Call for input: future-proofing the ferrybox

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Part of the ESA-IAP BALMON **feasibility** study

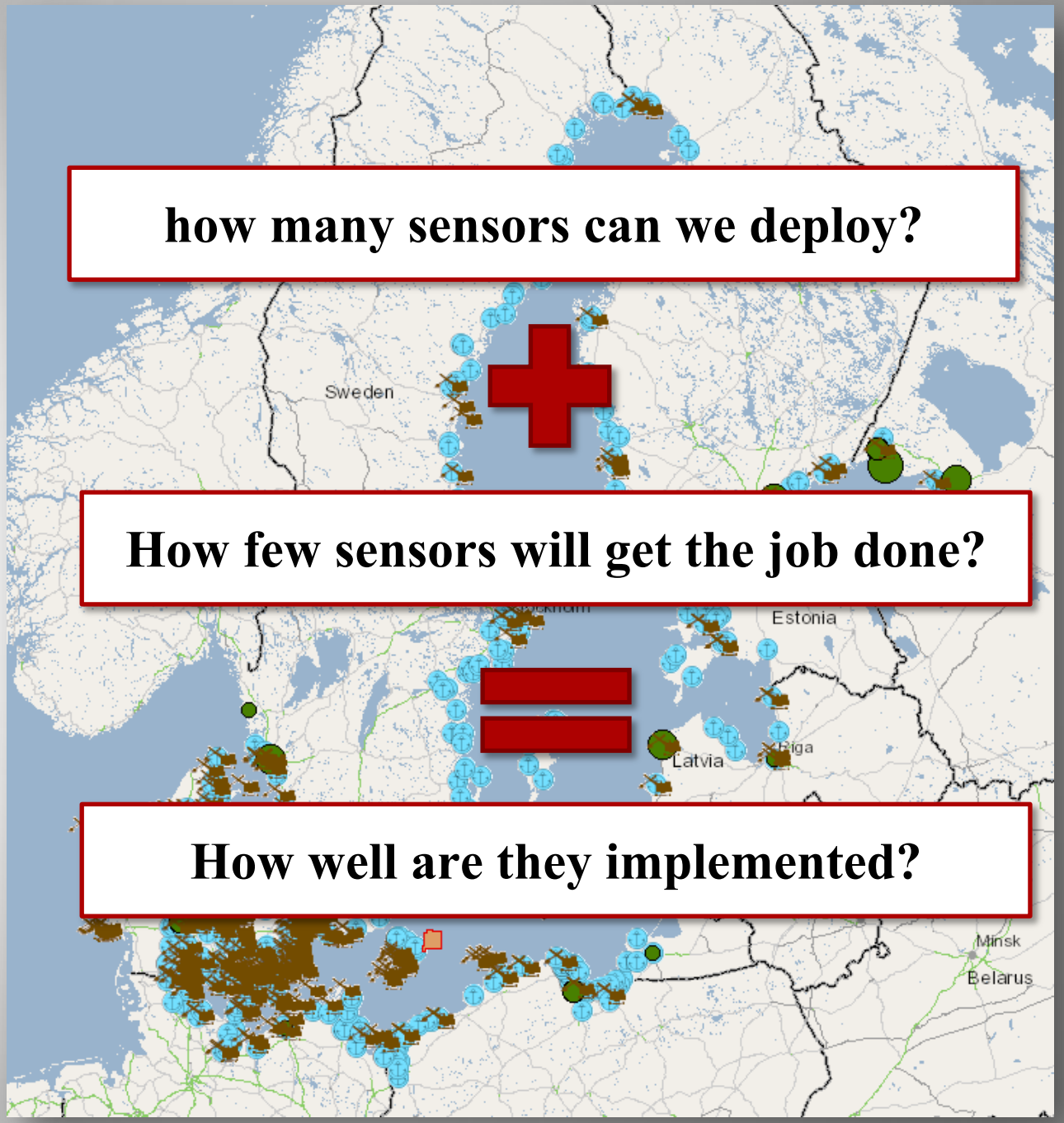
SYKE

esa

the Baltic Sea at risk

Pressures
eutrophication
fisheries
traffic

Disturbances
accidents
pollution
dredging
deposits



Brave new world… of ferryboxes

- Future MSFD support requires marine environmental observations with **vast spatiotemporal coverage**
- Ferrybox networks will play a pivotal role:
  - optical proxies for well-characterized biogeochemical processes
  - to help interpret Earth Observation data
- Harmonize use of automated in situ monitoring, earth observation technologies, and ecosystem models
- New sensors enter the market
- Algaline network in the Baltic is mature and open*

- **..time to focus on supporting new services**

*could be even more open

(not so) New directions

JERICO best practises for Ferrybox

SCOR Ocean Scope

BALMON

MyOcean, SeaDataNet, EMODNET

INSPIRE

#opendata

OGC Sensor Web Enablement—standard protocols and API that enable:

- Discovery of sensors, processes, and observations
- Tasking of sensors or models
- Access to observations and observation streams
- Publish-subscribe capabilities for alerts
- Robust sensor system and process descriptions

