ILVES application

Contents

xxx

Remember:

1) Inari: do a small figure of people under differnt skills:a network model of expertise and interaction.Coordinator is in the decision node and citizen activities in aims, between are key wp's and their methods

Consortium ILVES 29.1.1y 2015

Project full title: Ilmastomyönteiset ja vähäriskiset kuljetusvaihtoehdot x INSERT ENGLISHNAME HERE mn

This to be shorter: Project applicants and responsible persons

PI; responsible leader of consortium) Prof. Sakari Kuikka University of Helsinki, Department of Environmental Sciences, (UH/FEM) Finland: leadership, Bayesian analysis, decision models, interdisciplinary risk analysis), Professor Elja Arjas: methods in causal learning from non experimental data, Dr, Adjunct Professor Jani Luoto (leading expert in Bayesian econometric policy designs and model selection in Finland, fast interactive algorithms to Bayesian models education in econometrics and model selection, Dr Anti Hyttinen, expert in causal learning from non-experimental data.

XX Inkku: Make this whole list to be just keywords like in papers, rest goes to team descriptions!

Dr Juha Honkatukia VATT Institute for economic research (VAT Finland: spatial model estimates from XX VATT MODEL, JUHA model emulations of large spatial models, economic data, Pearl's causal approach to the analysis of expert knowledge available in VATT and Bank of Finland (end user).

Dr Jukka-Pekka Jalkanen Finnish Meteorological Institute (FMI)Finland emission modles and the data describing every vessel entering Baltic Sea (incuding risk indexes), integration of world wide fleet data from vessel specific to fleet characteristic specific

Dr, Adjunct Professor Henrik Ringblom Åbo Akademi, BALEX Finland: existing and new legislation, their causal power to AI applications of ILVES.

Research Manager, Master mariner Justiina Halonen, Kymenlaakson ammattikorkeakoulu, University of Applied Sciences Finland: understand the potential risks of inland waterways, interviews of stakeholders by numerical causal models provided by UH and Hugin ltd.

Dr Jyri Vilko Lappeenranta University of Technology, School of Business and Management Finland: modelling of logistic solutions and information needs of companies, impacting the human behavior by value focused thinking and knowledge availability, Pekka Sutela: expert knowledge and Russian expert contacts to Russian introduced risks, acting as expert to look at alternative ways to model causalities of national economics in EU, Finland and Russia.

Dr Miina Karjalainen Kotka Maritime Research Association: stakeholder contacts and dissemination, links to other Merikotkaprojects (see team description XX MIINA PUT KEY PAST PROJECTS AND CURRENT ONES TO SECTION 8, 3 sentences)

Prof. Olli Varis Helsinki University of Technology Finland: world and Finnish food security, expert input to use Pearls algorithms together with key balance equations of VATT and BOF models, using priors of the causalities from papers of Varis

Dr Rich Little, Dr Beth Fulton, Dr Lee, Dr XX CSIRO Australia: optimal insurance policy, role of alternative interventions to manage oil disaster risks, creating learning methods to Atlantis, oil spill risk applications to local oil production in Australia

Prof xx and dr YY, University of Waikato, New Zealand: how to describe risk in an understandable way, supporting cognition, linking Weka to support joined use of expert knowledge and causal learning in Hugin (to be developed in ILVES).

Dr Jouni Tuomisto, NHA human and seal components for inland water oil spills, experiences in risk communication, support of best practices in open science supporting risk communication.

Dr, CEO, Anders Madsen, Hugin. Further development of the world leading Bayesian network decision support software, application of Pearl's see and do functions to observed data and future policy predictions, interactive learning of values and priors from experts, policy administration, scientists, end users,

A private company to take care of Elja's salary?

The overall approach of ILVES

We link risks to human life, we use information to inform people and companies on their action and their impacts, and creating interest for better practices in shipping by improved information and methodology.

2 Rationale

1.1y 1 Aims

XX THIS WHOLE SECTION IS TOO LONG: SAKKE WILL SHORTEN IT LATEST ON TUESDAY AFTERNOON ,PARTS TO THE SOECIETAL IMACT SECTION The main aim of the proposal is to develop a risk management model to support policy decisions in the Finnish transportation sector to slow down the global climate change. The scope includes transportation of cargo and passengers on road, railways, and shipping in the Baltic Sea. The considered time horizon expands to 2050. This year was selected as a target for future EU transport policy, which aims at significant reduction of GHG emissions from traffic sector. This proposal aims at finding answers how these goals could be achieved from the point of view of Finnish society. The climate scenarios defined in the work of IPCC extend to year 2100, but the interim EU GHG reduction goals set for transport sector for 2050 are necessary stay within the longer term IPCC targets. This is important to support the achievement of the CO3 level in EU and worldwide. ILVES consortium argues that the responsible decisions of industry (oil risk governance) and citizens responsible behavior can and should be supported by the use of modern scientific risk analysis and tools and by and by related to communication approaches.

We forecast the future scenarios by the forward simulation version of the model fitted to relevant data, and assess the probabilistic outcomes of the key interest variables for three time steps in the future: year 10, year 20 and year 30. Influence of the climate policy actions should be possible to estimate from the economic and climate indicators at these mileposts. We input these estimates to a decision model, where the optimal policy, given the underlying key uncertainties, can be evaluated. This can be done separately or jointly for the key societal aims to understand the role of precise aims in the policy support (ref to the old paper in SILMU paper and to the two paper, Climate Change paper). We build on the established, earlier research and on our innovation partnerships to find solutions to the challenges related to interoperability of transport management systems, sustainable low-carbon fuels, security and safety.

The main goal of the IPCC policy is to restrict the increase of the global temperature to a maximum of 2 Celsius degrees. Achieving this goal will imply avoiding major impacts caused by climate change. The environmental record of shipping can and must be improved by both on-board technology, and better fuels and operations: overall, the EU CO2 emissions from maritime transport should be cut by 40% (if feasible 50%) by 2050 compared to 2005 levels (EC, 2011). This has been stated in the White Paper (EC, 2011), which can be considered to express the will inside the EU. Thereby, also Finland has its own aims to implement in climate policy.

An efficient transport network requires substantial resources. The cost of EU infrastructure development to match the demand for transport has been estimated at over € 1.15 trillion for 2010-2030 (EC, 2011). Science can contribute significantly to obtain optimal policy decisions, and due to these extreme costs, even small adjustments in infrastructure investments can pay back to national and private economy and society's welfare. We support directly the related decision-making and give strategic advice how to do new related research by carrying out the value of information analysis for the decisionmodel developed (oil spill risk management model, CO2 policy evaluation model),.

The maritime strategy of Finland for 2014–2022 provides an overall framework that serves Finland's economy, business life and employment and appreciates the new environmental norms. The strategy contains an analysis of the recent changes and an evaluation of the future challenges. It also outlines a vision for 2030 and identifies measures that are required to meet the objectives. A key aim in the strategy is to ensure well-functioning sea transport. According to the maritime strategy, Finland will be a forerunner in winter and environmental technology and will export high competence in those fields. Additionally, the maritime transport and maritime cluster have the skills and know-how to meet the future needs, and the visibility and attractiveness of the sector will increase.

Developing the inland waterway (IWW) system supports the White Paper (EC, 2011) targets. One of the (key?) targets is to shift 30% of road freight transport, where the distance is above 300 km, from road to rail by 2030, and the more than 50% by 2050. Another strategic target calls for ensuring all primary seaports are sufficiently connected to, where possible, inland waterway system by 2050. Also TEN-T (Trans-European Transport Network 2014) policy with new focus on multimodality puts inland ports in the spotlight. The deep water fairway in Saimaa Lake District is part of the core network corridors defined in the Connecting Europe Facility of the EU Infrastructure Package. The IWW development also contributes to the aims of Finnish Maritime Strategy 2014-2022 in improving and maintaining marine and inland water ways, to promote novel technologies to support sustainable and competitive vessel traffic, also in wintry conditions, and to contribute to the growth of Russian transit traffic via Finland. The political situation in Russia offers an intereresting and highly valid question to many areas in society to utilize the probabilistic prediction models we provide by using several experts (Uusitalo et al 200?)

The CO2 and other greenhouse gas emissions are not the only environmental concerns that need to be addressed. A fact in the risk analysis is that a single oil spill in the Gulf of Finland can incur costs up to one billion euros. This risk is related to the alternative traffic combinations. We will also look at the freshwater transportation though the Saimaa channel, Lake Saimaa being the home for a small population of Saimaa ringed seal (yearly reproduction around 65,population around 240 (INKU;TARKISTA LUVUT; NE LIENEE AIKA LÄHELLÄ)

The purely economic direct costs that realize on markets would be shared between insurance companies, international oil pollution compensation funds and Baltic Sea countries. Finland is a member of the Supplementary Fund of the International Oil Pollution Compensation (IOPC) Funds, which has a compensation limit of SDR 750 million (€ 961 million). However, the compensation is paid only if oil pollution result in an actual and quantifiable economic loss related to property damage, oil combating and clean-up costs, economic losses in fisheries, mariculture or tourism, and costs of reinstatement of the environment (IOPC Funds, 2013). Hence, losses to environmental values that are typically difficult to monetize are left outside from the compensation scheme.

