

18C Operator Interface Equipment Characterization

This Appendix contains a characterization of one operator interface system which has been designed to meet the control room standard design features as specified in Section 18.4. The key features of the design are discussed. The design characterized in this appendix does not necessarily represent the final design. The final design must be established based upon the requirements of Section 18.7, which is the responsibility of the COL applicant.

18C.1 Control Room Arrangement

The conceptual main control room contains the main control console, the large display panel, the supervisor's console, the assistant shift supervisor's desk, a large table and various other desks, peripheral equipment and storage space. The arrangement of these items of equipment and furniture is shown in Figure 18C-1. The spatial arrangement of the main control console, large display panel and supervisor's console is a standard design feature, as discussed in Subsection 18.4.2.15. Figure 18C-1 illustrates this standard arrangement.

18C.2 Main Control Room Configuration

The conceptual main control panel is configured as shown in a plan view in Figure 18C-2. As shown in Figure 18C-2, the configuration is that of a shallow, truncated V with desk space attachments at the ends of both wings. The dimensions are such that two operators can comfortably work at the console at all times.

A cross-sectional view of the main console is shown in Figure 18C-3. This is a cross-section at points A-A, indicated in Figure 18C-2. This view gives an indication of the console height and the depth of the console desk surface. The dashed lines indicate the position of the computer driven VDUs, which, in this concept, are CRTs.

A second cross-sectional view, at points B-B, as indicated in Figure 18C-2, is shown in Figure 18C-4. This view shows the cross-sectional shape of the console in the desk areas.

Figure 18C-5 shows a larger, more detailed version of the schematic shown in Figure 18C-2. This detail includes the identification and arrangement of the equipment installed on the main control console. This equipment includes computer-driven CRTs, flat panel display devices, panels of dedicated function switches and analog displays for selected equipment (e.g., Standby Liquid Control System and the main generator). The flat panel display devices are driven by dedicated microprocessors and, thus, are independent of the plant computer functions.

In general, the conceptual equipment arrangement on the main console is (1) safety-related and NSS on the left, (2) overall plant supervision in the center and (3) balance of plant on the right.

The flat panel displays on the left side of the console are divisionally dedicated. These flat panels are qualified to Class 1E standards and are used to monitor and control the divisional safety systems.

The flat panels on the center and right panels of the main console support monitoring and control of non-safety NSS and BOP systems.

The CRTs and flat panel display devices on the main control console are fitted with touch screens. In addition to the control capabilities provided by the touch screens on the CRTs and flat panels, there are panels of dedicated switches implemented in hardware and located on the main control console. Dedicated switches are discussed in Subsection 18.4.2.5.

18C.3 Large Display Panel Configuration

The conceptual large display panel is approximately 3 meters high and 10.5 meters wide. In conformance with the standard design feature discussed in Subsection 18.4.2.7, it has three major components; the fixed-position (mimic) display, the top-level alarm display and the large VDU. There are also fixed-position alarm tiles positioned in the top portion of the fixed-mimic display. All displays on the large display panel are positioned to be viewed by the operators from a sitting position behind the main control console as shown in Figure 18C-6.

The fixed-position displays occupy the central portion of the large display panel and is discussed in Subsection 18.4.2.8. The fixed-position displays are driven by controllers that are independent of the plant computer functions so that the fixed-position displays will continue to function normally in the event of plant computer functions failure. Figure 18C-7 illustrates an implementation of a fixed-position display design.

The plant-level alarm display panel is at the left of the fixed-position displays as you face the large display panel. To the right of the fixed-position displays on the panel is the large VDU.

18C.4 Systems Integration

A characterization of the plant instrumentation and control systems architecture which supports the control room operator interface is illustrated in Figure 18C-8. As shown in Figure 18C-8, display and control capability for both safety-related and non-safety-related systems are driven by microprocessors which are independent of the redundant plant computer functions. This assures the ability to safely shut down the plant in the unlikely event of computer failure. In the case of the safety-related systems, the microprocessors are divisionally dedicated and are each electrically isolated from the rest of the system.

