

**FOURTH MEETING OF THE ALLPIRG/ADVISORY GROUP**

**(Montreal, 6 – 8 February 2001)**

**Agenda Item 6:      Technical cooperation issues**

**TECHNICAL COOPERATION REQUIREMENTS OF DEVELOPING STATES  
AND ICAO'S PLANS FOR COORDINATED IMPLEMENTATION  
OF CNS/ATM SYSTEMS**

(Presented by the Secretariat)

**SUMMARY**

This paper presents, for the information of ALLPIRG/4, details on CNS/ATM systems requirements of developing States and options for its coordinated implementation using the Technical Co-operation Programme. It also provides an update on ICAO's Technical Co-operation Bureau's activities in the implementation of CNS/ATM systems in developing countries.

**1.      INTRODUCTION**

1.1            ICAO, through its Technical Co-operation Bureau (TCB) and in order to establish the requirements of developing States of CNS/ATM systems, conducted surveys in 1994 and in 1997. States in their replies to questionnaires indicated a very substantial need for assistance and preference for this assistance to be provided by ICAO. Furthermore, the information gathered and experience gained from the surveys and through the implementation of initial ICAO technical cooperation projects on the subject confirmed that the majority of States, in addition to their requirement for external technical assistance for CNS/ATM, also require funding through ICAO.

## 2. TECHNICAL ASSISTANCE REQUIREMENT OF DEVELOPING STATES

2.1 Out of 79 responses received to the ICAO questionnaire in 1997, 68 indicated that States were in need of external assistance for CNS/ATM systems planning and implementation in one or more of the following areas:

- a) needs assessments;
- b) national planning, including cost/benefit and recovery analysis;
- c) workshops and seminars;
- d) specification and procurement of equipment, installation and commissioning;
- e) human resources planning and development; and
- f) funding and donors mobilization.

2.2 As anticipated, some bilateral assistance was made available and will be increasingly made available to the developing States requiring assistance in equipment upgrading and transfer of know-how, whereas planning efforts and training, which are usually performed on a sub-regional basis, would be more suitable for financial support provided by global and regional funding institutions.

## 3. ICAO'S COORDINATED IMPLEMENTATION OF CNS/ATM SYSTEMS

3.1 In 1994, the ICAO Council recognized the necessity for the global coordination and harmonization of CNS/ATM systems implementation and decided that:

“... ICAO shall play its central role in coordinating technical cooperation arrangements for CNS/ATM systems implementation. ICAO also invites States in a position to do so to provide assistance with respect to technical, financial, managerial, legal and cooperative aspects of implementation .... In addition, ICAO shall facilitate the provision of assistance to States with regard to the technical, financial, managerial, legal and cooperative aspects of implementation.”

3.2 The Council, in defining the ICAO policy on CNS/ATM systems implementation, stressed the need for the ICAO Technical Co-operation Programme to assist States in the transition to CNS/ATM systems and stated:

“....that, on a priority basis, ICAO undertake to take action to encourage multilateral and bilateral agreements and/or to secure the necessary funds to support Technical Co-operation Programmes..., and encourage States and stakeholders to provide staff or other resources to support ICAO free of charge...”.

3.3 The ICAO Objectives Implementation Mechanism was established by the Assembly in 1995, aiming at the provision of additional resources to ICAO for following up on ICAO's Regular Programme

activities, including CNS/ATM planning and implementation. For details of the Mechanism please refer to Appendix “A”.

3.4 The Technical Co-operation Programme is implemented through projects, which typically provide assistance to the recipient administration through the assignment of experts, either individually or through sub-contracted consultant firms; the provision of technical advice and transfer of know-how; the training of national staff abroad through the award of fellowship training programmes and through the procurement, installation and commission of equipment.

3.5 The Technical Co-operation Bureau coordinates closely with ICAO’s Regional Offices, Regional Affairs Office, Air Navigation Bureau, Air Transport Bureau, Legal Bureau and/or other entities concerned with the development and implementation of CNS/ATM projects. This coordination includes technical, economic, legal and administrative issues and involves participation in multi-disciplinary teams, meetings and seminars within ICAO and at the regional and global level. For further details on ICAO’s technical cooperation strategies for CNS/ATM, please refer to Appendix B hereto, which presents an excerpt from the *Global Air Navigation Plan for CNS/ATM Systems* (Doc 9750).

