

REVIEW OF G-SHIP PROPULSION CONCEPT DEVELOPMENT

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PREFACE

CSC was asked by Genergy to provide review and advice regarding its concept for a new form of ship propulsion based on utilizing the potential energy of water combined with the proven high efficiency of air compression machinery where air inlet pressures are high. A contract for this effort was signed on 2 June 2014 with G-Ship, LLC to “Provide naval architectural, marine engineering and ship design and construction expertise review and analysis services as an independent reviewer on design concepts and engineering analyses.” The base period of performance was from 6/3/2014 through 8/15/2014 and a one month extension was later agreed to. This report describes CSC’s review efforts, conclusions and recommendations.

7.0 RECOMMENDATIONS FOR FURTHER EFFORTS

- Detail the propulsion equipment design at a higher level of detail to better show feasibility and indicate various calculations performed along with refinements of the systems
- Based on an existing concept or preliminary level ship design perform an alternative design featuring the propulsion concept to the same level of design detail including an economic comparison
- Consider applying the design to other types of ships than just containerhips. Low-density, high-volume cargo and a requirement for (relatively) high speed may not be the best fit for this type of propulsion system. Tankers, bulk carriers, RO-ROs or even passenger ferries may be a better fit.
- Consider economies of scale with regards to the propulsion system. Calculations have focused on duplicating the Emma Maersk because of the information available. Other vessels should be considered for comparison? Might the system give better results if designed for a small vessel (such as a harbor passenger ferry)? Do the air systems benefit from being made larger or smaller?
- Develop "industry standard" general arrangement drawings.

Reduction in fuel expense due to G-Ship Propulsion		at 30 mph
Increase in Container Revenue due to G-Ship Propulsion		at 30 mph
Emma Maersk Propulsion % Volume	5.00%	%
Propulsion System % Volume Below Waterline	20.65%	%
G-Ship Cargo Capacity compared to the Emma Maersk	84.35%	15.65% less cargo
Fluid Containers/ Levers occupy % of Ship Area	24.29%	%
Total Ship Container Volume Below Waterline	355,712	m3
Propulsion System Volume Below Waterline	73,440	m3
Fuel Expense		
Annual Emma Maersk Fuel Expense at 20 mph	\$31,070,900	"Fuel" Cell L10
G-Ship Fuel Expense	\$3,107,090	10%
Annual G-Ship Fuel Savings	\$27,963,810	
Annual G-Ship Cargo Revenue Advantage	\$34,962,204	
Annual Emma Maersk	\$131,778,063	100% Capacity
G-Ship Revenue	\$166,740,267	84.35%
G-Ship Income Advantage or Disadvantage	\$62,926,014	IN THE BLACK
G-Ship Benefit		
Annual Fuel Expense Savings	\$27,963,810	
Increased Speed-30 mph	30	mph
Economy Speed	20	mph
G-Ship Benefit - More Trips	1.5	
G-Ship Revenue - Same # Trips	\$111,160,178	
Higher speed Benefit \$	\$34,962,204	
Total Benefit	\$62,926,014	

Figure 14 Excerpt from Excel Spreadsheet