The data communication function includes both safety-related and non-safety-related communication performed by separate networks.

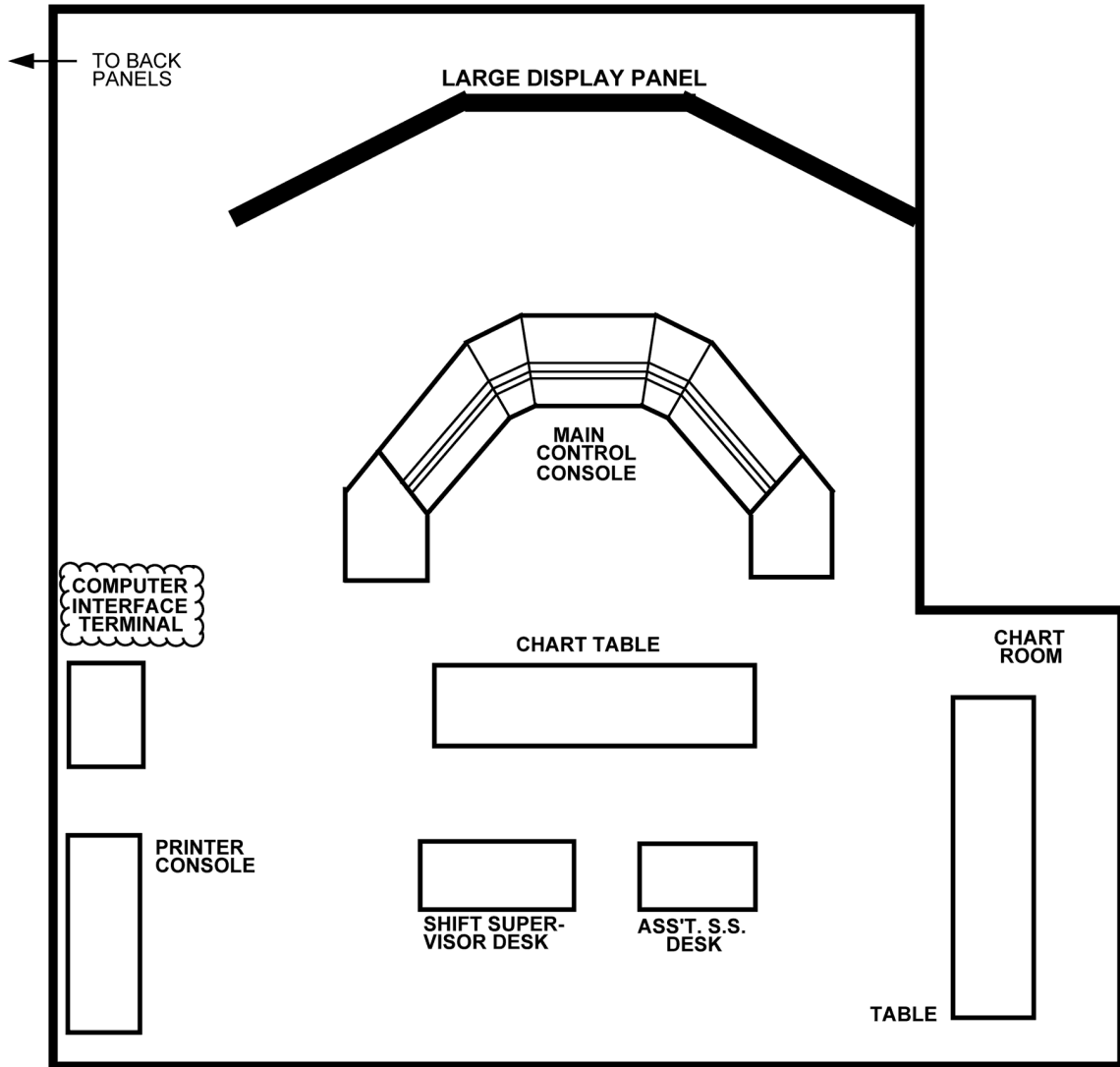


Figure 18C-1 Control Room Arrangement

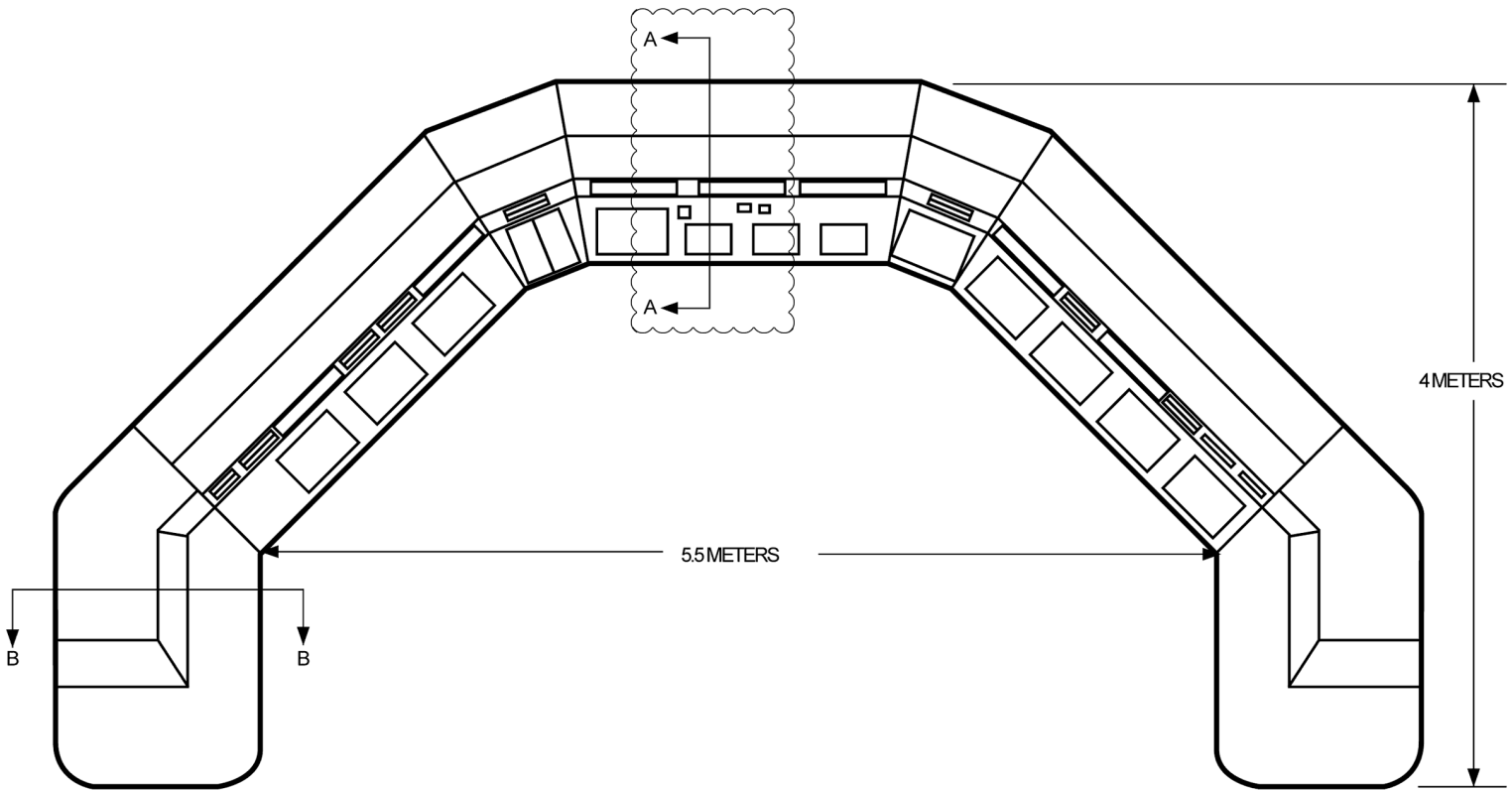


