AIS (Automatic Identification System) is a transponder system developed for sea traffic purposes. The system sends and receives important ship information and other safety-related information between other ships and shore-based AIS stations. The implementation of AIS has now been initiated and, as a result, the community will undoubtedly observe an increase in navigational safety. However, to the authors' knowledge, no study has so far rigorously quantified the risk reducing effect of using AIS as an integrated part of the navigational system. The objective of this study is to fill this gap. The risk reducing effect of AIS is quantified by building a Bayesian network facilitating an evaluation of the effect of AIS on the navigational officer's reaction ability in a potential, critical collision situation. The time-dependent change in the risk reducing effect on ship collisions is analysed during the implementation phase until the full enforcement of AIS in July 2008. The evaluation is performed for vessels navigating in world-wide operational routes. Furthermore, two different bridge systems are compared, a conventional bridge and a bridge equipped for solo watch keeping. It is found that the risk reducing effect on the collision risk of implementing AIS on a vessel will be approximately 55% and independent of the bridge type.