#### 4. SUMMARY OF TCB ACTIVITIES IN THE FIELD OF CNS/ATM

4.1 The following is a summary of CNS/ATM-related activities provided/being provided by the TCB to developing States:

a) General

- Participation in multi-disciplinary team developing guidelines for preparation of CNS/ATM-related business cases; and
- Participation in the preparation and updating of the *Global Air Navigation Plan for CNS/ATM Systems* (Doc 9750).

b) Asia and Pacific Regions

- Regional project providing in-country and sub-regional CNS/ATM familiarization workshops and cost/benefit seminars;
- CNS/ATM Transition Plan, including cost/benefit analysis (pilot project) for Bangladesh;
- GPS Procedures Development Seminar for India;
- ADS/CPDLC Seminar for India;
- CNS/ATM Specialized Seminars for the Republic of Korea and Indonesia;
- ADS & CPDLC equipment procurement for Myanmar;
- CNS/ATM training for Indonesia; and

- ADS/CPDLC STP for the Islamic Republic of Iran.

c) Africa Region

A project has been developed with ASECNA to study the rationalization of the airspace entrusted to it. The objectives are to reorganize the provision of air control services in the lower airspace, ensure service continuity when one centre is not available, and improve air safety in the airspace. The project is scheduled to be undertaken in the spring of 2001.

d) Europe and the Middle East Regions

Upon a request from the Arab Civil Aviation Commission (ACAC), a project document “CNS/ATM Implementation in the Arab World” has been prepared by TCB. The project will address the following major aspects:

- Air traffic management implementation plan;
- Evaluation of present communication, navigation and surveillance systems;
- Formulation of a technical solution to cover the needs of air-ground and ground-ground communications in the region;
- Identification of new requirements for aircraft equipment for communication, navigation and surveillance;
- Human resource development and training;
- Perform cost/benefit and recovery study and analysis;
- CNS/ATM course has been defined and was delivered during February 2000 at Queen Noor Civil Aviation Technical College (QNCATC);
- A project document for conducting workshops/seminars on CNS/ATM planning in the Magreb States was prepared in 1997 and submitted to donors. No positive response was received.

e) The Americas Region

GREPECAS, in its 5<sup>th</sup> and 6<sup>th</sup> meetings held in October 1995 and October 1996, respectively, approved the CAR/SAM implementation planning of the new CNS/ATM systems, recommending its use by the States initiating regional coordination activities for implementation, and requested ICAO to formulate and submit, for the consideration of the Civil Aviation Administration in this region, a technical cooperation regional project to assist the States with the planning and implementation of CNS/ATM systems, and to include all States of the CAR/SAM Region.

ICAO, in compliance with this recommendation, prepared a project document for “Transition to the CNS/ATM Systems in the CAR and SAM Regions.” This project is to support States/Territories of both regions in the planning and implementation of CNS/ATM systems, including the requirement for human and financial resources and the applicable training programmes. The project RLA/98/003 initiated its activities in the first quarter of 1999, financed by some States of the region. The results obtained through this project will be presented and discussed in detail during the ALLPIRG/4 Meeting. Additionally, in most of the national technical cooperation projects in the CAR/SAM Regions, one of the established objectives is the CNS/ATM transition activities, including training and equipment.

4.2 It should be recognized that there continue to be serious financial obstacles to the implementation of CNS/ATM systems, and that often the States with the greatest air navigation infrastructural needs are those with the least ability to make progress. Furthermore, the aviation needs of individual States often compete unsuccessfully with other infrastructural needs, such as those in the health and education sectors.

4.3 Consequently, there is a need to continue making financial institutions aware of the full potential for investment benefits that could be obtained from the implementation of CNS/ATM systems, including through the development of business cases, while governmental and international organizations have to be made aware of the opportunities that could be realized with the implementation of CNS/ATM systems.

## **5. ACTION BY THE ALLPIRG**

5.1 ALLPIRG/4 is requested to note the information presented in this paper and support the role of ICAO’s Technical Co-operation Programme as a major factor in the implementation of CNS/ATM systems worldwide.

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## APPENDIX A

### ICAO OBJECTIVES IMPLEMENTATION MECHANISM

The following paragraphs provide a description of an ICAO mechanism established to assist, *inter alia*, in coordinating the provision of assistance in CNS/ATM systems planning and implementation, in which the above-mentioned development partners, as well as States themselves, may find a suitable channel to provide the necessary support.

