

<b>MINUTES OF MEETING</b>		<b>SIMMAN 2008</b>	
SIMMAN 2008 Meeting of organizers and co-organizers no. 8: Summary and Conclusions on Day 4 of Workshop		Workshop on Verification and Validation of Manoeuvring Simulation Methods www.simman2008.dk	
Participants Frans Quadvlieg (MARIN), Riccardo Broglia (INSEAN), Joe Gorski (NSWC), Sun Young Kim (MOERI), Pierre Perdon (BEC), Zao-Jian Zou (SJTU), Takanori Hino (NMRI), Andrés Cura (HSVA), Key-Pyo Rhee (Seoul National University), Pat Purtell (ONR), Suak-Ho Van (MOERI), David Hess (NSWC), Fred Stern (IIHR), Kristian Agdrup (FORCE), Claus D. Simonsen (FORCE)			
C.C. to Hironori Yasukawa (Hiroshima Univ.), Michio Ueno (NMRI), In-Young Koh (NSWC), Serge Toxopeus (MARIN), Adolfo Marón (CEHIPAR), Joe Longo (IIHR), Yasuo Yoshimura (Hokkaido University), Evgeni Milanov (BSHC), Lanfranco Benedetti (INSEAN)			
Date April 17, 2008	Place FORCE, Lyngby, Denmark		
No. of pages 4	Minutes taken by Kristian Agdrup (FORCE)		<b>Action items</b>
<b>Agenda</b>		No.	Responsible
<ol style="list-style-type: none"> <li>1. Review of workshop session by session. Discussion of comparison results from a) EFD, b) system based methods and c) CFD based methods – issues, actions and conclusions</li> <li>2. Evaluation of workshop program and concept</li> <li>3. Plan for final proceedings</li> <li>4. Plan for section in ITTC MC Report</li> <li>5. Plan for journal article</li> </ol>			
<b>1. a) Model tests</b> Organizers have realized the need for systematic documentation of all performed model tests and will therefore ask all test performers to provide a brief paper (6 pages) for additional section in final proceedings. Email request incl. instructions to be sent out in May. Deadline for submission of EFD papers will be end of July.  Required content of EFD papers (preliminary list): <ol style="list-style-type: none"> <li>1. model geometry incl. appendages</li> <li>2. loading condition</li> <li>3. test program</li> <li>4. measurement system</li> <li>5. data acquisition procedure</li> <li>6. data reduction procedure</li> <li>7. test procedure</li> </ol> Chairmen should provide draft overview and conclusions based on minutes taken during sessions to organizers for Part A of final proceedings. Deadline: end October		#1	Agdrup/Stern
		#2	Cura, S.Y.Kim, Agdrup
<b>KCS model tests (chairman: Cura)</b> <u>Issues:</u> <ul style="list-style-type: none"> <li>- questions raised regarding CEHIPAR PMM test results incl. side force in pure yaw</li> <li>- BSHC free model tests were done at non-ideal initial conditions</li> <li>- SVA free model tests were done at higher helm rate than nominal, missing documentation</li> </ul> <u>Actions:</u> <ul style="list-style-type: none"> <li>- CEHIPAR to check PMM data again</li> <li>- further checks and comparison of CEHIPAR PMM with NMRI CMT results is needed</li> </ul>		#3 #4	Marón Cura/Broglia

<p>- FORCE may be able to conduct new PMM tests, to be confirmed          - request BSHC to submit remaining test data including alternative zig-zag tests and tests at different GM<sub>T</sub>-values, to be forwarded to MARIN for inclusion on plots          - MOERI will perform PMM tests with KCS in summer 2008, test program to be distributed</p> <p><u>Conclusions:</u>          - clarification is needed regarding both PMM and free model test data          - obtaining a new, second set of PMM data (for 4 DOF) should be pursued          - obtaining CMT data for 4 DOF should be pursued</p> <p><b>KVLCC model tests (S.Y. Kim)</b></p> <p><u>Issues:</u>          - MOERI PMM data is for ship self-propulsion point (SPP), not model SPP as benchmark free model data          - there are unresolved questions to INSEAN PMM data regarding port/stbd asymmetry in forces and inclusion of points          - CTO free model test data still not submitted</p> <p><u>Actions:</u>          - MOERI to correct PMM data to model SPP using NMRI CMT data and to compare results to INSEAN data          - INSEAN to clarify questions to data          - request CTO data again</p> <p><u>Conclusions:</u>          - clarification and correction needed for part of PMM data sets          - free model data sets from HSVA and MARIN correlate well</p> <p><b>5415 model tests (Agdrup)</b></p> <p><u>Issues:</u>          - hull definition file (iges) on web site does not include large skeg/plug          - MARIN free model data show erroneous port-stbd asymmetry in turning circles          - various documented differences between FORCE PMM and MARIN free model tests