The proposal will improve significantly the possibilities to change the maritime policy as a more sciences based policy. We will estimate as precisely as possible.

Such science – policy dialogue must be supported by the international scientific assessment groups. There is no organization capable of carrying out this so far, but the coordinator of this proposal is the chair of ICES (International Council for the Exploration of the Sea) Working Group on Risks of Maritime Activities in the Baltic Sea (WGMABS), which had its first meeting in in Helsinki April 2015. The WGMABS agenda includes dialogues with stakeholders in 2016 and 2017: LINKKI

Concepts of value of information and value of control in planning the policies

This is, to our knowledge, the first study to apply the Bayesian causal modelling techniques to the planning of future legislation options. Bayesian models are not widely applied in legislative analysis. We are especially looking forward to apply the Pearls algorithm (ANTTI: 1995 vai 2000 paperi) to the optimal policy design under a cas where many variables of a noisy chain to link decisions to aims (Varis & Kuikka, climate change arcticle) (ANTTI ET AL: FIG SOMEWEHERE HERE)

Instead of point estimate models, we apply Bayesian models that provide probability distributions instead. Fig 1 describes why a point estimate model can provide wrong policy advice in risk averse decision making. If the criteria is to avoid the risk level of small biomass (limit in the Fig), a point estimate model would suggest that policy A provides better expected value. However, the uncertainty related and related risk to this option is estimated to be higher than that of policy option B.

Inland water area, especially the Lake Saimaa district has several protected areas, Natura 2000 areas and habitats of protected species close to the Saimaa deep water route used by merchant vessels. Deep water route is proven to be difficult to navigate because of its narrowness and fast currents. Accident and near miss incidents recorded by maritime authorities reveal that the accidental risk in the Saimaa Lake is relatively higher compared to the sea areas (Finnpilot, 2014). Challenging navigating environment emphasize the importance of piloting or compensatory service for vessels.

The project studies several policy options that have a potential to improve the efficiency of transportation and thus decrease the CO2 emissions. In the technical side lie e.g. technological improvements in engines, shifts in the use of fuels, and new information technologies enabling savings in fuel and other costs and streamlining vessel maintenance and repairs (???CAN ULLA PROVIDE REFERENCES?). Another set of management options includes structural issues. These include e.g. the development of the Finnish dry port structure and railway network (Lättila et al., 2013), the reduction of the number of coastal harbors (Tapaninen, 2015), the promotion of inland water ways and harbors, the construction of the Kymijoki canal, and the proposed railway tunnel between Helsinki and Tallinn (???CAN ULLA PROVIDE REFERENCES?).

The project studies the effects of these policy options on several socio-economic and environmental factors. In addition to CO2 and other greenhouse emissions, we concentrate on oil spill risks related to ecological and economic consequences of oil spills, ?????OTHER ECONOMIC ASPECTS????, and the food security of Finland.

The risk analysis framework includes risk definition (our WP 2), risk analysis (WP 3–WP 5), risk management (WP 6) and risk communication (all WP, plus WP 7 especially). The challenge to provide interdisciplinary risk information is a demanding one (Haapasaari et al., 2012), and we will take new steps in risk communication by including cognitive scientists to get feedback from stakeholders on interdisciplinary risk estimates and from artists to describe the well-known and poorly known, unseen risks.

Fig. X. The combination of unusual ice conditions for mariners and the existence of rocks in unpredictable areas make the Gulf of Finland and Archipelago Sea as very difficult areas to navigation and ship operations. In the Gulf of Bothnia, the islands and rock are not numerous, but there are moving ice filds.: XX VALTTERI: MODIFY THIS

3 Societal significance and impact

Transport is fundamental to our economy and society. Finland is economically an island, and our export and import takes place by the shipping (viite Tullilta, sieltä prosenttiluvut kummastakin). Mobility is vital also for the internal market and for the quality of life of citizens as they enjoy their freedom to travel. Transport enables economic growth and job creation: however, it must be sustainable and acknowledge resource and environmental constraints. ??? THE NEXT SENTENCE SHOULD BE SOMEWHERE ELSE??? Passenger traffic is included to our proposal, as it provides and important part of the CO2 emissions.

The main societal impacts are as follows (if the project findings are implemented successfully, like planned in section xx.xx): 1) findings will supporting the policy to achieve CO2 emissions 2) nvestments based on suggested chain of creating new jobs along inland water ways 3) improved state of environment 4) improving the interest to apply best practises in companies that create main risks, leading to higher quality in all activities.

The strategic answers of ILVES to the 4 questions made by the call are as follows:

A) How can we improve resource efficiency and support the move towards a circular economy, which will serve to boost exports and competence-based growth in Finland

If the project findings will be implemented by the Finnish government, the need to use fossil energy in shipping and other traffic will decrease. The project findings will support the development of new shipping technology in Finland and therefore support exports. The new methods to develop legislation and other national policy options will support the development towards competence-based growth, as creation of such development needs a combination of national actions (taxes, subsidies, legislation, customer behavior). The new transportation options to inland water will boost local investments. As no development can take place without negative impacts, we look at the oil spill risk changes related to various transportation options.

B) What are the requirements for climate neutrality and resource efficiency in society?

We will study the requirements for climate neutral society, by calculating with a Bayesian decision model, what are the prerequisites of the national and international policies to achive the desired state of the climate aims in transportation policy. Bayesian network models can calculate the states of the system from causes to effects like any models, but they can also calculate backwards, .i. from desired aims back to required policies. This methodology will be important is overall support of climate policy by scientific tools. We will study how the oil companies, shipping companies and the users of these services increase their interest to avoid environmental disasters and customer responsible consumption to decrease the CO2 emissions. The policy options of society (taxes, laws) are compared to these ways to govern the environmental impacts in society.

C) In what ways can the public sector best support the overall transition so as to maintain a well-managed move towards a climate-neutral and resource-scarce society?

There is no clear answer to this question yet, but we will develop methods, legislation planning tools, practical policy actions and new governance solutions to reach these goals. The potential big impacts of resource-scarce international markets will be studied by the risk analysis of worldwide food production. New machine learning methods are applied to the worldwide food production data sets. Same methodology is used to learn traffic risks from large marine data sets.

D) How can we ensure that businesses, employees, the public sector and consumers possess the resources and skills that promote an ability to adapt to the changes and risks brought about by disruptive technologies?

We will analyse how new shipping technologies (like new fuel requirements, use of electric power in inland water to avoid oil spill risks) and shipping options can be used to support the climate policy in EU and Finland. We will look at the customer behaviour is selecting low carbon products from markets (SYKE; Jyri) and how the role of NGO's should be revised in the support of creating interests for companies to apply best available techniques to their shipping practises.

How to link together the customer selection and the co1.1y Risk analysis based on the knowledge provided by Professor Pekka Sutela: what is the probability that the agreement on which the use of Saimaa channel is based on , will continue to be in force in the future. This is a main political risk factor for the investments needed to develop inland waterway traffic.

How to transfer the knowledge from previous accidents?

Why EU legislation packages carry the names of the oil spill disasters? Do we learn only from observed accidents, not from model estimates?

Compare to practises in flying businesses and in nuclear power management

Flying business: all have the same interest of not having an accident: learn from these and the brand management of flying companies when developing the interests for best practises

Nuclear power management: an absolute trust on models and their estimates of unseen risks

Fig. X. XXXXXXXXXXXXXXXXXX

4 Objectives, expected results

??DESCRIBE HERE THE POLICY OBJECTIVES AND STRATEGIC OBEJCTIVES OF ILVES FIRST, THEN TACTICAL OBJECTIVES?? LINK THE EXPECTED RESULTS WITH THEM?

We build probabilistic interdisciplinary models by linking relevant knowledge: big data sets describing the attributes, such as fleet CO2 outputs, of merchant marine and passenger ships, and existing oil risk models developed by the FEM research group and CSIRO. We use the data sets from the Deepwater

Horizon post-hazard monitoring program (Oil Disaster Impact for Management database (ODIM)) as a basis of a learning ecology and socio-economic information in WP 1.1y WP 5 and WP 6.?? NEEDS REVISION, INCOMPREHENSIBLE?

