Chapter 2
Specific Requirements for an Aerodrome Control Tower

2.1 OPERATIONAL REQUIREMENTS

2.1.1 An aerodrome control tower has two major operational requirements for an air traffic controller to be able to properly control aircraft operating on and in the vicinity of the aerodrome. Those requirements are:

a) the tower must permit the controller to survey those portions of the aerodrome and its vicinity over which he exercises control;
b) the tower must be equipped so as to permit the controller rapid and reliable communications with aircraft with which he is concerned.

2.1.2 Surveillance by the aerodrome controller is normally done by visual means (eyesight) alone, mechanically through the use of binoculars to improve eyesight or electronically, through the use of radar or closed-circuit television. The controller must be able to discriminate between aircraft and between aircraft and vehicles while they are on the same or different runways and/or taxiways. The most significant factors contributing to adequate visual surveillance are the siting of the tower and the height of the control tower cab. The optimum tower site will normally be as close as possible to the centre of the manoeuvring part of the aerodrome, provided that at the intended height, the tower structure itself does not become an obstruction or hazard to flight.

2.1.3 The height of the tower should be such that, at normal eye level (about 1.5 m above the floor of the tower cab) the controller is provided with the visual surveillance previously described. The higher the tower, the more easily this optimum surveillance is attained, but at greater financial cost and with a greater likelihood of penetrating the obstacle limitation surfaces. Reflections in the cab glass and sun or lamp glare through the windows should be kept to a minimum.

2.1.4 Vertical supports for the cab roof should be kept to the smallest feasible diameter so as to minimize their obstruction of the controller's view. The supports should also be as few as possible commensurate with minimizing reflections. In this respect it should be noted that the less vertical supports, the fewer window panes are required. However, with fewer panes there will also be more reflections. The height of the window sills, which support the windows in the cab, should be as low as practicable since they affect the controller's ability to scan the surface area extending from the base of the tower. For the same reason, tower consoles should be designed so as not to exceed the height of the window sill. The depth of consoles has similar effects on sight limitations. Generally, the higher the window sill and/or the deeper the consoles the larger the surface area extending from the base of the tower which cannot be seen by the controller. Suitable minimum glare or non-glare lighting must be provided to allow the controller to read and write. It must also be arranged so that at night it does not diminish his ability to survey the aerodrome and its vicinity.

2.1.5 The tower controller must be provided with the capability to communicate rapidly, clearly and reliably with aircraft in his area of responsibility. Normally, this is accomplished through air-ground communications. It may occasionally be done by means of a light-gun from the tower using specified signals and prescribed acknowledgements from the aircraft. Since operations in and around a control tower generate a fair amount of noise (e.g. radios, aircraft engines, talking), the provision of sound-deadening features in control towers is very important. Therefore, the acoustic qualities should be taken into account in the selection of structural materials used for control tower construction. Sound-deadening materials should also be used internally, e.g. carpets or similar sound-absorbent material (dust-free and anti-static, if possible) should cover the cab floor and the walls up to the window sills.

2.1.6 The layout of working positions within the tower cab and the consequential arrangement of operating consoles will obviously be determined by the location of the tower in relation to the manoeuvring area, and more especially, the approach direction which is most frequently used at the aerodrome in question. It is also determined by the number of operating positions which are occupied simultaneously in the tower and the respective responsi-

bilities of these positions (control of arriving and departing traffic versus that of ground movements, clearance delivery position, operation of the lighting panel, etc.). As a consequence of this, the layout is most likely to vary from aerodrome to aerodrome and also at an aerodrome as traffic changes. Flexibility and far-sightedness are therefore primary considerations in the initial installation in order to avoid major structural or installation modifications that may result in the future due to changing operational requirements.

2.1.7 It should also be noted that, because of the responsibilities, and the frequent stress involved in the provision of ATC, the provision of other than purely operational facilities contribute to no small degree to the efficiency of the service provided and, as such, deserve careful consideration. They are more fully described in 2.2 and 2.3 below.

2.1.8 In view of the above and what has been said in Part III, Section 2, Chapter 1, 1.1, it should be noted that the illustrations, shown in Appendix A, can only serve as examples of possible arrangements and that final decisions regarding specific control towers must be based on detailed local studies conducted with the active participation of their eventual users.

2.2 STRUCTURAL REQUIREMENTS

2.2.1 Ideally a control tower should be of the required height and should have ample space to ensure an optimum working environment for personnel and equipment (including expansion capabilities), be energy efficient, durable and aesthetically pleasing — all at moderate cost. In the case of control towers located atop the aerodrome terminal building, it has often been found that such a location limits the expansion capability of the facility when air traffic and consequently tower staffing and equipment increase (e.g. radar, automation, etc.). Therefore, at the more important aerodromes or at those where significant future traffic developments are expected, it is better to have a separate control tower structure which is optimally sited, specifically designed to fulfil its operational purpose and whose height is sufficient to best meet ATC needs (see 2.1.3 above). Free-standing control towers have three main components: cab, shaft and base building (see Appendix A, Figure 1). A tower need not have a base building provided its offices, etc., can be integrated into the tower shaft (see Appendix A, Figure 2).

2.2.1.1 The space reserved for the tower cab should be ample but not excessive. As its size is increased, the controller's viewing angle out the opposite side of the tower cab becomes more limited by the height of the window sill (downward) and the roof line (upward). Similarly, physical co-ordination problems between controllers increase with larger space. One State (United States) suggests polygonic cabs of the following dimensions:

Level of activity	Approximate number of personnel simultaneously present in cab	Cab area (square metres)
Low	Not more than 6	21
Intermediate	Between 6 and 12	32
Major	More than 12	50

2.2.1.2 The size of the control cab should be primarily dependent on the number, location and size of control positions and consoles (see Appendix A, Figures 3 and 4). In relation to the primary runways, the cab should be physically oriented so as to obtain the best unobstructed view of the aerodrome manoeuvring area. The orientation should also be such so as to minimize sun glare while controllers monitor the primary areas, especially at sunrise and sunset when the sun is low on the horizon. The window panes should tilt outward to eliminate reflections from the consoles and to provide shading at high sun angles. They should be double-pane, free of distortion, untreated, with the frame banded to the glass for an airtight, waterproof and vapour-proof seal. Interior wall surfaces should be painted in a dark, flat colour to avoid reflections and vertical supports should also be non-reflective and also painted in a dark colour. Minimum clear height from cab floor to ceiling should be 3 m. The ceiling may slope up at its perimeter to enhance upward visibility, especially from the opposite side of the cab. It should be sound-absorbent and painted charcoal gray or flat black to avoid reflections.

