



Stratoconception®

Original patented process

Rapid Prototyping, Rapid Tooling and Rapid Manufacturing

CIRTES
research & development

The origins of the research works

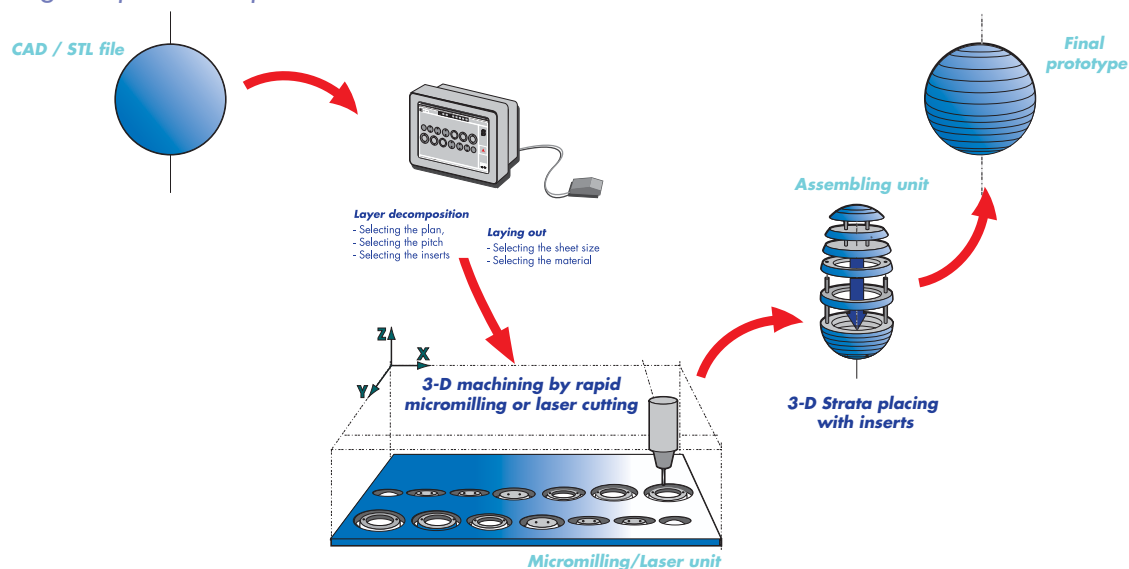
The research team supervised by Prof. Claude Barlier is working since the end of the 80's on finalising Stratoconception® process, which is being protected by relevant trademarks and international patents. Stratoconception® is a rapid prototyping process that allows to manufacture, layer by layer, an object designed by CAD, without any lag in the design / manufacturing workflow.

This process consists of breaking the part down, by computing, into a set of straightforward elementary layers called "stratum", in which stiffeners and strengthening plugs are inserted. Each strata are identified and then directly manufactured by rapid milling, laser cutting, hot wire cutting or all other cutting technologies from all kind of sheet material. These elementary parts are then fitted together with inserts, bridges or jointing features in order to rebuild the final part. The assembly of the strata is considered from the design step to help withstand the mechanical constraints during use. The plugs then work both as location rods and links between layers. In the case of thin walled parts, these plugs are placed outside the parts using sectile bridges.

The process is rapid and has no limitation either on shapes, materials or size. It allows the manufacture of solid parts, parts with undercutting (which cannot be manufactured in conventional 3D machining), or hollow parts. It can be used for new mechanical parts, as well as for mock-ups, models and toolings...

Since the origin of the process, the CIRTES team is works at its development. 19 patents and 8 trademarks have been deposed to the international since today. Numerous papers have also been published.

The original patented process



Stratoconception® - process-patent and trademarks C. Barlier, CIRTES - Saint-Dié-des-Vosges - France

The development of the software for the Stratoconception® process is fully mastered and made by the CIRTES, the owner of the source code. It has enabled the development of several products and several job integrations:

Stratoconcept® PRO Industrial version	Stratoconcept® LT initiation version	Stratoconcept® VR Prototyping training in high schools	Stratoconcept® HW Large PS parts manufacturing
OrthoStrato® Orthopaedic sector	Stratoconcept® PMP Polystyrene lost model manufacturing	Strat'Emball® Packaging	Pack & Strat® Packaging

Stratoconception®, Stratoconcept®, Strat'®, Orthostrato®, VirtuREEL®, Strat'Emball®, Pack & Strat® are CIRTES registered trademarks.



