Delivering Better Availability, and Lower Cost

Delivering Better Availability is the theme of SupportNET 22. That laudable objective has been constant for decades so why is it still a vital target as CDLS strives to deliver Support Advantage? Why, 40+ years after the creation of ILS and Logistic Support Analysis, have we failed to solve the problem despite it being the focus of operational, engineering, logistic and commercial effort. Perhaps we must revisit the basics of Availability and develop new affordable, effective ways to measure and drive it upwards while also bearing down on cost.

Ultimately, commanders require sufficient **Availability** to meet their task. Simply, Operational Availability or A_0 is the ratio of Uptime (when the system is ready for required operational use) to the sum of Uptime plus Downtime (when the system is not ready for tasking). Uptime is primarily affected by Mission Reliability, the Mean Time between Arisings that deny the system its utility. Downtime encompasses time for preventative maintenance including Condition-Based Monitoring, corrective Mean Time to Repair, and Admin & Logistic Delay Time awaiting the necessary resources. Downtime also covers dealing with non-mission critical Logistic Reliability faults.

Better Availability is delivered by improving reliability and by reducing downtime. Improving in-service reliability falls, often expensively, to equipment designers. TFDE focuses on reducing Downtime by addressing the full engineering, product support and logistics spectrum. For us, **Supportability** is *the responsiveness to unreliability that prevents a system's use* or *'when there's a problem on a system, how quickly can its utility be restored'*. Some call this Resilience but, for many years, that term has become synonymous with large spare parts inventory. While more stock can mitigate some impacts, it does not make a system more available; many other factors also apply.

TFDE have developed a technique to build a Digital Shadow of a system using data already available from MOD sources such as the existing Aircraft Data Sets, Land vehicle OCTADs and maritime equivalents. There is no burden imposed on FLCs nor reliance upon contractors for basic data; adequate price data is available from MOD sources and common benchmarks. MOD already owns the necessary V&V'd software tools. TFDE models show how the operating patterns (missions, flying hours, miles, days, cycles, etc) drive a series of scheduled and unscheduled maintenance events at a frequency for each location which all take time, use resources, and incur delays. These events define in detail system Downtime and cost. By analysis, we identify events with the greatest impact and evaluate the benefits from proposed remedial action. After the initial build, DTs can maintain the Digital Shadow for regular re-analysis through-life within existing resources using just 1 person. The summation process reduces Supportability to a single metric for a system that can be used at senior level to drive continuous improvement.

TFDE have found it **easier, quicker and cheaper to improve poor availability of existing systems by addressing Supportability across all its elements rather than by focusing on expensive reliability improvement and more resources.** We have applied our method to deliver substantial proven benefits on systems of varied technologies in all domains, at all stages of their life cycle, and in multiple countries. The technique can be implemented now.

- In 2010, potential identified for 39% more RAF Chinook Fg Hrs – fleet increased from 12,500 to 18,500 FH pa.
- In 2012, potential measures identified to improve RAF Merlin Mk3/3A availability by 32% with fewer aircraft – flying hours increased from 60% of AFT to 100% within 6 months.
- In 2017 working jointly with DE&S under TDI auspices, a Proof-of-Concept study identified 24% reduction in Puma HC1 annual support costs. IPTL endorsed the measures as achievable but were dropped for Puma HC2 upgrade. The method was openly published on the TDI website. We have moved forward since then.
- 2.4% reduction identified in annual support costs for Swedish Tgb 14/15 fleet (Mercedes G-Wagon) achieving same task with 20%fewer vehicles. Most importantly, identified 11% reduction in Forward maintenance time that was diverting soldiers from essential military training.
- Finnish Defence Forces Logistics Command used the approach to assess all contenders in the competition to replace their F18 fighter fleet including Lockheed-Martin F35, Boeing Super F18, Eurofighter Typhoon, Dassault Rafale and Saab Gripen, and their sub-contractors. In competition, all the Bidders provided relevant price data. This precedent is very likely to be repeated for the UK New Medium Helicopter programme.

Initial data capture, building a Digital Shadow for Supportability analysis will typically take about 3 months and cost less than £75K per DT. With TFDE training, knowledge transfer and EDP support, the technique could be rolled out to all 147 DE&S DTs within 2 years. Benefits will be at least 10 times the cost within the budget period and much more through-life; one less Merlin main rotor blade would save £250K, one major avionic, LRU £500K.

Substantial quick wins are urgent to sustain the credibility and momentum of Defence Support Transformation. Through-life costs savings and availability improvements of this magnitude are hard to match in any other way. Sometimes, innovation does not need new Technology but the novel reapplication of well-proven Techniques.