

# Flight Calibration and Safety Regulation

**Dipl. Ing. Sasho Andonov**

Advisor for Technical Systems

Civil Aviation Agency

Skopje, Macedonia

Fax: +389 2 313 9365

E-mail: [sandonov@dgca.gov.mk](mailto:sandonov@dgca.gov.mk)



## **1. ABSTRACT**

Few years ago, as part of his Safety Programme, EUROCONTROL had published a lot of documents which are giving legal frame for the improving safety in aviation. Most known documents are ESARRs (European Safety Regulatory Requirements). Implementation of ESARRs and other additional documents in the form of Acceptable Means of Compliance (AMC), ESARR Advisory Material (EAM) and GUIDance material (GUI) is obligatory in Europe!

In ESARR 3 (para 5.2.6) document is stated that every Air Navigation Service Provider (ANSP) shall implement his own Safety Management System (SMS). As part of this SMS, ANSP must take care of External Services, which are (maybe) included in ATM/CNS provision, but can be provided by different (external) companies which are not part of ANSP. In EUROCONTROL vocabulary External Services are explained as “All material and non-material supplies and services, which are delivered by any organization not covered by the ATM Service-Provider’s Safety Management System”.

It means that all External Services are also part of the Safety Assurance process and they must pass Regulatory Safety Control in accordance with the ESARR 3. The new Single European Sky legislation is on line with these requirements!

Having in mind that testing of the NAVAIDs and radars is not possible without checking their SIS (Signal In Space - which is done by flight trials), it means that also Flight Checking services must go through this process of Safety Assurance! We may speak here for two types of services:

1. Flight Calibration – which is connected with commissioning and other testing of NAVAIDs equipment with aim to assure ANSP that his systems are working properly and (subsequently) is safe (ANSPs oriented!); and

2. Flight Inspection – which is connected with Flight Checks necessary to assure the Regulator that ANSPs deserve to be certified (and keep certified!) for the ATM/CNS services (Regulator oriented!).

Both of them are External Services and they are liable for certification by Regulator following ESARR 3, para 5.2.6!

The aim of this paper is to consider influence of the new Safety Requirements in Europe (published in ESARR 3) to the compliance of FI Companies offering their services to the ANSP and Regulator!

## **2. RATIONALE FOR SAFETY ASSESSMENT OF EXTERNAL SERVICES**

The scope of the ANSP’s SMS will define the boundaries of values in which the elements covered by SMS may be assumed as safe enough. It should be noted that inputs coming from outside (External Services) could erode safety levels in our boundaries if we do not manage them properly. That is the reason that External Services should be identified and assessed by ANSP to ensure considered safety levels within the organization.

Ideally, safety and quality assurance processes used by external suppliers should satisfy our internal safety management standards and applicable safety requirements. Actually, ISO 9001:2000 may provide useful tools to support the implementation of ESARR 3. In some cases, ANSPs can effectively choose between different External Services. This is done through procurement procedures which may be good enough to meet the requirement in those situations.

However, situations exist in case of flight testing of NAVAIDs where there are options of different providers when not economically justified to have own such a service. Also, there are situations where no options are offered and the input has to be accepted as only possible one. In these cases, actions have to be defined by

Regulator and ANSPs to identify possible safety aspects of the offered flight testing service and mitigate risks. This means that Flight Inspection (FI) Companies have to be assessed in terms of safety in order to assure that offered service fits to the ANSP SMS boundaries mentioned above or to provide evidence that offered services is assessed, possible safety problems are identified and mitigation is in force.

I will keep this paper in accordance with the Legal Frame given in these two documents:

- **ESARR 3 (Use of Safety Management System by ATM System Providers) - Para 5.2.6**

“ATMSP shall ensure adequate and satisfactory justification of the safety of the externally provided services, having regard to their safety significance within the provision of the ATM service.”

- **SES Common Requirements - Annex 2 - Para 3.1.2**

“ANS shall ensure adequate justification of the safety of the externally provided services and supplies, having regard to their safety significance within the provision of its services (external services and supplies).”

### **3. NECESSARY ACTIVITIES OF ANSP FOR CHOOSING FLIGHT CALIBRATION SERVICES**

The more comprehensive EUROCONTROL document which is dealing with External Services is EUROCONTROL Generic Safety Management Manual (EGSMM). In the Part 2, Chapter 6 is dedicated to the External Services, but this chapter is dedicated more to the services which are directly connected with ATM/CNS provisions as power supply, communication (post office), etc.).

