



3DEXPERIENCE[®]

CATIA Icem Design Experience

CATIA Design | Surface Refinement

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3DEXPERIENCE Conference for
Design, Modeling & Simulation
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CATIA Design

What's New | R2020x

Highlights

Creative Designers

CREATIVE DESIGN
from art to part



HUMAN EXPERIENCE - FOR ALL

New role Base for Design, Animation & VR

CREATIVE DESIGN - ENHANCEMENT

Imagine & Shape customer production requirements
Natural Sketch VR, UX improvements

xGENERATIVE DESIGN - MATURITY

Explore design patterns « inspired by nature »

Surface Designers

SURFACE REFINEMENT
Perfection in Surface Quality



ICEM DESIGN EXPERIENCE

Season 2 base on customer pilot requirements

REVERSE ENGINEERING

Workflow Acceleration

Decision makers

PRODUCT EXPERIENCE
To make the right decision



CATIA LIVE RENDERING AxF

Measured appearance Material xRite AxF

DSTELLAR LIVE RENDER

High Performance cluster Computing CPU&GPU

CATIA PRODUCT PERCEPTION EXPERIENCE

Presentation brainstorming capture & vote

IMMERSIVE EXPERIENCE

Seat bulk alignment & Human avatar

Surface refinement | Continuity & Innovation

Continue to deliver the **Best-in-Class “explicit” Class-A Solution** with ICEM know-how

Provide innovative Surface modeling solution & methodology to **unify explicit & associativity**

ICEM Surf

The art of surface modeling



Best in class explicit workflow

Pure Explicit Modeling

ICEM Design eXperience

Innovative modeling User Experience



New User Experience

Direct modeling

Soft Parametric

Surf & Curve based

CATIA Icem

Empowered Surface modeling



Capture & re-use

Parallel Commands

Associativity & Explicit

Integrated workflow

From explicit to Associative & integrated Class-A modeling

ICEM Design Experience

The New Generation of Surface Modeling for CAS & Class-A



New User Experience

Direct modeling

Soft Parametric

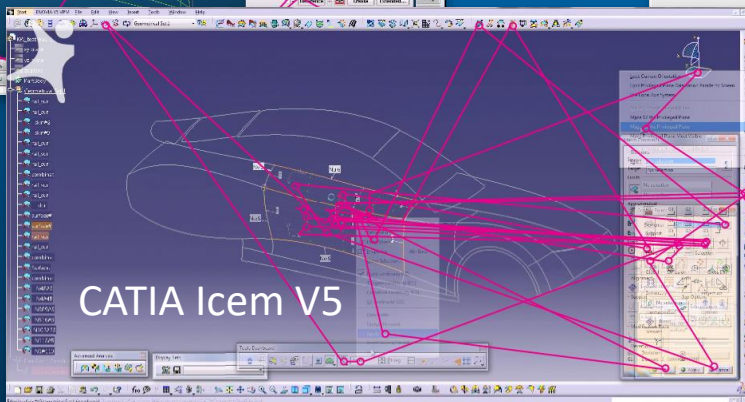
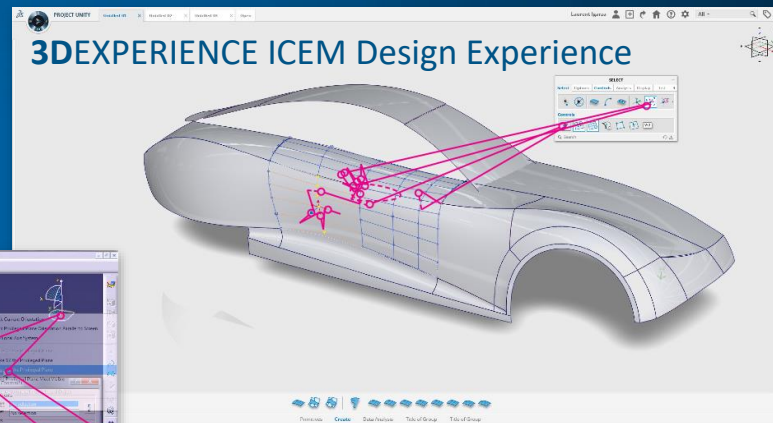
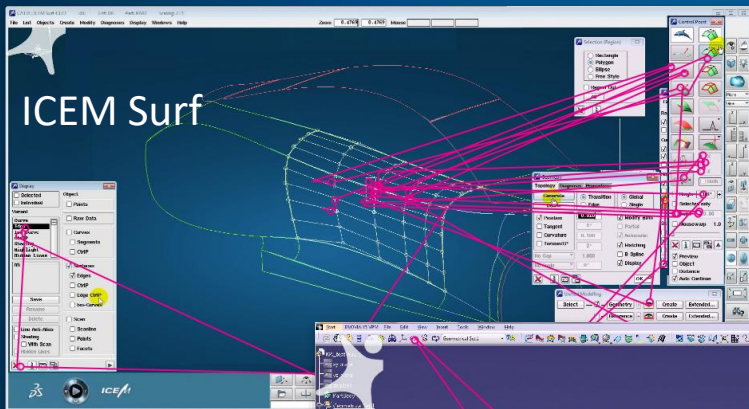
Surf & Curve based



