STUDENT WORKBOOK

AERIAL ARTILLERY ADJUSTMENT

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JUNE 1966

UNITED STATES ARMY AVIATION SCHOOL

FORT RUCKER, ALABAMA

AERIAL ARTILLERY ADJUSTMENT

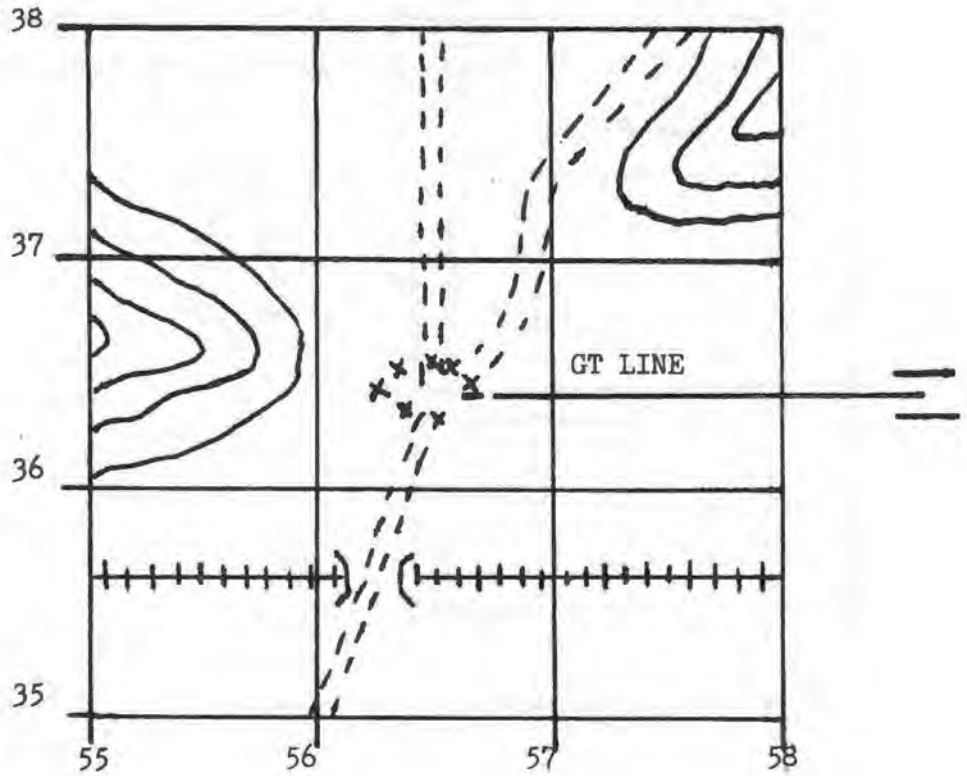
One of the basic requirements for an Army aviator is to possess the capability to adjust artillery fire. You, as an aviator, must be able to fulfill this requirement.

There are definite procedures to be followed in calling for and correcting artillery. You must commit these procedures to memory.

The following exercises are presented to illustrate certain basic fundamentals, such as target location, call for fire and subsequent corrections and correcting procedures. Your ability to work these exercises without error will enhance your effectiveness as an Army Aviator.

Proper communication procedures are to be utilized. An example mission showing the pro-words and their use is shown.

EXAMPLE MISSION:



EXAMPLE MISSION:

You have located an eight-man patrol. What is your call for fire to fire upon this target? Use coordinates for target location.

Answer:"Big Boy 20, this is Big Boy 81, Fire Mission (over) Grid 56553642, eight-man patrol, FZ VT, will Adjust (over)."

1. Requirement 1. Listed below are the elements of a call for fire that are out of sequence. Arrange the elements in the proper sequence.

a. 15 trucks in truck park.

b. Adjust fire (over).

c. Big Boy 20, this is Big Boy 81.

