

Cam-Era

An efficient, reliable and cost-effective system to monitor beach and nearshore processes and evolution.

NIWA's Cam-Era system has been specifically developed to provide coastal managers and engineers with a reliable, multi-purpose and cost effective system to monitor beach processes and evolution. It allows for a substantial improvement in the temporal and spatial monitoring of beach processes and evolution at a particular site over traditional monitoring techniques permitting users to develop a better understanding of nearshore hydro- and morpho-dynamics at a site of interest.

Cam-Era has benefited from ten years of development with the first systems installed in 1997. Currently there are 11 installations within New Zealand and an increasing number overseas, the most recent a deployment of a six camera system at Sea Palling on the East Coast of the UK.

For more information go to <http://www.niwa.co.nz/services/cam-era> or contact

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Applications

The Cam-Era system can be used for a range of shoreline and river monitoring research and operational applications. Examples include:

- Identifying shoreline position, dune toe and high water mark evolution
- Beach volume and width change
- Calibration of beach morphology models
- Location and movement of sand banks and bars
- Intertidal bathymetry mapping
- Identifying rip location and movements and detecting longshore currents
- Nearshore wave statistics
- Surf, beach and river mouth bar condition monitoring for navigation
- Object counts such as human use of boat ramps
- River mouth migration
- Public education



The Cam-Era package

Hardware: Video Camera, 1/3" CCD (including lens, enclosure, mount and transformer), IBM compatible computer with Microsoft XP Operating System and modem (if required).

Software: Image processing software specifically developed to allow exact measurements to be made off the images. The standard software has been developed to:

- Collect (daylight time) hourly snapshots, time-stacks and video-averaged images.
- Archive video-images.
- Transfer and hourly update of images to a web-site
- Account for lens calibration
- Image rectification
- Merge rectified images from more than one video camera
- Shoreline and sandbar detection

The software can be further "trained" to recognise objects by programming it to look for any change in light intensity or colour in the image. This can allow the software to find and count things such as breaking waves, shadows on un-broken waves, vegetation, people etc.

Installation

Technical support to install the Cam-Era system, calibration of the camera lens to account for distortion and, if a detailed survey is performed, image rectification.

Training and support

Supervised training including image rectification, set-up of the software for shoreline detection, and analysis. Support is provided through access to a Cam-Era user group forum set up to share experience of the Cam-era system and associated ongoing development of the analysis software.

Cam-Era validation

Research applications using the Cam-Era system have been published in peer-reviewed journals and conference proceedings and include:

Smith, K. R. and Bryan, K.R., Monitoring beach volume using a combination of intermittent profiling and video imagery, *Journal of Coastal Research*, in press.

Coco, G., Payne, G., Bryan, K.R., D. Ramsay, D., and T. Dolphin, T., (2006), The use of video-based systems to monitor shoreline dynamics, *Proceedings of the 1st ArabianCoast Conference*, Dubai (in press).

Coco, G., Bryan, K.R., Green, M.O., Ruessink, B.G., Turner, I.L., and van Enckevort, I.M.J., (2005), Video observations of shoreline and sandbar coupled dynamics, *Proceedings of Coasts and Ports 2005*, Adelaide, 471-476.

Bogle, J.A., Bryan, K.R., Black, K.P., Hume, T.M., and Healy, T.R., 2001, Observations of rip formation and evolution, *Journal of Coastal Research*, SI34, 117-127.

Paterson, A., Hume, T.M., and Healy, T.R., 2001, River mouth morphodynamics on a mixed and-gravel coast, *Journal of Coastal Research*, SI34, 288-294.

