Duration	2 working days	Live Webinar
Tuition Fee	CHF 1200 per participant	
Instructors	Beat Zimmermann (IFP)	
Certificate	ANI Certificate	

Questions at a glance	Answer
ICAO recognised?	No, there is no such thing as an ICAO recognition for training. ANI is a State-approved training provider and complies with all ICAO training regulations.
Pre-requisites?	Yes. Please see below for details.
Practical?	Mastery Test exercise to design an AR procedure in a sample scenario.
Travel required?	No

1. ANI Procedure Design Training Program and Concept

All ANI Procedure Design/PANS-OPS courses cope with ICAO document 9906 "Quality Assurance Manual For Flight Procedure Design", vol. II "Flight Procedure Designer Training".

2. ANI Advanced Level training

Based on educational experience some of the more complex criteria are covered as advanced training. It was observed that mastery of skills is better when the basic concepts of procedure design are consolidated with some practical work before the advance level training is started.

RNP AR is part of the Advance PBN course but for itself is too short to offer as a classroom course. Hence it is offered as a two day Live Webinar to attend from wherever the student would like.

3. Pre-requisites

To join an ANI advanced level course, students must demonstrate that they have undergone basic training, preferably at ANI, the Singapore Aviation Academy or ENAC Toulouse. Furthermore students should have some basic level procedure design experience (at least OJT after the basic training). If these requirements are not met, the ANI cannot guarantee successful completion.

PRE-REQUISITE SKAS
(extract from ICAO do. 9906, vol. II)

3.3.1 Mathematics

3.3.1.1 Algebra
Students should be competent in Algebra to at least the level of resolving equations with 2 unknowns and handling operations of the 3rd level (Exponentiation, Radical, Logarithms, Angular functions). This requirement will assure the understanding of formulas given in the relative criteria documents as well as the ability to follow rationales, on which certain criteria are based.

3.3.1.2 Geometry
Students should be familiar with the classical Euclidian Geometry (Plane Geometry, Solid Geometry) as well as Thales and Pythagoras constructions.

3.3.1.3 Trigonometry
Students should be competent in all Trigonometry Functions such as Sine, Cosine, Tangent, Cotangent, Secant and Cosecant. Furthermore they should be familiar with Trigonometry Theorems such as the Theorem of Sines and the Theorem of Cosines.

3.3.1.4 Probability and Statistics
Students should have basic knowledge of Statistical and Probability Mathematics, particularly an understanding of the Gaussian (Normal) distribution.

3.3.2 Aviation or Aviation-related pre-requisites

The job profile of an Instrument Flight Procedure Designer requires knowledge in various fields of activity in aviation. Training providers are encouraged to offer ab-initio training and that the following prerequisites are met by the student so as to ensure that the length of training can be optimized.

3.3.2.1 Air Traffic Management
Students should demonstrate fundamental knowledge of Air Traffic Management (ATM) as in ICAO doc. 4444 (PANS-ATM), as well as understanding the broad concept of ATM which consists of ATS including ATC (Air Traffic Control), ATFM (Air Traffic Flow Management) and ASM (Airspace Management), other fields related to ATM such as route spacing, ATC separation, aviation weather, etc.

3.3.2.2 Navigation, Navigation Systems and Geography
Students should demonstrate knowledge of Navigation, Navigation Systems and Geography to the level of any pilot's licence with Instrument Rating (IR). It is however not a requirement to hold such a license.

3.3.2.3 Aircraft Operations
Students should demonstrate knowledge of the basics of flying and aerodynamics. It is however not a requirement to hold a pilot's license.

3.3.2.4 Aircraft Performance
Students should demonstrate knowledge of Aircraft Performance to the level of any pilot's license with Instrument Rating (IR). It is however not a requirement to hold such a license.

3.3.2.5 Aeronautical Information Services
Students should demonstrate fundamental knowledge of Annex 15 (Aeronautical Information Services).