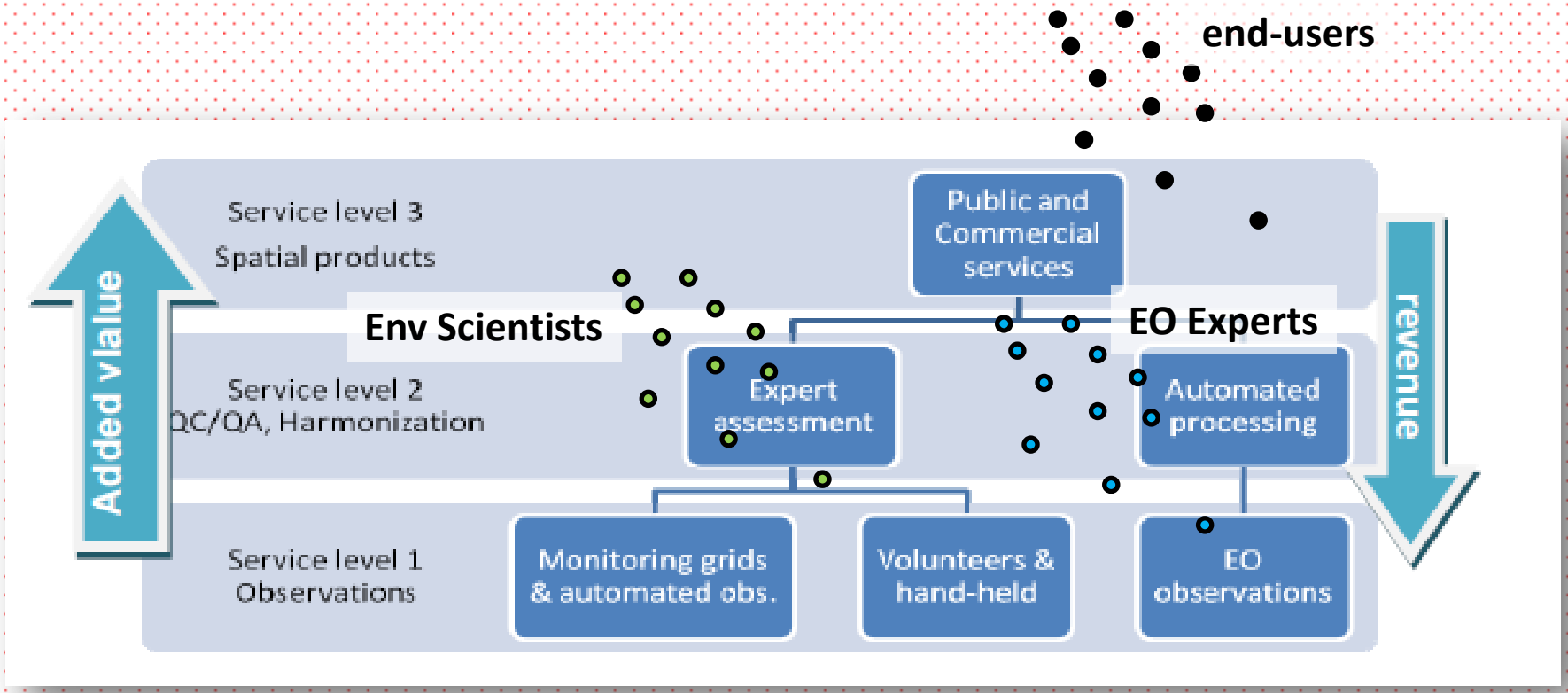
Users and services

User* requirements

BALMON feasibility study (ESA IAP) on Baltic Sea observation networks for water quality and coastal surveillance

- Parameters: nutrients, phytoplankton composition, biomass, Chl-a, temperature
- Access: centralized, open, fast, one transparent platform
- Accuracy: quality controlled, minimal delays
- Sampling / data on request: disturbances, emergencies

