



Building ALARA culture as a tool for effective risk communication

Sotirios Economides
Greek Atomic Energy Commission
Licensing & Inspections Department

The issue...

Management of radiation risk

Priority when planned, emergency or existing exposure situations are concerned

Risk Communication

Becomes challenging



The issue...

Management of radiation risk

Priority when planned, emergency or existing exposure situations are concerned

Risk Communication

Becomes challenging

- Radiation is invisible



The issue...

Management of radiation risk

Priority when planned, emergency or existing exposure situations are concerned

Risk Communication

Becomes challenging

- Radiation is invisible
- Lack of awareness



The issue...

Management of radiation risk

Priority when planned, emergency or existing exposure situations are concerned

Risk Communication

Becomes challenging

- Radiation is invisible
- Lack of awareness
- Biological effects



The issue...

Management of radiation risk

Priority when planned, emergency or existing exposure situations are concerned

Risk Communication

Becomes challenging

- Radiation is invisible
- Lack of awareness
- Biological effects
- Perceived risk



The issue...

Management of radiation risk

Priority when planned, emergency or existing exposure situations are concerned

Risk Communication

Becomes challenging

- Radiation is invisible
- Lack of awareness
- Biological effects
- Perceived risk

Risk in most of the cases is automatically related to **hazard**



Hazard Vs Risk

Different definitions:

Hazard: a situation that poses a level of threat to life, health, property, or environment (wikipedia)



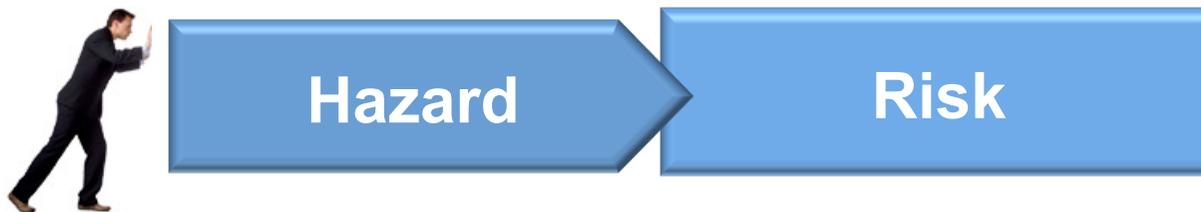
Hazard Vs Risk

Different definitions:

Hazard: a situation that poses a level of threat to life, health, property, or environment (wikipedia)



Risk: the potential that a chosen action or activity (including the choice of inaction) will lead to a loss/undesirable outcome (wikipedia)



Existing exposure situations

A situation of exposure which already exists when a decision for control needs to be taken (natural background, residual radioactive material from past practices).

For exposure situations like



typical implementation

of radiation protection is relatively **complex:**

Existing exposure situations

A situation of exposure which already exists when a decision for control needs to be taken (natural background, residual radioactive material from past practices).

For exposure situations like



practical implementation

of radiation protection is relatively **complex:**

- May involve several exposure pathways



Existing exposure situations

A situation of exposure which already exists when a decision for control needs to be taken (natural background, residual radioactive material from past practices).

For exposure situations like



practical implementation

of radiation protection is relatively **complex:**

- May involve several exposure pathways
- Generally give rise to wide distributions of annual individual doses

Existing exposure situations

A situation of exposure which already exists when a decision for control needs to be taken (natural background, residual radioactive material from past practices).

For exposure situations like



practical implementation

of radiation protection is relatively **complex:**

- May involve several exposure pathways
- Generally give rise to wide distributions of annual individual doses
- In many cases the behavior of the exposed individuals determines the level of exposure

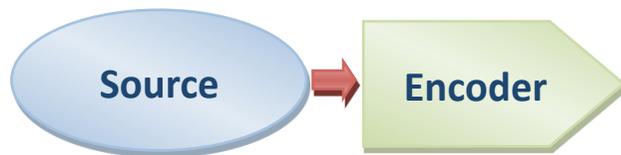


The Communication model (Shannon-Weaver, 1947)

Source

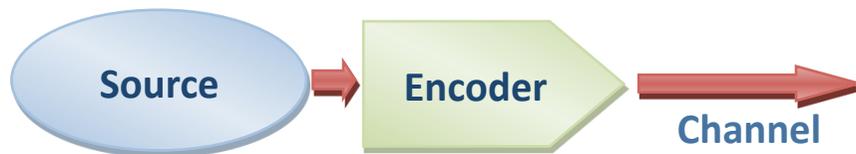
The source of communication is the initiator, or origin, that puts the model into action. It is an individual or group that has a specific reason (message) to begin the communication process.

The Communication model (Shannon-Weaver, 1947)



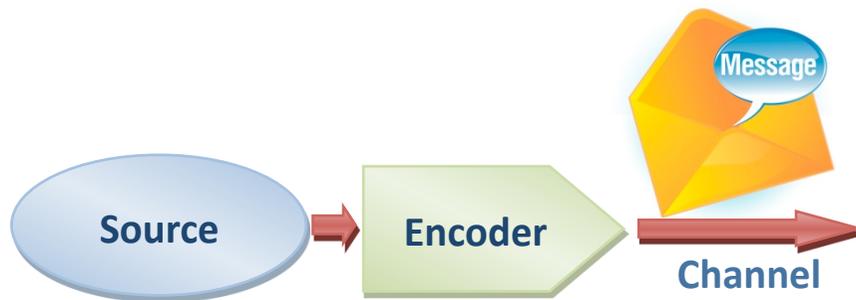
It takes the concept that the source wants sent out, and puts it into a suitable format for later interpretation.

