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# Rosetta

## ***VIRTIS Instrument Simulation and Validation Tool***

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## ROSETTA/VIRTIS

### ACRONYM & ABBREVIATION LIST

AD	Applicable Document
AI	Action Item
ASI	Agenzia Spaziale Italiana
CDR	Critical Design Review
C&DH	Command and Data Handling
CICD	Communication Interface Control Document
CIDL	Configuration Item Data List
EDAC	Error Detection And Correction
EGSE	Electrical Ground Support Equipment
EM	Electrical Model
ESA	European Space Agency
FM	Flight Model
FSW	Flight SW
GA	Galileo Avionica
HEX	Hexadecimal format
HK	Housekeeping
HW	Hardware
HSSL	High Speed Serial Link
IF	Interface
IR	Infrared
INAF	Istituto Nazionale di Astrofisica
ITAR	International Traffic in Arms Regulations
JSOC	Juno Science Operations Center (at SwRI, Texas)
JPL	Jet Propulsion Laboratory
JIRAM	Jovian Infrared Auroral Mapper
LM	Lockheed Martin
LSSL	Low Speed Serial Link
NA	Not Applicable
NASA	National Aeronautics and Space Administration
PI	Principal Investigator
RD	Reference Document
RID	Review Item Discrepancy
SC	Spacecraft
SCR	SW Change Request
SDD	SW Design Document

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## DOCUMENT CHANGE LOG

Issue	Date	Pages/Paragraphs affected	Changes Description

## REFERANCE DOCUMENTS

The following documents shall be used as reference background and support information. These documents are herein referred as [RD-XX].

<i>Id</i>	<i>Document Number</i>	<i>Description</i>

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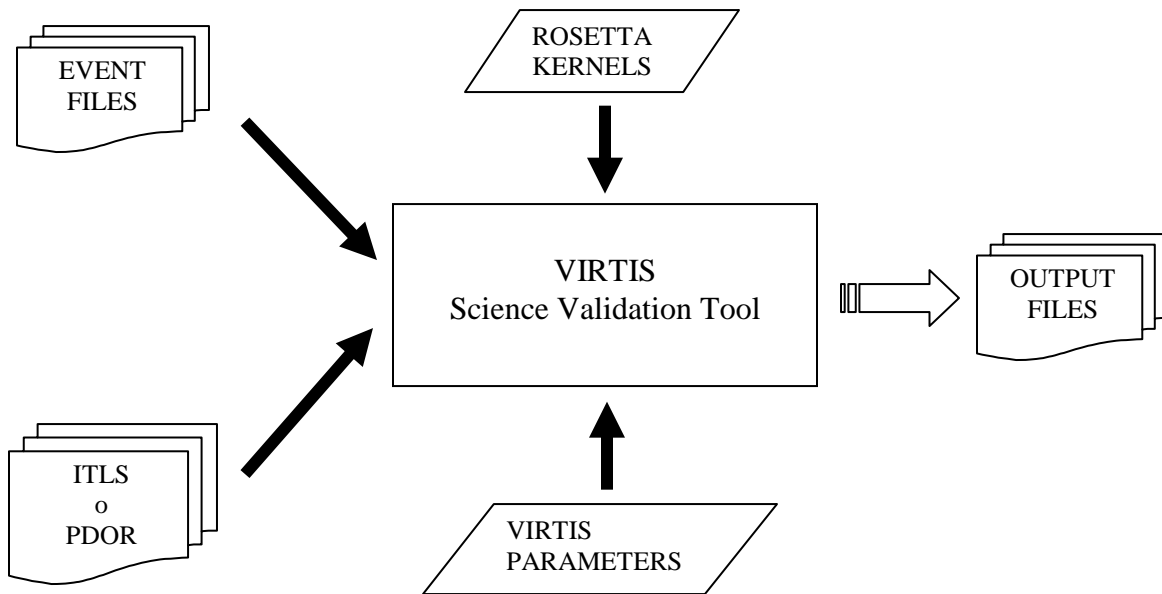
## **1 PURPOSE OF THIS DOCUMENT**

This document provides a detailed description of the SW architecture for the validation of the VIRTIS command sequences.

