Remote measurement of SOx from ships
Remote Measurement?

What is it?
- Ship external approach
- Fixed or mobile platforms
- Different sensor technologies
- Ship specific information from the AIS system

Benefits:
- Can be used to target the control of ships in ports
- Gives indication of compliance rate over a sea region
- Has a deterring effect
Danish Activities on Remote Measurement

Full scale project:
- Sniffer on the Great Belt Bridge and a small airplane
- Mid 2015 till end of 2016
- Budget: 6,3 mill. DKK
- Contractor: Chalmers & Aircraft Aps.

Demo project with UAV/Helicopters and cost effective sensors
Great Belt Bridge

- First year: 7000 observations, of these 5000 high/medium quality
- Uncertainty => Observations above 0,20 % sulphur considered an indication of non-compliance
- ≈ 2 % non-compliant
- Few incidents of gross non-compliance
Great Belt Bridge 2016
Remote measurements (sniffer)
Monitoring of sulphur emission from ships

Aircraft

- First year: 1400 observations (630 “sniffer” measurements)
- Optical measurements are used as targeting
- Approx 6% measurements indicate non-compliance
- Most ships – especially non-compliant ships - are observed more than once
- Few incidents of gross non-compliance
Monitoring of sulphur emission from ships

Aircraft June 2015 - July 2016
Remote measurements (sniffer)
Individual ships
Sharing of data

Clear indications of non-compliance are reported in THETIS-S (or by e-mail)
CompMon
EU Compliance monitoring pilot for Marpol Annex VI 2014-2016

Surveillance Aircraft  Fixed sites
Conclusions – and suggestions for future work

Conclusions

➢ Possible to perform remote measurements of SOx from ships on a continuous basis
➢ Results indicate high level of compliance of observed ships
➢ Few incidents of gross non-compliance
➢ System for reporting/sharing of data established

Further work

➢ Increased precision of measurements
➢ Common format for reporting
➢ Automatic transfer of data to THETIS-S
➢ Follow up on ”alerts” / info to PSC