incl. appendages, propellers, ship/model SPP          - additional free model data exists at MARIN for manoeuvres at other rudder angles than 10/10 &amp; 20/20 zig-zag and 35 deg turning circle, mainly for 18 knots          - new MARIN PMM and CMT data available for 18 knots</p> <p><u>Actions:</u>          - MARIN to provide definition (iges) of large skeg/plug for posting on web site          - MARIN free model data to be corrected and extended with additional data and comparison plots updated          - MARIN to submit raw data from new PMM and CMT tests</p> <p><u>Conclusions:</u>          - clarification and correction needed for free model data          - inclusion of new MARIN PMM and CMT data together with corrected free model data should provide a consistent data set for comparison</p>	<p>#5 #6  #7       #8  #9 #10       #11  #12 #13</p>	<p>Agdrup Milanov/ Quadvlieg  S.Y. Kim       S.Y. Kim Benedetti Stern       Quadvlieg Quadvlieg Quadvlieg</p>
<p><b><u>1. b) Systems based methods</u></b>          Chairmen should provide draft overview and conclusions based on minutes taken during sessions to organizers for Part A of final proceedings. Deadline: end October</p> <p><b>KCS+KVLCC+5415 simulations (Quadvlieg, KP Rhee, Perdon)</b></p> <p><u>Issues:</u>          - generally very large scatter in submitted simulation results, especially for KVLCC, less for 5415 (probably since less submissions + course stable ship)          - choice of RPM i.e. model/ship SPP and constant RPM/constant torque during manoeuvre plays a role for prediction results, but influence is not fully clarified          - difficulty in controlling initial conditions in free model tests makes evaluation unclear          - some but not all participants have submitted description of mathematical model (derivatives)          - comparison has been done with different schemes/parameters for the 3 hulls          - submitted data for turning circle manoeuvres with other rudder angles than 35 deg have not been analysed and include in comparison</p>	<p>#14</p>	<p>Quadvlieg, K.P. Rhee, Perdon</p>

<p><u>Actions:</u></p> <ul style="list-style-type: none"> <li>- chairmen to prepare list of missing mathematical model descriptions from participants and send to organizers who will request description from participants, deadline end July</li> <li>- chairmen to exchange presentations and update/unify comparisons</li> <li>- all presentations to be made available via FTP server</li> <li>- simulations to be grouped after choice of RPM</li> <li>- simulations to be grouped (colour-coded) after method i.e. empirical/PMM/CMT/CFD/SI/other...</li> <li>- include free model data on all comparison plots</li> <li>- MARIN to provide measured rudder forces for 5415 for inclusion in comparison</li> <li>- turning circle manoeuvres with other rudder angles than 35 deg to be analysed and compared</li> </ul> <p><u>Conclusions:</u></p> <ul style="list-style-type: none"> <li>- clarification is needed regarding trends in the predictions after corrections and grouping</li> <li>- there is a general need for more quantitative verification and validation</li> <li>- one trend is that "homegrown" methods, i.e. those using own model test data following in-house procedures and formats, give good results</li> <li>- consistency between design of model test program and the applied mathematical model is important</li> <li>- extrapolation outside range of model test data should be avoided</li> <li>- 4 DOF methods are consistently superior to 3 DOF methods for KCS and 5415 i.e. ships with low <math>GM_T</math></li> <li>- empirical methods should be used only for the ship type they are dedicated for</li> <li>- KCS showed to be a course unstable ship as expected and is a good choice for a benchmark ship</li> <li>- KVLCC hulls showed only minor deviations according to free model tests i.e. in the directional stability seen in the pull-out test</li> <li>- a distinction was made between modular methods (~MMG) and global system methods (~Abkowitz), but no conclusions could be made regarding their comparative performance</li> <li>- global system methods showed very sensitive to choice of math model (derivatives)</li> <li>- it is possible to use RANS CFD to obtain data fully equivalent to PMM/CMT data to serve as basis for simulations</li> <li>- direct simulation of free sailing manoeuvres using RANS CFD is possible but (still) very time consuming</li> </ul> <p><u>Recommendations:</u></p> <ul style="list-style-type: none"> <li>- to include 18 knots data as benchmark for 5415</li> <li>- to work towards definition of a "prediction quality index", Hess to provide example of method for inspiration</li> </ul>	<p>#15</p> <p>#16</p> <p>#17</p> <p>#18</p> <p>#19</p>	<p>Quadvlieg, K.P. Rhee, Perdon</p> <p>Agdrup</p> <p>Quadvlieg/ Perdon</p> <p>Quadvlieg</p> <p>Hess</p>
