

# Research project offer

**Location** : ISAE SUPAERO, Toulouse, France

**Department** : DISC

**Research group** : Decisional Systems

**Supervisor** : Juan Montero Jimenez (PhD Student), Rob Vingerhoeds

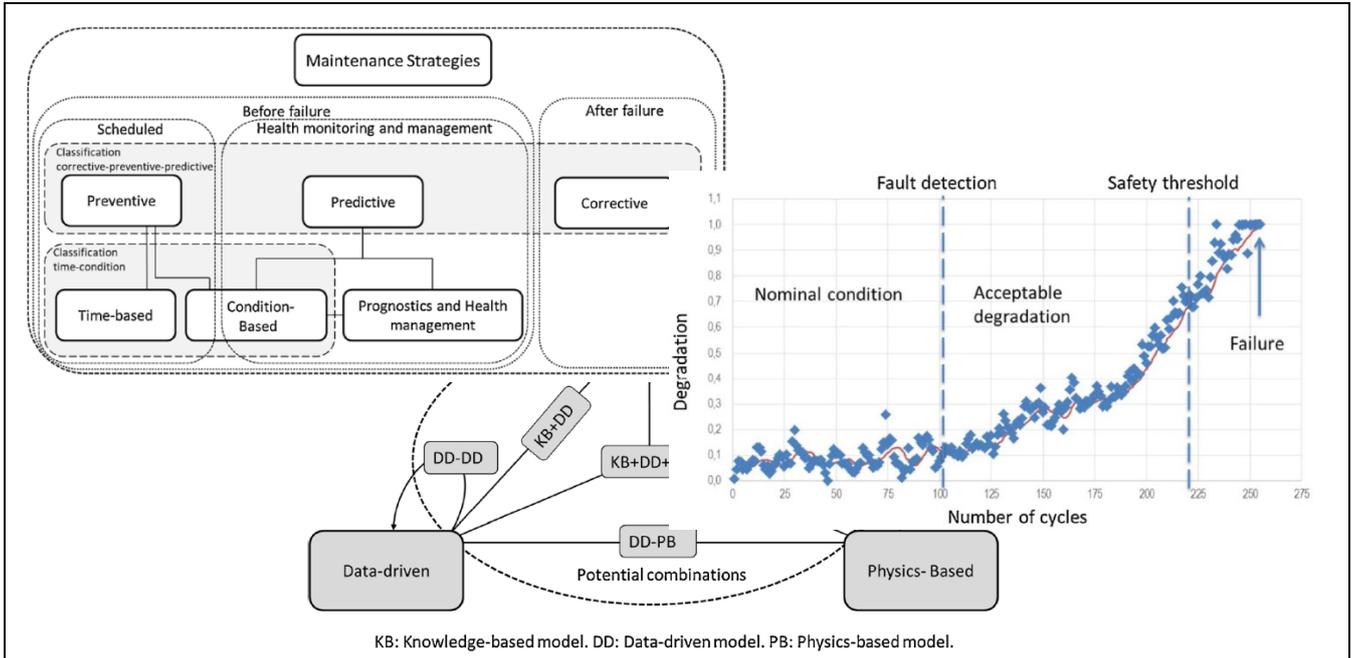
**Email** : rob.vingerhoeds@isae-sup aero.fr

## OFFER DESCRIPTION

**Title** : Guiding predictive maintenance system development

**Proposed duration and period** : 6 months, e.g. March-August 2021

<b>Context</b> (max 10 lines)	<p>Predictive maintenance is a maintenance strategy aiming at determining the “right” moment to trigger maintenance actions. The potential benefits of its implementation could be seen in safety increment, maintenance cost reduction, unforeseen breakdown elimination, productivity increment, etc. As modern technological systems demand high levels of safety and efficiency, predictive maintenance systems became an active field of research in academy and industry. Despite the potential benefits, the deployment of new predictive maintenance systems remains limited; several challenges regarding their design remain unsolved. The lack of a systematic approach to develop new predictive maintenance system is the motivation for the current research project. This project aims at contributing to solutions for these challenges.</p>
<b>Objectives and work</b> (max 20 lines)	<p>There exist several types of models and techniques used to perform diagnostics and prognostics. Determining what technique or techniques are best for a specific problem is not a trivial task, it relays on the specific purposes of the new predictive maintenance system and the available data, information and knowledge about the technical system.</p> <p>A good starting point exists today, based on symbolic artificial intelligence techniques (rule-based reasoning and case-based reasoning) to extract knowledge from existing predictive maintenance solutions found in literature, as well as on ontologies for predictive maintenance. The objective is to obtain a comprehensive view on the engineers’ decisions during the development process to select a model type or a specific technique to address a diagnostic or prognostic task.</p> <p>The existing PhD project is developing an approach building on symbolic artificial intelligence techniques to capture the designer’s experience and to propose solutions for new developments of predictive maintenance systems.</p> <p>Within the framework of the internship, the research will address the integration of different already existing building blocks (ontologies, case-based reasoning tool, etc.) into one working prototype and to apply this approach to a larger case-study for validation.</p>



**Possibility to continue with a PhD (Yes/No) :** Yes (funding to be discussed)

**REQUIRED APPLICANT PROFILE AND SKILLS**

<p><b>Study level</b> (tick possible choices)</p>	<ul style="list-style-type: none"> <li>■ Undergraduate students (3<sup>rd</sup> or 4<sup>th</sup> year)</li> <li>■ Master students (1<sup>st</sup> or 2<sup>nd</sup> year)</li> <li>■ PhD students</li> </ul>
<p><b>Required profile and skills</b></p>	<p>Design Systems Engineering and Computer Science Some knowledge on systems modelling is a plus (but not mandatory)</p>
<p><b>Other useful information</b></p>	<p>None</p>