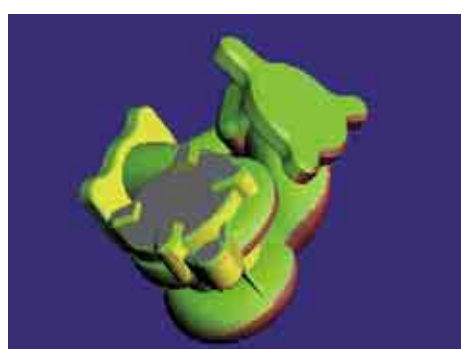
Stratoconcept®

THE SOFTWARE

Thanks to a simple and intuitive interface, the Stratoconcept® software uses the latest advancements of the Stratoconception® process. You can parameter (model, layers, strata, tool path, machine code) and access to every stage - from the STL model (rapid prototyping standard) to the machine code that drives the 3-D cutting. This structure enables to act at each stage to have a real « design » when making a prototype or a tool in Stratoconception®.

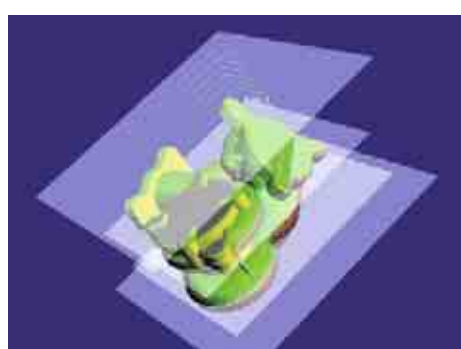
STL files Viewing and changing

- Model importation/exportation via the **STL** format and coherence check
- **Advanced viewing** (shading, wire mode, material aspect, ...)
- **STL model correction** (automatic or manual)
- **STL models change** : transformation, split, feature creation, ...
- Dimensional measurements



3D Slicing

- Automatic or manual choice of the **slicing axis**
- **Slicing planes placement** at the appropriate place
- Qualified Stratoconception® material choice in the **database** for defining the tool/material pair for strata machining



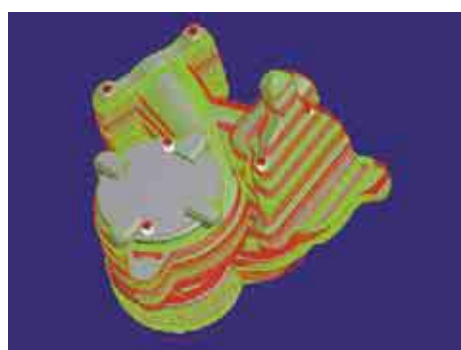
Assembling

- Positioning **inserts** placed by mouse for large parts
- **Bridges** for transparent or thin walled parts
- **Jointing features** for easy assembling



Stratification

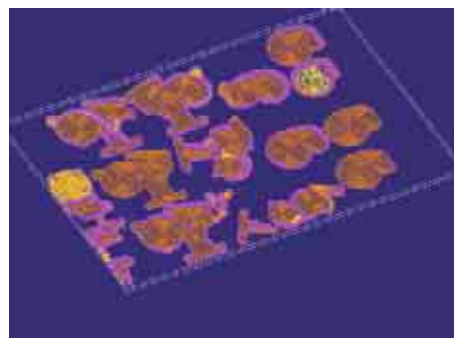
- Precision and speed control thanks to the **adaptive stratification**
- Complex parts manufacturing possibility thanks to the **turning-over** and the **recto/verso** machining



Material Freedom

Manufacturing

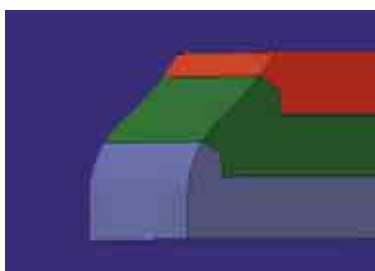
- **Tools and cutting parameters** choice using the database
- **Optimized laying out of** the strata for saving material
- Automatic generation of **the tool paths** recto and verso (cutting, face milling, inserts and plugs milling, rapid movement)
- Manufacturing report printing for the follow-up and the traceability of the prototype



