



From STC STIL WG to SEMI-CAST STIL WG

How to drive STIL forward?

**April 1, 2009
SEMI-CAST Meeting
San Jose, CA**

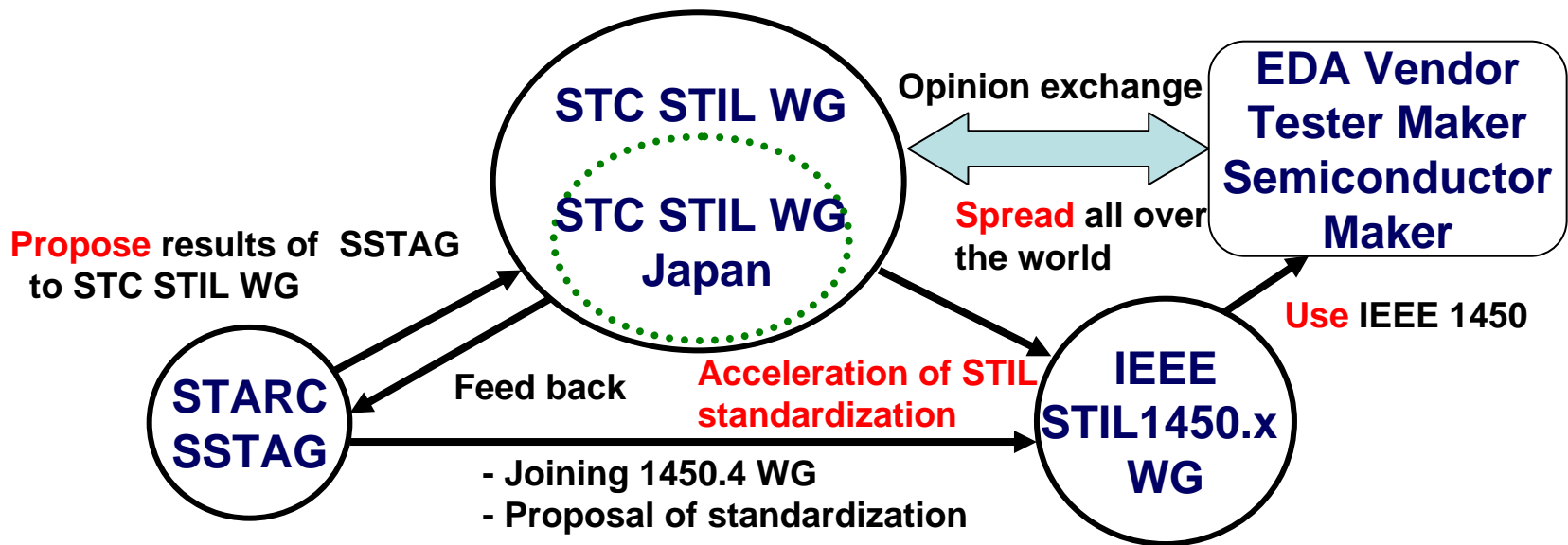
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STC STIL WG activity in FY 2008

Main point of establishment (1)

We collaborated with STARC SSTAG. It is the Japanese semiconductor industry's consensus that we propose the results of SSTAG to STC STIL WG. STC STIL WG encourage using STIL world-wide and accelerate STIL standardization.



Main point of establishment (2)

- ◆ Gain a world-wide consensus from proposals such as STIL Usage Guides.
- ◆ Propose an expanded STIL spec such as Tester Control Information to IEEE STIL WG and accelerate STIL standardization.
- ◆ Spread the use of STIL all over the world.
 - ◆ EDA vender, Tester maker: should support STIL
 - ◆ Semiconductor maker: should use STIL

STC STIL WG Organization

- Members : SSWJ(STC STIL WG Japan)
STC participation companies
Voluntary STC Members
- Leader: Greg Maston (Synopsys)
Kenichi Sakai (Renesas)