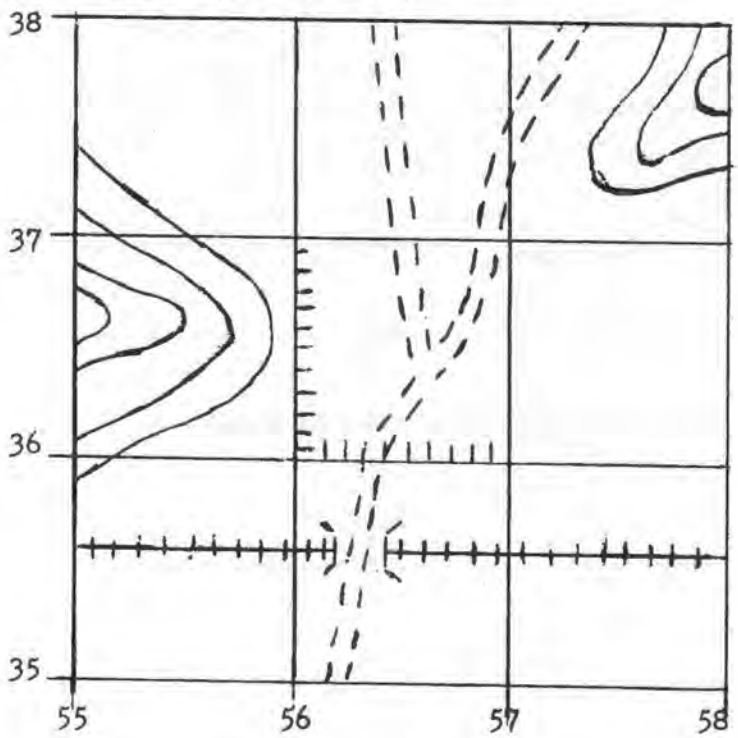
d. Shell HE and WP.

e. Adjust fire (over)

f. From target no. AB 702, right 50, add 100.

Answer: _____

Situation: You and the FDC have selected RJ 139 as registration point one. Use GT line. (See sketch.)



2. Requirement 2. What is your call for fire to register on RJ 139?

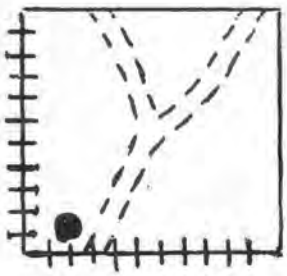
Answer: _____

3. Requirement 3. The following diagrams show the rounds in the adjustment and fire-for-effect phases. Give your spottings and subsequent corrections.

