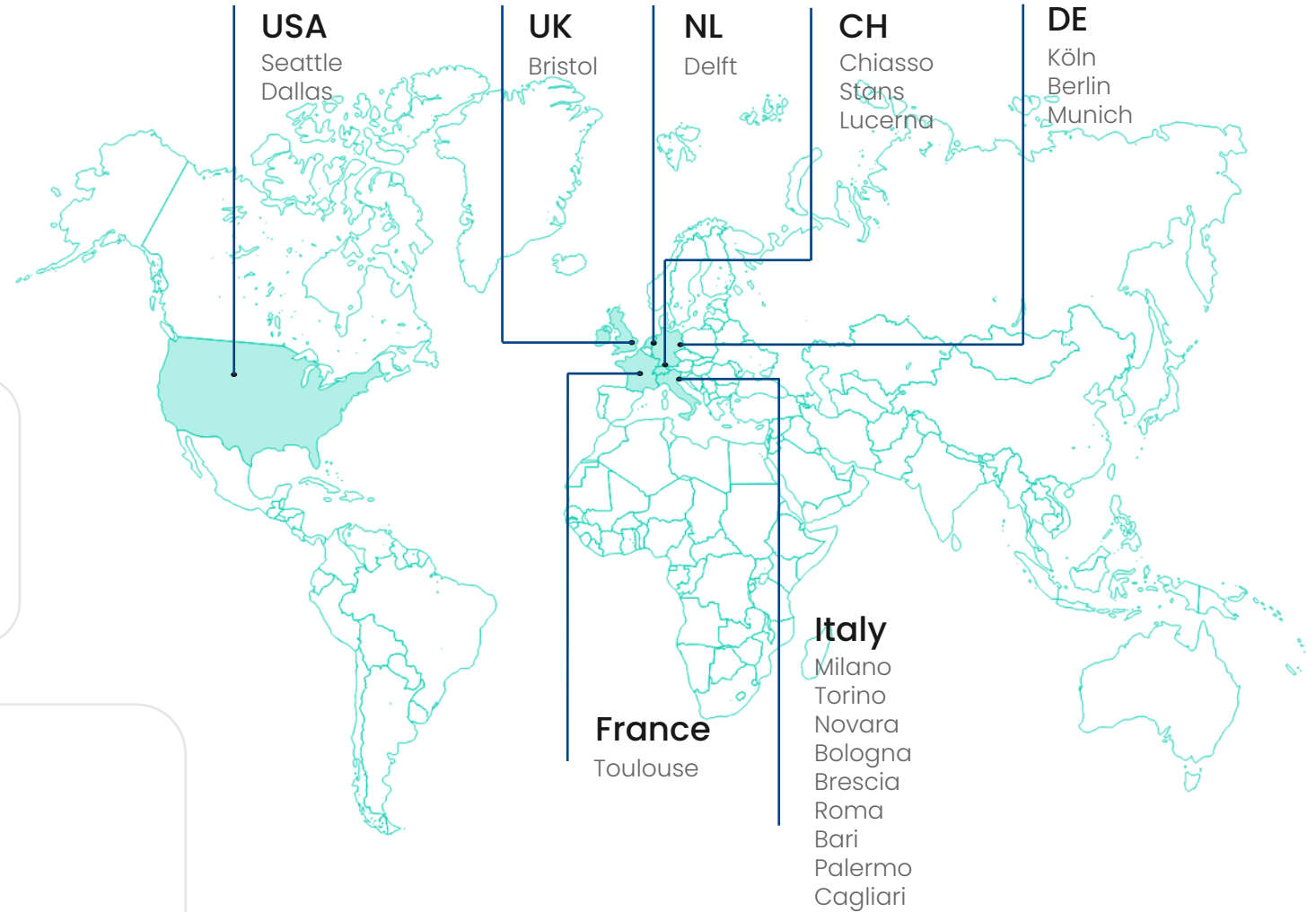
20
 Locations worldwide

30+
Certified Cross-Industry Quality

Years Experience

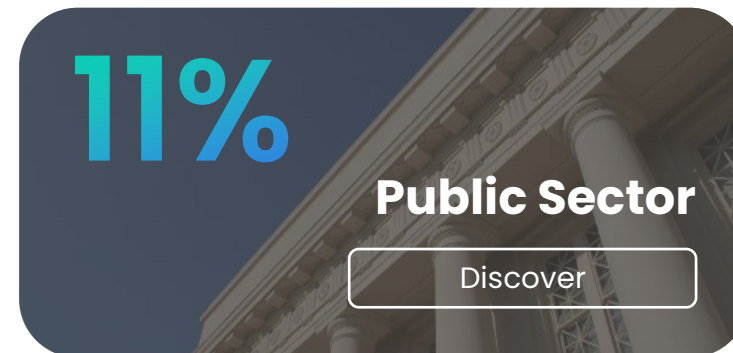
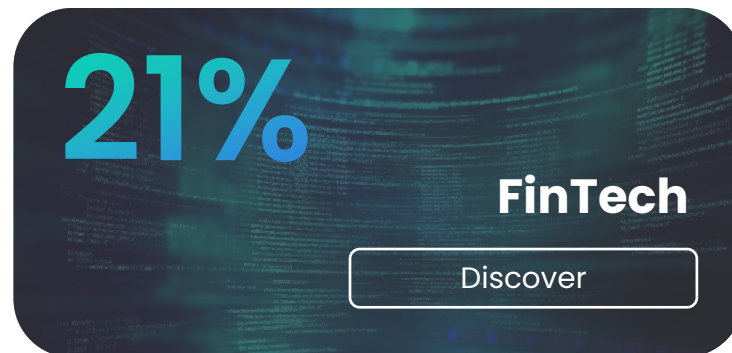
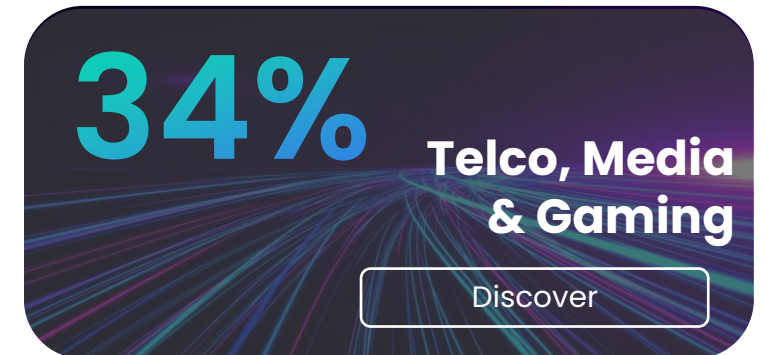
2000+
Specialised Know-how

