CIVIL AVIATION TECHNICAL ASSISTANCE, INCLUDING TECHNICAL PROCUREMENT, AS AN INTEGRAL COMPONENT OF DEVELOPMENT COOPERATION.

Colin Everard

Supply Chain / Procurement
Technical Assistance For Developing Countries

Abstract

This paper sets out to explain the crucial importance of civil aviation technical assistance for developing countries, to support global air safety. In the judgement of the author, the industry could do more to contribute to a better understanding of the highly important need for expanded development cooperation, especially in engineering disciplines. Within this overall context, the role of effective technical procurement as an element of the supply chain is highlighted.

Of the 190 Member States which are contractual signatories to the Convention On International Civil Aviation, which of these States can assert with honest conviction that their civil aviation systems meet all of the Standards, Recommended Practices and guidance material of the International Civil Aviation Organization (ICAO)? The short answer is: not many. If, for example, we look at the G20 countries (a group which includes the most developed and richest countries in the world), some of these countries would hesitate to declare that they meet all international standards to assure air safety. This is a group of 20 countries; so how do the remaining 170 States measure up?

The point of raising the issue of global air safety is to highlight the fact that, unfortunately, there are many countries in the world which face tremendous challenges in establishing and maintaining the required infrastructural facilities and services to assure air safety in all respects. As one hears from time to time, the chain of air safety is only as strong as its weakest link. And if up to 20 countries are regarded, in relative terms, as developed, then this leaves some 170 countries which are in various stages of development; they constitute the so-called developing world. Typically, these countries experience problems in the financing of infrastructural development; they lack funding for the technical training of their staff, for the purchase of up-to-date equipment and systems, as well as for the construction of required buildings. In the author's experience, the will to develop is ever-present, but the problem of overcoming the lack of adequate funding often proves to be insurmountable. Even when funding is made available to support an upgrading project, the continuing problem has to be faced of ensuring in the longer term that the upgrading will be properly sustained.

Over the last 60 years, recognition of the above situation has led to the establishment of an array of global and regional bilateral and multilateral financing institutions which have as their main mission the provision of support to Third World countries in their endeavours to strengthen and upgrade their capabilities in key areas. On an exceptional basis, financing has sometimes been provided for civil aviation development cooperation.
Among those organizations which have given priority to providing technical assistance to developing countries is ICAO. With funding made available by the United Nations Development Programme (UNDP), the

development banks and other financing institutions, or by the recipient country itself, ICAO has worked with most developing countries in helping to identify weaknesses and, under projects which set out specific objectives together with a detailed plan for implementation, has worked with civil aviation administrations to achieve an upgrading of facilities and services. In the project planning stage, not only are technical issues addressed, but infrastructural and environmental issues also need to be carefully considered. Typically, the assistance provided through ICAO includes the fielding of highly-qualified advisory personnel, arranging for specialized training abroad (training in the basic disciplines is available at the national level) and the procurement of equipment/systems. No doubt, the efforts of all concerned have been effective, but the question remains: are these efforts enough? If global air safety is to be sustained, it is obvious that technical assistance must be not only continued, but if possible expanded.

It has to be emphasised that every air safety technical cooperation project must be carefully tailored to ensure that its focus pinpoints main weaknesses, and that the project cost is kept to a realistic minimum. Due account must always be taken of the absorptive capacity of the country concerned. A realistic approach assesses a country's absorptive capacity, after which certain action stages are agreed and spelled out for completion before the objectives of a project can be fully realised on a sustainable basis.

By nature, every technical cooperation project, from its planning through to completion, is complex. In basic terms, each project needs unstinting cooperation between three parties: the civil aviation agency, the financing institution and the technical assistance partner organization. During the implementation phase the various inputs of each of the three parties needs to be carefully coordinated so as to avoid a waste of time and money. The impact of delays needs constant attention in terms of the scheduling of project inputs.

