

# andaltec

Plastic Technological  
Center

## Lighting Systems Developments

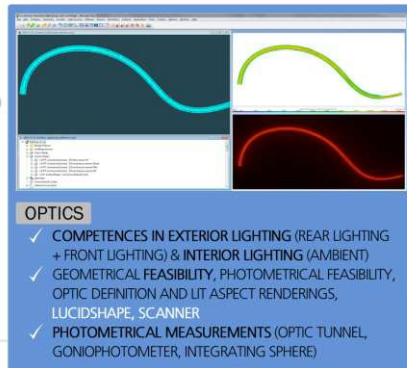


September, 2017



## ANDALTEC - Your global partner in Automotive Lighting Developments

### ANDALTEC – Your Global Partner In Automotive Lighting Developments



**LASER WELDING (LW)**  
✓ COMPETENCES IN PLASTIC-PLASTIC LW & IN PLASTIC-METAL LW  
✓ COMPETENCES IN SEVERAL TECHNOLOGIES: 3D ROBOT LW, SIMULTANEOUS & QUASI-SIMULTANEOUS LW, ETC...  
✓ LW FEASIBILITY/PRE-DEVELOPMENT (DESIGN & PROCESS RULES CHECK, ROBOT SIMULATION)  
✓ LW JIG/MACHINE SPECIFICATIONS, CHARACTERIZATION, LW JIG/MACHINE SUPPLIER FOLLOW-UP  
✓ LW JIG/MACHINE VALIDATION, TUNING



**METROLOGY LAB**  
✓ 3D MEASUREMENT  
✓ 3D SCANNING  
✓ REVERSE ENGINEERING

**PROTOTYPING**  
✓ MOCKUP DESIGN  
✓ 3D PRINT (MULTIJET, SLA, SLS, FDM)  
✓ CNC (3 and 5 axis)  
✓ VACUUM CASTING (2K, 3K)  
✓ RAPID INJECTION MOULD  
✓ THERMOFORMING  
✓ FINISHED SURFACES (POLISHING, METALLIZATION, PAINTING, GRAINING, COATING)  
✓ ASSEMBLY



## Research & Development:

### CAD DESIGN:

- CAD design of plastic and metal parts (soft: **CATIA V5**).
- Conceptual and detailed design.
- Choice of materials and manufacturing technology.
- High resolution 3D Scanner.
- Reverse Engineering (Soft: Geomagic Design X).

### CAE SIMULATION:

- **Mechanical Simulation:** Static, dynamic and crash analysis to check product specifications. (soft: **RADIOSS, ANSYS MECHANICAL**)
- **Structural Optimization** : In order to optimize the material lay-ups that minimize weight and maximize strength. (soft: **OPTISTRUCT-ALTAIR**)
- **Thermal Simulation:** Analysis with different thermal conditions, temperature ranges and thermal resistance of system components. (soft: **ANSYS FLUENT, OPENFOAM**).
- **Condensation Simulations:** Analysis of phase change, from gaseous to liquid, due to the established thermal loads. (Soft: ANSYS FLUENT).
- **FSI Simulation:** To take into account the coupling between thermal and mechanical problem join together. (soft: **ANSYS FLUENT-ANSYS MECHANICAL**).



## Research & Development:

### CAE SIMULATION:

- **Rheology:** Mold feature Optimization to improve the production process, validating the part design, predicting deformation defects, warping post-molding... Set up the injection molding parameters. Detection of part defects, fiber orientation over molding, cooling system, molding cycle, etc.. (Soft: **MOLDFLOW**).

