

CENTRAL INTELLIGENCE AGENCY
WASHINGTON, D.C. 20505

9 February 1982

Mr. E. Desautels
Assistant Security Manager
Department of the Navy
Office of Naval Research
Arlington, Virginia 22217

Dear Mr. Desautels:

The four articles from the 36th and 39th MORS forwarded to this Agency 18 September 1980 for classification determination have been reviewed with the following results:

1. The three articles written by Agency employees (36th MORS, pages 135-143; 39th MORS, pages 31-33; and 39th MORS, pages 55-58) have been reviewed by their respective authors, who have determined that the articles must remain classified at the SECRET level to protect sources and methods. They are properly classified under Executive Order 12065, Section 1-301(c).

2. The article from the 36th MORS, pages 114-128, although written by an Air Force officer, was reviewed by the Classification Review Division for Agency equities. It is our recommendation that the article remain classified at least at the CONFIDENTIAL level to protect foreign government information and foreign relations, E.O. 12065, Section 1-301(b) and 1-301(d). There are portions of this article, however, that may have to remain SECRET to protect U. S. military information under Section 1-301(a), but the author or someone authorized by the Air Force should be asked to make this judgment.

We are very sorry that a reply to your request for review of these articles has taken so long. We appreciate your patience and hope that you will call on us if we can be of further help.

Sincerely,



Chief, Classification Review Division
Office of Information Services
Directorate of Administration

Distribution:

Orig - Addressee

1 - Liaison w/Dept. of Navy

1 - Chrono

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6 January 1982

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MEMORANDUM FOR: [redacted]
Classification Review Division
Office of Information Services

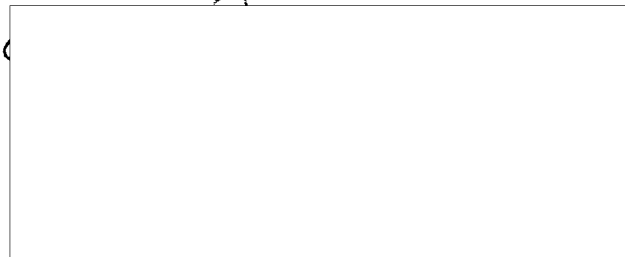
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FROM: [redacted]
Information Science Center
Office of Training and Education

SUBJECT: Classification Review

I have reviewed "The Future of the Soviet Badger Bomber." The information and methods involved still merit the classification of SECRET. A reevaluation of the matter in conformity with paragraph 2-210 of the Navy Classification Guide produced the determination that the document falls in category a.i.(a) which should remain in effect until 1988 or until four years after the number of Badger Bombers in the Soviet Air Order of Battle has been reduced to zero.

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26 January 1981

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MEMORANDUM FOR: [redacted]
Classification Review Division

STAT

FROM : [redacted] Chief
Defense & Economic Accounts Branch, SOVA

SUBJECT : Review of Classified Documents

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[redacted] and I have reviewed the attached documents
and believe that the classification level for each paragraph
and the overall document is still appropriate.

[redacted] STAT

I hope this is what is needed.
Many thanks for your patience and help
in a most confusing activity.



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Date 26 January 1982

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MILITARY ECONOMIC ANALYSIS THE KEY TO EVALUATING MILITARY ACTIVITIES (U)

(THIS PAPER IS SECRET)



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Central Intelligence Agency

INTRODUCTION

(U) Today's presentation offers an introduction to the complex field of military economics. This discipline provides a way to measure trends and to compare diverse forces. It enables one to measure the priorities assigned by a nation to military activities by quantifying their costs, in currency, in actual resources, and in opportunities foregone in other sectors. The practitioner of military operations research is used to considering individual system costs as an important aspect of his analysis. The CIA has expanded this cost aspect to military activities as a whole, thereby adding a new dimension to military analysis. Useful by-products of the military economic analysis are improved quality control for force estimates and enhanced understanding of force structures, organization, and operating procedures.

(U) Each year we publish estimates of the costs over time of Soviet defense activities as measured in rubles and in dollars. In recent years these estimates have been widely used by the Congress and within the Department of Defense. The dollar estimates, for example, have been prominently displayed in the Secretary of Defense's annual posture statement.

(U) The value of these aggregate estimates was summed up quite well by Secretary Brown in a memorandum to the Director of Central Intelligence dated May 20, 1977:

Economic analysis has come to play a significant role in our assessment of the military balance between the US and the Soviet Union. . .

We find the reports and analyses currently being produced in the area of military economics to be very useful; in fact they are the basis of the comparative economic analyses employed by Defense. The dollar estimates provide the best, single aggregated comparative measure of US and Soviet defense efforts. The ruble estimates are of value in assessing current and projected Soviet economic problems, the way they view their military forces and goals, and the ability of the Soviets to compete with us over the long term.

THE DEFINITION OF SOVIET COSTS

(U) The costs of Soviet defense activities can be measured in many different ways. The more common ways are:

--Current Ruble Costs

What it would cost the Soviets using Soviet established prices and pay rates to pay for their defense activities.

--Constant Ruble Costs

What it would cost the Soviets using their established prices and pay rates of a base year to pay for their defense activities.

--Dollar Costs

What it would cost in the US using US prices and pay rates (either base year or current) to:

- Produce Soviet designs
- Operate and maintain forces according to Soviet practices

--Factor Costs

What it would cost the Soviets using theoretical prices which precisely captured the value of resources (and profit) to pay for their defense activities.

--Opportunity Costs

What it costs in terms of forgone activities in the non-defense sector to provide the defense activities e.g. slower growing GNP.

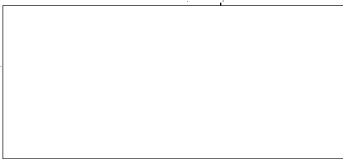
(U) The term "established prices" used in the definitions of current and constant ruble costs is important. The Soviets attempt to plan totally their economy. This includes establishing a fixed price for every good and service. Once established, they tend to remain in effect for years without regard for the actual cost of an item. Eventually, the relative price system is so far removed from reality that massive price revisions become necessary. Such revisions occurred in 1955 and 1967. When we, or others, estimate the ruble costs of Soviet defense activities, then, we are estimating what the Soviets have decided to pay for a set of activities rather than what it would have cost them if prices had been set in a free market by the forces of supply and demand. It is "factor costs" which capture this latter concept.

(U) The CIA uses constant ruble costs for its ruble estimates of Soviet defense activities. Recent estimates by the Defense Intelligence Agency and by a private individual, Bill Jones, have used current ruble costs. Both types of estimates have their uses, but it must be remembered that estimates in current rubles include the effects of inflation in the Soviet economy and changes in Soviet pricing policies for military goods.

(U) The degree of Soviet inflation is difficult to assess. Soviet official price indices deny it exists. Their indices, however, are clearly biased. This bias is evident both in the manner in which the indices are constructed and in their results. For example, we

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MILITARY ECONOMIC ANALYSIS - THE KEY TO EVALUATING MILITARY ACTIVITIES (U)

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recently acquired a Soviet parametric model for estimating shipbuilding costs. Comparing this model's results, which are in constant prices, with actual price information for specific ships indicates an inflation rate of about 5% for shipbuilding. Other preliminary work indicates an average inflationary rate for defense industries of about 3%. We expect to improve our estimates of Soviet inflation during the next year.

Estimating the Annual Costs of Soviet Defense Activities

(U) Any attempt to estimate Soviet defense spending is hampered by the fact that, in the USSR, information on defense spending is a closely guarded state secret. Only one statistic—a single line entry for "defense" in the annual State Budget—is announced. This figure is virtually useless, because its scope is not clearly defined, and its size appears to be manipulated at will to suit Soviet political purposes. (Changes in the announced defense figure from year to year bear no relationship to changes we observe in the forces themselves.)

(C) Because of the lack of meaningful official data, CIA annually provides alternative estimates of Soviet defense activities in both dollar and ruble terms. Both estimates begin with the detailed identification and listing of the physical components and activities which make up the Soviet defense program for a given year. By a variety of methods this physical data base is converted into two aggregates, one denominated in rubles, the other in dollars. For some components, such as military personnel costs, the physical data are costed directly, using available ruble prices and costs and dollar price and costs. For others, conversions are made from one value base to the other by applying dollar-to-ruble and, to a much more limited degree, ruble-to-dollar ratios which reflect the estimated relative efficiency of the Soviet Union and the US in a particular activity.