Management of traffic has high implementation uncertainty due to large abundance of operators whose decision making cannot be reliably predicted by economic theory ??REFERENCES NEEDED? Implementation uncertainty will most likely depend on the methods for control and incentives (e.g. fiscal policy decisions) and the applied combination of them. For example, the head of the expert elicitation subgroup of ILVES Stakeholder Support Group (ISSG) addressed during the proposal writing, that typical urge among the head of logistical units prioritizes quick transportation of the products. However, customers may gain no added value from such a rush. In the methodological package, we develop databases to be linked with buying decisions to remind the customer that his/her consumption related decisions have a CO2 label and risk label for aquatic environments, threatened species and recreational values, in risk terms. ??THIS CHAPTER NEEDS TO BE MOVED TO RESEARCH METHODS. BUT TAKE "a CO2 label and risk label for aquatic environments, threatened species and recreational values, in risk terms" AS EXPECTED RESULTS IN SECTION 4?

OPTIMAL policy design: The management of traffic is not easy, and it has been shown to be unsuccessful in achieving the given aims. Price signals play a crucial role in many decisions that have long-lasting effects on the transport system. Transport charges and taxes must be restructured in the direction of wider application of the 'polluter-pays' and 'user-pays' principl. They should underpin transport's role in promoting European competitiveness and cohesion objectives, while the overall burden for the sector should reflect the total costs of transport including infrastructure and external costs. Wider socioeconomic benefits and positive externalities justify some level of public funding, but in the future, transport users are likely to pay for a higher proportion of the costs than today. It is important that correct and consistent monetary incentives are given to users, operators and investors.

• Hyväkyttävän riskin käsite. Saimaan norppa on oma lukunsa. Sähkökäyttöisten alusten vaatimus voisi olla tapa kiertää öljyriskit ja kehittää nopeasti vaadittavaa tekniikkaa?

• The role of preventive actions and oil combatting actions: should the responsibility be in the same hands, as well as supporting science?

•

• include all sources of uncertainty: or be honest with your knowledge and let end users know how much you know: Fig 3.

??MOST OF THE ABOVE TEXT NEEDS TO BE MOVED TO SECTION 5?

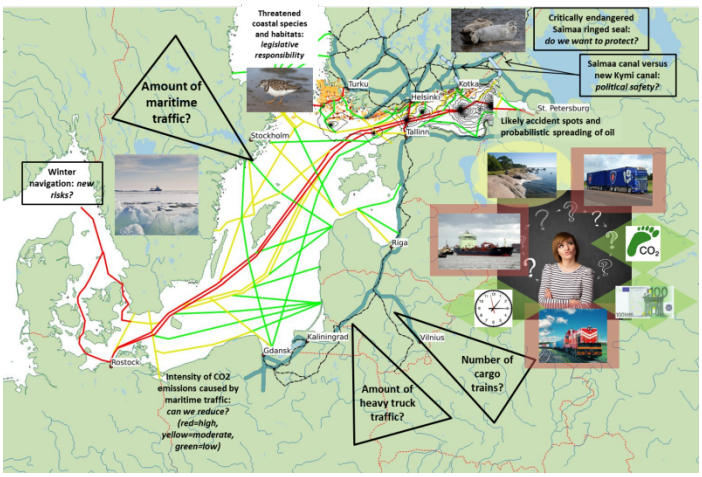

Fig. X. XXXXXXXXXXXXXXXXXXXXXXXXX

5 Research methods and material, support from research environment

Risks and probabilities can not be directly measured. Therefore, we need sophisticated modelling tools to estimate them. In this study we apply Bayesian time series models --# : (Jani: insert references here, including your on papers) **--Jouni (talk) 04:21, 22 April 2015 (UTC)** to the analyses of historical data, and the historical estimates of the more theoretically based model estimates of those variables, which could not be measured but which were estimated by the help of theory and data. This data includes some policy actions over the years, and we use the Pearl's (20xx) approach to try to identify causalities from non-experimental data. By this knowledge, and by the strong economic theory, we estimate the likely future impacts of policy action on the key interest variables by simulating the future probabilistic developments of the interest variables. From these simulation results, we take the predicted probability distributions of interest variables from the 10th, 20th, and 30th years from now on. We insert these probabilities to a decision model, where the implementation uncertainty (how likely it is that a policy will be realised in the way proposed) will be evaluated by the experts in jurisdiction. In this decision model, we take into account the uncertainty coming from expert judgement by eliciting expert knowledge (O'Hagan BOOK) using several experts and by integrating their probabilistic judgements in the decision model, i.e. A Bayesian influence diagram model (Kuikka et al 1999). The decision model will also provide value-of-information estimates, which describe what variables should be known more precisely at the time when decisions are made. This information is used in the project to focus the data analysis and modelling to policy relevant variables. In the planning of potential new policies, we also use the value-of-control analysis, where a probabilistic variables is made at least partly controllable by adding a new decision variable to the model. This analysis will reflect back to the planning of new legislation. This modelling approach will provide estimates of the likelihood to achieve the given gas emissions for the Finnish fleets, and the related economic, social and environmental interests in probabilistic terms.

Alternative future scenarios for environmental policy changes in shipping, like the efficacy of Emission Control Areas, vessel speed limitations and use of LNG as fuel will be tested using actual traffic data from Automatic Identification System (AIS) (Jalkanen et al, 2009,2012; Johansson et al (2013)) and chemical transport modeling (Jonson et al (2015). These facilitate the evaluation of environmental performance of maritime policy changes and have been already used as background scientific material at HELCOM and IMO (HELCOM, 2011; 2014; PBL, 2012; Smith et al, 2014). The use of actual ship traffic patterns and volumes aim at reducing the cumulative uncertainty of the cost/benefit analysis thus improving the overall performance of the Bayesian approach. The shipping scenario work directly contributes to the revision of the national programme of measures of the marine strategy, the first version of which already incorporated Bayesian modelling. Our proposal extends the work described in the national programme of measures, offering a more complete view on different transport modes and by including several future scenarios up to year 2050.

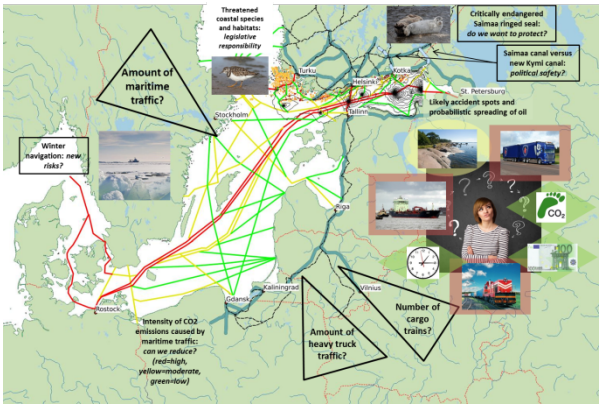

Fig. X. XXXXXXXXXXXXXXXXXXXXXXXXXXXX

We also apply an emulator model (O*Hagan, 20 xx) to learn the behaviour of the complex economic model (Juha: insert here the references) In the analysis of historical data by econometric Bayesian tools and more theory based models of VATT, we also use the alternative views of the causal structure

of the system. This will be done by using the views of different experts and stakeholders on ghe histotrical (Mäntyniemi et al 291 x), and on the other hand, on future causalities. If successfull, the learning of causalities from non-experimental data, the application will be a novelty in economic and environmental analysis. The methodology may have a major impact on the understanding of e.g. the impacts of policy actions (yearly interventions by total allowable catches) on stock dynamics, or in environmental management of water quality. It is obvious that same methodolgy is essential in any policy evaluation settings where similar data is available, like in evaluation of economic governance policies.

There is also an under evaluated link between the Bayesian parameter estimation and decision models. Many of the algorithms use extensive time in estimating the tail probabilities of the distributions. However, the need to know the probabilities precisely is linked to the decisions: if their ranking in decision model is not anymore sensitive on improved estimates in a MCMC chain, it is likely that the chain can be stopped. Therefore, the use of decision models together with parameter estimation is essential for such online decisions or fast decisionmaking, where there is no time to wait for better estimates. The experiences of UH/ECON and UH/FEM will be in an essential role when looking at this option. For example the set of Bayesian models in Baltic salmon stock assessment (Kuikka et al 201 xx) requires several weeks to run, even though they are supposed to be used in working group meetings which are two weeks long. The skills of UH/ECON to use the graphical processors of computers for faster calculus are likely very valuable in solving such problems. Bayesian nets: used to learn directly from large existing data sets (VTS data, number of vessels) OR from simulation results, if interest variables can not be observed (current risk in Gulf of Finland, CO2 omissions in 2040, these need to be model based estimates, but with uncertainty estimates to understand risk averse policy advice)

--# **:** inser Janis text from the email he provided on the causality learning

Our innovative and interdisciplinary approaches are as follows in various WPs:

WP 2: 1) Data compilation and expert knowledge elicitation: making knowledge ready. Coordinator is FMI. This WP will look after the data sets and their management.

