PREFACE

This is a draft of a report which is being circulated for information and comment. We hope to make it a chapter of a book titled *Military Planning In An Uncertain World*, and would appreciate any comments, criticism, ideas, and examples that readers may have. This draft began as a transcript of an informal talk and, despite some rewriting, it probably still suffers (like many such talks) from being "fashionable." We are aware that it has a number of other weaknesses and assume there are still others of which we are not aware. We hope to give it a thoughtful and leisurely review but are deferring this until we get some outside criticism.

A table of contents is given on the next page to show the relation of this chapter to the rest of the book. The chapter may not be quite self-contained as a paper, as it occasionally refers to other chapters; but we trust this will be understood or overlooked.

A more complete introduction and list of acknowledgments are given in RM-1829-1.
Analytical Approximation

Chi-Square Integral: To better than .0018 over $0 \leq \chi^2 \leq m$ and $2 \leq m < \alpha$, \( m \) being considered a continuous parameter,

$$F_m(\chi^2) = \frac{1}{2\pi(\frac{m}{2})^{\frac{1}{2}}} \int_0^\infty \left(\frac{\chi^2}{\pi} \right)^{\frac{m-1}{2}} e^{-\frac{\chi^2}{2}} d(\chi^2)$$

$$A = \frac{1}{\left[1+\alpha_1\eta+\alpha_2\eta^2+\alpha_3\eta^3\right]^4}$$

$$\eta = \sqrt{2} \ln(\frac{m}{\chi^2})$$

$$A = .5 + .133\frac{\chi^2}{m}$$

$$a_1 = .209 + \frac{.138}{\sqrt{2m+1}}$$

$$a_2 = .061 + .030\frac{\chi^2}{m} - .043 \left(\frac{2}{\chi^2}\right)$$

$$a_3 = .062 - \frac{.173}{\sqrt{m+6}}$$

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