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system: Support Conference

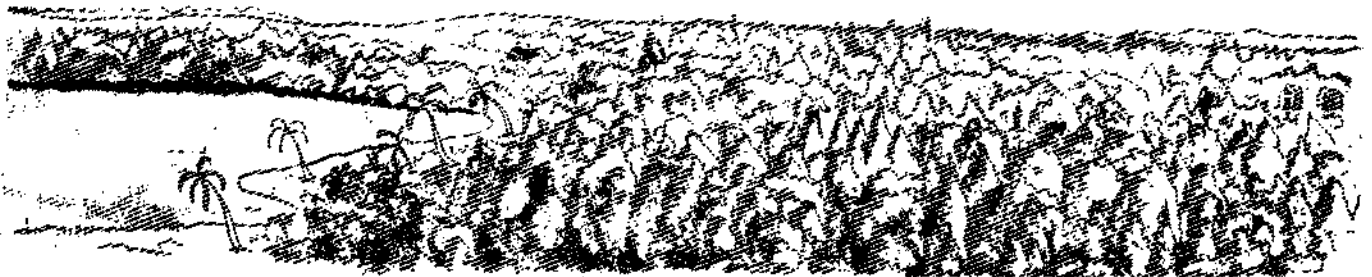
'ES

A/A45Y-1 INTERNAL DEFOLIANT DISPENSER SYSTEM



SUPPORT CONFERENCE

25 AND 26 AUGUST 1966




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SUMMARY

1. The first Logistics Support Meeting for the A/Al45Y-1 Defoliant Dispenser was held at Hayes International Corp, Birmingham, Ala., on 24 and 25 Aug 1966.
2. The purpose of this meeting was to review program status, evaluate "Major Problem Areas", and initiate and assign action as required to assure the timely and successful completion of program requirements for enhancement of logistic support.
3. Areas within this program requiring action, further refinement and over-all close surveillance are documented in section III and IV of these minutes.
4. A follow-up meeting was determined essential in order to review progress made on action items, reassess support posture, and include representatives of agencies absent from this meeting.
5. The minutes of this meeting will be used as a basis of agenda for the next meeting. Each action agency should complete their assigned action in accordance with the scheduled dates, if possible, and be prepared to present status of action taken at the next scheduled meeting. Additional items may be added to the agenda for review and discussion at this time. However, to assure adequate time for evaluation and staffing, it is necessary that proposed agenda items be submitted to WRAMA (WRNQG) at least one week before the scheduled meeting date.
6. The next meeting is tentatively scheduled at Hayes International Corp., Birmingham, Ala., 11-13 Oct 1966. Confirmation of date and location will be provided by separate correspondence.
7. It is desired to take this opportunity to compliment each representative for his active participation and support. Especially appreciated are the efforts of Hayes International in hosting this meeting and the fine assistance rendered. The productive results obtained and anticipated as a result of this meeting will be beneficial to all agencies concerned, and should improve SEA support and operational capability.


ROBERT N. SCHEIDECKER
Major, USAF
Chief, Operations Branch
Directorate, Materiel Management

SECTION I

INTRODUCTION/RANCH HAND REPORT

1. Mr. W. B. O'Neal welcomed the conferees and opened the meeting. Introduction was given by Lt William Crea, Air Force Project Engineer. Status of the program was reviewed by Mr. Don Smallwood, Hayes Project Engineer (Reference Section II).

2. Captain Peshkin gave the report from Ranch Hand. They are growing very rapidly and a considerable number of problems have developed. As early as January or February, it was realized that additional aircraft were going to be programmed for SEA. Storage, maintenance, and training requirements were anticipated; however, no staff support was furnished after discussions with operations and maintenance personnel at Tan Son NHut. Finally, the aircraft began to arrive. Storage problems still exist as does spare parts support. Flying continues at approximately 25 sorties per aircraft per month. This is the MACV planning figure for programming chemicals. Ranch Hand would like to be able to operate from an additional operating location in the II Corps area to increase sortie effectiveness. There are presently 9 aircraft in the country - 3 at Da Nang and 6 at Tan Son NHut. The operation continues successful because the equipment is basically good and the air frame is the best available. The defoliant system has the same characteristics, simplicity, and reliability. The main problems are as indicated below. Ranch Hand has been fortunate in their maintenance support resulting in almost - 100% aircraft availability. Many of Ranch Hand's problems could be helped by better staff support.

SECTION II
A/A45Y-1 SYSTEM STATUS

ITEM	CONTRACT	QUANTITY	DELIVERY DATE	REMARKS
1. A/A45Y-1 Prototype	08(635)3609	2	Sept. 1963	Used in C-130 Test at Eglin Systems started at Hayes
2. A/A45Y-1 Production	08(635)3609	20	Aug. 1964	Six Operational Systems in Viet Nam. One destroyed in C-123 crash in Viet Nam. Seven delivered to Fairchild-Hiller Corp. for installation in C-123. One awaiting dump valve and will be shipped to Fairchild-Hiller. One remaining at Hayes for Wing Boom Test. One unassigned. Three cannibalized for spare parts by Eglin.
3. Dump Valve Kit	08(635)4894	17	Aug. 1965	All operational A/A45Y-1 systems equipped with dump valve.
4. Wing Boom Prototype	08(635)5710	1	Sept. 1966	Fabrication complete by 23 Aug. 1966.
5. Wing Boom Production	08(635)5710	20	March 1967 (Anticipated)	Delivery to be 150 days after approval of Prototype.
6. Engine Mod Mark III	08(635)4894	15	Jan. 1967 (Anticipated)	Twelve to be installed on new purchase of twelve A/A45Y-1 by WRAMA and the remaining three for spares.

TECHNICAL MANUAL STATUS

ITEM	STATUS	REMARKS
T. O. 11C15-3-4-2 FIELD, DEPOT OVER- HAUL WITH IPB - INTERNAL DEFOLIANT DISPENSER MODEL A/A45Y-1	Awaiting validation of System Manual.	In process review performed at Hayes by WRAMA, 20 and 21 July 1966
T. O. 11C15-3-4-2 FIELD, DEPOT OVER- HAUL WITH IPB - INTERNAL DEFOLIANT DISPENSER MODEL A/A45Y-1	In process.	Manual change to add Mark III engine pump controls
T. C. T. O. (Proposed)	No contractual requirements. Never was negotiated as per supplemental agree- ment number 2.	Contractor recommends pre- paration of T. C. T. O. for instal- lation of system in C-123 aircraft
T. O. 11C15-3-4-2 FIELD, DEPOT OVER- HAUL WITH IPB - INTERNAL DEFOLIANT DISPENSER MODEL A/A45Y-1	In process.	Change to cover wing boom program
T. C. T. O.	In process.	To cover installation of wing boom A/A45Y-1 on C-123 for aircraft T. O. 's
T. C. T. O.	Awaiting receipt of 118A and contract coverage	To cover installation of Mark III engine controls in field to retrofit existing systems

SECTION III

ACTION ITEMS

Item Number 9-66-1 - Ground Support Equipment:

a. Problem Presented:

(1) There are four 1,000 gallon Transfer Tanks (Hour Glass) and one 2,500 gallon Fuel Servicing Unit, Type F-7 currently located at Tan Son NHut with a 5,000 gallon R-2 Storage Tank in the process of installation. There are also three 1,000 gallon Transfer Tanks (Hour Glass) located at Da Nang. The unsystemized arrangement and limited capacity of this equipment does not give sufficient capability to; (1) Fill aircraft that are located at Tan Son NHut, (2) Turn-around aircraft as rapidly as necessary, and (3) Operate with the three different type chemical agents now being used. The present system is characterized by the following; (a) Insufficient tank storage capacity. (b) Insufficient transfer capacity which limits turn-around time. (c) Inability to systematically select proper chemical appropriate to target requirements. (d) Inability to evacuate unused agent from tanks in aircraft.

(2) The present system is progressively deteriorating due to use of 1952 vintage Hour Glass transfer equipment. This system cannot be supported and therefore will be eliminated from inventory at failure or when sooner replaced. Glaring deficiencies of this system are as noted; (a) Non-standard system, (b) Limited or no spare parts available, (c) Fire hose used to connect transfer tanks deteriorates in from 4 to 10 days, (d) Contamination of flow system (mainly due to rubber particles from fire hose lining plus sand and other foreign particles introduced by siphoning probes) because of lack of well thought out systems approach, (e) Inadequate pumping capability (Spider pump used for siphoning agent from 55 gallon drums is old and weak).

b. Progress to Date:

(1) An R-2 Storage Tank (5,000 gallon), salvaged from an R-2 Servicing Unit, is to be installed by Ranch Hand to provide additional transfer and storage capability and is awaiting plumbing installation by Base Civil Engineer. (Compatibility of this tank with existing chemical agents is doubtful).

(2) One F-7 Servicing Unit is now in use with five more on order. (So far this equipment is functionally satisfactory, but will need teflon hosing and seals for compatibility with existing agents).

(3) Use of ARMY Bladder Tanks for storage is being investigated by 377 Combat Support Group (Base Fuels), Tan Son NHut. (Question of agent compatibility still remains).

(4) The A/A45Y-1 System has a self-filling capability, but was found to be too slow and therefore incompatible with quick turn-around requirement.

(5) Use of B-1 and B-1A Nitric Acid Servicing Units (2,000 gallon capacity) were proposed by Hayes as they were believed to be in excess storage. Investigation by WRAMA Vehicle Manager revealed these units to be unsatisfactory for their designed purpose and were dismantled and removed from inventory.

c. Action to be Taken and Action Agency:

(1) Provide adequate bulk storage and pumping facilities for three different chemical agents at two, possibly three different bases. A requirement exists for the simultaneous filling of as many as nine aircraft at Tan Son NHut and three at Da Nang with a possible total of five at Da Nang and three at another operating location (does not include Lucky Tiger). Action agency to be determined.

(2) Provide additional F-7 Servicing Units to Ranch Hand - WRAMA (WRNR).

(3) Provide teflon hoses and gaskets for F-7 Servicing Units - WRAMA (WRNR).

d. Forecast for Completion:

(1) Fixed facility - to be determined.

(2) Additional F-7 Servicing Units - accomplished.

(3) Teflon hoses and gaskets - to be determined.

Item Number 9-66-2 - TCTO for Installation of A/A45Y-1 System in UC-123B Aircraft, Class V Mod 1776:

a. Problem Presented:

Eglin AFB Contract AF 08(635)-4894, dated 20 Oct 1965, provided a line item for data in accordance with DD Form 1423 covering preparation of TCTO for installation of A/A45Y-1 System in UC-123B Aircraft (AFPI 71-531-(18)). Repeated attempts by Contractor, AFATL, and A/A45Y-1 IM have been unsuccessful in obtaining from C-123 SSM appropriate documentation (AFLC Form 118A) identifying type of TCTO and aircraft handbook revisions desired. Ranch Hand representatives advised that considerable difficulty is being experienced by Flight crews and Aircraft Maintenance personnel due to lack of appropriate -1 Flight Manual Supplement and Aircraft Maintenance Handbook data reflecting this systems installation. This creates an obvious problem with operation and maintenance as well as a serious problem with indoctrination of new crews due to high percentage and frequency of personnel rotation.

b. Progress to Date:

None

c. Action to be Taken and Action Agency:

(1) WRNB initiate documentation for preparation of TCTO covering installation of basic A/A45Y-1 system using Hayes tail boom and de-modification of aircraft (removal of tank and cradle assy) back to cargo configuration.

(2) WRNB initiate documentation for preparation of TCTO covering installation of Ranch Hand wing and tail boom and marriage with basic Hayes A/A45Y-1 System.

(3) WRNB establish requirement for preparation of Aircraft Maintenance handbooks concurrent with requirement for respective TCTO's.

(4) WRNB initiate immediate action to provide Ranch Hand with required supplement to T. O. 1C-123-1 Flight Manual reflecting Defoliant Spray configuration.

d. Forecast for Completion:

Delinquent - In view of non-participation in this meeting by C-123 SSM personnel, a report of intended action and progress made is required at next meeting tentatively planned for 11-13 Oct 1966.

