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**The United States Support Program Assistance to  
The International Atomic Energy Agency Safeguards:  
Information Technology, Collection, and Analysis - 2008**

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**Abstract**

One of the United States Support Program's (USSP) priorities for 2008 is to support the International Atomic Energy Agency's (IAEA) development of an integrated and efficient safeguards information infrastructure, including reliable and maintainable information systems, and effective tools and resources to collect and analyze safeguards-relevant information.

The USSP has provided funding in support of this priority for the ISIS Re-engineering Project (IRP), and for human resources support to the design and definition of the enhanced information analysis architecture project (nVision). Assistance for several other information technology efforts is provided.

This paper will report on the various ongoing support measures undertaken by the USSP to support the IAEA's information technology enhancements and will provide some insights into activities that the USSP may support in the future.

**Background**

The USSP continues to assist the IAEA in achieving an integrated and efficient safeguards information infrastructure, including reliable and maintainable information systems, and effective tools and resources to collect and analyze safeguards-relevant information.

The Department of Safeguards' Information Management Division (SGIM) missions embrace all aspects of providing, maintaining, and using the tools for Safeguards-related information collection, analysis, and management. SGIM is currently in the process of replacing its obsolete computer platforms, while also incorporating new tools and methods, strengthening its information security culture and systems, and modernizing analysis reporting to keep pace with evolving Safeguards' approaches to nuclear verification. Specific projects associated with these efforts include the Integrated Safeguards Environment, which is closely aligned with the IAEA Safeguards Information Re-engineering Project (IRP), as well as Commercial Satellite Imagery, Open Source Information, and Enhanced Information Analysis Architecture.

The IAEA is in the third and final phase of a project to re-engineer its obsolete IAEA Safeguards Information System (ISIS) to create an integrated, efficient, and secure safeguards information infrastructure. Phase III of the ISIS Re-engineering Project (IRP)

is concerned with developing and implementing the safeguards application software and with rolling out these systems as they are completed. The new ISIS will run in parallel with the current system, until the IRP project is complete. This current two-system configuration requires adjustments in data management, and coordination with other Safeguard's IT projects. This work is managed by the IAEA and performed by the IAEA and its contractors. The USSP has provided contractors and Cost Free Experts (CFEs) to assist the IAEA in the design, development, and implementation of the new ISIS. The USSP has pledged approximately USD \$9 million, which amounts to 50% of the extra budgetary portion of the project budget. Other Member States have contributed directly or in-kind. The remaining funding comes from the IAEA's regular budget.

While the IRP is a major focus of SGIM efforts in the next two years, the IAEA will need to maintain current information systems, and to maintain and strengthen its ability to provide information services to support safeguards operations. This includes a continuing expansion of information analysis activities in support of strengthened safeguards, in particular the compilation and use of State Evaluation Reports (SERs). SERs are critical for planning safeguards implementation and for drawing safeguards conclusions. The IAEA's capabilities in information collection and analysis need to expand and mature. As the amount of open-source information collection and analysis involved in producing SERs has increased (especially with the increase in the number of Member States with model Additional Protocols in force), the IAEA wants to streamline and automate its information collection and analysis process to ensure the same quality contribution to SERs. In addition, the IAEA needs effective information security, and quality management systems and practices, to maintain the confidentiality of sensitive safeguards information.

### **Open Source Information Collection and Analysis**

The USSP is assisting the IAEA with its open source information activities, which include maintaining current awareness, early warning for safeguards relevant events, maintenance of open source databases, and in-depth research for State Evaluations and other safeguards relevant issues. Nuclear Safeguards are currently headline news. Recent and on going world events, the introduction of GNEP, and the increased interest in nuclear power worldwide continue to fuel an increased need for safeguards related open source information.

The IAEA's Information Analysis Unit (IAU) is responsible for open source information activities. IAU collects this information from more traditional political, commercial, technical, and scientific sources, as well as new media sources including blogs, wikis, youtube, and Google Earth., The USSP has made CFEs, Junior Professional Officers (JPOs), interns (from 2002-2006), and consultants available, since 1998, to provide necessary human resources to IAU. JPOs and interns have been very helpful to IAU in collecting information from open sources. The JPO and intern positions provide a training and mentoring experience for entry level professionals, since they get an opportunity to work with safeguards experts. CFEs and consultants assist the IAEA with special projects or with information analysis, using their specialized knowledge. Often, consultants work with the IAEA for a two-week period on a special project. More than

twenty consultants have completed one or more working periods with the IAEA since 1998, under Task D.137: “Consultants – Assistance with Information Collection and Information Systems.” After a hiatus in 2007, this task is resuming in 2008. The USSP has sponsored training and provided access to commercial and public open sources to assist with IAU’s collection, translation, and analysis of open source information.

### **Satellite Imagery Analysis**

The USSP provides funding and personnel to the IAEA’s Satellite Imagery Analysis Unit (SIAU). SIAU provides SGIM with collection, processing, analysis, and dissemination of satellite imagery, and Geographic Information System (GIS) information related to nuclear verification activities. The IAEA uses information from SIAU to monitor nuclear fuel cycle sites and activities, to verify Additional Protocol Declarations and Design Information, to support Complimentary Access inspections, and to investigate alleged undeclared activities, based on SIAU’s open source analysis and GIS analysis and development. The USSP provided funding through POTAS and the U.S. Voluntary Contribution to help the IAEA upgrade SIAU’s computer workstations, including the procurement of new high, mid, and lower level computer systems. The new systems will replace outdated systems and provide updated hardware to increase SIAU’s efficiency. Intergraph software (used for satellite imagery analysis) will be installed on some of the new systems. These systems are scheduled to enter service later this year. The USSP provided funding for program development and technical facilitation of a Satellite Imagery workshop, which was held in May, in France, in collaboration with the French Support Program. USSP-funded consultants have helped the IAEA develop its satellite imagery program. The USSP supported the SIAU in the past with an intern and approved a new JPO position recently.