The Communication model (Shannon-Weaver, 1947)



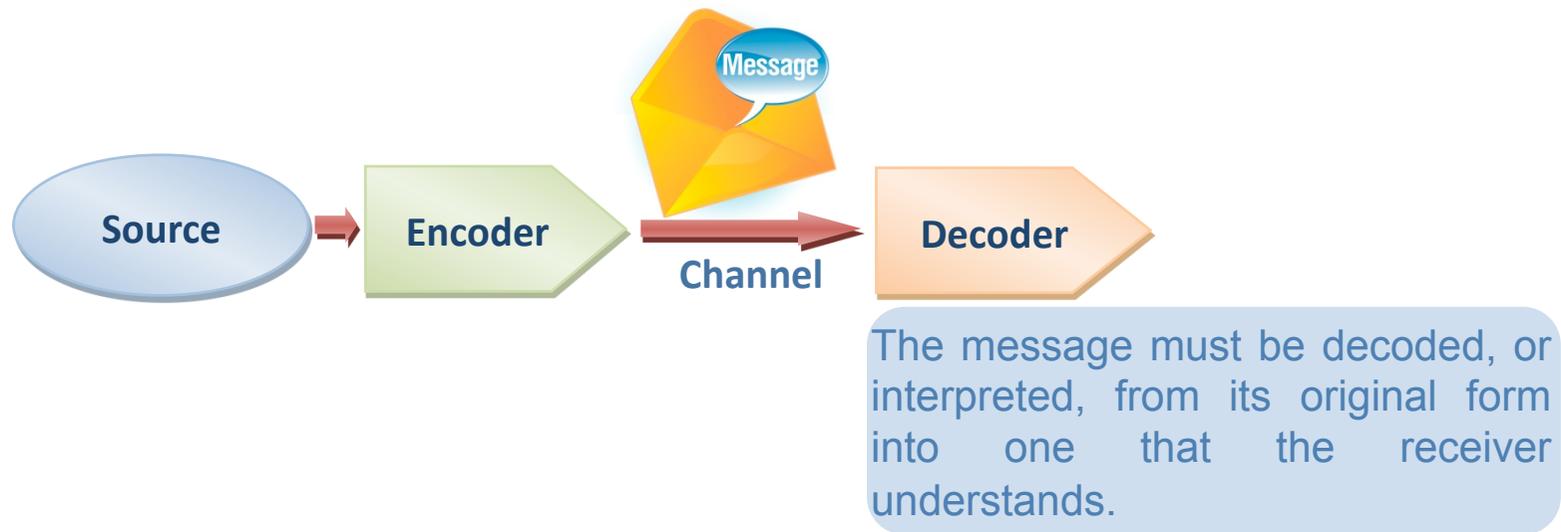
The channel is the route that the message (verbal, written, electronic, etc.) travels on.

The Communication model (Shannon-Weaver, 1947)

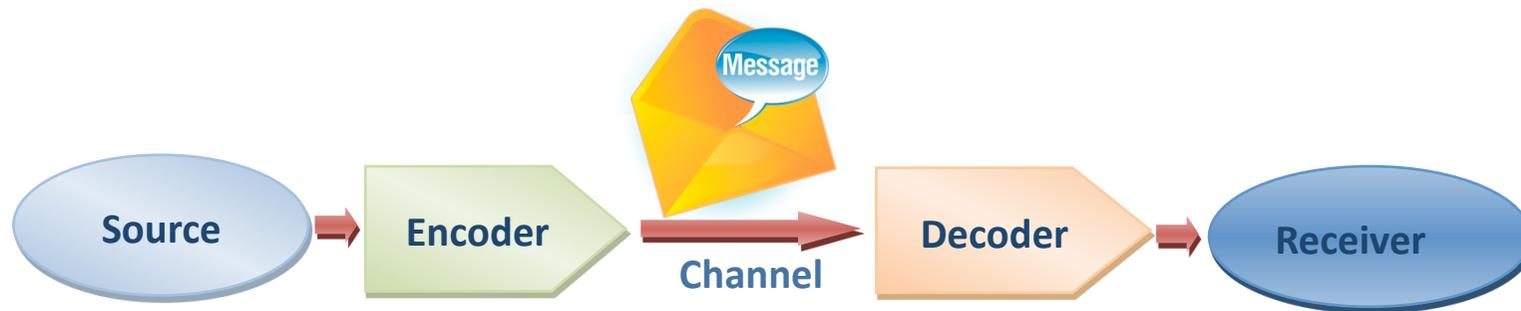


The information, idea, or concept that is being communicated from one end of the model to the other.

