

**Features:**

- APT acquisition 1
- New support options 1
- Justifying equipment replacement 2
- Maintenance "optimization" 2
- Linking FMECA, RBI, Integrity & Risk Mgmt 2
- Getting the basics right 3
- Joined-up life cycle Asset Management 3
- Critical Spares: in New York power 3
- Decision types & decision tools 4

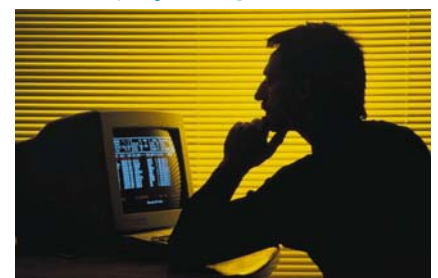
## Leading edge tools to optimize investment, operating, maintenance & materials decisions

Asset Performance Tools Limited, developers of the world-leading APT decision-support software tools, has been acquired by DST, the technical products division of The Woodhouse Partnership. This acquisition brings together some of the world's most sophisticated and flexible analytical toolkit with the most experienced practical implementation expertise in risk-based, life cycle planning and optimization of physical assets. The modular APT suite addresses over 40 common decision types in physical asset management, ranging from "Shall I buy a spare?" to "When should I replace this equipment?" plus optimal maintenance, inspection and shutdown intervals. The unique APT approach combines structured capture and quan-



tification of 'tacit knowledge' with rigorous "what if?" calculations to evaluate cost/risk options and optimal strategies. The APT toolkit was developed as part of the European MACRO project — a consortium of blue chip industrial companies, backed by the British & European governments over 5 years of R&D and field trials. Phil Summerfield, Partnerships & Alliances Director of DST, welcomed the move: "This acquisition represents a really exciting development, pooling the best tools in the business with a world-reach network of experienced practical support resources." Existing APT users include BP, SASOL, Pirelli, Tube Lines, National Grid & other major organisations

See [www.MACROproject.org](http://www.MACROproject.org)



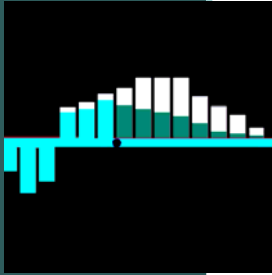
## New support services

DST is also delighted to announce the development and launch of a new technical support and development service. Drawing on the 12 years of experience in over 20 countries and most industry sectors, plus the 'Asset Management thought leadership' expertise of The Woodhouse Partnership, DST is now able to customize the mix of appropriate technology, business process 'embedding' and human resource development to individual client

needs. For example, the APT analytical tools can now be purchased as licensed utilities for day-to-day usage, or provided via an optimization analysis service (in the hands of expert consultants), or even 'embedded' within your own work and core business management systems. Online services are being developed to include a library of best practices and case studies, a 'networking club' for expert facilitators/consultants and a com-

petency certification and recognition programme for professional development. The Woodhouse Partnership is also building an international network of associates and industry sector experts to ensure that local support is available with specific regional culture and industry knowledge and skills. This network already covers North & South America, Southern Africa and Europe.

See [www.decisionsupporttools.com](http://www.decisionsupporttools.com)



*"These unique 'what if?' tools identify the optimal timing and intervals for maintenance, inspection or renewal."*



## Justifying equipment replacements

Justifying capital investment can be a complex business - due to a mix of uncertain assumptions, time pressures, resource constraints, difficulty in specifying quality and performance requirements and the need to manage conflicting interests. Projects have very different objectives in short and long timeframes - so comparisons of 'value-for-money' and life cycle costs are difficult. False economies and short-termism are still common ("on budget on time" instead of best value-for-money over whole life). This is where project-phase evaluations are

vital. A "what if?" approach to investments requires a toolkit disciplined data capture and exploration of different possible assumptions. At systems levels, Reliability, Availability and Maintainability (**RAMS**) simulation is very valuable for major infrastructure options. For the 'small and many' projects, where data is poor, and there is a wide variety of project types and benefits/objectives (e.g. safety, performance, cost reduction, reputation or legal compliance), **APT-PROJECT** is ideal as a consistent filter of value-for-money and a method of putting

a price on the 'intangibles'. For equipment replacement timing or life cycle optimization decisions, however, neither **RAMS** simulation nor simple cost/benefit NPV/IRR calculation is enough. We have to make 'total impact' calculations involving multiple cost elements, risks (failure modes and possible consequences), maintenance options, deterioration patterns & timing constraints. **APT-LIFESPAN** is the *only* tool currently able to model all these in a real-time "what if?" style to explore intervention options and optimize the timing and urgency for investment.