One important component of most projects is that of equipment/systems procurement; procurement is one of the key elements in the supply chain. The project technical procurement activity may involve both operational and training equipment. Thirty years ago, the technical procurement component of ICAO's projects steadily increased in terms of value and scope. Recognizing the concentration of technical expertise available within ICAO, linked with the capability of a highly-developed procurement section, ICAO launched its Civil Aviation Purchasing Service (CAPS), under which ICAO purchases equipment and systems on behalf of civil aviation authorities and agencies.

Today, ICAO holds some 120 CAPS registrations from civil aviation authorities and agencies around the world. The value of equipment purchased exceeds the equivalent of US$100 million annually. This paper includes an explanation of the background to the establishment of CAPS. It also contains a comprehensive description of how the scheme functions, that is from systems design through the various engineering and commercial steps to equipment/systems commissioning. Over the years, the contribution of ICAO's CAPS to global air safety has been inestimable.

1 Introduction and Background

In order to assure global air safety, technical assistance for developing countries is crucially important. Within this context, this paper explains and discusses:

a) The modalities under which developing countries receive technical assistance, nowadays often referred to as technical cooperation;

b) In terms of the practical application of development cooperation, the operation of the Civil Aviation Purchasing Service (CAPS), a service offered by the International Civil Aviation Organization (ICAO). Reference is also made to environmental considerations.

For the scientific community in general, and in particular for those in positions of leadership within this highly important community, a sound knowledge of the nature of the developing world, as well as of the basic principles of effective technical cooperation, are a *sine qua non* if involvement in these areas is to show fruitful results.

Of the 190 Member States which are contractual signatories to the Convention on International Civil Aviation, which of these States can assert with conviction that their civil aviation systems meet all the requirements of ICAO Standards, Recommended Practices and Guidance Material? The short answer is: not many. If, for example, we look at the G20 countries (see Appendix), some of these countries would hesitate to declare that they meet all necessary standards to assure air safety. The group of 20 countries (in fact 19 plus the European Union) represent the richest of the world, with about 80% of the world's collective gross national product in their domain. I have referred here to the group of 20 countries. So how do the remaining States measure up? Excluding 4 States of the European Union which are part of the G20, we are considering the air safety situation in some 167 countries.

2 Technical Cooperation

The point of raising the issue of global air safety is to highlight the fact that, unfortunately, there are many countries in the world which face tremendous challenges in establishing and maintaining the required infrastructural facilities and services to assure, in all respects, air safety. As one hears from time to time, the chain of air safety is only as strong as its weakest link. Although the term 'developing country' covers a wide range of countries in varying stages of development, some of the main problems which are faced by many of these countries can be summarised as follows; some of the problems itemised may be linked with others which are also highlighted:

i) A generally low level of economic development, resulting in extreme limitations of funding to generate expanded development, including the provision of adequate government services, for example in the fields of education and communications. One noteworthy aspect of this situation is that foreign exchange, which is needed for the procurement of major civil aviation systems and equipment, is in very short supply. Some of the poorest developing countries are geographically handicapped in that they may be small, remote island countries, or their countries may be land-locked;

ii) Lack of infrastructure development, covering both human resources and physical facilities. This problem is exacerbated when economic development is expanded, due to the movement of trained personnel into other jobs which usually offer higher remuneration; in turn, this adversely impacts on continuity of trained, experienced expertise. In some cases the services of trained personnel is lost altogether because these personnel find better-paid employment abroad;

iii) Lack of absorptive capacity. This is a major problem which, too often, is afforded insufficient attention. In terms of upgrading a country's competence in a given field, for example that relating to air safety, it is *essential* that the recipient country's level of absorptive capacity is measured before the upgrading project starts. The objective of sustained development can only be reached when the recipient country provides the required infrastructural resources to enable the upgrading, often involving the latest technology, to be properly absorbed in all respects on a continuing basis:

iv) The problem of language usage should not be underestimated. Especially in larger countries many languages may be spoken To give one (extreme) example to illustrate the point, in Indonesia more than 200 languages/dialects are spoken. Although educated people have a good knowledge of the national language (Bahasa Indonesia),

nevertheless translation of aviation-related documentation from, say, English into Bahasa Indonesian (possibly with important technical/scientific sections further translated into a regional language), presents a daunting, time-consuming challenge. Although Indonesia represents one example, this type of problem is present in a number of countries, especially in Asia;

v) Stability in the workplace. Many countries are afflicted with political instability and/or high levels of crime. In an increasingly violent world, a safe working environment is often under threat, a fact which impacts on orderly development and good job performance;

vi) Fragmentation of political entities (based on the notion and assertion of nationalism) has led in many cases to a dilution (sometimes the nullification) of available expertise, particularly in specialised scientific and technical disciplines.

