

Supplement to
3rd and Final Ethical Report for

*Reduced Order Modelling, Simulation and
Optimization of Coupled Systems
(ROMSOC)*

March, 2021
Nuremberg

Authors: Prof. Dr. Arne Manzeschke & Dominik Kemmer M.A., M.Sc.

Lutheran University of Applied Sciences Nuremberg (EVHN)
Anthropology & Ethics in Health Care

Supplement to 3rd and Final Report on Ethics for ROMSOC

Preface	3
1. Overview of ethical monitoring approach	4
2. Overview of projects, their respective ESRs, PIs, and industrial partners	5
3. Ethical issues regarding key information documents for PRIIPs using the Cornish-Fisher expansion	6
4. Further advises and comments concerning the ethical monitoring of ROMSOC	7
5. Evaluation of the conducted ethical monitoring approach and implications for future monitoring approaches	8

Preface

This document serves as complementary supplement to the 3rd and final Report on Ethics for ROMSOC. It elaborates on areas that could not sufficiently be covered by the 3rd report and elaborate on

- a short overview of the ethical monitoring approach for ROMSOC which is also graphically supported.
- an overview of projects, their respective ESRs, PIs, industrial partners, and recruitment periods.
- ethical issues regarding key information documents for PRIIPs using the Cornish-Fisher expansion.
- further advises and comments concerning the ethical monitoring of ROMSOC
- an evaluation of the conducted ethical monitoring approach and implications for future monitoring approaches

The following abbreviations were used:

- ESR: Early Stage Researcher
- ESR[number]: ROMSOC-subproject number [number]
- R&D: Research and Development
- PI: Principal Investigator
- PRIIP: Packaged Retail and Insurance-based Investment Product
- ROMSOC: Reduced Order Modeling, Simulation and Optimization of Coupled Systems

1. Overview of ethical monitoring approach

The ethical monitoring approach for ROMSOC consisted of three workshops where all ESRs, their respective PIs and some of the industrial partners took part (see Figure 1). At the first workshop, the main focus was directed to getting familiar with ethical concepts, ethical assessment, and the use of implications in order to analyze and evaluate the results of research and development projects. Against this background and in the first assignment, the participants had to raise ethical questions concerning ROMSOC in general and their respective subproject. Hereby collected data and identified ethical issues were further analyzed and discussed during the second workshop, in which there was also the general introduction of the idea of different mechanisms to cope with the ethical issues risen and to monitor ethical issues and coping mechanisms related to them. The second assignment revised the first one and delivered a more thoroughly overview of the ethical issues and the respective measures to cope with them. While the following third assignment involved also a check whether there were new ethical issues or changes in the already identified ones, it focused mainly on the evaluation and more precise specification of the coping and monitoring strategies. In the last and third workshop on ethics, a final revision and evaluation of the ethical monitoring and coping strategies was conducted and the accompanied ethical monitoring was concluded. Henceforth, ESRs, PIs, and industrial partners were assessed to be sufficiently informed, committed, and prepared to finalize their projects, to set in place adequate coping mechanisms, and to monitor them.

