

Specifications

1. Applicable standards

- ECSS-Q-ST-40C
 - Safety/Launch authority safety requirements
- ECSS-Q-70-71A
 - Data for selection of space materials and processes
- ESA-ADMIN-IPOL (2014)2
 - Space Debris Mitigation for Agency Projects

2. Requirement level

Requirement level	Definition
Shall	The word <i>shall</i> indicates mandatory requirements strictly to be followed in order to conform to the standard and from which no deviation is permitted (<i>shall equals is required to</i>). First order of importance. The requirement is vital. It must be validated in priority.
Should	The word <i>should</i> indicates that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required (<i>should equals is recommended that</i>). It is a second level of importance. It means that a <i>Should</i> requirement must be validated after a <i>Shall</i> requirement.
May	The word <i>may</i> is used to indicate a course of action permissible within the limits of the standard (<i>may equals is permitted to</i>). It is a third order of importance. The requirement is a plus to the system. A <i>may</i> requirement must be validated after a <i>Should</i> requirement.

3. ADCS Requirements

a) Global ADCS Requirements

RQ CODE	Requirement name	Details	Level
RQ01-ADCS	Each ADCS system has to switch ON on OBC orders.	The OBC activates the CTRL to control ADCS system	Shall
RQ02-ADCS	Each ADCS system has to switch OFF on OBC orders.	This is to prevent any issues from compromising the mission.	Shall
RQ03-ADCS	Each ADCS system has to be shielded against environmental disturbance.	Resistance against high and low temperatures, radiations and magnetic fields.	Shall
RQ04-ADCS	Each part of ADCS system has to not interfere with other modules from CubeSat.	Do not disturb other modules in an unintended way.	Shall
RQ05-ADCS	The ADCS module shall fit inside of the CubeSat		Shall
RQ06-ADCS	The ADCS module shall have a limited mass		Shall
RQ07-ADCS	The ADCS module shall have a limited power consumption		Shall

b) Actuators System Requirements

RQ CODE	Requirement name	Details	Level
RQ01-ACT	ACT has to be turned ON and OFF on CTRL order.	The OBC activates the CTRL which activates the ACT.	Shall
RQ02- ACT	ACT has an independent action on each axis.	Means the 3 axis are independently controller.	Shall
RQ03- ACT	ACT must orientate CubeSat to have EDT module facing the Earth.		Shall
RQ04- ACT	ACT should position with precision.	Need to have a good orientation.	Should

c) Sensors System Requirements

RQ CODE	Requirement name	Details	Level
RQ01-SENS	SENS has to be turned ON and OFF on CTRL orders.	The OBC activates the CTRL which activates the SENS.	Shall
RQ02-SENS	SENS has to send data to the CTRL.	The data collected will be sent to CTRL.	Shall
RQ03-SENS	SENS has to be able to realize a measurement session with only one type of sensor (GSCS, PSS, MMS).	The measurement session will be able to ask data from only one sensor	Shall
RQ04-SENS	SENS has to realize a complete measurement session on CTRL order.	A measurement session means that SENS will be activated to collect data.	Shall
RQ05-SENS	A specific warning is sent to CTRL for each sensor if it gives inaccurate measure.	Depends on the kind of sensor, some do analyze their values.	Shall
RQ06-SENS	A specific warning is sent to CTRL for each sensor if it fails.	Different warnings to turn OFF the right sensor.	Shall
RQ07-SENS	SENS should be redundant.		Should
RQ08-SENS	SENS has a fast answer time.		Should
RQ09-SENS	SENS hardware is low power consumption and lightweight.	Also, means the less possible pins.	Should

d) Controller Requirements

RQ CODE	Requirement name	Details	Level
RQ01-CTRL	CTRL has to react accordingly to the process order sent by OBC.	The OBC is the headmaster.	Shall
RQ02-CTRL	CTRL has to send SENS's processed data to the OBC.	Data from sensors can be used by all modules.	Shall
RQ03-CTRL	CTRL has to manage each ADCS system independently.	The ADCS system will be made of functions inside the CTRL allowing all parts to be independent.	Shall
RQ04-CTRL	CTRL has to process the SENS's data.	Data coming from the SENS's.	Shall
RQ05-CTRL	CTRL has to give orders to ACT.	Orders like ON/ OFF and also for positioning each axis	Shall
RQ06-CTRL	CTRL has to send periodically an activity report to the OBC.	OBC needs to know if there are issues in ADCS.	Shall
RQ07-CTRL	CTRL has to be able to determine the actual attitude.	Algorithm to get the current attitude.	Shall
RQ08-CTRL	CTRL has to be able to determine the wanted attitude.	Algorithm giving the wanted attitude.	Shall
RQ09-CTRL	CTRL has to be able to determine the correction necessary on the attitude.	Algorithm giving the correction to apply on ACT's.	Shall