
SYSTEM DESCRIPTION DOCUMENT

FOR

Universe

June 11, 2014

Prepared For:

Prepared By:

Colin George

Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

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Universe

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- 1 Metafunction

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1 Verify cables meet requirements

Refined By Subordinate Requirements:

- 1.1 CD Functional Requirement
- 1.1.5 ES Requirements Normal Environments
- 1.2 The Test system shall not consume more than 48 sq./ft. of floor space by the sum of components in use during testing

Basis Of:

Function: 1.1 Verify Requirements set

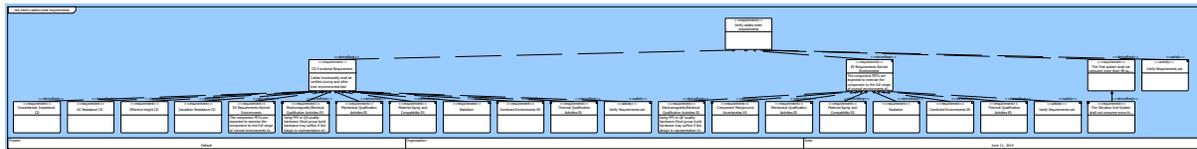


Figure 1 Verify cables meet requirements Requirements Diagram

1.1 CD Functional Requirement

Requirement Statement:

Cables functionality shall be verified during and after ever environmental test

Refines Higher-Level Requirement:

- 1 Verify cables meet requirements

Refined By Subordinate Requirements:

- 1.1.1 Characteristic Impedance CD
- 1.1.2 DC Resistance CD
- 1.1.3 Effective height CD
- 1.1.4 Insulation Resistance CD
- 1.1.5 ES Requirements Normal Environments
 - 1.1.5.1 Electromagnetic/Electrical Qualification Activities ES
 - 1.1.5.3 Mechanical Qualification Activities ES
 - 1.1.5.4 Material Aging and Compatibility ES
 - 1.1.5.5 Radiation
 - 1.1.5.6 Combined Environments ES
 - 1.1.5.7 Thermal Qualification Activities ES

Basis Of:

Function: 1.1 Verify Requirements set

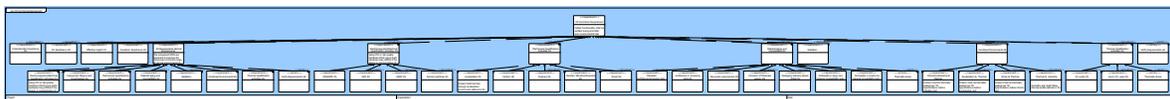


Figure 2 CD Functional Requirement Requirements Diagram

1.1.5 ES Requirements Normal Environments

Requirement Statement:

2 Originating Requirements

The component PRTs are expected to exercise the component to the full range of normal environments identified in this document. MC parts **shall** have this body of evidence for normal environments.

Refines Higher-Level Requirement:

- 1 Verify cables meet requirements
- 1.1 CD Functional Requirement

Refined By Subordinate Requirements:

- 1.1.5.1 Electromagnetic/Electrical Qualification Activities ES
- 1.1.5.2 Component Margins and Uncertainties ES
- 1.1.5.3 Mechanical Qualification Activities ES
- 1.1.5.4 Material Aging and Compatibility ES
- 1.1.5.5 Radiation
- 1.1.5.6 Combined Environments ES
- 1.1.5.7 Thermal Qualification Activities ES

Basis Of:

Function: 1.1 Verify Requirements set

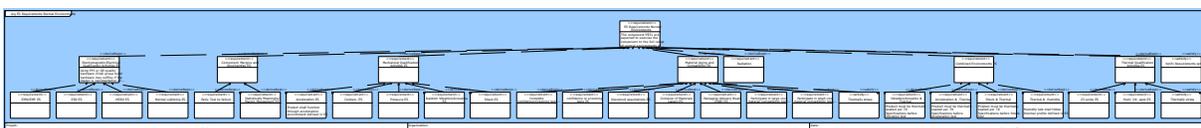


Figure 3 ES Requirements Normal Environments Requirements Diagram

1.1.5.2.2.4 simple finite element analysis ES c.

Refines Higher-Level Requirement:

- 1.1.5.2.2 Statistically Meaningful Margin Mssessment ES

Basis Of:

Function: 1.1.5 Identify Mode's

1.1.5.3.1 Acceleration ES

Requirement Statement:

Product shall function through acceleration environment defined in ES

Refines Higher-Level Requirement:

- 1.1.5.3 Mechanical Qualification Activities ES

Refined By Subordinate Requirements:

- 1.1.5.3.1.1 Aircraft carriage Env ES
- 1.1.5.3.1.2 Free Flight Env ES
- 1.1.5.3.1.3 MSS
- 1.1.5.3.1.4 Storage to loading Env ES

Basis Of:

Function: 1.1.2 Shock

2 Originating Requirements

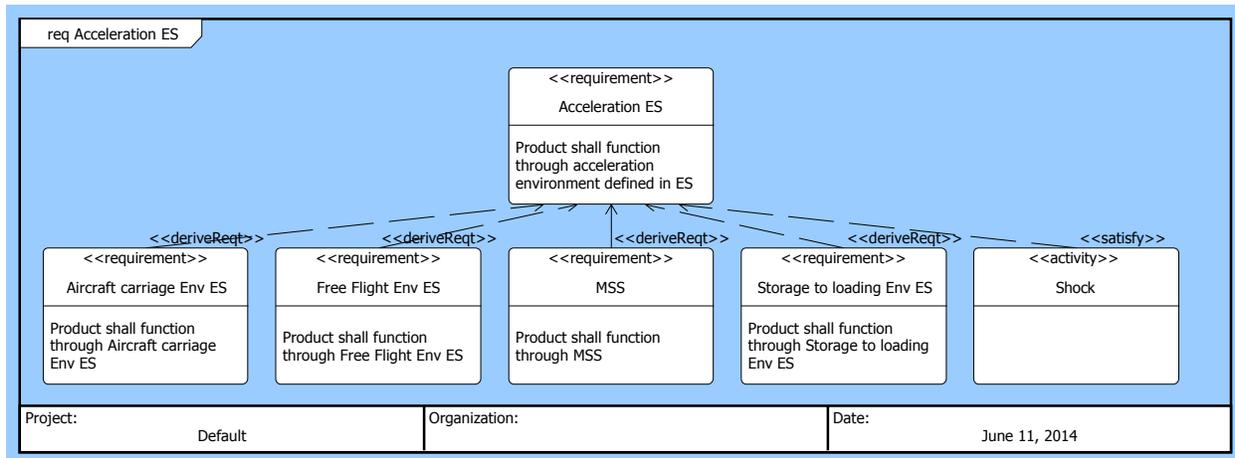


Figure 4 Acceleration ES Requirements Diagram

1.1.5.3.4 Random Vibration/Acoustica ES

Refines Higher-Level Requirement:

1.1.5.3 Mechanical Qualification Activities ES

Refined By Subordinate Requirements:

1.1.5.3.4.1 Chatter

1.1.5.3.4.2 Tests shall be run in the order listed in TK

1.1.5.3.4.3 Units shall be subjected to the vibration criteria listed in TK

1.1.5.3.4.4 Vibration criteria shall be preserved/verified (not amplified or dampened) at product and fixturing interface.

1.1.5.3.4.5 Vibration monitoring shall be sensitive to levels within vibration test tolerances defined in TK

1.1.5.3.4.6 Vibration shall be controled per vibration test tolerances listed in TK

1.1.5.3.4.7 Operator shall be able to verify chatter requirments during test

1.1.5.3.4.8 Product performance data shall not be contaminated by Vibration Subsystem components

1.1.5.3.4.9 The Vibration Sub-System shall not consume more than 48 sq./ft. of floor space

Basis Of:

Function: 1.1.3 Vibrate

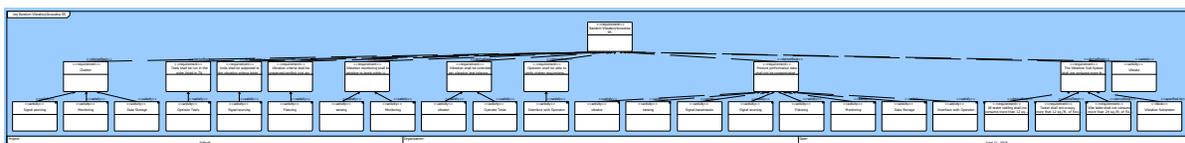


Figure 5 Random Vibration/Acoustica ES Requirements Diagram

1.1.5.3.4.1 Chatter

Refines Higher-Level Requirement:

1.1.5.3.4 Random Vibration/Acoustica ES

Basis Of:

Function: 1.1.3.4 Signal sourcing

2 Originating Requirements

Function: 1.1.3.6 Monitoring
Function: 1.1.3.7 Data Storage

1.1.5.3.4.2 Tests shall be run in the order listed in TK

Refines Higher-Level Requirement:
1.1.5.3.4 Random Vibration/Acoustica ES
Basis Of:
Function: 1.3 Operate Tests

1.1.5.3.4.3 Units shall be subjected to the vibration criteria listed in TK

Refines Higher-Level Requirement:
1.1.5.3.4 Random Vibration/Acoustica ES
Basis Of:
Function: 1.1.3.4 Signal sourcing

1.1.5.3.4.4 Vibration criteria shall be preserved/verified (not amplified or dampened) at product and fixturing interface.

Refines Higher-Level Requirement:
1.1.5.3.4 Random Vibration/Acoustica ES
Basis Of:
Function: 1.1.3.5 Fixturing

1.1.5.3.4.5 Vibration monitoring shall be sensitive to levels within vibration test tolerances defined in TK

Refines Higher-Level Requirement:
1.1.5.3.4 Random Vibration/Acoustica ES
Basis Of:
Function: 1.1.3.2 sensing
Function: 1.1.3.6 Monitoring

1.1.5.3.4.6 Vibration shall be controled per vibration test tolerances listed in TK

Refines Higher-Level Requirement:
1.1.5.3.4 Random Vibration/Acoustica ES
Basis Of:
Function: 1.1.3.1 vibrator
Function: 1.3 Operate Tests

1.1.5.3.4.7 Operator shall be able to verify chatter requirments during test

Refines Higher-Level Requirement:
1.1.5.3.4 Random Vibration/Acoustica ES
Basis Of:

2 Originating Requirements

Function: 1.1.3.8 Interface with Operator

1.1.5.3.4.8 Product performance data shall not be contaminated by Vibration Subsystem components

Refines Higher-Level Requirement:

1.1.5.3.4 Random Vibration/Acoustics ES

Basis Of:

- Function: 1.1.3.1 vibrator
- Function: 1.1.3.2 sensing
- Function: 1.1.3.3 Signal transmission
- Function: 1.1.3.4 Signal sourcing
- Function: 1.1.3.5 Fixturing
- Function: 1.1.3.6 Monitoring
- Function: 1.1.3.7 Data Storage
- Function: 1.1.3.8 Interface with Operator

1.1.5.3.5 Shock ES

Refines Higher-Level Requirement:

1.1.5.3 Mechanical Qualification Activities ES

Refined By Subordinate Requirements:

- 1.1.5.3.1.1 Aircraft carriage Env ES
- 1.1.5.3.1.2 Free Flight Env ES
- 1.1.5.3.1.3 MSS
- 1.1.5.3.1.4 Storage to loading Env ES

Basis Of:

Function: 1.1.2 Shock

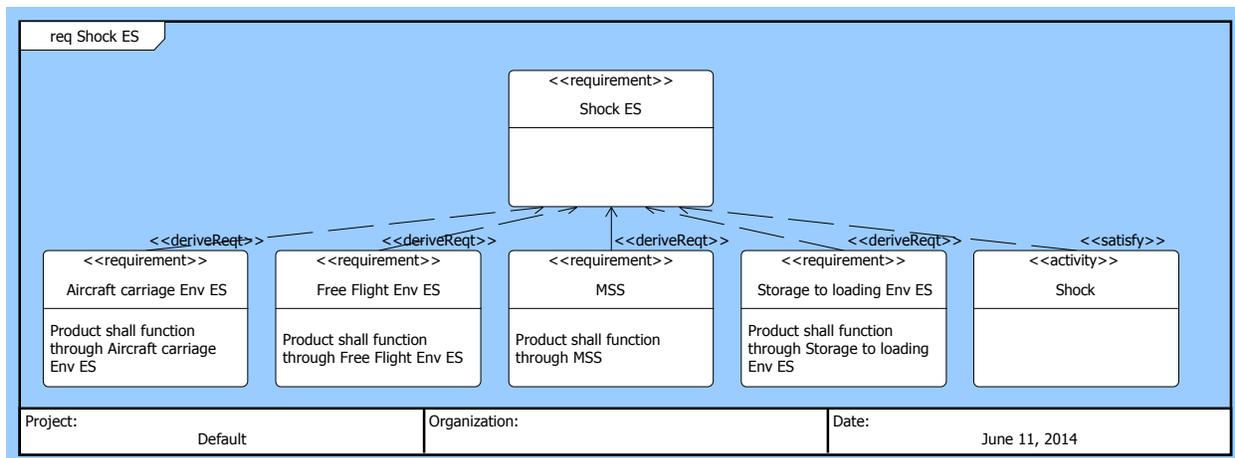


Figure 6 Shock ES Requirements Diagram

1.1.5.4 Material Aging and Compatibility ES

Refines Higher-Level Requirement:

2 Originating Requirements

- 1.1 CD Functional Requirement
- 1.1.5 ES Requirements Normal Environments

Refined By Subordinate Requirements:

- 1.1.5.4.1 Complete confidence/screening testing and analyze data ES
- 1.1.5.4.2 confidence or screening tests ES
- 1.1.5.4.3 Document assumptions ES
- 1.1.5.4.4 Inclusion of Materials Liaison ES
- 1.1.5.4.5 Packaging Advisory Board (PAB) ES
- 1.1.5.4.6 Participate in large core material compatibility testing ES
- 1.1.5.4.7 Participate in small core material compatibility testing ES

Basis Of:

Function: 1.1.1 Thermally stress

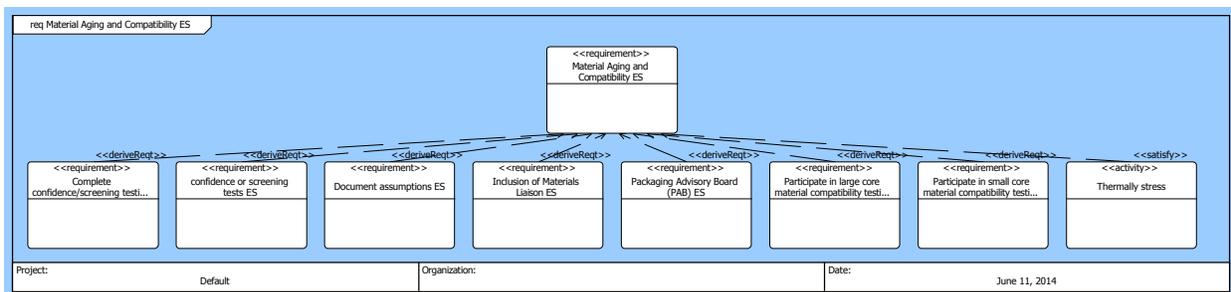


Figure 7 Material Aging and Compatibility ES Requirements Diagram

1.1.5.6.1 Vibration/Acoustics & Thermal

Requirement Statement:

Product must be thermally soaked per TK Specifications before Vibration test

Refines Higher-Level Requirement:

1.1.5.6 Combined Environments ES

Basis Of:

Function: 1.1.3 Vibrate

1.1.5.6.2 Acceleration & Thermal

Requirement Statement:

Product must be thermally soaked per TK Specifications before Acceleration test

Refines Higher-Level Requirement:

1.1.5.6 Combined Environments ES

Basis Of:

Function: 1.1.2 Shock

1.1.5.6.3 Shock & Thermal

Requirement Statement:

Product must be thermally soaked per TK Specifications before Shock test

Refines Higher-Level Requirement:

2 Originating Requirements

1.1.5.6 Combined Environments ES

Basis Of:

Function: 1.1.2 Shock

1.1.5.6.4 Thermal & Humidity

Requirement Statement:

Humidity test shall follow thermal profile defined in ES

Refines Higher-Level Requirement:

1.1.5.6 Combined Environments ES

Basis Of:

Function: 1.1.4 Expose to humidity

1.1.5.7 Thermal Qualification Activities ES

Refines Higher-Level Requirement:

1.1 CD Functional Requirement

1.1.5 ES Requirements Normal Environments

Refined By Subordinate Requirements:

1.1.5.7.1 **cycles** ES

1.1.5.7.2 Hum/ Int. gass ES

Basis Of:

Function: 1.1.1 Thermally stress

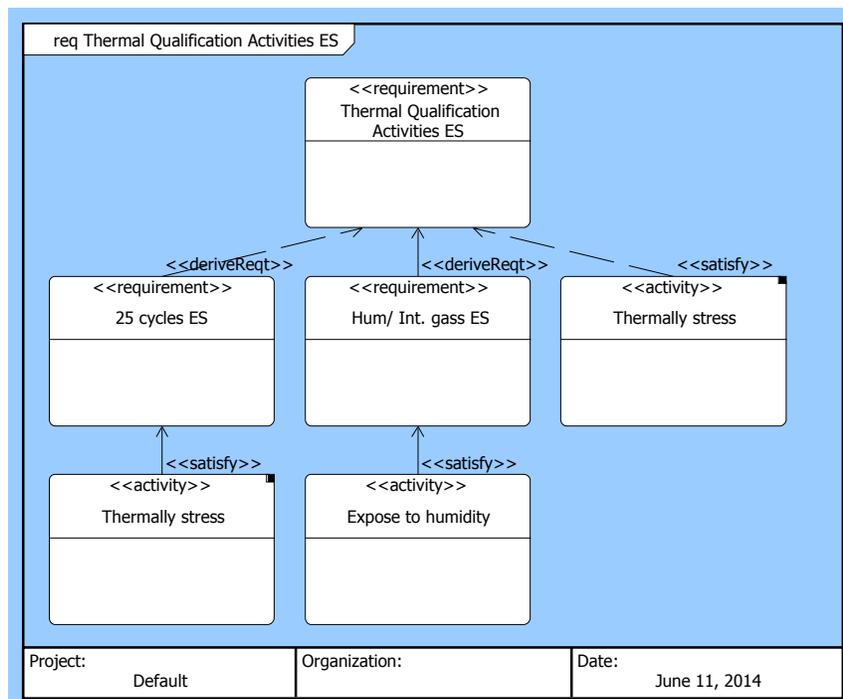


Figure 8 Thermal Qualification Activities ES Requirements Diagram

2 Originating Requirements

1.1.5.7.1 **cycles** ES

Refines Higher-Level Requirement:

1.1.5.7 Thermal Qualification Activities ES

Basis Of:

Function: 1.1.1 Thermally stress

1.1.5.7.2 **Hum/ Int. gass** ES

Refines Higher-Level Requirement:

1.1.5.7 Thermal Qualification Activities ES

Basis Of:

Function: 1.1.4 Expose to humidity

3 Design Constraints

4 Performance Requirements

5 Concerns & Decisions

6 Risks

7 Use Cases

8 Functional Behavior Model

Part I - Hierarchical Function List

- 1 Metafunction
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 - 1.1.1 Thermally stress
 - 1.1.2 Shock
 - 1.1.3 Vibrate
 - 1.1.3.1 vibrator
 - 1.1.3.2 sensing
 - 1.1.3.3 Signal transmission
 - 1.1.3.4 Signal sourcing
 - 1.1.3.5 Fixturing
 - 1.1.3.6 Monitoring
 - 1.1.3.7 Data Storage
 - 1.1.3.8 Interface with Operator
 - 1.1.4 Expose to humidity
 - 1.1.5 Identify Mode's
 - 1.2 Define Test Parameters
 - 1.3 Operate Tests
 - 1.4 House System
 - 1.5 Represent Product

Part II - Behavior Model

1 Metafunction

Allocated To:

- 1 Universe

8 Functional Behavior Model

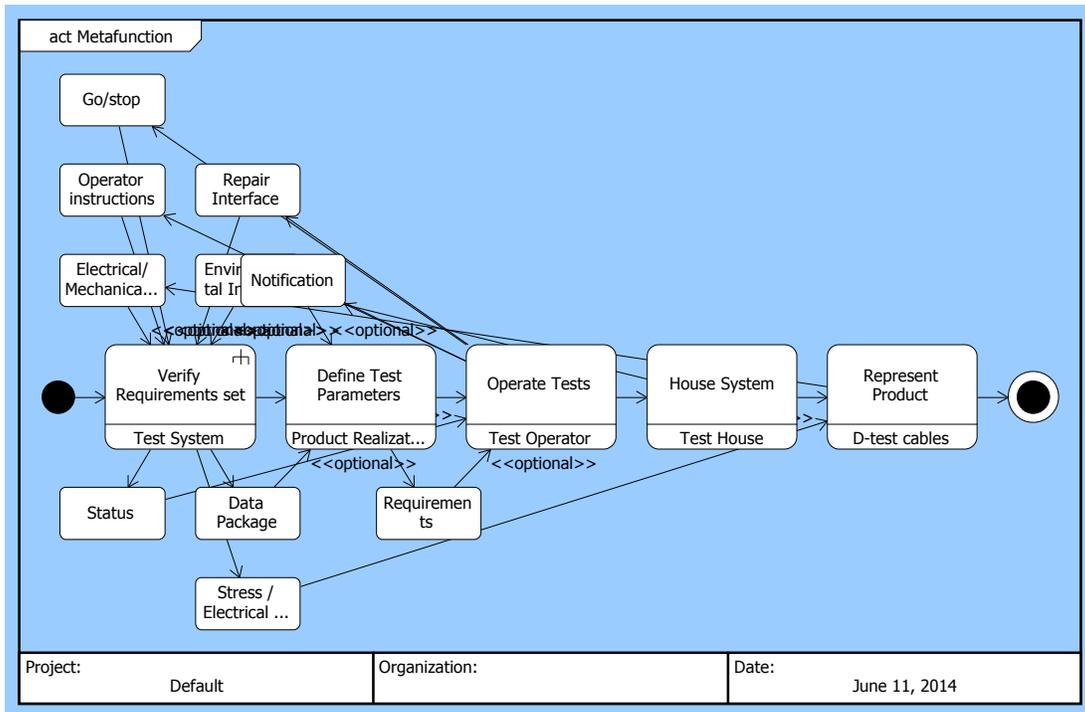


Figure 9 Metafunction (Activity Diagram)

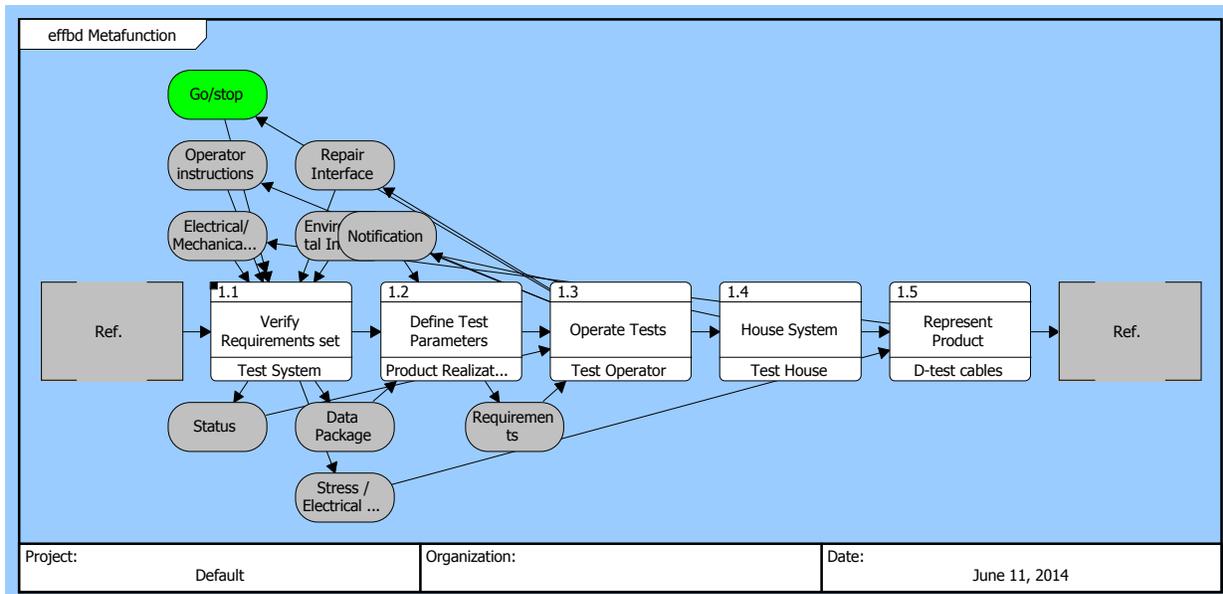


Figure 10 Metafunction (Enhanced FFBD)

8 Functional Behavior Model

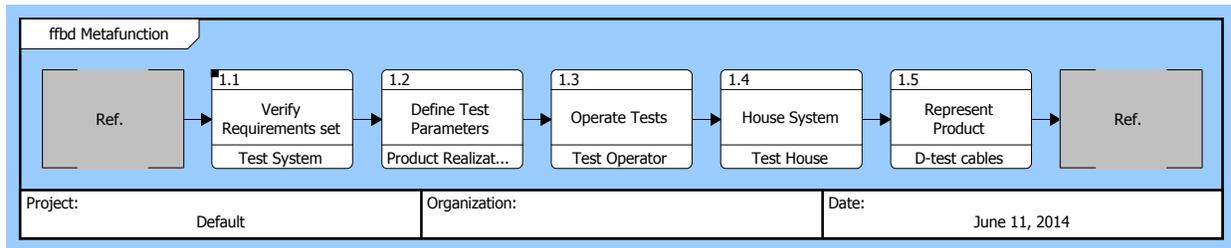


Figure 11 Metafunction (FFBD)

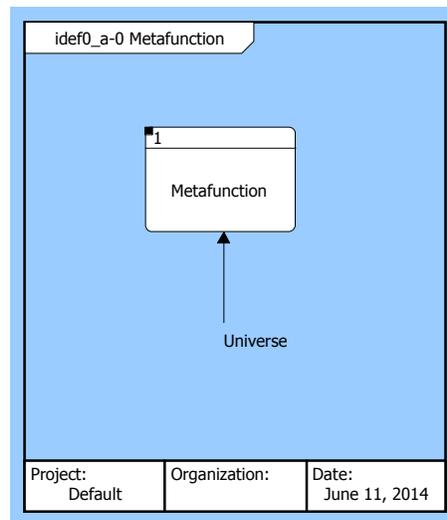


Figure 12 Metafunction (IDEF0 A-0 Context Diagram)

