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Technical report on Chapter 0 (Numero Zero) of Cognition in the Wind – Taqwim navigation, May 10-16, 2018.

Project start date	May 10, 2018	Fiumicino
Project end date	May 16, 2018	Gaeta

The present technical report describes the salient aspects of the project *Cognition in the wind* and addresses issues arisen during the field trip.

General description of the project:

We sailed for a week (and about 120 NM) on board the cutter Kleronia between Rome, the Pontine Islands and Gaeta, with variate weather conditions, embarking a number of pilot projects: a revisitation of the sailing draftsman; haiku writing in navigation; projects on navigation strategies in non-adaptive environments (including a study of the way in which clouds, changing entities, become reference points, however ephemeral, in second-to-second navigation); on the definition of scenarios in which orientation is lost; and on drawing challenges. In carrying out these projects we filmed in time lapse and in real time, in view of the creation of a short documentary, different onboard dynamics both on board and in the environment, from maneuvers that require sudden accelerations and coordination to the execution of line drawings and watercolors in difficult conditions, from the movements of the pilot's attention to convivial moments such as dinners.

The project was directed by Roberto Casati (Institut Jean Nicod, CNRS ENS EHSS, Paris) as part of the research activities Disorientation Remediation (PSL NYU), Design: Cognitive Foundations (PSL IRIS; EHES) and Cognition in the Wind (Institut Nicod), and had as a partner the Taqwim Association, whose members Fabrizia de Gasparre, Fabio Rosciglione, Fabio Sebastiani and Maria Sebrengondi coordinated the navigation. Simonetta Capecchi has intervened as a draftswomen on board representing the Urban Sketchers association. The writer Maria Sebrengondi composed the haiku. The shots were taken by Roberto Casati and Rocco Soldini.

The key brief of the field trip was an assessment of the suitability of the vessel for an embarked research activity. The project is thus a Chapter 0.

Timeline:

Day 1	10/05/18	Fiumicino	0 NM. Boarding, lodging in cabins. Moored.	
Day 2	11/05/1	Fiumicino-Fiumicino	6 NM, Briefing,	

	8		food, storage, acquaintance with the boat, test at sea, sailing + motor, NW 6-12 Kn. Sunny. Moored.	
Day 3	12/05/18	Fiumicino (41°44',4 N 012°13',10 E)- Nettuno (41°27',3 N, 012°39',8 E)	26 NM, sailing + motor; beam reach. Mainsail+genoa. Later: gennaker. W 6-10kn. Sunny.	
Day 4	13/05/18	Nettuno (41°27',3 N, 012°39',8 E)- Ponza (40°53',8 N 012°57',7 E)	37 NM, motor S 0-5 Kn Sunny. At anchor in bay.	
Day 5	14/05/18	Ponza (40°53',8 N 012°57',7 E)- Ventotene (40°47',10 N, 013°25'9 E)	23 NM, sailing, broad reach; genoa only. SW 10- 18 kn Sunny. Moored.	
Day 6	15/05/18	Ventotene (40°47',10 N, 013°25'9 E)	0 NM, port, moored.	
Day 7	16/05/18	Ventotene (40°47',10N, 013°25'9 E)- Gaeta (41°13',0N, 013°34',3 E)	26 NM, motor, 0-10 Kn variable direction. Heavy rain. Moored.	

Onboard projects:

Disegnatrice di bordo	Capecchi	Line drawings, watercolors	
Cognition in the Wind/ Disorientation remediation	Casati	Questionnaires, interviews	
Cognition in the Wind/ Non adaptive landmarks (clouds)	Casati	Interviews, movies	
Haiku on board	Sebregondi	Writing	
Social time lapses	Casati/Soldini	Movies	
Kleronia refitting	Sebastiani	Movie	
Making of	Casati/Soldini	Movies	

Equipment Casati

GoPro Hero 5			
4 64Go SD cards,			
1 GoPro clamp,			
1 32 Go SD card			
1 1 TB Lacie			
1 Volan notebook			
Smartphone Xperia			
1 GoPro Head-Mount 1 Extendable arm			
2 GoPro holder (3M adhesive strip)			
1 GoPro flexible arm			
ASUS PC 750Go			
PUPIL LABS wearable eye-tracker	Not carried on board for technical problems		