Expert elicitation of future risks: Even though the Finnish fleet creates an important element of oil spill risks, and especially so if we consider the potential of the inland water ways and their management, the Russian export of oil through the Gulf of Finland is the main element in overall risk in the Gulf of Finland. Costs of a big spill, like spill of Pristine in 20 xx, can cause costs of one thousand million euros. Of these costs, insurances and international oil foundation cover costs up to xxx 000 000 euros, and the rest of the costs would come to Finnish taxpayers, if the GoF is cleaned as much as it should be from ecological point of view. The Russian export can be redirected to e.g. Markets in China, which would have an impact on risks in GoF. In order to estimate this probability, we use experts to eliviate the required future probabilities.

Work package number	1	**Start date or starting event: month 1**	**End month**
Work package title	**WP1)** Analysis of historical data and meta-analysis of publications: information to predict:		
Activity Type	RTD		

Participant number						
Participant short name						**TOTAL**
Person-months						

Objectives

1)

Description of work and role of participants

The **WP 4** leader is Dr Honkatukia who is an expert on statistical and dynamic models, and knows well the information needs in several policy areas in Finland, based on VATT model XX JUHA: UPDATE THIS

Task 1.1 1 Data and model outcome compilation: historical observations and VATT model estimates to be used in causal learning and parameter estimation of decision models Dr Juha Honkatukia and Dr Miina Karjalainen D1.1y 3-1.1y 5

- KYAMK,

Task 1.1y 3 Expert knowledge elicitation: Leader Ulla Tapaninen : implementation UH

Expert elicitation of future risks: The probabilistic model of traffic chains: This needs to be computationally fast algorithm, but still being able to provide scientifically justified estimates of uncertainty, The parameter estimation by historical data and future simulation of traffic chains will be modelled by linking traffic equations to Pearl's See and Do functions (Pearl 20 xx) by using the simple parameter estimation approach developed by Varis and Kuikka (19 xx) approaches

D 1.1y 1,D 1.1y 1.1y D 1.1y 5

In this task,

Task 1.1y 4 Graphical analysis together with citizens: Leader Waikato University, New Zealand

D 1.1y 9-D 1.1y 11

This is our detailed test of how people understand the graphics and how they can insert their causal knowledge and own data to learning systems, including values (a link to WP xx, Hugin webbased system). We test different options from the cognition point of view, ie.how understandable the information contents of the data sets and/ or simulation results are,

Task 1.1y 4 Optimal data treatment of all data: how to discretize for various purposes.

The final use of the data or simulation results in decision making has an impact on how to discretize the data sets to get a fully interactive model including the most essential information content of data, or future simulations, like is the interest. In here, we will look how this data teartment should be done to effectively support decision making

D 1.1y 1 SMHI(8) UH(6+in kind 2). Journal MS: **Month xx.y** **D 1.1y 2 UH(10) SMHI(7) SLU(2).** Journal MS:. **Month xx.y** **D 1.1y 3 SLU(12) EMI(2) UH(in kind 2).** 18 Journal MS: **Month xx.y** **D 1.1y 4 SLU(9) FGFRI(2) EMI(2) UH(in kind 4).** Journal MS:. **Month xx.** **D 1.1y 5 SLU(12) SMHI(4) FGFRI(1) UH(in kind 2). Month xx.y** **D 1.1y 6 SLU(9).** Journal MS: M**onth xx.y** **D 1.1y 7 SLU(10) SMHI(7) UH(2)**. Journal MS: **Month xx.** **D 1.1y 8 SLU(10) SMHI(7 UH(2).** Journal MS: **Month xx.y** **D1.1y 9 EMI(12) FGFRI(3) UH(in kind 3).** Journal MS: **Month xx.y** **D 1.1xx EMI(12) UH(4+in kind 4) FGFRI(2).** Journal MS: **Month xx.** **D1.1y 11 EMI(10) UH (in kind 4) FGFRI(2)** Journal MS: **Month xx.**

Work package number	2	**Start date or starting event: month 1**				**End month**
Work package title	**WP 2** Structuring Decision model , inserting policy causal knowledge and value-of-information analysis of prior knowledge					
Activity Type	RTD					
Participant number						
Participant short name						**TOTAL**
Person-months						

Objectives

2) Law impact in p

Description of work and role of participants

The **WP 4** leader is Dr xx who is an expert on x statistical and dynamic

Don't model it if you cant implement it. If you cant model it, don't implement it.

Expert elicitation of historical and future uncertain developments: how

Task 1.1y 1 Spatial modelling of fish productivity D1.1y 3-1.1y 5

future trends D 1.1y 6-1.1y 8

Task 1.1y 3 Providing probabilistic

D 1.1y 1,D 1.1y 1.1y D 1.1y 5

In this task,

Task 1.1y 4 Detailed analysis D 1.1y 9-D 1.1y 11

This is our detailed test of.
D 1.1y 1 SMHI(8) UH(6+in kind 2). Journal MS: **Month xx.y** **D 1.1y 2 UH(10) SMHI(7) SLU(2).** Journal MS:. **Month xx.y** **D 1.1y 3 SLU(12) EMI(2) UH(in kind 2).** 18 Journal MS: **Month xx.y** **D 1.1y 4 SLU(9) FGFRI(2) EMI(2) UH(in kind 4).** Journal MS:. **Month xx.** **D 1.1y 5 SLU(12) SMHI(4) FGFRI(1) UH(in kind 2). Month xx.y** **D 1.1y 6 SLU(9).** Journal MS: M**onth xx.y** **D 1.1y 7 SLU(10) SMHI(7) UH(2)**. Journal MS: **Month xx.** **D 1.1y 8 SLU(10) SMHI(7 UH(2).** Journal MS: **Month xx.y** **D1.1y 9 EMI(12) FGFRI(3) UH(in kind 3).** Journal MS: **Month xx.y** **D 1.1xx EMI(12) UH(4+in kind 4) FGFRI(2).** Journal MS: **Month xx.** **D1.1y 11 EMI(10) UH (in kind 4) FGFRI(2)** Journal MS: **Month xx.**

Work package number	3	**Start date or starting event: month 1**				**End month**
Work package title	**WP 3 Answering to the probabilistic questions of decision models: data analysis add algorithm development :Dr Olli Varis, Dr Sakari Kuikka**					
Activity Type	RTD					
Participant number						
Participant short name						**TOTAL**
Person-months						

Objectives

1) To apply appropriate estimation method to each subnet of the decision model (MCMC, machine learning, expert judgement,

2)

3) To develop such MCMC algorithm that stays in those areas of probability distributions, where the decisions are most sensitive on estimates and the aims defined.

4)

Description of work and role of participants

The **WP 4** leader is Dr xx who is an expert on x statistical and dynamic

Task 1.1 Development of fast algorithms for decision support: professor Haario

Anders, Jani, Olli,

Task 1.3 Analysis or world main forces development: the migrations in Baltic Sea area and its

link to the rest of the world: Professor Olli Varis

In the risk analysis models of the worldwide food security and its impacts on the food security in Finland, we use the expert judgments on the chances that the fleets do no operate like assumed, due to for example harbor strikes. We build the food security models on the expert judgement models of Varis et al (xcxx), where the aim of the Bayesian analysis is to model the uncertainties in causalities. These models are based on link matrixes of Pearl (20 xx), and they currently include expert understanding without extensive data analysis, and therefore they can be used as priors for more data based analysis. We use the machine learning algorithms of WEKA software to run these additional analysis, usin g the extensive data sets of FAO (REF Olli). The sensitivities and risks of the system will thereafter be analyzed by sensitivity analysis that focus especially on uncertainties in causal relationships, like carried out for climate change models in Varis and Kuikka (20 xx' Climatic Change).

In the analysis of inland water ways, we look at the Kymijoki option which is estimated economically several times and the estimates can be used to look at the optional costs of such traffic option, where we invest on the inland harbor chains, by the Russian uncertainty of keeping the Saimaa channel open must be taken into account. We use expert knowledge (Professor Pekka Sutela and e.g. Russian transport specialist Professor Evgeny Korovyakovskiy) to look at the likelihood

future trends D 1.1y 6-1.1y 8

Task 1.1y 3 Providing probabilistic

D 1.1y 1,D 1.1y 1.1y D 1.1y 5

In this task,

Task 1.1y 4 Detailed analysis D 1.1y 9-D 1.1y 11

This is our detailed test of.

