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U.S. METRIC STUDY MISSION

to the

UNITED KINGDOM AND THE FEDERAL REPUBLIC OF GERMANY

OCTOBER 1976

Report of the NASA Representative

P. N. Vlannes

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16. Abstract

This document is the executive summary of the trip report prepared by the NASA representative of the U.S. metric study mission to the United Kingdom and the Federal Republic of Germany. The mission was organized and conducted under the aegis of the American National Metric Council to learn at first hand the progress of metrication in the United Kingdom and the progress of metrication in the aerospace industry in both the United Kingdom and the Federal Republic of Germany. Representatives of the mission included a cross section of government, industry, labor, and other segments of the private sector. After general and special meetings in the United Kingdom, U.S. members with aerospace-related interests met with aerospace representatives in the Federal Republic of Germany.

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REPORT OF THE NASA REPRESENTATIVE

I. INTRODUCTION

The purpose of the U.S. Metric Study Mission to the United Kingdom and the Federal Republic of Germany was to permit those responsible for metrication programs in the United States to learn at first hand the metrication programs of the two countries, how they were initiated, conducted, and assessed, the problems encountered, and how the United States might benefit from their experiences.

The study mission was organized and conducted under the auspices and direction of the American National Metric Council (ANMC). Representatives included a cross section of government, industry, labor, and other segments of the private sector. The meetings were divided into two parts: (a) three days of general discussions involving the total U.S. delegation, and (b) three days of special discussions in given areas of interest to the individual delegates. In the aerospace area, the special discussions were arranged by the Aerospace Sector Committee of the ANMC. Members of the delegation, who also were members of the Aerospace Sector Committee, attended the meetings with aerospace representatives of the United Kingdom (U.K.) and the Federal Republic of Germany (F.R.G.).

II. GENERAL MEETINGS IN THE UNITED KINGDOM

The mission met with representatives of the British Standards Institution (BSI) and the U.K. Metrication Board. Briefings were given on the U.K. Metrication Program, including its inception, approach, organization, progress, problems, and the lessons learned. Specific areas were covered, such as construction, engineering-related industries, engineering (including aerospace) industries, retail industries, and consumers. Detailed discussions on the U.K. Metrication Board itself covered matters such as organization, mission and operation, public information and training, and consumer outlooks.

Some results, facets, and opinions of metrication in the United Kingdom are:

1. Metrication must begin with the announcement at the topmost level (e.g., government, corporation, industry, company, etc.) of the policy to convert to the metric system.

2. Policy announcements are followed by designation of points-of-responsibility for government or other concerned entities.

3. Metrication touches upon everyone. It is an across-the-board problem. It also is an opportunity to discard the unneeded and to improve the ongoing.

4. All concerned persons should be kept informed and involved.

5. A program should be laid out by and for each concerned group; it should include a schedule, and every effort should be made to meet the schedule.

6. From a national point of view there is a rational progression, which consists of:

   a. Announcement of policy.

   b. Metrication of the documentation for materials specification and engineering design.

      This includes a rational approach to the metrication of all specifications and standards. (Note that this was one of the first tasks undertaken by the U.K. via the BSI.)

   c. Metrication of the engineering-related industries.

      This permitted production of the materials needed for the engineering industry, which, in turn, could produce the tools and equipment needed for production of other end-items and consumer goods. The engineering aspects constitute the most critical and time-consuming phases. Engineering is the key, will have the greatest workload, and should provide the leadership.

   d. Initiation of a national education program in the schools.

      Education in industry and the public and private sectors should be that needed to get the job accomplished. Involvement in the use and application of the metric system is the best way for learning.

   e. Metrication of the wholesale, retail, and consumer industries.

      This aspect should follow closely the availability of items produced and packaged to metric weights and measurements. Metrication of the weighed-goods area has no limitations as to timing of the initiation of conversion. It can proceed as expeditiously as scales are converted.

7. Consumers are interested mainly in four types of products: textiles, clothing, food, and drink.

8. Financial help (or subsidies) from the government "is a proposition to be avoided." No cost write-offs and no government subsidies were provided for metrication. Costs were permitted to lie where they fell and to be treated as any other business costs.

9. The British felt that their failure to enact legislation that would make the use of the metric system mandatory and establish a series of "M" (Metrication) Days was a serious error. This has been costly in effort and resources and has protracted the completion of their metrication program.

10. The European Economic Community (EEC) has established 1978 as the target year for essentially all trade to be in the metric system. It is incumbent upon all trading partners to comply. Restraint of trade provisions in the EEC agreement provide penalties for member countries that have barriers that could be an impediment to trade (e.g., a barrier could be preferential treatment for the use by a member country of nonmetric units of weights and measures).

11. Many payoffs are evident, such as increased trade with other metric countries, a reduction in the size of inventories, and a corollary benefit of upgrading of technology, procedures, and methods with a concomitant streamlining of endeavors.

12. Dedication is the requisite and most desirable quality needed to get the job done.

III. AEROSPACE SECTOR MEETINGS WITH REPRESENTATIVES OF THE UNITED KINGDOM AND THE FEDERAL REPUBLIC OF GERMANY

The meetings with aerospace representatives of the U.K. and F.R.G. were arranged to give an overview respectively of (1) a nonmetric country that was converting to a metric system and (2) a metric country with a nonmetric area in aerospace that was converting only one sector to SI. The U.S. aerospace representatives came from industry, the Department of Defense, the Federal Aviation Administration, and the National Aeronautics and Space Administration. Representatives of the U.K. and F.R.G. came from the materials, engineering, production, and service and support industries, and from civil aviation and the Ministry of Defense.