**In FY 2008,
SSWJ has been driving STIL WG activities**

SSWJ Organization

SSWJ: STC STIL WG Japan

- **Members : SSTAG members of STC participation companies + Voluntary STC Members**
 - FUJITSU MICRO ELECTRONICS LIMITED, Renesas Technology Corp.
- **Observers : SSTAG members of STC non-participation companies**
 - Panasonic Corp., NEC Electric Corp., OKI SEMICONDUCTOR Co.,Ltd, Sharp Corp., Toshiba Corp.
- **Leader : Kenichi Sakai (Renesas)**
- **Sub-leader : Takefumi Ueda (FUJITSU)**

STARC Overview

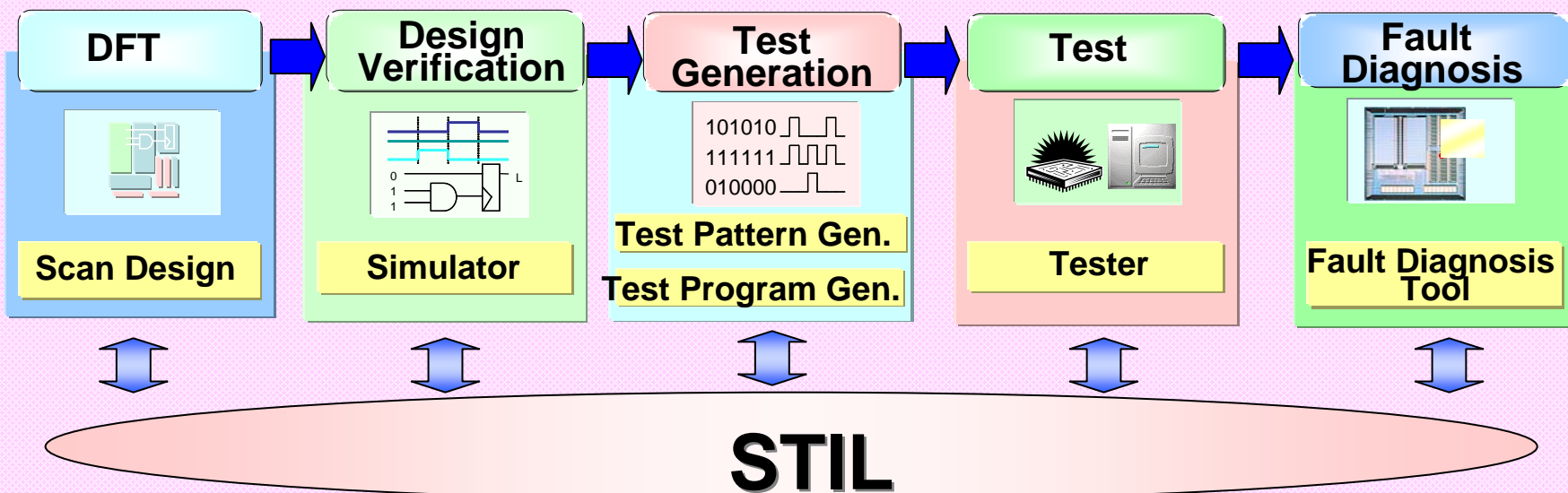
- Company Name:
Semiconductor Technology Academic Research Center
- Established: 1995
- Stockholders:
 - ◆ 11 Leading Japanese semiconductor companies
- Business Content
 - ◆ Development of Design Technologies: 5 items
 - Test & Diagnosis Technology
 - Building standard test environment
 - ◆ Joint Research with Universities
 - ◆ Education for SoC Design Engineers

- Why is STIL needed?
 - ◆ Original test languages have been used
- What are problems on STIL
 - ◆ There exist certain deviations on the interpretation of STIL by tools and equipments
 - ◆ STIL is almost satisfactory as test pattern, but not sufficient as Test Program
- What are advantages of STIL
 - ◆ Communication by a common test language
 - ◆ Latest tools and testers are available
 - ◆ Reduction of test work

Goal

- To establish standard interpretation of STIL
- To build test program environment complying with IEEE standard