D 1.1y 1 SMHI(8) UH(6+in kind 2). Journal MS: **Month xx.y**
D 1.1y 2 UH(10) SMHI(7) SLU(2). Journal MS:. **Month xx.y**
D 1.1y 3 SLU(12) EMI(2) UH(in kind 2). 18 Journal MS: **Month xx.y**
D 1.1y 4 SLU(9) FGFRI(2) EMI(2) UH(in kind 4). Journal MS:. **Month xx.**
D 1.1y 5 SLU(12) SMHI(4) FGFRI(1) UH(in kind 2). Month xx.y
D 1.1y 6 SLU(9). Journal MS: M**onth xx.y**
D 1.1y 7 SLU(10) SMHI(7) UH(2). Journal MS: **Month xx.**
D 1.1y 8 SLU(10) SMHI(7 UH(2). Journal MS: **Month xx.y**
D1.1y 9 EMI(12) FGFRI(3) UH(in kind 3). Journal MS: **Month xx.y**
D 1.1xx EMI(12) UH(4+in kind 4) FGFRI(2). Journal MS: **Month xx.**
D1.1y 11 EMI(10) UH (in kind 4) FGFRI(2) Journal MS: **Month xx.**

Work package number	4	**Start date or starting event: month 1**	**End month xx**

Work package title	**WP 4 Planning the future policy options: value of control analysis and the use of new causal interventions to reach future aims**					
Activity Type	RTD					
Participant number						
Participant short name						**TOTAL**
Person-months						

Objectives

5)

Description of work and role of participants

Cost benefit analysis of developing inland waterways: In the probabilistic cost benefit analysis of the more intensive use of inland wayer ways, we will use the SYKE data of the location of threatened species in areas where an oil spill is possible. Moreover, we value the damages to the use of summer cabines in the lake area by implementing an interactive questionnaire in the web, aiming to estimate the willingness to pay of the Finnish cottages owners to prevent spills (see Helle et al for a probabilistic cost benefit analysis of using the resources on preventive actions of accidents, compared to the use of resources on new oil combatting vessels). The potential losses of nature values and recreational values are the key elements of risks related to new traffic options in inland water ways. Moreover, as a an alternative policy of safeguarding nature values only (to see whether the aims lead to different policies) we will use the techniques of Ihaksi et al (20xx) to estimate the impacts of possible oil accident on threatened species. Among these, the Saimaa purpose seal is the most threatened and charismatic species, where Finland has a responsibility in safeguarding the population.

The **WP 4** leader is Dr xx who is an expert on x statistical and dynamic

Task 1.1y 1 Spatial modelling of fish productivity D1.1y 3-1.1y 5

future trends D 1.1y 6-1.1y 8

Task 1.1y 3 Providing probabilistic

D 1.1y 1,D 1.1y 1.1y D 1.1y 5

In this task,

Task 1.1y 4 Detailed analysis D 1.1y 9-D 1.1y 11

This is our detailed test of.

D 1.1y 1 SMHI(8) UH(6+in kind 2). Journal MS: **Month xx.y**

D 1.1y 2 UH(10) SMHI(7) SLU(2). Journal MS:. **Month xx.y**

D 1.1y 3 SLU(12) EMI(2) UH(in kind 2). 18 Journal MS: **Month xx.y**

D 1.1y 4 SLU(9) FGFRI(2) EMI(2) UH(in kind 4). Journal MS:. **Month xx.**

D 1.1y 5 SLU(12) SMHI(4) FGFRI(1) UH(in kind 2). Month xx.y
D 1.1y 6 SLU(9). Journal MS: M**onth xx.y**
D 1.1y 7 SLU(10) SMHI(7) UH(2). Journal MS: **Month xx.**
D 1.1y 8 SLU(10) SMHI(7 UH(2). Journal MS: **Month xx.y**
D1.1y 9 EMI(12) FGFRI(3) UH(in kind 3). Journal MS: **Month xx.y**
D 1.1xx EMI(12) UH(4+in kind 4) FGFRI(2). Journal MS: **Month xx.**
D1.1y 11 EMI(10) UH (in kind 4) FGFRI(2) Journal MS: **Month xx.**

Work package number	6	**Start date or starting event: month 1**				**End month**
Work package title	**WP 6 Software development and test with people out there: are people interested about our products given their values?**					
Activity Type	RTD					
Participant number						
Participant short name						**TOTAL**
Person-months						

Objectives

6) Learning Hugin
7) Systematic use of Metropol feedback systems in the yearly ICES WGMABS open risk communication meetings (2016: St Petersburg to meet industry, 2017 to help international WWF to adapt those parts of ILVES and WGMABS approaches which are needed for successful risk governance

Description of work and role of participants

The **WP 4** leader is Dr Anders Madsen,Huginltd,Denmark. xx who is an expert on x statistical and dynamic

Task 1.1y 1 Spatial modelling of fish productivity D1.1y 3-1.1y 5

future trends D 1.1y 6-1.1y 8

Task 1.1y 3 Providing probabilistic

D 1.1y 1,D 1.1y 1.1y D 1.1y 5

In this task,

Task 1.1y 4 Detailed analysis D 1.1y 9-D 1.1y 11

This is our detailed test of.

D 1.1y 1 SMHI(8) UH(6+in kind 2). Journal MS: **Month xx.y**
D 1.1y 2 UH(10) SMHI(7) SLU(2). Journal MS:. **Month xx.y**
D 1.1y 3 SLU(12) EMI(2) UH(in kind 2). 18 Journal MS: **Month xx.y**
D 1.1y 4 SLU(9) FGFRI(2) EMI(2) UH(in kind 4). Journal MS:. **Month xx.**
D 1.1y 5 SLU(12) SMHI(4) FGFRI(1) UH(in kind 2). Month xx.y
D 1.1y 6 SLU(9). Journal MS: M**onth xx.y**

D 1.1y 7 SLU(10) SMHI(7) UH(2). Journal MS: **Month xx.**
D 1.1y 8 SLU(10) SMHI(7 UH(2). Journal MS: **Month xx.y**
D1.1y 9 EMI(12) FGFRI(3) UH(in kind 3). Journal MS: **Month xx.y**
D 1.1xx EMI(12) UH(4+in kind 4) FGFRI(2). Journal MS: **Month xx.**
D1.1y 11 EMI(10) UH (in kind 4) FGFRI(2) Journal MS: **Month xx.**

Work package number	7	**Start date or starting event: month 1**				**End month**
Work package title	**WP 7 Dissemination: talking and savig the talks and feedback**					
Activity Type	RTD					
Participant number						
Participant short name						**TOTAL**
Person-months						

Objectives

8) Learning and using Hugin with people.
9) Learning what is seen histrorically and
10) Systematic use of Metropol feedback systems in the yearly ICES WGMABS open risk communication meetings (2016: St Petersburg to meet industry, 2017 to help international WWF to adapt those parts of ILVES and WGMABS approaches which are needed for successful risk governance

Description of work and role of participants

The **WP 4** leader is Dr xx who is an expert on x statistical and dynamic

Task 1.1y 1 Spatial modelling of fish productivity D1.1y 3-1.1y 5

future trends D 1.1y 6-1.1y 8

Task 1.1y 3 Providing probabilistic

D 1.1y 1,D 1.1y 1.1y D 1.1y 5

In this task,

Task 1.1y 4 Detailed analysis D 1.1y 9-D 1.1y 11

This is our detailed test of.

D 1.1y 1 SMHI(8) UH(6+in kind 2). Journal MS: **Month xx.y**
D 1.1y 2 UH(10) SMHI(7) SLU(2). Journal MS:. **Month xx.y**
D 1.1y 3 SLU(12) EMI(2) UH(in kind 2). 18 Journal MS: **Month xx.y**
D 1.1y 4 SLU(9) FGFRI(2) EMI(2) UH(in kind 4). Journal MS:. **Month xx.**
D 1.1y 5 SLU(12) SMHI(4) FGFRI(1) UH(in kind 2). Month xx.y
D 1.1y 6 SLU(9). Journal MS: M**onth xx.y**
D 1.1y 7 SLU(10) SMHI(7) UH(2). Journal MS: **Month xx.**
D 1.1y 8 SLU(10) SMHI(7 UH(2). Journal MS: **Month xx.y**

D1.1y 9 EMI(12) FGFRI(3) UH(in kind 3). Journal MS: **Month xx.y**
D 1.1xx EMI(12) UH(4+in kind 4) FGFRI(2). Journal MS: **Month xx.**
D1.1y 11 EMI(10) UH (in kind 4) FGFRI(2) Journal MS: **Month xx.**

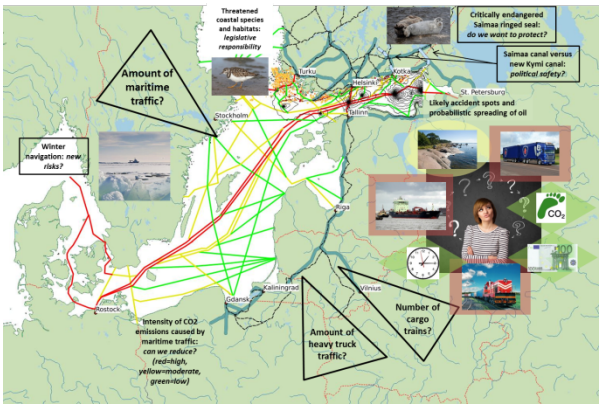

Fig. X. XXXXXXXXXXXXXXXXXXXXXXXXXXX

We use the social network analysis to look how the information flows between stakeholders to understand and learn from available information and to adapt this to the development of traffic chains, underlining the importance of scientific information and learning. This ill show us how to allocate the production of scientific knowledge to end users. The combination of academic, administrative and industry partners in using the information provided bu ILVES is tudied by this approach and the dissemination plan is updated based on these findings. We construct a scientifically based approach to plan our dissemination (carried out by Merikotka research association).

