Rascal Interface Control Document

Saint Louis University

Rascal



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| Prepared by: |  |  |  |
|  | Insert Author Name Here  Rascal Program Manager |  | Date |
| Approval: |  |  |  |
|  | Dr. Michael Swartwout  Argus Principal Investigator |  | Date |

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# Interface Overview

This Interface Control Document (ICD) serves to define all relevant interfaces between the Space Systems Research Lab’s (SSRL) Rascal payload (consisting of a 3U secondary spacecraft and 1.5U propulsion/image processing unit) and Boeing’s Colony-II bus. These interfaces consist of three major types:

1. **Mechanical -** structural interfaces that involve the physical connections between SSRL-Boeing components.
2. **Electrical –** digital/analog interfaces that involve data communication and power transmission to and from SSRL-Boeing components.
3. **Radio –** RF interfaces that involve data transmission between the ground and either the secondary or primary spacecraft.

Beyond these three designations, each interface can be broken down into three general categories: those that interface the secondary spacecraft with the primary spacecraft, those that interface the image processing/propulsion unit with the rest of the primary spacecraft, and those that interface both spacecraft to the ground. Each of interfaces within these categories will be defined in the sections that follow.

## Primary-Secondary Spacecraft Interface Overview

There exist two main interfaces between the primary and secondary spacecraft:

* Primary-Secondary Separation Mechanism
* Secondary Spacecraft Power Inhibit.

The former interface is mainly mechanical in nature, consisting of two solenoids (each housed within the secondary spacecraft) that latch onto two connection points that extend from the primary, as shown in Figure 1-1. Since the secondary spacecraft is set to be off until separation, it is required that the primary spacecraft passes power to the secondary spacecraft’s separation mechanism. The mechanism used for accomplishing this must provide a peak voltage of 5 Volts, with a current load of at least 1 Amp.

The latter interface is also mainly mechanical in nature, consisting of a simple switch that will be compressed when the secondary spacecraft is conjoined with the primary spacecraft. In this state, the switch would cut off all power between the secondary spacecraft’s batteries and the rest of the