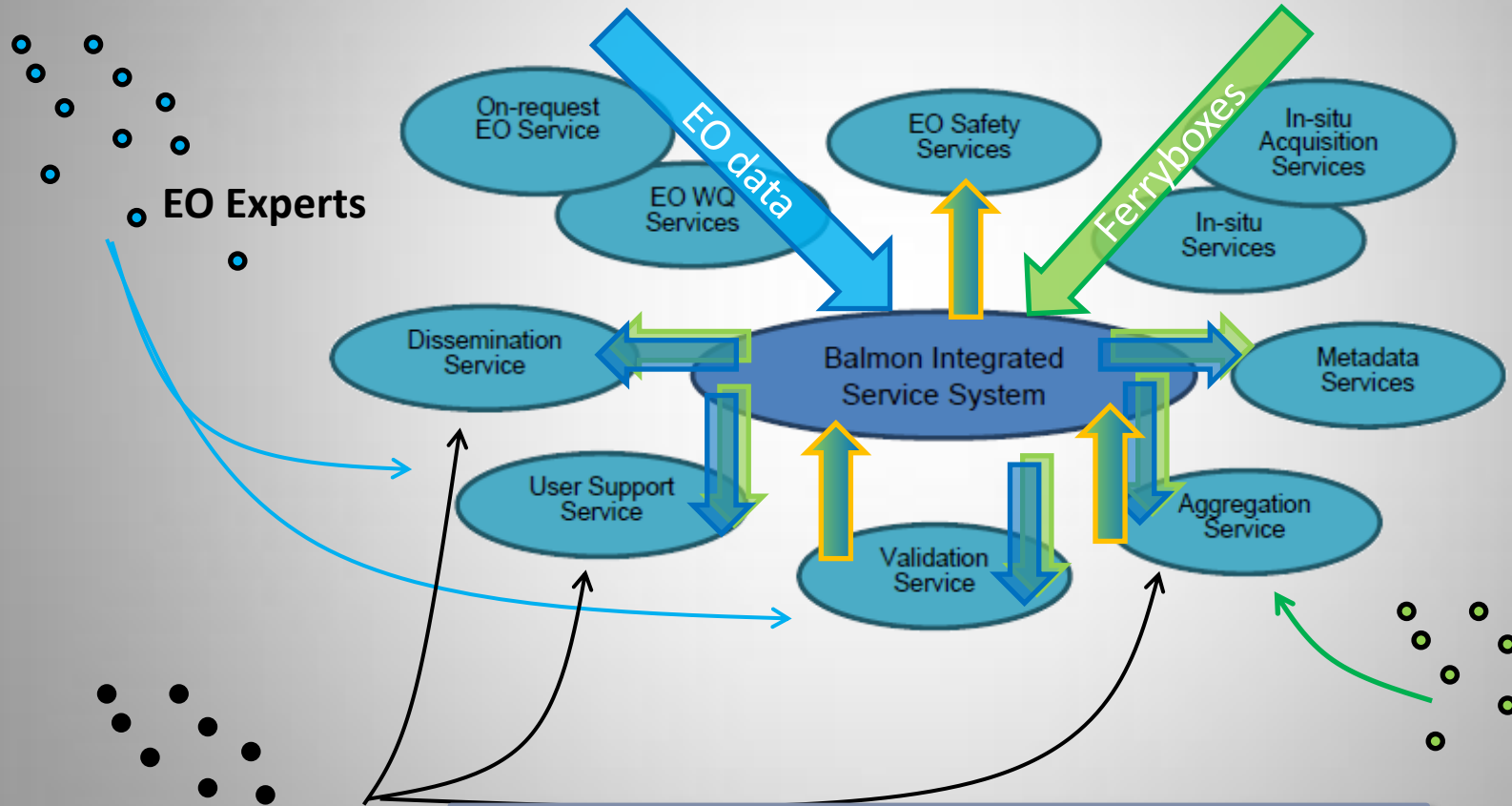
Tell us who you are



source: ESA BALMON project

Service cloud (vision)

BALMON feasibility study (ESA IAP) on Baltic Sea observation networks for water quality and coastal surveillance



Improve transparency and connectivity by

- detailed system description using standards where possible
- preventing loose ends, flexibility towards future tech
- Tailoring exposure of the system to user needs

source:

ESA BALMON project

From sensor to system to service

Sensor / observation requirements

Data types & what to store / transmit

- value / set / complex
- NRT vs Delayed delivery set

Context and interactivity

- awareness (GPS, other sensors)
- synchronization

Subsample information

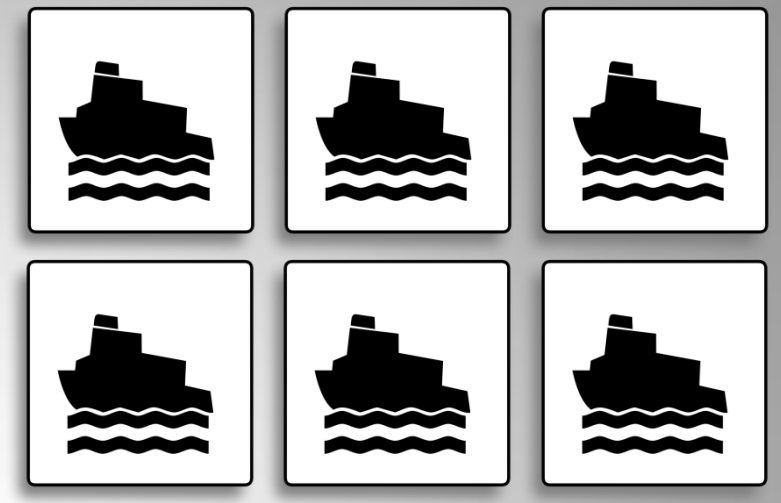
- e.g. variance around mean

Two-way communication between sensor system and service cloud allows

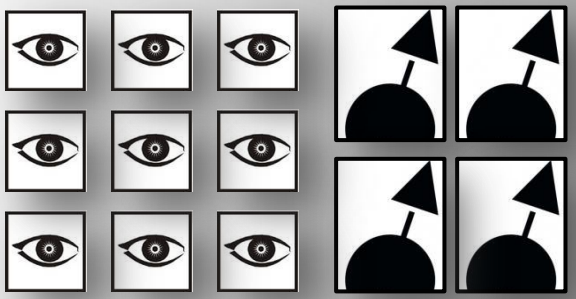
- data download [full/normal/off]:
  - on-request services
  - rescue/emergency services
- sampling scheme updates
- data availability status and forecast
- less vulnerability to platform discontinuities

Requirements:

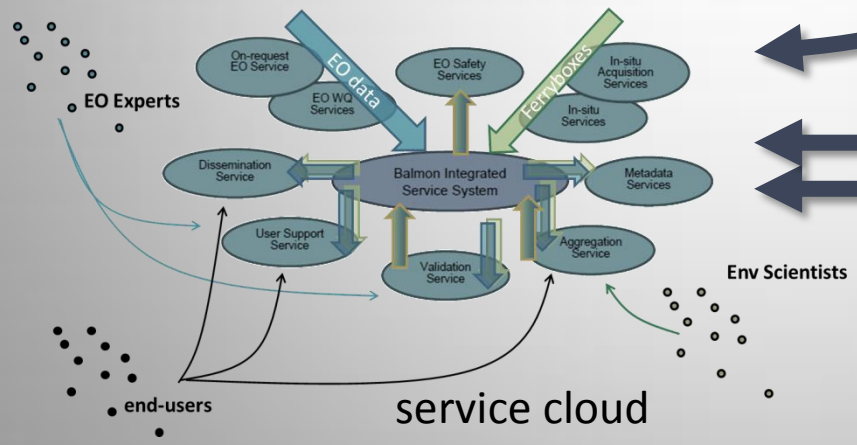
- redesign of ferrybox/sensor logic (?)
- affordable communications



