

# Research project offer



**Location :** ISAE SUPAERO, Toulouse, France  
**Department :** DISC/DCAS  
**Research group :** RESCOM  
**Supervisor :** Jérôme LACAN and Thibault GATEAU  
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## OFFER DESCRIPTION

**Title :** Blockchain for Space Traffic Management  
**Proposed duration and period :** 6 months, February 2021 – July 2021

<p><b>Context</b> (max 10 lines)</p>	<p>With the increase of the number of satellites in operations and space debris, global Space Traffic Management (STM) becomes critical. Indeed, Space agencies, like CNES in France, allocates more and more resources on this subject [1]. Additionally, private companies like the start-up Leo Labs, were recently launched on this market.</p> <p>One of the issues in this context is that the different countries can have different policies and different strategies. Few resources are shared to localize space debris and satellites. Moreover, when the space objects locations are known, they are not necessarily shared because of political and/or financial issues.</p>
<p><b>Objectives and work</b> (max 20 lines)</p>	<p>The objective of this internship is to study the idea of using a blockchain to share the data between different private and public entities. This idea was already proposed in [2] for general STM and in [3] for space debris management. However, [2] and [3] are extremely general and do not propose any concrete blockchain analysis nor implementation.</p> <p>On the other side, [4] proposed a first Ethereum implementation of smart contracts allowing to share and manage Space Tracking Data. The objective of this internship is to extend this work by defining new tools on blockchain allowing to define a distributed platform allowing to manage the access, encrypt/decrypt, buy/sell, evaluate the data shared by the different users. A high-level analysis allowing to determine the requirements of this system will be first done. Then, in the second step, smart contracts will be developed in solidity and evaluated.</p> <p><u>References :</u></p> <p>CNES technical considerations on space traffic management, Christophe Bonnal , Laurent Francillout, Monique Moury, Ursula Aniakou, Juan-Carlos Dolado Perez, Julien Mariez, Sylvain Michel in Acta Astronautica 167 (2020) 296–301</p> <p>Blockchain Enabled Space Traffic Awareness (BESTA): Automated Discovery of Anomalous Behavior, Harvey Reed, Mr. Nathaniel Dailey,, Robert Carden, Dave Bryson, 70 th International Astronautical Congress (IAC), Washington D.C., United States, 21-25 October 2019, IAC-19,A6,IP,6</p> <p>Trusat, <a href="https://trusat.org/">https://trusat.org/</a>, 2020</p> <p>Distributed Ledger for Depreciating Space Tracking Data, C. Dahdah, C. van Leeuwen, Z. Kheil, J. Detchart, T. Gateau, J. Lacan, submitted, June 2020</p>

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

## REQUIRED APPLICANT PROFILE AND SKILLS

<b>Study level</b> (tick possible choices)	<input checked="" type="checkbox"/> Undergraduate students (3 <sup>rd</sup> or 4 <sup>th</sup> year) <input checked="" type="checkbox"/> Master students (1 <sup>st</sup> or 2 <sup>nd</sup> year) <input type="checkbox"/> PhD students
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