


# › CBRN SENSOR EVALUATION

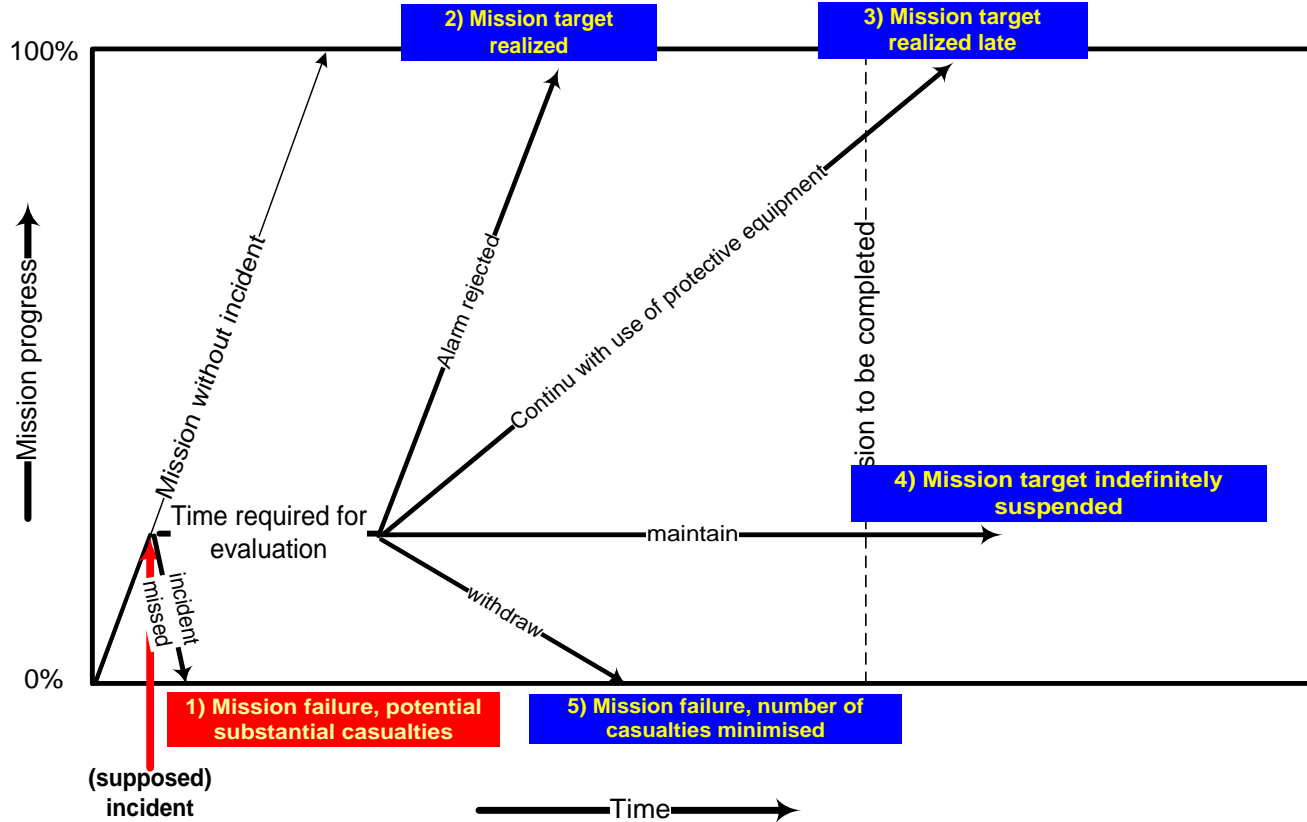
improved situational awareness | Dr.Ir. A.L. van Wuijckhuijse