STIL is usable in all stages



SSTAG Organization

- SSTAG: STIL-based Semiconductor Test Action Group
 - ◆ Continue activity of committee since 2005
- Periodical committee
 - ◆ Semiconductor Maker: 7 Companies
- Enlarged committee
 - ◆ EDA Vendor:
 - Cadence, LogicVision, Mentor, Synopsys
 - ◆ Tester Maker:
 - Advantest, Teradyne, Verigy, Yokogawa
 - ◆ Semiconductor Maker:
 - 8 Companies

STIL Usage Guide Image

SSTAG Activities

STIL Usage Guide 1450.0(PDF)

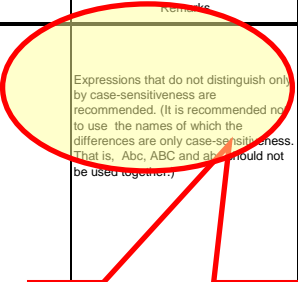
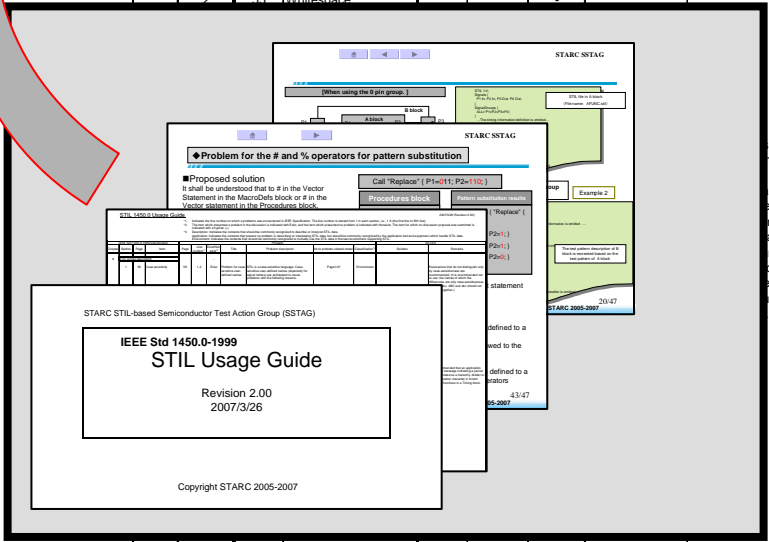
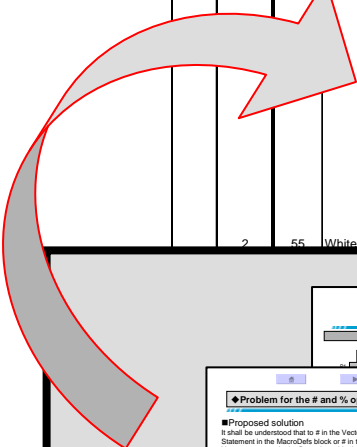
STIL 1450.0 Usage Guide

2007/3/26 (Revision 2.00)

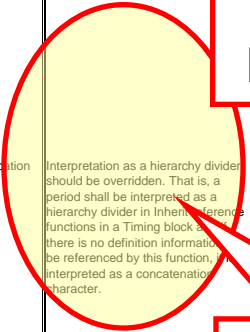
STIL Usage Guide is common guideline for STIL interpretation

Problem Description

Chapter	Section	Page	Item	Page number	1	exist	2	Problem description	Link to problem	Classification	Solution	Remarks
6	STIL syntax description											
	1	55	Case sensitivity	55	1-2	Exist		<p>Problem for case-sensitive user-defined names</p> <p>STIL is a case-sensitive language. Case-sensitive user-defined names (especially for signal names) are anticipated to cause problems with the following reasons.</p> <p>To distinguish names only by case-sensitiveness is prohibited except for comments in the <i>RTL Design Style Guide</i> provided by STARC.</p> <p>Formats such as VHDL and EDIF that don't distinguish upper case and lower case exist.</p> <p>A malfunction may occur when make the EDA tool read the STIL data that comes from the tester.</p>	Page1/47	Environment		<p>Expressions that do not distinguish only by case-sensitiveness are recommended. (It is recommended not to use the names of which the differences are only case-sensitiveness. That is, Abc, ABC and abc should not be used together.)</p>
	2	55	Whitespace									
								<p>Special character provided as a concatenation character. Using this character notation, strings with characters, that number is a length of STIL, can be defined. Inherit reference functions in a period represents two different hierarchy divider to delimit a block, and a concatenation character before it may cause a problem unclear which interpretation st</p>	Page2/47 - 4/47	Application	<p>Interpretation as a hierarchy divider should be overridden. That is, a period shall be interpreted as a hierarchy divider in Inherit reference functions in a Timing block. If there is no definition information, it shall be interpreted as a concatenation character.</p>	<p>It is recommended that an application issues the message indicating a period was interpreted as a hierarchy divider or a concatenation character in Inherit reference functions in a Timing block.</p>



