# A Paradigm Shift; Introducing Technology for the implementation of Incident Response System

**Binaya Bhusan Gadnayak**
Specialist, Incident Response System & Training
Uttarakhand State Disaster Management Authority
Government of Uttarakhand

**1. Introduction:** The technological intervention in disaster response is one of the most important aspects which empowers and encourages the administrative machinery to work systematically during crises. It also helps the senior officers/ stakeholders to access information, issue directions and ensure its execution in the field by various field officers.

**2. Converting IRS guidelines into software/ solution:** Resource mobilization, ensuring local level planning, reinforcing the Incident Action Plan by the higher formation of Incident Response Team within a specific timeline is also an important activity where the intervention of technology can play an important role. Therefore the Incident Response System now needs to be converted to solutions or software so that the triggering aspects, operational need, coordination and command aspects can be kept in a mobile/laptop/desktop for quick activation.

**3. The traditional approach to execution of Golden Hours SOPs and IRS guidelines:** The traditional approach to execution of Golden Hours SOPs and IRS guidelines is followed by phone calls to all required officers, briefing of the incident to every officer and required agencies of the central government, collecting information from the affected site either through wireless or phone calls and then taking the action to reinforce the site begins. As per observation, the traditional approach of execution of Golden Hours SOP and IRS takes a minimum of 03 to 04 hours to understand the situation and to take appropriate action by the officer concerned of the state government.

**4. Introduction of technology in disaster response – a best practice:** During interaction with states like West Bengal, Odisha and Maharashtra it has been found that a solution on Incident Response System provides enormous benefits such as ensure fixing of accountability of officer concerned, keep records of all activities with time of its conduct or performance such as; 1) from receiving of information to dissemination of information followed by various action taken by appropriate stakeholders, 2) preparation of Incident Action Plan and ensures its execution, 3) time to time interact with the stakeholders involved to resolve problems, if any, 4) ensures role clarity of officers involved in the Incident Response Team (IRT), 5) clarifies charter of duties of officers involved in the IRT, 6) alert members of adjacent IRTs of the affected area and other stakeholders,7) provide facility to integrate; a) alert Geofencing capabilities, b) EWDS, c) NDMIS, d) support both cell broadcast and location based alerting system, e) multi language support, f) two way communication, g) time to time modify various IRS forms as per local requirement, h) support to conduct of damage assessment and i) support for speedup of *exgratia* payment and its documentation.

**5. Ensuring performance of various response activities in time:** The introduction of technology through software needs to be based on the principle of IRS issued by the National Disaster Management Authority, GoI to facilitate officers involved in the EOCs and IRTs to access the information and take appropriate action with role clarity irrespective of their presence in the Headquarters or a remote location. The IRS solution will facilitate the availability of various resources on a GIS platform for ready reference either on their mobile or desktop/ laptop and also help the officers to access action taken at various levels of administration during the disaster response phase. This will also ensure; 1) timely collection of information about the incident, 2) timely dissemination of the information among higher authorities for mobilization and deployment of resources, 3) timely alert/ deploy trained and right officer to perform the

required task, 4) timely prepare incident action plan based on the information received and to ensure its execution, 5) Ensure Search & Rescue operations and 6) ensure monitoring of various activities conducted in the affected area.

**6. Taking decisions whether officers are in the Headquarters or remote locations:** Logically it has been analysed that the introduction of technology will empower officers to take the decision and issue directions to their subordinate formation whether they are in their Headquarters or remote locations. They can access various actions taken for effective response by the higher formation or the lower formation of IRT, documentation of daily situation report and activation of other facilities of IRS.