What has been the reaction of the international community to the situation in which developing countries find themselves? Over the last 60 years or so, recognition of this situation has led to the establishment of an array of global and regional bilateral and multilateral financing institutions; these have as their main mission the provision of support to Third World countries. On an exceptional basis, financing has sometimes been provided for scientific research and development in the field of civil aviation. Among those organizations which have given priority for the provision of technical cooperation is ICAO. As an Agency in relationship with the United Nations (UN), ICAO has worked with developing countries and with the United Nations Development Programme (UNDP) as a financing partner, to help countries identify weaknesses in their civil aviation systems. With funding made available by the country involved, together with financing provided by the UNDP, ICAO has participated in development cooperation throughout the developing world. In addition, over the years ICAO has cooperated with financing institutions such as the World Bank, Regional Development Banks and other institutions, such as the OPEC Fund, in the implementation of projects aimed at the upgrading of civil aviation facilities and services.

In addition to technical cooperation provided through bilateral and multilateral funding organizations (usually these are intergovernmental), industry participates in training schemes, both formal and on-the-job. However, in most cases the training provided is on a limited basis, for example with the aim of assuring effective operation and maintenance of specific equipment. In the judgement of the author, an altogether much broader and stronger commitment to supporting air safety in the developing world, employing a much larger-scale, more structured approach would represent a good investment in terms of contributing to air safety.

Every technical cooperation project must be carefully planned and the content of the proposed assistance must focus on the main areas of weakness in the air safety system. Also, the absorptive capacity of the recipient country must be objectively measured. If the absorptive capacity is below the minimum required, then necessary steps need to be spelled out for completion before the project commences. In an overall sense, infrastructural capacity, including environmental issues, need to be properly addressed.

It should be noted that no project falls in the ‘give-away’ category. Only after the full policy and financial commitment of the government/civil aviation Authority, can discussions on the proposed project begin. Concerning project external inputs, typically, technical cooperation projects comprise components for the provision of well-qualified professional expertise, the specialised training of staff abroad (basic training takes place at the country level), and project-related equipment; the latter may be for the support of training facilities, or may include capital equipment.

In basic terms, the project is a project of the government (or its civil aviation Agency/Authority). During the course of the project's implementation many complex challenges arise and hurdles need to be overcome. Tripartite meetings of the government/civil aviation Agency, the financing partner and ICAO are regularly held; these meetings not only review progress but also serve to resolve problems, especially those involving effective coordination, for example the timely provision of project inputs. The end objective of every project is the achievement of project objectives at the lowest reasonable cost within the shortest, but realistic, time-frame possible, always bearing in mind that the assistance provided must lead to a sustainable result.

Looking back over the years, during which hundreds of projects to support air safety have been implemented, can one assert with conviction that the results of these projects has been positively effective? Post project analyses and studies have shown that the answer is strongly positive. It would not be correct to state that this positive judgement is unreserved. There are always reservations; however, these are usually of such a nature that the overall positive judgement is not significantly impacted. Especially during periods of rapid expansion of the civil aviation sector, these air safety-related projects have unquestionably made a significant contribution in coping with the burden of maintaining air safety. If, for example, we look back to the situation in south-east Asia in the eighties, for some years the rate of growth of passengers and freight was of the order of 20% per year, with consequent enormous strain experienced by national civil aviation Authorities. In such a situation, the benefit of technical cooperation was of crucial importance.

Before turning to an explanation and discussion on the specialized area of major systems/equipment procurement, the author wishes to touch briefly on some elements of the nature of the developing world.

