# Air Force SBIR/STTR

# Innovation

**SBIR Topic Number:**
AF04-087

**SBIR Title:**
Expert Intelligent Match of Requirements and Solutions

**Contract Number:**
FA8750-05-C-0052

**SBIR Company Name:**
Stottler Henke Associates, Inc., San Mateo, CA

**Technical Project Office:**
AFRL Information Directorate, Rome, NY

This Air Force SBIR/STTR Innovation Story is an example of Air Force supported SBIR/STTR technology that met topic requirements and has outstanding potential for Air Force and DoD.
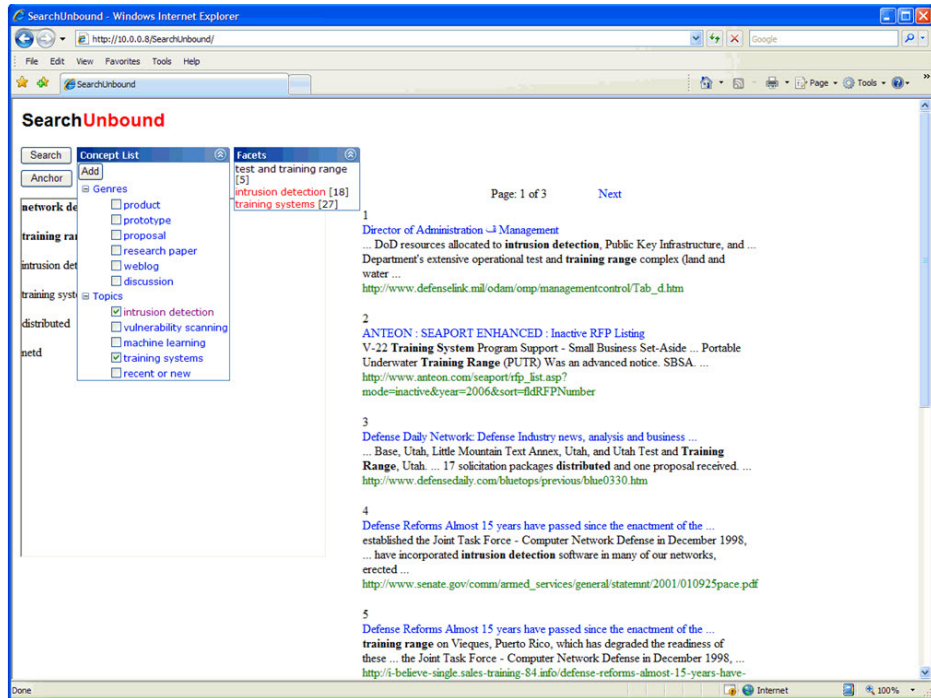


**Users and Communities of Interest can easily define new concepts that improve search**

# Expert Intelligent Match of Requirements and Solutions

- The Air Force needs a computer-based means of comparing Information Warfare (IW) requirements to the database collection of relevant solutions

- Stottler Henke developed an innovative software system that assists in the matching of documented requirements with existing or proposed solutions as described in white papers, proposals, and briefings

- The system increases practical search precision by improving the ability of users to identify documents of high utility

- This technology can act as a force multiplier for program managers and researchers involved in the identification of potential solutions for requirements originally identified in the course of a mission needs analysis

20090424

**A**

## Air Force Requirement

The Information Warfare Solution Analysis Integrated Product Team (IWSAIPT) database uses a set of multifaceted Information Warfare (IW) requirements that cut across several distinct IW areas (e.g., Counterintelligence, Computer Network Attack, Psychological Operations). Complex IW solutions that number in the hundreds are housed within a database. Matching a requirement to solutions can be a daunting, time-consuming affair when done by human review.

A computer-based means of comparing IW requirements to the database collection of relevant solutions is needed. Simple, literal, word-based searches are inadequate for this task because the keywords used may not be present in every IW solution document.

## SBIR Technology

Stottler Henke developed a software system that assists in the matching of documented requirements with existing or proposed solutions as described in white papers, proposals, briefings, etc. This research centers on the development of new semantic search techniques that can be built-up and maintained efficiently by end users. More specifically, the system has a "glassbox" approach to semantic modeling that allows groups of users to (re)define key concepts in an ad hoc exploratory fashion that leverages probabilistic query generation to improve search recall over standard interactive search.

The system interface introduces the "SearchUnbound concept" in which users define their search context within a large multi-purpose box. Within this box, users may provide search terms, semantic concepts, and even text fragments (e.g., bibliography entries). SearchUnbound then exploits the underlying Aware™ search engine to generate qualitatively different queries in an automated effort to identify information relevant to the user request. The user can then sort through these results using a unique faceted browsing system.

## Potential Air Force Application

The technology can act as a force multiplier for program managers and researchers involved in the identification of potential solutions for requirements originally identified in the course of a Mission Needs Analysis (MNA). Given a dynamic set of hundreds of requirements and a similar number of complex solutions – each potentially spanning several requirements in multiple IW areas – the task of matching requirements to potential solutions is quite challenging. More broadly, Aware can be used to improve online research effectiveness by allowing users to cast a wider net for solutions and then much more rapidly determine if the solutions match their specific needs.
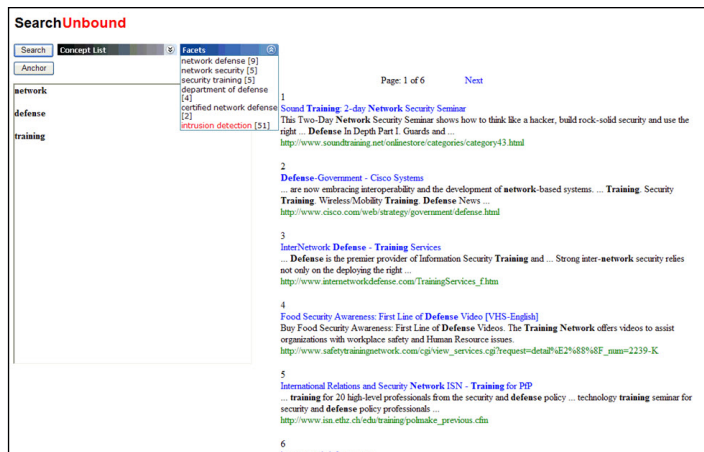


**Users can quickly see how their search terms appear in subsets of the search results.**

The final product of this effort has broad applicability to information discovery and analysis tasks encountered by a broad range of individuals as well as communities of interest. Finally, the progress made in this SBIR Phase II has set the stage for both an innovative Wiki based search system as well as a novel agile information extraction capability. Stottler Henke is working with the Air Force Information Operations Center (AFIOC) and other organizations to identify prospective transition opportunities.

## Company Impact

This SBIR project has allowed Stottler Henke to transition an existing but fairly mundane Web search product into an innovative targeted solution that achieves the benefits of semantic search without the overhead costs associated with traditional approaches.

Founded in 1988, Stottler Henke applies artificial intelligence and other advanced software technologies to solve problems that defy solution using traditional approaches.

# SBIR/STTR

**U.S. AIR FORCE**

Air Force SBIR Program
AFRL/XP
1864 4th Street
Wright-Patterson AFB OH 45433

AF SBIR/STTR Program Manager: Augustine Vu
Website: www.sbirsttrmall.com
Comm: (800) 222-0336
Fax: (937) 255-2219
e-mail: afrl.xppn.dl.sbir.hq@wpafb.af.mil

**AFRL**
THE AIR FORCE RESEARCH LABORATORY
LEAD | DISCOVER | DEVELOP | DELIVER