Lighter-Than-Air Systems
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Lecture – 100
Introduction to High Altitude Airships

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Moving to the introduction as airship high altitude long endurance platform. High altitude is basically a relative term because generally airship as you know at the end of course that normally airships used to fly from one place to another place, but, this type of system is remained above for a particular duration of time and serves as a platform for various purposes that is why it is called high altitude long endurance platform.

And it is placed around 20-25 kilometers. It is not actually in comparison to the other systems. It is not a high because satellite orbit is around maybe maximum 35,000 kilometers and even at International Space Station is, what is the height of that orbit anybody knows? What is the height of International Space Station? So it is around 400 kilometers. And so any of you have seen that International Space Station at the sky? Anybody from ground with naked eye, no?

You can see because there is a link spot your station and where you will register your email id they will send. NASA will send to you whenever it will cross above your city. Like whenever you enter Mumbai, whenever it will cross over the Mumbai they will send some duration before as an allot. You can see with the direction and time and in which direction it will be visible.

And especially at night, you can see the moving light with very high speed. Anyway, so, these are the systems which can be used for various purposes, maybe for communications, maybe for surveillance and many other applications we will see in later stage.

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So high altitude long endurance platform. Long endurance basically is for because it can stay at that height for a couple of months, 6 months, may be for even a year. That is why it is called a high altitude long endurance platform. And it remains a standard still and serves the purpose as standstill platform. And it is very cost effective relative to the satellite because designing and launching and sending at that height is very cost effective relative to the satellite.

Because in satellite you know how much risk is there and how much cost involved. So it does not create a disturbance to the commercial aviations because you know, at what height maximum commercial aviation takes place? Maximum, yeah max 7-8 kilometers. Whenever you fly, you will take a flight they announce you are 35,000 feet. So it does not create any disturbance. It is above that commercial flight. And the defense or fighter jet can go over that that it is a different thing.

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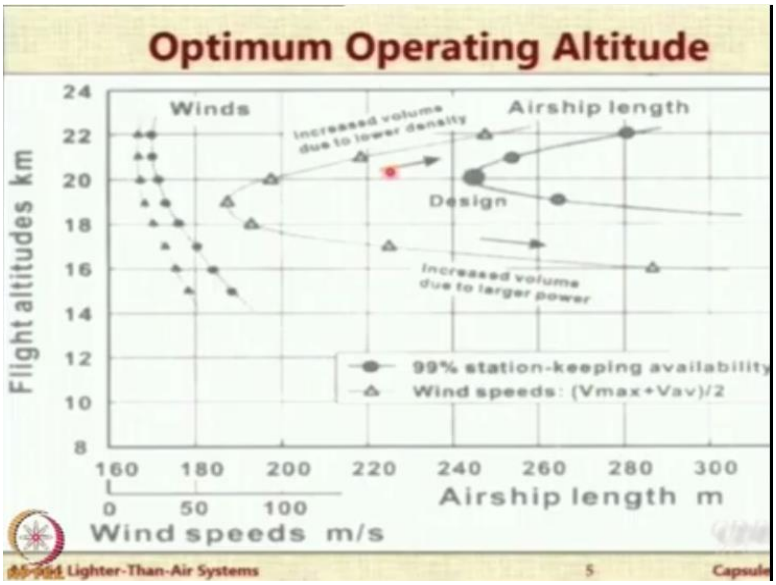

So, why question arises why it is placed only at 20 or 25 kilometers that is why it is answered here. So, the wind speed at that height is relatively lower. Below that due to the higher wind speed, so at high wind speed to overcome that drag because this system used to have very big and to overcome that drag you will need bulky power systems to overcome that drag. Otherwise, it will shift to another location.

So you can see the increased volume due to the larger power. So to produce that large power to overcome that large drag, you will need a large volume. Why large volume? Can anybody say? So, this system used to be driven by the solar power. So, for large voulme area because you need a large big solar energy. To place such large solar area, solar cells you will need a large space so that the system's size will increase.

And if you go above that, then again size will increase because that density of air will go down further. So, you can see here increased volume due to lower density and buoyancy because you have to take care of payload as well. To carry that payload, it will lead to displace a larger volume of light density of that air. So, you will need bigger size of airship for the same payload at higher altitude. Are you getting my point? So, that is why 20, 25 or 22 kilometers is optimum.

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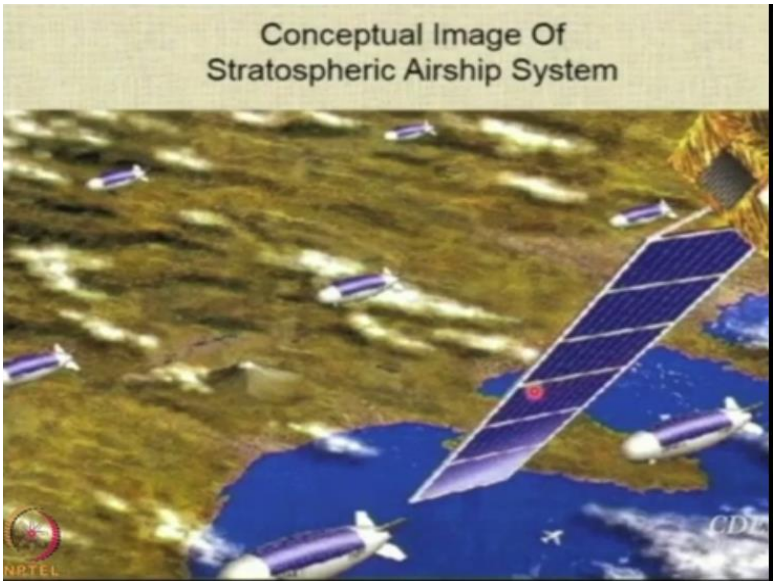

So, this is a conceptual image to demonstrate it had to serve different purposes.

