ACP OpDesign revolutionizes the product design and development process through a holistic, process driven method. It orchestrates the phases of product development, evaluating multiple design concepts, under multi disciplinary loads, based on topology, and parametric geometry, grade, gades (3G) optimization. ACP OpDesign is based on BETA CAE Systems' software products: the SPDRM and the ANSA/EPILYSIS/META suite. Capturing ETA's Accelerated Concept to Product (ACP) process, it delivers a streamlined optimization-led design path. With the ACP OpDesign you can: create new products from concept, optimize existing designs, evaluate numerous design concepts under multiple load conditions, optimize shape material, thickness, and consider manufacturability alternatives.

Optimization driven product development creates new challenges

The recent upsurge of optimization driven product development has created new needs and issues to be solved:

- Models need to be evaluated under multiple loads for numerous disciplines in order to develop optimum solutions in terms of mass and cost reduction without jeopardizing, if not improving, performance.
- Process definition and data handling have become an obstacle that consumes considerable amount of time and resources and thus needs to be streamlined.
- The use of Topology Optimization during the recent years, although it offered considerable benefits, especially in the early stages of the product development, it further increased data handling and resources needs.
- There is not an effective "umbrella" to combine in a streamlined process and in one database, Topology and Parametric Optimization along with manufacturing alternatives.

To address those issues ETA and BETA CAE Systems deliver the ACP OpDesign. Exploiting the ACP process and the software of BETA CAE Systems –the SPDRM process management software and the ANSA/EPILYSIS/META suite- the ACP OpDesign reveals the path to optimized products.

The ACP process

The Accelerated Concept to Product process is a performance driven, holistic product design development method based on optimization. It orchestrates the phases of product development, evaluating multiple design concepts under multi disciplinary loads, based on topology, and geometry, grade, gauge, gades (3G) optimization. It acts as an optimization suite or led by design optimization, provides the tools to design products from concept.

The process is arranged in three phases. The Concept, the Low Fidelity 3G, and the Decoupling & High Fidelity 3G (see Figure 1). You can either apply the process starting from Concept or seperately using legacy designs to optimise.

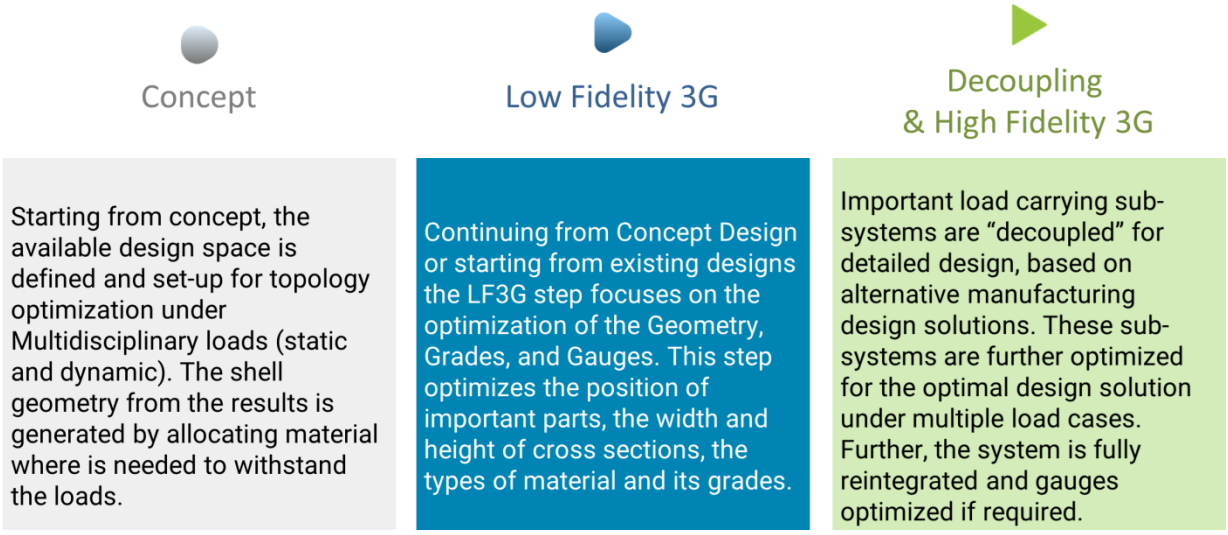


Figure 1: ACP process phases

Each of the phase consists of certain sub tasks (see Figure 2).

