SWISSPHONE

The problem which alerting is trying to solve

Pamphlet No. 3

Abstract

The massive shift to wireless makes the purpose and character of the present series of pamphlets all the more relevant. To study the problem which alerting is trying to solve, neither as an archaist nor as a techno maniac, to determine whether or not paging still is a valid solution to present and future alerting problems.

In deciding whether or not a technology is suitable for alerting, historical knowledge, though less persuasive than common sense, should influence, even guide, responsible decisions; it should enhance emergency preparedness which, of course, includes solutions to solve alerting problems as they arise.

The present pamphlet, then, looks at solutions to alerting problems from a historical perspective. It sets out how alerting problems brought about by physical disruptions, whether from terrorism, accidental or natural causes get solved.

The principle with this pamphlet is similar to the one with the two preceding pamphlets; it relies upon the reader's willingness to draw conclusions himself. Although some practical suggestions are made, it avoids practical suggestions which suggest that all fixed and wireless technologies will, in the near future, be digital and web-based. Such suggestions are inhuman. They reduce the process of alerting with technology to the level of a commonplace Google search. They overlook almost every requirement of which history tells us to expect when the need to alert with technology arises.

SWISSPHONE

Content

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I Introduction

As a simple technology of immense practical consequence in alerting, paging has been used to solve alerting problems quickly for more than fifty years.

But today, almost everyone has a web-based wireless device – some even have several – and feels they can be contacted twenty-four hours a day. This means the web will eventually be used to alert. The danger with this is that web-based devices are unsafe to alert with if neither the cognizance, or education, on alerting and another technology which is completely independent of the web to solve alerting problems, are there.

There are, of course, bound to be situations when web-based devices are practical to alert with. Yet attention must be drawn to the other side of the medal. Experience reveals that very often it is quite impractical to solve the alerting problem with devices which are neither specifically designed nor intended exclusively to alert with.

But we are in the midst of a change that portends a greater reliance on the web-based devices. It is inevitable. However, that established (DRC Type I) organisations in civil safety are trying to find a substitute to paging, and that they are still trying in an experimental way, guided by what appears to be, at the moment, plausible but of limited practical use, is partly due to the Paging Industry's incredible lack of judgement about what alerting is and why solutions to alerting problems require special attention, networks, devices, and spectrum utilisation policies.

If neither the personnel in civil safety nor the International Telecommunication Union (ITU); the US Federal Communications Commission; regulators in other countries, and also not the Paging Industry, can communicate what alerting is and why solutions to the Alerting Problem (Pamphlet No. 2) require special attention, networks, devices and spectrum utilisation policies, then paging will eventually peter-out.

Too much importance, however, is attributed as a rule to technology instead of the problem that alerting is trying to solve. Both history and careful consideration of the alerting problem should be able to make clear why paging still is necessary for creating elegant solutions to alerting problems.

This pamphlet, then, looks at the solution to the alerting problem of the S.S. Titanic.

The solution to the alerting problem of the S.S. Titanic is important in so far as it contributes consistent and factual understandings of the alerting problem to policy-makers all over the world.

1 Reasons to refer to history in the search of solutions to alerting problems.

There are compelling reasons to refer to history in the search of solutions to alerting problems.

The most important is that the people who rely on solutions to alerting problems are not the ones that choose which technology is used, and persons that make those decisions, therefore, will in historical knowledge accumulated from lessons-learned obtain valuable guidance in determining whether or not a technology is fit and adapted to solving alerting problems; in deciding whether the technology is for safety, security or both; in training and guarding against system malfunctions, etc.