The requirements specified here are subject to revision during routine Operations. In the event that a supplier believes that parts of the specified requirements would not apply, or additional requirements are necessary, such recommendations shall be submitted to INAF with substantiating analyses and documentation, for consideration and analysis.

## 2 SOFTWARE ARCHITECTURES

### 2.1 TOP LEVEL ARCHITECTURE



**Fig. 2.1**  
**Science Validation Tool Architecture**

VIRTIS Science Validation Tool has been designed to analyze both ITL and PDOR files. ITL file format is official product to support the VIRTIS Operation in routine, while the PDOR file will be used mainly for Test Purposes, like the first instrument Power on after the hibernation phase.

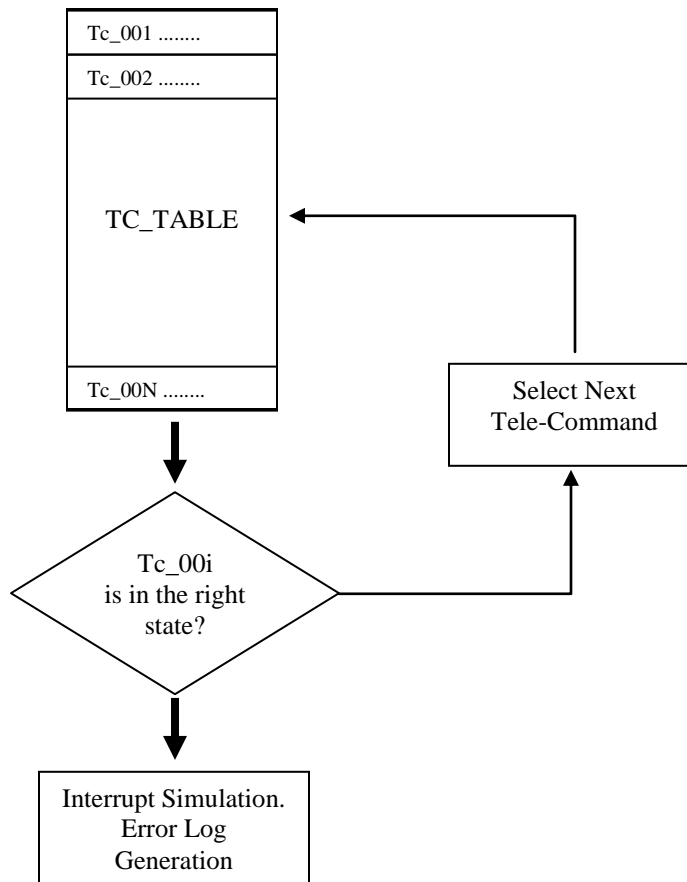
The scheme of Fig. 2.1 shows the main Inputs/Outputs of the Tool. In the next paragraphs and chapters detailed description of each single unit will be carried out.





### 3 TELE-COMMAND TABLE CHECK

This check is needed in order to verify that the VIRTIS Tele-Commands, within the operative sequences of the Timeline, are executed in the allowed instrument state. In case of anomalous event, an error message will be visualized and the Sequence simulation will be stopped.





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### 4 CHECK TELE-COMMAND SAFE TIMING