Figure 18C-2 Main Control Console Configuration

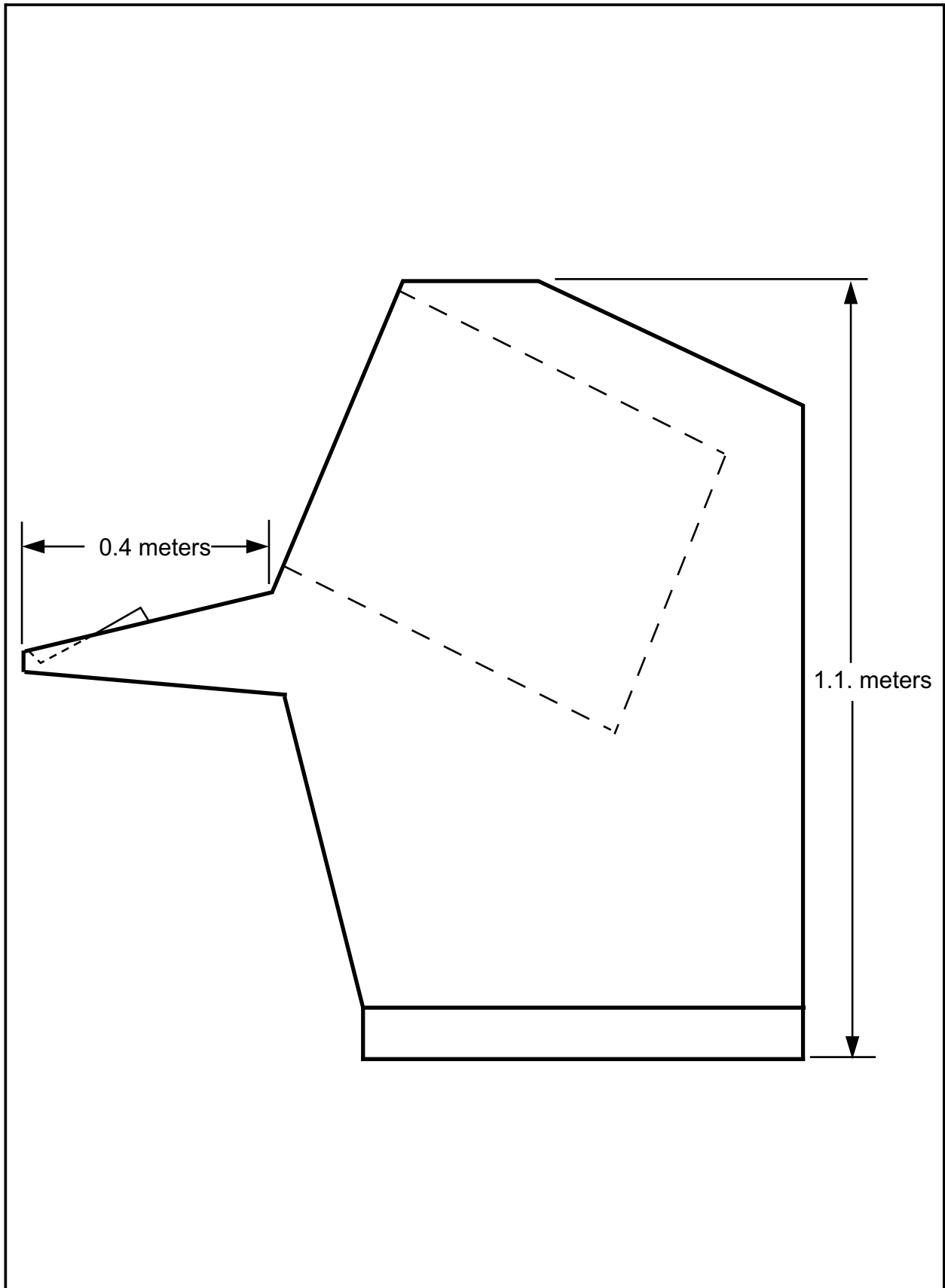


Figure 18C-3 Main Control Console Cross-Section A-A

