Analysts' Workbench

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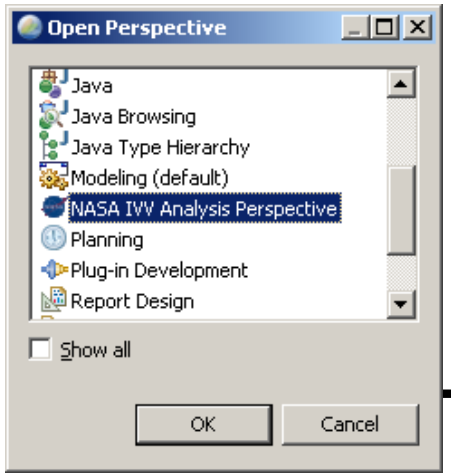
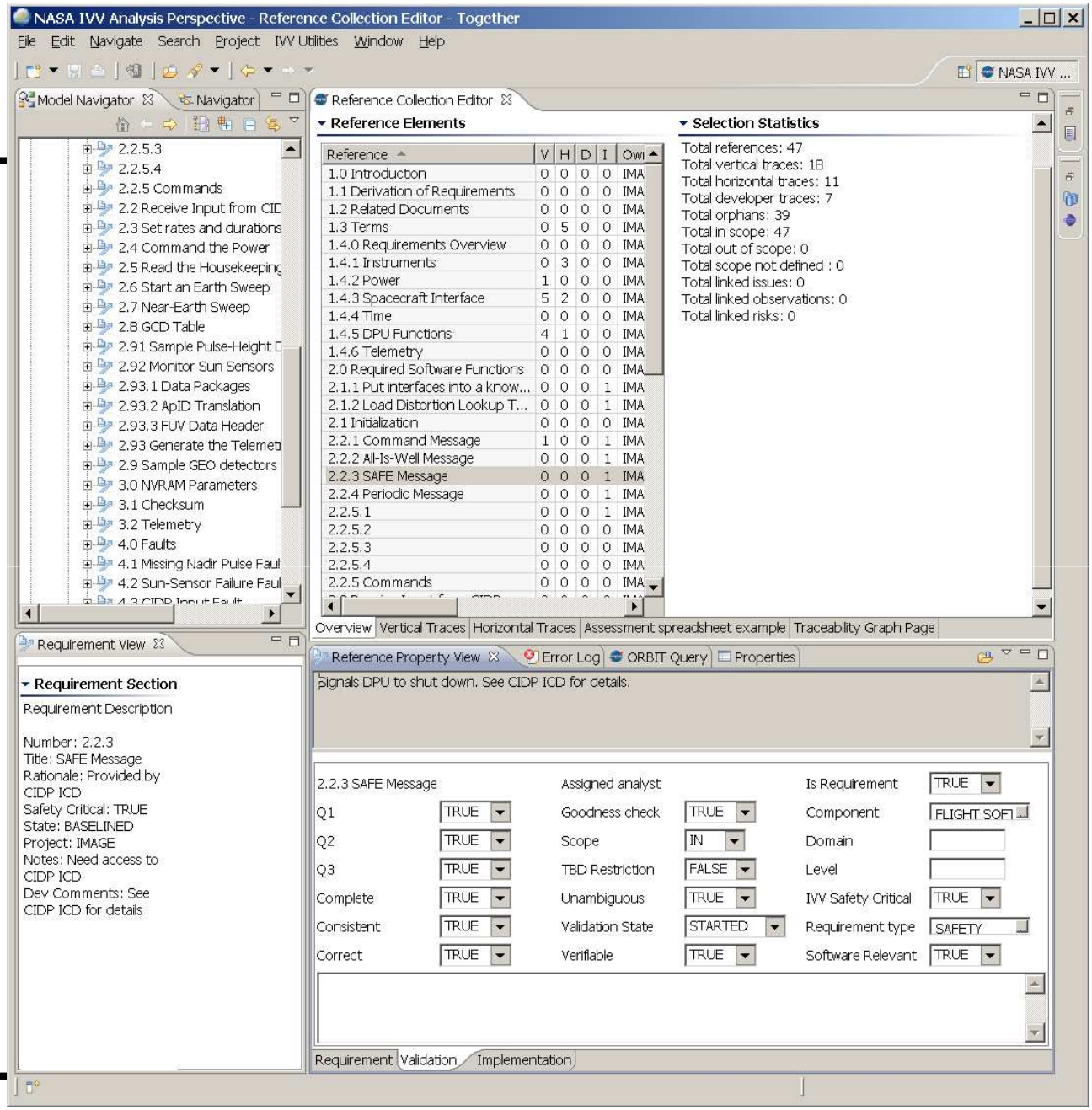
NASA IV&V Analysis Perspective

- Provides shell for client-side integration strategies
- Provides UI for working with project artifacts
- Provides UI for working with IV&V products
- Provides UI for traceability
- Enables IV&V workflow