ICEM Design Experience

The new generation of surface modeling for CAS & Class-A

The innovative User Experience
A New Level of Productivity, Innovation and Collaboration





ICEM Design Experience

The new generation of surface modeling for CAS & Class-A

A New Level of Productivity, Innovation and Collaboration

CAS Surface Modeling – Class-A Surface Modeling

Display Mo Organize Sculpt

Geometry Display

- [Icon]
- [Icon]

Visibility

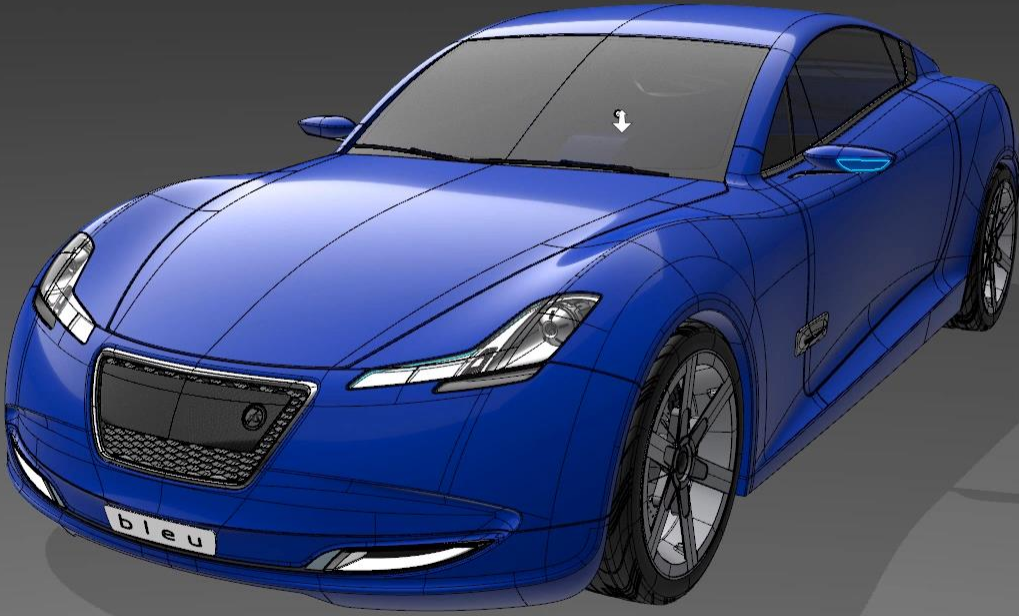
- [Icon]
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Visualize

- [Icon]
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Analyze

A user experience for surface modeler



Standard ClassA View AR-VR Tools Touch

[Toolbar icons: Cut, Copy, Paste, Undo, Redo, Rotate, Move, Scale, etc.]



ICEM Design Experience

The new generation of surface modeling for CAS & Class-A

A New Level of Productivity, Innovation and Collaboration



CATIA

bezier & nurbs maths
feature based geometry + solver
direct or parametric modeling
template parts