## Maintenance "Optimization"

Many methodologies and tools claim to 'optimize' maintenance. Reliability Centered Maintenance (**RCM**) has been widely accepted (and modified in various ways!) to help select what *type* of maintenance is appropriate (e.g. fixed-interval, condition-based, or on-failure). Practical experience over the last 20 years has also revealed that full, 7-step **RCM** is only justifiable for, typically, 30-40% of asset systems and failure modes. Reverse-**RCM** (or Review of Existing Maintenance, **REM**) is adequate and acceptable for low-criticality areas, and Risk

Based Inspection (**RBI**) is more suitable for many types of static equipment. The right asset management approach involves a toolbox *mix* of such methods, as introduced and case-by-case customized by The Woodhouse Partnership in any systematic review. However **NONE** of these methods provides effective guidance or business justification for the appropriate *amount or timing* of maintenance (interval, condition reaction point, cost/benefit). This is where **DST's APT-MAINTENANCE** and **APT-INSPECTION** contribute: to quantify and optimize

the mix of planned and unplanned costs, risks and performance impact. These unique

"what if?" tools identify the optimal intervention timings and quantify the premium paid for legal compliance or cost/risk impact of delaying any planned work. **APT-SCHEDULE** takes it even further; optimizing the bundling of maintenance, inspection & project work, shutdown strategy & 'opportunity' tasks.



## Linking FMEA, RBI, risk registers & integrity management processes

Risk management is a core part of good business, but it takes many forms, often disjointed. At the 'Enterprise' level, risk registers are assembled largely for corporate governance reasons. At physical asset management levels, safety and integrity requires identification and control of failure risks in a systematic, quantified manner (e.g. **RBI**). In operational decision-making, risks affect almost every op-

tion and intervention strategy, but they change with time, and 'optimization' requires sophisticated mathematics (e.g. **APT-INSPECTION**)! Leading organisations, however, are now linking all these activities together. Bottom-up identification of internal and external risks (**FMECA** & **SWOT** tools) inform investment, operations, maintenance and contingency planning strategies, and the residual risks are represented

in the corporate risk register. Safety case assumptions, environmental impact assessments and insurance strategies can also align with consistent, scaled ranges for event likelihoods and consequences. The Woodhouse Partnership can help you to navigate this maze and to build and implement a robust, transparent system, including the necessary mix of rigorous logic and sustained education/communication.

## Getting the basics right



Many DST and Woodhouse Partnership clients are at the front of their fields simply by doing the simple stuff well and consistently. This is exactly in line with our case-proven principles of:

- > Don't apply a complex solution if a simple one would solve most of the problem.

- > Make sure you ask the right questions - of the right people.
- > Don't let fancy technology distract us from solving the real problem - at root cause level.
- > Existing employee knowledge and experience are often enough (if captured and used correctly) to solve most problems.
- > Local motivation and 'ownership' are vital to ensure that improvements are implemented and benefits realized.
- > Communication, education and more communication!

Of course, not all problems and strategies can be addressed by simple common sense: sometimes

they involve very delicate juggling of conflicting factors, short-term versus long-term impact, uncertainties and interdependencies. In such cases it's vital to know which methodology, tool or process will safely navigate the issues and achieve consensus on what to do, when and why. This is the environment where DST operates - the practical guidance to find the optimal compromise between conflicting pressures, particularly when the available information is incomplete or uncertain! That's why companies such as National Grid, BP, SASOL and London Underground rely on our tools & methods to evaluate and prioritize investments, maintenance, inspections, renewals, spares & shutdowns.



*"Existing employee knowledge and experience are often enough (if captured and used correctly) to solve most problems."*

## Joined-up, life cycle asset management

There is a new level of professionalism emerging in the management of physical assets: one that crosses departmental and functional boundaries and delivers large scale economic and performance gains. This is the multi-disciplined, whole life planning and optimization of capital investments, operating, maintenance and disposal of physical assets. In contrast with the functional 'silo's of the past, such integrated approaches find the best mix of short term and long term costs, performance and risks.

