SAFEGUARDING AERODROMES AMIDST SUSTAINABLE DEVELOPMENT

DEVELOPMENTS IN THE VICINITY OF AERODROMES & AIRPORT AIRSPACE AND OBSTRUCTIONS

PRESENTED BY
AERODROME & GROUND AIDS INSPECTOR
MS. RAUNA MUNGONENA

NCAA

Namibia Civil Aviation Authority

OUTLINE

- Objective
- Regulatory Overview – Amended Part 139
- Sustainable Development
- Case Studies
- Obstacle Limitation Surfaces
- Mitigations
- Conclusion

Sustainable Development & Aviation

Purpose & Objectives

To appreciate sustainable development in aviation and provide information on the application process of structures in the vicinity of an aerodrome to determine whether it endangers the safety of aircraft operations.

Objectives:

- To describe the airspace around aerodromes to permit intended aircraft operations to be conducted **safely**.
- Prevent, where appropriate national controls exist, and airports from becoming unusable by the growth of obstacles around them.
- Establish a series of OLS that define the limits to which objects may project into the airspace.

NATIONAL HEADLINES

Hyphen Hydrogen Energy announces ammonia offtake MoUs with Approtium and Industrial Group

Namibia, 02 February 2023 Hyphen Hydrogen Energy (Hyphen) has signed non-binding Memorandums of Understanding (MoUs) with two major industrial companies with the aim of Hyphen providing them with up to 750,000...

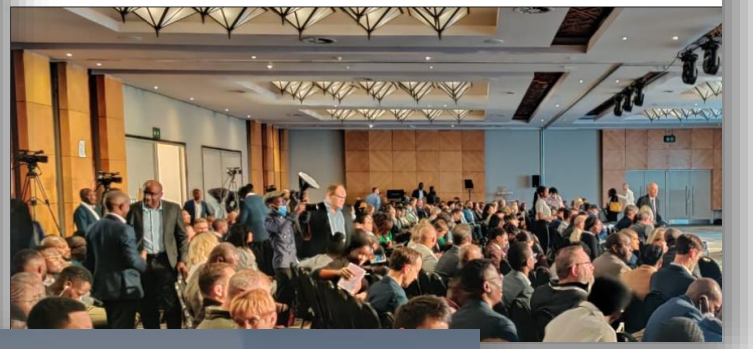
NEW ERA LIVE

HOME NEPC BUSINESS ENTERTAINMENT SPO

Home / N$500m green hydrogen pilot projects coming

N$500m green hydrogen pilot projects coming

2022-08-17 Maihapa Ndjavera



HYDROGEN ENERGY HYPHEN

GH2 Green Hydrogen Organisation

innosun sustainable power for Africa

IN THE PRESS

Daures Green Hydrogen Village construction set to begin – NBC

POSTED ON MARCH 30, 2023 BY NABOT

DAURES GREEN HYDROGEN CONSORTIUM

DAURES GREEN HYDROGEN VILLAGE

SUSTAINABLE DEVELOPMENT

CASE STUDIES

Wind Turbines near La Palma Airport, Canaries, Spain

The two turbines are approximately 420 m east of the main runway

Wind Turbines near Travis AFB California

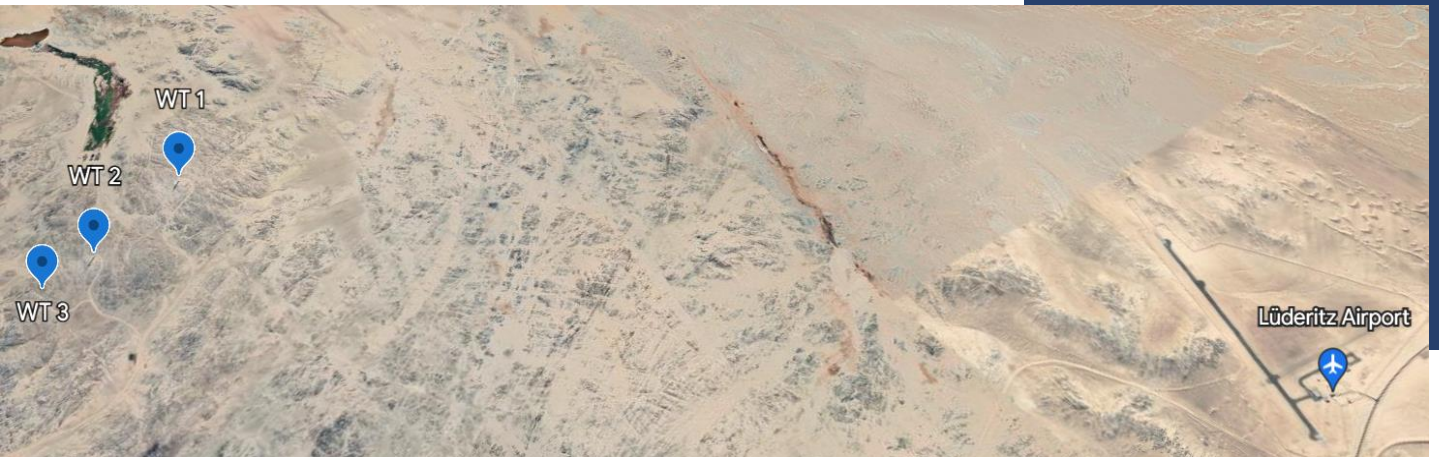
The wind turbines are approximately 8 km from the runway. Red air traffic control radar antennae can be seen at the top of the tower in the foreground.

CASE STUDIES

Wind Turbines at Kotzebue Radar, Alaska

These two turbines are operated by the US air force to provide additional power for operating this remote radar station.

