Historically, analysts, especially all-source analysts, have relied on data, research, and analysis methods that they learned in the disciplines of their backgrounds. This does not transfer well to all types of intelligence problems, nor is it conducive to replication and validity – critical elements that inform accuracy. Attempts have been made to create structured methods, but oftentimes the results are structure techniques or other heuristics because they didn’t address structuring data as a first principle. With the Analysis Engine, we begin by structuring data to provide the framework for structured methods. With structured methods, we are able to test the reliability and validity of an analytic method – supporting the development of analytic expertise and accuracy of analysis.

**Structuring Data and Analytic Methods to Increase Reliability, Validity, and Expertise**

- **Data structure** is driven by categorization based on empirical research.
- **Framework:** Built on basic research results of human problem solving issues; answers questions about how we can deter, delay, confuse, or otherwise undermine individual problem solving/decision-making activities.
- **Modularity:** Each finding is self-contained. A successful assessment uses as many or as few findings as applicable.
- **Versatility:** Findings can be derived from classified or open source data.

**Analysis Engine:**

- **Usability:** Evidence-based methodology provides all the necessary information for supporting findings and data collection questions for the analyst; no specialized experience in social sciences is necessary.
- **Applicability:** Basic research at foundation of methodology is applicable to human problem solving in a number of complex environments.
- **Decision Support:** Analysis Engine aids the user in determining the significance of findings, storing supporting source documents, and creating finished reports.

**The Analysis Engine is designed to:**

- Provide analysts with domain knowledge, supported by empirical data, rather than relying on the analyst’s existing domain background and experience.
- Address data gaps and increase analyst confidence in findings.
- Support development of collection requirements.
- Provide methods for weighing findings and informing mission planning.
- Help analysts handle the complexity of human behavior-based problems.

**Structured Methods with Flexibility**

The Analysis Engine takes advantage of cloud technology to allow quick navigation, storage of and access to source documents and other research.

- It can be used on a number of platforms.
- It feeds results into report templates to help guide analyst’s writing and produce documents with consistent organization.
- Design facilitates collaboration among a team of analysts.

**Developmental Research Approach**

Employing a team comprised of multi-disciplinary SMEs. Selection based on context deconstruction (social and behavioral sciences, computer network operations specialists, human factors engineers). Rigorous research process that included:

- Literature and extant data review.
- Site visits and interviews.
- Subject matter expert interviews.
- Reliability and validity testing.

Foundational research included:

- Triangulated literature review.
- Interpretational Analysis on research findings to categorize families of constructs related to certain vulnerabilities.
- Performed Cognitive Task Analysis to determine best method of presentation of information.
- Conducted reliability, validity, and usability studies.
- Revised as indicated.

**Capitalizing on Research in Relevant Disciplines to Increase Rigor, Identify Gaps**

- Supports the creation of repeatable methods, yielding higher reliability, performance improvement, and consistency in training.
- Addresses data gaps.
- Drives the analyst to examine collection and collection strategies.
- Increases confidence in assessments.
- Helps mitigate cognitive bias.
- Minimizes Type 1 (rejecting the null hypothesis when it is actually true) and Type 2 (accepting the null hypothesis when it should be rejected) errors.
- Reduces confirmation bias.
- Supports accurate data collection; can be used to drive collection requirements.
- Fosters the development of conceptual frameworks that accurately exploit decades of social science research rather than personal experience or conjecture.

**Next Steps**

- Utilize machine learning methods to update research findings.
- Test transfer of structure to other problem sets.
- Explore interoperability with other LAS tools.
- Examine and test various types of reporting templates.