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22 NOV 1961

MEMORANDUM FOR: Chief, Special Projects Branch, DPD

SUBJECT : Estimate of Weather Forecasting Capabilities as Applied to Future CORONA Missions.

REFERENCE : Memo [redacted] dated 14 November 1961

1. To be realistic, any quantitative statement on weather forecasting capability must be qualified in relation to the element being forecast, the spread in values which may be considered accurate, the time-range of the forecast, the particular place for which the forecast is made and the operational factors to be considered by the forecaster. This paper deals only with forecasts of cloud cover within the limits of favorable (4/8 or less) and unfavorable categories. It is further limited to forecasts for areas and locations in the USSR, valid near noon local sun time.

2. Operational factors considered by the forecaster have a great effect upon the reliability of his product. For example: We may consider spot forecasts for USSR targets made under two different operational conditions. In condition one, positive good weather must prevail over the target and the mission can be delayed indefinitely until good weather is forecast. In condition two, time is a major consideration. The mission must be accomplished at the earliest possible date and any possibility of good weather must be predicted. WSCEN records of past performances indicate that the average reliability of spot forecasts made under these two extreme conditions is as follows:

	Forecast Range		
	24 hr.	48 hr.	72 hr.
Condition one	85%	79%	63%
Condition two	65%	63%	43%

As can be seen, differences in the forecasting problem dictated by specific operational requirements results in a difference of 20% in forecast reliability.

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3. Our evaluation of forecasts received for the first six successful CORONA missions indicates average forecast reliability as follows:

Forecasts for each pass, issued 3 hours prior to ground control command time - 66%

Forecasts for the current orbital day, issued at the beginning of the day - 64%

Forecasts for the succeeding orbital day, issued at the beginning of the day - 61%

The forecasts received for the last three of the above missions showed an average increase in reliability over those received for the first three missions, of 8%. As the computer forecasting techniques become more refined we may expect another 5 to 10 percent improvement.

4. The relationship of forecast range and reliability to the time of day at which the forecast is issued is also complex. Short range go-no-go- type forecasts are based largely on the previous longer range forecast, plus an evaluation of the latest weather reports from the specific target area. Therefore, little data processing time is required. Longer range forecasts are based primarily on upper level prognostic charts. For these, 12 hours or more may be required to process the data and arrive at a forecast. These facts must be considered when establishing operational decision-making cut-off times. The following table illustrates this point as related to forecasts for spot targets in western USSR, valid at 1200 Local sun time (0900Z), and assuming a launch time of 2000Z:

Decision Cut-off Time	Forecast File Time	Forecast Range	Forecast Reliability
L - 0 hrs. 2000Z	1700Z	36 Hours	73%
L - 4 hrs. 1600Z	1300Z	36 Hours	73%
L - 8 hrs. 1200Z	0900Z	48 Hours	71%
L - 12 hrs. 0800Z	0500Z	48 Hours	71%
L - 16 hrs. 0400Z	0100Z	48 Hours	71%
L - 20 hrs. 0000Z	2100Z	60 Hours	61%
L - 24 hrs. 2000Z	1700Z	60 Hours	61%
L- 28 hrs. 1600Z	1300Z	60 Hours	61%
L - 32 hrs. 1200Z	0900Z	72 Hours	53%

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Major USAF
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