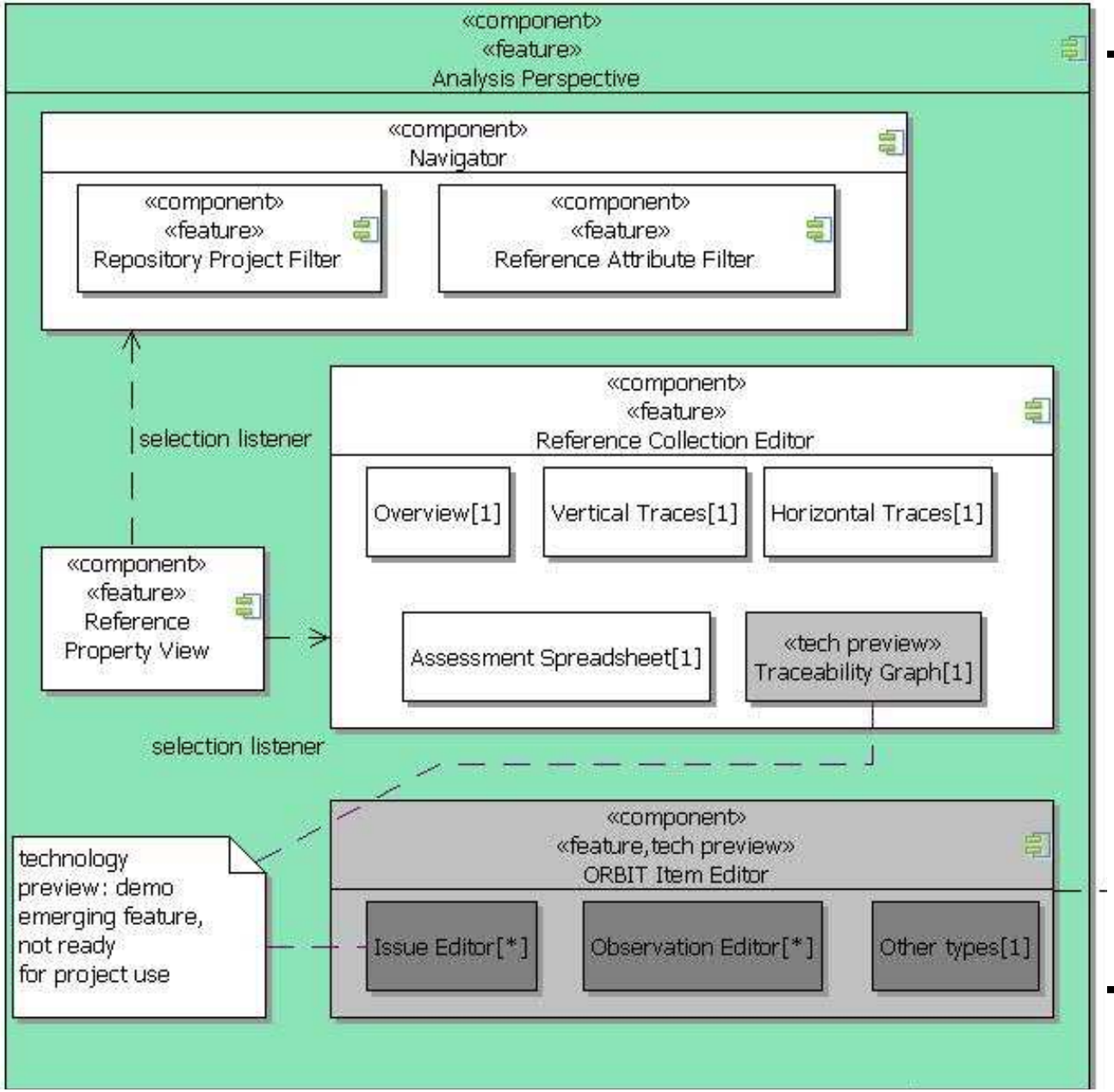
The Shell

- Eclipse platform
- To activate:
  - Window | Open Perspective | Other…
  - Select NASA IVV Analysis Perspective
  - Click on OK button





Feature Model



References

- Generic name for any information we may want to associate

- This can include project artifacts like:
  - Requirements
  - Test Designs
  - Software Architectures
  - Software Designs
  - Interface Designs
  - Implementations

- This can include IV&V products like:
  - Analyst's Assessment
  - Issues
  - Observations
  - Risks