Experiences in the N.Sea Oil & Gas

sector, and the Australian public utilities have revealed that such a joined-up approach can deliver up to 40% savings in whole life costs while simultaneously raising sustainable performance levels. The UK Institute of Asset Management has now UK Electricity & Gas Regulator, OFGEM, has announced that all network operators must demonstrate compliance with PAS 55 by April 2008. The current revision project for the standard has attracted 40 sponsors from 15 industries in 10 countries.

Underpinning this new maturity is a

widespread recognition of the vital importance of better risk-based decision-making. Tube Lines Limited, for example, winners of the first UK/IET Innovation Award for Asset Management, achieved this accolade by optimizing the maintenance and life cycle ownership costs of its many escalators. This involved cost/risk trade-off decision-making with multiple components, failure modes, cost uncertainties and radical changes to working practices. Tube Lines had adopted APT software as a key part of its decision toolkit....

## Critical spares: helping to keep New York's lights on

New York Power Authority (NYPA) is the latest top level organization to select APT-SPARES and APT-STOCK software tools to optimize its materials inventory. Complimenting their existing sophisticated inventory management systems, these APT tools enable asset management personnel to evaluate the level of risk resulting from holding different stock levels.

Andy Jennings, of Decision Support Tools distributor TWPL, provided

the associated training programmes and commented on the NYPA operation as "one of the best purchasing and warehouse management operations I have seen: this team certainly has the potential to make a very significant impact by their further optimization plans".

NYPA joins an impressive line-up of oil, utilities, transport, mining and manufacturing organisations to select APT as a key tool in their decision-support.



APT-SPARES software has been introduced to optimize which spares should be held, in what numbers, to minimize the costs and risks of power outages



**Turning technical problems into clear business benefits**

For more information, please contact:  
 Decision Support Tools Ltd.  
 Prince Henry House  
 Kingsclere Business Park  
 Hampshire RG20 4SW  
 United Kingdom  
 Phone: +44 (0) 1635 298800  
 Fax: +44 (0) 1635 295555  
 E-mail: support@decisionsupporttools.com

**Decision Types & Decision Tools**

Below is a navigation guide to over 40 common asset management decisions and the appropriate APT decision tools that help to ensure that the right questions are asked, the right evaluation and optimisation calculations are performed, and appropriate 'what if?' evaluations and sensitivity studies are performed: yielding optimal decisions and clear justifications.

APT process & 'what if?' calculator module

Decision Type	Cost/risk/performance evaluation of	PROJECT	LIFESPAN	MAINTENANCE	INSPECT	SCHEDULE	SPARES	STOCK
<b>Projects, Designs &amp; Modifications</b>								
<i>Cost/benefit analysis</i>								
Equipment upgrades								
Process changes								
Procedure changes								
Technology updates								
Efficiency improvements								
Problem priority/urgency								
Problem-solving efforts								
Investment paybacks								
Compliance requirements								
Public image/morale activities								
<i>Life Cycle &amp; Asset Replacement</i>								
Equipment selection								
Vendor comparisons								
Capex/Opex trade-off								
System configuration								
Repair vs Replacement								
Optimum maintenance & renewals mix								
Life extension projects								
<b>Operating &amp; Maintenance Strategy</b>								
<i>Performance/Reliability/Longevity</i>								
Optimum efficiency profiles								
Optimum run lengths between shutdowns								
Reliability, efficiency & longevity combinations								
<i>Planned/Preventive Maintenance</i>								
Optimum PM intervals								
PM task evaluation								
PM opportunities								
Time vs usage based PM								
Optimum shutdown interval								
Repair vs Replace options								
<i>Predictive Maintenance/Condition Monitoring &amp; Inspections</i>								
Inspection & CM intervals								
CM cost/benefit justification								
CM methods & performance								
Function testing intervals								
Failure finding inspections								
Safety risk exposures								
<i>Work Scheduling &amp; Shutdowns</i>								
Optimum timing and intervals								
Work groupings								
Evaluation of Opportunities								
Scheduling and task alignment								
<b>Spares &amp; Materials</b>								
<i>Insurance/slow moving spares</i>								
Stock holding levels								
Whole units vs components								
Shared or dedicated								
Supplier A vs Supplier B								
Pooled access contracts								
Supplier held spares								
Spares criticality								
Optimum availability								
<i>Consumables, stock, materials</i>								
Optimum stock levels								
Min/Max stock levels								
Reorder quantities								
Reorder cycles								
Supplier A vs Supplier B								
Pooled access contracts								
JIT/Supplier-held stock								
Optimum availability								
Storage requirements								