

RANGE OPERATION CENTER (ROC) – Small

Function: The ROC-S houses the range control stations (RCS), data termination racks (DTR), communication racks, instrumentation equipment, communications equipment, heating/ventilation/air conditioning (HVAC), and accommodates range personnel. All targetry and scenario driven training is controlled from this facility. The ROC-S is the central communications hub for all cabling systems downrange, the cantonment area, and installation connections.

General: The ROC-S provides office space, break room, and storage for personnel conducting training exercises as well as an observation room for viewing downrange training exercises either by line-of-sight or camera video as well as a real-time view of the range scenario control computers. Space is also provided in the communication room for required electronics and communications equipment. A mechanical/electrical room is provided for HVAC, panel boards, and other equipment. The ROC-S shall be positioned near the base line if possible to provide the observation room with the most allowable view of down range exercises that the topography permits. When line-of-sight is not possible, the ROC-S shall be totally camera dependent for observation of the training area with equipment provided by the Other Appropriations-Army (OPA) contractor. The control room is the heart of down range operation scenario control. Observation windows can be provided in the corridor and observation room to help reduce unwanted traffic into the control room area. The ROC-S shall be designed with deep roof overhangs and pull down shades to reduce solar glare. All windows in the ROC-S are to be a fixed type and insulated. Range flagpole shall have a red “range is hot” light atop pole switched from the ROC-S.

Design Drawings: See the Architectural drawings in the appendix of this document.

Siting Criteria: The ROC-S shall be located approximately 15 to 50 meters behind the baseline in an area offering an unobstructed view of all of the baseline and visibility of as much of the downrange area that is economically practical. The console operator view should have an unobstructed view of the firing line and down range firing positions either by line-of-sight or camera video coverage.

Typical Configuration:

Size:	74.3 square meters (800 square feet)
Occupancy:	10
Foundation:	Concrete slab on grade with turned down edges
Shell:	Reinforced split-faced CMU
Roof:	Insulated Standing Seam Metal Roof (SSMR) system
Doors:	Insulated hollow metal
Windows:	Aluminum frame with polycarbonate glazing
Interior Finishes:	Painted CMU, acoustical tile ceiling, sheetrock/metal studs
HVAC:	Central heat and air - Site adapted. Dedicated

	system for communications room.
Standard Lighting:	Fluorescent
Special Lighting:	See Night Operations Lighting paragraph
Lightning Protection:	Mast equipment protection
Power:	120/240Vac, Single Phase, 3-wire Secondary
Telephone:	Standard Voice Cable (optional)
Installation Network Connection:	Fiber Optic Cable (optional)

Electrical/Communications: This paragraph discusses electrical/communication considerations unique to this specific structure type. Downrange power, communication, load, transformers, trenching requirements, etc., are discussed elsewhere in this manual.

Electrical service. Electrical service to the ROC-S shall be 120/240Volt, single phase, 3-wire secondary, 60 Hz or 277/480Volt, three phase, 4-wire, and 120/240Volt, single phase, 3-wire secondary, 60 Hz. The voltage supplied must be maintained within 5 percent at a frequency of 60 Hz, +/-0.5. Surge suppression devices shall be provided at the service entrance for protection of the ROC-S distribution system. Rigid steel conduit shall extend a minimum of 1524mm (5 feet) beyond the outside of the building foundation for power circuits entering or leaving the building. The raised computer floor in the communications and control room must be a minimum of 305mm (12”) in depth and maintain an interconnecting pathway between these two rooms. The ROC-S power distribution panel shall have separate circuits for lighting, convenience outlets, communications, and HVAC equipment.

Additionally, two 120Vac, 20 amp duplex outlets on separate circuits should be provided in the base of each communications rack and DTR.

Lighting. Lighting shall be fluorescent and red lamps or lenses for night operation shall be provided with protected switching to prevent accidental illumination of white lights during night operations. The control room shall require a dimmable lighting system. Where necessary, low-level in-ground lights (similar to airfield markers) may be used for vehicle parking areas and walkways. There is no Army standard for the lighting system, the designer shall need to ensure that the customer’s lighting requirements are met.

Night Operations Lighting. To prevent interference with specialized equipment used during night operations, red lenses or red lamps must be provided in addition to standard lighting if the following conditions exist.

- Night training will be performed
- ROCA buildings are near the firing positions
- ROCA building has windows that cannot be covered.

Separate switching for the standard and red lighting shall also be provided, located near points of egress.

Grounding. Grounding is required for safety and for lightning protection. The ROC-S ground system shall consist of a buried, No. 4/0 AWG, stranded, copper conductor and ground rods all interconnected to yield an earth resistance of 25 ohms or less. Cable connections and connections to the ground rods and structural steel shall be exothermically welded. The DTR and communication rack ground points shall be connected to a Single Ground Point (SGP) with a minimum No.6 AWG, insulated, stranded, copper cable. The SGP shall be connected to the ground system with at least a NO. 4/0 AWG, bare, copper cable. Any additional DTR's or communication racks shall be bonded together with the same type and size copper ground.

Communication-Targetry Control. The ROC-S is the main communications hub for all facility cabling. Downrange targets shall be connected to the Data Termination Rack (DTR) with direct burial fiber optic cabling via conduit ductbank at the ROC-S filled with innerduct to facilitate future expansion [Military Construction (MILCON) funded]. The DTR is an enclosed equipment rack where all fiber optic cables are terminated in a cross-connect panel with industry standard type SC connectors (also MCD). The actual number of instrumentation racks will vary dependent upon range type and design. The raised computer floor in the communications and control room must be a minimum of 305mm (12") in depth and maintain an interconnecting pathway between rooms. Rigid steel Conduit (RGS) shall extend a minimum of 1524mm (5 feet) beyond the outside of the building foundation for communication cabling entering or leaving the building.

Other Appropriations-Army (OPA) funded communications equipment including the MDP can share DTR rack space to convert the fiber optic cables to industry standard. Ethernet copper network cable for connection with the Range Control System (RCS) for targetry control as well as other instrumentation requirements. The target/command and control system shall be Ethernet based. There should be coordination between the OPA contractor and MCD contractor to determine instrumentation requirements for displaying scenario video in the observation room.

Environmental. The indoor temperature for the operational equipment should be between 60°F (15.5°C) and 80°F (26.7°C). The non operating equipment should be between -40°F (-40°C) and 158°F (70°C). Humidity should be with in 50% +/- 10% (non-condensing).

Telephone/Network Communication. Telephone communications and an installation network connection are not required but if desired must be coordinated with the local installation Directorate of Information Management (DOIM).