

SOFTWARE

Almost all human factors/ergonomics (HF/E) professionals will use task analysis at some point during their careers. For many of us, it is the “little black dress” in our “wardrobe” of techniques – an old favorite used simply for task description when learning about a new domain, or dressed up with workload assessment, sequencing information, or other data when something more fancy is required.

In the past, one of the most frustrating things about performing task analysis has been recording the data. Microsoft Excel is OK for storing complex task data, but you have to draw diagrams manually, and numbering is a pain. Drawing packages produce attractive diagrams that take a long time to edit whenever there is a change, and other tools, such as workload modeling packages, are expensive, technical to use, and not intended to support hierarchical task analysis. In the past I’ve used HTA (hierarchical task analysis) packages that produce diagrams automatically but which have very limited capabilities for storing task properties – and, more important, for exporting them when report-writing time comes.

Product Overview

Task Architect is specifically designed to support HTA and has been rapidly growing in popularity over the past few years. The version released on December 5, 2005, is 1.2.20.

At the time of writing this review, I worked for an engineering consultancy called Praxis HIS, based in the UK, which employs systems, safety, software, requirements, and human factors engineers. I have used Task Architect for several projects with different clients. Most recently, we have been conducting safety assess-

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ments for Norwegian Air traffic control towers. This project has involved, among other things, producing a comprehensive hierarchical task analysis including data on a number of task properties.

This review is based on the current release of Task Architect. Given that the program is updated regularly, I have also indicated where new functionality is planned for the next version.

When building your analysis, tasks can be added in List View (see Figure 1) simply by typing a task description and

pressing the return key to add another task. Tab indents a task, demoting it; and shift-Tab promotes it to a higher hierarchical level. Numbering and renumbering happens automatically.

You can view your data in a number of ways. The Overview option gives a classic hierarchical diagram, which can be tailored to hide lower levels of the analysis with a single click. The vertical slice view allows you to drill down into the analysis, and again a simple point-and-click interface allows you to rapidly

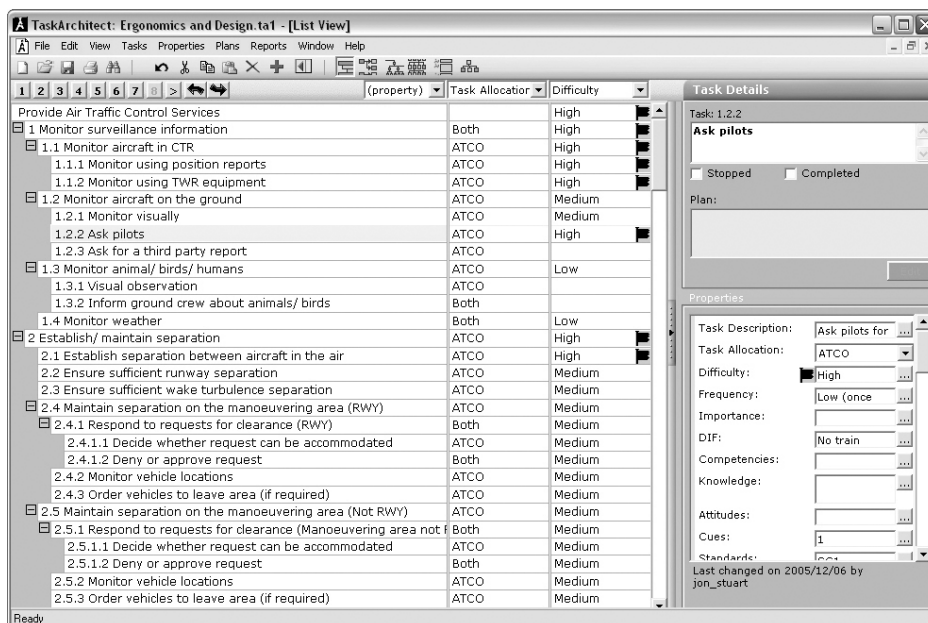


Figure 1. Tasks and properties in the list view.

navigate around the analysis. The Form View shows all the data for a single task, and you can navigate using hyperlinks on the left of the screen.

For those who prefer a left-right layout, you can also view the analysis laid out with the hierarchy going horizontally rather than vertically, which does somewhat combat the age-old problem of ending up with a five-foot-wide analysis because there are so many subtasks. There is also a view that shows a single task and its precursors.

