*International Civil Aviation Organization*

**The Third Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/3)**

Bangkok, Thailand, 6 – 7 June 2005

---

**Agenda Item 7: Funding of Regional Safety Monitoring Activities**

# CSSI INC'S INTEREST IN ASSUMING THE DUTIES AND RESPONSIBILITIES ASSOCIATED WITH THE PROVISION OF AIRSPACE MONITORING IN CONNECTION WITH RNP-BASED HORIZONTAL-PLANE SEPARATION MINIMUM

(Presented by the Secretariat on behalf of CSSI, Inc.)

**SUMMARY**

This paper expresses CSSI's interest in assuming the duties and responsibilities associated with the provision of airspace monitoring in connection with RNP-based horizontal-plane separation minimum. CSSI meets the competency standards for the designation of a provider of monitoring services as defined in the draft *Handbook to Guide Monitoring in the International Airspace of the Asia/Pacific Region in Connection with Introduction and Continued Safe Use of an Horizontal-Plane Separation Minimum Where Required Navigation Performance (RNP) is Applied*.

## 1. INTRODUCTION

1.1 The purpose of this paper is to express to RASMAG, CSSI, Inc.'s interest in fulfilling the role of the Safety Monitoring Agency (SMA) in the Region. This informational paper will give the Group background information on CSSI's capabilities and experience as they relate to the Region's need for safety monitoring. The scope of work to be performed by the SMA includes the following responsibilities:

(1) establish and maintain database of State RNP approvals;

(2) coordinate monitoring of horizontal-plane navigational performance and the identification of large horizontal-plane errors;

(3) archive results of navigational performance monitoring and contribute to conduct of annual assessment in light of agreed Regional safety goals;

(4) monitor compliance of operators with State RNP approval requirement after implementation of RNP-based horizontal-plane separation minimum;

(5) initiate necessary remedial actions and coordinate with specialist groups as necessary in light of monitoring results; and

(6) contribute to Regional database of monitoring results.

## 2. DISCUSSION

2.1 CSSI, Inc. is an award-winning, privately owned, technical and engineering services company headquartered in Washington, D.C. specializing in system analysis and engineering, application development, information technology, and technical program management. Principal clients include the Federal Aviation Administration (FAA), the National Aeronautics and Safety Administration (NASA), and the U.S. Department of Defense (DoD). Services provided to the FAA include: separation standards requirements and implementation, safety assessment and collision risk modeling, airspace analysis, operational ATC system maintenance and upgrades, air traffic modeling and simulation, system acquisition, and life-cycle management. CSSI also provides expertise to NASA through the performance of simulation modeling and analysis of new CNS/ATM concepts of operation, benefit assessments of CNS/ATM technologies, and development of analysis tools and training of NASA analysts. The airspace analysis and modeling team at CSSI consists of air traffic system engineers, collision risk specialists, mathematicians, and operational air traffic and flight crew specialists.

2.2 CSSI's relevant experience and capabilities related to separation standards and safety management includes:

2.3 Airspace Monitoring & Safety

- Provided technical support to the establishment of the North American Approvals Registry and Monitoring Organization (NAARMO) and the Pacific Approvals Registry and Monitoring Organization (PARMO) (formerly APARMO), including source documentation, database, website and additional program support from inception to present

- In support of the NAARMO and PARMO operations, coordinate monitoring of horizontal-plane navigational performance, and assist in the identification of large height deviations associated with technical and operational errors

- Current staff member established and maintained the database of RNP-10 approved aircraft and operators for the PARMO while an FAA employee at the William J. Hughes Technical Center

- Member of the Pacific Weather Deviation Monitoring Group, whose purpose was to evaluate mitigation strategies for aircraft encounters with convective weather with 50-lateral track spacing applied on designated PACOTS tracks

- Served an active role in the development of the ICAO RVSM Regional Monitoring Agency (RMA) Handbook, and the harmonization of regional monitoring requirements

- Analysis of the impact of weather deviation hazards on reduced separation standards

- Member of the Asia/Pacific Airspace Safety Monitoring Task Force

- Safety analysis supporting the pre- and post-implementation RVSM safety assessments for Northern Canadian Airspace

- Conducts requirements research to determine safety and operational impact of programs on existing ATC procedures and practices, and develops recommended modifications

- Collects, analyzes, tracks, and reports findings involving instances of height deviations within the air traffic system for possible inclusion and consideration in required safety studies associated with the RVSM programs

- Participates in meetings of the ICAO Separation and Airspace Safety Panel (SASP), and works with mathematicians and specialists in flight standards and airspace management to develop ICAO's standards and recommended practices for air traffic control

- Conducted an analysis to determine the effects of assigned altitude deviations with respect to mountain wave activity as part of a related FAA safety assessment for U.S. Domestic RVSM

- In support of the FAA's airspace safety assessment for the West Atlantic Route System (WATRS), conducted detailed mathematical analysis to determine if aircraft flying in the WATRS region were following the appropriate Lateral Offset Procedures

