

4. Styling

4. Styling

4.1. Approach

The Phase 1 concept design of the ULSAB program did not account for any Class A surfaces for the outer panels of the structure. To establish Class A surfaces in Phase 2, a complete styling of the ULSAB vehicle was necessary in order to create the surfaces of the roof panel, body side outer panel, the back light and the windshield. Styling also provided the major feature lines for the doors, deck lid, hood, fender and front and rear bumpers; these were needed for the development of the mating structural parts. For Phase 2, styling also gave the ULSAB structure a professional look and provided surfaces for further design studies in the future, i.e. on hoods, doors, deck lids, etc. The styling was developed electronically using CAS (computer aided styling), no clay models were used. With support from Porsche's styling studio, PES selected A. D. Concepts, a local source, to carry out the computer aided styling in a simultaneous engineering approach with PES. At the first team meetings of PES and A. D. Concepts, several elements of the styling were discussed with a view to creating a 3-dimensional styling model. Using the package drawings, important criteria such as overall vehicle proportions, vision lines, bumper locations and proposed cut lines were specified. After the initial meetings, a clearly defined vehicle architecture had evolved.

4.2. 2-D Styling Phase

4.2.1. Sketching

In a team review of the first sketches, a neutral styling approach was chosen to ensure the ULSAB styling model would not be too futuristic or radical. Traditional sketching techniques were used along with the latest electronic paint sketching software from the Alias|Wavefront company entitled StudioPaint running on Silicon Graphics High Impact workstations. Many automotive design studios around the world use this combination of hardware and software. The use of this tool for such a project increased productivity and enhanced the overall styling presentation with professionalism and accuracy, producing tighter sketches and more realistic, achievable styling goals.