Item Number 9-66-3 - Retrofit Installation of MARK III Engine:

a. Problem Presented:

AFATL (ATCB) has provided for complete modification kits to retrofit present operational Ranch Hand Dispensers, utilizing MARK I and MARK II engines, to latest ARMY standardized MARK III engine configuration. The A/A45Y-1 system has not been made full standard by AFSC; therefore, responsibility rests with AFSC to provide retrofit kits and required TCTO for Field installation.

b. Progress to date:

Required number of kits have been placed on Contract AF 08-(635)-4894 with Hayes International.

c. Action to be Taken and Action Agency:

(1) AFATL (ATCB) submit request to WRAMA (WRNSTR) for AFPI 18 covering this modification and appropriate handbook revisions.

(2) WRNSTR provide AFPI 18 as required.

(3) Contractual provisions by AFATL for TCTO and handbook revisions.

d. Forecast for Completion:

(1) 25 Sep 66.

(2) Provide AFPI to AFATL within five days after receipt.

(3) To be determined - contingent on authority for re-programming funds within project 2525 and subsequent initiation of Purchase Request.

(2) Reference a(2) above. WRAMA (WRNQ) will review this problem with appropriate personnel at WRAMA and Eglin AFB to determine specific cause and remedial action.

(3) Reference a(3) above. WRAMA (WRNQ) will review end item spares requirements to determine proper course of action necessary to provide adequate spare assemblies to support Field operations where battle damage or loss might be incurred requiring complete assembly replacement. Coordination with the using activity will be required.

d. Forecast for Completion:

(1) Reference c(1) above.

(a) Revision of AFLC Form 27 - 15 Sep 1966.

(b) Spare parts recomputation - 14 Oct 1966.

(c) Release of spare parts orders to contractor/vendors - to be determined based on method to be employed.

(2) Reference c(2) above. 15 Sep 1966.

(3) Reference c(3) above. 30 Sep 1966.

Item Number 9-66-4 - Spares:

a. Problem Presented:

(1) Requirement for M&O spare parts for support of A/A45Y-1 System is expected to reach critical proportions in the very near future due to, (1) increase in number of spray aircraft, (2) late provisioning action in relation to first operational units, and (3) system contamination by grit and rubber particles resulting from poor system arrangement and servicing equipment that is incompatible with presently used chemical agents. Also, WRAMA has received a flood of requisitions for spare parts exceeding initially provisioned quantities, which did not consider system contamination problem. Lack of spare parts support is a limiting factor in Ranch Hand operations.

(2) Spare parts orders are not being received by Hayes from Eglin AFB, procurement agency (APGC), in a timely manner.

(3) No provisions have been made to procure and stock spare complete assemblies, such as, Tank and Cradle Assembly, Engine and Pump Assembly, and Control Console Assembly.

b. Progress to Date:

(1) Reference a(1) above. A quantity of stop-gap spare parts were procured by AFATL on Contract AF O8(635)-4894. However, these have proven inadequate to sustain desired degree of Ranch Hand operation pending delivery of spare parts as a result of formal provisioning by WRAMA. Some support has been furnished by Hayes International through their engineering representative previously stationed with Ranch Hand. Further, WRAMA and DCASO at Hayes are working together with the contractor in an attempt to expedite vendor delivery of specific spare parts.

(2) Reference a(2) above. A previous review of this problem with Eglin AFB, procurement activity, was supposed to have alleviated this condition or at least improved flow of documentation from Eglin to Hayes. Further investigation is in order.

(3) Reference a(3) above. No progress to date.

c. Action to be Taken and Action Agency:

(1) Reference a(1) above. The programming check list (AFLC Form 27) will be revised to reflect increase in number of systems and bases to be supported, and spare parts requirement will be recomputed for appropriate procurement action.

Item Number 9-66-5 - Retrofit Installation of Optimized (Redesigned) Wing Boom on UC-123B Aircraft:

a. Problem Presented:

No authorization currently exists for installation of the Optimized Wing Boom on Ranch Hand and Lucky Tiger Aircraft. The wing boom, now employed by aircraft in SEA, is a non-standard item, has components which are not compatible with agents now in use, and is not logistically supportable.

b. Progress to Date:

The Optimized Wing Boom is presently being developed by AFATL under Contract AF 08(635)5710 with Hayes International.

c. Action to be Taken:

The using command will establish appropriate requirement for installation of Optimized wing Boom.

d. Forecast for Completion:

23 Sep 1966.

Item Number 9-66-6 - Maintenance Data and Technical Order Verification:

a. Problem Presented:

Maintenance data has not been provided field activities due to delayed verification of technical order. This has created considerable difficulty regarding system maintenance and identification of spare parts requirements.

b. Progress to Date:

Hayes has completed technical order draft in MIL Spec format. Preliminary review of blue line draft has been accomplished by WRAMA at Hayes. Equipment is currently available at Hayes and ready for verification. However, it has a MARK I configured engine installed. The MARK III engine is still pending delivery from vendor's plant where it is being mated to the pump. It was agreed that the difference between the MARK I and MARK III engine was not sufficient to warrant further delay in verification of technical order. WRAMA agrees to accomplish verification on existing equipment with MARK I engine. Final draft is to reflect the MARK III configuration, which will be verified against engineering drawings.

c. Action to be Taken and Action Agency:

(1) Hayes will take immediate action to establish a date with WRAMA (WRNSTR) for verification meeting at Hayes. Time of meeting should be established to allow a minimum of 15 days for proper notification of participating activities. Ranch Hand representatives agreed there will be no requirement for participation by their activity in this verification. In lieu thereof WRAMA will explore the possibility of obtaining using command assistance from personnel of SAWC at Eglin AFB, who have a current and specific knowledge of Ranch Hand operation.

(2) Assistance of the Hayes - DCASO Quality Office will be required in the performance of this certification and will be primary point of contact relative to WRAMA/Hayes coordination of proposed date of certification meeting.

d. Forecast for Completion:

At the earliest possible date.

Item Number 9-66-7 - Maintenance Training of Ranch Hand Personnel

a. Problem Presented:

Newly assigned Ranch Hand Maintenance personnel upon arrival have little or no knowledge as to maintenance of the A/A45Y-1 dispenser due to there having no prior training on this system. The resulting problems are obvious.

b. Progress to Date:

None

c. Action to be Taken:

(1) Ranch Hand should establish and submit an official requirement in accordance with AF Regulation 50-9 to Air Training Command citing type and scope of training required. However, due to extreme urgency of existing requirement, it was requested by Ranch Hand that a contractor representative (Hayes) be provided in the interim, pending development of training capability by ATC. If interim contractor support for indoctrination of Ranch Hand Maintenance personnel is not provided, some other immediate means of training must be investigated.

(2) Discussion of contractor support indicated the most feasible and expeditious approach would be use of an existing Eglin AFB contract. However, this will require approval and funding by Hq USAF.

d. Forecast for Completion:

- (1) Ranch Hand submit requirement as soon as possible.
- (2) Final action on this requirement is yet to be determined.

SECTION IV

GENERAL COMMENTS/OBSERVATIONS

1. Forthcoming flight test of the prototype optimized wing boom was introduced as a discussion item by AFATL representative, Lt. Crea. Also recognized was the recent diversion of UC-123B aircraft to Dallas, Texas, pending deployment and voluntary participation and support of Hayes International for the purpose of spraying insecticide in encephalitis infected areas. It was noted that this disease is not restricted to the CONUS as was indicated by an Associated Press report reflecting loss of 384 lives so far this year out of 1616 cases throughout Japan. As a result of the tremendous effectiveness and publicity of the C-123 spray operation in Dallas, it is envisioned that additional requirements are forthcoming for use of A/A45Y-1 equipped aircraft for insecticide spraying on a world-wide basis, especially in SEA. Lt. Crea indicated he would communicate with TAC regarding intended use of insecticides with the defoliant system. If use is contemplated, TAC will be asked to establish a formal requirement for test of insecticides concurrent with test of defoliants during flight test of optimized wing boom at Eglin during September and October 1966.

2. The Ranch Hand mission is not consistent with the mission of the organization to which they are assigned. This leads to competition for resources, maintenance, and Staff Support. Proper emphasis or priority has not been placed on the defoliation mission thereby restricting the establishment of appropriate facilities for storage and transfer of more than one type chemical agent at Tan Son NHut and other operating locations. A definite advantage is envisioned by identification of the defoliation system as a weapons systems for the delivery and dissemination of chemical ordnance. Specifically, one advantage of a weapons systems identification would be to rationalize the storage and loading problem by having the chemicals handled by personnel who handle other Air Force ordnance. This could possibly result in taking the aircraft maintenance people out of the ordnance loading business. This was not introduced as a problem as appropriate agencies were not in attendance for proper discussion and action assignment. However, aforementioned weapons systems identification has considerable merit and should be evaluated by PACAF and Hq USAF to determine specific advantages to be derived for further discussion during next meeting.

3. A need was expressed by Ranch Hand for a pamphlet depicting defoliation spraying in SEA covering subjects such as:

- a. Chemical type, effect and hazards.
- b. Type crop and vegetation recognition.
- c. Psychological effect on populace.

Such a pamphlet would be invaluable for indoctrination of new crews upon arrival in SEA and would be used to supplement present verbal instructional methods which are accomplished mostly during normal spray missions. Hayes International expressed an interest in preparing such a manual as they have the knowledge and capability. However, discussion was deferred to next meeting at which time it is hoped that the office of primary responsibility may be able to offer some constructive advice relative to obtaining this pamphlet.

SECTION V
A/A45Y-1 DEFOLIATION CONFERENCE ATTENDEES

Maj Robert N. Scheidecker, WRAMA

Capt Richard Peshkin, Ranch Hand

Lt William J. Crea, Jr., ATCB

SMS Charles Lightner, Ranch Hand

Mr. Gene Smith, WRAMA

W.B. O'Neal, Hayes

C.F. Conklin, Hayes

J.L. Harrington, Hayes

John Bonta, Hayes

Don Smallwood, Hayes

J.E. Merk, Hayes

Stan Burkot, Hayes

Ronnie Dear, Hayes

M.J. McMahan, Hayes

SECTION VI
DISTRIBUTION

<u>Nr of Copies</u>	<u>Activity</u>	<u>Name</u>
2	MACV	J-3 Chemical Branch
2	7th AF (DOPR) (DMP) (DAFSC/AFSC Lia Off)	Major Haugaton Lt Col McCellan
2	315th ACW (DO)	Maj Richard Engian Lt Col Reddrick Major Kline
4	309th ACS (SASF)	Lt Col Ferguson Major Dresser Captain Peshkin S/MSGT C. B. Lightner
2	377th CSG (DCM) (D/M)	Col Harris Lt Col Carter
1	377th OMS	Major Sibley
1	14th ACW (Comdr)	Colonel Bradburn
3	PACAF (DM) (DMM) (DMMB)	Colonel Thomas B. Kennedy Lt Col C. N. Powell Maj W. A. McKinney
5	Hq USAF (AFRDDA) (AFRDQRA) (AFSMEAA) (AFXOP) (AFSMSDA)	Lt Col Carter Lt Col May Mr. Ed Dougherty Maj Vinson Maj White
3	TAC (DOFT-S) (DOO-S) (DORQ-FM)	Maj Marshall Capt Adams Maj Novikoff
1	ATC (ATTAT-B)	Lt Col Gibson
1	Dept of Aerospace Munitions (GS-WC)	TSgt Gailles
4	AFLC (MCMTA) (MCMTE) (MCO) (MCOOM)	Mr. Fields Mr. Whitacre Mr. Finch Mr. Clark
2	ASD (ASJB)	Mr. Brown Mr. Brothers
1	AFSC (SCSMM)	Mr. Pfieler
1	HQ RTD (RTTW)	Mr. Goodwin
1	4408th CCTS	Capt John R. Spey
1	SAWC-LC	Lt Col Huston
3	AFATL (ATCB)	Lt Crea
3	SAAMA (SANM) (SANNR) (SAOR)	Mr. Arthur Miller Mr. Jack Burton
12	WRAMA (WRNCO)	Maj R. N. Scheidecker