- Provides systems and software engineering support to the prototype development of the Aircraft Geometric Height Measurement Element (AGHME) ground-based monitoring system

- Developed Regional Monitoring Agency workflow and procedures

2.4 Collision Risk Modeling

- Collision Risk Modeling support, including performance of lateral risk assessments for Pacific routes using mathematical models

- Advises the FAA on the development and application of mathematical models used to derive the separations applied by air traffic controllers

- Developed mathematical foundations for the separations applied by air traffic controllers who maintain surveillance over oceanic and remote airspaces

- Provided collision risk analysis to support RVSM implementation in U.S. Domestic airspace, as well as the Pacific, WATRS, and South China Sea

2.5 Operations/Airworthiness

- Development of aircraft operations and airworthiness approval documentation

- Development of the ICAO Asia-Pacific RVSM Task Force Program Plan and aircraft fleet upgrade estimates

- Analysis of operator equipment and traffic data for safe implementation of Required Navigation Performance (RNP)-10

- Development of cost-benefit analysis and State regulatory documentation for RVSM implementation in the Asia-Pacific, WATRS, and U.S. Domestic airspace

- Maintenance of RVSM aircraft manufacturer service bulletin data

- Support of analysis of traffic data and fleet equipage to assess system readiness, perform cost analysis, and simulate the ATC environment

- Support of technical assistance and training to States and aircraft operators regarding the RVSM approval process and monitoring procedures

- Pacific Region Operations/Airworthiness lead for implementation of Required Navigation Performance (RNP)-10 and reduction of lateral separation to 50 nm in 1998 and expansion of CPDLC in 1999

2.6 Program & Implementation Management

- Planning and presenting technical presentations at RVSM seminars associated with the implementation of RVSM in the North Atlantic, Asia-Pacific, WATRS, CAR/SAM, and Middle East Regions

- Provision of technical expertise to Asia-Pacific RVSM Task Force Working Groups

- Content development and maintenance of FAA RVSM web pages

- Implementation support and data analysis associated with RNP-10 in the Pacific

- Personnel authored the Notice of Proposed Rulemaking (NPRM), Regulatory Evaluation, and the Final Rule for both the Pacific and WATRS Implementation

2.7 GPS-Based Monitoring System Operations

- Airborne GPS data collection and processing to ensure aircraft compliance with RVSM altimeter standards

- CSSI, Inc. personnel have conducted over 4,500 RVSM monitoring flights in over 20 countries worldwide

- Development of aircraft operator training package for self monitoring

- Conducted the engineering development for the next generation Enhanced GPS-based Monitoring Unit (EGMU)

- CSSI, Inc. was selected by IATA to be a RVSM monitoring contractor in the North Atlantic Region, and was selected by IATA to be the sole RVSM monitoring contractor in the Asia Pacific and Middle East Regions

2.8 Systems Engineering

- Developed a software code used to parse the FAA's raw Enhanced Traffic Management System (ETMS) data to determine the region of flight (i.e. Alaska, CONUS, Northern Canada, Southern Canada, Mexico, Houston Oceanic, Miami Oceanic and San Juan FIR)

- Developed FORTRAN code to model air traffic data collected by the Oakland and Anchorage Air Route Traffic Control Centers. This data was used to calculate probability distributions of specific flight parameters, (i.e. origin-destination pairs, aircraft types) for the purpose of generating flight events that simulate the actual flight traffic. These flight events are currently used in support of a Northern Pacific Airspace simulation model to study the benefits related to future Air Traffic Management initiatives.

2.9 In addition to the relevant experience above, CSSI has been an active participant in ICAO regional and safety forums, which developed RNP requirements and the associated criteria for establishing separation minima based on RNP, and reduced vertical separation minimum (RVSM):

- ICAO Separation and Airspace Safety Panel (SASP)
- Asia/Pacific Airspace Safety Monitoring Task Force (APASM TF)
- ICAO Asia/Pacific RVSM Implementation Task Force
- Middle East Region RVSM Task Force
- Informal Pacific Air Traffic Control Coordinating Group (IPACG)/Fans Interoperability Team (FIT)
- Informal South Pacific Air Traffic Control Coordination Group (ISPACG)
- Regional Monitoring Agency coordination and data exchange meetings

2.10 CSSI's current capabilities and prior experience allow it to immediately fulfill the roles and responsibilities of the SMA, and is willing to start work as soon as is deemed appropriate by the Asia/Pacific States.

## 3. ACTION BY THE MEETING

3.1 The meeting is invited to note the information contained in this paper, and take whatever action considered appropriate by the Chairman.

## 4. REFERENCES

Draft *Handbook to Guide Monitoring in the International Airspace of the Asia/Pacific Region in Connection with Introduction and Continued Safe Use of an Horizontal-Plane Separation Minimum Where Required Navigation Performance (RNP) is Applied*

Report of the Fifth Meeting of the Asia/Pacific Airspace Safety Monitoring Task Force (APASM TF/5), Bangkok, Thailand, 24-26 February 2003

Report of the First Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/1), Bangkok, Thailand, 26-30 April 2004

…….