



# DEFENSE LOGISTICS AGENCY

AMERICA'S COMBAT LOGISTICS SUPPORT AGENCY



## Early Warning Systems A Deconstruction

November 6, 2013

Mr. Thomas Rasmussen



# Definition

A chain of information communication systems comprising sensor, detection, decision, and broker subsystems, in the given order, working in conjunction, forecasting and signalling disturbances adversely affecting the stability of the physical world; and giving sufficient time for the response system to prepare resources and response actions to minimise the impact on the stability of the physical world (Waidyanatha, 2010).



# Deconstruction

## Components

- A chain of information communication systems
  - sensor,
  - detection,
  - decision, and
  - broker subsystems,

## Actions

- Subsystems work in conjunction,
- Forecasting and signaling disturbances
- Provide sufficient time to prepare and respond



# Components

- Sensor, a converter that **measures a physical quantity** and converts it into a signal which **can be read** by an observer or by instrument<sup>1</sup>
- Detection, **quantification** of the ability **to discern** between information-bearing patterns and **random** patterns that distract from the information<sup>2</sup>
- Decision **identifying** the **values**, **uncertainties** and other issues relevant in a given decision, its **rationality**, and the resulting optimal decision<sup>3</sup>
- Broker an intermediary program which **translates** the language of a system from one internationally **recognized** language to another by way of a telecommunications medium<sup>4</sup>

<sup>1</sup>Wikipedia, **Sensor**, <http://en.wikipedia.org/wiki/Sensor>, Recovered October 30, 2013

<sup>2</sup>T. H. Wilmshurst (1990). **Signal Recovery from Noise in Electronic Instrumentation** (2nd ed.). CRC Press. pp. 11 ff. ISBN 0-7503-0058-2

<sup>3</sup>Wikipedia **Decision theory**, [http://en.wikipedia.org/wiki/Decision\\_theory](http://en.wikipedia.org/wiki/Decision_theory), Recovered October 30, 2013

<sup>4</sup>Wikipedia **Message broker**, [http://en.wikipedia.org/wiki/Message\\_broker](http://en.wikipedia.org/wiki/Message_broker), Recovered October 30, 2013



# Actions

- Subsystems work in conjunction,
- Forecasting and signaling disturbances
  - Forecasting: making statements about events whose actual outcomes have not yet been observed<sup>1</sup>
    - “Risk and uncertainty are central to forecasting”<sup>2</sup>
  - Signaling: a function that conveys information about the behavior or attributes of some phenomenon<sup>3</sup>
- Provide sufficient time to prepare and respond
  - Sufficient preparation time may require reliance on risky and uncertain (uncomfortable) forecasts.

<sup>1</sup>Wikipedia, Forecasting, <http://en.wikipedia.org/wiki/Forecasting>, Recovered October 30, 2013

<sup>2</sup> Ibid

<sup>3</sup>Wikipedia, Signal\_(electronics), [http://en.wikipedia.org/wiki/Signal\\_\(electronics\)](http://en.wikipedia.org/wiki/Signal_(electronics)), Recovered October 30, 2013



# DEFENSE LOGISTICS AGENCY

AMERICA'S COMBAT LOGISTICS SUPPORT AGENCY