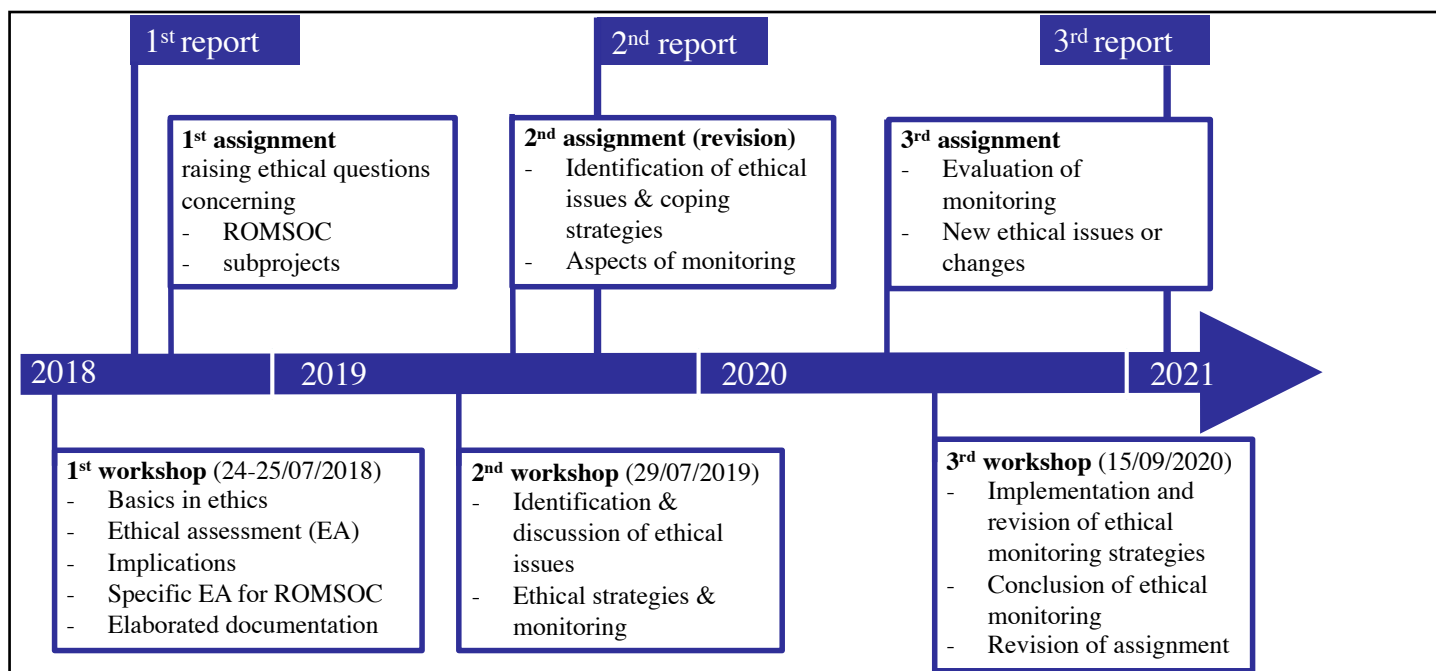


Figure 1: The ethical monitoring approach for ROMSOC and its subprojects.

2. Overview of projects, their respective ESRs, Pls, and industrial partners

Below you can find an overview of the different projects and the people aligned to them. It should be noted that project number four (ESR 4, Data driven model adaptations of coil sensitivities in MR systems) ended prematurely on 10th of March in 2020. Therefore, the ethical training and monitoring for this project ended before the evaluation and further refinement of mechanisms for coping with and monitoring the ethical issues of this subproject.

Projects six (ESR 6) and eleven (ESR11) experienced a change of ESRs. While the change in project six had already been conducted before the ethical monitoring started, the new ESR of ESR11 had to further conduct the ethical work that had been prepared by the predecessor of ESR11. This was no problem as ethical training and progress in identifying and monitoring ethical issues was only at the beginning.

Due to the COVID-19 pandemic, ROMSoc project was prolonged by twelve months until the end of August in 2022. It should be noted that the period covered and accompanied by the ethical advisors ended formally by the end of March in 2021. Even though it seems that all subproject and

ROMSoc Recruitment Overview (September 2020)

Project Title: Reduced Order Modelling, Simulation and Optimization of Coupled systems						
Project Acronym: ROMSoc						
Grant Number: 765374						
Type of Action: H2020-MSCA-ITN-2017-EID						
Starting Date: 01.09.2017		End Date: 31.08.2022				
ESR #	Name of Fellow	Title of Project	Recruitment Start Date	Recruitment End Date	Academic Supervisor(s)	Industry Supervisor(s)
ESR1	Bernadette Stadler	Real Time Computing Methods for Adaptive Optics	01.05.2018	30.04.2021	Ronny Ramlau (JKU)	Roberto Biasi (Microgate)
ESR2	Ashwin Sadanand Nayak	Mathematical modelling and numerical simulation of coupled thermo-acoustic multi-layer systems for enabling particle velocity measurements in the presence of airflow.	25.06.2018	24.06.2021	Andrés Prieto Aneiros (ITMATI, UDC)	Daniel Fernández Comesaña (Microflow)
ESR3	Giorgi Rukhaia	An Optimal Transportation computational approach of inverse free-form optical surfaces design for extended sources	01.05.2018	30.04.2021	Jean-David Benamou (INRIA)	Wilbert Ijzerman (Signify)
ESR4	José Carlos Gutiérrez Pérez	Data driven model adaptations of coil sensitivities in MR systems	01.10.2018	10.3.2020 – prematurely ended –	Peter Maass (U-HB) Tobias Kluth (U-HB), Lena Hauberg-Lotte (U-HB)	Chen Sagiv (SagivTech)
ESR5	Marcus Bannenberg	Coupling of Model Order Reduction and Multirate Techniques for coupled heterogeneous time-dependent systems in an industrial optimization flow	19.10.2018	10/18/21	Michael Günther (BUW)	Angelo Ciccazzo (STM)
ESR6	Robert Malte Polzin Onkar Sandip Jadhav	Model order reduction for parametric high dimensional models in the analysis of financial risk	07.05.2018 01.11.2018	20.06.2018 10/31/21	Volker Mehrmann (MATHEON-TUB)	Andreas Binder (MathConsult)
ESR7	Jonasz Staszek	Integrated Optimization of International Transportation Networks	15.9.2018	31.08.2021	Alexander Martin (FAU) Andreas Bärmann (FAU)	Marek Staszek (DB)
ESR8	Umberto Morelli	Efficient computational strategies for complex coupled flow, thermal and structural phenomena in parametrized settings	18.6.2018	17.06.2021	Peregrina Quintela Estévez (ITMATI, USC) Gianluigi Rozza (SISSA)	Gianfranco Marconi (Danieli)
ESR9	Marco Martinoli	Numerical simulations and reduced models of the fluid-structure interaction arising in blood pumps based on wave membranes	01.03.2018	28.02.2021	Christian Vergara (MOX-PoliMi)	Carl Botterbusch (CorWave)
ESR10	Shah Nirav Vasant	Coupled parameterized reduced order modelling of thermo-hydro-mechanical phenomena arising in blast furnaces	16.04.2018	15.04.2021	Gianluigi Rozza (SISSA) Peregrina Quintela Estévez (ITMATI, USC)	Alejandro Lengomin (AMIII) Tomás Símaro (AMIII)
ESR11	Naomi Auer Quan Ba Hong Nguyen	Optimal Shape Design of Air Ducts in Combustion Engines	16.04.2018 16.03.2020	25.10.2018 31.08.2021	Michael Hintermüller (WIAS) Axel Kröner (WIAS) (zuvor Caroline Löbhard (WIAS))	Karl Knall (MathTec)

