

Doc 9906 AN/472



## **Quality Assurance Manual for Flight Procedure Design**

Volume 1 Flight Procedure Design Quality Assurance System

Approved by the Secretary General and published under his authority

First Edition — 2009

International Civil Aviation Organization





## My Presentation



Institutional framework



Construction of regulations



Q Execution of review



Restraining system.

#### Three-level quality management system



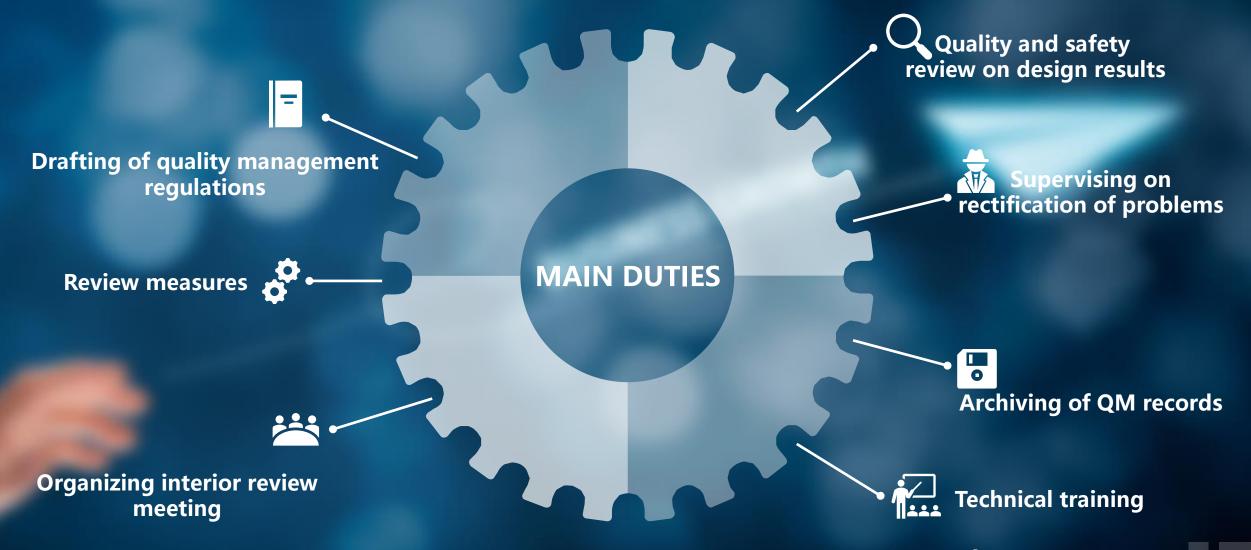
#### Three-level quality management system



Business Management dept.



#### Business Management dept.



#### Business Management dept.







Business Management dept

**Business Supervisor** 



- Organize
- Guidance
- Supervision
- Evaluation



Finish



#### Regulation at the national level











Doc.8168

CCAR97

Doc.9906

AC-97-FS-2011

AC-97-FS-005

#### Construction of company rules



It specified the content, measure, and key point of review, along with the supervision and implementation of feedbacks and rectify opinions.

It specified the reviewed material requirement, review method and focus, along with the implementation of feedbacks, rectify opinions and quality records.

#### Construction of company rules



Regulation of Error Classification in Flight Procedure Design

It specified the classification of errors, such as lapses, negligence, mistake, serious mistake. The standards of identification and classification, and the treatments of accumulated errors are clarified.



It specified the content, accuracy, integrity, timeliness, and validity of collected original data for each stage of design.

Template of Required Information in

Flight Procedure Design

#### Construction of company rules



Design Report

It offered supplementary requirements based on the templates published by CAAC China in several aspects including the integrity, accuracy and timeliness of data and information. It specified detailed requirements of the integrity of the content, elements of protection areas, and data evaluation for different stages of design. It also clarified the detailed requirement of charting, editing, layout and necessary discussion.



It specified the archiving of project's original data, design result, meeting summary, quality review record, rectification, approval and publishment. It also clarified the

Project Files Management Regulation

process of the access, transmitting, storage, and destruction of files.

#### Review of Original Data



Review of contract technical proposal

When the project starts, a design service contract clarifying the rights and obligations of both parties is necessary as the legal basis of design. In order to avoid dispute, the business management department will review the coincidence of technical service solution and the contractual objectives, the feasibility of implementation methods, the completeness of quality assurance measures.



