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Assessment of detection processing of IMS station data at the IDC

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The Standard List of Signal Detections (SLSD) produced at the International Data Centre (IDC) during automatic station processing for waveform technology stations is a key product in the monitoring activities for the CTBT. Not only is it a required product to be made available to States Parties for their work within their verification responsibilities, but it also is a basic product on which other IDC products are based.

For quality assurance purposes and to support the development of automatic station processing, an investigation was carried out to assess the noise detection rate observed at various seismic arrays and three-component (3C) stations, mainly from the primary seismic network of the International Monitoring System (IMS). The rate of noise to signal detections is a key indicator of the effectiveness of automatic station data processing. These rates evaluated on all defined detection beams should be used for adjusting the beam recipes to optimize the ratio of actual detections to noise detections, duly taking into account whether or not a beam is steered towards a seismically active region. The investigation was concerned with the period from January 2006 to April 2007 and relates the obtained results to the baseline performance measurements found during the first System Wide Performance Test (SPT1).

In general, the detection processing results are similar to the ones obtained during SPT1. However, larger differences were observed for a few arrays and a significant number of 3C stations. In these cases the noise detection rates increased. The changes for the 3C stations were found to be due to configuration changes in the station processing by introducing a new signal-to noise measure defined for a wider frequency

band and employing it for phase identification. For two arrays (AKASG, HFS) the detection recipes were changed after SPT1 and hence are the reason for the observed differences. It was also found that a number of configured beams do not provide a significant number of detections, not even noise detections. These beams need further evaluation to verify that they are non-redundant.