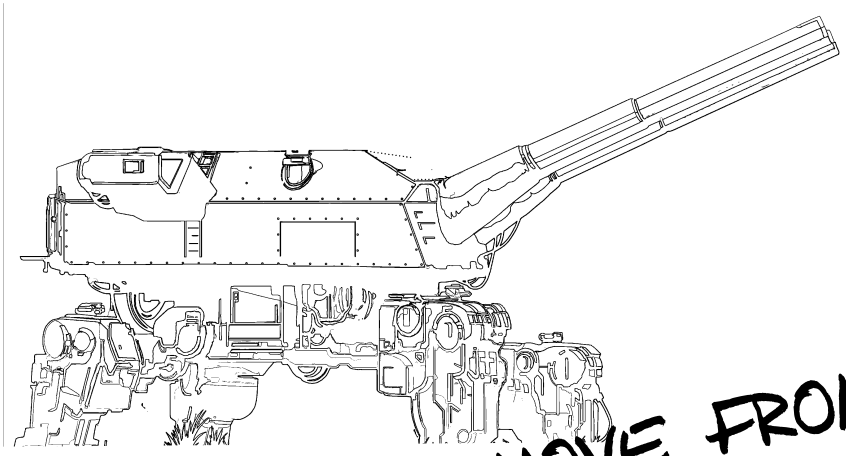
TM 9-[redacted]

Operator's Manual
Iron Nest Self Propelled Artillery System



DO NOT REMOVE FROM TURRET

HEADQUARTERS, CASTILE ARMY
DECEMBER 1925

IRON NEST
HEAVY TURRET SIMULATOR

https://linktr.ee/IRONNEST
Fan made technical manual by Michael Faragher of Between the Borders

TOP SECRET
Distribution restricted. See General [redacted] for distribution list. Ink is water soluble. If at risk of capture, submerge manual in water or set alight. Unauthorized distribution has been classified high treason by [redacted]

Contents

List of Figures 5

1 General Information 7
1.1 Orientation . . . 8
1.1.1 Version Notice . . . 9
1.2 Warnings . . . 9

2 Equipment Description 11
2.1 Location and Description of Major Components . . . 11
2.1.1 Map Table . . . 11
2.1.2 Receiver . . . 11
2.1.3 Requisition Console . . . 12
2.1.4 Upper Office . . . 12
2.1.5 Guns (Port/Starboard) . . . 12
2.1.6 Fire Control . . . 13
2.1.7 Elevation Controls . . . 13
2.1.8 Traversal Controls . . . 13
2.1.9 Fire Mission Calculator . . . 13
2.1.10 Hull Access Door . . . 13
2.1.11 Hull Amenities . . . 14
2.2 Equipment Data . . . 14
2.2.1 Cannon Performance Data . . . 14

2.2.2 Fire Control Equipment Performance Data 15
2.2.3 Walker Performance Data 15

3 Operating Instructions 17
3.1 Description and Use of Operator's Controls and Indicators . 17
3.1.1 Cannon Controls and Indicators 17
3.1.2 Fire Control Computer Operation 17
3.1.3 Munition Magazine Operation 21
3.1.4 Powder Magazine Operation 22
3.2 Resupply Operations 23
3.3 Normal Operations 25
3.3.1 Tactical Considerations 25
3.3.2 Compute Mission 26
3.3.3 Feed Projectile 27
3.3.4 Load Powder Charge 27
3.3.5 Gunlaying 28
3.3.6 Verification 28
3.3.7 Gun selection 29
3.3.8 Firing 29
3.3.9 Correction 29
3.3.10 Displacement 29
3.4 Emergency Operations 29
3.4.1 Pneumatic System Leakage 29
3.4.2 Misfires 30
3.4.3 Fires 30
3.4.4 Chemical Leakage 30

4 Ammunition 31
4.1 Armor Piercing 31
4.2 High Explosive 32
4.3 High Explosive, Max Burst Charge 32
4.4 Illumination Shell 32
4.5 Smoke 33
4.6 CS (Tear) Gas 33
4.7 Phosgene Gas 34

A Ranging Procedures 35
A.1 Grid Coordinates 35

A.2 Range and Bearing 36
A.3 Plotting a Vector 36
A.4 Triangulation 37
A.5 Trilateration 38
A.6 Terminal Effects 39

B Teletype Terminal 41

List of Figures

3.1 Elevation Controls 18
3.2 Fire Control Computer Interface 19
3.3 Munition Magazine Interface 21
3.4 Powder Magazine Interface 22
3.5 Requisition Interface 23
3.6 Air Mission Request Interface 24

A.1 Positionfinding by Bearing 37
A.2 Positionfinding by Range 39
A.3 Determining Area of Effect 40

B.1 Command Teletype 41
B.2 Intelligence Teletype 42

This page intentionally left blank.

CHAPTER 1
GENERAL INFORMATION

The Iron Nest is a novel, next-generation heavy artillery platform; it combines naval-dreadnought class heavy artillery with a super-heavy walking tractor style locomotion system. Its primary role, supporting Precisión Mecánica, dictates its offensive and communications capabilities, using its advanced wireless capabilities to both receive current reports from forward observers and headquarters and provide real-time tasking to autogyro reconnaissance units.

The locomotion systems provide unique benefits over stationary or wheeled artillery units. The ability to traverse terrain increases both strategic and tactical options and reduces the risk of counter-battery fire. Enemy forces require current targeting information to fire upon the Iron Nest, rather than simply requiring grid coordinates to strike a stationary position.

A state of the art mechanical fire control computer further enhances the system's capability, providing high probability of first shot kills given accurate intelligence and proper operation. This provides increased lethality, as the target will be unable to take cover against follow-up shots, and survivability, as counter-battery artillery will have little time to find a solution before they are neutralized.

The Iron Nest is the culmination of the Precisión Mecánica form of

warfare and the pinnacle of Castillian engineering. Those who operate it carry the weight of the nation on their shoulders.

1.1 Orientation

The Iron Nest is a 5,000 ton self-propelled artillery vehicle. It is comprised of two major sections, the hull and the turret.

The turret is a refinement of a last-generation German battleship turret, and contains two guns with independent elevation mechanisms. Much of the direct-fire systems, such as rangefinders, have been removed and the liberated space used to house additional communication and support equipment. The turret is essentially self-contained and does not require any ingress/egress during combat operations, although there is no engineering reason the Operator can't enter the hull at any time.

Safety tip: keep the trap door to the hull closed in operation

The hull is a custom super-heavy walking tractor refit for military use. It contains the crew berth, locomotion systems, and support systems. Turret Operators do not require significant access to the hull during combat operations, but it acts as a bunker and bunk between fire missions.

Fire missions for the Iron Nest are typically either strategic-level missions or counter-battery missions in support of its own operations. It is strongly integrated into both its logistic and command structures and is unsuited for independent deployment for any length of time, both for logistical and security reasons. The impressive range of its guns is its primary defense, however any artillery capable of matching its range are likely capable of inflicting serious damage on the vehicle. *It is imperative that the Iron Nest is used in a strategic support role and not an assault role.*

1.1.1 Version Notice

Illustrations based on prototype hardware in place at time of writing. Installed hardware may be of a later revision, and hardware upgrades may obsolete the images at any time.