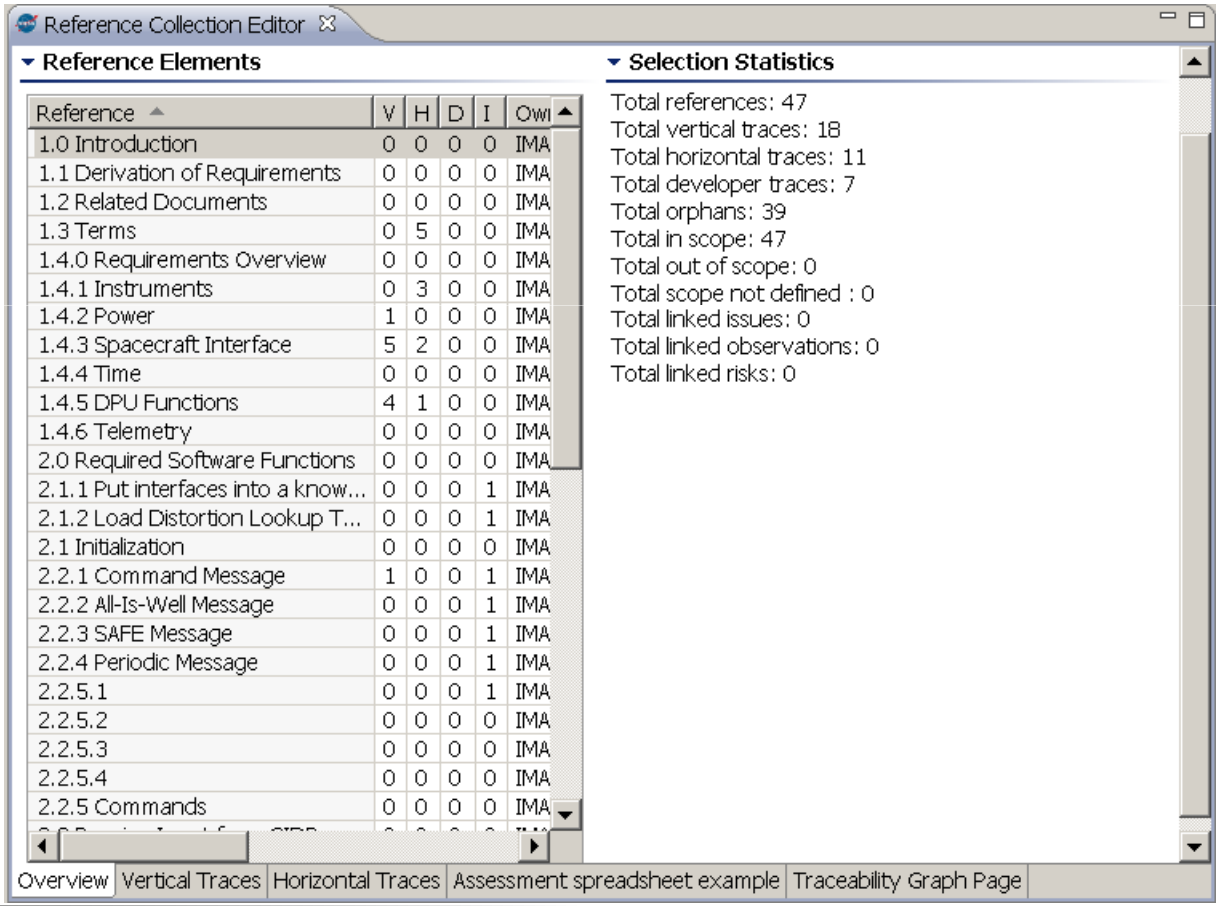
Reference Collection Editor

- Multi-tabbed editor for selections of Reference

- Overview
  - provide metrics about the selection
- Vertical Traces
  - manage traceability within a reference type
- Horizontal Traces
  - manage traceability to other reference types
- Assessment Spreadsheet
  - exportable spreadsheet display of references
- Traceability Graph
  - visualization of reference traceability

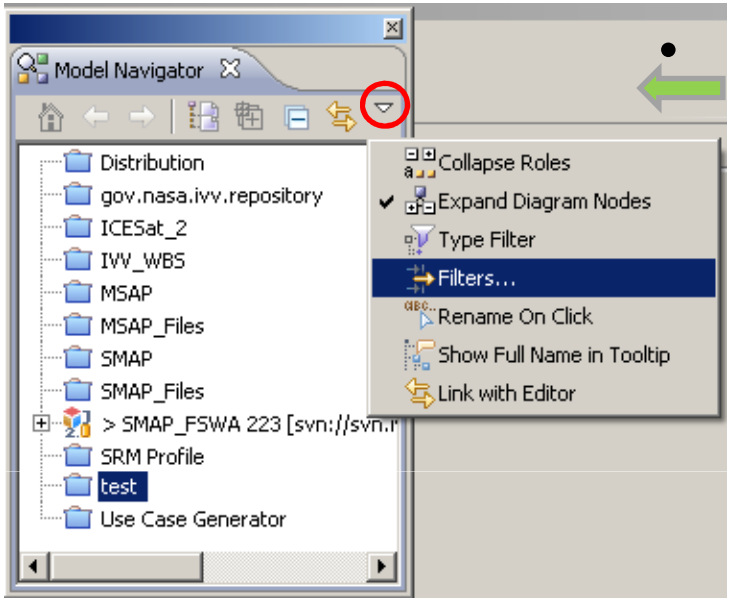
Reference Collection Overview

- The Overview page of the Reference Collection editor displays reference details and configurable metrics data.
- ***Tip: you can select the metric data for copy and paste.***

