

T-AKE Humanitarian Assistance/ Disaster Relief (HA/DR) Conversion

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Forward-deployed US Navy warships are increasingly called upon to provide disaster relief on short notice. These ships and crews are often able to provide much needed physical relief (nutrition and fresh water), manpower, medical and logistical support, but are limited in the short term by the supplies on hand when redirected to the disaster area.

The objective of this study was to design a modification to the *Lewis and Clark* class T-AKE that is capable, as a secondary mission, of providing short term humanitarian and recovery assistance to areas affected by natural disasters. Specifically, the ship would be capable of generating and distributing electrical power, generating, storing, and distributing potable water, and providing onboard medical care. Since fleet underway replenishment (UNREP) is to remain the converted platform's primary mission, the ship's requirements and decision framework accounted for tradeoffs between humanitarian assistance/ disaster relief (HA/DR) and UNREP capability. The study also considered the effects on the ship's internal arrangements, stability, seakeeping, and hull structure as a consequence of the conversion.

The *Lewis and Clark* Class T-AKE is the Navy's primary dry cargo UNREP asset. Designed with the speed and endurance to conduct replenishment missions with forward-deployed ships, the T-AKE has over 6,000 m² of elevator-accessed internal deck space for palletized dry cargo (including chilled) and adequate tank volume for over 3,000 MT of cargo fuel. The T-AKE also supports a Navy air detachment of 2 MH-60 helicopters. The amount of open deck space and tank volume available make the T-AKE an ideal base platform for conversion to a HA/DR asset.

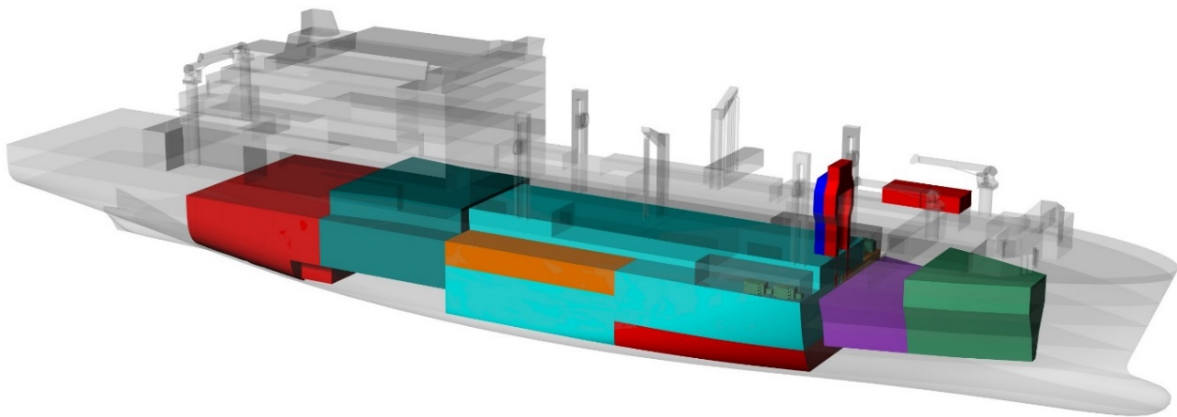
The trade space explored in this study was built on combinations of capability levels in each of the HA/DR mission areas (electrical, fresh water, and medical). Given the baseline T-AKE's cargo-carrying capacity, the weight of conversion-associated equipment, such as electrical and freshwater generation equipment, electrical distribution hardware, and medical facilities does not have a significant effect on the performance of the ship, especially under full load.

The final design was chosen utilizing a Measure of Effectiveness (MOE) approach, which assigned a quantitative score to each variant. The highest score represented the variant which met all requirements and best balanced the primary (UNREP) and secondary (HA/DR) missions. This variant features a large hospital-quality medical bay, several reverse-osmosis freshwater generating units, over a half million gallons of freshwater storage capacity, and two large COTS gas turbine generator sets. The table on the following page summarizes the specifications of the chosen variant.

Speed	20 kts
Range	14,000 nm
Crew accommodations	49 Naval 123 civilian 25 spares
Medical Spaces	5 examination rooms 2 operating rooms 104 hospital beds Storage/support areas
Aviation capability	2 embarked MH-60 helicopters
Dry cargo capacity for UNREP	6,329 m ²
Cargo fuel capacity for UNREP	1,583 MT
Electrical generation for HA/DR mission	50 MW
Potable water generation for HA/DR mission	185,000 gpd
Potable water storage for HA/DR mission	2,621 MT / 692,000 gal
Time on station for HA/DR mission	Up to 14 days (variable)

T-AKE (HA/DR) Characteristics

The HA/DR T-AKE outlined in this study capitalizes on the capabilities of the baseline T-AKE to provide a currently unavailable HA/DR capability that can be positioned with forward-deployed forces, ready to respond.



T-AKE (HA/DR)