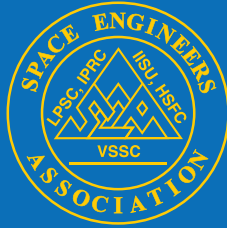


# SEA NEWS



## The News Letter of the Space Engineers Association

Volume - 50, Number - 1

MARCH 2024

### *Foreword from President*

I'm humbled and honoured to embrace the responsibility of President of our esteemed Space Engineers Association along with the newly elected EC members. At the outset SEA places on record the excellent contributions by team ISRO, towards the stupendous success of PSLV-C58 launch on the New Year, Aditya -L1 entry to Lagrange point and GSLV-F14/ INSAT 3DS missions.

As we embark on a new chapter in the Space Engineers Association, I wish to express my heartfelt gratitude to the outgoing Executive Committee members for their dedication and remarkable contributions to various activities of SEA. I also wish to place on record, the vision and leadership of all our former EC members and for the strong foundation they have laid down for our association since its inception in 1974.

This year, Space Engineers Association is celebrating its Golden jubilee. A one day technical seminar is planned to commemorate this along with the release of a souvenir. We assure to dedicate ourselves to continue and propel all activities related to SEA with full rigour namely all concerns related to Engineers, periodic technical talks, SEA news letter, family outing and Aarohan.

We welcome suggestions (if any) towards enhancing the activities of SEA. With each activity or event and initiative, let's harness the collective expertise and passion within SEA. I humbly and sincerely request your whole hearted support towards making our association stand as a beacon of inspiration and achievement.

*Jayanthi.V*  
President, SEA



**SEA Wishes all Scientists & Engineers for Successful RLV LEX 02 Launch**

## SEA OFFICE BEARERS 2024-25

| NAME (Shri/Smt)                                 | Area         | Contact No.    |
|---|--------------|----------------|
| <b>President</b>                                |              |                |
| Jayanthi V                                      | VRC          | 5556           |
| <b>Vice Presidents</b>                          |              |                |
| Dr. Mohan Kumar L                               | CMSE         | 3822           |
| Sri. N. Venkatesh                               | LPSC         | 7830           |
| Dr. Lakshmi V M                                 | TERLS        | 2897           |
| <b>General Secretary</b>                        |              |                |
| Nallaperumal AM                                 | APD/PCM      | 3667           |
| <b>Treasurer</b>                                |              |                |
| Vibhu Unnikrishnan                              | VRC          | 4256           |
| <b>Jt. Secretaries</b>                          |              |                |
| Guruvayoorappan SBM                             | VRC          | 5163           |
| Vidya L   | 70 Acre      | 2013           |
| Arjun Raj M                                     | INSTEF       | 2866           |
| Somanathan S                                    | RPP          | 3742           |
| Shunmugavel A                                   | RFF          | 2690           |
| Santhosh Babu S                                 | TERLS        | 2605           |
| Premkrishnan MK                                 | IISU         | 9309/9335      |
| Senthilkumar E                                  | VKC          | 9282/9268      |
| Santhana Gopal V                                | VMC          | 7243           |
| Krishnakumar S                                  | LPSC         | 7371           |
| Dr. P. Ganesh                                   | IPRC         | 04637-37281804 |
| <b>EX-Officio</b>                               |              |                |
| Senthil Kumar A                                 | PCM          | 3813           |
| <b>Cultural Secretary</b>                       |              |                |
| Ashish Tomy                                     | PLSD/ ASMG   | 7441           |
| <b>Finance Cell (ENWELF, Finance, Accounts)</b> |              |                |
| Dr. Sasikumar P                                 | QDC/SR (VKC) | 9210           |
| Arjun Raj M                                     | ESD/PCM      | 2866           |
| <b>Technical Board Members</b>                  |              |                |
| Rajasekhar, Nallaperumal A.M., Ramaswamy K.     |              |                |

## Message from Gen. Secretary, SEA

Dear SEA members,

*Greetings from the newly elected EC team.*

We thank the last year team for the successful conduct of activities including Aarohan 2022.

