

PRODUCT DESCRIPTION

SPAR™ v5.0

Introducing SPAR™ 5.0

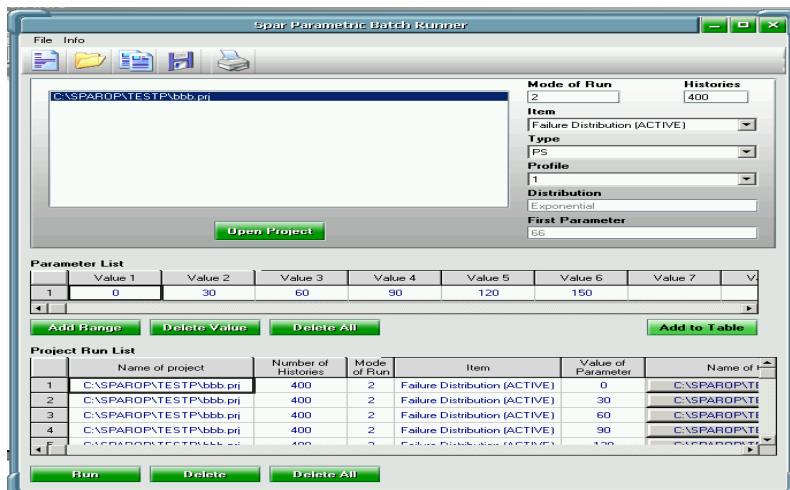
Clockwork Solutions announces the release of the latest software for prediction and management of the performance and life cycle costs of complex systems. SPAR™ has always been at the cutting edge of predictive modeling for complex systems, and now with SPAR™ 5.0 our technology is even more powerful and usable than ever before.

SPAR™ 5.0 Features

SPAR™ 5.0 is easy to use for anyone whom has been trained in SPAR™, and is compatible with all SPAR™ 4.1 project files. SPAR™ has also progressed significantly in Version 5.0. In addition to resolving all outstanding reported bugs, the following features are included in the new version:

- Enhanced Parametric Batch Runner executes a batch of SPAR™ runs with different parameters sequentially and automatically.
- Easier and more organized input forms allow data to be copied and pasted into/from an external spreadsheet
- A new, much more powerful mechanism of working with storages.
- Increased model execution speed when using non-exponential distributions.
- Increased space in the BubbleMaker™ for user logic.
- Easy access from the main SPAR™ screen to the Automatic Spare Parts Optimizer (SPARopt™ v1.0). SPARopt™ is a tool that automatically determines the best spare parts policy for a system, with or without budgetary and/or system availability constraints. For more information about SPARopt™, see the SPARopt™ Product Announcement or contact us at info@clockwork-solutions.com.

The major enhancements in SPAR™ 5.0 include the Batch Runner, Input Forms, and Storages Mechanism. These features are described in more detail below.



SPAR™ 5.0 Parametric Batch Runner

The SPAR™ Parametric Batch Runner is a tool enabling SPAR™ project files to be run sequentially in batches, with the ability to change various parameters of each project. It replaces SPAR Runner - which is no longer included in the SPAR™ suite.

The main screen of the SPAR™ Parametric Batch Runner is shown to the left. This one dialog box is used to select the project file, change parameters of the project, and display the project run list that identifies the changes made to all projects that will be run in the batch.

SPAR™ 5.0 Enhanced Input (Ingen™) Forms

New tabular data entry forms have been added to SPAR™ 5.0 in the Ingen™. These forms enable the user to copy and paste information into/from an external spreadsheet, and give clearer access to the input data.

The changed forms are:

1. System Description, where the types are defined.
2. System Composition of LRU's, where the link between the LRU and its type is declared.
3. Spare Parts Strategy, where the replenishment time point and the spare quantity added at each time point are assigned.

The screenshot shows a dialog box titled "SPAR™ 5.0 System Description Input Form". It features a dropdown menu for "Number of LRU types" set to 9. Below this is a list of LRU Type Names: 1 PS, 2 CBL, 3 MDH, 4 CMP, 5 DEC, 6 MTR, 7 LAN, 8 TEL, 9 DSK. To the right of the list are buttons for "Default Names", "Copy", "Paste", "Delete", and "Delete All".

SPAR™ 5.0 System Description Input Form

LRU Number	Type Number	Type Name
1	1	PS
2	2	PS
3	3	CBL
4	4	MDM
5	5	CMP
6	6	CBL
7	7	MDM
8	8	CMP
9	9	CBL
10	10	MDM
11	11	CMP
12	12	CBL
13	13	MDM
14	14	CMP

SPAR™ 5.0 System Composition Input Form

The screenshot shows a dialog box titled "SPAR™ 5.0 Spare Parts Strategy Input Form". It has a "Time" dropdown set to 234 and an "LRU type" dropdown set to 7 LAN. Below is a table with columns for "LRU Type", "Time 0", "Time 234", and "Time 456".