The ANSP policy regarding External Services is twofold:

- Fulfilling ESARR 3 requirements to manage externally provided services properly; and
- Optimizing the ANSP/Supplier relationship according to the entities involved in the overall External Service procurement process;

Having in mind abovementioned, ANSP shall put in his SMS some rules which will assure him through his Tender Procedure or Procurement Process that offered service will be in accordance with his requirements regarding Safety. This must be realized through Safety Assessment process of the possible Contractor! Also, ISO 9001: 2000, Section 7.4 (Purchasing) can be used as supporting tool.

As we can see, the company which is applying to such a service must provide evidence that equipment, procedure and people involved in offered service are able to fulfill all ANSP's requirements regarding accuracy, reliability and especially safety and, all that shall be in accordance with proposed Time Schedule.

### **4. WHAT ARE THE NECESSARY STEPS FOR FULFILING ESARR 3 REQUIREMENTS?**

These steps are arising from ESARR 3 and question is: Do (really) every FI Company must have his own Safety Management System?

The answer is very discussable!

FI Companies are not providing ATM/CNS services! They are used only in the process of maintenance of NAVAIDs (Flight Calibration!) or in the process of auditing the NAVAIDs from the Regulator (Flight Inspection!). So, it means that their services are borrowed and used by department responsible for technical maintenance (or regulation) of NAVAIDs. With other words we are speaking about “Externalization of maintenance activities”. Of course, maintenance is very important aspect of providing CNS services! So, ESARR 3 is applicable also for this service! This means that every FI company must be part of overall SMS of ANSP.

Having Quality Assurance Certificate from well-known Recognized Body (we will speak about ISO 9000 series!) is often use as surrogate for Safety Assurance Certificate, but it is not enough! These standards are missing few very important points which are included in SMS!

The Safety Assurance System (SAS) and Quality Assurance System (QAS) are very close each other based on their nature. The almost same Audit techniques are used in both of them! The most important difference is in the Terms of Reference.

QAS is dealing with design or manufacturing of the product or service which is constant in certain period of time! Product (or service!) is designed and put into production! All the time the same product is produced and we may speak about automation of the production. In the case of SAS we can not use following: In every moment we have different situation in the airspace controlled by ATCo with different users of this airspace. Simple example:

A car producer with QAS in force: “Crash test” show that new car design needs to change the thickness of metal plate used for autobody from 3 mm to 5 mm. SAS will take this into consideration and it will show that weight of autobody will arise for 66 % which means that brakes will need to handle with this additional weight! So, SAS will

arise immediately problem with brakes. QAS will not notice this problem and (maybe!) it will be noticed when the braking of the car will be tested!

Speaking about QAS, if there are some deficiencies noticed in the product or service, than internal assessment is made to find where the fault is and it is fixed. Usually, the other departments are not acquainted about the problems and they are not affected by changes in the “production process”! In the case of SAS, if there are some problems than it is investigated in all parts of the system and all subjects included in process are looking for solution which will be safe (on the first place!) and economically beneficial!

So, having QAS in force means that you can provide accurate and reliable product with high quality, but it does not mean that it will be safe. Quality of the equipment and procedures for measurements used by FI Companies will affect result, which is (again) strictly connected with safety! That is the reason that we need SAS implemented through SMS of the company which will be used as upgrade of the QAS (only for safety related issues!).

FI Companies are offering measurements of the characteristics of the SIS and they are compared with ICAO SARPs specifications. It means that this kind of service is actually part of Safety Assurance! It means that Flight Check is tool for assurance of Safety in the case of ANSP (Flight Calibration) or Regulator (Flight Inspection). It means that the approach is twofold:

1. Using Flight Check in the form of Flight Calibration is part of the maintenance the NAVAIDS systems and must be treated as External Service of ANSP (Externalization of maintenance activities); and
2. Using Flight Check in the form of Flight Inspection is part of the Regulatory Audit connected with Initial or On-going oversight of the ANSP (Externalization of oversight activities).

In both cases we are using “Externalized ATM/CNS personnel”, including pilots!

Discussing first case, having own Safety Management System is obligatory for FI companies in accordance with ESARR 3! Having QAS (in the form of ISO 9000 or similar) will help to build your SAS. Actually, the QAS should be base and few other things should be added for regular SAS. It must be documented, and document which is addressing this issue is called SMS!

**First**, FI Company must provide system (or process) of work where all possible risks are identified, assessed and mitigated.

**Second**, this system (or process) must have pro-active approach for solving possible problems.

**Third**, the system (or process) must provide mechanism for documentation of the possible treating of problems in past which will be assessed from the point of his Safety Importance. Lesson Dissemination is very important part of this mechanism!

Discussing second case, having QAS is enough, having in mind that Flight Check service is used **ONLY** for quantitative measurement and his values are later assessed for few additional aspects.