#### Establishment

The ICAO Objectives Implementation Mechanism was established by the ICAO Assembly in 1995. The Assembly endorsed a new policy on ICAO technical cooperation, which included the establishment of a funding mechanism, as well as the objectives of the new policy emphasizing global implementation of SARPs and ANPs, including, in particular, CNS/ATM. The Assembly has encouraged Contracting States

*“to make use of the Technical Co-operation Programme of ICAO and to contribute to this new funding mechanism, aimed at consolidating all other funding arrangements”.*

The first meeting of the ALLPIRG/Advisory Group held in April 1997 concluded that ALLPIRG members, in order to ensure timely and coordinated implementation of CNS/ATM systems, support ICAO and States in mobilizing funds for the ICAO Objectives Implementation Mechanism of the ICAO Technical Co-operation Programme in line with Assembly resolutions.

#### Objectives

The aims of the ICAO Objectives Implementation Mechanism are to provide additional resources to ICAO for following up on ICAO's Regular Programme activities; resources which could be applied to technical cooperation projects identified as required to support the implementation of SARPs and the facilities and services listed in the ANPs. The mechanism is strategically linked to ICAO's plans for the implementation of CNS/ATM systems. It stimulates ICAO's action for initiating projects required for the development of international civil aviation.

The mechanism gives priority and support to technical cooperation activities in the field of SARPs and ANPs implementation, CNS/ATM, safety oversight, aviation security, civil aviation master planning, restructuring of civil aviation departments/authorities and human resource development.

#### Contributions to the mechanism

The ICAO Objectives Implementation Mechanism includes a variety of funding modalities, which would suit particular donors' needs and provide a framework for flexible arrangements for the implementation of projects. Donations are also welcome in the form of voluntary contributions in kind, such as scholarships, fellowships, training equipment and funds for training from States and other public or private sources.

Funding and operation of the mechanism has been established, separately or in combination with each other, in accordance with the following methods:

- a) **For a General Fund.** States or donors may deposit funds in a special account established for the mechanism. These funds would be used exclusively for the implementation of technical cooperation projects approved by ICAO. The funds would not be tied to projects for any special area or purpose nor would they have to be used for purchase of equipment in the donor country or employment of its nationals, etc.
- b) **For a specific ICAO project.** States or donors may indicate their willingness to participate in the mechanism and give an indication of the amount they might be expected to donate for the year. Periodically during the year, ICAO would circulate descriptions of projects requiring financing and States or donors could indicate their willingness to finance all or part of a particular project. On advice from ICAO of the intent to proceed with a project, the funds would be deposited in the account established for that project.
- c) **For a specific State project.** States or donors may advise ICAO of their desire to see a particular improvement or development implemented and their willingness to finance the project under the mechanism for technical cooperation. ICAO would then cost the project and submit a preliminary budget to the States or donors. On approval of the preliminary budget, a full project document would be developed for signature by the recipient State, the donor and ICAO. The necessary funds would then be deposited with ICAO in an account established for that project.
- d) **For a general but identified issue.** A variation of the method outlined in c) is for a State or donor to make funds available for a particular issue, but to leave it to ICAO's judgement as to exactly how the funds are spent. For example, funds would be determined to be used for fellowships or for advancing some specific technical matter, such as CNS/ATM.

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## APPENDIX B

### ICAO TECHNICAL COOPERATION IN CNS/ATM IMPLEMENTATION

#### Mandate, objectives and role

ICAO offers technical cooperation in the civil aviation field through its TCB, which was created in 1952. TCB carries out projects funded by developing States themselves or by various bi-lateral and multi-lateral funding institutions, including UNDP.

The Criteria Governing the Provision of Technical Co-operation, approved by the ICAO Council in 1984, define the objectives of ICAO technical cooperation as follows:

*“ICAO will cooperate with Governments in providing assistance to civil aviation development in any sector, international or domestic, when such development will promote the economic and/or social growth of the country concerned, or will enhance the safety and efficiency of civil aviation and implementation of the Regional Air Navigation Plan.”* More specifically, with regards to CNS/ATM, in 1994 the ICAO Council *“recognized, in the interest of globally coordinated, harmonious implementation and early realization of benefits to States, users and providers of services, the need for technical cooperation in the implementation and efficient operation of CNS/ATM systems”*.