2.2.1.3 For washing windows, there should be an automatic window washer or a walkway around the exterior of the tower cab. This walkway should be as narrow as possible and as low as possible (including railing) so as not to impair the controller's close-down view. The walkway may also serve as part of an emergency escape route.

2.2.1.4 If the vertical supports between the window panes are not sufficient to support the roof alone, an additional minimum number of cab columns, with minimum diameter may be used. However, their number should be kept to a minimum commensurate with engineering standards.

These cab columns may be multi-purpose and also serve as roof drain, sanitary vent, conduits for power and antenna cables and the grounding system.

2.2.1.5 Tower cab lighting of variable intensity should generally be recessed in the ceiling and directionally adjustable. Operational lighting required to illuminate a specific working position should be placed and painted so as to minimize glare and reflections. Floor lighting and stair lighting should be recessed and shielded.

2.2.1.6 Carpeting of the tower cab floor should be wear-resistant, sound absorbant, anti-static and flame resistant.

2.2.1.7 Where airport movement radar/airport surface detection equipment (AMR/ASDE) or daylight radar repeater equipment is available, the displays should be swivel mounted, or suspended from a trolley and track in the cab, so that their orientation can be adjusted to remain in the field of vision of the controller concerned under varying conditions.

2.2.1.8 Due to its location, a control tower cab is normally very exposed to changes in atmospheric conditions and a wide variance in temperatures. Therefore, in many cases, a good air circulation is required to retain reasonable working conditions. Where provided, it should be equally distributed around the cab perimeter and operated so as to provide a stable environment. Experience has shown that air distribution from the window sill is better than roof-mounted equipment since the latter arrangement is frequently too noisy for personnel working in the cab as well as more difficult to maintain. A separate air-conditioning and heating/cooling system for the cab will prevent interior fogging or frosting of windows without overheating the cab. It will also prevent or remove the accumulation of ice on the outside of windows. In addition, the system will also serve to heat the cab alone, when it is not yet necessary to heat the rest of the structure, which in certain areas amounts to considerable cost-savings. The thermostat controlling such a system should be located away from exposure to direct sunlight or any other heat source.

2.2.2 The tower shaft has two primary functions; it supports the cab and provides access to the cab by a stairway and/or elevator and as such, it encloses and supports wires, pipes, etc. A secondary function of the tower shaft can be to provide accommodations for personnel and equipment on its different levels.

2.2.3 Where required, a building at the base of the tower shaft may be added as a single or multiple story structure. Normally, its primary function is to house an approach control unit and/or to provide accommodations for services associated with the provision of air traffic services (ATS). Such an arrangement is preferable to housing these services in the control tower shaft.

2.2.3.1 A free-standing functional shaft (without an associated base building) requires a very small area. It can be readily constructed in prefabricated sections and assembled on location in less time than a conventional building. The disadvantages of free-standing shafts are that they provide for practically no expansion in accommodations and various services are distributed at different levels which generally results in poor communication.

2.2.3.2 A base building combined with a functional shaft provides maximum utilization of space by using the vertical space in the shaft thus reducing space requirements in the base building. However, three separate air-conditioning and heating/cooling systems may be needed for the cab, shaft and base building. Another disadvantage is that the future expansion of those services accommodated in the shaft of the tower are limited.

2.2.3.3 The combination of a base building with a non-functional tower shaft limits the use of the shaft to the point where it houses only a minimal amount of mechanical and electronic equipment but no support personnel. This configuration provides great flexibility in the use of space, offers maximum expansion potential and permits separate construction of the two basic units. Additionally, a single or two-story base building lends itself to a more convenient and efficient circulation of people. The disadvantages are that a larger site is required and the associated design and construction costs are higher.

2.2.4 The material used for the structure of a control tower should be fireproof and all internal material should be fire resistant. In addition, the structure should provide for emergency exit especially from the tower cab and the upper shaft levels. Emergency exit points could be achieved by permanently affixed steel ladders to the outside of the structure or a safety cage on the inside. The structure should also be provided with a smoke detection and alarm system and an ample supply of pre-positioned fire extinguishers which are periodically checked. All stairways should include a hand rail. An elevator should be provided where the cab floor is 15 m or more above the ground. It has also been found that the provision of a central vacuum cleaning system with outlets in each room and blower units remote from normally occupied areas help appreciably in reducing noise.

2.3 ACCOMMODATIONS AND EQUIPMENT

2.3.1 The tower cab should be fitted with consoles to house equipment and provide desk space of the same height as the consoles for writing as well as space to mount monitoring equipment such as aerodrome lighting panels, instrument landing system (ILS) monitor panels, telephone and radio selector panels and brackets to hold microphones and telephone handsets. The console desks should also provide support for flight progress strip holders and should have radio/telephone connexions, including those used for monitoring. There should also be drawers for pens, pencils, paper, etc. Drink holders as well as ashtrays should be located safely away from radio and telephone selector panels and other equipment sensitive to liquid or ash spillings. A supervisor's desk(s) should be provided with necessary telephone and radio terminals and a bookcase should be available to keep appropriate reference material.

2.3.2 Where equipment is enclosed in fixed consoles which are backed to the outer walls of the tower cab, the consoles should open at the front for ease of maintenance. Modular consoles which are easily plugged in and out will similarly help in the maintenance work. If plexiglass tops are provided on consoles and other writing surfaces, regularly used essential charts and other materials may be inserted under the plexiglass. If the consoles and desks are not overlayed with some transparent material, the top surfaces should be made of stain-resistant laminate. Windows may require transparent, glare-proof shades which can be raised or lowered as needed. Where required because of local conditions, towers serving low activity aerodromes with only one or two control positions should have a convenience unit (drinking water, hot-plate or small microwave oven, small refrigerator to permit controllers to remain on the post while eating or drinking). Towers with intermediate or major activity require only the drinking water and possibly a hot-plate in the cab since the refrigerator, etc., generally caters for more persons and therefore must be larger. It can then be located more easily in the tower shaft or in the base building. Stairs leading up to the cab should be located furthest away from the cab operational areas in order to have the least impact on the cab's functional perimeter. There should be a gate at the top of these stairs to prevent accidents.

2.3.3 Where an approach control (APP) unit is located in the tower shaft or base building, provision should be made for a "drop tube" to send current flight progress strips on departures and arrivals to the APP. There should be a secured floor hatch (75 by 90 cm minimum) in the cab floor with an electric mechanical hoist which permits hoisting heavy equipment between the cab and the top elevator landing. If the highest elevator level is not on the floor level immediately below the tower cab, a hatch should also be provided on any intermediate floor.

