Creating and managing tons of documentation

How we use LaTeX in AcubeSAT

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Open Source CubeSat Workshop

Step 0: Requirements

Documents

- Simple
- Fast
- Consistent

Step 1: Tool

```latex
\section{Clock drift tests}
\subsection{USB}
We have performed no tests on USB's operation on clock drift.
According to the USB specifications:
\begin{quote}
\begin{itemize}
\item High speed data is clocked at 480.00Mb/s
\item Full speed data is clocked at 12.000Mb/s
\item Low speed data is clocked at 1.50Mb/s
\end{itemize}
\end{quote}
USB 1 clock speed is specified as
\( \SI{48}{\mega\hertz} \) with
a tolerance of \( \pm 500 \ \mathrm{ppm} \),
often reduced to a \( \pm 100 \ \mathrm{ppm} \) by
systems engineers \footnote{doc, p. 6}

\subsection{Communication between STM32F1 \& STM32L4}
We performed CAN communication tests between the STM32L4S9ZIT6
MCU on the OBC EM, and the STM32F103C8T6 MCU on the blue pill,
using the following parameters:
\begin{itemize}
\item Time Quantum: \( \SI{1000}{\nano\second} \)
\end{itemize}
```

LaTeX

+

- Open-source
- Flexibility
- Consistency
- Version-controlled documents
- ...

-

- Learning curve
- Difficult to install
- ...

