

THE GPS USE

IN BRAZIL

IS BECOMING OPERATIONAL

BY:

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1 – INTRODUCTION

This paper doesn't present the Brazilian Aeronautical Authority points of view. It's a point of view of user that had worked long time in the Diretoria de Eletrônica e Proteção ao Voo - DEPV, the Brazilian Air Traffic Control Agency. Now, after retire, is working in the GPS Consultoria Aeronáutica as a consultant. First of all I would like to demonstrate as I got involved with GPS.

Before the retirement, in 1995, I was working on DEPV and since 1984 I was involved with a lot of people around the world. Among them, naturally there was the GNSS, GPS, GLONAS, WAAS, LAAS, EGNOS, MTSAT, etc.

One of my last works on DEPV, was just to write the document that permitted the official utilization of the GPS, in Brazil. It is the AIC 03/95 whose name is Sistema de Posicionamento Global - GPS date Feb./02/1995. The criteria stated on this document that permits the use of GPS as a Supplementary Means of Navigation and, in general, and Special Application of the GPS, authorized case by case by the Aeronautical Authority.

2 - THE USE OF GPS IN BRAZIL

The GPS is been in use, in Brazil, as an excellent tool in many fields. Among them we can mention survey, geodetic, maritime and air navigation.

I'm not the right person to describe the GPS use in all these areas. So, this work will mention only the GPS as a means of air navigation and particularly my experience on this area.

GPS has been in use in Brazil, under Visual Flight Rules - VFR, for a long time. Its use came with the pilots, the new aircraft and the equipment supplier.

With the AIC 03/95 - Sistema de Posicionamento Global, became possible the IFR use of the GPS.

The GPS IFR uses are divided in two types: as a Supplementary Means of Navigation and as a GPS Special Application.

As a Supplementary Means of Navigation any aircraft TSO C129 equipped and certified can fly the Enroutes, STAR, SID and Non Precision Approach Procedures with WGS 84 geographical coordinates. The Enroute and TMA charts and some STAR and SID are already prepared with the WGS 84 coordinates. So, an equipped and certified aircraft can use them as a Supplementary Means of Navigation. The Non Precision Approach

Procedures charts will take a little more time. There are needs for survey all the runway thresholds.

An example of a GPS Special Application is the Stand Alone Non Precision Approach Procedures; the Special Cat I with a DGPS is another.

3 - A SPECIAL APPLICATION OF GPS.

When I retired I was invited to develop and implement a Special Application of GPS for a Brazilian Regional Airline.

At that moment there was on that Airline airport network an airport that was became an economical problem for the company. In functions of obstacles on the Missed Approach Phase the Final Minimum Descend Altitude (MDA) is height. So, the same happens with the ceiling and the visibility. During the wintertime, with bad meteorological conditions the aircraft can't land and goes to the alternate airport. The airport is equipped only with NDB. The assess to improve the airport infrastructure prove the need of a DME to give a positive guide on part of the Missed Approach. So, a VOR/DME or a GPS Approach Procedure should be the solution. The VOR/DME would resolve only that particular airport. There are others with similar problems. The option was to equip the fleet with TSO C129 GPS receivers; comply with a certification process; developing Approach Procedure for 17 (seventeen) airports; flight inspection all the Approach Procedure; training the pilots on the IFR use of the GPS for Approach Procedure; prepare the data cards; etc. The project involved many people and organizations like the ATC, CAA, and Certification authorities, the aircraft industry, the avionics supplier, data card supplier, etc. This project starts in the beginning of 1996 and is becoming operational just now when we have the first GPS Stand Alone Approach Procedure certified.

The GPS Stand Alone Approach Procedures developed on this project is authorized only for that Brazilian Regional Airline who submit their pilots and fleet under the specifics criteria stated by the Aeronautical Authority. The procedures, at the moment, aren't of common use. They aren't on public domain.

Note that the Supplementary use of GPS is for general use. But, the Special Application of GPS is authorized only for those who wants to submitted under a special certification process. This project is authorized case by case. Until now just one Brazilian Airline Company gets involved with a project like this.

4 - ANOTHER SPECIAL USE OF GPS

The Aeronautical Authority, takings in count the need for research and assess the capability of precision approach procedure authorized the installation of a DGPS station on São José dos Campos Airport. It isn't in day by day use. It is only for experience.

5 – CONCLUSION

GPS is been in use, in Brazil in many areas, like survey, geodetic, maritime and aeronautical navigation. The first step on aeronautical navigation was as VFR means of navigation. The second is a Supplementary Means of IFR navigation. The third is becoming operational just now as a Special Application in Stand Alone Approach Procedures. Other Special Application of the GPS is coming like the first experimental DGPS in São José dos Campos Airport.