1.2 Warnings

DANGER	Upon firing the cannon create lethal overpressure within 10 meters of the muzzle and can deafen or shatter glass to 50 meters. Unsecured objects may become projectiles. Personnel must remain outside of this area when the Iron Nest is in operation and all hatches and blast shields must remain secured when firing.

WARNING	Hydraulic systems, including rams, powered feed for elevation or traversal, can break bones or sever limbs. Never touch a driven wheel or get in the way of a ram, crane, shell, or powder bag.

This page intentionally left blank.

CHAPTER 2
EQUIPMENT DESCRIPTION

2.1 Location and Description of Major Components

2.1.1 Map Table

The map table is centrally located in the turret platform, and includes the map, its markers, and associated plotting and calculation equipment. It includes time of flight and shell tracking systems, a grid-based map overlay to update the map with real-time photographic reconnaissance data, and a pull chain for a horn for general notification purposes.

2.1.2 Receiver

Located in the rear of the turret compartment, the Receiver Group consists of radio and wired communication equipment tied into the requisition console, teletype terminals, counterbattery notification systems, and associated systems. The port teletype is used for communication from High Command, while the starboard is for field reports. Between these is a retractable counterbattery timer, which is deployed when counterbattery fire is expected.

2.1.3 Requisition Console

The starboard rear compartment adjacent to the Receiver contains the Requisition Console, which automates outgoing logistic requests, including autogyro tasking, resupply requests, and repositioning orders.

2.1.4 Upper Office

The port rear compartment contains the Upper Office, which includes quick reference for firing procedures, general paperwork, and a phonograph for morale purposes. The required documentation and forms are listed in [redacted]

2.1.5 Guns (Port/Starboard)

Gun arrangement (typical, rear to front):

- Rotary magazine
- Magazine index lever
- Shell rammer lever
- Powder control levers
- Powder rammer control
- Cannon Breech

2.1.6 Fire Control

The Fire Control system is comprised of two consoles in the center of the front of the platform. At ground level is the primary display and checklist, and suspended from the ceiling is the firing mechanism. The port and starboard levers link the corresponding gun to the trigger, which is a pull chain located between the levers.

2.1.7 Elevation Controls

Elevation controls are located to port of the fire control console. Each gun has a power feed and manual hand wheel and contains readouts of current elevations setpoints.

2.1.8 Traversal Controls

Traversal controls are located to the starboard of the fire control systems and consist of a lever for power feed and a hand-wheel for manual or fine adjustment.

2.1.9 Fire Mission Calculator

Directly to the aft of the port magazine is the computer to accurately calculate fire control missions. It contains multiple readouts and input wheels, and is described in detail in a dedicated section.

2.1.10 Hull Access Door

Access to the hull is accomplished through a trap door to the rear of the fire control console. The lever to open and close the door is located to port of the door itself.

2.1.11 Hull Amenities

Within the hull are various support sections. The kitchen contains a stove and sink as well as a prep station. A hygiene station, complete with sink, toilet, and shower, is provided to reduce the need to exit the vehicle. There is also a lower office for paperwork and recordkeeping, although it doesn't include a phonograph, and a situational map for general operational reference.

I don't know if the shower would work for decontamination, but it's still nice

2.2 Equipment Data

2.2.1 Cannon Performance Data

Mainguns: 2 x [redacted] Heavy Artillery Cannon
Manufacturer: [redacted]
Bore: 800mm
Barrel Length: 40.6 Calibers
Muzzle Velocity: 800 m/s
Rifling: Uniform 1:25, RH
Feed Mechanism: Hydraulic ram assisted manual loading
Rate of Fire: 40 Rounds per hour, per gun, absolute limit.
Ready Rounds: 12 (Six per gun)
Powder Charge Magazine: 100 (Shared)
Nominal Shell Weight: 5,000 kg

2.2.2 Fire Control Equipment Performance Data

Expected Mechanical Accuracy:
Elevation: ±0.01°
Traversal: ±0.1°
Maximum Depression: 0°
Maximum Elevation:60°
Minimum Range: 700 m
Maximum Range: 30,000 m

2.2.3 Walker Performance Data

Maximum Speed: [redacted]
Maximum incline, climb:[redacted]°
" , descending:[redacted]°
" , roll: [redacted]°
Maximum step-over height: [redacted]
Maximum trench clearing width: [redacted]

This page intentionally left blank.

CHAPTER 3
OPERATING INSTRUCTIONS

3.1 Description and Use of Operator's Controls and Indicators

3.1.1 Cannon Controls and Indicators

Elevation Controls:

The elevation controls, as seen in Figure 3.1, provide control over the elevation of both cannon. There are both manual control wheels (4) for fine adjustment and a powered system for rapid, coarse adjustment (6). These controls are identical for left and right cannon, and engaging the link (7) will lock both barrels together for a single salvo.

3.1.2 Fire Control Computer Operation

The fire control computer is located to the aft of the port rotary magazine, and is composed of two attached consoles. The upper console consists of wheels for target (1) and shell selection (5) as well as coarse (3) and fine (4) bearing controls, as well as a mechanical readout (2).

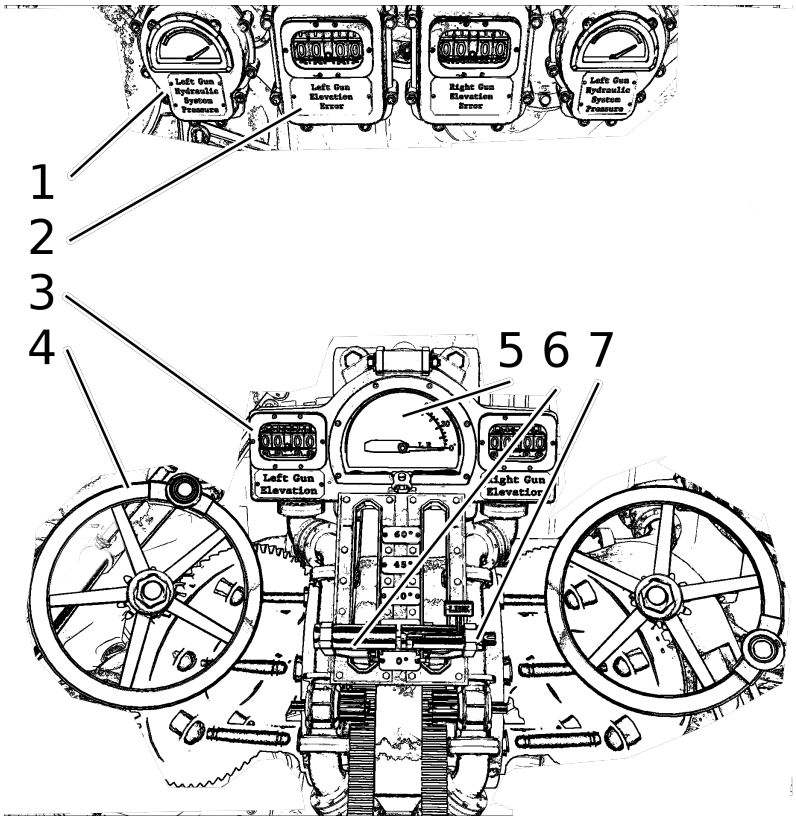


Figure 3.1: Elevation Controls

1	Hydraulic Pressure Gauge (Typ)
2	Gun Elevation Error (Typ)
3	Gun Elevation (Typ)
4	Elevation Hand Wheel (Typ)
5	Elevation Gauge
6	Elevation Power Feed (Typ)
7	Elevation Link