ICEM Surf

bezier maths
explicit geometry + solver
direct modeling



MORPHING

nurbs maths
explicit and features geometry
deformers modeling

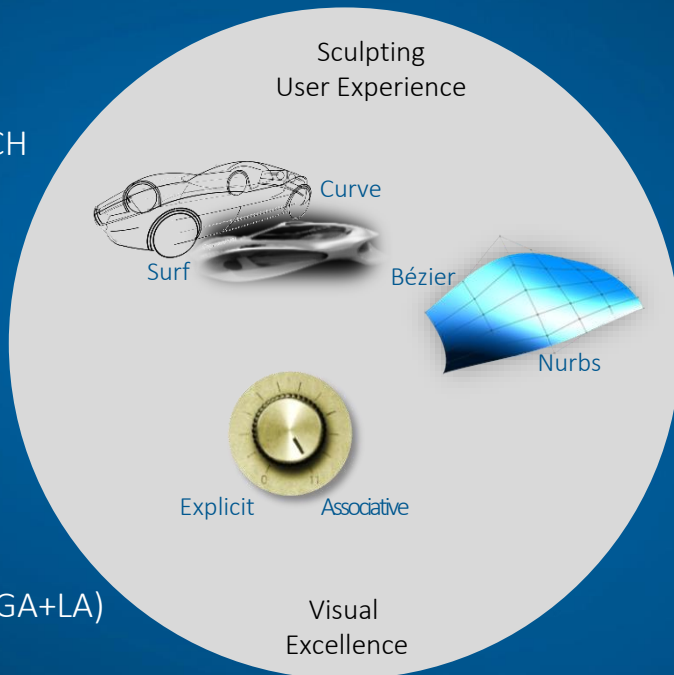


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The new generation of surface modeling for CAS & Class-A

A New Level of Productivity, Innovation and Collaboration

MODELING APPROACH



Sculpting
User Experience

Curve

Surf

Bézier

Nurbs

Explicit

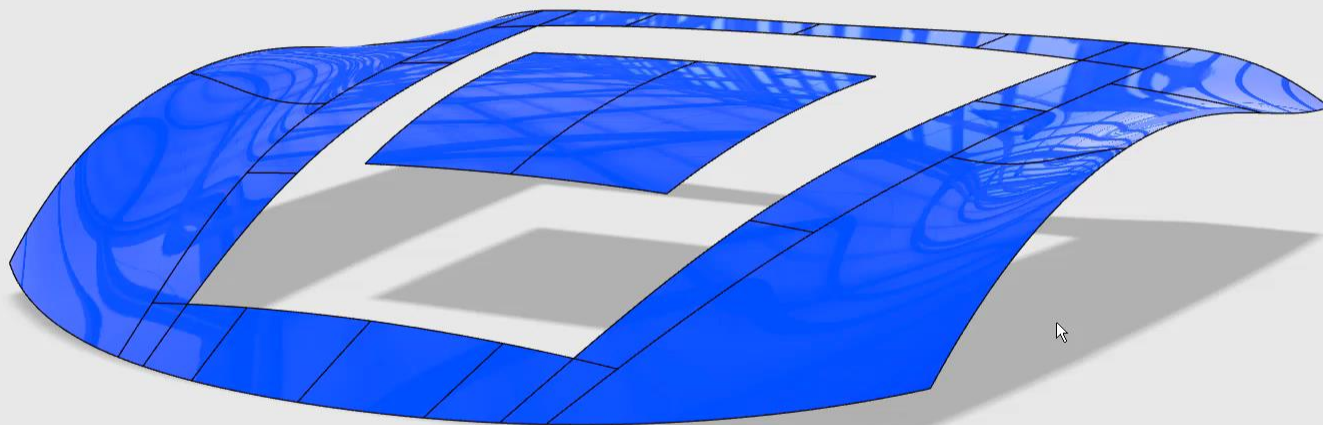
Associative

SURFACE CONTROL

SOFT PARAMETRIC (GA+LA)

Visual
Excellence

Surface 'Sculpting' Modeling UX



Sculpt | Display Modes | Organize

Select

Transform

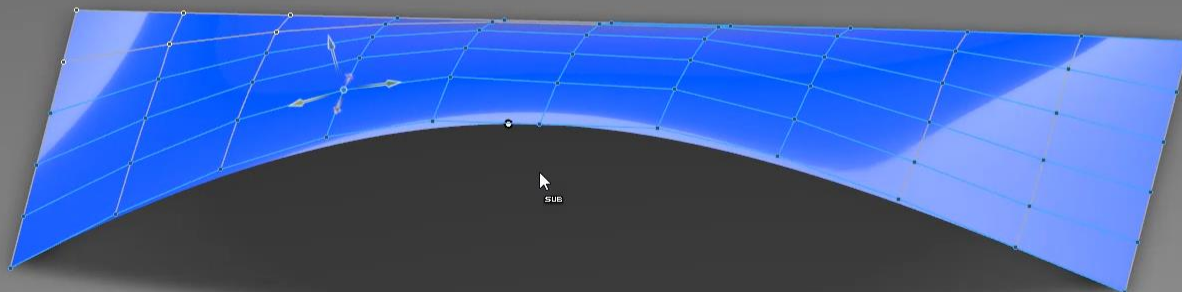
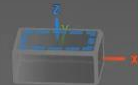
More