Wishing the team hearty congratulations for the successful New year PSLV launch, Aditya L1 point entry and GSLV F14/ INSAT 3DS.

SEA is entering into Golden Jubilee year this year as it was founded in 1974.

We must be thankful and show gratitude to the seniors who founded SEA and the following team who had nurtured the association to greater heights.

SEA has been functioning as a techno cultural platform for the space engineering community and their families of different ISRO centres.

We are fortunate to have a *Women President*, Vice President and Joint Secretary during its Golden Jubilee Year.

As we look for more and more exciting launches ahead, EC team assures you that we will revive all SEA activities both technical and cultural to cultivate a friendly environment ahead.

It is also planned to have a Golden Jubilee year celebrations by conducting one day Techno Cultural Program.

SEA NEWS which used to be a regular communication platform between the members will be revived and planned to be released once in two months. We seek articles from members, their families and associate members.

We also seek cooperation of all the members by actively participating and guiding the new team.

Thank you,

**Nallaperumal A.M.**  
*General Secretary, SEA*

## *Message from Former General Secretary, SEA*

Dear Space Engineers Association (SEA) Members and Family,

I extend my warmest wishes for a Happy New Year 2024. It has been a privilege to serve as the General Secretary of SEA for two consecutive terms since January 2020. Allow me to provide a brief overview of the activities undertaken during the past four years.

### ▪ **Membership List Update:**

One of the primary challenges we faced was the absence of a clear membership list. The first task we undertook was to update and clean the member list. With the dedicated efforts of all Joint Secretaries and Area Representatives, we successfully achieved this within four months.

### ▪ **Bank Mandate for Subscription:**

Establishing a standing instruction for a monthly subscription of Rs. 50 required obtaining signatures from SEA members. The task of collecting bank mandates from all members at VSSC, LPSC, IPRC, HSFC, and ISRO HQ was completed within six months.

### ▪ **Inclusion of Women in the Executive Committee (EC) from 2020:**

As the female representation was lower, more female representation was ensured in EC and office bearers by amending the bye-law.

### ▪ **Establishment of Chapters at HSFC and ISRO HQ:**

Recognizing the significant number of SEA members at HSFC and ISRO HQ, we established a chapter in Bangalore.

### ▪ **Formation of the Technical Board:**

A new Technical Board was formed to organize talks through Webex / offline mode and publish SEA News.

▪ **SEA Communication channels:** To enhance communication, separate WhatsApp groups were created for Members and Associate Members. An email list for all SEA Members was also prepared to ensure maximum dissemination of information.

▪ **Aarohan (SEA Cultural Day):** Aarohan 2022 was held at the Kerala Arts and Crafts village, Kovalam, with over 1000 participants, speaks a lot of the cultural interest amongst our members.

I extend my heartfelt gratitude to each SEA Member and the Executive Committee for entrusting me with the opportunity to serve as General Secretary for two consecutive terms. Wishing all the best to the new EC with Smt. Jayanthi V (President) and Sri. AM. Nallaperumal (General Secretary)

Best regards,

**Senthil Kumar. A.**

*Former Gen. Secretary, SEA*





## *My journey in ISRO* (21.01.1987 - 31.01.2024)

**ATHULA DEVI. S**

*Outstanding Scientist (Retd.)*

*Former Deputy Director, AVN*

I deem it a great honour and privilege to have spent my entire career of thirty seven years in a very prestigious organization like the Indian Space Research Organization. I thank God for blessing me with such an opportunity and my parents and family for supporting me and making me capable of taking up the responsibilities and completing them.

It was on January 21, 1987 that I came to join VSSC. I was allotted my Division - the Test and Evaluation Division (TED) coming under the Systems Reliability Group. TED was responsible for Screening of the devices as well as Test and Evaluation of all the avionics subsystems that was used in the launch vehicles. I was given the assignment of Test and Evaluation of baseband packages used in the launch vehicles.

