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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "VISIR: Technological infrastructure of an operational service for safe and efficient navigation in the Mediterranean Sea" *by* G. Mannarini et al.

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(In the following "NHESSD" stands for the paper under Review. When not specified, all other references to equations, figures, and tables are relative to the present document.)

General comments

The authors present the software and operational architecture of a DSS for safe and efficient navigation. There is no doubt that the work is of high standard and involves large-scale operational modeling of several physical parameters, combined with a multi

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layer interface for post-processing and visualization. I also found that the online platform is of good quality and rather intuitive. Finally the paper is well written [..] .

–Authors' response:
We thank the Referee for the appreciation of the model, the operational system, the user interface, and the way the manuscript is written.

[..] but I am afraid I cannot recommend publication without major changes. My main concern is about the contents of the paper, and the selection of the journal, even though it is submitted as part of a special issue on situational sea awareness.

–Authors' response:
First of all, we find it useful to recall official information about the NHESS journal and this special issue.

The scope of NHESS includes [1]:

"[..] the design, implementation, and critical evaluation of mitigation and adaptation strategies to reduce the *impact of hazardous natural events on human-made structures* and infrastructure, to reduce vulnerability and to increase resilience of individuals and societies; [..] "

The topic of the special issue in which we inserted the manuscript contains the following[2]

"[..] The key is to *develop information technologies* capable of disseminating user-oriented in-

[1] http://www.natural-hazards-and-earth-system-sciences.net/about/aims_and_scope.html

[2] Before removal, it was published at http://www.natural-hazards-and-earth-system-sciences.net/special_issues/schedule.html#4. We reproduce a screenshot of the original text in Fig. 1.

formation that is based upon rapidly changing *data from wind, waves* and current forecasts. Situational sea awareness is useful for all maritime operations, from *ship routing* to search and rescue, offshore hydrocarbon exploration and fisheries, where the knowledge of the environmental conditions is required to carry out *operations at sea safely and efficiently*. The environmental data of interest are the meteo-oceanographic analyses and forecasts as well as the *related positions of objects* and substances in the whole water column."

We think that the highlighted text proves that our manuscript is highly relevant to the scopes of both this journal and this special issue. We will elaborate more in the specific comments below.

Specific comments

A - *The paper is focusing on the software platforms and technology used to calculate and visualize optimal routes. Therefore it feels more like a technical report or manual written by a software developer and not like a manuscript prepared for a natural hazards journal. No natural processes are mentioned, while there is no theory, no initial hypothesis, no analysis and no results.*

–Authors' response:
Targeted services based on operational outputs from geophysical models represent a new paradigm of knowledge. For operational use by decision makers with a limited knowledge of the underlying natural processes, these services require technological tools of increasing complexity and robustness (Hey et al., 2009). Furthermore, the reproducibility and the degree of objectiveness of these services critically depend on the traceability of the computational process and the quality of the computer codes behind

it (Weintrit et al., 2013), (Mannarini et al., 2016a). This is why our NHESSD, with its declared emphasis on the technological aspects of the infrastructure for providing an operational service for the safety and efficiency of navigation, fits into the scope of the NHESS journal. In fact, such a scope includes not just natural processes but also their impact on human-made structures[3]. Motor vessels and sailboats are examples of such structures and the natural processes impacting on them are the meteo-marine conditions, represented in our case by the sea-state and wind forecasts. Our NHESSD also contains an essential description of the VISIR ship routing model (P3,P4 of NHESSD) which is functional to a better understanding of the purpose of the technological architecture. The fact that the scientific and computational issues behind the UI are made transparent to the UI end-user is one of the main achievements of the architecture. While we believe they do not need to be documented within this paper, they are described in detail in our other papers, see e.g. (Mannarini et al., 2016b), (Mannarini et al., 2016a).

Finally, to limit the more descriptive contents of the user interface, we are going to remove Table 2 of NHESSD. Also, we point out that a true manual of the VISIR web application can be found at http://www.visir-nav.com/en/help.

