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LABORATORY COMMAND



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PREPARED FOR THE

HUMAN ENGINEERING LABORATORY

BY

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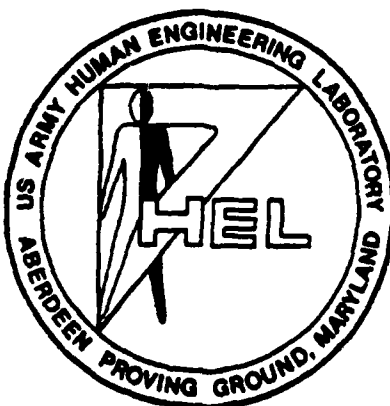
ACTION PLAN FOR THE CONDUCT OF FIELD
DEMONSTRATIONS OF THE IMCON/HIK

FINAL REPORT

Contract Number DAAA15-86-D-0013

August 1989

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ABERDEEN PROVING GROUND, MARYLAND 21005-5001

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ASI 89-03

**ACTION PLAN FOR THE CONDUCT OF FIELD
DEMONSTRATIONS OF THE IMCON/HIK**

FINAL

August 1989

By:

D. J. Shearin, Sr.

Prepared For:

**Combat Service Support Division
U. S. Army Human Engineering Laboratory
Aberdeen Proving Ground, MD 21005-5001**

Prepared By:

ASI SYSTEMS INTERNATIONAL

Aberdeen Group, P.O. Box 158
211 W. Bel Air Avenue, Aberdeen, MD 21001

2 August 1989

SUBJECT: Transmittal of ASI Report 89-03, "Action Plan for the Conduct of Field Demonstrations of the IMCON/HIK"

TO: Director
U.S. Army Laboratory Command
Human Engineering Laboratory
ATTN: SLCHE-CS (Mr John Salser)
Aberdeen Proving Ground, MD. 21005-5001

Dear Mr Salser:

Reference is made to Modification No. 001601 to Contract DAAA15-86-D-0013, Delivery Order 16, Subtask #4.

The above referenced document calls for the preparation of an action plan for the conduct of field demonstrations of the IMCON/HIK to include a draft demonstration plan and schedule and illustrated handout containing a description of the items to be demonstrated, a summary of performance characteristics of each item, and photographs of the items in use in a field type environment.

In accordance with the above reference, a draft plan for field demonstrations of the IMCON/HIK was forwarded for your review and comment on 8 June. Enclosed herewith is a final copy which has been revised to incorporate all of your comments. If you have any questions relative to this plan, request you contact Mr. D. J. Shearin, telephone 272-0800. Submission of this document completes our work under above referenced delivery order.

Sincerely



Allan R. Burke, Director
Aberdeen Group

1 Encl
a/s

ARB/tlw



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ASI 89-03

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DEMONSTRATIONS OF THE IMCON/HIK**

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INTRODUCTION

Purpose of Plan

The purpose of this document is to present a Plan of Action for the conduct of three field demonstrations of the Intermodal Container (IMCON) and Hooklift Interface Kit (HIK).

Location of the Field Demonstrations

All demonstrations are planned to be held at the HELFAST Logistics Test Site, Aberdeen Proving Ground (Edgewood Area), Maryland.

Schedule for Demonstrations

The Government has not established specific dates for the planned field demonstrations, however, tentative plans calls for demonstrations to be held during the summer and fall of 1989. Second generation IMCONs and HIKs have been designed and are being fabricated as part of a Phase II effort. First deliveries are scheduled for the August/September 1989 timeframe. If testing of the second generation equipment proves to be satisfactory, and if one or more of the demonstrations are scheduled subsequent to the testing of the second generation equipment, it is recommended that the redesigned Phase II items be used in the field demonstrations. Otherwise, first generation equipment should be used.

DEMONSTRATION PLAN OF ACTION

Visitor Protocol

A VIP on-site helicopter pad with windsock located in the northeastern corner of the test site as shown in Figure 1, will be available for visitors arriving by helicopter. Military sedans and/or buses should be made available to meet ground transportation needs depending on the rank/grade of the demonstration attendees. Parking area for ground vehicles will be marked for visitors arriving by automobile/bus. Invitations to attendees should contain instructions to report to the Edgewood Conference Center at the designated time for a pre-brief prior to the demonstration. A map

indicating the location of the Edgewood Conference Center (Location #21 identified as "Theater" is at Figure 2, page 4.

The briefer will show slides of the demonstration site, the equipment to be demonstrated and will describe the order of the presentation. Refreshments may be made available at the discretion of the OIC.

Once the pre-brief has been completed, the visitors will board buses and/or private vehicles and proceed to the demonstration site. Upon arrival at the demonstration site, a briefing officer will be on hand to welcome the visitors, lead them to the viewing area and narrate the demonstration. He will be assisted by on-site personnel as indicated under the "Personnel Requirements" section of this plan.

Physical Layout of the Demonstration Site and Equipment

Figure 1, page 2, is a schematic of the HELFAST Logistics Test Site. The viewing area will consist of two 8' x 8' x 20 1/2' side opening containers as shown in Figure 1. The actual demonstration will take place on the dirt road in front of the viewing area. Since all demonstrations are planned during daylight hours, no special lights for nighttime operations will be required. The narrator of the demonstration should be equipped with a hand held loud speaker

Equipment to be Demonstrated

Equipment to be demonstrated with the exception of the "Blue Max" container, will be pre-staged at Pad "D". It will consist of Palletized Loading System(s) (PLS), PLS flatracks, first and/or second generation IMCONS and HIKs, 8' x 8 1/2' x 20' ANSI/ISO containers, Medical Shelter (if available) or any combination thereof depending on the demonstration audience. A German manufactured "Open All" experimental container will be located immediately across the road from the viewing area. A static display of an IMCON and a commercial flatrack will be located on the hardstand south of the viewing area.