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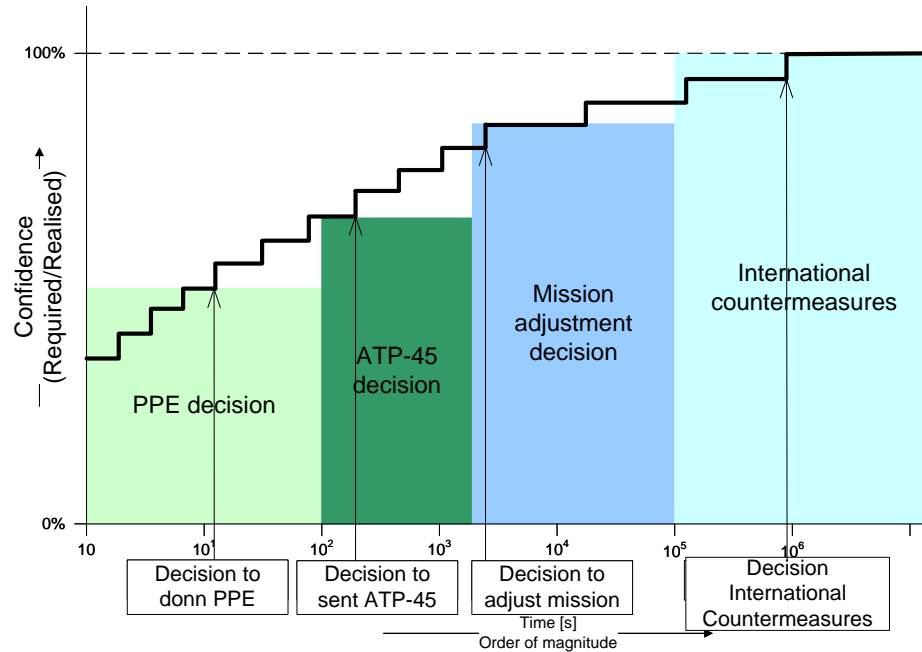
# INTRODUCTION

- › Situational awareness is required for operational decision making
  - › Situational awareness is obtained by
    - › Intelligence
    - › Detection
    - › Threat analysis
    - › Professional experience
- 
- DIM architecture

# EFFECT DETECTION EVENT ON MISSION

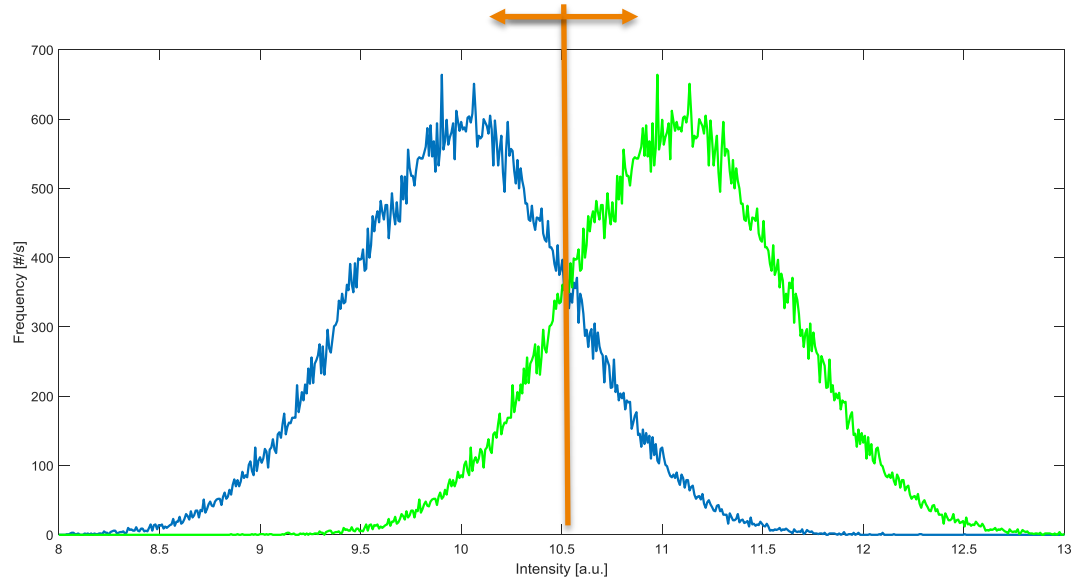


# REALISED/REQUIRED/DESIRED DIM CONFIDENCE



# DETECTION EVENTS

- › True positive
- › False positive
- › True negative
- › False negative
- › Alarm detection
  - › MEG
    - › Catastrophic
    - › Critical
    - › Marginal
    - › Negligible
- › Unnecessary detection