ferry fleet



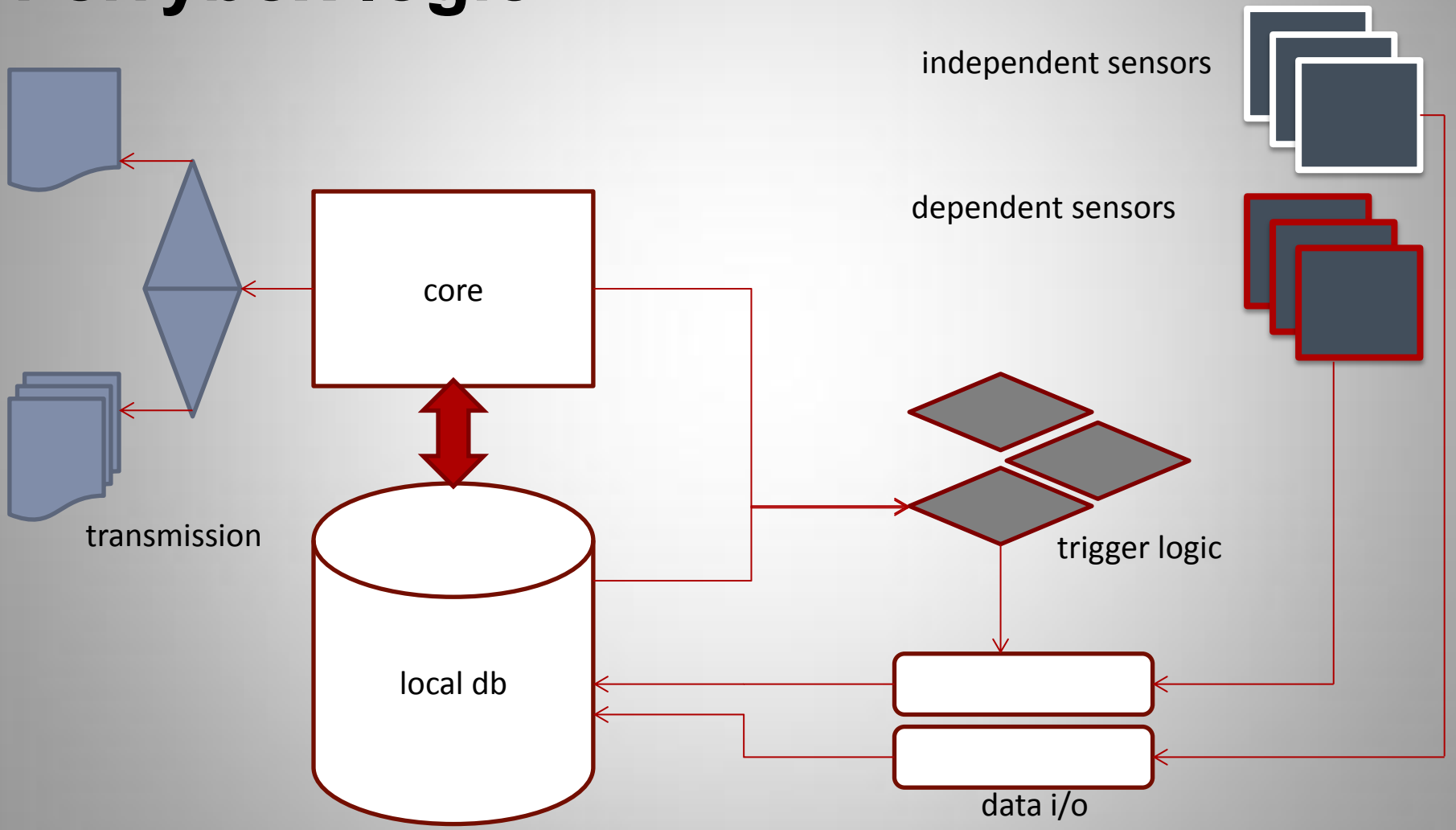
humans buoys



modular approach = high flexibility and scalability

To describe core ferrybox functionality, we need to map the requirements of **emerging sensors** as well as **metadata needed for user-driven services**

Ferrybox logic



Future ferrybox functionality

Future FB functionality 1: discover

- Standards: OGC ***Sensor Observation Service*** **[SOS]**
  - Each FB is a Sensor System *[OGC 06-021r4]*
  - Web-enabled, sporadically online
- Integration layer development tuned to FB and data services
  - task, alert, notify
  - basic core functionality for all users

GetCapabilities - provides access to metadata and detailed information about the operations available by an SOS server.

DescribeSensor - enables querying of metadata about the sensors and sensor systems available by an SOS server.

GetObservation - provides access to observations by allowing spatial, temporal and thematic filtering.

OGC 12-006

Future FB functionality 2: observe

Needed flexibility towards:

- Future sensors
  - e.g. flow cytometry, nutrient analysis, gases, hyperspectral, samplers
  - support for:
    - synchronization
    - data management
    - observation intervals

Realistic expectations:

- We are not buying new sensors
- Sensors should remain as simple as possible
- Some manufacturers can/will implement SOS
- FB will be the SOS umbrella for legacy + SOS enabled sensors

Future (FB) functionality 3: share

Metadata includes queryable attributes to respond to data requests based on Ownership, Visibility, Scope, and Embargoes

Ownership	Visibility	Scope	Embargo