SECTION VII
A/A45Y-1 INTERNAL DEFOLIANT DISPENSER SYSTEM

SYSTEM DESCRIPTION

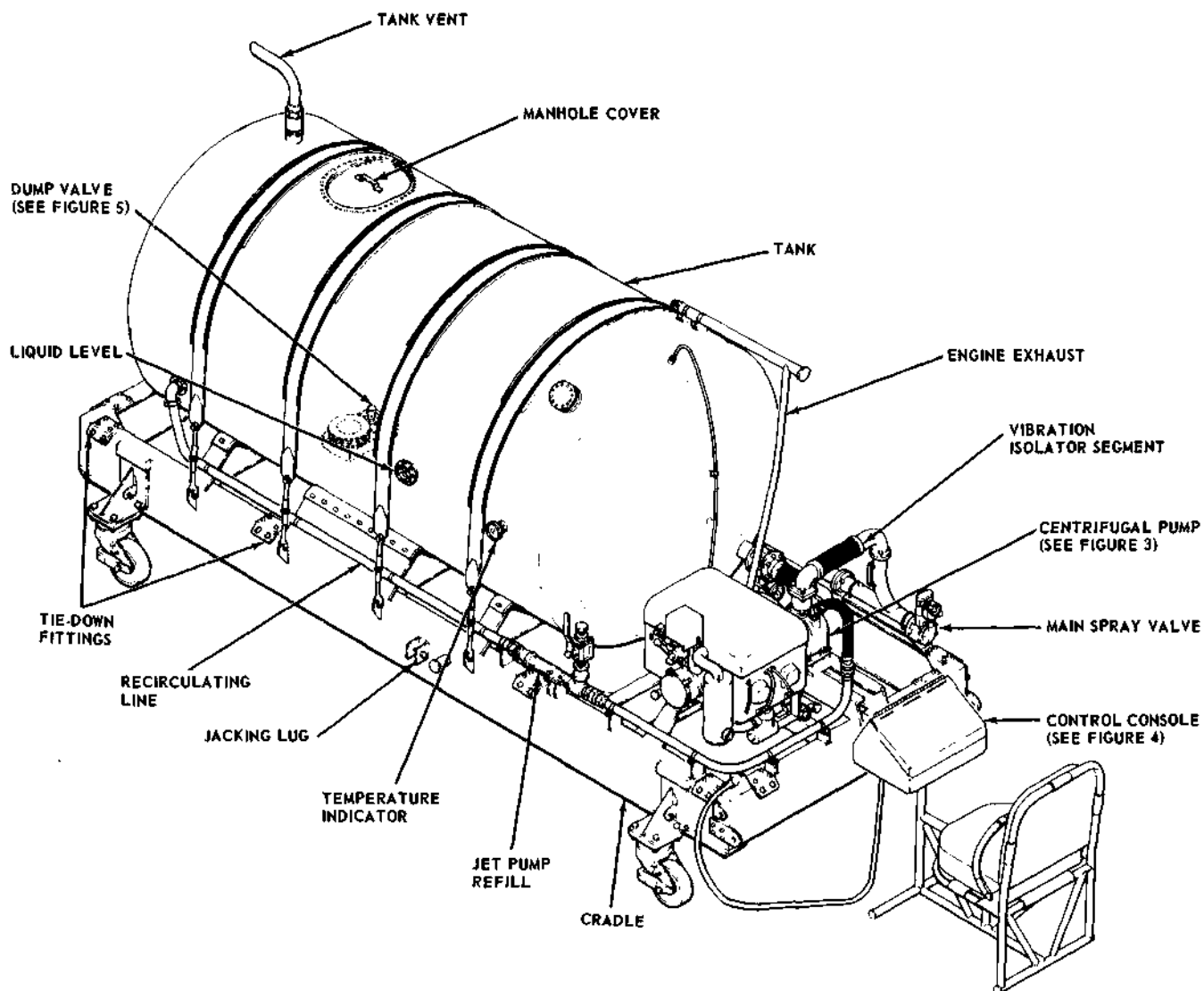
The A/A45Y-1 Internal Defoliant Dispenser, designed and manufactured by Hayes International Corporation, Birmingham, Alabama, is a complete airborne defoliant dispensing system. The dispenser is packaged to permit rapid installation into, and removal from, C-123 aircraft, with only minor modifications required to the affected aircraft. (See figures 1 and 2.)

The Internal Defoliant Dispenser, Part No. A/A45Y-1, provides for loading, transporting and dispensing of 1000 gallons of defoliant chemical, and in case of an emergency, dumping the full load overboard in less than 45 seconds. The tank and cradle assembly is mounted on detachable casters which are removed before anchoring in the aircraft. A control console is electrically connected into an electrical network which in turn is connected to the aircraft electrical system, certain controls and indicators in the flight compartment and the electrically operated units within the system. Pressure is applied to defoliant chemical, by an engine and pump assembly mounted on the same frame with the tank. The defoliant is transported to a nozzle assembly mounted in the slip-stream of the aircraft in such a manner that a strip 250 or 300 feet wide along the line of flight is effectively covered. The nozzle assembly is designed for the most effective atomizing of the defoliant and coverage of foliage to be destroyed. The dispensing operation and, in emergency, the dump valve operation can be controlled from either the control console near the tank and cradle assembly or from the pilot's position in the flight compartment.

CAPABILITIES AND LIMITATIONS

The internal defoliant dispenser is capable of containing 1000 gallons of defoliant which can be completely dumped overboard by remote control or manually in less than 45 seconds. The pump is capable of maintaining 60 ± 5 psi pressure during the normal 3- to 4-minute period of operational spraying. Refilling the tank assembly is accomplished with power and equipment contained within the defoliation dispensing system.

A/A45Y-1 INTERNAL DEFOLIANT DISPENSER



NOTE:
SEE FIGURE 6 FOR TAIL
BOOM AND FIGURE 7 FOR
WING BOOM. FIGURES 8
AND 9 SHOW A/A45Y-1
INSTALLED IN C-123 AIRCRAFT.

Figure 1. Major Components of Defoliant Dispenser

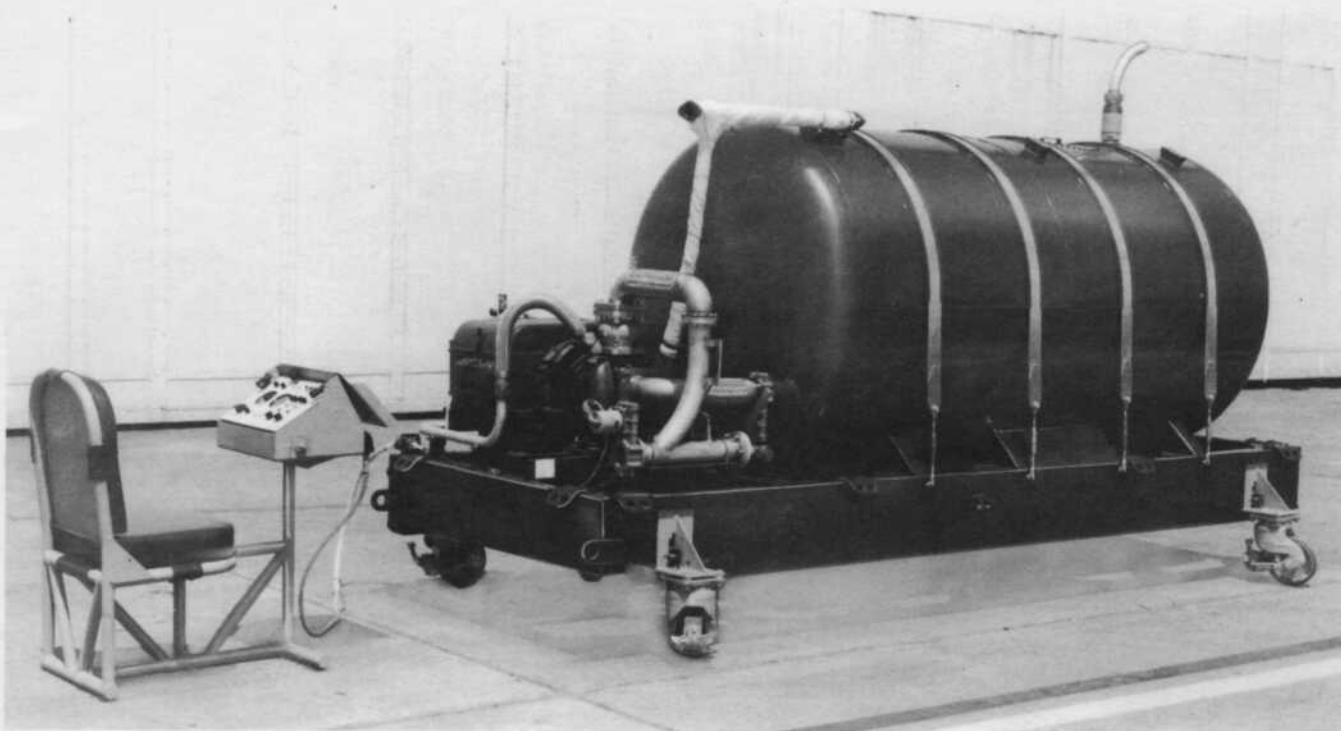


Figure 2. Defoliant Dispenser (right side)

LEADING PARTICULARS

Length	16 feet, 4 inches
Width	4 feet, 10 inches
Height (without casters)	6 feet, 5 inches
Weight	
Empty	1420 pounds
Full	12,420 pounds
Capacity	1000 gallons
Normal operating pressure	60 \pm 5 psi
Normal dispensing interval	3 to 4 minutes
Emergency dump duration	Less than 45 seconds
Electrical system	28 volts dc (supplied by host aircraft)
Dump valve operation	Electrical or manual
Refill time (approx)	20 minutes
Dump valve	Electrical, 10 inch
Spray valve	Electrical, 3 inch
Suction valve	Manual, 3 inch

TANK AND CRADLE ASSEMBLY

The tank and cradle assembly is the major unit of the entire system, having a 1000-gallon tank with baffles, manhole, tube connections, and stabilizing and tie-down brackets; an engine and pump assembly which consists of a four cylinder, horizontally opposed air-cooled, engine and pump directly coupled to the engine

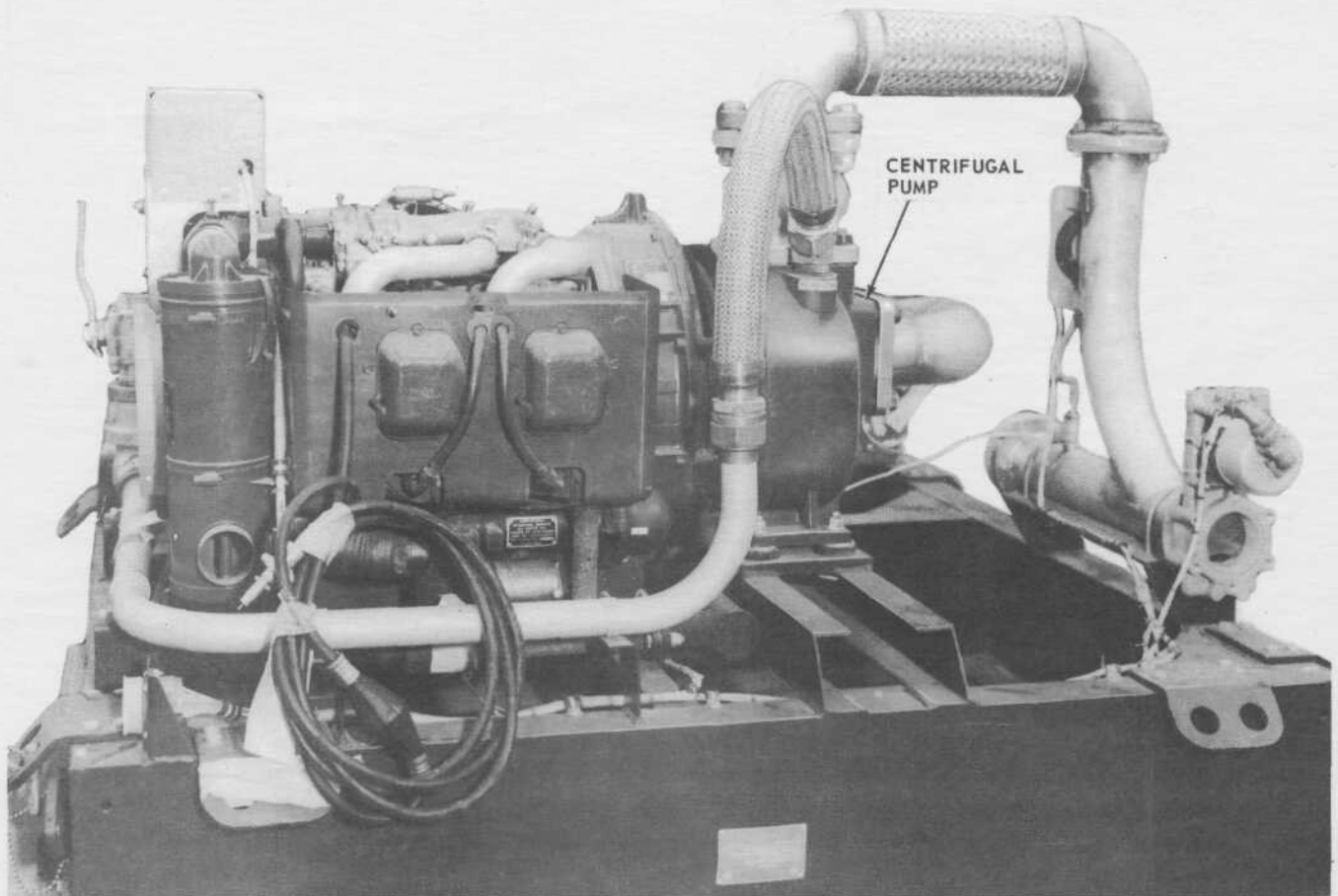


Figure 3. Centrifugal Pump

crankshaft; and a cradle which carries the tank, the engine and pump assembly, and is provided with four casters which are readily detachable. A temperature indicator and a liquid level gage are installed in the tank. The engine is slightly modified from its original configuration to achieve adaptability to the requirements of the dispenser system. The detachable casters are to provide limited mobility and are removed when the unit is tied down.