8 Functional Behavior Model

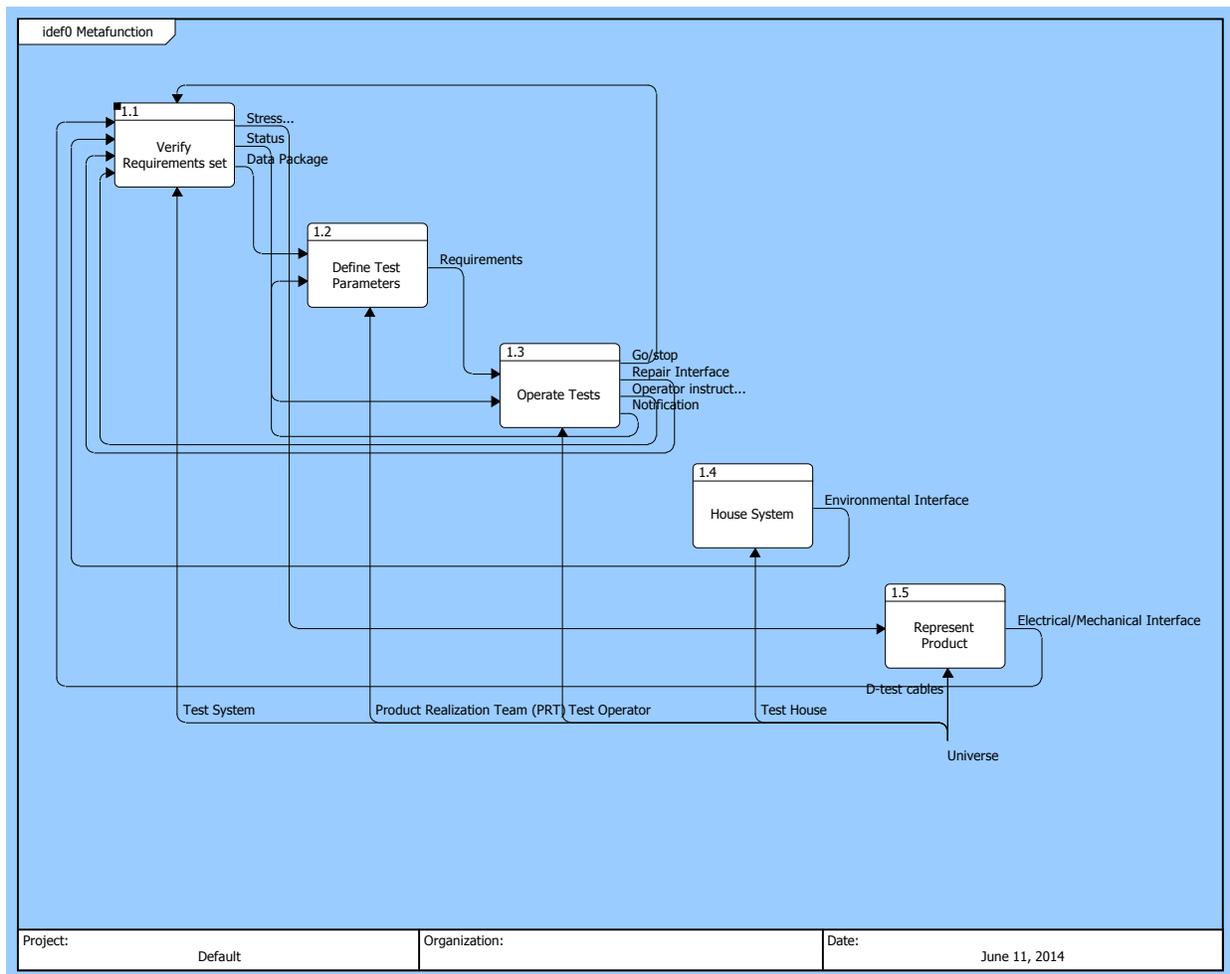


Figure 13 Metafunction (IDEF0 Diagram)

8 Functional Behavior Model

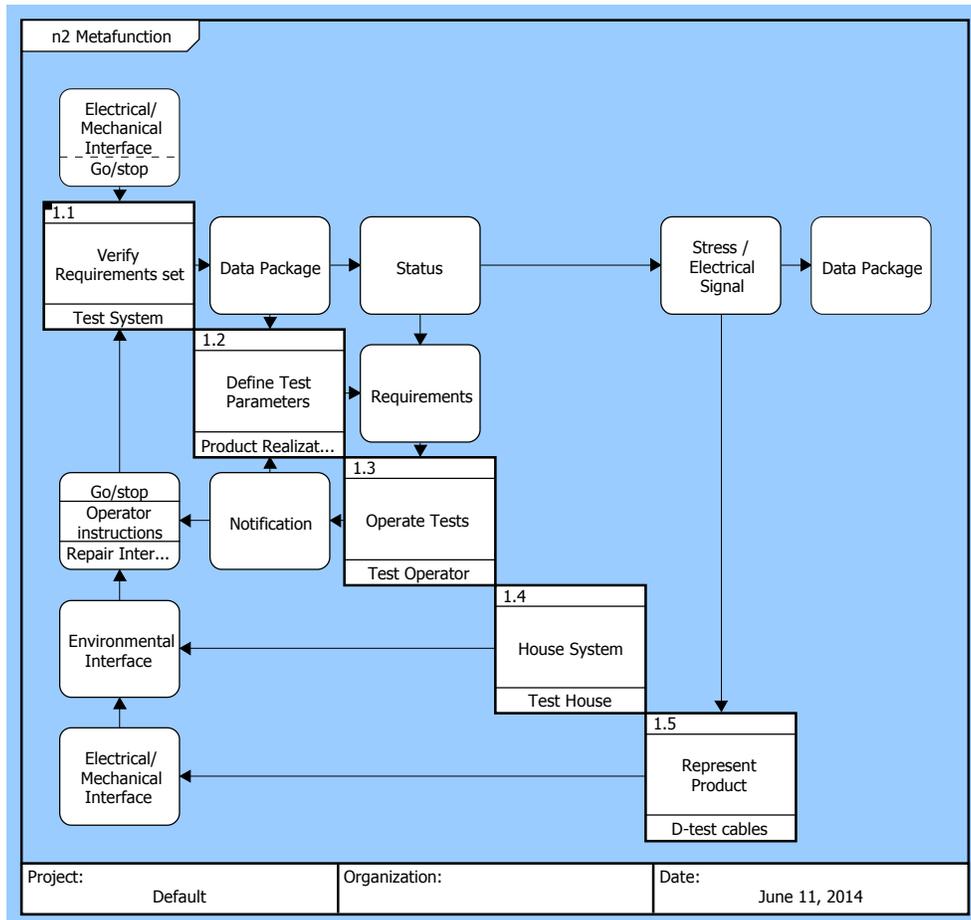


Figure 14 Metafunction (N2 Diagram)

8 Functional Behavior Model

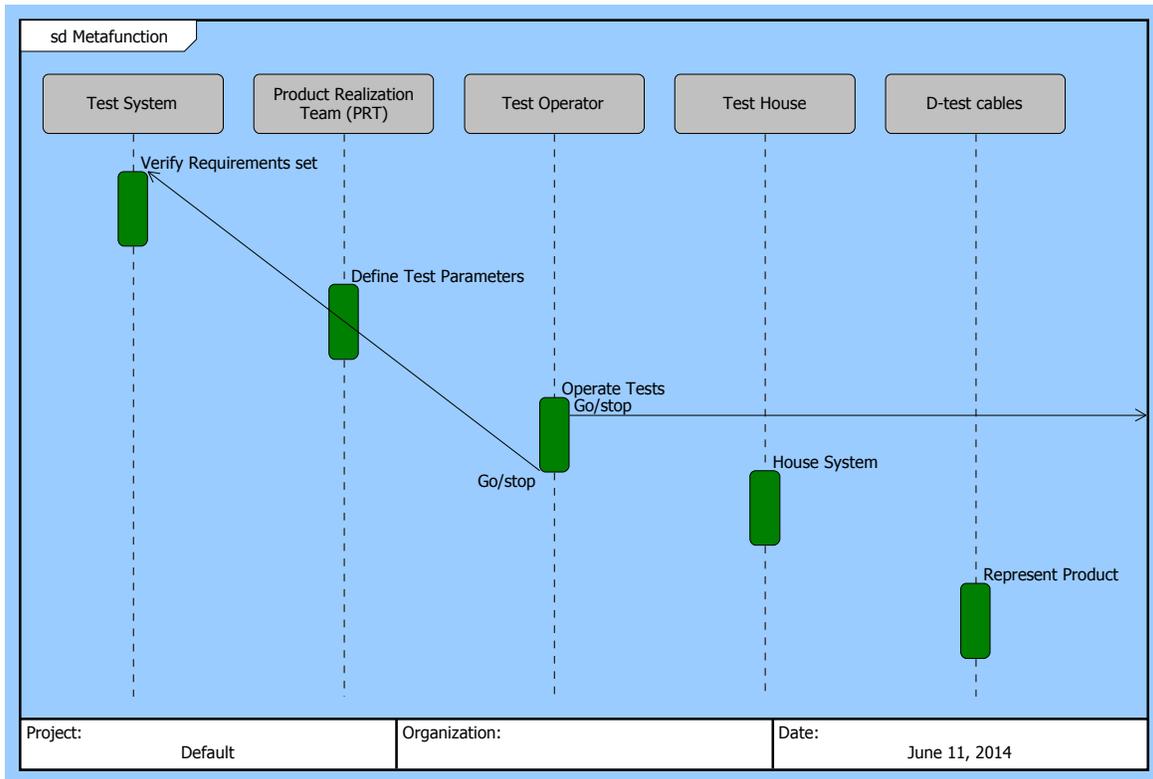


Figure 15 Metafunction (Sequence Diagram)

1.1 Verify Requirements set

Allocated To:

- 1.5 Test System

Based On:

- 1 Verify cables meet requirements
- 1.1 CD Functional Requirement
- 1.1.5 ES Requirements Normal Environments

Table 1 1.1 Verify Requirements set Interfacing Items

Interfacing Items	Source / Destination
Data Package	Input To: 1.1.3.8 Interface with Operator 1.2 Define Test Parameters Output From: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.7 Data Storage 1.1.4 Expose to humidity

8 Functional Behavior Model

Table 1 1.1 Verify Requirements set Interfacing Items

Interfacing Items	Source / Destination
	1.1.5 Identify Mode's
Electrical/Mechanical Interface	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.3 Signal transmission 1.1.3.5 Fixturing 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.1.5 Identify Mode's 1.5 Represent Product
Environmental Interface	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.5 Fixturing 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.4 House System
Go/stop	Triggers Function(s): 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.4 Signal sourcing 1.1.3.6 Monitoring 1.1.3.7 Data Storage 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.1.3.8 Interface with Operator 1.3 Operate Tests
Operator instructions	Input To:

8 Functional Behavior Model

Table 1 1.1 Verify Requirements set Interfacing Items

Interfacing Items	Source / Destination
	1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.3 Operate Tests
Repair Interface	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.2 sensing 1.1.3.3 Signal transmission 1.1.3.4 Signal sourcing 1.1.3.5 Fixturing 1.1.3.6 Monitoring 1.1.3.7 Data Storage 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.3 Operate Tests
Status	Input To: 1.3 Operate Tests Output From: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity 1.1.5 Identify Mode's
Stress / Electrical Signal	Input To: 1.5 Represent Product Output From:

8 Functional Behavior Model

Table 1 1.1 Verify Requirements set Interfacing Items

Interfacing Items	Source / Destination
	1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.3 Signal transmission 1.1.3.5 Fixturing 1.1.4 Expose to humidity

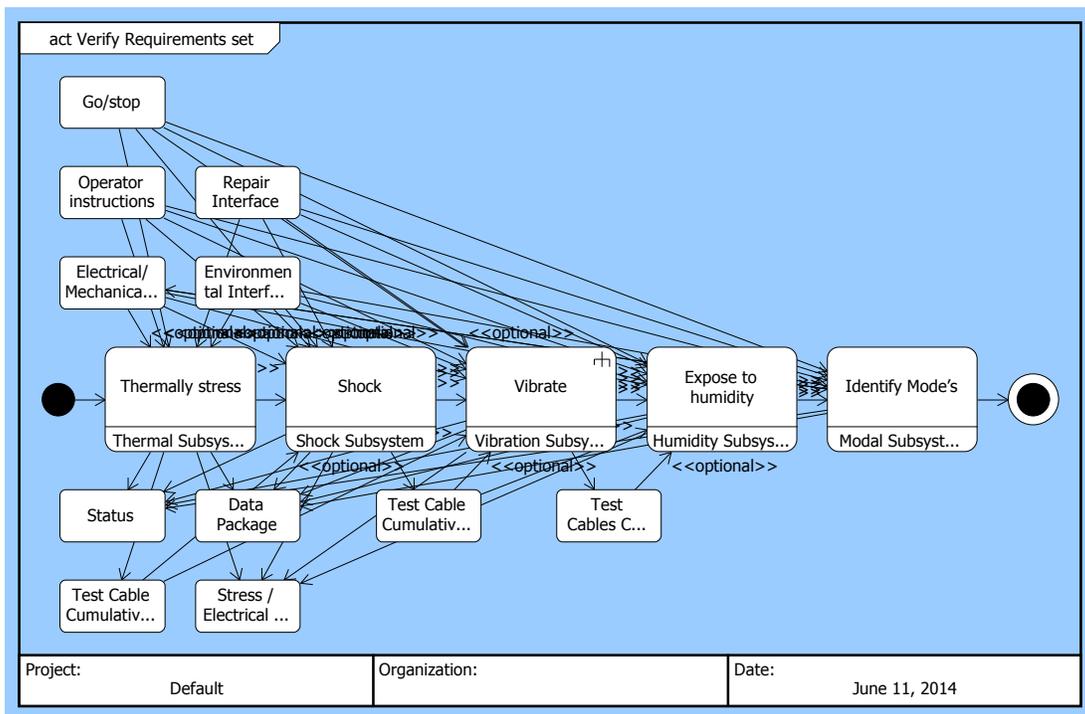


Figure 16 Verify Requirements set (Activity Diagram)

8 Functional Behavior Model

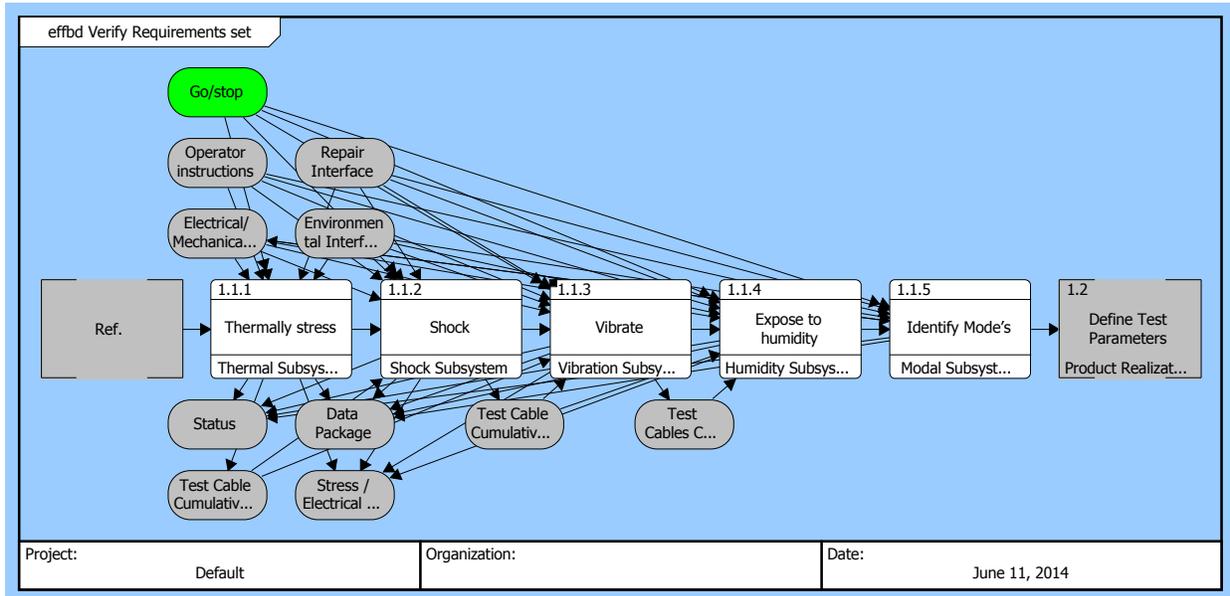


Figure 17 Verify Requirements set (Enhanced FFBD)

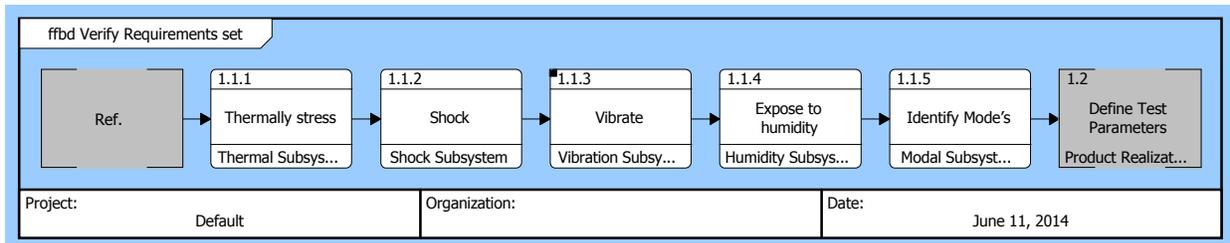


Figure 18 Verify Requirements set (FFBD)

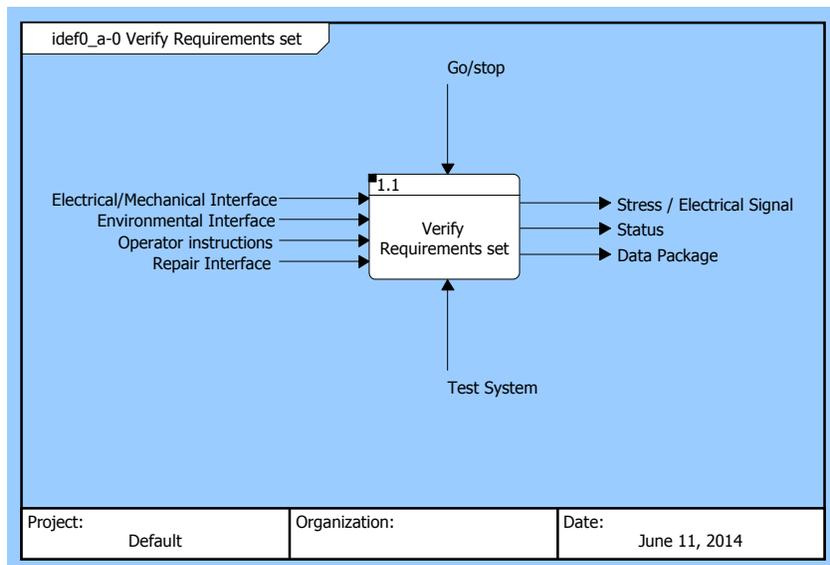


Figure 19 Verify Requirements set (IDEF0 A-0 Context Diagram)

8 Functional Behavior Model

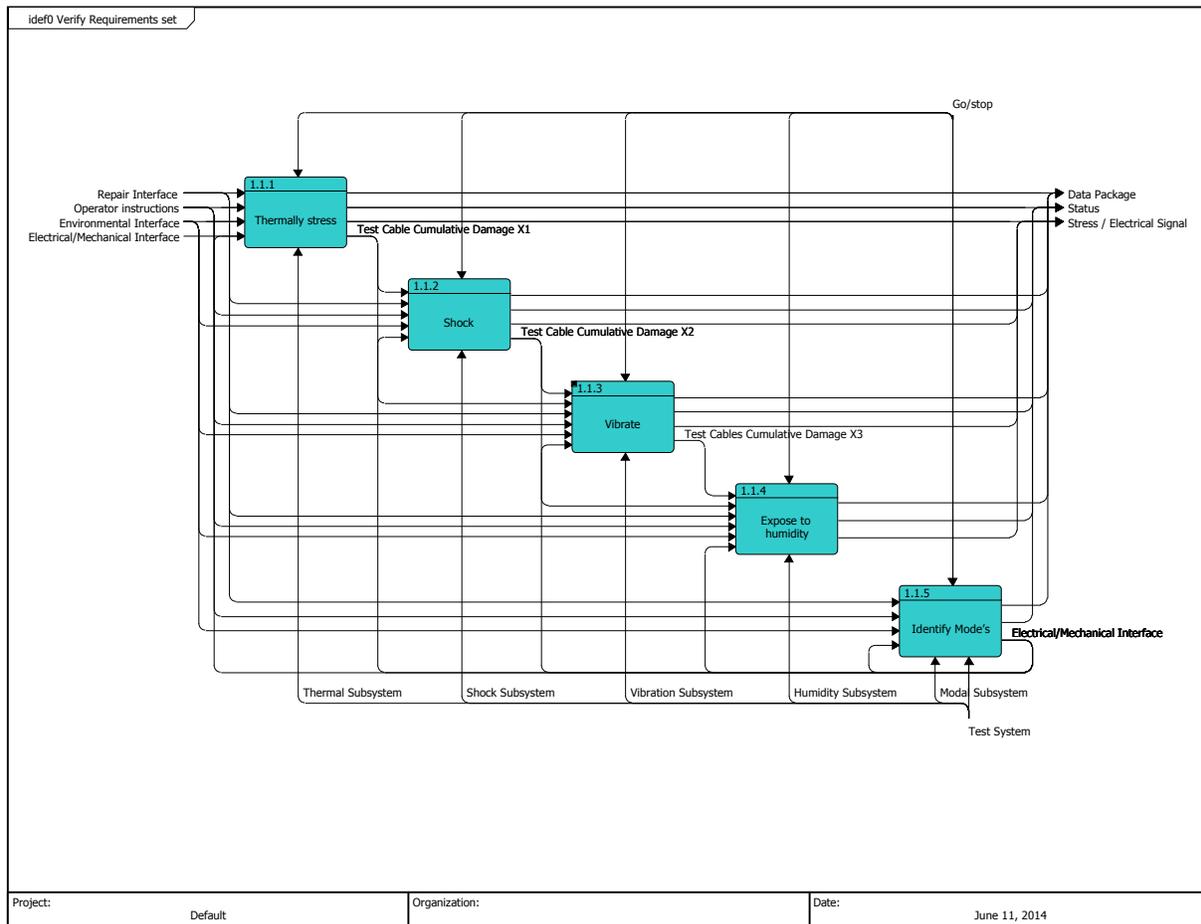


Figure 20 Verify Requirements set (IDEF0 Diagram)

8 Functional Behavior Model

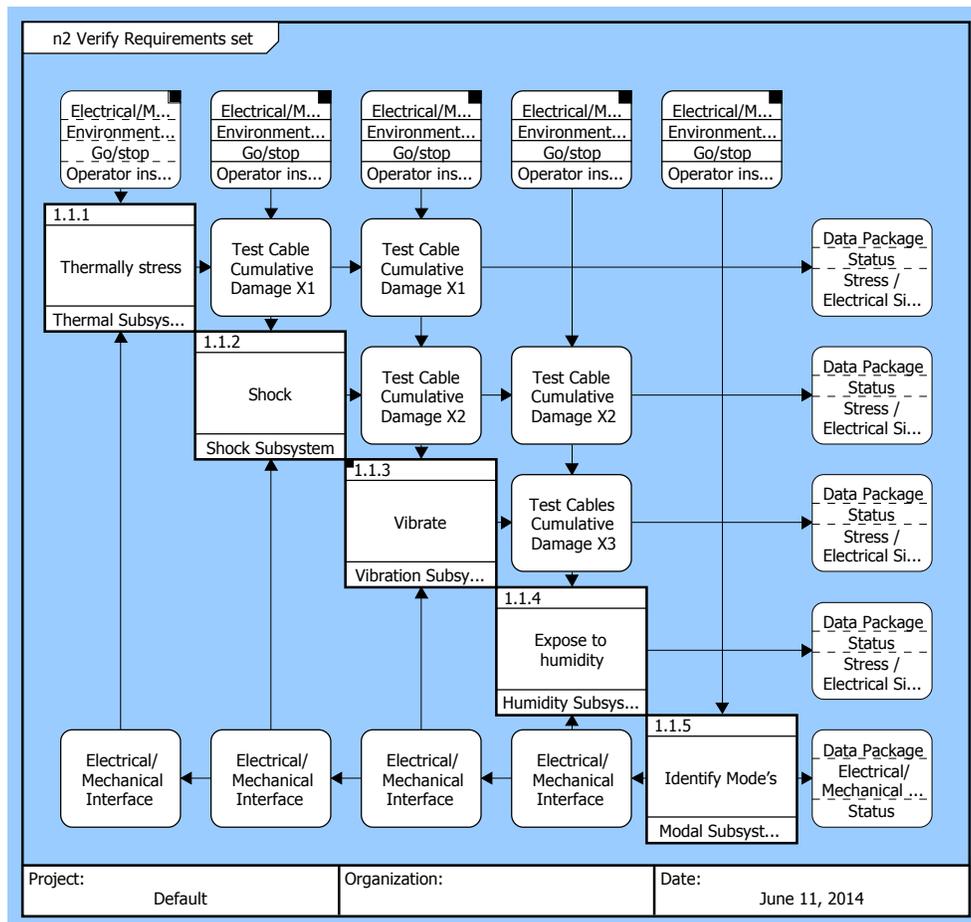


Figure 21 Verify Requirements set (N2 Diagram)

8 Functional Behavior Model

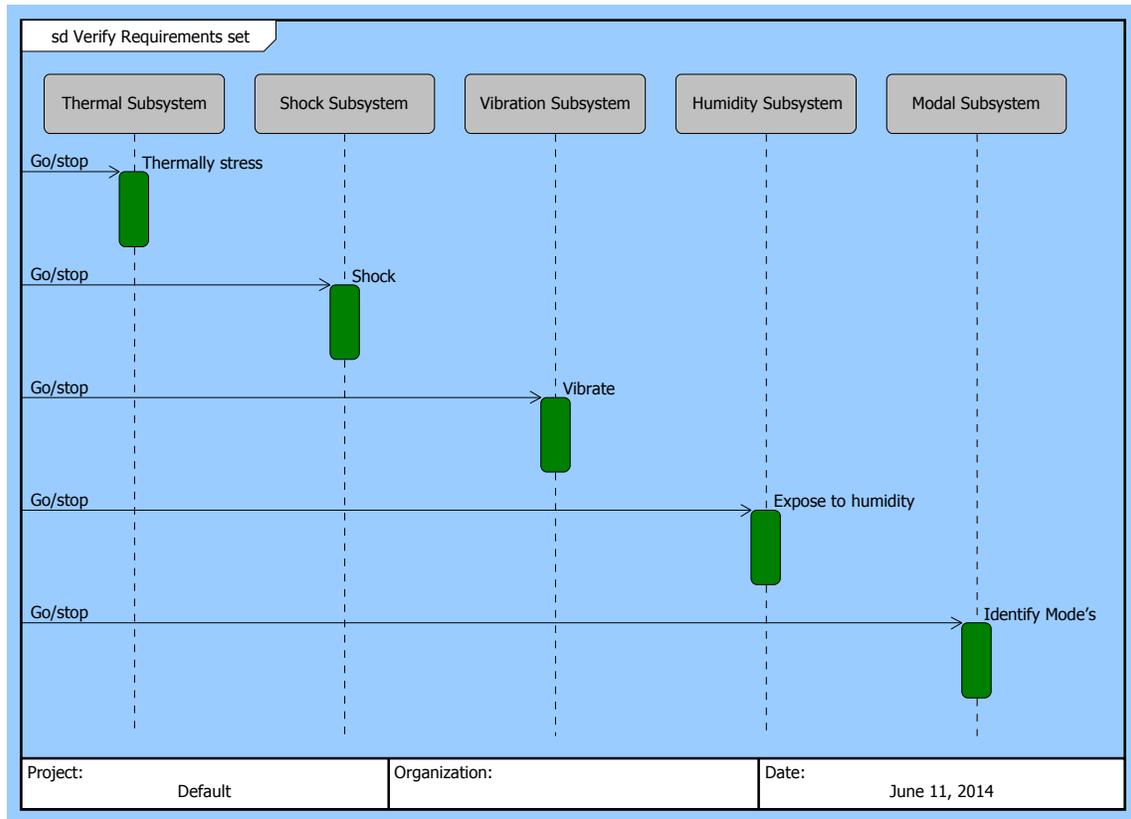


Figure 22 Verify Requirements set (Sequence Diagram)

1.1.1 Thermally stress

Allocated To:

1.5.3 Thermal Subsystem

Based On:

1.1.5.4 Material Aging and Compatibility ES

1.1.5.7 Thermal Qualification Activities ES

1.1.5.7.1 **cycles** ES

Table 2 1.1.1 Thermally stress Interfacing Items

Interfacing Items	Source / Destination
Data Package	Input To: 1.1.3.8 Interface with Operator 1.2 Define Test Parameters Output From: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.7 Data Storage

8 Functional Behavior Model

Table 2 1.1.1 Thermally stress Interfacing Items

Interfacing Items	Source / Destination
	1.1.4 Expose to humidity 1.1.5 Identify Mode's
Electrical/Mechanical Interface	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.3 Signal transmission 1.1.3.5 Fixturing 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.1.5 Identify Mode's 1.5 Represent Product
Environmental Interface	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.5 Fixturing 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.4 House System
Go/stop	Triggers Function(s): 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.4 Signal sourcing 1.1.3.6 Monitoring 1.1.3.7 Data Storage 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.1.3.8 Interface with Operator 1.3 Operate Tests

8 Functional Behavior Model

Table 2 1.1.1 Thermally stress Interfacing Items

Interfacing Items	Source / Destination
Operator instructions	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.3 Operate Tests
Repair Interface	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.2 sensing 1.1.3.3 Signal transmission 1.1.3.4 Signal sourcing 1.1.3.5 Fixturing 1.1.3.6 Monitoring 1.1.3.7 Data Storage 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.3 Operate Tests
Status	Input To: 1.3 Operate Tests Output From: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity 1.1.5 Identify Mode's
Stress / Electrical Signal	Input To: 1.5 Represent Product

8 Functional Behavior Model

Table 2 1.1.1 Thermally stress Interfacing Items

Interfacing Items	Source / Destination
	Output From: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.3 Signal transmission 1.1.3.5 Fixturing 1.1.4 Expose to humidity
Test Cable Cumulative Damage X1	Input To: 1.1.2 Shock 1.1.3 Vibrate 1.1.3.3 Signal transmission Output From: 1.1.1 Thermally stress

1.1.2 Shock

Allocated To:

1.5.2 Shock Subsystem

Based On:

1.1.5.3.1 Acceleration ES

1.1.5.3.5 Shock ES

1.1.5.6.2 Acceleration & Thermal

1.1.5.6.3 Shock & Thermal

Table 3 1.1.2 Shock Interfacing Items

Interfacing Items	Source / Destination
Data Package	Input To: 1.1.3.8 Interface with Operator 1.2 Define Test Parameters Output From: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.7 Data Storage 1.1.4 Expose to humidity 1.1.5 Identify Mode's
Electrical/Mechanical Interface	Input To:

8 Functional Behavior Model

Table 3 1.1.2 Shock Interfacing Items

Interfacing Items	Source / Destination
	1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.3 Signal transmission 1.1.3.5 Fixturing 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.1.5 Identify Mode's 1.5 Represent Product
Environmental Interface	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.5 Fixturing 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.4 House System
Go/stop	Triggers Function(s): 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.4 Signal sourcing 1.1.3.6 Monitoring 1.1.3.7 Data Storage 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.1.3.8 Interface with Operator 1.3 Operate Tests
Operator instructions	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress

8 Functional Behavior Model

Table 3 1.1.2 Shock Interfacing Items

Interfacing Items	Source / Destination
	1.1.2 Shock 1.1.3 Vibrate 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.3 Operate Tests
Repair Interface	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.2 sensing 1.1.3.3 Signal transmission 1.1.3.4 Signal sourcing 1.1.3.5 Fixturing 1.1.3.6 Monitoring 1.1.3.7 Data Storage 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.3 Operate Tests
Status	Input To: 1.3 Operate Tests Output From: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity 1.1.5 Identify Mode's
Stress / Electrical Signal	Input To: 1.5 Represent Product Output From: 1.1 Verify Requirements set 1.1.1 Thermally stress

8 Functional Behavior Model

Table 3 1.1.2 Shock Interfacing Items

Interfacing Items	Source / Destination
	1.1.2 Shock 1.1.3 Vibrate 1.1.3.3 Signal transmission 1.1.3.5 Fixturing 1.1.4 Expose to humidity
Test Cable Cumulative Damage X1	Input To: 1.1.2 Shock 1.1.3 Vibrate 1.1.3.3 Signal transmission Output From: 1.1.1 Thermally stress
Test Cable Cumulative Damage X2	Input To: 1.1.3 Vibrate 1.1.3.3 Signal transmission 1.1.4 Expose to humidity Output From: 1.1.2 Shock

1.1.3 Vibrate

Allocated To:

1.5.4 Vibration Subsystem

Based On:

1.1.5.3.4 Random Vibration/Acoustics ES

1.1.5.6.1 Vibration/Acoustics & Thermal

Table 4 1.1.3 Vibrate Interfacing Items

Interfacing Items	Source / Destination
Data Package	Input To: 1.1.3.8 Interface with Operator 1.2 Define Test Parameters Output From: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.7 Data Storage 1.1.4 Expose to humidity 1.1.5 Identify Mode's

8 Functional Behavior Model

Table 4 1.1.3 Vibrate Interfacing Items

Interfacing Items	Source / Destination
Electrical/Mechanical Interface	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.3 Signal transmission 1.1.3.5 Fixturing 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.1.5 Identify Mode's 1.5 Represent Product
Environmental Interface	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.5 Fixturing 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.4 House System
Go/stop	Triggers Function(s): 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.4 Signal sourcing 1.1.3.6 Monitoring 1.1.3.7 Data Storage 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.1.3.8 Interface with Operator 1.3 Operate Tests
Operator instructions	Input To: 1.1 Verify Requirements set

8 Functional Behavior Model

Table 4 1.1.3 Vibrate Interfacing Items

Interfacing Items	Source / Destination
	1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.3 Operate Tests
Repair Interface	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.2 sensing 1.1.3.3 Signal transmission 1.1.3.4 Signal sourcing 1.1.3.5 Fixturing 1.1.3.6 Monitoring 1.1.3.7 Data Storage 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.3 Operate Tests
Status	Input To: 1.3 Operate Tests Output From: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity 1.1.5 Identify Mode's
Stress / Electrical Signal	Input To: 1.5 Represent Product Output From: 1.1 Verify Requirements set

8 Functional Behavior Model

Table 4 1.1.3 Vibrate Interfacing Items

Interfacing Items	Source / Destination
	1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.3 Signal transmission 1.1.3.5 Fixturing 1.1.4 Expose to humidity
Test Cable Cumulative Damage X1	Input To: 1.1.2 Shock 1.1.3 Vibrate 1.1.3.3 Signal transmission Output From: 1.1.1 Thermally stress
Test Cable Cumulative Damage X2	Input To: 1.1.3 Vibrate 1.1.3.3 Signal transmission 1.1.4 Expose to humidity Output From: 1.1.2 Shock
Test Cables Cumulative Damage X3	Input To: 1.1.4 Expose to humidity Output From: 1.1.3 Vibrate 1.1.3.3 Signal transmission

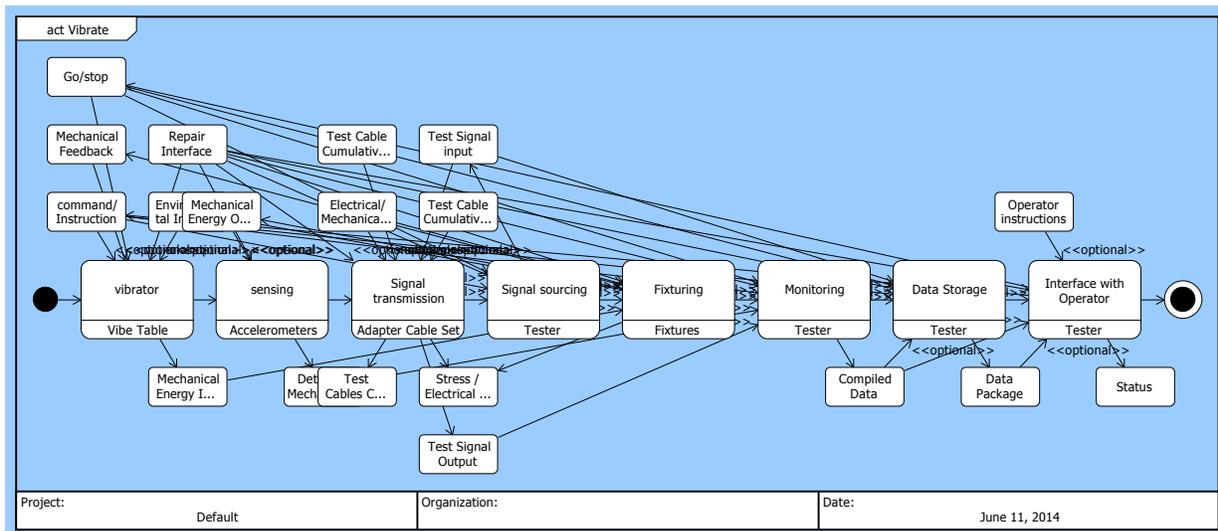


Figure 23 Vibrate (Activity Diagram)

8 Functional Behavior Model

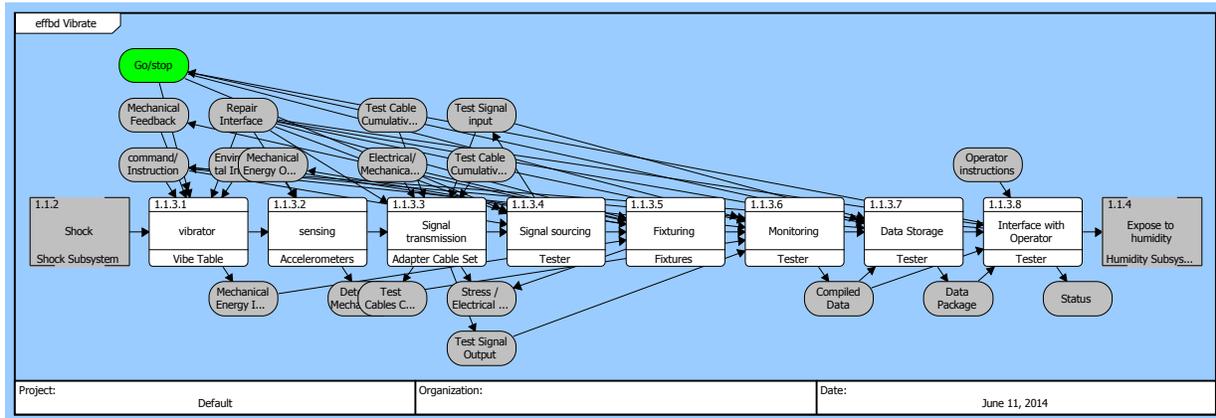


Figure 24 Vibrato (Enhanced FFBD)

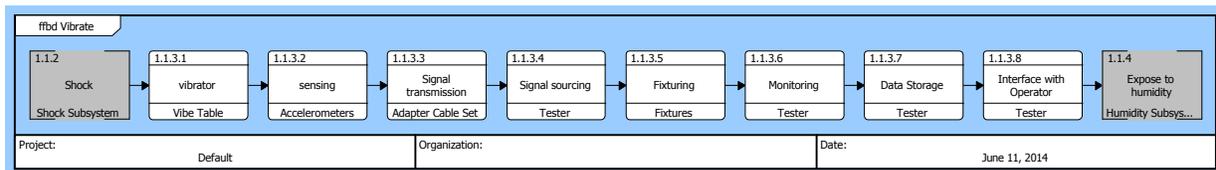


Figure 25 Vibrato (FFBD)

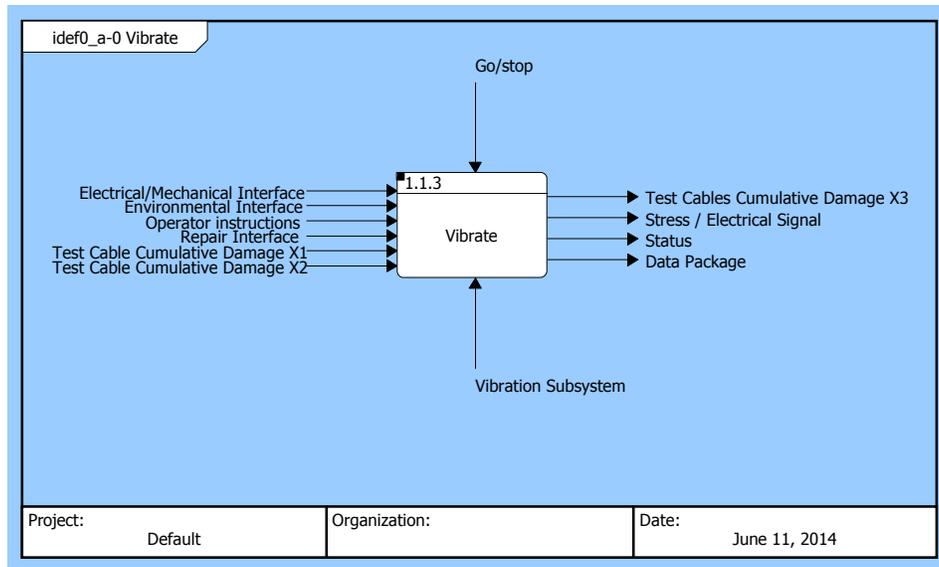


Figure 26 Vibrato (IDEF0 A-0 Context Diagram)

8 Functional Behavior Model

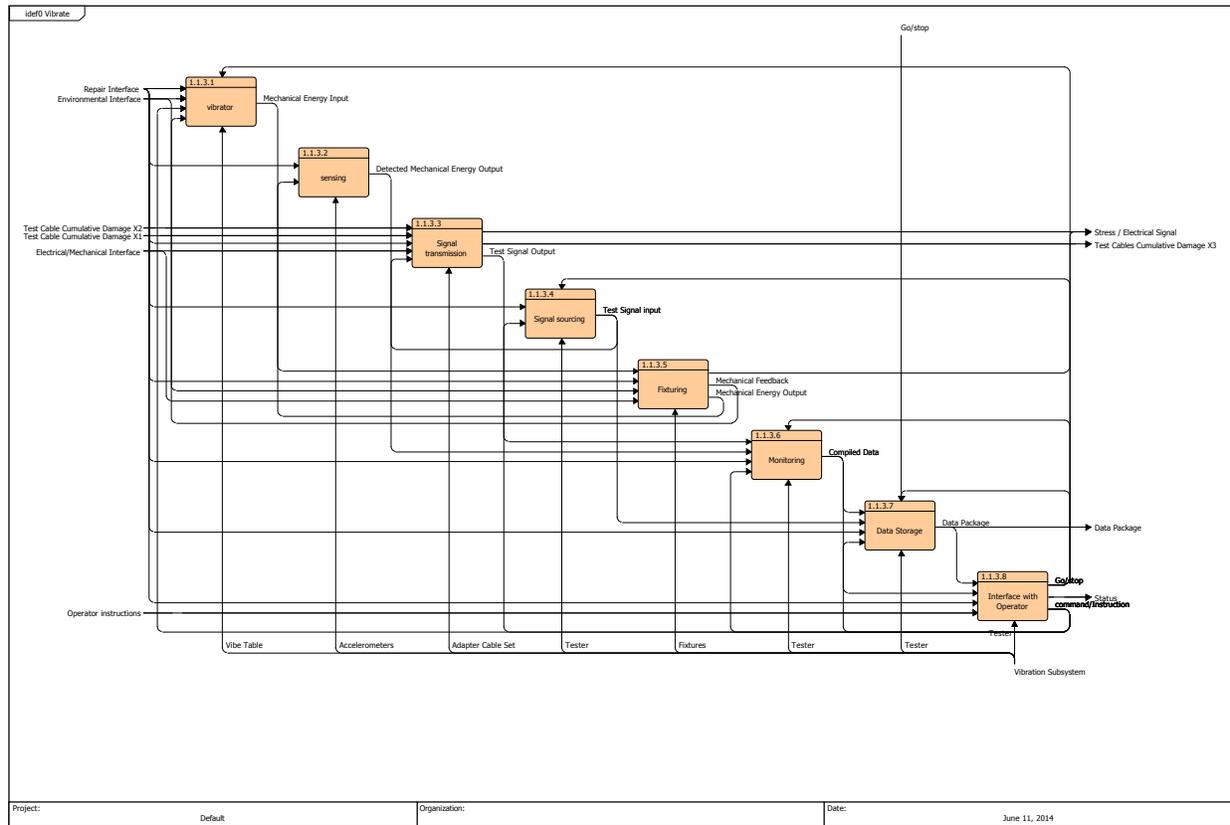


Figure 27 Vibrate (IDEF0 Diagram)

8 Functional Behavior Model

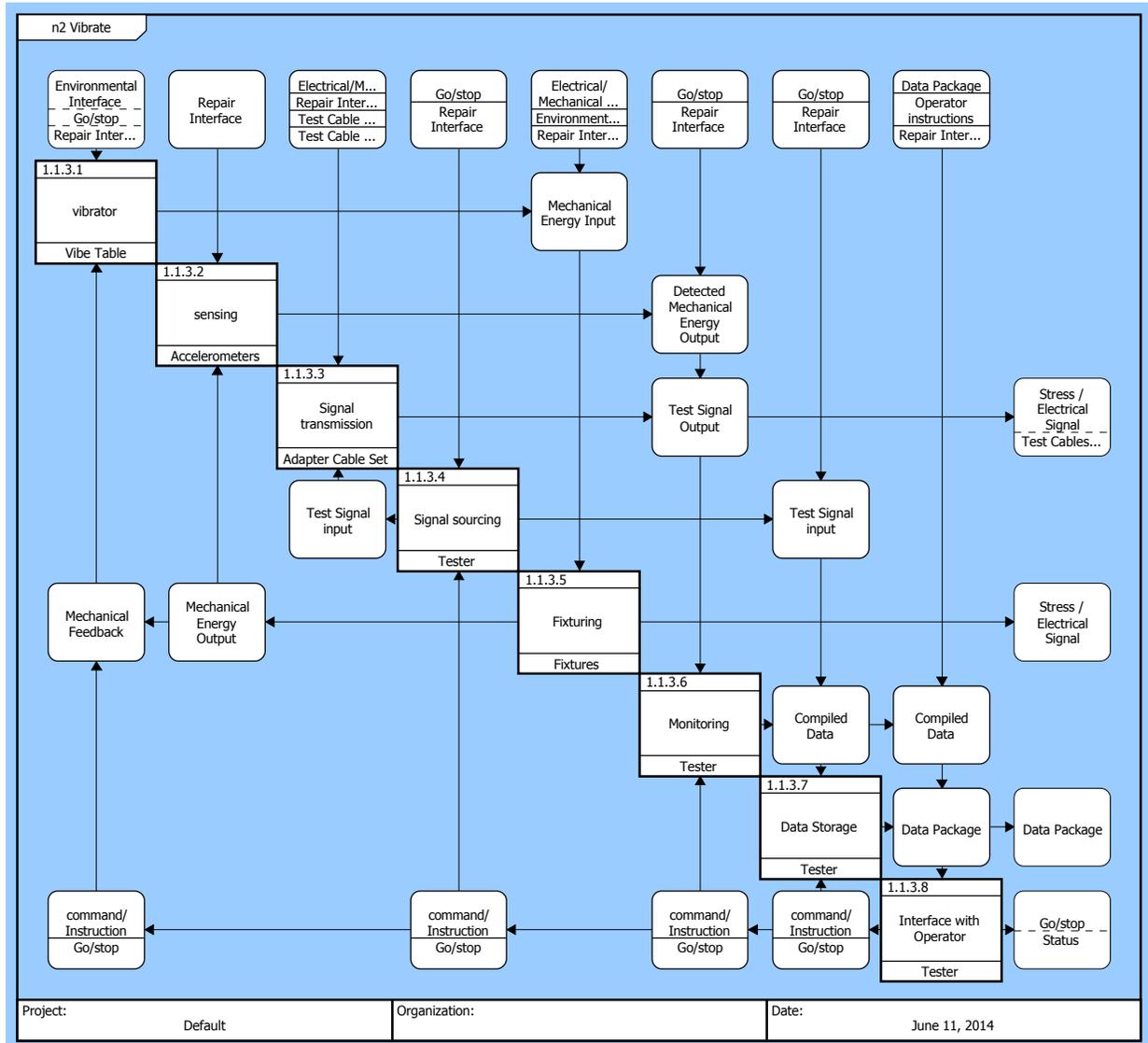


Figure 28 Vibrate (N2 Diagram)

8 Functional Behavior Model

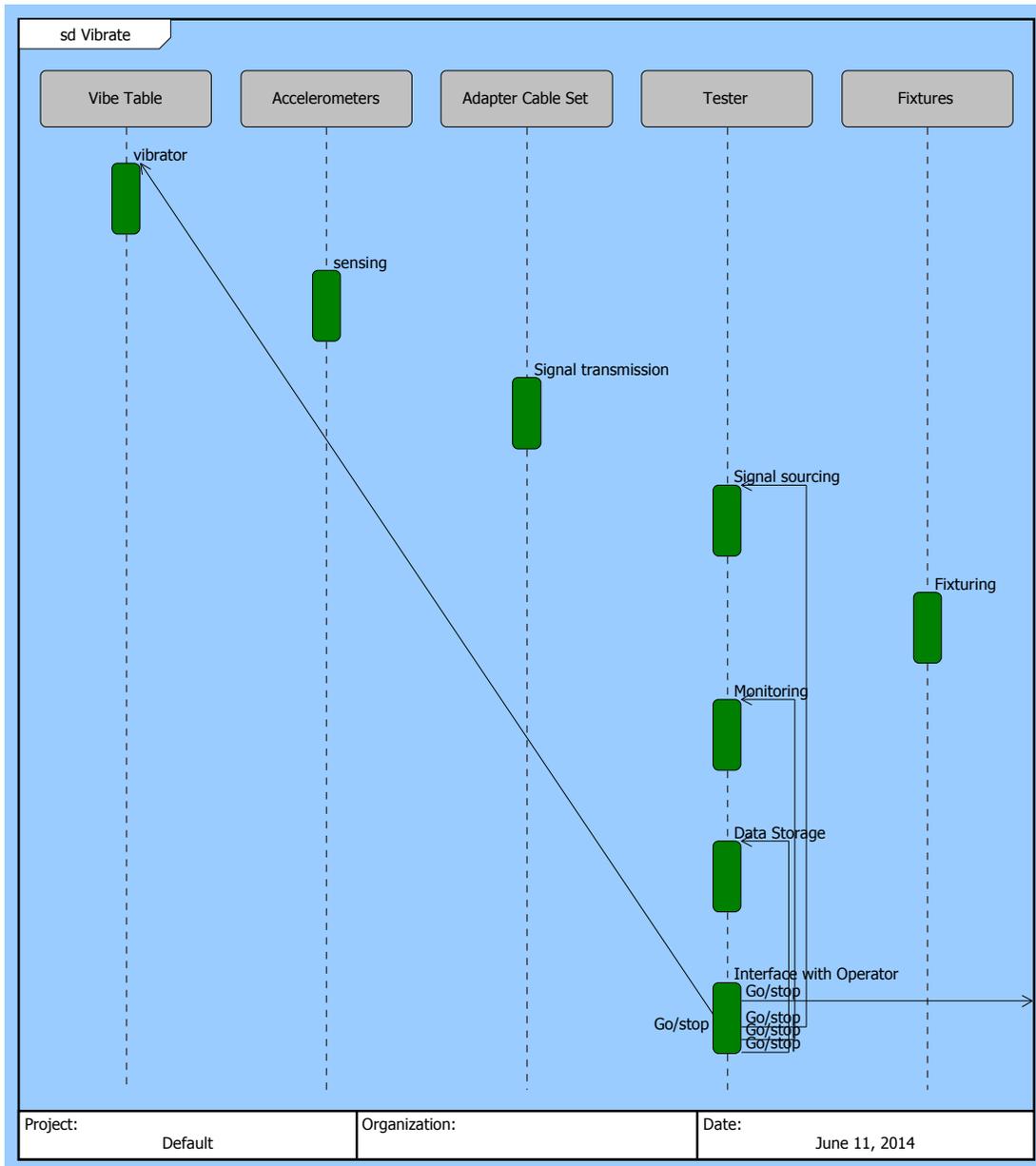


Figure 29 Vibrate (Sequence Diagram)

1.1.3.1 vibrator

Allocated To:

1.5.4.4 Vibe Table

Based On:

1.1.5.3.4.6 Vibration shall be controled per vibration test tolerances listed in TK

1.1.5.3.4.8 Product performance data shall not be contaminated by Vibration Subsystem components

8 Functional Behavior Model

Table 5 1.1.3.1 vibrator Interfacing Items

Interfacing Items	Source / Destination
command/Instruction	Input To: 1.1.3.1 vibrator 1.1.3.4 Signal sourcing 1.1.3.6 Monitoring 1.1.3.7 Data Storage Output From: 1.1.3.8 Interface with Operator
Environmental Interface	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.5 Fixturing 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.4 House System
Go/stop	Triggers Function(s): 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.4 Signal sourcing 1.1.3.6 Monitoring 1.1.3.7 Data Storage 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.1.3.8 Interface with Operator 1.3 Operate Tests
Mechanical Energy Input	Input To: 1.1.3.5 Fixturing Output From: 1.1.3.1 vibrator
Mechanical Feedback	Input To: 1.1.3.1 vibrator Output From:

8 Functional Behavior Model

Table 5 1.1.3.1 vibrator Interfacing Items

Interfacing Items	Source / Destination
Repair Interface	1.1.3.5 Fixturing Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.2 sensing 1.1.3.3 Signal transmission 1.1.3.4 Signal sourcing 1.1.3.5 Fixturing 1.1.3.6 Monitoring 1.1.3.7 Data Storage 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.3 Operate Tests

1.1.3.2 sensing

Allocated To:

1.5.4.1 Accelerometers

Based On:

1.1.5.3.4.5 Vibration monitoring shall be sensitive to levels within vibration test tolerances defined in TK

1.1.5.3.4.8 Product performance data shall not be contaminated by Vibration Subsystem components

Table 6 1.1.3.2 sensing Interfacing Items

Interfacing Items	Source / Destination
Detected Mechanical Energy Output	Input To: 1.1.3.6 Monitoring Output From: 1.1.3.2 sensing
Mechanical Energy Output	Input To: 1.1.3.2 sensing Output From: 1.1.3.5 Fixturing

8 Functional Behavior Model

Table 6 1.1.3.2 sensing Interfacing Items

Interfacing Items	Source / Destination
Repair Interface	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.2 sensing 1.1.3.3 Signal transmission 1.1.3.4 Signal sourcing 1.1.3.5 Fixturing 1.1.3.6 Monitoring 1.1.3.7 Data Storage 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.3 Operate Tests

1.1.3.3 Signal transmission

Allocated To:

1.5.4.5 Adapter Cable Set

Based On:

1.1.5.3.4.8 Product performance data shall not be contaminated by Vibration Subsystem components

Table 7 1.1.3.3 Signal transmission Interfacing Items

Interfacing Items	Source / Destination
Electrical/Mechanical Interface	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.3 Signal transmission 1.1.3.5 Fixturing 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.1.5 Identify Mode's 1.5 Represent Product

8 Functional Behavior Model

Table 7 1.1.3.3 Signal transmission Interfacing Items

Interfacing Items	Source / Destination
Repair Interface	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.2 sensing 1.1.3.3 Signal transmission 1.1.3.4 Signal sourcing 1.1.3.5 Fixturing 1.1.3.6 Monitoring 1.1.3.7 Data Storage 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.3 Operate Tests
Stress / Electrical Signal	Input To: 1.5 Represent Product Output From: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.3 Signal transmission 1.1.3.5 Fixturing 1.1.4 Expose to humidity
Test Cable Cumulative Damage X1	Input To: 1.1.2 Shock 1.1.3 Vibrate 1.1.3.3 Signal transmission Output From: 1.1.1 Thermally stress
Test Cable Cumulative Damage X2	Input To: 1.1.3 Vibrate 1.1.3.3 Signal transmission 1.1.4 Expose to humidity Output From: 1.1.2 Shock

8 Functional Behavior Model

Table 7 1.1.3.3 Signal transmission Interfacing Items

Interfacing Items	Source / Destination
Test Cables Cumulative Damage X3	Input To: 1.1.4 Expose to humidity Output From: 1.1.3 Vibrate 1.1.3.3 Signal transmission
Test Signal input	Input To: 1.1.3.3 Signal transmission 1.1.3.7 Data Storage Output From: 1.1.3.4 Signal sourcing
Test Signal Output	Input To: 1.1.3.6 Monitoring Output From: 1.1.3.3 Signal transmission

1.1.3.4 Signal sourcing

Allocated To:

1.5.4.3 Tester

Based On:

1.1.5.3.4.1 Chatter

1.1.5.3.4.3 Units shall be subjected to the vibration criteria listed in TK

1.1.5.3.4.8 Product performance data shall not be contaminated by Vibration Subsystem components

Table 8 1.1.3.4 Signal sourcing Interfacing Items

Interfacing Items	Source / Destination
command/Instruction	Input To: 1.1.3.1 vibrator 1.1.3.4 Signal sourcing 1.1.3.6 Monitoring 1.1.3.7 Data Storage Output From: 1.1.3.8 Interface with Operator
Go/stop	Triggers Function(s): 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate

8 Functional Behavior Model

Table 8 1.1.3.4 Signal sourcing Interfacing Items

Interfacing Items	Source / Destination
	1.1.3.1 vibrator 1.1.3.4 Signal sourcing 1.1.3.6 Monitoring 1.1.3.7 Data Storage 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.1.3.8 Interface with Operator 1.3 Operate Tests
Repair Interface	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.2 sensing 1.1.3.3 Signal transmission 1.1.3.4 Signal sourcing 1.1.3.5 Fixturing 1.1.3.6 Monitoring 1.1.3.7 Data Storage 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.3 Operate Tests
Test Signal input	Input To: 1.1.3.3 Signal transmission 1.1.3.7 Data Storage Output From: 1.1.3.4 Signal sourcing

1.1.3.5 Fixturing

Allocated To:

1.5.4.2 Fixtures

Based On:

1.1.5.3.4.4 Vibration criteria shall be preserved/verified (not amplified or dampened) at product and fixturing interface.

