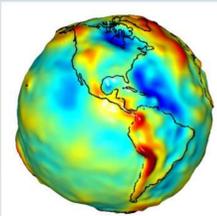




Context

NOAA has to reach 8% geographic area coverage annually for gravitational surveys. NOAA currently is only completing 5-6% per Fiscal Year

Project Gap



Elevation measurements have to be taken to map flood control certificates for the U.S. and its territories due to very sparse and incorrect measurements already in place.

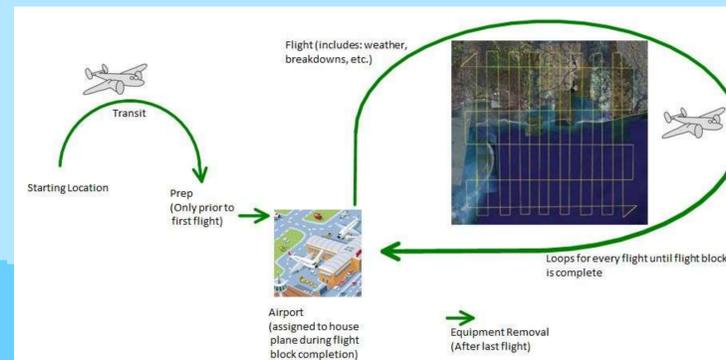
Need Statement & Design Alternatives

A plan to reduce variability within the gravitational survey is needed to maximize coverage within budget., before Fiscal Year 2022.

Design Alternatives

1. Focus on the Logistics Process
2. Acquire Additional Resources
3. Combine 1 & 2

The Logistics Process



Method of Analysis

Reduce the variance of each input variable by 5%, 10%, 15%, 20%, and 25%.

Run 10,000 replications after each change.

Calculate the days to completion.

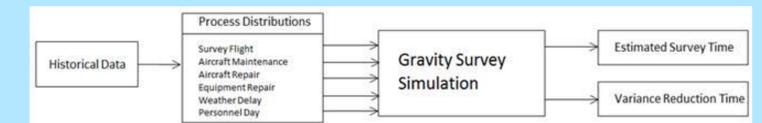
$$(10\%) = (\mu - \min) * 0.2 + \min$$

$$(50\%) = \mu$$

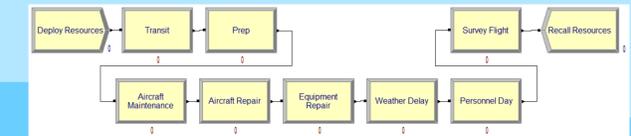
$$(90\%) = (\max - \mu) * 0.8 + \mu$$

Analyze which variables have the biggest impact on the survey by subtracting the new value from the base case.

Black Box Model

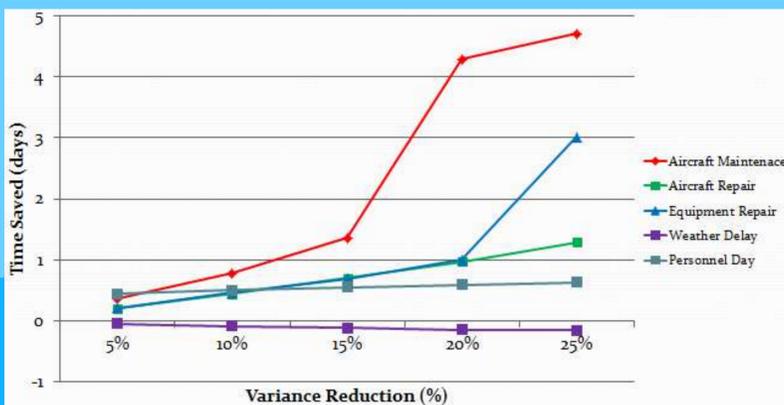


Simulation



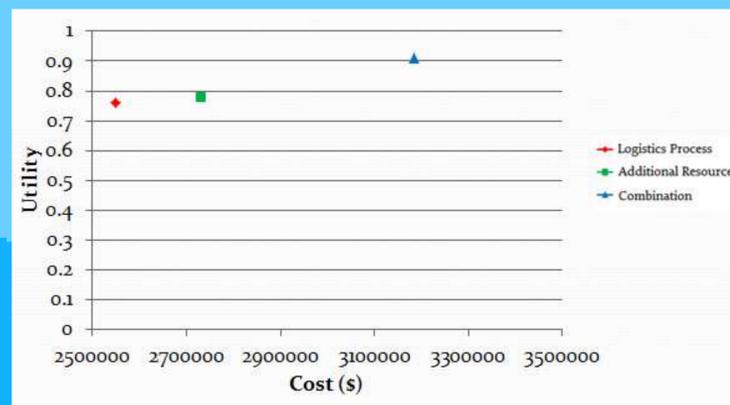
Results

Variance Reduction vs Base Case (90% to Completion)



Improvements in Aircraft Maintenance and Equipment Repair show the greatest time saved, respectively.

Utility vs Cost



The combination shows the highest utility, but focusing on the logistics process will not sacrifice too much utility and is at a much cheaper cost.

Recommendations

Focus on the performance of the surveys by allocating budget and resources towards improving parameters based on their rank in variability. Follow delay mitigation strategies to maximize the performance and output of the survey.

Conclusions

Variability reduction will reduce the time to conduct an average survey by 3 - 9 days based on 25% variance reduction. More surveys will be completed in 44 days or less. NOAA saves up to 47.4 days of survey time annually. There is now enough time to conduct another survey. Fewer days spent on survey results in less spending.