

The use of consumer grade drones in maritime disaster management

From theory to practice



A brief history of...

- ✓ 2015 first use of SUAS at CEPPOL to investigate use in counter pollution and assistance to vessels in distress;
- ✓ Oct. 2016 Publication of results;
- ✓ Since 2016 : SUAS used in most major large scale maritime emergency planning exercise (counter pollution);
- ✓ 2017 first small scale operational use in the field;
- ✓ 2018 first large scale operational uses at sea.



Figure : Visual detection of rice husk from 100m altitude (SUAS: 3DR Solo & GoPro) 3+Black).



From hypothesis to operational use:

Air surveillance plays a vital part in OSR operations: detection, relocation, quantification & qualification

BUT :

Air coverage not always available/possible;
Costly to run on continuous basis.

Disruption of Status quo #1:

Small airframes (rotary / fixed wing UAVs) now available at comparatively low cost (500-3,000€);

Sensors recently only available on specialized aircrafts now available in miniaturized form factors compatible with small UAV use at a fraction of « traditional » price...



From hypothesis to operational use:

Off the shelf SUAS are able to successfully detect slicks at sea as close range airborne surveillance systems while their ease of use ensures that the cost benefit analysis remains firmly on the positive side of the balance.

- SUAS operations are compatible with spill response operations [...]
- these operations do not disrupt the normal operations that take place on deck or on the bridge, and while rough weather conditions can make recovery of the SUAS challenging at times, most responders with regular practice should successfully be able to deploy and recover SUAS.
- [...] Anyone can successfully perform basic search patterns at close range.



Past operations - starting small...

Sunk F/V (Izel Vor) in Brittany, may 2017 :

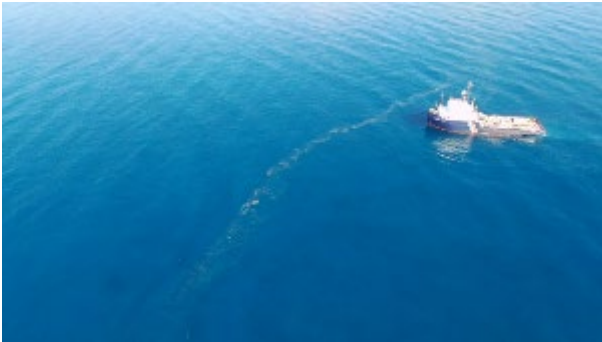
- Mission : Investigate possible pollution and secure wreck removal.
- IOT investigate pollution : use of parrot Beebop 2 from shore.



Past operations - going up...

Paraffin pollution, Eastern Corsica - july 2018 :

- Mission : Coordinate recovery effort at sea & guide 12 response units.
- track pollution & reinforce aerial coverage w/ parrot Beebop 2.



