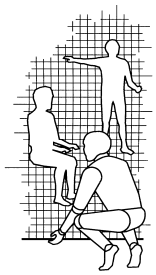
# Mark Dohrmann and Partners Pty Ltd

*Ergonomics* *Safety* *Risk Management*

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8 October 2009

Mr Richard Winnicki
AME System Pty Ltd
3/4 Garden Road
CLAYTON VIC 3168

**e-mail:** sales@amesystem.com.au

Dear Richard,

## Ergonomic Assessment of *activConsole* Workstation

Attached is our report following my attendance on Thursday 17 September 2009 at your factory and showroom in Clayton. The purpose of my visit was to conduct an ergonomic assessment of the Ultimate series *activConsole* workstation for the purposes of:

- independent verification and support for the "ergonomic credentials" of the design; and
- assisting future design improvements.

Main factors considered when assessing the design of a workstation for the surveillance and security industry include:

- tasks performed at the workstation
- items and equipment to be used
- adjustability to meet the range of population sizes

### Expected Application of the Ultimate series *activConsole* Workstation

It is understood that the 24/7 security and surveillance tasks performed at this workstation will involve sitting and standing. No large reading material is intended to be used or accessed.

The individuals using the workstation will be from all levels of security, surveillance or control operations and be working in an open plan environment.

The technology used at the workstation will include a CPU, telephone, cordless keyboard, cordless mouse and multiple LCD screens.

## Summary of Findings and Recommendations

The Ultimate series *activConsole* workstation is recommended for its application in the security and surveillance industries. There are some minor functional specifications that could be improved, such as providing a power point and network facility that is accessible on the top of the desk. These might be provided as an optional feature for clients, and would be a relatively simple design iteration that should be offered particularly if laptops are required to be used at the workstation.

Although it is not a typical office workstation, the workstation met the relevant standards specified by Australian and New Zealand Standard 4443:1997, Office panel systems - Workstations. Its design and functional specifications accommodate a sufficiently wide range of dimensions of users, and task demands. Overall, the *activConsole* combines some good innovation with ergonomic design based on sound guidelines and principles.

Thank you for requesting this assessment and please do not hesitate to contact our office if further information is required.

Yours sincerely,

**Mary Kikas**
**Physiotherapist & Ergonomist**
B.App.Sci (Physio); Grad.Dip (Ergonomics)
MHFESA
**Mark Dohrmann and Partners Pty Ltd**
Chartered Professional Engineers
Certified Professional Ergonomists

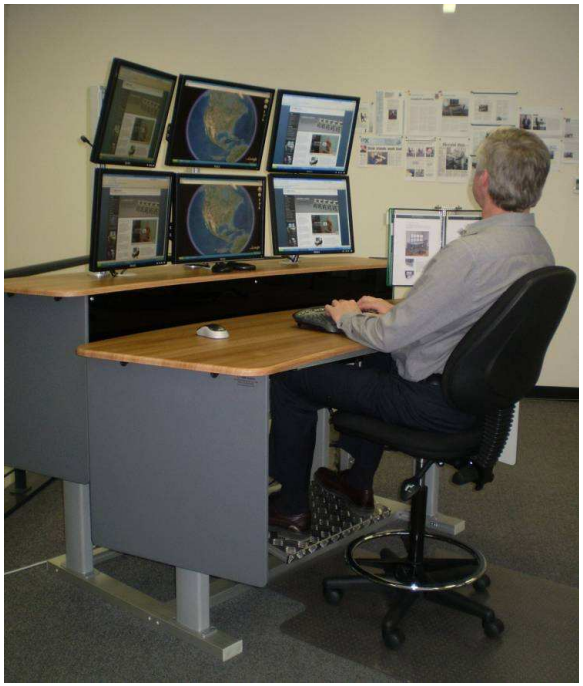
# EVALUATION OF ULTIMATE SERIES ACTIVECONSOLE WORKSTATION

| | | | |
|---|---|---|---|
| **Workstation:** | AME System - *activConsole* | **Assessed by:** | Mary Kikas |
| **Location:** | 3/4 Garden Road, Clayton, Victoria | **Date of assessment:** | 17 September 2009 |