It decided that:

*“Towards this end, ICAO shall play its central role in coordinating technical cooperation arrangements for CNS/ATM systems implementation. ICAO also invites States in a position to do so to provide assistance with respect to technical, financial, managerial, legal and cooperative aspects of implementation ... In addition, ICAO shall facilitate the provision of assistance to States with regard to the technical, financial, managerial, legal and cooperative aspects of implementation”*.

The Council, in defining the ICAO policy on CNS/ATM systems implementation, stressed the need for the ICAO Technical Co-operation Programme to assist States in the transition to CNS/ATM systems and stated:

*“that, on a priority basis, ICAO undertake to take action to encourage multilateral and bilateral agreements and/or to secure the necessary funds to support technical co-operation programmes ..., and encourage States and stakeholders to provide staff or other resources to support ICAO free of charge ...”*.

The Technical Co-operation Programme is implemented through projects that typically provide assistance to the recipient administration through three means: experts are assigned, either individually or through sub-contracted consultant firms, to provide technical advice and transfer of know-how; national staff are trained abroad through the award of fellowship training programmes; equipment is procured, installed and commissioned.



## **Special features of ICAO Technical Cooperation**

### **Recipient States of technical cooperation**

The ICAO Assembly has urged

*“Contracting States to give high priority to civil aviation development and, when seeking external assistance for this purpose, to stipulate to funding organizations, through an appropriate level of government, that they wish ICAO to be associated as the executing agency with civil aviation projects that may be funded”.*

Based on ICAO’s status as a United Nations Specialized Agency, certain important privileges may be applicable to civil aviation authorities purchasing equipment through ICAO, in accordance with the UNDP Standard Basic Assistance Agreement, in place in most recipient States where funding is provided under a UNDP project.

Governments with insufficient financial resources may be assisted by ICAO in identifying suitable donors for their projects and in the negotiations with these donors of convenient funding arrangements, which could include loans taken to finance technical cooperation inputs. This is consistent with the established ICAO policy that the costs for improvements in civil aviation services and facilities in developing States, which benefit first the users of these facilities, could be included in the cost basis for charges after implementation has been completed. Consequently, user charges can be applied to service loans (i.e. repay capital and interest), which finance specific facilities and services provided for, and implemented under, the ICAO regional air navigation plans.

### **Donors and funding organizations**

The ICAO Assembly has recommended

*“Contracting States with bilateral or other government-sponsored aid programmes to consider the value of using the ICAO Technical Assistance organization in helping to implement their programmes of assistance to civil aviation”. It also “recommends to these funding organizations, wherever appropriate, to give preference to ICAO for the identification, formulation, analysis, implementation and evaluation of civil aviation projects in the field of technical assistance”.*

ICAO can assist governments in the selection of equipment, equipment manufacturers (through international tender calls), individual consultants and consultancy companies as well as existing training establishments, to meet project goals in the most cost-effective manner. In this respect, ICAO’s neutrality allows for the selection of suppliers on a worldwide basis, where required.

Unless donors and funding organizations specifically ask ICAO not to do so, recipient countries will be informed about the funding sources in order to achieve visibility for the donor/funding organization. Furthermore, contributions received may, in particular cases, be published in the *ICAO Journal* for worldwide distribution. Funds are therefore not anonymous, unless the donor/ funding organization chooses to make arrangements to that effect.

Furthermore, ICAO will implement projects in close coordination with donors and funding organizations, and in accordance with the conditions defined by the donor/funding organization for the use of

funds made available, such as limitations on the geographical area for equipment purchases, expert selection and utilization of training institutions. At the same time, ICAO will take the responsibilities for legally acceptable, technically satisfactory and cost-effective project implementation through comprehensive project monitoring, support, evaluation and reporting.

Funding organizations, such as regional and interregional development banks, are responsible for the most cost-effective investments of the funds entrusted to them. It is, therefore, in the interest of these funding organizations to entrust the implementation of civil aviation projects to ICAO, or to at least consult or associate the Organization prior to investing in such projects. This will ensure compatibility with global civil aviation Standards, Recommended Practices and Procedures and achieve an adequate return for the investment in the interests of both their contributors and the recipient States.

