# Aviation Forecasting

# Past and Future Performance Goals

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## 1. INTRODUCTION

The current forecasting techniques for Antarctic operations rely on a minimal structure of weather observations, orbital satellite imagery "birds eye view", a few web cams, experienced Antarctic forecasters, and an advanced polar computer model that is restricted by the same limited data input.

Built on experience and a close relationship with modelers and researchers, forecasts achieve a level of performance well within the world norms.

## 2. BACKGROUND

Naval Information Warfare Center Atlantic, Polar Projects (NPP) requires all Forecaster's to complete comprehensive training and obtain supervised experience with certification prior to issuance of any forecast or warning. Education and experience is the core of our stability. A Quality Assurance (QA) Plan provides guidance to the forecasting staff and identifies the program focused goals. Quality Assurance measures have rewarded conservative behaviors in questionable weather situations. These questionable situations arise where there is conflicting data contributing to the forecasting puzzle and reason cannot provide a distinct outcome. Experience tempered by conservative reward then becomes the final judgement.

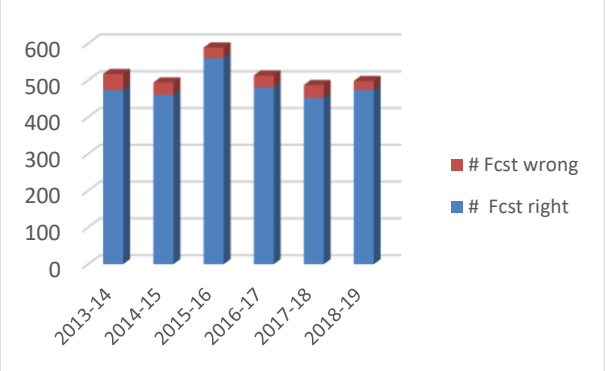
Given the restrictions of limited data, these uncertain periods can be a higher percentage over that of other global locations. With the lack of an alternative landing location, risky forecasting practices are discouraged as they can yield costly or even catastrophic outcomes.

## 3. FORECAST PERFORMANCE MEASURE

For the 2018-19 season, NPP forecasting staff provided 498 meteorology flight briefs. Of the 498 flights, 78 were forecasted for poor flight weather conditions, 15 of the 78 were incorrect resulting in missed opportunities (graph 1). This value is drastically down from 32 missed opportunities the previous year and was the lowest in the last 6 seasons.

Nine missions resulted in aborts. Using the measure over the past 6 years the lowest number of impacts occurred (24) but a higher than average number of aborts increased the cost of each mistake.

## 4. SUPPORT INITATIVES




Last year actions were identified to reduce errors. Only some of those actions could take place. All new initiatives assisted in a reduced error rate. The item enacted were:

- Smart weather observing applications with improved MET Kits (figure 1)
    - Provide all locations the ability to electronically transmit observations
    - Primary locations to have automated weather 24x7 observing system with manual override input during flight operations

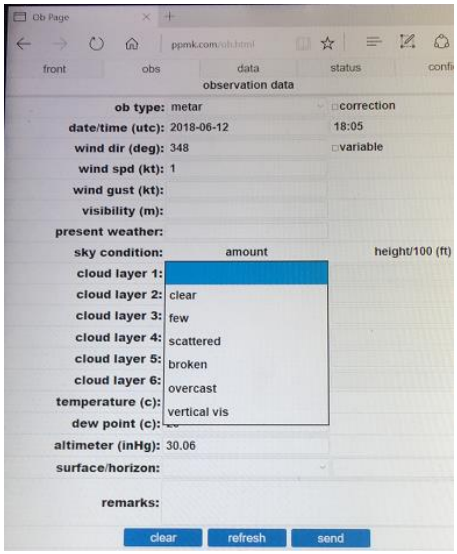



*Figure 1 - New METKit smart application, weather observation entry form.*

- One primary location deployed with cloud height/visibility distance laser range finders (LRF)
- Upper Air Radiosondes conducted from WAIS Divide
- Satellite repository USAF 557$^{th}$ provided 2.7km Satellite imagery over the entire continent
- Webcam multi-viewer with still animation looping. Six systems employed

## 5. SCIENCE CONTRIBUTIONS TO EVERYDAY FORECASTS

We embrace ideas that have come from collaborative meetings and science research. Our continuation training consists of the formal collective of COMET modules, round table discussions, and attendance of technical meetings. We also recognize our greatest learning experiences are the lessons we capture each season. Noted errors, forecast victories, and of course those lucky guesses get cataloged and used for the next year's training.

## 6. SUMMARY

Continued study and awareness to changes assists in greater accuracy for operational meteorological support. Higher degree of accuracy allows for less missed opportunities and greater effectiveness to the limited science deployment periods. Every missed opportunity is a day wasted but a balance for safety while cost effectiveness must be maintained.

As conditions alter over time the impacts relating to climate change need to be part of the forecasting scheme with techniques ready to identify and manage those changes. With science we can gain a greater awareness for continued improvement.