ADJUSTMENT PHASE

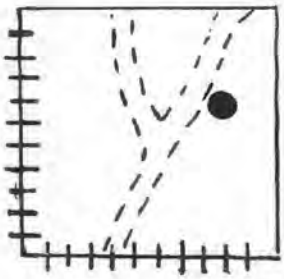
Spotting: _____ RD #1

Correction: _____



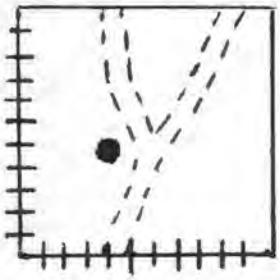
Spotting: _____ RD #2

Correction: _____



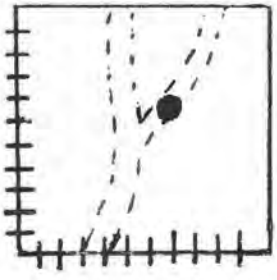
Spotting: _____ RD #3

Correction: _____



Spotting _____ RD #4

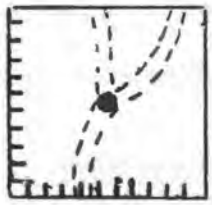
Correction: _____



FIRE-FOR-EFFECT PHASE

Spotting: _____

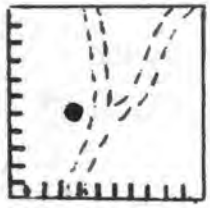
Correction: _____



Rd #1

Spotting: _____

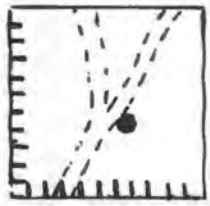
Correction: _____



Rd #2

Spotting: _____

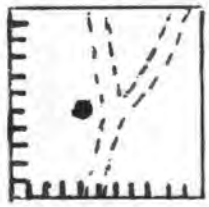
Correction: _____



Rd #3

Spotting: _____

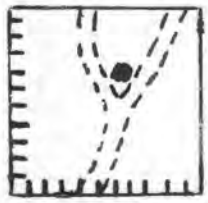
Correction: _____



Rd #4

Spotting: _____

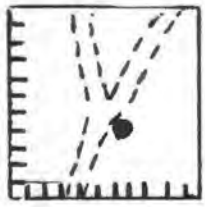
Correction: _____



Rd #5

Spotting: _____

Correction: _____



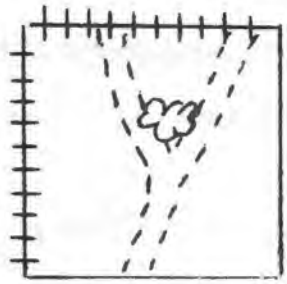
Rd #6

4. Requirement 4. The FDC transmits "Observe time registration, Over."

Give the proper response for the following rounds

Spotting: _____

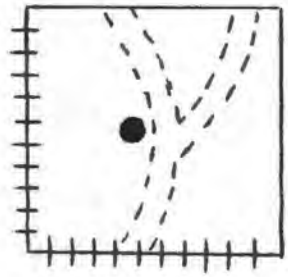
Correction: _____



Rd #1

Spotting: _____

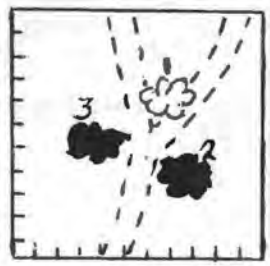
Correction: _____



Rd #2

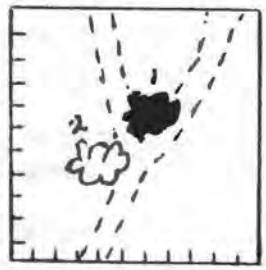
5. Requirement 5. The FDC transmits "Observe three rounds." Give the proper response to the following rounds:

Spotting: _____



6. Requirement 6. The FDC transmits "Observe two rounds." Give the proper response to the following rounds:

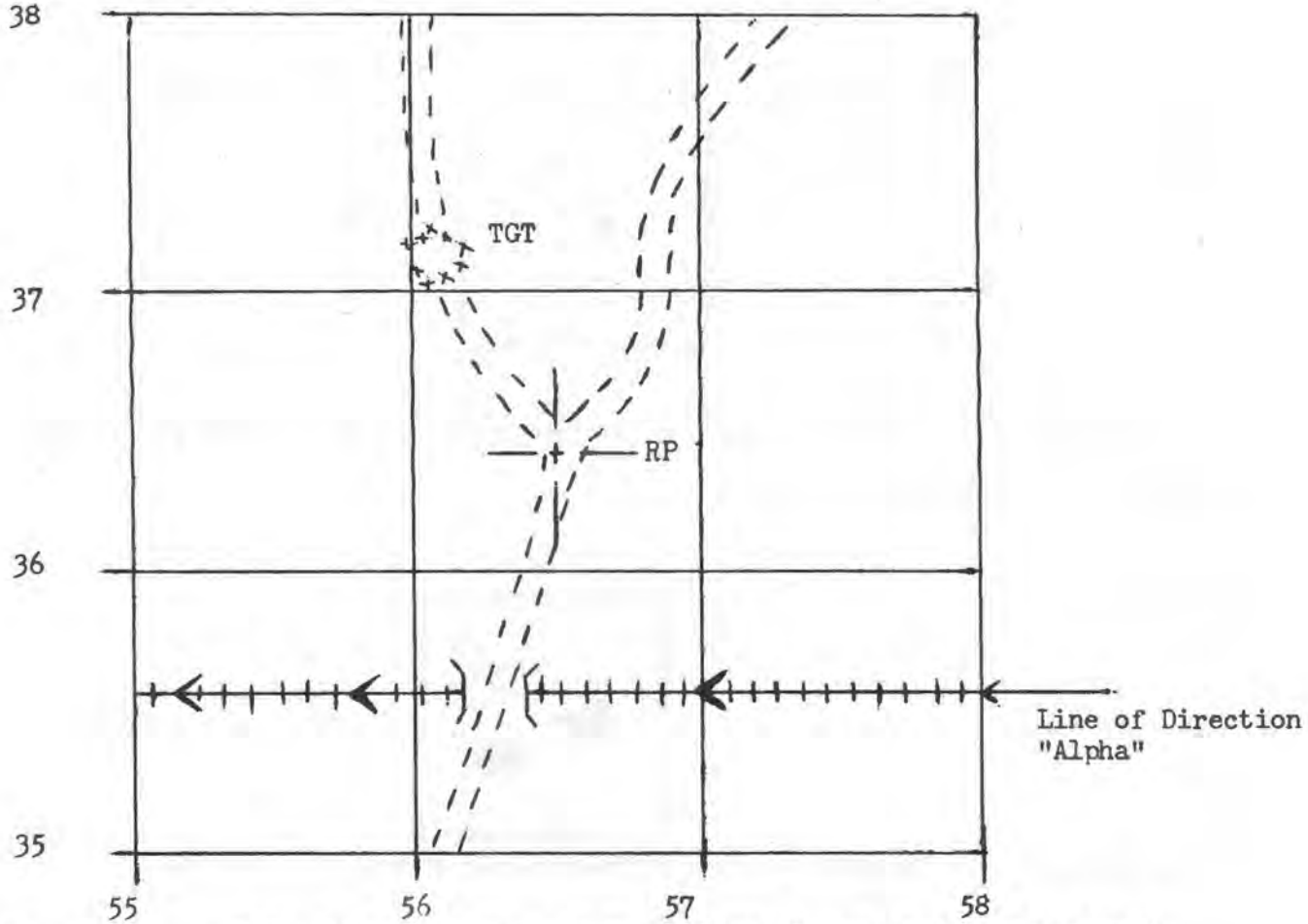
Spotting: _____



7. Requirement 7. Who will conclude the preceding mission?

Answer: _____

8. Requirement 8. You have located 10 men laying mines. What is the proper call for fire to fire on this target? Use a shift from RP 1 and utilize spotting line Alpha. Correct radio procedure will be indicated by (Over) (Out) etc.



9. Requirement 9. The FDC transmits "Battalion, Bravo, one round, target number AB 702 (Over)." Give the proper response to this transmission and answer the questions that follow:

a. What battery will be fired during the adjustment?

b. What size unit will fire-for-effect and how many rounds will each weapon in that unit fire?

10. Requirement 10. The following illustrations indicate the rounds during adjustment for the mission in Requirement 8. Give your spottings and corrections for each round. Your adjusting point is indicated by the black square. (Use spotting line Alpha.)

Spotting: _____

Correction: _____

Spotting: _____

Correction: _____

Spotting: _____

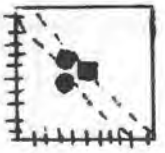
Correction: _____

Spotting: _____

Correction: _____

Spotting: _____

Correction: _____

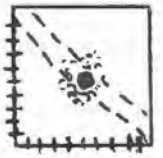


Spotting: _____

Correction: _____

Spotting: _____

Correction: _____



11. Requirement 11. You have observed a machine gun firing from a heavily fortified bunker.

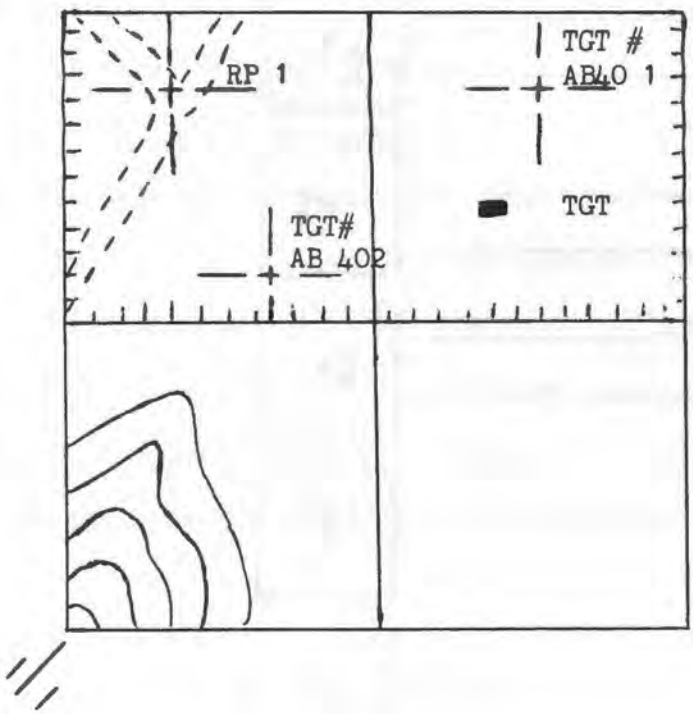
a. What type mission will you fire upon this target?

b. How many weapons will fire during the adjustment? During fire-for-effect?