Wind Turbines at Luderitz Town, Namibia



These three turbines are operated by InnoSun connecting to the NamPower electricity grid, producing 5MW of electricity.

CASE STUDIES

Solar Farm at George Airport, George

South Africa’s George Airport became the continent’s first solar-powered airport meeting 41% of its energy demand from a brand new 200 m2 solar power plant built on its grounds.

Solar farm at Kimberly Airport, Kimberly

Solar farm comprised 1 620 photovoltaic panels and was located on 700 m2 of land within the airport precinct, producing 927 000 kWh a year .

REGULATORY FRAMEWORK

SUBPART 11
OBSTACLE RESTRICTION AND REMOVAL

Applicability of Subpart

139.11.1 (1) This Subpart applies to all aerodromes except where otherwise specified.

(2) This Subpart does not apply to aerodromes used solely as heliports.

Erection of obstacles

139.11.2 (1) A person may not cause or permit the erection or growth of an obstacle at, or in the vicinity of, an aerodrome, where the obstacle may prevent an aircraft operation from being conducted safely or the aerodrome from being usable.

(2) The erection of buildings or other objects in the navigable airspace or in the vicinity of an aerodrome or navigation aid must be in accordance with standards prescribed in Document NAM-CATS-AH.

(3) A person may not cause or permit any object, including new or extension of existing objects to penetrate the obstacle limitation surface, established in accordance with regulation 139.11.3, without the written permission of the Executive Director.

GOVERNMENT GAZETTE
OF THE
REPUBLIC OF NAMIBIA

N$122.40 WINDHOEK - 24 June 2016 No. 6047

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GOVERNMENT NOTICE

No. 137 Promulgation of Civl Aviation Act, 2016 (Act No. 6 of 2016), of the Parliament 1

Government Notice

OFFICE OF THE PRIME MINISTER

No. 137 2016

PROMULGATION OF ACT
OF PARLIAMENT

The following Act which has been passed by the Parliament and signed by the President in terms of the Namibian Constitution is hereby published in terms of Article 56 of that Constitution.

No. 6 of 2016: Civil Aviation Act, 2016.

"**Safeguarding of aerodrome surroundings**

139.01.34 (1) The aerodrome operator must protect and safeguard land use activities within a vicinity of an aerodrome to limit the impact of illegal occupation affecting aircraft safety and for future expansion of the aerodrome, to ensure that air transport develops in a safe and orderly manner.

(2) A person who intends to carry out land use activities in the vicinity of aerodromes must, during the planning for such land use activities, conduct consultations with the Executive Director and owner or operator of the aerodrome with regard to safety impacts of constructions proposed to be built within the limits of the obstacle limitation surfaces as well as other surfaces associated with the aerodrome, human or surrounding communities activities, and land use such as –

(a) any development or change in land use in the aerodrome area;

(b) any development which may create obstacle-induced turbulence that could be hazardous to aircraft operations;

(c) the use of hazardous, confusing and misleading lights;

(d) the use of highly reflective surfaces or glint and glare effects that may affect a pilot's interpretation of visual aids or air traffic control tower personnel's ability to monitor aircraft;

(e) the altering of existing habitat or creation of areas that may encourage wildlife activity, which may be harmful to aircraft operations; and

(f) sources of electrical interference or non-visible radiation or the presence of moving or fixed objects which may interfere with, or adversely affect, the performance of aeronautical communications, navigation aids and surveillance systems.

(3) All land use practices and activities in the vicinity of an aerodrome must conform to the standards prescribed in Document NAM-CATS-AH.

(4) The aerodrome owner or operator of a certified or licensed aerodrome must develop an aerodrome master plan which supports a layout designed to yield the optimum airport capacity consistent with the available land, within the vicinity of the aerodrome and take into account, where appropriate, land use control measures.

(5) The aerodrome master plan must conform to the standards prescribed in Document NAM-CATS-AH.".

