



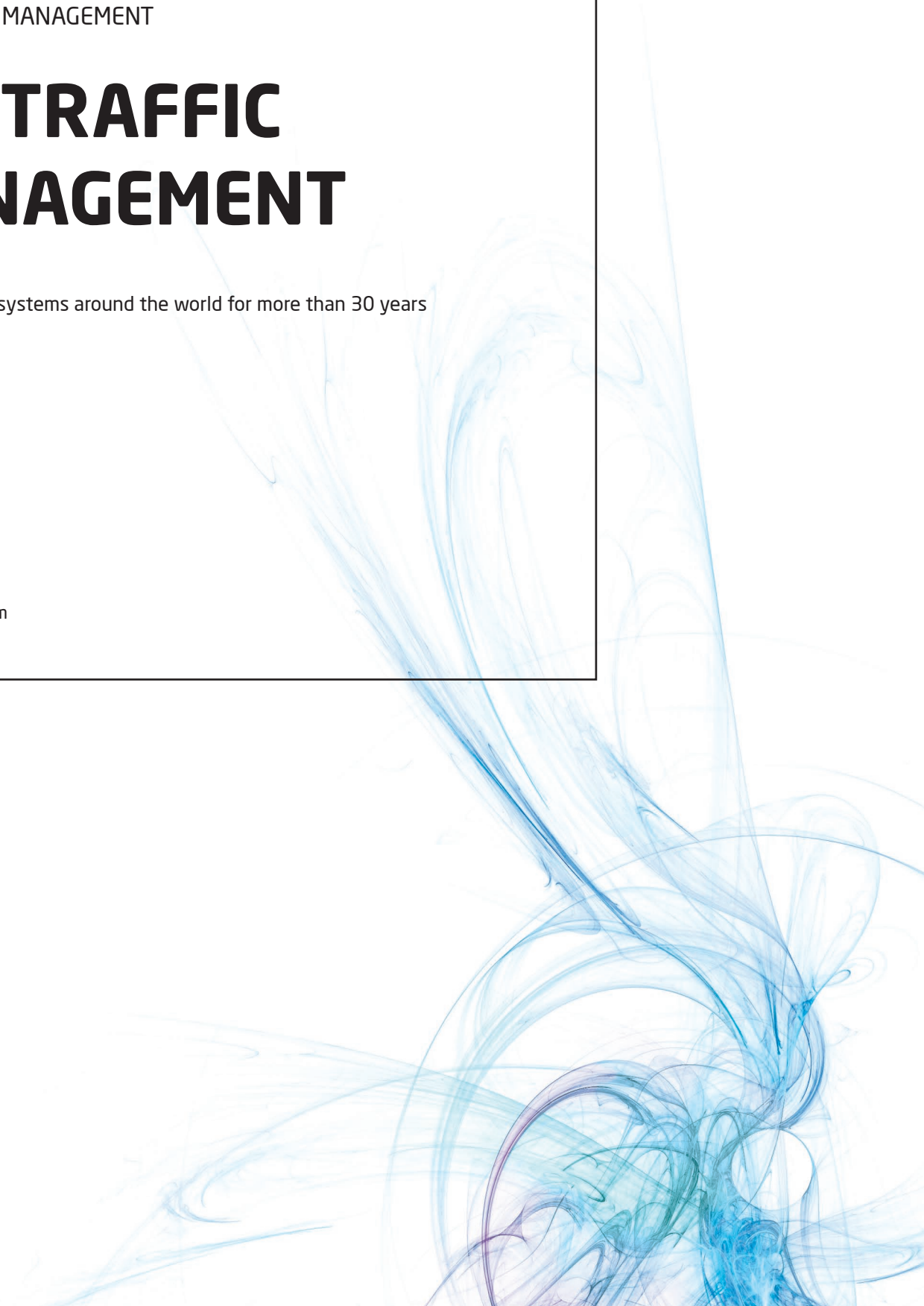
indra

AIR TRAFFIC MANAGEMENT

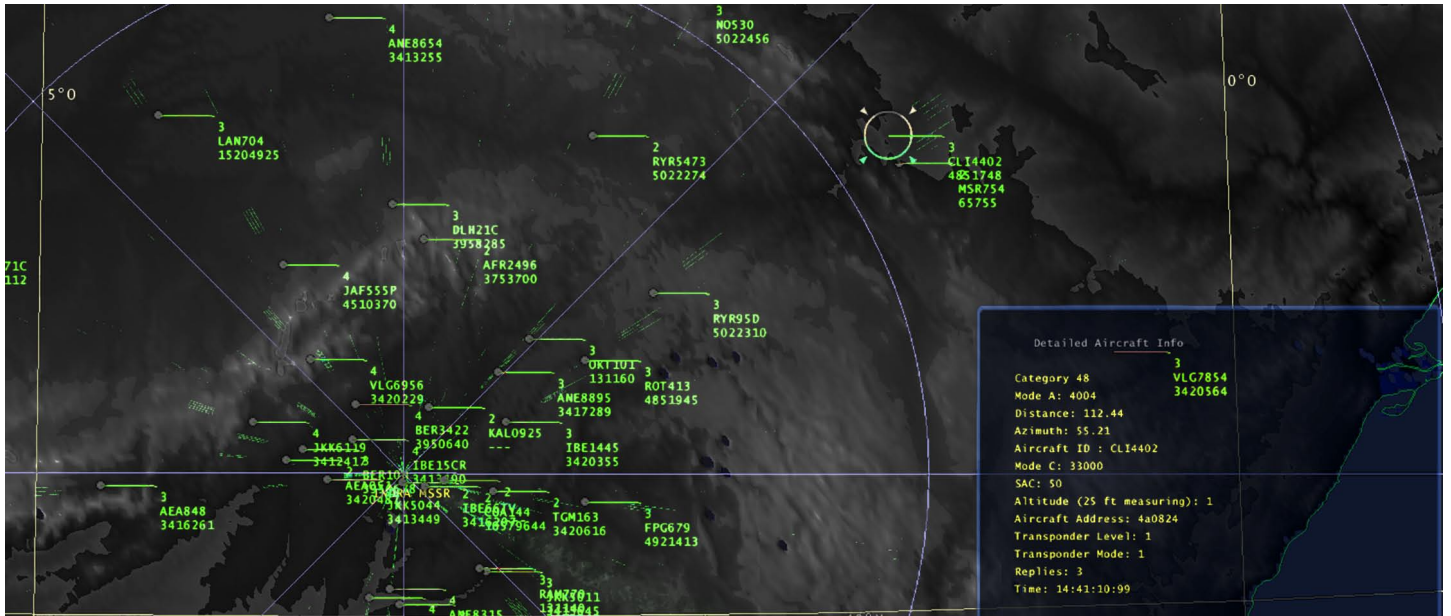
AIR TRAFFIC MANAGEMENT

Supplying ATM systems around the world for more than 30 years

indracompany.com



AIR TRAFFIC MANAGEMENT



Visual Radar 3000 Screen

Global technology and high performance solutions worldwide

Indra Air Traffic Management experience

Indra is a leading company in the international market in Air Traffic Management and control systems. Indra has been supplying Air Traffic Management systems around the world for more than 30 years, having supplied over 1000 Air Traffic Management installations in over 80 countries.

Additionally, Indra is the world leader for Flight Data Processing Systems, having supplied over 40 installations worldwide and has grown to be the leader Air Traffic Management system supplier in Europe for the past two years. In December 2008, Indra supplied Eurocontrol with the new next-generation interoperable Flight Data Processing System at Maastricht Upper Area Control Centre, one of the busiest and most complex en-route Air Traffic Control Centres in Europe.

The implementation of this Flight Data Processing System is a high technological advance directed to improve the safety, capacity, efficiency and environmental performance of Air Traffic management in Europe, and actively contributing to achieve the European's Commission Single European Sky objectives.

Indra has been selected by the most advanced European Air Navigation Service Providers to develop the future Air Traffic Management systems following the Single Sky Concept, through the iTEC Program (Interoperability Through European Collaboration).

This is currently formed by AENA (Spain), DFS (Germany), and NATS (United Kingdom), with Indra as industrial partner.

With the aim to provide our Customers with comprehensive, full and turnkey solutions, Indra product range covers the whole range of Air Traffic Management Systems, including Surveillance, Automation, Communications, Simulators and Nav aids.

Indra's has the in-depth experience and products necessary to undertake any Air Traffic Management program, with both a proven international management approach and a history of responsible program execution.

This experience, together with a solid technology base, permanent innovations and quality in processes and projects are the pillars sustaining Indra leadership position in Air Traffic Management, completely oriented to Customer needs and aimed to provide our Customers with the highest level of service.

Air Traffic Management references



More than 1 000 instalations in over 90 countries

Communication and Navigation

SDC-2000

Digital Voice Communications Control System

The SDC-2000 Digital Voice Communications Control System is specially developed for Civil and Military Air Traffic Control applications, either in real or simulated environments.

