

Institution

Environmental Testing
Pass

Cleared for Integration

**RockSat 2013
Payload Check-In
Procedure**

Revision	Date	Authored By	Description
00	3-09-2010	Shawn M. Carroll	Initial Release
01	4-26-2010	Shawn M. Carroll	Proofed Prior To Website Release
02	6-13-2010	Shawn M. Carroll	Added University and Pass Box to Cover Page
03	4-15-2011	Emily Logan	Update for 2011 launch
04	5-6-2011	Emily Logan	Check-in schedule updates
05	5-12-2011	Emily Logan	Check-in schedule updates
06	6-6-2011	Emily Logan	Modified for integration check-in
07	4-8-2013	Emily Logan	Check-in schedule updates, updated section testing canister voltage

Approvals

RockSat Student PM: Emily M. Logan

Date: 6/12/13

Principle Investigator (PI): Chris Koehler

Date: 6/12/13

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1.0 Introduction

1.1. Test Purpose and Objectives

The purpose of this document is to outline the testing procedure needed to verify that the

_____ payload complies with the requirements of the 2013 RockSat program. Compliance with the below requirements will ensure that the payload is safe and ready for environmental testing at Wallops Flight Facility to take place on 17 June 2011. Payloads that do not pass the checklist below may be removed from the flight if the issue cannot be easily remedied prior to the above said environmental test.

1.2. Team Check-In Schedule

Please note that your payload should be completely integrated as though it were going to check in and go straight to a vibe table. Each check-in is scheduled for a block of 90 minutes. If you have a canister partner, the entire can must be integrated and put together for check-in. Universities will be checked in as canisters, with a separate document for each team to verify electrical compliance.

SCHEDULE	University(ies)
9:00 AM	Embry-Riddle Team PHIDO
10:30 AM	Carthage College RedSpaceMen
12:00 PM	Lunch -- no check-ins
12:30 PM	Stevens Institute and MCC Pegasus II
2:00 PM	Temple University AIM and USNA Spacegoat
3:30 PM	Miami University High Flight and ESCC TEC
5:00 PM	Dinner -- no check-ins
5:30 PM	UNL EHD
7:00 PM	Follow-up check-ins begin if necessary
9:00 PM	Conference room open for general work

Quality Assurance (QA) Precautions

1.3. QA provisions

To ensure a path of compliance, each payload will be subjected to the procedure and testing outlined in this document. Additionally, each payload will have its own Preliminary Payload Check-In document, and results will be directly recorded into it. This check-in test will be performed once by the team for redundancy to ensure the payload is ready for official check in at the Refuge Inn the day before environmental testing. This is labeled as “environmental” on the test check boxes below. The payload will be inspected again before rocket integration. This is labeled as “integration” on the test check boxes below.

Please send the completed and signed form to the following address by **Friday, June 7, 2013**.

Colorado Space Grant Consortium
Discovery Learning Center Room 270
520 UCB
Boulder, Colorado 80309-052

You may also scan your completed and signed form into a .pdf and email it to rocksatprogram@gmail.com no later than 5:00pm MST on Friday, June 7, 2013.

Failure to complete this check-in procedure and ensure that it is received by June 7th may result in your payload’s removal from the flight. Please keep a tracking number for the package to make sure it arrives at COSGC. Finally, the payload will be re-checked Sunday, June 16th to ensure weekend work has not created any major changes in the payload. After passing this check, the payload will be sealed with a sticker. At this point, you will not have access to your payload.

2.0 Test Resources

2.1. Facilities

- Refuge Inn Conference Room

2.2. Equipment

Equipment	Quantity	Needs to be Cleaned (Y/N)
1 Scale (accurate to 0.1 lbf)	1	N
2 Multimeter	1	N
3 Flash Light	1	N
4 ¼" Female NPT Connector	1	N
5 Writing Utensil	1	N
6 Camera	1	N
7 Highlighter	1	N
8 Tape	1 Roll	N
9 Label Maker	1	N
10 Calculator	1	N
11 Stapler with staples	1	N
12 Approval Stickers	9	N
13 Directions to WFF	9	N

2.3. Required Personnel

Emily Logan—RockSat Student PM

Chris Koehler—Principle Investigator (PI)

At least 2 members of the payload team

3.0 Test Procedure

3.1. General Test Concept

The purpose of this check-in is to ensure the customer is in compliance with the requirements set forth by the RockSat-C Program and Wallops Flight Facility. The requirements are listed in the following table.

Requirement	Description	Verification
RSC.1 - Weight	RockSat Canister + Payload = $20 \pm 0.2 \text{ lb}_f$ Note: Established for RockSat 2009	Weighed before MOI and vibe testing.
RSC.2 - Volume	Contained within RockSat Canister	Constraint in User's Guide unless pre-approved by RSC manager and WFF. Visual inspection will be completed.
RSC.3 - CG/MOI	Within 1x1x1" of centroid	Customer responsibility prior to Wallop's testing. WFF testing determines "go" or "no go."
RSC.4 - Electrical	No current flow prior to command line OR g-switch activation	Customer responsibility prior to inspections and Wallops testing. WFF testing determines "go" or "no go."

