

PSEsupportCenter
Test

SIEMENS

Test Case Generation with IDATG

PSEsupportCenter
Test

Overview


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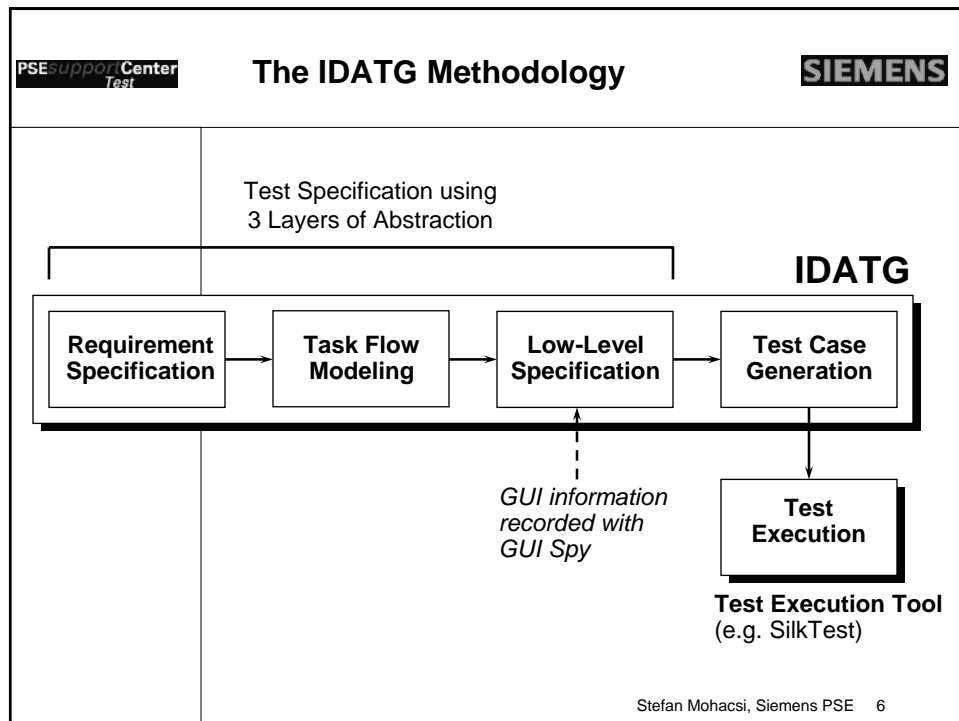
- **Problems of Traditional Test Automation**
- **The IDATG Methodology**
- **Formal Test Specification with IDATG**
- **Automated Generation of Test Scripts**
- **Success Stories**

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PSE-supportCenter Test	Why Test Automation is Essential	SIEMENS
Test Automation IDATG Methodology Formal Test Specification Test Case Generation Success Stories	<p>Manual maintenance and execution of all test cases...</p> <ul style="list-style-type: none">• requires a tremendous effort• is monotonous and frustrating• is affected by human mistakes <p>„Solution“ in many projects: Testing is skipped!</p> <div style="border: 1px solid black; padding: 10px; text-align: center;"><p>The only alternative is test automation!</p></div>	Stefan Mohacsi, Siemens PSE 3

PSE-supportCenter Test	Problems of Traditional Test Automation	SIEMENS
Test Automation IDATG Methodology Formal Test Specification Test Case Generation Success Stories	<ul style="list-style-type: none">• Depending on the test phase, different test languages, methods and tools are required• No solution combining different types of GUI and API testing is available• Test cases have still to be created manually• Test maintenance remains a huge problem• Test specification depends on implementation details• For GUI testing, simple Capture & Replay is usually not sufficient	Stefan Mohacsi, Siemens PSE 4

