

Online processing of telemetry data

Langis

Erkki Räsänen (Managing Director)

Langis

Founded in 2007

Measurement technology

Environmental measurements

Industrial measurements

Measurement services (Data as a Service)



We also know Remotely Piloted Aircrafts

Ari Kristola's F-18 Hornet

for Jet Scale Masters 2017

scale 1:5.5

made mostly of carbon fiber

weight will be well under 15 kg,
i.e. approximately $\frac{1}{2}$ - $\frac{1}{3}$ of weight
of jets of similar size



Why we are interested in RPAS

RPAS as a platform for environmental measurements

an idea with SYKE; RPAS could be efficient tool for gathering environmental data from large and inaccessible areas

we have the technology which facilitates manufacturing of multi-parameter water quality measurement probes suitable for multicopters

we also have an IoT - data processing framework which would facilitate new kind of approach for environmental monitoring

the approach: getting a real time snapshot of a deviation of a local environmental situation (i.e. an environmental damage or emergency)

RPAS and processing of telemetry data?

RPAS for emergency and response services

measurements in exceptional or hazardous conditions

quickly and accurately

get real time information for planning of actions

→ optimize the flight-plan of RPA while in the air

→ operate only in the areas of most importance

→ configure the measurement payload for new kind of measurements

⇒ **utilization of data analytics and machine learning for achieving this**

Environmental measurements with RPAS

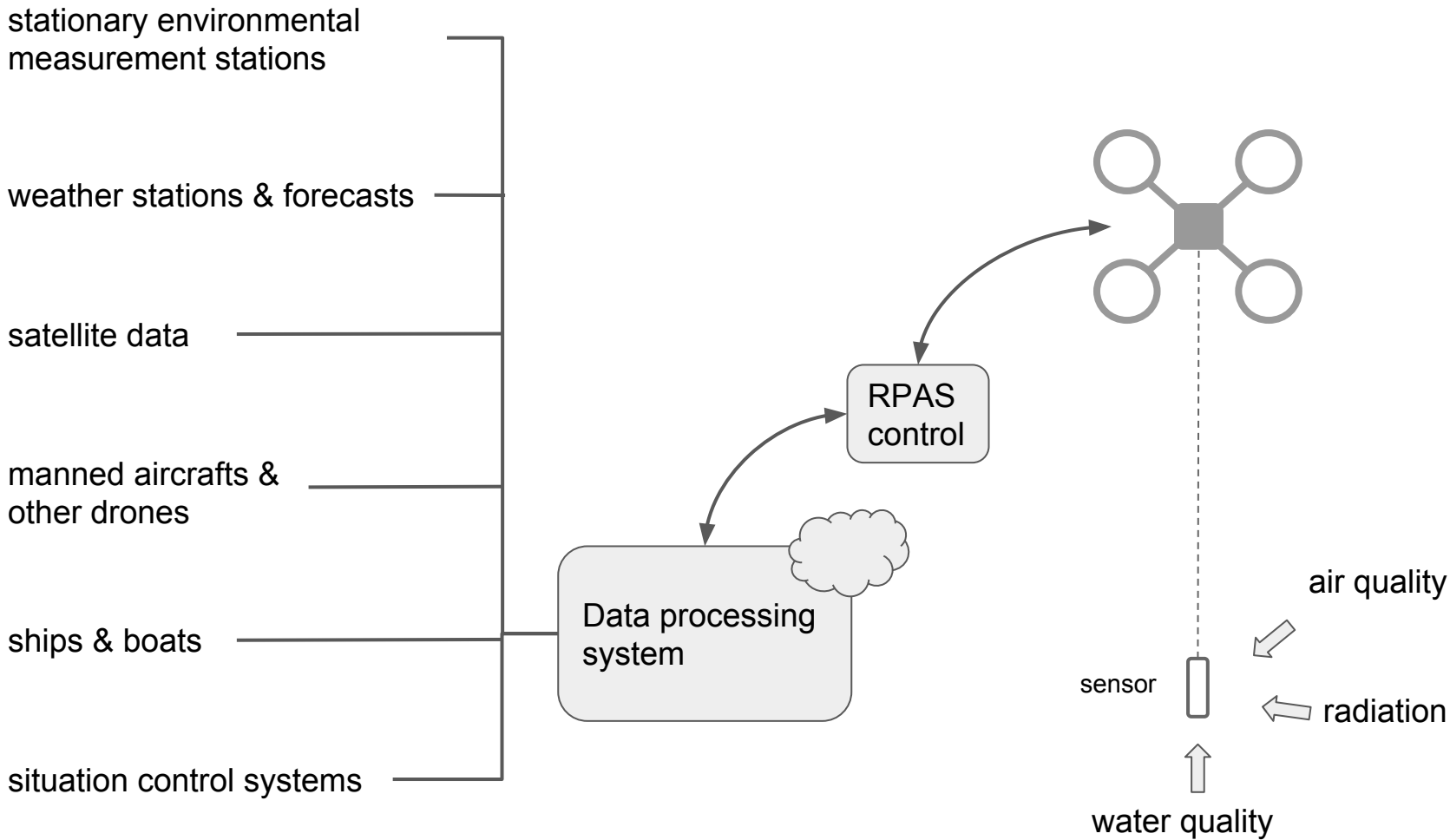
Why real time configuration is needed?