STARC Recommendation



Link to problem related material

STARC Solution

How to download STIL Usage Guides

SSTAG Activities

<https://www.starc.jp/index-e.html>



株式会社 半導体理工学研究センター

STARCTOP > STIL Usage Guide and Test Result of STIL Support Tools

- > about STARC
- > Joint Research
- > Members Areas

STIL Usage Guide and Test Result of STIL Support Tools

Japanese

What is the STIL Usage Guide

STIL(Standard Test Interface Language) has so flexible expressions, resulting in the risk of variations in expressions. This will cause to generate STIL dialects, which could lead to the dissemination of STIL. To avoid this problem and to achieve commonality of interpretation, it is required for users to achieve commonality of interpretation.

The STIL Usage Guide contains standard interpretation rules, discussed and summarized by STARC. STIL-based test programs using the Usage Guide will be used by users, and also play a part in the use of STIL.

The STIL Usage Guide enables users, tools and equipment to be used by the entire industry.

Published STIL Usage Guides 1450.0/.1/.2/.3 by now
Published STIL Usage Guides 1450.0/.2 revision, and 1450.3 in August



Click in here

STIL Usage Guides/ Test Result of STIL Support Tools

Test Result of STIL Support Tools

Using the STIL Usage Guide data (mixed and base) and STIL keyword data for test, created by STARC, we have checked the support status of main STIL support tools.

