SINOVIA

An open approach for heterogeneous ISR systems inter-operability

Pr C. Moreno, Dr S. Belot

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<thead>
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<td>See also ADM001676, UAV 2002 Conference &amp; Exhibition., The original document contains color images.</td>
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**Form Approved**
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*Standard Form 298 (Rev. 8-98)*
Prescribed by ANSI Std Z39-18
SINOVIA

- An innovative company
  - a great R&D experience around the intelligent control

- Our business
  - Inter-operability and control of heterogeneous infrastructures

- Our technology « Plug & Net »
  - a hardware and software modular approach
  - a validated technology in hard environments

Off-shore, nuclear, Fire security, avionics, Industrial process, embedded systems
Inter-operability and intelligent control

«As we look at the trends in hardware, software, communications and other base technologies in control systems, a clear picture of an Open Control System (OCS) begins to emerge. Users will choose best-of-breed application modules, again vendor-independent but interoperable, to build world-class control systems for competitive advantage.»

Elmar Husmann, PricewaterhouseCoopers

«When the landscape of data sources changes constantly — or sources are not precisely definable — no extract-and-load procedure can help. In this environment, extracting meaningful business information from raw business or technical data is a very inflexible and complex procedure.»

Dan Miklovic, Gartner Group

«The real impact of all this networking and smart [sensing and control] devices is that the amount of information coming up from the floor [into the enterprise] will increase by between 10 and 100 times.»

Eric Byres, British Columbia Institute of Technology
Interoperability

- Why
  - multiple heterogeneous systems
  - the need of interactions between these systems

- At a language level
  - A common syntaxe
  - A common semantic
    - it supposes minimum level of common functionalities

- At a functional level
  - multiple distributed services
  - services act together in order to reach a common goal
Interoperability & Components

- A component is
  - an autonomous entity
  - with an interface
  - able to interact each others
  - reusable and configurable

- An application is
  - a composition of components
  - a combination of capacities (functional modules)
    - the whole is more than the addition of the parts
    - leads to complex behaviors

- Evolving toward new applications
  - replacing components
  - adding new components
  - testing incrementally
Our Technology : Plug & Net ®

A complete solution for a fully distributed control & Inter-operability
Intelligent control solution for the new generation of inter-operable infrastructures:

- Diversity of equipment
- Proximated intelligence
- Distributed control systems
- Intensive use of new network protocols

«The core technology of the future is the data communications network.»

ARC Roadmaps the Future of Factory Automation, May 2001
Plug & Net

- Hardware and Software components
  - Modular
  - Distributed
  - Configurable
  - Adaptive
  - Reusability

- Hardware
  - Components for heterogeneous network interconnection
    - multi-protocols
    - real time

- Software
  - an open framework for components integration based on a « plugging » technology
Interoperable UAV SYSTEM with Plug & Net

Communications

Low control level

High control level

Data Link

C4I
UAV
Distributed Control & Interoperability

Communicating
From Anywhere to Everywhere with Anything

High control level
- Data representation
- Action planning
- Man-machine interactions

Low control level
- Data stream filtering
- Local processing loops
- Real time control
Plug & Net Concept

- Adaptability
  Modular agents

- Scalability
  Distributed agents

- Simplicity
  Plugging concept

Hardware
Agents
Software
Component
A Component is a Software Autonome Entity

A Component is composed by

An integration part (communications)
A GUI (interface)
A fonctionality (process part)
Interoperable UAV SYSTEM
Embedded Architecture
Interoperable UAV SYSTEM
With Plug & Net Agent

- Specific Software
- Specific Hardware
- I/O

API (Virtual DATA)
Real Time OS

Agent
Plug & Net
Agent

Upgrading devices
Communication capabilities

Interconnecting
Heterogeneous Device Protocols

TO DATA LINK
Interoperable UAV SYSTEM with Plug & Net Agent

Distributed hardware agents to transport your data over networks (field-bus, Ethernet, 1553, etc.) from terminals to supervision and control.

- Upgrading Old devices
- Communication capabilities
- Interconnecting Heterogeneous Device Protocols
Interoperable UAV SYSTEM
Ground Segment

Interoperable UCS

P & N AGENT

GUI

C4I

CCI

HCI

Data link

Data Link
Interoperable UAV SYSTEM

Ground Segment

Translator

Interoperability Core UCS

Command and Control Interface

Data Link

P & N AGENT

Interoperable UCS

Data link

CCI

HCI

GUI

GUI

C4I
Interoperable UAV SYSTEM
Ground Segment

Interconnecting Heterogeneous Device Protocols

Data Link

P & N AGENT

DLI API DRIVERS

TRANSLATOR

API DATA PLUGS

Heterogenous component container
Real Time Object OS

Command and Control Interface

GUI

CCI

HCL

STANAG

C4I

Data Link
Translator & Data Plugs

- Data conversion
- Data adaptation
- etc.

Data (Plugs)

Connection

Filter (script)

Plugs Browser
Heterogeneous components container

Components Plugging

Browsing and plugging

Machines
Applications
Components and Plugs

Plugging

Active Connections
Command and Control Interface

- **Supervision**
  - distributed I/O and data: drivers & networks
  - static et dynamics synoptics

- **Medium supervision**
  - alarms manager

- **Complex supervision**
  - process control (real time)
  - specifics representations
The Meta-Component Level

Virtual App

Comp 1.1  Comp 1.2  Comp 1.3  Comp 2.1  Comp 2.2  Comp ...

Meta-component

Meta-component
Interoperable UAV SYSTEM

Ground Segment

With Plug & Net Open Components

- GUI Designer
  Creating the GUIs and Virtualization

- Networks
  Viewing Hardware Agents as Components
  Accessing data and I/O as plugs

- Process Manager
  Interoperability of process control
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