The Communication model (Shannon-Weaver, 1947)



The Communication model (Shannon-Weaver, 1947)



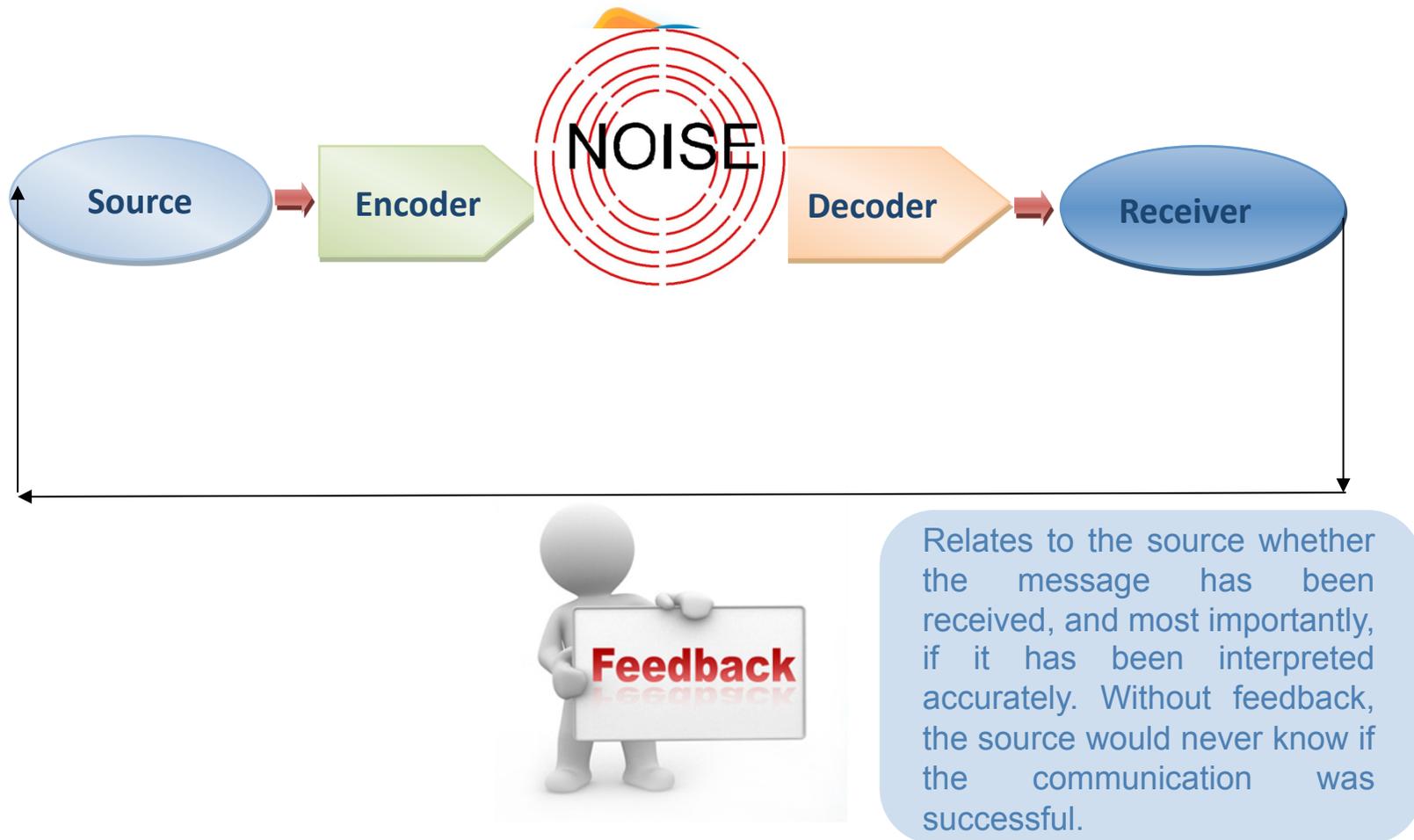
In order for communication to be executed, there must be a second party at the end of the channel the source has used.

The Communication model (Shannon-Weaver, 1947)



An interference or distortion that changes the initial message. Noise can be physical, as in an actual sound that muffles the message as it is being said, or it can be semantic, like if the vocabulary used within the message is beyond the knowledge spectrum of its recipient.

The Communication model (Shannon-Weaver, 1947)



Risk communication

A two-way, interactive and long term process, where the public and risk communicators are engaged in a dialog, rather than acting as senders and receivers (Bradbury 1994).

When it is applied effectively:

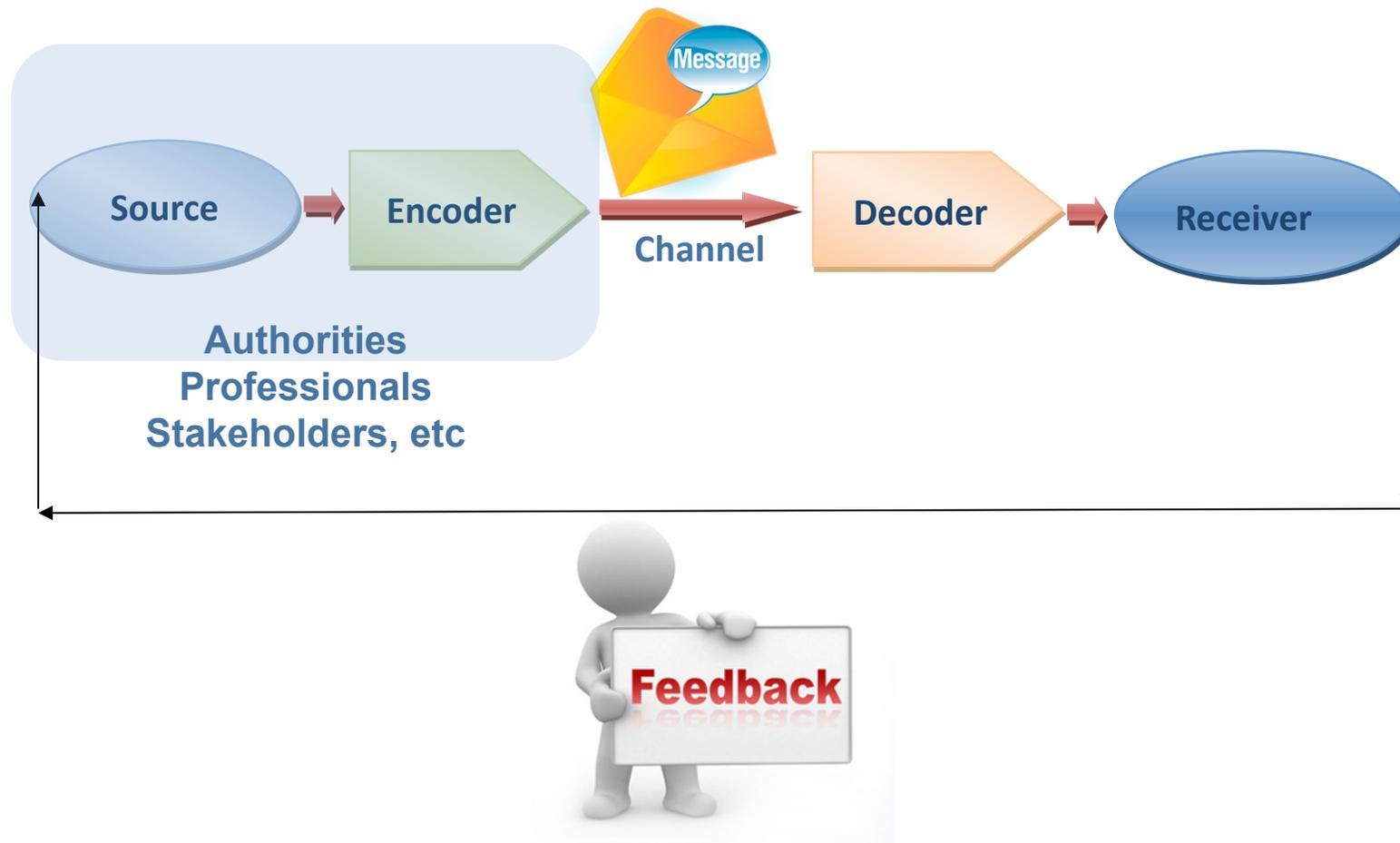
- successful implementation of the required protective actions and measures by people at risk
- reassures individuals who are not directly at risk by reducing rumors and fears
- facilitates relief efforts
- safe path for the organizations involved towards public trust and confidence.

If the goal of risk communication is to **manipulate (influence)**, the audience may feel resentful and distrustful and the risk message may be discounted. The communicators credibility may also be a casualty (NRC 1989).

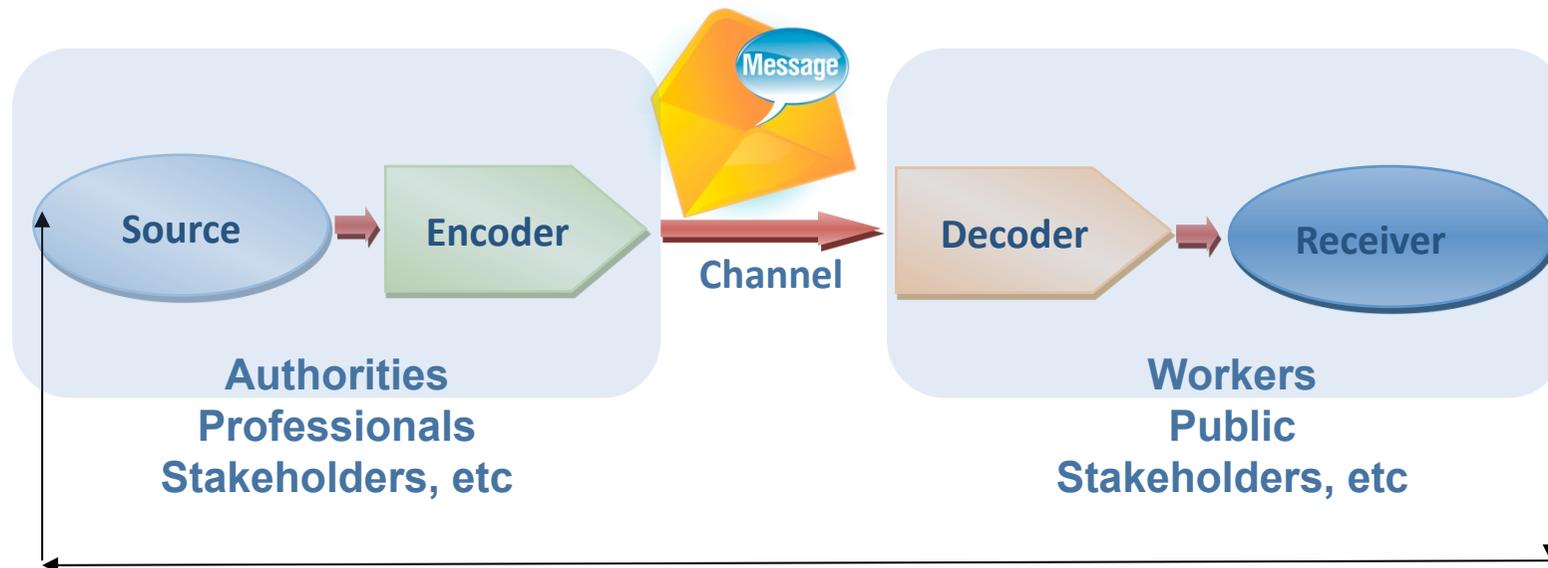
Exchange of reliable **information** and ideas assist the audience in making judgments and risk management decisions.