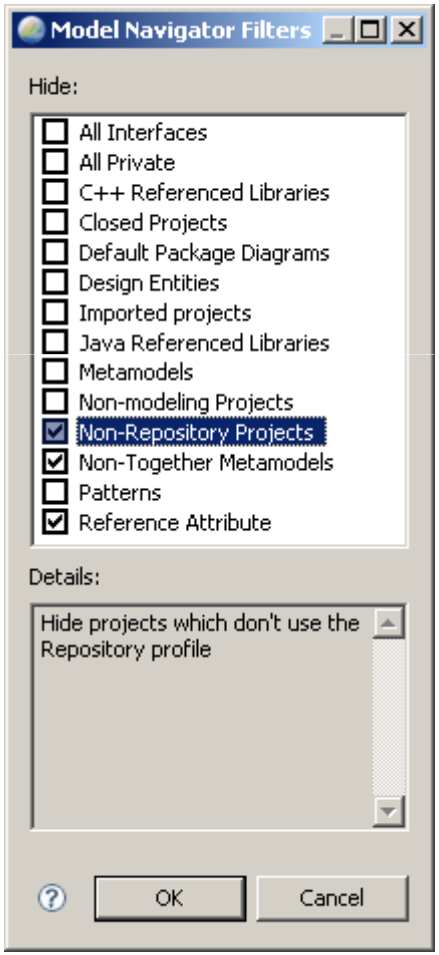


Reference	V	H	D	I	Owi
1.0 Introduction	0	0	0	0	IMA
1.1 Derivation of Requirements	0	0	0	0	IMA
1.2 Related Documents	0	0	0	0	IMA
1.3 Terms	0	5	0	0	IMA
1.4.0 Requirements Overview	0	0	0	0	IMA
1.4.1 Instruments	0	3	0	0	IMA
1.4.2 Power	1	0	0	0	IMA
1.4.3 Spacecraft Interface	5	2	0	0	IMA
1.4.4 Time	0	0	0	0	IMA
1.4.5 DPU Functions	4	1	0	0	IMA
1.4.6 Telemetry	0	0	0	0	IMA
2.0 Required Software Functions	0	0	0	0	IMA
2.1.1 Put interfaces into a know...	0	0	0	1	IMA
2.1.2 Load Distortion Lookup T...	0	0	0	1	IMA
2.1 Initialization	0	0	0	0	IMA
2.2.1 Command Message	1	0	0	1	IMA
2.2.2 All-Is-Well Message	0	0	0	1	IMA
2.2.3 SAFE Message	0	0	0	1	IMA
2.2.4 Periodic Message	0	0	0	1	IMA
2.2.5.1	0	0	0	1	IMA
2.2.5.2	0	0	0	0	IMA
2.2.5.3	0	0	0	0	IMA
2.2.5.4	0	0	0	0	IMA
2.2.5 Commands	0	0	0	0	IMA

Hide non-relevant projects



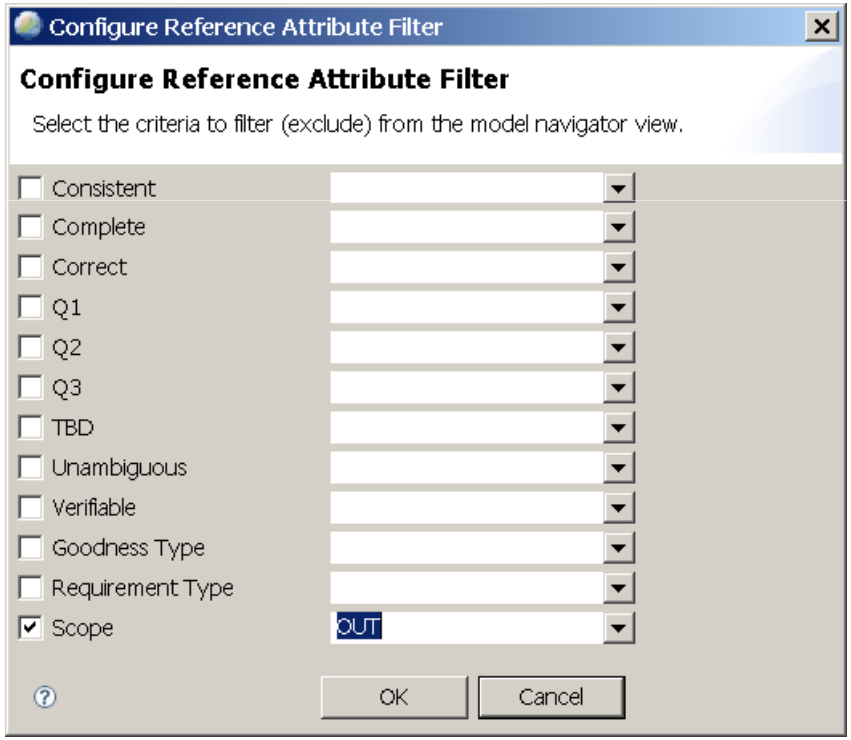
- From within the Model Navigator:
  - Open the Model Navigator's View Menu. This is done by clicking the downward arrow icon all the way to right at the top of the view.
  - Select Filters...



- From within the Model Navigator Filters popup:
  - Check the box next to "Non-Repository Projects"
  - Click OK

Filter References by attribute value

- From within the Model Navigator:
- Open the Model Navigator's View Menu. This is done by clicking the downward arrow icon all the way to right at the top of the view.
- Select Filters…
- Check the box next to
- "Reference Attribute"
- Click OK

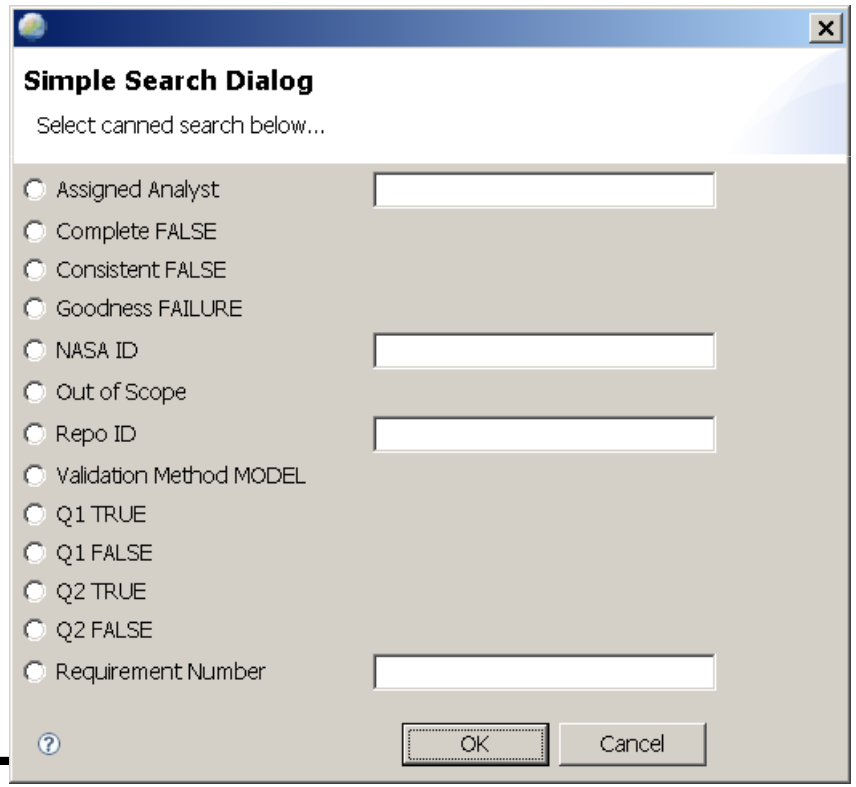


Running Simplified Searches

- From within the Model Navigator:
- Right-click an item and choose IVV Utilities | Simplied Search.