Beside the universal rule that the people who rely on solutions to alerting problems are not the ones that chose which technology is used, the other compelling reasons for referring to history are that:

1. Radio regulation came about to ensure that alerting problems could be solved at sea; in the US: *"The first Federal statute relating to wireless was the Wireless Ship Act of June 24, 1910 for the protection of life and property at sea. This act forbade any "ocean-going steamer" carrying or license to carry 50 or more persons to leave any port of the United States unless equipped with efficient apparatus for radio communication, in charge of a skilled person, and capable of communication over a distance of at least 100 miles… This Act was amended July 23, 1912, to include all vessels navigating the ocean or Grate Lakes, carrying or licensed to carry 50 or more persons, including passengers and crew or both. Auxiliary power supply, independent of the vessel's main electric power plant, and two operators and a constant watch were also required, although it was specified that in the case of cargo vessels a competent member of the crew might act as operator."* (Herring and Gross, 1936. *Telecommunications – Economics and Regulation*, McGraw-Hill Book Company, Inc. p. 239).

2. Research conclusively documents that there is a qualitative and quantitative difference between a day-to-day emergency and a disaster. The difference is summarised in the report to the President of the United States on the nuclear accident at Three Mile Island as follows:

   "In emergency situations, a period of emergency response *is highlighted by the utilization of traditional procedures, plans, resources, and mechanisms in responding to the threat. Within communities and counties, the traditional emergency relevant organizations and their established response patterns are utilized in an attempt to ameliorate the problems produced by the threat. In effect, during a period of emergency the officials and participants are not thrown into the unknown; routinized and established procedures are utilized.*

   A period of crisis response*, however, indicates a situation where the traditional procedures, plans, resources, or mechanisms for response are no longer perceived*

> *to be functional or appropriate, or are no longer being used to respond to the perceived threat. During a crisis response period, the officials and the participants are faced with a problem for which traditional, ready-made solutions are not appropriate. The primary questions are these: What is happening? What is appropriate activity? What should we do now?"* (The President's Commission on the Accident at Three Mile Island, 1979. *Staff Report To The President's Commission On The Accident at Three Mile Island – Report of the Emergency Preparedness and Response Task Force, pp. 51- 52*).

We now know that what works on a typical day, does not work in a disaster, as that exactly is the nature of disaster. In such circumstances, and partly because of gaps in vital information, people necessarily depend on their alertness instead of their intelligence to make their way forward. Basically, what this implies is that alerting has to convey *gaps* in information, not *loads* of information.

In sum, instead of attributing too much importance to technology, the Paging Industry has to realise that the search for an appropriate technology to solve alerting problems is a political exercise which cannot be independent of or insufficiently supported by historical evidence and local politics performed with an indigenous eye.

What follows, then, is an analysis of the solution to the alerting problem that saved the passengers and crew cast-away from the S.S. Titanic on the night of April 14, 1912.

The most important reason for studying this solution is not that it has been thoroughly documented by two formal inquiries; a US Senate Inquiry and a British Board of Trade Inquiry, and numerous commentators, but that the legal and practical implications of the solution still are of relevance to us today.

2 General basis for solving alerting problems

Before we move to the Titanic, it is convenient to reiterate that the alerting problem with technology is to relate information to the brain and the resulting cerebral activity to effective action (Pamphlet No. 2) and that, generally speaking, solutions to alerting problems depend on;

1. an awareness and preparedness to generate and process alerts,
2. continually evolving knowledge which could become the basis for effective action outside and inside the brain, and
3. behavioural processes which are neither fully measurable nor controllable.

The crux of the matter is that solutions to alerting problems involve physiological factors and sociological factors which cannot be described adequately. Nevertheless, they can be modelled as discrete factors, physiological factors constitute one set, (Set x), and sociological factors constitute another one, (Set y).

The solution to the alerting problem requires that y is a function of x (i.e. $y = f(x)$) otherwise it is not obvious how alerting with technology can exist, or function, at all.

2.1 Basis for solving alerting problems with wireless technology

Maritime experience led the Marconi International Marine Company to issue Circular No. 57 as its basis for solving alerting problems at sea. It sets out in a concise and unambiguous manner the conditions that must be met to insert a “distressing” signal in Set x for $y = f(x)$.

THE MARCONI INTERNATIONAL MARINE COMMUNICATION COMPANY, LIMITED.