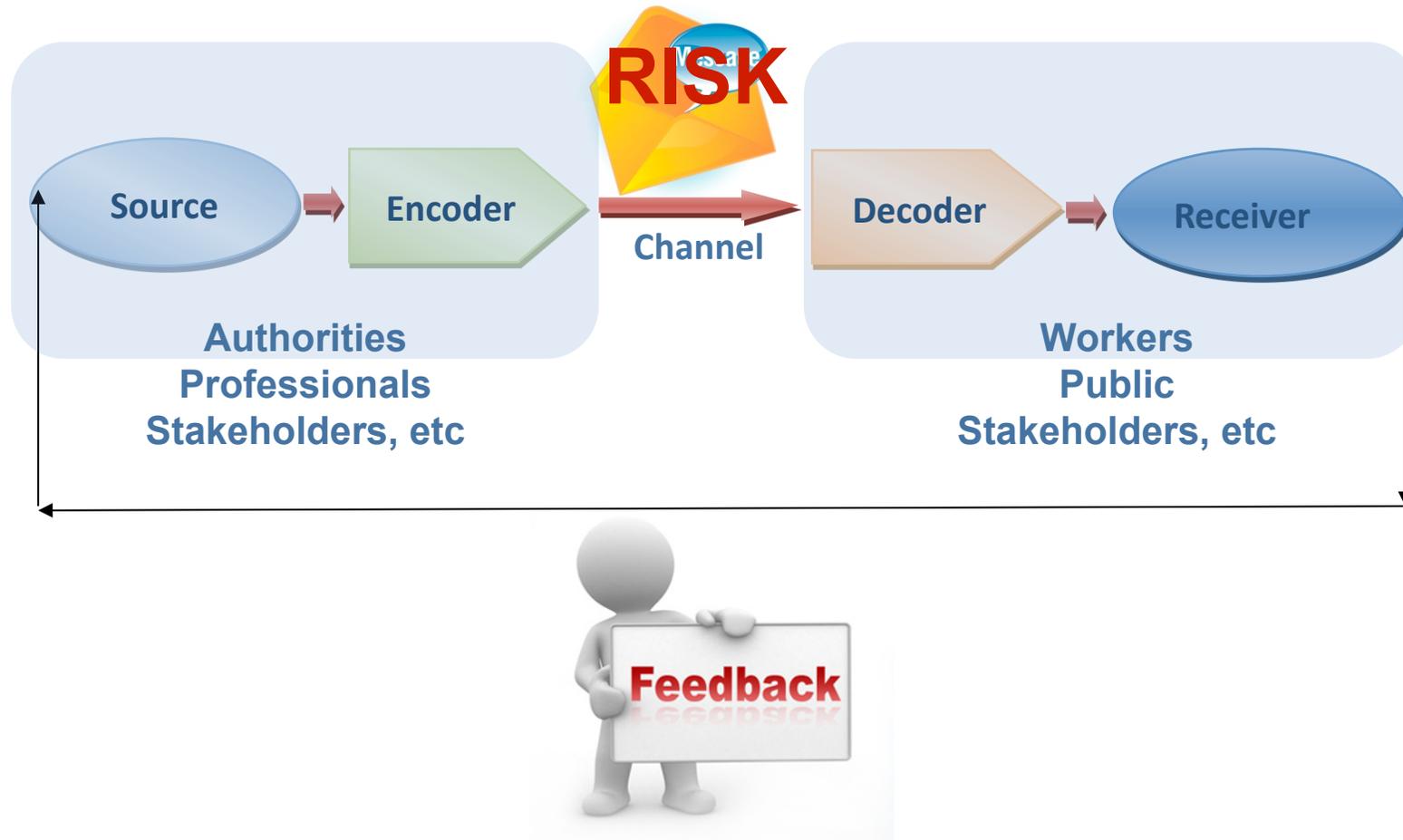
The Communication model (Shannon-Weaver, 1947)