It was the time that we were getting ready for the first Developmental launch ASLV-D1. But the launch was a failure. Subsequent D2 launch also was a failure. With the second failure, the technical teams worked with renewed vigour to find out the real root cause of both the failures. After exhaustive reviews by expert teams, and corrections implemented, the ASLV-D3 was made ready. The launch of ASLV-D3 was a grand success. All were exhilarated with this success.

In parallel, with the lessons learned from ASLV, the development of PSLV was also proceeding. It had many new avionics systems. TED was very busy with the development of checkout stations, qualification and testing of the new systems. The first development flight PSLV-D1 was a failure due to a software bug. This failure prompted ISRO to give more attention to

software quality assurance in all its systems.

In addition to PSLV, later GSLV MKII and LVM3 were also developed and made operational. It called for development of new test systems and facilities for screening and testing. The three launch vehicles were able to meet our nation's requirements for remote sensing, communication and navigation satellites. Commercial missions for many foreign countries, including developed nations were carried out. Prestigious missions like Chandrayaan 1,2,3, Mars Orbiter Mission and Aditya - L1 mission were accomplished. Recent addition to our fleet, SSLV was also successfully flight tested. I was fortunate to be a part of all these missions, in different capacities.

For a short stint of two years from 2007-2009, I worked as System Manager in MSA. This gave me an exposure to the entire Centre's activities. As member secretary of the TDP committee, I also got exposed to the R&D efforts happening in all entities. It was a real learning phase for me. During this period, I was also able to be a part of the exchange programme between ISRO and JAXA, the Japanese Space Agency.

In 2009, I joined back in SR entity as Head of the Test and Evaluation Division in 2009. In addition to development of in-house facilities, initiative was taken to develop industry participation to carry out Screening of devices and Test and Evaluation of avionics systems. This called for development of facilities and training of personnel at the industries to meet space quality requirements, thereby ensuring increased participation of the industries in India's space ventures.



Later I became Group Director of the Avionics Quality Group in 2012. As Chairperson of various technical review committees I was able to contribute to all launch vehicle missions with respect to component quality management, failure analysis of systems, review and clearance of integrated subassemblies and integrated launch vehicles for the operational missions. During this period, the Government Owned Company Operated (GOCO) facility for T&E of all packages for the operational missions of PSLV was established.

In 2020, in the midst of COVID pandemic, I was promoted as Deputy Director of Management System Area (MSA) in the Centre. With the imposed lockdown due to COVID, virtual mode of operation was initiated in all areas. The responsibility of implementing this was solely on the Computer and Networking groups in MSA. In addition to this, review meetings, promotion and recruitment interviews, training programmes, conferences etc. were organized in online mode. Support was also provided for establishing the Virtual Launch Control Centre at VSSC. As Deputy Director, I was able to lead and guide my excellent team for all these operations. A number of Technology Development Programmes were also initiated in MSA during this period.

After one year in MSA I moved back as Deputy Director to my parent entity - the Systems Reliability (SR) entity in July 2021. SR was responsible for quality assurance through qualification and acceptance testing of all launch vehicle systems and giving clearance for flight. I was able to lead a very efficient and dedicated team and meet all my responsibilities with their able support.

One major achievement during my tenure in Systems Reliability was the development of the 'TIRANGA' payload on the PS4 Orbital Experimental Platform in commemoration of the 75<sup>th</sup> Independence Day celebrations. This was the first onboard system ever made by the Systems Reliability Entity. It was a system that was designed to hoist the Indian Flag 'Tiranga' in Space on the 75<sup>th</sup> Independence day with a command from ground. The idea was mooted by three young engineers in our entity. The proposal was approved by higher management and we were able to make the system ready, after all tests, as per the project stipulated schedules. On Independence day, the flag

was hoisted in space by a Telecommand given from ISTRAC. It was a really gratifying and unforgettable moment for all of us to see the hoisting happening in Space, with Earth in the background.

