



evektor

Company Presentation



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Classification:
PUBLIC

Company profile

Evektor, spol. s r. o.

Engineering Services Division

 **148**

Engineering
employees

 **5**

Rapid prototyping
employees

Aircraft Division

 **141**

Engineering
employees

 **127**

Production
employees
(Evektor Aerotechnik, a.s.)

Company activities

Engineering services for industries

- Automotive industry
- Aircraft industry
- Consumer industry (STIHL, VIKING, etc.)
- Other

Own projects

- Eurostar / Sportstar ultralight airplanes
- VUT-100 Cobra / SuperCobra airplanes
- EV-55 Outback airplane

Research & Development

- EU-Framework programs
- CZ-Programs, e.g. MPO, Czechinvest, TACR

Cooperation with Universities and Colleges



Main activities

INDUSTRIES

Aircraft • Automotive • Consumer • Buildings



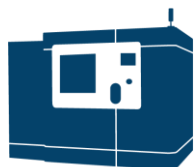
Design

Styling
Design / CAD design
Development of jigs and tools



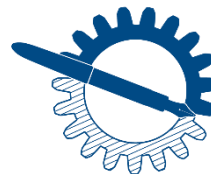
Analyses

Stress analyses
Aerodynamical analyses
Test room



Manufacturing

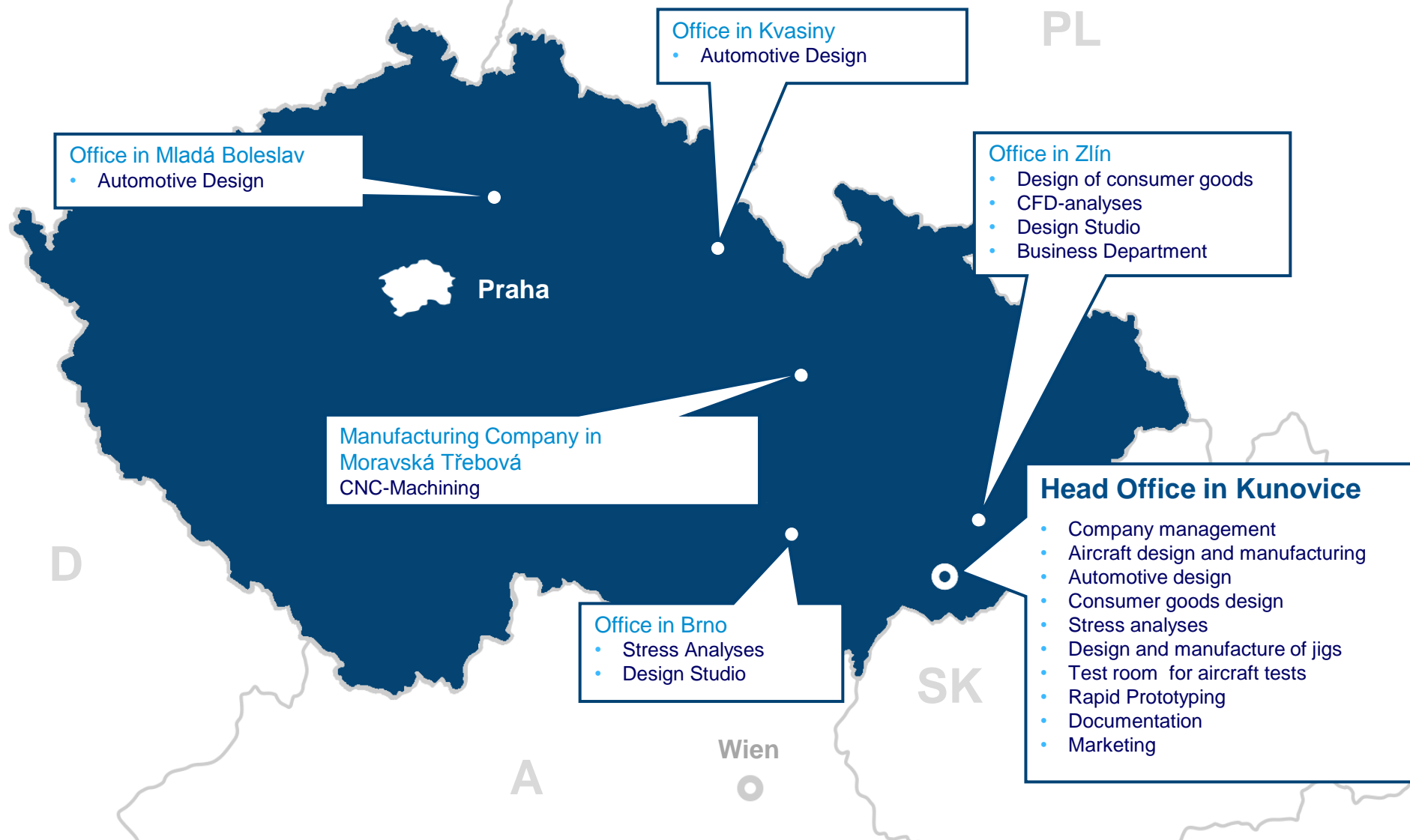
Rapid prototyping
Vacuum casting
Manufacturing