Equipment Soldini

Go Pro Session 5			
Canon 5D Mark II			
1 2Tb Lacie			
1 64Gb microSD card, 1 32gb microSD card			
2 32Gb CF (memory) card			
Rode Microphone + Dead cat windscreen			
1 MacBook Pro 15"			
SD-CF card reader			
1 Joby GorillaPod (wrappable tripod)			
iPhone 5s (to check framing / modify settings on GoPro)			
1 GoPro Head-Mount 1 Extendable arm			
2 GoPro holder (3M adhesive strip)			

Equipment Sebastiani lent to the project

Sony voice recorder	Used for interviews		
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General aspects, elements of the field trip:

The boat:

Kleronia is an aluminum hull cutter, built in 1996 by Feltz-Werh (Hamburg, Germany.) LOA 17.85 m, beam 4.82 m. It drafts 2,4 m. Displacement 28t. MTU Engine 167hp; bow thruster. Furling mainsail, furling jib, furling staysail. Hydraulic power on furls and 2 of the 6 Lewmar winches. 70M anchor chain. 4 PLB EPIRB. 10 Spinlock safety harnesses. 2 GPS Raymarine. 1 portable GPS, GEONAV Gipsy. Raytheon and Raymarine radar and plotter. VDO Plotter. Simrad Robertson AP20 and Raymarine 6000 autopilots. Raymarine wind and log instruments. ST60 Raymarine sounding. Raymarine E7 chart plotter; rada; AIS. VHF Shipmate RS8400; VHF Icom GMDSS; SSB Icom IC706MK2G. Three onboard PC with Globo charts. 2 portable VHF. Full set of sails, including a gennaker.

Boat features that are relevant for the project:

Kleronia has been fully refitted in 2018 after a transatlantic crossing and a long sailing season in the Caribbeans. In the refitting an extra, independent aft cabin (with its own bathroom) has been added in lieu of the sails storage space – accessible from deck. There are two other aft cabins (each sleeps 2; bunkbeds; independent bathroom) and one large stern cabin (sleeps 2; queen bed; independent bathroom). Extra sleeping facilities available in the dinette.

For the purposes of a research trip, 4 people can comfortably use the two internal aft cabins.

There is enough storage space in the dinette for small equipment, without interfering with activity at the chart table and onboard instrumentation. The ideal workplace is the square below deck, if its use does not interfere with convivial moments onboard.

220V plugs are available in many places in the vessel.

For a leaner research group (up to two), each researcher could have the full availability of one of the two aft cabins, and use its storage space for equipment.

It is expected that equipment in the SSH (Social Sciences and Humanities) be light, and easily (re)movable – as opposed to equipment for the Life Sciences or Physics. The only key point is that the space for equipment storage and use be really dedicated, not shared with other purposes material and activities.

The hydraulic assistance of winches and furls means that a lean crew can steer the boat in most conditions.

Special issues:

The most complex technical issue is the fixation of cameras in strategic places that may be difficult to reach, in particular during navigation. Soldini and Sebastiani went up the mast on day 2 to secure two GoPro holders with duct tape to the spreaders. Later on, on day 5 we attached a GoPro holder of the type that is used on snowboards and helmets.

We realized that it is quite easy to clamp the GoPro to a large number of suitable handles in the boat, both inside and on deck. In this sense the GoPro proves ideal given its low weight. A larger camera could be more complicated to attach for fixed shots.

Possible enhancements:

We left the GoPro holder on the lowest starboard spreader. The holder is fixed with a 3M adhesive strip. Given that it is not invasive (approx. 3 by 2 cm, protruding less than 1 cm), it may be advisable to put some holders permanently in place for future use.

A scanner onboard would be a great asset.