This test will first ensure that the required documentation is present. The next phase of testing assumes that the payloads arrive fully integrated and assembled in their respective canisters. The payload will then be visually inspected to ensure that it is contained in the canister. Next, the payload will be massed to ensure that it conforms to the mass requirements. Canisters utilizing an atmospheric port will be checked to make sure that the male 1/4" NPT connector on the payload end interfaces to a female 1/4" NPT connector. Canisters utilizing a special port will have the port hardware available for inspection to verify the correct interface is on the instrument.

To ensure that the canister is not shorted to the power source, the canister's skin potential relative to the power supply's terminals will be checked. This procedure quantifies the voltage and current on each set of RBF wires. The RBF wires must extend 3 ft. out of the canister. The customer(s) will then be asked to open the canister by removing the top bulkhead and outer skin, which will expose the payloads inside. During the process of removing the top bulkhead and outer skin, it will be verified that the internal structure bolts to 4 out of 5 of the top bulkhead attachments and 4 out of 5 of the bottom bulkhead attachments. Additionally, the general structure of the payload stack and potting will be checked. Finally, the battery type will be verified, and implications will be discussed with the team.

3.2. Documentation Check

The purpose of the documentation check is to ensure that your payload is well defined and if there are any questions about structures or electronics, the information will be readily available to help integration proceed as smoothly as possible. The documentation **must be in a binder.**

	Documentation Check	Environmental Initial	Integration Initial
1	The payload notebook contains the original or a copy of the completed check-in procedure turned in 6-7-13		
2	The payload notebook contains a full set of system schematics (computer generated)?		
3	The payload notebook contains a full set of mechanical drawings (computer generated)?		
4	The payload notebook contains data sheets and mechanical specifications <u>that would be deemed relevant to someone inspecting a payload.</u> Non-essential data sheets and design reviews should at minimum be available in electronic format.		
5	The payload notebook contains some type of structural integration procedure specific to this team's payload.		
Action Items:			
Notes:			

3.3. Canister Containment Check

The canister containment check verifies that the customer is in compliance with requirements RSC.2. This section verifies the payload does not extend outside of the canister and that it only connects to the canister through the interfaces designed for that purpose.

	Canister Containment Check	Environmental Initial	Integration Initial
1	The payload is completely contained within the RockSat canister?		
2	The payload is not physically connected to any point on the RockSat canister other than the top and bottom bulkheads?		
Action Items:			
Notes:			

3.4. Atmospheric Port Interface Check (If Applicable)

The atmospheric port interface check verifies that the customer design for the atmospheric port can be interfaced with the WFF atmospheric port setup.

	Atmospheric Port Interface Check	Environmental Initial	Integration Initial
1	The payload's atmospheric tubing fits in the wire-way?		
2	The terminating 1/4" Male NTP connector interfaces to the provided female 1/4" NTP connector?		
Action Items:			
Notes:			

3.5. Weight Check

The weight check verifies requirement RSC.1 from Table 1. The payload is weighed three times and the final weight is an average of the three trials.

	Weight Check	Environmental Initial	Integration Initial
1	Power on the scale (accurate to 0.1 lbf)		
2	Zero the scale		
3	Place the integrated canister on the scale and record the weight below: _____ lbf		
4	Remove the canister from the scale and rezero.		
5	Place the canister on the scale and record the weight below: _____ lbf		
6	Remove the canister from the scale and rezero.		
7	Place the payload on the scale and record the weight below: _____ lbf		
8	Average the weights and record the value below: _____ lbf ** If anything other than 20 ± 0.2 lbf, highlight this section of the document!!		
Action Items:			
Notes:			

3.6. Neutral Canister Potential Check

The neutral canister potential check verifies requirement RSC.4. The purpose is to ensure that no part of the payload is shorted to the canister, and that there is no voltage potential between the canister and the payload.

	Neutral Canister Check	Environmental Initial	Integration Initial
1	Payload has _____ pairs of <u>at least 3' (foot)</u> pairs of RBF wires connected. _____ pair(s) activate(s) at launch. _____ pair(s) activate(s) _____ minutes prior to launch.		
2	Payload has one connector tied directly to payload ground easily accessible when the payload is integrated in the canister?		
3	Place the multimeter in a mode to measure voltage *Range: 0-20V unless customer specifies a different range is required		-
4	Place one of the multimeter terminals on the skin of the canister and the other on the connection to ground		-
5	Record the voltage measured on the multimeter _____ V ** If anything other than 0V, highlight this section of the document!!		
6	Place one of the multimeter terminals on the skin of the canister and the other on the connection to the payload		
7	Record the voltage measured on the multimeter _____ V ** If anything other than 0V, highlight this section of the document!!		
Action Items:			
Notes:			

3.7. Voltage/Current Check

The purpose of the Voltage and Current check is to record the voltages across each pair of activation lines for WFF reference. The current check makes sure that there is no current flow across activation lines that activate at launch (even with the Wallops short no current should flow until the g-switch has compressed). It also verifies that current flow through the command line activation pairs does not exceed the 1A maximum.