8 Functional Behavior Model

1.1.5.3.4.8 Product performance data shall not be contaminated by Vibration Subsystem components

Table 9 1.1.3.5 Fixturing Interfacing Items

Interfacing Items	Source / Destination
Electrical/Mechanical Interface	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.3 Signal transmission 1.1.3.5 Fixturing 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.1.5 Identify Mode's 1.5 Represent Product
Environmental Interface	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.5 Fixturing 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.4 House System
Mechanical Energy Input	Input To: 1.1.3.5 Fixturing Output From: 1.1.3.1 vibrator
Mechanical Energy Output	Input To: 1.1.3.2 sensing Output From: 1.1.3.5 Fixturing
Mechanical Feedback	Input To: 1.1.3.1 vibrator Output From: 1.1.3.5 Fixturing
Repair Interface	Input To:

8 Functional Behavior Model

Table 9 1.1.3.5 Fixturing Interfacing Items

Interfacing Items	Source / Destination
	1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.2 sensing 1.1.3.3 Signal transmission 1.1.3.4 Signal sourcing 1.1.3.5 Fixturing 1.1.3.6 Monitoring 1.1.3.7 Data Storage 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.3 Operate Tests
Stress / Electrical Signal	Input To: 1.5 Represent Product Output From: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.3 Signal transmission 1.1.3.5 Fixturing 1.1.4 Expose to humidity

1.1.3.6 Monitoring

Allocated To:

1.5.4.3 Tester

Based On:

1.1.5.3.4.1 Chatter

1.1.5.3.4.5 Vibration monitoring shall be sensitive to levels within vibration test tolerances defined in TK

1.1.5.3.4.8 Product performance data shall not be contaminated by Vibration Subsystem components

8 Functional Behavior Model

Table 10 1.1.3.6 Monitoring Interfacing Items

Interfacing Items	Source / Destination
command/Instruction	Input To: 1.1.3.1 vibrator 1.1.3.4 Signal sourcing 1.1.3.6 Monitoring 1.1.3.7 Data Storage Output From: 1.1.3.8 Interface with Operator
Compiled Data	Input To: 1.1.3.7 Data Storage 1.1.3.8 Interface with Operator Output From: 1.1.3.6 Monitoring
Detected Mechanical Energy Output	Input To: 1.1.3.6 Monitoring Output From: 1.1.3.2 sensing
Go/stop	Triggers Function(s): 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.4 Signal sourcing 1.1.3.6 Monitoring 1.1.3.7 Data Storage 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.1.3.8 Interface with Operator 1.3 Operate Tests
Repair Interface	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.2 sensing 1.1.3.3 Signal transmission 1.1.3.4 Signal sourcing

8 Functional Behavior Model

Table 10 1.1.3.6 Monitoring Interfacing Items

Interfacing Items	Source / Destination
	1.1.3.5 Fixturing 1.1.3.6 Monitoring 1.1.3.7 Data Storage 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.3 Operate Tests
Test Signal Output	Input To: 1.1.3.6 Monitoring Output From: 1.1.3.3 Signal transmission

1.1.3.7 Data Storage

Allocated To:

1.5.4.3 Tester

Based On:

1.1.5.3.4.1 Chatter

1.1.5.3.4.8 Product performance data shall not be contaminated by Vibration Subsystem components

Table 11 1.1.3.7 Data Storage Interfacing Items

Interfacing Items	Source / Destination
command/Instruction	Input To: 1.1.3.1 vibrator 1.1.3.4 Signal sourcing 1.1.3.6 Monitoring 1.1.3.7 Data Storage Output From: 1.1.3.8 Interface with Operator
Compiled Data	Input To: 1.1.3.7 Data Storage 1.1.3.8 Interface with Operator Output From: 1.1.3.6 Monitoring
Data Package	Input To: 1.1.3.8 Interface with Operator 1.2 Define Test Parameters

8 Functional Behavior Model

Table 11 1.1.3.7 Data Storage Interfacing Items

Interfacing Items	Source / Destination
	Output From: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.7 Data Storage 1.1.4 Expose to humidity 1.1.5 Identify Mode's
Go/stop	Triggers Function(s): 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.4 Signal sourcing 1.1.3.6 Monitoring 1.1.3.7 Data Storage 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.1.3.8 Interface with Operator 1.3 Operate Tests
Repair Interface	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.2 sensing 1.1.3.3 Signal transmission 1.1.3.4 Signal sourcing 1.1.3.5 Fixturing 1.1.3.6 Monitoring 1.1.3.7 Data Storage 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.3 Operate Tests

8 Functional Behavior Model

Table 11 1.1.3.7 Data Storage Interfacing Items

Interfacing Items	Source / Destination
Test Signal input	Input To: 1.1.3.3 Signal transmission 1.1.3.7 Data Storage Output From: 1.1.3.4 Signal sourcing

1.1.3.8 Interface with Operator

Allocated To:

1.5.4.3 Tester

Based On:

1.1.5.3.4.7 Operator shall be able to verify chatter requirements during test

1.1.5.3.4.8 Product performance data shall not be contaminated by Vibration Subsystem components

Table 12 1.1.3.8 Interface with Operator Interfacing Items

Interfacing Items	Source / Destination
command/Instruction	Input To: 1.1.3.1 vibrator 1.1.3.4 Signal sourcing 1.1.3.6 Monitoring 1.1.3.7 Data Storage Output From: 1.1.3.8 Interface with Operator
Compiled Data	Input To: 1.1.3.7 Data Storage 1.1.3.8 Interface with Operator Output From: 1.1.3.6 Monitoring
Data Package	Input To: 1.1.3.8 Interface with Operator 1.2 Define Test Parameters Output From: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.7 Data Storage 1.1.4 Expose to humidity

8 Functional Behavior Model

Table 12 1.1.3.8 Interface with Operator Interfacing Items

Interfacing Items	Source / Destination
	1.1.5 Identify Mode's
Go/stop	Triggers Function(s): 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.4 Signal sourcing 1.1.3.6 Monitoring 1.1.3.7 Data Storage 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.1.3.8 Interface with Operator 1.3 Operate Tests
Operator instructions	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.3 Operate Tests
Repair Interface	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.2 sensing 1.1.3.3 Signal transmission 1.1.3.4 Signal sourcing 1.1.3.5 Fixturing 1.1.3.6 Monitoring 1.1.3.7 Data Storage 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity 1.1.5 Identify Mode's

8 Functional Behavior Model

Table 12 1.1.3.8 Interface with Operator Interfacing Items

Interfacing Items	Source / Destination
	Output From: 1.3 Operate Tests
Status	Input To: 1.3 Operate Tests Output From: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity 1.1.5 Identify Mode's

1.1.4 Expose to humidity

Allocated To:

1.5.1 Humidity Subsystem

Based On:

1.1.5.6.4 Thermal & Humidity

1.1.5.7.2 Hum/ Int. gass ES

Table 13 1.1.4 Expose to humidity Interfacing Items

Interfacing Items	Source / Destination
Data Package	Input To: 1.1.3.8 Interface with Operator 1.2 Define Test Parameters Output From: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.7 Data Storage 1.1.4 Expose to humidity 1.1.5 Identify Mode's
Electrical/Mechanical Interface	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate

8 Functional Behavior Model

Table 13 1.1.4 Expose to humidity Interfacing Items

Interfacing Items	Source / Destination
	1.1.3.3 Signal transmission 1.1.3.5 Fixturing 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.1.5 Identify Mode's 1.5 Represent Product
Environmental Interface	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.5 Fixturing 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.4 House System
Go/stop	Triggers Function(s): 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.4 Signal sourcing 1.1.3.6 Monitoring 1.1.3.7 Data Storage 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.1.3.8 Interface with Operator 1.3 Operate Tests
Operator instructions	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity

8 Functional Behavior Model

Table 13 1.1.4 Expose to humidity Interfacing Items

Interfacing Items	Source / Destination
	1.1.5 Identify Mode's Output From: 1.3 Operate Tests
Repair Interface	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.2 sensing 1.1.3.3 Signal transmission 1.1.3.4 Signal sourcing 1.1.3.5 Fixturing 1.1.3.6 Monitoring 1.1.3.7 Data Storage 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.3 Operate Tests
Status	Input To: 1.3 Operate Tests Output From: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity 1.1.5 Identify Mode's
Stress / Electrical Signal	Input To: 1.5 Represent Product Output From: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.3 Signal transmission 1.1.3.5 Fixturing

8 Functional Behavior Model

Table 13 1.1.4 Expose to humidity Interfacing Items

Interfacing Items	Source / Destination
	1.1.4 Expose to humidity
Test Cable Cumulative Damage X2	Input To: 1.1.3 Vibrate 1.1.3.3 Signal transmission 1.1.4 Expose to humidity Output From: 1.1.2 Shock
Test Cables Cumulative Damage X3	Input To: 1.1.4 Expose to humidity Output From: 1.1.3 Vibrate 1.1.3.3 Signal transmission

1.1.5 Identify Mode's

Allocated To:

1.5 Test System

1.5.5 Modal Subsystem

Based On:

1.1.5.2.2.4 simple finite element analysis ES c.

Table 14 1.1.5 Identify Mode's Interfacing Items

Interfacing Items	Source / Destination
Data Package	Input To: 1.1.3.8 Interface with Operator 1.2 Define Test Parameters Output From: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.7 Data Storage 1.1.4 Expose to humidity 1.1.5 Identify Mode's
Electrical/Mechanical Interface	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate

8 Functional Behavior Model

Table 14 1.1.5 Identify Mode's Interfacing Items

Interfacing Items	Source / Destination
	1.1.3.3 Signal transmission 1.1.3.5 Fixturing 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.1.5 Identify Mode's 1.5 Represent Product
Environmental Interface	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.5 Fixturing 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.4 House System
Go/stop	Triggers Function(s): 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.4 Signal sourcing 1.1.3.6 Monitoring 1.1.3.7 Data Storage 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.1.3.8 Interface with Operator 1.3 Operate Tests
Operator instructions	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity

8 Functional Behavior Model

Table 14 1.1.5 Identify Mode's Interfacing Items

Interfacing Items	Source / Destination
	1.1.5 Identify Mode's Output From: 1.3 Operate Tests
Repair Interface	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.2 sensing 1.1.3.3 Signal transmission 1.1.3.4 Signal sourcing 1.1.3.5 Fixturing 1.1.3.6 Monitoring 1.1.3.7 Data Storage 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.3 Operate Tests
Status	Input To: 1.3 Operate Tests Output From: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity 1.1.5 Identify Mode's

1.2 Define Test Parameters

Allocated To:

1.2 Product Realization Team (PRT)

Table 15 1.2 Define Test Parameters Interfacing Items

Interfacing Items	Source / Destination
Data Package	Input To:

8 Functional Behavior Model

Table 15 1.2 Define Test Parameters Interfacing Items

Interfacing Items	Source / Destination
	1.1.3.8 Interface with Operator 1.2 Define Test Parameters Output From: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.7 Data Storage 1.1.4 Expose to humidity 1.1.5 Identify Mode's
Notification	Input To: 1.2 Define Test Parameters Output From: 1.3 Operate Tests
Requirements	Input To: 1.3 Operate Tests Output From: 1.2 Define Test Parameters

1.3 Operate Tests

Allocated To:

1.4 Test Operator

Based On:

1.1.5.3.4.2 Tests shall be run in the order listed in TK

1.1.5.3.4.6 Vibration shall be controled per vibration test tolerances listed in TK

Table 16 1.3 Operate Tests Interfacing Items

Interfacing Items	Source / Destination
Go/stop	Triggers Function(s): 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.4 Signal sourcing 1.1.3.6 Monitoring 1.1.3.7 Data Storage 1.1.4 Expose to humidity

8 Functional Behavior Model

Table 16 1.3 Operate Tests Interfacing Items

Interfacing Items	Source / Destination
	1.1.5 Identify Mode's Output From: 1.1.3.8 Interface with Operator 1.3 Operate Tests
Notification	Input To: 1.2 Define Test Parameters Output From: 1.3 Operate Tests
Operator instructions	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.3 Operate Tests
Repair Interface	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.2 sensing 1.1.3.3 Signal transmission 1.1.3.4 Signal sourcing 1.1.3.5 Fixturing 1.1.3.6 Monitoring 1.1.3.7 Data Storage 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.3 Operate Tests
Requirements	Input To: 1.3 Operate Tests Output From: 1.2 Define Test Parameters

8 Functional Behavior Model

Table 16 1.3 Operate Tests Interfacing Items

Interfacing Items	Source / Destination
Status	Input To: 1.3 Operate Tests Output From: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.8 Interface with Operator 1.1.4 Expose to humidity 1.1.5 Identify Mode's

1.4 House System

Allocated To:
 1.3 Test House

Table 17 1.4 House System Interfacing Items

Interfacing Items	Source / Destination
Environmental Interface	Input To: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.1 vibrator 1.1.3.5 Fixturing 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.4 House System

1.5 Represent Product

Allocated To:
 1.1 D-test cables

Table 18 1.5 Represent Product Interfacing Items

Interfacing Items	Source / Destination
Electrical/Mechanical Interface	Input To: 1.1 Verify Requirements set

8 Functional Behavior Model

Table 18 1.5 Represent Product Interfacing Items

Interfacing Items	Source / Destination
	1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.3 Signal transmission 1.1.3.5 Fixturing 1.1.4 Expose to humidity 1.1.5 Identify Mode's Output From: 1.1.5 Identify Mode's 1.5 Represent Product
Stress / Electrical Signal	Input To: 1.5 Represent Product Output From: 1.1 Verify Requirements set 1.1.1 Thermally stress 1.1.2 Shock 1.1.3 Vibrate 1.1.3.3 Signal transmission 1.1.3.5 Fixturing 1.1.4 Expose to humidity

9 Item Dictionary

command/Instruction

Input To:

- 1.1.3.1 vibrator
- 1.1.3.4 Signal sourcing
- 1.1.3.6 Monitoring
- 1.1.3.7 Data Storage

Output From:

- 1.1.3.8 Interface with Operator

Compiled Data

Input To:

- 1.1.3.7 Data Storage
- 1.1.3.8 Interface with Operator

Output From:

- 1.1.3.6 Monitoring

Data Package

Input To:

- 1.1.3.8 Interface with Operator
- 1.2 Define Test Parameters

Output From:

- 1.1 Verify Requirements set
 - 1.1.1 Thermally stress
 - 1.1.2 Shock
 - 1.1.3 Vibrate
 - 1.1.3.7 Data Storage
 - 1.1.4 Expose to humidity
 - 1.1.5 Identify Mode's

Detected Mechanical Energy Output

Input To:

- 1.1.3.6 Monitoring

Output From:

- 1.1.3.2 sensing

Transferred By Interface Link:

- Accel cables

Electrical/Mechanical Interface

Input To:

- 1.1 Verify Requirements set
 - 1.1.1 Thermally stress
 - 1.1.2 Shock

9 Item Dictionary

- 1.1.3 Vibrate
 - 1.1.3.3 Signal transmission
 - 1.1.3.5 Fixturing
- 1.1.4 Expose to humidity
- 1.1.5 Identify Mode's

Output From:

- 1.1.5 Identify Mode's
- 1.5 Represent Product

Transferred By Interface Link:

Connector B Side

Environmental Interface

Input To:

- 1.1 Verify Requirements set
 - 1.1.1 Thermally stress
 - 1.1.2 Shock
 - 1.1.3 Vibrate
 - 1.1.3.1 vibrator
 - 1.1.3.5 Fixturing
 - 1.1.4 Expose to humidity
 - 1.1.5 Identify Mode's

Output From:

- 1.4 House System

Go/stop

Triggers:

- 1.1 Verify Requirements set
 - 1.1.1 Thermally stress
 - 1.1.2 Shock
 - 1.1.3 Vibrate
 - 1.1.3.1 vibrator
 - 1.1.3.4 Signal sourcing
 - 1.1.3.6 Monitoring
 - 1.1.3.7 Data Storage
 - 1.1.4 Expose to humidity
 - 1.1.5 Identify Mode's

Output From:

- 1.1.3.8 Interface with Operator
- 1.3 Operate Tests

Transferred By Interface Link:

Vibe Table Control Cable

Mechanical Energy Input

Input To:

- 1.1.3.5 Fixturing

9 Item Dictionary

Output From:
1.1.3.1 vibrator

Mechanical Energy Output

Input To:
1.1.3.2 sensing

Output From:
1.1.3.5 Fixturing

Transferred By Interface Link:
Adhesive

Mechanical Feedback

Input To:
1.1.3.1 vibrator

Output From:
1.1.3.5 Fixturing

Notification

Input To:
1.2 Define Test Parameters

Output From:
1.3 Operate Tests

Operator instructions

Input To:
1.1 Verify Requirements set
1.1.1 Thermally stress
1.1.2 Shock
1.1.3 Vibrate
1.1.3.8 Interface with Operator
1.1.4 Expose to humidity
1.1.5 Identify Mode's

Output From:
1.3 Operate Tests

Repair Interface

Input To:
1.1 Verify Requirements set
1.1.1 Thermally stress
1.1.2 Shock
1.1.3 Vibrate
1.1.3.1 vibrator
1.1.3.2 sensing

9 Item Dictionary

- 1.1.3.3 Signal transmission
- 1.1.3.4 Signal sourcing
- 1.1.3.5 Fixturing
- 1.1.3.6 Monitoring
- 1.1.3.7 Data Storage
- 1.1.3.8 Interface with Operator
- 1.1.4 Expose to humidity
- 1.1.5 Identify Mode's

Output From:

- 1.3 Operate Tests

Requirements

Input To:

- 1.3 Operate Tests

Output From:

- 1.2 Define Test Parameters

Status

Input To:

- 1.3 Operate Tests

Output From:

- 1.1 Verify Requirements set
 - 1.1.1 Thermally stress
 - 1.1.2 Shock
 - 1.1.3 Vibrate
 - 1.1.3.8 Interface with Operator
 - 1.1.4 Expose to humidity
 - 1.1.5 Identify Mode's

Stress / Electrical Signal

Input To:

- 1.5 Represent Product

Output From:

- 1.1 Verify Requirements set
 - 1.1.1 Thermally stress
 - 1.1.2 Shock
 - 1.1.3 Vibrate
 - 1.1.3.3 Signal transmission
 - 1.1.3.5 Fixturing
 - 1.1.4 Expose to humidity

Test Cable Cumulative Damage X1

Input To:

- 1.1.2 Shock

9 Item Dictionary

- 1.1.3 Vibrate
- 1.1.3.3 Signal transmission

Output From:

- 1.1.1 Thermally stress

Transferred By Interface Link:

Connector B Side

Test Cable Cumulative Damage X2

Input To:

- 1.1.3 Vibrate
- 1.1.3.3 Signal transmission
- 1.1.4 Expose to humidity

Output From:

- 1.1.2 Shock

Transferred By Interface Link:

Connector B Side

Test Cables Cumulative Damage X3

Input To:

- 1.1.4 Expose to humidity

Output From:

- 1.1.3 Vibrate
- 1.1.3.3 Signal transmission

Test Signal input

Input To:

- 1.1.3.3 Signal transmission
- 1.1.3.7 Data Storage

Output From:

- 1.1.3.4 Signal sourcing

Transferred By Interface Link:

Connector B Side

Connectors A side

Test Signal Output

Input To:

- 1.1.3.6 Monitoring

Output From:

- 1.1.3.3 Signal transmission

Transferred By Interface Link:

Connector B Side

Connectors A side

10 Resources

11 Components

Part I - Hierarchical Component List

- 1 Universe
 - 1.1 D-test cables
 - 1.2 Product Realization Team (PRT)
 - 1.3 Test House
 - 1.4 Test Operator
 - 1.5 Test System
 - 1.5.1 Humidity Subsystem
 - 1.5.2 Shock Subsystem
 - 1.5.3 Thermal Subsystem
 - 1.5.4 Vibration Subsystem
 - 1.5.4.1 Accelerometers
 - 1.5.4.2 Fixtures
 - 1.5.4.3 Tester
 - 1.5.4.4 Vibe Table
 - 1.5.4.5 Adapter Cable Set
 - 1.5.5 Modal Subsystem

Part II - Component Definitions

1 Universe

Built From Lower-Level Component(s):

- 1.1 D-test cables
- 1.2 Product Realization Team (PRT)
- 1.3 Test House
- 1.4 Test Operator
- 1.5 Test System

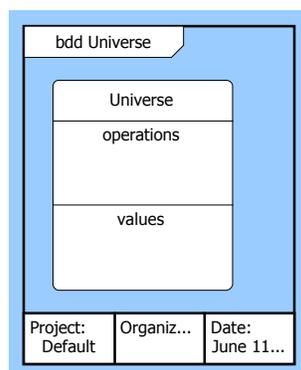


Figure 30 Universe (Classification BDD)

11 Components

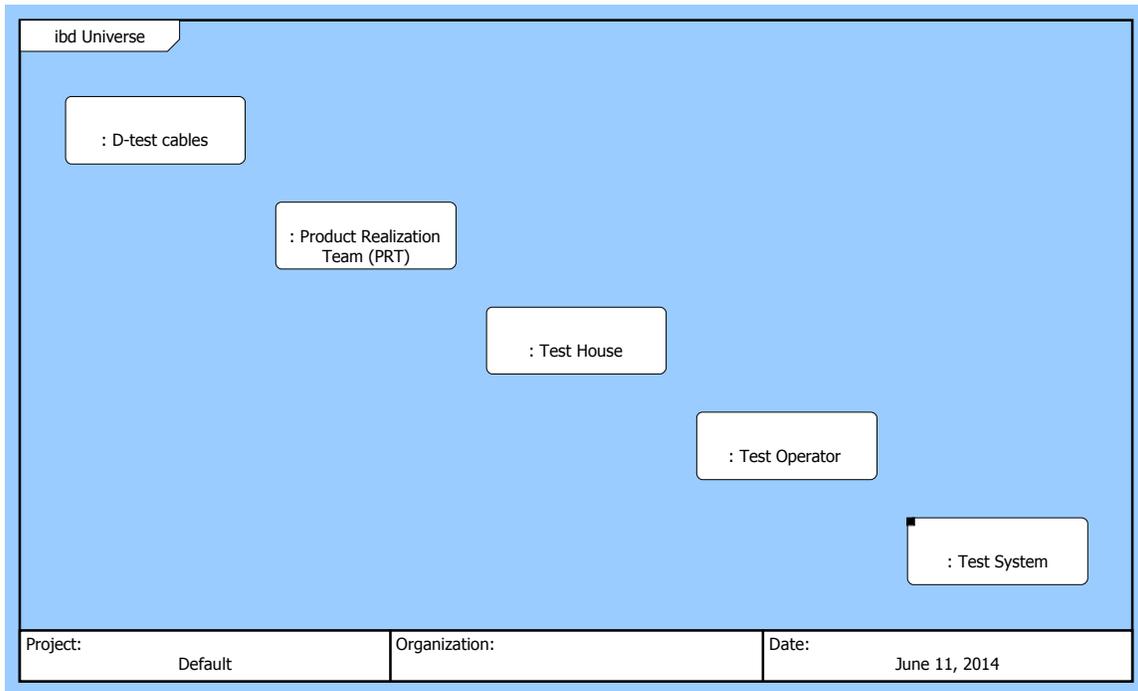


Figure 31 Universe (Flow Internal Block Diagram)

11 Components

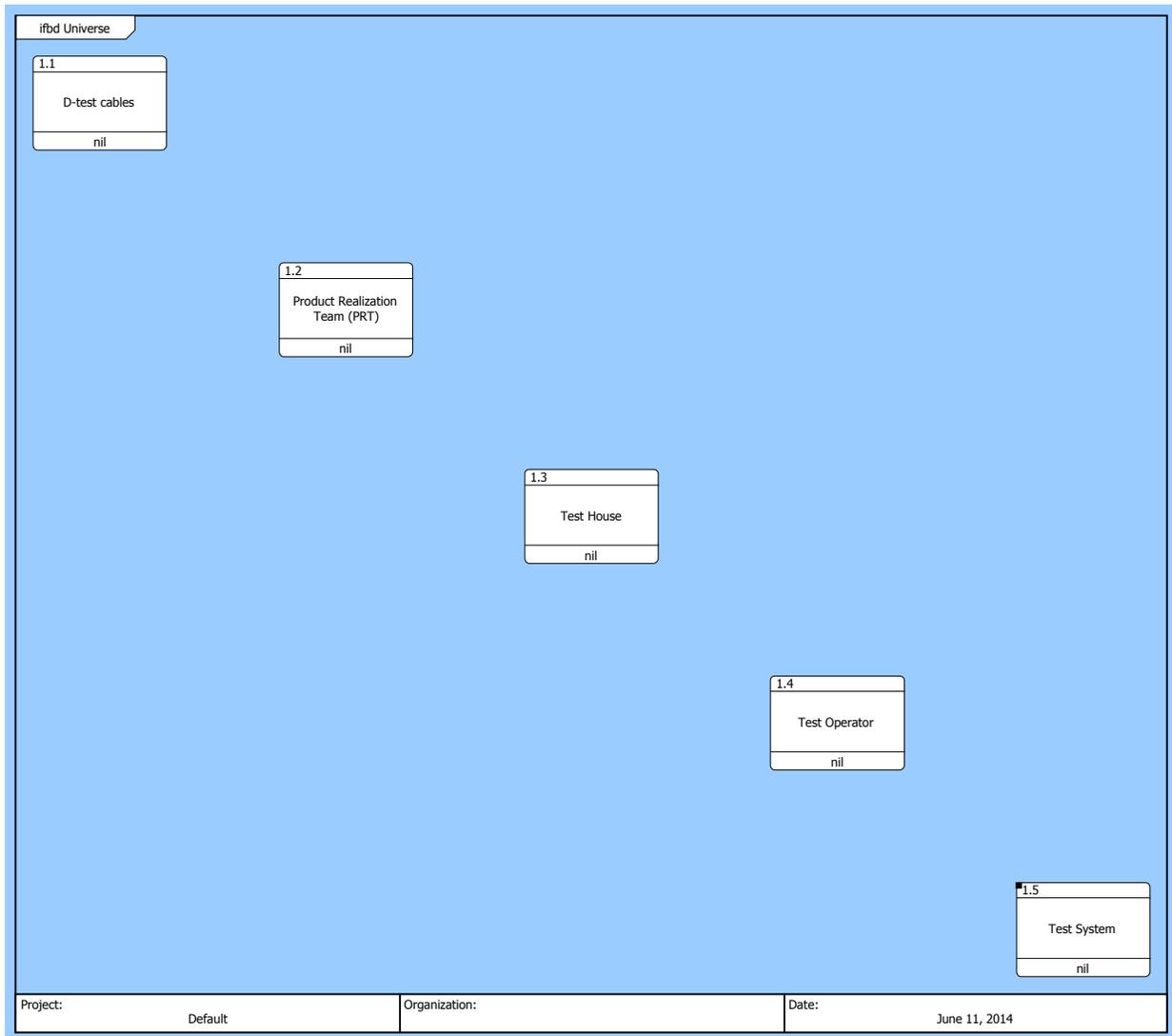


Figure 32 Universe (Interface Block Diagram)