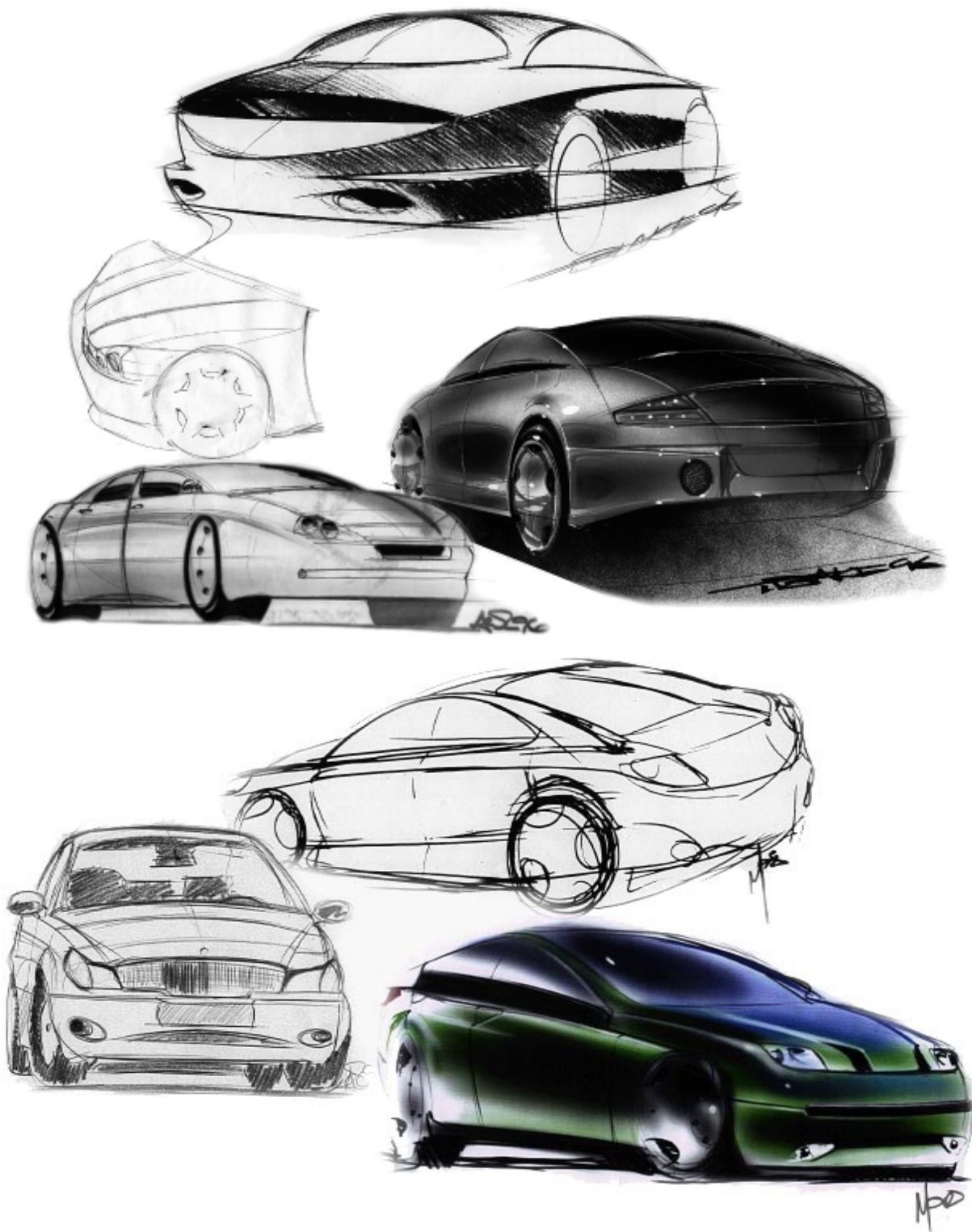


Figure 4.2.1-1 Styling Sketches

4.2.2. Clinic

In the first clinic, dozens of sketches were reviewed by the design and styling team to determine which direction the styling would take prior to its presentation to the ULSAB Consortium. With the best sketches selected, five separate side view proposals and several different front and rear end treatments were developed.

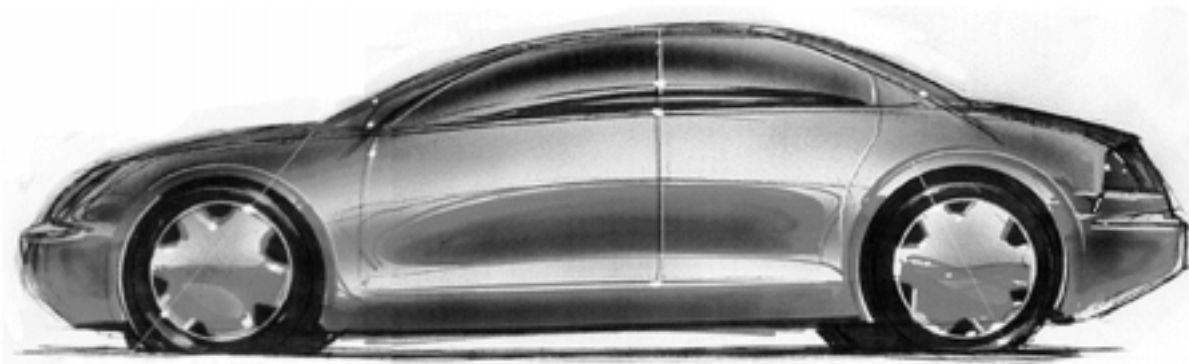


Figure 4.2.2-1 Side View Proposal

4.2.3. Electronic Paint

In the studio, the CATIA package data was imported into a 3-D conceptual modeling software, called CDRS, and a side view outline drawing was developed for sketching purposes. The drawing was imported into StudioPaint and the five, very disciplined, side view sketch proposals (A-E) along with front and rear end sketch proposals were developed.

4.2.4. Styling Theme Selection

The final styling theme selection was made during a meeting of the ULSAB Consortium's editorial group, together with PES and A. D. Concepts. In a secret ballot, the editorial group members from all around the world selected styling theme A. With the selection of the specific front and rear end treatments for the 3-D model, the 2-D phase of the ULSAB styling reached its conclusion.



Figure 4.2.4-1 Selected Styling Theme A



Figure 4.2.4-2 Styling Theme B



Figure 4.2.4-3 Styling Theme C



Figure 4.2.4-4 Styling Theme D



Figure 4.2.4-5 Styling Theme E



Figure 4.2.4-6 Selected Front View Proposal



Figure 4.2.4-7 Selected Rear View Proposal

4.3. 3-D Styling Model

To create the 3-D styling model, the package data was imported into CDRS along with the selected theme drawing and then the first phase of the 3-D model commenced. Side view lines, created using 2-D spine curves, were developed to represent the major feature lines of the vehicle. Typical sections at specific X locations were constructed. This data was reviewed by the design team to verify the positions of these major curves.