Other

Standardization
Certification
Manuals

EVEKTOR branches

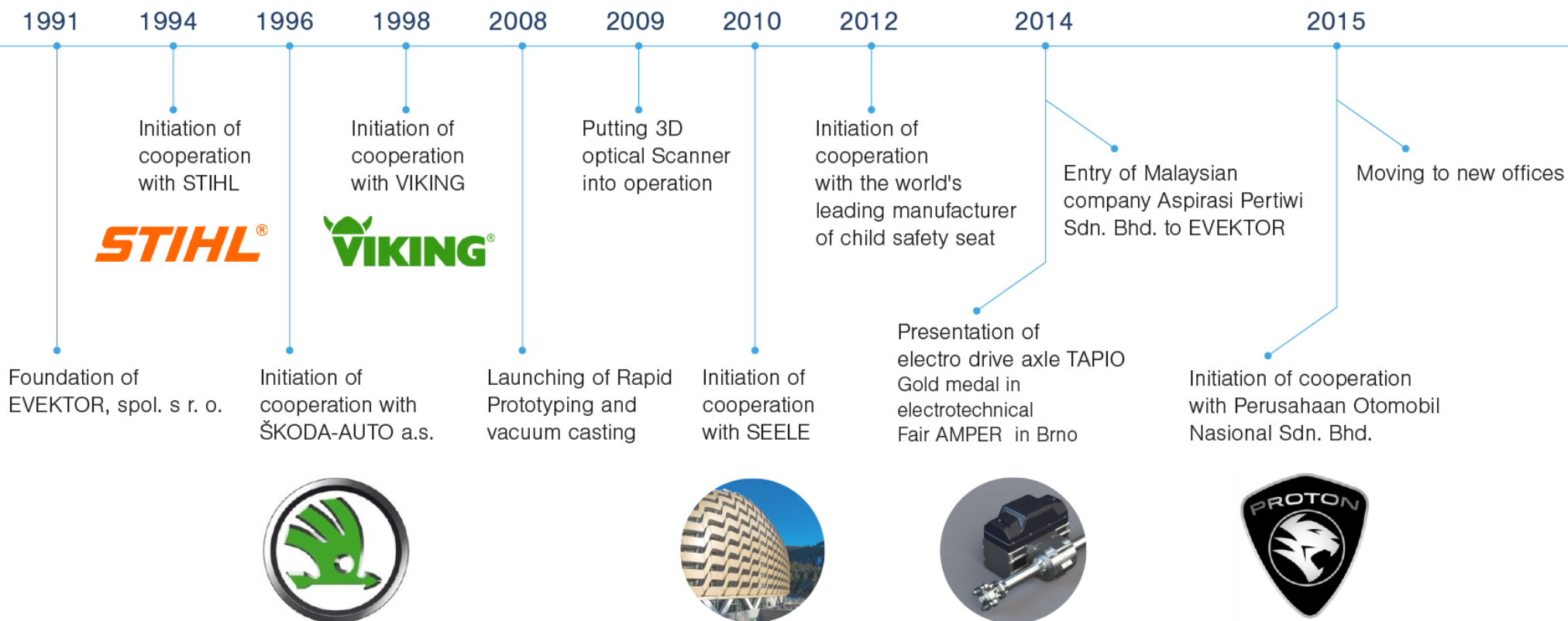


ENGINEERING SERVICES DIVISION

EVEKTOR, spol. s r.o.



