



**PRODUCT DESCRIPTION**

## SPAR™ Application - The SPAR Automatic Optimizer SPARopt™

### Spare Parts Optimization

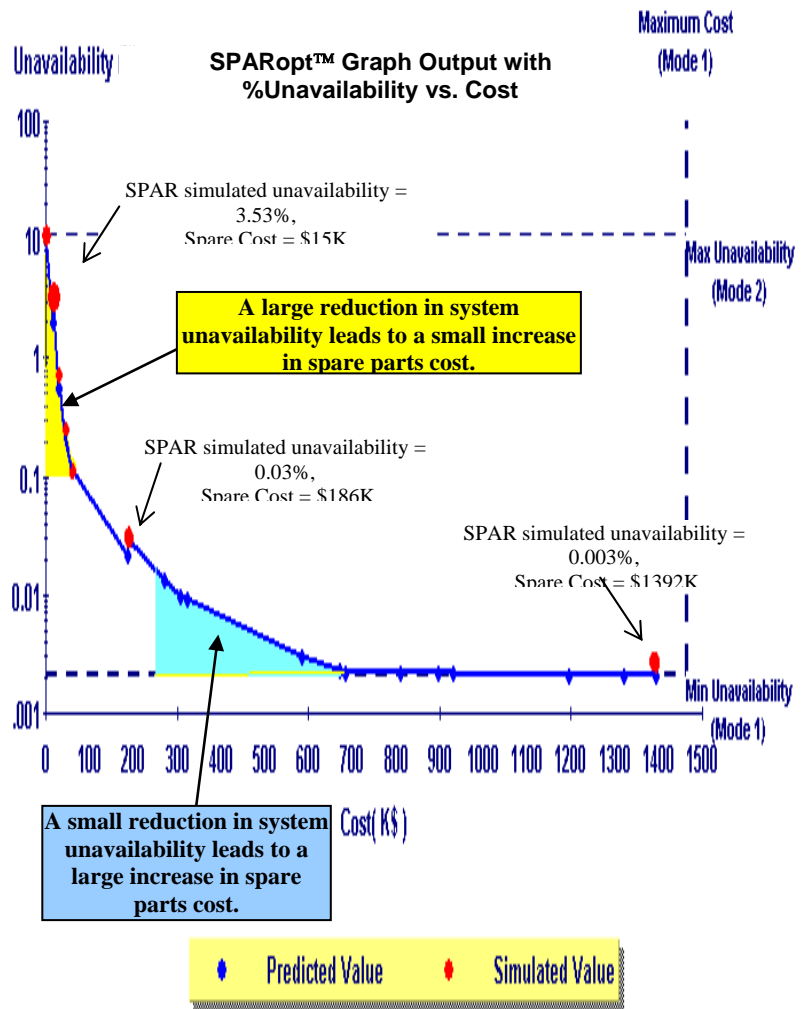
Spare parts optimization is one of the most common, but complex and expensive problems in many industries. Maintaining stocks of excess spares is not the best use of a limited budget, but lack of spares results in unacceptable system performance. Quantifying this relationship between cost of spares and system performance is the basis of making cost effective business decisions. Optimization of spares is a complex mathematical problem, but Clockwork has the solution.

### Introducing the SPAR Automatic Optimizer (SPARopt™)

There are two traditional methodologies for optimizing resources, analytical methods and simulation. Clockwork's proprietary SPAR technology uses highly accurate simulation to solve optimization problems - however simulation can also be very time and resource intensive. Use of analytical methods is more time efficient, but at the same time it is less accurate than the use of simulation. SPARopt™ offers a unique hybrid approach that uses SPAR simulation output as a starting point for an analysis that takes advantage of both analytical and simulation techniques, thus providing answers that are both accurate and quick!

### Graphical User Interface

The SPARopt™ GUI is immediately comfortable for any user of Microsoft™ Windows, with standard menus and functionalities. The GUI is centered around a graph of Unavailability vs. Cost, and a pair of corresponding tables for Stock Effectiveness and Sparing Strategy. The graph provides a natural way to understand the problem and compare alternative solutions.



## SPARopt™ GUI features

- Easy to use and understand
- Allows decision makers to examine the relationship between cost of spares & overall unavailability
- Ranks spares by their “bang for the buck,” thus identifying which spares contribute most to system unavailability
- Presents the most cost effective sparing strategy
- Graphical interface to compare multiple scenarios and the current spare storage. *Multiple scenarios can result from any changes - including costs.*



## Inputs to SPARopt™

- A SPAR Model – a set of system reliability parameters
- A Cost Profile – cost of purchasing spares
- Optimization Control Parameters – optional parameters that determine the resolution of the optimization process

## Cost vs. Performance

Using SPARopt™ you can:

- Minimize the cost of reaching a system performance goal
- Maximize System Performance with a given spares budget
- Perform Sensitivity Studies – Examine how changes in cost data affect the optimized spares policy
- Run Unconstrained Optimization – SPARopt™ generates a ranked spares effectiveness table

Stock Effectiveness						Sparing Strategy				
		 SPAR-Simulated Value  The Optimal Sparing Strategy				<input type="button" value="Launch SPAR"/>				
Rank	Spare Type/Filename	Unavailability %	Accumulated Cost ( K\$ )	Unavailability Reduction %	Spare Effectiveness	Type #	Type Name	Quantity	Cost per Item ( K\$ )	
2	(BBB_2.out)	0.7561	30.000			1	PS	3	126.000	
3	DSK	0.2008	45.000	0.5552	0.0000	2	* CBL *	0	0.006	
3	(BBB_3.out)	0.2556	45.000			3	MDM	1	72.000	
4	DSK	0.1254	60.000	0.1302	0.0000	4	CMP	3	84.000	
4	(BBB_4.out)	0.1167	60.000			5	* DEC *	0	0.006	
5	PS	0.0225	186.000	0.0941	0.0000	6	MTR	2	264.000	
5	(BBB_5.out)	0.0295	186.000			7	* LAN *	0	0.006	
9	MTR	0.0030	585.000	0.0063	0.0000	8	TEL	2	36.000	
10	CMP	0.0023	669.000	0.0007	0.0000	9	DSK	6	15.000	
11	DSK	0.0023	684.000	0.0000	0.0000	10				
17	MDM	0.0022	1392.000	0.0000	0.0000	11				
17	(BBB_6.out)	0.0026	1392.000			12				
18	BBBm1.out	0.0022	1464.000			13				

## Conclusion

Understanding the relationship between cost of spares and overall system availability can help you make more cost effective business decisions. The SPAR™ Automatic Optimizer helps analyze the tradeoffs between these issues in a unique and accurate way. Featuring a powerful GUI, flexible inputs, and insightful outputs, SPARopt™ will improve your bottom line quickly and easily.

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