(U) The direct cost methodology builds to a total defense budget by pricing each of its component parts. This methodology not only yields estimates of total defense spending, but it also permits analysis of the internal composition of spending by military service or by major military mission. It also can assess the impact of major military programs or even alternative force structures. Finally, because each year's estimate is constructed on a consistent set of definitions, it permits identification of spending trends in real terms.

(U) The following outline lists the major items we consider in detail in preparing our estimates:

- Force Estimates:
- Order-of-Battle
 - units
 - equipment
 - man (quantity/quality)
 - Deployment
 - geographical area
 - readiness condition
 - training and operating practices
 - Support
 - spare parts
 - maintenance
 - housing and other facilities
 - utilities
 - transportation
 - Command, Control and Communications

Production Estimates:

- Plant Capacities
- product type
- production rates
- Resource Requirements
- Force Requirements

Cost Estimates:

- Unit Costs
 - technology
 - learning curves
 - productivity increases
- Activity Costs
 - pay and allowances
 - maintenance
 - fuel
 - training
 - transportation
 - construction
 - Research and Development

(U) Consideration of the above list reveals the most important by-product of our procedures. Our methodology forces a systematic, integrated review of the totality of Soviet defense activities. This review reveals both gaps in our knowledge and inconsistencies among independently derived and individually produced estimates of component activities. It is in the context of our estimates that the overall direction and pace of Soviet defense activities becomes clear.

(C) Let us turn now to an area which has been much misunderstood and misrepresented, particular, in the press. Last year we presented an estimate of the ruble costs of Soviet defense activities (in constant terms) which was substantially higher than our previous judgments. We raised our estimate because we discovered that we had underestimated the established prices of Soviet defense goods. This underestimation was due to lack of information about the price inflation that occurred in the Soviet defense industries in the 1960s and about the magnitude of change in pricing policies for defense goods that took place in the 1967 price reform. The increase in our ruble estimate did not change our perception of the magnitude of Soviet defense activities or of Soviet military capabilities.

(S) Our detailed estimates of order-of-battle, military production, technological capabilities, and the other characteristics outlined above were not altered (other than to reflect relatively minor changes which always occur in annual revisions as the result of improved information). Our estimates of the dollar costs of Soviet defense activities did not change. We had, over the years, gathered through Count and other sources various price data on Soviet military goods. We now know that in 1967 the Soviets made massive adjustments in their established prices for military goods to bring these prices more in line with the actual costs of these goods. It took us a number of years, however, to gather enough post reform prices to recognize the magnitude of the adjustments. Similarly, it was only recently we obtained enough information to gauge the degree of Soviet inflation. Although we are continuing to collect and analyze additional information on Soviet prices we are reasonably confident in our current understanding. Should the Soviets institute another major price reform, however, it will take us some time to discover its extent. Even so, one should understand from the above discussion that the particular prices the Soviets assign to defense goods are but a small if important part of estimating the costs of Soviet defense activities.

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Other Topics in Military Economic Analysis

(U) There are many other important topics in military economics that I will not have time to discuss in detail, but on which we are devoting significant effort. Three of these are military price indices, the "index number" problem of international comparisons, and the valuation of military inventories.

(U) One of the more useful applications of our dollar cost estimates is to compare the dollar costs of Soviet defense activities with the dollar costs of US defense activities. Among other things, such a comparison requires converting dollars reported in the US Five Year Defense Program (FYDP) to constant dollars. Constant dollar figures are used so that trends in costs reflect changes in military forces and activities rather than the effects of inflation. Because the effects of inflation are different in the various defense industries and the defense product mix is different than the civilian product mix, there are no "off the shelf" price indices to use. Instead we construct our own using data from the Departments of Defense, Labor and Commerce. Our indices combine hundreds of individual time series to provide aggregate price indices for each defense appropriation account.

(U) The "index number" problem refers to a basic measurement problem common to all international economic comparisons. When we compare US costs we tend to overweight the Soviet activities. If the Soviet decision-makers were confronted with the US dollar price structure rather than their ruble structure, they would undoubtedly choose a different and cheaper (in dollar terms) mix of manpower and equipment. Similarly a comparison in ruble terms would tend to overweight the US activities. There is no "true" comparison, because any comparison must be in a common denominator, but the price structures of the two countries are different. The degree of overweighting thus cannot be precisely quantified.

(U) As an example of this index number problem, the cost of Soviet defense activities in 1976 is about 1.4 times that of US activities in 1975 when both are

measured in dollars (1975 prices). When measured in rubles the ratio is about 1.25. The 1.4 figure overweights the Soviets, the 1.25 figure overweights the US. Whatever the degree of overweighting the other figure it does not appear large enough to alter our basic conclusion that Soviet military activities overall have been growing for the past decade and currently are significantly larger than those of the US.

(U) The US budgets and our estimates of the costs of Soviet defense activities measure only the annual "flows" to operate and maintain current forces and to add new forces. These annual flows can be quite misleading if they are considered out of the context of existing inventories or out of the context of long term trends. We are writing a number of papers which discuss the valuation of existing inventories for specific forces. There are many conceptual problems involved. Because there is no free market for most used military equipment it is difficult to assign, say, a dollar valuation to a ten year old destroyer. The concept we are now using for a base case is to calculate the replacement costs for a piece of equipment, regardless of its age. Thus the value of the ten year old destroyer would be the cost of constructing a new destroyer with the characteristics of the old one.

SUMMARY

I have briefly described some of the major activities we cover in our military economic analysis. Time has not permitted going into detail on a description of the operational research tools we use. The field is a challenging one, full of theoretical and practical difficulties. Many problems remain to be solved. Many uncertainties remain to be understood and quantified. Even so our product has been widely used and of considerable value in understanding Soviet defense activities. I firmly believe there is no more demanding area today for military operations research than that of military economics, and perhaps for at least the next decade no more important area.

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OPERATIONS RESEARCH IN THE INTELLIGENCE COMMUNITY - AN OVERVIEW (U)

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INTRODUCTION

(U) As I began to track down pockets of OR in the intelligence community, I discovered that considerably more components and analysts were applying OR techniques to their work than I previously believed. Even more analysts were using an OR approach although they didn't always realize it. Because of this discovery, my view of what OR is and how it began deals primarily with the CIA. I apologize to those that may have been slighted in this brief review.

projections of Soviet strategic forces, and compare them with US programmed forces. These comparisons were, at first, simple static measures, e.g., counts of delivery vehicles, warheads. The kinds of comparisons soon included relative capabilities to destroy opposing force targets, initially using only best estimates of system characteristics. The analysis soon began to consider the amount of uncertainty in our understanding of these characteristics and efforts began to explore the implications of this uncertainty.

DEVELOPMENT OF OPERATIONS RESEARCH IN THE CIA

(S) One of the early applications of OR in the CIA was the development of a set of methodologies to assist in the evaluation of intelligence collection priorities. The approach was to use weapon allocation techniques to examine expected fatalities under various forces and intelligence levels. The analysis provided insights into the importance of acquiring more precise knowledge of certain force attributes e.g., how important it is to find all the Soviet ICBM complexes. This effort led to the development of the arsenal exchange model, which in due course found its way to the Office of Strategic Research.

(S) Once we, and our customers, were comfortable with these kinds of analyses, we began to look at the effectiveness of entire forces. To do this we used optimal weapon allocators that combined alternative estimates of numbers of weapons, weapon and target characteristics, and scenarios. After several years, this kind of analysis for strategic forces became well accepted by producers and consumers of national intelligence. And now, agency analysts are beginning to move more and more into the same type of quantitative analysis of theater ground and air forces, naval and mobility forces, and command, control and communications.

(S) OSR was directed not to do "net assessment", by the DCI, Helms, so, the AEM was used to examine how the Soviets might perceive the strategic balance of forces between themselves and the US. This model was particularly valuable in helping us to understand the implications of alternative force projections. However, little of this product found its way into published report on National Intelligence Estimates.