2.3.4 For a tower performing a combined aerodrome/approach control function, where APP is equipped with radar and operated from the cab, there may be an additional requirement for special screening of the radar displays to minimize reflections and glare. This special screening may be required despite the use of daylight radar displays (see Appendix A, Figure 5).

2.3.5 In a tower with low activity, the junction level in the tower shaft is primarily reserved to house the equipment work room, control tower mechanical equipment, elevator equipment, toilet and washing facilities. The level below that usually houses the uppermost elevator landing lobby, electronic equipment room and other spaces as required. If the toilet and washroom facilities cannot be located on the level immediately below the tower cab, they must be located on the next lower level in order to keep absences from duty by controllers as short as possible. In radar-equipped towers, equipment rack space for ASDE radar and microwave links may be located on either level. In towers with non-functional shafts, the levels between the base level and the next to last level normally serve only to add height to the tower shaft and to provide access to utility and elevator shafts at the various elevations (see Appendix A, Figure 6). Space in these levels may be used for storage, and other non-operational purposes.

2.3.6 The APP operations room, administrative offices, training and conference rooms, ready or break room, locker room, radar simulator training room, communications equipment room, radar equipment room, automation equipment room, recorder equipment and playback space, telephone equipment room, mechanical and/or electrical maintenance space can all be housed in a base building where provided, or, if space permits, in a functional tower shaft. The immediate economy of accommodating all these functions into a functional tower shaft may, however, be lost if there is no room for future expansion to accommodate new or additional control devices or personnel.

2.3.6.1 The APP operations room size is largely determined by the number of operating positions and radar consoles required or planned for the room. There are two types of radar consoles in use, vertical and horizontal and both types may be used in the same level (see Appendix A, Figure 7). In either case, illumination of the controller's operating position should be such that the presentation of information on the display is not impaired or that its interpretation is rendered difficult. Arrangements should be

made to allow individual controllers to exercise personal preference in this area to the degree that it does not interfere with the requirements of others. Within operational limits, the controller should have control over the intensity of any display which involves the transmission of light. Primary flight data information, i.e. information directly related to the traffic situation, should be displayed in such a way as to avoid significant refocussing of the eyes. For this reason, it is possible that large general displays of secondary information, i.e. information not concerned with the traffic situation, may not be practicable. Space and material for writing notes must be provided. The manipulations required to select specific facilities for use, whether data displays or communications, should be simple. Critical and most frequently used equipment and functions should be located closest to the controller and arranged so that their manipulation follows a logical sequence. A separate desk and adequate lighting, telephone and communications facilities should be provided in the operations room for the watch supervisor.

2.3.6.2 General lighting of operating rooms should be kept at a low ambient level consistent with good working conditions and with reflections reduced as much as possible. However, the floor area should be sufficiently illuminated to prevent accidents, etc. Door openings to lighted adjacent spaces should be screened so that light will not flood the space when doors are opened and interfere with a controller's vision. Operations rooms should be sound-proofed but the floor covering used should still permit chairs to roll easily. Consoles should be of the plug-in plug-out type and/or should be accessible from the rear for maintenance purposes. In some locations where space permits, consoles have been arranged so that they are backed into the radar repair room, thus permitting maintenance while the console remains in place.

2.3.6.3 At some selected locations a room similar to the APP operations room may be required for training controllers in the use of radar in a simulated APP environment. The radar simulator training room should be located in the training area and close to or above the radar equipment room (see Appendix A, Figure 8).

2.3.6.4 A room for training and conferences should be provided at larger facilities. When the size of the room exceeds 22 m^2 the room should be divisible by a movable type partition with low sound penetration characteristics. Controllable day-light lighting of such rooms is desirable. A chalkboard should be provided for each space. Wherever possible, a roll-up projection screen and an overhead (transparency) projector, as well as a film and slide projector should be included in the room equipment. This space may also be used as a briefing room.

2.3.6.5 The ready or break room provides space for personnel to relax during off-duty periods. Its size will be determined by the number of people likely to use the room simultaneously. Normally, allowance is made for 2.5 m^2 per occupant but starting with a minimum size of 10 m^2. In functional shaft facilities the break room should be located near the cab and in aerodrome control towers with a non-functional shaft, in the associated base building near the APP or combined aerodrome control tower/APP facilities. Lighting by controllable day-light is desirable. The layout of the room should separate the eating area from the lounge area and there should be a small counter, storage cabinets, food heating facilities and an appropriately sized refrigerator available in the break room.

2.3.6.6 Recorder equipment automatically records voice communications between controllers and pilots and telephone communications between controllers. The equipment is usually located in the communications room where access to cable ducts is facilitated. Access to recorder equipment and tapes should be restricted to only authorized personnel because of the valuable nature of recording tape in the investigation of incidents. When not installed in the chief controller's office a separate playback equipment room may be provided to permit personnel to listen to recordings for training purposes. When the playback equipment is portable it may be set up for use in other existing rooms. There should, however, be a separate tape storage room in a secure area to avoid the possibility of tapes being tampered with. The tape storage room should preferably be located away from areas which are frequented by many persons.

2.3.6.7 Whenever there is a requirement for operational equipment, there is a complementary requirement for technical equipment. Space provided for technical equipment must be ample and as close as possible to its operational counterpart(s). Therefore suitable provisions should be made for the housing of communications, radar and telephone equipment plus the required cable ducts and other utilities. Space for electronics equipment, in respect of required cable lengths is particularly critical, as are temperature, in some cases, and the cleanliness of the room.

2.3.6.8 Administrative personnel will require appropriately sized offices, furnished and decorated in accordance with their respective positions. Some functions will require a completely enclosed office while open-plan partitions (about 2 m high) will suffice for others. Clerical staff other than the unit secretary should be assigned common space. Staff establishments vary with facilities, therefore, office space may be required for some or all of the following (or counterpart) titles: Chief Controller; Deputy; Operations

Officer; Plans and Procedures Officer; Training and Evaluation Officer; Data Systems Officer; Personnel Officer; Chief Controller's secretary; and secretarial pool.

2.3.6.9 The locker room provides a space for personnel to secure their personal belongings while they are on duty, or a place to store work equipment while they are off duty. The locker room size depends on the number of personnel requiring lockers. Lockers are placed in rows, with an aisle of sufficient width (1.2 m) to allow personnel to pass. Lockers are normally provided with separate coat compartments and small upper compartments and should be provided with locks to all compartments. The locker room should be adjacent to the rest or ready room (see Appendix A, Figure 9).