Engineering Services Division milestones



Activities in Automotive industry

EVEKTOR, spol. s r.o.
Engineering Services Division



Activities in Automotive industry

Car bodies and interiors

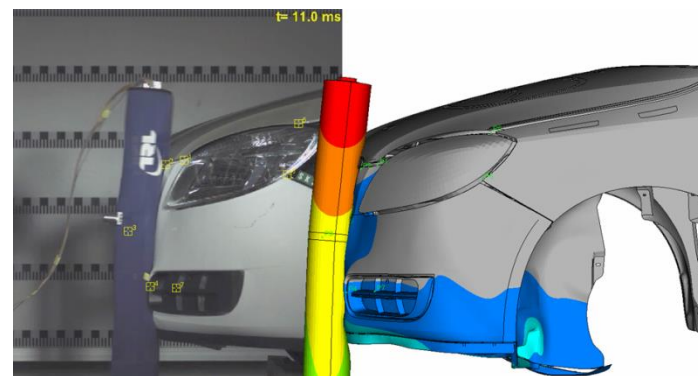
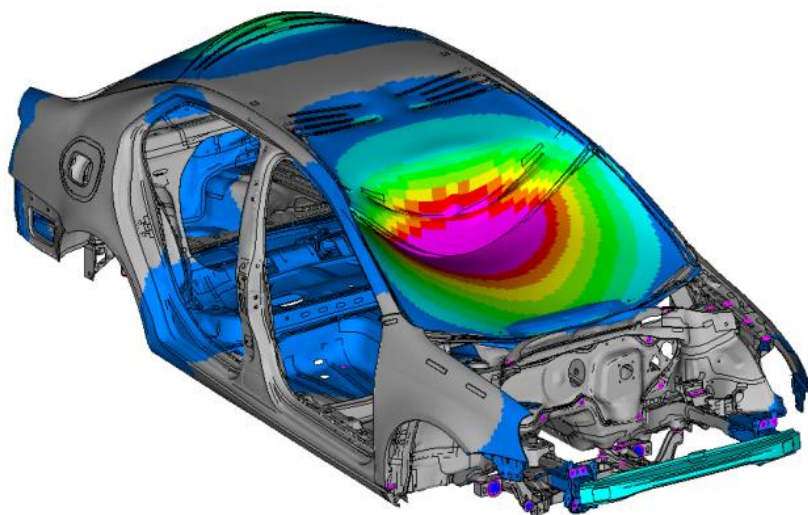
- Styling ideas
- C, B, A-class surfaces
- Bumpers
- Doors incl. kinematic analyses
- Side mirrors
- Interiors
- Dashboards
- Vents
- Baggage compartment
- Insulations



Activities in Automotive industry

Structure and Crash Analyses

- Static stiffness
- Optimization analyses
- Global dynamic stiffness
- Noise and Vibration analyses
- Simulations of crash tests (longitudinal impact, protection of pedestrians)
- Occupant safety

