SESSION 1: CHRIS GEOMETRIC AND ATMOSPHERIC CORRECTION
Chairman: M.A. Cutter

The topics covered in this session can be classified as follows:

(a)   CHRIS data products

(b)   Signal & noise assessment studies

(c)   Geometric studies

(d)   Data retrieval (geometric & atmospheric correction)

(e)   Miscellaneous

There were 10 papers presented in this session ranging from signal to noise assessments to utilisation of CHRIS as part of the International Charter on Space and Major Disasters. From the presentations made in this session it was clear that a lot of progress has been made by PIs in the pre-processing of CHRIS data.

– M. Cutter, Sira (UK), presented a paper on the recent updates that have been applied to the CHRIS Data Products, including radiometric calibration, gain changes for the Mode 2 coastal bands and the additions of observation angles and quality maps.

– B. Aiazzi, IFAC-CNR (Italy), described a procedure for information assessment of disitised multi-dimensional signals. The procedure has been applied to the CHRIS data to assess the information content of each band. Some discrepancies was found in the estimation of noise parameters on areas of different texture and mean grey values. Possible explanations were discussed.

– P. Marcoionni, IFAC-CNR (Italy), described an approach for evaluating CHRIS performance. The described approach analyses the bit-planes extracted from each spectral band. It assesses the randomness of every bit-plane, and finally computes the signal-to-noise ratio for each spectral channel. This approach differs from more traditional signal-to-noise assessments, which need to select a homogeneous area to isolate noise contribution.

– L. Alonso, University of Valencia (Spain). The group at Valencia had prepared a quasi-automatic routine for geometrically correcting the CHRIS data and this was presented at last year's workshop. The new understanding of image acquisition procedure, whereby the observations are determined by time division rather than fixed angle has lead to the need to reconsider the approach. This presentation described a study of the implication that this new information has on how the parametric algorithm must be implemented, as well as the impact on the acquisition geometry, the observation angles, and the pointing accuracy.

– S. Mbaye, Gael (France), described a method of geometrically correcting CHRIS data, which is under development. This method first undertakes ortho-retification using orbital parameters and then implements the geometrical correct using a single qualified Landsat covering the same image area.

– M. Kneubuhler, RSL (Switzerland), described the geometric and radiometric pre-processing of CHRIS data over rugged mountainous terrain in the Swiss Alps. The geometric correction applied a parametric approach taking account of the viewing geometry and geometric distortion due to the sensor and scene topography. Atmospheric correction was undertaken using ATCOR-3

– L. Guanter, University of Valencia (Spain), described two different methods for atmospheric correction of the CHRIS data, particularly over land. In addition the correction over inland waters was also described. The land results are based on data acquired from the SPARC 2003 and 2004 campaigns. The calculated sets of calibration coefficients showed high temporal stability between 2003 and 2004. In addition the spectral shape of the correction curve compared well with the one calculated from engineering assumptions applied by Sira. The inland water algorithm is still in development but the comparison with in-situ measurements of water-leaving radiance is promising.

– A Barducci, IFAC-CNR (Italy), describes an atmospheric correction procedure which was applied to CHRIS data acquired over San Rossore in 2004. The procedure is based on a physical model for the atmospheric light propagation and includes the assimilation of some atmospheric parameters and the optical properties of

natural surfaces. The spectral variation of the retrieved factors for different illumination and view angles was analysed.

– J Calpe, University of Valencia (Spain) describes an approach for cloud detection and masking based on CHRIS data. The technique makes use of the spectral, morphological and physical features. The technique has provided some promising results using data from four CHRIS acquisitions and further work is anticipated to improve the robustness.

– F Sarti, ESA/ESRIN (Italy), presented a paper on the use of Proba CHRIS and HRC data to support the International Charter on Space and Major Disasters. The activations included the forest fires in the Var, France (Sept 2003), the floods in Southern France, (Dec 2003), the earthquake in Bam, Iran (Dec 2003), the Indonesian tsunami (Dec 2004) and the Zarand earthquake in Iran (Feb 2005).

The conclusions drawn from the session were, first, that the updated calibration data had addressed a previous limitation in the data sets. (PIs should note that the calibration was based on pre-flight data and some allowance should be made for the long-term reduction in optical throughput instrument. However, the current results from the 2003 and 2004 Barrax campaign showed little throughput reduction and these compared favorably with the pre-launch measurements.) Secondly, the new definition of the Proba observation geometry, together with the provision of the observation angles in the CHRIS HDF files should satisfy most of the user requirements, although geometric correction was still an area where a standard routine would be beneficial. Finally, the availability of some standard tools to aid the newcomer to the use of the CHRIS data would be welcome.