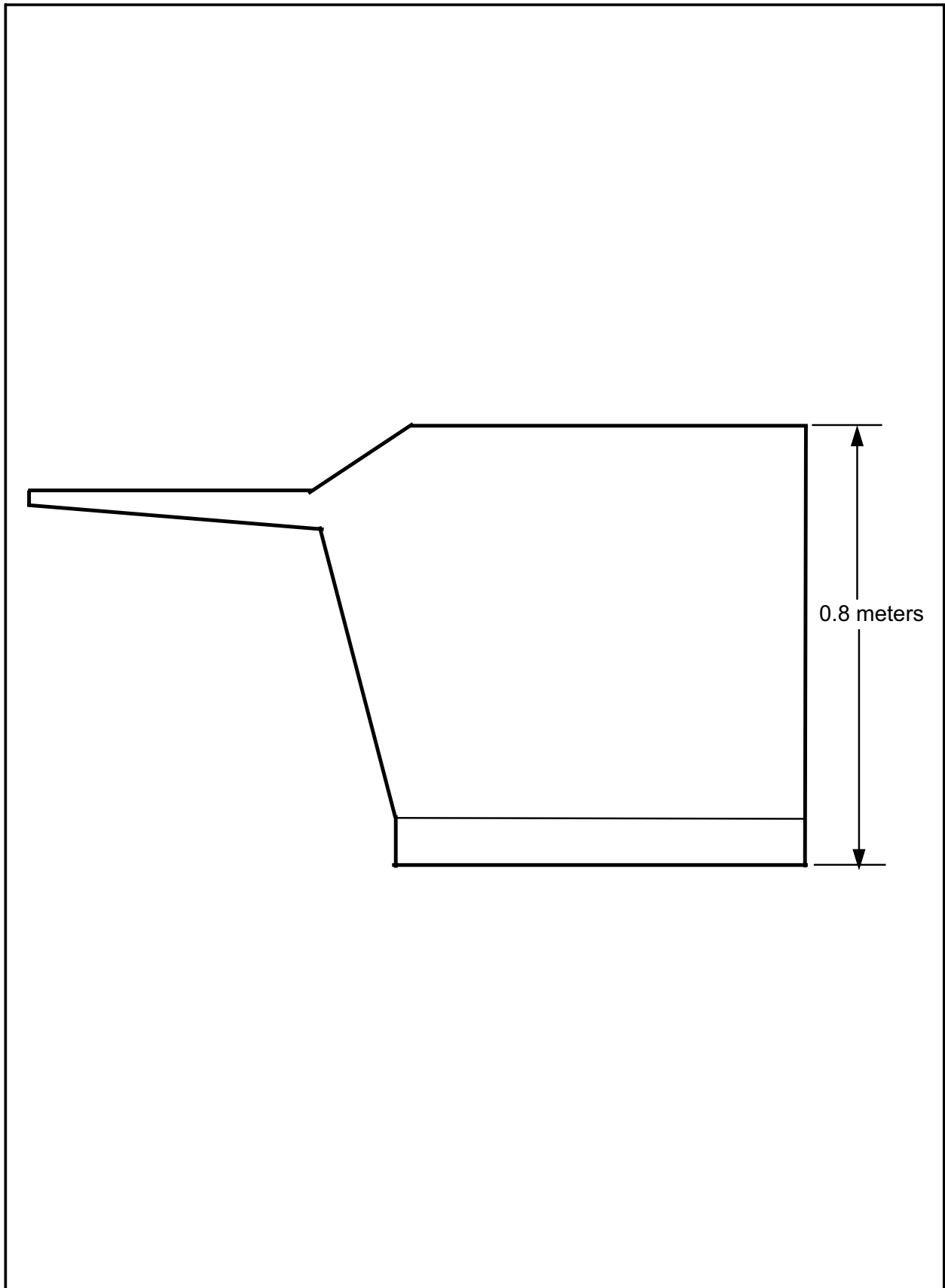


Figure 18C-4 Main Control Console Cross-Section B-B

The following figure is located in Chapter 21 :