3.3.2.6 Aerodrome safeguarding
Students must be familiar with the basic requirements for aerodrome safeguarding (Annex 14 Obstacle
limitation surfaces, Aerodrome reference codes).

3.3.2.7 Geodesy
Geodesy, also called geodetics, is the scientific discipline that deals with the measurement and representation of the earth, its gravitational field and geodynamic phenomena (polar motion, earth tides, and crustal motion) in three-dimensional time varying space. Geodesy is primarily concerned with positioning and the gravity field and geometrical aspects of their temporal variations, although it can also include the study of the Earth's magnetic field.

Students should demonstrate fundamental knowledge in the following areas of Geodesy:

• Geoid and reference ellipsoid
• Coordinate systems in space
• Coordinate systems in the plane
• Heights
• Geodetic Datums and Datum conversion • Point positioning
• Units and measures on the ellipsoid
• Geodetic Principal Problem
• Geodetic Inverse Problem

3.3.3 Language

In order to progress through the competency-based training outlined above, trainees need to demonstrate their ability to achieve terminal objective related to the competency elements. As training will be delivered within a certain timeframe, it is important that trainees learn the material within the time allocated. For this reason, proficiency in the language in which training will be delivered (instruction and training materials) is essential.

For courses in English, it is suggested that training providers require a score of 550 in the written TOEFL (Test of English as a Foreign Language), 213 in the TOEFL Computer Based Test, 79 in the TOEFL Internet Based Test and 750 in TOEIC (Test of English for International Communication) for students whose native language is not English. Alternatively, a score of 6.5 in the IELTS Academic Module (International English Language Testing System) can be accepted. Students having studied at an English speaking institution for one year or longer can be exempted from providing a TOEFL or IELTS score.

(end of extract)

Note: For ANI courses, an ICAO language proficiency Level 5 is also accepted. Level 4 is not sufficient to understand the lectures.

5. Training Phases

The above pre-requisite SKAs refer to entry into "initial training", which according to doc. 9906 is the first time that a Flight Procedure Design Student gets in touch with actual Flight Procedure Design criteria. Any required training to get to that level is called "ab-initio". Initial Training **MUST** be followed by an On-the-Job (OJT) training phase. The length of such a phase can be specified be the PDSP (Procedure Design Service Provider). Typically an OJT phase will not be shorter than 15 weeks. So when joining advanced level training, the above prerequisites still apply, plus the fact that the student must have undergone basic (initial) flight procedure design training.

6. RNP AR Training

The RNP AR Manual as published today is based on the operational experience of AR procedures between the years 2005 and 2009. In the meantime RNP AR procedures were published around the world, whether public or company owned, a lot of experience could be gained from these procedures. As a result, the RNP AR manual was undergoing a review and rewrite process that ended in autumn 2020. The third edition of doc. 9905 should be available at least in unedited version.

The practical exercise at the end then uses the ANI-developed Atlantis Sam Steiner International Airport to apply the criteria of RNP AR. As the layout of an RNP AR procedure is extremely flexible, it is difficult to create an exercise that exposes all advantages of RNP AR. Hence the exercise is in an environment where some problems must be solved with AR design techniques, consolidating the basic competencies to design such a procedure. A final discussion then explains how the advantages of RNP AR could eventually be used better in the given scenario.

7. Course Rundown

Phase	Topic	Details
Setting the stage	History of RNP AR	How RNP AR as a concept and finally a PBN NavSpec was established
Criteria	RNP AR	Doc 9905 criteria, issues with the information in the manual, logic (or better: illogic) of certain requirements. Errors in 9905.
Criteria	RNP AR latest experience	Live GoToMeeting session explaining some criteria that are outdated in the manual and illustrating some structure issues with doc. 9905.
Mastery Test	RNP AR	Design an RNP AR in a sample scenario Discuss results, eventual benefits. etc. Note: This is usually done by the participants after the two days tuition.