Mini Project Payload Subsystem: Tether

Problem Statement:
The satellite system is as follows-
10 kg main Satellite, 1kg Tether wire + End mass, 10 m Length of tether cable

1. Understand the working principle and physics behind the operation of tethers. Also spend some time on understanding the use of electron emitter and implementing it.
2. Design the electrical circuit for the main satellite electron emitter. Simulate optimum characteristics for the tether to function i.e. find the optimum bare, insulated length for the wire.

Constraints-
Any system parameter can not be exceeded.
Electron emitter is placed only in the main satellite and not in the end mass.
Maximum current 0.2mA.

Milestones

1. Understand physics of Tether and the need of electron emitter.
2. Get through the circuit design for tether without emitter (interaction with ionosphere)
3. Understand the cause of current gradient
4. Understand working of electron emitter and design the circuit
5. Get the optimum bare length for tether

Softwares: Matlab or any comfortable programming language

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How to start- For greater physical understanding refer to handout_dachev and for some idea of implementation in satellite refer to MITEE document. Then go through emitter.pdf for greater understanding of electron emitter.

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