

AEROBASE

We simulate reality

Physics-based material models and simulation software for the automotive, aerospace and manufacturing industries

COMPANY INTRODUCTION · LULEÅ & TROLLHÄTTAN, SWEDEN · AEROBASE.SE

Who we are

A spin-off from Luleå University of Technology, founded 2020

2020

founded

75+

years combined experience

10

commercial customers

7

Horizon Europe projects

THE TEAM



Bijish Babu, Ph.D.

CEO. Welding, additive manufacturing, forming, rolling



Daniel Berglund, Ph.D.

CTO. Metals & composites: forming, crash, welding



Henrik Tersing, Ph.D.

Forming, crash, welding, heat treatment, AM



Lakshmi Narasimhan, M.Sc.

Material modelling, composites



Midhun Xavier, Ph.D.

Agentic AI frameworks, LLMs tool integration



Erik Berglund, M.Sc.

Research engineer. Material modeling & simulation

Two sites: Kronan H4, Luleå · Innovatum, Trollhättan

What Aerobase does

In one slide

Aerobase turns laboratory material tests into validated simulation models that predict how advanced materials behave during manufacturing and in a crash. Engineering teams use our models inside the tools they already run – LS-DYNA, Radioss, PAM-CRASH and Abaqus – to design lighter, safer parts with fewer physical prototypes.

01

Know the material

We characterise and model advanced high strength steel, aluminium, composites and magnesium – including cast parts with local property variation and scatter.

02

Predict the part

Forming-to-crash on one materials backbone: the microstructure created during hot stamping flows straight into crash and durability models.

03

Make it usable

An AI agent lets engineers set up material models in plain language – faster setup, fewer hand-offs, solver-ready decks.

Solver-independent: the same material model runs in LS-DYNA, Radioss, PAM-CRASH and Abaqus.

Five products, one materials backbone

What each does and who uses it

01

SafeLight

Crash material models: predicts when and how materials fail, through post-buckling. Covers AHSS, aluminium (incl. HPDC castings) and composites.

For crash & CAE simulation teams

04

AeroCRAFT (preview)

Additive manufacturing process twin for WAAM, L-DED and L-PBF: melt pool, residual stress, distortion, with toolpath optimisation.

For AM research & pilot teams

02

Phases + AI agent

Microstructure evolution in hot and cold forming — grain size, phases, damage — feeding directly into performance models.

For forming & body-in-white engineers

05

Caliber

Testing-to-model service: test planning, experiments at partner labs, inverse calibration — delivering traceable model cards.

For materials engineering groups

03

AeroFEM Cloud

Tailored web interface with a full finite element code behind it. Runs in the cloud, generates reports automatically.

For teams without in-house CAE capacity

SafeLight – what it changes for you

Crash material models with quantified confidence

VALUE FOR CUSTOMERS

One model, all metals

One material model covers all metal components, instead of a separate card per material and per supplier.

Fewer physical tests

Reduces the need for component and large-scale structure testing before design sign-off.

Failure, not just stiffness

Predicts component performance up to failure, so critical areas are visible early in design.

Manufacturing carried through

Maps properties from forming, casting, welding, AM and heat treatment into the crash model.

WORKED EXAMPLE – HIGH PRESSURE DIE CAST ALUMINIUM

Cast aluminium varies far more in elongation than stamped sheet. Running the same component at the mean failure strain and at ± 3 standard deviations shows how much of that variation reaches the structure:

900 kN

peak force, high-quality material

850 kN

peak force at -3σ failure strain

6%

spread – design is robust

The model lets a designer evaluate risk of failure and set material tolerances in critical areas, rather than absorbing the uncertainty as extra weight.

Phases – one model across the process chain

From how the part was made to how it performs

The same material model runs through a chain of manufacturing steps and then into the functional analysis, carrying predicted properties, deformation and residual stresses with it. Small changes in chemical composition can be evaluated directly – useful when working with recycled material outside specification.

01

Forming

02

Welding

03

Additive manufacturing

04

Heat treatment

05

Crash & durability

Predicts temperature, microstructure, residual stresses and distortion – then feeds the result into performance analysis.

TRY IT BEFORE WE MEET

<https://phases.aerobase.se/>

Give the AI agent a chemical composition and it will calculate phase fractions, CCT and TTT diagrams and stress-strain curves – and write a ready input file for LS-DYNA, Abaqus or Calculix.

Where it is used today

- Hot stamping and press hardening of UHSS
- Welding, cladding and repair of large components
- Additive manufacturing build simulation
- Recycled steel with composition outside spec

Who we work with

Commercial customers and European research partners

COMMERCIAL CUSTOMERS – SWEDEN, UNITED STATES, BRAZIL



SEVEN HORIZON EUROPE PROJECTS – 2022 TO 2029



Partners Volvo Cars, Stellantis, Gestamp, GKN Aerospace, voestalpine, Tata Steel and Electrolux, alongside Fraunhofer, SINTEF, RISE, Eurecat and Luleå University of Technology.

Where we could help

And how to reach us



Battery enclosures & pack structures

Crash performance of enclosures in aluminium, AHSS and mixed materials, including cast and stamped parts.



Hot-stamped body structures

Microstructure from press hardening carried through into crash and durability prediction.



Structural castings

Gigacast aluminium and magnesium, where local property variation and porosity govern failure.

A first meeting is usually 30 minutes: you describe a part and a material problem, and we show whether our models already cover it.

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