The IMCONS, PLS flatracks and ANSI/ISO containers will have been pre-loaded with ammunition as follows: The PLS Flatrack will be loaded with palletized 155mm projectiles or palletized, weighted, tank ammunition containers. The IMCON will be loaded with

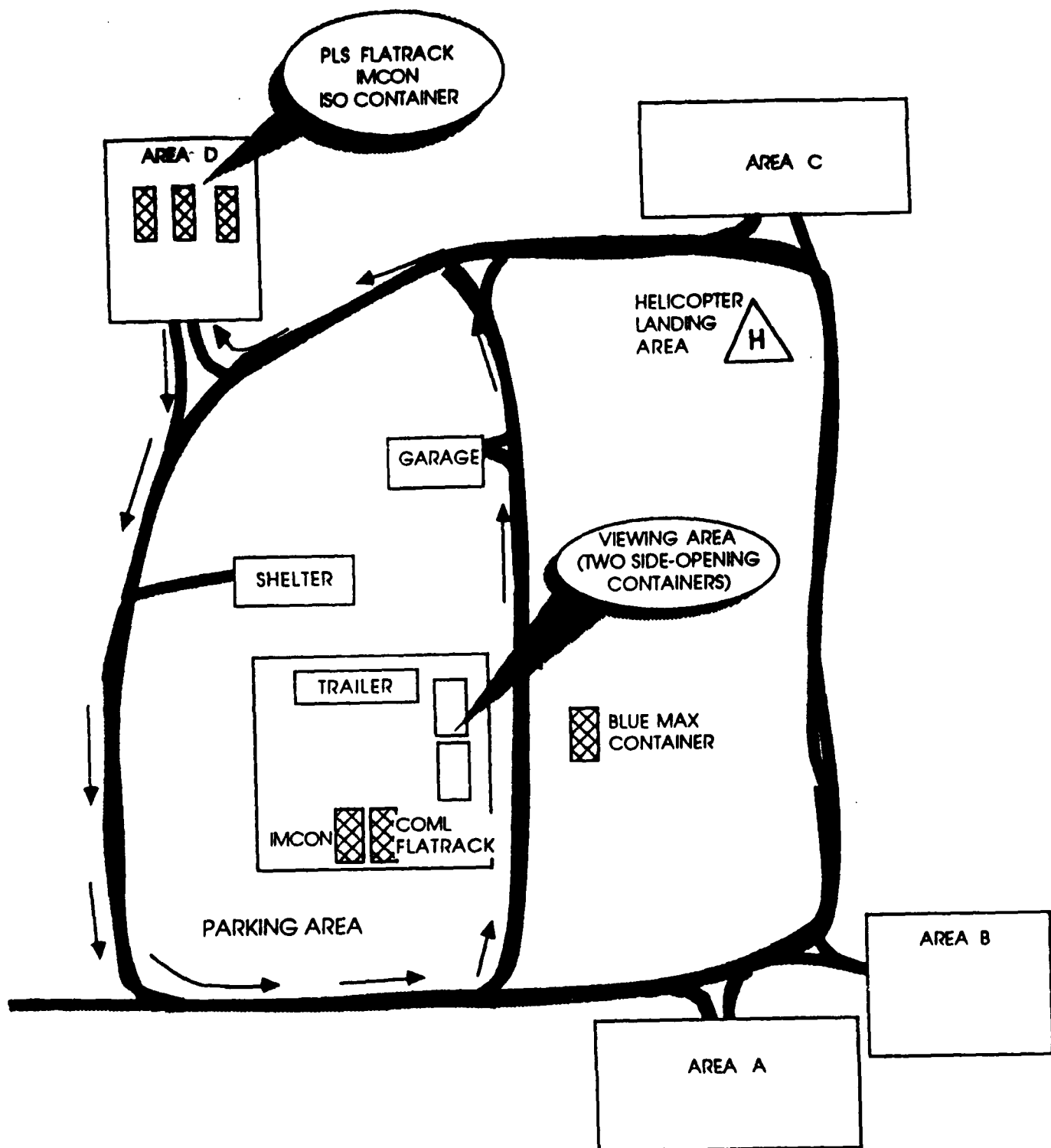
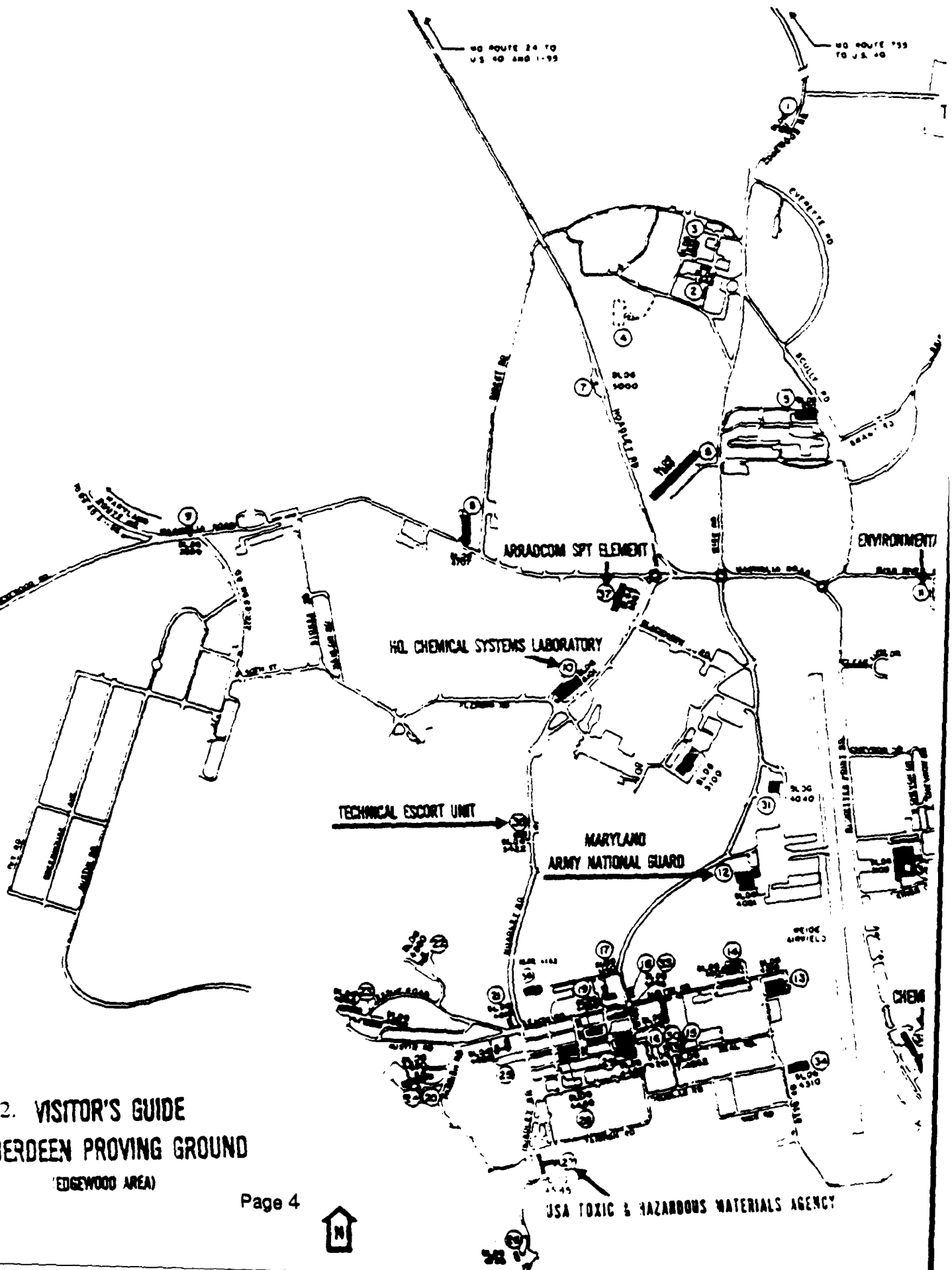
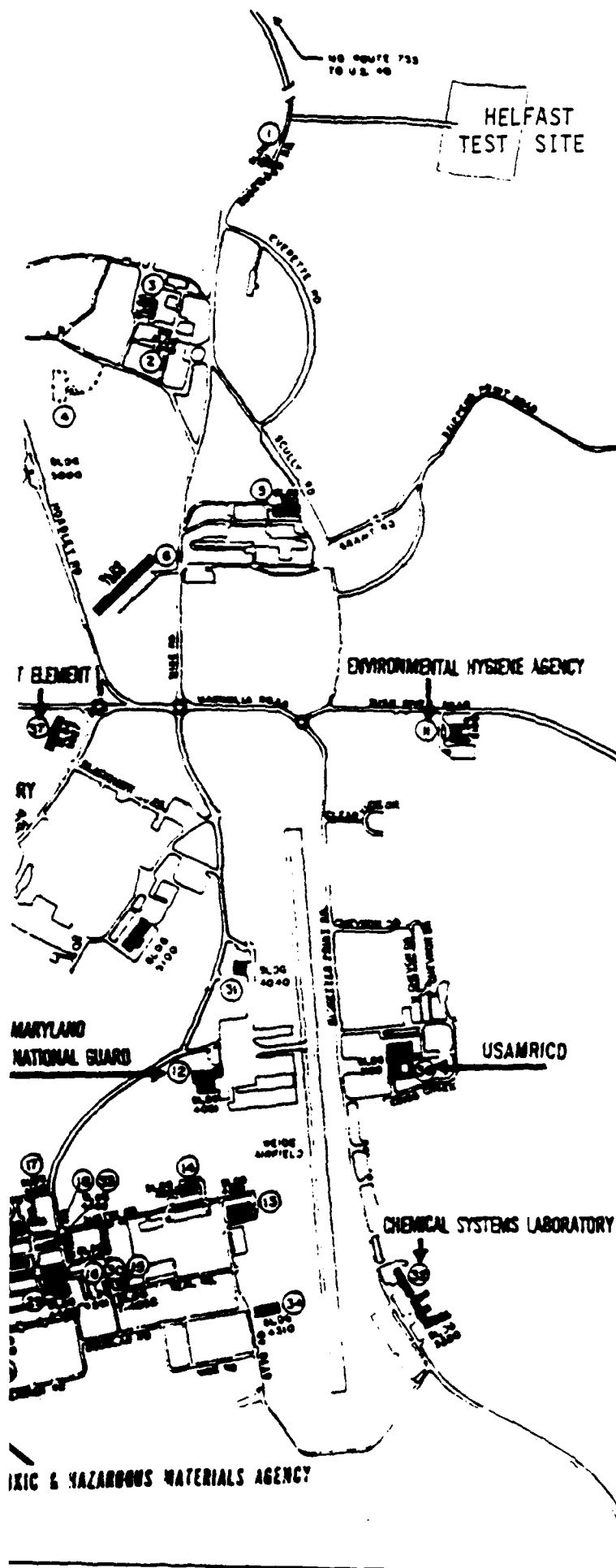


