

Briefing Paper

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Basic Integrated Home System Functions for the Elderly

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With an ageing European population and there being fewer young people in the population, we will have to ensure that, where they wish to do so, the elderly can continue to live at home independently for longer. There are various ways this can be achieved but it is not the aim to swamp independent elderly people with a mass of unwanted technical gizmos they will probably never use, rather, in the first instance, professional social workers (the GP, district nurse, home help, volunteers, carers) will want to assess the individual's needs to determine what techniques can be usefully applied to a specific case. As someone, for example, in a wheelchair will have different needs to someone who is in the early stages of dementia, this article will only address the basic, commonly relevant functions that can be applied to every home or apartment where the independent elderly live. We will also make a rough estimate of the costs.

Basic functions

As we want to make things easy for the elderly, we will generally use single-button operations and most of these buttons will correspond to specific actions the user wishes to take. For example, the person may want to sleep or get up, leave the home or come back in, cook, eat, watch television, receive guests, clean, take a bath or shower at a certain time. These are specific actions and, as a way of making things even easier, the buttons display icons that clearly show what each one does.

Other basic functions include fitting passageways with motion detectors so that lighting comes on automatically, having the heating automatically adjusting according to whether the person is in or out of the house or whether it is set for day or night mode.

The illustrations below show a number of basic functions for the homes of the elderly.



Figure 1:
Three buttons with clear icons: day setting, panic button and cooking. (Illustration source: E&D Systems)

Present or absent

For security reasons and to perform certain other functions, we have to know whether the person is at home and this can be done in a number of different ways. The simplest is to use a traditional two-state switch with a so-called check light. When this is lit, the resident is in and can use all other functions in the home and when it is not, the system switches off all lights and sockets around the home as well as all cooking appliances in

the kitchen and the heating automatically goes to night mode with the ventilation system switching to a lower setting. Ideally this central control switch shows two icons, the one being a small house with a person inside and the other a small house with a person outside, clearly showing where to press when the person is going out or coming back in again.

Sleep or day settings

When the resident is at home, we would also like to know whether he or she is going about their daily activities or whether they are sleeping. A two-state switch is put next to the bed so that the choice can be clearly made and this one shows an icon of the sun and the moon clearly indicating the day and night modes, respectively. We can also put a check light in the switch, which only comes on in the day mode, so that the resident is not bothered at night by its glare, as we know that some people prefer to be completely in total darkness in their bedroom. In day mode, all kinds of functions can be performed in the home and the heating is set to comfort mode compared to when the switch is in night mode and the heating is on a lower setting and the lights, sockets and kitchen equipment are switched off.

The WC route

There is also a WC button next to the bed. A person wanting go to the WC during the night can activate this button to light up a route to the WC thereby reducing the risk of banging into something, a cupboard or door, or tripping over in the dark. Depending on the person's condition, another sensor can be installed to activate the light path, for example, pressure sensitive mats either in the bed or next to it to detect whether the person is in bed or not.

The cooking button

In order to increase safety, a cooking button is placed in the kitchen. This not only activates the lighting in the kitchen, but also controls the kitchen equipment and the kitchen sockets' power supplies. This system ensures two potentially conflicting functions cannot be activated at the same time, for example, as cooking and taking a bath, or cooking and lying in bed, clearly do not go together, then, were the cooking function to be left on, the equipment and sockets would automatically be switched off. If desired, the cooking function can also be switched off, activated by a motion detector, if it has been unattended for a certain length of time.

The panic button

A panic button or alarm button can be fitted to the integrated home system so that were the elderly person to need help, pressing the panic button will pass on a signal to the personal alarm system (PAS), all lighting will come on, all noise sources will be disconnected from the mains (radio and TV) and the cooking function will be switched off.

Other buttons

There are a few other buttons in the home that correspond to certain activities. For example, there will be a "watch TV" button, "receive visitors" button and "eating" button, and also a "bathroom" button.

The personal alarm system

A personal alarm system (PAS) in the home of the elderly person is standard. The alarm can be triggered by using a button on a bracelet or necklace transmitter, or by pressing the panic button of the integrated home system. A two-way voice link is then set up with a care centre that is permanently manned and appropriate action can then be taken. For example, the care centre can send a volunteer or family member to the home and in certain cases, professional social workers can be called out.