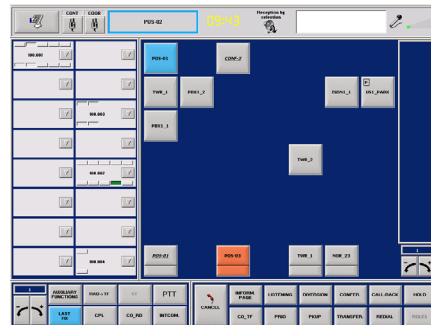
Indra's Voice Communication System architecture is designed to be easily adaptable to the requirements of every Customer in any Air Traffic System environment and efficiently respond to any network change while maintaining constant high network performance.



SDC-2000 Screen

This adaptability and efficiency, together with the most modern, innovative, well-proven and state-of-the-art technologies converge into Indra Voice Communication System to achieve the most existent goals in terms of availability and reliability. Its high reliability is supported by the use of Hot/Standby concepts of critical elements and great modularity.

The equipment, designed under PCM and ISDN technologies, uses HMI based either with touch type TFT screens or panels with push buttons and associated displays giving the operator, in a very intuitive way, and easy access to radio and telephone services with a wide range of possibilities.



SDC-2000 Screen

Neptuno 3000 Signal Multichannel Recorders

Indra designs and manufactures signal multichannel recorders for civil and military applications.

Neptuno 3000 recorder family makes easy signal multichannel recording, in analog and digital medium, with telephone or wider bandwidth.

Data are stored digitally for subsequent playback, transmission, routing or database management.



Neptuno 3000 Equipment

DVOR DME ILS

State-of-the-art NavAids

The Doppler VOR Ground Beacon from Indra is one of the primary navigational aids for a nation's airways system. It is a ground based, radio navigation aid, transmitting an omni-directional signal that enables an aircraft to determine its bearing relative to the location of the beacon. Designed to exceed all ICAO requirements, it is the ideal complement to the DME.

Distance Measuring Equipment (DME) is a ground based navigational aid for use by aircraft. Signals transmitted between an aircraft and a DME ground beacon enable the aircraft to accurately determine its distance from the beacon. The DME is used at an airport or en-route, and is one of the primary navigation aids in an airways system.

The ILS (Instrument Landing System) is a ground based precision approach aid to assist aircraft approach to runways. The system enables the aircraft to be maneuvered along a precise, predetermined, final approach path. The ILS is configured for either Category I, II or III as per requirements of ICAO Annex 10.

The ILS system comprises a Glide Slope (GS) system and a Localiser (LOC) system for vertical and horizontal course information on approach, and transmits coded signals to determine the amount of deviation from the optimum approach path.



DVOR-DME Antenna

Automation and Simulation

AIRCON 2100

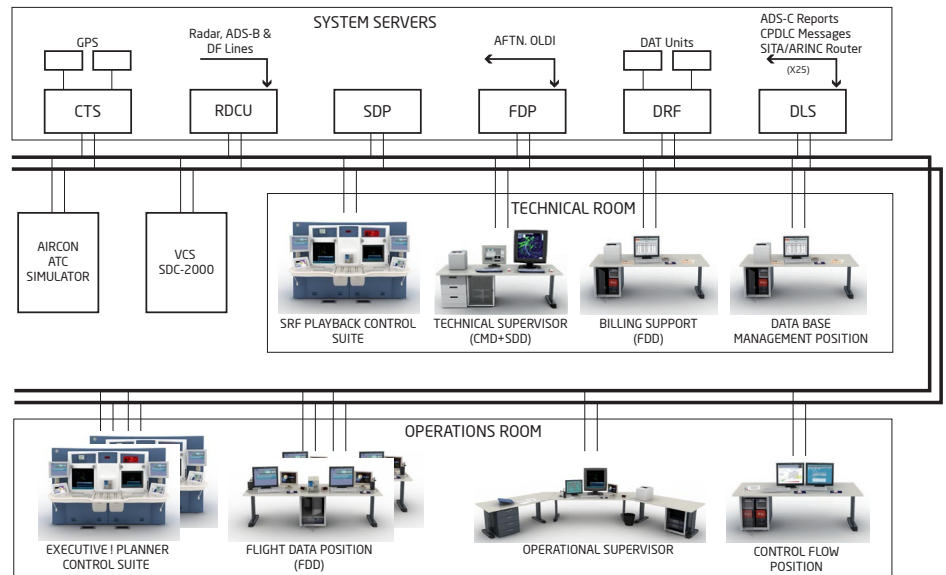
Advanced ATM System for ACC, APP and TWR ATC Centres

The AirCon 2100 is the result of our extensive experience in ATM products installed worldwide.