Controls

Laws

More

INNOVATIVE SCULPTING UX



Sculpt | Display Modes | Organize | Analyze

Select

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Transform

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Controls

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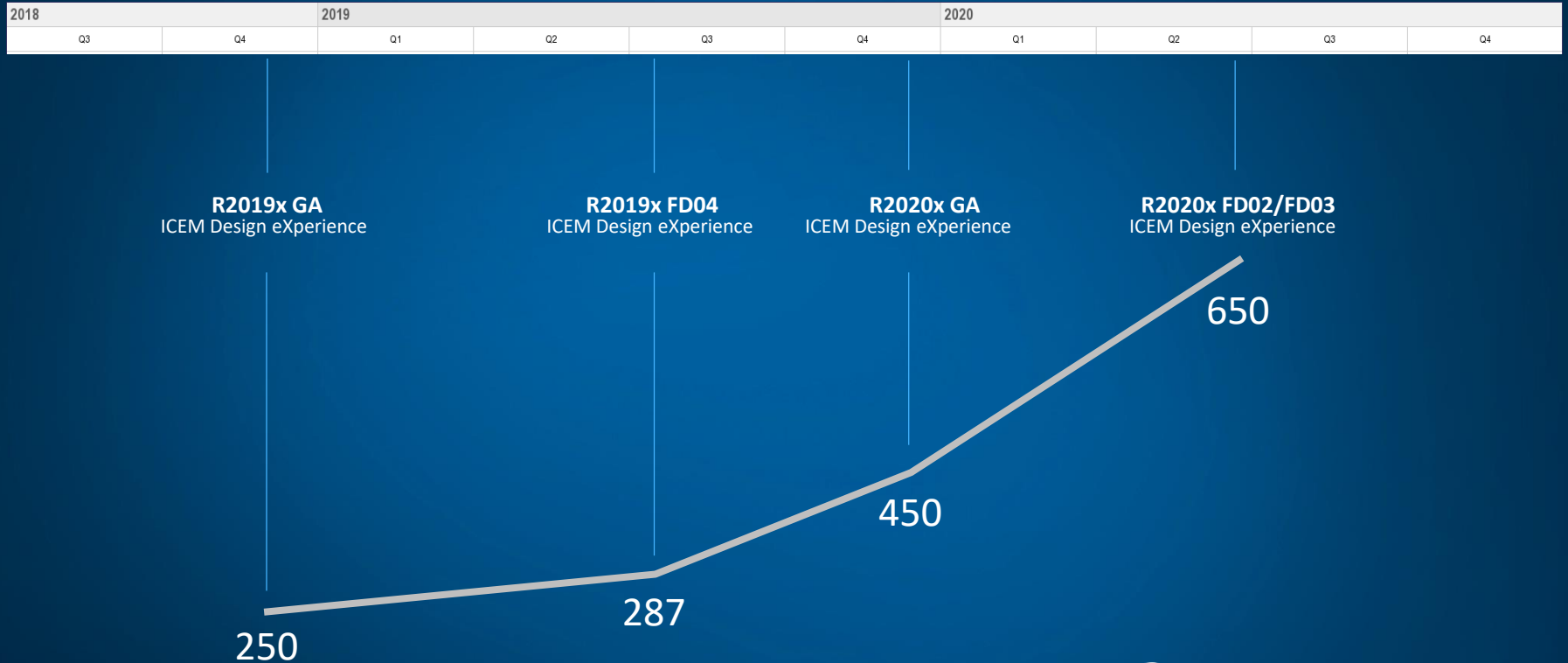
Laws

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More

ICEM Design Experience

Recent Availabilities (cumulative new deliveries)