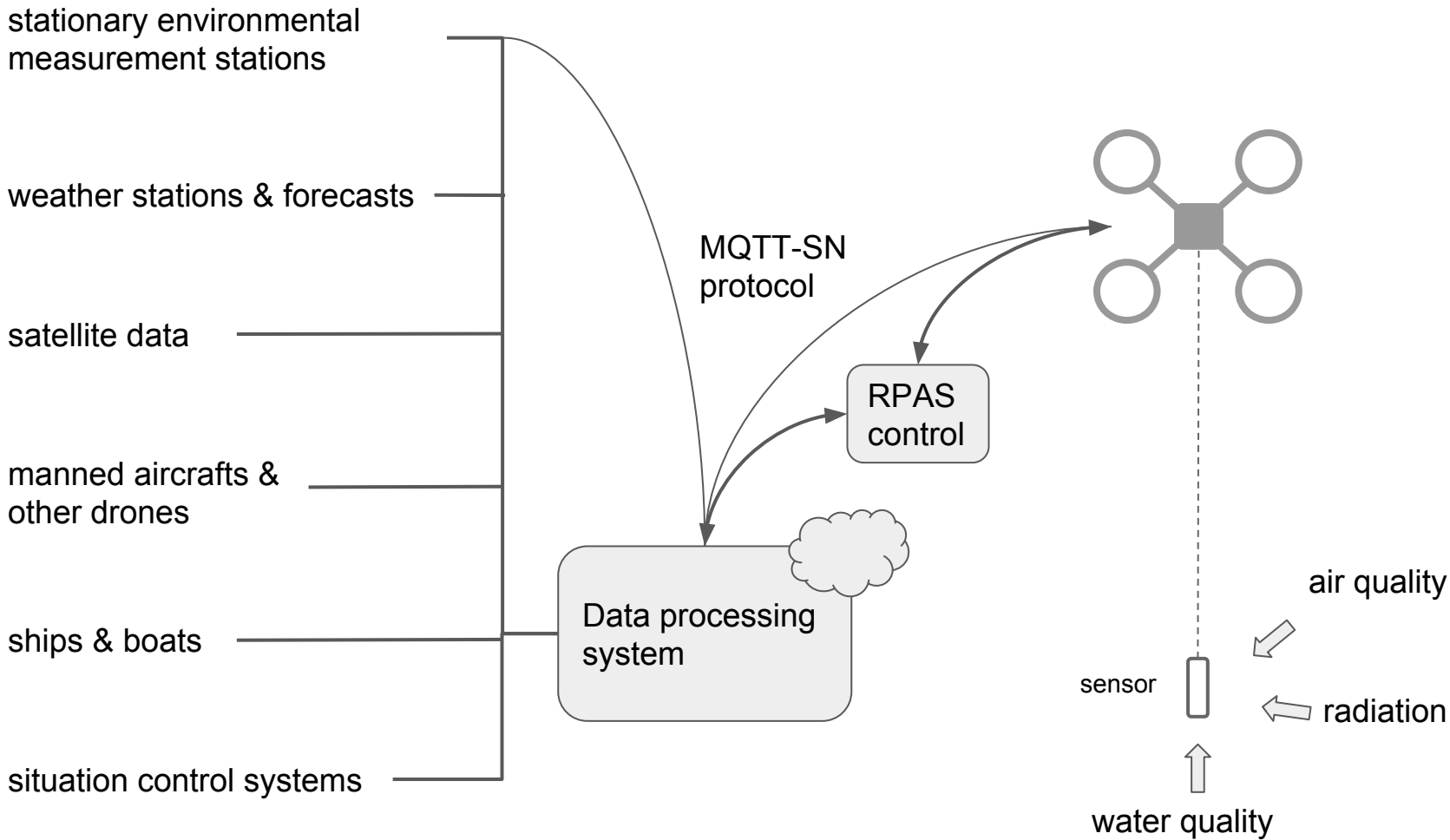
Performing measurements (e.g. spectroscopic) with wrong settings would be waste of valuable flight-time - incorrect settings can be corrected during the first measurement.

