

***IAEA IEC System for Incident and  
Emergency Communications:***

***System Description and  
Implementation Plan***

**Results of the Expert Group 5 of the WG-A**

**24 April 2007**



## EXECUTIVE SUMMARY

IAEA, Member States, State Parties and International Organizations have obligations to share relevant information during radiation events with transboundary impacts under the Convention on Early Notification of a Nuclear Accident (Notification Convention), and to facilitate prompt assistance according to the Convention on Assistance of a Nuclear and Radiological Emergency (Assistance Convention).

There are well-established systems for notification of radiation events and for the State Parties to fulfill their obligations under the Notification and Assistance Conventions. Such systems are: the IAEA ENAC, the Emergency Notification and Assistance Conventions web site, the EU ECURIE (European Community Urgent Radiological Information Exchange and EURDEP (European Data Exchange Platform), and other networks for communication operated by the World Health Organization (WHO), the World Meteorological Organization (WMO), the North Atlantic Treaty Organization (NATO) and the USA (National Atmospheric Release Advisory Centre, NARAC). At national level some countries also have well-established networks of emergency communications.

For reporting radiation events not covered by the Notification Convention, the IAEA operates other international communication systems. One of them is the Nuclear Events Web-based System (NEWS). However, there is no system to communicate or clarify uncorroborated information.

During a radiation event, sharing key information between States is of critical importance in decision-making. The current framework is not adequate to meet the demands and needs for the international community, because:

- It is not always clear to Member States which system to use to report events;
- Not all users are informed when an event is reported in one of the existing reporting systems;
- There is a need to avoid duplication of information and efforts made by the State Parties;
- The information currently shared via the IAEA is not sufficient and limited by the technical means available;
- There is no harmonized formats for notification and follow up messages, for handling multiple events simultaneously and for training and exercising in a way that it does not cause information on exercises be mixed with real events;
- There is no global system for sharing static and background information, neither that provides access to relevant assessment and assistance tools.

Therefore, there is a need to provide for a “one-stop shop” for exchange of data and information on radiation events and for information needed to assess the actual or potential consequences of such events. This should include, notification of radiation events and requests for assistance under the Notification and Assistance Conventions, information on radiation events and access to any relevant information needed to assess the potential or actual consequences and to provide assistance in case of radiation events.

The proposed system will provide for a global, reliable and secure means of effectively and efficiently exchanging and/or sharing information and data for routine communications, exercises, notifications, alerts and response to radiation events. The system will also allow for a coordinated public information approach and management of events with actual or perceived radiological consequence.

The system will streamline and build on the existing IAEA systems and facilitate the exchange and sharing of information in any radiation event – the term radiation event is further used in this paper to generically describe any nuclear or radiological safety or security related incident, emergency, threat or event of media interest.

The system will have a web interface and an interface for automated data exchange. Both interfaces need to use the same data format, network topology and protocols proposed by the WG-A<sup>1</sup>.

The system includes many subsystems, packages or modules for exchange of data and information and shared specific assessment and assistance tools. The notification of any nuclear or radiological safety or security related incident, emergency, threat or event of media interest must be implemented in the main module – incident and emergency notification and reporting module to avoid duplication of efforts by the Member States. The other subsystems or modules could be developed by the relevant expert groups following the basic features and design of the proposed system, and later integrated to the system.

Four basic functions need to be implemented in the system:

1. Communication protocol of radiation events, including request of assistance
2. Dynamic exchange of information
3. Assessment and assistance tools needed for response
4. Knowledge base with static and background information.

The system features to be implemented are: one user authentication identity; real-time status board; management of events and personalization; subscriptions and notification of messages; data import and export. The system will also provide for a separate area for information to the media and public. It will also be available for training on a dedicated and separated training site.

The proposed system should be implemented in phases with the participation of the main users in all the phases of the project. A prototype will enable notification of events and request for assistance, as required by the Notification and Assistance Convention, and reporting of any radiation events. The prototype should include the main functions and features of the system; however some of these functions and features could be partially implemented or mocked up.

This document was prepared in the scope of the International Action Plan for Strengthening the International Preparedness and Response System for Nuclear and Radiological Emergencies, Communications Working Group. The report was prepared by Ms. R. Spiegelberg Planer.

---

<sup>1</sup> See proposal of WG-A, expert groups 1, 2 and 3 [10, 11]

## TABLE OF CONTENTS

1.	INTRODUCTION .....	1
1.1.	Background.....	1
1.2.	Vision.....	2
2.	CURRENT SITUATION .....	2
3.	NEEDS.....	3
4.	SYSTEM REQUIREMENTS.....	5
4.1.	Requirements .....	5
4.1.1.	General requirements provided by WG-A.....	5
4.1.2.	Requirements for streamlining the IAEA ENAC and NEWS system .....	7
4.2.	Functional relationships among the various users (IO, MS) .....	9
4.2.1.	Users .....	9
4.2.2.	Functional relationships among users.....	10
5.	IMPLEMENTATION OF THE IAEA SYSTEM FOR INCIDENT AND EMERGENCY COMMUNICATIONS .....	11
5.1.	Scope .....	11
5.2.	Type of events to be exchanged .....	13
5.3.	Users description and access rights .....	14
5.4.	Functions and features of the system.....	18
5.4.1.	Functions.....	18
5.4.2.	Product Features .....	20
5.5.	Product Requirements and Deliverables.....	23
5.5.1.	Applicable Standards and System Requirements (needs revision by MTIT) .....	23
5.5.2.	Security .....	24
5.5.3.	Environmental Requirements .....	24
5.5.4.	Users Environment .....	24
5.5.5.	Deliverables .....	24
6.	PROPOSED IMPLEMENTATION PLAN.....	25
6.1.	Project management .....	25
6.2.	System prototype .....	26
6.3.	Project implementation phases and outcomes .....	27
6.3.1.	Work Plan .....	28
7.	RECOMMENDATIONS.....	29
8.	REFERENCES .....	31



# 1. INTRODUCTION

## 1.1. Background

In June 2004, an International Action Plan for Strengthening the International Preparedness and Response System for Nuclear and Radiological Emergencies (International Action Plan)[1] was approved. All work groups and expert groups collaborating on the International Action Plan are expected to submit their recommendations by April 2007. Expert Group 5 (EG-5) was tasked to propose solutions for Action 5 of the International Action Plan: “review and implement changes to arrangements for communication between the IAEA and Member States and the IAEA Secretariat, including the protected web site ENAC”. In this context, EG-5 shall produce this document describing the concept of a communication system for incidents and emergencies of the IAEA and its interconnectivity with IAEA Member States, State Parties and international organizations.

In September 2004, the General Conference requested the Secretariat “to review its current mechanisms for reporting and sharing information about incidents and emergencies, with a view to streamlining them” (GC(48)/RES/10) [2]. As a result of this requests, the 2005 established Incident and Emergency Centre (IEC) aims to serve as the international focal point for communication, preparedness, response and feedback of experience related to nuclear/radiological safety/security incidents and emergencies. Following those requests, one of the objectives of the IEC is to streamline current Agency reporting systems and to provide better and efficient means for communications of all relevant information in case of any nuclear or radiological safety or security related incident, emergency, threat or event of media interest.

This paper provides a description of the system proposed by EG-5 for implementation by the IAEA under the coordination of Incident and Emergency Centre to meet the needs of the International Action Plan and the request of the IAEA General Conference to the IAEA the Secretariat. It is consistent with our understanding of the proposals and discussions within the Working Group on International Communications (WG-A) of the International Action Plan, but is subject to change pending upon comments of the NCA 2007 meeting.

It also provides the input of EG-5 to the WG-A report, recognizing that the main task of EG-5 (implementation) can only be realized after the reports of WG-A and all the expert group reports are complete. At that point, the IAEA will work to secure funding and starting to implement the plan. The next step is the completion of a project initiation document which refines this document.

This document consolidates the discussions held in the meetings of the WG-A, internal meetings at the IAEA Secretariat and information convened in other documents which are referenced in section 8. Section 2 presents a summary of the existing systems used for emergency communications and event reporting. Section 3 identifies the needs for an international system for incidents and emergencies communications. Section 4 presents system requirements identified by the WG-A of the International Action Plan and functional relationships among various users. Finally, Section 5 presents a proposal for the IAEA system for incident and emergency communications, including user descriptions and roles, functionalities of the system and an implementation plan. In accordance with the International Action Plan, the system described in this document is intended to become an integral part of the internationally harmonized communication system for incidents and emergencies.

## 1.2. Vision

*As a major hub in a global system for incident and emergency communications, the IAEA Incident and Emergency Centre will host a global, reliable, secure and unified system for communication of incidents and emergencies. The system will receive, validate and appropriately disseminate information, and provide access to needed information resources for assessment and response in any nuclear or radiological safety or security related incident, emergency, threat or event of media interest. The system will also facilitate the request and provision of international assistance and will allow for a coordinated public information approach and management of events with actual or perceived radiological consequence.*

## 2. CURRENT SITUATION

Worldwide there are several international communications systems in existence or in various stages of development.

The IAEA is responsible for facilitating the sharing of relevant, authoritative information during nuclear or radiological emergencies with transboundary impacts and provision of assistance on request according to the Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (Notification and Assistance Conventions) [3].

The information exchange has been managed through fax, telephone, e-mail messages and through ENAC, the Emergency Notification and Assistance Conventions web site, an operational, dynamic and secure web site.