Table 3.1: Elevation Control Legend

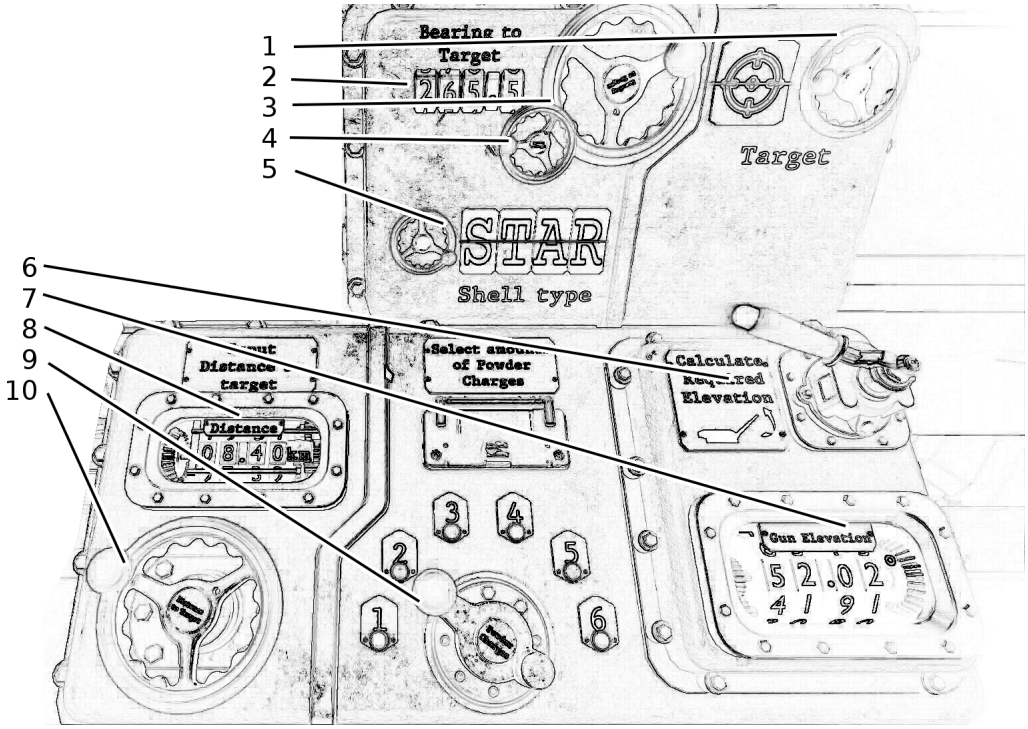


Figure 3.2: Fire Control Computer Interface

The lower console has inputs for range (10) and power selection (9) and readouts for range (8) and elevation (6).
Upon actuation of the computation lever (6) all inputs will be read and the elevation output will be updated. At the same time, the computer will stamp a paper tag with all pertinent information and provide it to the operator. *This data is only as accurate as the quality of the inputs!*

1	Target Selection Handwheel
2	Bearing Readout
3	Bearing Handwheel, Coarse
4	Bearing Handwheel, Fine
5	Shell Type Selection
6	Compute Lever
7	Elevation Readout
8	Range Readout
9	Powder Charge Selection
10	Range Input Handwheel

Table 3.2: Fire Control Computer Legend

3.1.3 Munition Magazine Operation

Indexing lever (1) increments the rotary magazine to the next position. When the shell rammer lever is actuated (2) the shell will be rammed into the chamber. When the rammer is fully retracted, the powder feeding systems will automatically be activated.

The rammer is designed to load a five ton shell at high speed. It will not even notice an arm or body in the way. Stay clear at all times.

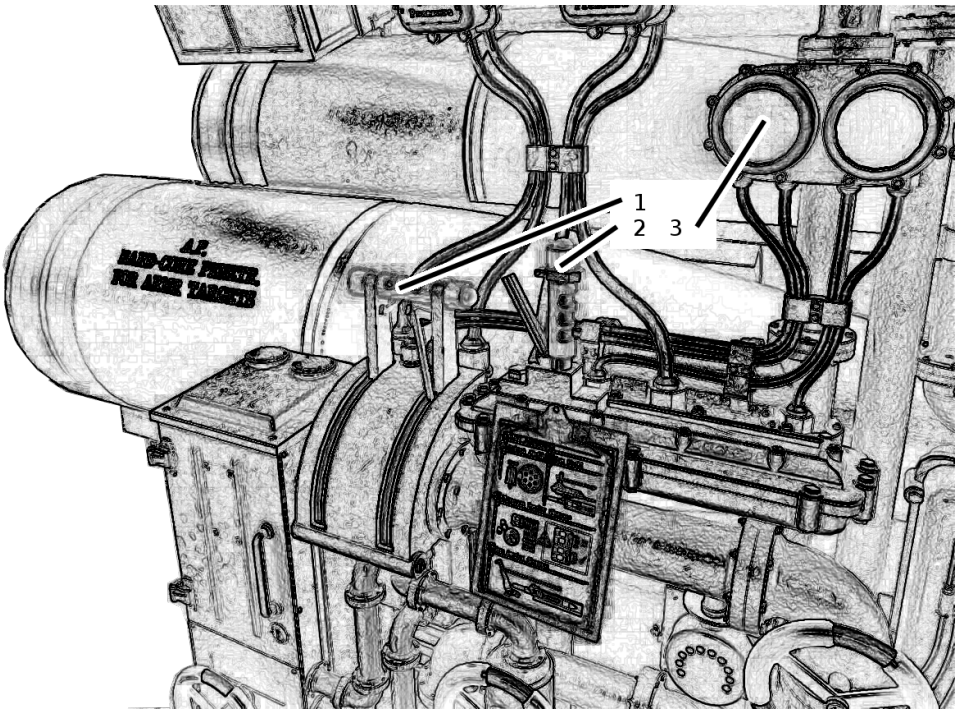


Figure 3.3: Munition Magazine Interface

1	Magazine Indexing Lever
2	Shell Ram Lever
3	Stage Indicator Light (Typ)

Table 3.3: Munition Magazine Interface Legend

3.1.4 Powder Magazine Operation

Powder is deployed from central stores in a semi-automatic manner controlled by the controls directly forward of the rotary magazine. The most recent calculated powder charge and current number of charges on the spanning tray are displayed on the mechanical counter directly aft of the control levers (2). *Be sure to use the correct charges for the mission, do not rely on this display if you have computed multiple fire missions.* Pulling the dispensing levers (3 & 4) will activate the designated dispenser and load a single charge onto the spanning tray. *These must be actuated in order.* The powder rammer (actuated by 5) will load the charges on the spanning tray and begin the automated breech locking and elevation processes.

