DEFENSE AND SECURITY

COMMAND, CONTROL, COMMUNICATION, COMPUTER AND INTELLIGENCE SYSTEMS

Inferior and security in five continents

Indra company.com

Introduction

Indra’s Defence & Security strategy is focused on being among the leading companies worldwide in providing operational solutions to our customers. Indra is already a world leader in Command, Control, Communication, Computer and Intelligence (C4I) systems, and is committed to leverage its recent investments in Research and Development to continue growing and expanding its presence in this important market.

C4I products are based on industrial components and have been developed using the latest advances in digital technology, telecommunications and data processing. All of this experience is now available for the development of C4I solutions.

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Scope

C4I systems implemented by Indra, designed in accordance with ACCS (NATO) specifications, satisfy all the requirements to constitute modular, scalable, upgradeable, customised Air Defence and Air Operation planning systems with the aim of supporting all the functions associated to the exert of the air sovereignty, being adaptable to any radar/link deployment and to any national defence authorities requirements.

Benefits

Cost savings

- Low power and volume COTS equipment
- Low cost maintenance
- COTS network and base software
- Standard implementation languages and OSs

Safety

- Modern and field proven technologies (several IFC systems world wide)
- Redundancy in processing and communication equipment with automatic reconfiguration
- Powerful system monitoring aids
- Ergonomic HMIs with optimised access to information and alerts

Support services

- Full documentation based on quality military standards (MIL-STD-498)
- Guarantee and logistics: Installation checkout and follow-on field support
- Training in HW/SW maintenance and operational tasks
- Financial assistance

Adaptability

- Scalability in working positions and external links
- Functional modularity and configurability through database
- Open hardware architecture for easy system growing
- Interoperability thanks to standard external data links

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**Introduction**

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**Operational functions**

- **HW/SW monitoring and diagnosis for failure**
- **Automatic flight plan-track correlation**
- **Automatic identification by spatial analysis**
- **2D/3D ECM automatic processing for**
  - Search, beacon and strobe radar data
  - Operational functions
  - Preparation and storage
  - Monitoring and reconfiguration
  - Loss recovery, size evaluation
  - Performance and update and analysis for
  - Multiple-Model kalman filters
  - Deferred control and format validation

**Coordinated centres**
- Adjacent centres
- Navy, AWACS SAM sites

**Evaluation**
- SIMULATION
  - Configurable recording of operational and
  - Real-time simulation of air routes including
  - Multiradar coverage computation at
  - Edition of radar, SAM/SHORAD and aircraft
  - Aircraft, radar and SAM/SHORAD
  - Command extensions and tools
  - Aircraft independent and reconfigurable
  - Detailed air route planning on GIS
  - Air mission planning
  - Non specified altitude/speeds
  - Edition of air routes
  - Characterisation editor
  - Georeferenced cartography

**Simulated**
- **Operator**
  - Coordinated centres
  - Active tracking and control of all tracks
  - Computation of time/distance/fuel and
  - Multisegment (ground-to-ground) A/A and
  - Aircraft manoeuvres and envelopes
  - Aircraft independent and reconfigurable
  - Detailed air route planning on GIS
  - Air mission planning
  - On-line integrated help (CBT)
  - Touch panel communication system
  - Radar control and supervision
  - C4I console

**Real-time**
- **Data**
  - SAFE
  - X-Windows, GIS
  - ADA, C/C++, Java
  - > 99,995 %
  - MTBF > 10 000 hours
  - HW redundancy + shared disks
  - NATO validated compilers
  - Availability
  - Reliability

**Standard**
- **Symbology**
  - Personalised workstation configuration
  - Local map generator

**Defensive & security**
- **Personnel**
  - Intelligence
  - Command support database
  - Multiradar coverage computation at
  - Selectable altitude levels
  - Coverage computation profiles (BBB, BAB, ABA...)