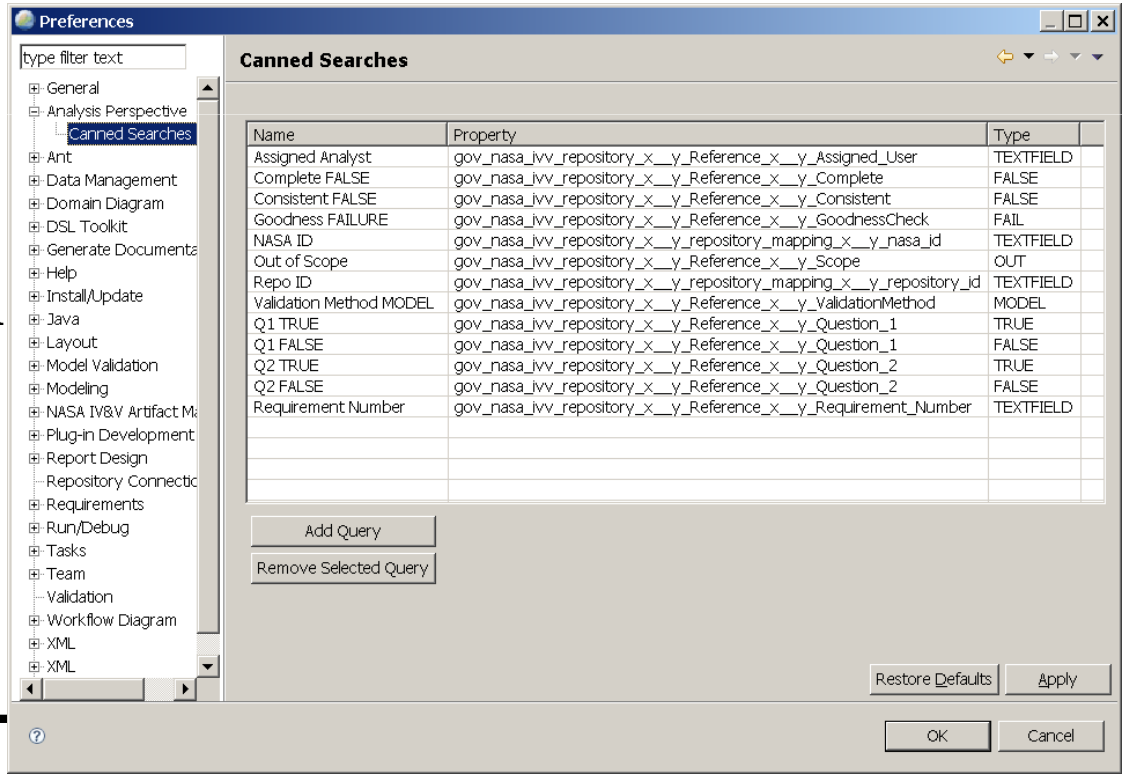
Note: Search will execute against all elements within the reference selection

- Select the desired "canned" search from the dialog and click OK.
- Search results will display in the Search view.



