Ship Name	Short Description	Links	References
Series 60 (S60)	Single-screw merchant ship, part of a Systematic series of ships.		- Todd, F.H. 1963 “Series 60 Methodical Experiments With Models Of Single-Screw Merchant Ships” Internal Report David Taylor Model Basin Washington DC 01-07-1963, Access Number AD0419990 - Fry, D.J. and Kim, Y.H., 1985, “Bow Flow Field of Surface Ships,” Proceedings of the 15th ONR Symposium on Naval Hydrody- namics, Hamburg, pp. 319-346. - Toda, Y., Stern, F., Tanaka, I., and Patel, V.C., 1990, “Mean-Flow Measurements in the Boundary Layer and Wake of a Series 60 C B =0.60 Model Ship With and Without Pro- peller,” Journal of Ship Research, Vol. 34, No. 4, pp. 225-252. - Ogiwara, S. and Kajitani, H., 1994, “Pressure Distribution on the Hull Surface of Series 60 (C B =0.60) Model,” Proceedings of CFD Workshop Tokyo 1994, Vol. 1, pp. 350-358. - Garofallidis, D. A., 1996, “ Experimental and Numerical Investigation of the Flow around a Ship Model At Various Froude Numbers Part II: Uncertainty Analysis for Measure- ments,” PhD Thesis, Dept. Of Naval Archi- tecture and Marine Engineering, National Technical University of Athens. - Toda, Y., Stern, F., and Longo, J., 1992, “Mean- Flow Measurements in the Boundary Layer and Wake and Wave Field of a Series 60 C B =0.60 Ship Model - Part 1: Froude Num- bers 0.16 and 0.316,” Journal of Ship Research, Vol. 36, No. 4, pp. 360-377. - Longo, J., Stern, F., and Toda, Y., 1993, “Mean- Flow Measurements in the Boundary Layer and Wake and Wave Field of a Series 60 C B =0.60 Ship Model - Part 2: Scale Effects on Near-Field Wave Patterns and Comparisons with Inviscid Theory,” Journal of Ship Research, Vol. 37, No. 1, pp. 16-24. - Longo, J. and F. Stern, 1996, “Yaw effects on model-scale ship flows,” Proceedings of the 21 st ONR Symposium on Naval Hydrody- namics, Trondheim, Norway, pp. 312-327. - Suzuki, H., Miyazaki, S., Suzuki, T., and Matsu- mura, K., 1998a, “Turbu-

			lence Measure- ments in Stern Flow Field of Two Ship Mod- els," Proceed- ings 3 rd Osaka Colloquium on Advanced CFD Applications to Ship Flow and Hull Form Design, Osaka, Japan.
Hamburg Test Case (HTC)	Single screw cargo/container ship. Model of the container ship "Te- resa del Mar", built by Bremer Vulkan in 1986.]		- Lammers, G., Laudan, J., and Strohrmann, H., 1989, "Correlation of Wake and Cavitation and their Consequences," HSVA Rept. 1565 (in German). - Bertram, V., Chao, K.Y., Lammers, G., and Laudan J., 1992, "Development and Verifi- cation of Numerical Methods for Power Pre- diction," HSVA Rept. 1579 (in German). - Bertram, V., Chao, K.Y., Lammers, G., and Laudan J., 1994, "Experimental Validation Data of Free-Surface Flows for Cargo Ves- sels," Proceedings of CFD Workshop Tokyo 1994, Vol. 1, pp. 311-320. - Gietz, U. and Kux, J., 1995, "Flow Investiga- tions on the Hamburg Test Case Model in the Wind Tunnel," Institute of Shipbuilding (Ifs) Rept. 550, Uni. Hamburg (in German). - Suzuki, H., Suzuki, T., Miyazaki, S. and Matsu- mura, K., 1998c, "Turbu- lence Measure- ments in Stern Flow Field of Two Ship Mod- els–Ryuko- Maru and Hamburg Test Case–," Proceedings of the Kansai Society of Naval Architects, No. 10, pp. 1-4.
