**Tables**

**Figure captions**

Figure 1 Forecasting a simple event under uncertainty. The decision to forecast occurrence or non-occurrence is made by reference to a decision threshold x* on the 'weight of evidence' axis, X.

Figure 2 Assumed distributions of 'weight of evidence' X before occurrences, $f_Y(x)$, and non-occurrences, $f_N(x)$. The decision threshold is x*. The horizontal hatching represents false alarm rate and diagonal hatching, hit rate.

Figure 3 Assumed distributions of 'weight of evidence' X before occurrences, $f_Y(x)$, and non-occurrences, $f_N(x)$. $\mu_Y$ and $\mu_N$ are the means of $f_Y(x)$ and $f_N(x)$ respectively. $d' = \mu_Y - \mu_N$ is a measure of forecasting skill.

Figure 4 Variation of relative cost with threshold probability for $p^*_{opt} \geq p_c$, for $d'$ from 0.0 to 3.0. R=0.3, $p_c$=0.2, $p^*_{opt}$=0.23.

Figure 5 Variation of relative cost with threshold probability for $p^*_{opt} \pi p_c$, for $d'$ from 0.0 to 3.0. R=2.0, $p_c$=0.2, $p^*_{opt}$=0.67

Figure 6 Variation of relative cost with threshold probability for optimal decisions; for $d'$ from 0.0 to 3.0. $p_c$=0.2

Figure 7 Variation of relative cost with d' for optimal decisions and $p^*_{opt} \leq p_c$; for R from 0.05 to 0.25. $p_c$=0.2.

Figure 8 Variation of relative cost with d' for optimal decisions and $p^*_{opt} \geq p_c$; for R from 0.25 to 4.0. $p_c$=0.2.

Figure 9 Variation of relative cost with d' for suboptimal decisions; for p* from 0.15 to 0.667 $p_c$=0.2, R=2.0, $p^*_{opt}$=0.667.

Figure 10 Variation of relative cost with d' for suboptimal decisions and a rare event, for p*=0.15 and p*=0.667. $p_c$=0.01, R=2.0, p*opt=0.667.

Figure 11 Modelled and empirical variation of hit and false alarm rates with threshold probability. Data points generated from probabilistic forecasts for rain at Canberra Airport. Curve from fitted SDT model with separation of means 2.162 and ratio of variances 0.886. pc=0.109.

Figure 12 Modelled and empirical variation of relative cost with threshold probability for an operation using the forecasts in Fig 11, with R=1.0. Data points from probabilistic forecasts, curve fitted using SDT model with parameter values as in Fig 11.