An alarm can also be automatically activated such as smoke detectors, CO detectors or

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motion detectors that can also be connected to the PAS. The motion detectors are a little like lifeguards in that if the resident has not shown any sign of movement for a certain pre-set period, an alarm will automatically be sent to the care centre should the resident have been taken ill or fallen.



Figure 2:
A feeling of greater safety for the resident and their environment with a PAS system.
(Illustration source: Bosch Security)

Access to the home

A traditional cylinder lock key can sometimes present problems for the elderly with slight or severe tremors so it is better to have an electrical cylinder lock that can be easily opened with a button on a transponder. If traditional keys are still used, it is better to position the cylinder lock above the door handle to increase visibility.

Depending on the physical or mental condition of the resident in question, the key can be placed with a carer, neighbour or family member. Here another problem could arise concerning access by professional carers or paramedics who might have to enter the home when the alarm has been activated. If they do not have a key there is still a simple

and safe solution. In this instance, and only in this instance, the home can be accessed by pressing the doorbell for a long time (10 seconds); the bell itself will ring for 1 to 2 seconds to indicate that someone will enter and after 10 seconds, the door opens.



Figure 3:
Opening the door with a transponder. (Illustration source: Agora Press)

And what does it cost?

Enquiries among some manufacturers showed us that the cost of the equipment needed to provide the basic functions is between EUR 2,000 and EUR 4,000. The cost of half a day to two days, depending on the system, for installation and programming have to be added to that.

The installation cost in a new build home or apartment will probably be somewhat lower and less disruptive than for an existing home. This is partly because expensive powerline or RF components often have to be used in existing homes due to the more difficult cabling installation that is usually encountered. In new build, everything can be integrated from scratch.

If the resident owns his home, or rents a private home or apartment, then the PAS unit including service will generally be rented from a specialist care shop rather than purchased. The average rent for a PAS unit is EUR 20/month. However, if the resident moves to an adapted service flat, then the equipment, including the PAS unit, is owned by the flat operator. The resident rents the service flat, including the integrated home system and PAS. The average rent for a service flat is EUR 21/day.

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We have also looked at the average prices for a stay in a rest home, which is EUR 43/day.

For a rough estimate of the financial cost, we assume that an elderly person can delay going to a rest home for two full years (730 days) by investing in the basic integrated home system functions in their own or privately rented home. We take the maximum figures as a basis: EUR 4,000 equipment costs + EUR 640 installation costs + 730 days PAS unit rental (EUR 480). In total, the cost over two years comes to EUR 5,120 or EUR 7.01/day.

Two years' rental of a service flat results in a total price of EUR 15,330 or EUR 21/day. A two-year stay in a rest home on average costs the elderly guest EUR 31,390, or EUR 43/day which clearly demonstrates that investing in their own home (existing or new build) pays for itself relatively quickly. Compared to the rent of a service flat, the payback time is 243 days. Compared to a stay in a rest home, the payback time is shortened to only 119 days. For a total price of EUR 15,330 the elderly guest can stay at home for two years. For the same costs he can stay in a rest home only for 119 days.

The above calculations are only a rough guide as no account is taken of other outgoings such as maintenance costs to the private home [included in the price of the service flat or rest home] or food costs in their own home or their service flat [included in the price of the rest home]. On the other hand, the elderly person might prefer to stay in their familiar surroundings for as long as they reasonably can by making use of the basic integrated home system's functions and even some of the extra ones. The full state of the resident's health (physical and mental) and level of independence are obviously a key determinant when making that decision.

In this article, we have only discussed the integrated home system's basic functions and their costs. Additional functions can be built into the basic ones, depending on the needs and requirements of the resident, for example roaming detection can be considered for someone in the early stages of dementia and good remote control for someone who is not so mobile.

In any event, this begins to demonstrate how new technology is being applied to home living and to enabling people to live more independently, safely for longer than they have ever been able to do. As advances continue to be made, so this facility can only get better.