**7. Technology and examples of effective functioning of administration in Uttarakhand:** One of the bus accidents happened at Uttarakashi in June 2022 when a bus having about 20 passengers fell into a gorge at about 4.30 PM. To speed up the response, the Golden Hours SOP of EOC and state IRT was activated. All senior officers were called and the Hon'ble Chief Minister visited SEOC to know about the situation. District Magistrate of Uttarakashi and his Operations Section of the IRT reported at the affected site for the response. Hon'ble Chief Minister of Madhya Pradesh Shri Shivraj Singh Chouhan reached SEOC, Dehradun at 01 PM on the same day and was briefed by District Magistrate, Uttarakashi with direct dissemination of all operational activities through the use of technology and the same also disseminated by media. The entire exercise that is "happening of the incident to the briefing of Hon'ble Chief Minister Madhya Pradesh by the District Magistrate, Uttarakashi" was one of the best examples of effective functioning of administration which was supported by technology.


**8. Components for ensuring paradigm shift:** To ensure the paradigm shift, from time to time the Uttarakhand State Disaster Management Authority conducted a brainstorming session to develop a tried and tested software involving principles of IRS Guidelines for the response. The target of the brainstorming session was to ensure; 1) better coordination, 2) effective planning and 3) command and control during disaster response. Several government departments including a) Indian Institute of Remote Sensing, b) Uttarakhand State Application Centre, c) Department of Telecom and d) all Nodal departments of the state government were involved to understand the requirement of various departments which can be incorporated into the solution/ software for smooth coordination during response. The inputs provided by various departments are as follows;

1. Incorporate and customize NDMA and USDMA IRS Command Structures;

2. Organize all stakeholder agencies in a hierarchical structure;
3. Capable of Pre-Incident Planning;
4. capable of preparing Incident Action Plan as per IRS Manual of Uttarakhand and IRS guidelines of NDMA, GoI;
5. Execute Comprehensive Resource Management;
6. Integrate a GIS Mapping viewer that is ESRI, OpenStreetMap, Google Maps, Heremaps, Bing and Mapbox compatible;
7. Incorporate CBRN Incident Management. Implementation of ERG and NDMA NRE Guidelines;
8. Manage incidents by activating Plans, Monitor Progress, Reporting and Disseminate Information;
9. Capable for automation of Calamity Assessment, Daily Monsoon, and Abstract Reporting as per recent MHA Guidelines from *tehsil* levels to the district to state levels authorities;
10. Incorporate daily Situation Reporting for Hospital Readiness and readiness of other facilities during any disaster and/or pandemic situation;
11. The solution may have capabilities to; organize the resource, plan for, respond and recover, reduce confusion and reduce response time for effective response;
12. The software may help the officers of the state government to function in an automated way (may be in a predicted or unpredicted situation) rather than a manual process;
13. The software may provide the facilities to operationalize the disaster management plan and Incident Response Structure of NDMA and USDMA;
14. The software may facilitate resource mobilization, activates and tracks Incident Specific SOPs/ Checklists for each stakeholder agency, members of Incident Response \Team and their personnel, and above all will enable the decision makers to respond pro-actively by providing Decision Support Intelligence, about the incident, throughout the incident cycle;
15. The software may have the capability to coordinate with all departments at the state level and coordinate with all line departments at the district and its below formations during responding to a situation;
16. The software may be designed as per National Disaster Management Plan, IRS guidelines of the National Disaster Management Authority and also as per state disaster response manual;
17. The coordination mechanism with all departments of state government and agencies of central government may be addressed as per arrangements of state government;
18. The software may have arrangements for Comprehensive resource management so that all participating departments can get advantages during disaster response;
19. The software may have proactive planning facilities that may be accessed by all departments to understand the progress of response efforts and minimize delay in resource mobilization and its deployment;
20. The software may have capabilities for dissemination of information as well as issuing of directions and its dissemination among all stakeholders (IRT) for its proper execution;
21. From time to time modify various IRS forms as per local requirements;
22. Support of conduct of damage assessment;

23. Support for speedup of *exgratia* payment and its documentation;

24. Capabilities to integrate historical information for future prediction of the incident;

25. Capability to integrate NDMIS of NDMA; and

26. Capabilities to integrate with public warning and existing EWDS system which should have the following capabilities.
    a. Alert Geofencing capabilities
    b. CAP
    c. Support both cell broadcast and location-based alerting system
    d. Multi-language support
    e. Two-way communication

