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ERCIS

The European Flood Awareness System and its integration with national flood warning systems

A reference model

Overview

- Motivation and Relevance
- Methodology
- Design Objectives
- Process modelling language: The EPC
- Process Example: Use of EFAS as a pre-warning
- Conclusion

Motivation and Relevance

- **EFAS:** Available for free to **partners**: Organizations with a role in flood forecasting or flood risk management -> range of organizations across different countries

- No studies on use since **pre-operational** phase but steady improvement of EFAS, reforms by partners, steadily adding new partners-> need to (re-)evaluate use

- **Research goal** of the thesis: **Reference model** showing different alternatives of use to aid (re-)evaluation for **Model Stakeholders**: EFAS, current and potential EFAS users

Methodology

- Design Science Research Methodology following Peffers et al. (2007) **DSR Cycle**
- Two iterations to ensure rigorous designs, evaluation through semi-structured interviews with model stakeholders
- **First Cycle**: Design Objectives for the reference model.
  First interview series: 5 Interviews for evaluation of Design Objectives and designing model, 4 additional interviews for designing model
- **Second Cycle**: Designing and evaluating the reference model.
  Second interview series: 4 follow-up interviews evaluating reference model, model sent for final comments, 2 additional interviews to broaden feedback on final model

Design Objectives: What the model depicts

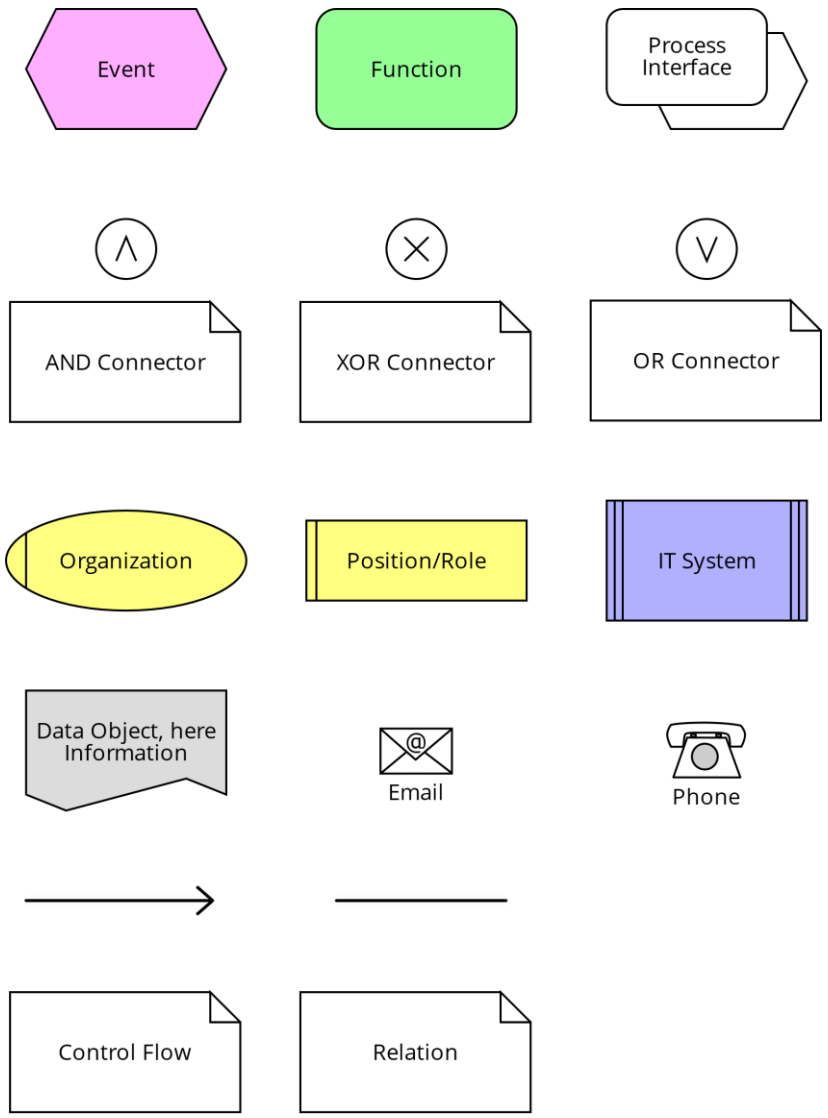
- **Design Objectives**: Depict 1) Roles and Responsibilities, 2) Communication Flows and 3) Decisions and Procedures of EFAS partners for using EFAS information

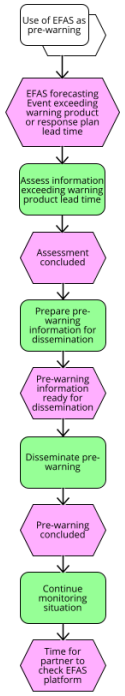
- **Roles and Responsibilities**: EFAS Forecasters on Duty, National Flood Forecasters, Emergency Managers, Meteorologists

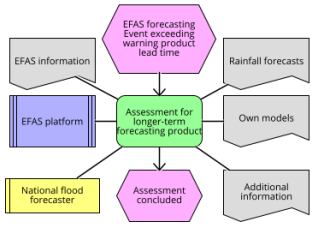
- **Communication Flows**: Forecasting and warning products, conference calls for coordination and guidance