11 Components

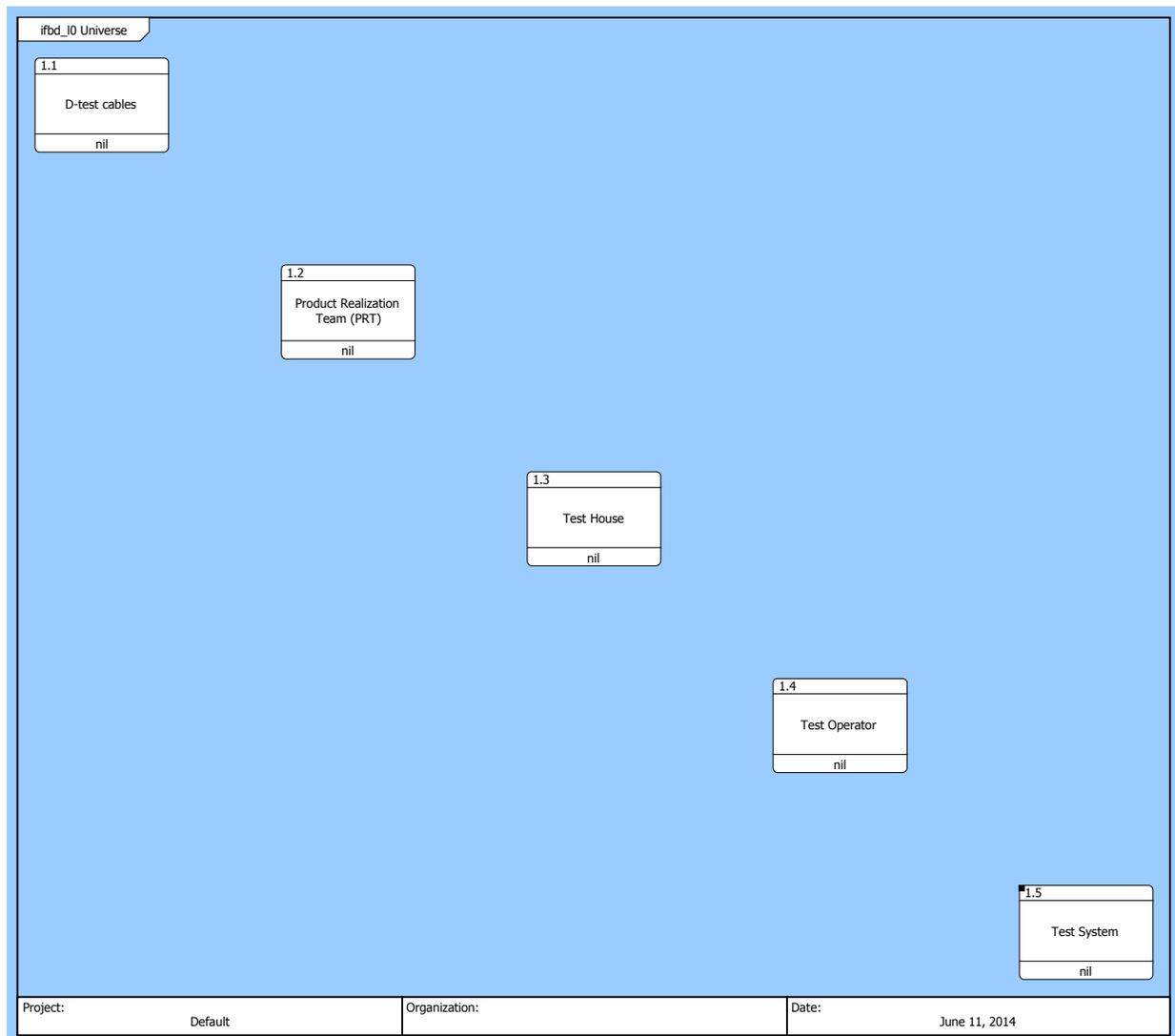


Figure 33 Universe (Interface Block Diagram (L0))

11 Components

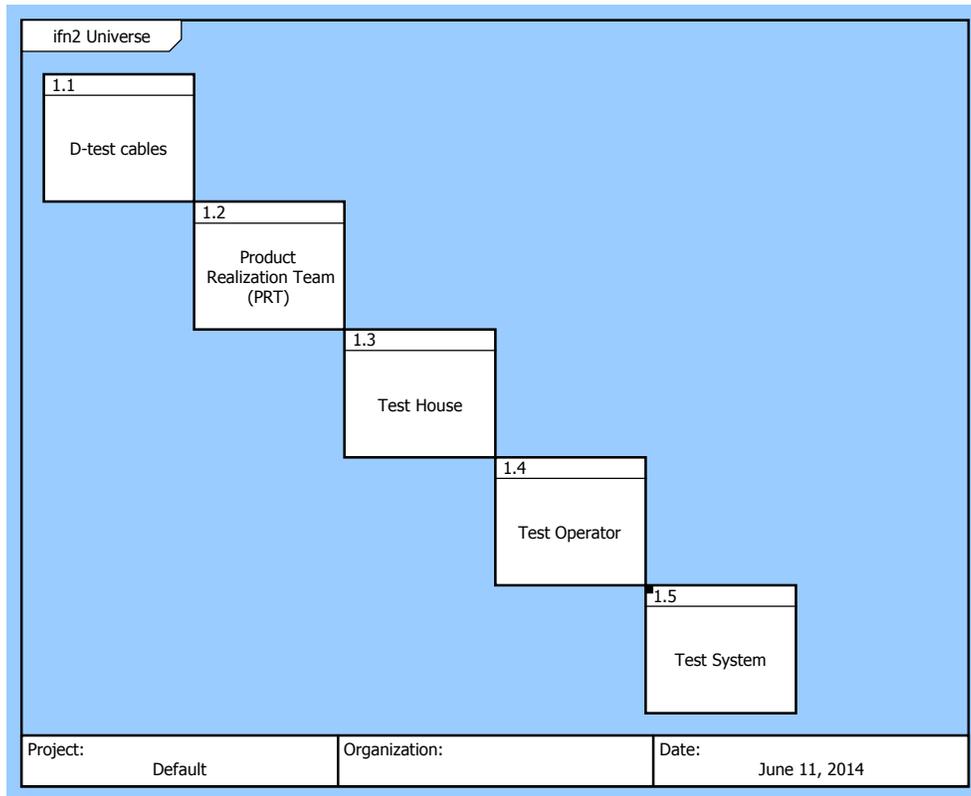


Figure 34 Universe (Interface N2 Diagram)

11 Components

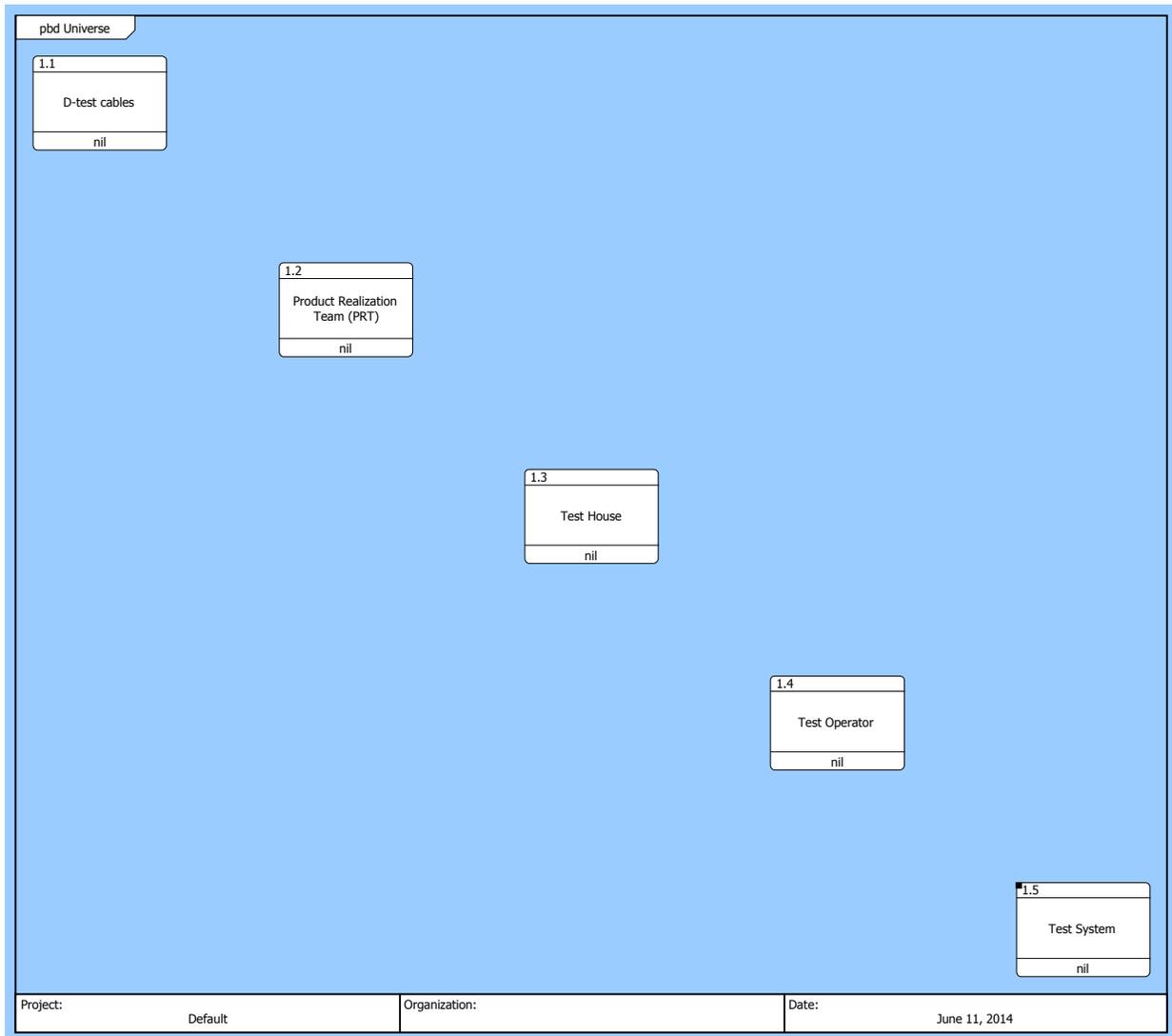


Figure 35 Universe (Physical Block Diagram)

11 Components

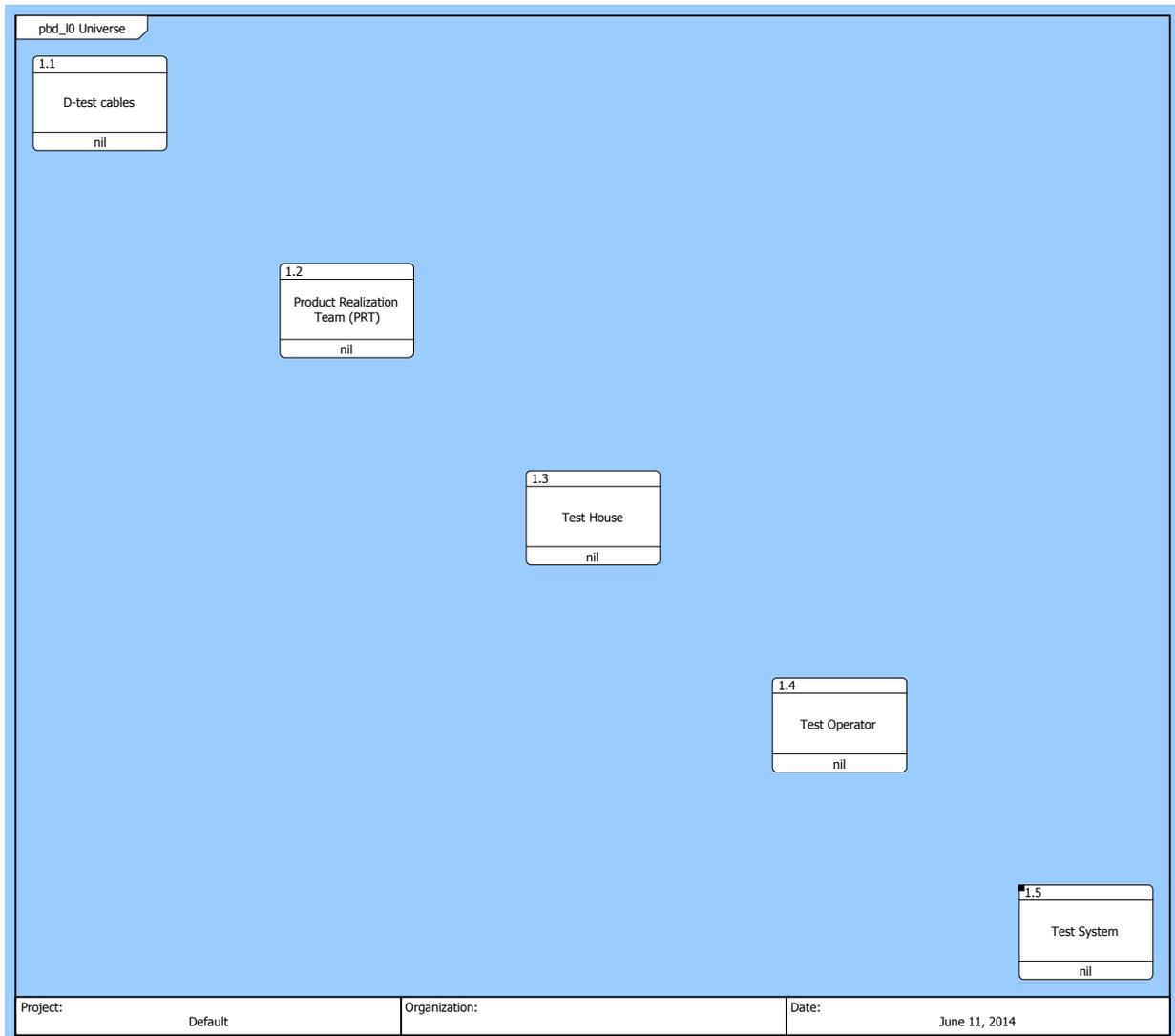


Figure 36 Universe (Physical Block Diagram (L0))

11 Components

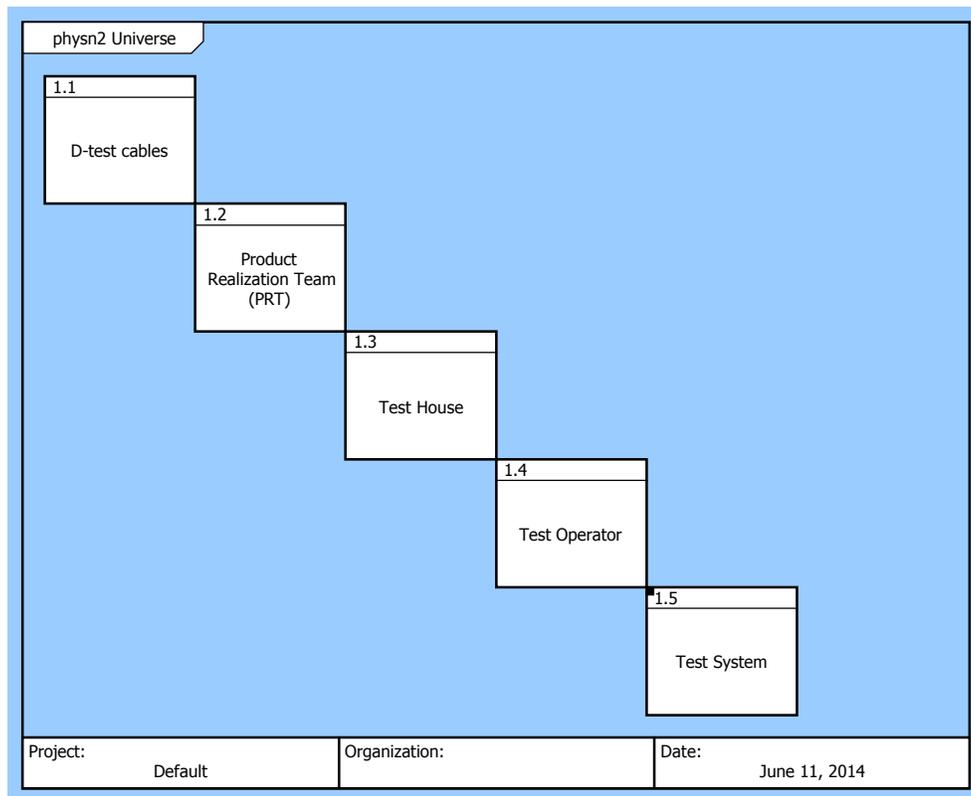


Figure 37 Universe (Physical N2 Diagram)

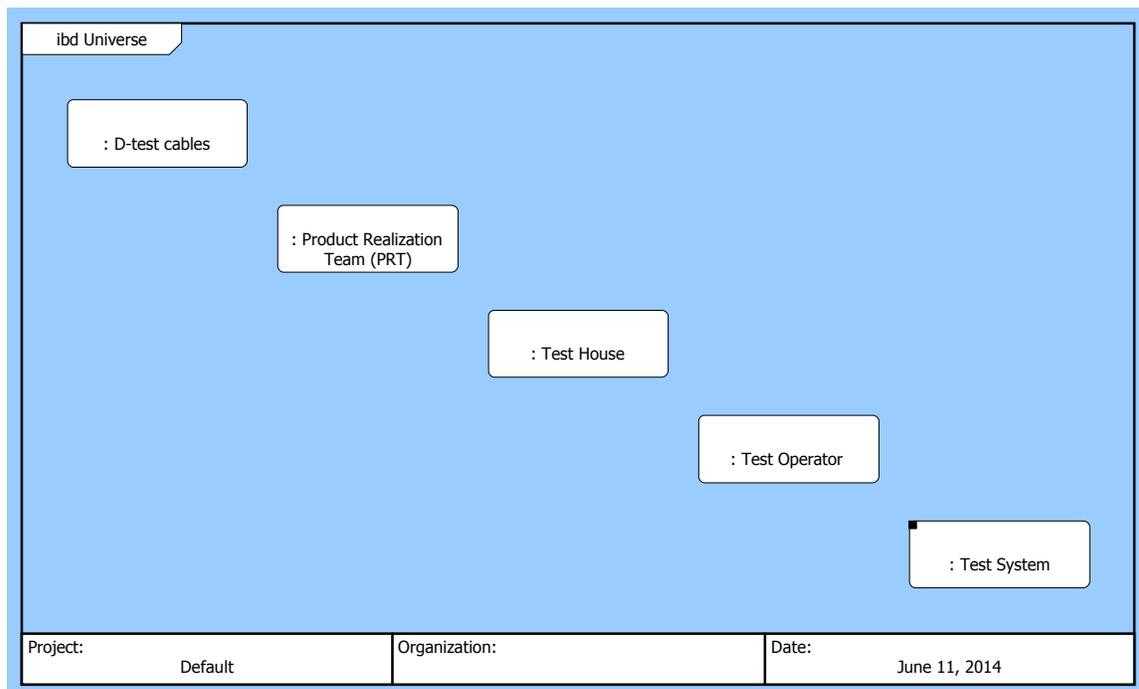


Figure 38 Universe (Standard Internal Block Diagram)

11 Components

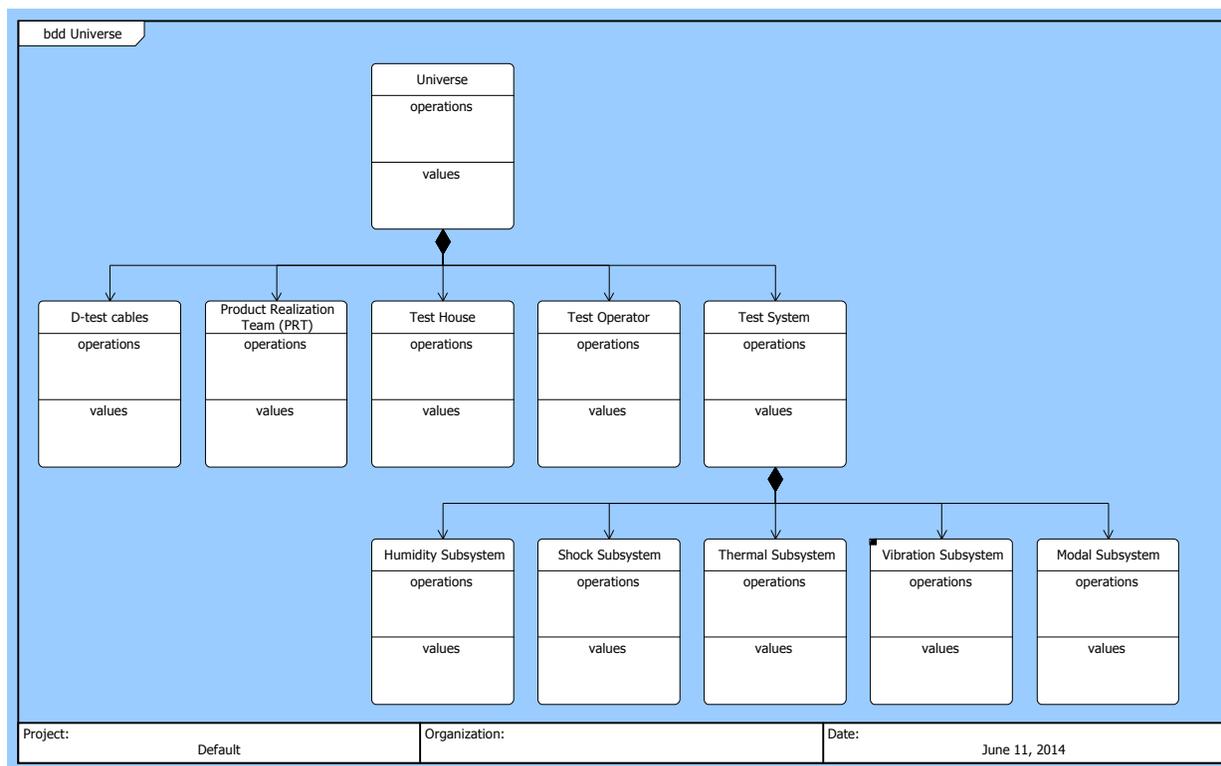


Figure 39 Universe (Structure BDD)

Performs Function(s):

- 1 Metafunction

1.1 D-test cables

Built In Higher-Level Component(s):

- 1 Universe

Performs Function(s):

- 1.5 Represent Product

1.2 Product Realization Team (PRT)

Built In Higher-Level Component(s):

- 1 Universe

Performs Function(s):

- 1.2 Define Test Parameters

1.3 Test House

Built In Higher-Level Component(s):

- 1 Universe

Performs Function(s):

- 1.4 House System

11 Components

1.4 Test Operator

Built In Higher-Level Component(s):

1 Universe

Performs Function(s):

1.3 Operate Tests

1.5 Test System

Built In Higher-Level Component(s):

1 Universe

Built From Lower-Level Component(s):

1.5.1 Humidity Subsystem

1.5.2 Shock Subsystem

1.5.3 Thermal Subsystem

1.5.4 Vibration Subsystem

1.5.5 Modal Subsystem

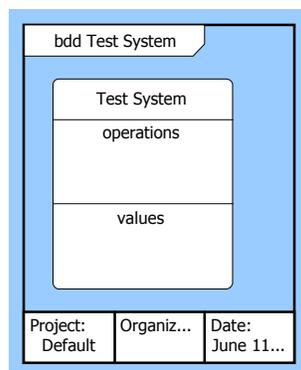


Figure 40 Test System (Classification BDD)

11 Components

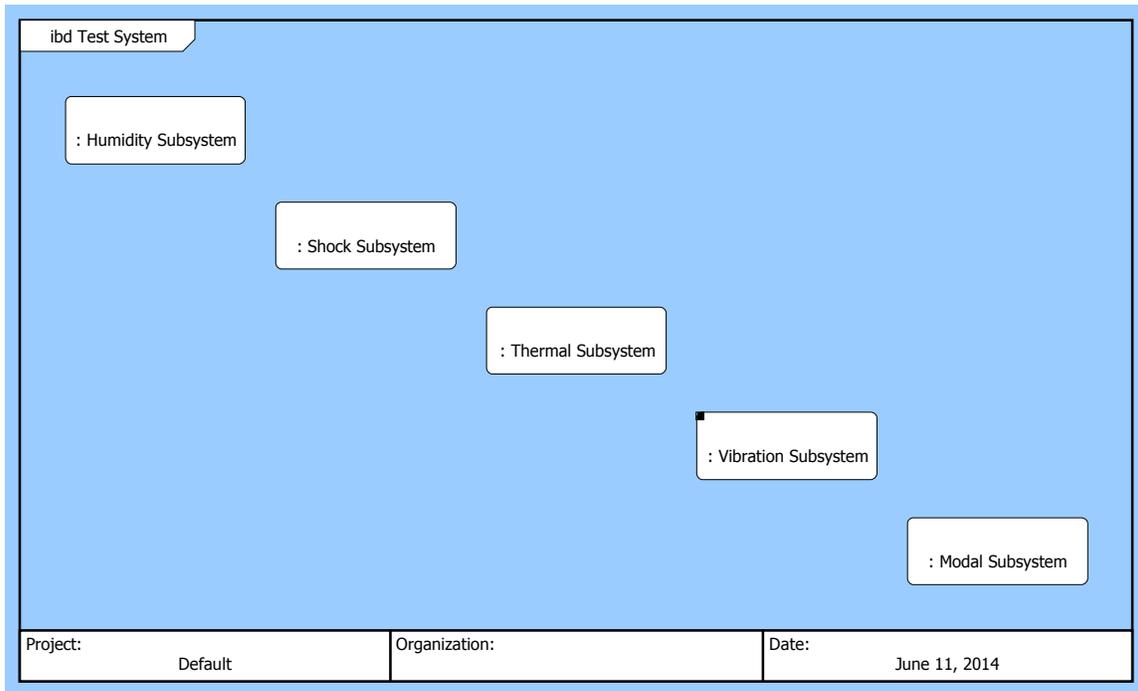


Figure 41 Test System (Flow Internal Block Diagram)