CIRCULAR No. 57.

It has been brought to our notice that the call "C.Q." (All Stations), while being satisfactory for general purposes, does not sufficiently express the urgency required in a signal of distress.

Therefore, on and after the 1st February, 1904, the call to be given by ships in distress or in any way requiring assistance shall be "C.Q.D."

This signal must on no account be used except by order of the Captain of the ship in distress, or other vessels or stations retransmitting the signal on account of the ship in distress.

All stations must recognise the urgency of this call and make every effort to establish satisfactory communication with the least possible delay.

Any miss-use of the call will result in the instant dismissal of the person improperly employing it.

THE MARCONI INTERNATIONAL MARINE COMMUNICATION COMPANY, LIMITED,
18, Finch Lane, London, E.C., 7th January, 1904.

On or after the 1st of February, 1904, alerting problems at sea are commonly dealt with; (i) a broadcast connection to all reachable stations (i.e. an “all informed” channel); (ii) one signal which makes any alert quite unmistakeable; (iii) a clear and definite line of responsibility; (iv) a commitment to take whatever consecutive action is just without delay (Pamphlet No. 1), and (v) the recognition that alerting is a deadly serious matter.

2.1.1 The case of the S.S. Titanic.

Table 1 is compiled from the British Inquiry into the loss of the S.S. Titanic. Although the chronological classification in Table 1 yields a good fit with how alerting problems are solved in reality, three precautionary remarks are necessary:

1. *Critical* warning messages sent to the Titanic (i.e. the ice reports) were not considered *critical* by the captain which suggests that to trust in language as an adequate method of conveying the reality of meaning is a recipe for disaster.
2. The sequence in Table 1 does not mean that knowledge becomes known in that order – or any other order for that matter.
3. *Alarms* are not *alerts* which means, alerting problems are not alarming problems. Nowadays, far too many alarming problem “solutions” are masquerading as alerting problem solutions.

Table 1: Chronological survey of wireless alerts caused by the S.S. Titanic			
#	General Classification	Particular classification after the inquiry into the loss of the Titanic	Observation
0	Precipitating factors (or a series of mistakes which can cause severe damage if the worst is, in fact, the case) can occur seconds, minutes, hours or even days before perceiving that safety is compromised.	Although several critical warning messages (ice reports) were telegraphed to the captain of the Titanic, speed is not reduced as night approaches, and the worst is, in fact, the case. N.B. In reality, acting upon critical information is a problem even before disaster hits.	Gap in vital information emerges despite clear transmission of warnings. There is no guarantee that people are in the know, not even with radios that work properly!
1	Awareness that safety is compromised.	11.40 p.m. the Titanic collides with an iceberg. After some probing it is found that six compartments are open to the sea.	Probing to obtain missing vital information.
2	The alarm. This corresponds to the decision to raise the alarm.	At approx. 12.15 a.m. the Captain *feels* the ship is doomed. He then decides to C.Q.D.	Approx. 35 minutes after the collision.
N.B. "C.Q.D" which is dah-di-dah-dit dah-di-dah dah-di-dit is designed to operate a telegraph operator's brain for $y = f(x)$ without gaining access to the medium language.			
3	The alarming process begins: In general the alarm transfer time is unspecifiable.	Stations that overhear M.G.Y ("Titanic") give C.Q.D: a. Mount Temple – Ship station, 50 miles off. Receives CQD on position 41.44N. 50.24W. b. Birma – Ship station, 70 miles off. c. Cape Race hears M.G.Y give corrected C.Q.D position: 41.46N. 50.14W. d. Carpathia – Ship station, 58 miles off. (Coincidentally, at 12.25 a.m. wireless operator Harold Cottam calls his friend, & colleague, George Phillips on the Titanic and says: "do you know that Cape Cod is sending messages for you?")	Mount Temple volunteers but is blocked by field ice. Volunteers to assist Advantage of alerting with "all informed"! Carpathia, misses first calls.
4	X_0 = Reception of the alarm X_1 = Assessment of the alarm (i.e. determining the level of need).	Titanic sends "Come at once. We have struck a berg. It's a CQD OM (*it's a distress situation old man*) Position 41.46N. 50.14W." Carpathia says "Shall I tell my Captain? Do you require assistance? Titanic says "Yes, come quick."	Receiving from a trusted entity (Phillips is Cottam's friend). Assessing actual need. Need confirmed.
N.B. The alerting process starts at X_2; it is consecutive to the need which has just been confirmed.			

