Terminal Aerodrome Forecast (TAF) Verification in the MET Alliance

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The MET Alliance is a group of national aeronautical MET service providers from Austria, Belgium, Germany, Ireland, Switzerland and the Netherlands. Each Member has a unique knowledge of its own area of operations. Within the MET Alliance, this expertise is shared and resources are brought together.

Why are we interested in the quality of our TAFs?
- For Pilots: to know how sure they can be when using them
- For Airlines: to make the most efficient flight planning possible
- For Air Traffic Control: to optimize capacity management
- For Forecasters: to know where they are good and where they should improve

How are TAFs verified

<table>
<thead>
<tr>
<th>TAF VIS</th>
<th>OBS</th>
<th>TEMP0 0107/0109 0700 BECFG</th>
</tr>
</thead>
<tbody>
<tr>
<td>VIS</td>
<td>TIME</td>
<td>OBS: 6000</td>
</tr>
<tr>
<td>0000 - 9999</td>
<td>05-07</td>
<td>06-07</td>
</tr>
<tr>
<td>1500 - &lt;3000</td>
<td>05-07</td>
<td>06-07</td>
</tr>
<tr>
<td>0000 - &lt;1000</td>
<td>05-07</td>
<td>06-07</td>
</tr>
<tr>
<td>0350 - &lt;6000</td>
<td>05-07</td>
<td>06-07</td>
</tr>
<tr>
<td>0750 - &lt;7000</td>
<td>05-07</td>
<td>06-07</td>
</tr>
<tr>
<td>1000 - &lt;1050</td>
<td>05-07</td>
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The highest FCST / OBS category AND lowest FCST / OBS category are verified for each hour.

Result Presentation

For Forecasters

Every forecaster wants to see how correct his/her TAF was!
- FC and OBS
- OBS but not FC
- FC but not OBS

For Management: Whose TAFs are best?

Depending on score! We look for a score with:
- good correlation to hits ➔ PSS, Gerrity Score GS, hit rate (POD)
- good (negative) correlation to false alarms ➔ HSS, FAR
- low correlation with base rate p(E) ➔ PSS, GS < HSS - POD - FAR

Scores like the ICAO Annex 3 hit rate, the contingency table diagonal, and Percent Correct, show no negative correlation with p(E) and POD and positive correlations with FAR. They are simple to understand, but they do not tell anything about forecast quality. Alternative: The ranking of a “proper” score is easy to understand AND informative.

For Forecast Users

LOW VISIBILITY - Maxima over all FCST hours. Period 2006 11 10 - 2006 09 31

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<th>150 - &lt;300</th>
<th>300 - &lt;600</th>
<th>600 - &lt;1000</th>
<th>1000 - &lt;2000</th>
<th>2000 - &lt;3000</th>
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What can Forecasters learn from Contingency Tables

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Many misses in Maxima, moderate rate of misses in Minima for low visibilities

Many false alarms for low visibilities (Minima)

Maximum visibility is regarded less important for flight operations than minimum visibility.

Forecasters are cautious not to miss events of visibility reductions.

At long forecast ranges (up to 30 hours), missed events are hard to avoid.

Blas: low Min visibilities are forecasted too often mostly by TEMPO, PROB

Many false forecasts of “slight” visibility reductions

Forcast VALUE is a very interesting issue with TAFs. The costs of airline operations are dependent on weather-related delays and safety aspects. Planning ahead is able to reduce these costs.

Forecast value can be determined if average weather-related costs and cost reduction potentials are known.

Flight operators and ATC are interested in thresholds.
- For airport land, p(E) indicates the relevance of an event.
- p(E) when E was fct indicates if forecast are specific or too cautious.
- p(E) when E was not fct indicates the “remaining risk”.

Dependence of Gerrity Score on Lead Time

Ceiling LOWL Winter 2008/09: Probabilities of Events and Dependence on Forecast

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