### ELECTRONIC DESIGN:

- Detail design of electronic components, hardware and software
- LED boards and driver modules
- Advanced Lighting Control Modules

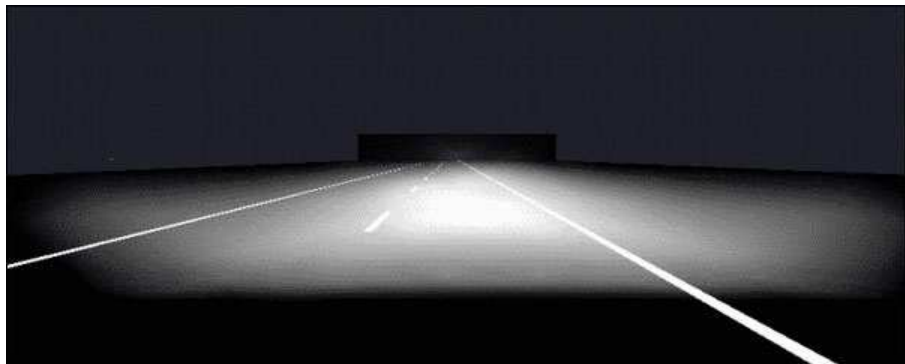




## Research & Development:

### OPTICAL DESIGN AND SIMULATION:

- **Design and simulation** of lighting systems and light sources: Classic optical surfaces (reflectors, prisms, filters) and advanced technologies (light-guides, flat-guides, collimators, total reflection).
- Design and conception of complex optical systems
- **Visualization Module** which delivers photo realistic images of the lighting system developed: lit appearance demonstrates the luminance effects when light source are illuminated in the model
- Design of **prototypes**, mockups or demonstrators.
- Software: **LUCIDSHAPE**



## Research & Development:

### SOFTWARE:

Andaltec has the following resources for industrial design, process and engineering simulation:



## Prototyping

The Prototyping Area offers a wide range of materials and technologies for the prototyping of the Lighting system developed:

- High Precision **CNC** (5 axis) for Optical Prototypes
- **Vacuum Casting (Silicone Moulds)**: Short serial parts with polyurethane resin with similar characteristics to the final product.
- **3D Printing**: Several 3D printers technologies available: (FDM, Multijet, SLS and SLA).
- **Rapid Injection Moulds** (aluminium moulds): Design of injection moulds and production of pre-series or short series in the production material.
- **Assembly of components** and different type of **finish surface** (metalized, polishing, painting, textured, impregnation, etc.).