(U) The efforts are continuing within the agency to better understand the nature of the forces and their effectiveness, but within some political and economic context. Our political analyses were led into "quantitative ways" by DCI Colby, when he charged the two components doing political analysis to establish small staffs to experiment with methodologies used by industry and the academic community. Through another reorganization, these staffs were combined in the Office of Regional and Political Analysis (ORPA) with largely the same charter. The early efforts of this group benefited greatly from Colby's personal support, as the simple statement that the Director liked this work opened many doors--and minds. The initial attitude of many political analysts typically ranged from skepticism to hostility. Equally typical, however, has been their post-project appraisal that the work was interesting and

(S) Interest grew in quantitative analysis when Schlesinger began his TDY at the agency. Reorganization options studied under Dr. Schlesinger and implemented by Mr. Colby, created an organization in OSR to, among other things, apply quantitative analysis to strategic problems. This new organization continued to make alternative



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well worth doing. Some of the most useful analytical techniques have been those which help to trace the logical consequences of subjective judgments, force an analyst to make assumptions explicit, or help organize complexity.

(S) The agency has grown increasingly interested in providing new methodologies for its analysts. One token of this interest is a program within our Office of Research and Development (ORD), designed to encourage and support a variety of new approaches to analysis. ORD has sponsored conferences on military, political and economic matters with a mind to reviewing the existing way of doing things and suggesting better, or different ways to do them in the future. Many agency components have benefited from ORD's efforts. OSR has received new methodologies that examine different aspects of force effectiveness in different ways, as well as the implementation of statistical methods to enable our order of battle analysts to better understand the large amounts of data that they receive. The Office of Weapons Intelligence (OWI) has similarly turned to ORD for assistance in developing their understanding of missile throw-weight.

WHAT METHODOLOGIES AND TECHNIQUES ARE WE USING?

(U) There exists a wide variety of methodologies and techniques in the agency and they are being applied to all phases of the intelligence process. They range from massive store houses of data to smaller, analytical data bases used to feed analytical routines that count numbers of things or compute defense costs; ~~from~~ optimal weapon allocators to detailed simulations of weapon and target interactions; and from subjective to statistical probability methods.

(U) There are examples of each of these that could be discussed in detail. You will hear several of them in later presentations. I will briefly mention some others.

OPERATIONS RESEARCH AND COLLECTION

(S) OR techniques are being applied to help manage collection resources, ensuring that the many different kinds of requirements by as many different kinds of users are satisfied, all within a finite collection budget. For example, the process of targetting imaging satellites begins with analysts requesting that certain targets be considered for coverage. The requirements of CIA analysts are gathered together with those of other agencies and reviewed by a committee of representatives from each of the intelligence community agencies. Each representative votes for the targets that his agency wishes to have covered and attaches a priority to each target. This review and voting is currently done manually, but there are plans for each agency representative to have a computer terminal and register his choices in that manner.

(S) The votes are tabulated and a target list is issued, ranking all targets by a "score" which reflects the measure of "importance" to the community. This list then becomes the "mission objective" which, along with satellite geometry and weather, is an input to an optimizing program which selects the mission profile that achieves the highest score, i.e., satisfies the most number of requirements and priorities. These collection activities generally result in massive amounts of information which must be sorted, catalogued, and stored in easily retrievable ways if it is to be of use to the analyst. The data management problem has been attacked by many organizations and in many different ways--some successful, some not. One proposal by analysts at the National Photographic Interpretation Center (NPIC) is the development of a program that subjects the data in the community imagery data base to a preliminary review. This "preprocessing" step would permit an analyst to receive only that data that met some pre-established criteria, thereby reducing the amount of irrelevant data confronting the analyst. An important application of this "preprocessor" would be to serve the indications and warning community as an alerting mechanism, where significant deviations from the normal observations are reported. The "preprocessor" can only be of value, however, if the analyst has confidence that his criteria have been properly defined.

DELPHI TECHNIQUE TO ASSESS SOVIET NAVAL MISSION PRIORITIES (NOTE 1)

(U) At a recent naval conference which some of our people attended, a number of delegates asked for an assessment of the priority of the various missions of the Soviet Navy. They felt that finer distinctions among missions were needed than simply "strategic attack" and "general purpose". There was sufficient interest and support that about 30 of the delegates joined together in an attempt to develop a way to answer such questions.

(U) It was anticipated that the main stumbling block would be the lack of agreement on how to apportion individual, multipurpose naval platforms among a variety of missions. To try to avoid that obstacle, it was decided to begin this project by trying to obtain consensus on the division of naval platforms according to their missions. The tool chosen for this task was the Delphi Technique.

(U) The Delphi Technique required the 30 experts to consider the views of their peers in an environment free from the biases caused by personalities--in this case a series of questionnaires. Peer views (expressed as numerical values) were fed back to each expert in terms of the median response and the interquartile range (IQR)

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of the responses. (The median is the middle answer in a series of responses; the IQR is the interval containing the middle 50 percent of the responses.) On each round of the Delphi, each participant was given an opportunity to reconsider and change his earlier response in light of the views of his peers.

(U) The first questionnaire asked for opinions on the wartime missions of 24 classes and seven general types of platforms built for the Soviet Navy since 1960, and it gave the experts nine missions to consider in their deliberations. Missions were selected if there was direct evidence for them or if they were commonly attributed to the Soviet Navy.

(U) The second questionnaire provided participants with the results of the first round, including their answers, and invited them to reconsider their first opinions and to change any that they wished. It did not include a mission for a platform if the median, first-round response was five percent or less. It omitted two platforms, SSBNs and landing craft, because agreement on their wartime missions was exhibited in the first round.

(U) Questionnaire number three presented the results of round two and asked the participants to reconsider their second-round responses and to change any that they wished.

(U) The Delphi was terminated after the third round of questionnaires, and the median responses in that round were accepted as the expert consensus of mission weights.

(U) To obtain naval mission priorities, the Delphi derived mission weights were applied to production figures and estimated prices for each platform. The resulting values were then aggregated by mission for each year between 1961 and 1976. Based on estimated ruble outlays for naval platforms, Soviet naval priorities since 1971 have been as follows:

Priority	Mission
1	Strategic Attack
2	Open-Ocean ASW
3	Open-Ocean Antiship
4	Coastal Defense
5	Mine Warfare
6	Reconnaissance
7	Amphibious Warfare
8	Interdiction of SLOC
9	Fleet Air Defense

(U) Based on equivalent numbers of platforms acquired for each mission, priorities for 1975 and 1976 were as follows:

Priority	Mission
1	Coastal Defense

2	Amphibious Warfare
3	Mine Warfare
4	Reconnaissance
5	Open-Ocean Antiship
6	Fleet Air Defense
7	Open-Ocean ASW
8	Strategic Attack
9	Interdiction of SLOC

(U) If projections of Soviet acquisitions of new naval platforms for 1977 and 1978 are accurate, these priorities will remain the same over the next two years. Generally, the participants felt that the project provided a useful way for examining the component missions of the Soviet Navy, and may in the future open the Soviet Navy to valuable new insights.

BAYESIAN ANALYSIS " (Note 7) "

(U) Bayesian analysis applies probability estimates to an intelligence problem. After the problem is formulated and reduced to a set of possible future events, the analyst estimates the probability of each of these future events. He then selects relevant items of evidence, and estimates the probability that each item of evidence would become available if each possible future event were going to occur. These estimates are aggregated using the statistical rule of Bayes to arrive at revised probabilities for each of the possible future events.

(U) There are a number of advantages to this technique. Because of its rigorous mathematical properties, it often moves the probabilities faster and farther than the analyst would be willing to do subjectively. In other words, the statistical procedure compensates for a natural time lag in the analyst's intuitive revision of probabilities as events evolve over time. It also partially compensates for a human tendency to fit existing evidence into preconceived explanations. The technique has been used to investigate the likelihood of hostilities (Vietnam, Sino-Soviet, and Arab-Israeli) as well as the probability that the Chinese are emphasizing one or more type of missile for development.

(U) The past analyses have generally been group projects but the Chinese missile study was carried out in one afternoon by two analysts, and the results were distributed to interested parties by xerox copy. When a larger group is involved, the procedure has the added advantage of providing a larger base of evidence, from various fields for the analysis.

DEFENSE INTELLIGENCE AGENCY

(U) The CIA is not alone in all of this. The Directorate of Estimates in DIA has a growing effort to use OR in support of their projections and analysis of foreign military threats. Some of the activities with which

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they are concerned involve: developing better ways to understand and describe the uncertainties contained in their projections of foreign forces; subjecting past projections to statistical analysis that may identify causes of errors and lead to better future projections; and developing new methodologies, along with upgrading the methodological capabilities of analysts in the estimates directorate as well as the other substantive directorates.

WHAT HAPPENS NOW?