### **Project N-Vision**

The USSP is assisting the IAEA with the development of enhanced information analysis architecture. Project N-Vision will provide IAEA Safeguards with an advanced information portal. Currently, the IAEA uses many different software applications and databases, which are not integrated. N-Vision will address many challenges to IAEA Safeguards including lack of secure access and navigation through all SG information, the high and increasing volume of information related to states’ nuclear activities, limited human resources for processing and analysis of data, difficulty in extracting relevant information, and identifying patterns and inter-relationships in information. N-Vision will provide an end-to-end system divided into five sections to address these challenges:

1. Collection will include current IAEA Safeguards information, open source information, and information from member states.
2. Processing will consist of indexing, data extraction, categorization, summarization, and translation functions.
3. Analysis will include link, timeline, relationship, networks, and geographical analysis.

4. Visualization will include search results, clustering, and relationships.
5. Collaboration will include sharing, blogs, wikis, e-mail, and the user portal.

The N-Vision project has three development phases. Delivery of Phase one is scheduled for the end of 2008. The search function of N-Vision will include an automatic categorization of documents by topic, country, physical model, and a federated search that will find documents from various sources including local Safeguards data, internet sites, and other IAEA sources. Users will be able to update sources to access the most timely and relevant information. Support for Korean language documents and translation functions for Arabic, Farsi, and Korean are planned. The breaking news feature will update news every ten minutes and notify users which of the websites have been updated that they are monitoring. The portal will provide a standard user's interface to all N-Vision components. The entity extraction function will recognize people, places, and events contained in text documents. This is scheduled for Phase One but its development will require user input and further refinement.

The USSP sponsored the development and facilitation of a workshop in 2004 for the benefit of the SGIM entitled: "Workshop on Turning Information into Knowledge." The meeting was convened to evaluate existing and emerging technologies that could be used by Safeguards information analysts. The concept for the IAEA's N-Vision project emerged, as a result of this workshop, as a means to increase the efficiency and effectiveness of IAEA Safeguards by facilitating analysts' access to IAEA information. A CFE sponsored by the USSP under Task D.148: "Expert – Technology Coordinator" was assigned to assist with the development of the concept. The USSP supported expert participation in a follow-up meeting: "Design and Definition for an Enhanced Information Analysis Architecture," under Task D.159, in 2005, for the further discussion of the N-Vision concept. A second cost free expert with experience in systems integration and distributed information management began an assignment in 2008 in support of N-Vision under Task D.169: "Expert – Application Integration Specialist." A request from the IAEA to provide consultations from an information analyst is under consideration.

### **SPRICS 2.0**

The USSP and almost all other Member State Support Programs have contributed to the SPRICS 2.0 project under Task D.160: "SPRICS 2.0." SPRICS is the Department of Safeguards' Support Program information computer system. The member states are dividing the costs of the upgrade of SPRICS, to allow sharing of information related to the support program activities between the IAEA and the sponsoring organization. The first five modules of the system are scheduled to be completed in June 2008.

### **IRP**

The USSP's main contribution is funding, which is provided for development, through the U.S. Voluntary Contribution. POTAS funding was provided for a CFE with experience in quality and project management, to assist SGIM with the management of the IRP. A CFE assigned to the Procurement Section in the Department of Management

is responsible for procurement activities related to large USSP tasks, such as IRP. Another CFE has been funded since 2004 under Task D.150: “Expert – Systems Analyst,” to assist SGIM with systems analysis. At the beginning of the IRP project, this CFE helped keep other projects on track, while regular budget staff members were reassigned to IRP-related activities. More recently, he has become involved in the redevelopment of some of the software applications. The JPO is currently in his second year under Task D.164: “Junior Professional Officer – CIR – Mobile.” He has worked for most of his time on the mobile version of the Computerized Inspection Report. CIR Mobile allows inspectors to submit their inspection reports electronically, minimizing the delay between inspection and reporting.

### **SAL ILIMS**

The USSP is contributing funding to upgrade the outdated Safeguards Analytic Laboratory (SAL) Laboratory Information System (LIS). LIS is a mainframe based command line system, originally installed in 1984. LIS is a very limiting system for SAL because of its obsolete user interface, programming tools, and hardware. LIS is difficult to maintain and/or enhance. The new SAL Laboratory Information Management System (LIMS) will replace LIS. The Integrated Laboratory Information Management System (ILIMS) will be the central software component of the new LIMS. ILIMS is designed as a local area network (LAN) based, relational, database with a graphical user interface. ILIMS will be capable of handling large amounts of data quickly and securely, perform calculations and data reductions, and retrieve and summarize data. It will directly interface with analytic instruments, exchange data with external organizations, generate performance metrics and statistics, and apply measurement uncertainty principles into its results. The USSP has provided a CFE under task D.161: “Expert – SALIMS Upgrade Project Leader,” and a consultant under task D.156.01: “Software Development Support: LIMS of the SAL – Phase III.”

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