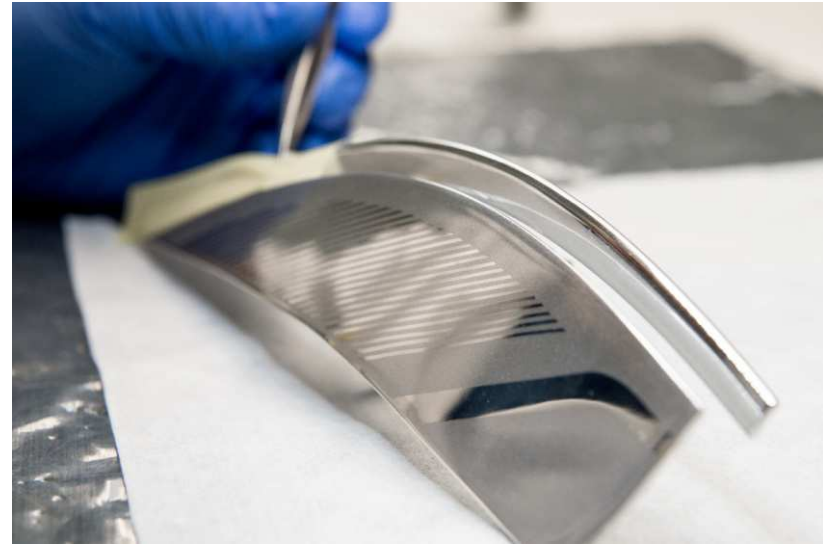


## Prototyping





## Prototyping



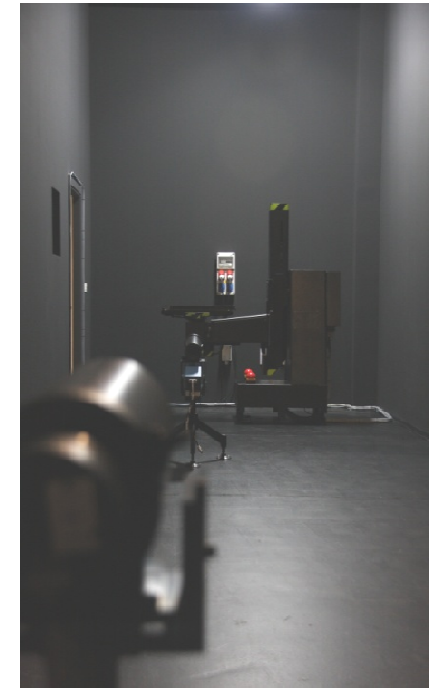
## Testing and validation

### PHOTOMETRIC & OPTICAL TESTING:

- Determination of photometric and luminous intensity values.
- Lighting System characterization (goniometer)
- Colorimetry.
- Reflection of reflectors.
- Characterization of photometric court.
- Fitting of Lighting systems
- Verification for compliance of the ECE regulatory and others specifications required for the homologation.



**ANDALTEC PHOTOMETRIC TUNNEL HAS THE FOLLOWING DIMENSIONS: 80m LONG X 20m WIDE. THIS IS THE LARGEST PHOTOMETRIC TUNNEL IN SPAIN AND ONE OF THE LARGEST IN EUROPE.**



## Other validation tests

### MATERIAL CHARACTERIZATION TESTS:

Mechanical and optical properties.  
Resistance to chemical products.  
Leak tightness.

### ACCELERATED AGEING TESTS

Salt fog testing.  
Artificial ageing  
Exposure to artificial radiation.  
Combined cycles of temperature and humidity.

### DIMENSIONAL MEASUREMENT (3D and 2D)

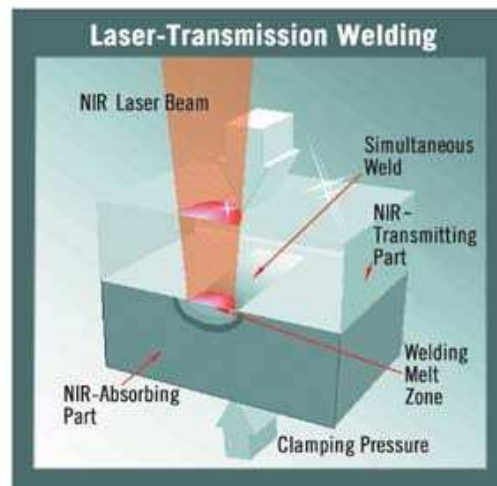
Reverse engineering by 3D scanning for dimensional control.





## Laser welding process

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## Projects experience

### INTERIOR LIGHTING:

Design, optical simulation and prototyping of light guide for interior / ambient lighting  
Roof lighting development (with button panel backlitted)

### EXTERIOR LIGHTING.

#### \* Headlamps:

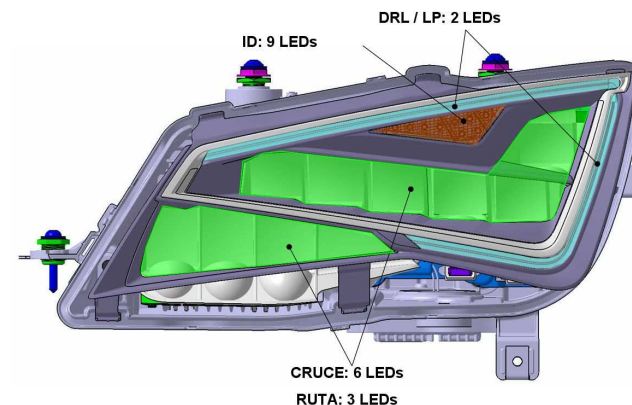
- Development of innovative optical modules  
(ex. Light beam / route with matrix beam technology and LED)
- HL complete with LEDs

#### \* Rearlamps:

- RL complete with LEDs

#### \* Center High Mounted Stop Lamps

- CHMSL complete with LEDs





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