Multi sensor resource manager that provides emplacement, search planning and resource coordination from force to unit level.
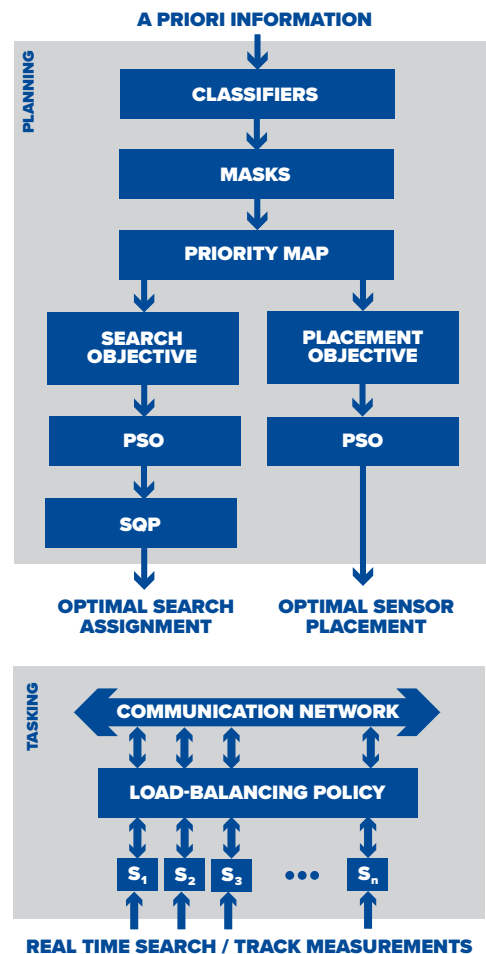

OVERVIEW

Military (Army, Navy, Air Force), State Department (embassies), Municipality (vehicle traffic management), Airport (Air Traffic Control), and Weather (storm tracking) managers have a need to maximize sensor-based threat detection to determine courses of action. This need includes full-area sensor resource coordination and re-allocation to reduce utilization and provide the best opportunity to identify threats. Stadium is a powerful resource manager software tool that serves as a high-speed, accurate planner and tasker that provides four key sensor actions: Placement, Search Pattern Planning, Load Spreading and Dynamic Real-Time Updating.

TECHNICAL

Stadium achieves three primary objectives to optimize system-level performance of heterogeneous sensor types:

1 Computes optimal emplacement or operating areas in order to best achieve early detection, discrimination, and fire control quality timelines.

2 Computes optimal search sectors for emplaced sensors in order to maximize coverages of the highest priority spatial volumes.

3 Tasks sensors to balance duty cycles among multiple sensors.

Stadium performs these objectives with efficiencies that enable dynamic adaptation during battle. For emplacement/operating areas and search sector determination, Stadium exploits a prioritized mapping of the space over an operating area, spatial masks that capture each sensor's capabilities and threat intelligence, and a rapid binary classifier technique that optimizes high priority space. For sensor tasking, innovative algorithms ensure each sensor performs the most productive tasks while minimizing over-loading. Once battle begins, search sectors dynamically adapt to observed enemy patterns while maintaining the original intelligence. Search volumes automatically resize, and new sensors can be added in real-time, and degraded sensors accounted for. Coverage metrics allow the user to compare multiple plans.

PLANNING

A PRIORI INFORMATION

CLASSIFIERS

MASKS

PRIORITY MAP

SEARCH OBJECTIVE — PLACEMENT OBJECTIVE

PSO — PSO

SQP

OPTIMAL SEARCH ASSIGNMENT — OPTIMAL SENSOR PLACEMENT

TASKING

COMMUNICATION NETWORK

LOAD-BALANCING POLICY

S_1 S_2 S_3 ••• S_n

REAL TIME SEARCH / TRACK MEASUREMENTS

Stadium is a rapid, dynamic sensor planner and tasker that optimizes emplacement and operating areas, search sectors, and sensor tasking for one or more heterogeneous sensor types. Stadium Benefits include:

- *Fast and accurate – optimizes emplacement and search in minutes and tasks in real-time.*

- *Automated sensor tasking that evenly distributes tasks among multiple sensors, thereby reducing overloading leading to leaked threats.*

- *Dynamically adapts during the battle, enabling maintenance of optimal search and tasking at all times.*

- *Web-based GUI (laptop, smart phone, table, etc.) irrespective of where Stadium is deployed, provides user the ability to assess metrics in a distributed fashion.*

SECURITY / OPERATION

Stadium security features include role-based login, application authentication and message encryption. Further, the Stadium Application Programmer's Interface (API) operates inside a container isolating the API from the rest of the system as an extra layer of security, while ensuring the software does not conflict with other required system dependencies.

Arcarithm provides required training on how to operate Stadium, and how to understand the output, with onsite training available. A training manual is provided with each Stadium license, and Arcarithm provides call center support as well.

SYSTEM REQUIREMENTS

CPU	Intel Core i3 or AMD Athlon 6 (or better)
Memory (RAM)	64-bit System: 16GB minimum 32-bit System: 8GB minimum
Operating Systems	Ubuntu 16.04 or higher RedHat 7
Graphics Card	Standard
Minimum Screen Resolution	1280 x 720 pixels
Storage	256GB

Stadium is delivered via direct digital download or via a set of DVDs.

PRODUCT DETAILS

Manufacturer	Arcarithm
Product Name	Stadium™
Version	2019
Manufacturer Part Number	A2019D
Product Type	Single License
Platform	Linux
Shipping Method	Digital delivery (or DVDs)

ABOUT STADIUM & ARCARITHM

Unlike current resource managers that are limited when utilization is high, Stadium is able to adaptively update the utility function used for optimization based on real-time data. This provides the user with the most accurate and up-to-date picture of the scenario, and maximizes the probability of successfully covering all threats.

Arcarithm delivers a depth of understanding and operational maturity beyond the capability of most companies. Our experience with every aspect of algorithm design, training, deployment and evaluation allows Arcarithm to produce quality products quickly and effectively, with the highest levels of reliability and accessibility. Arcarithm has been developing and providing services to the U.S. Military for more than seven years.

ARCARITHM

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