KRISO 3600 TEU (KCS)	The KCS was con- ceived to provide data for both expli- cation of flow phys- ics and CFD valida- tion for a container ship with a bulbous bow	https://www.t2015.nmri.go.jp/ https://www.w2022.nl/ http://www.simman2008.dk/ https://simman2014.dk/ https://simman2020.kl/	- Van, S.H., Yim, G.T., Kim, W.J., Kim, D.H., Yoon, H.S., and Eom, J.Y., 1997, "Measurement of Flows Around a 3600TEU Container Ship Model," Proceedings of the Annual Autumn Meeting, SNAK, Seoul, pp. 300-304 (in Korean). - Van, S.H., Kim, W.J., Yim, G.T., Kim, D.H., and Lee, C.J., 1998b, "Experi- mental Inves- tigation of the Flow Characteristics Around Practical Hull Forms," Proceedings 3 rd Osaka Colloquium on Advanced CFD Ap- plica- tions to Ship Flow and Hull Form De- sign, Osaka, Japan. - Lee, J., Lee, S.J., and Van, S.H., 1998, "Wind Tunnel Test on a Double Deck Shaped Ship Model," 3 rd International Conference on Hy- drodynam- ics, Seoul, Korea. - Fujisawa, J., Ukon, Y., Kume, K., and Takeshi, H., "Local Velocity Field Measurements around the KCS Model (SRI M.S.No.631) in the SRI 400m Towing Tank," Ship Performance Division Report No. 00-003-02,The Ship Research Institute of Japan, April 27, 2000. SPD Report No. 00-003-02 - Tsukada, Y., Hori, T., Ukon, Y., Kume, K., and Takeshi, H., SPD Report No. 00-004-01 - Kume, K., Ukon, Y., Fujisawa, J., Hori, T., Tsukada, Y., and Takeshi, H., "Uncertainty Analysis for the KCS Model (SRI M.S.No.631) Test in the SRI

			400m Towing Tank," Ship Performance Division Report No. 00-008-01, The Ship Research Institute of Japan, June 1, 2000. SPD Report No. 00-008-01 - Kim, W.J., Van, D.H. and Kim, D.H., (2001), " Measurement of flows around modern commercial ship models", Exp. in Fluids, Vol. 31, pp 567-578 - Hino, T., (2005 ed.), "Proceedings of CFD Workshop Tokyo 2005", NMRI report 2005 - Simonsen, C., Otzen, J., and Stern, F., "EFD and CFD for KCS heaving and pitching in regular head waves," Proc. 27th Symp. Naval Hydrodynamics, Seoul, Korea, 2008. - Zou, L. and Larsson, L., "Additional data for resistance, sinkage and trim", in Larsson et al.: "Numerical Ship Hydrodynamics - An Assessment of the Gothenburg 2010 Workshop", Springer Business Media, Doordrecht. - Simonsen, C. D., Otzen, J. F., Joncquez, S. and Stern, F. EFD and CFD for KCS heaving and pitching in regular head waves, Journal of Marine Science and Technology, 2013, 18: pp. 435-459 , doi:10.1007/s00773-013-0219-0 - Sanada, Y., Ito, S., Toda, Y. and Stern, F. "Added Powering Measurements of KCS Maneuvering in Regular Variable Heading Waves", 30th American Towing Tank Committee (ATTC), Carderock, MD, 2017 - Otzen, J. F., Esquivel, P., Simonsen, C. D. and Stern, F. "CFD and EFD Prediction of Added Powering of KCS in Regular Head Waves", 32nd Symposium on Naval Hydrodynamics, Hamburg, Germany, August, 2018 - Sanada, Y., Kim, D.H., Sadat-Hosseini, H., Toda, Y., Simonsen, C.S. and Stern, F., "Experiment and Numerical Simulation for KCS Added Powering in Regular Head/Oblique Waves", 32nd Symposium on Naval Hydrodynamics, Hamburg, Germany, August, 2018 - Wu, P. C., Hossain, M. A., Kawakami, N., Tamaki, K., Kyaw, H., Matsumoto, A. and Toda, Y. "EFD and CFD Study of Forces, Ship Motions and Flow Field for KRISO Container Ship Model in Waves" , 32nd Symposium on Naval Hydrodynamics, Hamburg, Germany, August, 2018 - Wang, J., Ren, Z. and Wan, D. Study of a Container Ship with Breaking Waves at High Froude Number Using URANS and DDES Methods, Journal of Ship Research, 2020 (to be published), doi:10.5957/JOSR.09180081 - Larsson, Lars, Frederick Stern, and Michel Visonneau, eds. Numerical ship hydrodynamics: an assessment of the Gothenburg 2010 workshop. Springer Science & Business Media, 2013.
REGAL	Modern cargo ship used as full scale benckmark.		- Ponkratov, D., (2016), The workshop in ship scale computer simulations, Proceedings, Lloyd's Register, Southampton, UK.