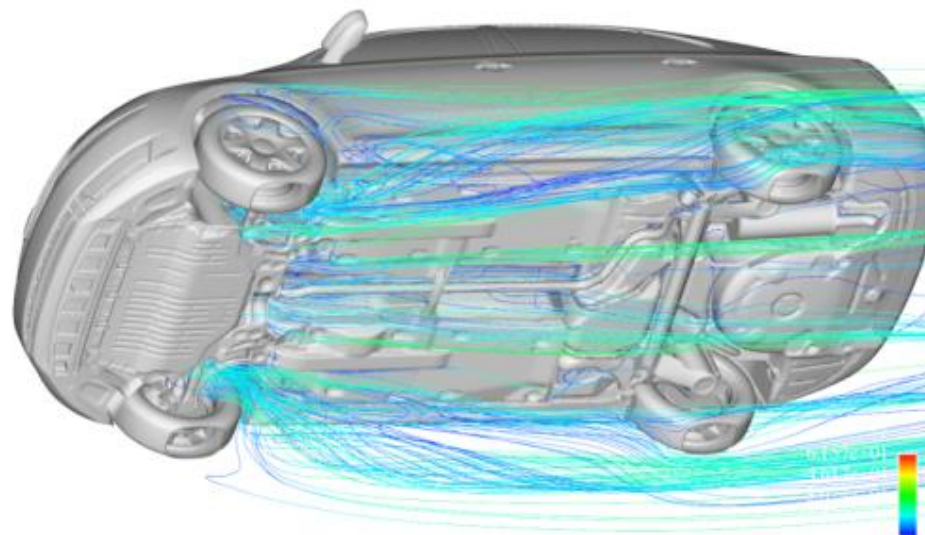
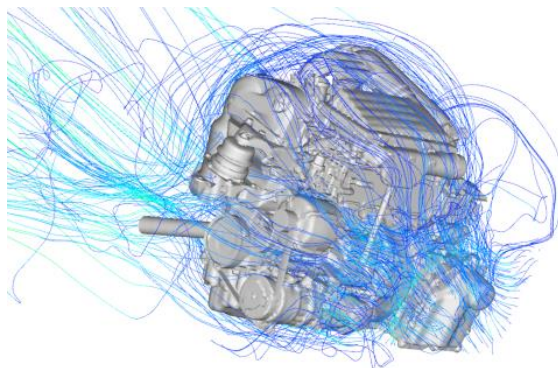


Activities in Automotive industry

CFD-Analyses

External and Internal flow

- CFD model preparation
- Calculations and optimizations using FLUENT and OpenFoam softwares
- Simulation and analyses of:
 - External and Internal flow
 - Climate comfort, Defrost/Defog
 - Flow in the engine compartment



Activities for car manufacturer PROTON (Malaysia)

Facelift PROTON PREVÉ – main modified parts

- Front bumper with grill, rear bumper with tailgate
- Styling of lights – front, fog and rear
- Interior – centre console, door trim, baggage compartment, etc.
- FEM and CFD validations
- Mock-up



Original PROTON PREVÉ



Other activities

EVEKTOR, spol. s r.o.
Engineering Services Division



Activities in Consumer industry

Development and design

- Small equipment and machines
- Topics: emissions, safety, vibrations, ergonomics
- Emissions, safety, vibrations, ergonomics
- Small combustions engines and electric motors
- Mechanisms
- Parts from plastics and light metals
- Fuel systems
- Research projects
 - Reduction of noise and vibrations
 - Drive axles for small vehicles
 - Small vehicles for municipal enterprises
- Measuring and test benches (incl. production)



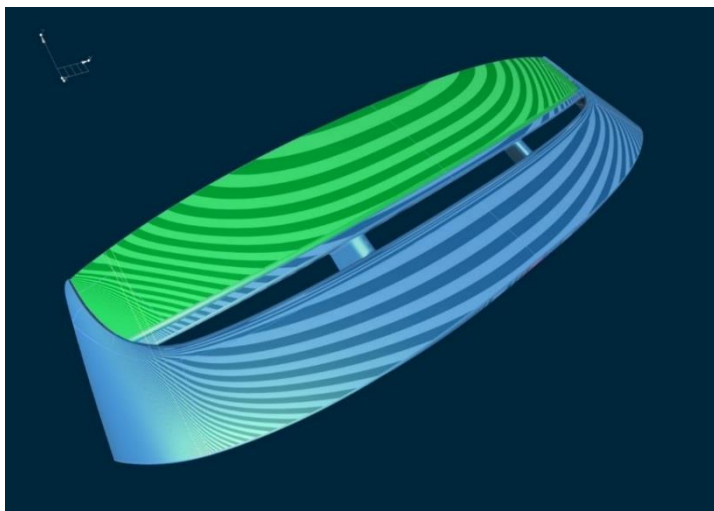
Activities in Building industry

- Design of special building structures from steel
- Design of building structures from light metals
- Programming in Rhinoceros for automatic generation of building geometry
- Automatic production of 3D-Models, production data and 2D-drawings