LRU Type	Time 0	Time 234	Time 456
1 PS	2	2	3
2 CBL	3	3	1
3 MDM	5	2	2
4 CMP	0	2	1
5 DEC	1	2	2
6 MTR	4	2	0
7 LAN	1	1	1

SPAR™ 5.0 Spare Parts Strategy Input Form

SPAR™ 5.0 Storages

In the Bubblemaker™, the "Storage" feature has significantly improved with the use of a new advanced mechanism. This new storage feature gives SPAR™ the capability of modeling complex storage situations. Any kind of model element can now be stored in and removed from multilevel storages at any point in time. These elements can also be given integer and real number attributes for element tracking.

The screenshot shows the "Into Storage" dialog box. It contains several input fields: "Level" (1), "Storage Number" (1), "Type" (1), and "Quantity" (1). There are also "Delay Time" and "Time of Action" fields, each with a "Set" button. Below these are checkboxes for "Use Ring" and several attribute fields: "First Integer Attribute: 0", "Second Integer Attribute: 0", "First Real Attribute: 0.0", and "Second Integer Attribute: 0.0", each with a "Set" button. At the bottom are "OK" and "Cancel" buttons.

SPAR™ 5.0 Into Storage Dialog Box

Corresponding operators including "Into Storage", "Out of Storage", and "From To Storage" have been updated or added to use the new storages features. In addition, the "Assign" operator has been changed to include SPAR™ quantities such as the total storage size, storage available size, and storage pipe size. A new event point, "At Spare Arrival", has been added to the Bubblemaker™ that is triggered when a spare arrives to the storage.

One of the new Storage dialog boxes, Into Storage, is shown to the left. This box is used to identify the storage level, number, element type, element quantity, time of storage addition, and numerical attributes associated with the element.

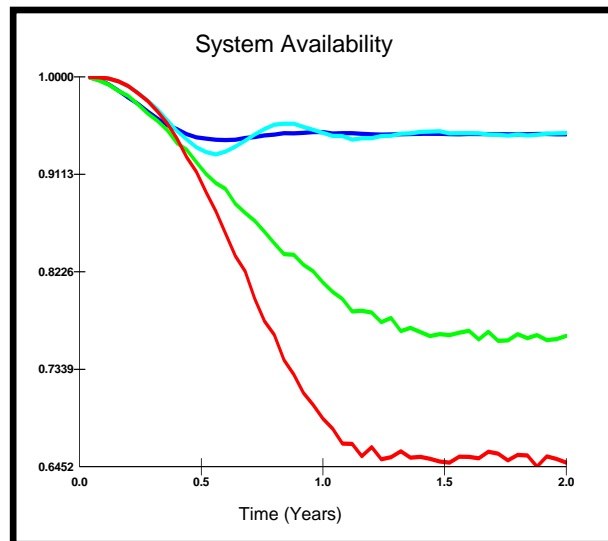
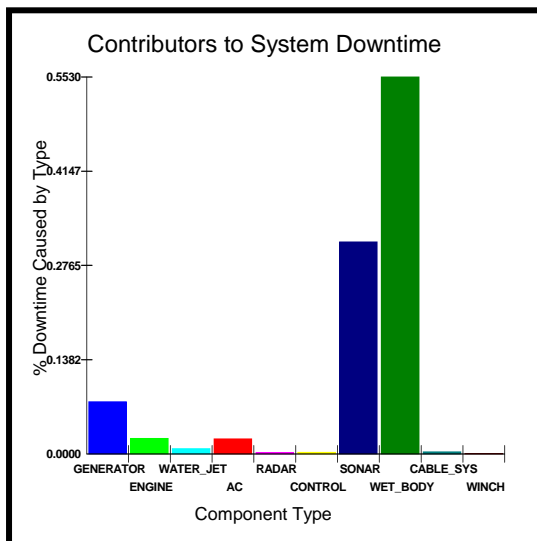
Other dialog boxes are used to move elements from one storage to another (including SPAR™ Level A Spare Parts Storage) and take elements out of storage.

SPAR's Applications Include:

- **System acquisition:** How do the life cycle costs of candidate systems compare?
- **Spare part planning:** What is the mix and level of spares needed to achieve a performance target given supplier lead time?
- **Maintenance planning:** When should preventive maintenance be done to minimize cost and maximize system life expectancy?
- **Warranties:** What should the warranty level and duration be to assure cost-effective operation of the system?
- **Design improvements:** What is the effect on performance and cost of:
 - Change in the degree of redundancy?
 - Use of a different grade component?
 - Change in the operating policies?
- **Risk assessments:** What is the risk of an event occurrence?

SPAR™ is Unique Because:

- **System-level approach:** SPAR™ relates proposed design and operations changes to system performance and cost.
- **Reliability-centered:** The basis for SPAR™'s predictions is the reliability characteristics of the individual components.
- **Monte Carlo solver:** SPAR™ uses a proprietary Monte Carlo simulator to achieve high confidence in a predicted result and to identify drivers of lost system performance.
- **An embedded internal model:** The SPAR™ Monte Carlo engine implements several internal models whose behavior can be customized by the user. This greatly simplifies the model specification.
- **Graphical User Interface:** SPAR™ models are entered graphically. Selecting from the menu of internal models provides much of the input.



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