Figure 1. HELFAST LOGISTICS TEST SITE, ABERDEEN PROVING GROUND (EDGEWOOD AREA) MD

Figure 2. VISITOR'S GUIDE
 ABERDEEN PROVING GROUND
 (EDGEWOOD AREA)





1. EDGEWOOD ROAD GATE
2. CHILD CARE
3. CREDIT UNION
4. CEMETERY
5. COMMISSARY
6. PROPERTY DISPOSAL
7. HOADLEY ROAD GATE
8. WAREHOUSE-SHIPING AND RECEIVING
9. MAGNOLIA ROAD GATE
10. HQ, CHEMICAL SYSTEMS LABORATORY
11. ARMY ENVIRONMENTAL HYGIENE AGENCY
12. MD. ARMY NATL. GUARD-AVIATION SUPPORT FACILITY
13. HOYLE GYMNASIUM
14. DISPENSARY/DENTAL CLINIC
15. THRIFT SHOP
16. CAFETERIA & POST EXCHANGE
17. RECREATION CENTER
18. POST OFFICE/CIVILIAN PERSONNEL
19. HQ, 3D BATTALION, USAOC&S
20. OFFICER'S CLUB
21. THEATER
22. NCO CLUB
23. BOQ'S 4900, 4902
24. GUEST HOUSE
25. CHAPEL
26. ROD & GUN CLUB
27. TOXIC & HAZARDOUS MATERIALS AGENCY
28. PROCUREMENT
29. PROVOST MARSHAL OFFICE
30. PX GAS STATION
31. FLYING CLUB
32. CHEMICAL SYSTEMS LAB
33. LIBRARY BLDG. 4405
34. MODEL RAILROAD
35. TECHNICAL ESCORT UNIT
36. USA MEDICAL RESEARCH INSTITUTE
FOR CHEMICAL DEFENSE
37. ARRAIDCOM SPT ELEMENT
38. ARMY COMMUNITY SERVICES

palletized tank ammunition, and the ANSI/ISO container can be loaded with a combination of palletized tank ammunition and 50 caliber boxed ammunition. The gross weight of the palletized ammunition loaded in the container shall not exceed the rated capacity of the PLS vehicle.