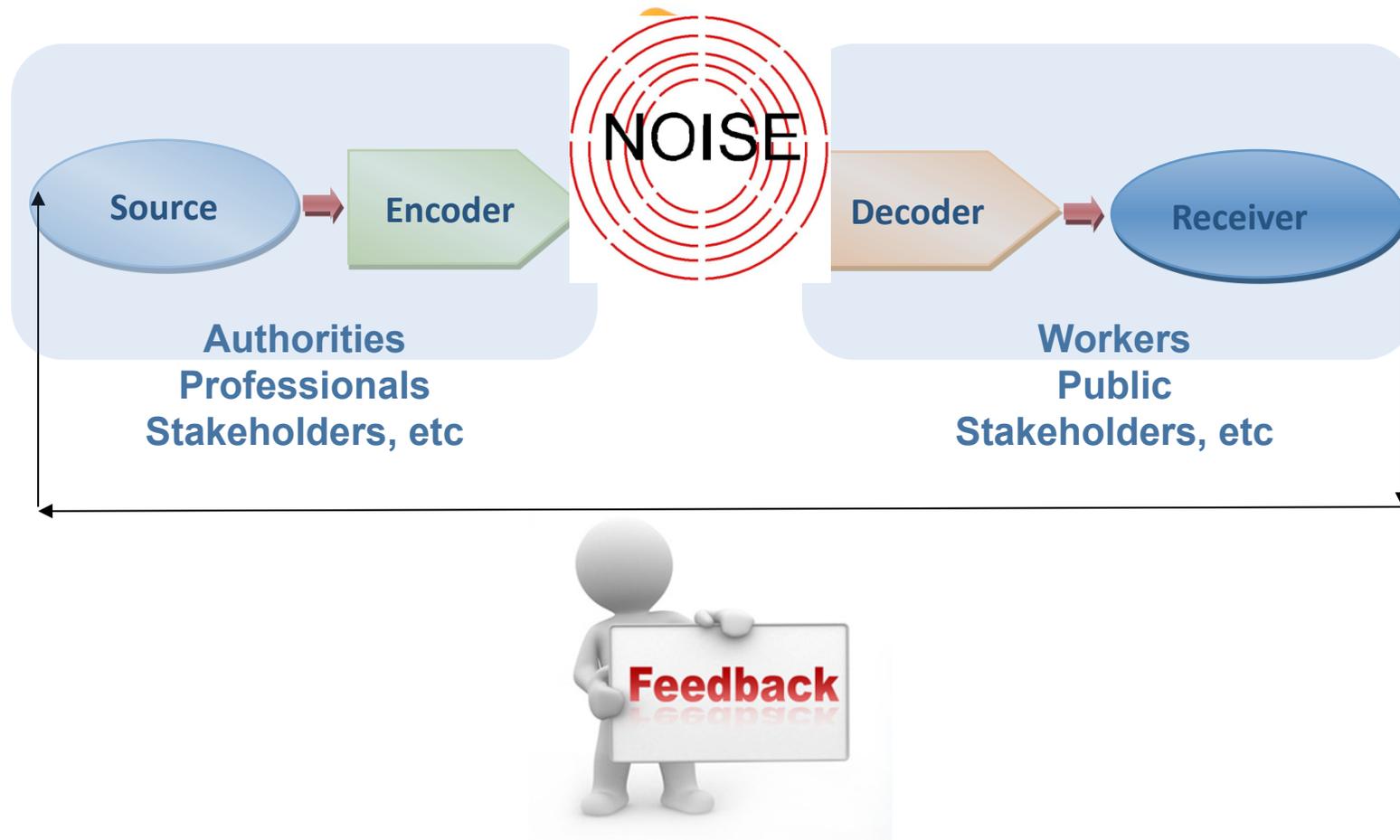
The Communication model (Shannon-Weaver, 1947)