The defoliant used in the dispenser is stored in the tank and is fed through a suction line to the pump. The pump is driven by an air-cooled engine and forces the defoliant through a discharge line to a spray valve. A recirculation line is

provided so that when the spray valve is closed, the defoliant will recirculate back through the tank. When the spray valve is open, the defoliant is forced into the spray boom and atomized by spray nozzles. When the tank is empty, a float-operated switch, located in the tank, automatically stops the engines.

The centrifugal pump consists essentially of an impeller and a pump body, and is driven by the engine through a direct drive. The engine drives the pump and the speed of the engine controls the quantity of defoliant being dispensed. (See figure 3.)

The recirculation line incorporates a jet-pump (ejector) tank refilling system which utilizes the fluid left in the tank from prior operation to initially operate the jet pump.

CONTROL CONSOLE

The control console is the nerve center of the defoliation system. All functions are controlled from this position; all monitoring equipment is located in this position; and the electrical supply is channeled and protected at this position. Prefabricated electrical cables tie the control console to all related

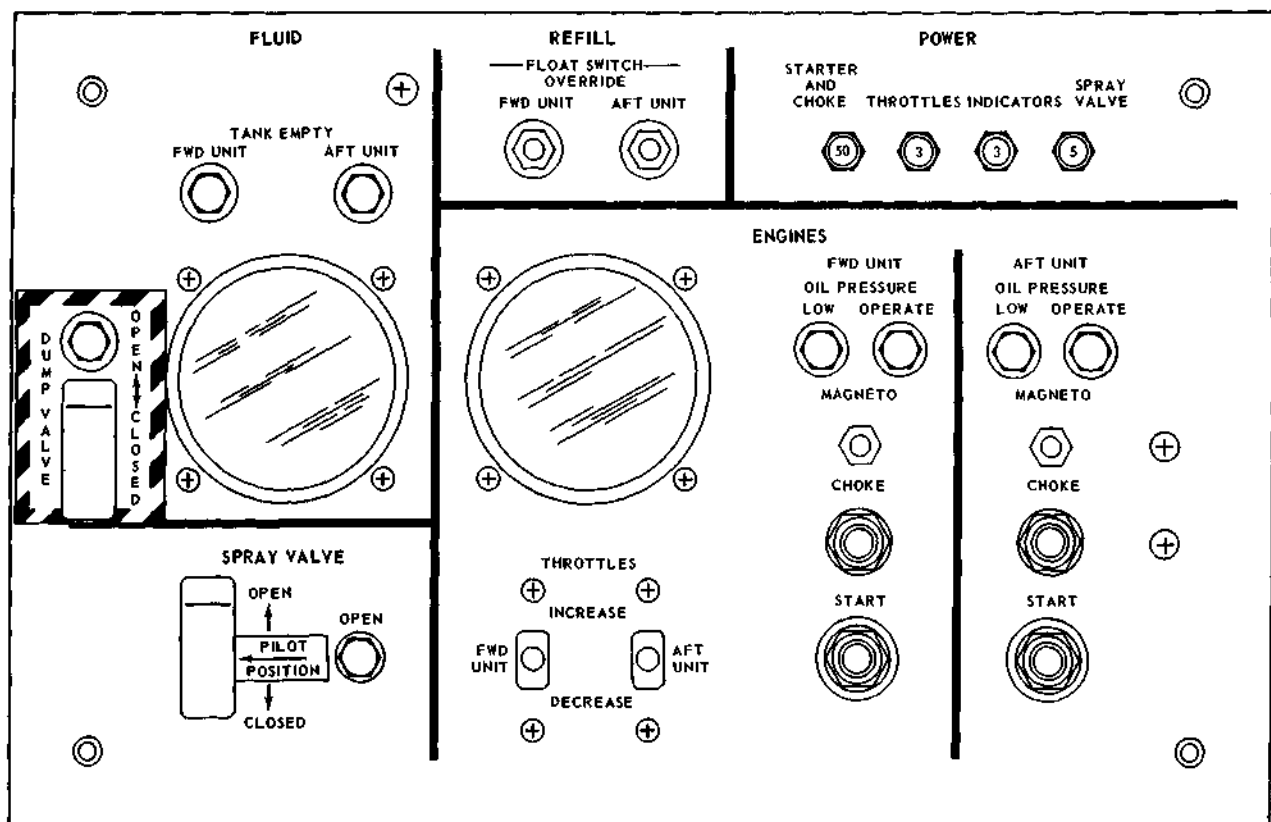


Figure 4. Control Console

parts of the system, including the controls on the pilot's instrument panel and the aircraft electrical supply system. Tandem or single installations are controlled and monitored from the control console without any changes or alterations being performed. In the event of electrical power failure of the aircraft electrical system, certain critical functions have an option of manual operation. (See figure 4.)

DUMP VALVE

The dump valve is a 10 inch gate valve having both electrical or manual activation. It is designed for horizontal (vertical flow) installation and liquid flow in only one direction. The bottom of the defoliant tank incorporates a vortex interrupter and adapter to which the dump valve is secured and is in perfect alignment with an opening and spring loaded door in the belly of the aircraft. A high speed motor coupled to an actuator provides 2 second operation of the dump valve in either direction and circuit manipulation to indicate open condition. (See figure 5.)

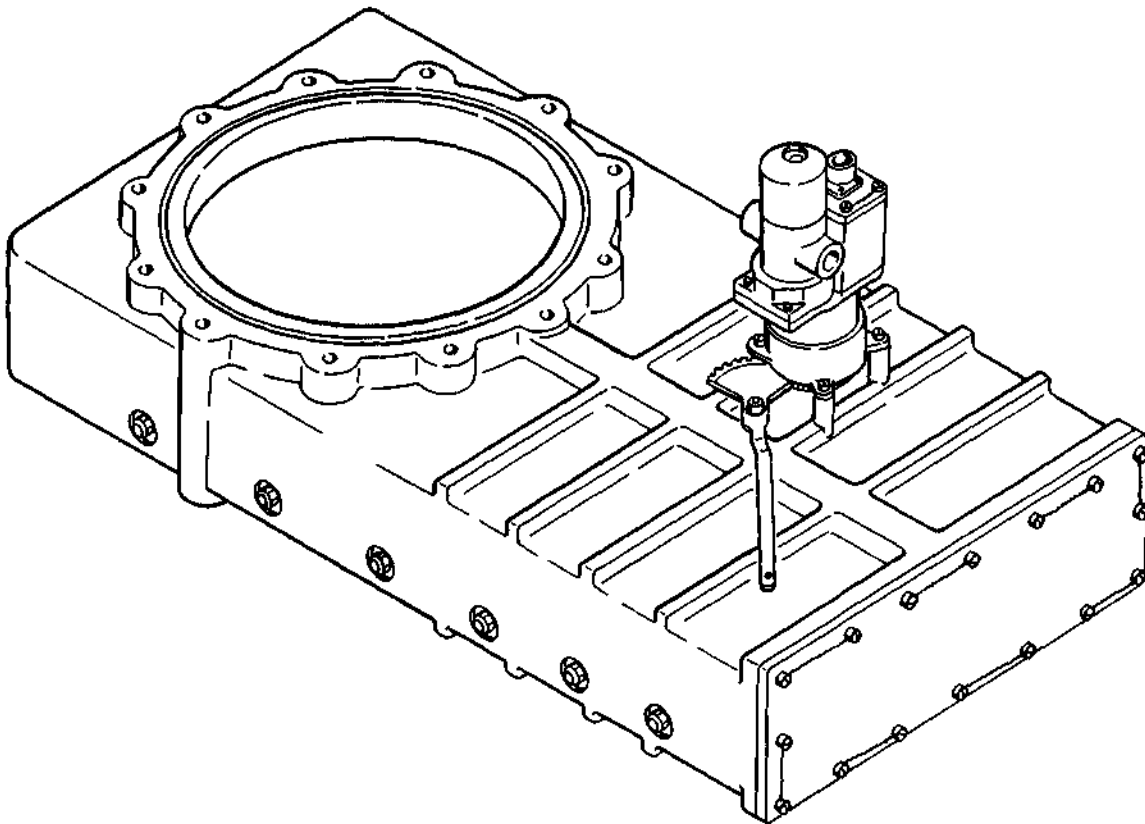


Figure 5. Dump Valve

SPRAY BOOM

The prime function of the spray boom is to discharge the defoliant under pressure at such a location and at such an angle that air flow, in the proximity of the discharge (spray) nozzle, contributes to the proper density of spray, the consistency of the defoliant blanket; and the lateral dimension of the effective strip. Two spray booms are available when the C-123 model aircraft is used and each boom satisfies a specific set of requirements.