Specialised engineers & professionals



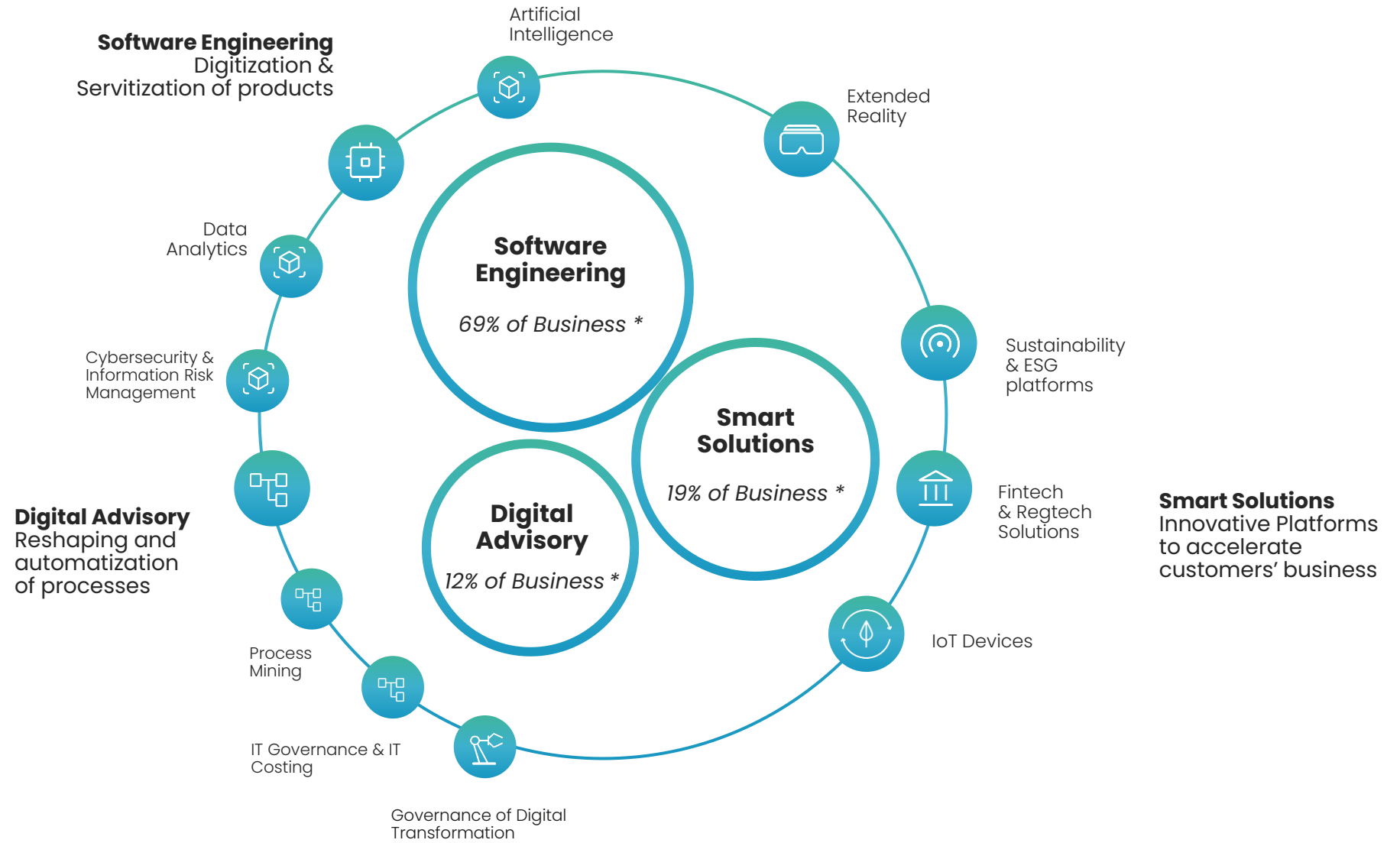
Core Markets & Incidence

We are expanding across different markets, with a **growing footprint** in Aerospace, Aviation, Defense, Industrial, Automotive, Telco, Government and Fintech, by leveraging more than 2000 experts, **competence centers** in AI, cybersecurity, XR, IoT.



* Percentages of business incidence by market segment are calculated on 2022 Pro-Forma Revenues of € 205Mn

Segmentation by Offering



* Percentages of business incidence by offering segment are calculated on 2022 Pro-Forma Revenues of € 205Mn



Licenses or Software as a Service:

We provide SW products as SaaS or upon license.

Leave It Up To Us:

Enjoy the benefits of getting your turn-key software solution from an experienced one-stop supplier.

Shoulder-to-shoulder:

our engineers work world-wide in the customers premises, with a work package approach or following a time & material model.



