



Institut für Weltraumsensorik und Planetenerkundung

**HRSC on MarsExpress**

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| <b>Doc.-No.</b> | : | <b>HRSC-DLR-TN-4200-002</b> |
| <b>Issue</b>    | : | <b>004</b>                  |
| <b>Date</b>     | : | <b>24-Aug-2004</b>          |

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**HRSC VICAR Label**

**Description Document**

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**Approval** .....

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**Release** .....

Prof. Dr. G. Neukum ( HRSC Principal Investigator )



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## **1. Purpose of this Document**

This document defines and describes the content of the image ASCII label and the image binary prefix for VICAR-formatted HRSC data of Level 0, 1, 2, 3, and 4. The document does not treat the various labels associated with interface files.

The document defines by which program a keyword will be written, by which programs it will be used, and it describes what the meaning of the keyword is.

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## 2. Introduction

### 2.1. VICAR ASCII headers

These headers consist of "keyword=value" pairs. "Keyword" is text and may have up to 32 characters. "Values" can be of type integer, real, character (both single values or an array). Header entries may be written, searched for, and read using the VICAR RTL. There are different general header types:

#### 2.1.1. The system header

This is used to hold system-specific data; most system label entries are default keywords that are written by the VICAR RTL automatically. Nevertheless, the system label can be accessed and read explicitly by any VICAR program. (The default keywords of the system label are not discussed in this document.)

#### 2.1.2. The history label

This holds information on the history of the image. Any program (identified by the keyword TASK="name of program") may access this label for appending information to it. History label information is mostly used for archiving purposes, and rarely used in the further processing.

#### 2.1.3. The property label

It is used to hold information relating to the status or property of the image. Any program may access this label to write and read information to and from it. Label entries are sorted by the different properties. All entries pertaining to some individual property are preceded by the entry "PROPERTY=...", followed by the individual keywords pertaining to the properties, e.g., the map label. Most information relevant to a particular image will be placed into the property label.

### 2.2. Binary prefix

The prefix will generally be used to store those information that differs with image line, e.g. Ephemeris time and exposure. Dedicated software is required to recover specific entries from



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the prefix. The image binary prefix is an important carrier of information in the data processing sequence.

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### 3. General Strategy of Writing Labels

#### 3.1. ASCII Label

As new images are created at different levels in the data processing sequence, label entries are carried along from the old to the new images. In addition, new label items will be appended. Label entries are added sequentially, i.e. The order in which keywords appear is determined by the processing sequence. The keyword will not be written if the information to fill it is not applicable. Keywords may be updated by other programs if necessary. Duplicate entries of certain keywords may exist in different sections of the history label.

#### 3.2. Binary Prefix

Although data will pass through different programs in the processing sequence, and although there will be different image data products in between, all image data files (level-0 till level-2) will have one identical framelike structure to hold the binary prefix. Some entries of this frame will be filled at the beginning of the processing. Others are just placeholders that will be initially empty but will be filled by the different programs later.

#### 3.3. Table Entries

The keywords and binary label entries are shown in form of a table with a number of different columns.

The column "Label group" describes the kind of label: System Label (S), History Label (H), or Property Name: MAP, LOOKUP\_TABLE, M94\_INSTRUMENT, M94\_ORBIT, M94\_CAMERAS, DTM, PHOT, FILE, FOOTPRINT.

The column "First Level" describes in which level the keyword will be written the first time and the column "Last Level" indicates in which level this keyword will be written the last time.

The column "Issue" indicates in which issue of this document the keyword was changed.

The column "PDS" indicates if this label item is part of the HRSC and/or SRC label in PDS format.





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## 4. Binary Prefix Structure

```
typedef struct {
/*0-7 */ double EphTime; /* Ephemeris Time */
/*8-11 */ float Exposure; /* Camera exposure time in ms */

/*12-15 */ int COT; /* Camera Objective Temp in 1/100 K */
/*16-18 */ int FEETemp; /* FEE unit temperature, 1/100 K */
/*20-23 */ int FPMTemp; /* FPM temperature, 1/100 K */
/*24-27 */ int OBTemp; /* Optical bench temperature, 1/100K*/
/* Please, note that FERT is used for DU_CENTRAL_BRACKET, 1/100 K */
/*28-31 */ int FERT; /* First Earth Recieved Time */
/* Please, note that LERT is used for CH_THERMAL_I/F, 1/100 K */
/*32-35 */ int LERT; /* Last Earth Recieved Time */

/* Please, note that reserved1 is used for DU Temperature */
/*36-39 */ int reserved1; /* reserved for future use */

/*40-41 */ unsigned short CmpDataLen; /* Compressed Data Length */
/*42-43 */ unsigned short FrameCount; /* Frame counter */

/* Please, note that Pischel is used for Gain number */
/*44-45 */ unsigned short Pischel; /* Pischel Byte */

/*46-47 */ unsigned short ActPixel; /* Number of active pixels */

/* Please, note that RSHits is used for total number of frame erros per frame
in bypass mode it is the number of filled pixels */
/*48-49 */ unsigned short RSHits; /* Reed-Solomon errors */

/* Please, note that reserved2 is used for overflow frames */
/*50-51 */ unsigned short reserved2; /* reserved for future use */

/*52 */ unsigned char DceInput; /* Status of DCE input stage */
/*53 */ unsigned char DceOutput; /* Status of DCE output buffer */
/* FrameErr1 and FrameErr2 are currently not used in MEX */
/*54 */ unsigned char FrameErr1; /* Frame Error Number 1 */
/*55 */ unsigned char FrameErr2; /* Frame Error Number 2 */
/*56 */ unsigned char Gob1; /* GOB Number1 */
/*57 */ unsigned char Gob2; /* GOB Number 2 */
/*58 */ unsigned char Gob3; /* GOB Number 3 */
/* Please, note that DSS is used for DU_THERM_REF, K + 173.15 */
/*59 */ unsigned char DSS; /* Deep space station id */
/*60 */ unsigned char DecmpErr1; /* Decompression error 1 */
/*61 */ unsigned char DecmpErr2; /* Decompression error 2 */
/*62 */ unsigned char DecmpErr3; /* Decompression error 3 */
/* Please, note that FillerFlag is used for New gain number */
/*63 */ unsigned char FillerFlag; /* Filler bits exist or not */
/* Please, note that reserved3 is used for First pixel with the new gain */
/*64-67 */ unsigned int reserved3; /* reserved for future use */
}
```



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}  
hrpref\_typ;