(U) It seems clear that the success of operations research in intelligence analysis requires more than the highly developed skills of agency practitioners. Doing the analysis is only a small part of the task; the other part is to understand the concerns of our managers and customers--many of whom have never experienced this kind of analysis, or what they believe to be "that kind of

analysis". We have to demonstrate that an OR approach makes the problem more understandable, and hence more solvable, and enhances the quality of our product.

NOTES

1. Claude R. Thorpe, CIA, "Mission Priorities of the Soviet Navy," paper presented to the CANUKUS Soviet Maritime Intelligence Conference, Washington, D.C., March, 1977; and the Update on Soviet Naval Developments Conference, Washington, D.C., June, 1977, sponsored jointly by the Dalhousie University and the Carnegie Endowment for International Peace.

2. Richards J. Heuer, Jr., CIA, "Adapting Academic Methods and Models to Governmental Needs: The CIA Experience," paper presented to the 18th Annual Convention of the International Studies Association, St. Louis, Missouri, March, 1977.

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THE INFLUENCE OF FUTURE RESOURCES AND RESOURCE CONSTRAINTS AND ECONOMIC TRENDS ON THE AIR FORCE MANPOWER PROGRAM (U)

THIS PAPER IS

(SECRET)

MAJOR David H.

Lohmann

USAF

ABSTRACT

ABSTRACT

(S) The future force structure of the Air Force, in weapons systems and manpower, is predicated on the assumption that sufficient resources will be made available to fund their acquisition and retention. This assumption appears unrealistic, based upon historical experience.

(S) Inflation, economic growth or the lack of it, pay increases and budget limitations have considerable influence on the Air Force's ability to maintain required programs. Additionally, Congressional and USAF policy changes can alter the basic composition of these programs.

(S) The basic purpose of the paper is to quantitatively predict the impact of economic influences and policy changes on the Air Force manpower program, and thus to measure the potential impact on the weapons systems force structure.

(S) The paper contains a description of the projection model built to accomplish these forecasts. Some of the key program variables considered in the model are inflation rates, pay raises, and the retiree population. Some of the policy variables which can be considered are the enlisted/officer ratio, legislated mix conversions, and trends in the size and composition of the Reserve Forces.

(S) The model's ability to generate a hypothesized manpower force structure is also described.

(S) The result of using the model to forecast resources availability in the FY 1976-81 planning horizon and the resulting impact on the force structure are presented. The model predicts that, even under the most favorable of realistic circumstances, significant cut-backs in either manpower and/or weapons systems will be required throughout the planning horizon.

(S) Also presented are comparisons of the manpower structure and trends of other allied Air Forces and a descriptive analysis of the workings of similar economic forces on the Soviet Air Forces.

INTRODUCTION, PROBLEM SPECIFICATION

"If we are to maintain the maintenance of world-wide military balance, it should be done consciously with full understanding of the long-term consequences, rather than unconsciously because of generalized disquiet or the neglect of the consequences of inflation."

Hon. James R. Schlesinger
22 January 1975, Before the
Executive Club of New York

Dr. Schlesinger's statement summarizes a commonly held perception among Defense analysts that economic conditions can affect the morale of the U. S. defense establishment as significantly as the threat to be countered. Therefore, the ability to quantitatively evaluate the character of the economic influence appears to be of particular value. The work described herein was directed toward this goal.

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"WARNING NOTICE SENSITIVE INTELLIGENCE SOURCES AND METHODS INVOLVED"

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THE INFLUENCE OF FUTURE RESOURCE CONSTRAINTS AND ECONOMIC TRENDS ON THE AIR FORCE MANPOWER PROGRAM (U)—D. P. Lohmann

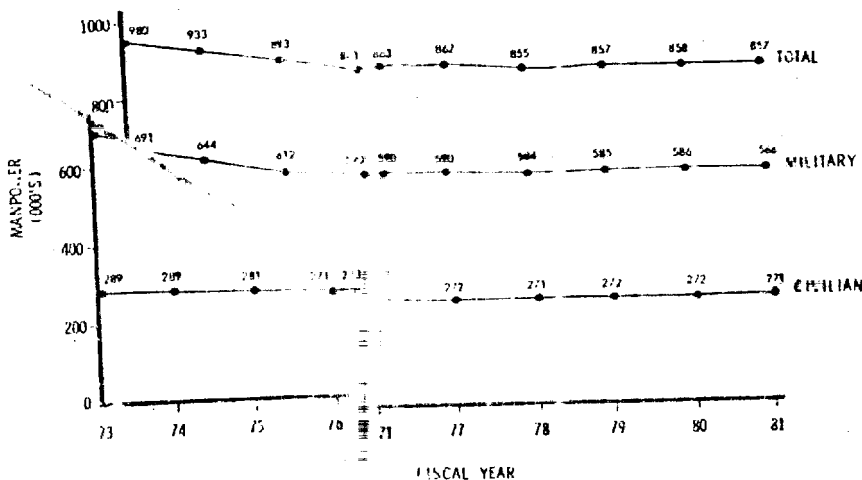
(U)The analysis concentrated on the impact of resource constraints and economic influences in the Five Year Defense Plan (FYDP) planning horizon. Predictions in this time period were deemed to be of the most value to current decisions. In a shorter time frame, the analytical estimates are probably not as accurate as the monitoring of Congressional Committee and (MB) actions. In a longer time frame, the economic predictions become

so imprecise as to make the estimates of little value.

(FOUO)The current practice is to assume that resource availability will be relatively stable throughout the planning horizon. As shown in Figure 1, the Air Force is programming a level manpower program from FY-76 through FY-81.

ACTIVE FORCE MANPOWER PROGRAM

JAN 75 FYDP (PRESIDENT'S BUDGET)



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Figure 1

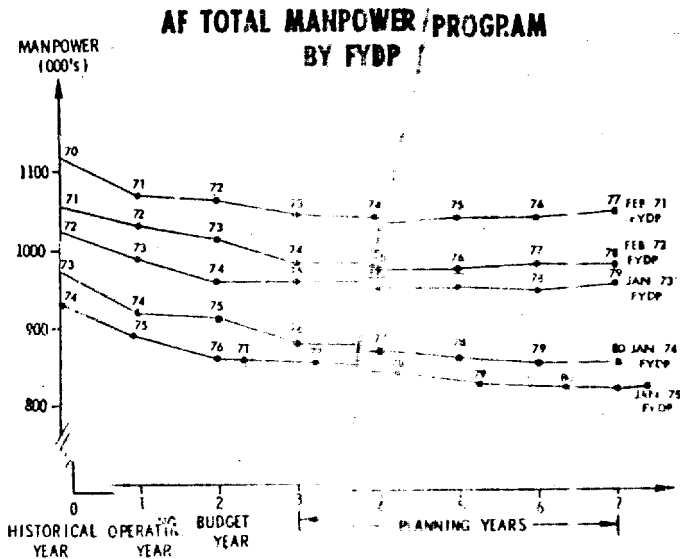
(U)The reasonableness of this straight lined program is questionable based upon an examination of a series of historical FYDP projections in retrospect. Figure 2 illustrates that every one of the recent FYDPs have been

straight lined and every one of them has been at a lesser resource level than its predecessor. Obviously, some major influence is not being accurately captured in the FYDP process.

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(U) It has been contended that the SDA phasedown was unpredictable and this is the major cause of error. The phasedown, however, is now complete and error rates should have returned to their old levels. As shown in Figure 3, however, the error rate is growing -- not getting smaller. It is contended in this paper that the major cause of the forecast errors is the inability to specify the impact of economic conditions on resource availability.

Further, policy determinations, usually outside the control of the resource manager, can cause serious subsequent forecast errors. Examples of these policy changes are enlisted/officer ratio targets and legislated conversions from military to civilian.