Why real time optimization of the flight plan is required?

Operating “blindly” in the case of emergency would be waste of time.
Optimization requires data from other sources (distance, currents, topology...) and also the real-time measurement data can be used for optimization.

RPAS and “Big Data” Approach ⇒ accurate snapshot of the situation





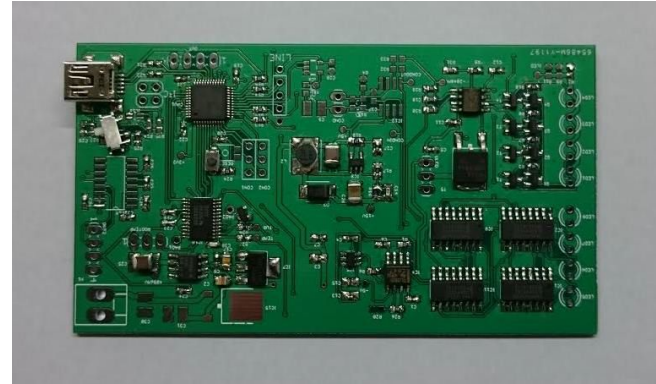
Sensor systems for RPAS

We have a measurement platform for environmental measurements

facilitates a “multi-sensor” for water quality measurements

can be easily combined with air quality and radiation measurements

we can produce a tailored measurement solution for RPAS (small size & weight)



The data processing system

Logger-Gateway (at RPA):

operates as MQTT-SN client Message Queue Telemetry Transport - Sensor Networks

reads sensors via CAN bus and stores the data locally

can perform local data processing (stm32 CPU)

delivers sensor data to the system

receives control & configuration data from system

data buses: GSM, packet radio (868MHz, 2.4 GHz..), Lora, integration to the telemetry system of RPA is also possible



The data processing system

Cloud computing system for telemetry data processing

BladeCenter with 48 Blades, small but capable of handling “Big Data”

Operates as MQTT Broker and can efficiently handle data from many sources

Computation software: R and MapReduce, which facilitate real time analytics and utilization of machine learning algorithms



Conclusion

RPAS & Environmental measurements & Big Data Approach; benefits?

We have a complete framework which would facilitate this kind of approach.

The status: we're seeking for partners and resources.