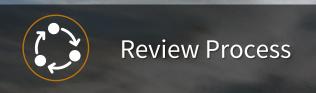


Airport routing delimited in pre-feasibility is different from coordination results in site selection.











and submit the materials



STEP 1

Internal audit of design department

Apply to the management department



Register the management department

#### STEP 4

The management department organizes the audit committee



STEP 5

Review by the technical committee



Feasibility Study Meeting



The business management department shall organize the feasibility study meeting for examining the design proposal and conduct the examination in accordance with the Management Regulation on Flight Procedure Design Scheme Review. The proposal review will be taken place in the form of a meeting consisting of review teams composed of members of the technical committee.









Focus



Accuracy of original data



Rationality of flight procedures design proposal



Rationality of navigation facility layout



Adaptability of operating standard and clearance processing



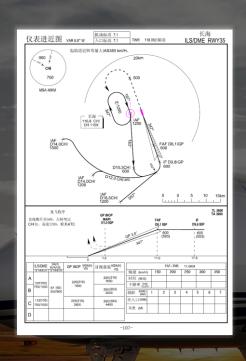
Feasibility of airspace and route planning

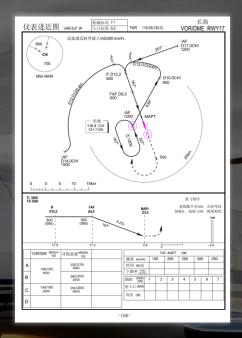


Adaptability of design proposal and urban planning development



Case Analysis





#### 长海机场气象资料

根据长海气象数据统计,岛内雾日较多,平均每年52 天,占全年14.2%,主要在4-7月,多平流雾,变化突然, 来去迅速。云高300米以下占总观测次数17.2%,能见度2800 米以下占总观测次数20.8%,低云和低能见度天气较多(占 全年1/5)。



Adding ILS to the main landing in one Airport:

After analyzing the meteorological data, it is proposed to add ILS to the secondary landing



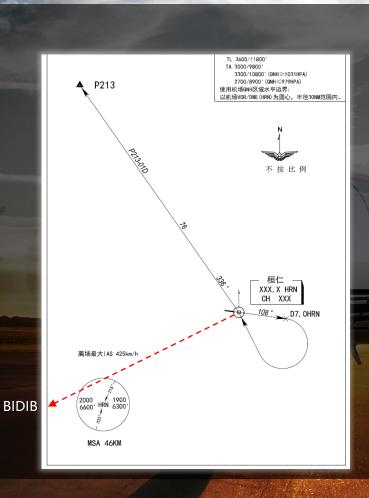


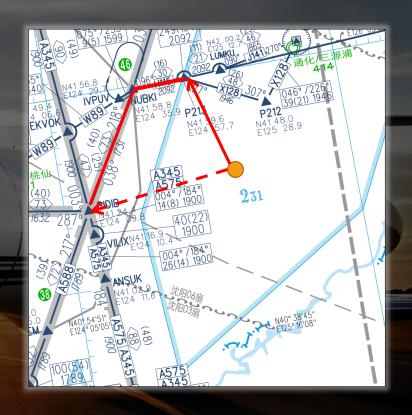
Offset takeoff of the 2nd runway in one airport is 5.7%, vegetation shall be treated according to the requirement that it is not larger than 5%, after analyzing the departure path area, it is not within it, and the aircraft performance meets the range load.



Case Analysis

Due to the limitation of military airspace, a new route heading to P213 was designed. Considering most to the flow come from southwest, the review meeting decided to add a route heading to BIDIB(by ATC) to shorten the flight distance.









Focus



The integrity of original data



The normalization of charting



The conformance of ICAO and CAAC China's standards and regulation in quotation of regulation, calculation of parameters, drawing of protection areas, assessments of obstacles and the determination of operation minima.



The accuracy and integrity of navigation coding data and waypoints 'coordination



The coincidence of SID/STAR and airspace planning



The validity of conclusion and suggestion



The practicability of the procedure including climb/descend gradient, speed limitation, turn radius, MSD etc.



