

HEADQUARTERS  
32D AAF BASE UNIT  
(Civil Air Patrol)  
500 Fifth Avenue  
New York 18, New York

TRAINING CIRCULAR)  
NO. 1)

17 October 1944

INSTRUCTIONS - NAVIGATIONAL TRAINER AND  
OTHER NAVY TRAINING AIDS

A. General

The Special Devices Division of the Bureau of Aeronautics, United States Navy, has made available to Civil Air Patrol a number of training aids which will help materially in the accomplishment of the Training Program. The most outstanding piece of such equipment is the Mark IV Navigational Trainer which has been used very effectively at Navy flying schools. A total of 125 of these Trainers has been allocated to the 48 CAP Wings. Other training aids obtained from the Bureau of Aeronautics include (a) Cardboard Plane Models No. 5-D; (b) Plastic Planes Model Device No. 5-F - British, Russian, German, Italian; (c) Metal Tank Models Device No. 5-L - Japanese, British, German, U. S.; (d) Navigational Computer Mk8 Device No. 1-GG-2; (e) Plotting Board Mk3 1-GG-3; and (f) Aircraft Navigational Plotter Device No. 1-GG-7. Assignments of this equipment have been made to localities where it is felt that it can be used to best advantage in serving the greatest number of students. Instructions pertaining to the care and use of these several training aids are presented in this circular. Similar circulars will be issued as additional training devices are made available.

B. Navigational Trainer - Mark IV

1. Purpose

a. The primary purpose of the Mark IV Navigational Trainer is to provide ground facilities for training pilots in dead reckoning. It may also be used for navigation practice and check-out. Pilots may run through a simple mission or may execute a complicated search and interception. Students can be checked in radio procedure through a telephone installation simulating two-way radio.

b. This is an expensive piece of equipment, the use of which will be restricted to official CAP training conducted under the personal supervision of qualified CAP instructors assigned to such duty.

## 2. General Description

a. The Mark IV Trainer is a complete mockup of the cockpit of a training plane. It is mounted on a cart which may be closed to simulate instrument flying. It is powered with storage batteries and in response to manipulation of all normal controls, moves over any reasonably level available space at the rate of one foot of travel per nautical mile of flight. Thus, the Trainer travels two and one-half feet a minute at an indicated air speed of 150 knots.

b. The pilot controls the movement of the Trainer through the use of the throttle, stick and rudder, exactly as he would a training plane. The speed of the Trainer is governed by the throttle, and is registered on the airspeed indicator. Direction is controlled by the rudder pedals and is registered on the rate-of-turn indicator. Rudder pedals and the rate-of-turn indicator are coordinated to execute and indicate a standard turn at 150 knots; at other speeds inaccurate readings will occur.

c. The stick is used in the normal manner for climbing and diving and the corresponding maneuver is indicated on the rate-of-climb instrument. Thus, if the stick is pulled back, a climb is indicated, the registered altitude will increase and the throttle must be advanced to maintain constant air speed. If the throttle is not advanced, registered airspeed will fall off and the speed of the Trainer across the deck will decrease proportionately.

d. In addition, an aircraft clock and a magnetic compass provide sufficient instruments to supply all data necessary for the solution of dead reckoning and navigational problems.

e. The course "flown" by the student is traced on the deck by means of a chalking device located at the pivotal point of the Trainer. Thus, an accurate record of all maneuvers, as well as the start and finish points, is provided. A student's flight pattern can be checked against pre-computed reference points previously marked on the deck. Such reference points are visible to the student only through a sliding hatch at his feet. This hatch, when opened, automatically turns on tell-tale light visible to the instructor.

f. With the hood closed, the student cannot take bearings on stationary objects and must rely entirely on his instruments. Should the instructor prefer not to mark points and headings on the deck, the student may fly with the hood up and have the finish point checked on the basis of an air plot.

## 3. Space and Storage Requirements

a. The area available for the use of the Trainer determines the scope of the problems that may be assigned. In general, problems requiring not more than 50 minutes to complete can be executed in a space measuring 75 feet square. If space is limited, longer problems can be worked out by assigning headings corresponding to the diagonals of the area.

b. Since the Trainer is battery operated it may be used anywhere, indoors or outdoors, wherever space is available. However, decks should be level and smooth and must be capable of sustaining the weight of the Trainer, which is approximately 1,000 lbs. If an outdoor space is selected, facilities for under-cover storage, with electric outlets for charging batteries, should be available.

c. The Trainer is adaptable to all climatic conditions, having a cockpit of sufficient size to accommodate students wearing winter flying gear, as well as an air circulating fan for comfort in warm climates.

#### 4. Operation Manual

Each of the Mark IV Navigational Trainers delivered to Civil Air Patrol will be accompanied by an Operation Manual and Parts Catalog covering all phases of the care, maintenance, repair, adjustment, operation, and use of the Trainer.

#### 5. Instructions for Uncrating

a. These instructions are also enclosed in an envelope tacked to the outside of the crate when the Trainer is shipped from the factory.

b. The Mark IV Navigational Trainer is shipped in one large boarded crate, which contains the Trainer itself, and two smaller wooden boxes containing the battery and the electrolyte, respectively.