Prior to departing for Europe, the chairman of the U.S. aerospace team forwarded a series of questions to the Europeans that could serve as a basis for the discussions. Those questions can be grouped into seven areas:

1. Aerospace approach to metrication
2. SI units for aerospace
3. Metrication of drawings, specifications, standard parts, documentation, etc.
4. Training
5. Costs of metrication
6. Impact of U.S. metrication
7. Advice for U.S. aerospace industry

The European aerospace approach to metrication is essentially that stated by the British for national metrication:

1. Announcement of policy
2. Documentation conversion
3. Conversion of the aerospace materials industries
4. Conversion of the aerospace engineering and engineering-related industries
5. Conversion of the aerospace support, sales, and service industries

The above are carried out with concurrent public relations, training, and customer-oriented programs.

The facets, results, and status of European aerospace metrication are summarized below:

1. The U.S. aerospace industry can expect to face increasing international competition in worldwide aerospace sales. The Europeans are intent on converting to the metric system, have completed the basic transition, and have created the mechanisms for metric production. (A premium price for nonmetric requirements is levied for materials, engineering, and production.)

2. Long-life equipment such as that for aviation, ships, railways, and stationary power plants is expected to be operational for 25 to 35 years. This means a long-term phase-out of dual inventories and indicates the need for a supplementary production capability for production of nonmetric replacement parts and components.

3. The EEC will use the International Standards Organization publication 1000 (ISO-1000) as the basis for SI for aerospace, even though there are still some technical differences in measurement units that have to be resolved. The Europeans feel they are flexible enough to accommodate to any changes to ISO-1000. (Note: Since the United States also is committed to the SI and has adopted the ISO-1000 as the base documentation for SI units, the Department of Commerce, under its statutory authority for U.S. weights and measures, should move forward to vigorously resolve the questions pertaining to those SI units that are now in controversy or remain unresolved.)

4. The greatest workload, particularly in aerospace, and the key to metrication are in the engineering areas. Metrication in the engineering areas begins with the changeover of documentation required to permit engineering design, and from there, proceeds through the various engineering phases needed to effect production of the equipment and tools that enable all other phases of metrication to move forward.

5. All aerospace drawings, specifications, standard parts, documentation, etc., have been metricated or converted. Design of new components and new aircraft or systems is in SI.

6. Unspoken, but implied, is that the Europeans have used metrication as a device and motivator for streamlining and updating their systems, procedures, methods, etc., and as a motivator for replacing and updating their production equipment. This should make them more competitive in the marketplace. Both Britain and the F.R.G. are anticipating the need to comply with EEC requirements to conduct trade in metric units by 1978.

7. The need for U.S. participation in the establishment of aerospace standards, whether for American/European standards or as international standards, is evident. U.S. participation is both desired and requested by the Europeans. (Note: The NASA representative recommends that the U.S. aerospace community should become more actively involved in the Association Européenne des Constructeurs de Matériel Aerospatial (AECMA) and ISO, as well as with other organizations such as the Aerospace Industries Association (AIA), the American National Standards Institute (ANSI), and the Society of Automotive Engineers (SAE), which are involved in the establishment of international standards. Federal agencies such as the DOD, NASA, FAA, and the Civil Aeronautics Board (CAB) should provide active participation in these endeavors.)

8. Where international standards do not exist, and in the event that the international collaboration is not forthcoming, the Europeans are prepared to go forward with the establishment and use of European standards.

9. As evidenced by the above, the U.S. aerospace industry will need to set the pace for the U.S. changeover to the metric system. Federal agencies with regulatory authority or legislative mandate should assume leadership in a collaborative endeavor with industry and the public and private sectors in aerospace metrication.

10. Air carriers are waiting on the International Civil Aviation Organization (ICAO) for metrication of flight operations. Here, U.S. participation is mandatory.

11. Most training for metrication has been accomplished in the schools. In all other sectors, only that training needed to accomplish a specific job is given. Training by practical use of SI has been the most expeditious, least costly, and most effective route.

12. No costs write-offs and no government subsidies were provided for metrication. Costs were permitted to lie where they fell, and were handled by industry within normal cost accounting and amortization procedures. The only government funding was that inherent in education and for funding of government agencies such as the U.K. Metrication Board. Because of the costing approach, no cost guidelines were prepared and no metrication cost studies were undertaken. The aerospace sector, like all other sectors, received no government subsidies for metrication. None were sought by the industry, and none were allowed by the government.

13. Costs for metric tools provided by workers in industry were not allowed. Industry provided the metric tools needed to get the job done in-house. This cost was stated to average about $75-$78 per worker.

14. The Europeans believe the least costly route is the shortest phase-over period.

15. The Europeans state that early U.S. metrication for aerospace, particularly in aviation, could be mutually beneficial, particularly in those areas that would minimize nonmetric components and reduce the size of dual inventories.

16. The Europeans are looking to the United States to provide leadership for "space metrication." (Note: This is stated after emphasizing that metrication of all other aspects of aerospace is complete except for flight operations.)

The advice the British and West Germans had for the U.S. aerospace industry may be summed up as follows:

1. Eliminate or minimize hybrids.

2. Do not confuse start of metrication with cessation of use of nonmetric.

3. Carefully watch all cataloging systems; they give what is converted and the rate of conversion.

4. Have a coherent program, and stick to the schedule.

5. Keep all interested parties informed and involved.

6. Do not neglect public relations.

7. Keep abreast of metrication education in school because it impacts industry operations.

8. Too long a time schedule can be overly costly.