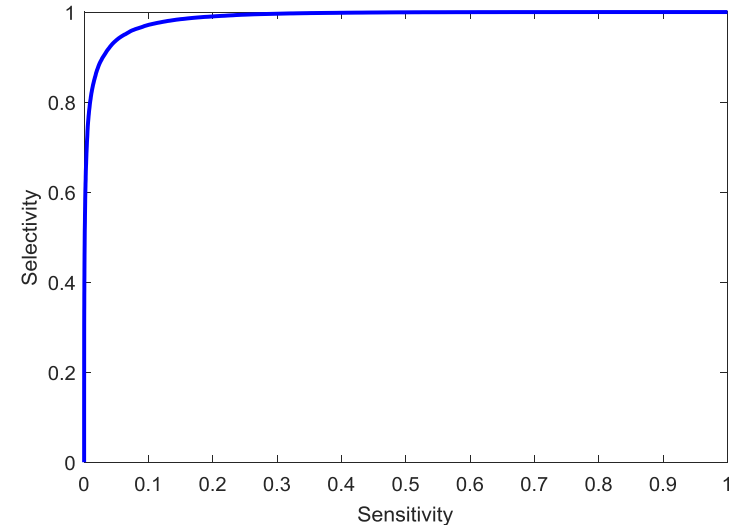


# SENSOR EVALUATION

- › Determination of sensor performance under certain challenge and background conditions
- › Level of detection dependant on anticipated use of sensor signal
- › Required confidence depends on action based upon input. Not assessed in current evaluation

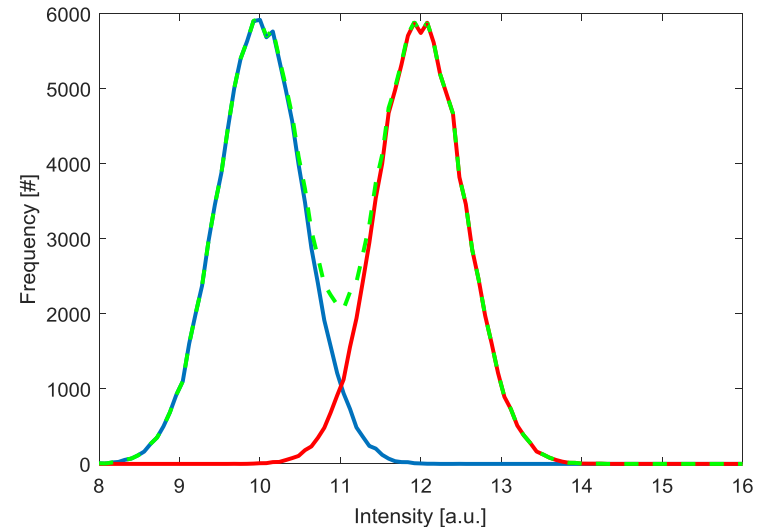
# RECEIVER OPERATOR CHARACTERISTIC BASED EVALUATION

- › Sensor characterized by four interdependent variables
  - › Response time
  - › Sensitivity
  - › Probability of Detection
  - › Specificity



