



## **SMARTFIBER**

**Miniaturized structural monitoring system with autonomous readout micro-technology and fiber sensor network**

**Collaborative Project**

**ICT – Information and Communication Technologies**

### **D7.1 Dummy interrogator package**

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<b>1</b>	<b>Abstract and public summary.....</b>	<b>3</b>
1.1	Objectives/Background.....	3
<b>2</b>	<b>Modeling and optimization of interrogator shape.....</b>	<b>4</b>
2.1	Introduction.....	4
2.2	Experimental proof.....	4
2.3	Modeling and optimization approach.....	6
2.4	Optimal solution.....	7
2.5	Future research.....	8
<b>3</b>	<b>Inner package production.....</b>	<b>9</b>
3.1	Inner package design intent.....	9
3.2	Mock-up PCB.....	10
3.3	Optical Interface.....	10
3.4	Wireless compatibility of package material.....	11
<b>4</b>	<b>Outer package production.....</b>	<b>11</b>
4.1	Outer mold design.....	11
4.2	Mold materials.....	12
<b>5</b>	<b>Conclusion/Summary.....</b>	<b>13</b>
<b>6</b>	<b>References.....</b>	<b>13</b>

## 1 Abstract and public summary

The scope of this deliverable is to prepare a dummy package simulating the shape of the first iteration interrogator for embedding.

### 1.1 Objectives/Background

#### Modeling and optimization of interrogator shape

Embedding a foreign object – no matter how small – inside a composite laminate has an influence on its mechanical behavior. This embedded object causes a redistribution of strains and stresses of the laminate under load, and can possibly alter the behavior and strength of the total structure. Modeling these redistributions enables the determination of the best shape to minimize the impact on strength.

#### Inner package production

As the inner package consists of the interrogator PCB with its exposed optical interfaces and wirebonds it must have protection from the rigors of the embedding process and the subsequent operational environment. Traditionally these delicate structures are housed within a rigid, usually metal box but, in this application, the use of protective overcoating polymer or glob-top approach may be more appropriate. Overall the dummy inner package will consist of a mocked-up PCB with simulated optical interface and alternate protection consisting either of a Kovar box , which contains the PCB but allows egress for the fibre and antenna or of a glob topped PCB. Both of these will conform to the target size limit of 5cm x 5cm x 5mm.

#### Outer package production

The outer package should provide room to host the inner package while having an outer shape as determined by the shape optimization analysis. Several materials or material combinations are possible, each having their merits and difficulties.