In the analysis of inland water ways, the economic risk for recreational values is estimated by willingness to pay estimates to avoid spills (Ahtiainen, 20 xx, Helle et al accepted with minor revisions) and by making a new questionnaire in the web to cottage owners.

In building the option of investing on new channel option, the sediment contamination is a riks related to the building of channel (ref 1999), where the toxic elements in edimenta are then released and a human health risk activated This needs to be compared to the risks caused to e.g. Saimaa ringed seal, which is a small population where the safeguarding responsibility of Finland is of very high status. We apply the risk methodology developed for GoF to the inland water ways to be able to compare the environmental risks caused by traffic options. This knowledge is made available to customers by using the new tools in web to show

In order to improve vessel safety, the operational safety risk in inland waterborne traffic is estimated with expert in the field; pilots and captains of the vessels. Reconstructing the operating environment of Saimaa deep water route and the connected fairways to the navigation simulator, enables focused shipmanoeuvre training in identified high-risk areas. Shipping route specific simulation allows also to test the performance and applicability of different size and types of vessels. Simulation tests are conducted with competent crews, ie. pilots, in order to debar skill-related interference. In addition, simulated operating environment can act also as a platform to demonstrate the oil spill response capability; response times, accessibility of incident locations and optimal disposition of oil spill response vessels.

- risk comes fom human, the measurements are reated, insurance must be based on the crew, big brother is watching you, the combination of crew types and experiences, the control from community comes from the companies, not from countries or IMO, learning fom cultural aspects of crews

???OBS. In order to take full advantage of the navigation simulator (located in Kotka, KUAS), there is a need to modify its database, ie update the digitalized nautical charts of inland waterways and visualization of the fairways concerned. Utilizing underwater infrastructure data obtained with multi beam survey would make the risk modeling more precise. IF SAKARI GIVES US MONEY: total 100 000€ incl. 55 000e/FAIRWAY MODELLING AND 35 000€ VISUALIZATION, plus 1000 € per vessel type wanted. **Current data also needed. SYKE?**

Atlantis: The oil spill element could be applied to Australian north coast oil production environment. I know there is biodiversity data and threatened species

Jyri: FMEA: causal learning in risk management (link to Duke, have text from there) The FMEA (Failure Mode and Effect Analysis) framework can be used to investigate the potential failure modes and their causes and effects in the supply chain processes. FMEA allows identifying and analyzing potential failure modes in a system, and identifying actions that could eliminate or reduce the likelihood of potential failure (Chuang 2002).

Currently, the increasing demand for efficiency and sustainability is one of the driving forces that both public and private organizations are facing. Considering the usage of the inland water ways and other potential transportation channels and pro-environmental aspects, it can be argued that the utilization of the transportation system is unbalanced. In order to investigate the potential of the whole logistics system a more holistic perspective is needed. To fill this gap in the current body of knowledge we aim to study the transportation system from the end user perspective. The most essential elements of the study will include management of the supply chain risks as well as the infrastructural and operational antecedents enabling the utilization of more environmental friendly transportation as well as information exchange from the perspective of current systems applied. The elements mentioned will allow to form a broader perspective of the Finnish transportation system and its potential in facilitating more environmental friendly and low-risk operations.

One of the under-researched aspects of the logistics systems is the inland water ways. Inland water logistics answers the program question: Inland water logistics reduces emissions and concurrently utilizes existing resources i.e. inland water transportation routes and replaces trucking and railway transports. However this requires the development of information systems of inland water logistics:

- Existing information systems for import and export have interfaces to systems of maritime transports, trucking and railway transports, and, for example, customs, insurance companies, forwarding agencies, harbours and companies. Sometimes these existing information systems may have an interface also to inland water logistics. Existing information systems are developed mainly to serve import and export. Our proposal is that based on these existing information systems, we develop the information system of inland water logistics. This new system would serve:
    - as a part of the existing information systems of import and export like the current trucking and railway transports;
    - as independent logistics system when other interfaces are not needed, like the inland water transport between domestic cities;
    - as independent import and export logistics system, for example, in logistics through channel of Saimaa; interfaces are required to customs, insurance companies, forwarding agencies, harbours and companies;
    - in emerging new requirements.
- Logistics risks can be reduced using inland water logistics because inland water logistics offers a new transport option in addition to truck and railway transports. Inland water logistics uses less imported fuel compared to transported tons. New risks include environment risks and winter time risks. Risk identification, assessment and mitigation of consequences are considered also in the planning the information system. This work includes a clarification how these risks are managed or solved in, for example, Sweden, Russia, etc.

WE WOULD need also insurance specialisgs here: one option is Rich Little, CSIRO, when evaluating Koe teksti how combinations of knowledge and actions impact the uncertainty of the resources (see paper in Ecological Letters). This may be a good suggestion for one part of their co-operation.

Inland water system development requires the development of insurance options.

5.1 Data management plan

We utilize the existing large databases of:

1. VATT and Bank of Finland for the economic data
2. vessel databases of TRAFI
3. traffic databases of TRAFI, already analysised in TUT modelling of CO2 emissions (REF)
4. CO2 footrpint estimates of SYKE and University of Oulu (Jyri: insert here the name of the expert or databases)
5. fish stock estimates of ICES (International Council For the Exploration of the Sea) for the impacts on stocks and fisheries
6. threatened species database of SYKE, which is already linked (REF) to vessel accident estimates (REF), and to the spread of oil after an accident on a given area. spread of oil is based on the use of XX model where the observed weather data is used to estimate likely hit of oil to the threatened species
7. bird databases of SYKE
8. TRAFI databases from WGMABS report
9. Ship emission, pollutant transport and numerical weather prediction datasets of the Finnish Meteorological Institute
10. Bank Of Finland Databases on national economy and on the experts judgements based over the years to enable the comparison off an expert and models in future predictions (testing Pearl's statement that
11. The knowledge bases of CSIRO to apply best insurance practices in oil production idustry to vessel traffic, especially tankers.
12. MEERI 2012 Calculation system for Finnish waterborne traffic emissions, sub model of the calculation system LIPASTO 2012 **??? ALREADY MENTIONED?**
13. Underwater multi beam survey data, Meritaito Oy/Liikennevirasto **availability not confirmed yeT**

ALL PARTNERS: list here the databases you are going to use We will provide these databases for other users in the open database system of OPASNET. The data sets of this proposal are described on page .XX

However, as the data is only historical observations, the more usefull information for other scientists than those in ILVES consortium are the estimates of interest variables (like risks, xx,xx). We will provide probabilistic databases of the estimates to allow effective estimation of prior probabilities for future analysis. This will enable the more effective learning in sciences, where it is important from the point of view of end user of the information, that estimates include also other knowledge than just the data that happens to be observed in single studies.

In expert elicitation, we use the following experts:

1. The economic expert panel ?? Of Finland, which has, by the help of model estimates and data, evaluated yearly the future economic growth of Finland. By vomparing this to the actual realised economic development, observed and estimated later on, we evaluate the probabilistic

exactness (likelihood functions for the decision model) of the predictability of Finnish economy.

6 Ethical issues

The key ethical issue is the controversy in scientist life: can my risk communication wait until my paper is published and available (see the problem of dioxin, GOHERR webpages). --# : In an email of xxth April 2015, ICES officer Maria dd wrote that CCCCCCCCCCC, copy from email here **--Jouni (talk) 04:21, 22 April 2015 (UTC)**

Our proposal does not contain work with human embryo/foetus, humans or animals. This proposal does not have research components, which include genetic data, personal information (religion,) or tracking of people. Currently, XX senior researchers out of YY in the consortium are female. Recruitment as well as the advancement and salary of the employed researchers are based solely on personal achievements and not on gender.

7 Implementation: schedule, budget, distribution of work

Here or earlier: ? The aim of the scientific design is idea to use first version of the model in the beginning, and show by the model in the ned how much the project improved the knowledge and policy strategy The first version in the beginning second in third year, policy analysis for the evaluation in year 4, and the updating of the model during the last to years to decrease the scientific uncertainty to minimum.