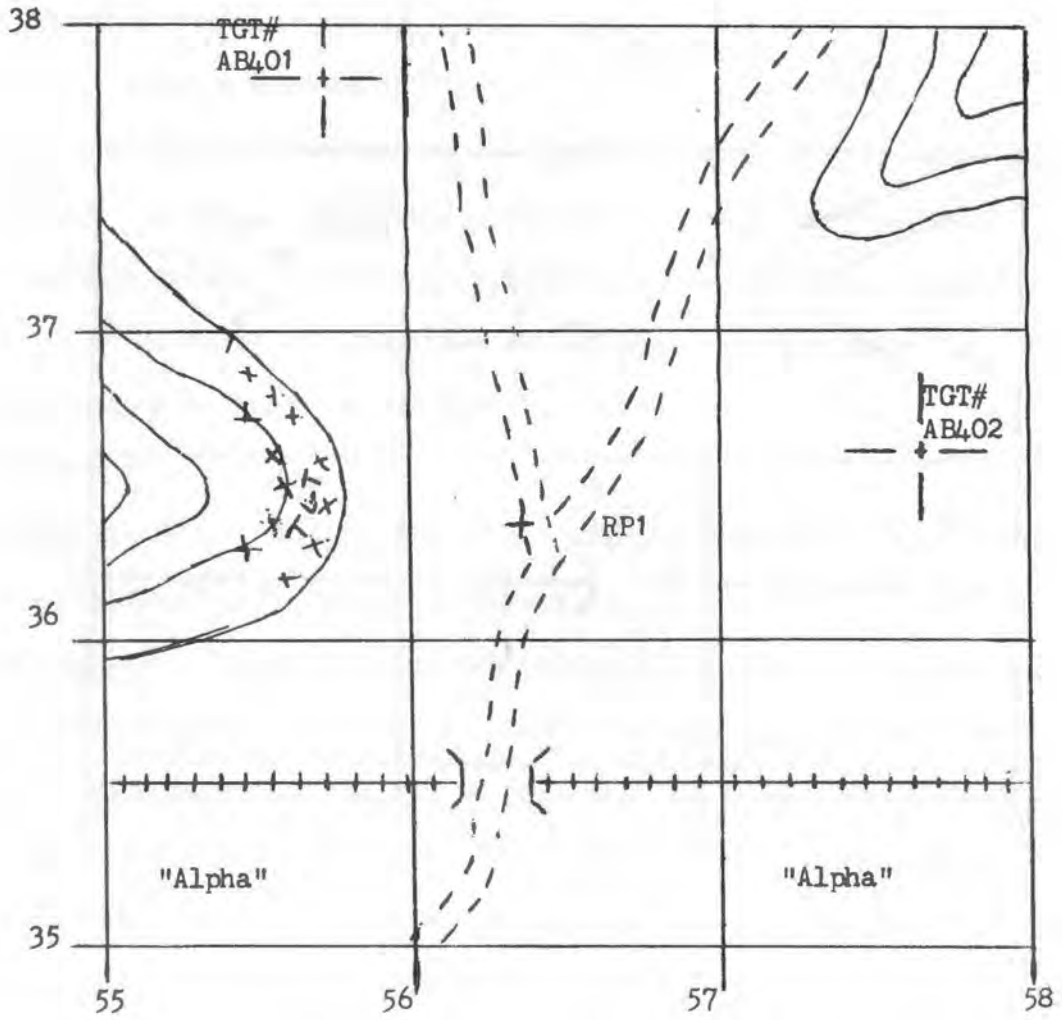
(1)

(2)