Delegate software development entirely



Focus on your core activities



Less fragmentation = higher quality



Highly efficient development process



Ecosystem of Excellences

TXT Group has a solid network of **multidisciplinary competences** and **vertical excellences**, developed in industries in which we are the leader. We arrange them in a dynamic and productive way, according to the evolution of the markets. From *consulting*, to *design and implementation of digital solutions*: with us, customers identify and achieve their highest goals for their business evolution. Because we listen, understand, and enable them for **continuous innovation**.

 | ASSIOMA

 | ASSIOPAY

 | CHELÉO

 | DM

 | ENNOVA

 | MACSOL

 | HSPI

 | LBA

 | PROSIM

 | E-TECH

 | PACE

 | PGMD

 | NOVIGO

 | QUENCE

 | REVERSAL

 | RISK

 | SPS

 | TERATRON

 | TLOGOS

 | WCS



TXT

Never better.

Commitment to Quality



ISO 9001:2015
ISO/IEC 27001
ISO 37001
ISO 14001
ISO 45001

EN 9100:2018 for aerospace activities

SA8000



Capability Maturity Model
 Integration Level 3

AUTOMOTIVE SPICE® Process Capability Level 2



DO-178C for airborne system and equipment
DO-200 for aeronautical data processing
DO-278 for on-ground mission critical system



MIL-STD 498
 for SW development & documentation



AQAP-2110 & 2210
 for software development & documentation



ISO 26262
 for software development & documentation



Commitment to Security

- **NOSI/NOS** up to NATO SECRET EU
- **TULPS** license
- **CIS area** at TXT HQ in Milan, equipped with:
 - Equipped with alarm
 - Located underground with reinforced perimeter walls
 - NATO SECRET & NATO RESTRICTED EU (Digital data)
- A set of **IT Policies and Procedure** already in place to regulate IT aspects such as Information access, Remote terminal management, Emergency procedures and failures, Cyber risk analysis, ...
- **Cyber Essential Plus** Certification from 2021



Consistently
High quality

Aerospace & Defense

Adhere to high standard of excellence
and adopt industry best practice.



Aerospace & Defense Division

10 ● Location Worldwide

600+ ● Passionate Engineers

30+ ● Years industry Focused

€45m ● Revenue 2022



OEMs

AIRBUS

LEONARDO

BOEING

ELTGROUP

PILATUS

MBDA
MISSILE SYSTEMS

MITSUBISHI
AIRCRAFT CORPORATION

COMAC

SAAB

SUKHOI

EMBRAER

AND MORE

Airlines

American Airlines

Lufthansa

FINNAIR

ICELANDAIR

ETIHAD
AIRWAYS
ABU DHABI

QATAR
AIRWAYS

Emirates

SWISS

DELTA

brussels airlines

CATHAY PACIFIC

AND MORE

Product Suppliers & MROs

SAFRAN
AEROSPACE DEFENCE SECURITY

GE Aviation

Rolls-Royce

Avio Aero

FAUSTIAN AIRTEX

RUAG
Aerospace Defense Technology

SR Technics

UTC Aerospace Systems

AIRFRANCE
INDUSTRIES

KLM
Engineering & Maintenance

TURKISH AIRLINES

innovint
AIRCRAFT INTERIOR

AND MORE

Academia & Research

Cranfield
UNIVERSITY

ILR BERLIN
INNOVATION AND LEADERSHIP IN AEROSPACE

POLITECNICO
MILANO 1863

Brunel
University
London

AEROSPACE
TECHNOLOGY
INSTITUTE

VirginiaTech

UNIVERSITY of
DAYTON

The University of
Nottingham

UNIVERSITY OF
SOUTH ALABAMA

ASDL

AND MORE



TXT A&D Offering



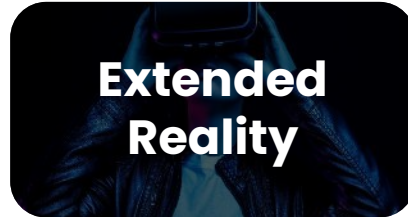
Training & Simulation

Modelling & simulation for synthetic training devices
Training needs analysis and training center design



Embedded Systems

Software development for airborne systems
Virtual and automated test environment



Extended Reality

Virtual training platform for operations and maintenance training
Fully device- and industry-agnostic



ProSim Simulation

Professional avionic certification support
Airbus A320 & Boeing 737



Cyber Security

IT Risk Management & Compliance
VA/PT
IT Security Engineering
Digital Forensic



Aircraft Design & Analysis

Model-based, multidisciplinary aircraft design
Aircraft-level systems architecture



Flight Operations

En-route flight profile optimization
Mission planning and debriefing station development



Product Configuration

Layout definition
3D configuration
Smart collaboration



VAPS XT

HMI software solutions for embedded displays



InstructIQ

AI-Powered automated assessment of Mission-Readiness Training



VAPS XT

Powerful full-featured software tool for the rapid development of interactive graphical HMI displays for avionics and other embedded applications

VAPS XT Overview

- HMI graphics and logic in a structured, model-based environment
- Deploy HMI design to virtually any embedded system
- Create ARINC 661 displays and widgets
- Customize the styling of your widgets or HMI without modifying the implementation
- Record scenarios that can be played back to demonstrate your HMI

Key features

- ARINC 661 compliant avionics
- RTCA DO-178 compliant/certified systems
- UAS ground station displays
- Graphical overlays for tactical navigation applications



Training & Simulation



Our Mission

"To be the partner of choice for OEMs, TDMs, and training organizations, providing first-class support and advanced software solutions."

Flight Crews



Ground Crews



Mission Crews



Cabin Crews



...best-class training for aviation professionals.