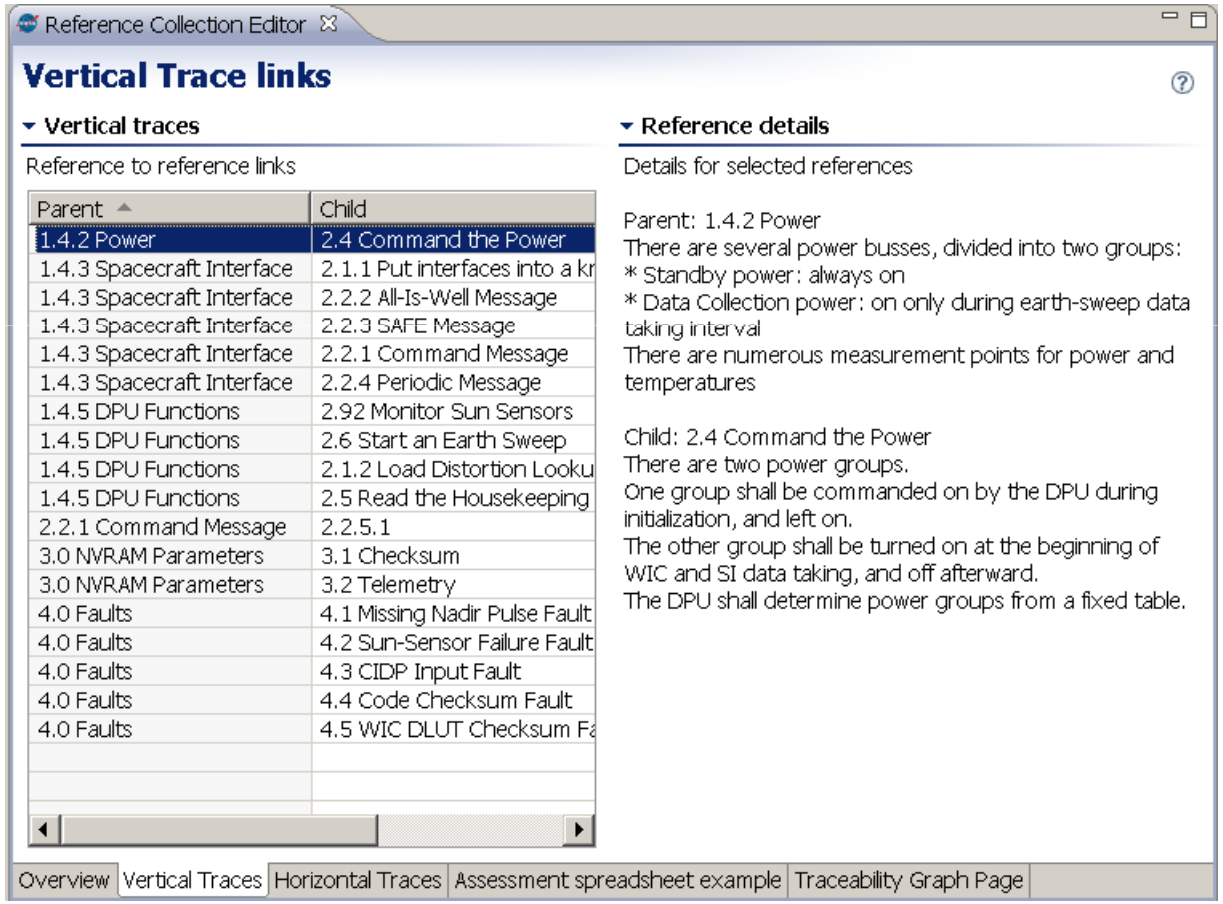
Modifying Simplified Searches

- Open Preferences. From the main menu, choose Window | Preferences | Analysis Perspective | Canned Searches
- Select the desired "canned" search from the dialog and click OK.
- Edit existing queries by altering content in the table. Add or remove queries by using the appropriate buttons.
- ***Add Search Query***
  - Click Add Query
  - Enter a brief, descriptive name for the query
  - Select a property from the drop-down list
  - Enter the desired value in the Type column
  - Click Apply or OK



Reference Collection: Vertical Traces

- Reference-to-Reference links



Parent	Child
1.4.2 Power	2.4 Command the Power
1.4.3 Spacecraft Interface	2.1.1 Put interfaces into a kr
1.4.3 Spacecraft Interface	2.2.2 All-Is-Well Message
1.4.3 Spacecraft Interface	2.2.3 SAFE Message
1.4.3 Spacecraft Interface	2.2.1 Command Message
1.4.3 Spacecraft Interface	2.2.4 Periodic Message
1.4.5 DPU Functions	2.92 Monitor Sun Sensors
1.4.5 DPU Functions	2.6 Start an Earth Sweep
1.4.5 DPU Functions	2.1.2 Load Distortion Looku
1.4.5 DPU Functions	2.5 Read the Housekeeping
2.2.1 Command Message	2.2.5.1
3.0 NVRAM Parameters	3.1 Checksum
3.0 NVRAM Parameters	3.2 Telemetry
4.0 Faults	4.1 Missing Nadir Pulse Fault
4.0 Faults	4.2 Sun-Sensor Failure Fault
4.0 Faults	4.3 CIDP Input Fault
4.0 Faults	4.4 Code Checksum Fault
4.0 Faults	4.5 WIC DLUT Checksum Fa

Reference Collection: Horizontal Traces

- Reference-to-“other” links

Reference Collection Editor

Horizontal Trace links

Horizontal traces

Reference links

Parent	Child	Description
1.3 Terms	MEP	Model
1.3 Terms	WIC TDI	Model
1.3 Terms	DPU	Model
1.3 Terms	TDC12	Model
1.3 Terms	CDIP	Model
1.4.1 Instruments	WIC	Model
1.4.1 Instruments	SI	Model
1.4.1 Instruments	GEO	Model
1.4.3 Spacecraft Interface	CDIP	Model
1.4.3 Spacecraft Interface	DPU	Model
1.4.5 DPU Functions	DPU	Model

Link details

Details for selected link

Source: 1.3 Terms
Description: byte 8-bit unsigned number
CIDP Common Instrument Data Processor - the Spacecraft Computer
DLUT Distortion Lookup Table - corrects image geometric distortion
DPU Data Processing Unit - the flight processor
MEP Main Electronics Package.
TDC Time-to-D...

Target: MEP
Metaclass: Component20
Full name: design.instruments.MEP
Description: Model

Overview | Vertical Traces | Horizontal Traces | Assessment spreadsheet example | Traceability Graph Page