Support Material/Equipment

On site support equipment required will consist of one or two 4K or 6K Rough Terrain Fork Lifts to be used for loading ammunition into the containers and on flatracks prior to the demonstration. A bus and/or military sedans or other appropriate passenger vehicles should be provided for transport of attendees from the conference center to the HELFAST Logistics test site. The following "inert/dummy" palletized ammunition will be required for the demonstration:

- 155mm Projectiles
- 105mm (or 120mm) tank ammunition containers (weighted)
- 50 Cal. boxed ammunition

On-Site Personnel Requirements for the Demonstration

The following represents minimum personnel requirements for the conduct of each demonstration. Additional personnel to assist in visitor control may be required depending on the number of visitors:

- 1 *Officer In Charge (OIC) - Military or Civilian
- 1 Non-Commissioned Officer In Charge (NCOIC)
- 2 Demonstration Assistants (Will also serve as Asst. Drivers)
- 2 Wheeled Vehicle drivers (military preferred)
- 1 RTFL Driver (Vehicle driver may be used to operate this equipment)

*The OIC will also be the on-site safety officer.

Handouts for the Attendees

The following hand-outs will be distributed to all visitors as they exit the bus upon arrival at the demonstration site:

1. A single sheet showing times and description of demonstration, entitled "Schedule for Today's IMCON/HIK Demonstration" (See Appendix A)
2. A multi-page narrative description of background information and equipment information, including photographs of equipment being demonstrated. (See Appendix A.)

Order of Presentation

Following is a typical schedule for a demonstration. It can be varied depending on the audience, available time/personnel.

- | | |
|-----------|---|
| 0800 | Invitees arrive at Edgewood Conference Center |
| 0800-0815 | Welcome presentation by Director, HEL (or his representative) |
| 0815-0845 | Program presentation by PM AMMOLOG (or his representative) |
| 0845-1015 | Attendees board bus for transportation to HELFAST Test Site |
| 1030-1130 | Demonstration of equipment (Narrated by designated OIC) |
- a. Driver of a PLS truck with a standard flatrack loaded with palletized tank ammunition will drive from the equipment staging area to a position in front of the viewing area and download the standard flatrack. On signal from the briefer, he will upload the flatrack and return to the equipment staging area.
 - b. Driver of a PLS truck with a special IMCON flatrack loaded with palletized tank or artillery ammunition will drive to a position in front of the viewing area and download the IMCON, disconnect and pull the PLS forward approximately 10 feet and stop. On signal from the briefer, he will backup the PLS

vehicle until it contacts the lifting bar on the IMCON, engage the PLS load system and upload the IMCON, and return to the equipment staging area.

- c. Driver of a PLS truck carrying an ANSI/ISO container containing palletized ammunition with the HIK ancillary attachments in place, will drive to the reviewing area and download the container. On signal from the briefer, the driver will engage the PLS load system and upload the ANSI/ISO container, and return to the equipment staging area. The driver and the Assistant driver will immediately disconnect the cruciform unit from the ANSI/ISO container and re-connect it to the Deployable Medical Shelter (DEPMED), if available
- d. Driver of a PLS truck carrying the DEPMED shelter with the HIK ancillary attachments in place will drive to the viewing area and download the shelter. The Asst. Driver will then disconnect the cruciform from the DEPMED shelter. Once it is disconnected, the driver will drive the vehicle approximately 10 feet forward, lock the brakes, and turn off the vehicle engine. On signal from the briefer, the driver will restart the engine and back the vehicle using the Asst Driver as ground guide until the cruciform is positioned on the DEPMED shelter. The Assistant driver will then re-connect the cruciform lower ISO locksto the shelter and guide the driver in the upload of the shelter. Once reloaded, he will join the driver in the cab and return to the equipment staging area.

NOTE: If the DEPMED shelter is not available, or planned for demonstration, that part of the demonstration calling for the disconnecting and re-connecting of the cruciform onto and off of the container will be performed as part of the demonstration of the uploading/downloading of the ANSI/ISO container, depending on demonstration time requirement.

- e. Two options are offered for the demonstration of the experimental German manufactured "Blue Max" container as follows:

- (1) Option 1 - On signal, the 6,000 lb. rough terrain fork lift (RTFL) with the HEL 5th wheel device attached will pull the 12 ton trailer with the "Blue Max" into the viewing area. The driver will turn off the engine of the RTFL, proceed to the rear of the container and, with the assistant driver, open the Blue Max. The narrator will invite the spectators to examine the Blue Max. It will remain in the open position which represents the end of the demonstration.
- (2) Option 2 - The "Blue Max" will have been pre-located on the ground (or on the trailer) immediately across the road from the viewing area. Upon completion of demonstration phase described in paragraph "d" above, the driver and assistant driver will open the container for inspection which represents the end of the formal demonstration.

1130-1200 Examination of Equipment and Questions and
Answers Period

At end of Equipment examination and Questions and Answer Period, the narrator will announce the bus departure time and instructions for return of visitors to the Conference Center where they will pick up their individual transportation

END OF DEMONSTRATION

Other items for consideration for inclusion in demonstration.

Depending on when the demonstrations are scheduled, and whether or not the roller attachment for offloading PLS flatracks from the M872 34-ton trailers prove to be satisfactory and available, it can be included as part of the above indicated demonstration.

APPENDIX A

SAMPLE HANDOUT

SCHEDULE FOR TODAY'S IMCON/HIK DEMONSTRATION

- 0800** Invitees arrive at Edgewood Conference Center
- 0800-0815** Welcome presentation by Director, HEL (or his representative)
- 0815-0845** Program presentation by PM AMMOLOG (or his representative)
- 0845-1015** Attendees board bus for transportation to HELFAST Test Site
- 1030-1130** Demonstration of equipment (Narrated by designated OIC)
- a. Driver of a PLS truck with a standard flatrack loaded with palletized tank ammunition will drive from the equipment staging area to a position in front of the viewing area and download the standard flatrack. On signal from the briefer, he will upload the flatrack and return to the equipment staging area.
 - b. Driver of a PLS truck with a special IMCON flatrack loaded with palletized tank or artillery ammunition will drive to a position in front of the viewing area and download the IMCON, disconnect and pull the PLS forward approximately 10 feet and stop. On signal from the briefer, he will backup the PLS vehicle until it contacts the lifting bar on the IMCON, engage the PLS load system and upload the IMCON, and return to the equipment staging area.
 - c. Driver of a PLS truck carrying an ANSI/ISO container containing palletized ammunition with the HIK ancillary attachments in place, will drive to the reviewing area and download the container. On signal from the briefer, the driver will engage the PLS load system and upload the ANSI/ISO container, and return to the equipment staging area. The driver and the Assistant driver will immediately disconnect the cruciform unit from the ANSI/ISO container and re-connect it to the Deployable Medical Shelter (DEPMED), if available
 - d. Driver of a PLS truck carrying the DEPMED shelter with the HIK ancillary attachments in place will drive to the viewing area and download the shelter. The Asst. Driver will then disconnect the cruciform from the DEPMED shelter. Once it is disconnected, the driver will drive the vehicle approximately 10 feet forward, lock the brakes, and turn off the vehicle engine. On signal from the briefer, the driver will restart the engine and back the vehicle using the Asst Driver as ground guide until the cruciform is positioned on the DEPMED shelter. The Assistant driver will then re-connect the cruciform lower ISO locks to the shelter and guide the driver in the upload of the shelter. Once reloaded, he will join the driver in the cab and return to the equipment staging area.