7+
Locations worldwide

200+ Specialised Know-how
Specialised engineers & professionals

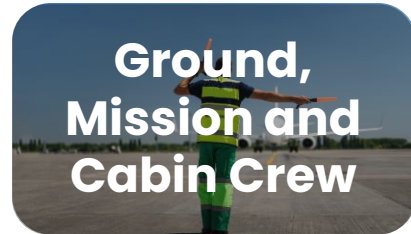
20+
Years Experience



Training & Simulation solutions



Experience on the development of the whole range of flight simulators, up to FFS Level D



Training devices for maintenance technicians, mission operators and cabin crews



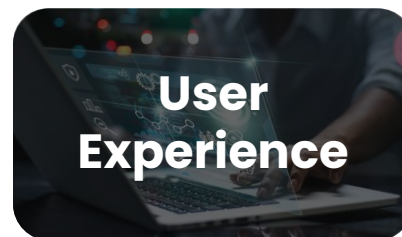
LVC, Modelling, Scenario Simulation, DIS/HLA



AR/MR/VR training solutions, proprietary platform to create, manage and play XR experience



Mission planning and debriefing systems, Health Usage and Monitoring Systems, Digital Maps



UX/UI and HMI, Design Experience, Gamification, Metaverse, Content Creation



Big Data Analysis, Data Management, Value Extraction, ETL



Deep engineering knowledge Across Training Device lifecycle



Definition of system specification and functional requirements

Aerospace System engineers and SME from Aerospace market.



System and software design

Including also re-hosting from real aircraft to lower-end hardware.



Software and system development

Using proven technique and tools (Agile, DevOps) with certified process and standards.



Testing, verification and validation

From subsystem test to full device Acceptance Test Procedure.



Certification with pilots and aviation authorities

Involved in certification with FAA, EASA, CAAC, LBA, CASA, ENAC, CAA.



Life-long application maintenance

Field Support, (Ri)Qualifications, updates and upgrades.



Cross domain expertise

User Interaction

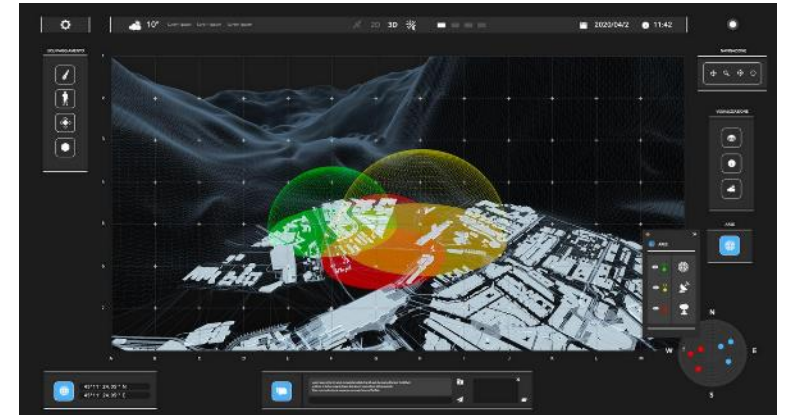
- UI/UX design and implementation
- 3D artists team for amazing VR implementation
- Instructional design and CBT development

Training Solutions applications

- Virtual Training Simulator
- 3D digital-twin for mechanics and technicians
- Complete interactive simulation of the target systems
- Simulation of corrective, preventive, maintenance, malfunctions tasks
- Learning management systems

Training Systems

- Training center, from conceptual design to final implementation
- Mission/Tactical scenarios
- Video Wall design



Flight Simulators



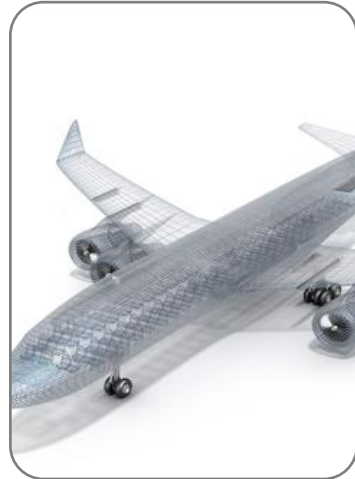
Flight Simulator Expertise

Data Package



Flight test support and data gathering/analysis

Dynamics & Systems Modelling



Flight model and systems model development

Avionics, Displays & Cockpit



Simulation and integration of avionics, displays and cockpit panels

Support Tools



Framework, IOS, Cueing Systems, Sound, Visual, Configuration Control

Certification Support



Support to simulator certification up to FFS level D



Across each flight simulator tier

TXT often acts as “system integrator” of the entire training system.

Offering span from Virtual Reality devices, Virtual Cockpits, to Flight Procedure Trainers, to Level D Full Flight Simulators



BEECHCRAFT
B200



AW101
NAWSARH ULTD



C27-J VCT



PC-21 FTD

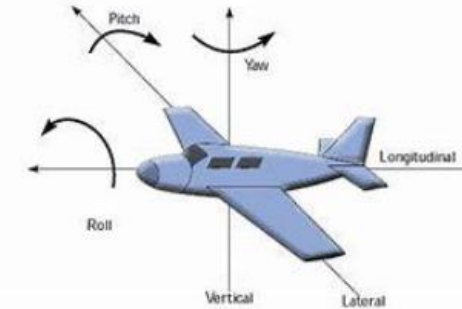


AW189 FFS



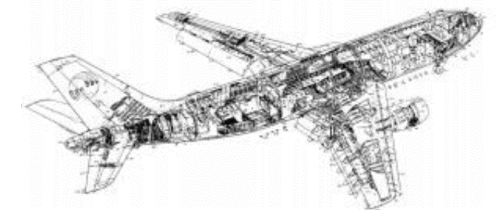
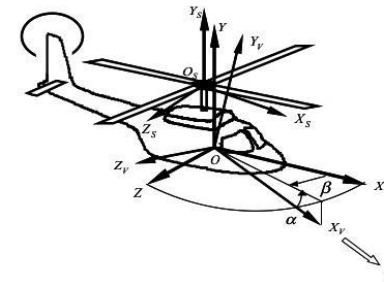
Flight Model development