2.3.6.10 Lavatories must be provided adjacent to areas occupied by personnel and, as a general rule, one toilet may be provided for occupancies of 15 persons or less. Where there is an APP operations room, the lavatories shall be located nearby; however, a lavatory should be located on the closest possible level below the cab in all towers. If a rest area is not provided elsewhere within the facility, there should be one in the women's lavatory. The arrangement and installation of the lavatories should, at least, correspond to the level normally provided in public service installations, i.e. accessories, mirrors, grab bars, soap and towel dispensers, waste receptacles, coat hooks, etc., as required.

2.3.6.11 The peak demand for parking at the facility will determine the required employee parking lot size. However, in some cases allowances need to be made for official cars and visitors. Normally, peak demand for parking will occur during shift changes. A study and evaluation of the largest concentration of personnel at the facility during this shift change (employee, visitor and official vehicle parking) will determine the capacity required.

2.3.7 Where aerodrome ground radar surveillance equipment is available, it will normally be mounted on the roof of the cab and the display(s) mounted in the cab and readily accessible to view by the ground control and the local control positions. The installation of the display should be made so that it poses the minimum obstruction to the controllers' direct view of the aerodrome traffic. Where an APP is collocated, and a repeater radar display is mounted in the cab, it should be readily accessible to view by the local controller and without creating any obstruction to view.

2.3.8 The aerodrome lighting control panel should be incorporated in a cab console or in a separate desk. The ILS monitor panel/alarm should also be mounted in the cab console but can be in a less utilized area. Radio and telephone selector panels should be installed at the control positions and should include emergency and other special use telephone equipment. Depending on their number and personal preference, radio speakers may be mounted in the consoles or a special overhead rack suspended from the ceiling. Other cab equipment includes wind direction and speed indicators, altimeter readout indicator, light-gun(s) and clock(s) and, where required, remote runway temperature readout. Where the tower personnel have been assigned the additional responsibility for making partial weather observations, cloud height and temperature indicators should be included. A link to the local meteorological station and to aeronautical information service (AIS) needs to be included and, in some cases, a connexion to the computer of the associated area control centre (ACC) so that flight plan information can be exchanged.

2.3.9 Towers with intermediate and major activity should be supplied by one commercial power source and one uninterruptible power supply; or one commercial power source and one standby power generator capable of supplying power to all critical equipment within 15 seconds of failure of normal power supply; or two independent sources of commercial power. Where the primary commercial power source is of poor quality, a power stabilizing system should be considered for installation to prevent damaging voltage surges.

2.3.10 Provision should be made for emergency lighting as follows:

a) for an aerodrome control tower without power generator, the emergency lighting should be battery supplied and provide lighting of exits, corridors and stairs, interior spaces housing critical electrical and mechanical equipment and critical areas having electronic equipment;
b) for an aerodrome control tower/APP with a power generator, the emergency lighting arrangements should cover:
   1) battery lights in the power generator and electrical rooms;
   2) reduced lighting connected to the emergency power supply for the cab, the APP operations room (spots and floor lights only), the radar and communication equipment rooms, the electrical/mechanical room, the break room and the lavatory;
   3) exit corridors and vestibules should be sufficiently lighted by the emergency system to provide illumination for emergency exiting.

2.3.11 There should also be an internal telephone system at towers with intermediate and major activity. All the operation rooms, the more important work rooms and offices and some strategic locations in the general areas (entry hall, etc.) should be provided with clocks. Where necessary, adequate security systems should be provided (see Part III, Section 2, Chapter 1, 1.5).

2.3.12 If the location of the aerodrome served by an ATS unit, in relation to nearest housing, is such that commuter distances to work are excessive and/or if housing at reasonable cost cannot be found by personnel within a reasonable distance from the aerodrome, it may be advisable to consider the development of a residential housing project in co-operation with the appropriate local public authorities.

2.4 OTHER CONSIDERATIONS

Where APP is provided for one aerodrome only, the APP will normally be accommodated within a control tower structure unless it is performed by one or more sectors within an ACC. In some rare cases where approach control for a number of closely located aerodromes is provided from one APP and where neither of the two preceding arrangements is satisfactory, a stand-alone terminal control centre (TMC) may need to be provided to perform the APP function. In this case it is most likely that it will resemble a miniaturized version of an ACC and the provisions for such a facility apply, albeit on a reduced size (see Part III, Section 2, Chapter 3 — Requirements for area control centre).

Appendix A

Illustrations of Aerodrome Control Tower Designs and Layouts

Figure 1.— Aerodrome control tower with base building and non-functional shaft serving an intermediate activity aerodrome — outside view