PSE Support Center <small>Test</small>	Functionality of Siemens IDATG	SIEMENS
Test Automation IDATG Methodology Formal Test Specification Test Case Generation Success Stories	IDATG = Integrating Design and Automated Test Case Generation	
	<ul style="list-style-type: none">• Specification of API and GUI tests on 3 abstraction levels using graphical editors• Mapping of project requirements to test packages• Built-in GUI Spy for mapping test steps to GUI elements• Generation of test scripts in various formats (XML, SilkTest, WinRunner etc.)	
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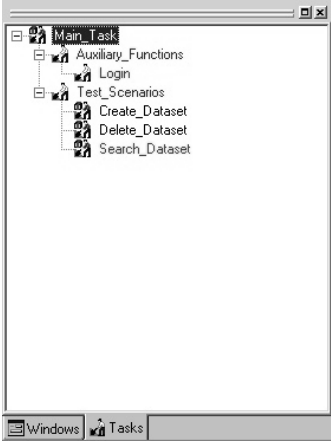


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Task Model (Layer 1)

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Test Automation
IDATG
Methodology
Formal Test Specification
Test Case Generation
Success Stories



- Based on the functions described in the software requirements specification
- Decomposition in sub-tasks improves clearness and maintainability

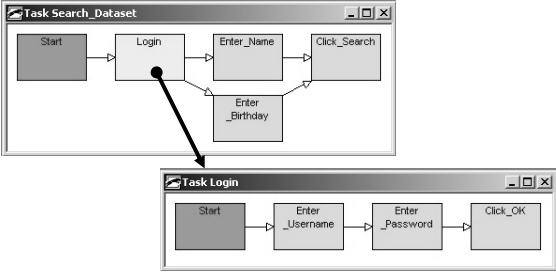
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Task Flow Model (Layer 2)

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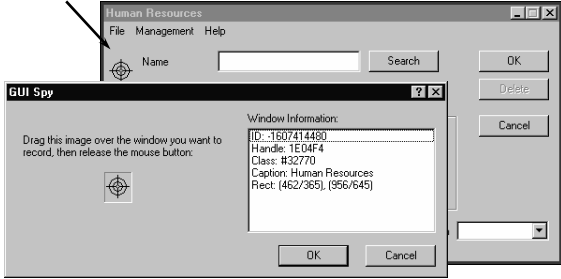
Test Automation
IDATG
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- The sequence of test steps for each task can be defined with the Task Flow Editor
- Building Block Concept: Each step may either represent an atomic step (blue) or an entire sub task flow (yellow)
- Re-use of sub tasks minimizes effort for test maintenance


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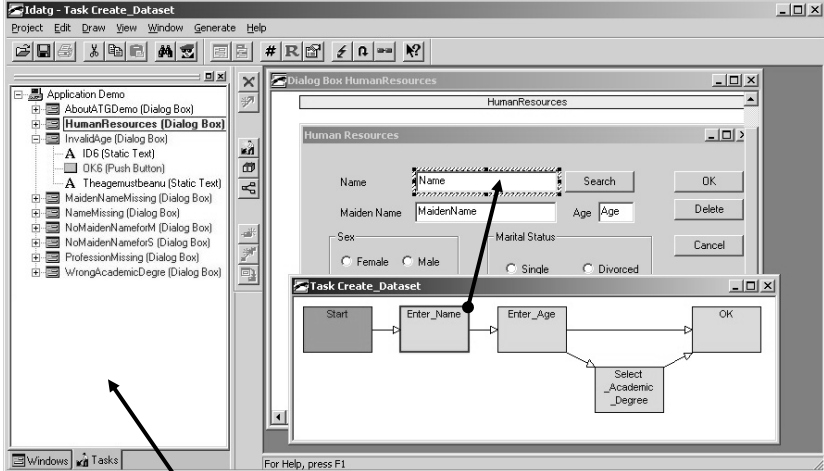
PSEsupportCenter Test	Step Description (Layer 3)	SIEMENS
Test Automation IDATG Methodology Formal Test Specification Test Case Generation Success Stories	<p>Each Step is defined by :</p> <ul style="list-style-type: none">• Test Instructions<ul style="list-style-type: none">• For GUI testing the user input, e.g. a mouse click)• For API testing, either test commands in a low-level language or the path to a test script• Test Driver that will execute the instructions• Semantic Pre-Conditions (e.g. all fields have to be filled out correctly)• Expected effects (Post-Conditions) (e.g. a new window opens)	Stefan Mohacsi, Siemens PSE 9