- Development of **customized flight models**, for fixed-/rotary-wing aircraft, with full coverage of all static and dynamic contributes, suitable for training devices up to FFS Level D
- **Generic Flight Model** that can be tuned for specific A/C type (fixed-/rotary-wing)
- **Fixed-wing model**: includes equations of motion, aerodynamics, ground interaction, propulsion and Weight & Balance model
- **Rotary-wing model**: multibody flight model based on Blade Element Theory for MR, Momentum Theory for TR, aerodynamic surfaces, fuselage, aerodynamic interaction model, landing gear/skids model, W&B model
- **Special effects**: ground effect/resonance, windshear, rotors downwash, flare, smoke, fire, bow waves...
- Objective and subjective tuning acting on physical parameters to match flight test data



Aircraft Systems

- Availability of basic components for generic system models (fixed- / rotary- wing)
- Custom simulation tailored onto specific aircraft model and configuration
- Interconnection of the different systems
- Engine / Fuel / Hydraulic / Electric / Lighting / ECS / Fire / Landing Gear / Floats / Hoist / Cargo Hook / ...
- Simulation of systems malfunctions



Technology

- C++ or Model-Based Design (Matlab/Simulink) with automatic C++ code generation
- Cross-platform capabilities, Windows or Linux



Avionics

- Integration of real avionics modules
- Re-hosting of real avionics modules
- Reverse engineering of black-box modules
- Avionics modules managed/simulated by TXT include:
 - Autopilot/AFCS
 - Navigation (FMS, RNAV, RNP, SBAS-GBAS, SAR and special operations)
 - Communication (HF, VHF, SAT, IFF)
 - Mission Computer (DMG, Weapons, Radars, electronic Warfare)
 - Sensors (ADC, AHRS, Pitot)



Displays

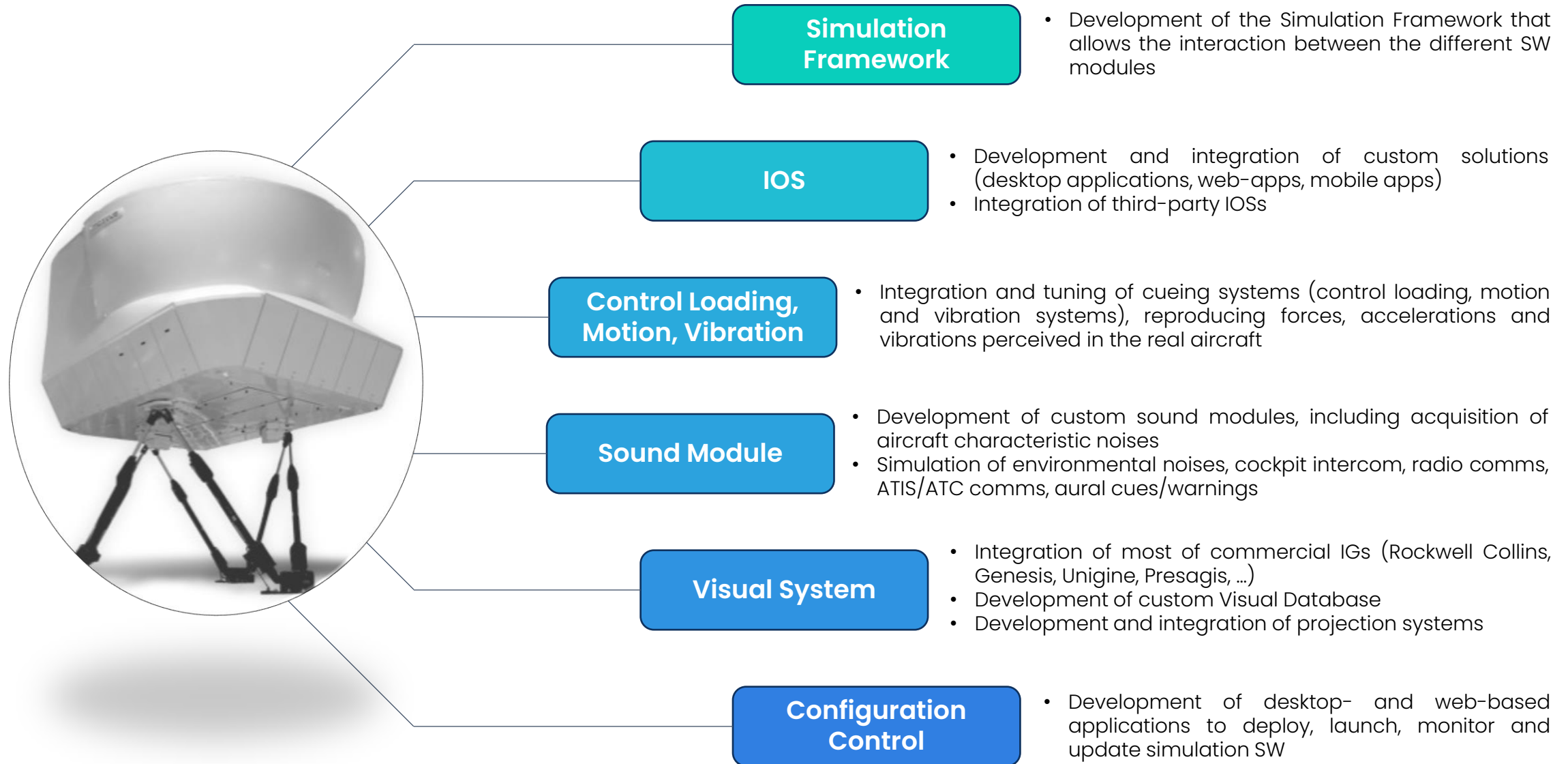
- Integration of real HW modules
- Development of simulated cockpit displays with C#/WPF, C++/QT
- Modelling with VAPS and VAPS XT proprietary tools