Admin and management: the long experience of FEM to coordinate multidicplinary, hugh learning curve projects focusing on risk and decision analysis

8 Research teams, collaboration

The consortium consists of the following research teams:

1) University of Helsinki, Fisheries and Environmental management group (FEM), The group leader and the PI of ILVES proposal is professor Sakari Kuikka, who is specialiced to multidisciplinary decision analysis by Bayesian decision models. This group consists of biologists, social scientists, economists (in plural if you join, Jani), statisticians, mathematicians and engineering scientists. The interdisciplinary research group (link to group webpages here) applies Bayesian statistics and decision theory to managemnt of natural resources and environmental values. Group was, together with professor Corander's group in statistics, where FEM has close co-operation, ranked as third in the series of "Societal impact" in the evaluation of research groups in the University of Helsinki evaluations, in 201 x). The quality indexes of the publications were 9th and 10th best ampng the 156 evaluated groups (insert here the link to overall report and to Bayes group) Group aims to futher improve the interdisciplinary risk analysis and effective learning in science. Kuikka has been coordinator in 4 FP or Horizon 2020 projects of EU: 1) PRONE, which was about developing risk methodology for fisheries, 2) ECOKNOWS, which was about developing Bayesian models and learning databases in fisheries science, 3) IBAM, which was about use of Bayesian integrative methods in environmental management and 3) current project GOHERR, which is about developing governance for human and ecosystem health management of Baltic Sea. Kuikka is also the chair of ICES working group for Working Group on Risks of Maritime Activities in the Baltic Sea (WGMABS), which aims to develop a new oil risk management and advisory system for Baltic Sea, being an important route to implement the project findings in active policy. Professor Samu Mäntyniemi is specialised in Bayesian risk analysis.

Hyttinen, Antti (tutkijatohtori) 02941 51164, 040-7525515 Tietojenkäsittelytieteen laitos

1 henkilön tiedot tulostettiin. http://jmlr.org/papers/v14/hyttinen13a.html

--# :

- ALL PARTNERS: mention the key advisory roles you have in society
- FMI involvement in Baltic Sea NOx Emission Control Area application
- FMI involvement in North Sea NOx Emission Control Area background studies (economic and human helath impacts assessments)
- FMI involvement in the 3rd IMO GHG study
- FMI reports annual ship emissions in the Baltic Sea area

- and then same amount of text from everyone. FEM text needs to be a bit longer, but something like 12 lines from everyone, please. **--Jouni (talk) 04:21, 22 April 2015 (UTC)**

2) VATT Juha:

3) Finnish Meteorological Institute is a leading expert in meteorology, air quality, climate change, earth observation, marine and arctic research areas. The main objective of FMI is to improve the safety and the quality of living of Finnish citizens. In order to do this the FMI observes the physical state of the atmosphere, its chemical composition and electromagnetic phenomena. The Institute has several laboratories which analyze the most important air pollutants, develop new measurement techniques and test the reliability of the measurements. Dr. Jukka-Pekka Jalkanen is a senior researcher in the dispersion modelling group of the FMI. He is the head developer of STEAM emission model for maritime traffic. He has written 32 peer-reviewed papers of which 17 most recent ones concern ship emissions. Dr Jalkanen has acted as WP leader in several shipping related projects, (SAMBA which was a feasibility study of the use of satellite AIS in ship emission modeling for the European Space agency, SNOOP was about environmental impacts of shipping, BSR Innoship was about human health impact of shipping) and is currently involved in two projects (KAMON, SHEBA) concentrating on wintertime navigation and sustainable shipping scenario studies in the Baltic Sea (SHEBA). FMI will benefit, including salary strategy of meteorologists and comparisons to competing weather forecasts producers, from the methodology to rank models and experts in the comparison of realized weather and predicted weather. This offers a business idea to some private company.

4) TTY: Jarkko Raantala 2 years Heikki Liimatainen youngest IPCC member (even though in a competing proposal)

5) FMI: pinser professors to concince And this is what I hope from LUT ϑ :

6) Adjunct professor Jyri Vilko professor in logistics, has applied simulayion studies to evaluate alternative logistics (refs) and is a leading Finnish expert in his field. Professor Haario is an expert in Bayesian parameter estimation of complex models and has developed probabilistic Bayesian version of the FMI weather forecast model (HEIKKI: Ref + mahdolinen weblinkki). Professor Pekka Sutela is a world known expert in national economics, expertising in political stability in Russia. , and providing valuable expert knowledge in addition to model simulations for the evaluation of policy success and economic development. There is a connection to Thailand's best business school logistics scientists to support the distribution of methods to third countries (Jyri inser here the details)

7) Duke University, USA. Assistant professor Fan Li's main research interest in statistical methodology lies in causal inference, that is, designs and methods of analyses to evaluate treatments, interventions or actions in randomized experiments or observational studies, and their applications to social sciences, economics, health policy, psychology and epidemiology. Dr Li also hase a strong interest in statistical methods for big and complex data, especially neuroimaging data, with an emphasis on developing advanced Bayesian inferential and computational methods. Li works also on missing data, variable selection and small area estimation which means Fan: what ?? and is important for our project in the application of xx to the xx data set and policy evaluation.

8) Kotka Maritime Research Association (KMRA) operates in close collaboration with the maritime industry, universities, research organisations, institutes, and authorities both nationally and internationally. The aim of the KMRA is to improve the interaction between science and society to

make the most of the results, by conveying theory into practice. The practical solutions based on scientific research can improve the profitability of maritime industries, decrease the environmental impacts of maritime transportation, and in general produce the most cost-efficient solutions to challenges the maritime sector is facing. In addition, the main outcomes of KMRA activities, results and recommendations, could eventually contribute to major EU policies, and even be taken into account at a global level (for example by IMO). In ILVES consortium the role of KMRA is to communicate and disseminate the essential findings of the project to the target groups and end users within the maritime sector.

The consortium as a whole: the modelling approach is strongly lead by Bayesian inference and decision analysis tools. The experiences of FEM group are used in developing and leading this process. The economic estimation and simulation models of VATT, together with the large datasets, are used to estimate economic changes. The UH/ECON will provide skills in the Bayesian time series analysis and in testing the theories given the observations. HUT will provide the models related to world wide food security and likely future risks. FMI will provide state of the art models to describe the GHG emissions of shipping fleets, their atmospheric dispersion and impacts to the human health and the environment, LTU will provide knowledge in Bayesian mcmc analysis of complex models, the models used to manage logistic chains, and the expert knowledge and international expert views of Russian development having a potential impact on planned logistic pathways through Saimaa lake area. Åbo Akademi will provide expert knowledge in evaluation of current and potentially future national and international maritime legislation and its probabilistic impact on risks. KMRA will lead the stakeholder contacts and dissemination. City of Helsinki will provide expert knowledge in modelling logistics and an information end user aspect to the analysis. KYAMK will provide practical experience from maritime activities, and the databases of inland shipping routes and possibilities. University of Duke will provide Bayesian modelling skills in economic analysis and will contribute to oil spill management. CSIRO will provide Bayesian expertise in exploitation and risk analysis, analysis of insurances to increase the interest to avoid accidents, and expertise in oil spill risk analysis. FAN AND RICH: do we need Waikatu? Coul Duke provide the same services, or do your models require such expert skills that they can not be easily applied by other scientists than yourself only, i.e. how easily applicable they are to learn new methods ? Reason why I think Waikatu is that I would like to link practical and graphically educative (=supporting understanding the elements of future policy evaluations ?: University of Waikatu will provide expertise in the use of artifical intelligence methods to enable learning databases. Their WEKA software (LINK) is a leading software in AI field and provides effective data handling and use of Bayesian network models. The consortium offers an excellent combination of skills which are needed to support environmental and economic policy with modern calculus systems. Understanding correctly the real causal relationships in a system where society makes a new intervention must be based on as good causal understanding as possible. The priors of the models must use the existing published papers as effectively as possible. Here the modelling skills and expert understanding of ILVES consortium meet in a unique way to solve practical problems.

9 Mobility plan

--# : Everyone: what trips you do and longer visits between partners in order to strategically support the learning and use of research findings in your home institutes. This needs STRATEGIC thinking, as we have partners from outside Finland **--Jouni (talk) 04:21, 22 April 2015 (UTC)**

UH/FEM Sakari Kuikka will visit CSIRO in winter 2015 – summer 2016. During this trip, the oil spill risk methods of Finland will be reviewed and the CSIRO modelling skills will be used to plan the insurance schemes as tools to manage the oil disaster risks. Also the adding of oil spill element to Atlantis will be developed during this visit.

LUT School of Business and Management (LBM): Jyri Vilko will visit Thammasat University in the winter 2015-2016. During this researcher exchange he will collaborate with the local researchers in researching the inland water ways usage potential in South East Asian and Finnish perspectives. In

2017 Professor Vilko will visit the Massey University, in New Zealand. The aim of the visit is to collaborate in studying supply chain relationships and responsibilities in multi modal logistics.