**9. Comparison between traditional IRS & Technology based IRS:** To shift the paradigm that is from traditional IRS mode to technology-based IRS, an illustration has been given for a better understanding of the paradigm shift in the implementation of IRS in states and districts as follows.

| **Execution of IRS through a software / Solution** | |
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| **Activity – 1:** Decision support and actions before a disaster happens | |
| **Traditional IRS** | Decisions about resource requirements and possible flooding are made based on **human assumptions** and will not be correct and actions will become **reactive** rather than proactive and thus will cause **delay.** |
| **Technology based IRS** | IRS solution will provide decision makers **accurate information** about the total number of affected villages and associated population/ livestock in time and will **forecast quantities** of equipment, responders, relief materials etc. that may be **mobilized**.<br><br>The solution will provide **information** about facilities that will not be affected during monsoon and will be ideal to be used as temporary shelters.<br><br>The solution will provide a **checklist** to all personnel before their deployment which can be accessed by computers/ laptops and mobile devices for better performance. |
| **Activity – 2:** Performing the Action/Tasks and tracking the same during the disaster | |
| **Traditional IRS** | The Disaster Management Plan and SOPs are paper-based or just **static** documents. These documents cannot be referred to during a crisis and all tasks must be performed based on a personality-based approach and **manual instructions**.<br><br>Many important tasks may be overlooked and missed which may cause another disaster. |
| **Technology based IRS** | Plans will be **incorporated** into the Incident Response Solution and can be sent to multiple stakeholders for its execution with a **single button click** during responding to a disaster.<br><br>Officers of concerned IRTs will receive **SMS, Checklists** as per their roles and update the status through laptops, tablets and mobile devices. |
| **Activity – 3:** Finding the required resources and how to effectively mobilize the closest resources to save time and lives | |
| **Traditional IRS** | **Manual records** of inventory quantity, contact numbers etc. are kept in various folders of the computer which may not available very easily.<br><br>Assessments and deployments are done without proper **visualization** and are based on **assumptions**. |

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| | Calls to resource owners to mobilize are manual and **time-consuming.**<br><br>Visualization of location-based resources on a Mapping platform is not available and finding the right resources that are closest to the affected site is not possible.<br><br>Resource Tracking and Cost forecasting become a confusing task |
| **Technology based IRS** | **Resources**, Contact numbers will be updated regularly by individual departments and are **geo-located** on the Mapping platform as well as will be available on a single platform.<br><br>**Radius search** will be available during disasters which will provide decision-makers access to the closest resources that can be **mobilized with a single button click.**<br><br>**Notifications** to resource owners will automatically be triggered by the system.<br><br>**Real-time** tracking of resource deployments and the availability of quantities of resources can be viewed on dashboards to avoid delays. This is a very **crucial** aspect of having a system because delays in resource mobilization are the main cause of human suffering and death. |
| **Activity – 4:** Live Updates from fields and actions as the situation unfolds during response and relief operations | |
| **Traditional IRS** | **Situational Awareness** and getting updates from various locations from responders are manual and cannot be visualized in real-time.<br><br>**Event Logging** is done in paper/Word Document and can be lost and will be hard to track.<br><br>**Incident Action Plans are generated manually** |
| **Technology based IRS** | Events/ Videos/Images will be entered into the system **from the field** through mobile phones and can be tracked via colour coding<br>Decision makers can view these live updates/videos/images immediately on the **Mapping Module** so they can make effective decisions in a time-bound manner.<br><br>Report generation (IAPs and Situation Reports) will be **automatic** and thus saves **time and effort**. |

**10. Conclusion:** Therefore to ensure the introduction of the right technology with the right people for the right work, the paradigm shift for smooth implementation of IRS is an urgent need which will help the government machinery to make their availability at the site with accountability and role clarity for smooth response.