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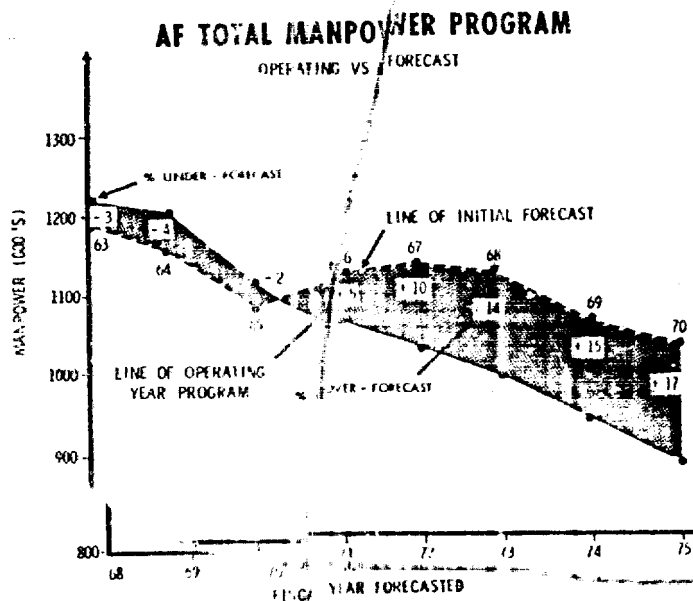


Figure 3

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(U) The problem, therefore, can be specified as follows: Identify the key variables influencing resource availability and the key policy variables influencing the composition of those resources; quantify these variables; interrate them into a model that will specify the interaction of their impacts; insure that the model can deal with sophisticated projections of key variables where they have been developed; insure that all key variables can be captured in a way. Once developed, exercise the model through reasonable values of the key variables under a set of realistic assumptions. Lastly, insure that the quantitative methodologies employed are straightforward and that the results can be confidently used by Air Force decision makers.

(U) The discussions which follow describe the effort to solve this problem. The characteristics of the model are described in the section immediately following. Next is a description of the results achieved in exercising the model to predict resource

availability in the FY 76-81 time frame. The third section attempts an interpretation by examining the results in a total force context in comparison with similar economic forces operating on the Soviet Air Forces. The summary discusses the growth potential of the model and the model improvements underway, and concludes with a statement of the adaptability of the model to the sister Services.

CHARACTERISTICS OF THE MODELInput Options

(U) The model is designed to allow the analyst to select an economic causation scenario he believes most appropriate and to select a set of policy options to model the current or predicted environment. Because of this capability, the list of input variables includes a large number of different considerations. On a particular run, however, only a subset of these will probably be used. The input variables are listed in Table 1.

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Table 1

List of Input VariablesEconomic Values

The Gross National Product (t)
 The DOD Budget (t)
 Percent of the Gross National Product Devoted to the Air Force
 Percent of the DOD Budget Allocated to the Air Force

Economic Rates

The Inflation Rate (t)
 The Cost of an i th unit of Manpower in the 1st Time Period
 The Pay Raise Rate of the i th unit of Manpower (t)
 The Cost Per Retiree in the 1st Time Period
 The Pay Raise Rate for Retirees (t)
 Timing of the Pay Raise (October or January)

Manpower Values

The FYLP Manpower Levels for the i th Category of Manpower (t)
 The Retiree Population Projection

Manpower Ratios

The Enlisted/Officer Ratio (t)
 The Civilian/Military Ratio (t)
 Percent Increase in Reserve Per Year
 The Legislated Conversions from One Category of Manpower to Another

Budget Values and Ratios

The Total Air Force Outlay in the 1st Time Period
 The Active/Reserve Budget Split & Magnitude in the 1st Time Period
 The Manpower/Non-Manpower Budget Split and Magnitude, Active and Reserve in the 1st Time Period

(t) Indicates values for all time periods. i th manpower categories are for $i = 1$ to 10 -- military active, officer active, enlisted active, U.S. direct hire civilian active, foreign national active, military reserve, civilian reserve, total civilian active, officer reserve, enlisted reserve.

Decision Options

(U) The decision options available to the analyst are of two types, those affecting the particular type of economic causations to be hypothesized (a) and those

specifying the policies and priorities to be modeled (p). The setting of these decision options is dependent upon the particular purpose shown in Table 2.

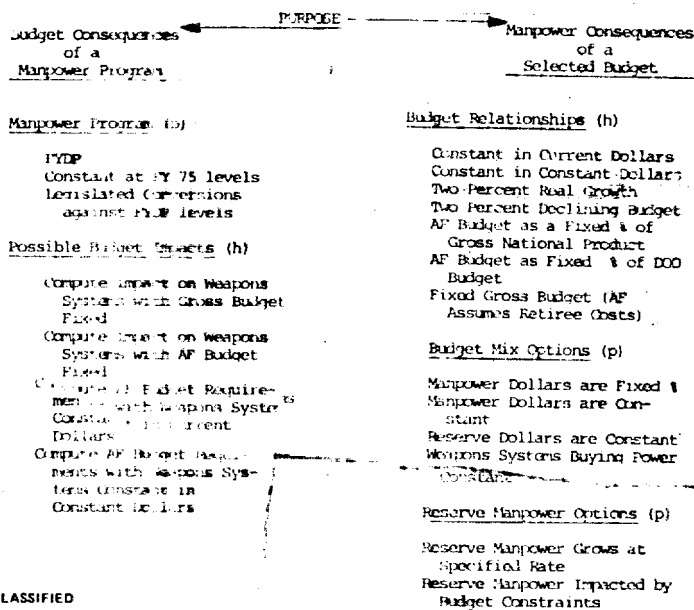
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Table 2

Decision Options



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(U) The 36 decision option combinations can be run with any pre-specified input variables. Assuming only two value sets for each variable (point, vector or matrix), there are over 8,000 possible unique input/variable combinations.

(U) This large number of options dictated development of a model that could process options quickly. It also dictated a limiting approach to the setting of values for the input variables. Every input variable

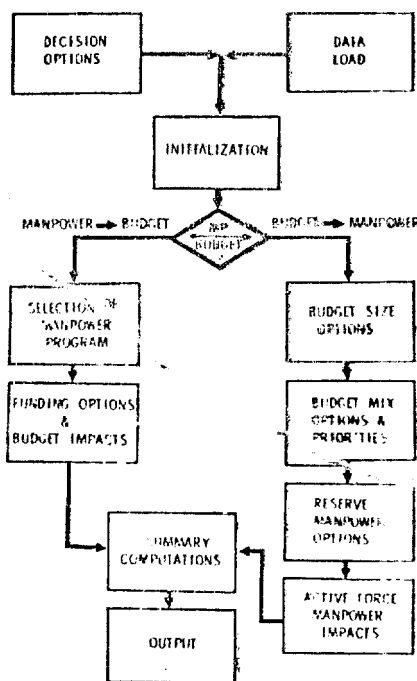
could be run through a reasonable range of values; however, this process would have resulted in an unwieldy number of runs at this point in the model's development. Therefore, a "best estimate" approach was employed. Historical data, the projections of other government agencies, and other information were used to make a best estimate of the input variable values. These estimates for the FY 76-81 time frame prediction are described in the next section.

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MODEL FLOW



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Figure 4

Model Flow

(U)The model flow is illustrated in Figure 4. Each block is an independent sub-routine generating values required in the next block. The decision options block includes the setting of values as outlined in Table 2. It also includes setting certain run specifications. These are the types of run, i.e., manpower impact of a budget constraint or vice versa, the level of output detail desired, and whether the analyst wants the manpower output in end strengths or manyears. The data load block includes all of the input variables outlined in Table 1. The initialization block performs computations required in a number of subsequent blocks, e.g., the projection of retiree costs into the outyears. In the budget to manpower option, the first block, "Budget Size Options" outputs an Air Force total budget for all time periods depending upon the budget option selected. This total Air Force budget is then broken down into manpower/non-manpower and active/reserve depending upon the priorities selected for each year in the next block entitled "Budget Mix Options and Priorities." Depending upon whether or not reserve manpower is allowed to grow according to some expansion plan, the amount of the budget allocated to active and reserve manpower can be overridden by the next block, "Reserve Manpower Options."

(U)The "Active Force Manpower Impacts" block then allocates the manpower dollars to military or civilian, based upon the mix trends specified for all time periods.

Sub-allocations are made to officer and enlisted, and to U.S. direct hire and foreign nationals — again depending on the mix trends specified. The output to the "Summary Computations" block are projections of affordable manpower in each category for all time periods.

(U)If the manpower priceout option is specified, the first block selects the particular manpower program to be costed. The options available are the FYDP by category and year, maintenance of the current levels throughout all time periods or a particular conversion program. The conversions allowed are active military to retired status, to civilian active or to reserve military; officer to enlisted, U.S. direct hire active to foreign national or to reserve civilian. It is also possible to specify the conversion rate in each case, e.g., the percent of officers reduced who are eligible for retirement and who will, therefore, join the retiree population. Efficiency conversions can be also incorporated, e.g., convert 100 military to 90 civilians. This conversion capability currently exists only when pricing out a manpower program. If the manpower consequences of a budget constraint is being determined, it is assumed that increases in the retiree population are independent of reductions in force. It is possible, however, to iteratively exercise both sides of the model to solve this problem although this is a cumbersome process.