After completing one year in Systems Reliability, I moved over as Deputy Director to Avionics Entity. The new quad redundant systems for the prestigious Gaganyaan mission were in the final stages of design. I was able to lead the team in completing the development of all systems and initiating the Qualification process. New miniaturised designs with functional integration and improved functionalities and capabilities were proposed for Orbital Re-entry Vehicle. Configurable micro telemetry systems were designed and developed. All were very challenging works, which could be completed with the support from my very dedicated and brilliant team of engineers.

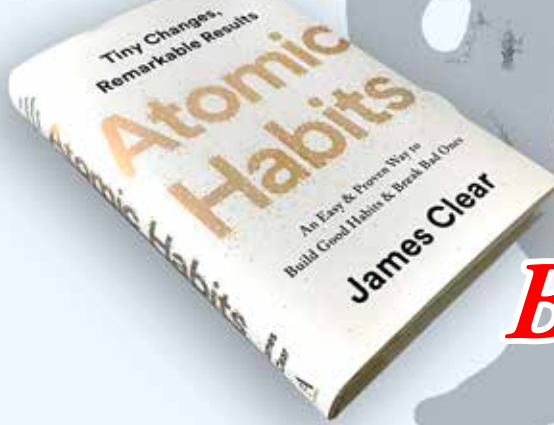
I was also involved actively in the implementation of the ISO 9001 based Quality Management System in the Centre from its inception. Being a certified Internal auditor and Lead auditor, I took part in audits and was instrumental in generating the Key Process Document for the Process based QMS.

During the course of my career, I have received four awards, namely the Lal C Verman award instituted by IETE for outstanding contributions in the field of Quality, IEEE Outstanding Woman Engineer award, Women's day award for contributions in ISRO and ISRO team excellence award.

I am happy that I have been able to work in three different entities in the Centre and have been able to contribute to the best of my ability in all domains that I have worked. Meeting Indian Prime Minister after the successful soft landing of Vikram Lander on lunar soil and witnessing the Republic day parade at New Delhi in 2024, as part of the ISRO women scientists' contingent were unforgettable events.

I thank all my bosses for the valuable support and encouragement they have given me throughout my career. I also thank all my colleagues for giving me full support in all my activities and help me succeed in them.

I once again thank God Almighty for giving me the opportunity to work in ISRO and wish all success to this great Organization in all its future endeavours.



# Book Review

by **Nallaperumal AM**  
Gen. Secretary, SEA

**Atomic Habits** by James Clear is a comprehensive, practical guide on how to change your habits and get 1% better every day. Using a framework called Laws of Behavior Change, Atomic Habits teaches a simple set of rules for creating good habits & breaking bad ones. The three lessons highlighted are,

## Lesson 1: Small habits make a big difference

- It is so easy to overestimate the importance of one defining moment and underestimate the value of making small improvements on a daily basis.

Meanwhile, **improving by 1 percent** isn't particularly notable - sometimes it isn't even noticeable - but it can be far more meaningful, especially in the long run.

The difference a tiny improvement can make over time is astounding.

It doesn't matter how successful or unsuccessful you are right now. What matters is whether your habits are putting you on the path toward success.

- Focus on getting 1 percent better every day.**

## Lesson 2: Forget about setting goals. Focus on your system instead.

Goals are about the results you want to achieve. **Systems** are about the processes that lead to those results.

- If you're having trouble changing your habits, the problem isn't you. The problem is your system. Bad habits repeat themselves again and again not because you don't want to change, but because you have the wrong system.
- You do not rise to the level of your goals. You fall to the level of your systems.

## Lesson 3: Build identity-based habits

- The key to building lasting habits is focusing on creating a new identity first. Your current behaviors are simply a reflection of your current identity.