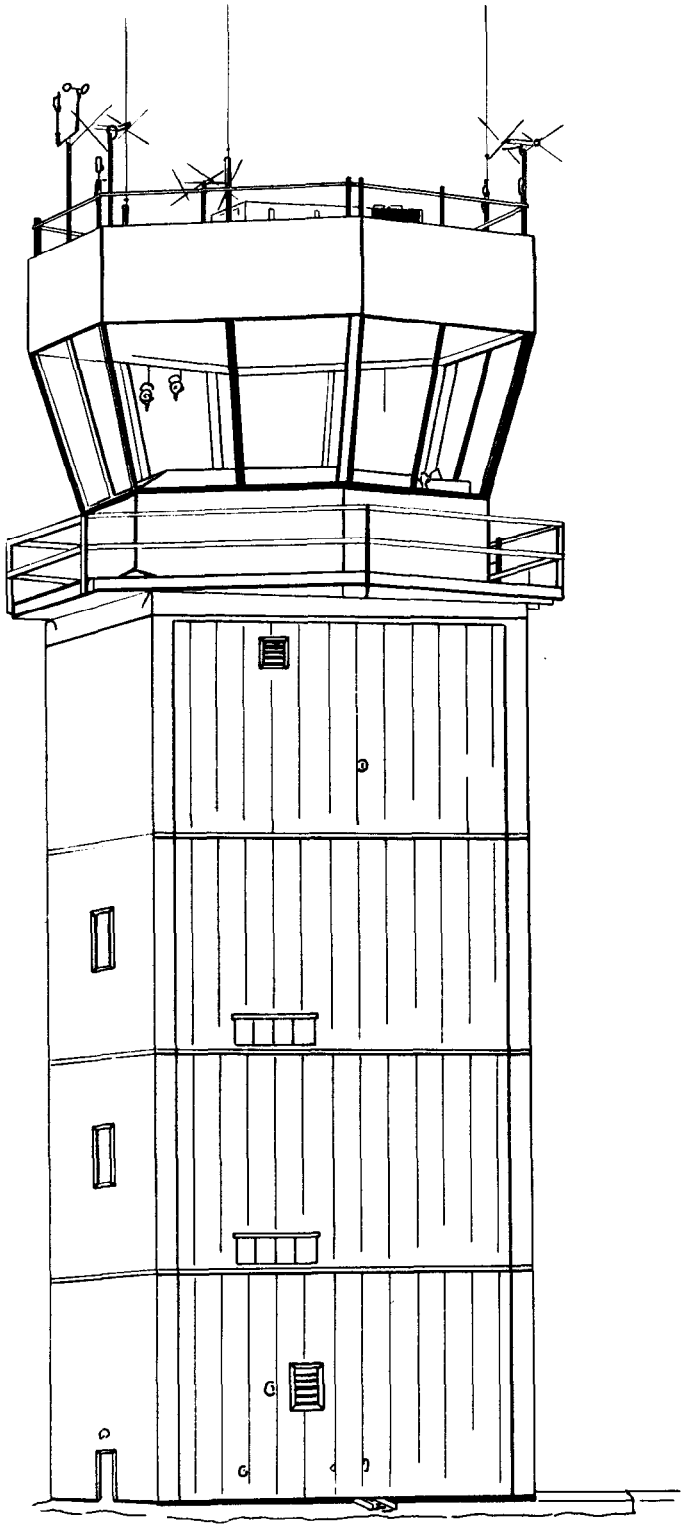
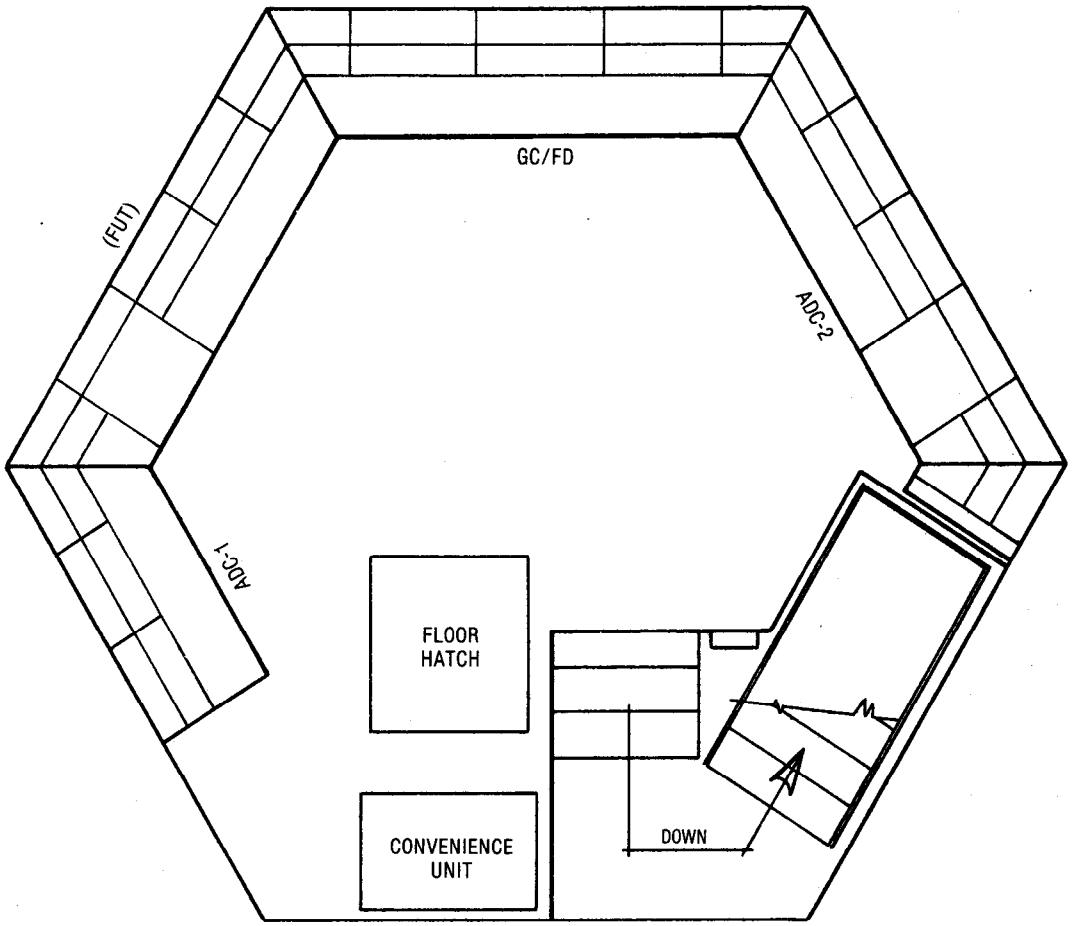


Figure 2.— Free-standing aerodrome control tower with a functional shaft serving a low activity aerodrome — outside view