DTMB model 5415	Model 5415 was conceived as a pre-liminary design for a Navy surface combatant ca. 1980. The hull ge-ometry includes both a sonar dome and transom stern. Propulsion is pro-vided through twin open-water propel-lers driven by shafts supported by struts.	http://www.simman2008.dk/ https://simman2014.dk/	- Fry, D.J. and Kim, Y.H., 1985, “Bow Flow Field of Surface Ships,” Proceed-ings of the 15th ONR Symposium on Naval Hydrody- namics, Hamburg, pp. 319-346. - Ratcliffe, T., 1998, http://www50.dt.navy.mil/5415/. - Longo, J. and Stern, F., 1999, “Resistance, Sink- age and Trim, Wave Pro-file, and Nominal Wake and Uncertainty Assessment for DTMB Model 5512,” Proceedings 25 th ATTC, Iowa City, IA. - Avanzini, G., Bennedetti, and Penna, R., 1998, “Experimental Evaluation of Ship Re- sistance for RANS Code Validation,” ISOPE ’98, Montreal, Canada, May. - Olivieri, A. and Penna, R., 1999, “Uncertainty Assessment in Wave Eleva-tion Measure- ments,” ISOPE ’99, Brest, France, June. - A. Olivieri, F. Pistani, A. Avanzini, F.Stern and R. Penna, 2001,”Towing Tank Experiments Of Resistance, Sinkage And Trim, Boundary Layer, Wake, And Free Surface Flow Around A Naval Combatant Insean 2340 Model” IIHR Technical Report No. 421 - Simonsen, C. D., 2004, “PMM model test with DDG51 including uncertainly assessment” Technical Report INSEAN 2007 - L. Benedetti, B. Bouscasse, R. Broglia, L. Fabbri, F. La Gala, C. Lugni “PMM model test with DDG51 including uncertainly assessment_1” Tech-nical Report FORCE Technology 2004 - Larsson, Lars, Frederick Stern, and Michel Visonneau, eds. Numerical ship hydrodynamics: an assessment of the Gothenburg 2010 workshop. Springer Science & Business Media, 2013.
HSVA	Tanker.		- Hoffmann, H.P., 1976, “Investigation of 3-Di- mensional Turbulent Bound-ary Layer on a Ship Double Model in Wind Tunnel,” Insti- tute of Shipbuilding (IfS) Rept. 343, Uni. Hamburg (in German). - Knaack, T., 1984, “Laser Doppler Velocimetry Measurements on a Ship Model in Wind Tunnel,” Institute of Shipbuilding (IfS) Rept. 439, Uni. Ham-burg (in German). - Knaack, T., 1990, “LDV-Measurements of Reynolds-Stresses in Wake of a Ship Model in Wind Tunnel,” Institute of Shipbuilding (IfS) Rept. 499, Uni. Hamburg (in German).
Hull-form varia-tion Dyne tanker	Tanker.		- Denker, J., Knaack, T., and Kux, J., 1992, “Ex- perimental and Numerical Investigations of HSVA-Tanker 2 Flow Field,” Institute of Shipbuilding (IfS) Rept. 521, Uni. Hamburg. - Knaack, T., 1992, “Investigation of Structure of Reynolds Tensor Fields in a

			Three-Dimen- sional Flow," Institute of Shipbuilding (IfS) Rept. 527, Uni. Hamburg (in German). - Lundgren, H. and Ahman, M., G., 1994, "Exper- imentell och numerisk bestamning av vag- motstand for ett tankfartyg (Dyne tankern)," Chalmers University of Technology Rept. X-94/58 (in Swedish). - Dyne, G., 1995, "An Experimental Investigation of the Tanker Model "Dyne" in a Towing Tank," Chalmers University of Technology Rept. CHA/NAVR/-95/0036.
Ryuko-Maru	Tanker.		- Ogiwara, S., 1994, "Stern Flow Measurements for the Tanker 'Ryuko-Maru' in Model Scale, Intermediate Scale, and Full Scale Ships," Proceedings of CFD Workshop Tokyo 1994, Vol. 1, pp. 341-349. - Suzuki, H., Miyazaki, S., Suzuki, T., and Matsu- mura, K., 1998a, "Turbulence Measure- ments in Stern Flow Field of Two Ship Mod- els," Proceedings 3 rd Osaka Colloquium on Advanced CFD Applications to Ship Flow and Hull Form Design, Osaka, Japan. - Suzuki, H., Suzuki, T., Miyazaki, S. and Matsu- mura, K., 1998c, "Turbulence Measure- ments in Stern Flow Field of Two Ship Mod- els–Ryuko-Maru and Hamburg Test Case–," Proceedings of the Kansai Society of Naval Architects, No. 10, pp. 1-4.
DAIOH	Tanker.		- Tanaka, I., Suzuki, T., Himeno, Y., Takahei, T., Tsuda, T., Sakao, M., Yamazaki, Y., Kasa- hara, Y., and Takagi, M., 1984, "Investiga- tion of Scale Effects on Wake Distribution Using Geosim Models," J. Kansai Soc. N.A., Japan, No. 192, pp. 103-120. - Kasahara, Y., 1985, "An Experimental Investi- gation of the Scale Effect on Nominal and Effective Wake Distribution Using Geosim Models of Two Different Ships," Proceed- ings 1 st Osaka International Colloquium on Ship Viscous Flow, Osaka, Japan, pp. 432- 449.
