ON CONSTRUCTION AND CONVERSION OF CARRIERS AND CRUISESHIPS FOR EMERGENCY EVACUATION PURPOSES

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My thoughts on the subject of seaworthiness of large ocean vessels began a number of years ago, as a child. I had occasion to travel several times on a great oceanliner, Cunard's Queen Elizabeth II. I recall vividly one passage occurring during a major storm on the North Atlantic with enormous ocean swells that would have been catastrophic for most vessels. However, I had been reassured by an earlier tour of the ship by its captain, who had explained to us the safety features of its strong hull and stabilization system. Indeed, the rattling of the toilet seat was the most noticeable indication of the great storm outside. On another occasion on the same vessel, we met near disaster when the engine room caught fire outside of Southampton, England, forcing a near evacuation. Crashing into a large sperm whale was another misadventure experienced on this vessel, all of which galvanized my interest in ships and seaworthiness.

Approximately five years ago, I found myself relaxing at the portside bar of a resort in Aruba. As I enjoyed my piña coladas, I looked out onto the number of large cruiseships in port. I began to notice how different the architecture was from the QE2 and Norwegian mailboats to which I was accustomed. I noticed that the hulls seemed to be made of much larger panels of steel with noticeable indentations. I noticed the prolifera of balconies from the top deck down to much lower levels than ever before with large panels of glass, both on the balconies and on the bridge, where the windows crossed the entire beam of each ship. Thinking of the unfortunate disaster of the USS Cole, I wondered how these mammoth floating hotels would fare in a similar disaster with their apparently thin skins. I wondered whether these Caribbean cruiseships could sustain the types of storms that I had witnessed as a child. I began to think about the enormous investment into each of these cruiseships, wherein so much money is increasingly devoted to interior features akin to a five star resort with average construction costs of several hundred million dollars. I began to wonder whether enough was being expended on safety and whether the hull standards were sufficient to protect those lives in USS Cole type disasters and in violent storms. In February 2006, Royal Caribbean International, Inc. ordered what will be the world's largest cruiseship. Project Genesis will cost $1.24 Billion and will carry 6,400 passengers, replete with balconies, even on low decks.

Shortly thereafter, on the same trip, I had cocktails with a fellow guest at the same resort. He was President of a major Fort Lauderdale company with worldwide repair contracts for Rolls-Royce Plc., one of the leading manufacturers of propulsion systems for cruiseships. I began to relate to him my concerns. I was not surprised when he wholeheartedly agreed with me that most cruiseships today are NOT designed to weather Atlantic crossings and are in effect floating hotels designed to move in fairly calm seasonal waters between Florida, New York and Caribbean ports. We discussed the issues of hull plating and he mentioned that most of the vessels in front of us were constructed with large panels of ½" hull plating, compared to the QE2's plating of 1 ¼". Indeed, he related an incident of a ship wherein the entire bridge window had blown

inward in a violent Caribbean storm. What would happen to the many rows of windowed balconies at lower height? What would happen to the ship when inundated with water through those passages in the event of a strong storm? These questions were left unsaid, though very much on my mind. Over the course of the next few years, I began think about a variety of disasters and our ability, as a nation to move or evacuate people in mass.[1]

In Florida, there are two major highways, I-95 and I-75 that allow the millions residing in or visiting Florida to escape by automobile. Even with southbound lanes directed northward, these passageways have proven to move at a standstill of bumper-to-bumper traffic in recent major hurricanes. As a result, one of the potentially most unsafe places to be in a hurricane is on the highway. The evacuation problem of Florida is particularly acute, as the highest population density resides at 12 feet or less above sea level, much of the presently settled state having formerly been swampland drained for development. Aside from much recently publicized evidence suggesting weather patterns changing toward more and stronger hurricanes in that region, there are also tsunami threats from potential major mountain slides in Caribbean islands, La Palma (Canary Islands), or from tectonic activity. Interestingly, however, is the fact that much of the East Coast cruiseship industry is centered in the Port of Miami. Wouldn't it be interesting to explore utilizing this as an asset during times of disaster rather than another potential insurance and environmental liability?

During the First and Second World Wars, much use was made of civilian vessels in times of national need. The merchant marine was a critical component in our nation's victories. Indeed, the great liner Queen Mary spent much of her latter life in service as a troop ship rather than as a luxury liner. Of course she was built to weather transatlantic crossings. During the war years, she carried several times her normal capacity (15,000 troops at a time compared to typical haulage of 1,957 passengers[2]). What if today, our cruiseships were held to a higher standard of construction allowing for use during the violent storms common on the Atlantic, rather than constructed as flimsily as currently allowed for regional cruises? In a recent near disaster (4/2005) the *Norwegian Dawn*, a large 1000' Caribbean luxury cruiseship of typical construction of its type, was hit and flooded by a 70' rogue wave in 40 foot swells that reached deck 10 and fully breached two cabins. Has this event taught us anything? In that instance, 2,500 passengers were imperiled. Given the potential cost of life and dollars as the construction costs of these floating resorts skyrocket (costs driven primarily by the luxuries therein, not the hulls and infrastructure), wouldn't it make sense to require more significant standards to protect these lives and assets? What if all cruiseships were required to have 1 ¼" hulls and automatic hurricane doors on all balconies and major windows? Wouldn't this make them much safer vessels?