### **Strategies for ICAO technical cooperation in CNS/ATM implementation**

Initial assistance for CNS/ATM has been provided to several States from multilateral and bilateral sources including ICAO, focussing mainly on familiarization, initial transition planning and setting up of pilot projects.

CNS/ATM familiarization projects were implemented by ICAO in the Asia/Pacific and Latin America Regions in 1995/1996, confirming the requirements and expectations of States for assistance and support through ICAO with their CNS/ATM systems transition and implementation planning and implementation. Additional CNS/ATM familiarization seminars were conducted by ICAO in 1996/1997, either on a sub-regional basis or at the request of specific States. States have been assisted by ICAO in carrying out cost-benefit analyses for national CNS/ATM systems implementation, based upon ICAO's cost-benefit analysis guidelines. National civil aviation master plans, prepared by ICAO for numerous States, now regularly address phased CNS/ATM systems implementation and training requirements.

ICAO assistance is currently focussed on assisting States and users in deriving early benefits from CNS/ATM through the planning for, and immediate application of, satellite-based systems, such as through WGS-84 surveys and training, GPS, ADS/CPDLC and ATN procedures development and training, as well as providing the basic infrastructure necessary to implement CNS/ATM systems. Providing that technical cooperation in these target areas meets with States' and donors' expectations, it can be assured that financing from States' or donors' funding allocations meets required priorities. ICAO projects are also assisting States in procuring equipment to set up the basic infrastructure necessary to implement CNS/ATM systems.

In addition, human resources development requirements, commensurate with CNS/ATM systems implementation are being addressed at the national as well as at the regional level through efforts to introduce or expand CNS/ATM-related training courses at national Civil Aviation Training Centres (CATCs). The ICAO TRAINAIR training resource sharing network is proposed as the methodology and vehicle for standardized needs-based and curriculum-driven training introduced at the CATCs, with more basic training carried out through nationally oriented courses and advanced training proposed for regional training courses at regionally oriented CATCs. Highly technical, managerial, institutional, organizational, legal and financial subjects will continue to be dealt with in regional or national seminars led by specialized ICAO staff.

Cooperative arrangements among Contracting States in a sub-region or region, managed by ICAO, concerning a homogeneous ATM area or major international traffic flow, as described in Part I, Chapter 3, similar to cooperative arrangements under implementation, *inter alia*, in ICAO's Universal Safety Oversight Audit Programme and proposed under its Aviation Security and TRAINAIR Programmes, will allow

participating States to closely collaborate in planning as well as in systems procurement and training. Cooperative, multinational arrangements, provided these are priority-endorsed by the participating States as well as sub-regional organizations, where applicable, should fall into line with the latest development focus of at least some multilateral development partners, possibly even with bilateral donors. These cooperative arrangements are, consequently, proving to be avenues for cost-sharing arrangements of interest to, and suitable for, States as well as a variety of donors, funding organizations and the aviation industry. They have, therefore, potential for substantial application for CNS/ATM systems where inter-State cooperation is essential for cost-effective and harmonious implementation. Additionally, cooperative projects provide a vehicle for technical cooperation among developing countries (TCDC) and regional capacity-building. Recognizing the importance of proper cost/benefit analysis for CNS/ATM planning and implementation, on country-specific as well as regional basis, TCB continues to participate in an ICAO project team establishing guidelines for CNS/ATM related business case development.

The ICAO Strategic Action Plan, based upon the Chicago Convention and adopted in 1997, aims at furthering the safety, security and efficiency of international civil aviation, by developing a vision for harmonious development of international civil aviation on a national and regional basis and reflecting this vision in global planning. The Plan advocates for the Organization to ensure the currency, coordination and implementation of regional ANPs and to provide the framework for efficient implementation of new air navigation systems. To this end, it lays stress on, *inter alia*, ICAO through its Technical Co-operation Programme assisting States in the mobilization of human, technical and financial resources for civil aviation facilities and services.

Satellite-based air traffic management, including its supporting services of communications, navigation and surveillance, is essentially a global undertaking of air navigation systems' evolution, requiring regional and national supporting infrastructure and human resources. Development and implementation of SARPs for CNS/ATM systems by ICAO is therefore of crucial importance to the international aviation community and in particular to States. While certain States will be in a position to address their CNS/ATM systems development needs using their own resources, external assistance will be required by the vast majority of developing States for providing the infrastructure and qualified human resources needed, as substantiated by the two ICAO surveys briefly described above. The surveys prove that, if harmonized implementation is to be effected worldwide and efforts are to be made for early benefits to be gained from the new systems, as mandated by the ICAO Assembly, major efforts must be made by the international aviation and development financing communities to put in place the required regional and national infrastructure, and commensurately developed human resources, and secure the required funding.

