

Sheet Forming of Aeronautic Parts with Laser Assisted Technology (SALAT)

Project Proposal for FoF-NMP-2012-7



Sheet Forming of **A**eronautic Parts with **L**aser **A**ssisted **T**echnonogy (**SALAT**)

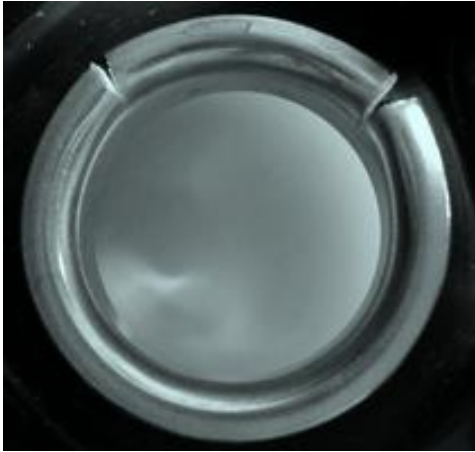
Motivation and Background



Persistent problem in Aeronautic Part Manufacturing

Light alloys (Ti, Mg, Al, etc...) are the best technological materials for certain aeronautic applications, due to good combination of properties: resistance/weight ratio, heat resistance, creep resistance, fire resistance, and so on.

But: work hardenability brings **SERIOUS PROBLEMS** when plastic forming.



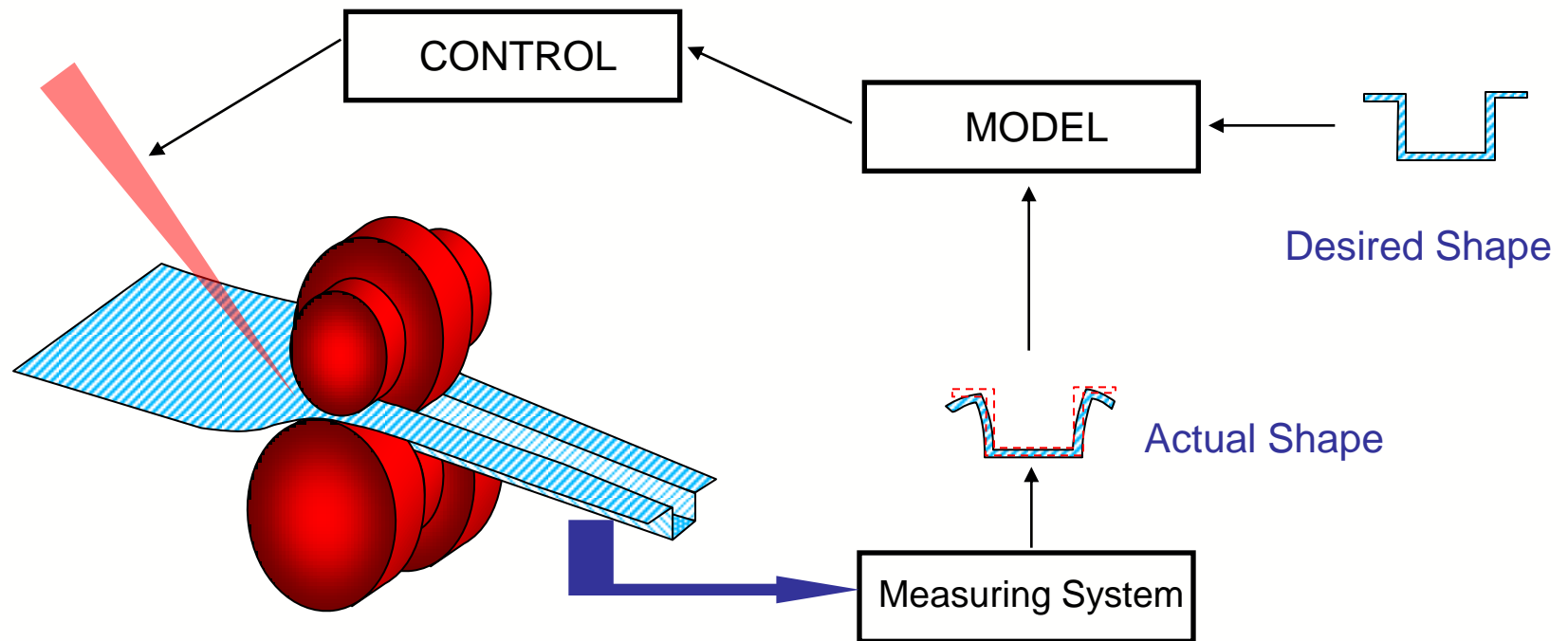
Hot forming is also delicate due to the sensibility to gas diffusion or phase changes.

Machining : best way for building complex structures with high quality, but very high *buy-to-fly*

Casting: material effective but higher price than forming, and lower mechanical properties.