Table 1: Chronological survey of wireless alerts caused by the S.S. Titanic			
#	General Classification	Particular classification after the inquiry into the loss of the Titanic	Observation
5	X_2 = The *alerting* process begins:	Cottam rushes to the bridge, finds Captain Rostron has gone to bed. Officer on watch bars Cottam from disturbing the Captain; Cottam disregards the order of the officer on watch and rushes the message to the Captain's cabin.	Mustering volunteers.
6	X_3 = Turnout.	Captain Rostron positions the Titanic; turns his ship about; doubles his lookouts, etc., etc.	Volunteering to help.
7	X_4 = Travel time.		Approx. 3 hr., 25 min.
8	Life-saving.	Carpathia is on the scene of the wreck at 4.10 a.m. The lifeboats are scattered over 4 to 5 miles; they are all picked up by 8.00 a.m.	Lives lost : 1490 Lives saved : 711

2.1.2 Implication from $y = f(x)$

The implication from $y = f(x)$ is that alerting problem solutions must be:

1. Centred on *volunteering*, not summonses for help *per se*.
2. Dependent on what people will do, not on what they are supposed to do.
3. Geared to what could, not what should happen.
4. Directed at *self–organisation* with creative mental processes which can neither be discovered nor estimated by *analysis*, *synthesis* or both. Strictly speaking, disaster planning does not go as planned. It cannot be over emphasised that normal systems, routines and procedures must fall short for a disaster to exist (and that disasters can and do, indeed, exist). In which case, it has to be expected that *self-organisation*, thanks to alerting with or without technology, supersedes the ability of established (DRC Type I) organisations to understand circumstances.

   Self-organisation is invaluable as no one – especially not any central supervisor, or co-ordinator – has an eye on the continually evolving availability, whereabouts, knowledge and experience of those that must be alerted. In our case study, Cottam first rushes to the bridge but Rostron – God bless his soul – is in his cabin.
5. Placed upon what is best for the individual; not what is best for the team or company. But because preference works for the team as well, the individual knows whether or not it is to his advantage to be alert all of the time to the needs of the team or company.
6. Qualitatively and quantitatively improved by the all-informed process.

7. Brought about by cerebral connections previously created by the relationship between the people in a *team* with the people in other teams and practices.
8. For reconciling personal objectives and an organisational preference in volunteering by both career and volunteer personnel vis-à-vis problems of safety, health and protection of the environment.

It is absolutely necessary to distinguish between *alarms* and *alerts*. There is a tendency to conflate the two.

2.2 Basis for solving alerting problems today

It is certainly a hard task to conquer the spirit of self-righteousness which puts all the blame for ineffective action on equipment that is archaic, not “interoperable” or both. And where this spirit reigns, one might well ask how PLAN[1], “interoperability” or both will improve matters when normal systems, routines and procedures fall short in practice.

[1] Acronym for Personal Localized Alert Network (See: Pamphlet No. 2).

Some government officials are quite prepared to talk with marked self-confidence about the usefulness in disasters of such things as PLAN and “interoperability”, but they do not know what they are talking about. They have got – as engineers would say – no know-how.

People, including so-called “first responders”, neither create nor can capture context completely, especially not in crises.

A crisis is a breakdown in the ability to make life-saving messages meaningful – in which case, in a crisis response period, gaining access to the medium of language technologically is suspended until the people involved reconquer the ability to make at least some meaning out of the situation they are in.