(U)The "Funding Options and Budget Impacts" block prices out the manpower program resulting from the previous block. The analyst specifies how he wants to pay for the cost of manpower. His options are to assume retiree costs and whatever remains from a constant gross budget can be employed to pay weapons systems costs. He can select a similar option by ignoring retiree costs, working with a fixed overall Air Force budget, and computing the amount remaining for weapons systems. Lastly, a total program can be priced out by relaxing the constrained total budget and retaining the capability to preserve either the current level of weapons systems dollars or their purchasing power.

(U)The "Summary Computation" block computes certain management indicators, converts manyears to end strengths and performs the aggregations required. The model output includes a listing of the input parameters, options selected, the manpower and budget projections and management indicators on the specified or computed budget and manpower mixes.

Model Limitations

(U)Some general observations on the model are appropriate. It is readily apparent that the model is descriptive in nature. It does not, in itself, optimize. It is true that various alternative manpower programs can be compared by successive runs, however, the analyst must specify some objective function and set constraints to evaluate the results. Preliminary work has been done on the adaptation of optimizing techniques to the problem but thus far, optimizing efforts have been frustrated by the inability to specify an objective function in any but the most simplistic terms.

(U)Another limitation of the model is the current inability to analyze the impact of manpower shifts from one planning category to another, e.g., base operating support to combat. There are differentiating characteristics in each planning category which should be captured. For example, the enlisted/officer ratio, the military/civilian ratio, and the average cost of military all vary as a function of planning category.

(U)The most critical weakness in the current model is the inability to consider conversions to contract services. This type of conversion is not difficult to deal with analytically; however, the lack of accurate

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historical data on the economic consequences of these conversions and accounting problems have, thus far, resulted in the inability to reasonably translate contract conversion policies into meaningful quantitative indicators.

The Model's Computer Program:

(U)The computer program is a JOBO FORTRAN statement program. It is currently designed to use a 116 character width terminal, linked to a Honeywell 6000 computer. Since the program runs in conversational mode, run time is a function of terminal speed.

(U)Although some of the characteristics of the program are equipment unique, adaptation to other systems

is not difficult. It is also readily adaptable to the batch mode.

THE FY 76-81 PROJECTIONSSetting the Input Parameters

(U)In its current state of development, the input parameters were at one value only. No distributions were inputted. The single point estimates were generated by examination of budget source documents, economic projections from the civil or Government sector, or historical trend lines. Table 3 shows the sources of the input data for the FY 76-81 projection. These values can, of course, be modified to agree with the perceptions of other users of the model.

Table 3
Setting FY 76-81 Input Parameters

<u>Category</u>	<u>Variable</u>	<u>Source</u>
Economic Values	Domestic National Product (GNP)	OMB, Modified by The Conference Board Projections (Notes 1 & 2)
	FY Budget	OSD/P&AE (Note 1)
	Air Force Budget as Percent of GNP	Historical Trend
	Air Force Budget as Percent of DOD Budget	Historical Trend
Economic Rates	Inflation Rates	OSD(C) Modified by Fortune Projections (Notes 3 & 4)
	Manpower Costs	FY 76 President's Budget (Air Force Input)
	Pay Raises	FY 76 President's Budget (Air Force Input) Modified by Percentage of Manpower Costs not Impacted by Raises
	Retiree Pay Rates	Consumer Price Index Projections
Manpower Values	Manpower Values	FY 76, Based Upon FY 76 President's Budget
	Enlisted/Officer Ratio	FY 76
	Civilian/Military Ratio	Historical Trend
Manpower Rates	Increases in Reserve Manpower	Historical Trend
	Contracted Conversion	FY 76 Budget Markups
	Manpower Values	FY 76 Column of FY 76 President's Budget (Air Force Input)
Dollar Values	Manpower Values	FY 76 Column of FY 76 President's Budget (Air Force Input)
Dollar Rates	Manpower Values	FY 76 Column of FY 76 President's Budget (Air Force Input)

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Setting of Decision Options

(U) There are a large number of combinations of decision options that can be hypothesized. For example, the model construction allows the analyst to link the Air Force budget to the GNP or to the DOD Budget, change budget priorities and to modify the manpower mix as he sees fit. Estimation of manpower and other resource

levels in the FY 76-81 time frame, however, requires commitment to a limited set of decision options.

(U) Table 4 demonstrates the impact of these 12 illustrative scenarios on the manpower levels which are affordable in FY 81.

Table 4

IMPACT OF VARIATION IN DECISION OPTIONS ON AFFORDABLE ACTIVE MANPOWER, FY81

ROW #	DECISION OPTIONS							AFFORDABLE ACTIVE MANPOWER, FY81			% FROM BASE
	INFLATION	PAY RAISE	PAY RAISE TIMING	BUDGET LEVEL	BUDGET MIX	ENLISTED/OFFICER RATIO	MILITARY/CIVILIAN MIX	MILITARY	CIVILIAN	TOTAL	
Base Case	None	None	-	Constant	Constant	FYDP	None	612,463	246,412	858,877	-
10	Yes	Yes	Oct	Constant	Initial	FYDP	None	238,814	97,763	336,577	-61%
9	Yes	Yes	Oct	Constant	Constant	FYDP	None	309,242	124,310	433,552	-49%
5	Yes	Yes	Oct	Constant*	Constant	FYDP	None	309,242	124,312	433,554	-35%
6	Yes	Yes	Oct	Constant*	Constant	FYDP	None	436,515	175,625	612,140	-9%
12	Yes	Yes	Oct	Constant	Constant	FYDP	2.5/1r*	404,707	207,704	612,411	-24%
11	Yes	Yes	Oct	Constant	Constant	Constant	None	465,643	187,344	652,985	-24%
7	None	Yes*	Oct	Constant	Constant	FYDP	None	466,654	187,150	653,804	-24%
2	None	Yes	Jan*	Constant	Constant	FYDP	None	503,315	201,317	704,632	-18%
8	Yes	Yes	Oct	Constant*	Constant	FYDP	None	510,635	205,445	716,080	-17%
3	Yes	Yes	Oct	Constant*	Constant	FYDP	None	664,614	207,397	872,011	+8%
7	Yes	Yes	Oct	Constant*	Constant	FYDP	None	710,247	285,558	995,805	16%
4	Yes	Yes	Oct	Constant*	Constant	FYDP	None	771,013	310,206	1,081,219	+43%

*Change Variable.

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(U) Based upon these results, affordable manpower is most sensitive to the pay raise and its timing. The level of inflation selected (although halving the inflation rate still results in reductions in the order of 41 percent) and most significantly the budget level selected. Enlisted/officer ratio changes and military to civilian conversions are not as influential.

(U) The selection of an Air Force budget level to hypothesize against, therefore, is critical. It is areas that growth budgets, e.g., a budget level linked to the GNP, and Dr. Schlesinger's two percent growth budget can

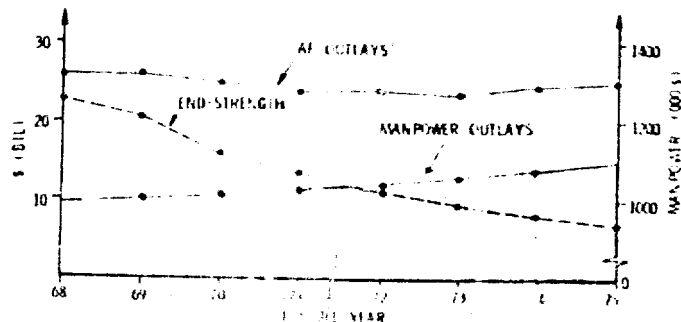
be discarded because of their poor reception in the Congress. Historical trends, however, can be examined to gain some insight into possible levels.

(U) Figure 5 illustrates Air Force budget levels for the last nine years. Air Force total outlays have remained relatively stable in current dollars as a reasonable projection for future levels, based upon historical experience. Also shown in Fig. 5 are the historical impacts of raising manpower cost: a 37 percent increase in manpower costs accompanied by a 25 percent decrease in end strength.