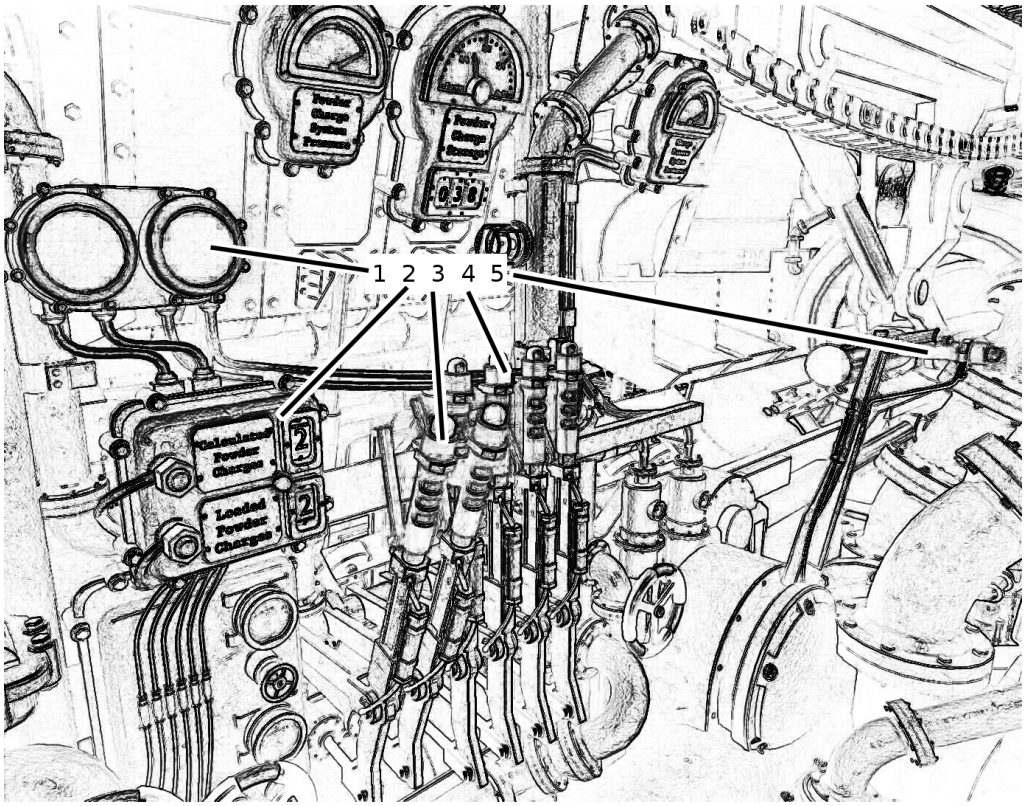


Figure 3.4: Powder Magazine Interface

1 Stage Indicator Light (Typ)
2 Charge Quantity Display
3 Charge Lever, Active (Typ)
4 Charge Lever, Inactive (Typ)
5 Powder Rammer Lever

Table 3.4: Powder Magazine Interface Legend

3.2 Resupply Operations

For simplicity, all resupply is handled through a semi-automated system whereby the operator places a card representing their request into a reader, and the instructions are passed to the resupply team directly. This prevents miscommunication and aids in proper accounting of resources.

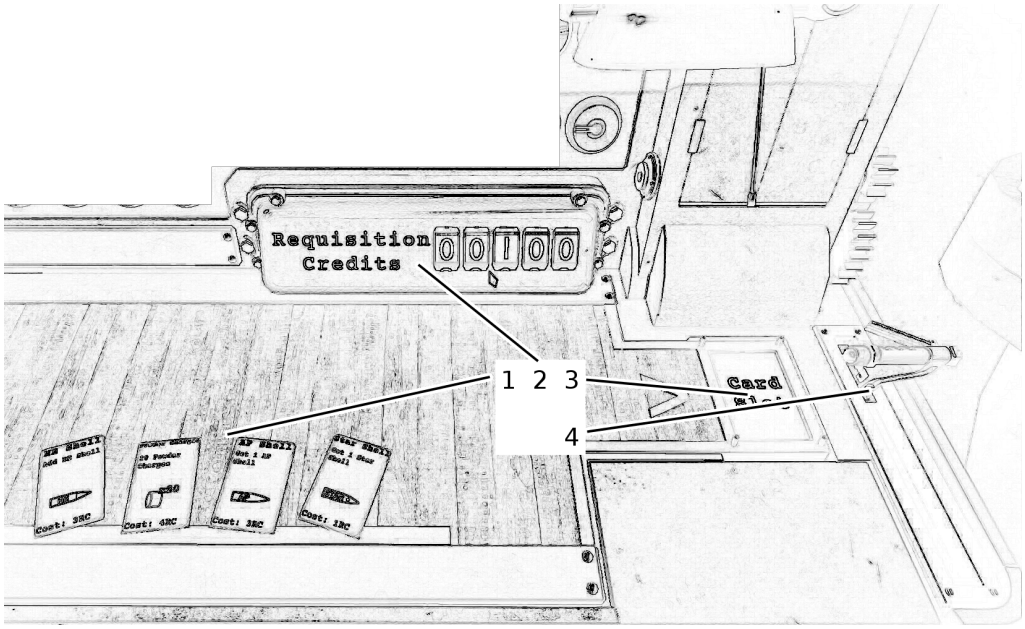


Figure 3.5: Requisition Interface

Command supplies sufficient resources to the operation, noted as "Requisition Credits," and the cost of resupply is listed on the resource cards. Excessive consumption of resources or wanton destruction are

1 Requisition Card (Typ)
2 Available Requisition
3 Card Receptacle
4 Request Lever

Table 3.5: Requisition Interface Legend

against the interests of Command, and reflect poorly on a wasteful operator.

To request resupply, place the corresponding card into the card slot, select the desired magazine, and toggle the activation switch; the resupply team will handle the rest.