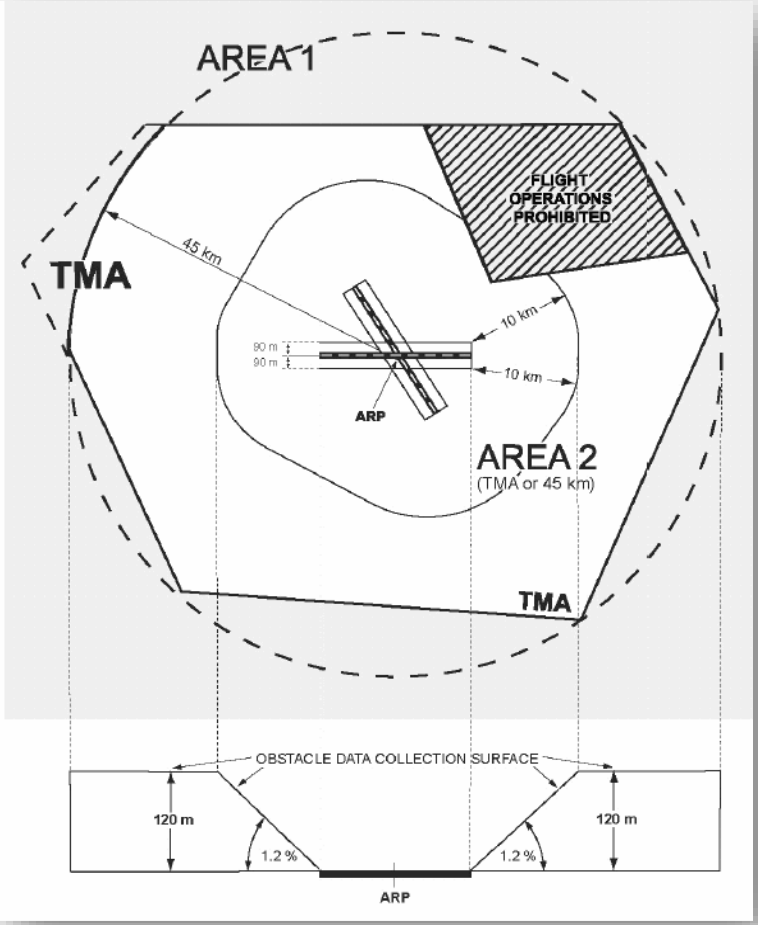
REGULATIONS

Safeguarding of aerodrome surroundings 139.01.34	Aeronautical Studies 139.01.35	Obstacle Restriction & Removal 139.11	Visual Aids for Denoting Obstacles 139.13	Certification of Air Navigation Services 170.01.4	Protection of Radio Navigation Sites 171.04.12	Approval to provide flight procedure design services 173.02.1
NAMCARs Part 139				NAMCARs Part 170, 171 & 173		

OBJECTS OUTSIDE THE OLS

A person may not construct any building, structure or other objects beyond the limits of the obstacle limitation surfaces of an aerodrome that extend above a height of 45 meters above the mean level of the aerodrome landing areas.

- Objects which do not project through the approach surface, but which would nevertheless adversely affect the optimum siting or performance of visual or non-visual aids shall be removed.
- The Executive Director may direct the removal of any obstacle which, in the opinion of the Executive Director, constitutes a hazard to aircraft operations, and the cost of such removal must be borne by the owner of the obstacle or the person who placed the obstacle at the place where it is removed from.



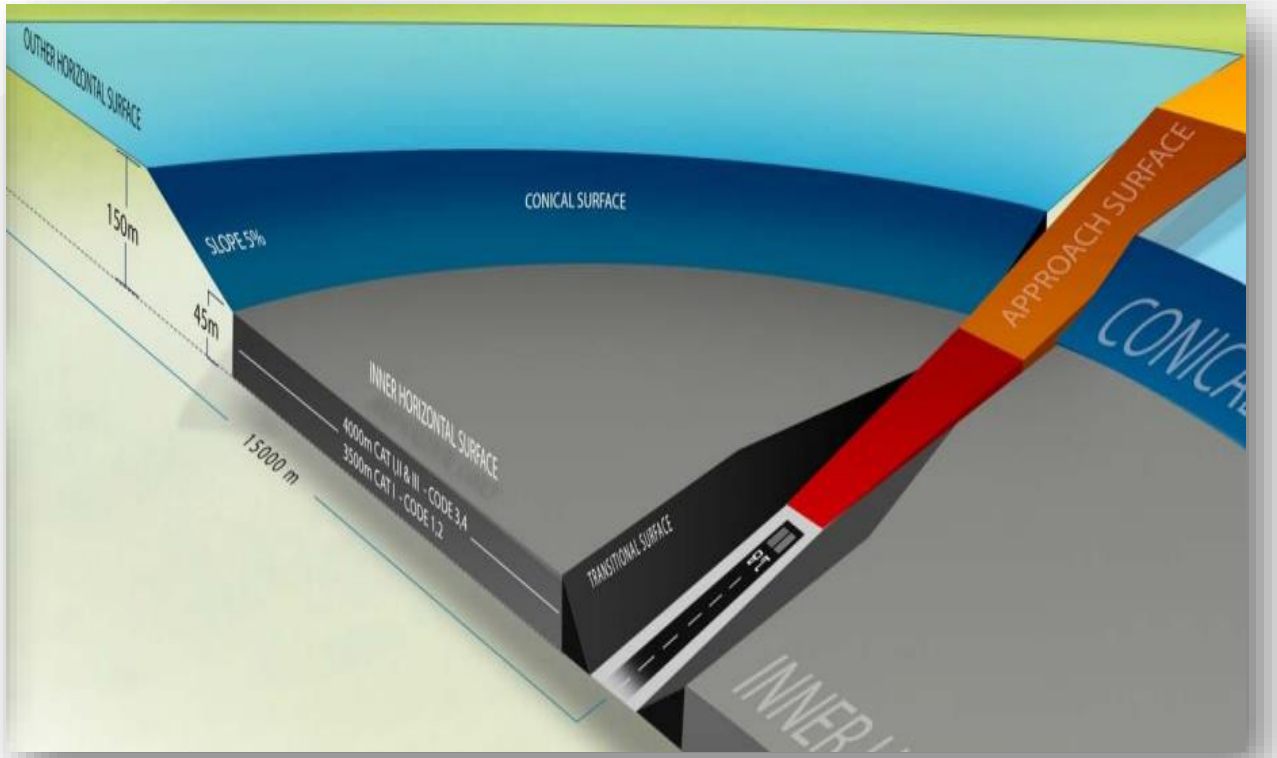
REGULATIONS

Inadequate industry guidance, such as regulations and technical guidance guidance

- There are, at present, inadequate regulations and technical guidance material to address the safety impact of airport wind and solar panel farms in Namibia. As best practice CAAs in various States routinely require aerodromes to assess the effects of these structures, such as reflection of sunlight from solar panels.
- Airports should, as part of the change management process in their safety management system, consider all of the risks posed by sustainable-related infrastructure such as wind, solar panel farms, etc. at or adjacent to their airport in order to ensure the safety of the overall operation.