- e. The driver and assistant driver will approach the "Blue Max" located on the ground or on a trailer located directly across the dirt road from the viewing area. On signal from the demonstration officer, they will open the container for inspection

1130-1200 Examination of Equipment and Questions and Answers Period.

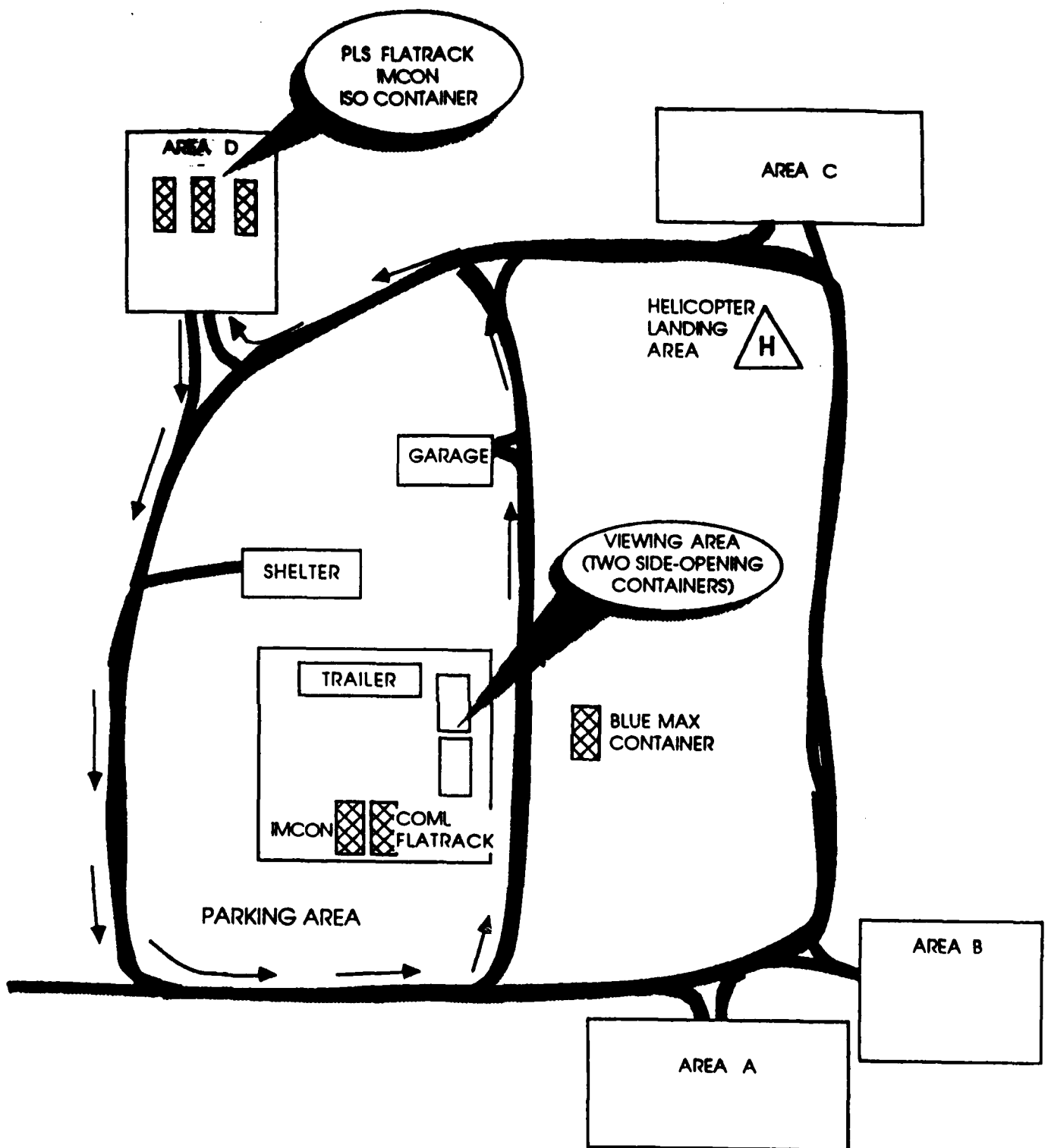


Figure 1. HELFAST LOGISTICS TEST SITE, ABERDEEN PROVING GROUND
(EDGEWOOD AREA) MD

IMCON/HIK FIELD DEMONSTRATION, HELFAST TEST SITE

INTRODUCTION

Welcome to the HELFAST Test Site and the field Demonstration of Proof of Principal of the Special Intermodal Container (IMCON) and Hooklift Interface Kit (HIK).

BACKGROUND

The US Army Human Engineering Laboratory (HEL) in concert with the Project Manager Ammunition Logistics (PM AMMOLOG) is in the process of evaluating soldier/vehicle interfaces associated with the use of the Palletized Loading System (PLS) in the role of an ammunition carrier. In 1987, HEL completed a series of field trials using 55B trained soldiers to determine the times required to upload and secure the PLS flatrack with a variety of ammunition loads. As a follow-on effort, in 1988 HEL ran a series of related field tests with the PLS system to evaluate the compatibility of the PLS with a new developmental flatrack type intermodal container (IMCON) which, is totally compatible with a standard American National Standards Institute/ International Standards Organization (ANSI/ISO) container handling equipment. At the same time, HEL ran tests to also determine the compatibility of a developmental Hooklift Interface Kit (HIK) which is planned to be used in the uploading, transport, and downloading of commercial 8' x 8 1/2' x 20' ISO containers loaded with ammunition or other classes of supplies onto and off of a PLS vehicle without the use of a PLS flatrack. These initial tests confirmed the feasibility of using both the IMCON and the HIK as part of the Palletized Loading System. Both of these items are being demonstrated today, together with an experimental "Open All" container.

Why is it important to be able to transport standard commercial containers on PLS vehicles?