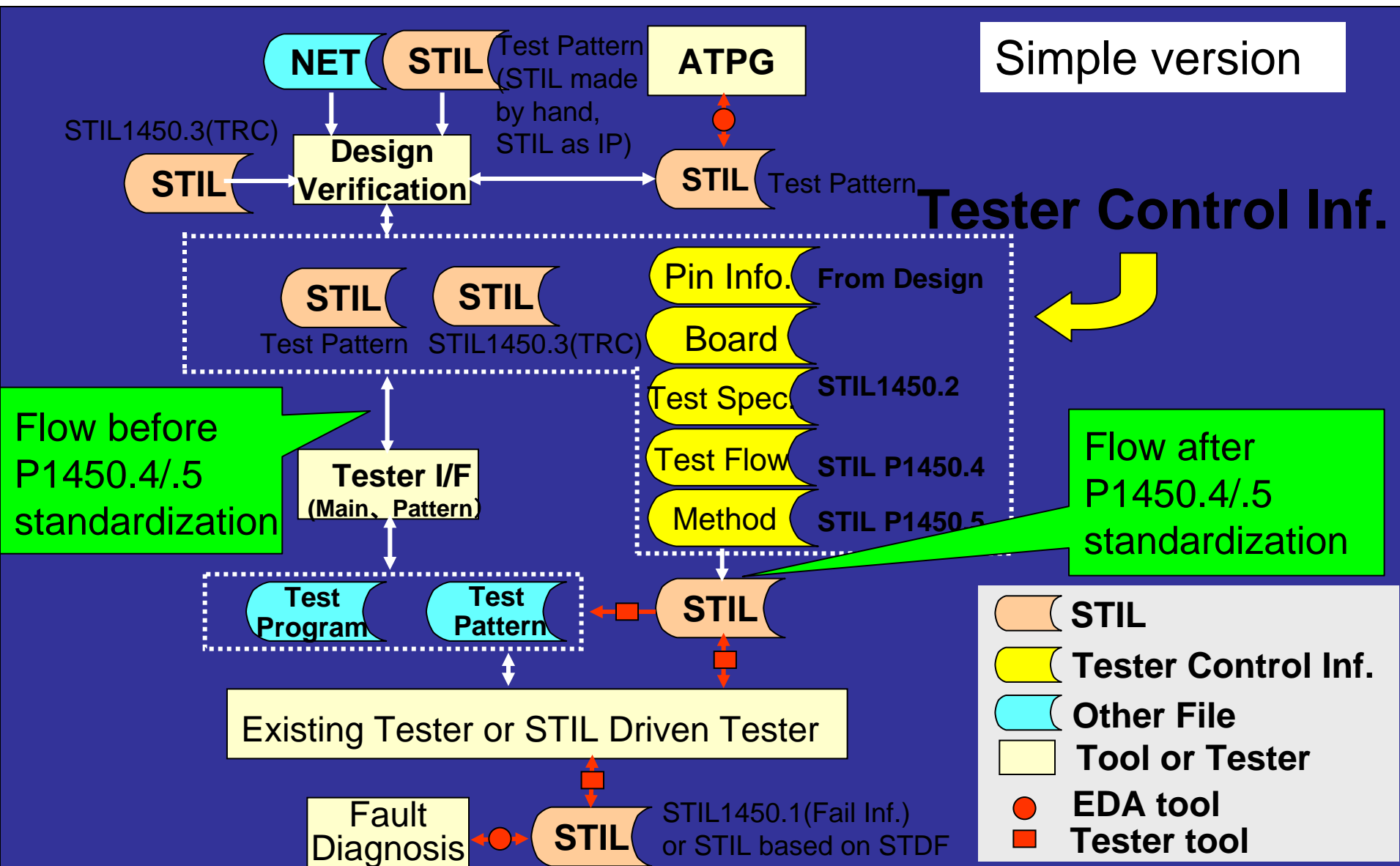
[Test Result of STIL Support Tools Download](#)

Number of Download of STIL Usage Guide : over 2,300 times

Seeking Fully STIL-based Test Development Flow

SSTAG Activities







Simple version



Tester Control Inf.

Flow before P1450.4/.5 standardization

Flow after P1450.4/.5 standardization

-  STIL
-  Tester Control Inf.
-  Other File
-  Tool or Tester
-  EDA tool
-  Tester tool

Seeking Fully STIL-based Test Development Flow

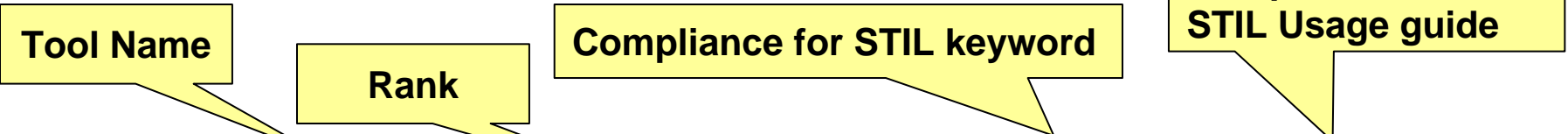
- Problem of Current Flow
 - ◆ STIL is not sufficient as Test Program
- Status in Japan
 - ◆ Using the test program auto-generation system
 - ◆ It needs Tester Control Info.
 - ◆ Want to express device tests without depending on testers
 - ◆ Needs to describe Tester Control Info. by STIL
 - ◆ Made STIL example for Tester Control Info.
 - ◆ Found 57 issues in STIL
 - ◆ Fed back them to IEEE STIL WG until now
 - ◆ STIL example for simple Analog test, AC test, MemoryBIST under making

Studying of STIL related tools

- Making STIL check data and criteria
 - ◆ Checking support status of STIL Usage Guide and STIL Keyword
 - ◆ Publication will be beginning of April
- Studied STIL related tools
 - ◆ ATPG tools: 4 EDA Vendors
 - ◆ Tester tools: 3 Tester Makers
 - ◆ Fault Diagnosis tools: 3 EDA Vendors
 - ◆ Test interface tools: 1 Maker
 - ◆ Published studying results last May