# COMPONENTS SENSOR SIGNAL

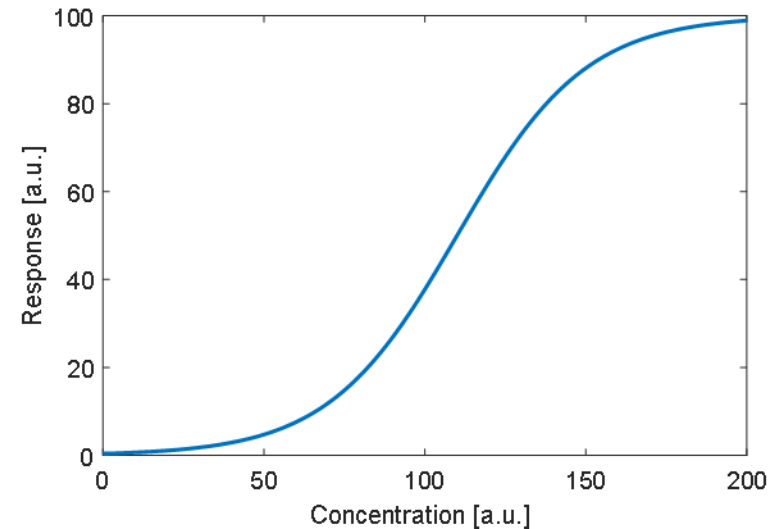
- › Sensor signal
  - › Electronic noise
  - › Clutter
    - › Influences of the environment
  - › Signal