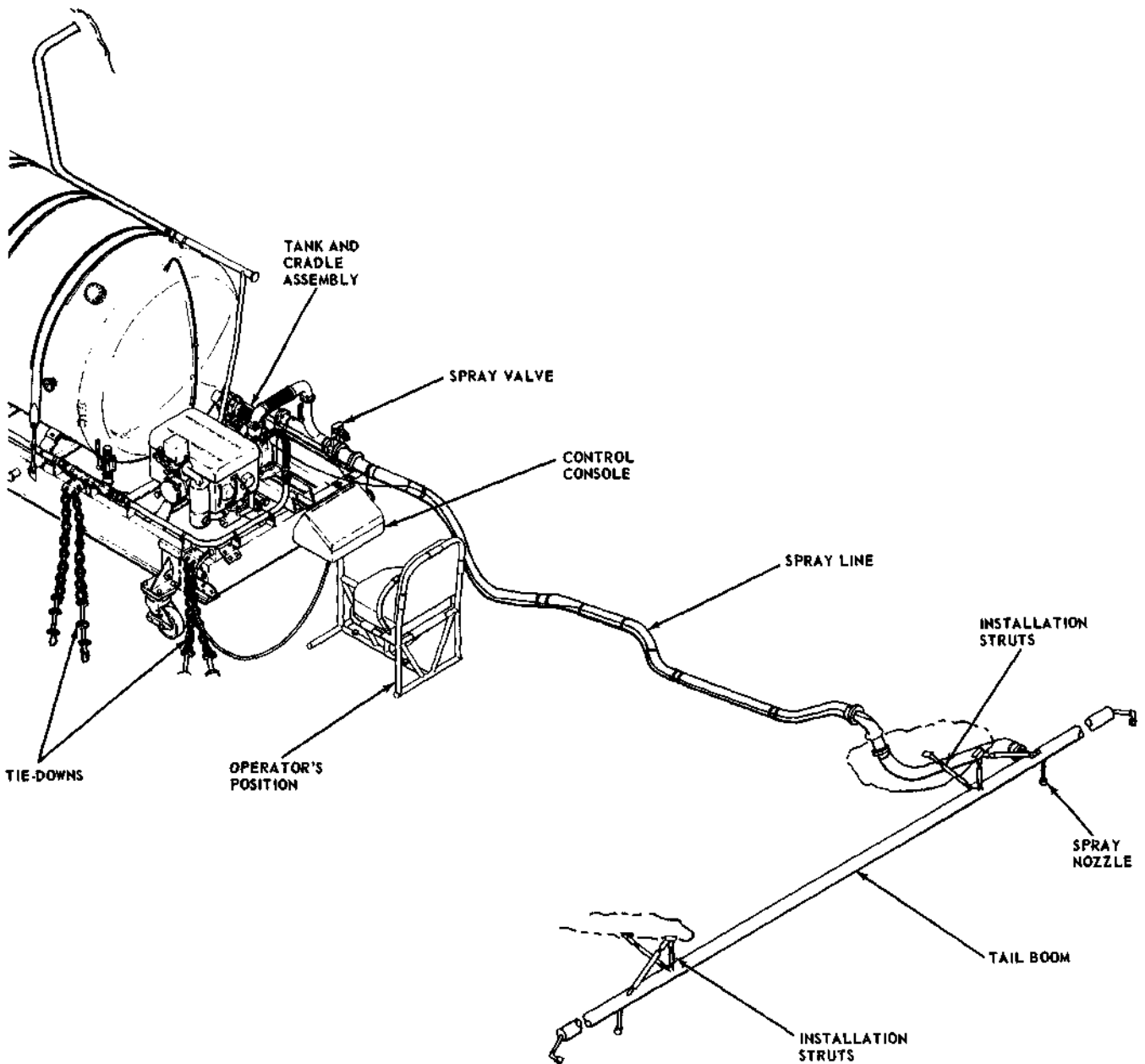
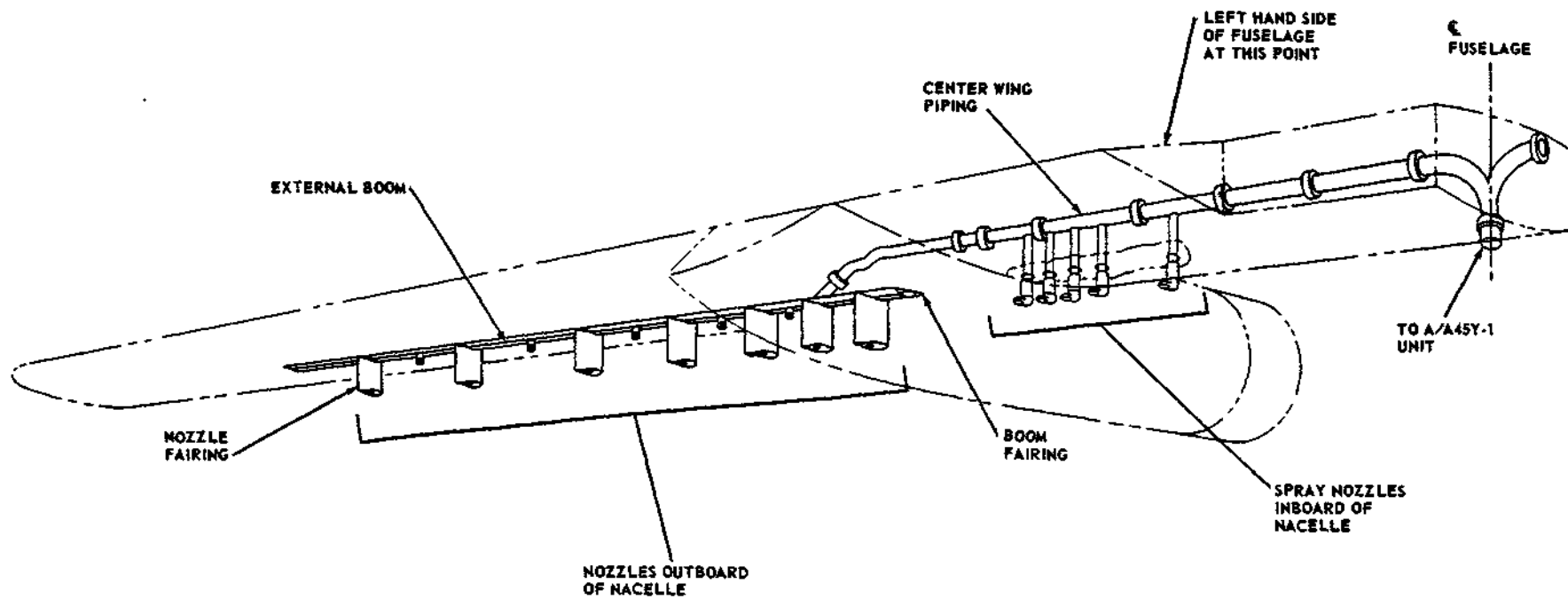


Figure 6. Tail Spray Boom and Associated Plumbing

Figure 7. Wing Spray Boom



The tail spray boom (figure 6) is mounted outside the aircraft, approximately midway of the aft cargo loading door. It is designed for simple and fast installation and removal and provides coverage of a 250 foot strip.

The wing spray boom (figure 7) is installed in the inside of the center wing and externally underneath the outboard wing. As compared to the tail boom, its installation and removal is more complex and is considered a more permanent installation. The wing boom provides coverage of a 300 foot strip and the effectiveness of the application is more uniform.

Installation and removal of either spray boom does not require special skills or special tools.

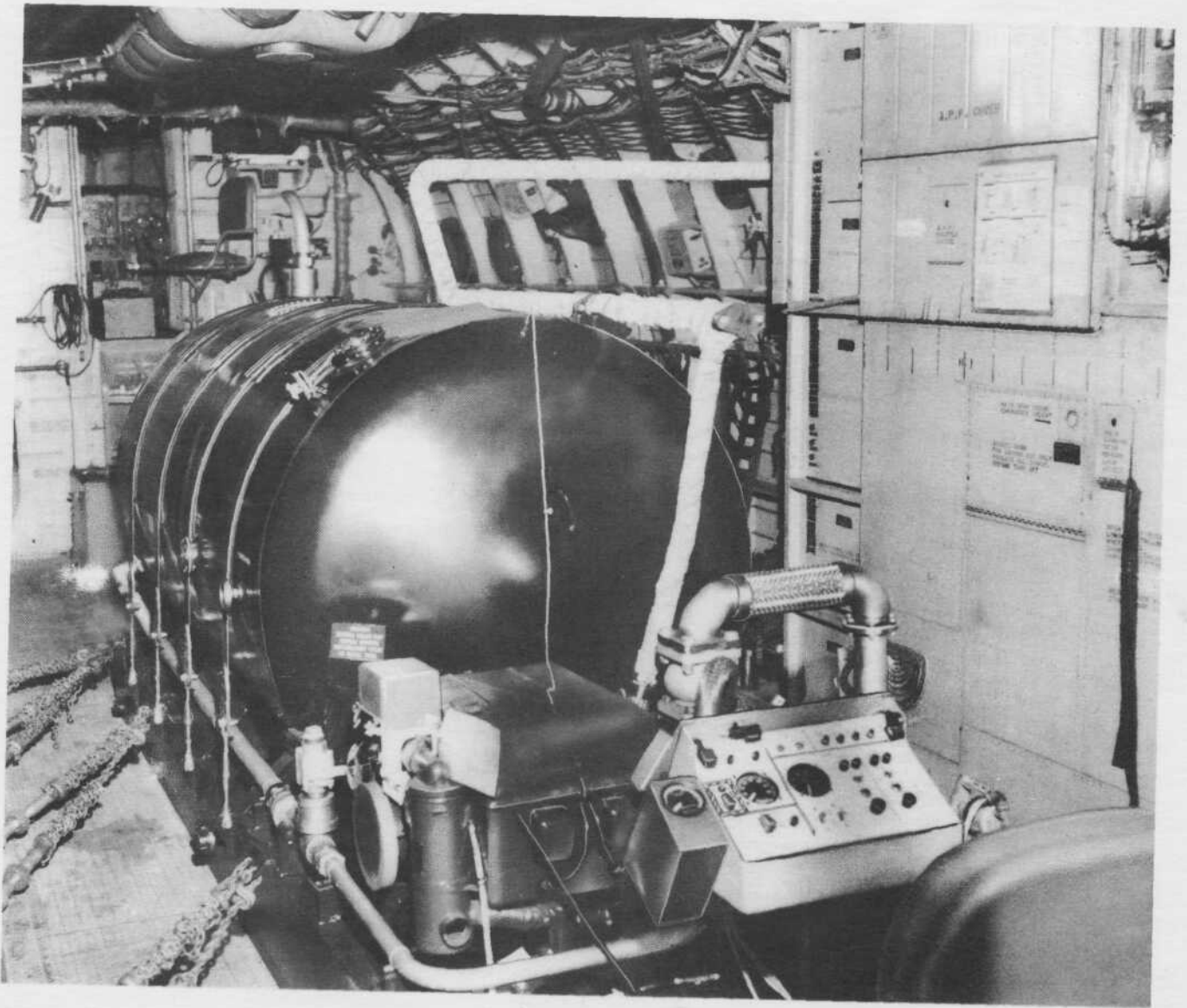


Figure 8. Installation in C-123 (left side)

AIRCRAFT INSTALLATION

The dispenser installation in C-123 aircraft consists of towing the tank and cradle assembly (unfilled) into the aircraft and securing it to the aircraft floor utilizing twenty 10,000-pound hook and chain assemblies and the cargo floor tie-down fittings (figures 8 and 9). All piping, hose assemblies and electrical cables are installed which tie the A/A45Y-1 dispenser into the aircraft (as modified) systems, and the control console is secured to the aircraft floor; thus, making the aircraft-dispenser combination ready for servicing and operation.

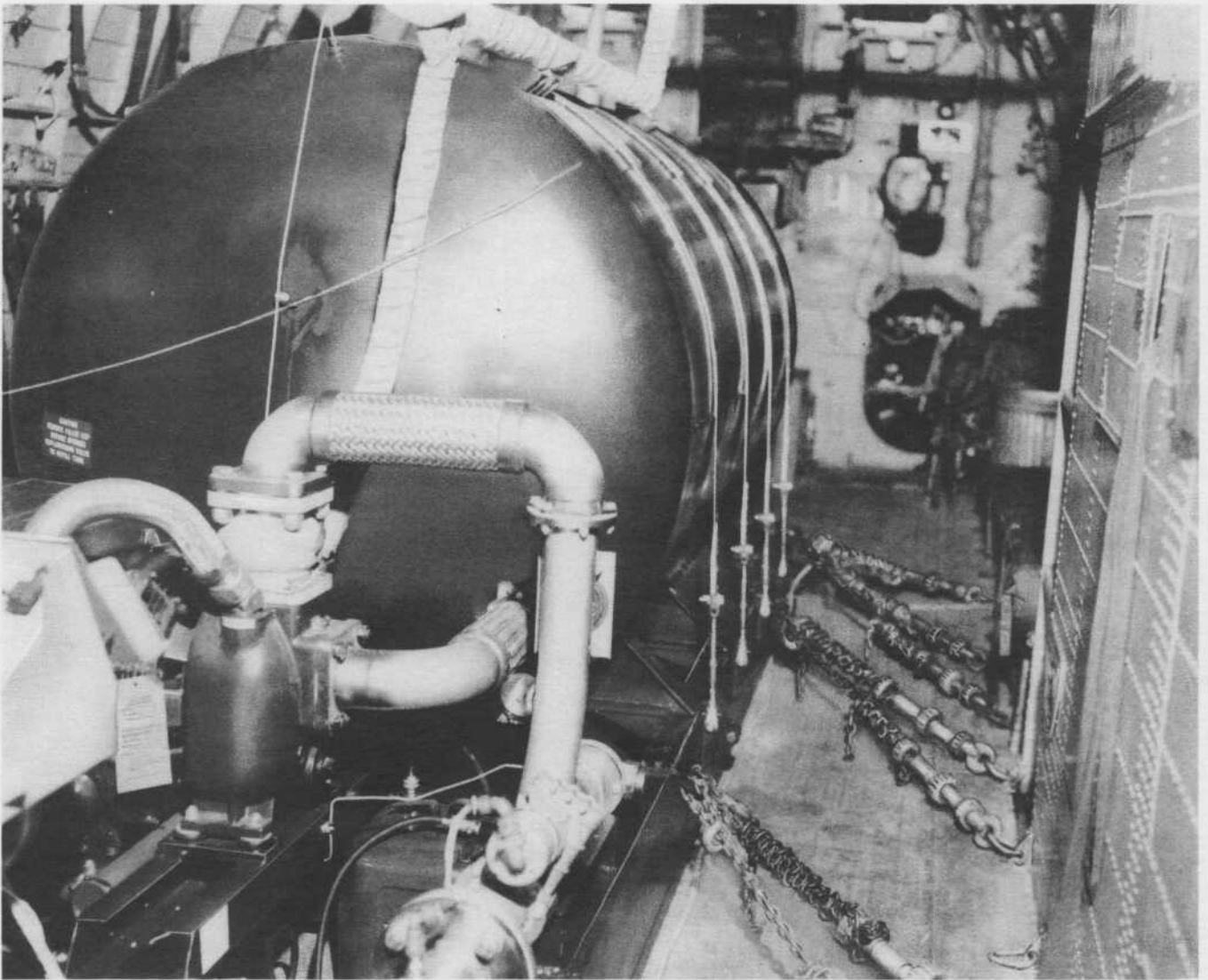


Figure 9. Installation in C-123 (right side)

VIET NAM RANCH HAND OPERATIONS

A sketch of the ground support equipment used by RANCH HAND to refill the A/A45Y-1 dispensers with agent is shown in figure 10. The refill system presented here is the system used at Tan Son Nhut Air Base, Viet Nam. It utilizes four 1000 gallon HOURGLASS tanks. A similar refill system is used at Da Nang, but utilizes only three HOURGLASS tanks. These tanks are the predecessor to the A/A45Y-1 and incorporate a 10-horsepower engine and pump unit by which the agent is transferred into the aircraft.