• Institute • Contact	• Visible • Hidden	• Open • Non-commercial • For sale	• xx yrs to open • xx yrs to non-commercial

Future (FB) functionality 4: offer/trade/buy/sell

- Contact *dissemination service*
- Assimilated data products are of higher value

Future (FB) functionality 5: refer/cite/credit

- *User support service* documents which data sources contribute to your product & informs whom to credit

Future (FB) functionality 6: improve

- Quality control & assurance methods yield improved data layers with some delay. Requires functionality: announce procedure, status , method version, inform users when QAd data are ready

Summary

- Future environmental observation services need dynamic in situ monitoring platforms
- Bottom-up support (sensors and sensor systems) is needed to create and maintain a flexible observation service
- Metadata provision is key
- The ferrybox core functionality needs to be revised (or does it?)

Roadmap

Action	Contributions
Lobby / Advocate / Beg	Local actions + workgroups
Reference documents (white paper)	Misc. projects
Ferrybox core software (Algaline, others?)	Suggest functionalities
Implement sensors	Develop platform independent wrappers/modules
Data framework	Format/upload for SDN, MyO, EMODn
Tailored data portals	

Who can contribute?

Hardware manufacturers (sensors/ferryboxes)

- Adoption a selling point
- Publish communication protocols
- Consider open source

Research / monitoring institutions

- Open data ≠ stamps on forms
- Research into novel sensing techniques
- Get a data scientist
- Develop open source

End-users

- Voice your needs and requests