11 Components

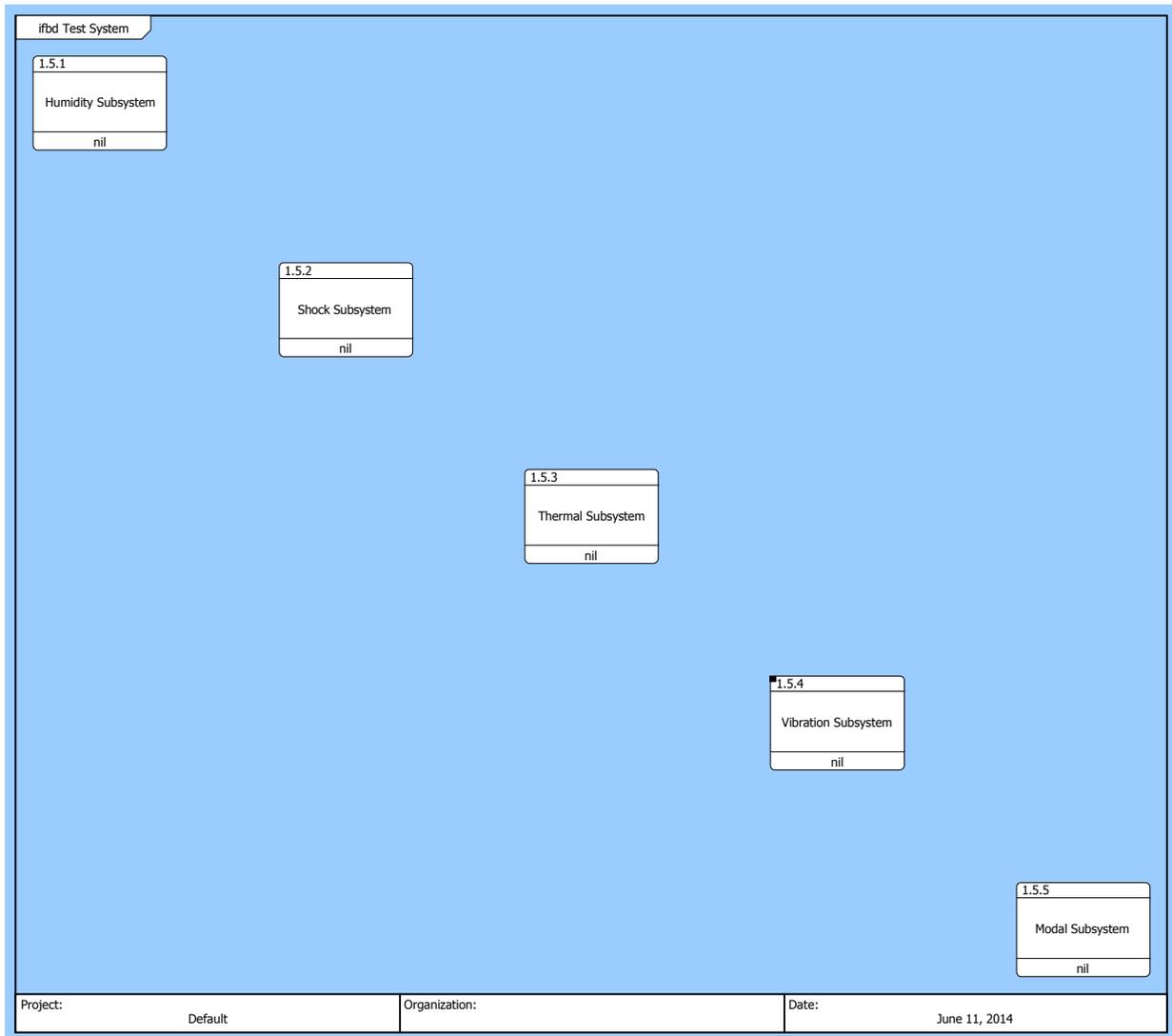


Figure 42 Test System (Interface Block Diagram)

11 Components

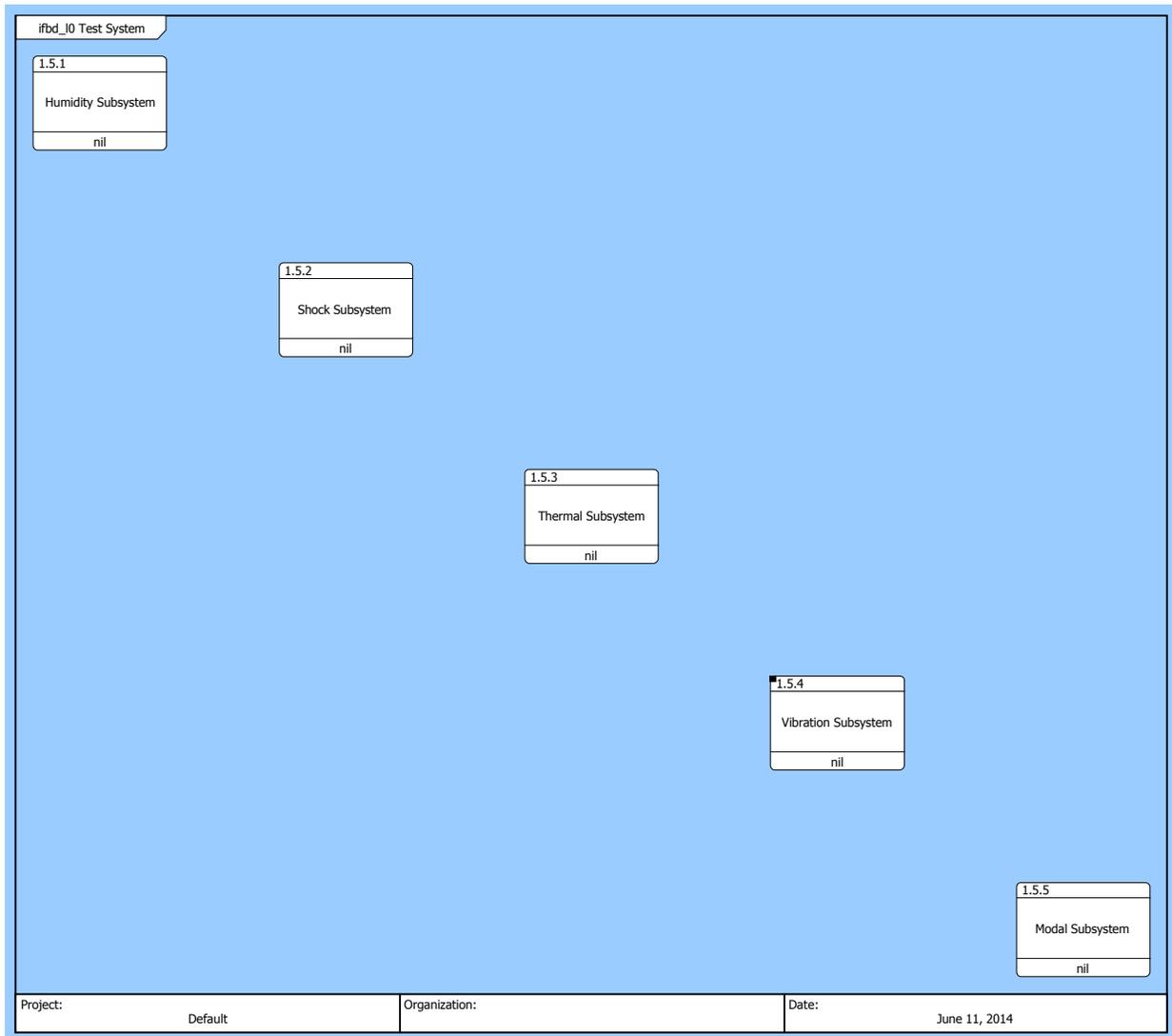


Figure 43 Test System (Interface Block Diagram (L0))

11 Components

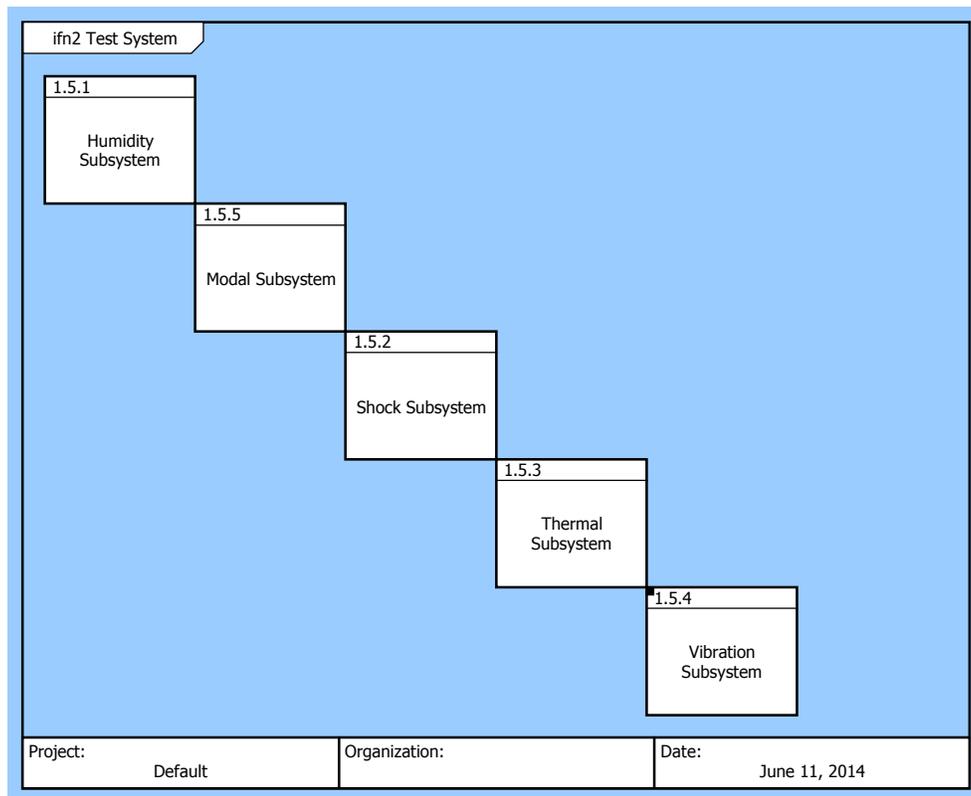


Figure 44 Test System (Interface N2 Diagram)

11 Components

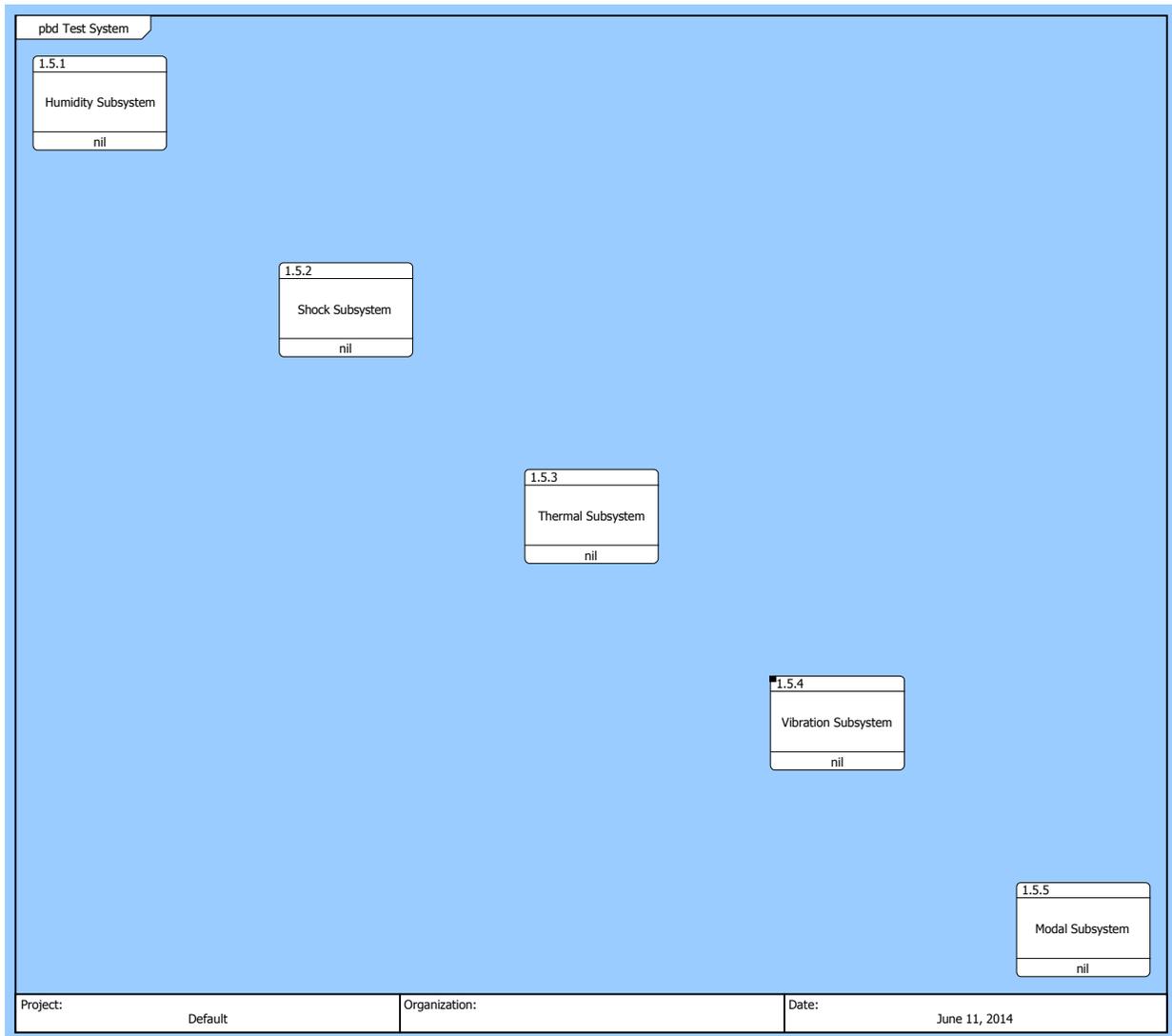


Figure 45 Test System (Physical Block Diagram)

11 Components

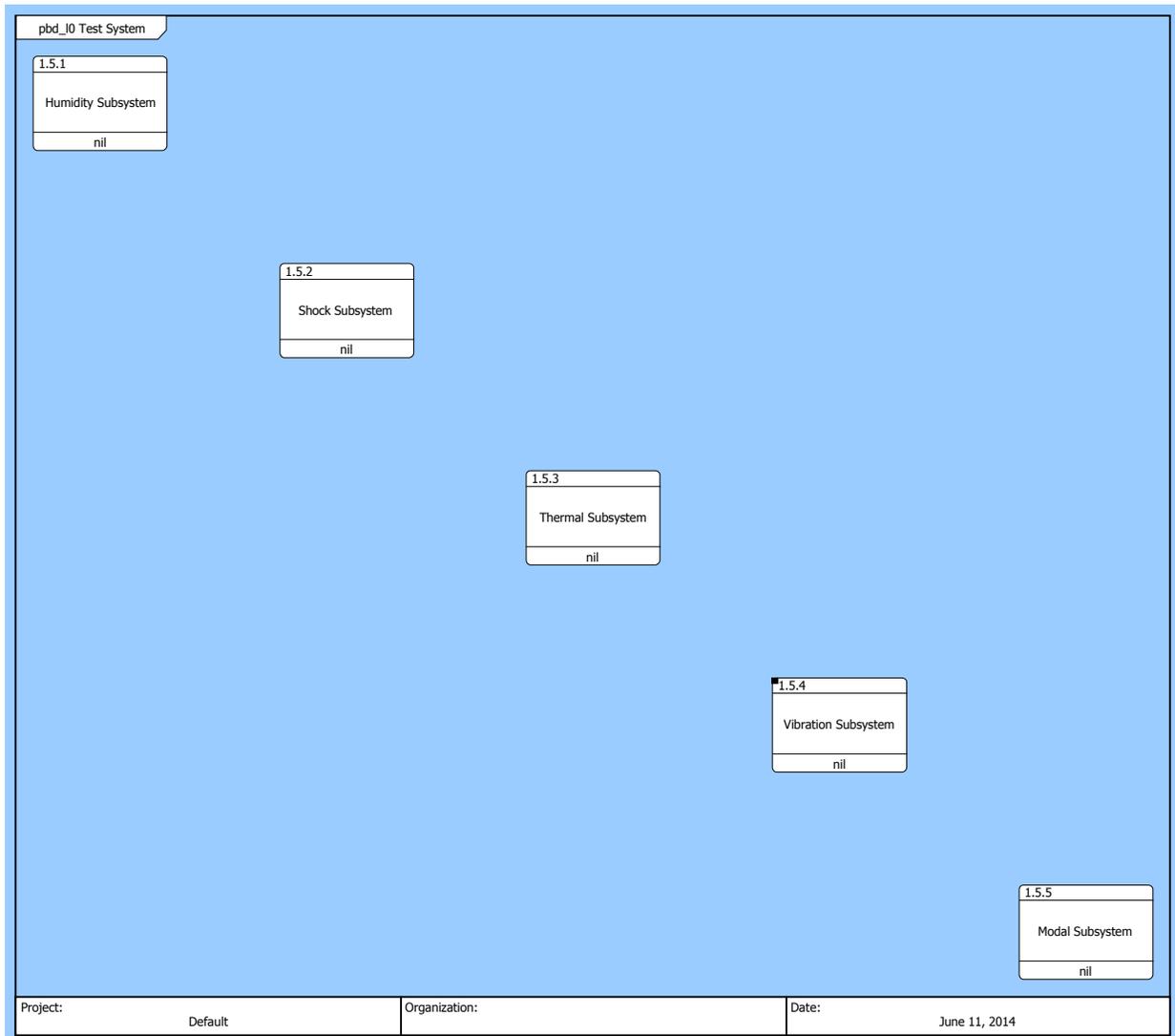


Figure 46 Test System (Physical Block Diagram (L0))

11 Components

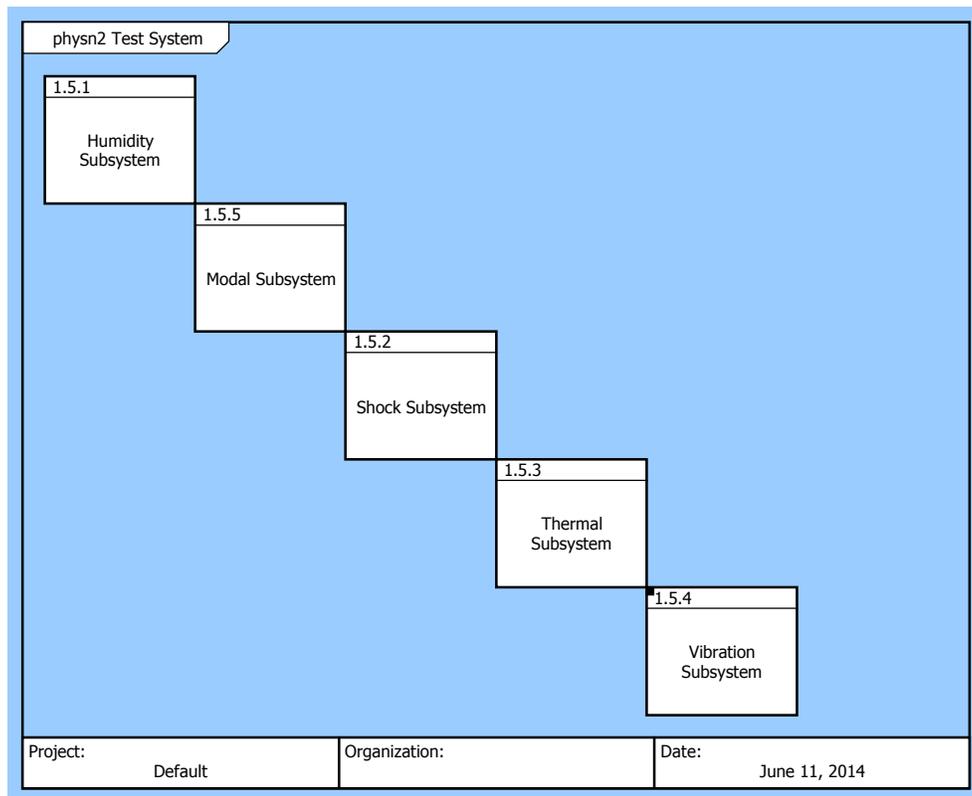


Figure 47 Test System (Physical N2 Diagram)

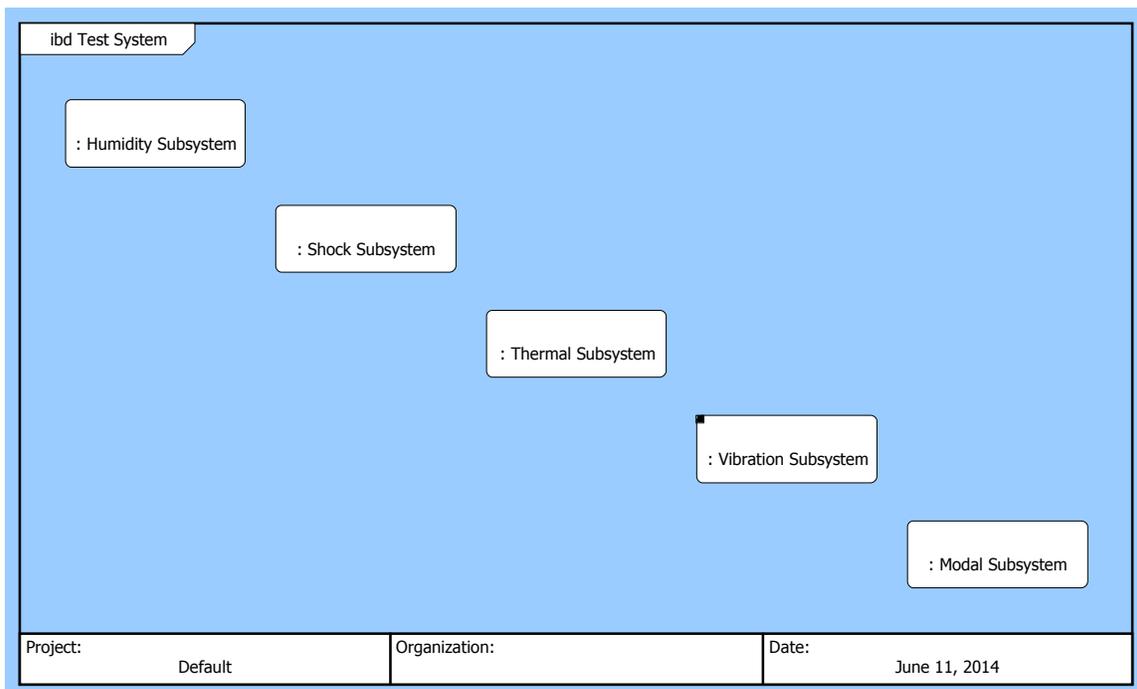


Figure 48 Test System (Standard Internal Block Diagram)

11 Components

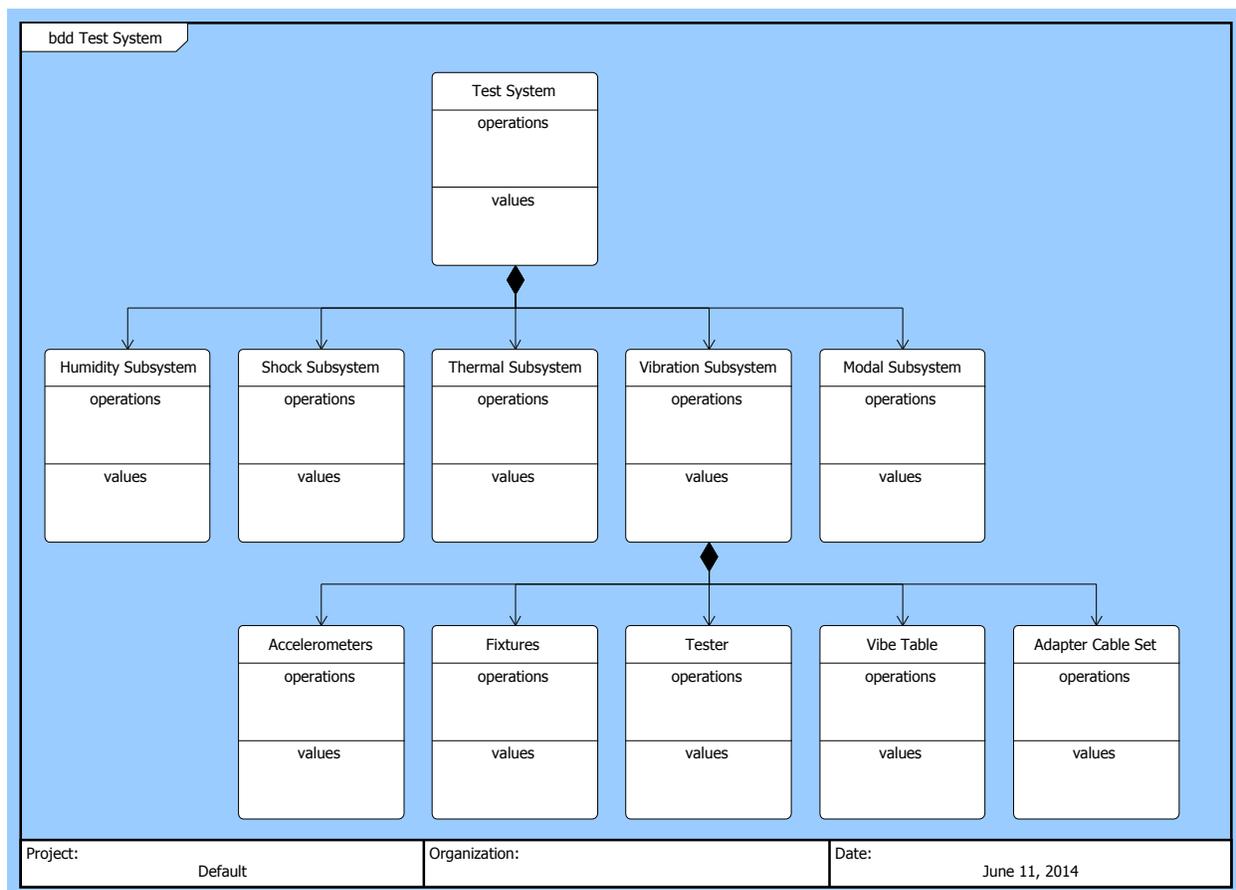


Figure 49 Test System (Structure BDD)

Performs Function(s):

- 1.1 Verify Requirements set
- 1.1.5 Identify Mode's

1.5.1 Humidity Subsystem

Built In Higher-Level Component(s):

- 1.5 Test System

Performs Function(s):

- 1.1.4 Expose to humidity

1.5.2 Shock Subsystem

Built In Higher-Level Component(s):

- 1.5 Test System

Performs Function(s):

- 1.1.2 Shock

1.5.3 Thermal Subsystem

Built In Higher-Level Component(s):

11 Components

1.5 Test System

Performs Function(s):

- 1.1.1 Thermally stress

1.5.4 Vibration Subsystem

Built In Higher-Level Component(s):

- 1.5 Test System

Built From Lower-Level Component(s):

- 1.5.4.1 Accelerometers
- 1.5.4.2 Fixtures
- 1.5.4.3 Tester
- 1.5.4.4 Vibe Table
- 1.5.4.5 Adapter Cable Set

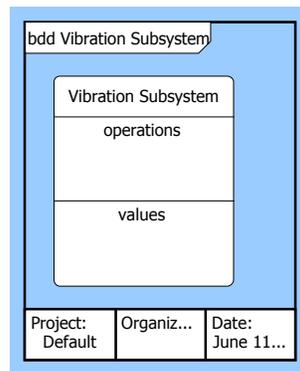


Figure 50 Vibration Subsystem (Classification BDD)