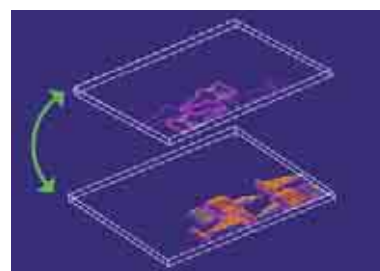
Major patented innovations



Assembling with bridges



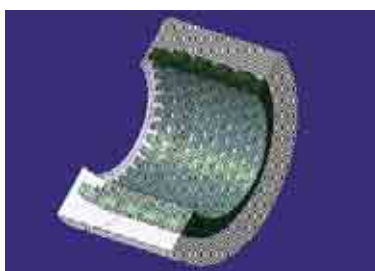
Assembling with imbrication



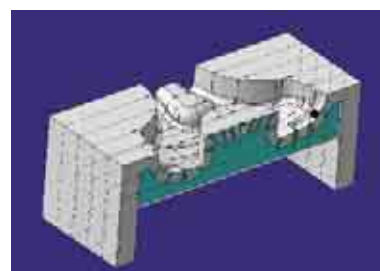
Recto/verso machining with turning over



Staking/interstrata finishing



Thermal cells



Interstrata venting system

References

French and foreign companies: PSA, STEELCASE, KOHLER France, DAUM, SAINT-GOBAIN PAM, STRAT'YM, CATOIRE SEMI, LIEBHERR, EAD AEROSPACE, PHILIPS, ZODIAC AEROSPACE, AIRBUS, ALCAN (Switzerland), PIONEER (Estonia), RIBERMOLDE Lda (Portugal), BRUNS (Netherlands), Fonderie ENCIVAL (Belgium), ROTO (Slovénia), TECH'IZ (South Korea), SAM KWANG STRATES (South Korea), BAZ (Russia)...

Technical trade school: ENSAM, ENIM, ESIEC, ESSTIN, ENSHMG, IFTS, CNRS CEMES, Ecole Supérieure d'Arts Plastiques (Monaco), Oundle School (England), Université d'Essen (Germany)...



An industrial reality

APPLICATIONS



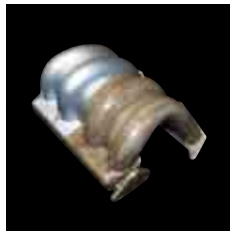
Case - Valeo



Work of art - André Bour
Sculptor



Vase PMMA - Baccarat



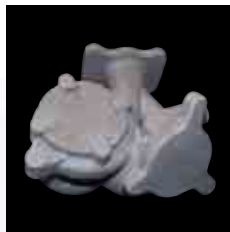
Automotive manifold - PSA



Valve body
Saint-Gobain PAM



Mock-up - PSA



Automotive turbocharger



"Magnum" Tiger - Daum



Plane seat
EAD AEROSPACE

Mock-ups and prototypes

for the activity sectors

Car industry
Aeronautics
Architecture
Building
Electric appliances
Packaging
Energy
Bottling
Glass industry
Medecine
Health industry
Furniture
Sculpture
Shoe manufacturing
(...)

Models and toolings

for the processes

Foundry
Plastic forming
Modeling
Forging
Stamping
Glass forming
Concrete forming
(...)



Hydroforming- Airbus



Plastic injection - Antiope



Contact moulding - PSV



Aluminium low pressure die
casting - CRAFT Fastool



Blow moulding
Vegetal & Mineral Water



Aluminium high pressure
die casting - CRAFT Molstra



Sand foundry
Saint-Gobain PAM



Polystyrene injection - PSA



Concrete moulding
Strat'YM

Prototyping Freedom

A wide range of products

A wide range of Stratoconception® products

CIRTES offers a wide range of products allowing the manufacturing of mock-up, prototypes, models and rapid toolings:



- Specific stations dedicated to the Stratoconception® process based on micro-milling or hot wire cutting machines or laser cutting machines,



- Specific equipments for the Stratoconception® process for the flanging of the plate and strata on the machine table, the assembling and finishing of the part...



- Integration of the Stratoconception® process on existing machines stocks,



- Services (hot-line, training...)



- Wide range of softwares based Stratoconception®,



- Specific developments dedicated to special job applications.

Cirtes, the French Centre of Rapid Product Development in Europe



The CIRTES, European Research Centre for Rapid Prototyping and Rapid Tooling, has been located in the heart of the industrial area of Saint-Dié-des-Vosges (France) since 1991. The CIRTES also has a sub-office in the South-West of France, in Carmaux.

The CIRTES offers a process research and technology platform equipped with the latest performant systems of: 3D scanning, CAD/CAM, 3D modeling, rapid prototyping, tooling and manufacturing processes, high speed machining and 3D control now available.

These means with the research and transfert team of the CIRTES are at the disposal of industrial companies for R&D contract on new process research and rapid product development.

Cirtes, Innovation by research & development

Research and Technology Organization (RTO, member of EARTO), the CIRTES aims at developing Research and Development projects around its two fields:

- Rapid Prototyping and Tooling with its patented and trademarked process Stratoconception®
- Machining monitoring with its patented and trademarked process Actarus®

Its contracts relate to various branches of industry. Among its current contracts, it is necessary to quote PSA and MECACHROME for the automotive branche, DAUM and BACCARAT for the crystal manufacture branche, SAINT-GOBAIN PAM for pipes manufacturing, AIRBUS and CEA DAM for aeronautics and arms, AREVA for the energy branch, ALCAN for aluminium parts and tools.

www.stratoconception.com

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