Today, it is estimated that approximately 80% of the worlds general cargo being shipped to overseas ports by shipping line operators is containerized. (This excludes bulk ores, coal, bulk petroleum and commercial grains). U.S. lines trading with Europe and the Far East is today more than 85% containerized. Practically every major port in the world has been equipped to handle ANSI/ISO

containers. A 1989 survey of world ports by Container News determined that of 300 world ports surveyed, 268 or 89.3% were heavily engaged in container traffic. New cargo ships are all being built with container cargo cells. Most of the older break bulk cargo ships have already been converted to handle containers. It is anticipated that the use of containers in the future will increase still further. The "bottom line" is that the ports and the ships will have minimal capability for handling break bulk type cargo in the future. Therefore, the military has little alternative but to plan for the movement of the bulk of the military cargo, except for large vehicles and oversized equipment that will require special handling, by containers. It is planned that the PLS and other military line-haul type vehicles will be used to move the containerized military supplies from the ports forward. Ways must be found to make the Military Logistic System more suitable to the handling and transport of standard commercial containers including the use of the PLS system.

EQUIPMENT INFORMATION

(Photographs of the items discussed in the following paragraphs are contained in the rear section of this handout)

A. IMCON: Although the IMCON is being designed primarily for the movement of ammunition, it will be capable of carrying all classes of supplies. Its design capacity is 52,970 lbs. gross weight. Follow-on prototypes are being designed to be consistent with the design capacity of the PLS. Key characteristics/capabilities of the IMCON follow:

1. Unlike the PLS flatrack which is not inter-modal, the IMCON has been designed with standard inter-modal corner castings so that the container can fit into the cells of container ships, and can be lifted by the container handling gantry cranes at all major ports. It can be loaded with ammunition or other supplies at a CONUS production facility or depot and can be shipped all the way to an ammunition supply point in the forward areas of the battlefield without the contents being transloaded.

2. Loaded IMCON containers are capable of being

stacked nine high in the ship cells. PLS standard flatracks cannot be effectively placed either singularly or stacked in container ship cells.

3. The IMCON utilizes the same type of "A" frame interface with the PLS lifting mechanism for loading and unloading in the same manner as the current PLS flatrack and is NATO compatible.
4. Both ends of the IMCON are foldable so that empty containers can be stacked within minimum cube space for retrograde both by PLS vehicles and inter-modal retrograde in the cells of container ships.
5. Under an on-going Phase II program, one of the folding ends of the container is being redesigned so that it can also be folded outward to serve as a ramp for loading damaged light vehicles onto the IMCON for retrograde and/or recovery operations.

Field Test results:

Timed field trials performed by HEL on this equipment revealed that the average time for two men to lift the ends of an IMCON from a folded position to an upright position, lock and secure them in place is less than one minute (Approx. 56 Seconds) The Average time to back a PLS vehicle into position, activate the hydraulic lifting mechanism and upload an IMCON loaded with ammunition is approximately 1.71 minutes The average time to down-load the IMCON is approximately one minute. These times are consistent with the times experienced in earlier timed trials for uploading/downloading the current PLS flatrack.

B. HIK- Because of the overwhelming costs associated with the procurement of the very large numbers of containers required to support a major military conflict, the military will have to rely on the inventory of more than 2 million commercial 8' x 8 1/2' x 20' ANSI/ISO containers used by the private sector. The objective of the Hooklift Interface Kit (HIK) is to enable a PLS vehicle to upload/download a standard ANSI/ISO 8' x 8 1/2' x 20' container on

to and off of a PLS vehicle without the use of a flatrack, by use of the PLS lifting mechanism rather than having to use the large overhead gantry type cranes which are normally used to pick up these containers from the top. Although these large cranes are located at the major ports throughout the world, they would not necessarily be available in inland storage areas.

By the use of a cruciform (see photographs) that interfaces with the hooklift mechanism on the PLS vehicle and the four corner castings on the end of a commercial container, it has been demonstrated that it is possible to safely pick up these fully loaded commercial containers from the end and load them onto PLS vehicle chassis in the same manner as the PLS flatrack, directly on the frame of the PLS vehicle without using a PLS flatrack.

Since it was questionable whether a container when loaded with 36,000 pounds of ammunition for example, could be picked up by this method without breaking it, a stress analysis was performed which indicated that a loaded ANSI ISO commercial 8' x 8 1/2' x 20' container was capable of being picked up and loaded onto a PLS chassis by use of a cruciform attached to the end corner castings and a vehicle rear end guide and transport attachment. HEL testing of the HIK confirmed the findings of the stress analysis. The efficacy of this concept is being demonstrated today.

Test Results:

Field tests performed by HEL have demonstrated that it is possible to upload and down-load a standard ANSI ISO commercial container loaded with ammunition on to and off of a PLS vehicle by use of a HIK attached to the end of the container without damaging the container, its contents, components of the HIK or the PLS vehicle. The design specification called for a time to attach/detach the HIK to/from an ANSI ISO container not to exceed 15 minutes. with a desired time of 10 minutes. Based on 24 field trials with less than a day's training of test participants, the mean time required to perform these functions was only 4.7 minutes, or less than 1/3 of the specified required time.

Options for Tactical Employment of the HIK

Based on the results of tests performed with the initial prototype model of the HIK, there are three major options for the

final employment of the HIK as described below. These may change, depending on the final design of the HIK:

- a. OPTION 1- The cruciform and the PLS vehicle rear mount HIK components will be maintained on the vehicle at all times:

Advantages:

1. No prior decision relative to type of mission to be performed is necessary. With minimum time delay (time required to move the cruciform from its on-vehicle stowage position and place it on the hook of the Multi-lift mechanism (or vice versa)), the PLS vehicle would be capable of picking up either a standard PLS flatrack or an ANSI ISO container.

Disadvantages:

1. The load carrying capability of the vehicle would be reduced by approximately 2570 pounds with the Phase I design HIK unit plus the weight of the crane. Note: The Phase II design is expected to result in a significant reduction in the weight of the HIK.
2. An on-board crane would be required to lift the cruciform from its stowage position to the "ready" position. This may necessitate a modification.
3. The HIK ancillary components mounted on the rear portion of the vehicle would have to be designed with a fold-away capability in order to provide proper clearance so that the standard flatrack could be picked up. The initial prototype has this capability. This somewhat complex design requires a minimum of 3 sections on each side of the vehicle with connecting pins which will results in loss of rigidity. This design is also prone to mud buildup which would restrict the free movement of the folding parts. The folding parts represent a potential safety hazard to personnel removing the various pins and folding the heavy rails into a

stowage position.