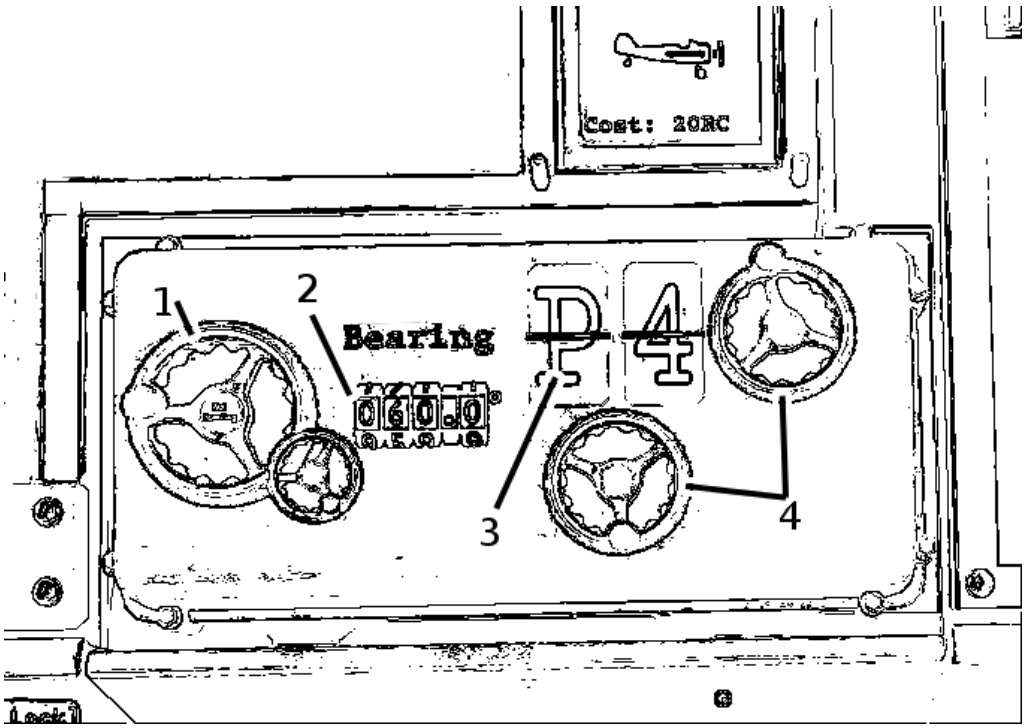


Figure 3.6: Air Mission Request Interface

Do not stack multiple cards in the card slot. It will prevent proper operation.

1	Bearing Adjustment Wheel
2	Bearing Indicator
3	Grid Square Indicator
4	Grid Square Hand Wheel

Table 3.6: Air Mission Interface Legend

3.3 Normal Operations

First, learn to do it right. Shortcuts come later

The primary duty of the Iron Nest is to provide fire support by executing fire missions. Repositioning of the vehicle is performed by specialists, as traversal and site selection require considerable engineering capability. This manual only covers the operation of the Iron Nest during firing.

It is important to note that some operations depend on another, but many can be performed in parallel. For example, the projectile and powder must be loaded at neutral elevation, then the cannon must spend considerable time elevating. This time can be used to traverse the turret, load or elevate the other gun, or otherwise perform actions in the time that would be wasted waiting and staring at an indicator. The mark of an experienced Operator is to waste no time while still remaining mindful and precise.

Once a fire mission is ordered and range and bearing to target(s) is determined, the firing procedure is described below.

Information on receiving fire mission orders and determining range and bearing to target are covered in Appendices B and A respectively.

3.3.1 Tactical Considerations

The Iron Nest is heavily armored, but is also functionally immobile. Support elements are tasked with protecting the turret from close-in threats, but opposing artillery presents a direct and imminent threat. *Counter battery fire is lethal* and suppressing all enemy artillery is objective number one. Plan missions against every known artillery

emplacement immediately, and use both guns and rapid traversal to eliminate these threats prior to them planning a successful mission on your location.

You cannot miss fast enough to make up for a hit! Be as fast as you can without sacrificing accuracy. A missed round provides ample time for counter battery fire.

The turret's armor provides some leeway, but is meant to provide breathing room, not stop all enemy fire. Remember: your supply chain, along with hundreds of tons of powder and munitions, is outside of your armor envelope.

3.3.2 Compute Mission

Objective: Determine bearing and elevation of fire mission.

Enter Mission Data

Using handwheels, select target type and shell type. This is critical when computing multiple fire missions, but for a single mission, it can be omitted.

Set Bearing

Using handwheel, input bearing on target.

Set Range

Using handwheel, input range on target.

Select Charges

Select appropriate number of charges. The minimum number is optimal for economy, while increased powder usage will reduce time of flight.

Compute Mission

Pull compute lever. Retrieve fire mission summary sheet.

3.3.3 Feed Projectile

Objective: Select and feed projectile for fire mission.

Index Carousel

Use magazine increment lever until proper projectile is in line with ram.

Activate Ram

Push lever to activate ram.

3.3.4 Load Powder Charge

Do not load powder until ram has retracted!

Select Powder Load

Pull powder charge levers one at a time until the proper number of charges are on the spanning tray.

Activate Ram

Push lever to ram powder into chamber. Breech will close and lock automatically.

3.3.5 Gunlaying

The cannon must be at a neutral elevation to load. Use downtime to load opposite cannon, traversal, or other activities. After the breach is locked, the cannon will seek its last set elevation.

Traversal

Traversal controls are located to the right of the main firing console. Use traversal lever for hydraulic assisted high speed slewing and hand wheels for fine adjustment.

Elevation

Elevation controls are located to the left of the main firing console. Use the lever for coarse automated elevation selection and the hand wheels for fine adjustment. The guns may be elevated individually or locked together using a toggle on the elevation handles.

3.3.6 Verification

The main firing console contains a step by step verification checklist prior to firing. Verify each stage of the firing process is complete using the information summary on the console and toggle these switches. These switches are informational and provide no mechanical function, however it is highly recommended all steps are verified before firing.

3.3.7 Gun selection

The overhead ignition system can be selected to fire either gun or both. Select the desired tube(s).

3.3.8 Firing

Brace for recoil. Pull the firing lever.

3.3.9 Correction

Check the map table and teletypes for updated intelligence. Using visual indicators or range and bearing corrections, compute a new fire mission. Repeat this process until desired round(s) put successfully on target.

3.3.10 Displacement

When possible, reposition after fire missions. Counterbattery fire is based on the last known position, and that's the position of the last firing. Moving to a new position requires substantial computation and mapping, but also reduces the risk of effective counter-battery fire.

3.4 Emergency Operations

3.4.1 Pneumatic System Leakage

Leakage of pressurized gasses, including steam, is to be repaired immediately by tightening any leaking connection or bypassing any damaged component.

3.4.2 Misfires

A failure to ignite requires a second firing attempt.

Should this fail, or should a projectile fail to clear the barrel, the cannon is disabled and cannot be repaired by the operator. Specialized teams and equipment are required to clear the projectile. The cannon does not have the capability to extract or discard the powder. Any checkfire, handfire, or misfire leaves the cannon in an unsafe condition and must remain pointed towards the enemy or a safe direction.

3.4.3 Fires

In the event of a fire, an operator **may not** operate the powder magazine. Any powder currently on the rammer must be loaded immediately and the breach sealed. Smoke from any fire will quickly incapacitate, but cooking off of powder will create an overpressure event likely to kill the entire crew and destroy the Nest.

Any fire is a critical event that reduces operational capability ;it is the duty of the operator to prevent or extinguish any fire before it threatens the machine. Remember: a mask can protect you from smoke, but not oxygen deprivation.

3.4.4 Chemical Leakage

Leakage of riot agents is not a lethal event, but requires proper protective posture (properly rated masks) to continue operations. Notify command at the need to decontaminate the vehicle and be prepared to provide a full accounting of the incident and the loss of combat capability of the Nest.

Leakage of lethal agents creates an environment incompatible with sustainment of human life. Any personnel not already in full-body protective gear are likely to expire; adopting a protective posture after exposure is useless.

CHAPTER 4
AMMUNITION

All rounds are ballistically matched in order to reduce Operator workload and the chance of inappropriate fire control solutions.