For near real-time reporting of information on events that are not defined as an emergency, the IAEA operates two separate international communication systems: the Nuclear Events Web-based System (NEWS) and the Illicit Trafficking Database (ITDB). Moreover, additional systems for identifying lessons and trends from past events (e.g. the Incident Reporting System) are functional at various levels and are also operated by IAEA. At the moment, there is no information system for disseminating event information from the media and other non-authoritative sources of information and share them with Member States.

These systems have been developed by the IAEA with extensive consultation with Member State representatives. They are the result of an effort to optimize the wide-ranging needs, desires and capabilities of the IAEA Member States. However, the rapidly increase of availability of world-wide electronic communications systems and the evolving need to promote better sharing of information in diverse areas suggests that the current solution could be improved. For instance, international communications could be improved by sharing experience and lessons identified from real events as well as exercises; by prompt and efficiently addressing events that circulate through open source (media) or that are uncorroborated information.

The European Community (EC) has also information systems or projects that aim to provide information needed during emergencies, such as the ECURIE (European Community Urgent Radiological Information Exchange), EURDEP (European Data Exchange Platform) and the ENSEMBLE. ECURIE is a system for rapid notification of radiological and nuclear accidents implemented by EU Council decision 87/600/EURATOM. EURDEP is both a standard data format and a network for the exchange of environmental radiation monitoring data between European countries in almost real-time. The EURDEP web site provides for visualisation in

real-time of radiological monitoring data in Europe. ENSEMBLE is a web-based software for real-time reconciliation and harmonization of dispersion forecasts from leading meteorological and emergency centres, with participation of 22 models worldwide.

The IAEA Secretariat and the EC are currently in the implementation phase of a system that will provide an interface of the IAEA's ENAC and the EC's ECURIE communication system.

Other international organizations dealing with emergency situations also have established networks for communication. The World Health Organization (WHO) has a network of contact points to get information in case of nuclear and radiological emergencies. The World Meteorological Organization (WMO) has a network of expertise and for distribution of atmospheric dispersion products. The UN Office for Coordination of Humanitarian Affairs (OCHA) has established networks for sharing information needed during emergency situations including radiological incidents or emergencies. Other information networks are: North Atlantic Treaty Organization (NATO), data exchange network of Baltic Sea States (CBSS), the National Atmospheric Release Advisory Centre (NARAC) in the USA etc.

At national level some countries also have well-established network of emergency communications, such as the Emergency Communications Network (ECN) in the USA. Other countries have developed web sites to communicate radiation events.

For a more detailed description of the current situation refer to the Information Paper - Strategy to achieve an Internationally Harmonized Communications System for Nuclear and Radiological Incidents and Emergencies (NCAM/INF/2005/07) [4].

### **3. NEEDS**

With such diversity of systems there are a number of issues which should be addressed and contribute to more efficient reporting and communication of events worldwide.

There are well-established systems for notification of radiation events and for the State Parties to fulfil their obligations under the Notification and Assistance Conventions. These systems could be improved because in some cases: either the information currently shared via the IAEA is not sufficient; there is a need to avoid duplication of information and efforts made by the State Parties; or the information that can be shared is limited by the technical means available.

However, for reporting events not covered by the Notification and Assistance Conventions, it is not always clear to Member States which system to use to report events as these may be related to one or more categories of events reported under the various existing systems. Consequently, not all the appropriate communities are informed when an event is reported in one system and event information editing and submitting may be duplicated in several systems (international, bilateral) where such reporting arrangements apply.

In case of emergency<sup>2</sup>, the nature of key emergency data, and requirements for efficient emergency communications and for emergency monitoring programmes will evolve with time during the event. The government agencies and the international organizations will need to communicate among themselves and with the media and public in all phases of the event.

---

<sup>2</sup> Definitions and terminology are presented in WG-A Glossary

The existing emergency communications systems provide features for notification or first alert and for coordination of accident related information with other organizations. However, they do not provide at the same system, background information, neither media nor public information. Although some of the existing mechanisms could be used to report incidents without actual major consequences, these mechanisms are not adequate. Moreover, there is no system to exchange information on non-authoritative information or exchange messages clarifying uncorroborated information.

Therefore, there is a need to provide for a “one-stop shop” for exchange and sharing of information on radiation events and information needed to assess the actual or potential consequences of such events. This should include, notification of radiation events and requests for assistance under the Notification and Assistance Conventions, information on events of any kind and access to any relevant information needed to assess the potential or actual consequences and to provide assistance.

In developing such as system, there are a number of issues which should be addressed and which could contribute to more efficient reporting and communication of events worldwide. Some of them are:

- It is not always clear to Member States which system to use to report events as these may be related to one or more categories of events reported under the various existing systems.
- Not all users are informed when an event is reported in one of the existing reporting systems.
- Member States, who are also EU members states, need to submit twice the same information in order to fulfil their reporting obligations to IAEA and EU.
- Event information editing and submitting may be duplicated in several systems (international, bilateral) where such reporting arrangements apply.
- There is no single access point for all relevant information for response/assistance actions.
- There is no system to capture, filter, store and disseminate information from non-authoritative sources.

In addition, there is a need to provide for some degree of standardization of the format used for notification and follow up messages, to handle multiple events simultaneously and to provide for training and exercise features in the system in a way that it will not cause information on exercises be mixed with real events.

## 4. SYSTEM REQUIREMENTS

### 4.1. Requirements

#### 4.1.1. General requirements provided by WG-A

The general requirements for an international platform have been described in a number of documents produced by the WG-A, such as the information paper presented at the 3<sup>rd</sup> Technical Meeting of the National Competent Authorities [5] and report of the WG-A meeting held in July 2006. The excerpts of these documents are presented below, as they are essential for the proposed implementation plan presented in section 6:

1. The system must to allow IAEA Member States (MS), State Parties (SP) and International Organizations (IO) to fulfil their obligations under the Early Notification Convention (sending and distributing notification).
2. The system should provide effective means of communication for all MS, SP and IO communicating any kind of relevant information in relation to preparedness and response to nuclear or radiological events.
3. The system should provide communication means required to manage an event on an international level including the coordination of international response actions and assistance.
4. The system needs to allow communication between Competent Authority (CA) and IO and between CA and CA, CA and IO, and IO to IO as well.
5. The system should allow for the transfer of all relevant information concerning the event. (To fulfil this requirement, the system could consist of sub-systems.)
6. The system should be able to address multiple types of events from minor incidents, including rumours, to large scale emergencies.
7. The system should be able to effectively handle multiple events simultaneously.
8. It should be possible to use the system in exercise mode to verify connectivity, operability and proficiency.
9. The system should be designed to be used also for routine communications.
10. The system should be user-friendly and should require only a minimum amount of training.
11. The system should be designed to operate with minimum human resources.

#### Requirements for the notification subsystem

1. The system should have an alerting function for notification and dissemination of urgent information.
2. The system must allow rapid provision of critical information even if not all information fields are available.

## Requirements for information exchange

1. The system should allow a "single site login" or "Single sign on".
2. The system shall be based on current standards used in information exchange with the internet.
3. The system should allow the access to all information or tools made available by Member States, international organizations or specialized services meeting the minimal standards.

## Technical Requirements

1. The system should be based on technology that is available to all MS, ST and IO and shall be independent of operating systems.
2. The system should use standard Internet protocols, however, it should foresee fax protocols where needed (redundancies, countries not yet having access to modern technology).
3. The system technology and architecture should be easily upgradeable but maintain full backward compatibility.
4. The system should be based on architecture and protocols that assure a high degree of security<sup>3</sup>, reliability<sup>4</sup> and integrity<sup>5</sup>.
5. The system shall be designed in a modular way allowing changes and complements based on experience made during exercises and real events.
6. The system should be designed so that the implementation, sustainability and maintenance of the system are as simple and inexpensive as possible.

## Specific Requirements

7. The system should allow communication of information and data sets defined in Annex 1 (possibly through sub-systems). NOTE: this is part of the outcomes of EG-1 and EG-2. Refer to EG-1 document.
8. The system should be designed for the CA to easily communicate with their national system, provided that the national system meets certain given standards.
9. The system should minimize the need for duplicate data entry of information by countries.

---

<sup>3</sup> Security: The platform should provide for protection against non-authorized access.

<sup>4</sup> Reliability: The platform should be always available under any conditions.

<sup>5</sup> Integrity: The platform must ensure that the information being transmitted is valid and it is not been intentionally or accidentally tampered with.

10. The system should have the capacity to share both static and dynamic public information products and should include a designated area for confidential information (maps and details of NPPs for example) that are shared for preparedness planning purposes, not for re-release to the public by other Member States.

#### ***4.1.2. Requirements for streamlining the IAEA ENAC and NEWS system***

The ENAC concept of operation should be taken as requirement for the system. Further more and in addition to the ENAC requirements, the requirements of the NEWS system are also to be considered.