DEFINING OBSTACLE LIMITATION SURFACES

- It is important to understand the Obstacle Limitation Surfaces for aerodromes within approximately 15 km of any proposed structures.
- An infringement of Obstacle Limitation Surfaces is not necessarily a project show-stopper, however understanding any potential infringements and subsequent engagement with the relevant authority(s) is mandatory to maximize a projects' success.



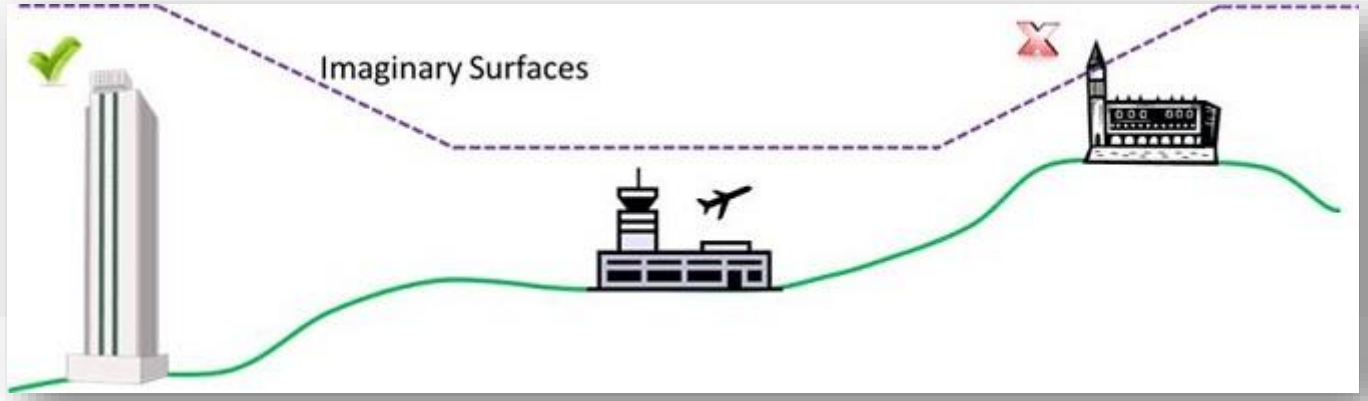
OBSTACLES & OBJECTS

OBSTACLES

- All fixed (whether temporary or permanent) and mobile objects, or parts thereof, that:
  a) are located on an area intended for the surface movement of aircraft; or
  b) extend above a defined surface intended to protect aircraft in flight; or
  c) stand outside those defined surfaces and that have been assessed as being a hazard to air navigation

OBJECTS

- Anything such as sky-scrappers, a series of wind turbines or electricity poles, terrain, etc. may affect the safety of aircraft operations
- May not project through the OLS but which would affect the optimum performance of visual or non-visual aids should, as far as practicable, be removed