The ICAO Technical Co-operation Programme has played its role in civil aviation development by traditionally assisting its Contracting States in the establishment and/or upgrading of civil aviation facilities and services in accordance with States' requirements and the regional ANPs. As part of the ICAO Strategic Action Plan, this Programme is, however, being requested to place enhanced emphasis upon the implementation of ICAO's SARPs to the greatest possible extent worldwide. Since a substantial part of future SARPs are being geared towards CNS/ATM systems, the ICAO Technical Co-operation Programme will have to play an increasing role in the implementation of these new air navigation systems, including associated facilities, services and related human resource planning and development.

ICAO will perform its function in CNS/ATM technical cooperation effectively, as mandated by its Assembly (i.e. its 185 Contracting States), and as requested by other international organizations, industry and users through CASITAF and ALLPIRG/Advisory Group meetings and reinforced by its Strategic Action Plan. Recognizing the limited resources of the Technical Co-operation Bureau of ICAO, however, and the continuing

restriction of zero growth for ICAO's regular budget, an effective ICAO CNS/ATM Technical Cooperation Programme will require substantial additional external resources, particularly funding, to enable it to perform the functions and to implement projects relating to the requirements identified in the surveys carried out.

For the ICAO CNS/ATM Technical Co-operation Programme to fulfil this mandate and the strategic functions envisaged, its own strategy will, therefore, focus on activities that are at the core of States' and users' interests, and for which funding, consequently, can be assured. While harmonized — “*seamless*” — implementation of CNS/ATM systems worldwide is at the heart of the interests of the international aviation community, initial areas to be focused upon will necessarily be those which generate early benefits to users and, hence, have the added attraction of economic value, i.e. an immediate return on investments made.

To be in a position to better respond to States' and users' requirements, the ICAO Technical Co-operation Programme — being a non-commercial entity and traditionally assisting its developing Contracting States mainly through Governments — has, therefore, embarked upon the expansion of its resource base by focussing on non-traditional development partners and funding sources. These non-traditional development partners and funding sources include not-for-profit interregional and regional development banks and financing institutions, international organizations and associations and, to a limited extent, industry and service providers. Entities operating in civil aviation on a purely commercial basis are, so far, not in a position to collaborate with ICAO contractually, other than as a subcontractor.

With this aim of expansion of its resource base, the ICAO TCB will continue its efforts in presenting to development and financing partners its capabilities and experience in the implementation of civil aviation projects worldwide. In particular, emphasis has been placed on the presentation of the unique values it can contribute to projects aimed at the upgrading of civil aviation facilities and services as part of CNS/ATM systems implementation planning worldwide. Resource mobilization will, therefore, continue to be one of the main activities of TCB. Funding sources, such as Bretton Woods institutions, regional development banks and industry will be approached to fund the projects.

Results of initial projects carried out with non-traditional development and financing partners are encouraging, as they underscore large areas of common interests where ICAO is in a unique position to contribute, to these projects, the required technical and managerial expertise and experience in an objective manner, thus ensuring the provision of balanced advice, in the ultimate interests of the recipient States. In addition, ICAO, being a not-for-profit development partner, is able to provide cost-effective services, thereby assisting financing partners and recipients in conserving scarce resources. These initial projects, however, also underscore the necessity for sufficient funding to carry out, through the ICAO Technical Co-operation Programme, project development activities expected by States.

As ICAO's most prominent goal is to provide its Contracting States with assistance in the implementation of SARPs worldwide, ICAO's Technical Co-operation Programme will associate itself with as many CNS/ATM-related civil aviation development efforts as possible, in the ultimate interest of States, as this would contribute to ensuring harmonized and technically acceptable implementation. Financing of a healthy, relevant and effective ICAO Technical Co-operation Programme, particularly for CNS/ATM is, therefore, in the interest of all ICAO Contracting States, inasmuch as harmonized and fully SARPs-compliant CNS/ATM implementation results in substantially enhanced safety and efficiency of civil aviation worldwide, eventually bringing multi-billion dollar savings to service providers, industry and users.