	Voltage/Current Check	Environmental Initial	Integration Initial
1	Place the multimeter on a mode to measure voltage Range: 0-20V unless customer specifies a different range is required	--	
2	Have customer point out which pairs activate at launch and mark with T-0-SCHOOL_NAME using tape or the label maker. If there are multiple lines for launch activation for this payload, add the number of each pair after the school name (1, 2, 3...)		
3	Have customer point out which pairs activate prior to launch and mark with T-2-SCHOOL_NAME (2 = minutes prior to launch, using tape or the label maker. If there are multiple lines for launch activation for this payload, add the number of each pair after the school name (1, 2, 3...))		
4	Measure the potential between the positive and ground terminals on each T-0 pair for the current payload: T-0-1 _____ V T-0-2 _____ V T-0-3 _____ V T-0-4 _____ V T-0-5 _____ V		

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	Voltage/Current Check	Environmental Initial	Integration Initial
5	<p>Measure the potential between the positive and ground terminals on each T-X for the current payload:</p> <p>T-2-1 _____ V</p> <p>T-2-2 _____ V</p> <p>T-2-3 _____ V</p>		
6	<p>Place the multimeter on the appropriate mode to measure current (switch cable config if required as well)</p> <p>*Range: 0 – 0.1A unless customer specifies a different range is required</p>		
7	<p>Measure the current through the positive and ground terminals of each T-0 node for the current payload:</p> <p>T-0-1 _____ (mA A) {Circle one that applies}</p> <p>T-0-2 _____ (mA A) {Circle one that applies}</p> <p>T-0-3 _____ (mA A) {Circle one that applies}</p> <p>**If any current exceeds 0.1 A, highlight this section of the document!**</p>		
8	<p>Place the multimeter on the appropriate mode to measure current (switch cable configuration if required as well) in a range the customer feels will not be exceeded on early activation lines.</p>		

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	Voltage/Current Check	Environmental Initial	Integration Initial
9	<p>Measure the current through the positive and ground terminals on each T-X node for the current payload:</p> <p>T-2-1 _____ (mA A) {Circle one that applies}</p> <p>T-2-2 _____ (mA A) {Circle one that applies}</p> <p>T-2-3 _____ (mA A) {Circle one that applies}</p> <p>**If any current exceeds 1 A, highlight this section of the document!**</p>		
	Action Items:		
Notes:			

3.8. Internal Inspections

The purpose of internal inspections is to make sure the customer is connected to at least 4 of the 5 bulkhead connection points on both the top and bottom of the canister. It also checks that these are the only points where the payload connects to the canister. Additionally, the visual inspection checks the battery type. Finally, this check looks at the quality of staking to make sure the payload is prepared for flight conditions.

NOTE: This section will be completed after all payloads in a canister pass 3.2 – 3.7.

	Internal Inspections	Environmental Initial	Integration Initial
1	After ALL payloads in a canister have been checked for compliance with sections 3.2 – 3.7, have one customer remove the top bulkhead.	--	--
2	As the customer removes the top bulkhead, verify that the internal structure bolts to 4 out of 5 of the top bulkhead connection points.		
3	After the customer removes the skin, verify that the internal structure bolts to 4 out of 5 of the bottom bulkhead connection points.		
4	Inspect the payload and ensure that it does not connect to the canister anywhere except the top and bottom bulkheads.		
5	<p>Verify battery type in payload. (Rechargeable lithium-ion batteries are permitted but are NOT to be recharged on the base) Check compliance below:</p> <p>(Check One) Compliant _____ Not Compliant _____</p> <p>** If not compliant, highlight this section of the document!!</p>		

	Internal Inspections	Environmental Initial	Integration Initial
6	Visually inspect the payload's staking work and rate the quality from 1-10. (1 no staking present; 7 acceptable; 10 consider applying at Wallops) 1 2 3 4 5 6 7 8 9 10 {Circle One}		
Action Items:			
Notes:			

4.0 Additional Items for Friday Morning

5.0 Major Issues and/or Concerns

6.0 Directions and Instructions for Arrival at WFF (6/13 only)

Discuss directions, arrival time, and location of safety briefing.

7.0 Signature and Approvals Section: Environmental Testing

Signing below agrees that it has been verified that all highlighted sections of the document have been addressed and resolved, and all action items have been completed

for the _____ payload. After signing, the Environmental Testing box on the front of the document may be checked to indicate a pass.

RockSat Student PM: Emily M. Logan

Date: 6/13/13

Principle Investigator (PI): Chris Koehler

Date: 6/13/13

Payload team representative (please print)

Date: 6/13/13

Payload team representative signature

8.0 Post-vibe Action Items

9.0 Signature and Approvals Section: Integration

Signing below agrees that it has been verified that all highlighted sections of the document have been addressed and resolved, and all action items have been completed

for the _____ payload. After signing, the Integration box on the front of the document may be checked to indicate a pass.

RockSat Student PM: Emily M. Logan

Date: 6/16/13

Principle Investigator (PI): Chris Koehler

Date: 6/16/13

Payload team representative (please print)

Date: 6/16/13

Payload team representative signature

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