- (1) Remove top and end boards first.
- (2) Remove inner braces and side panels as units.
- (3) Remove remaining side panel and all outboard braces, so that Trainer rests on supports fastened to bottom skid.
- (4) Note printed instructions on protective paper covering, indicating location of altimeter rod and loose tail-light, and remove all paper, being careful not to disturb indicated equipment.
- (5) Place lift bars under Trainer putting them as close to skids as possible to prevent Trainer tipping during lifting operation. Do not disturb the Chalking Device cable under the Trainer.
- (6) Remove rear battery compartment panel.
- (7) Remove battery from crate and inspect battery for possible damage during shipment.
- (8) Remove crate from electrolyte container, and fill cells according to instructions sent with the battery. If battery has been shipped in "dry charged" condition, it should be charged, after being filled, according to instructions.

- (9) After battery is fully charged, install cells and connect.

c. Again, this caution is paramount. Do not uncrate this equipment until you are sure of the proper procedure.

#### 6. General Instructions

The Commanding Officer of each unit to which one of the Navigational Trainers is assigned will be held responsible to see that every possible means is used to insure that proper care is taken of this training aid. The following instructions will be closely followed:

- a. Keep Trainer locked at all times when not in use.
- b. Assign a responsible CAP instructor, with such assistants as may be necessary, in charge of Trainer.
- c. Restrict use of Trainer to official CAP training operations conducted under the personal supervision of one of the assigned instructors.
- d. Assign a qualified CAP mechanic in charge of maintenance and repair of Trainer.
- e. If possible arrange for instructors and mechanic to visit some Naval Air Station in the vicinity and take instruction in the operation and maintenance of the Trainer.
- f. If possible arrange for a Navigational Trainer Operator from the nearest Naval Air Station to visit the unit and demonstrate the use of the Trainer.
- g. Make every effort to eliminate breakage, as replacement parts are difficult to obtain.
- h. Service batteries at least twice monthly.
- i. Require those responsible for the operation and maintenance of the Trainer to become thoroughly familiar with the Operation Manual.
- j. Require those responsible for the operation of the Trainer to apply at frequent intervals the periodic check-up set forth on page 22 of the Manual.
- k. In event of damage in shipment, make a complete list of all damaged parts and mail to National Headquarters at once through CAP channels.
- l. Requests for repair and replacement parts needed for normal operation will be prepared with complete nomenclature and parts numbers as listed in the Parts Catalog and forwarded to National Headquarters through CAP channels.

#### C. Cardboard Plane Models No. 5-D

This type of airplane model consists of unassembled cut-out cardboard parts designed for assembly into three dimensional silhouette models to a scale of 1 to 72. Parts are cut from a specially treated board so that they will withstand disintegration from frequent assembly. These

models are relatively inexpensive. They may be quickly produced and they serve effectively in the training program. When assembled, silhouette models are best displayed suspended against a light background. They thus take on the appearance of solid airplane models. Each silhouette model is designed with precision so that front, side and top views are accurate. Three-quarter views simulate the airplane sufficiently for most recognition purposes. Ease of shipment and storage is an important factor in providing this type of plane model to the United Nations Fighting Forces throughout the world. There are many different types of airplanes included in this assembly. Make sure that this group of training aids is placed in the hands of the proper officer to insure most effective use in training cadets and senior members.

D. Plastic Planes Model Device No. 5-B - British,  
Russian, German, Italian

Model airplanes may be used in a variety of ways. Hung by string or wire from the ceiling of classrooms, wardrooms, and hallways, the models may be continually kept in view and presented in different attitudes for training in recognition. Airplane models may be used as an integral part of many training devices. Individually, they may be shown to a class when discussing a particular airplane or when demonstrating the difference between airplanes. Models of various friendly and enemy aircraft have been produced on a scale of 1 to 72 or 1 inch to 6 feet. The models are molded in plastic and have a black uncamouflaged finish. Aircraft types included in this set represent a standardized list of ground operational models which, however, will be subject to change because of introduction of new types. Make sure that model airplanes are used intelligently in identification classes and not wasted or carelessly thrown about.

E. Metal Tank Models Device No. 5-L - Japanese,  
British, German, U. S.

Characteristic features of various tanks may be learned from these models. This series includes some 50 different foreign and U. S. types. These models are constructed of metal, to a scale of 1 inch to 3 feet. With tank warfare playing such an important part in present operations, cadets will be interested in knowing the various tanks and which ones belong to the Allies. Many times combat crews are sent on bombing missions with instructions to bomb enemy tanks; thus, combat crews must know the identification of enemy tanks.

F. Navigational Computer Mk8 Device No. 1-GG-2; Plotting Board  
Mk3 1-GG-3; Aircraft Navigational Plotter Device No. 1-GG-7

Enlarged reproductions of standard air navigation instruments and equipment have been made up for classroom demonstration. The size of

17 Oct 44

these reproductions makes it possible for them to be seen from all parts of the room. These large scale models are useful in the lay-out of problems on a blackboard and in demonstrating the use of the standard size equipment.

By direction of Colonel JOHNSON, National Commander.

*Harry H. Blee*  
HARRY H. BLEE  
Colonel, Air Corps  
Operations & Training Officer

OFFICIAL:

*Robert A. Buchanan*  
ROBERT A. BUCHANAN  
Captain, Air Corps  
Actg Adjutant

DIST:

"Z" (5) (3) (2) (2) (1)