–Authors' changes to manuscript:
A1, A2, A3, A4.
A1) On P1, row10, to insert:
"Targeted services based on operational outputs from geophysical models represent a new paradigm of knowledge. For operational use by decision makers with a limited knowledge of the underlying natural processes, these services require technological tools of increasing complexity and robustness (Hey et al., 2009). Furthermore, the reproducibility and the degree of objectiveness of these services critically depend on the traceability of the computational process and the quality of the computer codes

[3]http://www.natural-hazards-and-earth-system-sciences.net/about/aims_and_scope.html

behind it (Weintrit et al., 2013), (Mannarini et al., 2016a)."
A2) On P10, row 305, to remove reference to Tab.2
A3) On P12, row 376, to insert:
"It is important to stress that the technological infrastructure developed for running VISIR in operational mode allows an end-user to drive the execution of a state-of-the-art research model, customizing his/her route needs, vessel features, and level of safety. The fact that the scientific and computational issues behind the UI are made transparent to the UI end-user is one of the main achievements of the architecture."
A4) On P13, to remove Tab.2

B - *The manuscript mentions some technical aspects of a web application and even though I lack the expertise to follow and evaluate the system architecture, the description looks rather vague so it doesn't really provide the reader with a clear idea of how the system was built. The examples provided in the end are the most relevant part of the paper to the scope of the journal and the special issue, but no background on the route evaluation method is provided and my final impression was that the work was submitted to the wrong journal. Starting from the title, I see a weak link between 'safe and efficient navigation' and natural hazards. Acknowledging that the title is relevant to the special issue, I find that the authors should move the software aspects to the supplementary material and focus more on the natural processes involved, as well as on the best route calculation methodology.*

–Authors' response:
Concerning providing more background on the route evaluation method, we devoted the entire Sect.2 of NHESSD (nearly 2 pages) to summarizing main aspects of a the ship routing model. This part is better documented in other papers ((Mannarini et al.,

2016b) for motorboats, (Mannarini et al., 2015) for sailboats) also cited in NHESSD. However, we are going to stress the link between one of the examples provided and the safety checks performed by the VISIR model.

Concerning moving the software aspects to the supplementary material, in compliance with the technological scope of this special issue (Fig. 1), we still believe that it is crucial for this paper's identity to stay focused on the architectural choices made for implementing the ship routing service.

–Authors' changes to manuscript:
B1.
B1) On P11, row 333 to insert:
"For instance, Fig.5c shows that, for the selected route, pure loss of stability is experienced along the geodetic route, starting from positions at 110 NM from the departure place. The optimal route instead per construction does not suffer from this hazard. However, it is up to the user to individually uncheck the default flags of the safety constraints: parametric rolling, pure loss of stability, surf-riding and broaching-to."

C - *The title of the special issue is also the only reason I didn't recommend to reject the manuscript, but it is clear that as a coastal oceanographer I don't have the right background to review the work, therefore I would prefer not to review the revision. Finally, the best route functionality is not available in the free version of the online system, therefore I would recommend that reviewers should be provided with free online access to the full system..*

–Authors' response:
We thank the Referee for suggesting that we provide full access to the VISIR interface

for a more complete evaluation. After this suggestion, on 29-04-2016 we provided him/her anonymous access through the Topical Editor. The same level of access was simultaneously granted also to Referee #1. However, we are sorry that, due to the current business model, we cannot grant such level of access to all readers of the manuscript.

–Authors' changes to manuscript:
The Referee kindly accepted to test the operational system through the VISIR user interface, and we reacted to his/her feedback in Author's Comment #3.

References

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Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., doi:10.5194/nhess-2016-32, 2016.

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Discussion paper

Situational sea awareness technologies for maritime safety and marine environment protection

- Guest editors: N. Pinardi, I. Federico, A. Olita, P. Marra, and R. Archetti
- Timeline: 01 Oct 2015–15 May 2016
- More information

Situational sea awareness (SSA) is a field of applied oceanography that relies on operational oceanographic products (analyses, re-analyses and forecasts) to inform users about environmental conditions at sea, including early warning for marine extremes and hazards. The key is to develop information technologies capable of disseminating user-oriented information that is based upon rapidly changing data from wind, waves and current forecasts. Situational sea awareness is useful for all maritime operations, from ship routing to search and rescue, offshore hydrocarbon exploration and fisheries, where the knowledge of the environmental conditions is required to carry out operations at sea safely and efficiently. The environmental data of interest are the meteo-oceanographic analyses and forecasts as well as the related positions of objects and substances in the whole water column.

Fig. 1. Screenshot of the "Situational sea awareness technologies for maritime safety and marine environment protection" scope.

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