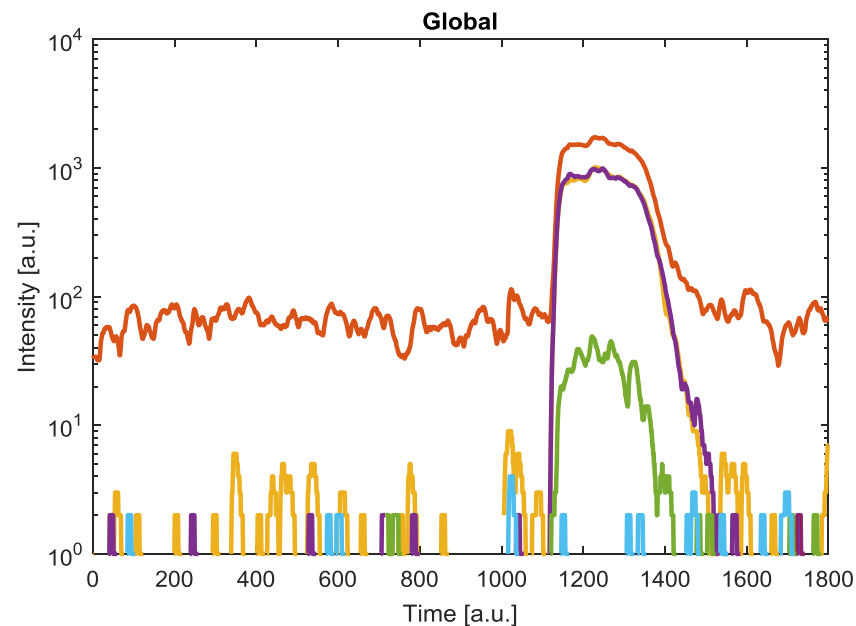


# DETECTOR RESPONSE

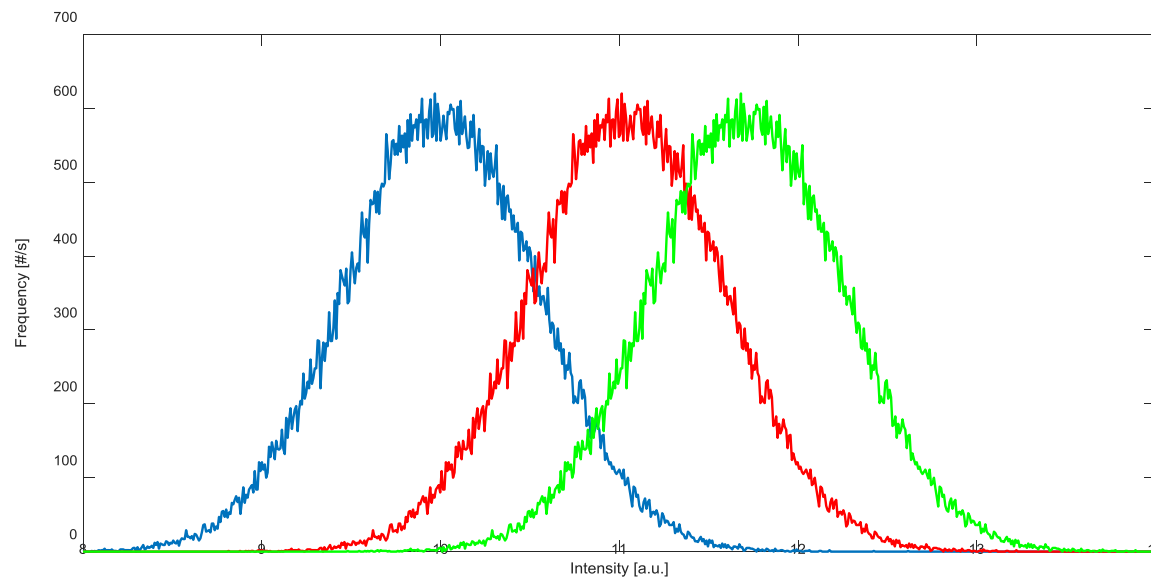
- › Detector response;
  - › Limit of Detection
  - › Lower Limit of Quantification
  - › Linear range
  - › Upper limit of Quantification
  - › Saturation



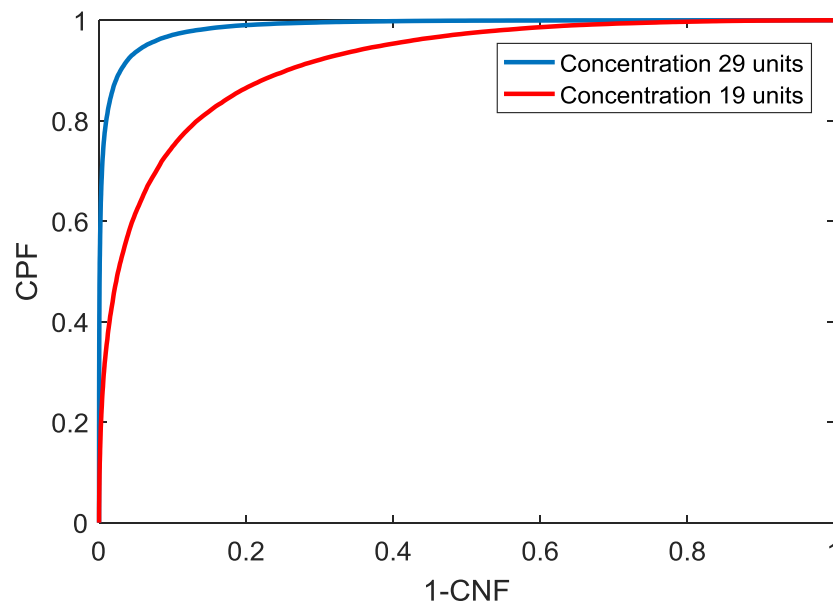
# RESPONSE OF DETECTOR IN CLEAN ENVIRONMENT



# CLUTTER AND AGENT RESPONSE



# RECEIVER OPERATOR CHARACTERISTIC CURVE



## CONCLUSIONS

- › Current sensor evaluation doesn't assess the sensor from an operational point of view.
- › Improving sensor evaluation offers the possibility not only to determine limit of detection but also the ability to assess the detection quality.
- › Operator will be provided not only with a detection event but also with a probability of detection and false alarm rate for the specific environment.
- › Increased regret decisions can be taken after certain levels of confidence are reached.

A nighttime city street scene featuring a tram with vibrant green light trails. The tram is moving from left to right, leaving a long, curved trail of light. The background shows multi-story buildings with lit windows and streetlights. The overall atmosphere is modern and dynamic.

› **THANK YOU FOR YOUR  
ATTENTION**

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