10 Key literature

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THE LAST 4 PAGES:

11 Interaction plan

11.1 Objectives of interaction

The very basic philosophy of risk communication in ILVES approach differs from that usual in science: we aim to have an impact, not in first hand the number of

Transport security is high on the EU's agenda. The EU's comprehensive approach of policy, legislation and monitoring of air and maritime transport safety should be further consolidated and strengthened through cooperation with major international partners.A risk based approach to the security of cargo need to be modelled by the extensive data sets and high number of existing probabilistic models describing the collision and grounding risks of the vessels, requiring an interdisciplinary cost benefit models to evaluate the policy options.

- getting feedback on the acceptable risks

Tulevina vuosikymmeninä arktisten investointien arvioidaan yltävän 100 miljardiin euroon. Näin todettiin pääministerin ilmoituksessa arktisesta strategiasta lokakuussa 2013. Samassa yhteydessä myönnettiin nöyrästi, että voimien yhdistäminen ei aina ole ollut suomalainen vahvuus, joten siihen on kiinnitettävä erityistä huomiota. Tässä onkin pysähtymisen paikka. Yritysten yhteistyö on välttämätöntä liiketoiminnan syntymiseksi.

Liikenne- ja viestintäministeriön Fintrip-ohjelmassa on kehitetty määrätietoisesti verkostomaista toimintamallia oman hallinnonalan tutkimus- ja kehittämistoiminnan koordinoimiseksi ja alan toimijoiden verkostojen törmäyttämiseksi. Yhtenä tuloksena on verkosto, joka suunnittelee Arktisen merellisen osaamiskeskuksen perustamista. Tämä hanke yhdistää kaupunkeja, yrityksiä ja ministeriöitä, jokaista omassa roolissaan. Yhteistyötä tarvitaan koulutuksessa, tutkimuksessa, tuotekehityksessä, markkinoinnissa ja viennissä. Potentiaalisia asiakkaita löytyy kansainvälisistä öljy-yhtiöistä, vakuutusyhtiöistä ja laivanvarustamoista. Osaamiskeskuksen myötä Suomi voi profiloitua arktisen operoinnin osaajaksi, ympäristön puolustajaksi ja cleantechin huippumaaksi

Press releases: We will follow the path taken by UH/FEM in oil spill risk management press relations on the weeks 16 and 17 of 2015. @Sakari_Kuikka tweeted, as chair of ICES WGMABS, close to xx times. These thweets were retiited xx times and they spread to dd endusers. This took place in only zz days. The press release made by FEM on the 20th April 2015 lead, for example, to an radio interview on Radio Suomi on the 21st. This happening was made known to about zz endusers on the 20th April 2015, which lead to feedback, by email, from only qq information endusers. This type of reaction chains are used both in studies of risk communication and cognition, and in the active

Events, seminars, public talks: The first seminar of ILVES was arranged on the 24th April, 2015, in Viikki, lecture room bb. This was made known on the 21st April, and there were xx endusers, zz scientists and dd industry participants in the seminar. A yearly workshop will be related to ICES WGMABS, where Kuikka is chair (links to

Workshops: We will conduct the Metropol platform (xx link) and the ILVES risk communication platform (made in BONUS GOHERR on the 21st Aprill 2015, see LINK)

Science trucks: are these eatables or what ?

Theatre, drama: Pihla's supervisor in France, Pihla's school

Other art channels: Tuula, Seppo, Pihla's group

How we learn scienfically and practically from these risk communication steps; UH cognition and communication sciences (Prof ff

11.2 Target group/stakeholders/partners

The links of the ILVES consortium to the rest of the society are arranged in several ways. Even though the administration of risk lies in e.g. Trafi (traffic planning), Ministry of Environment (SYKE (oil, .

We have commitments of interests from xx different end user groups ANYONE KNOWING MORE?? (link, dd, ee, cc, ff, etc. and l**inks to viki, where commitments are and the pdf of closed file (that is to be evaluated,) and those comment nd suggestions, that have came ever since then**

ILVES Stakeholder Support Group (ISSG) is chaired by Dr , Adjunct professor Anti Mäkinen (background in WWF and works now in TRAFI as the key persons under whose the working with aero risk management.

Dr, Adjunct Professor Ulla Tapaninen, Maritime economics and logistics, University of Turku; and Senior Advisor, Helsinki City Excecutive Office, Economic Development, City Competitiveness: expert knowledge, its elicitation and its leadership

ILVES Scientific advisory board (ISAB): Elja

Subgroup of staleholder l

Ulla: you may also want a small salary budget, and then you could be the one who coordinates a subgroup of Coordination Committee, where Anita is chair. This could consist of local end users who provide expert knowledge on the policies? This subgroup could be named as: Expert knowledge elicitation group

The chair of the advisory committee, Dr Anita Mäkinen, is responsible about maritime and air traffic gas emissions. We use the risk governance lessons learned in aviation to help identifying risk governance options for maritime activities. This will be based on the active role of the TRAFI agency, which is responsible for the traffic policy design in Finland. Moreover, the representative of the Liikenneministeriö will be in advisory commitee, making the interactions with decision makers to be as close as possible.

The review by Haapasaari et al on the best practices of risk governance in nuclear risk analysis framework will be used as an example to adapt the new approaches. When suggesting the risk governance for international maritime activities (called Blue Belt in EU whitebook), we also use the good experiences obtained from EU Common fisheries policy, where the involvement of stakeholders to yearly policy decisions is well organised and studied in REF. The new ICES working group WGMABS (insert the link here), chair Sakari Kuikka, will be used as one way to disseminate the findings to society. HELCOM is an active customer for such advice.

- Neste Oil Shell/Jorma Ollila? _ UPM

upmn puunhankinnan puolelta (Esa Korhonen, Heli Rantala Stora Ensosta) voisi olla kiinnostusta, uuden sellutehtaan sijoittuminen. läsisatamien kehittäminen olisi tällöin mahdollinen

-
- huoltovarmuuskeskus: Hilmolan on tehnyt Tallinnan tunnelista huoltovarmuusanalysin. Raija Viljanen voisi kirjoittaa suosituksen
- * 2008 HELCOM resolutions: need for revision to fit with current risks and national and EU legislation

Saimaan Kanavan Neuvottelukunta and Suomen Vesitieyhdistys ry. /Finnish Waterway Association, (toiminnanjohtaja Heli Koukkula-Teixeira, hallituksen pj. Kyösti Vesterinen) are asked to join the societal advisory board of the consortium.

Russian inland water way strategy/Professor, Dr. Science (Econ.) Tatjana A. Pantina, Vice-Rector for Research, the Admiral Makarov State University for Maritime and Inland Shipping, St. Petersburg

Inland water way system, benchmarking: Sweden: Johan Lantz, Senior Advisor, Swedish Maritime Administration. In EU-level: European Federation of Inland Ports, Kathrin Obst, EFIP Director Kathrin.Obst@inlandports.be Neste Oil ja Fortum, bioöljyt? Ensuring the communication with other inland water area related project groups, such as ”WATER: connecting people” by Metsähallitus/ Jari Ilmonen/Luontopalvelut + Sanna-Kaisa Juvonen ja Mikko Tiira, Vesienhoidon, luonnonsuojelun sekä elinkeinojen ja väestön tarpeiden yhteensovittaminen

11.3 Means of interaction

We will conduct interactive webpages, where endusers can test the policy options by using the decision model. This will include such sensitivity analysis, where the objective settings are asked from users so precisely, that the decision model can rank the decision alternatives. This will create a learning database from the value weights of the stakeholders and citizens (separately for different groups). The decision model will enable the decisions really implemented in practise, and will estimate the weights of aims, as the knowledge base is known and the decisons are known. Then the only missing thing from equation is the objective function.

Dr Anita Mäkinen will be the chair of the ILVES End User Advisory Board will be the chair of the Advisory board which is responsible to provide the formulation of relevant policy options and the probabilities for the likely implementation success of policies.

- Coordination committee: Chair Dr, docent Anita Mäkinen @trafi.fi, Lassi Hilska Liikenneneuvos, johtava asiantuntija Liikenneverkot Liikennepolitiikan osasto @lvm.fi, Merivakuutus, Helsingin, Turun, Oulun ja Kotkan satamat, Swedish inland
- Kari Kosonen on FINPILTilta olisi kiinnostunut kehittämään sisävesiliikennettä, he eivät laskuta Saimaalta täyttä kustannusta. KYAMKilla aineistoja.
- Liikennevirastosta joku ohjausryhmään, sieltä raideliikenteen ihminen voisi olla VR:n sijasta mukana
- Lolan Eriksson: LVM: Anita, Ulla ehdotti
- Jorma Härkönen logistiikkakeskus, voi auttaa löytämään sopivat partnerit,
- sisävesiliikenneyhidtyksen johtaja (SEIRA).
- Anita veti meriliikenneryhmää jossa mietittiin uusia toimenpiteitä,

Henrik Ringblom: EMSA as end user

- coordination committee Expert knowledge elicitation group
- UPM

11.4 Responsibilities and implementation

11.5 Schedule

saimaan pränddi arv