ICEM Design Experience

The New Generation of Surface Modeling for CAS & Class-A

What's new in R2019x**FD01**

- ▶ **Analyze – Curvature**
Logarithmic radius display of curvature analysis
- ▶ **OmniCut - Planes**
Support for cutting geometry elements by standard CATIA planes
- ▶ **CATIA Compass & OmniPlane Alignment**
Support for non-IDX commands
- ▶ **Omni-Plane – Mouse Menu**
Improved Omni-Plane creation workflow & Orientation
- ▶ **Organize**
Improved management of Multiple Display lists
- ▶ **Omni-Surf – Flow Control - Extrapolation**
Extrapolation options (Both / Start / End / Off) for curves on support in Blend, 'T', 'H' & 'X' cases
Extrapolation options for flange on surface curve, and for 2-parallel curves (blend)
- ▶ **Presets – Duplicate identification**
Duplicate new variant checks on creation
- ▶ **Sculpt - Mouse Warp**
Mouse warp value is displayed in 3D
Improved slider display
- ▶ **Selection**
Selection of individual analysis are now supported in the selection table
Selection of 3D curve overlapping with boundary edge are now supported in the selection table

ICEM Design Experience

The New Generation of Surface Modeling for CAS & Class-A

What's new in R2019xFD02

- ▶ **OmniSurf – Single Patch**
Improved algorithm now produces only a single patch result
- ▶ **OmniSurf – Multi-Blend**
Improved control mesh quality through OmniSurf Type Multi-blend surface (N Parallel)
- ▶ **OmniMatch**
Improved automatic detection of curve matching situations (interior/endpoints)
New slider to slide the matching point along the master in a T config
- ▶ **OmniPlane**
New selector panel to aid the user in defining different methods to create a plane
Improved plane visualization options
- ▶ **Selection**
Position selection by “Intersect”
Multiple selection of filtered objects
- ▶ **OmniCut**
Simplification of Cut results
- ▶ **Analysis**
GSD Planes are now selectable for Analysis input when defining a Plane

ICEM Design Experience

The New Generation of Surface Modeling for CAS & Class-A

What's new in R2020x GA

CONTINUITY

Matching:

Sliding along master in T case of curve matching, with persistent condition
Improved automatic detection of curve matching situations (interior/endpts)
Smart detection of probable and possible curve matching intent

ORGANIZE

Buttons to create from the selection a new frame, display list, or selection set
Display List:
Keyboard shortcut to quickly create a temporary list from the current selection

CREATE & MODIFY

OmniCurve:

In SelAct, an iso-curve is created on the selected surface at the pick point
One-click curve extract from surface boundary (v1)
Associative isocurve with editing behavior and softparametric modes (v1)
One-click, two-click and n-click curve creation from a section analysis on a scan

OmniPlane:

New plane creation modes including trace plane, and new subcommand icons
Indicate that a plane is parallel to the view plane

OmniSurf:

Multi-blend surface from N parallel curves (aka Loft) has improved control mesh
Flange panel buttons for fast access to standard directions X,Y,Z, View, Object
Blend supports furtive control point display and furtive sculpting (v1)
Support for case change from X to T/L, and to go back to original case
G-sliders are replaced by G-buttons (first version)

Cut:

Curve cut by segment point supports left, both, right selection by pick position
Cut surface by isocurve at position of point projected on boundary edge

Soft Parametric:

New geometry can be sculpted when editing command parameters

SELECT

Position selection by "Intersect" with section crossings and multiple intersections
Locking to support geometry with shortcut "P" in position selection more stable
Object selection by key press similar to ICEM Surf
Selection Table:
Selection table with optimized usability (like ICEM Surf)
Selection table supports context menu (Hide/show etc) also multi-selection
Selection of 3D curve overlapping with boundary edge brings up selection table

DISPLAY & NAVIGATE

V-Nav:

Shortcut to freeze/unfreeze navigation view
All six standard views are accessible by one mouse click via the V-Nav box
Shading:

Shaded analysis (Highlight) is also shown in wireframe; material auto-switch
Further tweaking of IDX standard materials

Analysis:

Separate options to show sections on invisible surfaces and on invisible clouds
Section analysis can display sections for all three directions X,Y,Z at once
PoC: Side-by-side comparison of different Geometrical Sets

SCULPT

Mouse warp value is displayed in 3D and it goes up to 10000
Improved behavior when pulling a surface point in normal direction
Extrapolating shorter then longer removes then re-inserts segment points
Button to re-approximate a wire with the merge mode of CurveConcatenate
New screenspace robot with automatic view alignment
Alt-RMB on robot center to quickly switch robot orientation modes