<p><b><u>1. c) CFD based methods</u></b></p> <p>Chairmen should provide draft overview and conclusions based on minutes taken during sessions to organizers for Part A of final proceedings. Deadline: end October</p> <p><b>KCS+KVLCC+5415 simulations (Hino, Broglia, Gorski)</b></p> <p><u>Issues:</u></p> <ul style="list-style-type: none"> <li>- KCS test case data from CEHIPAR has unresolved questions that make final comparison impossible</li> <li>- 5415 UA values seem to be missing contribution from asymmetry bias for both static and dynamic tests</li> </ul> <p><u>Actions:</u></p> <ul style="list-style-type: none"> <li>- check/update 5415 UA values</li> <li>- categorize submitted methods into free to heave and pitch/ free surface/ etc.</li> </ul> <p><u>Conclusions:</u></p> <ul style="list-style-type: none"> <li>- more verification is still needed</li> <li>- more submissions were expected</li> <li>- increased complexity in calculations (bare hull resistance -&gt; bare hull drift -&gt;</li> </ul>	<p>#20</p> <p>#21</p> <p>#22</p>	<p>Hino, Broglia, Gorski</p> <p>Stern Hino, Broglia, Gorski</p>

<p>appended hull drift) shows increased error levels/scatter</p> <ul style="list-style-type: none"> <li>- side force and yaw moment generally better predicted than X-force</li> <li>- transition modeling can be a problem</li> </ul> <p><u>Recommendations:</u></p> <ul style="list-style-type: none"> <li>- agree on definition of acceptable accuracy; one proposal was "within model test UA level"</li> <li>- re-analyse and compare data including Fourier decomposition</li> </ul>		
<p><b><u>2. Evaluation of workshop concept and program</u></b></p> <p>The chairmen gave following comments to the organizers:</p> <p><u>Instructions:</u></p> <ul style="list-style-type: none"> <li>- instructions for systems based methods should be more brief and clear</li> <li>- CFD instructions were updated too late relative to submission date</li> <li>- early version of CFD instructions had too many test cases</li> <li>- model test instructions and test programs should have been more clear and consistent with objective (model SPP, fixed RPM etc.)</li> </ul> <p><u>Benchmark data:</u></p> <ul style="list-style-type: none"> <li>- good idea to include all 4 hulls, should be continued</li> <li>- model test data should have been checked and analysed earlier by dedicated persons (chairmen?)</li> <li>- undesirable to have variations of appendages as for 5415</li> </ul> <p><u>Program:</u></p> <ul style="list-style-type: none"> <li>- poster sessions were successful</li> <li>- program was well designed (full use of sessions)</li> <li>- discussions were good, fruitful, possibly due to informality</li> <li>- sometimes difficult for persons at rear to follow discussions</li> </ul>		
<p><b><u>3. Plan for final proceedings</u></b></p> <p>The following overall schedule was agreed upon:</p> <ul style="list-style-type: none"> <li>• mid June – questions to model test and simulation results clarified/updated</li> <li>• end July – submission deadline for EFD papers</li> <li>• end Oct - submission deadline for chairmen's summary and conclusion sections and EFD overview sections</li> <li>• end Dec – final proceedings sent out to participants on CD-ROM</li> </ul> <p><u>Publication of benchmark data</u> – current plan is to do this after checks and corrections via a link from the workshop web site. Estimated date: early 2009. Meanwhile the SIMMAN participants can download all current model test data (as presented at workshop) from the FTP server.</p>		
<p><b><u>4. Plan for section in ITTC MC report</u></b></p> <p>The organizers request for a special session at the ITTC conference in Japan in September was declined by the ITTC Executive Committee (EC). Therefore the aim is to include preliminary conclusions in MC report section after all. Cura will ask AC/EC for postponement of submission deadline due to SIMMAN. Stern/Agdrup will take lead on this section and circulate to MC and chairmen for comments during May.</p>	<p>#23</p> <p>#24</p>	<p>Cura</p> <p>Stern, Agdrup</p>
<p><b><u>5. Plan for journal article</u></b></p> <p>Organizers plan to publish article in selected journal end 2008 or early 2009. Chairmen will be co-authors.</p>		