CAB FLOOR PLAN

Key to symbols

ADC = Aerodrome control
GC = Ground control
FD = Flight data
(FUT) = Future

Scale

Metres

.3 0 .3 .6 .9 1.2 1.5 1.8 2.1

1 0 1 2 3 4 5 6 7

Feet

Figure 3.— Interior layout of a low activity aerodrome control tower cab

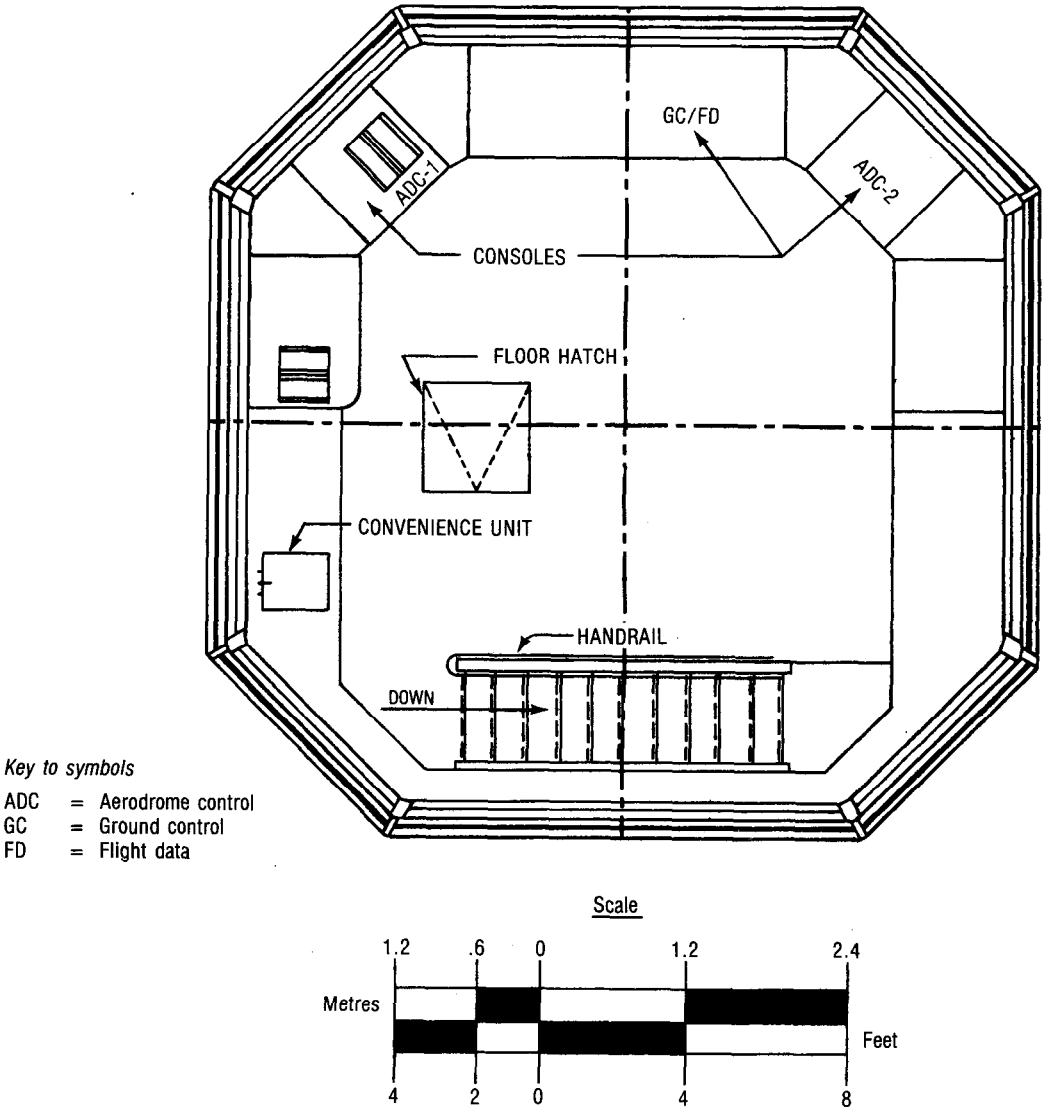
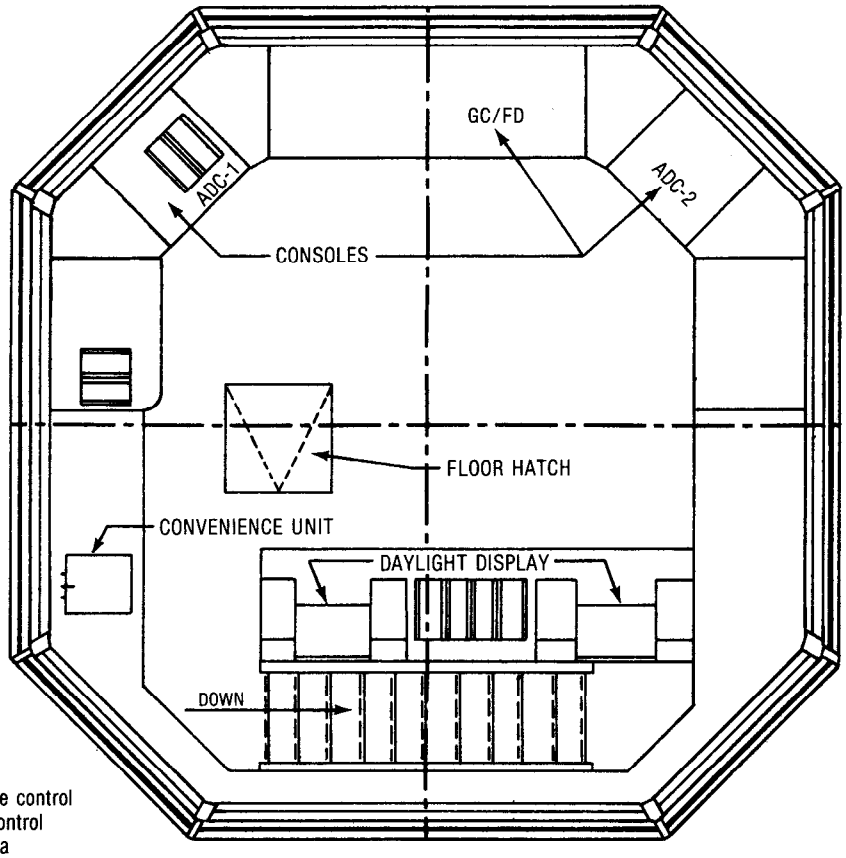


Figure 4.— Interior layout of an intermediate activity aerodrome control tower cab



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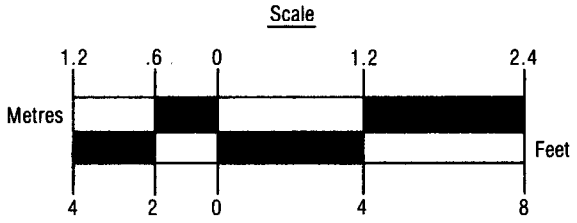

Figure 5.— Interior layout of an intermediate activity aerodrome control tower cab with radar-equipped approach control in the tower cab