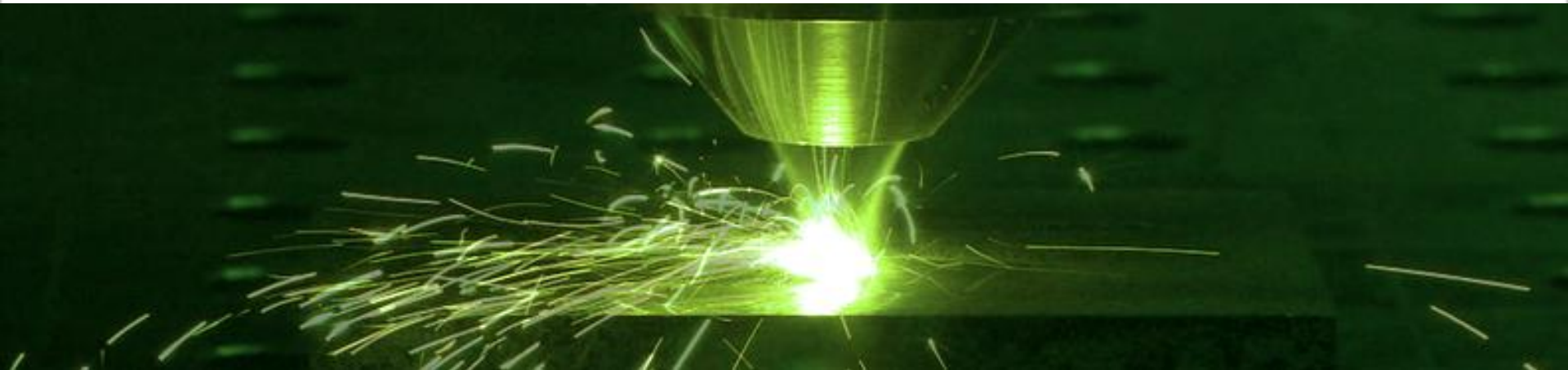
Laser Assisted Forming:

- Known to improve formability by local yielding, without damage to the material properties
- Enabling technology for Knowledge based Manufacturing:
Adaptive forming system



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Project Objectives



Main Goal: DEMO-oriented project

To develop Laser Assisted Forming Technology of Light Alloys, specially adapted for the production of parts for the Aeronautic Industry

Brief Description:

Laser Assisted progressive forming techniques will be developed and demonstrated for shaping parts from plates of alloys with strain hardening, cracking sensibility and high cost.

Good scientific background but little or no industrial implementation.

Exploitation of high gradient thermal fields and highly localized yielding with dynamic recovery, allowing

- Forming with minimal or no strain hardening effects
- Reduction of the allowable bending radius, improve design flexibility
- Reduction in the post-processing needs, energy needed, improve productivity.
- Improving the chance of sheet forming to gain presence in aerostructures, with the derived advantages in raw material optimization, cost reduction and flexible design.

OBJECTIVES

- ❖ Quantify and demonstrate the benefits of laser assisted forming, build demonstrator manufacturing system and real aeronautical components.
- ❖ Identify the specific applications in which the proposed technique is most beneficial and quantify the benefits.
- ❖ **Spin-forming:** internal & external engine parts, ozone converter housing components, dry seal metal flanges, reducers. **Roll-forming:** stringers, channels, beams, functional or structural profiles. **Incremental Sheet Forming (ISF).**
- ❖ Attain larger advantages in productivity, energy savings, product performances.
- ❖ Develop the technology and engineering for expanding the applicability of the technique to a wider range of products, specially high added value product.
- ❖ To improve the capability of European SMEs around the aerospace applications, to provide high quality high added value parts with minimal setup, control and qualification efforts.

Partner Search:

| Known Partners | | | | |
|-------------------|------------------------------|--------|---------|---|
| S.No | Partner Name | Type | Country | Role in the Project |
| 1 | AIMEN | RTD | SPAIN | Project Leader, System Integrator, Process Research |
| 2 | AIRBUS | LE | France | Industrial End User |
| 3 | DREISTERN | SME | Germany | Roll forming machine, prototype assembly and trial |
| 4 | BIAS, Bremen | RTD | Germany | Process research and modelling |
| 5 | (Diode Laser Manufacturer) | SME | -- | Custom laser Sources |
| Required Partners | | | | |
| S.No | Profile | Type | Country | Role in the project |
| 6 | Machine tool producer | SME | Any | Spin forming and ISF prototypes |
| 7 | Industrial End User | LE/SME | Any | Requirements, Demo activities |
| 8 | Industrial System Integrator | SME | Any | Software, measuring, hardware |
| (9) | Aeronautics applications RTD | RTD | Any | Calculations, part engineering |

*Thank you for
your kind Attention*

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