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AF BUDGET MIX & MANPOWER



PRESIDENT'S BUDGET (JAN 75)

ITEM	68	69	70	71	72	73	74	75	% CHG
AF OUTLAYS	25.0	24.0	23.0	22.0	21.0	20.0	19.0	18.0	-2
MANPOWER \$	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	+0
MANPOWER %	40.0	41.7	43.5	45.5	47.6	50.0	52.6	55.6	+31
% MANPOWER	40.0	41.7	43.5	45.5	47.6	50.0	52.6	55.6	+11
END STRENGTH	1300	1200	1100	1000	900	800	700	600	-55

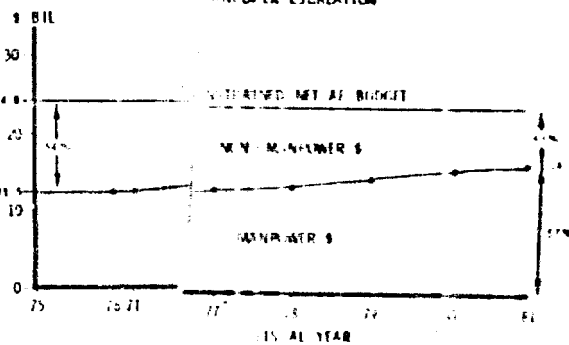
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100A decision maker, when faced with possible reductions of the manmade required by a fixed basket, would probably explore other options such as reduction of procurement, R&D, and other non-manpower elements. Figure 6 shows the model's prediction of the basket.

Under a fixed basket, the total non-manpower dollars would fall from 64 percent of the basket (\$13.00) to 41 percent of the basket (\$10.50).

NON-MANPOWER BUDGET IMPACT CONSTRAINED AF BUDGET

WITH MANPOWER ESCALATION



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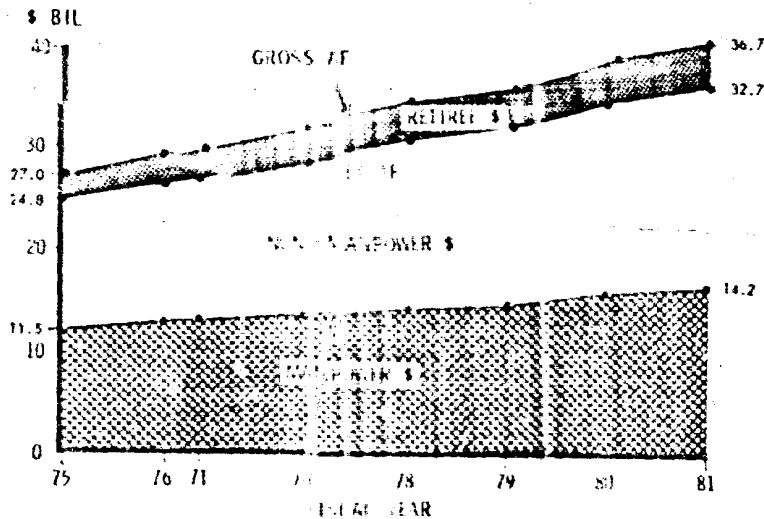
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(S) To avoid both consequences, manpower cutbacks and investment program reductions, requires a growing budget. The requirement to fund the FYDP manning program and to retain the purchasing power of today's non-manpower budget is shown in Figure 7. The net Air Force budget required in FY 81 would be \$12.7 billion. It should be noted that the non-manpower budget in this case does not include procurement of new weapons systems

above the current rate. The current FYDP Air Force investment program, including the A-10, F-15, F-16 and full procurement, require investment rates considerably above current levels. The layouts for these programs would have to be extended to FY 88 under this option. Under the previous case of a fixed budget, the investment plan could not be implemented in any time frame.

BUDGET PROJECTIONS OF FYDP MANPOWER PROGRAM

1975 TO FYDP



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IMPLICATIONS OF THE FINDINGS

The model developed to predict the necessity to significantly reduce force levels under all reasonable economic scenario assumptions. The model under each scenario has been detailed. Given that the model has accurately captured the essential characteristics of the program, what then are the consequences of these reductions to defense policy?

The method of assessing these consequences in a total force context is to compare the effect of similar constraint forces on the Soviet Union, the United States, and other Western countries on the other side of the projected consequences for the USAF.

Comparison with Other Forces (Economic)

A smaller Air Force is not an undesirable consequence in itself. In fact, if the mission can be accomplished with fewer resources, it is desirable. Therefore, the significance of a smaller Air Force can only be evaluated by an examination of the threat to be faced in the future. As Figure 8 shows, the Soviet Air Force has not demonstrated its ability to penetrate various of our air bases or power structures due to economic constraints and events are now that of the United States Air Force projected constraints. In the Figure, Soviet Air Forces are defined to include Strategic Rocket Forces, Long Range Aviation, Frontal and Transport Aviation, Air Forces of the Heavy Bombers, and Control Military post activities are also included. Central Command and support activities are not included.

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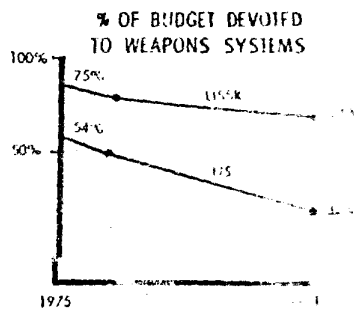
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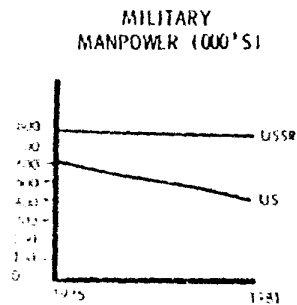
IMPACT OF ECONOMIC FORCES

U.S. AND USSR

AT CONSTANT MANPOWER LEVELS



AT CONSTANT WEAPONS SYSTEMS EXPENDITURES



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(1) These data on the Soviet future involve do not predictions of actual circumstances. For comparative purposes, the graph on the left in this figure is a constant manpower level. The graph on the right, however, alternatively, a constant weapons systems expenditure rate. In addition, the assumption is made that in the Soviet planned economy that inflation is controllable and that the Soviet planners will continue to grant pay raises of 2.5 percent per year to their military.

(2) It should be noted that there is no evidence that military programs are seriously affected by Soviet economic constraints. This relative insensitivity of Soviet defense expenditures to domestic economic conditions was also noted by the RAND Institute (see 5). That is to say, however, that there is no one may not compete for defense resources in the future. The opportunity cost of labor, particularly skilled technicians, and the opportunity cost of industrial technological capacity may in the future generate resource constraints on the Soviet defense establishment. However, there is no evidence that opportunity costs are a great influence in Soviet decision making (see 6).

(3) Most recent estimates project increasing defense expenditures for the Soviets (3-5 percent per year) a condition which causes the projected difference between the USAF and the Soviet Air Program to be smaller. Therefore, the ability of the Soviets, in the future, to

produce and maintain greater quantities of weapons and manpower is shown.

(4) Examination of the impact of similar economic forces on the defense postures of other western countries reveals that a number of them face circumstances similar to the United States. For example, in recent years the inflation rate has exceeded the growth in defense spending in France, Italy, Great Britain, Canada and Japan. In West Germany, growth in defense spending has exceeded the inflation rate; however, manpower costs have risen considerably and they, therefore, find themselves in similar economically constrained circumstances. West Germany has transferred missions to the reserve forces; France has shifted emphasis away from the nuclear deterrent toward conventional forces. Italy has postponed modernization programs; Great Britain has significantly reduced her forces outside Europe. Canada has reduced manpower levels and curtailed her air and naval operations. Japan has cutback on the purchase of new weapons. According to a special report in The New York Times, these accelerations were a direct result of economic pressures (note 7).

Organization with other forces (Organization)

An industry comparative analysis is also useful for evaluating the manpower composition of the USAF and for assessing the ability of the USAF to absorb major reductions in non-weapons systems manpower.

