# Exchange Activities

1. Standard formats for data exchange
2. Algorithms to be shared
3. Fact sheet for documenting algorithms
4. Candidate datasets for model testing
5. A bit of Delft-FEWS

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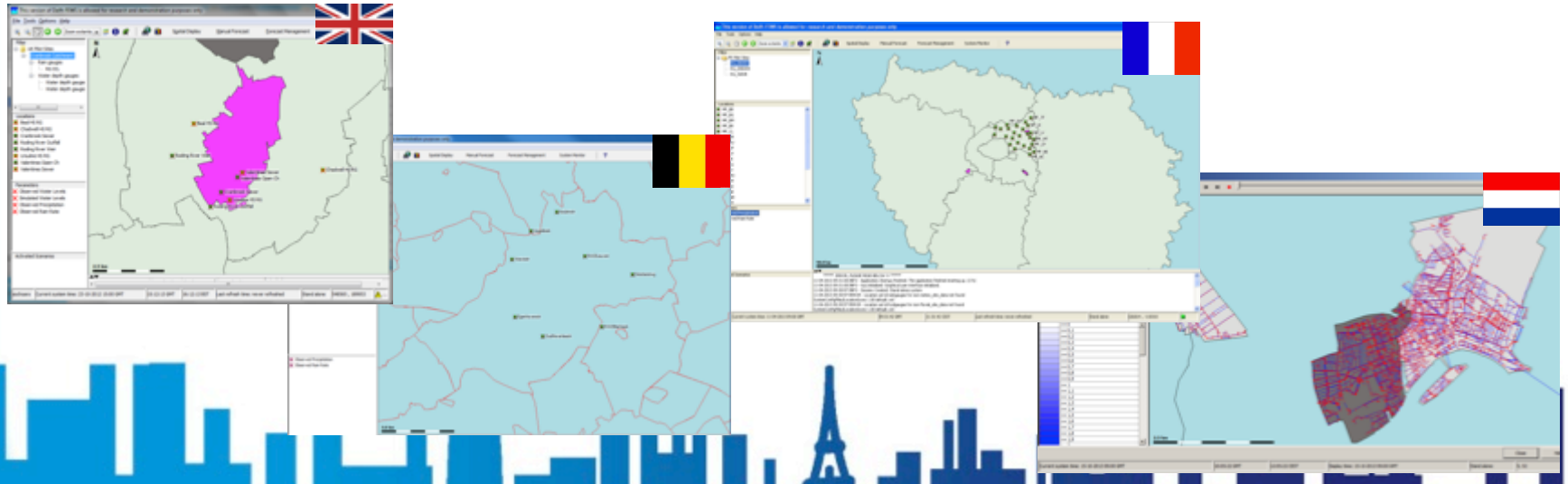
RainGain Project Meeting, Paris, 22nd October 2013



# 1. Candidate standard formats

- FOR SERIAL DATA (point location time series):
  - Only CSV
- FOR SPATIAL DATA (namely, radar grid data):
  - Mainly CSV
  - Also: ESRI ASCII and Nimrod
  - Possibly: HDF5 (used in NL and UKMO)

# CSV:
# main exchange format

- Simple text file, one column per time-series from sensor or radar grid
- **Main advantage:** easy to use and code, one single file per storm event
- **Main disadvantage:** file size, slow to read and write

RG_POBS_23-08-2010_Fews.csv

```
1  Location Names,Beal_HS_RG,Ursuline_HS_RG,Chadwell_HS_RG
2  Location Ids,Beal_HS_RG,Ursuline_HS_RG,Chadwell_HS_RG
3  Time,Rainfall[mm],Rainfall[mm],Rainfall[mm]
4  2010-08-22 18:00:00,0,0,0
5  2010-08-22 18:05:00,0,0,0
6  2010-08-22 18:10:00,0,0,0
7  2010-08-22 18:15:00,0,0,0
8  2010-08-22 18:20:00,0,0,0
9  2010-08-22 18:25:00,0,0,0
10 2010-08-22 18:30:00,0,0,0
11 2010-08-22 18:35:00,0,0,0
12 2010-08-22 18:40:00,0,0,0
```

