



**Specification Analysis Tool
Applied to Tool Vendor Challenge**
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Forward

Thank you for considering our tools. We believe that we have significant new products and technologies that will change the way we create and review documents. It is no secret that the computer and the Internet revolution have provided us with so much data that we are unable to effectively consume this data. Our products and technology address this serious issue and we are working so that they will become as common as word processing.

This document is a sample analysis using our Specification Analysis Tool (SAT) product.

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1.0 Introduction

In 2007 we used the Specification Analysis Tool (SAT) Tool to analyze the Problem Statement of the Tool Vendor Challenge from the European Systems Engineering Conference 2006, 18-20 September 2006, Edinburgh, UK. We performed the analysis in February 2007, after the conference session. There was no dialog with the participants.

<http://www.incose.org/eusec2006/index.php?chapter=toolvendor&par=challenge>

2.0 Methodology

The Problem Statement was analyzed as a single document. It was converted to text format. The Parse Text option was selected and all the display areas were disabled except for those addressed in this white paper. The follow steps were used to prepare for the analysis.

1. Copied the HTML text area into a text editor and saved in .txt format.
2. Modified the heading numbers from "1." To 1.0" patterns. Placed a period at the end of each heading. This is optional and typically not performed in an analysis.
3. The Parse text option was enabled.
4. The imperatives were set to "shall" or "must".
5. The SAT Default template was used for the analysis.
6. The Domain Structure Analysis service was modified to match this domain area.
7. The SAT activity was restricted to 20 minutes. Each report executed within 2 seconds.

The analysis entailed subjecting the Problem Statement to each service and saving the results into Previous Analysis. The following services were used in the analysis:

1. Requirement Text Analysis
2. Find Duplicate Objects
3. Generic Structure Analysis
4. Domain Structure Analysis
5. Generic Capabilities Analysis
6. Domain Capabilities Analysis
7. Key Reqs Analysis

The next level of analysis where the findings of each service are further refined was not performed. This is an ad hoc activity and usually yields more insight, however there is much to say about the document at this level of analysis.

3.0 Findings

This is a very small body of work. The findings suggest that it is premature to proceed to any levels of analysis other than trying to surface and understand the requirements. The goal is clear but the statements use vague syntax and are characterized with compound thoughts suggesting indecision. The findings suggest that the solution specialists need to sit down with the customer and understand what they think is needed. No lower level requirements should be derived from this work or should models be attempted of the problem set until this dialog is started no matter how much pressure exists to impress the customer with a can do self start attitude.

4.0 Data

4.1 Requirement Text Analysis

The finding of this service suggests that significant work is needed to understand the problem so that an effective solution can be prepared. Over 69% of the objects triggered a RTA rule. They fall into the following risk categories: 48% Medium, 13% High, 48% Low. The total is greater than 100% because objects have multiple findings from Low to High risk. The fact that there are objects with multiple finding is also a negative indicator.

Item	Risk	Count	Children	% lines	% imperative	% shall	% will	% isreq	% Norm
Buzz Words rta	High								
Compound Req rta	Low	10		43.47					
Directive rta	Low	2		8.69			22.22		
Fragment rta	Low								
Incomplete rta	High	1		4.34	100		11.11		
Internal Reference rta	High								
Multiple Imperatives rta	Med	9		39.13			100		
Not Standalone rta	Low								
Options rta	High	2		8.69			22.22		
Unbounded rta	Low	2		8.69			22.22		
Undefined rta	Low								
Unsure rta	High								
Untestable rta	High								
Weak Phrases rta	Med	4		17.39			44.44		
Weak Words rta	Med	1		4.34	100		11.11		
z Mined Objects		16		69.56					

Rules Total 16

Rules Triggered 9

Rules Not Triggered 7


Percent of Rules Triggered 56%

4.2 Find Duplicate Objects

There are no duplicate objects.

4.3 Generic Structure Analysis

The document shape indicates that there is insufficient decomposition. All the statements are at level 1 with no further decomposition. Typically the document shape should be similar to a diamond or pyramid in any mature body of work.

Item	Count	Prcnt	Shape
1. Level 1 Req <i>gsa</i>	17	100	
2. Level 2 Req <i>gsa</i>			
3. Level 3 Req <i>gsa</i>			
4. Level 4 Req <i>gsa</i>			
5. Level 5 Req <i>gsa</i>			
6. Level 6 Req <i>gsa</i>			

Item	Risk	Count	Children	% lines	% imperative	% shall	% will	% isreq	% Norm
1. Level 1 Req gsa		5	17	21.73			55.55		
2. Level 2 Req gsa									
3. Level 3 Req gsa									
4. Level 4 Req gsa									
5. Level 5 Req gsa									
6. Level 6 Req gsa									

4.4 Domain Structure Analysis

The document shape indicates that each area has been addressed at similar levels of decomposition.

Item	Count	Prcnt	Shape
1. General Background dsa	4	80	
2. Functional modes dsa	5	100	
3. User interface dsa	4	80	
4. Planning constraints dsa	3	60	
5. Vendors are asked to provide the following information dsa	1	20	

Item	Risk	Count	Child	% lines	% imperative	% shall	% will	% isreq	% Norm
1. General Background dsa		1	4	4.34	100		11.11		
2. Functional modes dsa		1	5	4.34	100		11.11		
3. User interface dsa		1	4	4.34	100		11.11		
4. Planning constraints dsa		1	3	4.34	100		11.11		
5. Vendors are asked to provide the following information dsa		1	1	4.34	100		11.11		

Rules Total 5

Rules Triggered 5

Rules Not Triggered

Percent of Rules Triggered 100%

4.5 Generic Capabilities Analysis

The reading level is 11. There are no imperatives. The keywords suggest a computerized consumer appliance.