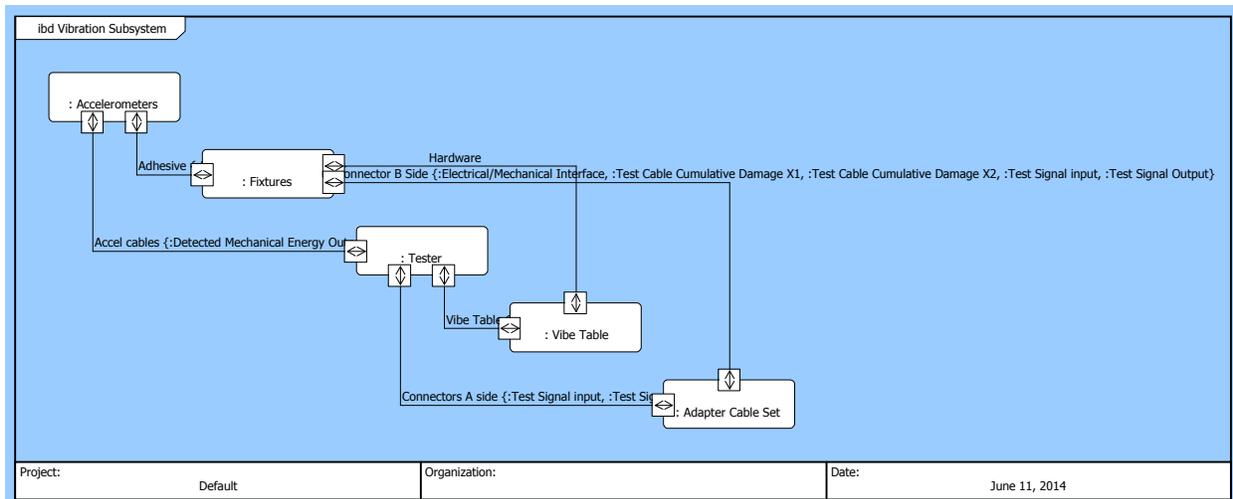


Figure 51 Vibration Subsystem (Flow Internal Block Diagram)

11 Components

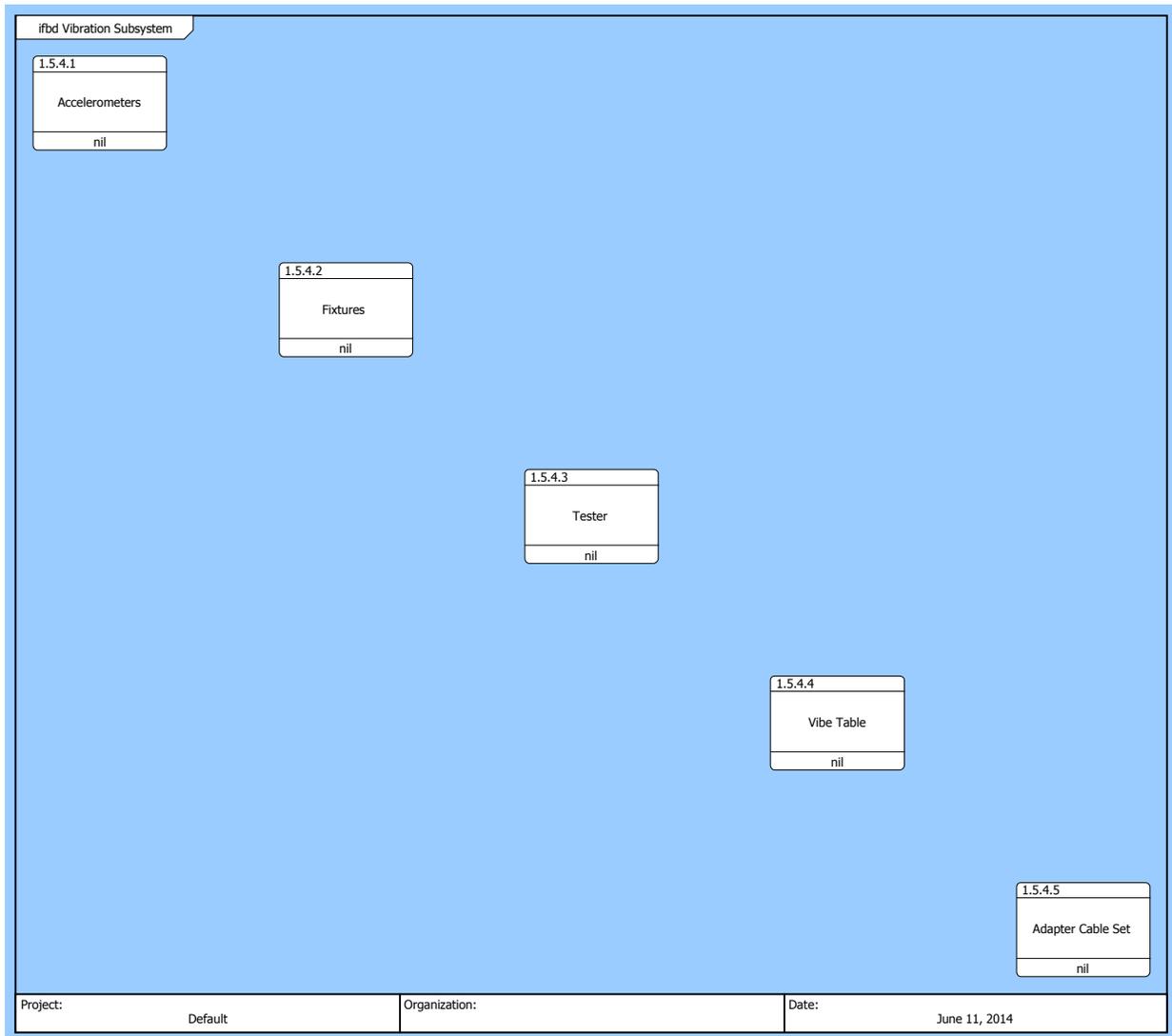


Figure 52 Vibration Subsystem (Interface Block Diagram)

11 Components

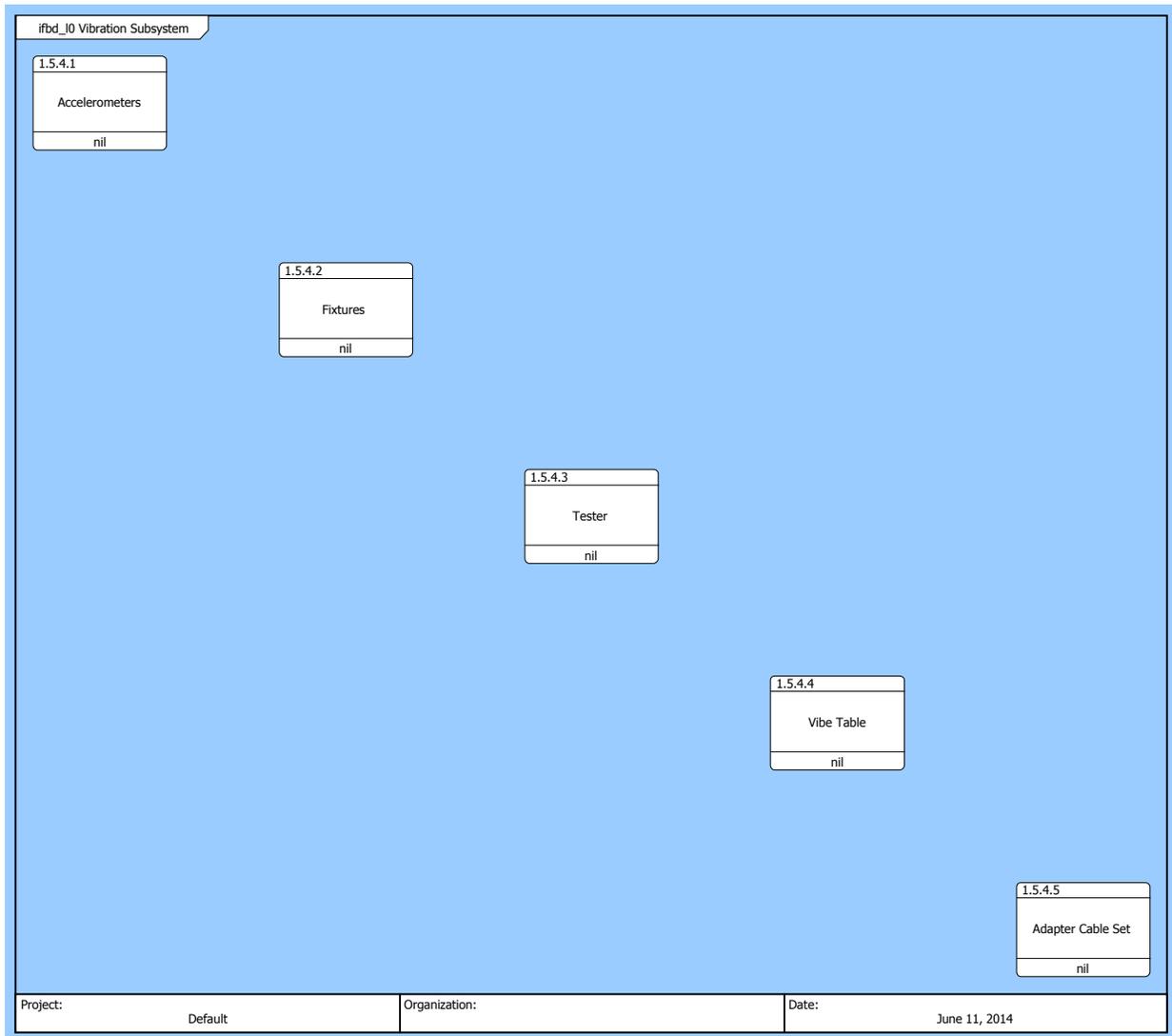


Figure 53 Vibration Subsystem (Interface Block Diagram (L0))

11 Components

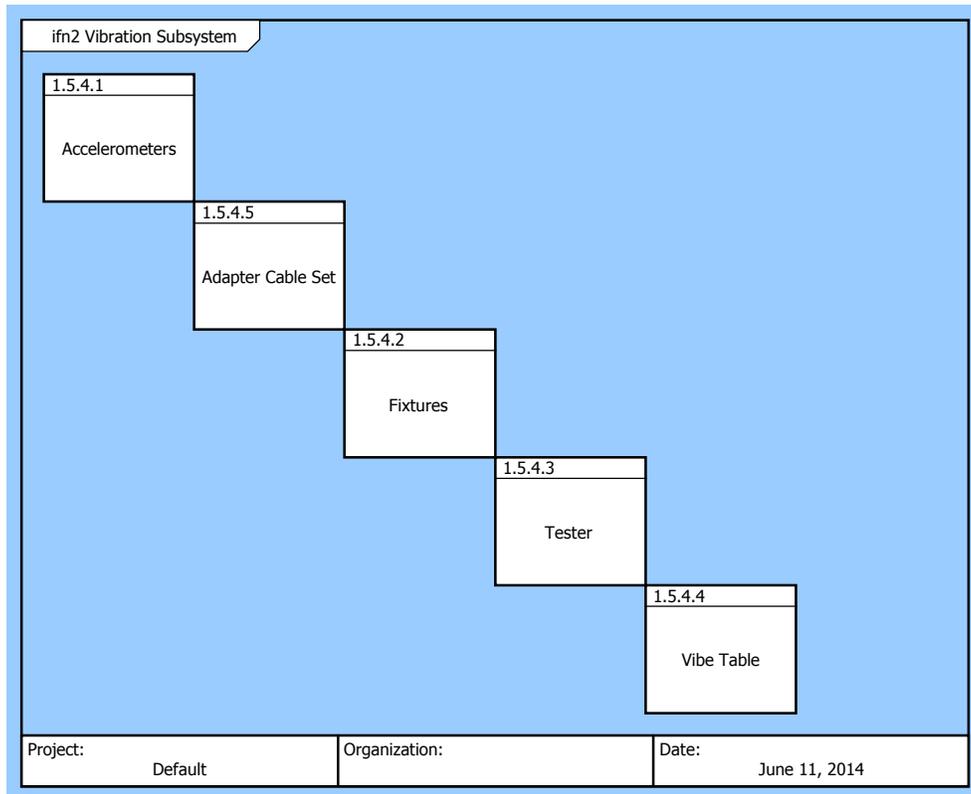


Figure 54 Vibration Subsystem (Interface N2 Diagram)

11 Components

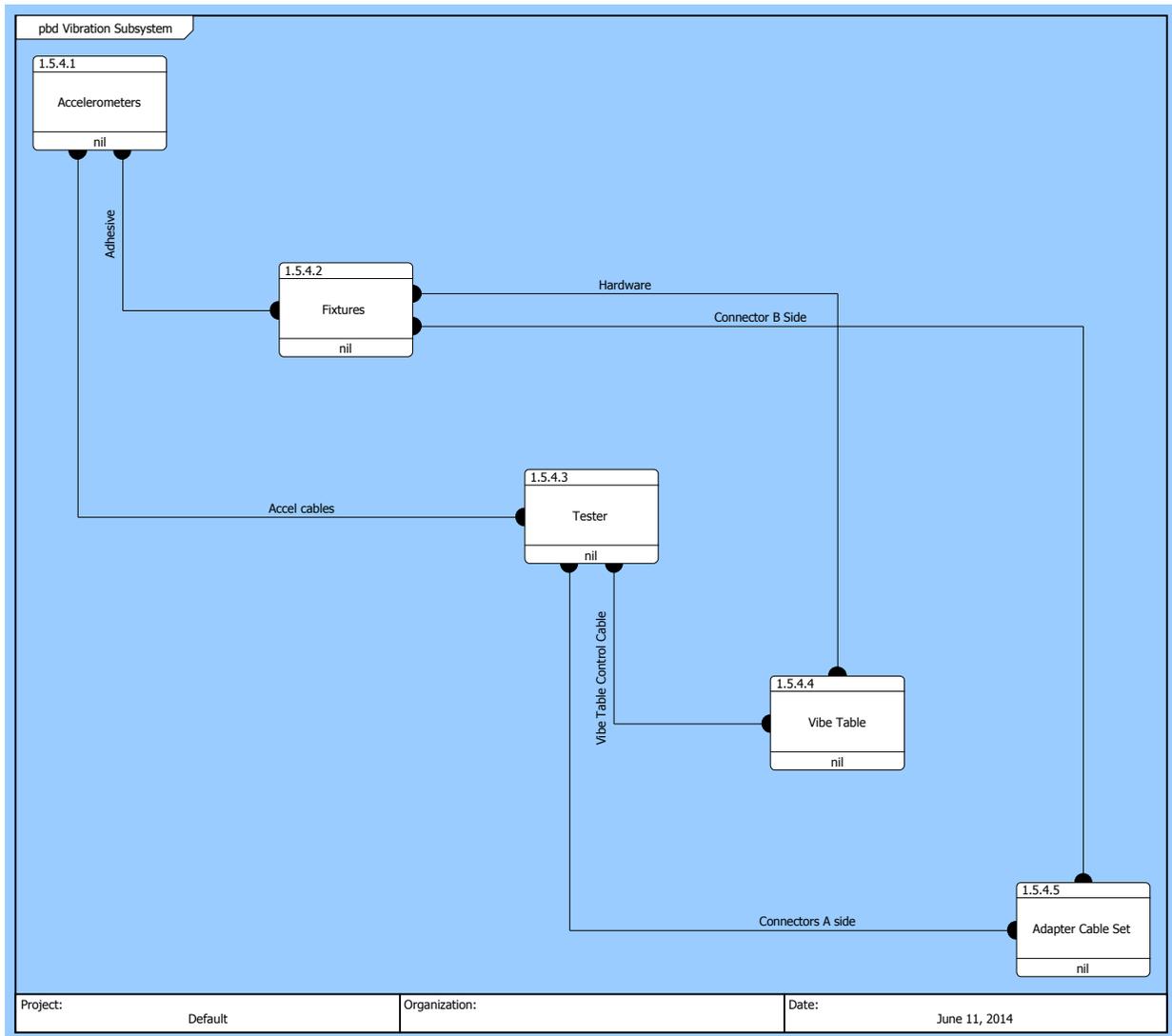


Figure 55 Vibration Subsystem (Physical Block Diagram)

11 Components

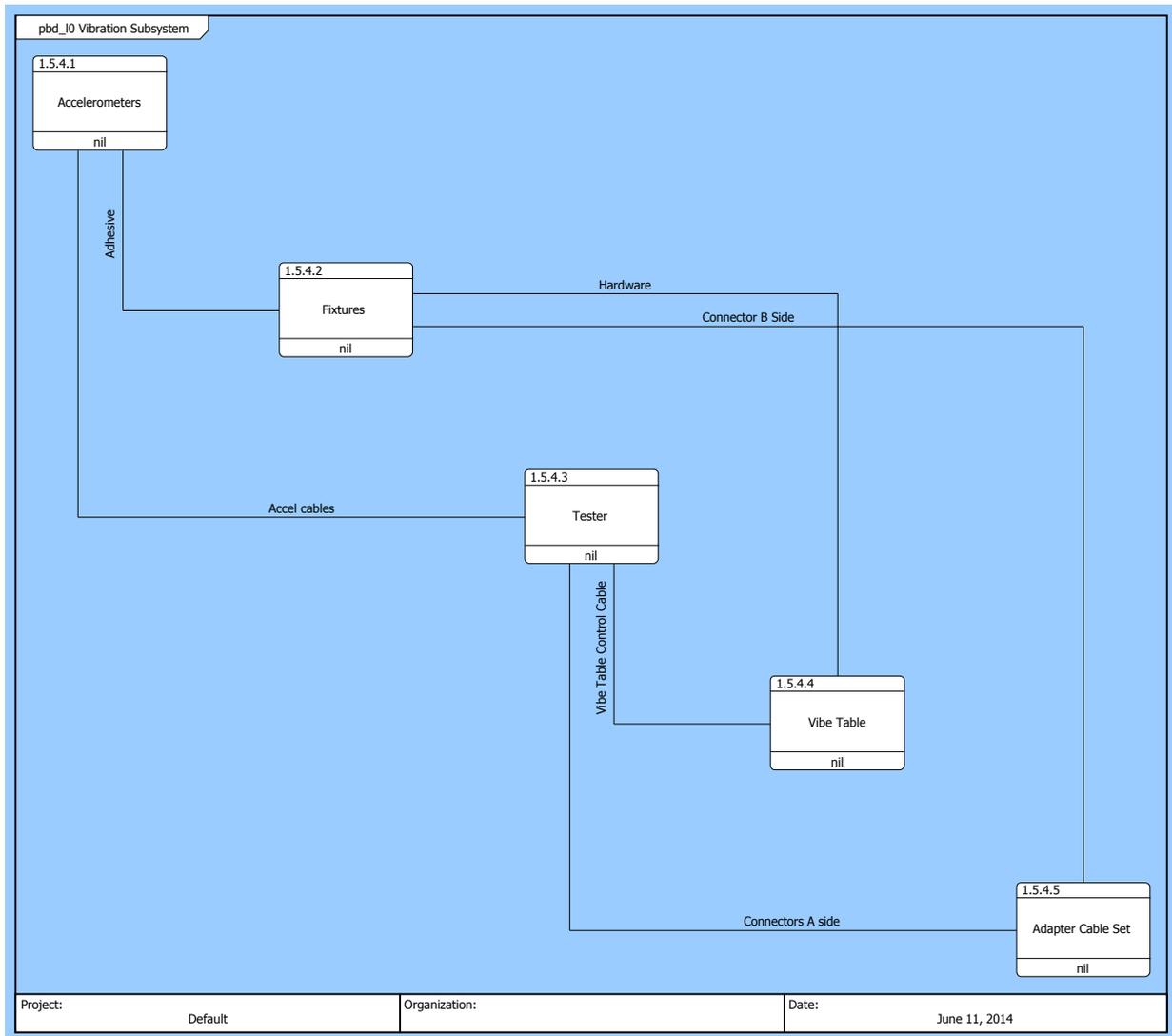


Figure 56 Vibration Subsystem (Physical Block Diagram (L0))

11 Components

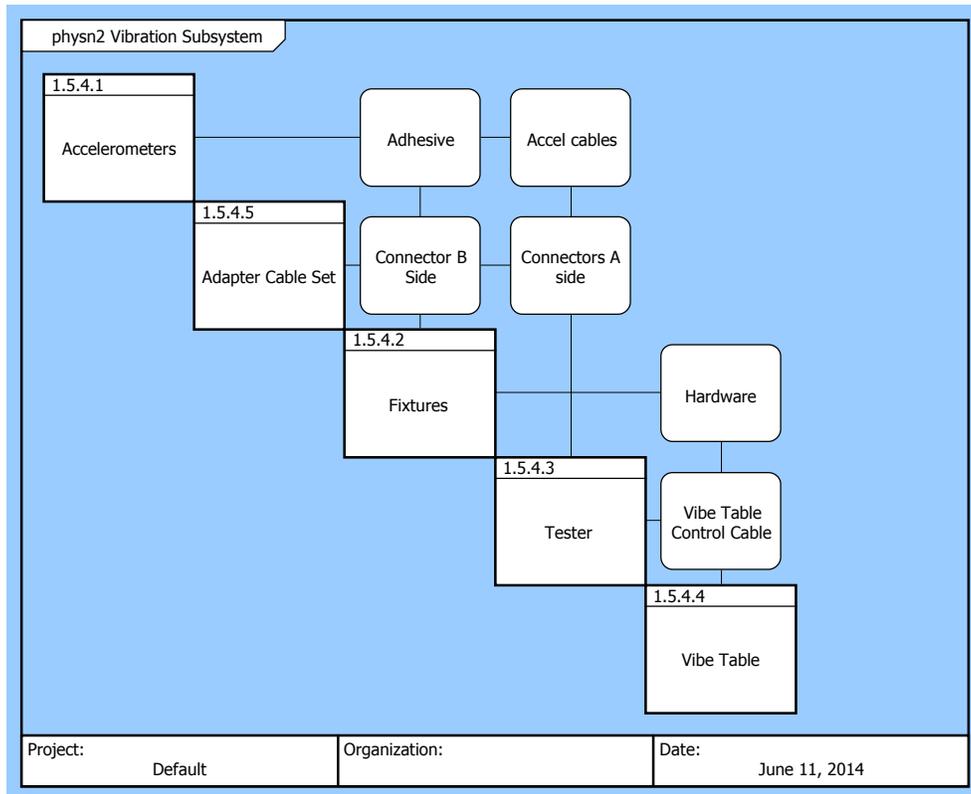


Figure 57 Vibration Subsystem (Physical N2 Diagram)

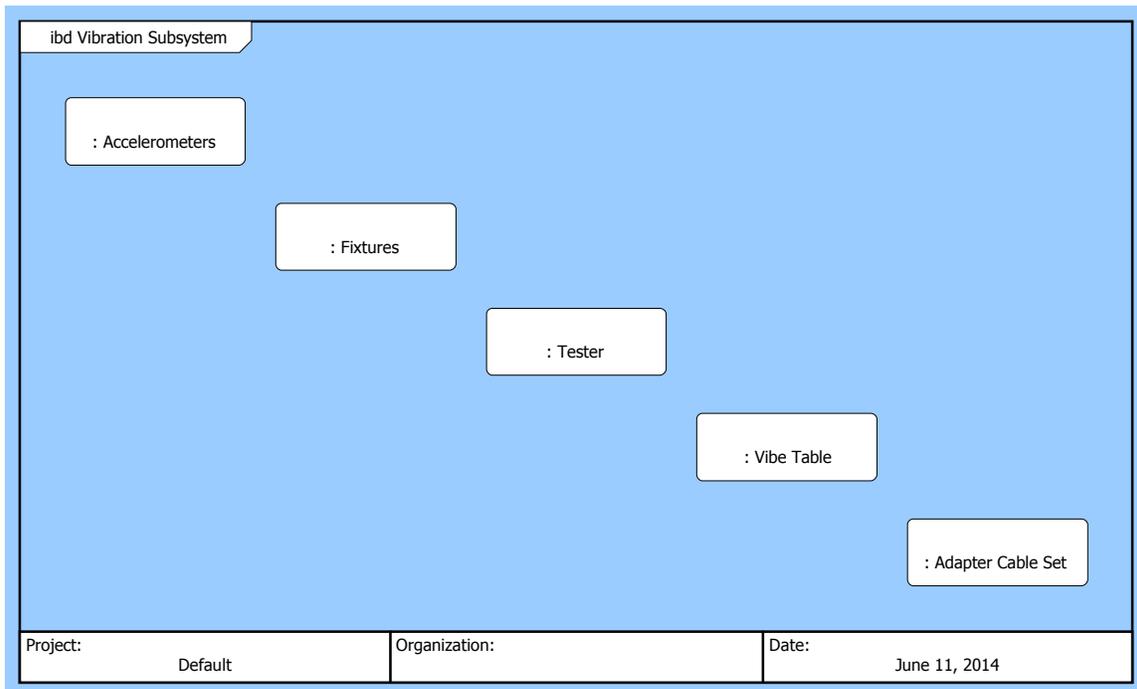


Figure 58 Vibration Subsystem (Standard Internal Block Diagram)

11 Components

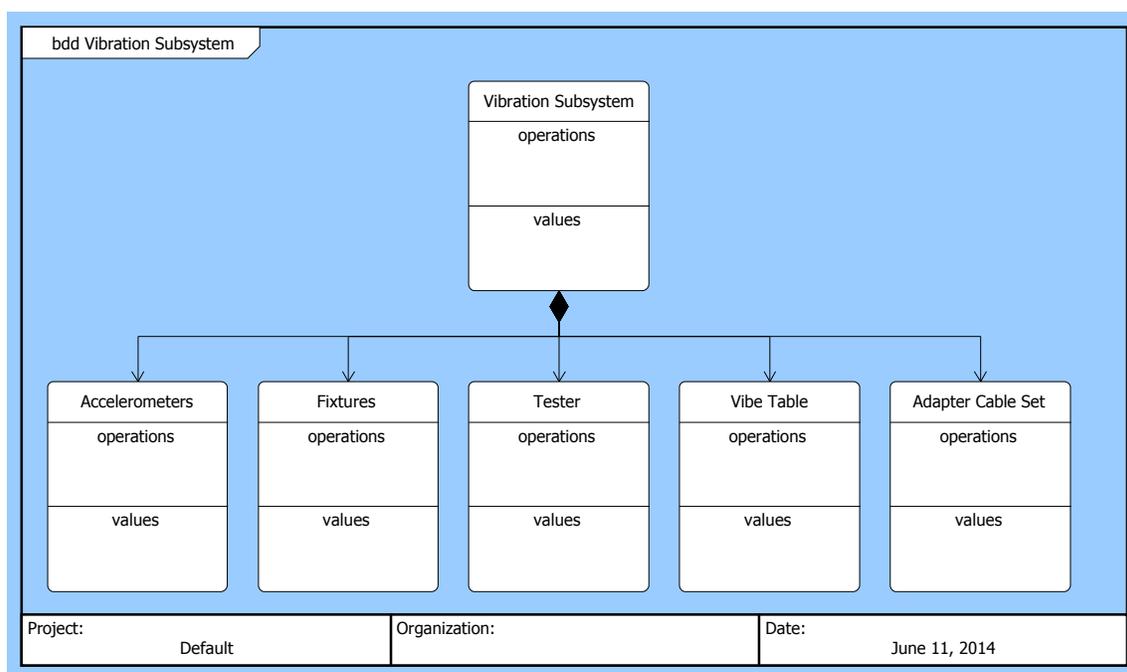


Figure 59 Vibration Subsystem (Structure BDD)

Performs Function(s):

1.1.3 Vibrate

Specified By:

1.1.5.3.4.9 The Vibration Sub-System shall not consume more than 48 sq./ft. of floor space

1.5.4.1 Accelerometers

Built In Higher-Level Component(s):

1.5.4 Vibration Subsystem

Connected to Physical Link(s):

Accel cables

Adhesive

Performs Function(s):

1.1.3.2 sensing

1.5.4.2 Fixtures

Built In Higher-Level Component(s):

1.5.4 Vibration Subsystem

Connected to Physical Link(s):

Adhesive

Connector B Side

Hardware

Performs Function(s):

1.1.3.5 Fixturing

11 Components

1.5.4.3 Tester

Built In Higher-Level Component(s):

1.5.4 Vibration Subsystem

Connected to Physical Link(s):

Accel cables

Connectors A side

Vibe Table Control Cable

Performs Function(s):

1.1.3.4 Signal sourcing

1.1.3.6 Monitoring

1.1.3.7 Data Storage

1.1.3.8 Interface with Operator

Specified By:

1.1.5.3.4.9.2 Tester shall not occupy more than 12 sq./ft. of floor space

1.5.4.4 Vibe Table

Built In Higher-Level Component(s):

1.5.4 Vibration Subsystem

Connected to Physical Link(s):

Hardware

Vibe Table Control Cable

Performs Function(s):

1.1.3.1 vibrator

Specified By:

1.1.5.3.4.9.3 Vibe table shall not consume more than 24 sq./ft. of floor space

1.5.4.5 Adapter Cable Set

Built In Higher-Level Component(s):

1.5.4 Vibration Subsystem

Connected to Physical Link(s):

Connector B Side

Connectors A side

Performs Function(s):

1.1.3.3 Signal transmission

Specified By:

1.1.5.3.4.9.1 All tester cabling shall not consume more than 12 sq./ft. of floor space

1.5.5 Modal Subsystem

Built In Higher-Level Component(s):

1.5 Test System

Performs Function(s):

11 Components

1.1.5 Identify Mode's

12 Interfaces

Part I - Derived Functional Interfaces

Table 19 1.1 D-test cables External I/O

Functions	Interface Items	Interfacing Elements
1.5 Represent Product	→ Electrical/Mechanical Interface	1.1 Verify Requirements set 1.5 Test System 1.1.1 Thermally stress 1.5.3 Thermal Subsystem 1.1.2 Shock 1.5.2 Shock Subsystem 1.1.3 Vibrate 1.5.4 Vibration Subsystem 1.1.3.3 Signal transmission 1.5.4.5 Adapter Cable Set 1.1.3.5 Fixturing 1.5.4.2 Fixtures 1.1.4 Expose to humidity 1.5.1 Humidity Subsystem 1.1.5 Identify Mode's 1.5 Test System 1.1.5 Identify Mode's 1.5.5 Modal Subsystem
	← Stress / Electrical Signal	1.1.3.5 Fixturing 1.5.4.2 Fixtures 1.1 Verify Requirements set 1.5 Test System 1.1.1 Thermally stress 1.5.3 Thermal Subsystem 1.1.2 Shock 1.5.2 Shock Subsystem 1.1.3 Vibrate 1.5.4 Vibration Subsystem 1.1.3.3 Signal transmission 1.5.4.5 Adapter Cable Set 1.1.4 Expose to humidity 1.5.1 Humidity Subsystem

12 Interfaces

Table 20 1.2 Product Realization Team (PRT) External I/O

Functions	Interface Items	Interfacing Elements
1.2 Define Test Parameters	→ Requirements	1.3 Operate Tests 1.4 Test Operator
	← Data Package	1.1.4 Expose to humidity 1.5.1 Humidity Subsystem 1.1 Verify Requirements set 1.5 Test System 1.1.1 Thermally stress 1.5.3 Thermal Subsystem 1.1.2 Shock 1.5.2 Shock Subsystem 1.1.3 Vibrate 1.5.4 Vibration Subsystem 1.1.3.7 Data Storage 1.5.4.3 Tester 1.1.5 Identify Mode's 1.5 Test System 1.1.5 Identify Mode's 1.5.5 Modal Subsystem
	← Notification	1.3 Operate Tests 1.4 Test Operator

Table 21 1.3 Test House External I/O

Functions	Interface Items	Interfacing Elements
1.4 House System	→ Environmental Interface	1.1 Verify Requirements set 1.5 Test System 1.1.1 Thermally stress 1.5.3 Thermal Subsystem 1.1.2 Shock 1.5.2 Shock Subsystem 1.1.3 Vibrate 1.5.4 Vibration Subsystem 1.1.3.1 vibrator 1.5.4.4 Vibe Table 1.1.3.5 Fixturing 1.5.4.2 Fixtures 1.1.4 Expose to humidity 1.5.1 Humidity Subsystem 1.1.5 Identify Mode's

12 Interfaces

Table 21 1.3 Test House External I/O

Functions	Interface Items	Interfacing Elements
		1.5 Test System 1.1.5 Identify Mode's 1.5.5 Modal Subsystem

Table 22 1.4 Test Operator External I/O

Functions	Interface Items	Interfacing Elements
1.3 Operate Tests	→ Go/stop	1.1 Verify Requirements set 1.5 Test System 1.1.1 Thermally stress 1.5.3 Thermal Subsystem 1.1.2 Shock 1.5.2 Shock Subsystem 1.1.3 Vibrate 1.5.4 Vibration Subsystem 1.1.3.1 vibrator 1.5.4.4 Vibe Table 1.1.3.4 Signal sourcing 1.5.4.3 Tester 1.1.3.6 Monitoring 1.5.4.3 Tester 1.1.3.7 Data Storage 1.5.4.3 Tester 1.1.4 Expose to humidity 1.5.1 Humidity Subsystem 1.1.5 Identify Mode's 1.5 Test System 1.1.5 Identify Mode's 1.5.5 Modal Subsystem
	→ Notification	1.2 Define Test Parameters 1.2 Product Realization Team (PRT)
	→ Operator instructions	1.1 Verify Requirements set 1.5 Test System 1.1.1 Thermally stress 1.5.3 Thermal Subsystem 1.1.2 Shock 1.5.2 Shock Subsystem 1.1.3 Vibrate

12 Interfaces

Table 22 1.4 Test Operator External I/O

Functions	Interface Items	Interfacing Elements
		1.5.4 Vibration Subsystem 1.1.3.8 Interface with Operator 1.5.4.3 Tester 1.1.4 Expose to humidity 1.5.1 Humidity Subsystem 1.1.5 Identify Mode's 1.5 Test System 1.1.5 Identify Mode's 1.5.5 Modal Subsystem
	→ Repair Interface	1.1 Verify Requirements set 1.5 Test System 1.1.1 Thermally stress 1.5.3 Thermal Subsystem 1.1.2 Shock 1.5.2 Shock Subsystem 1.1.3 Vibrate 1.5.4 Vibration Subsystem 1.1.3.1 vibrator 1.5.4.4 Vibe Table 1.1.3.2 sensing 1.5.4.1 Accelerometers 1.1.3.3 Signal transmission 1.5.4.5 Adapter Cable Set 1.1.3.4 Signal sourcing 1.5.4.3 Tester 1.1.3.5 Fixturing 1.5.4.2 Fixtures 1.1.3.6 Monitoring 1.5.4.3 Tester 1.1.3.7 Data Storage 1.5.4.3 Tester 1.1.3.8 Interface with Operator 1.5.4.3 Tester 1.1.4 Expose to humidity 1.5.1 Humidity Subsystem 1.1.5 Identify Mode's 1.5 Test System 1.1.5 Identify Mode's

12 Interfaces

Table 22 1.4 Test Operator External I/O

Functions	Interface Items	Interfacing Elements
		1.5.5 Modal Subsystem
	← Requirements	1.2 Define Test Parameters 1.2 Product Realization Team (PRT)
	← Status	1.1.4 Expose to humidity 1.5.1 Humidity Subsystem 1.1 Verify Requirements set 1.5 Test System 1.1.1 Thermally stress 1.5.3 Thermal Subsystem 1.1.2 Shock 1.5.2 Shock Subsystem 1.1.3 Vibrate 1.5.4 Vibration Subsystem 1.1.3.8 Interface with Operator 1.5.4.3 Tester 1.1.5 Identify Mode's 1.5 Test System 1.1.5 Identify Mode's 1.5.5 Modal Subsystem

Table 23 1.5 Test System External I/O

Functions	Interface Items	Interfacing Elements
1.1 Verify Requirements set	→ Data Package	1.2 Define Test Parameters 1.2 Product Realization Team (PRT)
	→ Status	1.3 Operate Tests 1.4 Test Operator
	→ Stress / Electrical Signal	1.5 Represent Product 1.1 D-test cables
	← Electrical/Mechanical Interface	1.5 Represent Product 1.1 D-test cables
	← Environmental Interface	1.4 House System 1.3 Test House
	← Go/stop	1.3 Operate Tests 1.4 Test Operator
	← Operator instructions	1.3 Operate Tests 1.4 Test Operator

12 Interfaces

Table 23 1.5 Test System External I/O

Functions	Interface Items	Interfacing Elements
	← Repair Interface	1.3 Operate Tests 1.4 Test Operator
1.1.5 Identify Mode's	→ Data Package	1.2 Define Test Parameters 1.2 Product Realization Team (PRT)
	→ Status	1.3 Operate Tests 1.4 Test Operator
	← Electrical/Mechanical Interface	1.5 Represent Product 1.1 D-test cables
	← Environmental Interface	1.4 House System 1.3 Test House
	← Go/stop	1.3 Operate Tests 1.4 Test Operator
	← Operator instructions	1.3 Operate Tests 1.4 Test Operator
	← Repair Interface	1.3 Operate Tests 1.4 Test Operator

Table 24 1.5.1 Humidity Subsystem External I/O

Functions	Interface Items	Interfacing Elements
1.1.4 Expose to humidity	→ Data Package	1.1.3.8 Interface with Operator 1.5.4.3 Tester 1.2 Define Test Parameters 1.2 Product Realization Team (PRT)
	→ Status	1.3 Operate Tests 1.4 Test Operator
	→ Stress / Electrical Signal	1.5 Represent Product 1.1 D-test cables
	← Electrical/Mechanical Interface	1.1.5 Identify Mode's 1.5.5 Modal Subsystem 1.5 Represent Product 1.1 D-test cables
	← Environmental Interface	1.4 House System 1.3 Test House
	← Go/stop	1.1.3.8 Interface with Operator 1.5.4.3 Tester 1.3 Operate Tests

12 Interfaces

Table 24 1.5.1 Humidity Subsystem External I/O

Functions	Interface Items	Interfacing Elements
		1.4 Test Operator
	← Operator instructions	1.3 Operate Tests 1.4 Test Operator
	← Repair Interface	1.3 Operate Tests 1.4 Test Operator
	← Test Cable Cumulative Damage X2	1.1.2 Shock 1.5.2 Shock Subsystem
	← Test Cables Cumulative Damage X3	1.1.3 Vibrate 1.5.4 Vibration Subsystem 1.1.3.3 Signal transmission 1.5.4.5 Adapter Cable Set

Table 25 1.5.2 Shock Subsystem External I/O

Functions	Interface Items	Interfacing Elements
1.1.2 Shock	→ Data Package	1.1.3.8 Interface with Operator 1.5.4.3 Tester 1.2 Define Test Parameters 1.2 Product Realization Team (PRT)
	→ Status	1.3 Operate Tests 1.4 Test Operator
	→ Stress / Electrical Signal	1.5 Represent Product 1.1 D-test cables
	→ Test Cable Cumulative Damage X2	1.1.3 Vibrate 1.5.4 Vibration Subsystem 1.1.3.3 Signal transmission 1.5.4.5 Adapter Cable Set 1.1.4 Expose to humidity 1.5.1 Humidity Subsystem
	← Electrical/Mechanical Interface	1.1.5 Identify Mode's 1.5.5 Modal Subsystem 1.5 Represent Product 1.1 D-test cables
	← Environmental Interface	1.4 House System 1.3 Test House
	← Go/stop	1.1.3.8 Interface with Operator 1.5.4.3 Tester 1.3 Operate Tests

12 Interfaces

Table 25 1.5.2 Shock Subsystem External I/O

Functions	Interface Items	Interfacing Elements
		1.4 Test Operator
	← Operator instructions	1.3 Operate Tests 1.4 Test Operator
	← Repair Interface	1.3 Operate Tests 1.4 Test Operator
	← Test Cable Cumulative Damage X1	1.1.1 Thermally stress 1.5.3 Thermal Subsystem

Table 26 1.5.3 Thermal Subsystem External I/O

Functions	Interface Items	Interfacing Elements
1.1.1 Thermally stress	→ Data Package	1.1.3.8 Interface with Operator 1.5.4.3 Tester 1.2 Define Test Parameters 1.2 Product Realization Team (PRT)
	→ Status	1.3 Operate Tests 1.4 Test Operator
	→ Stress / Electrical Signal	1.5 Represent Product 1.1 D-test cables
	→ Test Cable Cumulative Damage X1	1.1.2 Shock 1.5.2 Shock Subsystem 1.1.3 Vibrate 1.5.4 Vibration Subsystem 1.1.3.3 Signal transmission 1.5.4.5 Adapter Cable Set
	← Electrical/Mechanical Interface	1.1.5 Identify Mode's 1.5.5 Modal Subsystem 1.5 Represent Product 1.1 D-test cables
	← Environmental Interface	1.4 House System 1.3 Test House
	← Go/stop	1.1.3.8 Interface with Operator 1.5.4.3 Tester 1.3 Operate Tests 1.4 Test Operator
	← Operator instructions	1.3 Operate Tests 1.4 Test Operator

12 Interfaces

Table 26 1.5.3 Thermal Subsystem External I/O

Functions	Interface Items	Interfacing Elements
	← Repair Interface	1.3 Operate Tests 1.4 Test Operator

Table 27 1.5.4 Vibration Subsystem External I/O

Functions	Interface Items	Interfacing Elements
1.1.3 Vibrate	→ Data Package	1.2 Define Test Parameters 1.2 Product Realization Team (PRT)
	→ Status	1.3 Operate Tests 1.4 Test Operator
	→ Stress / Electrical Signal	1.5 Represent Product 1.1 D-test cables
	→ Test Cables Cumulative Damage X3	1.1.4 Expose to humidity 1.5.1 Humidity Subsystem
	← Electrical/Mechanical Interface	1.1.5 Identify Mode's 1.5.5 Modal Subsystem 1.5 Represent Product 1.1 D-test cables
	← Environmental Interface	1.4 House System 1.3 Test House
	← Go/stop	1.3 Operate Tests 1.4 Test Operator
	← Operator instructions	1.3 Operate Tests 1.4 Test Operator
	← Repair Interface	1.3 Operate Tests 1.4 Test Operator
	← Test Cable Cumulative Damage X1	1.1.1 Thermally stress 1.5.3 Thermal Subsystem
	← Test Cable Cumulative Damage X2	1.1.2 Shock 1.5.2 Shock Subsystem

Table 28 1.5.4.1 Accelerometers External I/O

Functions	Interface Items	Interfacing Elements
1.1.3.2 sensing	→ Detected Mechanical Energy Output	1.1.3.6 Monitoring 1.5.4.3 Tester
	← Mechanical Energy Output	1.1.3.5 Fixturing 1.5.4.2 Fixtures

12 Interfaces

Table 28 1.5.4.1 Accelerometers External I/O

Functions	Interface Items	Interfacing Elements
	← Repair Interface	1.3 Operate Tests 1.4 Test Operator

Table 29 1.5.4.2 Fixtures External I/O

Functions	Interface Items	Interfacing Elements
1.1.3.5 Fixturing	→ Mechanical Energy Output	1.1.3.2 sensing 1.5.4.1 Accelerometers
	→ Mechanical Feedback	1.1.3.1 vibrator 1.5.4.4 Vibe Table
	→ Stress / Electrical Signal	1.5 Represent Product 1.1 D-test cables
	← Electrical/Mechanical Interface	1.1.5 Identify Mode's 1.5.5 Modal Subsystem 1.5 Represent Product 1.1 D-test cables
	← Environmental Interface	1.4 House System 1.3 Test House
	← Mechanical Energy Input	1.1.3.1 vibrator 1.5.4.4 Vibe Table
	← Repair Interface	1.3 Operate Tests 1.4 Test Operator

Table 30 1.5.4.3 Tester External I/O

Functions	Interface Items	Interfacing Elements
1.1.3.4 Signal sourcing	→ Test Signal input	1.1.3.3 Signal transmission 1.5.4.5 Adapter Cable Set
	← Go/stop	1.3 Operate Tests 1.4 Test Operator
	← Repair Interface	1.3 Operate Tests 1.4 Test Operator
1.1.3.6 Monitoring	← Detected Mechanical Energy Output	1.1.3.2 sensing 1.5.4.1 Accelerometers
	← Go/stop	1.3 Operate Tests 1.4 Test Operator
	← Repair Interface	1.3 Operate Tests 1.4 Test Operator
	← Test Signal Output	1.1.3.3 Signal transmission

12 Interfaces

Table 30 1.5.4.3 Tester External I/O

Functions	Interface Items	Interfacing Elements
		1.5.4.5 Adapter Cable Set
1.1.3.7 Data Storage	→ Data Package	1.2 Define Test Parameters 1.2 Product Realization Team (PRT)
	← Go/stop	1.3 Operate Tests 1.4 Test Operator
	← Repair Interface	1.3 Operate Tests 1.4 Test Operator
1.1.3.8 Interface with Operator	→ command/Instruction	1.1.3.1 vibrator 1.5.4.4 Vibe Table
	→ Go/stop	1.1.1 Thermally stress 1.5.3 Thermal Subsystem 1.1.2 Shock 1.5.2 Shock Subsystem 1.1.3.1 vibrator 1.5.4.4 Vibe Table 1.1.4 Expose to humidity 1.5.1 Humidity Subsystem 1.1.5 Identify Mode's 1.5.5 Modal Subsystem
	→ Status	1.3 Operate Tests 1.4 Test Operator
	← Data Package	1.1.1 Thermally stress 1.5.3 Thermal Subsystem 1.1.2 Shock 1.5.2 Shock Subsystem 1.1.4 Expose to humidity 1.5.1 Humidity Subsystem 1.1.5 Identify Mode's 1.5.5 Modal Subsystem
	← Operator instructions	1.3 Operate Tests 1.4 Test Operator
	← Repair Interface	1.3 Operate Tests 1.4 Test Operator

Table 31 1.5.4.4 Vibe Table External I/O

Functions	Interface Items	Interfacing Elements
1.1.3.1 vibrator	→ Mechanical Energy Input	1.1.3.5 Fixturing

12 Interfaces

Table 31 1.5.4.4 Vibe Table External I/O

Functions	Interface Items	Interfacing Elements
		1.5.4.2 Fixtures
	← command/Instruction	1.1.3.8 Interface with Operator 1.5.4.3 Tester
	← Environmental Interface	1.4 House System 1.3 Test House
	← Go/stop	1.1.3.8 Interface with Operator 1.5.4.3 Tester 1.3 Operate Tests 1.4 Test Operator
	← Mechanical Feedback	1.1.3.5 Fixturing 1.5.4.2 Fixtures
	← Repair Interface	1.3 Operate Tests 1.4 Test Operator

Table 32 1.5.4.5 Adapter Cable Set External I/O

Functions	Interface Items	Interfacing Elements
1.1.3.3 Signal transmission	→ Stress / Electrical Signal	1.5 Represent Product 1.1 D-test cables
	→ Test Cables Cumulative Damage X3	1.1.4 Expose to humidity 1.5.1 Humidity Subsystem
	→ Test Signal Output	1.1.3.6 Monitoring 1.5.4.3 Tester
	← Electrical/Mechanical Interface	1.1.5 Identify Mode's 1.5.5 Modal Subsystem 1.5 Represent Product 1.1 D-test cables
	← Repair Interface	1.3 Operate Tests 1.4 Test Operator
	← Test Cable Cumulative Damage X1	1.1.1 Thermally stress 1.5.3 Thermal Subsystem
	← Test Cable Cumulative Damage X2	1.1.2 Shock 1.5.2 Shock Subsystem
	← Test Signal input	1.1.3.4 Signal sourcing 1.5.4.3 Tester

12 Interfaces

Table 33 1.5.5 Modal Subsystem External I/O

Functions	Interface Items	Interfacing Elements
1.1.5 Identify Mode's	→ Data Package	1.1.3.8 Interface with Operator 1.5.4.3 Tester 1.2 Define Test Parameters 1.2 Product Realization Team (PRT)
	→ Electrical/Mechanical Interface	1.1.1 Thermally stress 1.5.3 Thermal Subsystem 1.1.2 Shock 1.5.2 Shock Subsystem 1.1.3 Vibrate 1.5.4 Vibration Subsystem 1.1.3.3 Signal transmission 1.5.4.5 Adapter Cable Set 1.1.3.5 Fixturing 1.5.4.2 Fixtures 1.1.4 Expose to humidity 1.5.1 Humidity Subsystem
	→ Status	1.3 Operate Tests 1.4 Test Operator
	← Electrical/Mechanical Interface	1.5 Represent Product 1.1 D-test cables
	← Environmental Interface	1.4 House System 1.3 Test House
	← Go/stop	1.1.3.8 Interface with Operator 1.5.4.3 Tester 1.3 Operate Tests 1.4 Test Operator
	← Operator instructions	1.3 Operate Tests 1.4 Test Operator
	← Repair Interface	1.3 Operate Tests 1.4 Test Operator

Part II - Logical Interfaces

Part III - Physical Interfaces

12 Interfaces

Accel cables

Transmitted Data:
Detected Mechanical Energy Output

Connecting Elements:
1.5.4.1 Accelerometers
1.5.4.3 Tester

Adhesive

Transmitted Data:
Mechanical Energy Output

Connecting Elements:
1.5.4.1 Accelerometers
1.5.4.2 Fixtures

Connector B Side

Transmitted Data:
Electrical/Mechanical Interface
Test Cable Cumulative Damage X1
Test Cable Cumulative Damage X2
Test Signal input
Test Signal Output

Connecting Elements:
1.5.4.2 Fixtures
1.5.4.5 Adapter Cable Set

Connectors A side

Transmitted Data:
Test Signal input
Test Signal Output

Connecting Elements:
1.5.4.3 Tester
1.5.4.5 Adapter Cable Set

Hardware

Connecting Elements:
1.5.4.2 Fixtures
1.5.4.4 Vibe Table

Vibe Table Control Cable

Transmitted Data:
Go/stop

Connecting Elements:

12 Interfaces

1.5.4.3 Tester

1.5.4.4 Vibe Table

13 Requirements Traceability Matrix (RTM)

Allocated Capabilities/Requirements	Traced From Higher-Level Elements
1 Universe (Component)	
1 Metafunction (Function)	
1.1 D-test cables (Component)	
1.5 Represent Product (Function)	
1.2 Product Realization Team (PRT) (Component)	
1.2 Define Test Parameters (Function)	
1.3 Test House (Component)	
1.4 House System (Function)	
1.4 Test Operator (Component)	
1.3 Operate Tests (Function)	1.1.5.3.4.6 Vibration shall be controlled per vibration test tolerances listed in TK (Requirement) 1.1.5.3.4.2 Tests shall be run in the order listed in TK (Requirement)
1.5 Test System (Component)	
1.1 Verify Requirements set (Function)	1.1.5 ES Requirements Normal Environments (Requirement) 1.1 CD Functional Requirement (Requirement) 1 Verify cables meet requirements (Requirement)
1.1.5 Identify Mode's (Function)	1.1.5.2.2.4 simple finite element analysis ES c. (Requirement)
1.5.1 Humidity Subsystem (Component)	
1.1.4 Expose to humidity (Function)	1.1.5.6.4 Thermal & Humidity (Requirement) 1.1.5.7.2 Hum/ Int. gass ES (Requirement)
1.5.2 Shock Subsystem (Component)	
1.1.2 Shock (Function)	1.1.5.3.5 Shock ES (Requirement) 1.1.5.3.1 Acceleration ES (Requirement) 1.1.5.6.2 Acceleration & Thermal (Requirement) 1.1.5.6.3 Shock & Thermal (Requirement)
1.5.3 Thermal Subsystem (Component)	
1.1.1 Thermally stress (Function)	1.1.5.7 Thermal Qualification Activities ES (Requirement) 1.1.5.4 Material Aging and Compatibility ES (Requirement) 1.1.5.7.1 cycles ES (Requirement)
1.5.4 Vibration Subsystem (Component)	
1.1.3 Vibrate (Function)	1.1.5.6.1 Vibration/Acoustics & Thermal (Requirement)

13 Requirements Traceability Matrix (RTM)

Allocated Capabilities/Requirements	Traced From Higher-Level Elements
	1.1.5.3.4 Random Vibration/Acoustics ES (Requirement)
1.1.5.3.4.9 The Vibration Sub-System shall not consume more than 48 sq./ft. of floor space (Requirement)	
1.5.4.1 Accelerometers (Component)	
1.1.3.2 sensing (Function)	1.1.5.3.4.5 Vibration monitoring shall be sensitive to levels within vibration test tolerances defined in TK (Requirement) 1.1.5.3.4.8 Product performance data shall not be contaminated by Vibration Subsystem components (Requirement)
1.5.4.2 Fixtures (Component)	
1.1.3.5 Fixturing (Function)	1.1.5.3.4.4 Vibration criteria shall be preserved/verified (not amplified or dampened) at product and fixturing interface. (Requirement) 1.1.5.3.4.8 Product performance data shall not be contaminated by Vibration Subsystem components (Requirement)
1.5.4.3 Tester (Component)	
1.1.3.4 Signal sourcing (Function)	1.1.5.3.4.3 Units shall be subjected to the vibration criteria listed in TK (Requirement) 1.1.5.3.4.1 Chatter (Requirement) 1.1.5.3.4.8 Product performance data shall not be contaminated by Vibration Subsystem components (Requirement)
1.1.3.6 Monitoring (Function)	1.1.5.3.4.5 Vibration monitoring shall be sensitive to levels within vibration test tolerances defined in TK (Requirement) 1.1.5.3.4.1 Chatter (Requirement) 1.1.5.3.4.8 Product performance data shall not be contaminated by Vibration Subsystem components (Requirement)
1.1.3.7 Data Storage (Function)	1.1.5.3.4.1 Chatter (Requirement) 1.1.5.3.4.8 Product performance data shall not be contaminated by Vibration Subsystem components (Requirement)
1.1.3.8 Interface with Operator (Function)	1.1.5.3.4.7 Operator shall be able to verify chatter requirements during test (Requirement) 1.1.5.3.4.8 Product performance data shall not be contaminated by Vibration Subsystem components (Requirement)
1.1.5.3.4.9.2 Tester shall not occupy more than 12	

13 Requirements Traceability Matrix (RTM)

Allocated Capabilities/Requirements	Traced From Higher-Level Elements
sq./ft. of floor space (Requirement)	
1.5.4.4 Vibe Table (Component)	
1.1.3.1 vibrator (Function)	1.1.5.3.4.6 Vibration shall be controled per vibration test tolerances listed in TK (Requirement) 1.1.5.3.4.8 Product performance data shall not be contaminated by Vibration Subsystem components (Requirement)
1.1.5.3.4.9.3 Vibe table shall not consume more than 24 sq./ft. of floor space (Requirement)	
1.5.4.5 Adapter Cable Set (Component)	
1.1.3.3 Signal transmission (Function)	1.1.5.3.4.8 Product performance data shall not be contaminated by Vibration Subsystem components (Requirement)
1.1.5.3.4.9.1 All tester cabling shall not consume more than 12 sq./ft. of floor space (Requirement)	
1.5.5 Modal Subsystem (Component)	
1.1.5 Identify Mode's (Function)	1.1.5.2.2.4 simple finite element analysis ES c. (Requirement)

14 Acronyms

15 Glossary
