

## 1.0 SCOPE

### 1.1 PURPOSE

This Interface Control Document/Drawing (ICD) defines and controls the design of interfaces between the Shuttle Orbiter and the cargo element.

### 1.2 DEFINITION

For the purposes of this document the cargo element includes the cargo bay assembly. The cargo bay assembly includes two major elements which are (1) MightySat 1 satellite (2) Satellite de Aplicaciones/Cientifico - A (SAC-A satellite) The MightySat 1 satellite is integrated with Hitchhiker (HH) Ejection System, then mounted inside a lidless canister with a HH avionics box which is mounted on a HH adapter beam assembly on bay 6 port side. The SAC-A satellite is installed in an HH canister equipped with a HH ejection system and a HH motorized door assembly (HMDA) which is mounted on a forward side of HH adapter beam assembly on bay 2 port side. The collective name for this payload is called MightySat. The MightySat cargo element and Cargo Element or Payload are synonymous.

### 1.3 EFFECTIVITY

This document is applicable to all Shuttle Orbiter/Cargo Element configurations unless otherwise specified.

### 1.4 CONFIGURATION CONTROL

Configuration control will be initiated upon signature approval and maintained in accordance with NSTS 07700, Vol IV.

### 1.5 DOCUMENTATION

#### 1.5.1 Payload Unique

As a payload unique ICD, this document defines and controls specific payload requirements as well as Shuttle Orbiter provisions. The payload specific requirements reside at the beginning of Sections 3.0 through 14.0.

Paragraph X.0.1 (i.e., 3.0.1, 8.0.1, etc.) is used to define the payload and to document its interface requirements in terms of selectable standard Orbiter capabilities and requirements in accordance with payload requirements as agreed to in the specific Payload Integration Plan (PIP).

Section X.0.2 (i.e., 3.0.2, 8.0.2, etc.) provides mission unique interface definitions in payload unique ICD's.

Paragraph X.0.3 (i.e., 3.0.3, 8.0.3 etc.) documents these requirements which can be considered "standard" for the generic payload.

Paragraph X.0.4 (i.e., 3.0.4, 8.0.4, etc.) provides interface definition of special Orbiter accommodations not documented in the Shuttle/Orbiter Standard Interfaces.

Standard Shuttle Orbiter provisions as defined in Sections 3.0 through 14.0 are derived directly from the Shuttle Payload Interface Definition Document for Small Payload Accommodations, NSTS-21000-IDD-SML, which in turn is derived from the Shuttle Orbiter Standard Interfaces, ICD-2-19001, and are selectively dispositioned to reflect the requirements established in Paragraph X.0.1 and the specific Payload Integration Plan (PIP).

The following format shall be followed in establishing the payload specific ICD requirements:

- Applicable: Sections' Paragraph Text, Tables and Figures are shown in full, with associated subparagraphs.
- Not Applicable: Sections' Paragraph Text, Tables and Figures are deleted in their entirety except for paragraph's number and title which shall be shown as "Not Applicable". Subparagraphs will automatically be deleted when leading paragraph is "Not Applicable".
- Title Only: A lead-in paragraph is shown by title and number only. This condition allows disposition of the subparagraphs without carrying the lead-in paragraph (text, tables, and/or figures) when its content does not add to the Interface Control Definition.
- Exception: An exception is taken to the Shuttle Payload Interface Definition Document for Small Payload (IDD) paragraph. The exception paragraph shall use less than the total Orbiter capability identified in the IDD. Exceptions can currently only be written against the text of a paragraph. Any exception to tables and figures shall be included in the paragraph text.

#### 1.5.2 Relationship to Payload Integration Plan (PIP)

The PIP represents the cargo element to STS agreement on the responsibilities and tasks which directly relate to the integration of the Cargo Element into the STS, and includes the definition of tasks which the STS considers optional services. The payload unique ICD provides specific design data and defines the engineering parameters applicable to the Orbiter/Cargo Element interfaces and optional services identified in the PIP. In the event of conflict between the payload unique ICD and one or both PIPs, the PIPs will take precedence. This ICD documents and controls applicable interfaces and optional services as identified in PIP NSTS-21358 (MightySat) and PIP NSTS-21372 (SAC-A) for an integrated payload configuration.

#### 1.5.3 ICD Waivers; Deviations; and Exceedances

ICD agreements with payloads are based on NSTS allowed payload services and provisions are identified in this document. All Orbiter/STS design-to requirements for payloads are controlled at Level II. The unique payload ICD does not require NSTS Orbiter Project approval if it remains within the Orbiter vehicle interface design parameters. Limits of this ICD are established in a conservative manner to minimize individual payload and mixed cargo analyses. Any exceedance or deviation in payload capabilities or services shall be documented in the payload unique ICD's, Section 20, and evaluated to assure that the stated condition is controlled in a manner to guarantee acceptable conditions to eliminate any added risk to the vehicle or crew.

#### DEFINITIONS:

EXCEEDANCE: Documentation of a condition that does not comply with stated requirements but does not add any risk due to intended usage or

configuration and can be shown acceptable without special analysis or controls.

DEVIATION: A non-compliance that requires additional analysis or control to eliminate risk and is acceptable when properly documented.

WAIVER: A condition that does not comply with the requirements of this ICD could add risk and requires special controls/analysis to assure adequate flight margins.

#### 1.5.4 Avionics Control Drawing

Orbiter-to-Payload electrical interfaces shall be as specified in Section 13.0. Refer to Avionics Control Drawing VS72-270122 (schematic) for overall Orbiter-to-Payload proposed electrical wiring implementation.

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