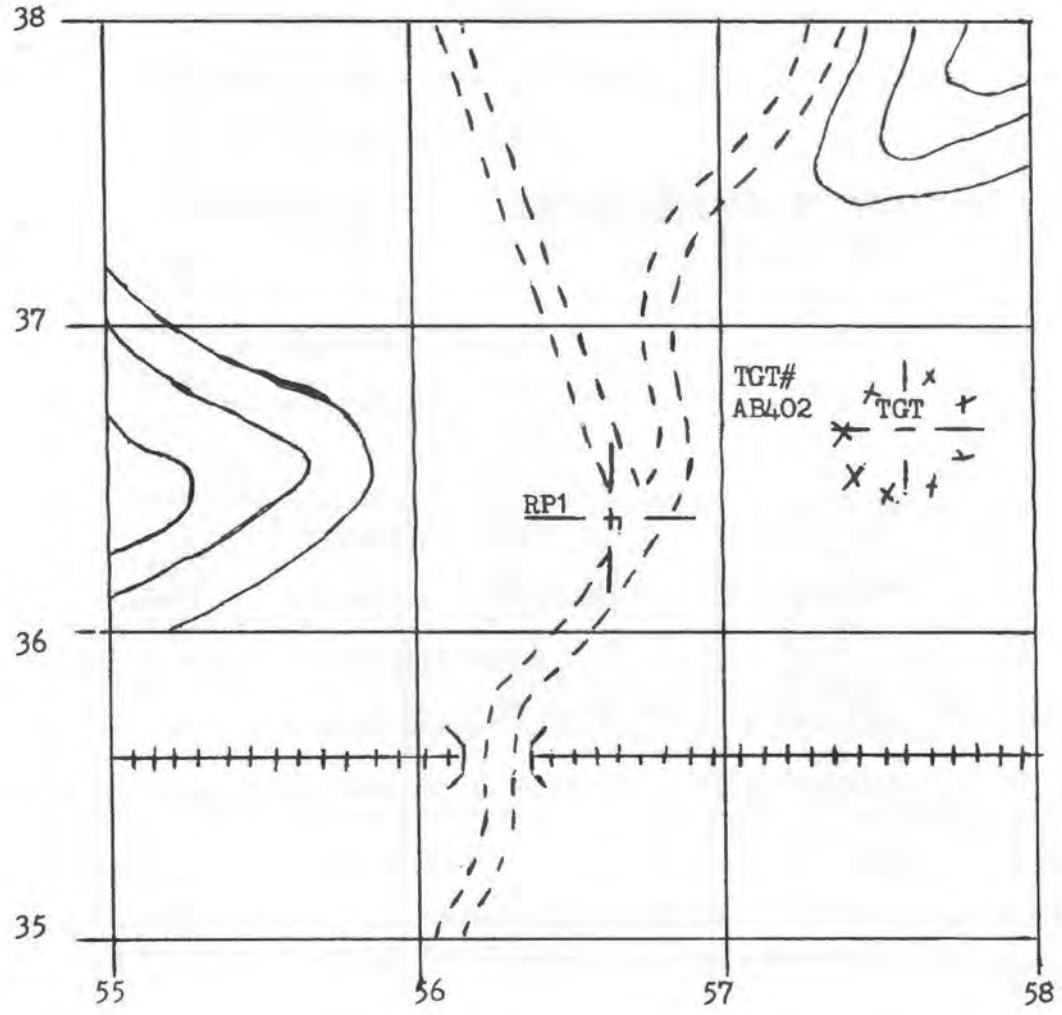
c. What is your call for fire to bring fire upon this target? Use a shift from a known point and the Gt line.



12. Requirement 12. You have observed a company of infantry "digging in." What is your call for fire to fire upon this target? Use a convenient spotting line and shift.



13. Requirement 13. You observe an eight-man-survey party located within a previously fired upon wooded area. What is your call for fire to fire on this target?



Answer: _____

_____

_____

SOLUTION AND EXPLANATION OF AERIAL ARTILLERY ADJUSTMENT EXERCISES

1. Requirement 1.

Solution: "BIGBOY 20, this is BIGBOY 81, FIRE MISSION (over) From Target No. Ab 702 right 50 add 100, 15 trucks in truck park, Shell He and WP, adjust fire (over)."

Explanation: Elements of a call for fire or subsequent corrections must be transmitted in sequence. Firing upon a target with artillery requires close teamwork between the observer, the fire direction center, and the firing battery. Each member of this team is keyed to respond to certain standard operating procedures. The call for fire and subsequent corrections are standard operating procedures and must be committed to memory. If an element is transmitted out of sequence, confusion is created and effectiveness of fires is seriously affected.

2. Requirement 2.

Solution: BIGBOY 20 this BIGBOY 81, FIRE MISSION (over) Registration point one registration, adjust fire (over)."