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And when you see in India, there is a concept of placing around 20 airships to cover the entire nation. So, that it can serve the purpose of communication as well as surveillance because particularly in India it is very problamatic problem to get a seamless connectivity and you know India is at the bottom in Asian continent while we consider the speed of internet and it does not fall under the 100 when you consider the entire world.

India is beyond that because low speed. And even you move from one location to another location, it will not get a seamless connectivity and nowadays even remote locations, there is no feasible 3G connection or a smooth 3G connection. The world is now talking about 5G and we are struggling to get a 3G connections that is our problem in remote location especially.

And big cities it is a problem of radiation and towers used to place for better connectivity that is another problem, infrastructure. So it can serve a very good platform to cover the nation for communication systems especially.

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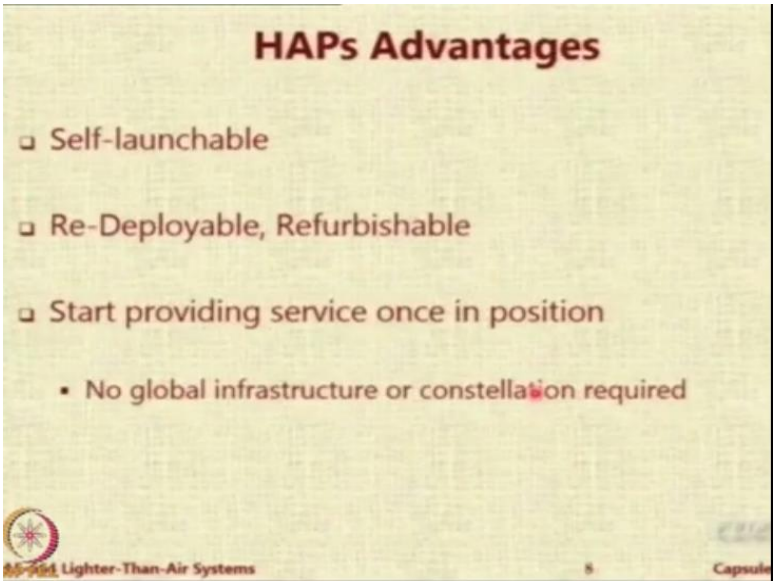

So what are the advantages over the satellite system? It is self-launchable, you do not need a launcher. So you do not need a rocket. You can bring it down and then after refurbishing you send it to back which you cannot do in a satellite. And that is a big problem actually because after expiry satellite used to be there and create debris and space debris is a big problem nowadays. So as you place it in a position, it starts serving. And no global infrastructure or constellation required, so the other benefits over the satellite.

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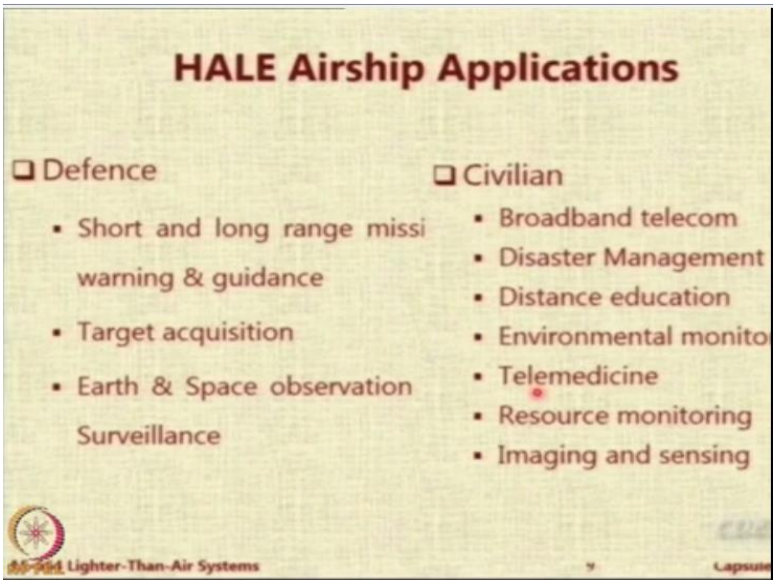

And what are the various applications we can see. When you talk about defence, you can use under surveillance or guidance, warning to observe border areas. And for civilian maybe communication is a big benefit from these systems. So we will see a small video which will demonstrate the application of these systems, it will be clear. Let us see the video. **(Video Starts: 09:23)** It is a video of a Stratobus, a conceptual video **(Video Ends: 12:06).**