There are times when there are far too many scattered parts to the problem of making sense, and, then, central supervisors and co-ordinators naturally know neither what to say nor what to do. But in such situations, people are a source of new possibilities and capable of *self-organisation.*

Self-organisation, as described in Pamphlet No. 1, occurs without any apparent preparation. In fact, a subconscious labour is always taking place in life.

The professionals of safety, security, or both, have to expect *self-organisation* on the grounds that their knowledge and that of central supervisors and co-ordinators about what has happened, is happening and could happen, is incomplete, and, therefore, despite careful planning, descriptions of social actions reveal that the problem of protecting life and country has had to deal with information that is incomplete, if not absolutely wrong.

The above findings are drawn from 50 years of painstaking research by scientists all over the world. Vis-à-vis the problem of controlling information, they substantiate the need to determine what is achieved humanly before looking into what is achieved technically.

2.2.1 Apprehending information problems in a world of hi-tech.

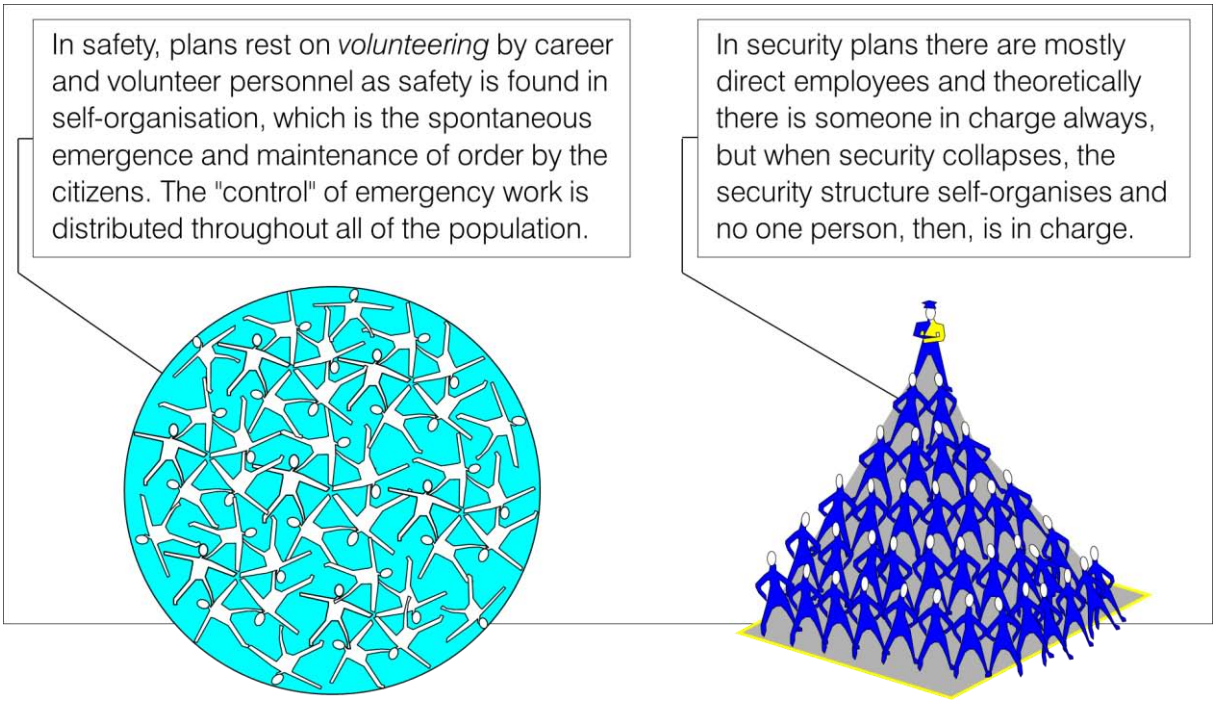
Construing how technology can help – or endanger – life and country requires tying in faith-based relationships and the knowledge of behavioural scientists. A vast amount of empirical and explicit information about how safety is ensured, or jeopardised, already exists, and this information must be used to extrapolate realistically the behavioural responses that critical information problems and gaps in vital information solicit.