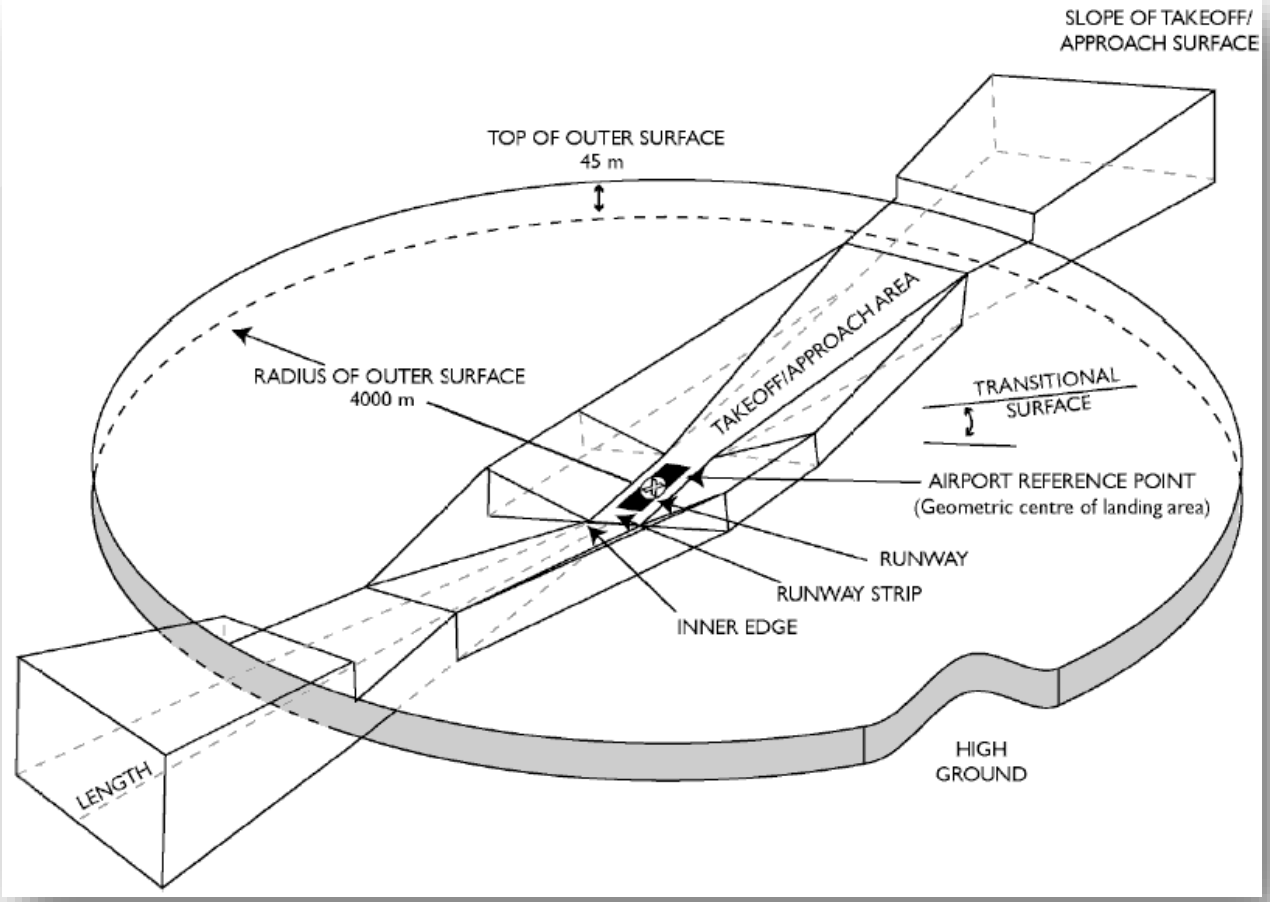
OBSTACLE LIMITATION SURFACES

Provides protection in the final phase of the approach to landing manoeuvre or go round

- Approach Surface
- Take-off Climb
- Transitional Surface
- Inner Approach Surface
- Inner Transitional Surface
- Balked Landing Surface
- Obstacle Free Zone

Provides protection to the airspace for visual circling prior to landing

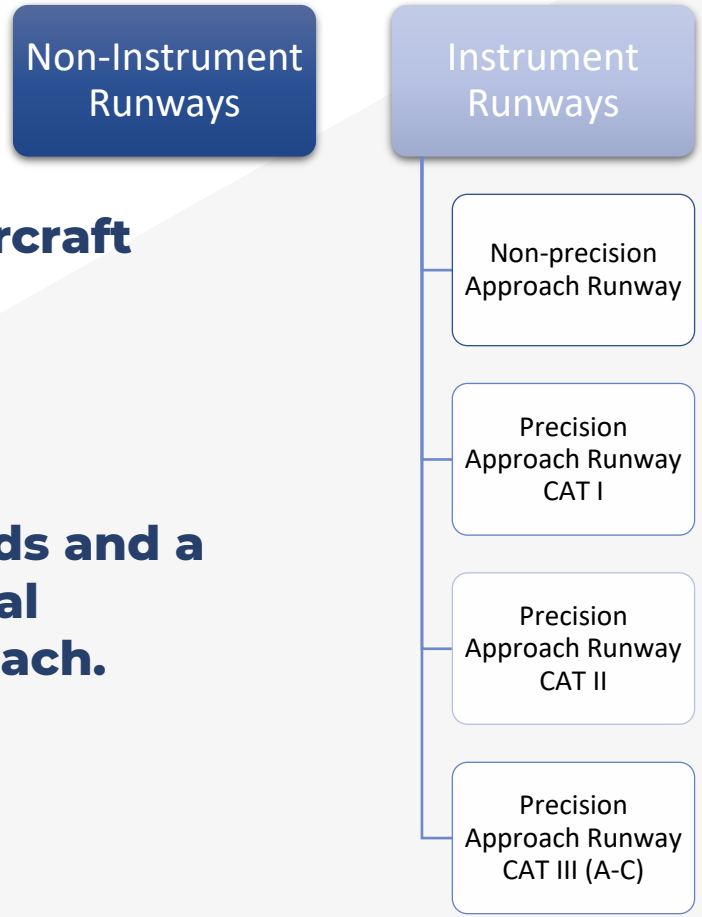
- Inner Horizontal Surface
- Outer Horizontal Area
- Conical Surface



TYPES OF RUNWAYS

Non-Instrument Runway
A runway intended for the operation of aircraft using visual approach procedures.

Instrument Runway
An instrument runway served by visual aids and a non-visual aid providing at least directional guidance adequate for a straight-in approach.



OLS CONSIDERATION & COMPUTATION

Obstacle limitation surface parameters to consider when determining the surface and penetration dimensions.

- Type of approach
- Runway code number
- Determine the type of surface and related dimensions, such as Length / Width / Slopes /Height
- Refer to NAMCARs & NAMCATS-AH Part 139.11 Tables 11.1 & 11.2
- Use GIS or any other OLS programs to depict the surfaces and produce the OLS charts

Table 4-1. Dimensions and slopes of obstacle limitation surfaces — Approach runways