4.1 Armor Piercing

Description: Armor Piercing, Explosive Filler
Abbreviation: AP
Purpose: Penetration of armored or underground targets; delayed detonation until target has been penetrated
Appearance: Black

Notes: Reduced charge to metal ratio results in significantly increased shell penetration into armor or soil, but reduces explosive radius and damage to exposed personnel. Also used when damage to secondary targets is undesirable.

4.2 High Explosive

Description: High Explosive, Standard Charge
Abbreviation: HE
Purpose: General purpose High Explosive shell for use against structures, soft vehicles, and personnel.
Appearance: Green ogive

Notes: General purpose round, effective under most circumstances.

4.3 High Explosive, Max Burst Charge

Description: High Explosive, Maximum Charge, Airburst
Abbreviation: HCHE
Purpose: Creates maximum effective overpressure, suitable for soft vehicles and structures, as well as highly effective against exposed personnel.
Appearance: Green ogive, yellow stripe

Notes: Increased charge mass as well as airburst configuration creates a tremendous effective blast radius, but leads to increased cost and decreased effect on buried or armored targets. Significant collateral damage is to be expected.

4.4 Illumination Shell

Description: High-Lum Illumination Shell, Parachute Equipped
Abbreviation: STAR
Purpose: Illumination and scouting
Appearance: Blue, white star on ogive

Notes: Airborne illumination source for night operations or general scouting use.

In addition to providing sufficient light for ground forces to operate, this also provides greater effectiveness of scouts in poor lighting conditions and can provide psychological effect; if the terrain is in range of a star shell, it is in range of high explosives, and the position has been dialed in.

Highly effective as a non-lethal spotting shell when friendly forces in area of operation.

4.5 Smoke

Description: Smoke Screening Shell
Abbreviation: SMK
Purpose: Concealment/Harassment
Appearance: White(?)

Notes: Pyrotechnic smoke generator, ground based. Internal flame reduces, but does not eliminate, fire hazards. Still a ballistic hazard to friendly personnel.

4.6 CS (Tear) Gas

Description: CS (Tear) Gas
Abbreviation: TGAS
Purpose: Crowd Control / Area Denial
Appearance: Yellow ogive, white stripe

Notes: Gas irritates eyes and mucous membranes without lethal effect. Forces targets out of the area or to adopt a protective posture that limits their effectiveness. Remains a ballistic threat to friendly personnel.

Generally non-persistent and unlikely to cause permanent injury. Useful for riot control and tying up responders treating the affected.

4.7 Phosgene Gas

Description: Chemical Agent, Lethal
Abbreviation: PGAS
Purpose: Destruction of Personnel / Area Denial
Appearance: Yellow ogive, blue stripe

Notes: Phosgene kills exposed personnel and prevents enemy forces from entering the area without significant protective equipment. Reduces collateral matériel damage. Ballistic hazard to target.

Phosgene is a low-persistence choking agent with an effective life of several minutes. This allows for more rapid decontamination and reoccupation of the affected area than agents such as HD or Lewisite. Decontamination or vapor knock-down with water, as well as interaction with standing water or water vapor, will generate acid; be prepared for this byproduct.

As a heavier than air gas, trenches, basements, and valleys will increase concentrations more rapidly, while elevated positions will clear more quickly. *In case of shell leakage, turret of Iron Nest will have lower concentrations than hull, but expect the entire vehicle will contain lethal levels of gas until cleared by the Chemical Corps.*

APPENDIX A
RANGING PROCEDURES

The Iron Nest contains an enhanced mapping table, tied into the fire control system to track projectile flight. This is a one-way connection, and the map cannot be used to program the fire control computer.

Included are map markers to further enhance situational awareness. These include red hostile markers, yellow positional markers, blue friendly spotter tokens, and a blue token for the Nest itself. *Use the pointed marker, not the center of the token, to indicate grid position.*

Some Operators keep tokens based on their kills and display them on their map. This is an unofficial practice and is not condoned.

But it's mentioned and not prohibited. Tacit permission

A.1 Grid Coordinates

The map table is subdivided into 200 grid squares, arranged in a 20 by 10 matrix. Each grid square is labeled with a letter-number combination beginning with A0, such that E3 is the 5^{th} square from the left and the 4^{th} from the bottom.

Each of these grid squares is further subdivided into ten by ten squares, each labeled 0 to 9, such that 3:5 is the 4^{th} from the left and 6^{th} from the

bottom.

The combined format for a map location is presented in the format XY x:y, which from the above examples would be E3 3:5.

A.2 Range and Bearing

Range is the distance between two points, be it the Iron Nest and a target or a spotter and a target. It is automatically calculated by the table, reducing Operator error.

Bearing is the map angle between two points, with 0 being North and proceeding clockwise through 360 degrees. The map in the Iron Nest is pre-calibrated for magnetic declination and all bearings can be used as true. Magnetic bearings should not be trusted, as the large amount of ferrous metal in the Nest will disrupt magnetic compasses for a substantial distance.

This could be compensated for, but prototypes and all

A.3 Plotting a Vector

In order to properly plot a vector to the target, use the red pencil to trace a line from the position of the Iron Nest to the position of the target. The table will automatically make note of the length and bearing of the line, denoting the range and bearing to the target.

The rules may be arbitrary, but nobody can save you if you break them. Use red.

Non-firing vectors, such as between a spotter and a target, should be made in yellow or white to avoid confusion when making construction or reference lines.

A.4 Triangulation

When the target's position is unknown, but forward observers have a bearing on the target, triangulation can be used to determine the position to plot a vector for a firing position.

The basic method of triangulation is to take the bearings from multiple field reports and plot them on the map to determine the location of the target.