Although much has been written on the subject of development cooperation, no agreement exists either between practitioners or air safety-related organizations concerning the most appropriate way to deliver effective development cooperation. Diverse approaches have been applied, but none of these have been wholly successful. Even after half a century of well thought through efforts to generate a common formula, failure to agree on a common approach persists.

In the opinion of the author, this situation exists because of the complexity of the development activity, involving as it does a mosaic of cultures, economic factors and, perhaps above all, widely diverse attitudes which are found in the countries which need support. This means that when considering technical cooperation needs, each country should receive individual, separate assessment. Within this context, in certain countries the main attitudinal tenet which needs strengthening is to replace an attitude of reliance on others with the adoption of, to the maximum extent feasible, an attitude of self-reliance. Every country of the world has a certain tempo of development. In order to accelerate this tempo, in some developing countries a stronger *will* to develop is needed, with the aim of achieving self-reliance as soon as possible. In this context, the slogan of the Kuwait Fund, which is: 'Helping people to help themselves', is indeed pertinent.

3 The Civil Aviation Purchasing Service (CAPS) of ICAO

As explained, one of the important components of most technical cooperation projects is the provision of systems/equipment. In this paper, reference to the purchase of equipment covers major systems/equipment acquisition. Purchase of day-to-day, recurrent items of equipment can be handled using one of the many excellent computer programmes which are available.

Although the importance of adherence to sound purchasing principles continues to gain

recognition, regrettably purchasing operations are still pursued which result in severe cost overruns. The procurement of construction, for example, is complex and when procurement basic principles are ignored, the result may lead to financial disaster. Over the years, many examples of serious cost overruns have occurred. To give two examples in the field of construction: in the early years of 2000 the Scottish Parliament Building was constructed. The original cost estimate was about £25 million. The final cost amounted to £414 million. In the field of design and construction of airports many severe cost problems have occurred; and they continue. The on-going construction of Vienna-Schwechat Skylink terminal represents an example: the original cost was estimated at 400 million Euros. Today's estimate is 850 million Euros.

Recognizing the many pitfalls which await the unwary or ignorant purchaser, in the seventies (a time of high passenger and freight growth in several regions of the world), ICAO established the Civil Aviation Purchasing Service (CAPS). As referred to above, the utilization of CAPS was, from the outset, intended to be used for high-value procurements. Although ICAO is a regulatory organization responsible for the compilation of Standards, Recommended Practices and Guidance Material to assure safety of air navigation, ICAO maintains a Bureau dedicated to assisting in providing technical cooperation aimed at contributing to the enhancement of air safety in the developing world. With a well-organized and experienced procurement section (the section had been involved in world-wide technical procurement for over 25 years), the Technical Cooperation Bureau was well placed to expand its activities by offering procurement services under the CAPS scheme. It was also recognized that for support in CAPS activities, ICAO represents one of the highest concentrations of civil aviation technical, air transport economics and legal expertise in the world.

The concept of the operation of CAPS contains two particular advantages:

a) In aspiring to attain the highest professional standards in the procurement of systems/equipment, as an international organization ICAO's approach is objectively unbiased;

b) The ultimate aim of CAPS is to provide the best possible service, rather than to operate the scheme for profit. This means that in measuring the degree of success of a procurement project, emphasis is placed on quality, rather than the so-called profit bottom line.

The concept of the way in which CAPS would function was developed in consultation with civil aviation administrations around the world. In terms of charges, a major departure from the then 'flat-rate' approach, was made so that as the value of the procurement increased, then the percentage charge decreased. The minimum value which is handled under CAPS is the equivalent of US$10,000. The basic percentage charged at this level is 6%; at the threshold of US$100,000 the percentage is reduced to 4%, and so forth.

From the outset, the aim of CAPS was to provide a complete technical and commercial service. These would comprise the following steps, steps which must always be undertaken in full consultation with the civil aviation Agency/Authority:

- detailed systems design
- preparation of detailed specifications
- identification of supply sources on a world-wide basis
- calling for tenders/bids
- technical and commercial evaluation of bids
- contract negotiation
- after award of contract, the administration of the contract

- in-factory and site systems/equipment testing, leading to commissioning

For the CAPS user, individual or all of the above components may be selected, as required.