APPROACH RUNWAYS

	RUNWAY CLASSIFICATION									
	Non-instrument Code number				Non-precision approach Code number			Precision approach category I Code number		II or III Code number
Surface and dimensions[a]	1	2	3	4	1,2	3	4	1,2	3,4	3,4
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
CONICAL										
Slope	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Height	35 m	55 m	75 m	100 m	60 m	75 m	100 m	60 m	100 m	100 m
INNER HORIZONTAL										
Height	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m
Radius	2 000 m	2 500 m	4 000 m	4 000 m	3 500 m	4 000 m	4 000 m	3 500 m	4 000 m	4 000 m
INNER APPROACH										
Width	—	—	—	—	—	—	—	90 m	120 m[e]	120 m[e]
Distance from threshold	—	—	—	—	—	—	—	60 m	60 m	60 m
Length	—	—	—	—	—	—	—	900 m	900 m	900 m
Slope								2.5%	2%	2%
APPROACH										
Length of inner edge	60 m	80 m	150 m	150 m	140 m	280 m	280 m	140 m	280 m	280 m
Distance from threshold	30 m	60 m	60 m	60 m	60 m	60 m	60 m	60 m	60 m	60 m
Divergence (each side)	10%	10%	10%	10%	15%	15%	15%	15%	15%	15%
First section										
Length	1 600 m	2 500 m	3 000 m	3 000 m	2 500 m	3 000 m	3 000 m	3 000 m	3 000 m	3 000 m
Slope	5%	4%	3.33%	2.5%	3.33%	2%	2%	2.5%	2%	2%
Second section										
Length	—	—	—	—	—	3 600 m[b]	3 600 m[b]	12 000 m	3 600 m[b]	3 600 m[b]
Slope	—	—	—	—	—	2.5%	2.5%	3%	2.5%	2.5%
Horizontal section										
Length	—	—	—	—	—	8 400 m[b]	8 400 m[b]	—	8 400 m[b]	8 400 m[b]
Total length	—	—	—	—	—	15 000 m	15 000 m	15 000 m	15 000 m	15 000 m
TRANSITIONAL										
Slope	20%	20%	14.3%	14.3%	20%	14.3%	14.3%	14.3%	14.3%	14.3%
INNER TRANSITIONAL										
Slope	—	—	—	—	—	—	—	40%	33.3%	33.3%
BALKED LANDING SURFACE										
Length of inner edge	—	—	—	—	—	—	—	90 m	120 m[e]	120 m[e]
Distance from threshold	—	—	—	—	—	—	—	c	1 800 m[d]	1 800 m[d]
Divergence (each side)	—	—	—	—	—	—	—	10%	10%	10%
Slope	—	—	—	—	—	—	—	4%	3.33%	3.33%

a. All dimensions are measured horizontally unless specified otherwise.
b. Variable length (see 4.2.9 or 4.2.17).
c. Distance to the end of strip.
d. Or end of runway whichever is less.
e. Where the code letter is F (Table 1-1), the width is increased to 140 m except for those aerodromes that accommodate a code letter F aeroplane equipped with digital avionics that provide steering commands to maintain an established track during the go-around manoeuvre.

Note.— See Circulars 301 and 345 (forthcoming), and Chapter 4 of the PANS-Aerodromes, Part I (Doc 9981) for further information.

OLS APPLICATION PROCESS

Consult

- A person who intends to carry out land use activities in the vicinity of aerodromes or construct any building, structure or other objects beyond the limits of the obstacle limitation surfaces of an aerodrome that extend above a height of 45 meters above the mean level of the aerodrome landing areas must, conduct consultations with the Executive Director and owner or operator of the aerodrome
- Submit form FSS-AGA-FORM-032 and/or 33 for the erection of permanent or temporary structures, respectively

Review

- The inspector or authorized person reviews the information provided in FSS-AGA-FORM-032 or 33 and associated aeronautical study, where applicable
- Where the application infringe airspace requirements the application may be forwarded to the AirSpace Committee (NAirC) for further review and provides a recommendation to the Executive Director to endorse or not endorse the application

Objection/No objection

- If the proposed structure(s) penetrates one or more OLS, the inspector or authorized person issues a technical report indicating the surfaces penetrated, and the Executive Director provides the applicant with an objection letter with recommendations.
- If the proposed structure(s) does penetrate the OLS, the inspector or authorized person issues a technical report ascertaining the non-penetration, and the Executive Director provides the applicant with a no objection letter

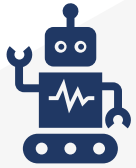
CONTROL MEASURES TO ADDRESS IDENTIFIED OBSTACLES

Oversight

- Removal
- Shielding
- Operational Limitations
- Suspension of certain operations

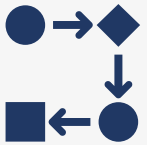
Training

- Staff competency and appropriate Training



Technology

- Marking
- Lighting
- Frangibility
- Modification of flight patterns
- Established OLS Charts
- Airport Master Plan