Explanation: Registration points are selected points that are usually permanent and surveyed. In this particular mission, you and the fire direction center both know where RJ 139 is located. The fire direction center has RJ 139 plotted on their firing charts with surveyed coordinates. You have registration point one plotted on your map and are observing it. In the target location portion of your call for fire there is no need to transmit coordinates since the FDC already has them. Registration is transmitted in the type of adjustment portion to tell FDC you are ready to register on RJ 139 and that this is a precision mission.

3. Requirement 3.

Solution: Adjustment Phase

Rd #1

Spotting: +, 300 L

Correction: R 300, drop 400 (over)

Rd #2

Spotting: -, 100R

Correction: L 100, add 200 (over)

Rd #3

Spotting: +, Ln

Correction: Drop 100 (over)

Rd #4

Spotting: -, 50R

Correction: L50, add 50, FFE (over)

Explanation: Adjustment Phase.

One gun is used during adjustment in all precision missions. The first round in adjustment is spotted as over, 300 left. The deviation correction is to bring the burst on line and then establish a range bracket. A range change of drop 400 meters was adequate to insure a round short of the target.

This range bracket is then successively split until a 100-meter bracket is split and fire-for-effect can be entered. All deviation corrections are made to the nearest 10 meters.

Solution: Fire-for-Effect Phase.

Rd #1

Spotting: Target

Rd #2

Spotting: Over, line

Rd #3

Spotting: Short, line

Rd #4

Spotting: Over, Line

Rd #5

Spotting: Doubtful, right

Rd #6

Spotting: Short, Left

Explanation: Fire-for-Effect Phase.

During the fire-for-effect phase of a precision mission, only spottings transmitted to the FDC. The radio pro-word (over) is omitted once fire-for-effect is entered. The pro-word is not used so that transmissions such as "short left (over)" will be eliminated, thus doing away with any confusion that could result.

4. Requirement 4.

Solution:

Rd #1: Air

Rd #2: Graze

Explanation: Only two spottings are possible in a time portion of a registration. Spottings of "Air" or "Graze" are used. The fire-for-effect radio procedures apply.

5. Requirement 5.

Solution:

Rd #1: Air

Rd #2: Graze

Rd #3: Graze

Explanation: When more than one round is fired, each burst is spotted as it takes place. The bursts must be spotted in order. In this case, "Air" "Graze" "Graze" and not "Graze." "Air," "Graze."

6. Requirement 6.

Solution:

Rd #1: Graze

Rd #2: Air

Explanation: The same as Requirement 5.

7. Requirement 7.

Solution: The Fire Direction Center

Explanation: The object of a registration mission to determine corrected data to be used in subsequent firing. The observer does not have the means to accomplish this. The FDC will control the termination of all registrations. Another type of precision mission is the destruction mission. This mission is conducted to destroy point-type targets through the use of precision-fire techniques. The observer is the only one in a position to determine if the target has been destroyed and will terminate this type precision mission.

8. Requirement 8.

Solution: BIGBOY 20, this is BIGBOY 81, fire mission (over) From registration point one, spotting line Alpha - right 750 add 400, 10 men laying mines, FZVT, adjust fire (over)."

Explanation: This is an area-type mission. The primary difference between an area mission and a precision mission is the nature of target.

The target in this mission is a relatively dispersed target and is mobile as opposed to a precision target that is small and immobile. The method of target location employed in this mission was a shift from a known point. A line of known direction was used as a spotting line. This line (a railroad track) was selected prior to flight and given the code name "Alpha." Line "Alpha" is employed by the FDC to insure that they are "looking" at the target from the same direction you are. You, as an observer, mentally superimpose line "Alpha" over the registration point and place yourself along this line looking at RP 1 in the previously arranged direction.

9. Requirement 9.

Solution: "Roger, Battalion, Bravo, one round target number AB 702 (over)."

a. Bravo battery.

b. A battalion in effect and each weapon will fire one round simultaneously.

Explanation: A "message to observer" is transmitted to the observer by the FDC. This message consists of normally four major elements - battery(ies) to fire-for-effect, adjusting battery, number of rounds in fire-for-effect, and target number. These are the elements of information the observer needs to know to properly conduct this fire mission. The FDC can transmit any additional information, and any elements which are different than those requested in the call for fire. EXAMPLE: Fuze time rather than Fuze VT.