In Progress

- Subject to change -

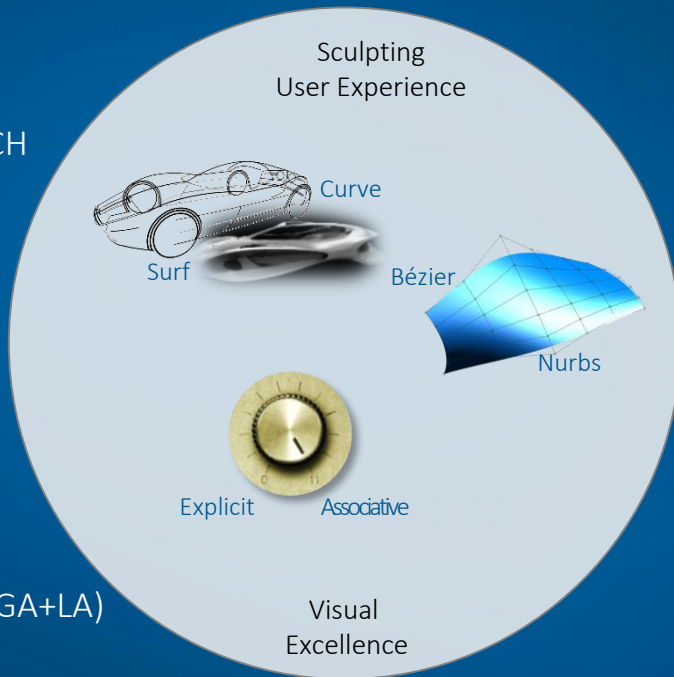


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The new generation of surface modeling for CAS & Class-A

A New Level of Productivity, Innovation and Collaboration

MODELING APPROACH



SURFACE CONTROL

SOFT PARAMETRIC (GA+LA)



Flexibility - Automation
GLOBAL | LOCAL

ICEM Design Experience

The new generation of surface modeling for CAS & Class-A

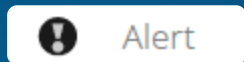
SOFT PARAMETRIC



Flexibility - Explicit - Automation Associativity

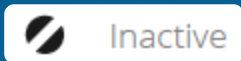
GLOBAL | LOCAL

Update **never modifies** geometry



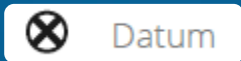
Alert

Sleeping geometry
looking around if its spec is respected



Inactive

Sleeping geometry
not looking around



Datum

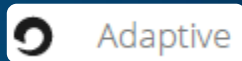
Explicit geometry,
no associativity « dead »



Revert

Back to legacy feature

Update **can modify** geometry



Adaptive

Morphing geometry
keeping conditions



Rebuild

Updating geometry features
forgetting sculpting actions



Reshape

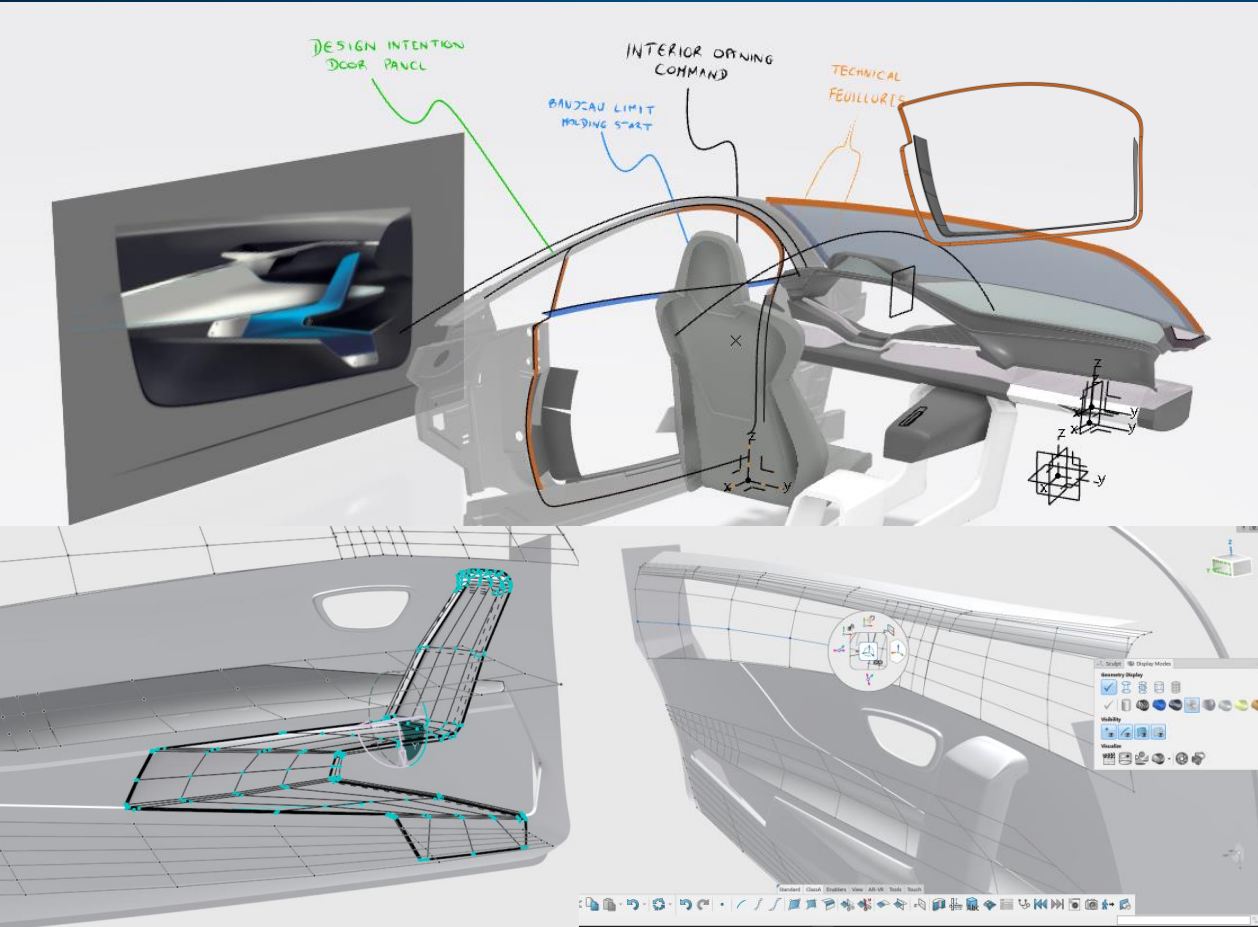
Updating geometry
keeping sculpting actions