Reference Collection: Spreadsheet

- Exportable to CSV and Excel

Reference Collection Editor

Assessment spreadsheet example

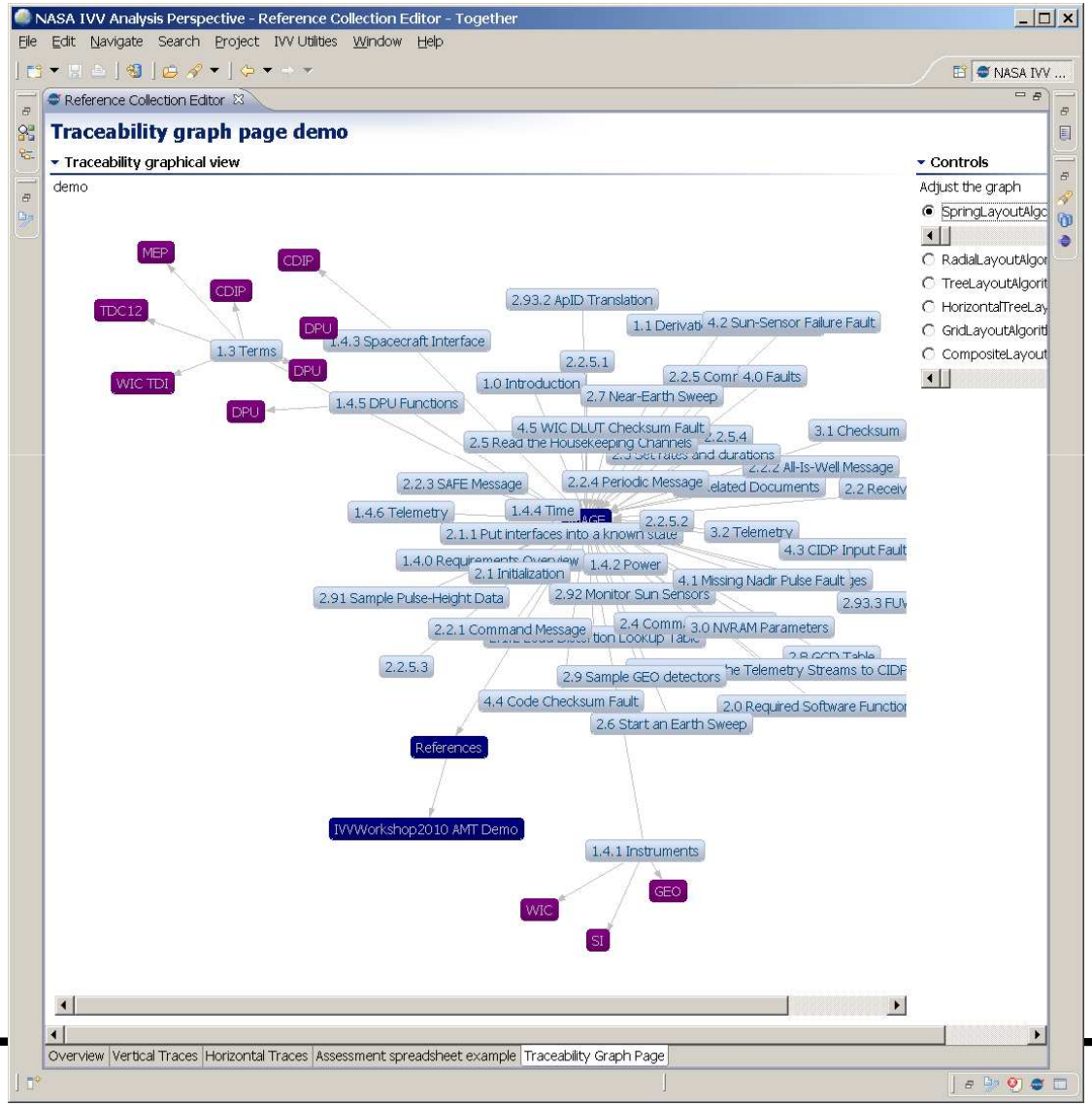
Reference spreadsheet view

Read-only (for now)

Package	Type	Name	ID	NASA ID	Req Number	R
IMAGE	Requirement	1.0 Introduction	1	1	1	
IMAGE	Requirement	1.1 Derivation of Requirements	1.1	1.1	1.1	
IMAGE	Requirement	1.2 Related Documents	1.2	1.2	1.2	
IMAGE	Requirement	1.3 Terms	1.3	1.3	1.3	
IMAGE	Requirement	1.4.0 Requirements Overview	1.4	1.4	1.4	
IMAGE	Requirement	1.4.1 Instruments	1.4.1	1.4.1	1.4.1	
IMAGE	Requirement	1.4.2 Power	1.4.2	1.4.2	1.4.2	
IMAGE	Requirement	1.4.3 Spacecraft Interface	1.4.3	1.4.3	1.4.3	
IMAGE	Requirement	1.4.4 Time	1.4.4	1.4.4	1.4.4	
IMAGE	Requirement	1.4.5 DPU Functions	1.4.5	1.4.5	1.4.5	
IMAGE	Requirement	1.4.6 Telemetry	1.4.6	1.4.6	1.4.6	
IMAGE	Requirement	2.0 Required Software Functions	2	2	2	
IMAGE	Requirement	2.1.1 Put interfaces into a known state	2.1.1	2.1.1	2.1.1	
IMAGE	Requirement	2.1.2 Load Distortion Lookup Table	2.1.2	2.1.2	2.1.2	
IMAGE	Requirement	2.1 Initialization	2.1	2.1	2.1	
IMAGE	Requirement	2.2.1 Command Message	2.2.1	2.2.1	2.2.1	
IMAGE	Requirement	2.2.2 All-Is-Well Message	2.2.2	2.2.2	2.2.2	
IMAGE	Requirement	2.2.3 SAFE Message	2.2.3	2.2.3	2.2.3	S.
IMAGE	Requirement	2.2.4 Periodic Message	2.2.4	2.2.4	2.2.4	
IMAGE	Requirement	2.2.5.1	2.2.5.1	2.2.5.1	2.2.5.1	

Overview | Vertical Traces | Horizontal Traces | Assessment spreadsheet example | Traceability Graph Page