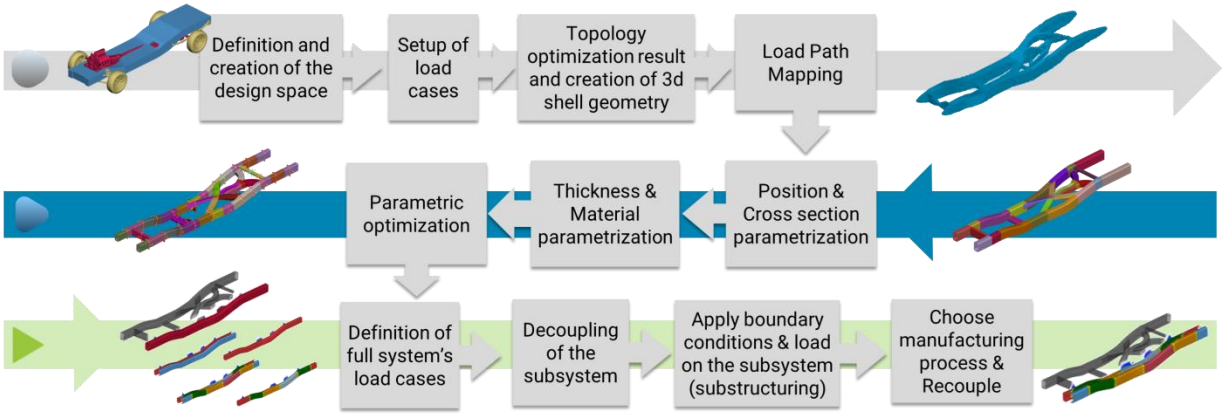


Figure 2: The ACP process

The ACP Process is realized through ETA's and BETA CAE Systems' new product, the ACP OpDesign.

The ACP OpDesign architecture

The ACP OpDesign is a client developed to band with the advanced management software SPDRM and the ANSA/EPILYSIS/META suite, both products of BETA CAE Systems. Mapping ETA's ACP Process, it cooperates with all mainstream optimizers and solvers to complete even the most demanding optimization task. The architecture that makes this process possible is shown in Figure 3.

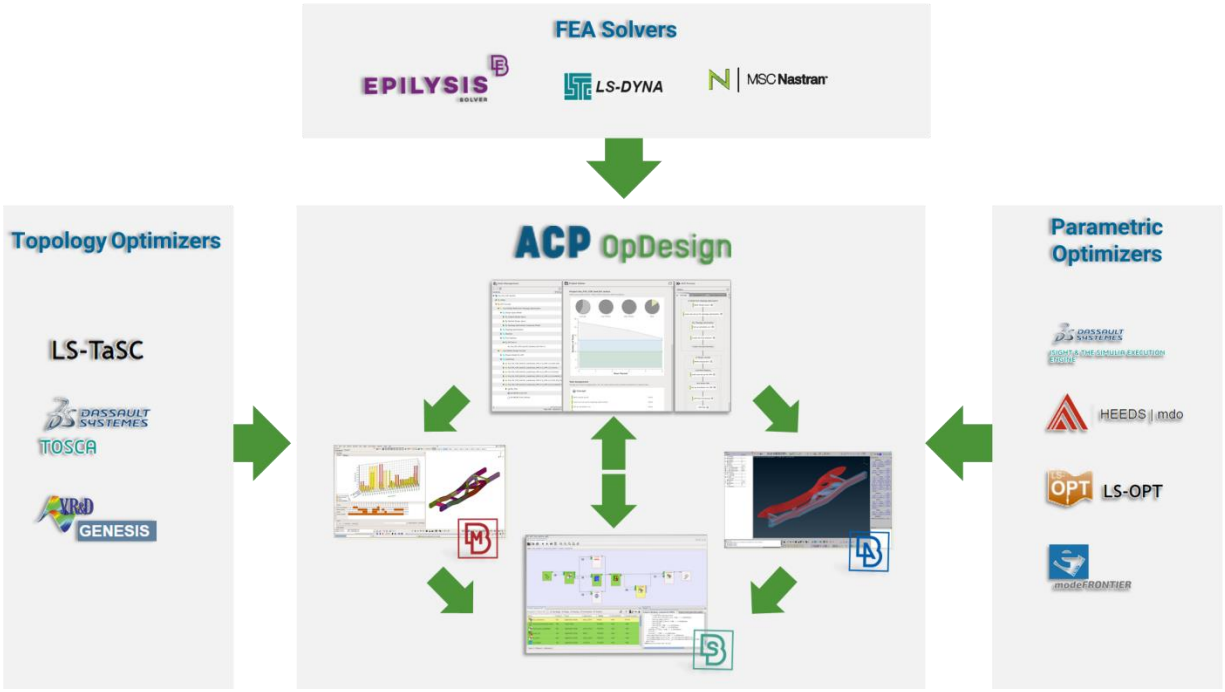


Figure 3: ACP Process architecture

The ACP OpDesign: The Optimal Design Gateway

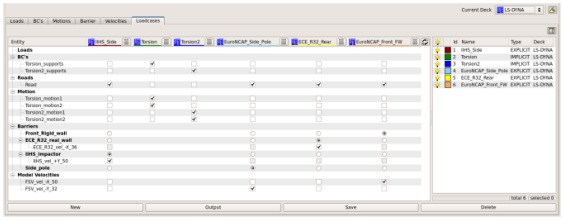
With an intuitive user interface, the ACP OpDesign helps you move forward in your optimization processes having a clear image of the required tasks to be performed in each phase of the ACP process. The data management capabilities incorporated in the ACP Opdesign makes sure that you will work with your data effortlesly. All required tasks and modelling processes can be either completed within ACP OpDesign or by calling the required tool from within the software. (See figure 3: ACP Opdesign GUI design)

Figure 4: ACP OpDesign GUI design

Dedicated tools highlights.

