The following technical paper abstract information was recently submitted in connection with session DOD107,Inspection/Test

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Paper Title: Expeditionary Oil Testing and Evaluation
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Abstract: "The UH-60 Black Hawk returned to base at 1530 on a Friday afternoon with an active engine chip light on final approach. On any day other than Friday, dealing with this maintenance issue would be routine. Because the US Army tracks pacing items such as helicopters by an hourly readiness status, having a grounded aircraft over a 4 day weekend is not acceptable."

Short of tearing down an engine, maintenance teams have historically used oil evaluation for determining whether a component truly has problems. Unfortunately, the turnaround time for processing an aviation sample is 24 hours, and oil evaluation labs are typically closed on weekends. If the sample comes back bad on Tuesday, the unit will have eaten 96 hours of down time. The maintenance team will need to do an engine swap and run the aircraft up to verify readiness. It's going to be yet another long weekend at the UH-60 hanger for the aircraft mechanics.

What if it were possible to do oil evaluation in the field rather than sending samples to the lab? Conventional lab equipment is too big, unwieldy and expensive for field deployment. However, Spectro Scientific has developed a rugged, portable expeditionary fluid analysis system that gives users in the field the ability to perform comprehensive, mobile lubricant sampling. This battery-powered, 33 pound device enables complete lubricant testing to support informed maintenance decisions. The Q5800 packages a solvent free kinematic viscometer, an infrared spectrometer, a filtration particle counter, and an XRF spectrometer. An operator with two hours of training can test a sample in 7 minutes.

Oil testing is only one aspect of oil analysis. Equally important is the analysis and interpretation of the data generated by the lab's equipment. In a conventional oil lab, experienced analysts interpret the data. Prescient is a software intelligent agent for analyzing the results obtained from performing lab tests on oil samples. Like an experienced analyst, Prescient uses a two step evaluation process. The first is statistical analysis to flag contaminants that exceed the limits established through analysis of real-world data. Prescient then uses its expert knowledge base to interpret the contaminant patterns discovered through lab testing and statistical analysis. In less than a minute, Prescient diagnoses and recommends corrective actions and also explains the reasons for its assessment. Prescient results can be viewed in a web browser or via an Android tablet application.

"The UH-60 Black Hawk returned to base at 1530 on Friday with an active engine chip light on final approach. The maintenance staff pulled an oil sample and processed it using their Q5800 lab and Prescient. About 8 minutes later, the team reviewed test results on an Android tablet. Prescient's only finding: no evidence of unusual wear, though the engine's oil additives are depleted. After an oil

change – and replacement of an apparently faulty chip light – the team ran up the engine and then left for the weekend."