The agent is delivered in 55-gallon drums, then pumped from three drums at a time into the refill tanks. This is the slowest part of the operation. The procedure for filling tanks is as follows:

- a. The number 2 tank is filled from 55-gallon drums.
- b. The agent in the number 2 tank is pumped into tank number 3.
- c. Agent in tank number 3 is then pumped into tank number 4.
- d. Tank number 2 is refilled and the agent pumped into tank number 3.
- e. Tank number 2 is again refilled from the drums and pumped into tank number 1.
- f. All other tanks now filled, tank number 2 is refilled again.

Upon return from a mission, the aircraft is backed as close as possible to the refill tanks and the systems are refilled with agent using a commercial fire hose. After completion of the days work the HOURGLASS tanks are filled and the agent transferred into the aircraft. The refill tanks are then refilled in preparation for a second mission. Due to the long time needed to fill from the drums, the RANCH HAND crews are limited to only one turn around, or a total of two missions.

A big disadvantage of refilling in this manner is the problem of contamination to the agent. Foreign matter gets into the refill tanks and from there into aircraft defoliant dispensing system. The rubber inside lining of fire hoses, presently used, is acted upon by the defoliant and causes large pieces of rubber to be released into the defoliant stream, thereby reducing the system effectiveness. See figures 11 thru 14 for potographic on-site refill operations.

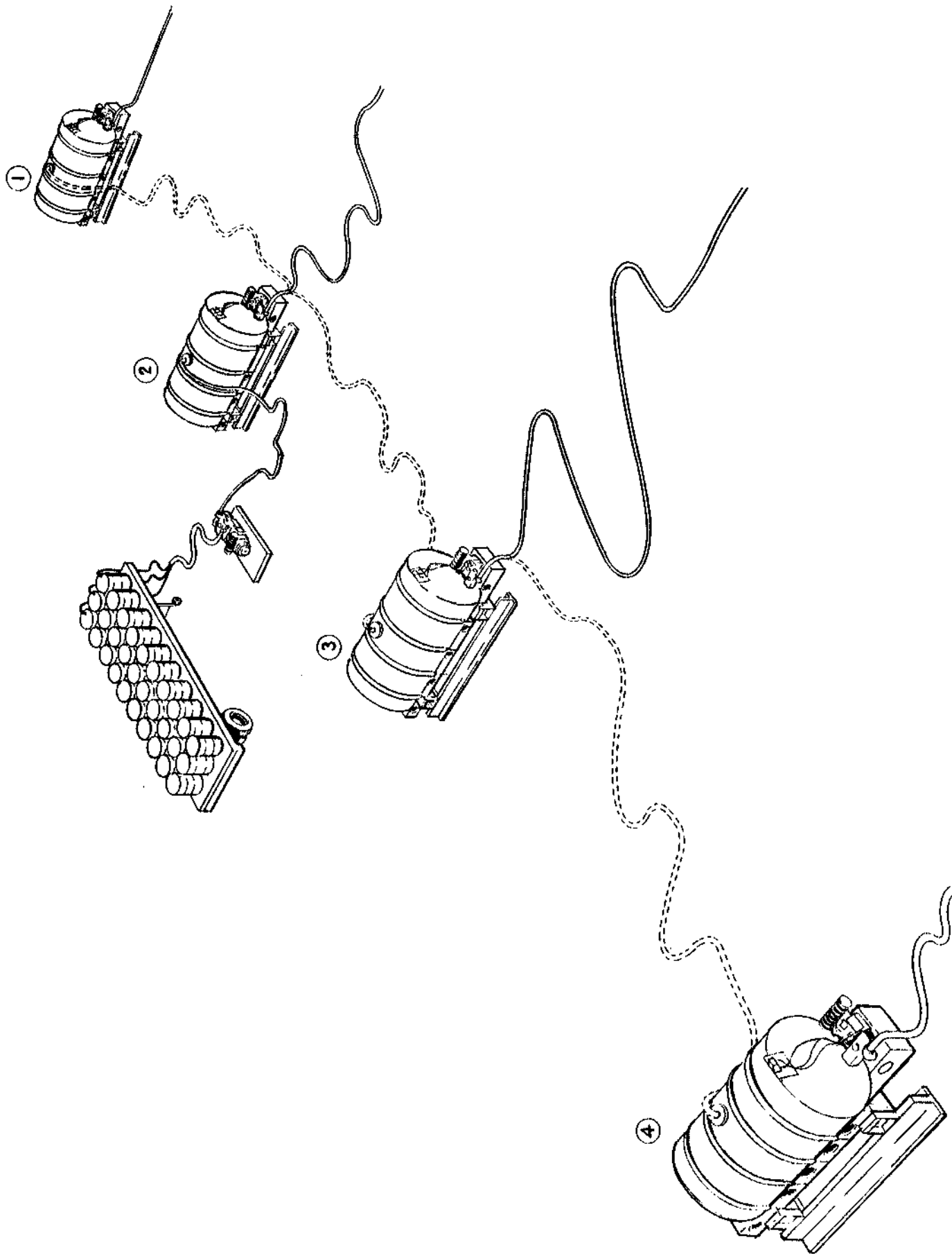


Figure 10. Existing Defoliant Transfer System Tan Son Nhut Air Base, Viet Nam



Figure 11. Ranch Hand Work Area



Figure 12. Hour Glass Tank and Pump



Figure 13. Hour Glass Tank and Pump (Insulated)

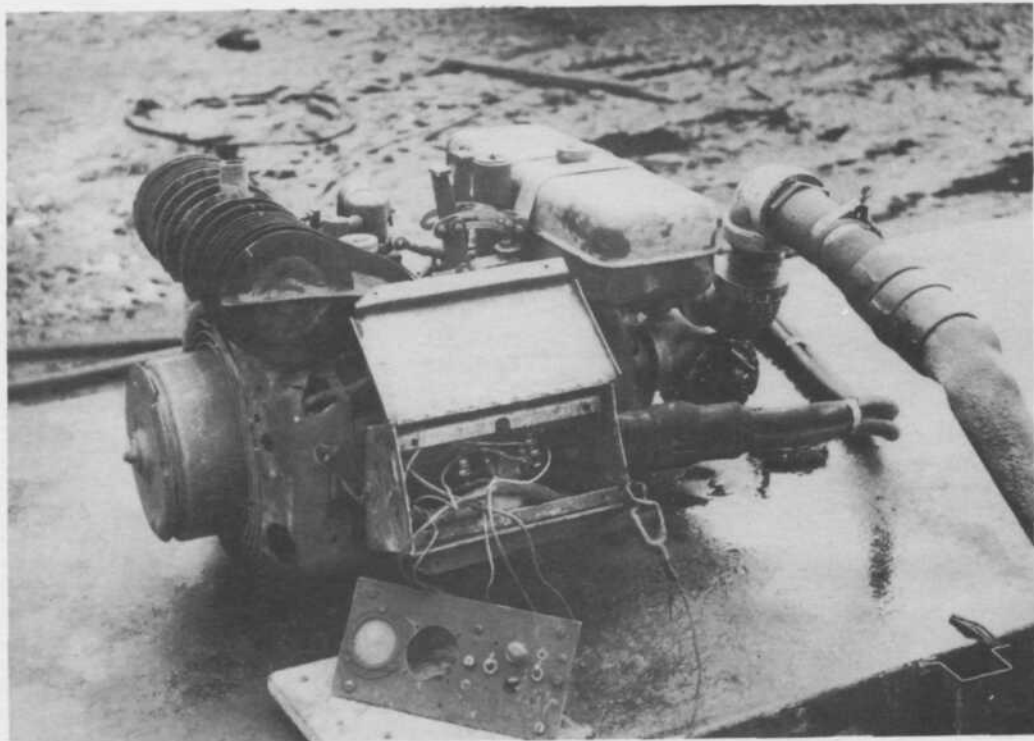


Figure 14. Hour Glass Spider Pump

OPTIMIZED DEFOLIANT HANDLING SYSTEM

GENERAL

A complete optimized defoliant handling system utilizes three engine-pump combination units to transfer the defoliant from original containers to A/A45Y-1 units in aircraft readied for an operational defoliation mission. A storage tank, platform, control consoles, hoses, and nozzles, combined into a well balanced system, accomplish the entire defoliant handling operation. Economy of man-hours, reduction of turn-around time and elimination of wasted defoliant are the prime factors for consideration. (See figures 1 and 2.)

GENERAL LAYOUT DESCRIPTION

A platform, having a height compatible with a flat bed trailer and an area to accommodate a 10,000 gallon tank and three engine-pump transfer units, is located in close proximity to truck roadways and aircraft parking ramp. The platform would have one engine-pump unit on the side adjacent to the truck roadway, a 10,000 gallon tank in the center and two engine-pump units on the side nearest the aircraft parking ramp. Hoses, nozzles, and manifolds are used to tie all major components into a well balanced and efficient system.

SPECIFIC

The actual arrangement of the defoliant handling system is contingent on the complexion and layout of the particular air base; however, certain specifics must be met to achieve maximum effectiveness.

PLATFORM

The platform is a locally manufactured structure approximately the same height as a flat bed trailer and having lateral dimensions as necessary to accommodate the shape and size of the 10,000-gallon tank plus the related units. A support for a suction hose and manifold is located on the truck side of the platform and is designed so that the suction manifold is supported at approximately the centerline of the flat bed trailer. The platform deck has 1/4-inch cracks between decking members to dissipate any defoliant spillage.

