



SAGE 3

Short Description of
JTI-CS-2012-1-SAGE-03-014

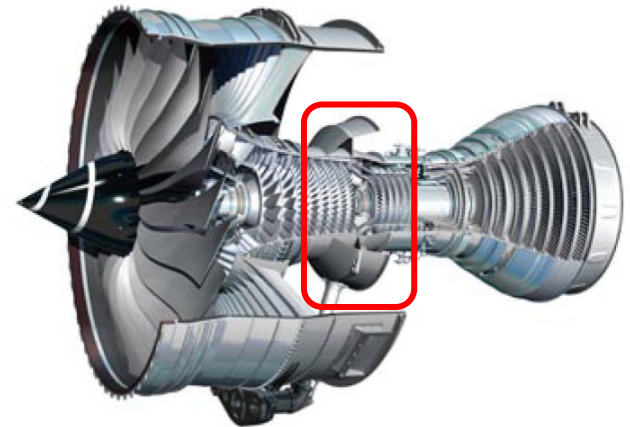
*“Extended operation temperature range
for compressor structure materials”*

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Background and objectives

- Highly efficient three shaft engine technologies are being developed in SAGE 3 where increased by-pass ratio, increased pressure ratio and reduced weight mainly contribute to the improvements. Higher pressure will implicitly generate higher temperature loads in the core engine.
- This CfP project topic intends to extend current temperature capability for compressor structure materials beyond current state (Typically Ti-6Al-2Sn-4Zr-2Mo at ~450°C).
- It is of importance that the alloy can become available in cast, forged and sheet material forms and in addition be weldable which highlights the need for process experiment and subsequent mechanical characterization.



Work Breakdown Structure

1. Literature review and survey of currently existing commercially available high temperature titanium alloy(s)
 2. Manufacture of representative but simplified parts of the most promising alloy(s)

The most promising titanium alloy(s) is/are selected and manufactured in at least three of the following forms: Investment casting, Ring rolled part, Welded part, Hot Isostatic Pressing of powder.
 3. Evaluation of microstructure and properties of selected titanium alloy(s)
 - Mechanical properties that need to be investigated are: tensile properties, creep resistance & fatigue life and in addition to these properties it is important evaluate alpha case growth kinetics at the elevated temperature.
 - A microstructure examination should be included
- Special skills: Equipment, or an available supply network: for investment casting of titanium, manufacturing of ring rolled titanium, Hot Isostatic Pressing (HIP) of titanium alloy powder into near net shape parts. The CfP partner needs metallography and mechanical testing equipment for evaluating the mechanical properties.
 - Maximum topic budget 800000€. Duration 30 months.