



**IR Controlled curing**  
**Infrared controlled curing of**  
**thermoset composites**



smart

advanced manufacturing

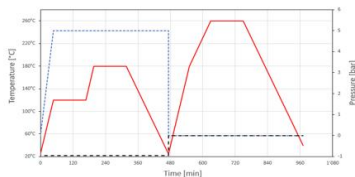


# PROPOSAL INTRODUCTION (I)

**Vision:** Implementation of infrared controlled curing of composite structures related to ship, wind or aerospace parts for time, costs and energy reduction

**Motivation:** Enabling next generation of composite manufacturing  
**Comparison of cost and energy issues**

Standard autoclave

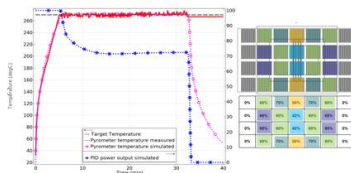
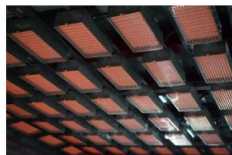


Curing in the autoclave  
 Working Size 2\*1.2 m  
 Total power 55.5 kW  
 Post curing in an oven:  
 Total power 3.4kW

Energy consumption  
 Curing: 138kWh  
 Post curing: 15.7kW

**Total energy 154 kWh**  
**Costs(0.305 Euro/ kWh): 46 Euro**  
**Process time 16h**

IR Controlled curing



Curing in one step dependent on part size  
 Working Size 0.2\*0.1 m  
 Power of each heater 0.54 kW  
 Total power: Power distribution \* Heat element

Energy consumption  
 Curing: 2.8kWh

**Total energy 2.8 kWh**  
**Costs(0.305 Euro/ kWh): 0.85 Euro**  
**Process time 1h**

**Content:** A rapid, cost effective manufacturing process to produce complex composite parts using a coupled experimental and simulation approach (developed already TRL4) applied to end user application with a target of TRL 6-7

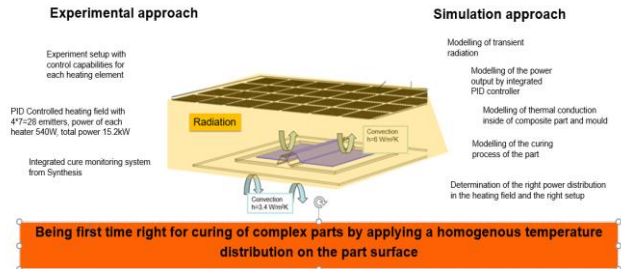
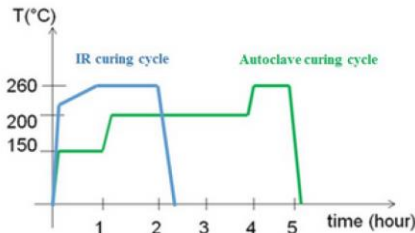
## PROPOSAL INTRODUCTION (II)

**Expected outcome:** By applying out of autoclave radiation based heating system instead of convection driven processes following outcome should be achieved:

- Lower investment in comparison with other fast curing processes
- Reduction in energy costs of manufacturing
- Reduction in manufacturing time and increasing in productivity
- Very well adapted for curing large parts in aeronautical industry
- Very well adapted to cure small and series part
- Very well controlled and fast time response

**Impacts:** : Reduce cycle time, energy effort for manufacturing of composite structures, lower equipment costs and lower development times.

**Schedule:** : Suggested start date: 2021 06 01. Duration: 2 years



## PARTNERS

**Current Consortium:** Research organization, IR provider

**Partner search:** End user from aerospace, automotive, ship or wind turbine industry, automation provider, material supplier



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Please check also for further information:

<https://www.youtube.com/watch?v=65NjkY2XUhs&t=2395s>

<https://authors.elsevier.com/c/1c3q-x-7hh~hi>