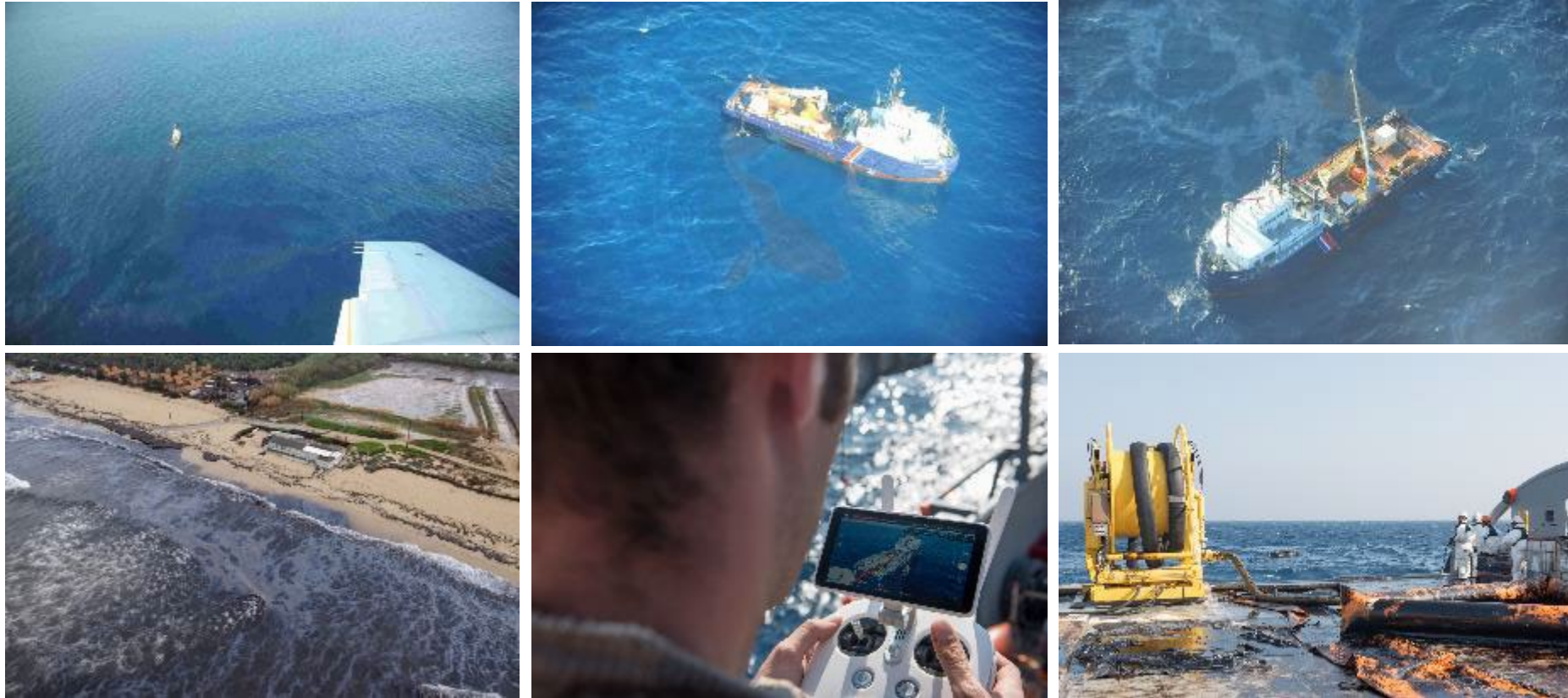
Past operations - going big!

Collision at sea b/w “Ulysses & Virginia” & subsequent oil spill - october 2018 :

- Mission : Coordinate operation from crisis center.
- Deployment of pilots + DJI Phantom 4 : slick tracking and recovery guidance.



Past operations - going big!





Past operations





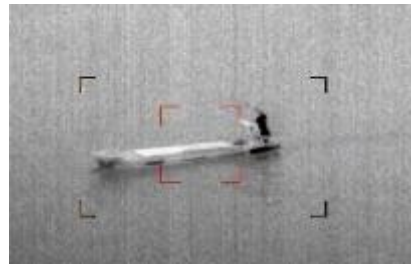
Lessons learnt:

1. It works;
2. Most “quality” consumer drones will do (but...)
 - a. The weather is against you. Choose a robust machine and have (quite) a few!
 - b. Wind + water resistance, autonomy, range and picture quality are what matters.
3. You **will** loose a few unless you keep them in a closet;
4. Rules, rules, rules...
 - a. Most people can fly safely, but make sure your pilots are trained properly;
 - b. No point using consumer drones if you make things overly complex (ie. training & dev.);
 - c. National regulations may get in the way but **keep going!** Solutions do exist.
 - d. Rules will keep you safe.
 - e. SOPs are king...
 - f. But they don't cover every eventuality - BPT improvise wisely;
5. Don't hesitate to tinker and develop custom made solutions (sensors);
6. If you pay someone to “tinker” for you, prices could surprise you...



The way forwards:

- Quadcopters are great but range and stay are limited;
- Fixed wing SUAS are a great upgrade from consumer drones;
- Professional version of “consumer” drones are a good “upgrade”;
- Easy to use VTOL with HD EO/IR, automatic flight patterns/target following modes and long range → interesting compromise!



Built for purpose drones are a missed opportunity for the industry



The next step? Built for purpose SUAS.

Environmental parameters (VOC, explosimetry...) are often difficult to verify prior to deploying personnel.

From past experience (exercises & real ops) :

- Decision on PPE;
 - Decision to actually deploy personnel...
- Very difficult without environmental information
→ Detection of changing parameters relies only on personnel sent for recon.

What if... SUAS allowed us to change that?



The use of consumer grade drones in maritime disaster management

From theory to practice



Thank you for your attention.