Note: One of the objectives of the Phase II Design of the HIK is to reduce the overall weight of the components mounted on the rear of the PLS vehicle, and the complexity of design by shortening the container guide rails and thus eliminating the necessity to provide a folding capability.

- b. OPTION 2 - Only the rear components of the HIK will be mounted on the PLS vehicle. The cruciform will be stored by the unit.

Advantages:

1. A weight savings of 1100 pounds would be achieved by the selection of this option over option 1. This would result in a greater load carrying capacity for the vehicle.
2. When stored on the ground in the upright position (with the use of a single pedestal prop), the cruciform can be picked up directly by the hook of the lifting mechanism on the PLS thus avoiding the necessity for an on-board crane.

Disadvantages:

1. Same as disadvantage 4 of Option 1.

c. OPTION 3 - Under option 3, the HIK rear vehicle components and the standard PLS rear vehicle roller components would be interchangeable. The standard rear rollers used on the PLS vehicle and/or the cruciform and rear vehicle HIK components will be stored in the unit vehicle motor pool. If the PLS vehicle is planned to be used to move flatracks, the standard roller components will be placed on the vehicle prior to the start of a mission. If the vehicle is to be used to transport ISO containers, the HIK components will be mounted on the vehicle. Under the Phase II design, the rear rollers and the HIK rear components of two of the prototypes will be designed so that both can be rapidly clamped into place hydraulically or by air service on the truck.

Advantages:

1. This option would provide a greater vehicle load carrying capacity than either Option 1 or Option 2 (Option 1 - 1410 lb; Option 2 - 370 lbs, based on the Phase I prototype design)
2. The rear components of the HIK could be designed as one piece providing significantly greater rigidity.
3. The sliding surface for the ISO could be increased to 10 inches in width requiring less precision when loading the ISO container.
4. The simple, rigid non-folding design would eliminate many finger traps and therefore be more "soldier friendly". Elimination of the folding requirement would also eliminate the possibility of a problem of mud binding in the folding joints, and
5. This interchangeable feature would eliminate the potential problem of fouling the flatrack on the HIK rear vehicle components.

C. OPEN ALL CONTAINER

The "Open All" container is an experimental container manufactured by the Drehtainer Technik Corporation, Hamburg, Germany. US production rights are with the Blair International Corporation, Durham, England and Muskegon Heights, MI.

The Open All container (see attached brochure) is available in all ISO standard modules. A simple lever mechanism facilitates the easy operation of the cover assembly and corner post assembly. Open/closure time is 30 seconds. All-around access allows much improved lashing. Loading and unloading by conventional fork lifts can be carried out without the use of ramps, loading docks, or use of special forklifts such as the variable reach fork lift, etc. Because of the "Open All" capability, this container is ideally suited for hard mounted supply cabinets in an ASL/PLL maintenance van configuration or for any other type of commodity in which complete access from both sides of the container is desired. The cover assembly can be totally removed by crane if required. The unit provides the normal security level of a standard ISO container. Other

designs of this container are on-going by the manufacturer that may offer ~~additional~~ advantages over the standard ANSI/ISO end opening container.

Anyone desiring additional information on the above items can contact Mr John Salser as indicated below. Upon completion of the testing of the Phase II design IMCON/HIK, the US Army Human Engineering Laboratory will issue a final report of test results. Personnel/ organizations desiring a copy of this report should contact:

Director, US Army Laboratory Command,
Human Engineering Laboratory
ATTN: SLCHE-CS (Mr. John J. Salser)
Aberdeen Proving Ground, MD. 21005-5001

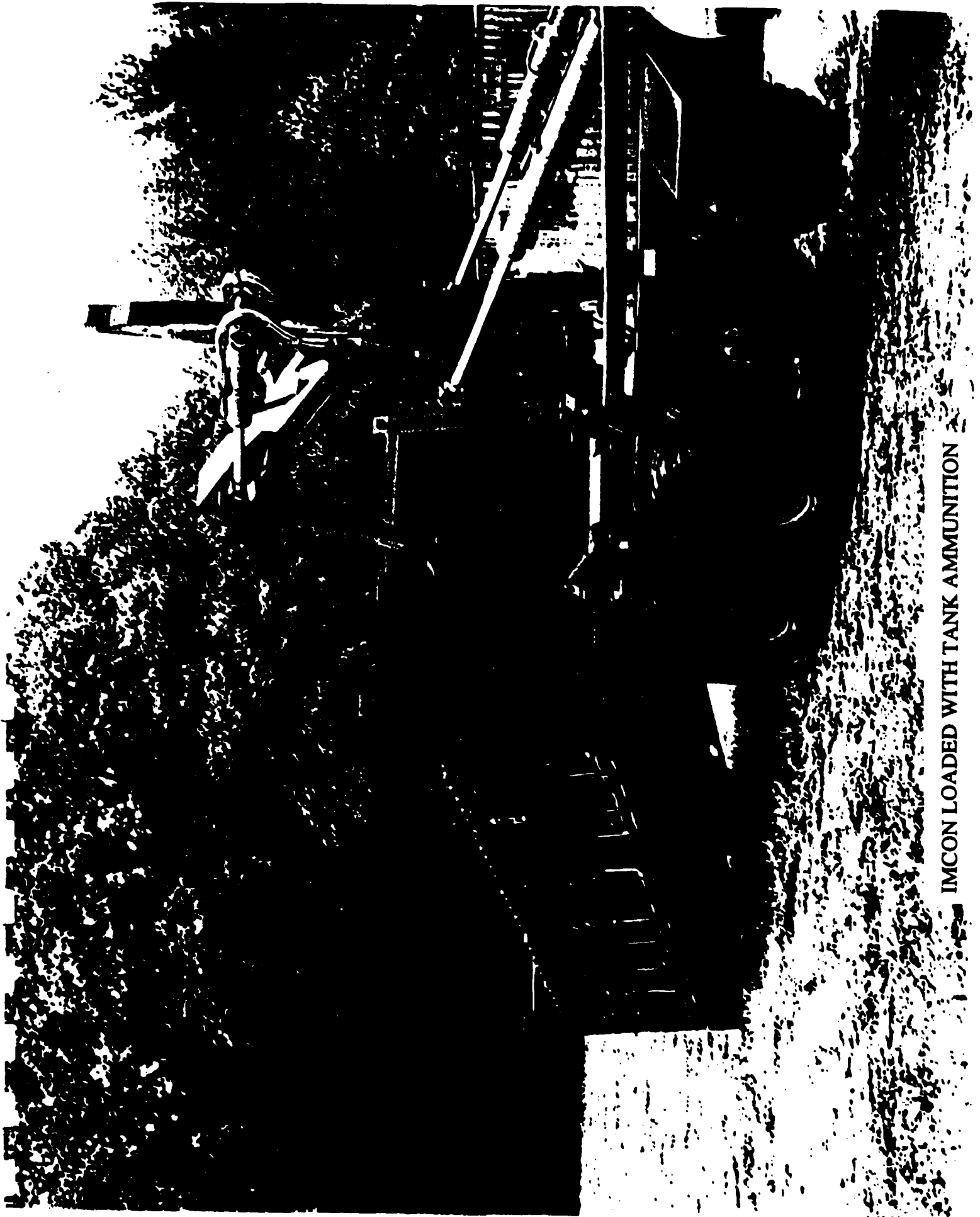
or telephone Mr John Salser AV 298-5861: Commercial (301) 278-5861.



