SIMULATORS FOR TRAINING SOLDIERS ON DISASTER MANAGEMENT AND MITIGATION

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Synopsis

There are times when nature unleashes fury that is far more formidable than the deadliest weapons of war. The nation then turns towards the armed forces for help. Since aid to civil administration is a constitutional responsibility of the military, soldiers have always risen to the occasion, whether it is the Tsunami, an earthquake or a cyclone. After the formation of the Integrated Defence Staff, DCIDS(Ops) has been charged with the responsibility of coordinating the tri-service operations at the apex level. Like any other military operation, advance planning and training can improve their effectiveness considerably.

It is now well established that simulators are a useful tool to hone the skill of soldiers. The very existence of the SDD is ample evidence of the efficacy of intelligent training methods to create virtual reality. And there is reason to believe that these techniques can also be exploited to design and develop simulators for disaster relief. In fact some such devices have been in use for several years in Europe and the USA. The simplest of these is a mannequin which is widely used to train people on the fine art of resuscitation. First developed by a Norwegian doctor the 'Resusci-Anne' is now a popular device in many countries and many versions of this contraption have since been evolved.

This paper discusses some of the simulation systems that can be created through 'spin-off' technologies to train soldiers for disaster relief and mitigation. It also contains a brief reference to 'Mobile Tethered Aerostats' which can be deployed at short notice to provide aerial pictures of the affected areas to plan and coordinate the relief operations.

The 'Acid Test' of *Peace*

Soldiers are trained to slay the enemy on the battlefield and destroy their encampments and equipment. The SDD has been developing simulators to help them in the process of honing their *'kill-skills'*. War is said to be the litmus test of training, for, that is the primary task of the men-in-arms. It indeed is their sacred mission. However, in another avatar, the very same men are often called out during calamities to *save* life and *salvage* the belongings of the victims, and thus mitigate their suffering. And the soldiers have invariably responded to such challenges admirably well; be it the dreaded tsunami, an earthquake or a cyclone. But are they as well trained and prepared for these jobs as they should be? Regrettably, the answer to this question is in the negative.

Peace can sometimes be as challenging as war, and those who fail to appreciate this point end up in grief. Sir Winston Churchill who was arguably one of the ablest strategist-

soldiers of the twentieth century, succeeded in leading the British to a resounding victory, but when the Great War ended, he was unable cope with *the acid test of peace*. To his chagrin and dismay he found himself thrown out of office immediately after the victory in Europe (VE) and victory over Japan (VJ). In despair he rued, "No sooner did the war end, ***peace broke out!"***

Aid to Civil Power in Disaster Management

Assistance to the civil authorities is a legitimate function of the armed forces, as per the statute. And statistics reveal that, at least once every two years, India is ravaged by a major disaster. While the tsunami is fresh in every one's mind, not many of us have forgotten the Gujarat earthquake of 2001 and the cyclone in Orissa of 1999. And, indeed, there have been countless incidents which caused less damage. It is possible to classify disasters into three categories, as follows:

(a) Caused entirely by an act of God such as earthquakes, cyclones and tsunamis.
(b) Failure of man-made objects and structures. This category includes railway accidents, collapse of bridges or dams and leakages in atomic power plants. The infamous Bhopal gas tragedy also falls in this class.
(c) Disaster caused by human beings either deliberately or otherwise. Riots, strikes and stampedes are examples of this classification.

In all the three cases, there are significant similarities in the consequences, which are

(a) Loss of life and physical injury or infirmity.
(b) Damage to property and loss of earning opportunities
(c) Breakdown of law and order
(d) Disruption of communications

Role of the Soldiers

The task of the armed forces is clearly defined. It is to save lives, salvage property, restore law and order and assist in re-establishing communications. When pressed into service, men from the three services have invariably given off their best and their public image is good. However, with proper planning and training of personnel, it is possible to immeasurably improve their performance. This process is also similar to how the armed forces prepare for war. Here it needs to be noted that at the national level a Disaster Management Committee has been established under the Ministry of Home Affairs to coordinate all activities related with such calamities. After the formation of Integrated Defence Staff, the post of DCIDS (Ops) has been specially created to ensure that military resources are properly utilized in the event of a calamity. A Bill has been drafted to institutionalize all these functions to enhance synergy. Here also, training would need to be conducted at two levels, as is done to prepare for war:

(a) For commanders and staff officers, training should cover the process of gathering and analyzing information and data to plan the operations. This would be on the lines of the methodology adopted by WARDEC.

(b) At the grass roots level the soldiers need to acquire the skills required to perform the tasks assigned to them.