The construction of the greenhouse, (the upper glass and roof surfaces of the vehicle), was started, transferring preliminary surfaces back and forth between CDRS and CATIA using an IGES translator. In the following Class A surfacing using CATIA, only subtle design changes were made to the CDRS surface model until both the styling and engineering teams were comfortable with the result. The release of the styling data by the styling team, in IGES file format, marked the first step in the 3-D modeling phase.

Next, body side lines were constructed and surfaces were created. With the wheel openings, and the front and rear stance developed, the model started to take shape. The team developed the best proposal for front and rear door cut lines and this information was then incorporated into the CDRS styling model.

After the front and rear end surfaces were completed, shaded tile images of the surface model were used to evaluate the forms. Highlight sections and surface curvature graphs were used to verify the aesthetic value of the model.

4.3.1. Surface Release

Prior to the official surface release, the styling was reviewed to establish the exact location of all cut lines and shut lines. Shaded tile model images, with highlight reflection lines, were created in CDRS to allow both styling and engineering to discuss potential areas of concern. With the final release of the IGES surface model, the 3-D modeling phase was complete.

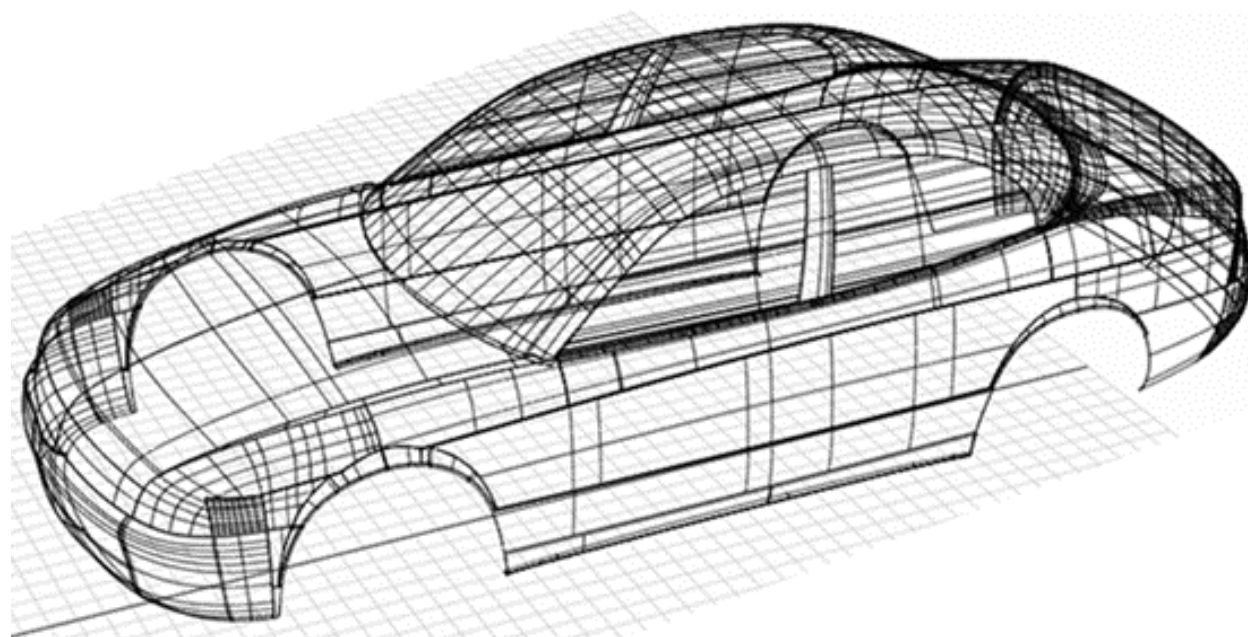


Figure 4.3.1- 1 Surface Release

4.4. Rendering

After the release of the surface model, the CDRS model was prepared for rendering. Model colors were selected in texture maps created to enhance the overall appearance of the photo realistic rendering. Neutral backgrounds and specific views were selected to create the first ULSAB styling images. To incorporate subtle engineering changes in the model, the CDRS 3-D models were revised and additional renderings were created. The models were enhanced further by the addition of texture maps for items such as license plate and rear window defrost. The 3-D model was imported back into StudioPaint 3-D to examine styling changes to the front and rear lamp treatments. These changes were then incorporated into the CDRS 3-D model and the final renderings completed, which concluded the styling phase.



Figure 4.4-1



Figure 4.4-2