#### **Concept of operation of ENAC**

ENAC allows contact points with write access to submit messages to the IAEA Incident and Emergency System (the forms are consistent with the IAEA EMERCON fax forms). Once a message is submitted, the 24h on-call staff of the IAEA Incident and Emergency System receives an alarm and can access the message on ENAC. If a message was received by fax or by telephone only, the 24h on-call staff can enter the message on ENAC on behalf of the country. To this point in time, only the submitting contact point and the on-call IAEA staff can see the message. The on-call IAEA staff will then authenticate and verify the message by telephone. Once the message is verified, the IAEA on-call Emergency Response Manager will publish the message on ENAC, which makes the information available to all contact points nominated by the Member States. Those contact points that have subscribed an email address will receive an email with a link to the published message. If needed, the IAEA staff can also request confirmations that the message has been seen and read by the contact points. In this case, ENAC will select the email primary addresses from the selected countries from the contact-points database and send an email with a link to the message with a request to confirm reading the message. ENAC automatically records the confirmations and displays it to the IAEA Incident and Emergency System staff. If the message was confirmed by telephone or by fax, IAEA staff can enter this on ENAC.

ENAC displays the information from different messages in a status board which lists the latest information for every information item specified on the forms. Additional documents and links to web sites can be added to messages or to specific information items.

As ENAC is available all the time, events are published real time. However, ENAC also offers a preparedness area where routine documents, information, as well as web links are displayed. The preparedness part of ENAC also contains the address book with all contact points nominated by the IAEA Member States.

ENAC uses a fixed data set based on the fax forms in the ENATOM manual. However, due to the specifics of web publishing, a few more fields were added. These fields describe the actions of the IAEA's Incident and Emergency Center, when publishing information on ENAC. The information set covers facility information, facility conditions, protective actions, on-site weather conditions and measurements. However, the information set is restricted to predefined fields and additional information can only be submitted via attachments in any format.

## **Fundamental requirements of NEWS:**

The fundamental requirements of the INES and NEWS systems to be retained with the IAEA system for communication of radiation events are presented in this section. It was underlined by the INES Advisory Committee that the IAEA should maintain a nominated officer to represent the needs of INES National Officers and the INES system within the integrated platform to be developed. The fundamental requirements, which were prepared by the IAEA Secretariat and the INES Advisory Committee meeting in July 2005 are as follows:

- The system should retain a number of levels of User type with different writing and reading access. In NEWS, there are currently 4 such levels. Level 1 access (the highest) is restricted to the National Officers and their nominees.
- The function of registration of new users should be carried out by the INES National Officer or his/her nominee.
- Only the INES National Officer or his/her nominee should be able to input or change any event information.
- Event information from the INES system should be considered “valid” on receipt. It does not need further validation as the information can only be sent by the INES National Officer or his/her nominee.
- As soon as event details are posted by the INES National Officer or the designated nominee, the system should provide immediate notification to all registered users that the event has been posted on the system.
- The system needs to allow input of several provisional Event Rating Forms (ERF) and one Final ERF (which can be corrected). If a final ERF is corrected, the previous version should be stored as a provisional rating.
- Only the latest ERF should be visible to the public but all should be visible to users with higher level access. The system should ensure that users know if they are not looking at the latest version.
- The system should be able to make some information (and the knowledge of its existence) only available to certain categories of users. For example the justification of the event rating (or the fact that such information exists) is not visible to members of the public.
- The system should prevent “old” events being visible to members of the public. The definition of “old” should be able to be changed; it is currently 6 months.
- The system should maintain the ability to view information as formatted in the ERF, and have the ability to print out the form. Alternative views may be proposed for approval by INES National Officers.
- The system should provide the ability to search and query the database. There should be the ability to print out ERFs that match the defined search or query.

- All data from all systems linked in this platform or other linked platforms should be tagged in such a way that the user can pull together all information relevant to an event from any system.
- Events should have a unique numbering system for easy reference.
- The current facility for a discussion forum is no longer required.
- Passwords for access should be maintained by a secure system that prevents others viewing such passwords.
- The integration of systems within a platform should include other systems that are used to share information on events (eg IRS, FINAS, EVTRAN, RADEV etc).

## **4.2.Functional relationships among the various users (IO, MS)**

### **4.2.1. Users**

The following are users that either are data owners, users or viewers of information and data communicated through the portal. Their requirements (data owner) and needs (users) should be taken into account in the architecture design of the System.

#### **Decision makers and advisors to decision makers**

Decision makers and advisors to decision makers perform key roles in responding to radiation events which could be triggered by safety or security related events anywhere and anytime. At national level, this category of users respond to the emergency by implementing countermeasures according to existing national plans and procedures. At international level, this category of users may trigger specific emergency assistance activities while continuing to play their key role as focal points for notifications and information according to Notification and Assistance Conventions and inter-agencies protocols.

This category of users can only perform efficiently on a national and international level when making use of an integrated System for reporting events and disseminating relevant information on events (e.g. information needed during the event or experience feedback from other similar events that may prevent events to happen later or may help ameliorate emergencies).

#### **Experts in nuclear safety, radiological protection, environmental monitoring, modeling, emergency management**

These experts are performing within national authorities or within specialized national/international organizations. Sharing data and assessment products in the environment provided by the System allow experts efficiently and accurate to perform their functions during event response or preparedness for event response activities. The development of the System should consider the current level of practice acquired in areas such as environmental radioactivity monitoring data exchange (e.g. EURDEP).

#### **Public information staff**

Public information staff is active in all national/international organizations involved in event reporting/follow-up and emergency response activities.

This category of users needs timely provision of relevant, accurate and coherent information to the media/public. The System environment should provide such authoritative information. The System will also provide the means for a coordinated public information process at all levels (local, national, international) – this need being widely identified as a major need to be addressed by all users and parties involved in the incident and emergency response activities. Requirements in this area are under development by International Action Plan Communications Work Group (Task A4).

### **Member States – National Competent Authorities, INES National Officers and other networks of expertise**

These users provide authoritative information on events to be recorded and displayed by the System. The rights to send such authoritative information will be established according to the current principles of ENAC, NEWS – INES and other reporting systems.

The design of the System will provide the means to streamline reporting of events by those systems aiming to easy access of all information about a specific event and relate to it. It is envisaged that the streamlining which the System is providing will allow Member States to effectively and better perform according to their roles.

### **IAEA Staff, Media and the General Public**

IAEA staff, media and the general public provide non-authoritative information on events. In the current global and dynamic media environment, uncorroborated information together with real event information is traveling at high speed and can widely affect people and have social and economic consequences. Therefore it is equally important to treat non-authoritative information at the System. The use of the System may enable timely and authoritative press releases back towards this category of users thus achieving the highly desired purpose of utility of the incident and emergency response activities.

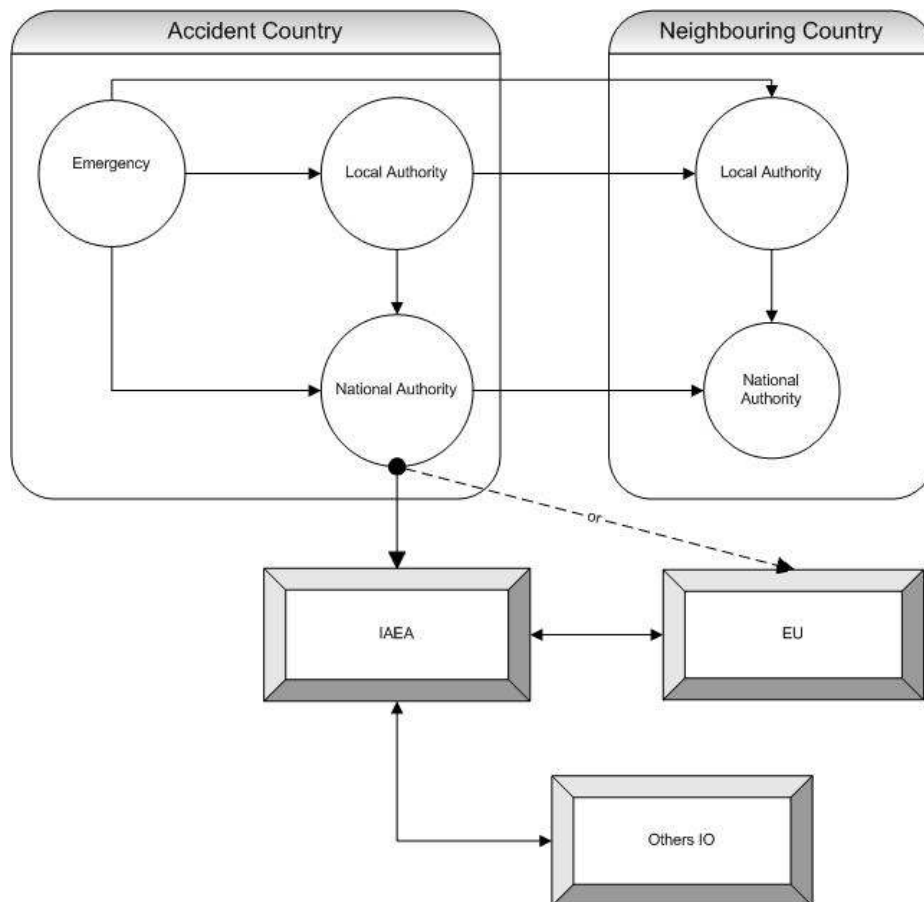
#### ***4.2.2. Functional relationships among users***

The key organizations involved in the response to an incident or emergency situation are namely:

- facilities
- local authorities;
- national authorities;
- local and national authorities in neighboring countries;
- national authorities in non- neighboring countries; and
- international organizations.