Table 1: Recruitment end dates if not already reached are approximations and could be subject to further prolongations. Due to the COVID-19 pandemic, ROMSoc in general was prolonged until the end of August 2022.

ROMSOC as a whole are well suited and equipped for coping with existing and upcoming ethical issues, this cannot be guaranteed in beforehand. Therefore, it seems necessary to stress the fact the the ESRs, Pls, and their respective industrial partners have to take full responsibility for an on-going and continuous ethical monitoring of already identified ethical issues and an observant and attentive attitude towards potentially upcoming new ethical issues and challenges.

3. Ethical issues regarding key information documents for PRIIPs using the Cornish-Fisher expansion

In ESR6, ethical concerns were expressed concerning the key information documents for packaged retail and insurance-based investment products (PRIIPs) which are related to the research and development of ESR6. Below you can find the expressed concern as it was mainly composed by the industrial partner of ESR6.

The “Regulation (EU) No 1286/2014 of the European Parliament and of the Council of 26 November 2014 on key information documents for packaged retail and insurance-based investment products (PRIIPs)” stipulates that each PRIIP must be accompanied by a key information document (KID) in which the manufacturer quantifies the risk, the possible return, and the costs associated with the product.

The aim of PRIIPs is to improve investor protection by standardizing pre-contractual information made available to private investors for investment products whose performance is based on the underlying assets. The key information document prescribed by the PRIIPs regulation is a short and standardized document that must not exceed three pages. It contains information about the type and characteristics of the product, its objectives and risk profile, costs and fees, as well as potential returns must be kept separate from any marketing material.

The Commission Delegated Regulation (EU) 2017/653 of March 8, 2017 prescribes how the key information sheets are to be designed and which calculations have to be performed to obtain the risk and return numbers. For certain types of PRIIPs, the calculation of these numbers may become very time-consuming. This is the reason why ESR6 deals with reduced order models for financial risk analysis to make the calculation of PRIIPs numbers more efficient and still keep them meaningful and reliable.

For so-called category 2 instruments (packed instruments like exchange traded funds (ETFs) on, say, the DAX), manufacturers of PRIIPs are required to use a so-called „Cornish-Fisher expansion“. For historic return distributions that are far away from a normal distribution (e.g., Bitcoin or the exchange rate between CHF and EUR), in combination with very short holding periods (of a few days), this Cornish-Fisher expansion delivers results that are not meaningful for two reasons: First, the derived Cornish-Fisher “probability density” cannot be seen as a probability density anymore, and second, the pessimistic scenario will turn out to be seen better than the optimistic one. These limitations of Cornish-Fisher expansion have been formally made known to the authorities (especially to the European Securities and Markets Authority (ESMA)) in January 2020 and informally to

Supplement to 3rd and Final Report on Ethics for ROMSOC

various stakeholders already in 2018. However and very surprisingly, there were no measures taken to correct this use of the Cornish-Fisher expansion. The category 2 part of the Delegated Regulation could easily be repaired (e.g. by stipulating to carry out a category 3 type simulation for extreme moments of historic returns). For so called category 3 instruments, the published PRIIPs KIDs very often show exactly the same scenario values for the pessimistic, the moderate and the optimistic scenario.