PSEsupportCenter Test	Recording Windows with the GUI Spy	SIEMENS
Test Automation IDATG Methodology Formal Test Specification Test Case Generation Success Stories	<p>Cursor</p>  <ul style="list-style-type: none">• The GUI Spy allows you to capture windows directly from the screen• Supports VC++, VB, .NET, Web testing and Java	Stefan Mohacsi, Siemens PSE 10



User Interface of IDATG







Convenient Workspace showing window and task hierarchy

Visual connection between task steps and GUI objects

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Test Case Generation with IDATG



Test Automation

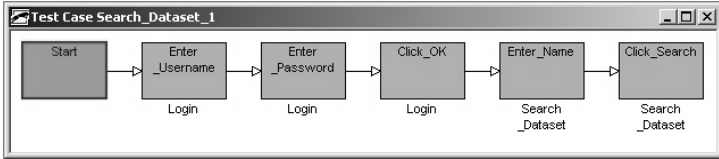
IDATG

Methodology

Formal Test Specification


Test Case Generation

Success Stories




- As soon as part of the application has been specified, it is possible to generate test cases**
- Generation algorithm tries to cover all edges in the task flow graphs in consideration of semantic conditions (C1 coverage)**
- Generated test cases are displayed as flow diagrams**
- Requirements coverage can be checked at a single glance**

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Exporting Test Cases



Test Automation

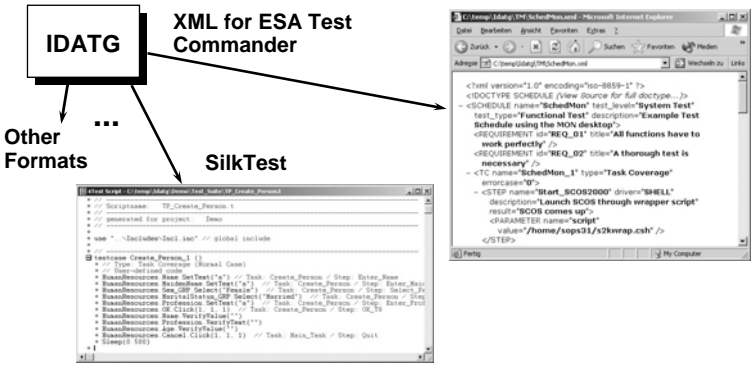
IDATG

Methodology

Formal Test Specification


Test Case Generation

Success Stories





- The specification as well as the generated test cases are stored in XML format
- Test cases can be converted into arbitrary formats (e.g. SilkTest or WinRunner scripts)

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Exporting the GUI Specification to HTML & WinWord






IDATG Specification

HTML Converter



HTML Files

Word Macro



WinWord Document

- The GUI specification can be conveniently exported as HTML or WinWord® file

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Sample WinWord® Document

Test Automation
IDATG
Methodology

Formal Test
Specification

**Test Case
Generation**


Success Stories

**Screenshots incl.
Transitions
exported as JPGs**

**Detailed Information
about GUI Objects
and Transitions**

Window-ID / Caption	Type	Mx.	My.	Cat.	SVT	WHt	TypeSpecifc / Userdefined
File	Menu Item	1	1	N	SD	SD	
Edit	Menu Item	1	1	N	SD	SD	
ID_FILE_EDIT	Menu Item	1	1	N	SD	SD	
ID_FILE_OPEN	Menu Item	1	1	N	SD	SD	
ID_FILE_SAVE	Menu Item	1	1	N	SD	SD	
ID_FILE_PRINT	Menu Item	1	1	N	SD	SD	
ID_FILE_EXIT	Menu Item	1	1	N	SD	SD	
ID_HELP_ABOUT	Menu Item	1	1	N	SD	SD	