Regarding the financing of CAPS work, by nature this operates as a Trust Fund, which means that funds are deposited in trust by the user; the funds are then placed by ICAO into a CAPS user account. The funds may be deposited directly by the civil aviation Agency, or they may originate from a development bank or other financing institution; in some cases, ICAO has assisted in financing negotiations.

As stated, the CAPS scheme is utilized for major purchases. Examples include:

- communications equipment across a broad spectrum, for example systems/equipment for air traffic management, navigational aids – ILS, VOR, DME;
- radar systems, together with ancillary (data processing) equipment;
- airport lighting systems, for example runway edge lighting;
- crash, fire and rescue vehicles;
- construction, for example planning and construction of runways, control towers and associated buildings and facilities;
- training aircraft and flight simulation equipment.

There can never be an annual programme for CAPS work. This is not the nature of the scheme. CAPS is there to be utilized as required at any time by civil aviation administrations. The essence of CAPS is flexibility and speed. Often, procurements handled under CAPS represent a component (perhaps the most complex element) of a much larger project of a civil aviation Agency/Authority. Although the value of CAPS' work is variable on an annual basis, currently the annual value of purchases handled equates to about US$150 million. Today CAPS Registrations held by ICAO number about 120.

Before leaving the subject of procurement, some brief comments on the basic purchasing process may be helpful in terms of providing background information which highlights important considerations; adherence to this proven advice will assure the successful accomplishment of a large-scale purchase. In the field of procurement, there are no short-cuts. Processing steps can be accelerated, but they should never be omitted altogether. If this basic tenet is ignored, then immediately the risk increases of cost overruns and a project which soon finds itself out of control.

When initiating a major purchase, the first step is to establish a group of professionals, with a designated head, who will be responsible for seeing the project through to completion. The designated head, often the head of purchasing or a senior financial officer, retains complete responsibility at all times during the processing of the purchase contract. He/she will be advised by technical/scientific and financial specialists as needed. But only the designated head maintains his/her responsibility for the execution, in all respects, for the project. The head will follow the highest ethical standards. Under no circumstances will outside influence (whether political or otherwise) at any stage of the purchase be permitted. In cases where interference in selecting the best offer is attempted, then the interfering party should be warned. If the interference is repeated, then the supplier involved should be disqualified.

Comments on some stages of the purchasing process follow; these comments will need to be considered in the context of their applicability to a particular-type purchase:

3.1 Specifications

It should be appreciated that if specifications are drawn up in too-great detail, then it is likely that the cost of adhering to these specifications may well be excessive. Industry normally offers state-of-the-art systems/equipment. To deviate

significantly from a standard-type specification can cause additional costs. With this in mind, it is usually better to spell out the main pillars of the requirement and to then require performance parameters around these pillars. In other words, industry is invited to offer its own technical solution to meeting the specified requirement.

3.2 Calling For Offers – Bids/Tenders

Sometimes, certain equipment is known to be manufactured by a handful of firms. In many cases, however, it is worth advertising (for example in technical journals) to obtain Expressions of Interest. From the responses, plus the listing of recognized firms within the industry, a long list can be compiled. After enquiries covering the technical and commercial suitability of each firm, a short list will be drawn up. Typically, this list will show 4-6 firms.

3.3 Evaluation of Bids

This will be divided into technical and commercial parts. Those offers which are inadequate in terms of responsiveness will be disqualified. When considering the responsive offers, rather than simply recording the lowest price, emphasis should be placed on the *value* offered. In other words, one seeks the lowest price *which meets the specifications.* The price of the selected bidder may not be the lowest=priced. But it will be the *best bid.*

3.4 Negotiation and Award of Contract

Although the successful firm will need to adhere strictly to contractual conditions, the contract which is negotiated should, in basic terms, be fair to both parties. If the buyer presses the contractor too strongly on the finally agreed price, for example, the result becomes an unequal partnership and the end result may have a degree of negative effect. The contract will comprise general conditions and special conditions. In the event of serious differences which may need to be resolved by the interpretation of the law, it is preferable that these differences are referred to, and finally decided by, an arbitration tribunal (which one and the location to be specified), rather than in a court of law. This approach can lead to a relative significant reduction in costs.