# Nimrod:
# alternative format for grid data

- Data stored in binary format
- **Main advantage:** file size (good for storage!), reading and writing speed
- **Main disadvantage:** more complex and difficult to handle/code, several files per storm event (one file per time step)
- Tools will be provided to convert from CSV to Nimrod and vice-versa
- Tools will be provided to convert from ASCII to Nimrod and vice-versa
- Tools will be provided to clip smaller areas from complete radar images in Nimrod format
- Format already in use in UK and Belgium

# ESRI ASCII:
# alternative format for grid data

- Text format
- **Main advantage:** commonly used, easy to read/write, ready for display using GIS software
- **Main disadvantage:** file size, slow to read and write, several files per storm event (one file per time step)
- Tools will be provided to convert from CSV to ASCII and vice-versa
- Tools will be provided to convert from ASCII to Nimrod and vice-versa
- Tools will be provided to clip smaller areas from complete radar images in ASCII format

# HDF5 (Hierarchical Data Format): alternative format for grid data

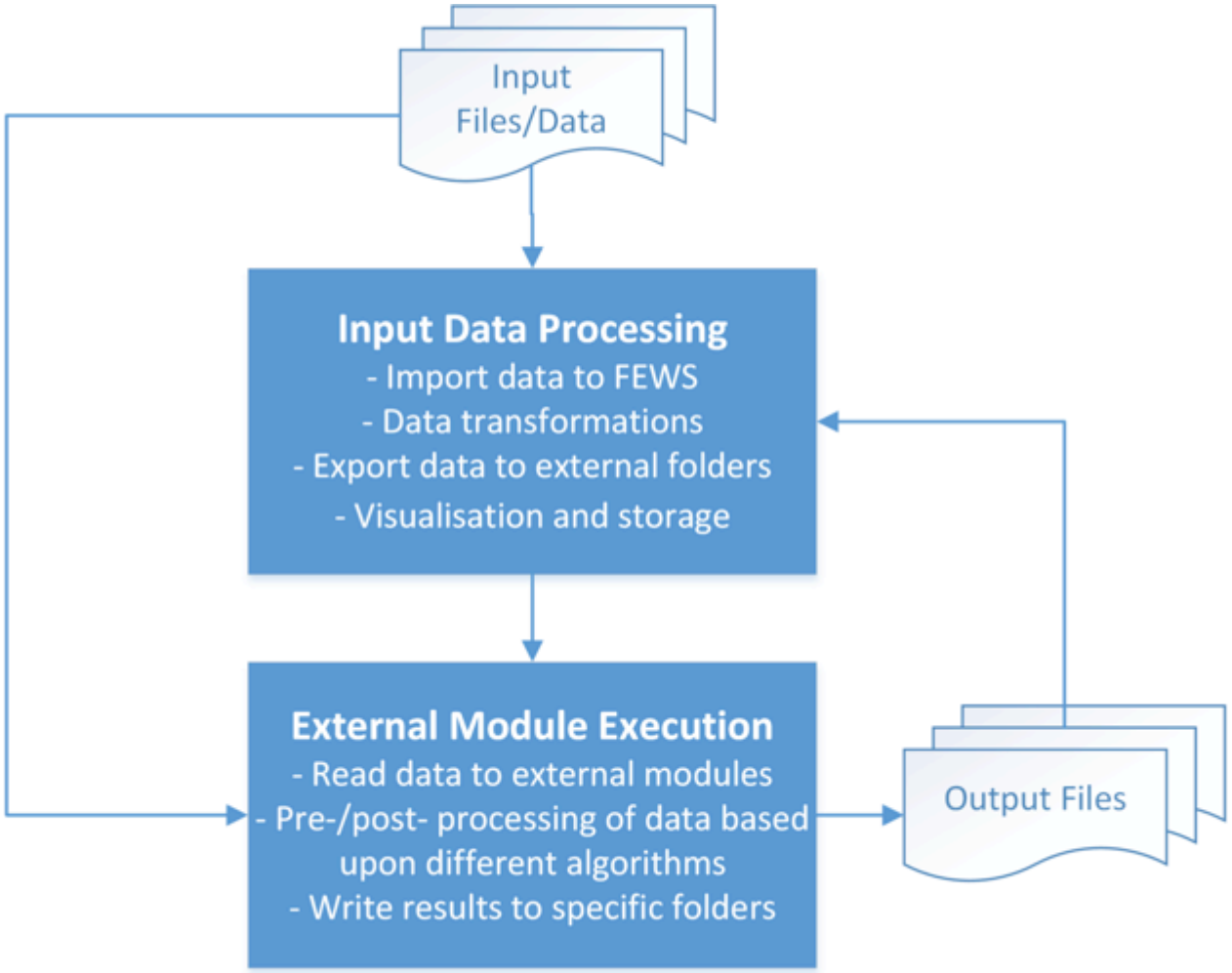
- Text format
- **Main advantage:** standard format used in EU meteorological services, toolboxes/libraries available for data conversion
- **Main disadvantage:** more complex
- Tim will provide more info about it