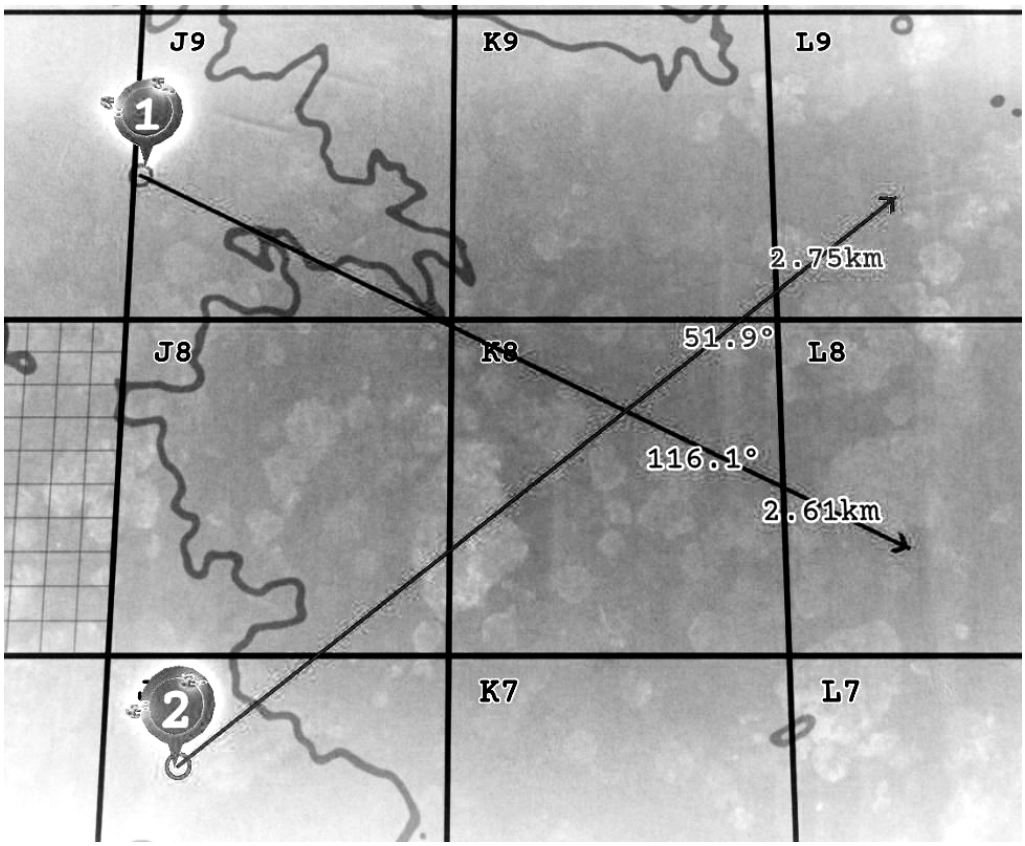


Figure A.1: Positionfinding by Bearing

Using the situation in Figure A.1 Spotter One sees the target at a bearing of 116.1 and Spotter Two sees the target at bearing 51.9. Two rays are drawn on these lines and the target is at the intersection.

Make sure to draw these rays excessively long, as attempting to continue a ray that doesn't intersect introduces error. *However* if such an extension is required, ensure it is on the same bearing and as close to aligned as possible. It is less desirable than shooting a new bearing, but is offered as an option if speed is more important than accuracy. Both speed and accuracy are maintained if the Operator simply does the mapping correctly the first time.

Triangulation will fail if the target is collinear with all available spotters.

A.5 Trilateration

In certain situations, the range but not the bearing may be known. In this case, trilateration may be used to determine the position of the enemy.

Using the situation in Figure A.2 the target is 1.53 km from Spotter One, and 1.71 km from Spotter Two. The target is located where these range circles overlap. This provides an ambiguous situation with two separate valid target locations. This will be the case in virtually all circumstances except when the target is collinear with two spotters, or when three or more spotters are involved.

In cases where both range and bearing spotters are available, a hybrid method should provide a valid solution, but may provide multiple ambiguous solutions as above.

In case of ambiguous solutions, star shells, autogyro reconnaissance, or logical deduction (such as removing a target in friendly territory or over water) may be used to determine the correct solution. Dropping five tons of expensive ordnance on what may be a friendly target is not the proper way to verify a target.

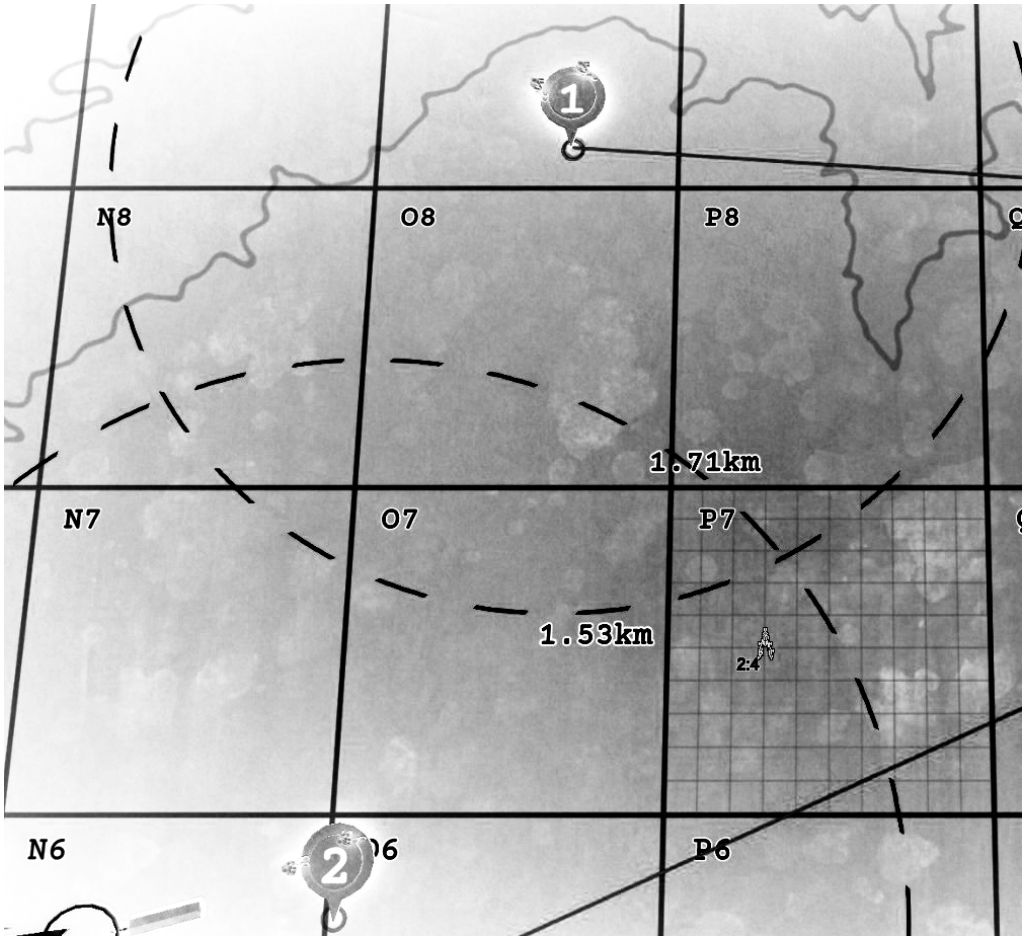


Figure A.2: Positionfinding by Range

A.6 Terminal Effects

The map table includes a mechanical hand calculator for estimating the terminal effects of a fire mission. This only takes into account blast effects and not the penetration required for underground or hardened targets.