Safety issues:

In the *Disegnatrice di bordo* project we developed on the spot a sub-project, having Capecchi pulled up the mast to the highest spreader. This was made possible by the extremely light sea in the bay of Ponza. We should secure each item taken and used up the mast. Even a pencil falling from 20 meters can have destructive impact and present a hazard. People operating at the base of the mast should wear a helmet.

Movie shooting issues:

We collected almost 600Gb worth of visuals over the week. This is partly due to the fact that we shot a number of movies in time lapse *photo* mode. The choice can prove suboptimal for post-production, and the time lapse *video* mode should in the future be preferred unless there is pressure for hires individual shots.

Power issues:

Being built for outdoor use, GoPro are equipped with batteries that have a use of about 1 hour at full steam (continuous video or high frequency time lapse.) This puts a strain on the activity, as it chunks the shooting and requires extra work for replacing the batteries. If sea and weather conditions are not prohibitive, and if the GoPro location is sufficiently protected, it is however possible to power the camera directly on a 220v circuit. This solution requires cables that go from below deck to the deck. The safest way appears to use one of the portholes in the cockpit (we experimented this for shooting the piloting), allowing for cables to run on the deck, where they should be properly secured. With the boat moored, we also had a cable go through the porthole over the kitchen, which was not ideal given some showers during the day.

Further shooting improvements:

A smartphone or tablet is highly suggested to remotely control the GoPro. Indeed, through the GoPro app it's possible to modify shooting settings, check battery and memory status, check framing of the shot. Note: the WiFi necessary for the connection will eat up the batteries of GoPro and smartphone at a much faster rate. The smartphone WiFi connection was tested on land and it should reach to a camera that is 15m away. A tablet with a more powerful WiFi antenna may provide more distant connection.

Advancement of projects:

As mentioned, this was a chapter 0, whose main brief was to test the model of a SSH boat and the suitability of this particular vessel. This said, some significant progress was made on most projects.

Casati collected 4 interviews on the Disorientation Remediation project, that pointed to three new scenarii to be added to the Disorientation Hub. He also interviewed at length informally Capecchi on drawing challenges.

Casati and Soldini shot about 20 short movies (real time and time lapse) and a large number of photographs, providing footage for a study on unexpected boat movements, on cloud use for steering, on the ability of pilots to keep a route, and on social interactions. Some of the movies were tests for particular framings of images and for the suitability of the GoPro (in particular, for the fluidity of time lapses and the camera field of view.)

Capecchi made about 40 sketches (line drawings and watercolors) in navigation and on land.

- DIARIO - a journal of meetings and various notes, with technical details (hulls, tools, repairs) - MUJI White Notebook (20x20) - 13 double pages.
- SBARCO Landing in Ventotene, on MOLESKINE notebook (A4, with some 20x20 sheets representing skies), 13 double pages.
- VEDUTE Panoramic sights, on 5 free CANSON 19x76 accordion sheets (module: 19x19)
- FRAMMENTI Fragments of skies and seas, on 10 free Hanemueller 10x20 sheets center folded

(module: 10x10)

Sebregondi wrote 24 haikus relating to moments of the navigation.

During navigation, a boat check was run, with a test of all the equipment and communication devices, MOB supports and a series of ordinary maintenance operations.

Casati could not run one of the key recordings (eye tracker of piloting and drawing) as the eye-tracking device did not perform adequately before the field trip (unreadable images outdoors.)

Ideas for future developments:

Endless. Refer to preliminary project documents, with a list of potential projects, most of which are technically comparable in size to those run in Chapter 0.

Room for improvement, general:

More planning must be devoted by the researcher in the preparation of projects before sailing, but mind the great potential for project steering and improvisation.

More coordination between sea activities and land activities when anchored or moored.

Minor enhancements (see above.)

General assessment:

On the whole, the results of the Chapter 0 are way beyond expectations. Minor adjustments are of course always possible, but Kleronia proves an excellent vehicle for the kind of lean SSH study exemplified by those we carried on, which is all the more impressive giving the very short preparations of the projects, and the fact that some of them were redefined onboard.

Update 2019: A 30 minute documentary, [Cognition in the wind](#), directed by Rocco Soldini, scientifically supervised by Roberto Casati, has been realized and made available online.