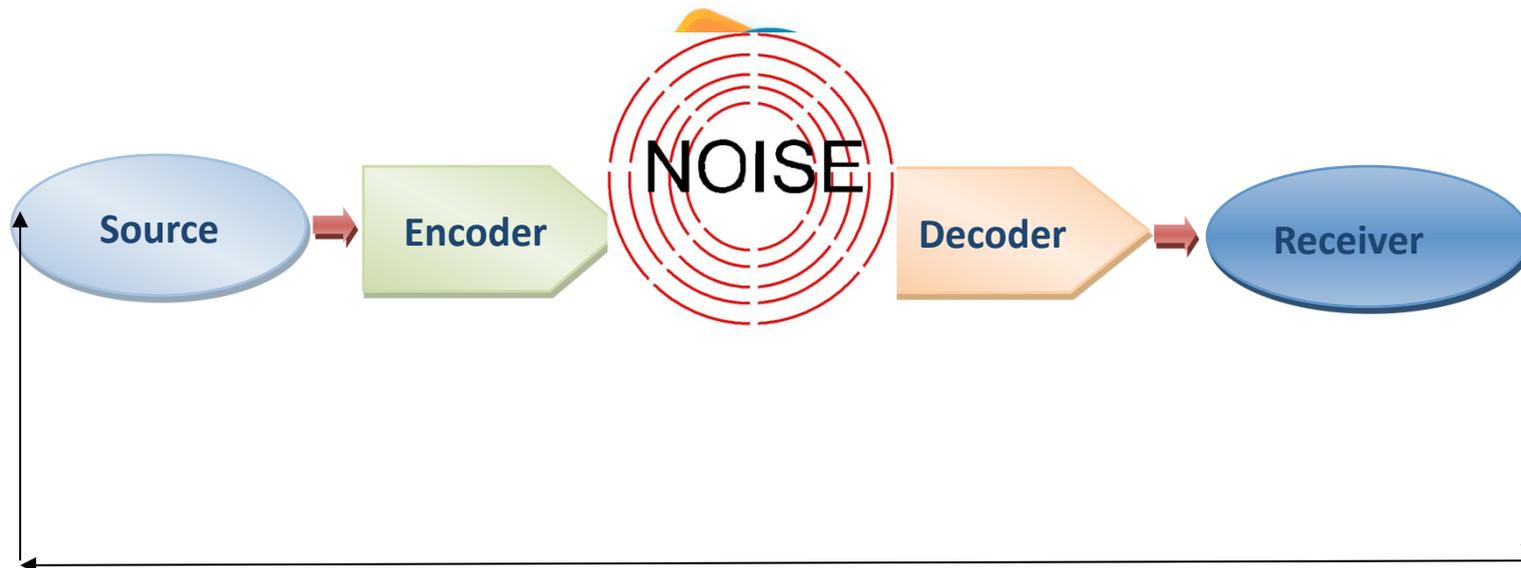
The Communication model (Shannon-Weaver, 1947)



The Communication model (Shannon-Weaver, 1947)



The Communication model (Shannon-Weaver, 1947)



Are all the parts of the communication chain ready?



Risk communication and ALARA culture

ALARA culture can effectively facilitate communication procedures, independently of the type of exposure addressed.



Risk communication and ALARA culture

ALARA culture can effectively facilitate communication procedures, independently of the type of exposure addressed.



It is a reference framework, a state of mind and attitude which among others allows an individual and/or an organization to act in a responsible way in order to manage radiation risks and giving radiation protection the priority it should have.

Risk communication and ALARA culture

ALARA culture can effectively facilitate communication procedures, independently of the type of exposure addressed.



It is a reference framework, a state of mind and attitude which among others allows an individual and/or an organization to act in a responsible way in order to manage radiation risks and giving radiation protection the priority it should have.

It is characterized by risk awareness, balanced judgment of risks and benefit, capability to develop and use required skills and tools for risk assessment and management, balance of resources and economic and social considerations.

Risk communication and ALARA culture

Certain **elements contributing to ALARA culture** should be taken in to account when risk management strategies regarding existing exposure situations (and not only) are to be developed and applied:

- **ATTITUDES & BEHAVIOR**

Influenced by different cultural backgrounds, personal opinions, existing economic and social conditions or exposure situations.

This can explain differences in the degree of ALARA implementation, as well as of risk communication strategies and procedures among individuals, organizations and countries.

Positive attitudes: Questioning attitude, openness, transparency, commitment to dose reduction



Risk communication and ALARA culture

Certain **elements contributing to ALARA culture** should be taken in to account when risk management strategies regarding existing exposure situations (and not only) are to be developed and applied:

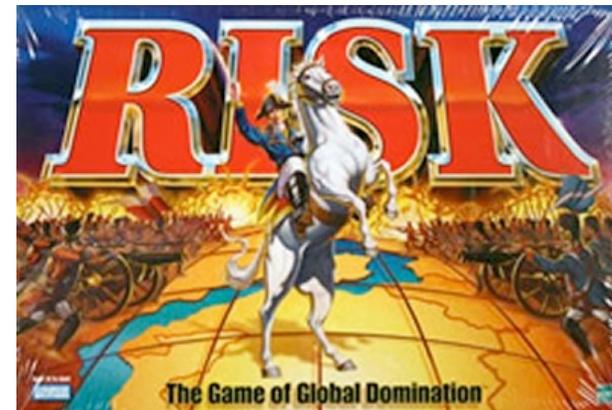
- **ATTITUDES & BEHAVIOR**
- **EDUCATION & TRAINING**



Risk communication and ALARA culture

Certain **elements contributing to ALARA culture** should be taken in to account when risk management strategies regarding existing exposure situations (and not only) are to be developed and applied:

- **ATTITUDES & BEHAVIOR**
- **EDUCATION & TRAINING**
- **RISK AWARENESS**



- It is the basis of ALARA culture.
- Need to reach a common understanding of radiation risk among all the stakeholders involved in the exposure situations.
- The degree or level of knowledge has to be adopted to the situation, the level of responsibility, the required competences in radiation protection etc.

