

“Tempo understands that both costs and returns must be measured over time.”

The Next Generation Inventory Optimization Tool

Do you struggle with?

- ▶ Fleet build-up and run-down
- ▶ Obsolescence and technology refresh
- ▶ Reliability improvement impact on spares solutions
- ▶ How to spare aging systems
- ▶ Long lead-time versus short lead-time buys
- ▶ PBL incentive schemes with complex metrics
- ▶ Other future program changes such as Ao targets, operating hours and basing

STOP struggling! Tempo solves these problems quickly, easily, automatically.

The steady state fiction underlying all current spares optimization methods worked reasonably well before the extensive use of COTS components starting in the late 1990’s. Since then, market-driven technological obsolescence has become a common headache for inventory managers and planners. Tempo is the first optimization tool to deal directly and correctly with part obsolescence and a host of related problems – automatically.

Steady State Spares Optimization

Inventory planning is a complex discipline demanding the most sophisticated algorithms to insure that the right inventory is acquired and located at the right place. Tempo advances the state of spares optimization by incorporating the economic impact of time on inventory decisions. The most important examples are decisions required in the phase-in or run-down of fleets but there are many other less obvious cases where traditional steady-state optimization tools provide the wrong answer.

All current spares optimization tools assume long-term, steady-state scenarios, which remain unchanged forever. In the real world, the situation always changes as basing, activity levels, support arrangements, even system configuration, evolve. Steady-state tools can

only chain together a sequence of runs, each one unaware of the others and assumed to be a permanent situation. Nor does simulation offer a solution, being limited to evaluation of solutions determined by analysis.

For complex long-term Performance Based Logistic contracts, these real word changes and random variations create significant performance and financial risk that current tools simply cannot address leading to high risk margins and pricing.

Before Tempo, the only way to approach this problem was to conduct multiple runs. Each run would build an iterative quasi-optimized solution for that stage based on the results of the last run. This repetitive approach is laborious, time-consuming and prone to error. Tempo changes the game by addressing directly – and correctly – the complex impact of time.



What Tempo does

Tempo, although based on the modern version of the VARI-METRIC calculating engine, takes account of both predictable changes in hardware and foreseeable changes in operating and support scenarios. Unit price changes, reliability improvement, configuration changes, lead time improvements, basing changes, operating Tempo and even Ao target changes are all foreseen and accounted for. For the first time, the impact of technological obsolescence and the remaining useful life of parts can be applied to directly

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influence future spares purchasing decisions and minimize waste from buying excessive parts that will be retired early. Tempo creates a calendar of all these changes and automatically manages them to reduce time, labour and errors.



“The longer the program life and the shorter the mean technological life, the bigger the difference between a steady state solution and the Tempo solution.”

Why Tempo is different

Tempo incorporates seven important changes to take direct account of time.

- ▶ **Tempo** captures changes to key variables over time including the predictable changes to hardware attributes such as reliability and unit price, and the foreseeable changes to fielding scenarios such as fleet size and usage rates.
- ▶ **Tempo** maintains a complex set of calendars to separate and account for specific points at which inventory solutions are required. These include budget cycles, delivery schedules phase-schedules, reliability growth or wear-out, and Mean Technological Life (MTL) by class or item.
- ▶ **Tempo** considers the specific time period over which a spare part can be used which might be less than the whole system life because the procurement or repair lead times delay the delivery of benefit from a spare; approaching the end of system life has the same effect. Obsolescence or MTL also shortens the usefulness and Return on Investment of a spare.
- ▶ **Tempo** evaluates each increase in stock against hybrid and multiple performance targets to accommodate complex PBL contractual frameworks that could include targets for operational availability, fill rate and delay times.
- ▶ **Tempo** contains an enhanced analytical engine that uses an economic present value ‘bang for buck’ ratio for marginal optimization.
- ▶ **Tempo** relieves the analyst of drudgery and reduces error-prone analytical tasks. Currently, analysts using steady-state models must split scenarios into multiple time-slices, one for each fixed condition, and load results from the last run as inputs to the next. As the volume of change increases, complexity, workload, time and the probability of error grow exponentially and quick-turnaround analysis becomes increasingly problematic.
- ▶ **Tempo** delivers new time-based analytical outputs showing the comparative inventory and performance results through time to support the analyst.

Tempo Benefits

A Tempo-optimized solution is superior to those provided by steady-state tools because it:

- ▶ Explicitly handles inevitable changing scenarios
- ▶ Avoids the errors implicit in steady-state models including over-stocking of life-limited and long-lead time parts
- ▶ Maximizes return on investment and avoids waste due to market-driven obsolescence
- ▶ Optimizes timing of procurement to match fleet build-up, re-basing and run-down for lowest Life Cycle Inventory Cost
- ▶ Deals explicitly with time, eliminating the drudgery of hand-made multi-period calculations

Tempo is ideal for:

- ▶ Budget trade-offs between expensive, long-lead time parts that will be critical at some stage and inexpensive short lead time items that might provide immediate performance. Tempo determines the proper mix by comparing the cost and return corrected to Net Present Value.
- ▶ Complex, multi-period Performance Based Logistics environments with multiple metrics and KPIs. Tempo can optimize in a complex mix of metrics by comparing the incentive reward against the cost.
- ▶ Obsolescence and Aging Systems where technology insertion, mid-life upgrades and late-life spares requirements are inevitable. Tempo recognizes the differences between the useful life of a part and that of the system in which it is fitted, and calculates their respective value.
- ▶ Simultaneous new-fleet build-up and old-fleet retirement scenarios, characterized by changing Ao targets, operating tempos and basing. Tempo simplifies inputs and provides all solutions in a single run.
- ▶ Expeditionary deployments, training exercises and other time-bound excursions requiring spares solutions integrated with long-term, normal deployment solutions.

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Tempo™

TFD Engine for Multi-Period Optimization



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