Task properties. You can specify up to 40 task properties, which should be enough for most purposes. There are various types of property, including selection list (with either single- or multiple-choice selections), number, text string, task reference (cross referencing to a task elsewhere in the analysis), a weighted-sum formula (defined by the user and calculated based on task properties), internet URLs, and pictures (Figure 2).

Of these, I've used only the selection list and text string, although I would also have used the weighted-sum formula if my data had been structured differently. In order to use this function, you have to enter the data as numbers rather than, for example, using "High," "Medium," and "Low" to rate difficulty, and then assigning scores for the different values. I think the latter would be preferable, as it means subject matter experts (and you!) can work with verbal descriptions rather than numbers. In its next release, TaskArchitect, responding to user requests, will have rating scale properties that enable you to make calculations on the numbers but still show the verbal descriptions.

A useful feature is that you can color-code diagrams or change the font based on task properties. So, for example, you could automatically highlight all tasks that use a particular piece of equipment and put high-frequency tasks in bold. This formatting is then applied to all the diagrams. In terms of other formatting, you can change the color of boxes and the font, but you can't change the shape. Because the page breaks are generated automatically, you can't move them. Actually, I didn't find this a disadvantage—provided you are happy with fairly simple looking

diagrams, the reports generated automatically are fine, and if you want something more fancy, you can export to Visio and change the formatting there (although you are then back to having to reedit diagrams if anything changes).

Task Architect reports that in the next release, you will be able to expand and collapse all diagrams as well as move page breaks, giving you more formatting control.

Import and export. In terms of export generally, the tool is pretty flexible—diagrams are produced and formatted automatically in HTML, Visio, and a variety of graphics formats (e.g., BMP, JPEG). You can also produce a task list in HTML, having chosen which properties you wish to use. This means that, for example, it takes only a few seconds to produce a tailored list to send to a subject matter expert for checking. You can export task data as comma- or tab-separated text or using an XML file, and then import into other programs. But I found it quicker and easier simply to produce an HTML task list and cut and paste into Microsoft Word or Microsoft Excel if I needed to

add columns or a paragraph of explanation for the subject matter experts. If I didn't need to do this, I would just send the HTML file as is.

You can also import data from Microsoft Excel and Mind Manager. Although task numbering is based on the hierarchy and updates are automatically based on task position, there is also a unique task ID number that doesn't change and which can be used to export to programs like DOORS.

Other properties. If you are working as part of a team, you can detach parts of the analysis, work on them separately, and then rejoin them later (provided you don't change the definitions of the task properties).

Task Architect allows you to create plans, which you can then choose to include in the diagrams and task lists. You can also include conditions—for example, one plan may apply in emergencies and another during normal operations. Plans are produced using a fairly self-explanatory point-and-click interface. The order in which tasks can be included in the plan is determined by their order in the hierarchy,