Safety and reliability being the cornerstone of the AirCon 2100, Indra's recognized expertise in ATC systems has served to make the AirCon 2100 a system friendly to use and easy to maintain. It represents the best trade-off for ATM systems ranging from highly competitive COTS solutions to full performance custom systems.

Components

- Flight Data Processing (FDP)
- Surveillance Data Processing (SDP)
- Radar Data Compressor Unit (RDCU)
- Data Link Server (DLS)
- Situation and Flight Data Displays (SDD/FDD)
- Data Recording Facility (DRF)
- Control & Monitoring Display (CMD)
- Data Base Management (DBM)
- Simulation Subsystem (SIM)



Automation System Overview

APP ACC & TWR SIMULATORS

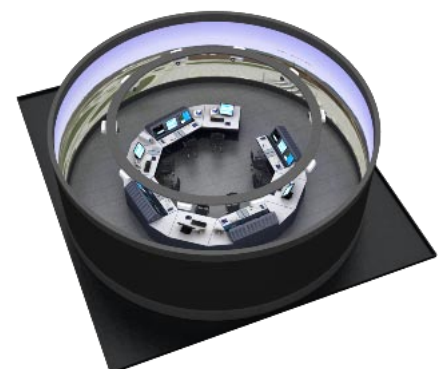
Indra has extensive experience in provision of turnkey ATM Total Training solutions, composed by En-Route/Approach and Tower simulation solutions, either standing-alone or with a real ATM replica system in a back-up and contingency mode

Indra has designed, developed and installed En-Route/Approach and Tower Simulation Systems in Europe, Latin America, Africa and Asia. Our experience includes all phases, from design to commissioning as well as performance of necessary developments and required Air Control

Centre integrations when necessary. Focused on its exhaustive didactical purposes, Indra's En-Route/Approach and Tower simulation system provides simultaneously a multi-exercise and multi-level of difficulty environment, in which the students/controllers receive their evaluation reports automatically, including infringements and workload. Voice, data and 3D-images are recorded, synchronized with given instructions and playback functions during the exercises evaluation.

The Spanish Centre for Training of Air Traffic Controllers (SENASA) is worldwide reference of integration of Indra's Simulators in a "Total Training Solution". Since SENASA centre was founded in 1990, Indra has been continuously updating its systems and functionalities.

Nowadays, this centre contains three En-Route/Approach simulators, six control tower simulators with 180° (Three with 360°) degree environment, and CBT and Brief/Debriefing Rooms, where more that one hundred students can simultaneously practise in different positions.



Surveillance

Surface Movement Radar

Indra stands out from its competitors, bringing together the latest generation unit with state-of-the-art technology

The Surface Movement Radar is a very high resolution radar designed for detecting small radar cross section targets using the continuous wave signals. The Indra Surface Movement Radar is the only continuous wave surface movement radar in the market, highly improving radar coverage, accuracy, reliability and maintainability as compared to the common magnetron surface movement radars.

The usage of X band, large bandwidth and low energy consumption are some of its capabilities in comparison with other technologies. The signal and data processing is fully programmable and uses the latest high resolution target detection and automatic tracking techniques for airport surveillance environment requirements. Indra's Surface Movement Radar is characterised by a high level of integration designed to be deployed as a standalone system or integrated as part of an Advanced Surface Movement Guidance and Control System.



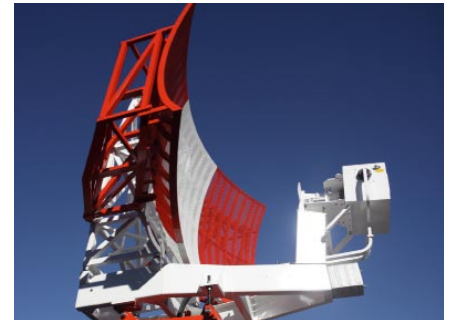
SMR Antenna

Primary Surveillance Radar

This is an air traffic control radar with newest technology

Indra has more than 20 years experience in Primary Surveillance Radar design, manufacture, operation and integration, with a wide range of products covering any customer necessities. Indra Primary Surveillance Radar is a fully solid-state radar system that incorporates the latest technologies into a surveillance radar system.