# 2. Algorithms to be shared

**General approach:**

- Sharing through Delft-FEWS platform (but users may chose to run the algorithm directly without going through the platform, depending on what is more convenient)
- What is required from developers?
  - An executable file which can be run headless and which takes data and produces outputs in one of the standard formats we will define chosen
  - Algorithm documentation
- I (Susana) will wrap-up algorithms and will create the adaptor for using them in Delft-FEWS
- Tutorial material is available for incorporating external algorithms into your customised platforms

# Conceptual workflow for executing external rainfall processing modules through Delft-FEWS



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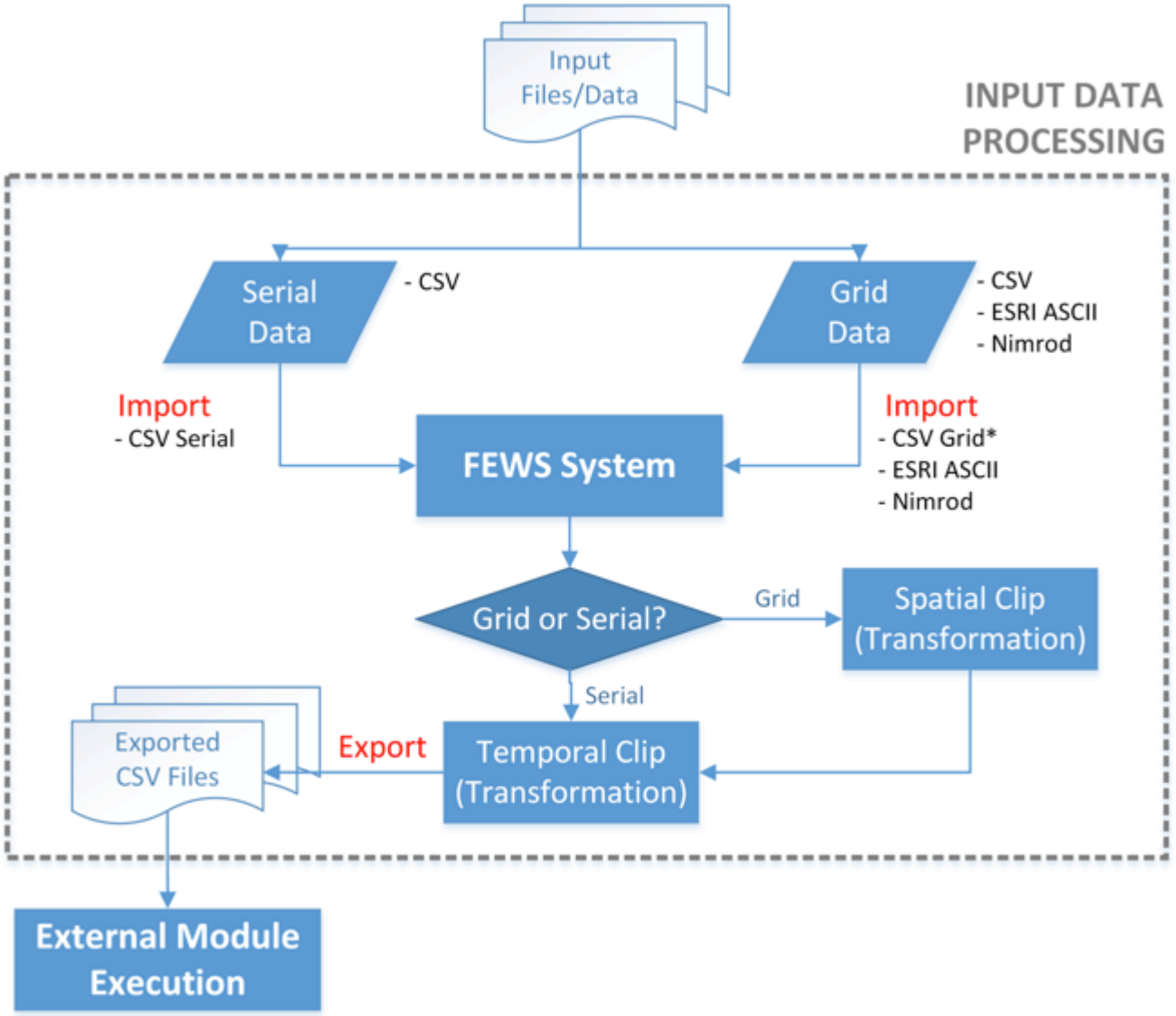