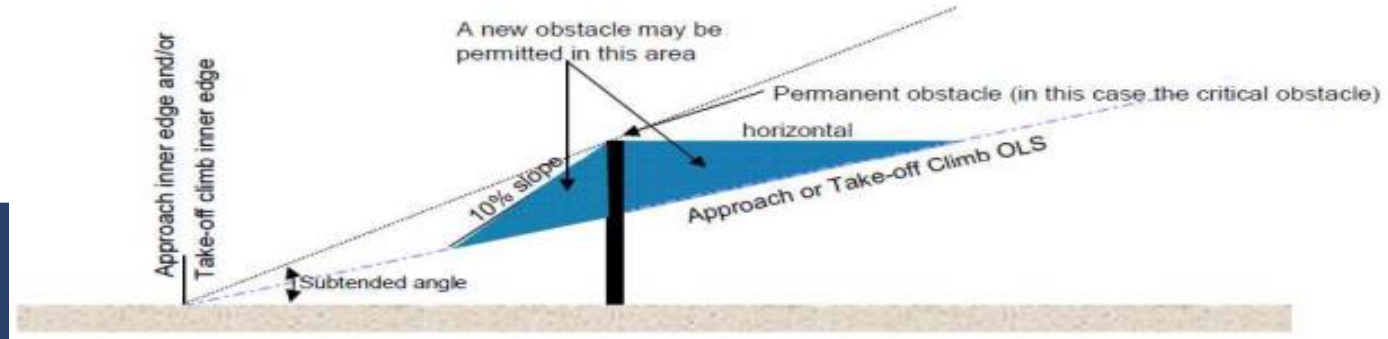


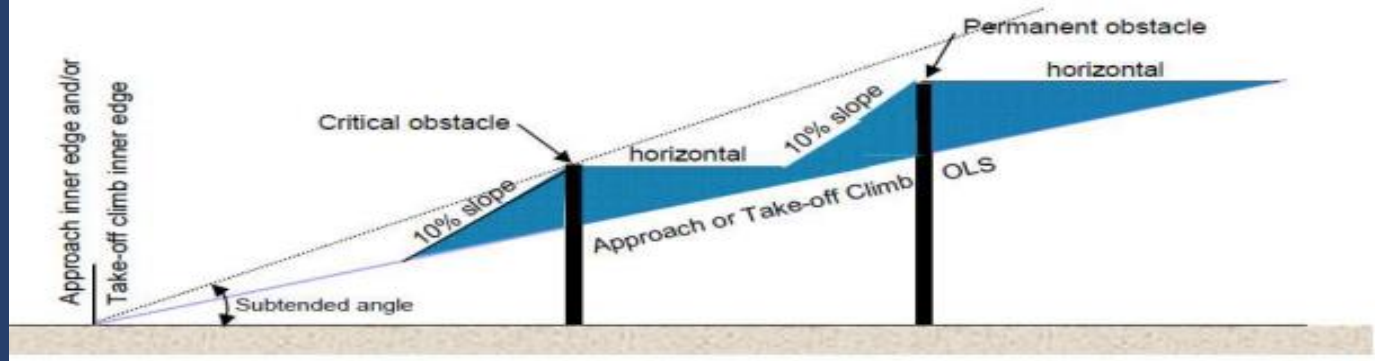
Regulations or Procedures

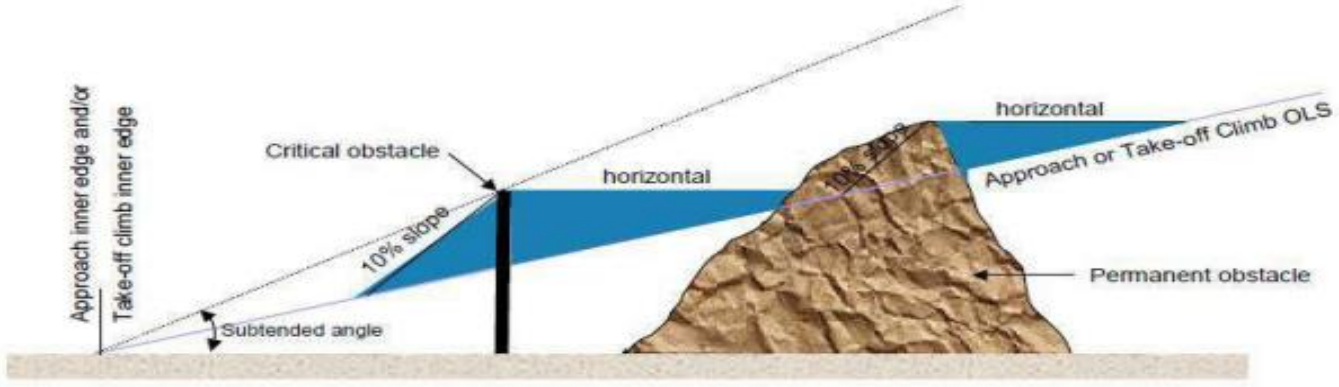
- Reporting
- Promulgation of obstacles/objects
- Aeronautical Studies
- Re-declaring runway distances

SHIELDING

- An existing obstacle within the approach and take-off climb area is called the critical obstacle. Where a number of obstacles exist closely together, the critical obstacle is the one which subtends the greatest vertical angle measured from the appropriate inner edge.







SHIELDING

A new obstacle may be assessed as not imposing additional restrictions if:

- when located between the inner edge end and the critical obstacle, the new obstacle is below a plane sloping downwards at 10% from the top of the critical obstacle toward the inner edge;
- when located beyond the critical obstacle from the inner edge end, the new obstacle is not higher than the height of the permanent obstacle;
- where there is more than one critical obstacle within the approach and take-off climb area, and the new obstacle is located between two critical obstacles, the height of the new obstacle is not above a plane sloping downwards at 10% from the top of the next critical obstacle.

AERONAUTICAL STUDY

“Is a study of an aeronautical problem to identify possible solutions and select a solution that is acceptable without degrading safety”

Aeronautical study is conducted to assess the impact of deviations from the aerodrome standards as prescribed in the NAMCARs in order to:

- present alternative means of ensuring the safety of aircraft operations,
- to estimate the effectiveness of each alternative and
- to recommend procedures to compensate for the deviation

Safety Risk		Severity				
Probability		Catastrophic A	Hazardous B	Major C	Minor D	Negligible E
Frequent	5	5A	5B	5C	5D	5E
Occasional	4	4A	4B	4C	4D	4E
Remote	3	3A	3B	3C	3D	3E
Improbable	2	2A	2B	2C	2D	2E
Extremely improbable	1	1A	1B	1C	1D	1E