The information flow among those organizations depends on local, national and international arrangements. At international level the Notification and Assistance Conventions have set the requirements for notification of events and request of international assistance. For events that are not considered in the Notification and Assistance Conventions, there are other arrangements, such as: the report of events rated using the INES scale and of those attracting media interest through the NEWS system, and other systems used for illicit trafficking events. However, there are no obligations to report those events that fall outside of the framework of the Notification Convention.

Figure 1 presents the flow of information to be exchanged in the framework of the Notification Convention. In case of events outside the scope of the Notification Convention, there is no obligation to notify the neighbouring countries or IAEA. The information is routed to the IAEA or EC, while supporting information may be obtained from other international organizations or other existing systems.



*Figure 1 – Flow of information to be exchanged in the framework of the Notification Convention*

## 5. IMPLEMENTATION OF THE IAEA SYSTEM FOR INCIDENT AND EMERGENCY COMMUNICATIONS <sup>6</sup>

### 5.1.Scope

The IAEA aims to develop a common reliable and secure system for reporting incidents and emergencies (also referenced as radiation events in this paper) that will attend the general requirements set by the WG-A which are presented in section 4 of this document. The system should also attend the recommendations of the various expert groups of the WG-A and the recommendations of the IAEA Member States.

<sup>6</sup> This section contains excerpts of the Platform for Incidents and Emergencies (PIE) - Vision jointly prepared by IAEA/MTIT and IEC [7].

The definition and documentation of all information items to exchange have been defined by The Expert Groups 1 and 2 (EG-1 and EG-2) of the WG-A. The outcomes of these groups, which include the definition of the data set and format by phases of radiation events and user profiles of each of those phases, should be considered in the implementation of the IAEA system. Outcomes of other expert groups should also be considered in the development of the system, such as area for public information as set by the Expert Group 4 and requirements for video-teleconference (Expert Group 6), if so required.

The Expert Group 3 (EG-3) of the WG-A for enhanced international communication during radiation events has discussed solutions for network topology and protocols. The solution proposed by EG-3 adopts a central server architecture for message exchange, where participants connect to a common central server to post, read and acknowledge the receipt of information (messages) using a Web service mechanism. To ensure high availability of the central server, it will be mirrored at geographically separated sites.

This document does not aim to describe the fully automated system, however the current IAEA proposal includes a ‘machine’ interface to facilitate automated message exchange with national and international emergency management systems (such as ECURIE). Because the IAEA system follow the recommendations of the EG-1, which included the definition of a superset of data for exchange and the definition and documentation of all information items, the current proposal could be expanded to include the ‘machine-machine’ interface later on. The system and mechanisms discussed here intend to be implemented in a web environment; e.g. users will access the system through standard web browsers and no installation of additional software should be required (see Section 6.8).

The proposal presented in this section also attends the recommendations of the IAEA Member States to streamline the existing near-real time systems for reporting of information on radiation events. In this respect, the proposed system should also attend the requirements of the existing systems (section 4.2).

Since 2005, the IEC has worked in the framework of the International Action Plan to define high-level needs and features of an IAEA incident and emergency communications system and the capabilities needed by the users and the target users. Based on the requirements and needs identified (see previous sections) the IAEA system should:

- Integrate the functionality of existing systems (ENAC and NEWS) for reporting, disseminating and managing radiation events;
- Enable exchange and sharing of information on any radiation event;
- Take into account recommendations of the WG-A and WG-B for improving international exchange of real-time information;
- Capture, store and disseminate information from non-authoritative sources;
- Provide online access to needed information resources for any radiation event thus facilitating international exchange and sharing of information, the providing of required assistance and the providing of coordinated public information in response to these events;
- Allow online logging of actions taken by the IEC and Member States.

More specifically, it should:

- Allow online reporting and retrieval of information on radiation events;
- Allow information to be reported using electronic forms, which work also in offline mode, i.e. w/o a live connection to the system;
- Allow information items such as emails and scanned fax messages to be stored and shared;
- Facilitate dissemination of incident and emergency information via multiple channels;
- Facilitate automated data exchange with incident and emergency systems in Member States and international organizations;
- Facilitate provision of assistance;
- Provide a download area for documents and software packages;
- Establish a knowledgebase providing access to related reference material;
- Log/journal of IEC relevant activities in preparedness and response (e.g. information exchange and provision of assistance on request);
- Enforce secure information access and exchange;
- Be based on such an architecture that will provide reasonable levels of service reliability, availability and sustainability.

## **5.2.Type of events to be exchanged**

The IEC system for incident and emergency communication and information exchange should assure that the notification of an emergency (under the Notification Convention) is appropriately transmitted and received, that follow-up emergency-related information describing the status of the event and of emergency response actions is appropriately made available to all concerned parties, and that other relevant background information is also made appropriately available to all concerned parties.

However, the system should also ensure reporting and exchange and sharing of information on other radiological and nuclear incidents, threats and other events of media interest (radiation events). Of course, the system should deal with the different type of events, in a different manner. Moreover, the system should also allow for the exchange of non-authoritative information including clarification of uncorroborated information.

In an emergency situation, government agencies (at various levels) and international organizations communicate internally, with other governments and international organizations, and with the public. The current concept used in emergency communications includes the following type of communications:

- Notification of the emergency or first alert

- Co-ordination of dynamic, event-related information with other institutions or agencies; and
- Dissemination of static, background information;
- Public and media information.

For incidents (non-emergency situations), the system should also enable a similar approach including the display of the incident and related information. It will also make available technical and public information on the event and their follow up.

In addition to the capacity to accommodate the various types of communications, the system should also include the possibility to communicate a request for assistance and should also make available various relevant assistance oriented tools.

The system will be designed to provide different level of warnings, alerts and advisories that will be displayed when relevant. It will also enable the user to customise it in accordance with its needs (e.g. receiving alerts from some specific events of interest).

The information should be clearly marked and routed according to the potential consequences, which an event (e.g. incident) may produce and according to the degree of promptitude which the response to the event may require. The system will also enable the reporting and exchange and sharing of information on threats and other events of media interest.

The system will enable an immediate identification of messages generated due to emergency situations at facilities such as NPPs; it should allow for categorization of events according to their safety significance and security relevance.

The system should also include means to identify conditions that warrant early warning in order to prevent or ameliorate possible future safety or security events. The system should also include means to provide information on radiation events of media interest. It should be possible that public and media information could be exchanged through the system at various levels of user accessibility.

In summary, the system will address any radiation event, and through its various modules provide means for notification or first alert of an emergency under the Notification Convention, report other radiological and nuclear incidents and threats or event of media interest, provide an interface for request of assistance, assure dynamic exchange of information, and provide assess to needed assessment and assistance tools during any nuclear or radiological safety or security related incident, emergency, threat or event of media interest.

### **5.3.Users description and access rights**

The users of the IAEA system have been described in section 4. Based on the system requirements and identified users, it is envisaged that the system will provide key support and means to perform in the following ten areas of activities:

1. Reporting information
2. Receiving information
3. Reviewing information

4. Requesting / providing assistance
5. Performing technical assessment
6. Providing and disseminating public information
7. Performing editorial tasks in the operation of the system
8. Performing IT administrator tasks in the operation of the system
9. Interfacing with the media
10. Interfacing with the general public.

At national and international level, institutional users have been defined in ENAC. The same approach will be considered in this proposal. However, it is needed to provide different levels of user roles according to the various functions of the system. The description of these functional roles and a comparison with the existing systems is provided in Table 1.

Tables 2 presents the current contact points used in the ENAC system and serve as support information for Table 1. Table 3 presents the current classes of users in the NEWS system.

TABLE 1 – FUNCTIONAL ROLES

<b>Function</b>	<b>Roles</b>	<b>Relationship with existing systems</b>
Reporting	<ul style="list-style-type: none"> <li>• Notify emergency under the Notification Convention or request assistance under the Assistance Convention</li> <li>• Report incidents</li> <li>• Communicate/clarify uncorroborated information</li> </ul> (Full write and read access)	<ul style="list-style-type: none"> <li>• Users in Member States operating under the arrangements of ENATOM, ECURIE and INES/NEWS.</li> <li>• Includes the current NCA(D) ENAC users, and class A and B NEWS users (see Tables 2 and 3).</li> </ul>
Receiving	<ul style="list-style-type: none"> <li>• Authenticate and verify messages sent by the reporting parties</li> <li>• Assess background information</li> <li>• Offer and/or broker assistance</li> </ul> (Full write and read access)	<ul style="list-style-type: none"> <li>• Staff of the IAEA Incident and Emergency System, EC and IO users operating under ENATOM, ECURIE and INES.</li> <li>• It includes ENAC NCA(A), at the IAEA Incident and Emergency Centre: Incident Reporting Coordinator, Response System Coordinator, IAEA IES On-call staff (Emergency Response Manager)</li> <li>• No NEWS users fit this description.</li> </ul>
Reviewer	<ul style="list-style-type: none"> <li>• Assess information</li> </ul> (Read-only access)	<ul style="list-style-type: none"> <li>• IAEA IES staff, EC and IO users operating under ENATOM, ECURIE and INES.</li> <li>• It includes ENAC reviewers and INES class C users.</li> </ul>
Assistance	<ul style="list-style-type: none"> <li>• Reports assistance capabilities.</li> </ul>	<ul style="list-style-type: none"> <li>• IAEA IES staff, EC and Member State users(CAs in Member States).</li> </ul>