10. Requirement 10.

Solution:

1st Volley:

Spotting: Lost

Correction: Shell Smoke (over).

2nd Volley:

Spotting: Doubtful, 450 Right

Correction: Shell HE, Left 450 (over).

3rd Volley:

Spotting: Over, 50 Left

Correction: Right 50, Drop 200 (over)

4th Volley:

Spotting: Short, Line

Correction: add 100 (over)

5th Volley:

Spotting: Over, Line

Correction: Drop 50, Fire-for-Effect

6th Volley:

Spotting: Range Correct, 30 Right

Correction: Left 30, Repeat (over)

7th Volley:

Spotting: Range Correct, Line

Correction: End of Mission, Estimate 10 Casualties (over)

Explanation: Area-type fire is characterized by speed and volume. It will be employed by the aerial observer against the majority of targets in a combat situation. An Army aviator must command a thorough knowledge of its use and techniques of employment. The first volley in this requirement is sensed as "lost". For some reason, this volley was unobserved by

you. This can easily occur if the rounds should impact in a defilade position. There are two courses of action that can be taken in this situation. The best course of action is to request shell smoke (or white phosphorus). This will readily mark the location of the impace point and adjustment can be made. However, do not neglect to change back to Shell HE in your subsequent correction. The other course of action has certain disadvantages and should only be used as a secondary choice. A bold shift can be made to move this "lost" round out into an open area where it may be observed. A sensing of "lost over or short" must be made in this case and this is not always possible. The smoke rounds in volley number two locate the impace point. This volley is located within the doubtful zone and are shifted for deviation with no range change. Shell HE is requested at this point. A 200-meter range bracket is established and is successively split. Volley number five has established one end of a 100-meter bracket and fire-for-effect is entered. Volley number six is a battalion firing for effect and all bursts are airbursts since VT fuze was used. However, the center of these bursts is not on line and should be brought back to line. Volley number seven was accurate and sufficient. "End of Mission" is transmitted to the fire direction center. This releases the artillery battery from the mission. A surveillance is transmitted to inform the S2 of damage inflicted on this target.

11. Requirement 11.

Solution:

a. Destruction.

b. (1) one.

(2) one.

c. BIGBOY 20, this is BIGBOY 81, Fire Mission (Over). From target No AB 401 R 150 drop 300, machine gun firing from heavily fortified bunker, destruction, adjust fire (over)."

Explanation:

The target in this mission is a hardened point-type target and requires precision fire techniques to destroy it. A registration mission is fired to determine corrected data and not destroy targets. A destruction mission must be fired to destroy this target.

One of the characteristics of a precision mission is that one gun is used in adjustment and fire-for-effect.

When a shift from a known point is to be used to locate a target and a number of known points are available, use the known point closest to the target if at all possible. Target No. AB 401 is closest to the bunker in this mission and should be used. A small shift to a target is much better because it keeps errors in judgment of range and deviation to a minimum.

12. Requirement 12.

Solution: BIGBOY 20, this is BIGBOY 81, Fire Mission, (over). From registration point one spotting line from grid 56593639 to grid 56213792, L800 Add 300, Company of Infantry "digging in," fuze VT, adjust fire (over)."

Explanation: The road extended from RP 1 to the north was used as a convenient spotting line. It is readily identifiable on the ground and on a map. The road is relatively straight and a direction can be easily determined from it. The item of primary importance when transmitting the location of a convenient spotting line is to insure that the FDC knows what direction the line is extended. This is accomplished by using the

words "From" and "To" when transmitting the coordinates. Line "Alpha" is a line of known direction. It was not used in this problem since a convenient spotting line was designated for use.

13. Requirement 13.

Solution: BIGBOY 20, this is BIGBOY 81, Fire Mission(over). Target AB 402 eight-man survey party in wooded area, Fuze VT, Fire-for-effect (over)."

Explanation: The ability to fire upon a target without adjustment, greatly increases the effectiveness of artillery. There are five instances when surprise fires can be delivered upon a target -

a. Surveyed location.

b. Recently-fired-upon location.

c. Small accurate shift from a known point (RP, etc).

d. Prominent terrain feature.

e. Large target area.

Surprise fire was utilized in this requirement. The eight-man survey party is located at a recently fired upon location.