In this block the time between each Tele-Command is checked in order to avoid unwanted rejection by the onboard SW. Below to this chapter there is a detailed list of execution time per each Tele-Command.

```
ZDM10144 SpecialSW_Tc_100_DurationSec = 120;  
ZDMD0011 SpecialSW_Tc_101_DurationSec = 30;  
ZDMX0058 SpecialSW_Tc_103_DurationSec = 5;  
ZDMX0213 SpecialSW_Tc_105_DurationSec = 10;  
ZDMX0224 SpecialSW_Tc_106_DurationSec = 10;  
ZPWM2394 SpecialSW_Tc_117_DurationSec = 10;  
ZPWM2395 SpecialSW_Tc_118_DurationSec = 10;  
ZPWM3395 SpecialSW_Tc_130_DurationSec = 60;  
ZPWMA101 SpecialSW_Tc_131_DurationSec = 10;  
ZPWMA358 SpecialSW_Tc_133_DurationSec = 10;  
ZPWMA359 SpecialSW_Tc_134_DurationSec = 10;  
ZPWMB101 SpecialSW_Tc_135_DurationSec = 15;  
ZPWMB358 SpecialSW_Tc_137_DurationSec = 15;  
ZPWMB359 SpecialSW_Tc_138_DurationSec = 60;  
ZSKA8121 SpecialSW_Tc_140_DurationSec = 355;  
ZVR00000 SpecialSW_Tc_142_DurationSec = 10;  
ZVR00037 SpecialSW_Tc_149_DurationSec = 30;  
ZVR00038 SpecialSW_Tc_150_DurationSec = 30;  
ZVR00106 SpecialSW_Tc_158_DurationSec = 5;  
ZVR00107 SpecialSW_Tc_159_DurationSec = 5;  
ZVR00110 SpecialSW_Tc_160_DurationSec = 15;  
ZVR00111 SpecialSW_Tc_161_DurationSec = 60;  
ZVR00113 SpecialSW_Tc_162_DurationSec = 10;  
ZVR00114 SpecialSW_Tc_163_DurationSec = 10;  
ZVR00117 SpecialSW_Tc_165_DurationSec = 10;  
ZVR00120 SpecialSW_Tc_166_DurationSec = 120;  
ZVR00123 SpecialSW_Tc_168_DurationSec = 30;  
ZVR00124 SpecialSW_Tc_169_DurationSec = 30;  
ZVR00125 SpecialSW_Tc_170_DurationSec = 10;  
ZVR00126 SpecialSW_Tc_171_DurationSec = 10;  
ZVR00130 SpecialSW_Tc_174_DurationSec = 2;  
ZVR00131 SpecialSW_Tc_175_DurationSec = 120;  
ZVR00134 SpecialSW_Tc_177_DurationSec = 30;  
ZVR00135 SpecialSW_Tc_178_DurationSec = 30;  
ZVR00136 SpecialSW_Tc_179_DurationSec = 10;  
ZVR00137 SpecialSW_Tc_180_DurationSec = 10;  
ZVR00141 SpecialSW_Tc_183_DurationSec = 2;  
ZVR00039 SpecialSW_Tc_189_DurationSec = 5;  
ZVR00040 SpecialSW_Tc_190_DurationSec = 5;  
ZVR00118 SpecialSW_Tc_191_DurationSec = 1800;  
ZVR00119 SpecialSW_Tc_192_DurationSec = 1800;
```

1	2	3	4	5	6 ÷ 44	45	46	47	48	49	50	51
Time Relative "SPK"	Time Absolute "ITL time"	Spare	Sequence Code	Sequence Type	..... .....	Number of Parameters	Parameter Type	Parameter Code	Parameter Value	Parameter Type	Parameter Code	Parameter Value
4501908 67,1	630	NaN	1024	1	NaN	2	1	51	1	1	53	5

Time Relative SPK:

Time Absolute "ITL":

Sequence Code:

Sequence Type:

Number Of Parameters

Parameter Type

Parameter Code

Parameter Value

Tempo in secondi universale

Tempo Presente nel File ITL

Codice Sequenza da me definito

1=FOP, 2=Tele-Command

Numero di parametri da caricare

1=DEC, 2=HEX

Vero Codice presente nelle FOP

Valore

## VIR\_STATE

1	M-PEM	0
2	M-COOLER	0
3	H-PEM	0
4	H-COOLER	0
5	Spare	0
6	ME	0
7	M-COVER	0
8	H-COVER	0

0 = OFF, 1 = ON

1	2	3
Parameter Type	Parameter Code	Parameter Value
1	51	1
1	53	5

Parameter Type

Parameter Code

Parameter Value

1=DEC, 2=HEX

Vero Codice presente nelle FOP

Valore