SOFT PARAMETRIC



GLOBAL | LOCAL

USE CASE – Interior door panel



BENEFITS OF INTEGRATED PROCESS (STYLE & ENG) COMBINED WITH THE FLEXIBILITY OF IDX

Curve based approach

Bézier Quality

Straight Topology

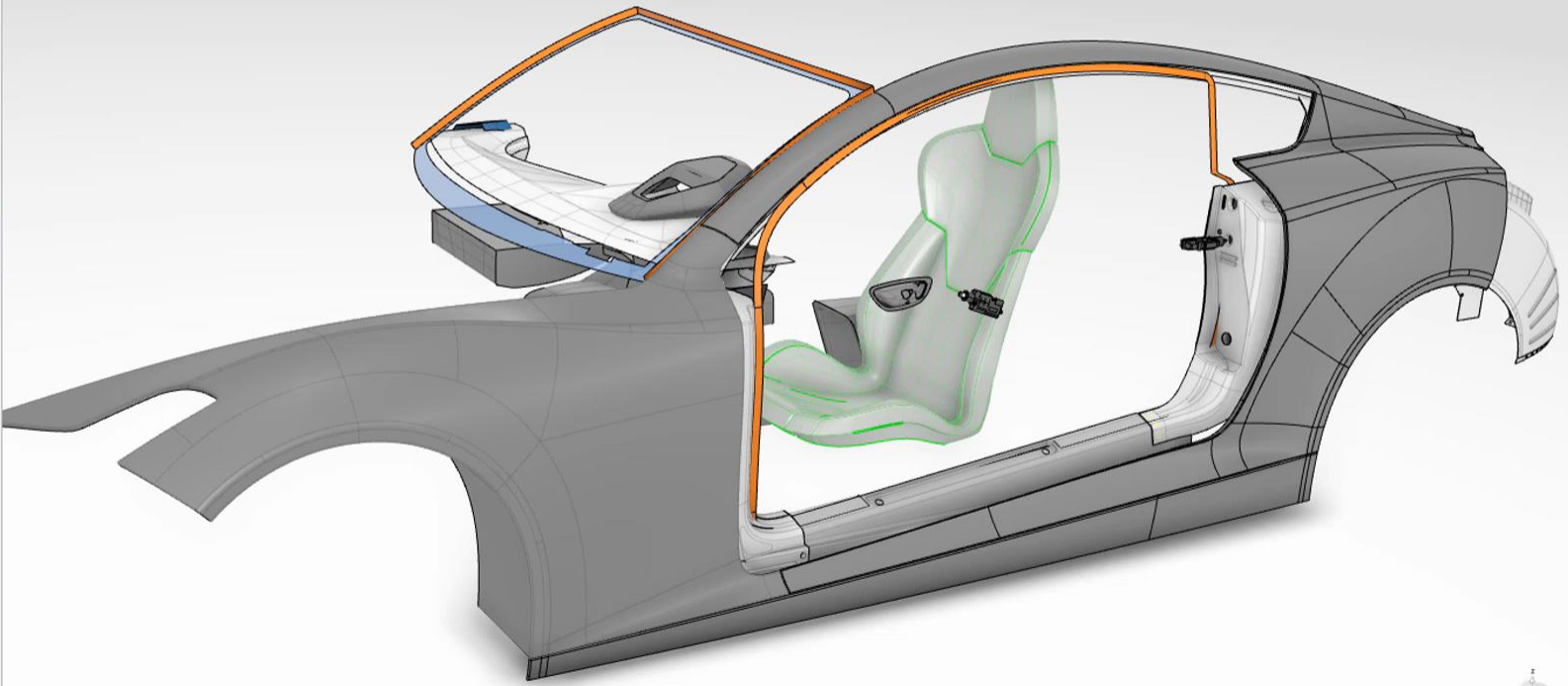
Subdivision Synergy (IMA)