## *A. Compliance required:*

| Element | AS/NZS 4443:1997 | | Notes |
|---|---|---|---|
| | Complies | Fails | |
| Desktop height:<br>- adjustable for sitting 610–760 mm, minimum travel 150 mm<br>- increments not > 25mm<br>- adjustable for standing 900 –1100 mm | ✓ | | Height adjustable from 700 mm to 1200 mm (operator & LCD desk top) adjustments at 10 mm increments. Actual height adjustment measured during my assessment was between 675 mm – 1350 mm. |
| Forward clear foot space:<br>min leg space 600 mm (D) and 650 mm (W) | ✓ | | 700 mm (D), & 1240 mm (W) space from seated position. No obstructions with forward-rear adjustment of footrest. |
| Knee space min:<br>- 650mm W, 450mm D, 645mm H (fixed) | ✓ | | 700 mm (D), & 1240 mm (W) space from seated position. No obstructions Enough space from seated position. |
| Appropriate independent certification | ✓ | | Linak lifting system certified to maximum weight rating of 140 kg for both operator desk and LCD desk. |
| Work surface thickness over the leg space:<br>max 33 mm (recommended ≤ 25 mm) | ✓ | | 18 mm MDF (suitable). |
| Dimensioning of modesty panel - not > 400mm from floor when work surface in highest position. | ✓ | | 70 mm from floor when desk is in its lowest position and suitable. For the desk adjusted to it's maximum height for standing (1200 mm) it extends 600 mm below the desk surface at a height of 600 mm from the floor, which is suitable for standing tasks and one foot resting on the footrest. |
| No sharp edges, corners, protrusions | ✓ | | No sharp corners or protrusions throughout operator and LCD part of workstation. |
| Stability under sudden load at corners | ✓ | | Stable at ends. |
| Stability under sudden load at centre | ✓ | | Stable at middle front edge of both operator and LCD parts of workstation. |

| Element | AS/NZS 4443:1997 | | Notes |
|---|---|---|---|
| | Complies | Fails | |
| Work surface area:<br>Single task – 1200 mm x 800 mm<br>Mixed task – 1600 mm x 800 mm | ✓ | | The rear edge of each of the LCD desk is 1967mm either side of the apex and the front edge of the operator desk is 1573 mm.<br>The depth is 640 mm for the operator desk and 450 mm for the LCD desk, therefore in combination the work surface area is suitable and compatible for the tasks performed at the desk and the equipment required. |
| Footrest | ✓ | | 325 mm deep by 590 mm wide, angled $11^{o}$ height adjustable based on customization of workstation. Lowest point is 70 mm above the floor.<br>Can be technician adjusted any distance rearwards from the front edge of the operator desk through to the underside of the LCD desk. |



## *B. Qualitative elements:*

| | | | | |
|---|---|---|---|---|
| ***Rating*** | ***N/A*** | ***1*** | ***3*** | ***5*** |
| | ***Not applicable*** | ***Inferior solution - does not meet good usability and ergonomics principles*** | ***Standard solution - meets good usability and ergonomics principles*** | ***Exceptional solution - exceeds good usability and ergonomics principles*** |

| Element | Rating | Notes | Recommendations |
|---|---|---|---|
| Viewing distances and angle of view to monitor. | 5 | 970 mm based on six, 17" LCD screens on collapsible brackets with little depth adjustment. Acceptable, can be modified to suit individual needs, based on the number and size of LCD monitors required by the work design and the provision of monitor arms which provide additional 290 mm range, reducing viewing distance to 680 mm. Given the security and surveillance nature of the work and the monitor sizes used, there is little if any use for viewing small font sizes and/or images.<br>Good angle adjustment, greater in vertical plane than horizontal plane (which is limited by top and bottom edge of screen hitting monitor bracket arms). | |
| Ease of desk height adjustment (user) | 5 | Easy to adjust height of individual desks by using flat digital panel to the right of the operator desk.<br>There's a locking feature to avoid unintentional raising or lowering of operator desk while using the desk.<br>Optional safety feature on operator desk: pressure cut out, if the height adjustment button is depressed and operator's legs are under the desk, as soon as the pressure bar contacts the operator's thighs, it instantaneously stops the desk lowering further and automatically raises the desk surface several centimetres, having only exerted a maximum downward force of 2 kg on the operator's thighs. | |

| Element | Rating | Notes | Recommendations |
|---|---|---|---|
| Forward reach by user:<br>maximum occasional forward reach 700 – 800 mm | 4 | Operator desk maximum forward reach < 800 mm. Given the application there would be little, if any requirement to reach to far end of desk. Desk surface is accessible from all positions along the front edge. | |
| Sideways reaches – check all combinations of likely work styles | 3 | Sideways reach unrestricted as no pedestal requirement and CPUs are managed on tray underneath LCD desk. | |
| Forward utility space for extra papers, documents, accessories, etc. | 4 | Acceptable level of desk storage space with opportunity all around desk for G-clamp optional equipment such as phone stand, document holder, etc. | |
| Can anyone who wishes, work along the entire length? | 4 | LCD monitors can be positioned anywhere on the LCD desk surface, based on customisation by the client (in terms of the total number of LCD monitors that need to be displayed on each desk). This would allow access to the entire length of the operator desk. A variety of monitor arm options can be provided and located to suit user function and preference. | |
| Mobility of screen (especially lateral movement) | 5 | Well designed hinged bracket that allows at least $180^{o}$ side to side movement. | |
| Mobility of telephone (especially lateral movement) | 3 | Acceptable, as long as the phone is moved to a suitable reach zone- this will be determined by how often it is accessed. A suitable mounting arm with telephone platform can be retrofitted anywhere along the outer edge of the operator desk, as required. | The telephone should be positioned in the Primary Reach Zone (refer to attachment 1 below) if it is to be accessed frequently. |
| Mobility of accessory placement | 3 | Acceptable, as long as the accessories are moved to a suitable reach zone- this will be determined by how often they are accessed. Under desk clearance throughout for G-clamp mounting of optional accessory equipment. | The accessories can be positioned in the Secondary Reach Zone if they are to be accessed occasionally. |
| Flexibility of task light placement and spread | 3 | Acceptable, as long as the lighting source is not within the visual field. | Task lighting should be directed from behind and side of the operator. |
| Cable management (power, data) | 5 | The cables are located on an aluminium tray, within the rear, enclosed paneled section of the LCD desk. | |