Figure 18C-5 Arrangement of Equipment on Main Control Console

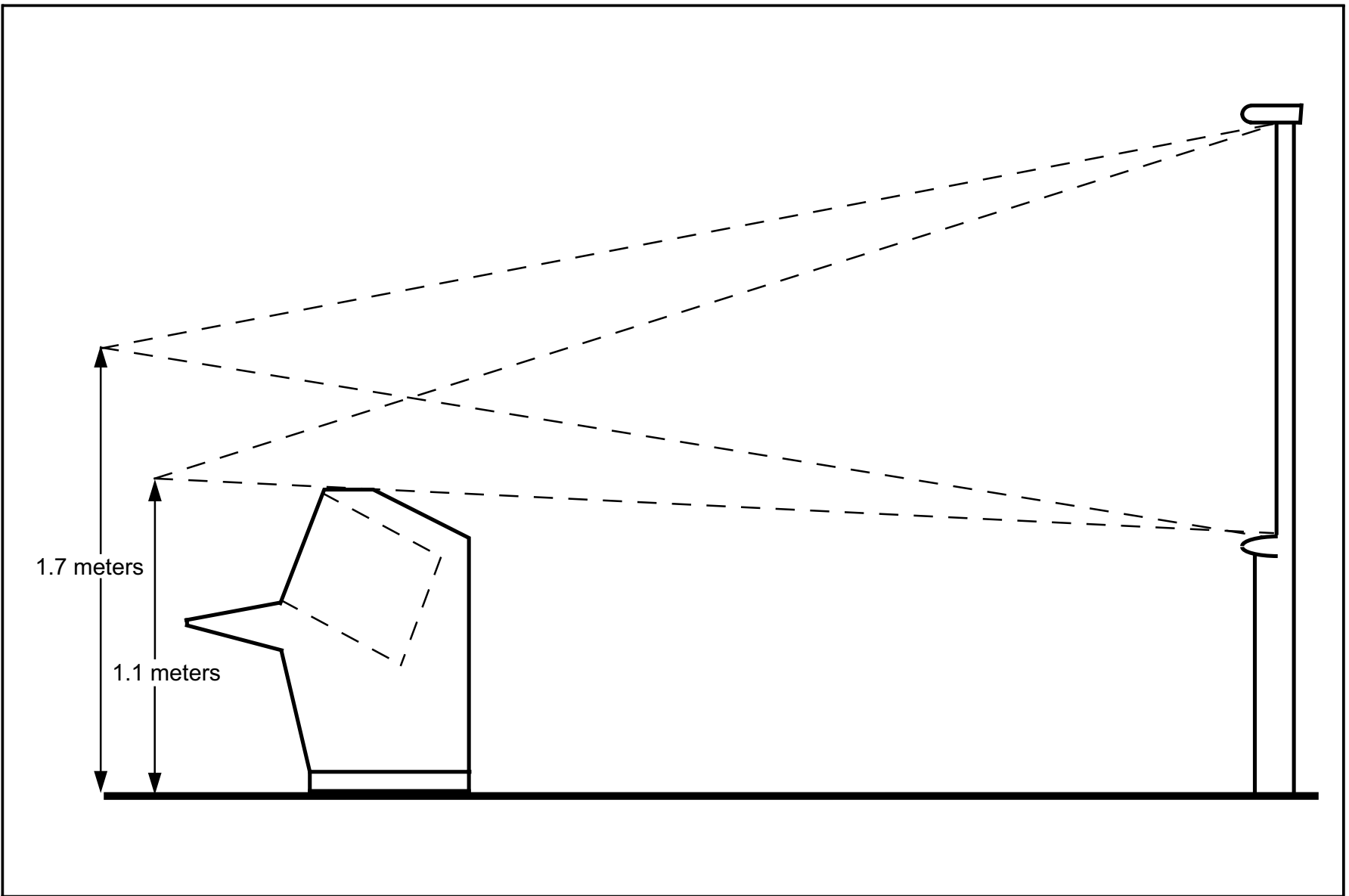


Figure 18C-6 Side View of Relative Positions of Main Console and Wide Display Device

The following figure is located in Chapter 21 :