Styling studio

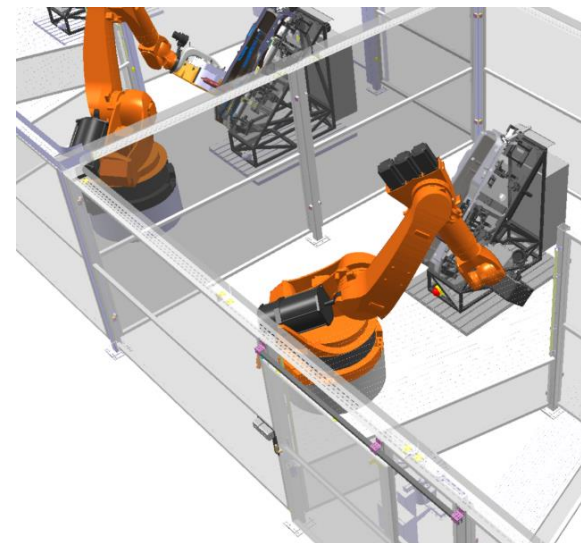
- Design concepts of interiors for airplanes and cars
- Design concepts of consumer industry products
- Ergonomic studies
- Visualizations and animations
- Production of digital and real models
- C, B, A-Class Surfaces



Digital factory

Industrial robotized workplaces

- Complex solution (selection of the right type of robot, electrode holders, electrode grinder, etc.)
- Design of new robotized workplaces
- Modernisation of old robotized workplaces
- Design of jigs, safety fencing equipment with safety features
- Coordination and implementation of robotized workplaces



Rapid Prototyping – 3D printing, Vacuum Casting, 3D scanning

3D printing:

FDM Method

size 914 x 610 x 914 mm

Polyjet Method

size 490 x 390 x 200 mm

Vacuum casting:

Working area: 850 x 850 x 800 mm

Working area (expansion module):
850 x 700 x 1800 mm

Max. volume: 5 l

3D scanning:

Minimum size of the part: 20 mm

Accuracy: 0.025 mm



- Vero family of opaque materials



- VeroClear



- Tango family rubber-like flexible materials



- Digital ABS
Rubber-like materials

References



Adam OPEL AG, Germany • ANDREAS STIHL AG & Co. KG, Germany • AUDI – Sparte Werkzeugbau, Germany
 BMW Group, Germany • Cybex Austria • Daimler AG, Germany • Lotus Cars, United Kingdom
 Perusahaan Otomobil Nasional Sdn. Bhd., Malaysia • Seele Pilsen, Czech Republic
 Škoda Auto a.s., Czech Republic • Varroc Lighting Systems, s.r.o., Czech Republic • VIKING GmbH, Austria
 Volvo Group, Sweden • VW Werkzeugbau, Wolfsburg, Germany • WEBASTO GmbH, Austria
 Zetor a.s., Czech Republic