Role of Simulators

A study of literature and survey of the website on the internet reveals that extensive work has been done in the western world to design and develop training aids and simulators to hone the skills of saving lives. The pioneer in the field was a Norwegian inventor who created and patented the 'Resusci-Anne' during the mid eighties. This is a sensor base mannequin which helps the rescuer to learn the fine art of resuscitation by synchronizing one's breathing with that of the victim. Since then, several versions of this contraption have been designed and developed for para-medical persons and home guards. Similar dummies can be created to simulate human beings trapped in fire or needing to be rescued from drowning. While the array of simulators for disaster mitigation is endless a beginning can be made by configuring the following general categories of devices:

(a) Intelligent mannequins to learn and practice rescue of accident victims be it in fire accidents, marooned on islands or drowning in flood waters/cyclonic oceans.
(b) Cameras installed or carried by rescue teams to record all events. It has been our experience that if the rowdy elements know that their deeds are being recorded they are less likely to commit unlawful acts.

Tethered Aerostats

Tethered aerostats have now come to be accepted as an effective alternative to helicopter survey. In terms of cost the aerostat is several times cheaper than the other options as the table below would show. As digital photography becomes cheaper and the cameras become lighter, the balloon required to carry the recording device would become cheaper and more maneuverable. For disaster management there can be no better tool. In fact, they are as good as '***simulated helicopters'***. These systems can also be used as transponders and reflectors to restore communications where radio relay is used.

It is understood that development work has been initiated in this field for operational units. A more detailed analysis might reveal that use of such aerostats in hostile environment may be exposed to vulnerability since the balloon can be easily shot down. On the other hand, such systems can be very effectively used for the following applications:

(a) Disaster relief

(b) Public order and traffic control
(c) Law enforcement
(d) Transmitting to remote headquarters
(e) Aerial Relay

Table 1 Cost Comparison

	Aeroplane	Helicopter	Aerostat
Capital cost	Rs 30 Crores	Rs 30 Crores	Rs 1 Crore
Training cost	Several crores	Several crores	Negligible
Training time	Two years	18 months	Two weeks
Positioning cost	Average, Rs 6 lacs per deployment	Average Rs 10 lacs per deployment	Rs 10 per km
Flying cost	Rs 1 lac per flying hr	Rs 2 lac per flying hr	Under Rs 500 per hour
Surveillance time	3 to 4 hours	1 to 2 hours	Continuous with 30 minute breaks every 5 hours

Review of Technologies for Simulation Systems

In 1991, when the SDD was created, the technologies that were emerging were computer imagery for creating computer graphics and laser beams for simulating the process of

aiming weapons. Most of the simulators developed during the last fifteen years are configured around the breakthroughs made in these two fields. If one takes stock of the situation now, one finds that during the present phase revolutionary advances have occurred in the following areas:

(a) Digital cameras and video photography. The price of digital cameras and their prowess have generally been following the Moore's Law. The aggregate effect is of the same magnitude as the advances in Personal Computers during the last two decades.
(b) Cellular telephony has revolutionized audio connectivity. Within a short span of ten years, the cell phone connections in India have exceeded the land line terminals. The cellular coverage is expanding exponentially.
(c) As a direct consequence of the above advances, data networks have become much more comprehensive and effective.

Design and development of training simulators has to take note of the above developments to harness the potential of the above tools to create greater reality in the simulation process.

Concluding Observations

Use of simulators to enhance the effectiveness of training has now been accepted by the rank and file of the Indian army. The initial resistance to change has been overcome. It is now time to expand the scope of this tool to cover other areas. As a 'spin-off' the simulation process can be used to learn the fine art of reviving victims of asphyxiation, drowning fire-burns and even strokes caused by trauma. Intelligent mannequins have been developed by many innovators and the internet has a treasury of information on these subjects. And these skills will not only be useful during peace. Soldiers need to acquire these skills to save their comrades in war, too. Use of tethered aerostats is common in the West. We in India seem to be lagging in this race. It is time to harness the potential of aerial photography and the art of reading these pictures. It is not as easy as it seems. The scene looks quite different when viewed from the top and one has to adjust one's vision to make sense out of these images. Also, time has come for us to harness the full potential of the digital camera. As per a Vedic verse '***one picture tells a thousand words'*** In the digital systems, we observe that text consumes very little space, when compared with scanned images. The Armed Forces would be well advised to induct a large number of cameras into the system. If the miscreants and the rowdy elements know that they are being photographed, they would think twice before committing unlawful acts.

Aid to civil authority is an essential part of the charter of military duties. To ensure excellence in performance, we have to plan and prepare. There are no short cuts. There is an old adage, 'The more you sweat in peace, the less you sweat in war' In this case the dictum would read, 'The better you are prepared for disaster, the less your countrymen will suffer' And indeed, ***'Whatever is worth doing is worth doing well!"***