

DARPA Project Walrus

Peter Lobner, 1 May 2019

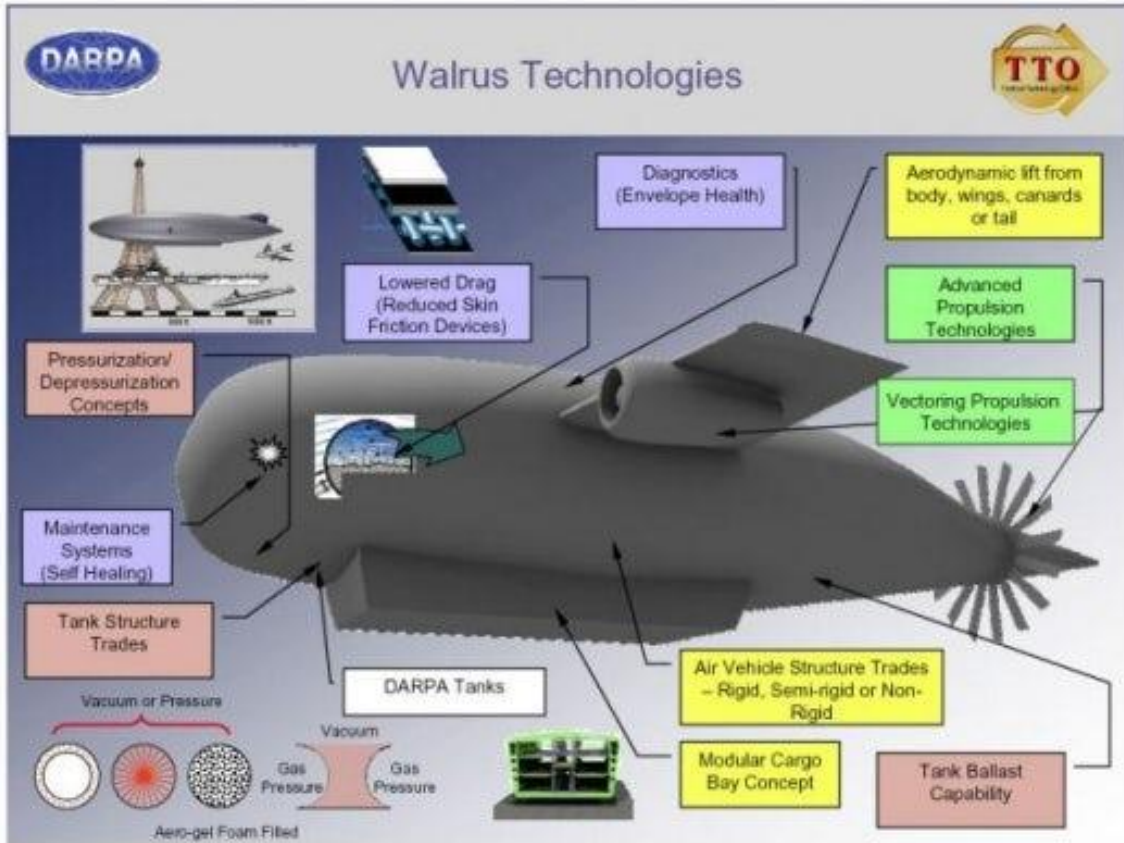
Project Walrus, sponsored by the Defense Advanced Projects Agency (DARPA), sought to develop new technologies and design concepts for a strategic, heavy-lift, hybrid (semi-buoyant) cargo airship. The goal was to develop a design for an Operational Vehicle (OV) capable of carrying a 500 – 1,000 ton (454 – 907 metric ton) payload 12,000 miles (19,312 km) and delivering an Army fighting unit directly “from fort to fight.” Of course, some assembly of cargo items may be required at the landing site, but this would be minimized. It was expected that a fighting unit could be fully operational within six hours after landing.

Among the advanced airship technologies of interest to DARPA were:

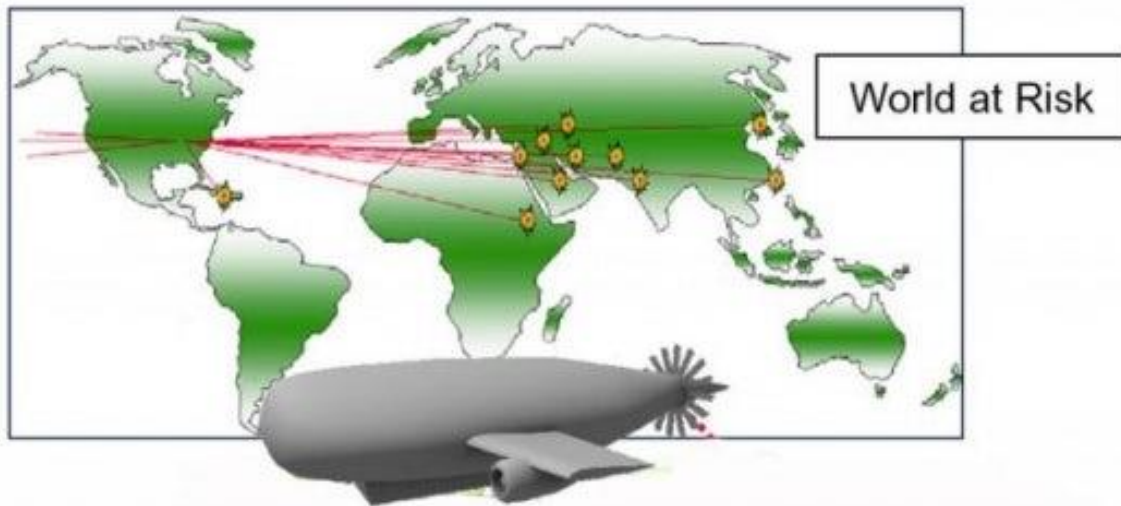
- Advanced materials for airship structures and envelopes
- Drag reduction
- Semi-buoyant hybrid airships that generate the necessary lift from the combined effects of aerostatic lift from helium, vectored thrust from propulsion systems, and aerodynamic lift from wings and fuselage during forward flight.
- Innovative lift and buoyancy control concepts that did not rely on off-board ballast, other than ambient air. Here the goal was to be able to discharge heavy loads at a remote landing site without having to take on compensating ballast in order to maintain control of the unloaded airship.
- Operate without significant ground infrastructure.
- Land in unimproved sites with rough ground and obstacles up to five feet tall (i.e., bushes, boulders).
- Electrostatic atmospheric ion propulsion.

While the Walrus OV initially was being developed for strategic airlift, it was expected that it could be adapted for other missions, such as:

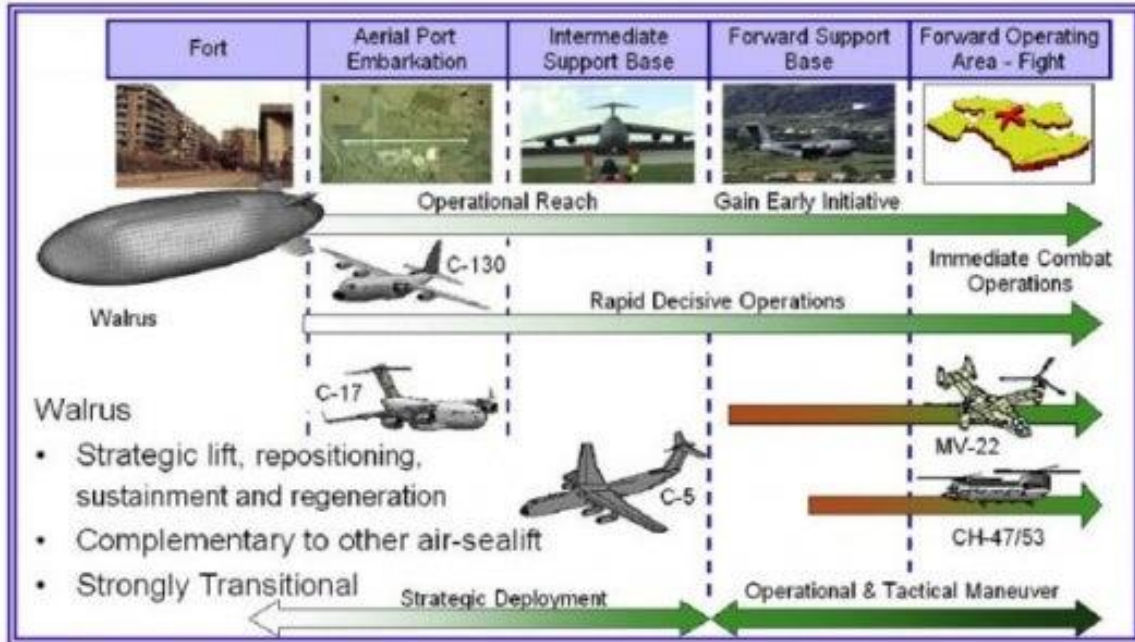
- Theater (shorter range) airlift
- Sea-based airlift
- Long-duration intelligence and communications missions



*Walrus technology features.
Source: DARPA*



*Walrus "fort to fight" deployment capability.
Source: DARPA*



*Walrus integration with other military airlift capabilities.
Source: DARPA*

In mid-2005, DARPA launched a 12-month Phase 1 study with the award of contracts to Lockheed Martin's Advanced Development Programs (the Skunk Works) in Palmdale, CA (\$2,989,799) and Aeros Aeronautical Systems in Tarzana, CA (\$3,267,000). Their Phase 1 work focused on trade studies to identify the most promising OV design options and associated technical risks. A technology development plan for risk reduction also was required.

Project Walrus was terminated in mid-2006, after completion of Phase I. In spite of being cancelled early, this project was important because of its contributions to raising industry interest in the capabilities and potential roles for modern airships.

Phase II, which was cancelled, originally was conceived as a three year program to be performed by one contractor down-selected from Phase I. Phase II was to focus on design refinement, technology development, risk reduction demonstrations of components and systems, and flight testing an Advanced Technology Demonstration (ATD) scaled airship with a payload comparable to a C-130 Hercules fixed-wing cargo airplane (about 30 tons).