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Application of CID JASMINE in Decision Support for Command and Control

The main idea of CID JASMINE is to provide effective solution that will satisfy all requirements for CID (Combat Identification) Server both in national and multinational environment. To make it possible, the topic of CID has been deeply analyzed. Also existing CID solutions and capabilities have been studied. After that, advanced programming techniques and patterns have been applied to achieve goal.

D eveloping solutions for identification of objects on battlefield is crucial to minimize casualties and improve performance of military forces. In brief, definition of CID is as follows: Combat Identification (CID) is the process of attaining an accurate characterization of entities in a combatant's area of responsibility to the extent that high-confidence, real-time application of tactical options and weapon resources can occur. The CID Server is one of CID solutions that improve combat identification process by collecting CID data from different sources and providing it on demand to consumers.

TELDAT, an innovative company from Poland, has started development of its own CID Server product – CID JASMINE. The main goal of this article is to present concept of CID JASMINE and to show its main features according to existing CID and CID Server solutions.

The CID JASMINE product is based on existing components of JASMINE System, both software and hardware. As a hardware component CID JASMINE uses Server Box, which is an efficient and powerful military Server station. Dedicated CID JASMINE software will work on Microsoft Windows 2008 Server operating system. All software elements are based on the SOA (Service-Oriented Architecture) and build upon Message

Bus. Position Location Information (PLI) will be received using NFFI IP1, IP2 (NATO Friendly Force Information, Interface Profile 1 and 2) and Link 16. It will be provided using Link 16 and NFFI SIP 3 (Service Interoperability Profile 3). CID Server capabilities will be successively extended to all available CID solutions, like VMF (Variable Message Format) and BRM (Battlefield Replication Mechanism). CID JASMINE will also provide operational picture and expose it using NVG (NATO Vector Graphics) protocol and web client application. This will enable to use CID information created by Server directly from Web Browser user interface.

Therefore CID JASMINE will not only be a set of functional services but it will also provide operational picture on tactical level. The architecture and implementation of CID JASMINE will be focused on quality parameters of product. In all cases, the goal for CID is to provide the level of identification that is necessary for Weapon Delivery Assets to make correct decisions.

CONCEPT AND IMPLEMENTATION

CID JASMINE is an implementation of the concept of CID Server from TELDAT Company. CID JASMINE is a part of JASMINE System.

According to NNEC (NATO Network Enabled Capability) concept elements of JASMINE System was designed to be able to work at all military levels, starting from the highest to the brigade level or even at the mobile battlefield unit. The system consists of hardware and software. The main advantage of the JASMINE System is its high flexibility and easy way of configuration, which shortens the time needed for achieving operational condition. JASMINE System

equipment and its interoperability have been tested during the national and international exercises, where wide range of provided services were presented.

Position Location Information (PLI) information is received using:
- NFFI IP1, IP2 – land tracks is send to CID JASMINE using UDP or TCP protocol
- Link 16 – messages containing information about paths of different types of objects can be provided to CID JASMINE. Some of the possible messages are J3.5, J3.2

The information is provided for consumers using:
- Link 16 – there are dedicated Link 16 messages that enable to provide information on demand, according to given area
- NFFI SIP 3 – based on Web Services this protocol allows to pool for tracks information for specified area

PERFORMANCE AND RELIABILITY

The quality of CID Server depends mainly on the two factors:
- quality of data services, i.e. the services that are responsible for storing and providing data
- quality of internal communication infrastructure

This two elements will be supported in CID JASMINE in the following way:
- data store will be based on relational database, however it will be supported with object oriented database and additional caching mechanism. On this area TELDAT engineers has broad experience gained during developing data services for tactical command systems (BMS JASMINE)
- communication and messaging infrastructure will be provided by Message Bus, the TELDAT middleware solution that provide robust, scalable and reliable infrastructure for interconnecting system services

Provided mechanisms will guarantee proper quality:
- the performance of system will be based on scalability of data services and Message Bus. It will be possible to add new physical servers that will work as cluster for CID JASMINE during mission, without interrupting the server
- reliability will be assured by reliable-messaging that is part of TELDAT Message Bus solution

SUMMARY

Combat Identification is a basic capability for modern forces. CID Server is one of the solutions that extend CID capabilities and in some scenarios it is essential. The importance of CID Server has been noticed by NATO nations and also by NATO itself. First solutions have been implemented and STANAG development has been started.

CID JASMINE is an implementation of CID Server from TELDAT company. The main advantages of CID JASMINE will be:
- interoperability – it supports all required interfaces and protocols
- performance and quality – based on the proven components of JASMINE System and SOA architecture it provides powerful platform for CID data exchange

CID JASMINE is a network centric product and an element of NNEC compliant architecture of JASMINE System. It consists of hardware and software elements and therefore it is a complete product ready to use on the field, in particular in NATO operations. ■

CID Server capabilities will be successively extended to all available CID solutions (like VMF and BRM). Link 16 communication will be implemented over JREAP C protocol.

CID JASMINE provides also operational picture and exposes it using NVG protocol and Web Client application. This enables to use CID information created by Server directly from Web Browser user interface. Therefore CID JASMINE is not only a set of functional services but it also provides operational picture on tactical level.

The architecture and implementation of CID JASMINE is focused on quality parameters of product, in particular:
- performance – server process a lot of real time data
- scalability – it is possible to scale CID JASMINE to multiple computer stations. This is achieved using MessageBus infrastructure and SOA architecture
- reliability – Server Box is a military server that satisfies all quality and reliability parameters for military equipment. Also development of CID JASMINE software has been focused on reliability

CID JASMINE implements NATO STANAG which provides a standard for a service that will allow maintenance of a database that contains all friendly positions that have been reported by forces by means of Force Tracking Systems (FTS), C2 systems with the capability of extracting own position information and other identification systems, including Combat Identification (ID) systems and the forwarding of the positional information to weapon delivery assets and other attack-associated units such as forward/tactical air controllers, fire support cells, and command and control nodes by means Link 16 and other RF based information exchange networks.

CID JASMINE interfaces (draft of STANAG):
- NATO Friendly Force Information (NFFI) Interface Profile 1 (IP1)
- Link 16 J-series messages
- HTTP 1.1 as defined by the World Wide Web Consortium (W3C)
- NATO Friendly Force Information (NFFI) Interface Profile 2 (IP2)
- NFFI Service Interoperability Profile 3 (SIP3) web services

- NFFI-Message Text Format (NFFI-MTF)
- Draft STANAG 5519, Tactical Data Exchange – Variable Message Format (VMF) K-series messages
- Other tactical data links
- Serial interface for specific CID systems

CID Server uses various protocols and each of them use its own identifiers for battlefield objects. CID JASMINE will solve this issue in the following way:
- for all types of information received by CID JASMINE the original information will be preserved
- if it will be necessary to map information between different protocols and it will be impossible to translate identifiers, then new identifiers will be generated according to configuration
- once created mappings for identifiers will be stored for future use, to guarantee that each piece of information will be mapped in one way
- system will provide user interface for configuring and manually manipulating all mappings

Presented above strategy will be used not only for identifiers mappings but for all parameters of battlefield objects that require mappings.