<b>Function</b>	<b>Roles</b>	<b>Relationship with existing systems</b>
	<ul style="list-style-type: none"> <li>Offers assistance (Write access to assistance area; read access to others)</li> </ul>	<ul style="list-style-type: none"> <li>No ENAC users fit this description.</li> <li>NEWS class C and D users could partially fit this description</li> </ul>
Technical Assessments	<ul style="list-style-type: none"> <li>Assess information and make available results of their technical assessment on the reported situations (Write access to assistance area; read access to others)</li> </ul>	<ul style="list-style-type: none"> <li>IAEA IES staff and other IO staff; users in Member States operating under ENATOM and various bilateral agreements.</li> <li>ENAC reviewers, and INES class C and D users partially fit this description.</li> </ul>
Public Information	<ul style="list-style-type: none"> <li>Provides press release and other information to be exchanged within the system with other public information staff (Write access to public information area and Read access to whole the system)</li> </ul>	<ul style="list-style-type: none"> <li>IAEA IES staff and users in Member States responsible for media relations.</li> <li>No existing ENAC and NEWS users fit this description.</li> </ul>
Editor	<ul style="list-style-type: none"> <li>Maintain information such as reference documents, administrative functions, etc</li> <li>Maintain contact point information and designated national officers for the subsystems (Write and read access)</li> </ul>	<ul style="list-style-type: none"> <li>IAEA IES staff and users in Member States responsible for maintaining relevant background and reference documents, and contact information.</li> <li>Includes ENAC managers and NEWS administrators.</li> </ul>
Administrator	<ul style="list-style-type: none"> <li>Maintain system (Administrator access)</li> </ul>	<ul style="list-style-type: none"> <li>IAEA IEC staff and users in Member States responsible for registering, activating and deactivating user accounts, and granting permissions to the data.</li> <li>Includes ENAC managers and NEWS administrators.</li> </ul>
Media	<ul style="list-style-type: none"> <li>Provide non-authoritative information including report of events (Read-only access to Public Information area, with a separate and independent physical arrangements)</li> </ul>	<ul style="list-style-type: none"> <li>Staff of media companies.</li> <li>Currently, media are given the 'registered public' NEWS role.</li> </ul>
General public	<ul style="list-style-type: none"> <li>(Read-only access to the area open to the public, with a separate and independent physical arrangements)</li> </ul>	<ul style="list-style-type: none"> <li>General public.</li> <li>Currently, general public has read only access to the public area of NEWS.</li> </ul>

TABLE 2 – CURRENT CONTACT POINTS AT ENAC

<b>Actor</b>	<b>Description</b>
ENAC Reviewer	Persons or entities authorized to access ENAC with read-only permission.
<i>Contact Point</i>	An <i>ENAC Reviewer</i> who can also subscribe to announcements.
National Competent Authority Abroad (NCAA)	The single entity in a Member State (or relevant international organization) authorized to verify or send information about the impact of an emergency in another country on their State (organization) to the IAEA. An NCAA is authorized to access ENAC, view posted information and submit messages (MPAs only) and will be requested to confirm if needed.
National Competent Authority Domestic (NCAD)	An entity in a Member State authorized to send information about an emergency situation in their country to the IAEA. There can be several NCADs for a State. An NCAD is authorized to access ENAC, view posted information and submit messages (all types).
National Warning Point (NWP)	The single office in a State designated to receive, at any time, a notification and/or warning message or request for information and immediately act upon it. An NWP has authorization to access ENAC, view posted information and confirm, upon request, having read and understood newly posted messages.
IES Staff	Staff of the IAEA Department of Nuclear Safety and Security that may be activated as part of the IAEA Incident and Emergency System (IES). They are trained in advance on how to operate the basic functions of ENAC regarding posting and verifying messages, documents and external links.
ENAC Manager	An <i>IES Staff</i> who manages the archiving of information; checks performance and/or functionality and manages the list of authorized users.
ERM	An <i>IAEA IEC Staff</i> (at any time, a single individual), who is authorized to publish messages, documents and external links on ENAC and/or send out information to Member States.

TABLE 3 – CURRENT CLASS OF USERS AT NEWS

<b>Actor/ Class of Users</b>	<b>Description</b>
Public/Guest User	Any person or entity that access NEWS web site. Read-only access to: NEWS Home Page; “What’s New” Page; Contact Information Page; NEWS Events, Event Rating Forms and Press Releases published in the last 6 months
Registered Public User	Persons or entities registered to the system with read-only access. An email notification is sent when a new event is posted in the system. Public permissions
NEWS Level D (Browser) User	Other experts or representatives of governmental bodies. They are nominated only for viewing information. Registered Public User permissions; View Documents; View Discussion Messages. An email notification is sent when a new event is posted in the system.
NEWS Level C (Expert) User	Senior experts from regulatory bodies, operating organizations, technical support organizations. INES National Officers, IAEA Safety Committees, NEA/CNRA members or WANO Regional

Actor/ Class of Users	Description
	Directors nominates these experts. They view all information and to participate in the discussion forum. An email notification is sent when a new event is posted in the system.
NEWS Level B (Facility Operator) User	Senior management experts from each utility/nuclear facility. These experts are entitled to send event information for their facilities (event descriptions, press releases and technical documentation), to view all information, and to participate in the discussion forum. An email notification is sent when a new event is posted in the system.
NEWS Level A (National Coordinator) User	INES National Coordinator. These experts are registered with permission to send event information for their country (event descriptions, event ratings according to INES, press releases and technical documentation), to view all information, and to participate in the discussion forum. They also register Level C users. An email notification is sent when a new event is posted in the system.
NEWS Web Page Author	IAEA staff. NEWS Level A (National Coordinator) User permissions; Create NEWS Web Page; Edit <i>own</i> NEWS Web Page.
NEWS Web Page Editor	IAEA staff. NEWS Web Page Author User permissions; Edit <i>any</i> NEWS Web Page.
NEWS Administrator	IAEA staff. All permissions granted.

## 5.4.Functions and features of the system

### 5.4.1. Functions

According to the vision statement in section 1, the IAEA proposes to develop a *reliable, secure and unified /system for communication of radiation events. This system will receive, validate and appropriately disseminate information, and provide access to needed information resources for any radiation event (nuclear or radiological safety or security related incident, emergency, threat or event of media interest). The system will also facilitate the request and provision of international assistance and will allow for a coordinated public information approach and management of events with time or perceived radiological consequence.*

The system will have a web interface and an interface for automated data exchange. Both interfaces will be implemented using the same data format, as proposed by the WG-A<sup>7</sup>.

The system includes many subsystems, packages or modules for exchange of data and information and shared specific assessment and assistance tools. Figure 2 presents a visualization of the system functions and subsystems or modules.

---

<sup>7</sup> See proposal of WG-A, expert groups 1 and 2 – data format exchange [10]

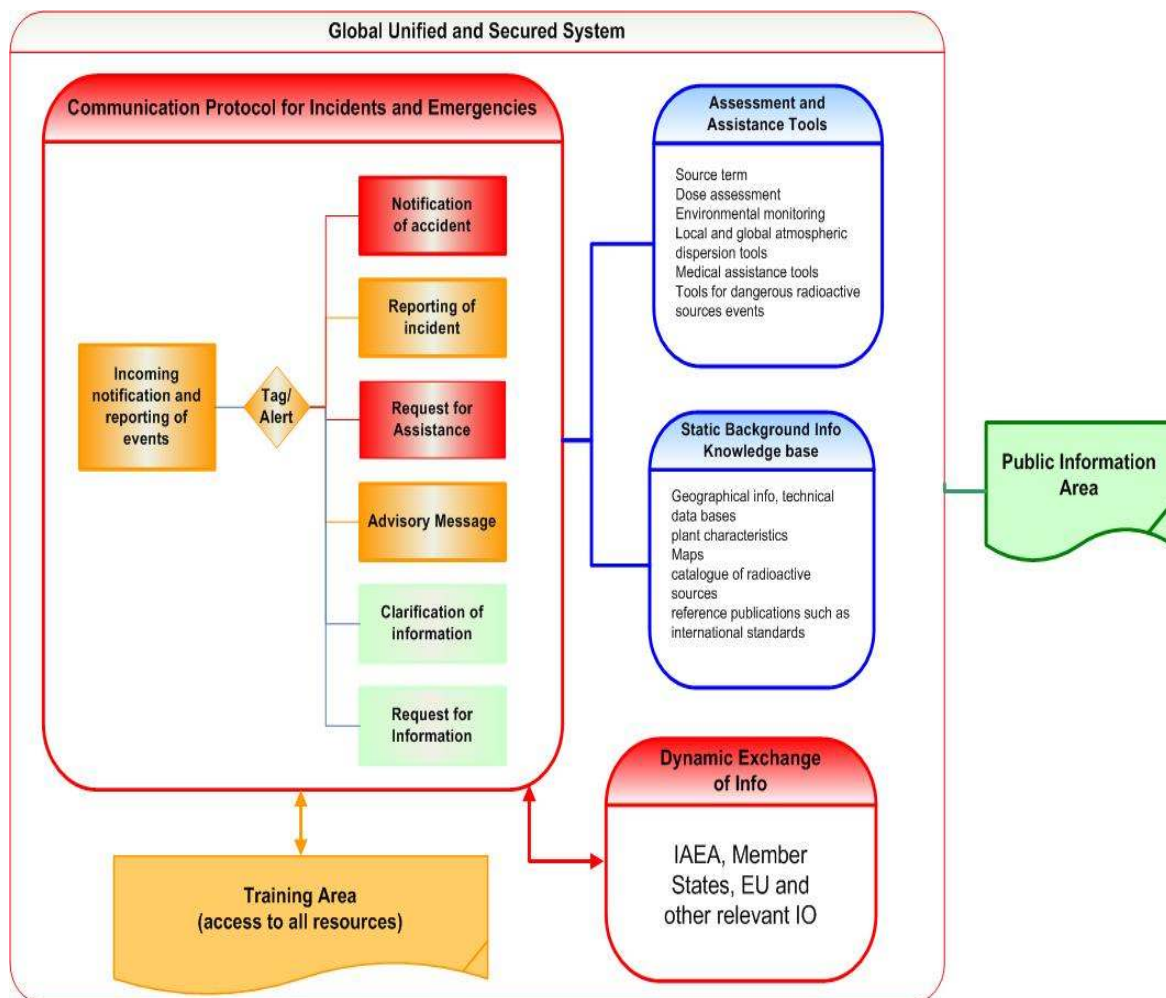


Figure 2 - system functions and subsystems or modules

Therefore, the main functions of the system are:

1. *Communication protocol of radiation events.* This includes a main subsystem, module or package for notification or reporting of any radiation event (nuclear or radiological safety or security related incident, emergency, threat or event of media interest). Related assistance communications such as assistance requests are included here.
2. *Dynamic exchange of information* during any radiation event. This includes the exchange of dynamic incident and emergency information with Member States or other relevant international organizations and the exchange of follow up information such as the plant status, countermeasure decisions, environmental monitoring data, official press releases, etc.
3. *Assessment and assistance tools.* This includes tools for exchange of technical support information or for provision of relevant information for assessment of radiation events. It will include subsystems, modules or packages for assisting decision making during incident and emergency and for assistance during response. Examples are decision making tools for: medical assistance for injured people, planning and training during response to an actual incident involving dangerous radioactive sources and other national and international available resources in support of emergency assistance. Other tools such as estimates of dose received in case of radiation events with exposure or contamination of people, environmental monitoring, technical

assessment of radiation events at nuclear installations, especially in the area of on-line monitoring and display capabilities, atmospheric dispersion models will be also made available in the system,

4. *Static background Information or knowledge base:* This includes information available in the international organizations and Member States that support incident and emergency response. Examples are: geographical information for specific emergency planning areas, technical data bases, plant characteristics, maps, catalogue of radioactive sources, reference publications such as international standards, etc.

Currently some of these functions are performed by the IAEA existing systems. Others are available at other international organizations or Member States and links to the information or automated system for exchange information should be built.

#### **5.4.2. Product Features**

Below is the list of the main functional areas of the fully implemented system, built over a series of related development projects. These projects will be discussed in section 6 (Proposed Implementation Plan).

##### **User Authentication**

The system will use a Single Sign-On for user authentication. Users already logged on to the Agency's [iaea.org](http://iaea.org) domain will not be required to enter a separate username and password, while external users will be required to provide their login ID and password to authenticate with the system. The system will allow limited read-only access without requiring users to log on when visiting the separate public site<sup>8</sup>.

##### **Status Board**

The system will provide near real-time status boards containing messages on radiation events. Each status board will indicate when new messages relevant to the board have been posted.

##### **Event Management**

The system will allow users to submit, browse, find, view and update radiation event messages. The user will be allowed to select the availability of the events by geographical location and type of users. Messages will 'trigger' workflows, related to message authentication, approval and publication.

The system will allow users to log follow-up messages/data related to other messages and events, providing a journal of all actions related to radiation events.

The system will enable user to report and view data of interest. It will include different views for nuclear and radiological incidents, emergencies, or non-authoritative information, including clarification of non-corroborated information.

---

<sup>8</sup> The separate web site address is needed to attend one of the functions of NEWS: communicate the safety significance of events to the media and public.

## **Subscriptions and Notifications**

The system will allow users to subscribe and be notified about new messages using either Really Simple Syndication (RSS) feeds, email, Short Message Service (SMS) or fax. It might also include voice messages as an option to notify the users on new posted information.

## **Content Management**

The system will allow users to browse, find, add, update and delete content, such as text documents, video, audio, photos, graphics and links to external resources/websites. The system will allow users to hierarchically organize the content (in a folder-like structure) and protect it by granting rights to users and/or groups. It will also allow users to link/attach content to radiation event messages.

Content management includes resources for the different uses of the system, such as: requests for information, assessment tools needed for radiation events during response, support documentation (e.g. access to catalogue of sources).

## **Requests for Information and Assistance**

Requests for information: The system will allow the user to request information on an event, which did not happen in the user's country.

Request for assistance: The system will provide a tool to request assistance, directly or through the IAEA. The system will make the request available for the identified countries after the IAEA (if so requested) has verified the request. Otherwise the system will directly divert the request to the identified State Party.

## **Assessment Tools**

The system should provide basic tools for nuclear safety and radiological protection assessment and links to other relevant tools. Some of the desirable tools and displays to be implemented are:

- Environmental monitoring results: the system will receive environmental monitoring data from external source and also provide a tool to input the environmental monitoring data and their geographical coordinates. The values will be displayed in a geo-referenced map, which will allow zooming, scrolling, printing and saving as image file.
- Atmospheric dispersion products: the system will exchange atmospheric dispersion products in global and/or local scale, meteorological data including the weather forecast and other relevant data with other organizations or institutions that can provide such information on request, and will make them available for viewing, downloading and printing.
- Short range dispersion estimations computer codes for nuclear installation emissions and for RDD related situations: the system will provide to the users the possibility to run computer estimations of dispersion, deposition – contamination and related dose to population and individuals following radioactive releases from nuclear installations or due to the detonation of RDDs. These estimations should cover with some degree of details, a spatial range of up to a few tens of kilometres from the emission source.

- Assessment of Incident and Emergency Situations at Nuclear Facilities (CASAT): The system will provide the necessary tools, mechanisms and expertise for the enhancement of capabilities of technical assessment of radiation events at nuclear installations, especially in the area of on-line monitoring and display capabilities.
- Tools for decision making in case of event involving dangerous radioactive sources: This consists of relevant documents, purpose-designed indexes, data sheets, and forms to assist in the real-time decision-making for radiation events.
- Tools for coordinated medical assistance following radiation events.
- RANET: The system will include a subsystem for providing RANET forms of assistance and other specified RANET tools.

### **Background and Static Information**

The system will integrate other available information systems at the IAEA, other international organizations or at the Member States. This includes information available in the international organizations and Member States that support incident and emergency response. Examples are: geographical information for specific emergency planning areas, technical data bases, plant characteristics, maps, catalogue of radioactive sources, reference publications such as international standards, etc.

The system will take reference data related to the nuclear facilities and radioactive sources available in existing IAEA databases, such as Power Reactors System (PRIS), Research Reactors System (RRDB), Nuclear Fuel Cycle Information System (NFCIS) and the catalogue of sources (IcSRS). Other available information system should also be considered such as links to the Incident Reporting System for nuclear facilities.

A knowledge base of resources needed to support radiation event response will be part of the system. This knowledge base will consist of many subsystems or modules that will address the specific needs of the different areas supporting radiation event response.

### **Contact Management**

The system will provide a central ‘address book’ of contact points in Member States and other international organizations. The system will allow users to browse, find, add, update and delete lists of contacts. The system will allow the user to edit own contact information.

The system will allow users to hierarchically organize contacts (in a folder-like structure) and protect them by granting rights to users and/or groups.

### **Personalization**

The system will allow users to define the content and layout of their personal ‘homepage’. The system will allow users to define and maintain their personal list of links to messages, contacts and content. The system will allow users to organize their links in a folder-like structure.

## **Data Import and Export**

The system should allow data entry, format and transfer of data in the common data format defined by the Expert Group 1 of the WG. It will allow the users to import and export the data in the common data format defined by the Expert Group 1 of the WG-A.

## **Integration with National and International Emergency Management Systems**

The system will provide a ‘machine’ interface to facilitate automated message exchange with national and international emergency management systems (such as ECURIE). This interface will be based on common data format and communication protocols as defined by the Expert Groups 1, 2 and 3 of the WG-A.

The system will make available national and international emergency related knowledge resources and nuclear safety and radioprotection assessment tools which are related to radiation events.

## **Full-Text Search**

The system will allow users to search all messages, content and data from integrated Agency systems.

## **Display of information for the public**

The system will display some information on a public available website, (which should be ideally physically separated on a different web server and supporting SQL server).

## **Training**

The system will be made available for training on a dedicated and separated training site (with specific URL).

## **5.5.Product Requirements and Deliverables**

### ***5.5.1. Applicable Standards and System Requirements (pending to IAEA MTIT developments)***

The IAEA Visual Identity and Style Guide standards will apply to the “look and feel” of the system.

The system will be hosted on the standard Agency Web and database server infrastructure:

1. Microsoft Internet Information Server 6 or later running on the Microsoft Windows 2003 operating system or later.
2. Microsoft .NET Framework 2 or later.
3. Microsoft SQL Server 2005 or later running on the Microsoft Windows 2003 operating system or later.