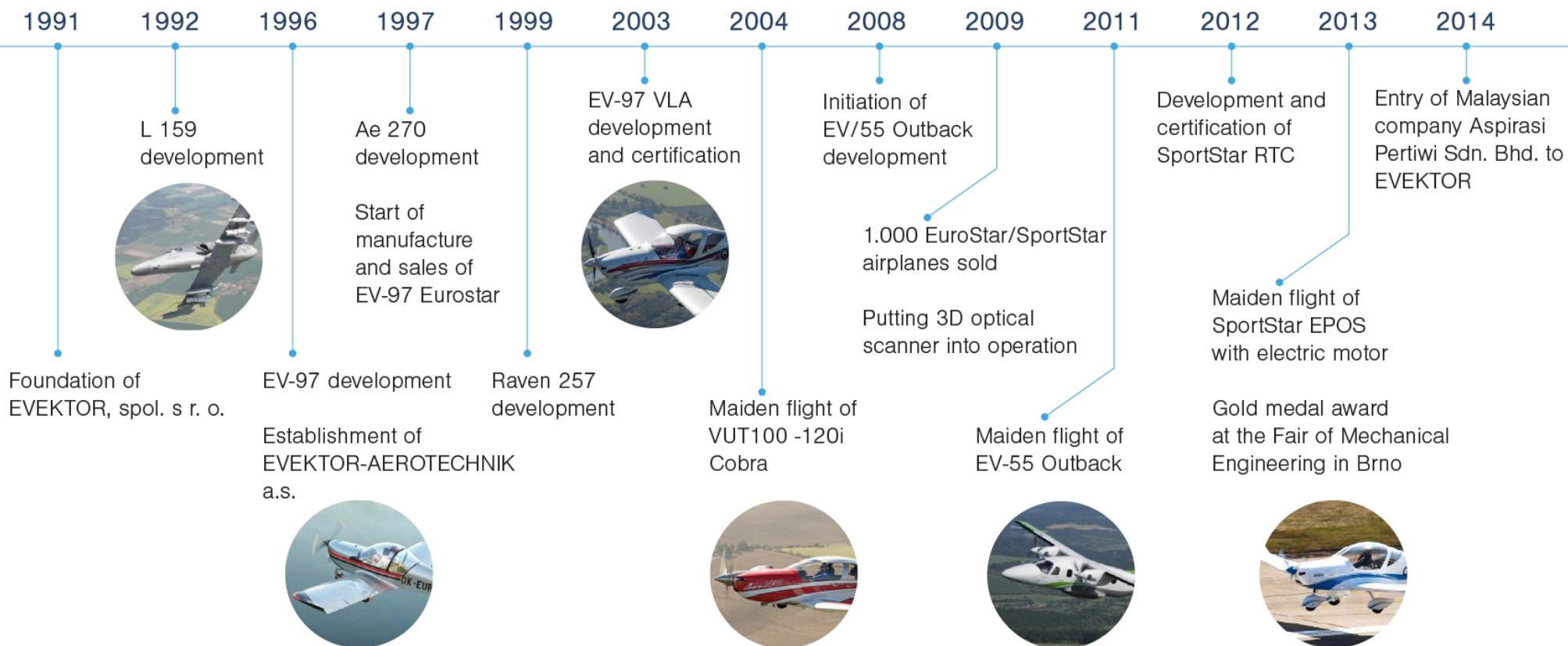
AIRCRAFT DIVISION

EVEKTOR, spol. s r.o.

EVEKTOR-AEROTECHNIK, a.s.



Aircraft Division milestones



Activities in Aircraft industry

Development and design

- Activities in accordance with JAR/FAR-23 and JAR VLA regulations
- Airframes
- Interiors
- Doors
- Aircraft systems and mechanisms
- Parts from plastics
- Composite elements
- Jigs and tools (assembling and welding)



Activities in Aircraft industry

Construction and tests of aircraft

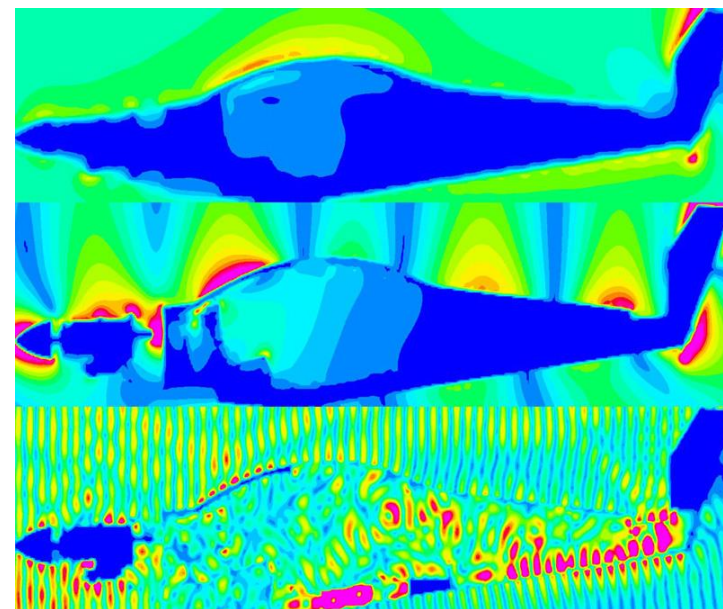
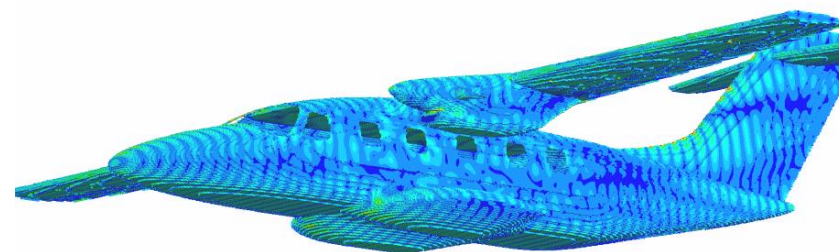
- Prototype production
- Series production & maintenance
- Flight tests