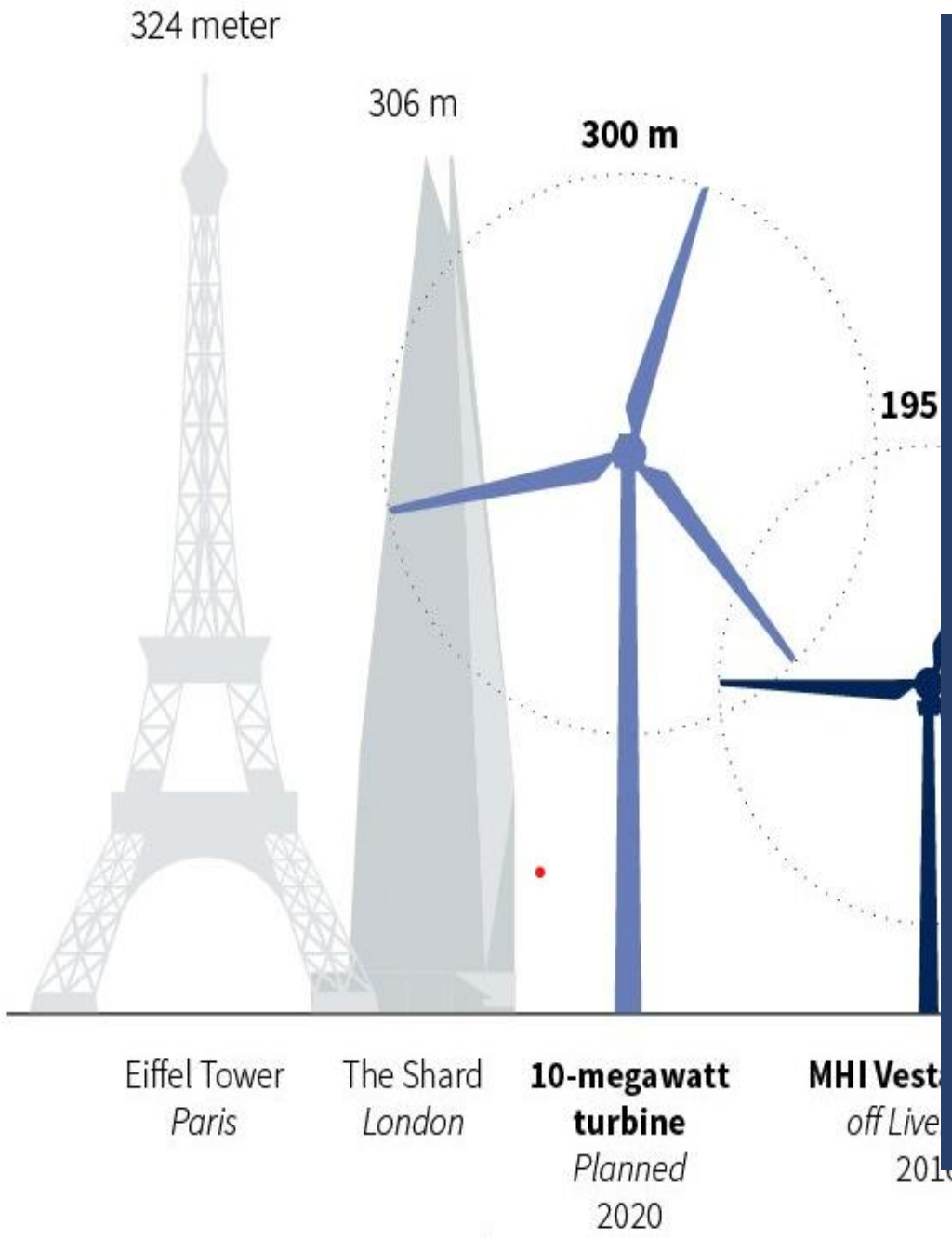
The only reasonable means of providing an equivalent level of safety is to adopt suitable procedures and to require, as a condition of certification or licensing, that cautionary advice be published in the appropriate AIM publications. The determination to require caution will be primarily dependent on two considerations:

- pilot’s need to be made aware of potentially hazardous conditions; and
- responsibility of the NCAA to publish deviations from standards.

Aviation & Solar Power

Elements to be assessed

- Obstacle limitations
- Reflection of ATC and airside drivers
- Environmental Impact Assessment (EIA)
- Interference with CNS equipment & meteorological equipment
- Electro-magnetic interference from DC-power sources
- Protection of critical aviation facilities
- Access routes for fire and rescue vehicles
- Impact assessment on Wildlife Strike Hazard Management
- Aeronautical studies & safety assessments



Aviation & Wind Turbines

Elements to be assessed

- Obstacle limitations
- Collision risk
- Wake turbulence effects
- Technical Impact on Radar Systems
- Technical Impact on Radio Navigation Systems
- Communication Systems
- Impacts on future airport development
- Aeronautical studies & safety assessments

RESPONSIBILITIES

Aerodrome Operator

- Establish the OLS
- Make arrangements with local authorities for consultation
- Implement obstacles control procedures and measure
- Monitoring and evaluation of obstacles within the OLS

Local Authorities

- Refer any request for erection of structure to the aerodrome operator/NCAA
- Issue the building permit after the approval of the NCAA

Civil Aviation Authority

- Approve the OLS established by the aerodrome operator
- Review OLS applications
- Oversee implementation of regulations and obstacles control procedures established by the operator

CONCLUSION

- Aerodrome operator must define, monitor, evaluate and publish the Obstacles Limitations Surfaces in 15 km the aerodrome boundaries
- Aerodrome operator should continuously engage the relevant parties to ensure that the established OLS process is robust and effective

- Infringement in OLS is not necessarily a project show-stopper, however understanding any potential infringements supported with an aeronautical study and stakeholder engagement is required to maximize a projects'' success and achieve an acceptable safety margin

- A successful obstacle control process requires the collaboration of varies stakeholders.
- Such collaboration should provide a safe environment for efficient and safe operation of aircraft near the aerodrome


Yes, we have ruined the Earth and
have done an exceptionally good job
of it. Yes, we should look at
sustainable development. But we
cannot afford to do things
sequentially, but parallelly and make
sure that we do not repeat our
mistakes.
Rakesh Sharma


The
Future
of Flying

THANK YOU !!

We look forward to working with you

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