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PSE support Center Test	<h1>Success Stories</h1>	
<p>Test Automation</p> <p>IDATG</p> <p>Methodology</p> <p>Formal Test Specification</p> <p>Test Case Generation</p> <p>Success Stories</p>	<div> <h2>ECS-IDE (Hicom-Knowledge Base Editor)</h2> </div> <ul style="list-style-type: none"> • Test Automation successful in spite of very complex GUI • Effort for maintenance and test execution is very low • It is possible to generate tests for both the English and the German version (!) <div> <h2>HLR-I (Web-Application for Mobile Phone Companies)</h2> </div> <ul style="list-style-type: none"> • Without IDATG, 3 additional testers would have been necessary • 635h have been saved • Each test run only required 17% of the effort for manual testing 	
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Success Story: ESA

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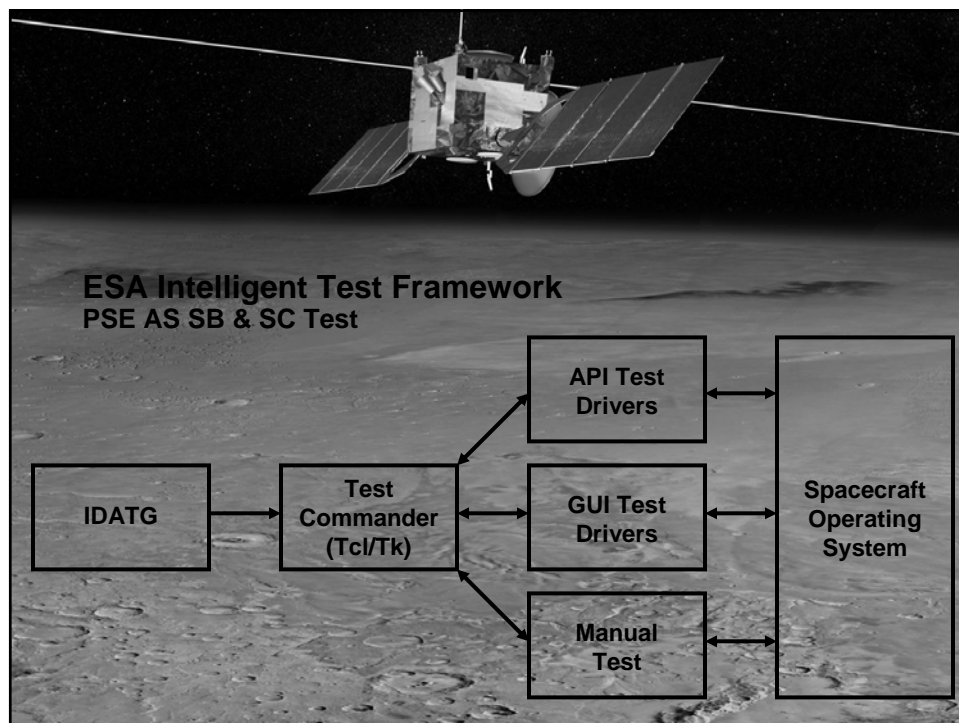
Test Automation
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- **PSE AS Space Business and IDATG team create test automation framework for ESA's Spacecraft Operating System**
- **Tests are specified with IDATG**

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PSE Support Center <small>Test</small>	Summary	SIEMENS
	<ul style="list-style-type: none">• 3-layered graphical specification method significantly reduces maintenance effort• Many errors already found in design phase• Visualization of test sequences and GUI rather than an abstract language• Complete, faultless test scripts incl. GUI-Map• Formal specification is a valuable aid for the programmer	
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PSE Support Center <small>Test</small>	Contact Information	SIEMENS
	<div style="border: 1px solid black; padding: 10px;"><div style="display: flex; justify-content: space-between;"><div><p>Stefan Mohacsi Siemens Austria AG PSE Support Center Test</p><p>Phone: +43-51707 / 43417 e-Mail: stefan.mohacsi@siemens.com Intranet: http://idatg.siemens.at</p><p>Official Distributor:</p></div><div style="text-align: right;"> <div style="border: 1px solid black; padding: 5px; text-align: center;">QualityScope</div><p>http://www.qualityscope.com</p></div></div></div>	
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