As shown in Figure A.3 the calculator relies on manual shell selection and opens or closes an iris to estimate the blast effects of the selected shell. By overlaying this on the target, an estimate of the area affected can be

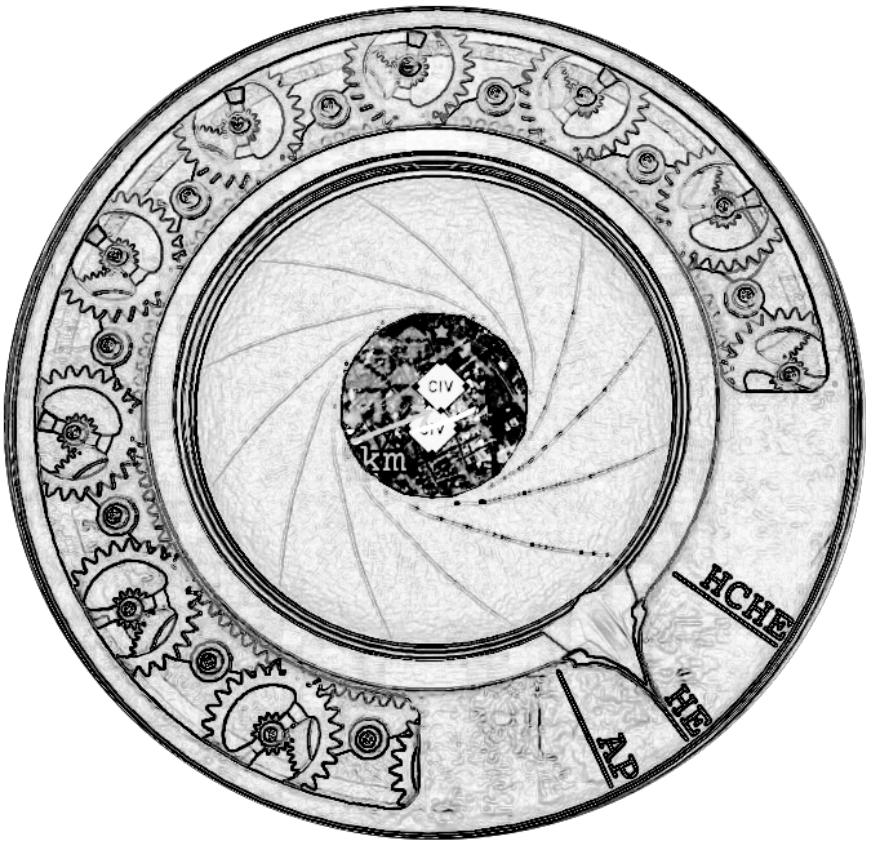


Figure A.3: Determining Area of Effect

obtained. This can be helpful for targeting multiple enemy units or avoiding nearby friendly targets.

APPENDIX B
TELETYPE TERMINAL

Description:

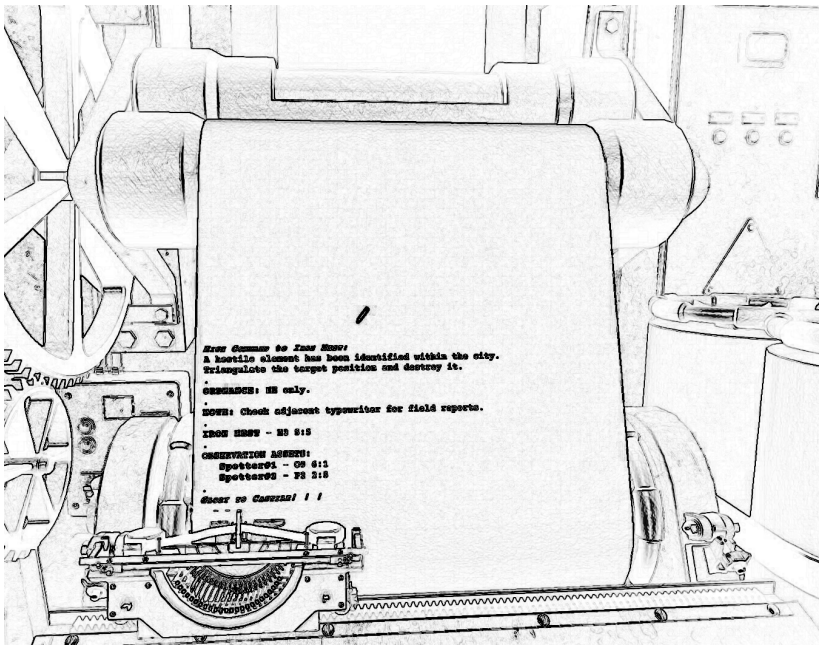


Figure B.1: Command Teletype

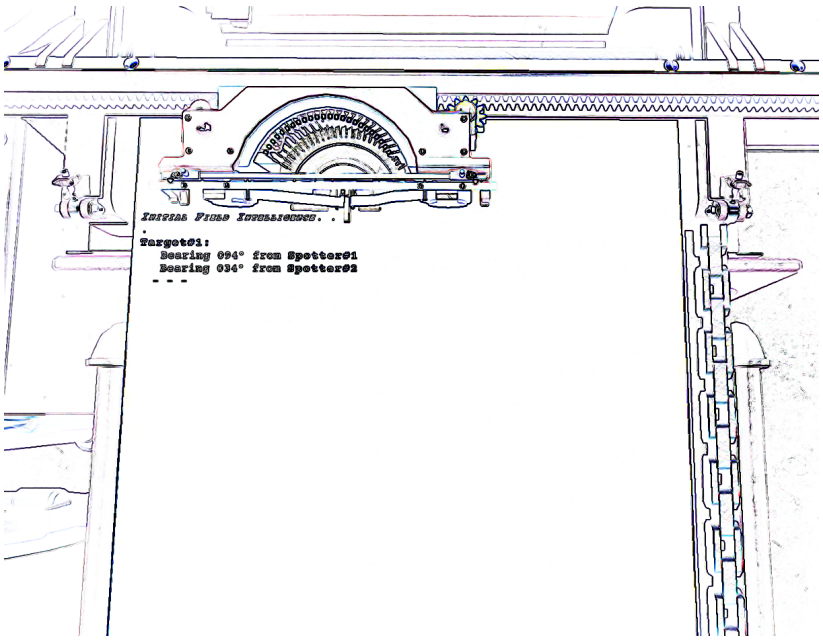


Figure B.2: Intelligence Teletype

The Iron Nest is equipped with two receive-only teletype terminals in order to send fire missions or Intelligence updates to the Operator. They are hammer-struck, ink-ribbon based teletype machines, capable of advanced typesetting, such as boldface and underlined text. Models may vary and the machine is carrier agnostic, capable of functioning over radio or wire, using any encoding technique supported by the Iron Nest's communication systems. These systems are not operator serviceable, and the output of the teletype is the only point of interest for Operators.

The teletype system is configured with bells of varying tones to alert the Operator of the severity of the incoming message. These tones include informational updates, incoming orders, and notifications of counter-battery fire.

Purpose:

The Teletype provides both reception and logging of fire missions or updates provided to the Iron Nest. While the Operator is expected to

make pertinent personal notes, the exact messages will remain logged for future reference. Any additional orders may also be sent via the Teletype.

Content:

Any fire missions contain some or all of the following information:

Target Type: The type of target contains pertinent information regarding shell selection and timeliness of mission. An underground bunker would require an AP shell, while groupings of soft targets may require high explosive or gas payloads. Threats, such as enemy artillery, may require a more rapid reaction, and first-shot kills may prevent return fire or enemy repositioning. *This implicit shell selection does not override explicit orders.*

Shell Type: The fire mission may include explicit orders pertaining to the type of shell used.

Iron Nest Position: For Operators who haven't yet performed a mission since mobilization, or simply for reference, the grid position of the Iron Nest may be included.

Reference Position: Positions may be reported as landmarks for future aiming reference. Example: *Spotter #1 is at E7 1:0*

Target Position: A target may be specified by a bearing, angle, or both from any given landmark, including the Iron Nest.
Examples:
Target #1 is bearing 084° from Spotter #1
Target #1 is 11.73km Distance from Spotter #1