

## ***EXLOG21 Technology Summary***

EXLOG21 is an intelligent decision aid that will assist logistics and supply personnel achieve their mission of generating focused and tailored logistics support to the expeditionary forces within the Area of Operations (AO). Currently under development, EXLOG21 provides a computer model for estimating component failure of self-propelled engineering equipment and motor transport assets, and preferred methods of resupply. Component failure is estimated using Bayesian probabilistic networks, and cause-and-effect are modeled using game theoretic techniques. This innovative, hybrid approach combines already statistically known info (how often one part fails) to produce statistics on how often an assembly (group of parts used to perform a particular function) will fail as well as build predictions. Ultimately, predictive estimates can be made on how often particular vehicles will fail. By using these statistics, one could in turn estimate the Class IX parts block needed, and which vehicles would be most likely to fail. Efficient scheduling heuristics are then used to derive the best methods of resupply. Throughout the process, pro-active intelligent agents deliver focused advice --- in terms of onboard sparing and pre-positioned replenishments, predictive failure analysis for corrective maintenance actions, and real-time reevaluation and adjustment of logistics planning packages --- to the logistics and supply personnel. EXLOG21 can interface with existing on-board vehicle diagnostics systems, as well as external data communication uplinks for distributed knowledge sharing.

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