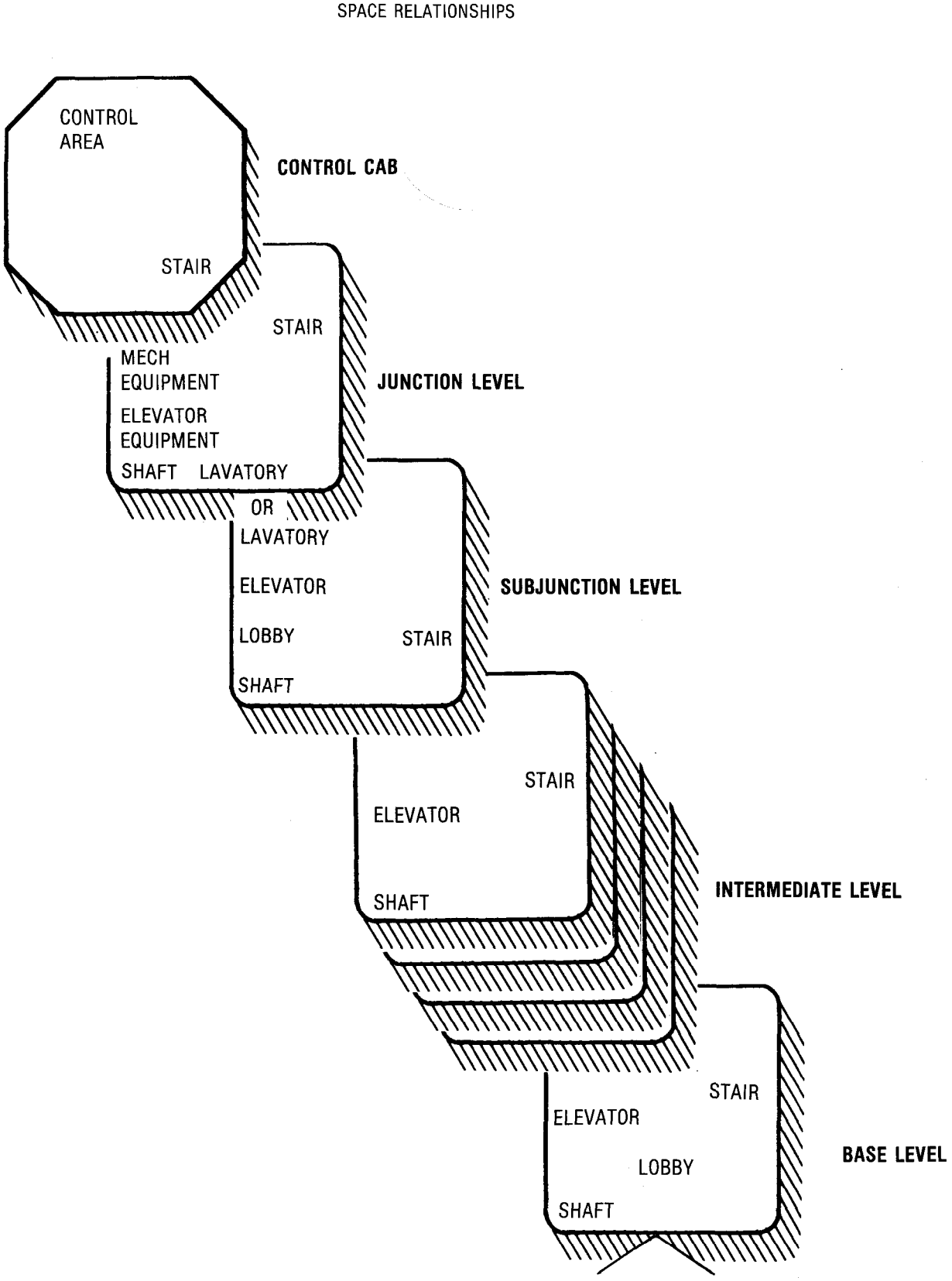

Figure 6.— Diagram of the level arrangement in the non-functional shaft of an aerodrome control tower

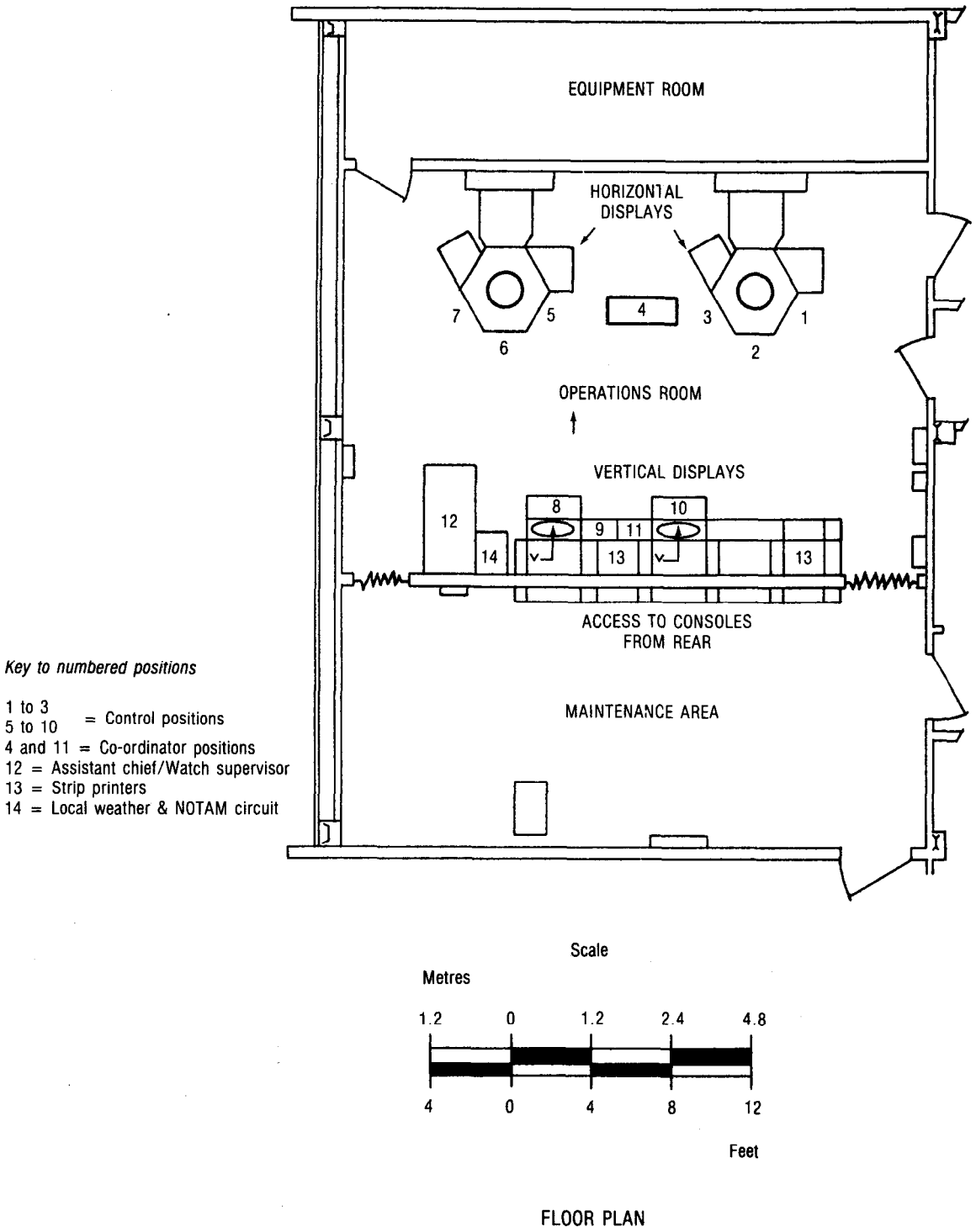

Figure 7.— Layout for approach control operations room using horizontal and vertical displays