Reference Collection: Traceability Graph



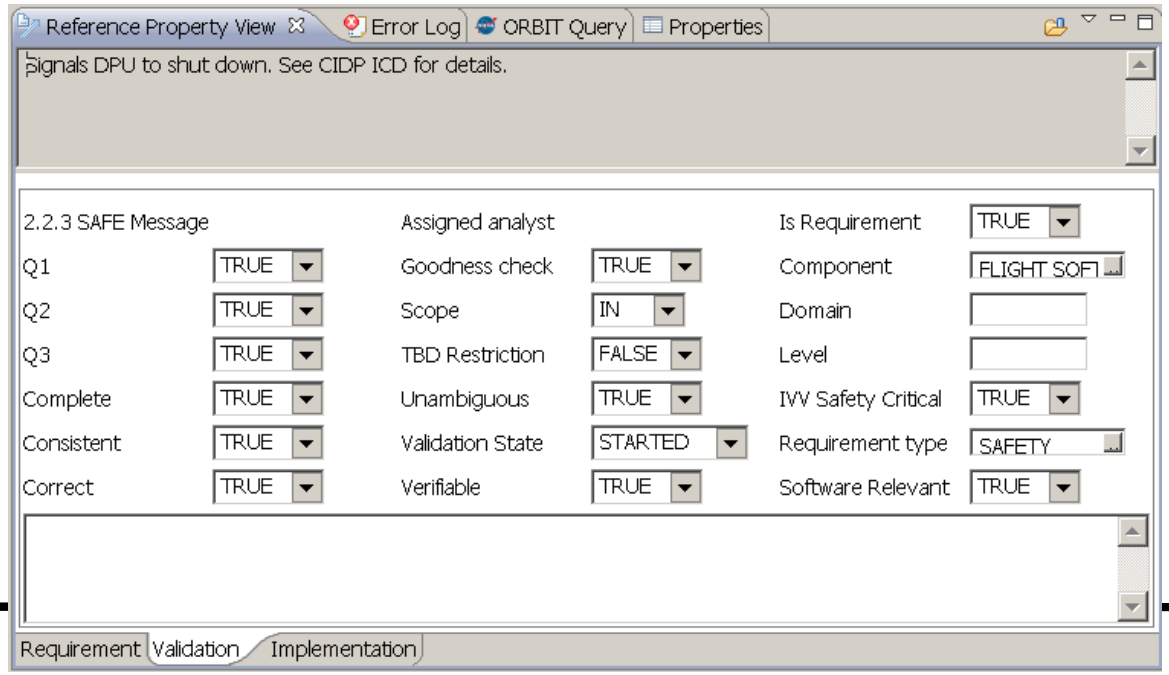
Compare Reference Elements

- From within the Model Navigator:
  - Select two Reference elements in the Model Navigator
  - Right-click one selected Reference and choose Compare with | Each Other (as References)
  - The Reference Compare View will open to indicate differences between the two.

- From within the Reference Collection editor:
  - Right-click a row in the table on the Vertical Traces tab and choose Compare elements
  - The Reference Compare View will open to indicate differences between the two.

Editing Assessment Data

- Assessment data is presented in the Reference Property View.
- Select a Reference element (either within the Model Navigator or within the Reference Collection editor)
- Open the appropriate tab in Reference Property View
- Set attribute values as desired
- Attribute values will be stored locally
- Synchronize to commit changes to the server



Analysis Scenarios

- Requirement import
- Traceability Linkage
  - Visualize and manage
  - Create traces in Navigator
- Assessment management
- Observation and Issue management

- Artifact View is always available

NASA IVV Analysis Perspective - Reference Collection Editor - Together

File Edit Navigate Search Project IVV Utilities Window Help

Model Navigator | Navigator

2.2.5.3
2.2.5.4
2.2.5 Commands
2.2 Receive Input from CID
2.3 Set rates and durations
2.4 Command the Power
2.5 Read the Housekeeping
2.6 Start an Earth Sweep
2.7 Near-Earth Sweep
2.8 GCD Table
2.91 Sample Pulse-Height D
2.92 Monitor Sun Sensors
2.93.1 Data Packages
2.93.2 ApID Translation
2.93.3 FUV Data Header
2.93 Generate the Telemet
2.9 Sample GEO detectors
3.0 NVRAM Parameters
3.1 Checksum
3.2 Telemetry
4.0 Faults
4.1 Missing Nadir Pulse Faul
4.2 Sun-Sensor Failure Faul

Reference Collection Editor

Reference Elements

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2.2.3 SAFE Message	0	0	0	1	IMA
2.2.4 Periodic Message	0	0	0	1	IMA
2.2.5.1	0	0	0	1	IMA
2.2.5.2	0	0	0	0	IMA
2.2.5.3	0	0	0	0	IMA
2.2.5.4	0	0	0	0	IMA
2.2.5 Commands	0	0	0	0	IMA

Selection Statistics

Total references: 47
Total vertical traces: 18
Total horizontal traces: 11
Total developer traces: 7
Total orphans: 39
Total in scope: 47
Total out of scope: 0
Total scope not defined : 0
Total linked issues: 0
Total linked observations: 0
Total linked risks: 0

Overview | Vertical Traces | Horizontal Traces | Assessment spreadsheet example | Traceability Graph Page

Requirement View

Requirement Section

Requirement Description

Number: 2.2.3
Title: SAFE Message
Rationale: Provided by CIDP ICD
Safety Critical: TRUE
State: BASELINED
Project: IMAGE
Notes: Need access to CIDP ICD
Dev Comments: See CIDP ICD for details

Reference Property View | Error Log | ORBIT Query | Properties

signals DPU to shut down. See CIDP ICD for details.

2.2.3 SAFE Message		Assigned analyst		Is Requirement	TRUE
Q1	TRUE	Goodness check	TRUE	Component	FLIGHT SOFT
Q2	TRUE	Scope	IN	Domain	
Q3	TRUE	TBD Restriction	FALSE	Level	
Complete	TRUE	Unambiguous	TRUE	IVV Safety Critical	TRUE
Consistent	TRUE	Validation State	STARTED	Requirement type	SAFETY
Correct	TRUE	Verifiable	TRUE	Software Relevant	TRUE

Requirement | Validation | Implementation

Thank You