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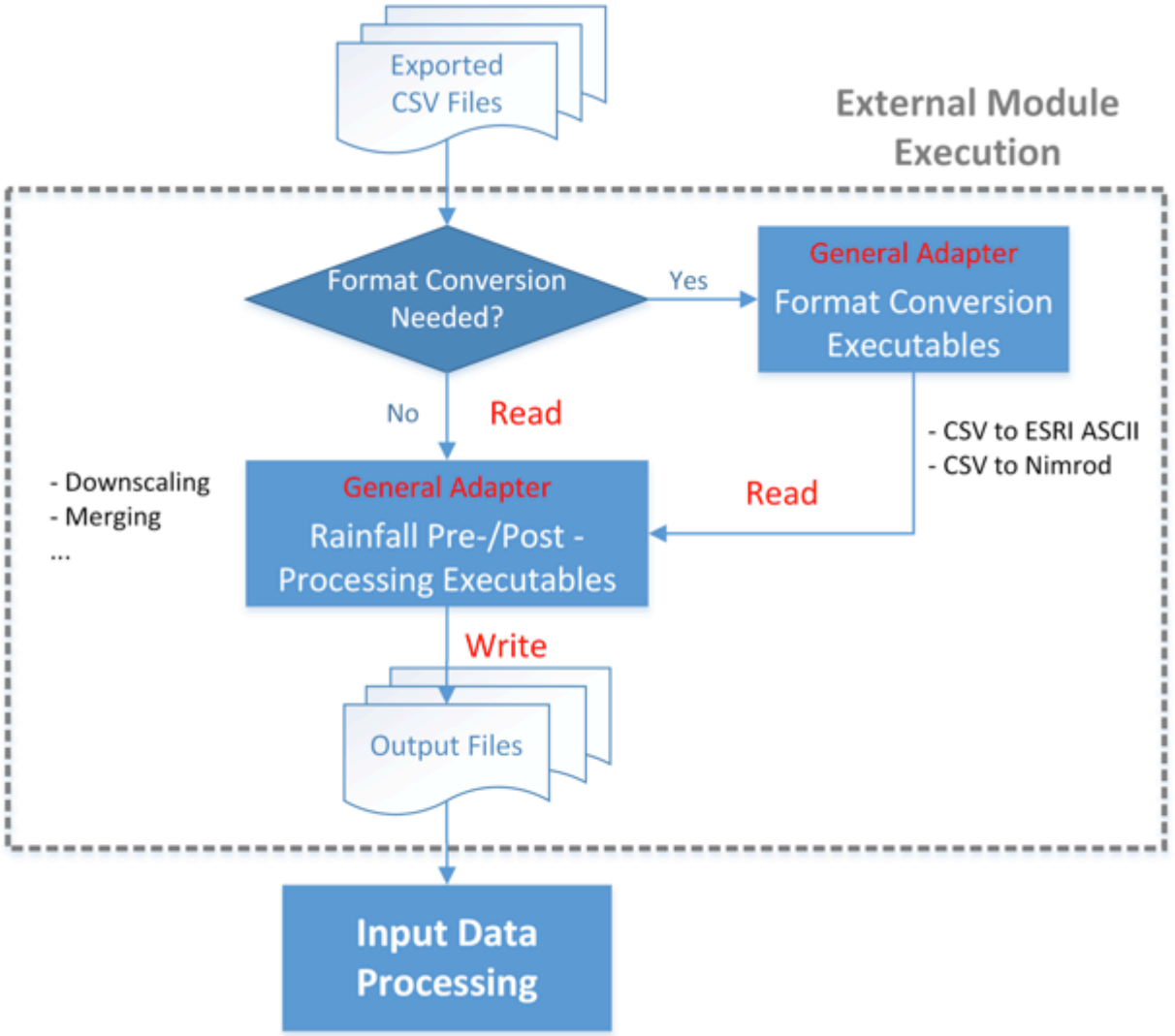