Studying of STIL related tools

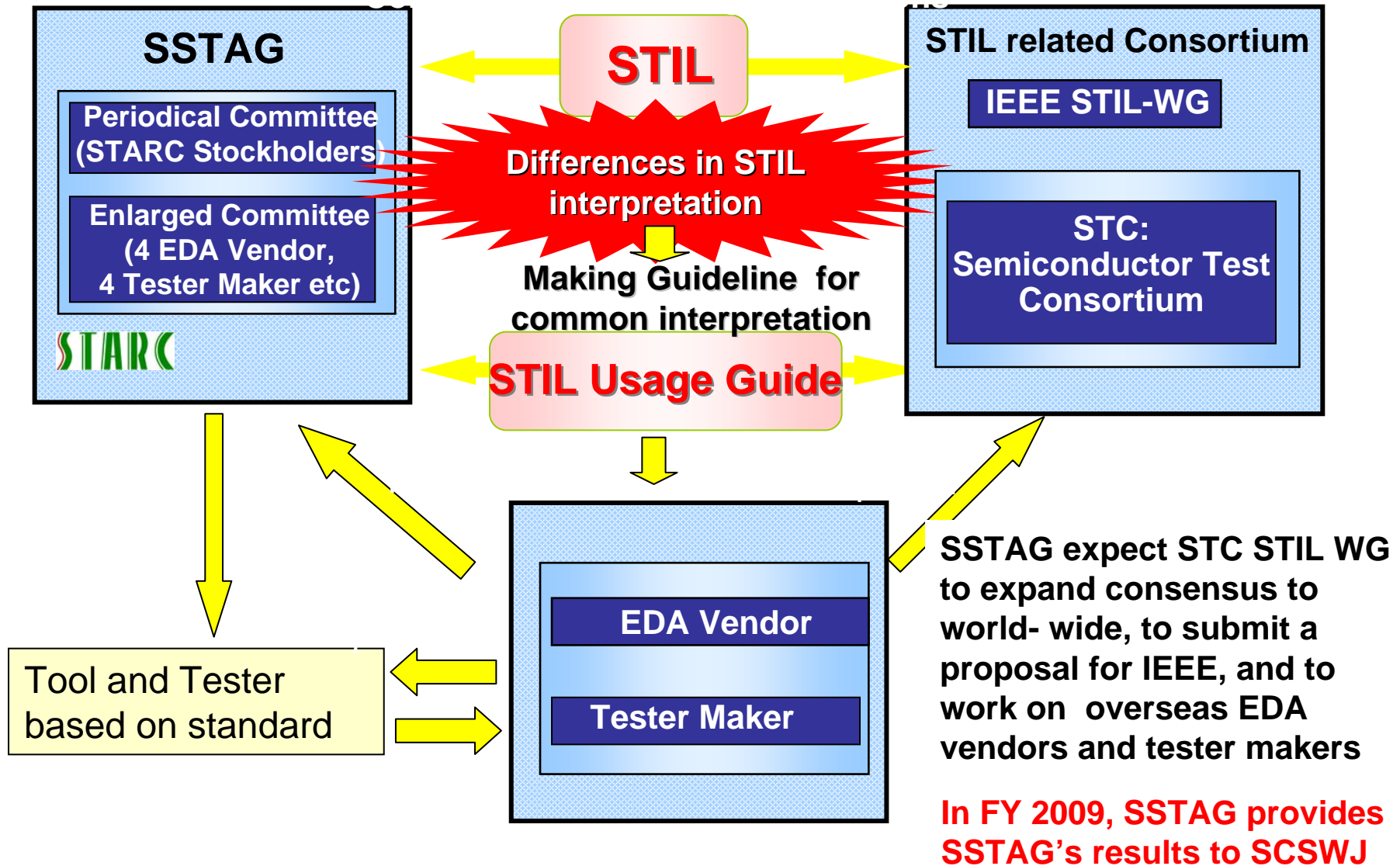
Image of studying result



Tool type	Function type	Tool (Version)	Vendor	Overall evaluation		Compliance with the keyword data		Compliance with STIL Usage Guide 1450.0Rev2.00	
				Rank	Comment	Compliance with critical items/point	Remaining items	Compliance with critical items/point	Remaining items
ATPG	STIL output		Synopsys	Results not disclosed per the vendor's request					
		FastScan/TestKcompress (v8.2007-3.10)	Mentor	A	Not complying with some portion of STIL Usage Guide 1450.0, but usable level.	A (100)		A (100)	A (100)
		EncounterTest (6.2.5)	Cadence	BB	Some violations in handling user keywords in STIL Usage Guide, but usable level.	BB (70)		BBB (80)	A (100)
		Etverify (6.0a.SP1)	LogicVision	A	No problem in the output STIL	A (100)		A (100)	A (100)
	STIL read		Synopsys	Results not disclosed per the vendor's request					
		FastScan/TestKcompress (v8.2007-3.10)	Mentor	B	Some items such as a message not being output do not comply with STIL Usage Guide, but usable level.	A (100)	B (20)	B (20)	BB (58.3)
		EncounterTest (6.2.5)	Cadence	B	Two keywords violate the specifications, but usable level. However, for the Bus notation, some caution should be taken.	B (0)	B (20)	BB (40)	BB (43.7)

Collaboration with the overseas parties

SSTAG Activities



Schedule

	2008							2009		
	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
Shows, Meetings	▲ GSC			Report the results	▲ ITC				Report the results At next GSC	▲
STIL Usage Guides	.0, .2, .3 Rev. up Draft	Review Publish	Brush up Publish	On an as needs basis		Comment for Vote of .4 Propose	Propose to IEEE	.1, .6 Review Draft	Review Publish	▲
Studying the support situation of STIL relation Tool	Exchange of opinions ▲ Give an explanation at STIL WG Meeting	Exchange of opinions	Check Submit	Update reports		Update Tool ver. And add new tools		Submit Update reports	▲	Submit Update reports