A more interesting question, perhaps is: What if we could use these vessels, in times of national need, for purposes other than that which they were primarily intended? It seems to me that it is worth exploring a complete revisitation of licensing and

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[1] As founder of Permafresh Corp., it is worth mentioning that our food preservation technologies allowing greatly increased shelf-life of rations and fresh foods even without electricity were primarily motivated by such disaster-abatement concerns, despite the present publicity of our wine preservation technologies.

[2] Source: queenmary.com

construction standards on all new large passenger vessels allowed in our ports, therefore allowing them to withstand the unexpected and to maximize their utility to the communities that must tolerate their pollution and other social costs. Furthermore, it seems reasonable to reexamine whether some such improvements could be achieved reasonably and effectively by requiring the existing fleets to return to dry-dock for routine overhauls. One would expect the insurance industry to applaud and assist in encouraging the cruiseship industry to make such changes, as would a potential new customer for their services, the United States Government and its Coast Guard and Federal Emergency Management Agency.

What I propose is as follows: that FEMA and USCG develop contingency plans for evacuation including use of the cruise industry and establish training protocols for their staff in the event of crises. Given that the home ports of many of our cruiseships are in or near potential hurricane disaster areas (such as Florida), it would be useful to design ships strong enough to weather such storms. With sufficiently strong hulls and window protection, such ships could provide an alternate means of flight from such disasters. With satellite warnings of oncoming storms, there are often many hours or days of preparation time available. With proper training of FEMA, USCG, and state and local officials, as well as with coordination with broadcasters, people in the path of violent storms (as well as chemical or even epidemiological hazards or outbreaks) could be more quickly removed from the area at risk. Essentially, they would be directed to a boarding area and loaded onto cruiseships that could evacuate them by sea before the storms hit. It is interesting to observe that Washington State, another cruiseship hub, though not prone to hurricanes, is highly vulnerable to volcanic threat. The city of Tacoma, much of which is constructed on top of ancient lava pathways, is likely to be destroyed at some point in the future by further volcanic eruption. Although technology exists to give some advance warning of volcanism, there are few present plans for how to evacuate hundreds of thousands or millions of people from the northwest cities in such an event. Again, with cruiseships and a large fleet of major fishing and cargo vessels at hand, an excellent opportunity exists to tap these vessels into a merchant marine for such emergencies, utilizing tax credits and other means to assure industry cooperation.

The recent San Diego fires of October and November 2007 painted a picture similar to that seen in Florida during the 2006 hurricane season, when both the I-5 and I-15 freeways were clogged with vehicles and shut down, as an estimated 1,000,000 people were dislocated, including a record 515,000 people in the evacuation zone. Again, with a workable merchant marine trained to utilize cruise and cargo ships, another means of escape, seaward, would have been possible. Disasters requiring similar evacuations could also include rescuing people in the event of tsunami destruction, post-nuclear attack, or in the event of epidemics when such vessels could be used to isolate the healthy or quarantine the ill. There is also the lingering menace of a supervolcano under Yellowstone Park. Should it become less stable (there is evidence of substantial uplifting of the ground already, sufficient to spill a lake into a forest), rapid evacuation of 100 million people or more from several states may become necessary. Clearly the United States is unprepared for such contingencies. Another Three Mile Island or Chernobyl event would similarly tax our ability to respond.

UTILIZATION AND RECONFIGURATION OF AIRCRAFT CARRIERS AND NAVAL VESSELS IN TIMES OF NATIONAL EMERGENCY

One of the greatest shortfalls of the federal response to the Hurricane Katrina disaster was perhaps its failure to utilize its nearby fleet to assist in the response. In part, this was due to territorialism and failure to properly request and coordinate assistance between FEMA and the DOD and other agencies and, in no small part due to the fact that this has not been a rehearsed role for the military in peacetime. It is not the purpose of this analysis to point fingers of responsibility, rather to suggest ways in which civilian, FEMA, and military initiatives can be coordinated synergistically during future disasters. Let us look macroscale at some of the primary problems occasioned by that disaster. Aside from the obvious immediate destruction of property, there were a large number of people stranded in neighborhoods, on destroyed roads, and on rooftops with very few helicopters to assist; there was disease caused by rotting animals and human corpses, open sewage, and destroyed chemical infrastructure; there were too few doctors and nurses available and it took too long to medical care where it was needed; there was fire and widescale power outages, with little means to provide electricity where it was needed (important for preserving food, provision of medical care, and in economic recovery, aside from electricity's utility in returning people to their homes).

Upon interviewing a retired senior official in the US Public Health Service, I was surprised to learn that there is essentially no coordination or training between FEMA, the Agency allegedly in charge of our Federal disaster response, and the US Public Health Service, the Agency in charge of our response to epidemics and medical crises. Though we have thousands of USPHS doctors and nurses trained in how to treat an epidemic, there is entirely insufficient training and coordination between FEMA, the agency that is able to mobilize the people away from the epidemic or toward treatment or quarantine, and those with the expertise in treating the condition. Furthermore, there is a huge deficiency in recordkeeping once trained personnel retire (their personnel records at USPHS are removed to retirement services at US Office of Personnel Management).