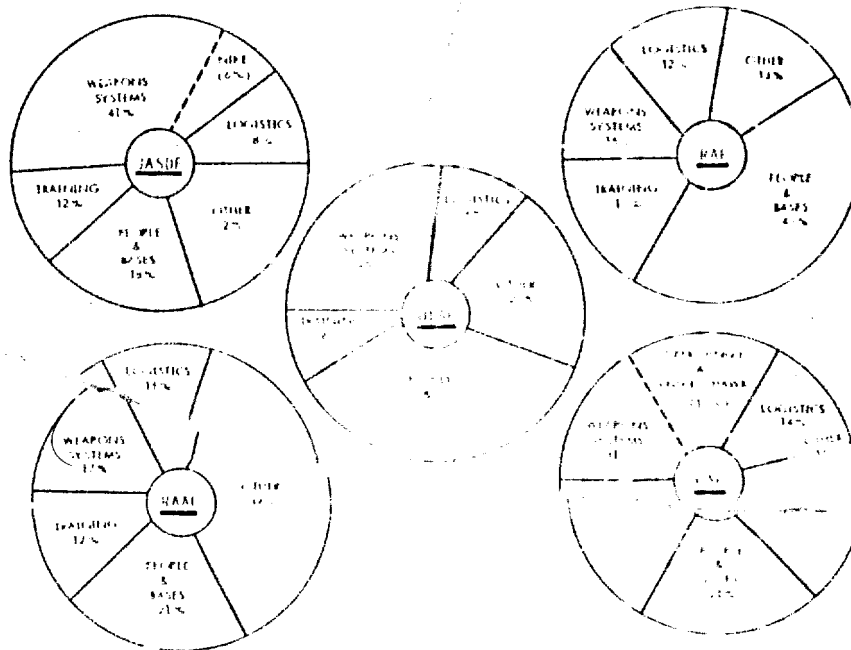
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MANPOWER COMPOSITION OF ALLIED AIR FORCES



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As shown in Fig. 9, the USAF projected 26% of its total manpower into the weapons systems area in 1974. When compared to the Royal Australian Air Force (RAAF) or the Royal Air Force (RAF), this percentage looks quite favorable. Recall, however, that the USAF has deployed forces and extensive lines of communication to maintain with a relatively small Air Force manning, as would expect a high "leverage" category. In the case of the RAF, with its network of bases and its maintained with a large percentage of their manpower in the field, will have a man with a relatively small manning. They cannot address the economy of scale that the USAF force would achieve with the new mission.

When compared to the Japanese Air Self-Defense Force and the German Air Force, the USAF manning in the weapons systems does not look too impressive. The Japanese allocate 41% of their manpower to weapons systems, which is a percentage to be envied. The Japanese Air Self-Defense Force is almost certainly needed to air defense and their manning of their manning in their high weapons systems area. The German Air Force has a strategy of manning in the

tactical support, tactical airlift, reconnaissance and other missions. The short lines of communication may explain their ability to allocate such a high percentage of their manpower to weapons systems.

There are a number of conclusions that can be drawn from this comparison. First, our missions are, of course, different and it would be unwise for us to try to copy the manning patterns of other nations. Second, there are constraints imposed by the mission on the manning patterns that an Air Force can devote to weapons systems. However, third and most important, there appears to be room for improvement, although limited, in the USAF ratio of weapons systems to non-weapon systems manning. The magnitude of this possible manning problem is not great enough to meet the manning objectives required under the more conventional operating conditions. Shown in Fig. 10 are the manning patterns required support reductions under various manning scenarios. Case I is a constant manning half of Case II is a constant manning. Case III is a declining manning pattern, and Case IV is a declining

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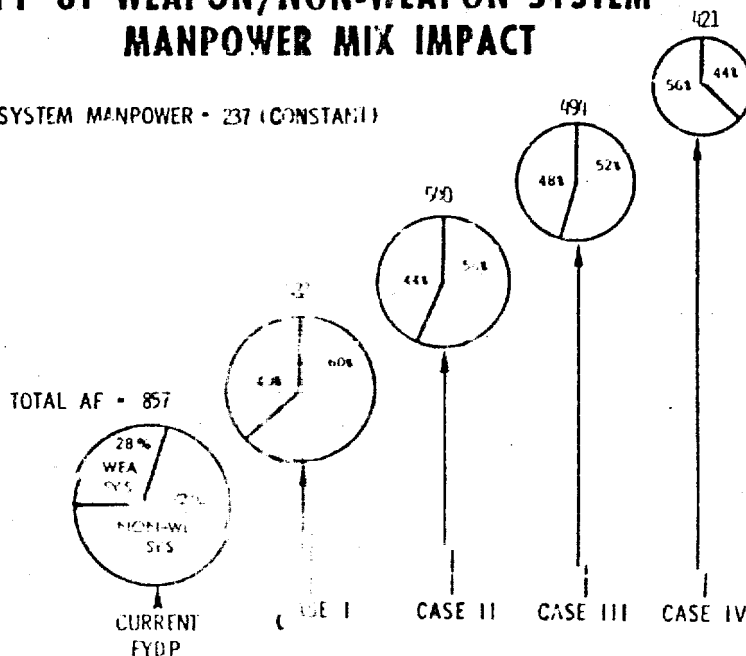
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FY 81 WEAPON/NON-WEAPON SYSTEM MANPOWER MIX IMPACT

WEAPON SYSTEM MANPOWER - 237 (CONSTANT)



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Figure 1c

Value of Comparisons

(5) In summary, it appears that the Soviet Union will retain the ability to build a military establishment with few external economic constraints while the other hand the U.S. and other western nations may be forced to reduce their manpower and/or weapons systems levels. This conclusion, however, should be made in a general context only. The data currently available from the intelligence community on Soviet Forces, manpower and key economic indicators is very sketchy. For example, very little is available on Soviet levels of

forces or the civilian component of the Soviet defense establishment.

(6) Specific comparative analysis of the manpower strengths of the two Air Forces is likewise not recommended. When coupled with the known deficiencies in the intelligence estimates, the differences in skills, methods of operation, and weapons systems/manpower mix make such a comparison of little value in evaluating relative combat capability in a total force context.

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THE INFLUENCE OF FUTURE RESOURCE CONSTRAINTS AND ECONOMIC TRENDS ON THE AIR FORCE MANPOWER PROGRAM (U)—D. P. Lohmann

SUMMARY

(U) The model described is an integrating mechanism which allows the analyst to assess the impact of economic forces on resource availability. The model considers key economic variables and policy options and computes affordable manpower or weapons systems dollars availability. It can also priceout a given manpower program.

(U) Current efforts to improve the model include:

- o Exploration of optimizing techniques.
- o Incorporation of contract services conversions.
- o Use of sub-models to better predict inflation.
- o Inclusion of an iterative loop to consider the cost of the required reductions-in-force.
- o Specification of the impact of shifting manpower from one planning category to another.
- o Ability to handle stochastic variables.

(U) These efforts will enhance the level of detail that can be dealt with in the model. Improving the accuracy of the model is dependent upon an examination of the retrospective validity of its projections. This effort to reconstruct the data available in 1968 to attempt to project the FY 69-75 resource levels is currently underway. Initial results indicate that the model would have produced lower resource levels than actually occurred by a factor of 3 to 4 percent.

(U) There are three unique input variables in the model. Changes in these values, for example, incorporation of ship conversions, inflation rates, would of course be required to be modeled in the other Services. The majority of the data used, however, available in programming manuals and documents which should be readily available.

(U) The model has been used to project the consequences of budgetary constraints and economic influences on the Airforce resource availability in the FY 76-80 time frame. Based upon realistic economic scenarios, serious doubts on the ability of the Air force to

operate at planned PDP levels are indicated. Significant reductions in manpower and/or weapons systems are forecast are indicated. The ability to transfer manpower from support categories to the weapons systems category to maintain combat capability appears to have limits based upon a comparison with other Air Forces. In addition, enlisted/officer ratio changes and civilianization programs offer limited savings. In a total force context, similar economic forces are constraining allied Air Forces. On the other hand, Soviet Air Forces appear to be relatively free of similar constraints.

NOTES

1. CAS (PA&E) Memorandum of 2 July 1974, Overview of Defense Resources. Classified SECRET.
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5. DeLoach, John and Phyllis Chynoweth, Preliminary Economic Analysis of Soviet and Chinese Military Production, The Rand Corp., Santa Monica, CA, RAND-OR-73-1, Nov 1973. Classified SECRET.
6. Secretary of Defense (Intelligence) Memorandum of 10 February 1974, U.S. Military Requirements: A Draft Report on Arms, Manpower, and Air. Classified SECRET - Foreign Consumption.
7. Finney, J. A. W., "Inflation Slows Growth of West's Arms Industry," New York Times, 30 Dec 1974.

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