Users shall be able to utilize the system through commercially available Web browser software, including the following:

1. Microsoft Internet Explorer 6 or later,
2. Mozilla FireFox 1.5 or later.
3. Opera 9 or later.

The system will require JavaScript and cookies to be enabled in the users' Web browser. No custom software will be required to reside on the user's computer.

### **5.5.2. Security**

Any action related to changing the data in the system (events, follow-up to events, emergency response or assistance) will require user authentication and authorization. Users will access the system using the SSL protocol.

All messages between the IAEA system and external systems will be transported using the SSL protocol, with mutual authentication using digital certificates. Integrity of messages will be assured by using digital signatures.

### **5.5.3. Environmental Requirements**

Server components of the system will operate in standard IAEA hosted environment (the IAEA MTIT Data Centre) in a first phase. The system design should enable the implementation of mirror sites for purposes of reliability and redundancy. Client components of the system will operate in standard browsers on personal computers and mobile devices (smart phones and PDAs).

### **5.5.4. Users Environment**

The user community spans both internal users accessing the system from the Agency's local area network (LAN) and external users accessing the system via Internet. Most users are expected to access the system using standard personal computers in the office environment.

A smaller number of users will be accessing the system using portable personal computers (i.e. laptops/notebooks) and mobile devices (mobile phones and personal digital assistants – PDAs), both from their office environment as well as outdoors (e.g. from the site where the radiation event is located).

### **5.5.5. Deliverables**

Deliverables will contain interface software or product as described in this document, system documentation such as on-line help, User Manual and System Maintenance Manual and it will also include the document Incident and Emergency Communications Manual<sup>9</sup>. The Online Help will describe the use of the System from the end users' point, based on tasks that the users perform (also known as the 'how to' or task-oriented help). It should contain reference help, explaining functions of different user interface elements, cross-referenced task-oriented and reference help, an Index of important keywords; glossary of relevant terms, acronyms and abbreviations and provide a full-text search facility.

---

<sup>9</sup> In a similar format as the current EPR-ENATOM 2004 [6]

The User Manual will describe the use of the System from the end users' point, based on tasks that the users perform. It should contain an Index of important keywords, glossary of relevant terms, acronyms and abbreviations and be available in hardcopy and as a PDF document which can be downloaded from the system.

The System Maintenance Manual will contain the information necessary to modify, extend and deploy the system.

The Incident and Emergency Communications Manual will consolidate the new arrangements for exchange information on radiation events (nuclear or radiological safety or security related incident, emergency, threat or event of media interest). This document should be prepared in a similar format as the current ENATOM. [6]

## **6. PROPOSED IMPLEMENTATION PLAN**

### **6.1. Project management**

It is proposed to implement the unified IAEA IEC System for Incident and Emergency Communications in four major management phases. The first phase includes the preparation of this document and other documents jointly prepared by the IAEA Incident and Emergency Centre and IAEA Division of Information Technology (MTIT). Phase 2 consists of the endorsement of the project by the concerned network of expertises at the Member States and International Organizations (national competent authorities, INES national officers, International Organizations co-sponsors of INES and NEWS) and the outreach for extra-budgetary funds for the project. Phase 3 is the development and implementation of the prototype of the system. The selected features for the prototype are presented in section 6.2. Phase 4 will consist of the implementation of the first version of the full version of the system with the main features as described in section 5.4.2. After phase 4, the current ENAC and NEWS systems will be discontinued. Phase 5 will aim to develop and further implement the full system, including subsystems or modules for specific assessment and assistance tools, full public information area, etc. Figure 3 presents the phases of the project.

Due to the diversity of the goals and needs of the system owners and users, key to successful project implementation is the participation of the main users in all the phases of the project. A group of experts with representatives of the different networks of expertise: notification of emergencies, reporting of incidents, emergency response and international information exchange during incident and emergency should be constituted to participate in project evaluation and test. Members of this user group should be: CA users of ENAC, CA INES national officers and users of NEWS, EU, OECD/NEA and IAEA IES staff.

The IAEA IEC staff will manage the project and actively participate in all phases of project development and implementation.

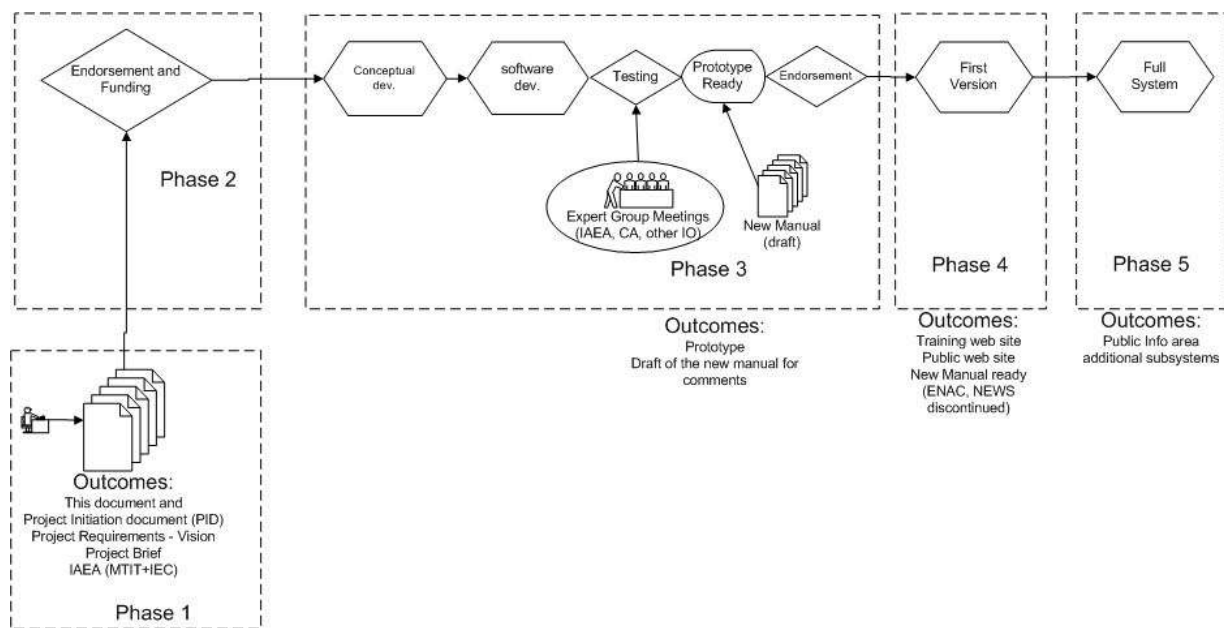


Figure 3 – Project phases

## 6.2. System prototype

It is foreseen that the unified system will be presented to its users in a prototype, in which some of the functionalities of the system will be addressed fully, others partially and others will be implemented as screen mock-ups.

The ENAC and NEWS systems already provide some of the system requirements (see section 4), therefore streamlining and retaining specific requirements of both systems while improving the reporting/notification on radiation events via multiple channels will be one of the objectives of the prototype.

The prototype will enable notification of events and request for assistance, as required by the Notification and Assistance Convention, and reporting of any other type of radiation events (radiological and nuclear incidents, threats, and events of media interest). It will also include exchange of non- authoritative information and clarification of uncorroborated information.

To achieve that, the following system features (section 4) will be provided:

- User authentication: different networks of expertise will be able to log on and perform their functions by having different access levels to the system.
- Status board
- Event management: Priority will be given to this feature. Input and display of the various types of events will be fully implemented.

The following features will be partially implemented (partially operational and mock-ups):

- Content Management: it will enable request of information, request for assistance and clarification of uncorroborated information
- Integration with other IAEA information system: it will provide for integration with some reference data related to facilities (PRIS, NFCIS and RRDB).
- Display of information for the public: it will focus on NEWS requirements
- Subscriptions and notifications

- Contact management
- Integration with national and international emergency management systems
- Personalization
- Data export and import

The prototype will also include the existing features and links available in ENAC, such as the links to WMO centers and the meteorological products made available by WMO. Assessment tools available at the IAEA will be linked to the system.

### **6.3. Project implementation phases and outcomes**

#### **Phase 1- Project initiation**

Description: This phase consists of the preparation of various documents that present the concept and requirements of the unified system. The major outcome of this phase is the current document. However, other reports were produced to support the views and strategies presented in this document. These reports are: the IAEA Incident and Emergency Portal produced at the IAEA IEC [7] and the Project Brief (July 2005) [8] and the Project Initiation Document - Vision produced by the IAEA MTIT [9].

Outcomes: This document and the project initiation document (PID)

#### **Phase 2 – Endorsement and funding**

Description: In this phase, this document will be presented to the system users and users at Member States and relevant international organizations, such as the CA users, INES National Officers, NEWS co-sponsors (OECD/NEA and WANO), EU, etc. Meetings with the users will be convened, if needed. Funds will be sought through extra-budgetary contributions and IAEA essential investments. During this phase the user group to advise and test the prototype should be constituted.

Outcomes: Project endorsement, funds available, user group identified.

#### **Phase 3: Conceptual development and implementation of the prototype**

Description: This phase consists of the conceptual development of the prototype, development of the graphical user interface (GUI) and software. It is foreseen that the user group will advise during the development of the software and test the prototype. During this phase the document Incident and Emergency Communications Manual (replacing the current ENATOM) will be prepared and circulated for comments to all contact points (e.g. National Competent Authorities, INES National Officers).

