J.C. Augusto, S. Martin, M.D. Mulvenna, W. Carswell, H. Zheng. Holistic Night-Time Care. Gerontechnology 2010;9(2):<page>. Assisted living systems for healthcare are being developed as part of the fundamental shift from hospital-centred to home-centred models of care within health services. These systems are supported by Smart Environments, physical environments enriched with sensing and actuating devices, e.g., smart homes. Most of the contributions reported in the technical literature focus on the most active period of the day (daylight time). Our project NOCTURNAL (Night Optimised Care Technology for UseRs Needing Assisted Lifestyles) assumes that the night period and daylight periods of the day are different enough to require separate analysis[1]. At night time, people with dementia can experience fearfulness and anxiety which can lead to restlessness, physically threatening behaviour, 'wandering', and disruption of normal behaviour (feeding, sleeping and hygiene). **Methods.** A number of different approaches have been tried by other researchers. A literature study[2] shows that technology can play a pivotal role providing assistance to people with dementia during night time (Table 1). However, these studies focused on monitoring a specific aspect of the night time activity or applying a single technology to aid people with dementia during the night. Our work builds upon the current setup commercial telecare offerings and provides additional features. Several of these additional features focus around providing greater guidance. Smart sensing and guidance algorithms will help control the lights and support navigational guidance at night time. A primary goal of the work is to encourage good sleeping habits through a combination of movement sensors (bed and infra-red based) that detect movement in sleep augmented by a combination of changing light levels and music[3]. An important, multifunctional feature for each dwelling will include a bedside audio visual unit. This unit will form a type of Avatar with extra input received from the array of sensors located throughout the house. The audio visual unit will be able to collect the in-house sensor information and form a Decision Support Structure (DSS) choosing the appropriate response. The unit can also display pictures and play music for reminiscence therapy, which has also been proven to alleviate anger, confusion and tension[4]. **Discussion.** At night, a person with dementia will be more likely to be confused and disorientated as they awake from sleep. Therefore it can be argued that for them a need for assistive technology may be more acute. The opportunities for research for nocturnal care of people with dementia using holistic assistive technologies are for more specialised algorithms; specially designed interventions that provide therapeutic support to people to reduce anxiety; and sophisticated guidance, through the use of lightning.

References

1. McCullagh P, Carswell W, Augusto J, Martin S, Mulvenna M, Zheng H, Wang H, Wallace J, McSorley K, Taylor B, and Jeffers W. State of the Art on Night-Time Care of People with Dementia. Proc. of the conf. on Assisted Living 2009, IET.
2. Carswell W, McCullagh P, Augusto J, Martin S, Mulvenna M, Zheng H, Wang H, Wallace J, McSorley K, Taylor B, Jeffers P. A Review of the Role of Assistive Technology for People with Dementia in the Hours of Darkness. Technology and Health Care, 17:4, 281-304. 2009.
3. Sixsmith A and Gibson G. Music and the wellbeing of people with dementia, Ageing and Society, 27 (2007), 127-145.
4. Wang J. Group reminiscence therapy for cognitive and affective function of demented elderly in Taiwan, Geriatric Psychiatry, 22(12) (2007), 1235-1240.

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Table 1. Technology for night time care

Activity	Possible Assistive Technology	Time of day
Music Therapy	Digital TV, personalised music library	Planned session times during the day.
Reminiscing Therapy	Digital TV, personalised photo and music library	Planned session times during the day.
Simulated Presence and Verbal Instruction	Digital TV, Avatar, PIR's, RFID's	Non specific, some planned, some reactive to PwD
Active therapy	Keyboards, touchpad's, activity planner	Planned session times during the day.
Vocalization and restlessness during night	Digital TV, PIR's, pressure sensors, lighting and music	Reactive to PwD