This means that several thousand highly trained retired personnel with expertise in responding to crises are unable to be quickly located and reactivated in times of crises. Much of the same problem occurs in the military services, when veterans retire. It would seem prudent, therefore, to maintain an active and current address and telephone and internet address database of all veterans with special skills and all retired USPHS and FEMA personnel, so that when those with special training are needed, they can be found and asked to assist in the crisis (compensation could easily be implemented at their previous rank's pay level or at a premium for the inconvenience). During Katrina, there was an inexcusable shortage of helicopters, often the only rapid transportation means to those in peril or to fires. With a proper database and with the use of private sector call centers (pre-trained in different remote locations, so as not to tie up overloaded regional telephone resources), and instantaneous email alerts, all former military helicopter pilots could have been contacted and many mobilized during this crisis. Perhaps helicopter manufacturers and private sector pilots could also be included into the database and contacted to get equipment and personnel where needed. Similarly, retired USPHS officials whose training records are well known when they are with USPHS could be

contacted and activated in times of crises. Veterans have long memories, come pre-trained for a command context of response, and tend to have an unflappability in crisis, that makes them perhaps more ideal resources than relying on unfiltered private contractors. Perhaps a special reserve status could be created to pre-enlist a force of such veteran pilots, medical and support workers in the event of national crisis.

AIRCRAFT CARRIERS: A SPECIAL TOOL

I recall a post Katrina conversation with a former US Navy flag officer in which we discussed the use of aircraft carriers. He expressed much consternation that the military was not properly utilized as a resource by FEMA, despite having had carriers near the disaster area. He quickly observed that a carrier's hanger bay could easily have been removed of aircraft and converted to serve as a floating convention center to hold the evacuated public. Given the enormous construction costs of carriers and the difficulties in achieving their appropriations from an overtaxed Congress, it would make sense to explore potential civilian uses for these mammoth investments. Furthermore, aside from being potentially floating airports or heliports AND floating convention centers with plenty of food and plumbing, you also could look at a carrier as a floating power plant AND as a floating hospital. One can imagine a next generation or refitted carrier with secure doors separating the hanger bay from the rest of the ship, plenty of toilets and showers and hospital quarters accessible from the hanger bay, with a nuclear power plant with connections that could tap into land-based, portfront nodes and conduits to provide power to damaged power grids in times of crises. If New Orleans had such nodes, the restoration of partial power would have been much quicker. With an evacuation center in a hanger bay of a carrier, people could have been extracted more quickly, particularly if helicopters were flown onto the flightdeck, allowing easy transport of the wounded, medical supplies, and critical personnel. From an appropriations standpoint, FEMA, DOE, and military funding could be applied to the next generation of carriers, allowing these national assets to provide shared benefits to many, also easing public sentiment for appropriation for future carriers. Indeed, even obsolete carriers, such as the USS Intrepid, could be converted to some of these uses. Helicopters could evacuate people to the carriers and from them onto the mainland. Additionally, they could be used to fight fires, such as those that recently devastated San Diego. One can imagine a different outcome had a carrier loaded with firefighting choppers been stationed offshore from San Bernardo during its fires.

Clearly other seaworthy Navy and USCG vessels could be used as evacuation vessels. However, the advantages of an open hanger bay and the ease in securing such an open space would make them preferable to allowing the public into other fighting vessels. Given their nature as floating airports, carriers are also ideal locations for control and coordination facilities, using satellite communications, unaffected during severe storms, to coordinate activities from different agencies from one or more control rooms. By creating one management team to centrally monitor activities of every action group and through having a center that allows each action group to contact each other, one could avoid some of the familiar "pipeline" problems of different government agencies unable to coordinate their activities. The proximately of command coordination to the aircraft and personnel providing the relief would also permit prompt and direct in-person

feedback loops that have been missing in prior responses to crises. Such a center should be designed with redundancy and transferability so that the potential sinking of a carrier would not disturb the network. A potentially useful further refinement to the next generation of naval vessels designated for such service would be to install centrifugal stabilizers to improve the comfort of sailors and the public in rough seas. It is interesting that Naval vessels, more prone to forays into dangerous swells, lack what most cruiseships take for granted, aside from those stabilizers used on gunturrents to steady their aim. Public use of such vessels might ease the path for Congressional funding for these comfort conveniences.

Finally, such vessels could be used to provide nuclear power to power grids of conflict nations, including Iraq and North Korea, without risking transfer of controlled technologies. Effectively, by parking such a vessel with a Naval fleet or in a Naval Base, power could be generated and distributed entirely within the control of the US or Allied Navies. This would make it easier for the United States to live up to its power commitments to these nations while, at the same time, securing isotopes and classified technologies. This would ease creation of future energy and non-proliferation agreements with such countries. Unarmed versions of these floating powerplants could also be used in zones where the firepower of an aircraft carrier is undesirable or politically untenable.

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