Activities in Aircraft industry

EMC-Analyses

- Behaviour of electromagnetic fields
- Interactions among individual systems
- Routing of cable harnesses
- Layout of antennas
- PCB and cable harnesses
- Influence of external radiation fields
- Influence of indirect effects of lightning



Cooperations in Aircraft industry

Exteriors

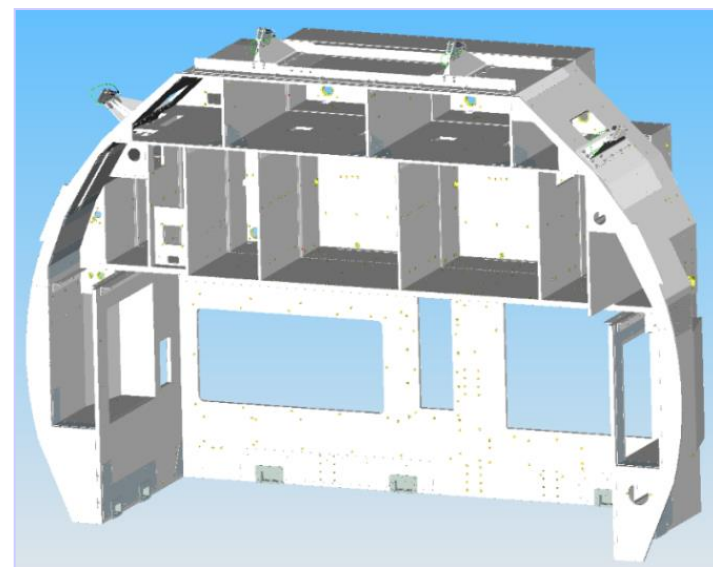
- B 747-8 – cooperation with Spanish company Aernnova – fuselage design
- A350 XWB – cooperation with German company GDC – strength analysis of longitudinal spar



Cooperations in Aircraft industry

Interiors

- For all Airbus airplanes since 2012 (development and production)
- Sandwich-structures
- Cooperation with ZODIAC AEROSPACE Group and Aircraft Industries



References



Aernnova, Spain • Aero Vodochody, Czech Republic • Aircraft Industries, a. s., Czech Republic
 E.I.S. Aircraft GmbH, Germany • IBIS AEROSPACE Ltd., Taiwan • Marshall Aerospace, Great Britain
 SOCATA, France • Sokol, Russia • Vulcan Air S.p.A., Italy • WALTER a.s., Czech Republic
 Wolfsberg Aircraft NV, Belgium • Zodiac Galleys Europe s.r.o., Czech Republic



Used software

Design

- CATIA V5
- PRO/ENGINEER / CREO
- SOLIDWORKS
- ICEM SURF
- ALIAS
- MECHANICAL DESKTOP
- ANSYS / DESIGNSPACE
- RHINOCEROS
- RUPLAN/KABI
- MODO
- VRED
- MAYA

Analyses

- MSC/NASTRAN
- ANSYS
- MSC/MARC
- PAM-CRASH
- MSC/PATRAN
- ANSA
- FEMAP
- ANIMATOR
- SAVLE
- MATHLAB, MATHCAD
- CETOL
- MITCALC
- GID
- CST STUDIO SUITE
- CONCEPT II
- CRIPTE, POWERBALANCE
- MINISTATIK
- FORTRAN
- OPEN FOAM
- ENSIGHT
- GENERATOR

Other Software

CNC-Programming

- CATIA
- VERICUT
- AUTOFORM
- MAGICS RP

PLM-System

- SMARTEAM V5R18

Documentation

- 3D VIA COMPOSER

Digital factory

- TECNOMATIX





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