

MPH

MOBILE PARTS HOSPITAL

Long lead times and high costs of procuring and inventorying replacement parts have reduced equipment readiness rates, resulting in soaring operations and support costs for the Army. This happens despite the fact that the DoD maintains repair part inventories at a cost of over \$60 billion annually. The Army's Mobile Parts Hospital (MPH), a project initiated by the U.S. Army TARDEC'S NAC, exists to offset this imbalance by producing spare parts near the point of need and reducing the time invested in the part procurement process. Instead of our soldiers having to wait weeks or even months for the part they need, the MPH can get the part to them in a matter of days or even hours.

HOW MPH WORKS...

MPH is a self-contained, self-sustaining mobile mini-manufacturing center that can:

- Send and receive digital manufacturing-ready data
- Create manufacturing-ready data
- Reverse-engineer individual repair parts with scanning devices and simulation hardware
- Produce the part and electronically qualify and verify it before the part is released for use

MPH TODAY...

Current efforts demand that the following be demonstrated on a mobile platform:

- On-demand manufacturing of small individual parts
- Remote site extraction, control, and insertion of part data to allow for on-site manufacturing
- Creation of a parts database to provide the technical information for the field manufacture of parts

THE FUTURE OF MPH...

Phase III of the project will:

- Result in the real-life assumption of the MPH program by the Army's PM Heavy Tactical Vehicles program office

NAC PARTNERS AND THEIR ROLE IN MPH:

U.S. Army TARDEC'S National Automotive Center (NAC) (Warren, MI)

Is the federal government's program manager for this project. TARDEC'S role is to advance and apply enabling technologies in the areas of simulation and modeling and repair part imaging.

ALION (Warren, MI) - Prime Contractor

Provides program and system integration, part selection, new fabrication technologies, and part validation.

Focus: HOPE (Detroit, MI)

Supplies the command and control center for MPH and develops the reverse-engineering and rapid machining methods for the project.

CAMP (Cleveland, OH)

Assists ALION and Focus: HOPE with advanced engineering support in reverse-engineering.

For more information visit:

www.mobilepartshospital.com

NATIONAL AUTOMOTIVE CENTER

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Many of the U.S. Army TARDEC'S National Automotive Center's (NAC) current projects are part of the Army's 21st Century Truck Initiative aimed at integrating commercially viable advanced technologies into commercial and military vehicles. The goal is to enhance safety, performance, and fuel efficiency while reducing operating costs and emissions.

The Mobile Parts Hospital (MPH) combines the latest manufacturing infrastructure and technologies in a mobile unit that can readily travel to any destination. Both standard and unique replacement parts can be manufactured from technical data and computer numeric control code. If needed, parts can be reverse-engineered with laser point technologies.

MPH is the automotive equivalent of the Mobile Army Surgical Hospital used to stabilize soldiers before sending them out of theater for more complex care. MPH's objective is to provide the same kind of initial treatment to a vehicle so its crew is protected and can finish the mission before going back to the normal maintenance line for repair.

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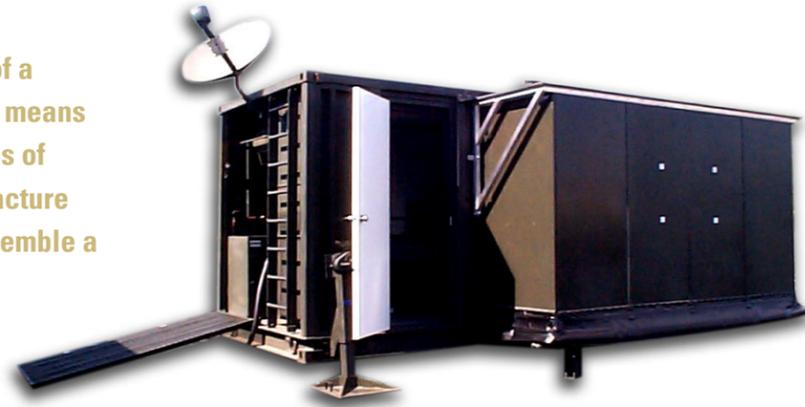
ARMY PARTNERSHIPS IN MOTION



NAC

MOBILE PARTS HOSPITAL

The MPH project is in the second phase of a multi-phase program. Moving to Phase II means that the MPH can now produce more types of parts than in Phase I and can also manufacture fully dense metallic parts that closely resemble a part one would get from an OEM.



MPH's Phase II system consists of two militarized ISO containers which house advanced commercial manufacturing equipment. Each 20-foot long module can operate independently or as part of a larger virtual manufacturing network and is designed to be transported by PLS and C-130 aircraft. Housed in each module are communications equipment that access manufacturing data from U.S.-based locations via a two-way satellite that can also link to the Internet through a 208 V three-phase electrical power source.

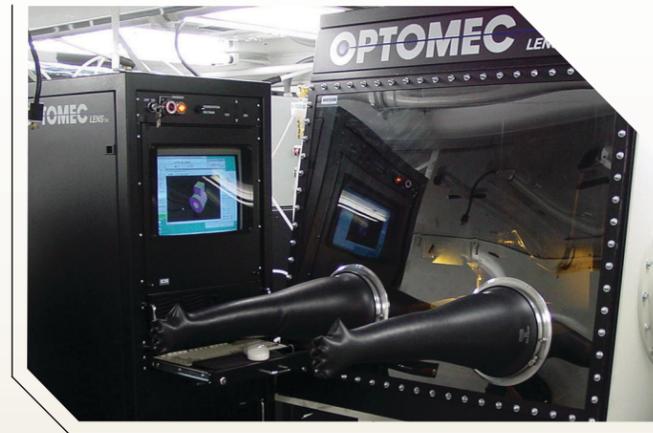


When set-up, this 20-foot, 27,000 lbs. container can begin producing parts in the field in less than one hour.

MPH's first module, called the Lathe Manufacturing Module (LMM), includes a 5-axis Mazak Integrex 100 II SY milling and machining center. All tooling and maintenance equipment needed for the on-site manufacture of parts is contained in this module, which can be set up in less than one hour.



A member of the MPH team demonstrates how a serpentine pulley can be produced using a tool base of twenty different tools that can be controlled automatically from the LMM's command center.



The second module, the LENS™ Rapid Manufacturing Module (RMM), is housed in an expandable standard 20-foot Army ISO shelter. It can also be set up quickly—in one hour or less. The RMM contains an Optomec LENS™ 750 Directed Metal Deposition Machine, which can create a fully dense, near net-shape metal part in 5-axis orientation. The machine uses a powerful laser to melt metal powder, which sprays out of four small nozzles on the 5-axis rotating head. The part is then built in layers from a Computer Aided Design (CAD) model.



Compressed liquid Argon is used to create an inert environment within the LENS™ machine while an Affinity Chiller is used to cool the laser inside the machine. In case engineering part data is not available on a specific item, the part can be reverse-engineered using a Nextec Hawk 3-dimensional laser scanner, also housed in this module.