Cockpit

- Integration of real aircraft panels with simulation environment
- Simulated cockpit: reproduction of real aircraft panels with simplified communication protocols
- Virtual cockpit: 2D graphic representation of real cockpit panels on touch screen displays



Support tools



Certification support

QTG tool development

- Development of QTG tools compliant with major certification authority requirements (EASA, FAA, CAAC, ICAO)
- Automatic and manual QTG test execution, comparison of FSTD performance with real aircraft reference data and automatic evaluation of tolerances required by regulations
- Automatic generation of QTG documents, customizable to different authority standards

Certification

- Preparation of certification documentation
- Support during certification test session with authority

Validation Test

- Performance: static conditions and dynamic maneuvers (take-offs, landings, engine start-up, etc.)
- Handling qualities: dynamic response, static stability and flight control data
- Atmospheric model: behavior of the flight model in turbulence, gust and icing conditions
- Motion system: performances in terms of displacement, frequency response, vibration, etc.
- Visual system: visibility, field of view, alignment, occulting, geometry, brightness, etc.
- FSTD system: visual, motion and instruments response and sound characteristics in specific flight conditions



Ground, Mission & Cabin



Ground, Mission and Cabin crews training systems

Ground Staff



Maintenance training, operational support, airport operations

Mission Operators



Training for military and civil mission aircrews

Cabin Crew



Cabin crew familiarization, normal and emergency procedures



Virtual Maintenance Trainer (VMT)

- Development of virtual interactive 3D model of the entire aircraft for mechanics and avionics maintenance crew training
- Complete simulation of the aircraft systems, avionics and displays, AGE/GSE, reproducing the interaction between different systems
- Implementation of step-by-step guided procedures to complete maintenance tasks: remove/install procedures, operational tests, fault isolation
- Component location tests, free-play mode
- Automatic evaluation of trainee performance
- Development of XR systems for maintenance at part task level

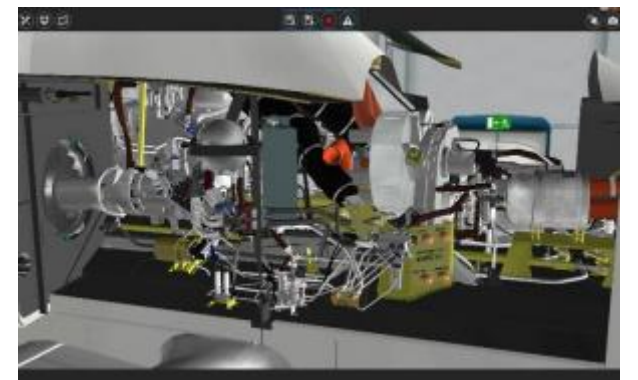


Operational Support

- AR support for on-field operations
- Integration of virtual instructions with the real environment to guide the operator in the procedure execution

Airport Operations

- VR training for all airside operators (Marshalling operation, De-icing, Follow-me, ...)
- Custom airport scenario
- Possibility to score every completed procedure



Mission Operators

Hoist/Rescue Operations

- Development of suspended load model:
 - Single pendulum (Rope assumed as a rigid rod, simpler mathematical problem and reliable behavior, bending effects not simulated)
 - Multiple pendulum (Rope made by N rigid segments, simulation of bending effects and proper motions, increased mathematical and computational complexity)
- Simulation of custom mission scenarios (SAR operations, Medical transfer, Firefighting operations, Tactical support and transport)
- VR Hoist Operator Trainer:
 - Hand Tracking to send operator inputs to dynamic system
 - Interlink Simulation, complete mission scenario with interaction between Pilot and Hoist Operator
- MR Hoist Trainer:
 - Integration of dynamic model with an actuator system to simulate the movement and forces of the hanging load on the cable



Military Operations

- Rear crew mission training
- BattleLab Simulations
- Part Task Trainer for Radar/ESM/ECM Crews



Cabin Crew

TXT Capabilities

- Virtual Reality training devices based on proprietary platform PaceLab WEAVR for cabin crew operations
- Development of custom 3D models of aircraft interiors and exteriors
- Analysis and implementation of procedures according to checklist/manuals/...

Features

- Teleport in order to allow the user to move around the aircraft (inside & outside)
- Components highlight, TextBox and voice indications
- Sound feedback on user interaction
- Possibility of randomizing initial status of the items in the scenario
- Scoreboard displayed at the end of the procedure
- Data analytics tracking by WEAVR Manager
- Multi-users allowed
- Learning and testing modes (Lesson/Exam)

Applications

TXT has developed several applications for both normal and emergency procedures training, which include:

- Virtual Door Trainer
- Galley familiarization
- Virtual inspections, pre-flight checklist, walkaround procedure,
- Cabin fire extinguishing



Modelling & Simulation



45022002773048 08737 41734 45 22011 86045 88914222000048 22011 447209310170933 86045

ISL : 3 0 2 5 8 8 4 8 7 2 9 4 5 4
TAS : 5 0 0 5 8 8 4 9 6 2 1 3 6 8

629 998 : FT
700 023 : HS
53 657 : JQ

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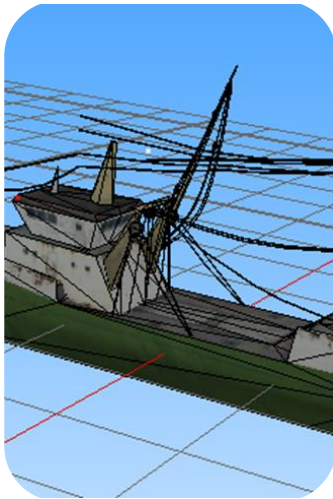
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Modelling & Simulation Activities

Environment and Object Modelling



Environment database
Weather conditions
3D models
Material classification
Sensor
characterization.