Figure 18C-7 Fixed-Position Display

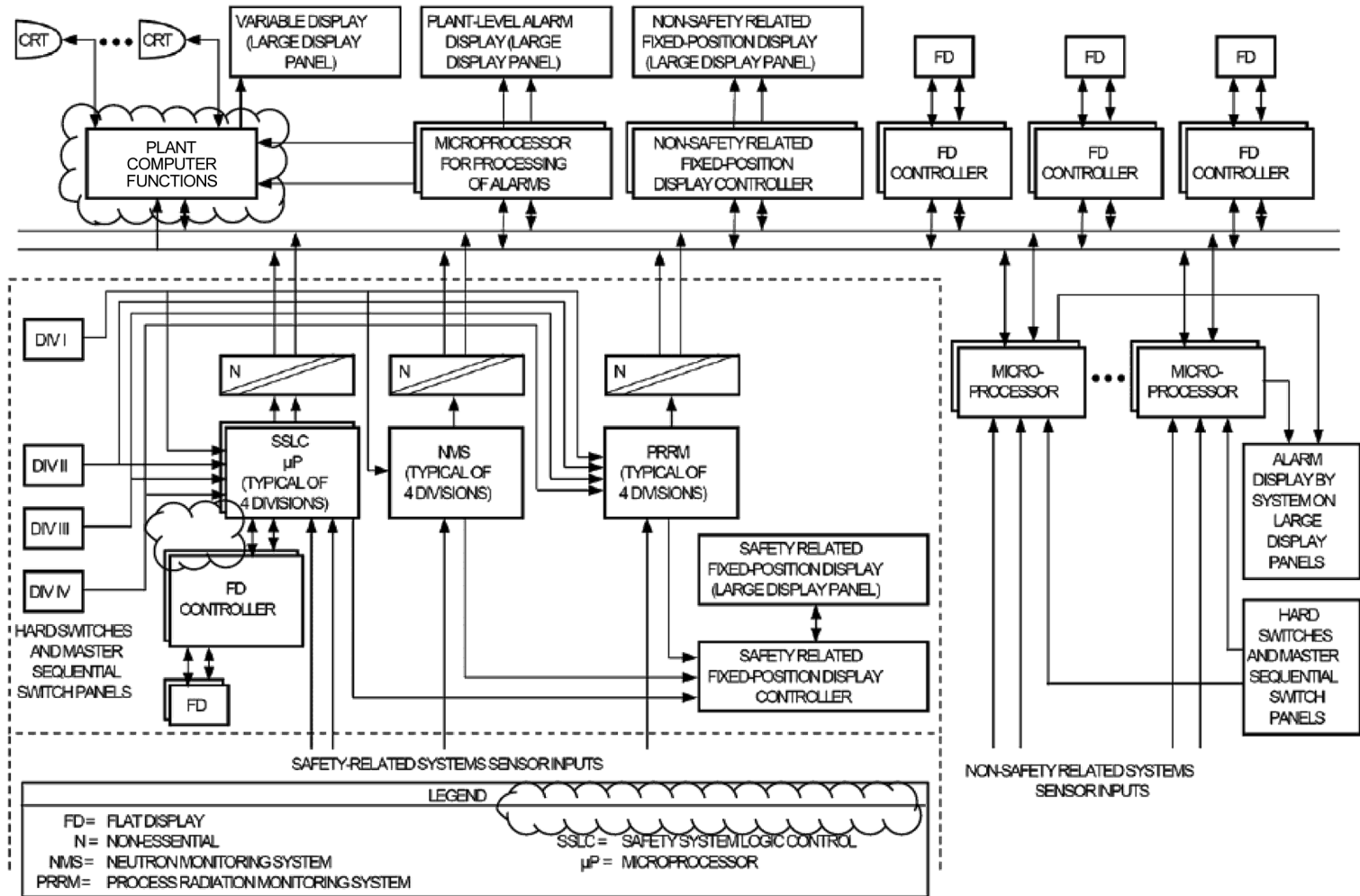


Figure 18C-8 Overall Configuration of Operator Interface System