Accessed Unique Words: 124

Accessed Unique Syllables: 305

Words with 3+ Syllables: 54

Polysyllabic Count: 70

Reading Level: 11

Accessed Words

Number Sort

12: control	10: system	9: appliances	9: appliance	5: computerised
4: ccc	4: computer	4: manual	4: controls	3: home
3: central	3: software	3: modes	3: working	2: electric

2: information	2: planning	2: cosy	2: manually	2: interface
2: widgets	2: development	2: air	2: functional	2: devices
2: mode	2: following	2: version	2: able	2: dual
2: alarm	2: micro-controllers	2: full	1: self-diagnostic	1: used
1: systems	1: year	1: human-machine	1: minimum	1: supply
1: operation	1: certain	1: entertainment	1: connected	1: intended
1: additional	1: microwave	1: terminated	1: manufacturer-supplied	1: easy
1: remote	1: background	1: controlling	1: hardware	1: initially
1: allow	1: half	1: given	1: permitted	1: dvd
1: performed	1: average	1: refrigerators	1: controlled	1: versions
1: project	1: example	1: tv	1: radio	1: maximum
1: ie	1: asked	1: pre-programmed	1: monitor	1: enable
1: purchase	1: physical	1: advance	1: kitchen	1: simple
1: includes	1: independently	1: electrical	1: playersrecorders	1: appropriate
1: conditioners	1: available	1: limited	1: larger	1: user
1: fully	1: upgrade	1: critical	1: enabled	1: constraints
1: cookers	1: installation	1: display	1: developed	1: include
1: vendors	1: ovens	1: three	1: basic	1: one
1: number	1: pilot	1: heating	1: clocks	1: addition
1: conditioning	1: supported	1: learn	1: different	1: expanded
1: least	1: supplied	1: general	1: applying	1: test
1: run	1: modular	1: activity	1: capable	

Accessed Unique Words: 124

Alpha Sort

2: able	1: activity	1: addition	1: additional	1: advance
2: air	2: alarm	1: allow	9: appliance	9: appliances
1: applying	1: appropriate	1: asked	1: available	1: average
1: background	1: basic	1: capable	4: ccc	3: central
1: certain	1: clocks	4: computer	5: computerised	1: conditioners
1: conditioning	1: connected	1: constraints	12: control	1: controlled
1: controlling	4: controls	1: cookers	2: cosy	1: critical
1: developed	2: development	2: devices	1: different	1: display
2: dual	1: dvd	1: easy	2: electric	1: electrical
1: enable	1: enabled	1: entertainment	1: example	1: expanded
2: following	2: full	1: fully	2: functional	1: general
1: given	1: half	1: hardware	1: heating	3: home
1: human-machine	1: ie	1: include	1: includes	1: independently
2: information	1: initially	1: installation	1: intended	2: interface
1: kitchen	1: larger	1: learn	1: least	1: limited
4: manual	2: manually	1: manufacturer-supplied	1: maximum	2: micro-controllers
1: microwave	1: minimum	2: mode	3: modes	1: modular
1: monitor	1: number	1: one	1: operation	1: ovens
1: performed	1: permitted	1: physical	1: pilot	2: planning
1: playersrecorders	1: pre-programmed	1: project	1: purchase	1: radio
1: refrigerators	1: remote	1: run	1: self-diagnostic	1: simple
3: software	1: supplied	1: supply	1: supported	10: system
1: systems	1: terminated	1: test	1: three	1: tv
1: upgrade	1: used	1: user	1: vendors	2: version
1: versions	2: widgets	3: working	1: year	

Accessed Unique Words: 124

4.6 Domain Capabilities Analysis

Typically this service would be modified to match the domain area under analysis. Since there were other more important findings, this service was not updated to "match" this domain area.

What would happen is the consumer appliance industry would be used as the model to populate the rules for this service.

4.7 Key Reqs Analysis

There are many areas that are not addressed by the Problem Statement. Of the areas that are hit by the text, there is very little content as evidenced by the counts. Several of the KRA rules are associated with business areas such as ATC and it appears this statement does not match these business areas. Note: the template can be modified to pull the business areas from the Key Reqs Analysis service and a new service can be created called Business Areas. That was not done for this analysis.

Accessed Patterns Found

Number Sort

9 system 2 Central 2 software 1 function 1 System 1 hardware
 1 machine interface 1 central 1 Function 1 capable 1 electrical

Alpha Sort

1 System 9 system 2 software 2 Central 1 central 1 machine interface
 1 Function 1 capable 1 electrical 1 function 1 hardware

Accessed Patterns Not Found

performance	response time	architecture	distributed	hybrid	flexible
growth	flexibility	safety	safe	fail\s*safe	fail\s*over
recovery?	data	environment	power	temperature	humidity
salt fog	shock	vibration	mechanical	enclosure	facility
facilities	room	training	train	maintenance	maintainability
support	logistics	ils	reliability	maintainability	availability
EMI	EMC	TEMPEST	UL	Ergonomics	HMI
MMI	ATCRBS	Beacon	Primary	Secondary	Mode-S
track	velocity vector	history	mosaic	flight plan	fix
posting	conflict alert	MSAW	minimum safe altitude warning	flight plan probe	clearance delivery
security	secure	log\s*on	log\s*off	log\sin	log\s*out
restricted area	track pairing	ADIZ	plot	maps?	range scale
off\s*set	capability				