Engineering Context Modeling

No historical breaking (reshape)



- Layers
- annotations
- Design input
- Handle
- Technical Volu
- Shapes startin
- WIP



3DEXPERIENCE Unified Modeling

for unified industrial design workflow

Flexibility

Freedom of Creativity
virtual Clay modeling

Imagine & Shape
Subdivision surfaces



Precision

Detailed High Class Surfaces
Class-A Surface modeling

ICEM Design Experience
Explicit Surfacing & Reverse Eng. Eng

Power

Feature based Surfacing
Associativity & Automation

Generative Shape Design, template, Knowledgeware
Parametric Surfaces

Organize

Frames

- DEFAULT
- Construction
- porteur
- Image
- bandeau
- courbes Y0
- Welt flange
- Handle
- Armrest
- Armrest Base Patc...

Display Lists

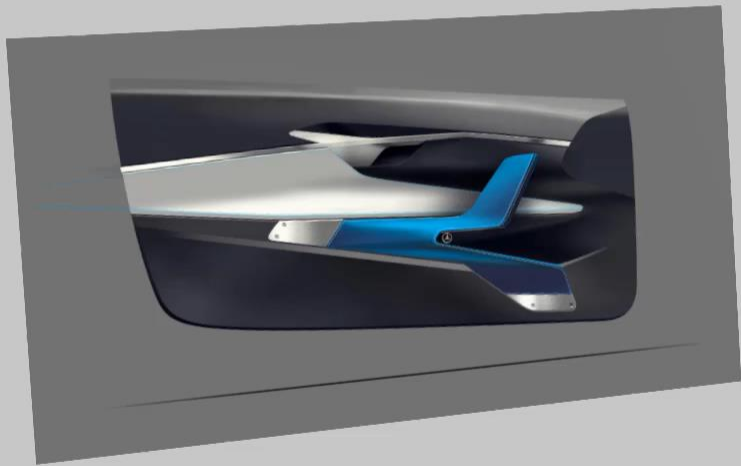
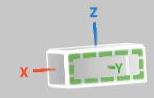
- None
- MASTER

Select Sets

- Current selection

Object Properties

UNIFIED MODELING WORKFLOW



Navigation icons: Rotate, Pan, Zoom, etc.

Script

Select

Transform

Controls

Laws

Analyze

ANALYZE

- Highlight
- Sections
- Deviation
- Curvature

Display Modes

Geometry Display

Visibility

Visualize

Main CAD software toolbar with icons for file operations, navigation, and modeling.

ICEM Design eXperience

3DEXPERIENCE-R2020x @ a glance



for both CAS & Class A modelers



with a dedicated User eXperience

- sculpting : take benefit of legacy & innovative tools
- display : native high-end level of visualization (including VR) & realtime diagnosis



featuring « Soft Parametric »

- create features , shape them, tune update behavior
- under evaluation for General Availability within year 2020



benefiting from unified modeling paradigm

- rely or drive natively IMA subdivision surface
- Bezier & Nurbs at any time, mixed Curve & Surface approaches

IF WE

TM