**Operational**
- **Software**
  - Planning Position (PLA)
  - Technical Supervision (STCC)
  - Training Operation Responsible (TOR)
  - Simulation Operator (SIM)
  - Sensor Coordination and Performance

**C4I**
- **Emergency**
  - Planning (ACM)
  - ATO/ACD (IED)

**Design and technical features**
- **Data**
  - Data server (clustered)
  - Link - 11B
  - Atc link
  - Radar
  - Flight plans
  - Air missions
  - Active+passive tracks
  - Situational display (sit)

**Software development**
- **Hardware/software platform**
  - Typical medium size center configuration (Configurable at user request)
  - HMI
  - NATO validated compilers
  - Availability
  - Reliability

**Background**
- **HMI**
  - Large screen video/data projectors
  - Link - 11
  - Link - 11B
  - Atc link
  - Radar
  - Flight plans
  - Air missions
  - Active+passive tracks
  - Situational display (sit)
**Defence and Security**

- **Operational Functions**
  - Preparation and storage of operational data
  - Monitoring and reconfiguration of operational data
  - Incursion size evaluation
  - Passive track update and analysis for data association
  - Control and format validation

- **Support Functions**
  - Configuration and management of operational data
  - Management of information exchange
  - Automatic computing and supervision of short-term approach and collision alerts
  - Automatic threat analysis, ranking and engagement and ID responsibility

**Simulated Scenes**

- Coordinated centres
- Adjacent centres
- Navy, AWACS SAM sites

**Data Link Network Management (DLNM)**

- Surveillance Operator (SO)
- RAP Production (RP)
- Identification (ID)
- Controller (C)
- Weapons Allocator (WA)

**Planning Position (PLA)**

- Command support data base
- Action radii of deployed aircraft at different profiles (BBB, BAB, ABA…)

**Technical Supervision (STCC)**

- Multiradar coverage computation at selectable altitude levels
- Deployment planning on GIS cartography

**Manual Data Entry (MIO)**

- Air operations plan management in EDIATO
- Operations planning decision aids
- Target assignment of standard ACMs and ACOs
- Aircraft independent and reconfigurable structured standard sections
- Aircraft route planning (SEAD, AI, SAR…)

**Operational Multifunction Consoles**

- Georeferenced graphical edition of all NATO georeferenced cartography
- Spatio-temporal operative validation of operations plans
- Time and logistic validation of air mission planning
- Action radii of deployed aircraft at different profiles (BBB, BAB, ABA…)
- Route planning
- Creation and edition of air routes
- Edition of air routes on GIS cartography
- Previsualisation and printing of target assignment
- Automatic insertion of missing (required) data

**C4I Console**

- Detailed air route planning on GIS georeferenced cartography
- Time and logistic validation of air mission planning
- Plan viewer
- Time and logistic validation of air mission planning
- Action radii of deployed aircraft at different profiles (BBB, BAB, ABA…)
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**Flight Plan**

- Flight plan
- Plan viewer
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**Operational Planning (OPS)**

- Flight plan
- Plan viewer
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**Sensor Coordination and Performance**

- Battle management (BBB)
- Battle area management (BAB)
- Air battle management (ABA…)

**ACM console**

- Simulated radar data
- Radar control and supervision
- C4I console

**Planning Position (PLA)**

- Command support data base
- Action radii of deployed aircraft at different profiles (BBB, BAB, ABA…)

**Previsualisation and Printing of Target Assignment**

- Time and logistic validation of air mission planning
- Action radii of deployed aircraft at different profiles (BBB, BAB, ABA…)
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**Engagement and ID Responsibility**

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**Image Processing**

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**Network Traffic Supervision**

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**MTBF**

- > 99,995 %
- MTTR < 30 minutes
- MTBF > 10000 hours

**Hardware Architecture and Controller**

- Multi-threaded process of the complex
- XV (Linux, Solaris, Tru64)
- X-Windows, GIS
- ADA, C/C++, Java

**Operational Software**

- Oracle / PostgreSQL
- Network traffic supervision
- HW redundancy + shared disks
- Multithreaded

**Software Development**

- Large screen video/data projectors
- Link - 11
- Radar
- Flight plans
- Active+passive tracks
- Situational display (sit)

**Data Base**

- ORACLE / PostgreSql
- Network traffic supervision
- HW redundancy + shared disks

**Performance Figures**

- > 99,995 %
- MTTR < 30 minutes
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**Typical Medium Size Center Configuration**

- Configurable at user request
- 40 (no SSB)
- 8
- 500
- 50
- 1200 NM x 1200 NM
**Introduction**

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**Command, Control, Communication, Computer and Intelligence Systems**

In the last 25 years Indra has customized, tested and installed in its final operational environment several IC centers for the Spanish Air Force and major South American countries, the most recent fully compliant with NATO standards (ACCS).

**CONFIGURABLE C4I CENTER**

- Air bases
- CAOC
- Long range PSR + SSR
- Long range 3D PSR
- Mobile radars

- Interceptors
- Deployable C4I Centers
- Civil aviation SSR
- ATC Centers
- Weather Centers

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**Support services**

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