IMCON WITH ONE END FOLDED

IMCON BEING LOADED





IMCON LOADED WITH TANK AMMUNITION



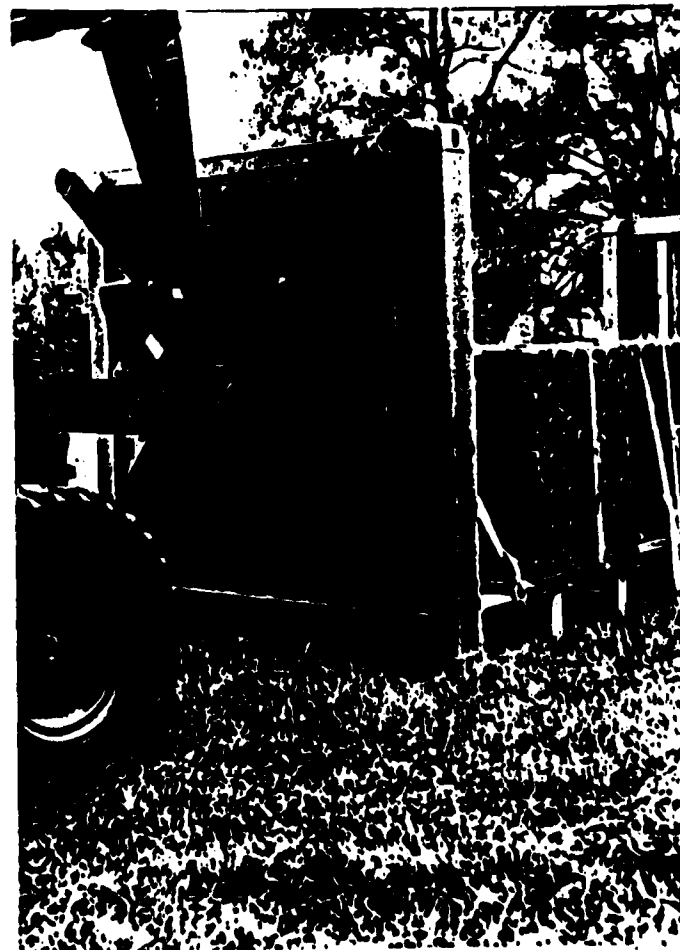
CRUCIFORM IN GROUNDED POSITION



CRUCIFORM IN READY POSITION

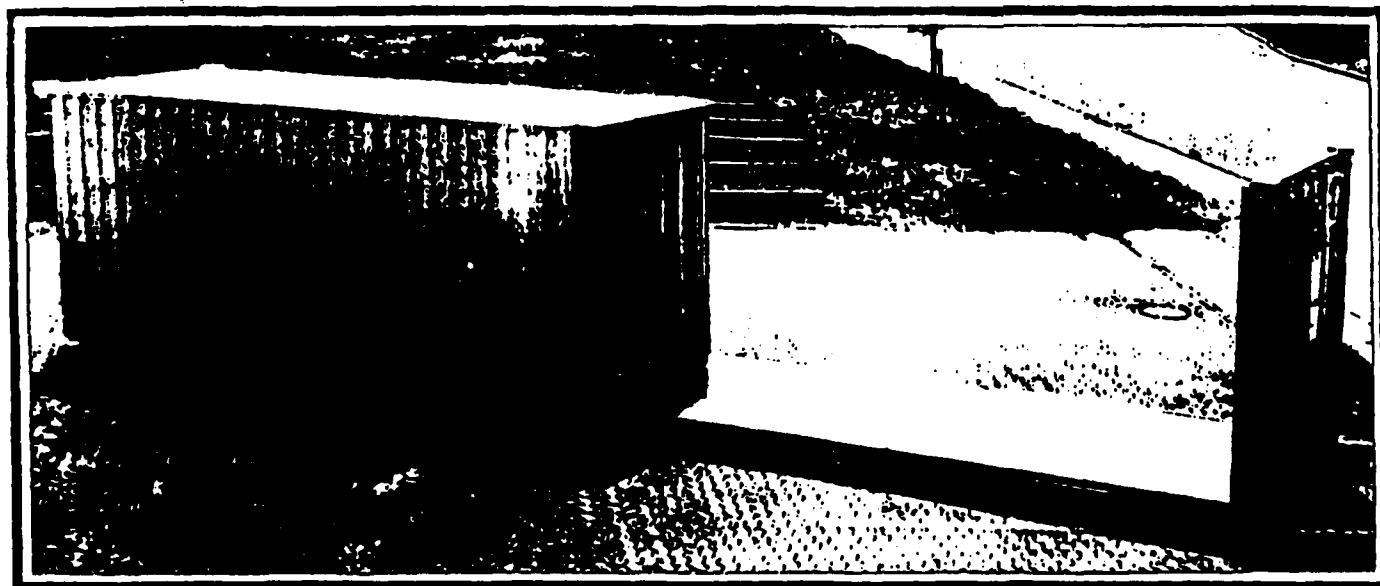


HOOKLIFT INTERFACE PICKING UP ISO CONTAINER



HOOKLIFT INTERFACE KIT PICKING UP COMMERCIAL FLATRACK

OPEN ALL CONTAINER



Die Zukunft
rationeller Transporte hat begonnen

The future
of efficient transport has just begun

DREHTAINER  **TECHNIK**
Gesellschaft für Containersonderbau m. b. H. Hamburg