The responsibility for taking such a measure and to establish a better investor protection should be taken by the European Commission. This is even more important as a proper PRIIPs calculation is mathematically challenging, which implies that manufacturer of PRIIPs and their respective information documents are prone to improperly use the Cornish-Fisher expansion instead of more adequate measures as there is no sanctioning mechanism set in place.

The industrial partner of ESR6 put emphasis on the fact that he had discussed this issue with some employees of the financial authority of a member state. Again, the methodology of the published PRIIPs KIDs has not been changed by the manufacturer and has not been penalized by the authorities. There seems to be a fundamental and structural problem concerning the implementation and monitoring of investor protection measures: Theoretically, there are high penalty threats for manufacturers producing misleading key information documents (e.g., by publishing performance scenarios that exhibit no risk at all). However, even though it seems that penalizing manufacturers of such PRIIPs lies in the responsibility of the national market authorities or the European Commission, such measures are still lacking.

4. Further advises and comments concerning the ethical monitoring of ROMSOC

Apart from sticking to the established and agreed-upon ethical monitoring and coping measures and strategies, we want to stress further aspects that should be regarded during the remaining time of the ROMSOC project.

As the formal ethical monitoring has finished but not the ROMSOC project, members of ROMSOC are advised to continue the search for ethical issues and the implementation of ethical monitoring measures. They are further called to take responsibility – as far as possible and meaningful – for their respective subprojects and for the results and possibilities that originate or may originate from them. Apart from implementing the already created disclaimer, it will be necessary to responsibly publish and dispose of the results and the knowledge gained so far. Furthermore, all members, hence: ESRs, Pls, and Industrial Partners, are responsible to carry on the the coping and monitoring measures that they have put in place. Without this self-commitment, there could be several gaps in the ethical monitoring of ROMSOC and its subprojects.

If any doubt or ethical issues that are hard to assess or to cope with should come up and be identified, it is highly recommended to take further ethical advice.

As shown in the concerns of ESR6 regarding the key Information documents, the misuse of the Cornish-Fisher expansion should be banned by regulation authorities, which cannot be the responsibility of ESR6 or its members. Here, it seems necessary to remind the respective authorities of their own monitoring duties.

5. Evaluation of the conducted ethical monitoring approach and implications for future monitoring approaches

The ethical monitoring approach conducted for ROMSOC had some specific characteristics from which certain strengths/possibilities but also weaknesses/limits derive that should all be considered in future ethical monitoring approaches.

Concerning its strengths and possibilities, one should name the emphasis on participation. All members of ROMSOC were involved to a high degree in identifying ethical issues of their respective subprojects and of ROMSOC as a whole. Thus, they were all invited to contribute with their personal expertise, perspectives, and experiences. This bears a high chance of generating a high degree of commitment and internalization of the need to ethically reflect and monitor R&D strives. Furthermore, due to that personal involvement chances are that the elaborated coping and monitoring solutions are adaptive and workable as they were found by the respective experts of the domains who had been accompanied and guided by the ethical advisors. In addition and as shown by the high rates of involvement during group discussions, members of ROMSOC were highly sensitized to pay special attention to ethical issues.

However, there are also weaknesses and limits that derive from this approach. First of all, the workload generated by the ethical evaluation and monitoring of eleven subprojects was quite ambitious to be covered by two ethical advisors with only three workshops as fixed dates at hand. Even though ethical issues of ROMSOC as a whole could be fairly addressed, at times it seemed that going deeper into the analysis of ethical issues and coping and monitoring strategies concerning certain subprojects would have been helpful. The ethical advisors tried to cope with the huge amount of aspects to be considered by working with large excel-files. While this was an excellent method to collect and administrate all data necessary, the facility of inspection was diminished. Another problem was the lack of an external instance for regulation that could also exercise sanctioning mechanisms. As there was no such instance and as the ethical advisors had no power in this regard, all (further) monitoring depends on the willingness of the ROMSOC members. To guarantee a thorough ongoing monitoring, instances of regulation empowered by sanctioning mechanisms would be highly recommended.

For upcoming ethical monitoring measures, there should be enough resources on the side of the ethical advisors as well as on the side of the specific subprojects to go deeper into the issues – if necessary. Furthermore, guidelines should be developed in order to avoid blind spots due to preferences of ethical advisors for one or another special form of ethical monitoring.