Sensor Modelling



Integration and
customization of
COTS SW
EO/IR, Radar models

Scenario Simulation



Use of main COTS
for scenario creation
Distributed
architecture
integration



Virtual Training



TXT Capabilities

TXT has experience in all types of Extended Reality

- Immersion in a full digital environment (Virtual Reality)
- Reality enhanced by virtual elements (Augmented Reality)
- Interaction with both real & virtual objects (Mixed Reality)

XR applications

- Operators and Technicians Training
 - Rescue Hoist operations
 - Virtual Maintenance Training (VMT)
 - Interactive and guided procedures
- Pilot Training
 - 3D cockpit interaction / real cockpit and hands for mixed reality
 - Virtual displays & Flight data linked to the simulation
 - IG Virtualization
- Cabin crew Training
 - Virtual door trainer
 - Virtual inspections



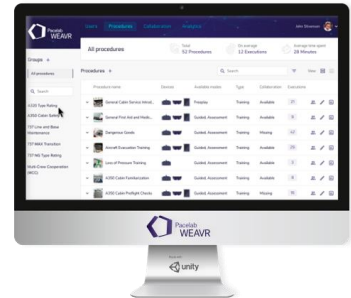
TXT Product

Proprietary platform Pacelab WEAVR:

- Create, deploy and execute a wide array of XR solutions from the same set of technical data
- No prior coding skills are required
- Device agnostic platform: all types of device are supported
- Open system supporting the integration of third-party assets (MES, PLM, LMS/TLS, etc.)
- Upload and distribution of XR content to users seamlessly from web portal

WEAVR Modules

- **Creator**
 - Creation of hands-on training contents using intuitive Drag-and-Drop functionality
 - Implementation of standard elements behavior and animations (buttons, levers, etc.)
 - Creation of customized objects and associated behavior
- **Manager**
 - Comprehensive management portal
 - Periodic reports summarizing activities
 - Remote collaboration allowing more parties to share the same view and exchange information
- **Player**
 - Allows to access, select and execute available procedures
 - Centralized application execution
 - Execution modes (Automatic, Guided and Assessment)



TXT

60

CTC NORCAL APP WITHIN 20 NM ON 125.35 354.1

REIGA 374-LV ::::

NOTICE FOR REASONS OF NATIONAL SECURITY PILOTS ARE REQUESTED TO AVOID FLIGHT AT AND BELOW 800' AGL IN THIS AREA

TRACY 203 TCY ::::

CTC NORCAL APP WITHIN 20 NM ON 121.3 270.35

NASA FLIGHT OPERATIONS CENTER IN THIS AREA

CTC NORCAL APP WITHIN 20 NM ON 135.2 379.1

Ground Stations



Ground Stations

Mission Planning & Debriefing Station



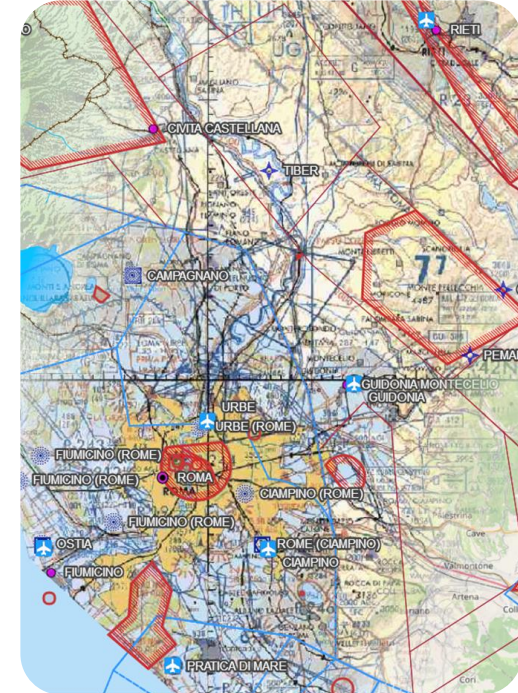
Flight planning, Fleet Management, Tactical Scenarios, Data recording and analysis

Health and Usage Monitoring Systems



Aircraft systems and components status monitoring

Map Service



Development of digital maps for on-board and ground tools



Mission Planning & Debriefing Station

Mission planning

- Flight planning (Terrain/Obstacles management, Aeronautical Data, Route Collision detection, Vertical Profile, Meteo, NOTAM, Aircraft Performance, Maps)
- Fleet management (Weight & Balance, Communications Preset, Checklist, EMS Libraries)
- Simulation of different scenarios (Tactical Entities, Sensor Prediction, Line of Sight, Search and Rescue Aids, Sonobuoy patterns)
- Solutions compliant with the security certification standards



Debriefing Station

- Data download and analysis (Raw Bus 1553, A429, I/O, and measures FH, T&Go)
- Issues identification (Configurable algorithms, Automatic Data analysis, Human In-depth analysis and activity support)
- Mission rehearsal and reporting functionalities
- Data synchronization (Telemetry, HUD, Video, Camera / FLIR, MFD)
- Reproduction on 2D / 3D interactive map