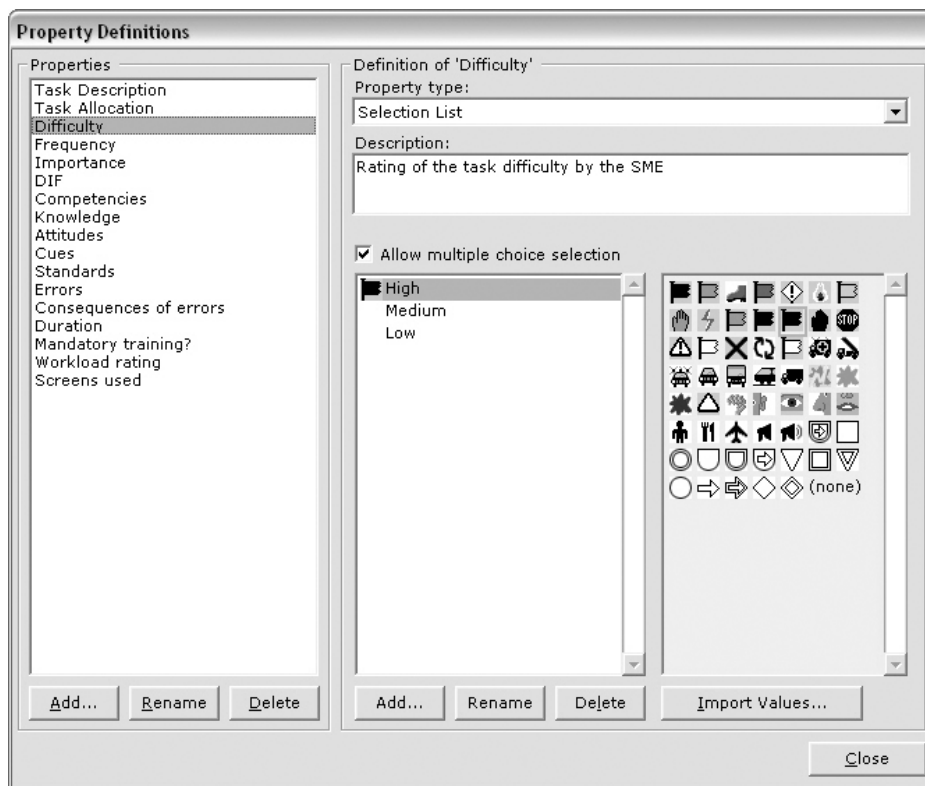


Figure 2. Defining the task properties.

so it is helpful to have tasks roughly in sequence in your analysis.

There are quite a few usability features that you don't really notice but that make life easier – for example, the ability to highlight the subtasks of the tasks you select, and context tasks that appear at the top of the task list as you scroll down. All in all, there is considerable functionality, and it is easy to get started and to use. Task Architect also provides customized tailoring (e.g., to export to Micro Saint, Sharpe, or other products).

Limitations

Creating the analysis and rearranging tasks is quick and easy. However, as I tend to use the keyboard primarily for rapid data entry, I initially found the data entry mechanism for task properties a bit slow compared with, say, Microsoft Excel.

Because the interface is mouse based, you have to select a task, select the task property, select the values you want from a list or type them in, select the next task, and so on. An update in the next release means that it will be possible to enter data using just the keyboard.

In practice, rather than getting subject matter experts to rate tasks, noting the data on paper, and then typing them in, I just used a laptop and entered the ratings in real time as the experts provided them, although I usually gave them a printout to read rather than just using the screen. This saved time on data entry and meant that the speed of data collection became the limiting factor; you have more than enough time to select the next task while the experts ponder their answers. An advantage of this practice is that Task Architect automatically records the time you last edited the task and the name of the person doing the editing. This can help to keep track of where you were if a session is interrupted or if several of you are working on the same analysis. The disadvantage is that you don't have a master copy of subject matter expert ratings to which to refer in case you make mistakes with data entry or change a task rating by mistake, unless you print one out right after the session.

The intelligent page breaks are great, and the program is clever about overlapping tasks at different levels so the hierar-

chy is still clear but takes up less space. However, sometimes it would be useful to have more control over layout when you are formatting diagrams for a report – for example, the capability to print out just one high-level task and its subtasks at a time. You can get around this by exporting to Visio or by using the Detach Tasks function.

In addition, the next release will include features for allocating parts of the analysis to individual pages and expanding/collapsing the analysis in order to produce the output you need. I found that when using task highlighting, it would have been useful to be able to save formats for reuse so I could rapidly switch between different schemes.

Installation and Update

Installation is straightforward – you just download the files from the Web and it happens automatically. Updates happen in the same way (you don't lose any data, and the license number is retained). Hardware requirements are a minimum of a 333 MHz Pentium 4; at least 50 MB of free disk space; and a minimum of 64 MB of available memory (RAM), which for the nontechnical among us translates to being able to run it perfectly well on an old slow computer if you have to.

Cost and Support

Licenses offer value for money at \$500 Canadian (approximately £240/US\$431), for which you get the latest version and access to updates whenever a new version is produced. You can download a fully functioning trial version from the Web site for free and then convert it to a licensed version by paying online and entering the license number into the welcome screen.

The user guide is clearly written and fairly comprehensive and also gives an introduction to HTA techniques, which is useful for the novice user. For more advanced users, it is probably easiest to call for advice if you need to know how to do something tricky that isn't covered in the manual.

Customer service is excellent: You generally get straight through to someone involved in producing the product, and if not, someone will call you back soon after. Task Architect staff are very helpful

at explaining how to do things if you are pushing the boundaries of the product and are also open to suggestions for improvements – new functionality is being added all the time. This does lead to occasional bugs, but these are sorted out very quickly (so far within 24 hours of reporting them).

Summary

Task Architect is a well-thought-out product that's easy to use. Like the little black dress, it can be adapted for a number of uses, and as new functionality is added, it is becoming increasingly powerful as a tool to support the interpretation and analysis of task data, as well as recording and storing the task analysis itself. If you are doing hierarchical task analysis, I definitely recommend giving it a trial, especially as you can try it for free!

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