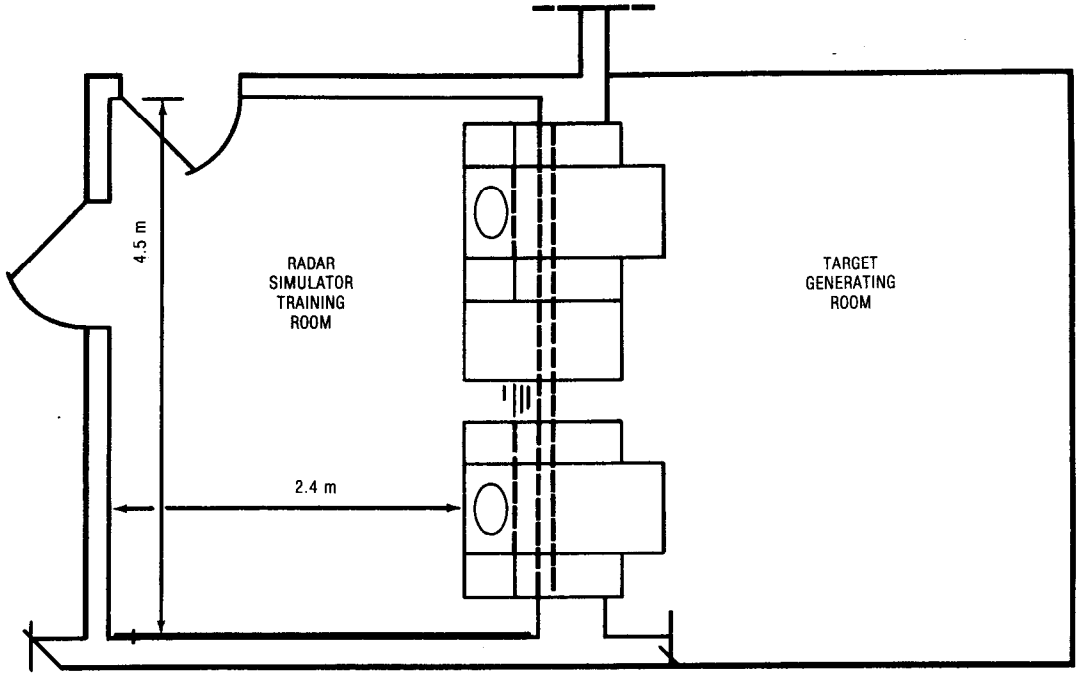

Figure 8.— Layout for radar simulator training room

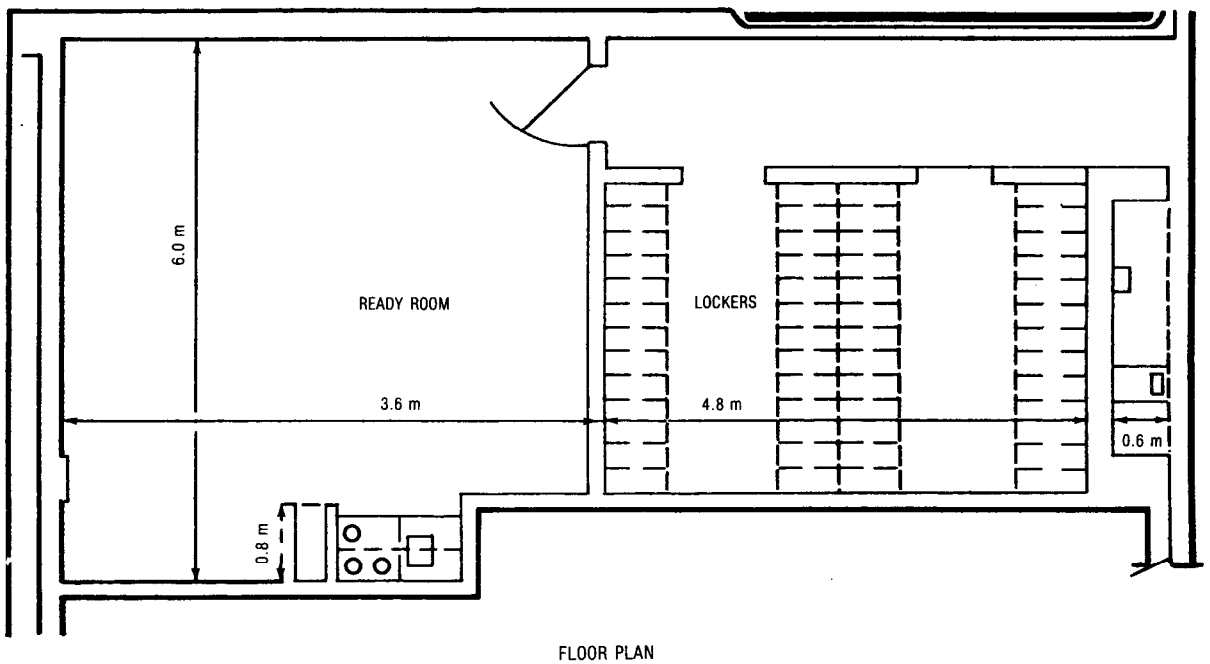

Figure 9.— Possible layout for a ready and locker room

Appendix B

CHECK-LIST

AERODROME CONTROL TOWER AND APPROACH CONTROL OPERATIONS EQUIPMENT

Item	Tower only	APP in Tower cab	Separate APP
1. Headset	x	x	x
2. Microphone	x	x	x
3. Transceiver	x	x	x
4. Speakers	x	x	x
5. Radio selector panel	x	x	x
6. Telephone selector panel/handsets	x	x	x
7. Intercom	x	x	x
8. Auto-switch headset/speaker	x	x	x
9. Recorder (radio and telephone)	x	x	x
10. Power	x	x	x
11. Back-up power	x*	x	x
12. Signal lamp and reel	x	x	
13. Wind speed and direction display	x	x	x
14. Barometric altimeter	x	x	
15. Altimeter setting indicator	x	x	x
16. Clock	x	x	x
17. Aerodrome lighting panel	x	x	
18. Navaid(s) monitor panel	x	x	x
19. Lighting, including emergency lights	x	x	x
20. Daylight radar/display consoles	x*	x	
21. Radar displays, controls, consoles			x
22. Secondary radar controls		x	x
23. Radar simulator			x
24. Flight data panel	x	x	x
25. Automation equipment		x	x
26. Clipboards/displays (NOTAM etc.)	x	x	x
27. ATIS recorder		x	x
28. Fire alarm and extinguishers	x	x	x
29. Desks/consoles/shelves	x	x	x
30. Chairs	x	x	x
31. Shades	x	x	
32. Air conditioning, heating/cooling	x	x	x
33. Convenience group (hot-plate/water, etc.)	x		
34. Lunch facility		x	x
35. Water fountain		x	x
36. Bookcases	x	x	x
37. Binoculars	x	x	
38. Sound-absorbing coverings (floor/wall)	x	x	x

* Where necessary due to particular circumstances.