ENGINE AND PUMP UNIT

The engine and pump unit is identical to that incorporated in the A/A45Y-1 dispenser and is specifically engineered for effective transfer

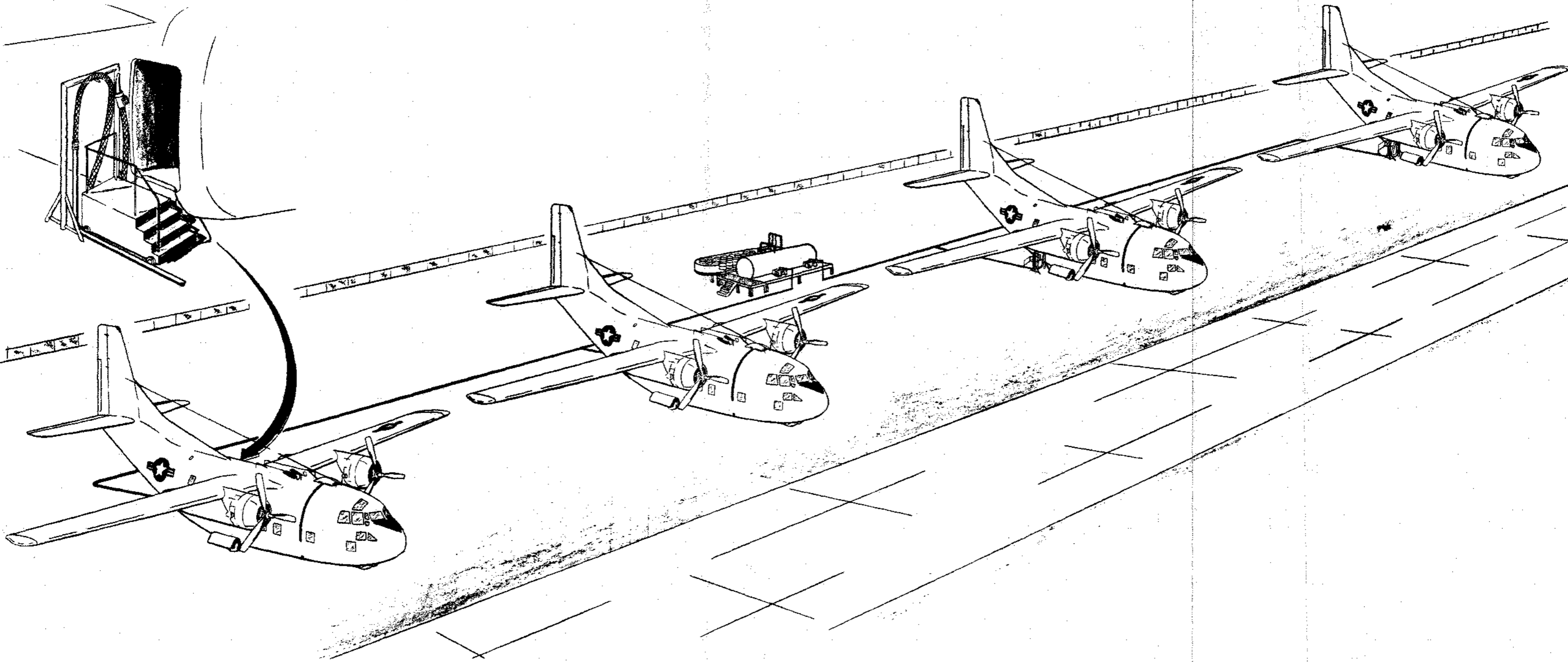


Figure 15. Optimized Defoliant Handling System Layout

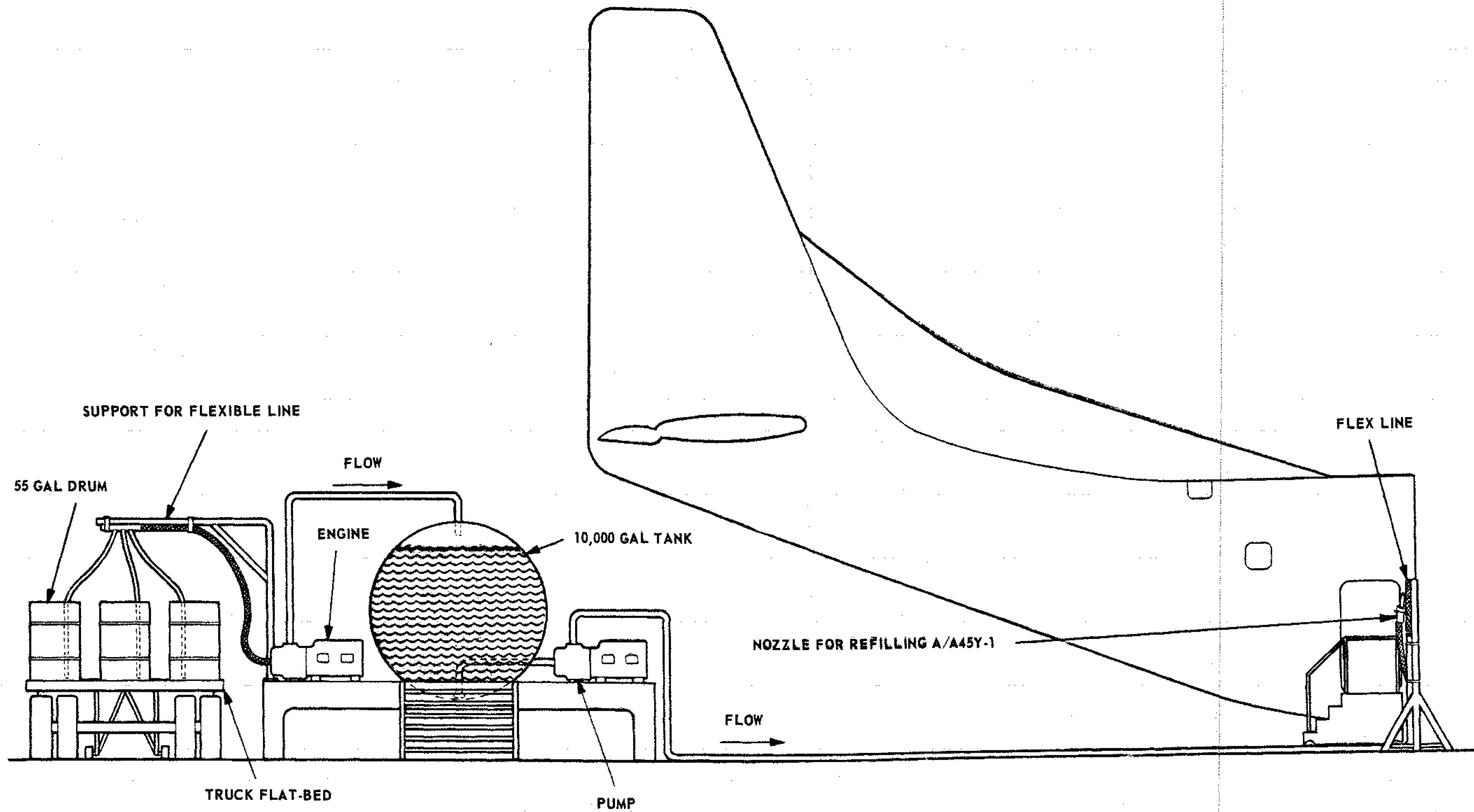


Figure 16. Defoliant Handling System Components

of defoliant under sustained operation. The engine is a government standard, air-cooled, four cylinder, four stroke cycle, horizontally opposed model modified for remote control when mated with the control console. The engine is available in large quantities, economical to operate, proven in performance, and easily maintained due to maximum accessibility. It is designed to operate a minimum of 1500 hours at rated load and speed between major overhauls. Its extensive use in defoliation operations tends to standardize maintenance and provide a spare parts source through controlled cannibalization.

The pump has been modified by the manufacturer so that it attaches to the engine at the blower section and the drive end of the crankshaft thus giving the engine and pump a one to one ratio. Shock mounting is provided to the engine-pump unit.

CONTROL CONSOLE

The control console is located at the end of the storage to permit visual monitoring of any engine-pump unit on the platform. All transfer functions are controlled by a single operator at the control console position. In addition to control functions, there are certain monitoring gages and instruments installed in the instrument panel of the control console. The electrical network is considered semi-permanently installed and so arranged that simple maintenance is quickly accomplished.

TANK

The tank has a 10,000-gallon capacity, protected sight gage, manhole, vent, drain line connection, and facilities for securing to the platform. The sight gage is a vertically mounted glass tube with connections to tank at each end, protectors to reduce the probability of breaking, and calibrations to indicate tank contents.

MISCELLANEOUS

Suction Hose. Suction hoses are provided having an inside diameter which will not be too restrictive to defoliant flow and having a wall structure to prevent collapse of hose. Hoses which are frequently disconnected have quick-disconnects to prevent rapid deterioration at connecting points.

Pressure Hoses. Pressure hoses are capable of pressures up to 100 psig and have adapters in cases where control nozzles are attached. Hose material is selected to withstand the chemical action of the defoliant.

SYSTEM TIE-IN

The storage tank is located in the approximate center of the platform with one engine-pump unit on the truck side of the platform and two engine-pump units on the aircraft side of the platform. The single engine-pump unit has a 3-inch suction hose connected between the pump and the suction manifold. The suction manifold has three 1-1/4 inch suction hoses attached which are suspended from the suction manifold in such a manner as to hang directly over three 55-gallon drums on the flat bed trailer. A control console is secured to the platform deck in the proximity of the end of the storage tank and is electrically connected to the engine-pump unit.

Two engine-pump units and their companion control console are located on the aircraft side of the platform and are shock mounted to the platform deck. The suction ports of the two engine-pump units are manifolded so that a single line attaches to the bottom of the storage tank. The discharge (pressure) ports of the two engine-pump units are also manifolded and after the pressure manifold, a single line conveys the defoliant to the aircraft having A/A45Y-1 dispensers to be serviced. Check valves are installed in pump discharge lines to permit operation of a single engine-pump unit when demands are less than maximum. At each aircraft position, a smaller pressure line with a shutoff nozzle is connected into the main line hose. These two engine-pump units are controlled concurrently from a single control console.

An electrical network is provided which gives electrical tie-in of all related electrically functioning units. Cable insulation is chemically unaffected by defoliant in the environs of the defoliant handling system.

CAPABILITIES

Transfer 10,000 gallons from drums	25 minutes
to storage tank (less truck move time)	
Service two A/A45Y-1 dispensers	5 minutes
(in aircraft)	
Service four A/A45Y-1 dispensers.	5 minutes
(in aircraft)	

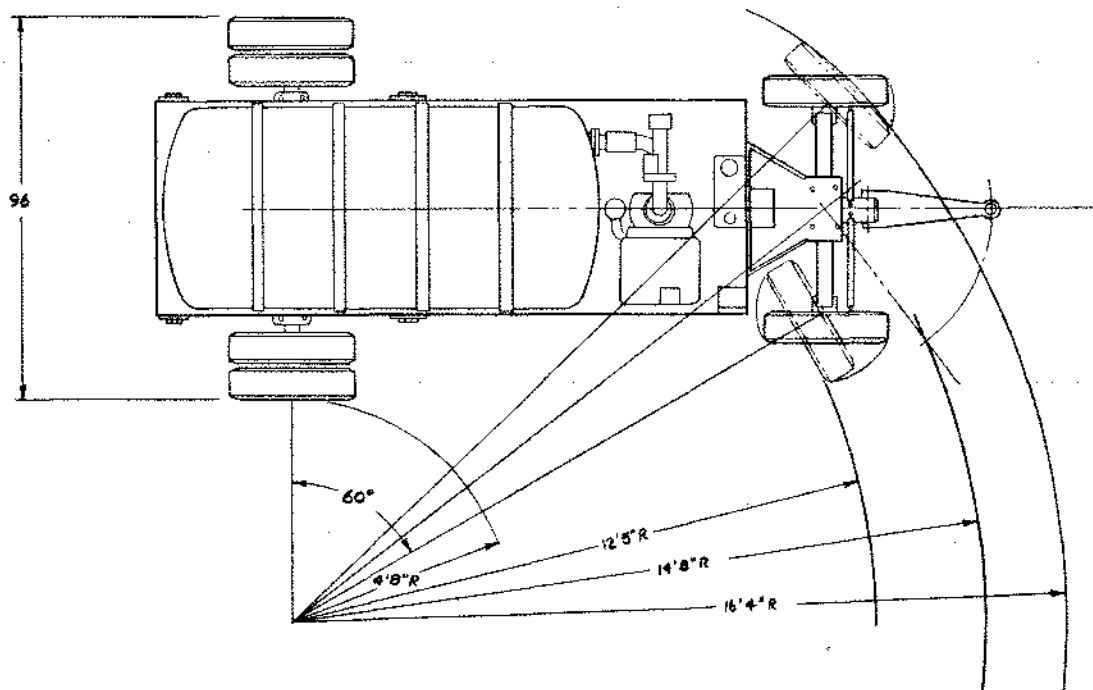
Remotely controlled functions:

1. Drums to storage tank
shutoff valves
2. Storage tank to aircraft
main lines (2) shutoff
valves
3. Engine throttle
4. Engine starter
5. Engine ignition

PORTABLE DEFOLIANT HANDLING UNIT

The portable defoliant handling unit idea is conceived for military installations where limited servicing of A/A45Y-1 dispensers might be required. The trailer is capable of traveling at faster speeds and for greater distances than the A/A45Y-1 dispenser and, being a powered unit, it speeds up the servicing of the dispensers installed in aircraft. Overall dimensions are kept within limits which will permit air transportation of loaded units to isolated landing fields or airstrips.

Technical data and capabilities are contained in figure 17.