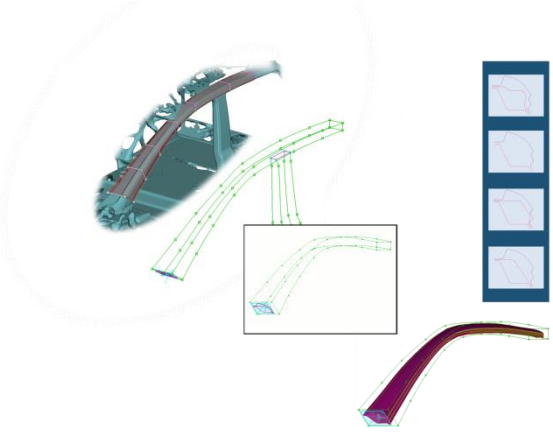
In addition to the industry proven pre existing tools, used to realize the ACP process, the ACP OpDesign features a list of tools designed and developed in the context of actual optimization projects. Such tools include:

The Load Case Manager:



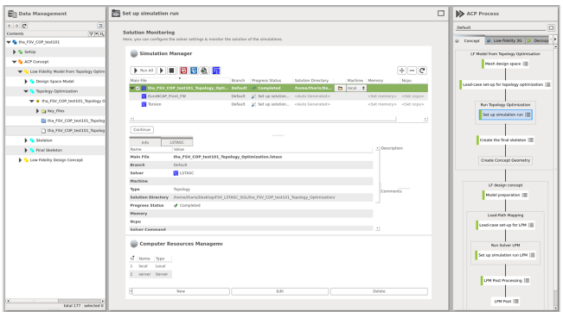
The load case manager lets you create Static (NASTRAN, LS-DYNA Implicit), or Crash Load Cases (LS-DYNA Explicit) which will be used during the process. Loads, BCs, Barriers, Velocities can be defined within the tool with the aid of ANSA.

"Skinning":



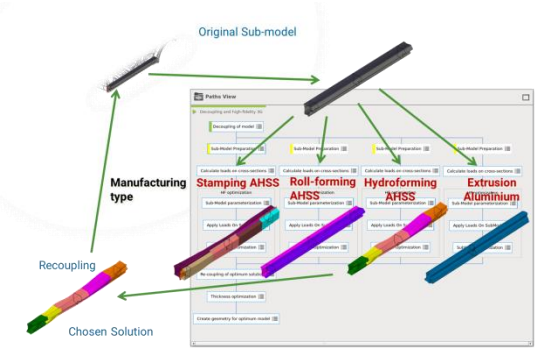
With Skinning, you can easilly create the geometry of the final skeleton from topology optimization results during the Concept phase . It offers an easy and fast way not only to create the geometry based on the selected cross section, but also to automatically treat the connected geometries.

The Simulation Manager:



The Simulation manager lets you monitor your job's status. Through this tool you can modify significant solution parameters, such as, memory, CPU number, and which Machine. It offers a tool with all actions related to simulation. The simulation jobs that have to be submitted during the process are prepared in the LC Manager and fed automatically to the Simulation Manager.

"Substructuring" and Manufacturability:



With the aid of dedicated tools you can "decouple" important load-carrying subsystems easilly to further optimize their design. Taking under consideration also the manufacturing alternatives the best solution is then "recoupled" into the original system.

Why the ACP OpDesign

ACP OpDesign, is an intuitive and process guided optimization desktop environment. With its optimization oriented and highly specialized user interface, based on the process depicted as a diagram in the tool, it offers to the user the capability to take advantage of an efficient, direct interaction to:

- ANSA's powerful morphing and parametrization functionality,
- Custom designed META Post-processor tools,
- Topology and parametric optimization Software,
- FEA solvers

Additionally, the ACP OpDesign features a list of additional tools designed and developed in the context of actual optimization projects.

All these are offered in a straightforward and streamedline process in a friendly user interface to boost productivity and achieve the expected results.

BETA is a simulation solutions provider, dedicated to the development of state of the art software systems for CAE. For almost 30 years, we have been developing tools and delivering services for the front runners of numerous sectors by listening to their needs and taking up even the most demanding challenges.

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ETA has long been an Innovation Leader in the development of cutting-edge product development techniques and software. ETA offers expertise in all aspects of structural analysis and has been a leader in implementing optimization into the product development process for a variety of structural products.

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