Technologies

- Web/Mobile/Desktop/X-platform applications
- C++/QT, Javascript, HTML5, React, SQL-databases
- Different architectures:
 - Client/Middleware/Server architecture
 - Cloud solutions
 - Microservices architecture



HUMS

In order to prevent damages caused by usage and non-effective maintenance, TXT manages monitoring systems able to track the overall status of the aircraft

Benefits

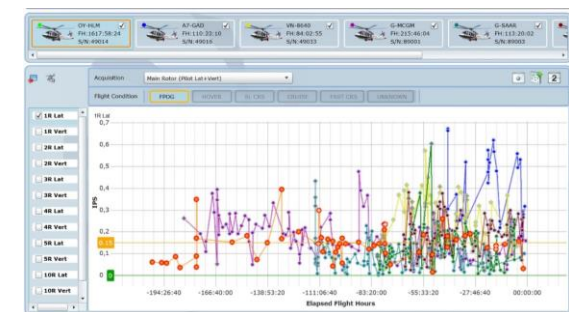
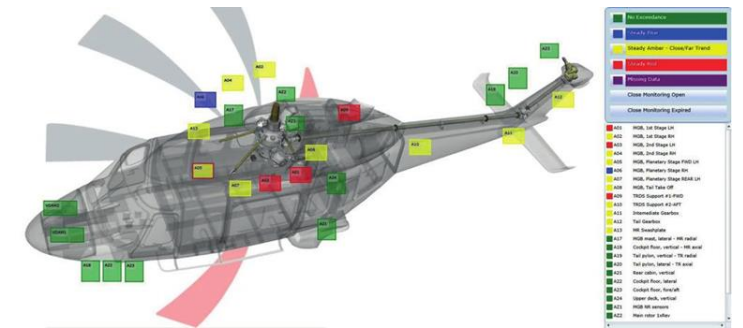
- Management of maintenance activities on the whole fleet in order to maximize airworthiness
- Full awareness of aircraft components status, trends and malfunctions
- Prevention of mission abortion and Aircraft on Ground (AOG)

Functionalities

- Parameters monitoring at component level (Vibrations, Temperatures, Accelerations, ...)
- Planning of maintenance activities
- Predictive/Preventive maintenance
- Maintenance Work Order management (Issues management, Life cycle)
- Diagnostic activities (malfunctions)

Technologies

- Real-Time data transfer
- C++/QT, C#/WPF, Java, Javascript, HTML5, Python, SQL-databases



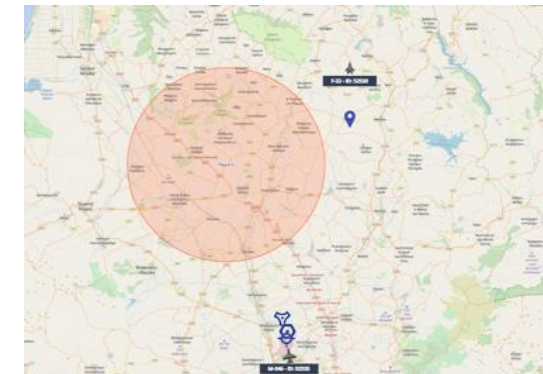
Map Services

Digital Map Services

- Analysis and export of digital maps from open-source GIS applications
- Development of different types of maps (Scale resolution, Aeronautical information, Obstacles, etc.)
- Handling of multiple format of raster, vectorial and terrain elevation data

Applications

- **IOS:** digital maps integrated in flight simulators Instructor Operating Station allow planning and monitoring of pilot training sessions
- **Electronic Flight Bag:** integration in the EFB of a digital moving map with an intuitive user interface able to increase the operational efficiency
- **Flight Profile Optimizer:** our proprietary platform FPO exploits digital maps for in-flight route replanning, reducing operational costs thanks to trajectories optimization
- **SAR Mission Support System:** immediate data communication with a secure connection between all the stakeholders involved (containing text, map data, images, aircraft status,...)
- **Mission Planning & Debriefing System:** intuitive flightpath planning and mission rehearsal thanks to digital maps integrated into MPDS
- **DMG:** our Digital Map Service allows operators to create customized maps on AW169/189 Digital Map Generator, providing worldwide coverage and different combinations of views as well as regular updates



Technologies

- Typescript, JavaScript, HTML5, React and C++/QT
- QGIS, ArcGIS, OpenStreetMap
- GDAL and PROJ libraries



User Experience



UX/UI

UX/UI and HMI



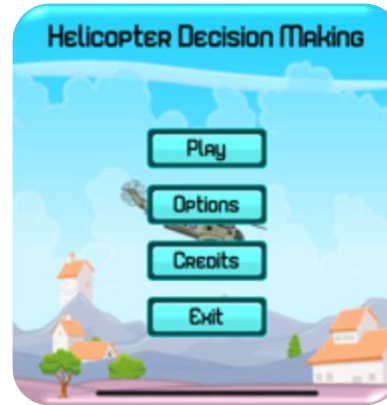
Thanks to the combination of decades of engineering experience and proven creative and experiential skills, TXT Group is able to produce cutting-edge and transversal UXUI and HMI.

Design Experience



TXT Group has combined the synergy between technology, experience, architectural need in order to create unique projects with very high results in terms of efficiency and "wow effect".

Gamification



The focus on the user and the experience has led TXT Group to specialise in the fields of gamification and training & simulation, creating engaging and immersive learning and skills testing experiences for its customers.

Metaverse



TXT Group is able to develop highly immersive experiences in the Metaverse for its customers, developing everything in house

Content Creation



Thanks to a large production team, TXT Group is able to develop all content, from 2D to 3D, according to different customer requirements and on all types of devices





Never Better.



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