#### Manual

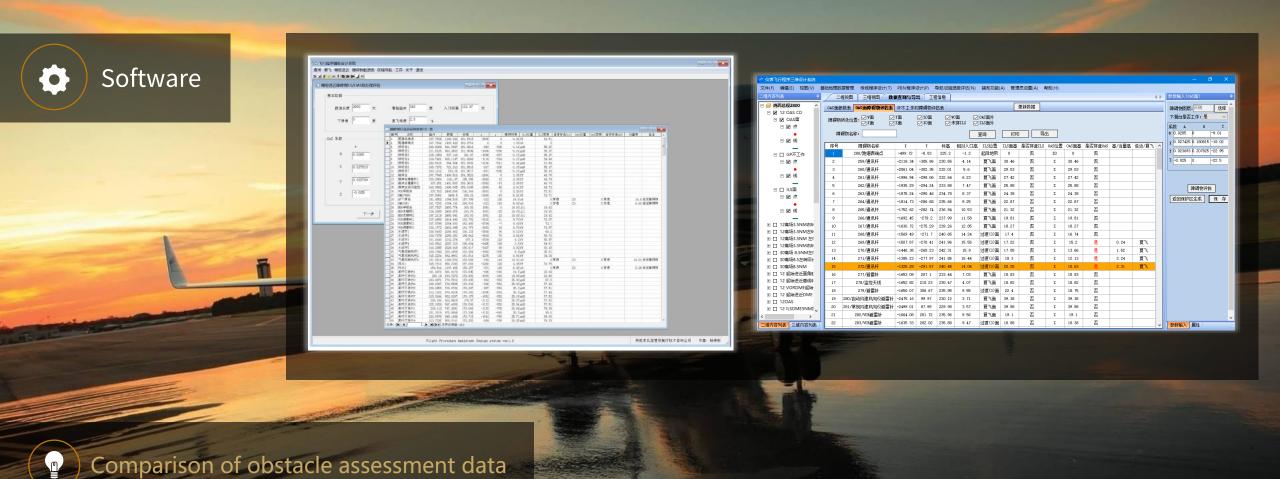
#### \_机场飞行程序审核检查单

序号	检查类型	检查名称	是否正确	存在问题	差错性质	备注
1	原始数据	设计规范的时效性				
2	原始数据	各类使用数据正确性				
3	原始数据	各类使用数据精度				
4	空域规划	空域需求				
5	空域规划	进离场飞行冲突				
6	空域规划	飞行程序航迹与航路航线衔接				
7	空域规划	雷达引导下的特殊飞行航迹检查				
8	空域规划	等待程序划设位置				
9	空域规划	过渡高度层和过渡高度/高设置				
10	标称航迹	离场第一个航路点距离				
11	标称航迹	航段爬升/下降梯度设置				
14	标称航迹	中间进近航段				
15	标称航迹	航路点位置设置				

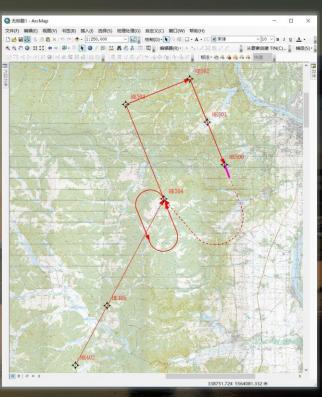
The reviewer will check the report with all the original data and previous review opinions. Review the airspace and air routes' separation based on both design and operation regulations and experience. The consistency of coding and charting will also be checked one by one.

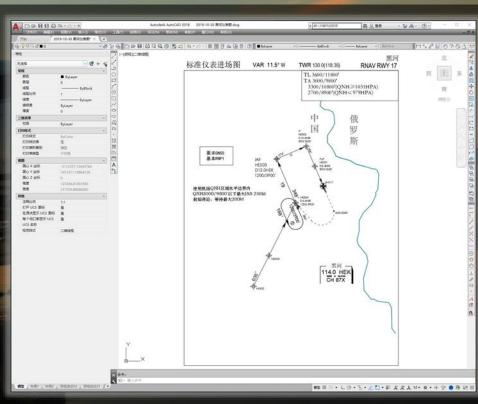


By a separate software rather than the one used in design, the reviewer will check the results of parameter calculation, obstacle assessment, minima determination, protection area drawing, and waypoints' coordination.