## **5. GENERAL ASSESSMENT OF THE FI COMPANY BY ANSP**

FI business today is based on market economy. All FI companies are trying to find new customers and improve their image on the market. It is usually connected with certification from your home Regulator and sometimes this certificate is accepted from foreign Regulators. ANSPs may rely on certification of these FI Companies to some extent i.e. in the assessment and selection of companies to provide services.

A Certification is a proof that a company has implemented a mechanism to ensure quality and/or safety.

Nevertheless the requirement for Regulator is to:

- Specify its own technical requirement;
- Assess FI companies taking into account as a positive item its certification;
- Perform a safety assessment of the FI service provided.

Certification under the SES Common requirements scheme should provide assurances in the Quality and Safety domains. In both cases, either result of certification and renewal audits should be made available to ANSP or foreign Regulator and they should be allowed to conduct its own qualification audit.

**But, nevertheless, having reliable SMS is going to be obligatory!**

### **5.1. General Presentation of FI Company**

The general assessment of the company shall address the following:

- Type of Aircraft
- Organization (including SMS!)
- Equipment and Procedures
- Human Resources and Skills
- References (very, very important!!!)

## **5.2 Technical Aspects**

The company shall provide a demonstration of its capability to satisfy Flight Inspection requirements (equipment, procedures, related risk analysis, performance, accuracy, reliability....). This can be satisfied by presenting the references from previous jobs, or with visit (Audit!) to the company laboratories and premises!

## **5.3 Quality and Safety Aspects**

The company shall demonstrate its capability to ensure a fully compliant Flight Inspection service according to technical and operational requirements and applicable standards with a special attention for the possible non-conformances of the NAVAIDs system. The operational QAS and SAS in force are good demonstration of this!

## **5.4 Documentation Aspects**

The company shall describe its procedures for development of the required measurements, procedures and calibration of equipment through documents and management of its documentation system.

## **6. CONCLUSION**

Flight Checking of NAVAIDs and radars is usually part of External Services provided by FI Companies. They interfering Air Navigation System as External Services, which are covered by ESARR 3 obligations! Due to his nature of services they provide, FI Companies are dealing with ANSPs and with Regulator. In the first case they are under obligation to have their own SMS which is actually upgrading of their QAS (dealing with Safety Issues)! Having such a documented system is economically beneficial and legally obligated!

## **7. REFERENCES:**

- [1] EUROCONTROL ESARR 3 “Use of SMS by ATM Service Providers”, 2000;
- [2] EUROCONTROL EAM/GUI 1 “Explanatory material on ESARR 3 requirements”, 2001;
- [3] EUROCONTROL EAM/GUI 4: “Mapping between ISO 9000 and ESARR 3”, 2004;
- [4] EUROCONTROL Generic Safety Management Manual, Part 2, Chapter 6, “External Services”, 2006;
- [5] SES Common Requirements – European Commission document, 2005;

<b>Abbreviation</b>	<b>Meaning</b>
ESARRs	European Safety Regulatory Requirements
SMS	Safety Management System
QAS	Quality Assurance System
SAS	Safety Assurance System
ANSP	Air Navigation Service Provider
FI	Flight Inspection
ATM	Air Traffic Management
CNS	Communication, Navigation, Surveillance
ANS	Air Navigation Services
SIS	Signal In Space

# B I O G R A P H Y



**Name:** Sasho Andonov      **Date of birth:** 28/06/1963

**Nationality:** Macedonian

**Address:** Civil Aviation Agency  
Dame Gruev 1  
1000 Skopje  
Macedonia

**Tel:** +389 2 307 4594 (home)  
+389 2 313 9300 (office)  
+389 70 380 023 (mobile)

**Fax:** +389 2 313 9365 (office)

**E-mail:** sandonov@dgca.gov.mk (business)  
saso.andonov@mt.net.mk (private)

**Present Employment:** Advisor-CNS Expert; Planning and Development Department;

I am Graduated Engineer of Telecommunications and Electronics. I have finished studies on the Electro-technical Faculty of University of Kiril and Metody in Skopje, Macedonia in 1990.

My first employment was in Macedonian Radio Television (state owned TV company) in the Department of Transmitters and Links. After 4 years I went to Pikon, private paging company where I was working as Technical Manager and in 1995 I started with my carrier in aviation. I have spent 4 years in CAA of Macedonia as Head of NAVAIDs (part of Technical Department) and after that I was transferred to Planing and Development Department working mostly on Project Management and P&D! From the beginning I was responsible for Flight Calibration of NAVAIDs, the task which is still dedicated to P&D Dept. for conducting tender procedures! Last two years I am dealing with Safety Issues in CNS area.

I am member of few working groups connected with CNS in ICAO, EUROCONTROL and NATO.