Realistic extrapolation requires stating the premise of departure; if it is faulty, then the extrapolation will be wrong too.

When we agree that the information that appears most readily when there are gaps in vital information is the one that serves self-organisation, not central supervision, or co-ordination, we are then in a position:

1. to foresee what people can – and cannot – do with more and newer technology,

2. to accept that non-spontaneous responses start just at the moment when spontaneous responses finish, i.e., when self-organisation is superseded by established organisation,
3. to distinguish between alertness for the sake of *safety* and intelligence for the sake of *security*,
4. to recognise that information flows for the sake of *safety* and flows of intelligence for the sake of *security* need not, are not and cannot be controlled with the same technology, precision and organisation, and
5. to plan for safety differently than for security because, in reality, safety is found both in spontaneous and non-spontaneous responses, whereas security is found in deliberate response (i.e. non-spontaneous, specific responses).



Other than hazard types, different organisational principles give rise to significant differences in how alerting problems are solved.

Safety is for oneself and one's entourage or company; security is for a political entity. Officials overlook this basic difference in function and, in their views, the difference between *safety* and *security* is just in degree, not in nature. A differentiation of the two functions is a matter of fact and, once this is accepted, everything else about vital signals and safety on the one hand, and critical intelligence and security on the other hand, falls into place.

2.2.2 Connection paths in $y = f(x)$

With information-mediating technology, the goal of obtaining vital information can be achieved only if there is a *path* to someone who is *competent and ready to supply the information* that is needed.

A *path* is what is used by a *signal* to get from one point to another. A path is a feature of a connection. The idea that a path is the same thing as a connection is quite misleading. Grandma and her grandchildren are connected (i.e. related) regardless of whether or not there is a ready path between them.

The word “path” is used for the trajectories taken by signals, e.g. radio propagation path. Any adjective plus “connection” describes a signalling process between endpoints e.g., “packet-switched connection”, “wireless connection”, or even “bad connection”.

Signal paths are in constant flux and escape control. They pass through different mediums such as, for example, cyberspace, the fixed and mobile telephone service infrastructure and the television broadcasting network.

An uncontrollable factor arising from human activity, as with information technology, is that paths are impossible to guarantee; paths used by signals are as random as the course of gossip and notoriously variable and unreliable. And, moreover, it is impossible to eliminate a connection.

There is no point of inserting elaborate security as a substitute for trust. Trust is not – as commonly assumed – substitutable. Indeed, encryption and access rights are set up where there is distrust.

Furthermore, officials in charge cannot ignore the fact that common node systems depend on cyberspace. Although cyberspace is certainly useful, its drawback stems from the fact that it is incomprehensible, and when something goes wrong, a harmless situation can suddenly turn into a catastrophe.

In a world of high tech, whether or not $y = f(x)$ in a crisis – or in any other situation for that matter – is an open question. But it is nevertheless not so open as to be unaffected by certain principles as to how vital information is obtained in emergencies and disaster situations.

Now if, alerts are for relating *vital* information to the brain and the resulting cerebral activity to effective action (i.e. $y = f(x)$) as, for example, in Chief Laurence Hatton who said, “Well, what you do is, if you are going to a normal alarm, you are just thinking about where the address is. If you have any indication it is a working fire you size it up. At least I do a mental size-up. In other words, you start thinking about it is two o'clock in the morning, there is a possibility that, if it is a residence building, that people are probably in bed. There is probably going to be a life hazard on the second floor. It is cold out. The rooms are all going to be shut. Delayed discovery, ice on the roads; it is going to take longer for the trucks to get there. These are all things that you think about as you are going to respond to the firehouse or respond to the fire” (Laurence Hatton

interviewed by Margaret Dildilian, (2004). *Answering The Call: The History of The Port Washington Volunteer Fire Department, Transcript of Oral History Interview with Laurence Hatton, Flower Hill Hose Company No.1*, Port Washington Fire Department, Inc. & Port Washington Public Library, 2006, p. 70).