# 2. Algorithms to be shared

**From ICL:**

- **Merging:** KED, Bayesian, Mean Field Bias (at least)
- **Downscaling:** Lipen's (now at KUL)
- **X-band radar processing routines:** this will depend on whether or not they work well, on how case-specific they are, on how useful they could be for other partners (i.e. is it worth sharing it and spending time in wraping up the algorithms?)

# 2. Algorithms to be shared

**From other partners? Some initial suggestions:**

- **ENPC:**
  - **Downscaling:** Auguste's
  - **X-band radar data processing:** same issues as ICL's algorithms
- **KUL:**
  - **Merging:** Brandes, Simple-Kriging-based
  - **Nowcasting:** depending on progress throughout project
- **TU Delft:**
  - **X-band radar data processing:** same issues as ICL's algorithms

# 3. Algorithms documentation

- Fact sheet in Excel
- Includes:
  - Brief description
  - Inputs / outputs
  - Pseudocode
  - Citation
- Open file…

# 4. Datasets to be used for model testing:

- One common rainfall dataset will be applied to models of all pilot locations. This dataset will include: C-band and/or X-band radar data, raingauge data, merged radar-raingauge data, downscaled radar data. This would enable drawing conclusions regarding the effect of different rainfall inputs on different models.

- Complete dataset specific to each pilot location, comprising rainfall as well as water depth/flow measurements. This would enable assessing the performance of the model.

**Comments:**

- We need an initial dataset for initial testing and upcoming joint publication

- We can later on have better datasets once new X-bands are installed

# 5. A bit of Delft-FEWS

- Initial implementation at all pilot locations is done!
- Next steps:
  - Implementation of data format conversion tools (first will be available in January 2013)
  - Implementation of data clipping tools (January 2013)
  - Implementation of exchange algorithms as they become available
  - Visualisation will be improved in the process
- Tutorial material circulated in August 2013 has helped clarify the overall structure of the platform and will hopefully facilitate the implementation of what is left to be done