This radar gives the state of- the-art in airspace surveillance by combining features only available in the United States Federal Aviation Administration. Very high and reliable radar detectability, solid-state, programmable, MDT-IV Doppler processing, signal generation and demodulation, processors and communications technology. This system allows the air traffic controller to monitor all the aircraft in the airspace, clearly, simultaneously and without interference.



PSR Antenna

Secondary Surveillance Radar

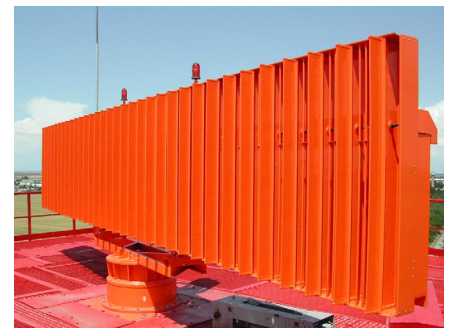
Only Indra's experience can have developed a low cost and high performance radar as Indra Monopulse Secondary Surveillance Radar Mode S

Indra's Monopulse Secondary Surveillance Radar Mode S is the fourth significant generation of secondary radars in Indra. It complies with the requirements stated by the International Civil Aviation Organization (ICAO) and with the performance demanded by EUROCONTROL to the surveillance and navigation mode S systems.

This Mode S system means a low cost and high radar performance solution which offers great flexibility to adapt to the client necessities. The Monopulse Secondary Surveillance Radar Mode S radar includes full international capabilities as enhanced surveillance performances.

The global system architecture makes use of the experience gained by Indra in developing and installing surveillance radar networks for clients world-wide.

This is a very open and flexible architecture, ensuring highest performances either co-mounted with Primary Surveillance Radar or stand-alone. It is configurable according to the client's requirements and the needs of the different sites, such as its communications architecture and maintenance network.



MSSR Antenna

ADS-B

A New Generation of Air Traffic Management Surveillance Systems

The Automatic Dependent Surveillance Broadcast is a surveillance system dependent on data and systems available on the aircraft. The system is a high performance solution fully developed and manufactured by Indra complying with the actual international requirements and recommendations for the Automatic Dependent Surveillance Broadcast as part of an air traffic control system.

An advanced system providing the following applications: enhanced air traffic services in non radar airspace, air traffic control surveillance in radar airspace and on the airport surface.

Indra's solution consists of an electronic antenna mounted on the top of a building or tower, and the main equipment that contains the core of the process. The system is a highly flexible and high performance turnkey solution allowing different configurations in order to satisfy the customer requirements.



ADS-B Antenna

A-SMGCS

Integration of all sensors data for the safety of the airport movements

The main functions of an Advanced Surface Movement Guidance and Control System are: Surveillance, Control, Routing and Guidance.

The Indra Advanced Surface Movement Guidance and Control System is based on an open and flexible architecture offering high performances.

The system can integrate data from different surveillance sensors: Primary Surveillance Radar, Secondary Surveillance Radar, Surface Movement Radar, Automatic Dependent Surveillance Broadcast, Wide Area Multilateration, Multilateration and the airport sensors.

The integration of all these data ensures an accurate traffic picture and the safety of the movements in the airport area under all circumstances.



Barajas T4 Satellite

MLAT & WAM

The multilateration is a cooperative technology delivering high performances for surface movement, terminal area and wide area surveillance

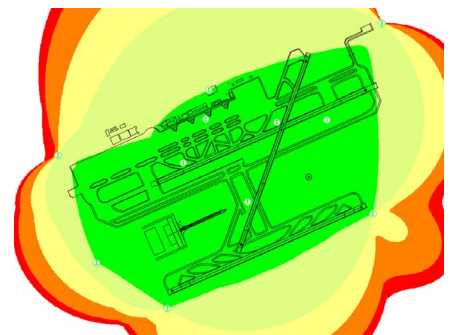
Multilateration is a scalable solution that is designed to cost-effectively meet the surveillance requirements for en-route, approach and terminal area, as a complement to radars solutions.

Indra's Multilateration System solution is applied for the surveillance of the approach and the movement area providing a very high accuracy.

The Multilateration System could be deployed as a standalone system to track targets in the terminal area or integrated as a part of an Advanced Surface Movement Guidance and Control System.

The Wide Area Multilateration (WAM) is a multilateration solution applied to enlarge areas oriented to en-route surveillance and represents a complement to the secondary surveillance radar.

Indra's Wide Area Multilateration systems are flexible solutions characterised by the facility of deployment and the highest performances.



Multilateration Accuracy



ISO 9001:2000



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V.2.1-eng-03-11-2009