Then, and regardless of whether or not the foregoing accurately describes what an Incident Commander (IC) does on his way "to a normal alarm", one thing is sure; (Set x) is a self-organising set which is effectively organised by myriad control signals spontaneously received and generated from the memory, the heart, the lungs, the stomach, the throat, the skin, the feet, the hands, the ears, the eyes, the nose and all other avenues of stimulus and sensory perception.

And, since such self-organisation must be a function of x, what has to be safeguarded in x for y to self-organise as required in emergencies are the *paths*, and there are, broadly speaking, no *paths* to vital control signals that are easier to establish and safeguard than those which access neither the medium of language nor the digital domain of cyberspace or any other underlying telecommunication network that has one or more common nodes.

2.3 Keeping mind over matter

Kenneth Boulding observed:

> "*The bit ... abstracts completely from the content of information ... and while it is enormously useful for telephone engineers ... for purposes of the social system theorist we need a measure which takes account of significance and which would weight, for instance, the gossip of a teenager rather low and the communications over the hot line between Moscow and Washington rather high.*" (Frank Webster – *Theories of the Information Society*, Second Edition, Routledge, 2002, pp. 25).

More crucially, volunteer and career personnel in a public safety circle need – and with radio-paging some do indeed have – an alerting platform that quickly and accurately measures the weight of the communication of a road accident as low, and that of a nuclear accident as high.

In well prepared civil safety circles, emergency call service alerts are signals sent with the same immediacy in each of these two events. Vastly different responses are obtained with a single call and the same quantity of information sent because, consistent with the basics of alerting, the goal of each signal is established beforehand and, therefore, it suffices to send the right signal to obtain an adequate response. Trained volunteer and career fire and rescue service personnel who use paging correctly are ready to accept signals and to provide the prescribed response guided by the consecutiveness of the activity which emerges on the "all-informed" and "tactical" channels associated with the alerting platform.

A facility that alerts will specify one alert for commanding the attention of the entire emergency force. If this capability is wrecked, or not comprehensive in any way, connecting co-operating human minds speedily is no longer possible.

There should be only a few different kinds of alerts for other purposes. It is quite unnecessary to set up more than a strict minimum number, because there are many alternative *paths*, both around and through the medium of language, for sending information that is less than vital.

3 Summary

Alerting problems are as old as life itself, but thanks to the whole movement towards wireless, they have changed radically, both in their nature and in their range and, despite the technological wonders of today, it is fair to say that they are more acute than they were ever before.

For this there are a number of reasons. From a communication regulation perspective, the most important is that very little, not to say no, consideration is given to how alerting problems actually present themselves to people. In spite of the great amount of work that has been carried out on the subject of passing information safely and securely since Shannon[2], there is still a need for much more research into what can pass information indirectly without obscuring valid perceptions and this in such a way that it will be safe to assume that the procedure is of *service* instead of a disservice.

It is not unusual, especially during the early stages when practice is not guided by existing knowledge derived from research, that intervention suppresses the symptoms without treating the condition. This often is the case, for example, in the medical profession where recent discoveries arrived at through decades of research underscore the fact that sound medical practice is beyond the competence of many doctors and nurses.

The point is that compared to the mysticism of communication, the material of organisms is a model of simplicity and that communication regulators, and also the Paging Industry, therefore, cannot hope to solve today's alerting problems by always talking about technology only.

Clearly, the search for appropriate technologies to solve today's alerting problems has to be guided by historical evidence and local politics performed with an indigenous eye, and not by errors of common sense only.

Edouard Dervichian, Business Development, 01-08-2011

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[2] C. E. Shannon (1948). *A Mathematical Theory of Communication*. The Bell System Technical Journal, pp 379 – 423, July 1948 No.3, and pp. 623 – 657, October 1948 No.4 Vol. XXVII.

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