Risk communication and ALARA culture

Certain **elements contributing to ALARA culture** should be taken in to account when risk management strategies regarding existing exposure situations (and not only) are to be developed and applied:

- **ATTITUDES & BEHAVIOR**
- **EDUCATION & TRAINING**
- **RISK AWARENESS**
- **ENGAGEMENT AND PARTICIPATION OF STAKEHOLDERS**



Different categories of stakeholders can be identified, such as:

- Competent authorities
- Licensees
- Public
- Manufacturers, suppliers and designers
- Radiation protection professionals
- Professional associations
- Exposed workers



Risk communication and ALARA culture

Certain **elements contributing to ALARA culture** should be taken in to account when risk management strategies regarding existing exposure situations (and not only) are to be developed and applied:

- **ATTITUDES & BEHAVIOR**
- **EDUCATION & TRAINING**
- **RISK AWARENESS**
- **ENGAGEMENT AND PARTICIPATION**
- **DISSEMINATION OF INFORMATION**



"We can't 'send' at the moment, the system's crashed"

Risk communication and ALARA culture

Certain **elements contributing to ALARA culture** should be taken in to account when risk management strategies regarding existing exposure situations (and not only) are to be developed and applied:

- **ATTITUDES & BEHAVIOR**
- **EDUCATION & TRAINING**
- **RISK AWARENESS**
- **ENGAGEMENT AND PARTICIPATION OF S**
- **DISSEMINATION OF INFORMATION**
- **LESSONS LEARNED**



" What did you take away from the meeting ? "

Risk communication and ALARA culture

Certain **elements contributing to ALARA culture** should be taken in to account when risk management strategies regarding existing exposure situations (and not only) are to be developed and applied:

- **ATTITUDES & BEHAVIOR**
- **EDUCATION & TRAINING**
- **RISK AWARENESS**
- **ENGAGEMENT AND PARTICIPATION OF STAKEHOLDERS**
- **DISSEMINATION OF INFORMATION**
- **LESSONS LEARNED**



Risk communication and ALARA culture

Certain **elements contributing to ALARA culture** should be taken in to account when risk management strategies regarding existing exposure situations (and not only) are to be developed and applied:

- **ATTITUDES & BEHAVIOR**
- **EDUCATION & TRAINING**
- **RISK AWARENESS**
- **ENGAGEMENT AND PARTICIPATION OF STAKEHOLDERS**
- **DISSEMINATION OF INFORMATION**
- **LESSONS LEARNED**



Risk communication and ALARA culture

Certain **elements contributing to ALARA culture** should be taken in to account when risk management strategies regarding existing exposure situations (and not only) are to be developed and applied:

- **ATTITUDES & BEHAVIOR**
- **EDUCATION & TRAINING**
- **RISK AWARENESS**
- **ENGAGEMENT AND PARTICIPATION OF STAKEHOLDERS**
- **DISSEMINATION OF INFO**
- **LESSONS LEARNED**

Competent authorities, professional organizations, education and training organizations, national and international networks, etc. play an important role in the dissemination of ALARA culture elements.

WG on ALARA culture

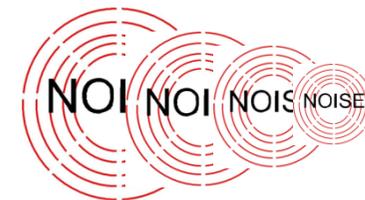
The objective is to maintain and further develop a high level of radiation protection by:

- promoting the ALARA culture in all fields of application,
- implementing the ALARA principle into practice, and
- analyzing feedback from implementing ALARA in various sectors.



In conclusion....

- Risk communication may be proved to be challenging in the case of existing exposure situations.
 - The optimization of radiation protection is complex (exposure pathways, distribution of doses, behaviors).
 - Requires the involvement of new stakeholders (knowledge on radiation risk and ALARA philosophy?)
- ALARA culture can be used as a tool for risk communication. It includes specific elements which can improve:
 - the encoding and decoding of the information provided
 - the creation of an effective communication channel
 - the reduction of noise



In conclusion....

- Stakeholders involved in existing exposure situations must be aware of radiation risk and ALARA philosophy:
 - Education & training
 - Dissemination of information
 - Feedback
- The role of Competent authorities, licensees, radiation protection professionals, national and international networks (EAN, EAN NORM, ERPAN), etc is crucial regarding the dissemination of ALARA culture.





for your attention!



References

1. S. Economides, F. Hardeman, C. Nuccetelli, S. Risica, C. Schieber, A. Schmitt-Hannig, E. Vermeersch, Development and Dissemination of ALARA culture, IRPA 13 International Congress, Glasgow, 2012.
2. European ALARA Network Workshop, Experience and new Developments in Implementing ALARA in Occupational, Patient and Public Exposures, Prague, Czech Republic, 12-15 September 2006.
3. International Atomic Energy Agency, Communication with the Public in a Nuclear or Radiological Emergency, IAEA, Vienna, 2012.
4. International Atomic Energy Agency, Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards, General Safety Requirements Part 3 (Interim), IAEA, Vienna, 2011.
5. International Commission on Radiological Protection, The 2007 Recommendations of the ICRP, Publication 103, 2008
6. International Commission on Radiological Protection, Application of the Commission's Recommendations to the Protection of People Living in Long-term Contaminated Areas after a Nuclear Accident or a Radiation Emergency, ICRP Publication 111, 2009.