KRISO 300K VLCC (KVLCC or KVLCC2)	The MOERI KVLCC2 was conceived to provide data for both explication of flow physics and CFD validation for a modern tanker hull form. No	http://www.simman2008.dk/ https://simman2014.dk/ https://simman2020.kr/	- Van, S.H., Kim W.J., Kim, D.H., Yim, G.T., Lee, C.J., and Eom, J.Y., 1998a, "Flow Measurement Around a 300K VLCC Model," Proceedings of the Annual Spring Meeting, SNAK, Ulsan, pp. 185-188. - Van, S.H., Kim, W.J., Yim, G.T., Kim, D.H., and Lee, C.J., 1998b, "Experimental Investigation of the Flow Characteristics Around Practical Hull Forms," Proceedings 3 rd Osaka Colloquium on Advanced CFD Ap- plications to Ship Flow and Hull Form De- sign, Osaka, Japan. - Kim, S-Y and Kim Y-G, 2000, "Effects of stern hull form on the manoeuvrability for a tanker," Proceedings MARSIM 2000, p. 349-366.

	full-scale ship exists.		- Shin, S.S., 2012, “A study on effects of the sefl-propulsion points in PMM tests for KVLCC’s manoeuvrability”, Proceedings MARSIM 2012, session 7.2. - Larsson, Lars, Frederick Stern, and Michel Visonneau, eds. Numerical ship hydrodynamics: an assessment of the Gothenburg 2010 workshop. Springer Science & Business Media, 2013.
Japan Bulk Carrier (JBC)	JBC (Japan Bulk Carrier) is a capesize bulk carrier equipped with a stern duct as an energy saving device.	https://www.t2015.nmri.go.jp/ https://www.w2022.nl/	- Hino, T., Hirata, N., Ohashi, K., Toda, Y., Zhu, T., Makino, K., Takai, M., Nishigaki, M., Kimura, K., Anda, M. and Shingo, S. “Hull Form Design and Flow Measurements of a Bulk Carrier with an Energy-Saving Device for CFD Validations”, 11th International Symposium on Practical Design of Ships and Other Floating Structures (PRADS), Copenhagen, Denmark, 2016
ONR Tumblehome Ship (ONRT)	The ONR Tumblehome model 5613 is a preliminary design of a modern surface combatant, which is publically accessible for fundamental research. The 1/49 scaled ship model is appended with skeg and bilge keels. The model has a wave piercing hull design with 10° tumblehome sides and transom stern. The model also has rudders, shafts and propellers with propeller shaft brackets	https://www.t2015.nmri.go.jp/ https://simman2020.kr/ https://www.w2022.nl/	- Sanada, Y., Tanimoto, K., Takagi, K., Toda,Y., Stern, F., Trajectories and Local Flow Field Measurements around ONR Tumblehome in Maneuvering Motion, Ocean Engineering, Vol. 72, 2013, pp. 45-65 - Sanada, Y., Elshiekh, H., Toda, Y., Stern, F.,Effects of waves on course keeping and maneuvering for surface combatant ONR Tumblehome, 30th Symposium on Naval Hydrodynamics Hobart, Tasmania, Australia, 2-7 November 2014 - Sanada, Y., Elshiekh, H., Toda, Y. and Stern, F. “ONR Tumblehome course keeping and maneuvering in calm water and waves”, Journal of Marine Science and Technology, Vol. 24, No. 3, 2019, doi:10.1007/s00773-018-0598-3

Duisburg Test Case (DTC)	Duisburg Test Case (DTC) is a hull design of a typical 14000 TEU container ship, developed at the Institute of Ship Technology, Ocean Engineering and Transport Systems (ISMT) for benchmarking and validation of numerical methods.		- El Moctar O., Shigunov, Vladimir & Zorn, Tobias. (2012). Duisburg Test Case: Post-Panamax Container Ship for Benchmarking. Ship Technology Research. 59. 50-64. 10.1179/str.2012.59.3.004.
Wigley hull	Wigley hull is an analytical (parabolic) hull shape used as benchmark in the seakeeping field.		- Journee, J.M.J., 1992. Experiments and calculations on 4 Wigley hull forms in head sea. Delft University of Technology Report; Delft University of Technology: Delft, The Netherlands - Soonseok Song, Roberto Ravenna, Saishuai Dai, Claire DeMarco Muscat-Fenech, Giorgio Tani, Yigit Kemal Demirel, Mehmet Atlar, Sandy Day, Atilla Incecik, Experimental investigation on the effect of heterogeneous hull roughness on ship resistance, Ocean Engineering, Volume 223, 2021, 108590, ISSN 0029-8018, https://doi.org/10.1016/j.oceaneng.2021.108590.