3.5 Contract Administration

This is a dedicated activity which must be in place through all the stages of the contract performance, up to completion.

Provided a large-scale procurement is handled professionally by ensuring that *all* basic steps are properly undertaken, then timely completion of the contract requirement within the cost as contractually agreed is a realistic expectation.

With the above description of CAPS and how it has functioned over the last 30 years or so, it may be concluded that in terms of supporting air safety in developing countries, its contribution has been inestimable.

4 Technical Cooperation and the Environment

Over the last forty years or so, increasing attention has been directed at environmental problems. In response to this situation, various bodies (such as the UN and ICAO) have initiated work to examine the impact of damage to the environment and, on the basis of the results of scientific investigation, to recommend measures to reduce damage.

As far as international civil aviation is concerned, ICAO has been a leader in terms of spearheading work in the environmental field. Most of ICAO's work is undertaken by the ICAO Council Committee on Aviation Environmental Protection (CAEP).

At the end of 1996 the ICAO Council adopted a Resolution which began with the following statement:

'Whereas aircraft engine emissions are contributing to air pollution and to global atmospheric problems such as climate change and depletion of stratospheric ozone, as indicated by recent international scientific assessments, and the scientific community is working towards a better definition of the extent of aviation's impact ….'

In 1999 the aviation sector requested the International Panel on Climate Change (IPCC) to prepare a special report for ICAO on Aviation and the Global Atmosphere. The report was prepared in collaboration with the Scientific Assessment Panel to the Montreal Protocol on Substances that Deplete the Ozone Layer.

The IPCC report recognized that the effect of some types of aircraft emissions are well understood; however, it was revealed that others are not. The report identified a number of areas of scientific uncertainty, such as the climatic impact from oxides of nitrogen and methane. It is understood that some of the recommended research is on-going.

In 2004 ICAO adopted three major environmental goals:

a) limit or reduce the number of people affected by aircraft noise;

b) limit or reduce the impact of aviation emissions on local air quality;

c) limit or reduce the impact of aviation greenhouse gas emissions on the global climate.

The work of ICAO's CAEP has been mainly directed at developing standards which must form part of the aircraft certification procedures. It has also developed guidance material in the field of airport planning and management, operational procedures and market-based measures to reduce the impact of aviation on the environment.

Much work has been undertaken. Much remains to be done. It is worth noting, for example, that stemming from technological improvements in the fields of aircraft noise, engine emissions, air traffic management and in land-use planning, current aircraft operations are very much more efficient than was the case in the 1970s.

In terms of technical cooperation, it is understandable that some may regard aviation environmental problems as a matter to be resolved by the developed world; certainly, the developed world has a major problem on its hands, if it is to maintain a responsible attitude to the international community. However, the developing world *must* also face up to its responsibilities. Especially in industrialized countries of Asia, as well as in Central and South America, severe air pollution problems already exist. Urgent attention needs to be given to reducing the impact of environmental problems in these countries and efforts must be redoubled to convince governments to introduce remedial action.

The mind-set of governments and leaders of the community, not only in industrialized countries but throughout the world, has to be converted to environmental protection consciousness, as it may affect every human activity. Otherwise future generations may be faced with environmental problems which will have increased to such proportions, that it will be impossible to overcome the sheer size of the challenge.

Appendix: The Group Of Twenty Countries – G-20

- European Union
- Argentina, Republic Of
- Australia, Commonwealth Of
- Brazil, Federative Republic Of
- Canada
- China, People's Republic Of
- France, Republic Of
- Germany, Federal Republic Of
- India, Republic Of
- Indonesia, Republic Of
- Italy, Republic Of
- Japan
- Mexico, United States Of
- Russia, Federation Of
- Saudi Arabia, Kingdom Of
- South Africa, Republic Of
- South Korea, Republic Of
- Turkey, Republic Of
- United Kingdom Of Great Britain And Northern Ireland
- United States Of America

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Contact Author Email Address

colin.emy.everard@aon.at

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