Investigating Inf. Required for Tester Control	Exchange of opinions ▲ Give an explanation at STIL WG Meeting	Exchange of opinions	Enhance description (Analog and Memory) Submit documents	Requirement to IEEE		Exchange of opinions	Exchange of opinions	Submit documents	▲	Requirement to IEEE

Activity in FY2008

- STIL Usage Guides
 - Review of 1450.0/.2 Revision up
 - Review of 1450.3/.6 Created
 - Comment for vote of 1450.4
- Studying the support situation of STIL relation Tool
 - Try to check STIL relation Tool using “STIL check data”
- Investigating Inf. required for Tester Control
 - Seek a solution to the issues required for Tester Control Information

Summary of Survey

- Give a clue to the direction of the future
- Our activity meet the your expectations
 1. Usage Guides
 - ✓ Effective : dialects, tool support, etc.
 2. Studying the support situation of STIL relation Tool
 - ✓ Effective: Spread the use of STIL
 3. Investigating Inf. required for Tester Control
 - ✓ Effective: Accelerate STIL standardization

SEMI-CAST STIL WG activity in FY 2009

Activity in FY2009

- From STC STIL WG to SEMI-CAST STIL WG
- STC STIL WG Japan(SSWJ) shifts to SEMI-CAST STIL WG Japan(SCSWJ)
- New organization and plan to be determined
- We collaborate with STARC SSTAG
- Spread the use of STIL all over the world
 - ◆ To make common consensus of STIL Usage:
SCSWJ provides STIL Usage Guide
 - ◆ To accelerate STIL standardization to STIL test program: SCSWJ provides Tester Control Info.

Request to SEMI-CAST

- We would like you to positively participate in discussions in order to build a world-wide consensus.
- It is necessary to promote effective standardization for S/W(STIL Based test Environment) and H/W(Boards, Jig).
- We would like to establish a collaborative relationship with related WG in SEMI-CAST.