Step 2: Document ID

AcubeSAT-###-**-$$$

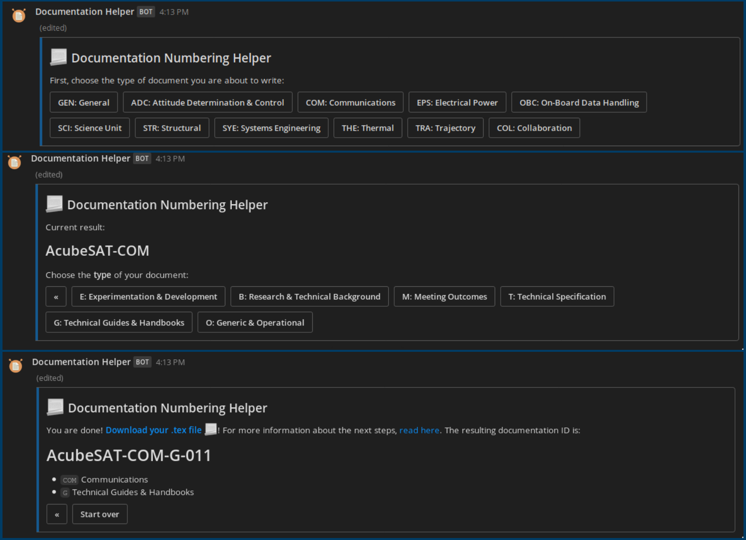
Step 2: Document ID

AcubeSAT-OBC-BT-028

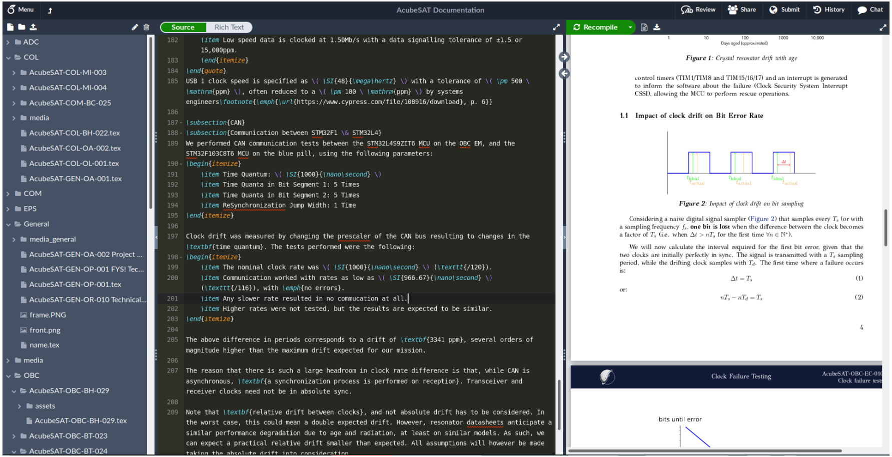
Step 2: Document ID

AcubeSAT-EPS-MI-003

Step 3: Create

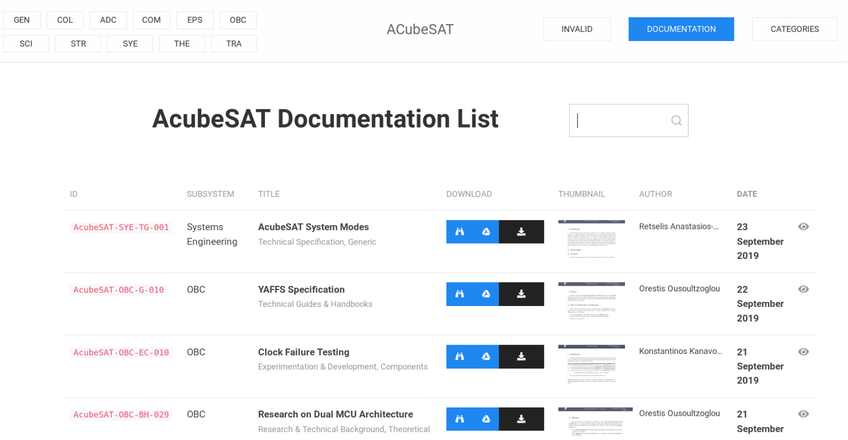


Step 4: Write



https://github.com/overleaf/overleaf

Step 5: Browse



https://helit.org/mm/docList/public

Step 6: Final Result

A SAT

AcubeSAT System Modes

AcubeSAT-SYE-TG-001

Retselis Anastasios-Faidon

September 23, 2019
Version: 0.3

Aristotle University of Thessaloniki

Aristotle Space and Aeronautics Team
CubeSat Project

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Contents

Changelog

Date	Version	Document Status	Comments
19/08/2019	0.5	INTERNALLY RELEASED	Final Version
18/08/2019	0.4	DRAFT	Spelling and Grammatical check
17/08/2019	0.3	DRAFT	Antenna Design
16/08/2019	0.2	DRAFT	Theory
15/08/2019	0.1	DRAFT	Initial revision

This is the latest version of this document (0.5) as of August 19, 2019. Newer versions might be available at https://helit.org/mm/docList/AcubeSAT-COM-BH-028.

1 Introduction

AcubeSAT is going to use the UHF band when it comes to telemetry and telecommands (TT&C), which is commonly used in CubeSat missions for the same purpose. In launchers' interior we must have the predicted dimensions for our 3U CubeSat and at the same time our antenna (which I m going to present to you later in this report) because it occupies a lot of space. So, there is a need to deploy it because the existence of mechanical part protrusion is forbidden. Our deployment system will be approximately the same with UPSat's.

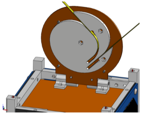

***Figure 1**: UPSat's deployment system*

We were interested in using an omnidirectional antenna which can provide circular polarization so that we do not have that much polarization losses (the enormous distance of our link imposes it). The deployment system above gives us the capability to use two monopole antennas. So, the idea is to examine if we could combine two monopoles in a way that will make them operate-radiate as a turnstile antenna. The turnstile antenna is a combination of two orthogonal dipoles fed with equal amplitudes and quadrature phase and this antenna is capable of producing circularly polarized field in the direction normal to the dipoles' plane (0^o and -90^o for Right Handed Circular polarization, called RHC). Let's say that the dipoles are along the x- and y- axes. The combination radiates Left Handed Circular polarization in the –z direction. The existence of a ground plane changes the sense of circular polarization of the wave radiated in the –z direction and adds to the direct radiated wave (+z direction).

2 Theory background

2.1 Boundary Conditions

Suppose that we have a locally plane boundary in space described by a point and a unit normal vector $\vec{n}$ that points from region 1 (ϵ_1,μ_1,σ_1) to region 2 (ϵ_2,μ_2,σ_2). We