DESCRIPTION
TANK TRAILER DEFOLIATION LIQUID REFILL

MADE FROM HAYES INTERNAL DEFOLIATION DISPENSER, MODIFIED FOR GROUND SUPPORT. STANDARD MILITARY WHEELS & TIRES ARE USED. 16 X 8 10 PLY FLAT BASE RIMS. WEIGHTS, EST. EMPTY WEIGHT 4,000 LBS. LOADED 13,000 LBS. 1000 GAL. CAPACITY. BRAKES REAR WHEELS ONLY. BESLER OR WESTINGHOUSE AIR, WITH HAND PARKING, MOTOR DRIVEN GATE VALVE WITH REMOTE CONTROL STATION FOR INSIDE AIRCRAFT REFILL OPERATION CONTROLLED BY OPERATOR INSIDE AIRCRAFT TO PREVENT SPILLING. HOSE 3 IN. DIA. X 10 FT LONG 4 HOSES WITH QUICK CONNECTORS CARRIED IN TUBES. FRONT SUSPENSION, DOUBLE TRANSVERSE SPRING PROVIDES HIGH LOAD CAPACITY GOOD STEERING PROPERTIES AT ANY SPEED ON FIELD OR ROAD. TIGHT TURN RADIUS PROVIDES HIGH MANEUVERABILITY WITH SAFETY.

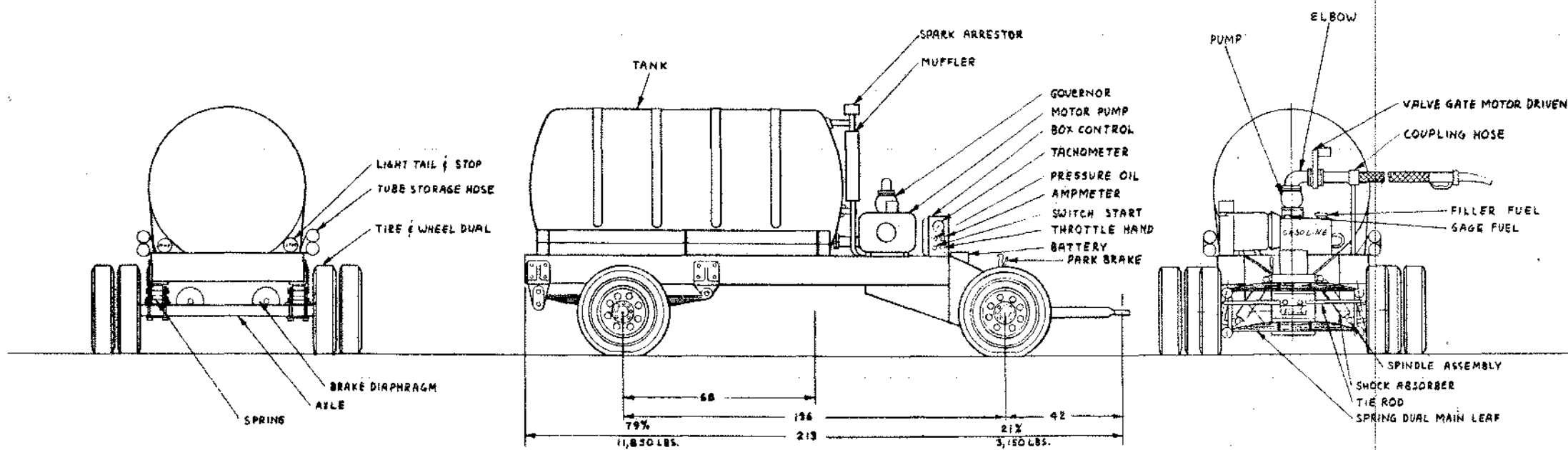


Figure 17. Tank Trailer Defoliation Liquid Refill



INTERNATIONAL CORPORATION
BIRMINGHAM, ALABAMA

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NOTES

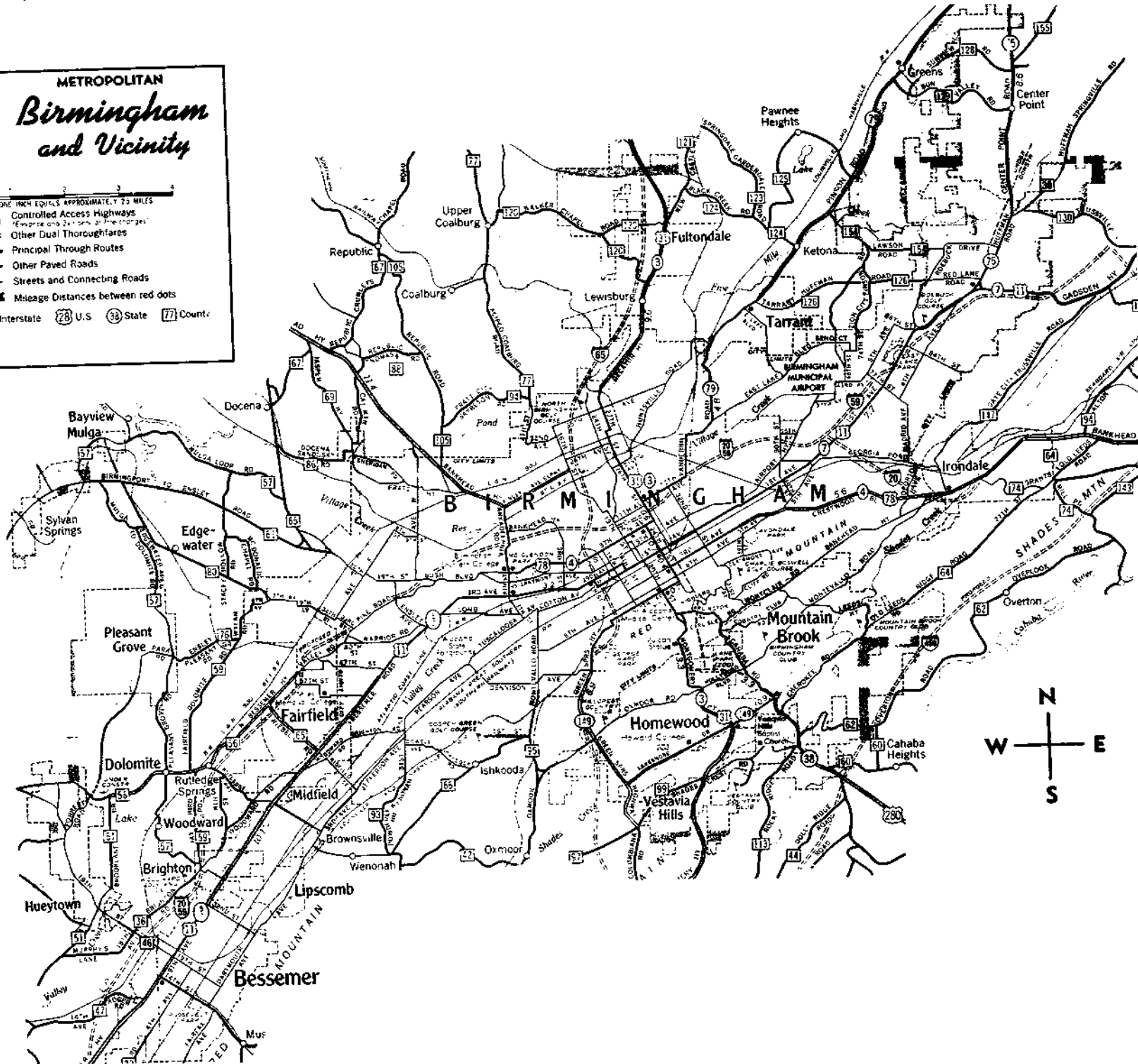
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METROPOLITAN

Birmingham and Vicinity

SCALE ONE INCH EQUALS APPROXIMATELY 7.5 MILES

- Controlled Access Highways
(Reverse and 24-hour toll-free charges)
 - Other Dual Thoroughfares
 - Principal Through Routes
 - Other Paved Roads
 - Streets and Connecting Roads
 - Mileage Distances between red dots
- Highway Numbers: Interstate U.S. State County



MISCELLANEOUS INFORMATION

AIR LINES

PHONE

Air France	251-7076
Alitalia Air Lines	324-1291
BOAC & BOAC Cunard	323-7259
Delta Air Lines	592-9601
Eastern Air Lines	323-7711
Southern Airways	595-3737
Trans World Air Lines	WX-9000
United Air Lines	592-9611

Hotels:

Pick-Bankhead	2300 5th Ave. North	251-3231	
Dinkler-Tutwiler	2005 5th Ave. North	252-8161	
Essex House Hotel	605 North 21st	322-1771	(apartments)
Redmont Hotel	2101 5th Ave. North	251-0171	(apartments)
Thomas Jefferson Hotel	1631 2nd Ave North	252-7141	

Motels and Motor Inns:

Anchor Motel	4121 3rd Ave South	595-6157
Birmingham Airport Motel	Municipal Airport	592-0061
Downtowner Motor Inn	2224 5th Ave North	324-0601
Guest House Motor Inn	951 South 18th	324-8653
Holiday Inn (downtown)	1313 3rd Ave. North	323-8931
Holiday Inn (Irondale)	7941 Crestwood Blvd.	592-0311
Parliament House Motor Hotel	420 South 20th	323-7211
Roebuck Motels	9229 4th Ave. South	833-9152
Sheraton Motor Inn	2040 Highland Ave. South	323-4413
Town House Motor Hotel	2008 8th Ave South	251-9235

Physicians And Surgeons Exchange

871-4611

TAXI CABS

Yellow Cab Co.	252-1131
Two Way Cab Co.	592-7421
Checker Cab Co.	323-7741
Stricklin Taxi Cab Co.	841-3239

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS WARNER ROBINS AIR MATERIEL AREA (AFLO)
ROBINS AIR FORCE BASE, GEORGIA 31093



REPLY TO
ATTN: WRNCO (Mr. Smith/5045)

17 Oct 1966

SUBJECT: Logistics Support Conference, A/A45Y-1 Dispenser, Defoliant, C-123
Aircraft (WRAMA(WRNCO) Ltr, 19 Sep 1966 and WRAMA Msg (U) WRNCO-32569,
28 Sep 1966)
TO: TAC (DOFT-S/Maj Marshall)
Langley AFB Va 23365

Request action Item Number 9-66-2 "TCTO for Installation of A/A45Y-1
System in UC-123B Aircraft, Class V Mod 1776" be removed from
referenced conference minutes and replaced with attached revised
Item Number 9-66-2 "Installation of A/A45Y-1 System in C-123B
Aircraft".

FOR THE COMMANDER

ROBERT N. SCHEIDECKER
Major, USAF
Chief, Operations Branch
Directorate, Materiel Management

1 Atch
Subj Minutes -
Item Number 9-66-2

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Item Number 9-66-2 - Installation of A/A45Y-1 System in C-123B Aircraft:

a. Problem Presented:

Difficulty was reported by AFATL personnel in obtaining appropriate documentation from C-123 Aircraft SSM for procurement of data on Eglin AFB Contract AF 08(635)-4894 dated 20 Oct 1965. Also, problems were reported in obtaining -1 Flight Manuals and Maintenance Handbooks by Ranch Hand Personnel.

b. Progress to Date:

1. Since the A/A45Y-1 System was being procured on an R & D Contract and had not been approved by CSAF/AFLC for installation in the C123 Aircraft, no action could be taken by the SSM to provide for procurement of TCTO data.

2. Flight and operational information for those C-123 Aircraft having A/A45Y-1 System installed is provided in T. O. 1C-123(B)-1 dated 15 July 1965 and 1C-123B(1)-15-1 dated 23 Apr 1966. WRAMA is now conducting a complete review of the -1 Manual and at completion any change needed will be made. MR 1478-3 dated 21 Jun 1966 approved procurement of necessary installation TCTO 1C-123-590, Engineering Data and Handbooks changes for the approved Class V Mod 1776. Procurement action is now being negotiated with Fairchild-Hiller for this data. Pending delivery of this data, the schematics and sketches as shown in the operational manual may be utilized to perform minimum maintenance.

c. Action to be Taken and Action Agency:

1. Ranch Hand Personnel take action through appropriate distribution channels to obtain available Dash One Handbook data for A/A45Y-1 System installed in C-123 Aircraft.

2. SSM make follow-up action to assure procurement of additional required data in a timely manner.

3. SSM expedite - 1 Flight Manual Review.

d. Forecast for Completion:

Target date for delivery of additional data including published -1 Flight Manual is Feb 1967.