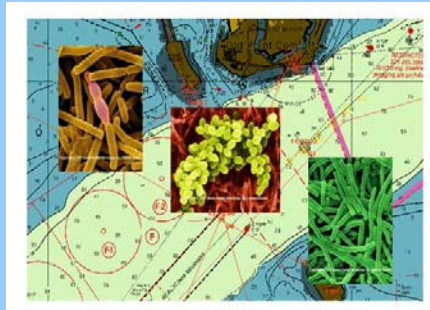
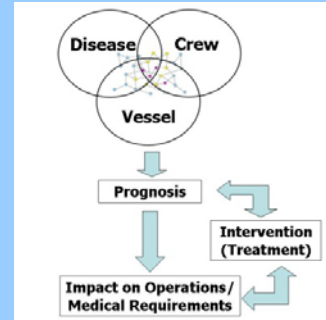


## Motivation & Rationale



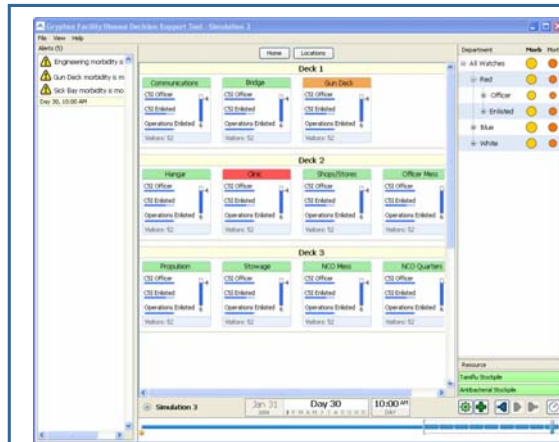
US Navy missions are critical to force protection and defense capabilities for the nation. With deployments to geographic locations where endemic disease rates are much higher than in the U.S. and with extended periods of deployments, the potential impact of disease on shipboard operational capability may be significant. Keeping soldiers healthy is vital to the success of the US Navy.



SDDT is a course-of-action planning tool. It simulates the impact of disease and the effects of treatments and intervention procedures on the operational capability of a ship. SDDT is designed as a prognostic tool to assist Medical Officers (MO) in assessing the potential impact of disease, evaluating potential interventions and treatments (including in combination), and evaluating resource requirements for personnel. SDDT provides for rapid simulation of multiple scenario variations based on different disease characteristics and interventions to enable to MO to provide more informed guidance for disease management.

## SDDT Model

SDDT is built on the Gryphon Simulator. The SDDT model is based on an LHD-1 class Navy ship. It includes details on personnel in 15 different departments spread over 12 duty stations. Personnel are further divided by the 3 duty shifts they belong to and between enlisted crew and officers. This allows the model to fully capture the different behaviors of the different personnel in the ship on an hourly basis. Pandemic Influenza was chosen as it is common threat to the health of Navy personnel. Several medical and non-medical interventions suggested by domain experts have been incorporated. This includes vaccines, antivirals, and several different methods of social distancing such as avoiding contact, extending mess hall hours to reduce crowding and redirecting some personnel to eat on the helipad also to reduce crowding.

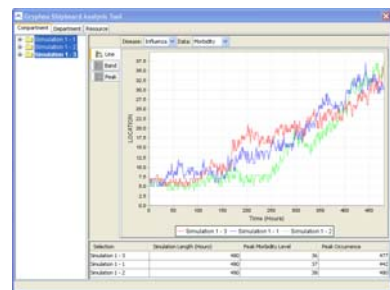


User-defined alerts; e.g. warning when operational level or resource level becomes critical

View Operation Level as an Interactive Dashboard

Monitor specific or aggregate groups of people.

Monitor resources used for interventions  
Replay simulations

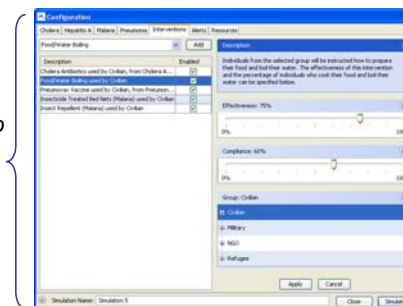


Compare results of simulations

Apply various interventions to see how they might mitigate the affects of the disease

Disease	Interventions	Alerts	Dept	Morb	Mort	Avg. Inf.	Avg. Lat.	CFR	Reprod. Rate
Enabled						70.8	20.4	0.02	1.8
Air-Blue-enlisted						70.8	20.4	0.02	1.8
Air-Red-enlisted						70.8	20.4	0.02	1.8
Air-White-enlisted						70.8	20.4	0.02	1.8
CS-Blue-enlisted						70.8	20.4	0.02	1.8
CS-Red-enlisted						70.8	20.4	0.02	1.8
CS-White-enlisted						70.8	20.4	0.02	1.8
Deck-Blue-enlisted						70.8	20.4	0.02	1.8
Deck-Red-enlisted						70.8	20.4	0.02	1.8
Deck-White-enlisted						70.8	20.4	0.02	1.8

Customize disease parameters or use standard disease templates



## Results

Presented to USNORTHCOM along with another gryphon model of the PACOM AOR and given out to attendants on CD and USB stick

## Next Steps

- Combine UI components with FDDT to allow unified product for any ship or facility (in progress)
- Allow end user creation and customization of model
- Extend the model to include other diseases important to ship operations such as Norovirus
- Extend the model to include Marines that leave the ship to perform missions in countries with large numbers on endemic diseases
- Create similar models for use on commercial vessels such as cruise ships