This phase finalizes with the endorsement of the prototype by its users. The system prototype will be presented at the meetings of the National Competent Authorities Coordinating Group, INES Advisory Committee and Technical Meeting of the INES National Officers and international organizations such as OECD/NEA, WANO and EU for endorsement.

Outcomes: System prototype ready and endorsed by its users; Incident and Emergency Communications Manual.

#### **Phase 4: Deployment of the first version of the system**

Description: During this phase the product features (section 5.4.2) of the prototype will be deployed. Some key items and milestones of this phase are:

- The Authentication feature, which include management of user accounts will be deployed and distributed to all users
- The historical data of the existing systems (ENAC and NEWS) will be transferred to the new Incident and Emergency Communication System;
- The training web site and the public web site will be deployed, including communication of new address to all users and re-route of old address to the new one;
- Existing ENAC and NEWS will be discontinued;
- New Manual for the public site of NEWS will be prepared.

Outcomes: First version of the unified system operable and made available to all users at Member States and international organizations. The system will be hosted at the IAEA and at its backup/mirror site(s).

#### **Phase 5: Implementation of the full system including specific subsystems <sup>10</sup>**

Description: Phase 5 will consist of many steps, which will aim to implement all system functionalities and features, thus providing additional assessment and assistance tools, completing the public information subsystem and develop and implement other needed tools. This phase will also consist of the implementation of those functions that enable dynamic exchange of information during any radiation event ( nuclear or radiological safety or security related incident, emergency, threat or event of media interest). In this phase solutions to enable access to information available in other international organizations and at Member States will be developed and implemented. Some of these features are a dedicated area for public information officers (following requirements of the EG-4). Subsystems that were identified by WG-B will also be developed and implemented, as needed.

Outcomes: Updated system software. Updated documentation.

##### ***6.3.1. Work Plan***

The implementation of the project depends of the resources available. A possible and general work plan is presented in Figure 4 to illustrate the implementation process (This work plan should be further reviewed).

---

<sup>10</sup> At this stage, it is difficult to foresee all needed subsystems. However the system will be developed taken into consideration that other subsystems may be developed and linked or integrated later on.

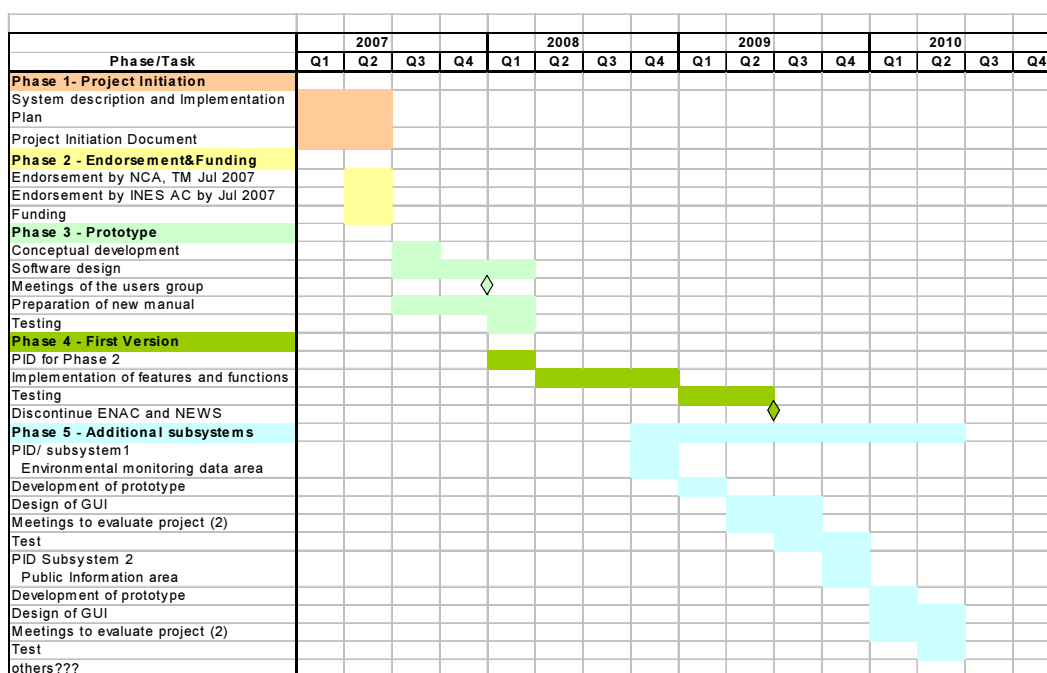


Figure 4 – Preliminary work plan

## 7. RECOMMENDATIONS

It is recommended that the IAEA in close cooperation with the State Parties, Member States and other relevant international organizations should:

- A. Develop a system that provides for a global, reliable and secure means of effectively and efficiently exchanging and/or sharing information and data for routine communications, exercises, notifications, alerts and response to radiation events. The system will allow for a coordinated public information approach and management of events with time or perceived radiological consequence. The system needs to allow IAEA Member States (MS), State Parties (SP) and International Organizations (IO) to fulfill their obligations under the Early Notification Convention, the Assistance Convention and multilateral and bilateral agreements refereeing to these conventions.
- B. Implement the system with a web interface and an interface for automated data exchange. Both interfaces need to use the same data format, network topology and protocols proposed by the WG-A<sup>11</sup>.

<sup>11</sup> See proposal of WG-A, expert groups 1, 2 and 3 [10, 11]

- C. Include many subsystems, packages or modules for exchange of data and information and shared specific assessment and assistance tools. The notification of any radiation events must be implemented in the main module – the incident and emergency notification and reporting module to avoid duplication of efforts by the Member States. The other subsystems or modules could be developed by the relevant expert groups following the basic features and design of the proposed system, and later integrated to the system.
- D. Implement the system into phases. The first phase should include the development of a system prototype that proofs its functionalities and basic features. It should include as a minimum the management of events, i.e. notification of accident and reporting of any radiation events. The next phase should consist of the implementation of the full event management system, transfer historical data of the existing systems (ENAC and NEWS), which will be discontinued. The subsequent phases should implement the other foreseen subsystems, packages or modules for exchange information and shared specific assessment and assistance tools.

It is also recommended that system development and implementation refer to the proposal stated in this document. This proposal was developed in accordance with the recommendations of the other expert groups of the WG-A, and took in to account the current proposals of WG-B.

It is further recommended that any future subsystems, modules or packages be developed in accordance with the above mentioned proposal.

## **8. THE WAY AHEAD**

It is foreseen that the IAEA IEC staff will manage the project and actively participate in all phases of project development and implementation. However a group of experts with representatives of the different networks of expertise: notification, reporting of incidents, emergency response and international information exchange for any radiation event should be constituted to participate in project evaluation and test. Members of this user group should be: CA users of ENAC, CA INES national officers and users of NEWS, EU, OECD/NEA and IAEA IES staff.

During the conceptual phase of system development, it is proposed that the WG-A advise and support: (1) revision of the current ENATOM to include all radiation events to be integrated in the new system; (2) integration of the existing notification and reporting systems; (3) preparation of the new Incident and Emergency Communications Manual (replacing ENATOM).

## 9. REFERENCES

- [1] International Action Plan for Strengthening the International Preparedness and Response System for Nuclear and Radiological Emergencies (GOV/2004/40)
- [2] International Atomic Energy Agency 2004 General Conference Resolution GC(48)/RES/10
- [3] Convention on Early Notification of a Nuclear Accident and Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency
- [4] Information Paper - Strategy to achieve an Internationally Harmonized Communications System for Nuclear and Radiological Incidents and Emergencies (NCAM/INF/2005/07)
- [5] 3<sup>rd</sup> Technical Meeting of the National Competent Authorities
- [6] International Atomic Energy Agency, Emergency Notification and Assistance Technical Operations Manual, EPR-ENATOM (2004), IAEA (2004)
- [7] IAEA IEC Incident and Emergency Portal, working material prepared by F. Baciú, R. Spiegelberg Planer and M. Eklund, IEC, IAEA (2005)
- [8] IAEA MTIT Project Brief, working material prepared by G. Petison and A. Velimar, MTIT, IAEA, 2005.
- [9] IAEA MTIT Project Initiation Document – Vision, dated 2006-12-14. working material prepared by A. Velimar, MTIT, IAEA, 2005.
- [10] Working material: IAEA's Information Exchange Format, results of expert group 1 and 2 of the WG-A of the International Action Plan.
- [11] Working material: International radiological information exchange network protocols, results of the expert group 3 of the WG-A of the International Action Plan.

## List of Contributors

A. Velimar	International Atomic Energy Agency
F. Baciu	International Atomic Energy Agency
G. Winkler	International Atomic Energy Agency
K. Deaufrains	International Atomic Energy Agency
R. Spiegelberg Planer	International Atomic Energy Agency
W. Stern	International Atomic Energy Agency
D. Rauber	National Emergency Operations Centre Nationale Alarmzentrale Switzerland
M. Stoltz	Nuclear Safety Authority (ASN), DGSNR France
P. Hofer	Ministry of Agriculture, Environment & Water Management Austria
V. Tanner	

Reported prepared by R. Spiegelberg Planer, coordinator of the Expert Group 5 of the Communications Working Group of the International Action Plan for Strengthening the International Preparedness and Response System for Nuclear and Radiological Emergencies