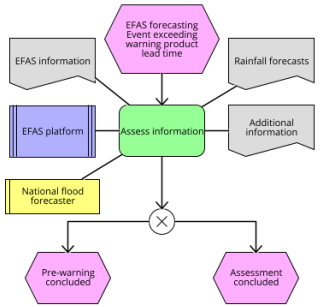
- **Decisions and Procedures**: Warning and Forecasting, Pre-warning, Response

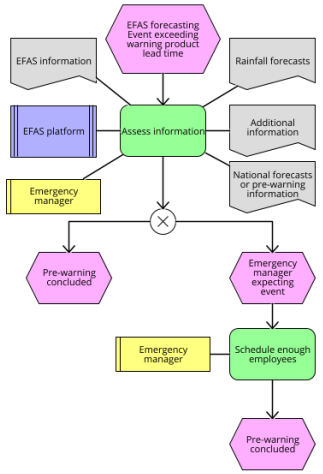
Process modelling language: The extended Event-driven Process Chain

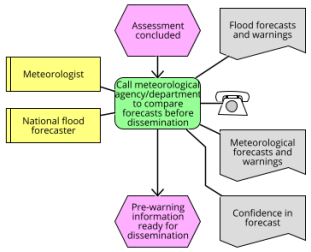


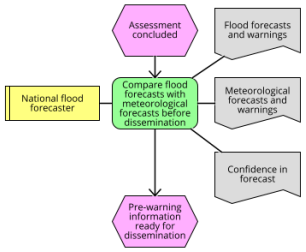

Use of EFAS as pre-warning
EFAS forecasting Event exceeding warning product or response plan lead time
Assess information exceeding warning product lead time
Assessment concluded
Prepare pre-warning information for dissemination
Pre-warning information ready for dissemination
Disseminate pre-warning
Pre-warning concluded
Continue monitoring situation
Time for partner to check EFAS platform

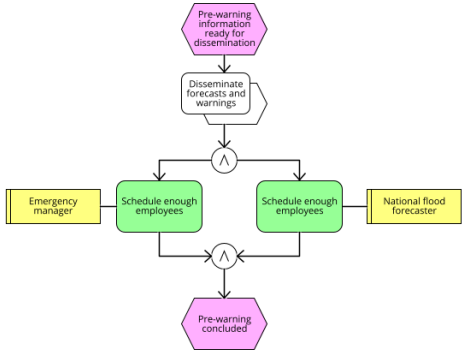

EFAS forecasting Event exceeding warning product lead time
EFAS information
Rainfall forecasts
EFAS platform
Assessment for longer-term forecasting product
Own models
National flood forecaster
Assessment concluded
Additional information

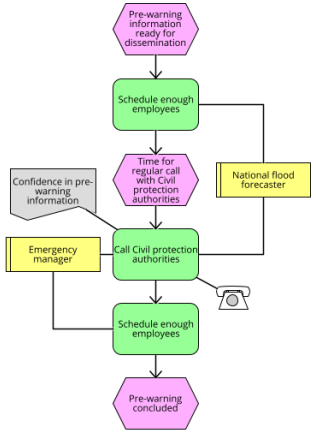

EFAS forecasting Event exceeding warning product lead time
EFAS information
Rainfall forecasts
EFAS platform
Assess information
Additional information
National flood forecaster
Pre-warning concluded
Assessment concluded


EFAS forecasting Event exceeding warning product lead time
EFAS information
Rainfall forecasts
EFAS platform
Assess information
Additional information
National forecasts or pre-warning information
Emergency manager
Pre-warning concluded
Emergency manager expecting event
Emergency manager
Schedule enough employees
Pre-warning concluded


Assessment concluded
Flood forecasts and warnings
Meteorologist
Call meteorological agency/department to compare forecasts before dissemination
National flood forecaster
Meteorological forecasts and warnings
Pre-warning information ready for dissemination
Confidence in forecast


Assessment concluded
Flood forecasts and warnings
National flood forecaster
Compare flood forecasts with meteorological forecasts before dissemination
Meteorological forecasts and warnings
Confidence in forecast
Pre-warning information ready for dissemination


Pre-warning information ready for dissemination
Disseminate forecasts and warnings
Emergency manager
Schedule enough employees
Schedule enough employees
National flood forecaster
Pre-warning concluded


Pre-warning information ready for dissemination
Schedule enough employees
Time for regular call with Civil protection authorities
National flood forecaster
Confidence in pre-warning information
Emergency manager
Call Civil protection authorities
Schedule enough employees
Pre-warning concluded

Conclusion

Considerations for (re-)evaluating use of EFAS

- Utilizing pre-warnings: pre-warnings universally appreciated but often only informal, partners could consider to utilize more as confidence in EFAS improves
- Forecast users: Managing training, guidance and experience
- Availability of plans: Plans connect warnings to responses -> changing warnings implies planning effort, plans not always available
- Relationship between forecasting agencies and Civil Protection agencies: Forecasters emphasize accuracy, CPAs emphasize precaution -> likely different preferences, e.g. for threshold-setting

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References

- Peffers, K., Tuunanen, T., Rothenberger, M. A., & Chatterjee, S. 2007. "A design science research methodology for information systems research", in Journal of Management Information Systems, (24:3), pp. 45–77. https://doi.org/10.2753/MIS0742-1222240302