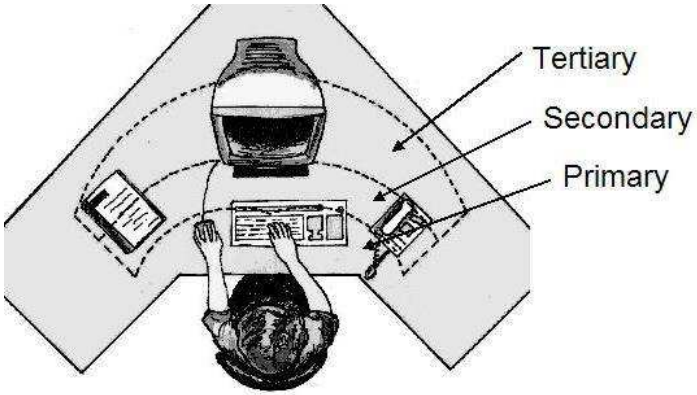
| Element | Rating | Notes | Recommendations |
|---|---|---|---|
| Access for cable maintenance (power, data) | 5 | Easily accessible at rear of LCD desk, with removable panels and the opportunity to raise the desk to interact with these, in order to avoid bending. | |
| Control / management of trailing leads | 5 | One single lead from the rear of the LCD desk which comes off the multiple power outlets. Can be loomed from the ceiling or the floor. | |
| Access to power, from all possible work points | 3 | Laptops are not a usual requirement in a security or surveillance setting, however in these instances power points or networking plugs can be accessed from the rear of the LCD desk. | Future design iteration may consider access to power points and networking points located on the back edge of the operator desk surface. |
| Feels stable and secure | 5 | Solid and sturdy construction with certified maximum weight rating. | |
| Edge treatment – suitability | 5 | Tight laminated, covering over MDF rounded, full edge moulding. | |
| Ease of cleaning. | 3 | Smooth, easy to clean surface with standard cleaning solvent or warm sponge. | |
| Surface reflectivity potential (include fittings) | 3 | Acceptable light absorbing colour range available, low level sheen and non-reflective surface qualities. | |
| Freedom to personalise layout | 3 | The under-desk footrest will dictate where the operator sits at the desk. The footrest can be adjusted by a technician to alter forward-rear adjustability. | Consider easy forward-rear operator adjustable footrest, which will improve freedom in operator layout. |
| Left/right handedness – suitability | 3 | The desk is symmetrical and can be changed from left to right and right to left. | |
| Manual handling risk exposure (e.g. changeover of equipment) | 4 | Adjustments and changeovers can be made with minimal manual handling risk as individual adjustment or technician adjustment (forward – rear movement of footrest). | |
| Likelihood that good posture will be actively encouraged by the design | 5 | Symmetrical seated or standing posture can be maintained with the benefit of the footrest for sitting and standing. In addition, height adjustable LCD and operator desks provide operator opportunity for optimal sitting posture. | |

| Element | Rating | Notes | Recommendations |
|---|---|---|---|
| "Group" acoustic quality (nest of stations) | N/A | Unable to assess. | |
| Storage of CPU | 5 | The CPU sits on an aluminium tray (1040 mm wide x 190 mm deep) with a 5 mm lip to provide stability to each CPU. There's capacity for two large CPU cases to sit on this tray. | |
| Adjustability Controls – robustness, marking, comfort | 5 | Easy to adjust with safety feature locking mechanism which prevents accidental activation and lowering or raising of the operator desk. | |

## Reach Zones

The following explains the reach zones considered when assessing a desktop layout. Desktop items should be stored within a suitable reach zone.

- The **primary reach zone** is the area that can be reached with the forearms extended and the upper arms (and elbows) hanging relaxed by the side of the body.
- The **secondary reach zone** is the area that can be reached with the torso upright and the arms reaching out from the shoulders.
- The **tertiary reach zone** is the area that can be reached when the torso is bent forward and the arms are stretched out.




Frequently accessed items such as papers, books and files should be arranged within the primary reach zone. The keyboard and mouse should also be placed within this zone.

Folders that are accessed occasionally can be placed in the secondary reach zone and are ideally kept on the desktop. If folders are placed in shelves above the desk, it is preferable to stand to access them.

The tertiary reach zone should not be accessed when seated as excessive strain on the muscles of the lower back will result.