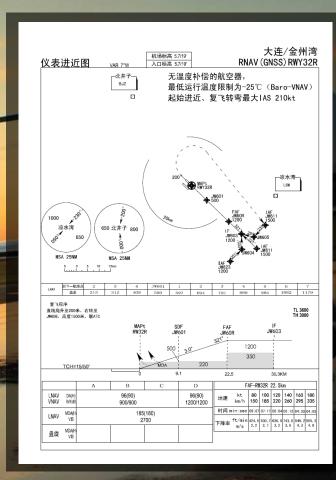


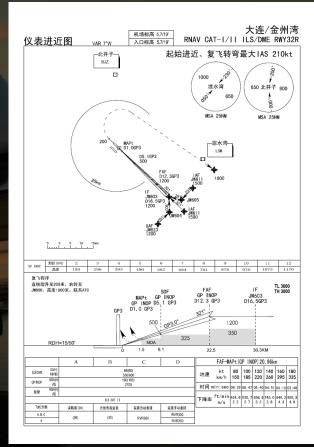
Check the waypoints' coordinate with different software

## Review of design results 附图五 RWY28 离场保护区图 附图1-5 RWY28 离场保护区图 Case Analysis Departure protection area drawing: turn at a point in SID chart, but the protection area is turn at an altitude **Execution of Independent Quality Review**



- Missed approach procedure's charting and text are inconsistent
- The ending point's name is missing in Rwy32ILS-RNP approach chart.







#### 《标准仪表进、离场程序设计方案描述》

航径 描述	定位点	F0	磁航向 (°)	转弯 指示	高度 (m)	高度 (ft)	速度限制 (kt)	VPA/ TCH	导航 性能
IF	HB607				900		MAX230		RNAV1
TF	HB601				650				RNAV1
				RWY23	进近复飞	ζ,			
IF	HB602				650				RNAV1
TF	HB601				650				RNP1
TF	RW23	Y						3. 2/1 5	RNP0.3
CF	HB608	Y							RNP1
DF	HB604			R	900		MAX210		RNP1

限制为-30°C;最大下滑角为3.5°时。最高温 900/30001 563/18501 复飞程序 直线爬升至HB608 700' (265') 720' (280') 735' (295' 290 (151) 295 (156) 330 (191)



The speed limitation in chart isn't consistent with navigation coding table

#### Supervision after Expert Review Meeting



When the flight procedure design report is submitted to CAAC by client, the administration will organize an expert review meeting for inspection. The designer and reviewer of the report should attend the meeting, and communicate with the experts. The expert's group's opinion will be issued after the meeting. The business management department will put the expert's group's opinion on records, and supervise the modification and optimization based on it. In principle, all the modification and optimization should be done within one week after the meeting.





#### Punitive measures

The designer and reviewer should take on the specific duties and shoulder the responsibilities throughout the FPD process.

Lapse
negligence,
Mistake
serious mistake

If there are **eight mistakes** in a year, the designer should make a summary of self-learning about the errors, and provide it to the company by the end of the year.

The party who makes **SCIIOUS** mistake, relates to the specific case, the incident should be recorded in the personal technical document after the research of the company, the designer should stop designing to improve the skills through the training relates 飞行程序设计差错性质鉴定标准及管理办法 to the incident, and resume work after he pass the examination of the company.

**Constraint Mechanism** 

沈阳广通测绘设计有限公司



## Performance review

	Levels of error property	Redundancies	Points of overstep one time	The upper limit of points
	lapse	5	0.5	20
1000年代	negligence	2	2	20
では、方式は、方式は、方式は、方式は、方式は、方式は、方式は、方式は、方式は、方式	mistake	1	3	30
一 一 本 一 一 一 一 一 一 一 一 一 一 一 一 一 一 一 一 一	Serious mistake	0	6	30

Constraint Mechanism

## Performance review



#### The reviewer

The time limit for the amendment	Point will be deducted for a day later	The upper limit of points
2 days	1	4



Reporting days	Point will be deducted for a day later	The upper limit of points
2 days	1	10



Errors in the final report

Point will be deducted for one lapse	Point will be deducted for one negligence	Point will be deducted for one mistake	Point will be deducted for one serious mistake	
1	2	3	6	

Constraint Mechanism