To change your behavior for good, you need to start

believing new things about yourself. You need to build **identity-based habits**.

Changing your beliefs isn't nearly as hard as you might think. There are two steps.

- Prove it to yourself with small wins.
- Your identity emerges out of your habits. Every action is a vote for the type of person you wish to become.

## How to build better habits in 4 simple steps

- The process of building a habit can be divided into four simple steps: cue, craving, response, and reward.

The cue triggers a craving, which motivates a response, which provides a reward, which satisfies the craving and, ultimately, becomes associated with the cue. Together, these four steps form a neurological feedback loop - cue, craving, response, reward; cue, craving, response, reward - that ultimately allows you to create automatic habits. This cycle is known as **the habit loop**.

We can transform these four steps into a practical framework that we can use to design good habits and eliminate bad ones.

## How to create a good habit:

- The 1<sup>st</sup> law (Cue): Make it obvious.
- The 2<sup>nd</sup> law (Craving): Make it attractive.
- The 3<sup>rd</sup> law (Response): Make it easy.
- The 4<sup>th</sup> law (Reward): Make it satisfying.

## How to break a bad habit:

- Inversion of the 1<sup>st</sup> law (Cue): Make it invisible.
- Inversion of the 2<sup>nd</sup> law (Craving): Make it unattractive.
- Inversion of the 3<sup>rd</sup> law (Response): Make it difficult.
- Inversion of the 4<sup>th</sup> law (Reward): Make it unsatisfying.



## Felicitations Program & Technical Talk on "Leadership Challenges"

by Dr Rajasree M.S

Director of Technical Education, Govt. of Kerala

on 18<sup>th</sup> March 2024, Monday, 6:15 pm

@Hotel Nandanam Park, Nandavanam, Palayam, Trivandrum

SEA organized its first talk and felicitations program on 18<sup>th</sup> March, 2024 by Dr Rajasree MS, Director- in-charge of Directorate of Technical Education, Govt. of Kerala on "Leadership challenges" at Hotel Nandanam Park. The program is attended by 60 members. The program started with welcome by Shri Nallaperumal AM, GS, SEA and introduction of speaker by Smt. Jayanthi V, President, SEA

The speaker covered various aspects of leadership challenges, pillars of leadership and the methods and approaches to overcome the real time challenges. She covered the principles from ancient time leadership approach to current day trends.

10 senior members who retired in February and retiring in March, 24 was also felicitated during the program. The senior members shared their valuable contributions and tips for the current generation.

Shri Mohankumar, VP, SEA felicitated the senior members. Shri Arjun Raj extended vote of thanks for the program.

*SEA Wishes the retirees a happy and healthy retirement life ahead....*



## LIST OF NEW ENTRANTS

| SL.NO. | NAME                 | DIVISION/ENTITY           | CENTRE |
|--------|----------------------|---------------------------|--------|
| 1      | A.AJIKUMAR           | EPUSD/ESES                | LPSC   |
| 2      | ANIL JAISWAL         | EPUSD/ESES                | LPSC   |
| 3      | SYAMKUMAR            | NDTD/SRQA                 | LPSC   |
| 4      | N.NEETHI RAJAN       | CMD/ADMIN&AUXILLARY       | LPSC   |
| 5      | KESAVA VISHNU G      | ESSD/ESES                 | LPSC   |
| 6      | SUJITH V             | EEF/MME                   | LPSC   |
| 7      | SHREEJITH TV         | PPEG/MSA                  | LPSC   |
| 8      | SHAIK GHOUSE BASHA   | ESSD/ESES                 | LPSC   |
| 9      | ANOOP PK             | SPTD/ESES                 | LPSC   |
| 10     | AKASH PL             | APD/PCM                   | VSSC   |
| 11     | AMBILI K             | PFC/CPM                   | VSSC   |
| 12     | MANOJ TK             | QA-CSMSD/SR-CPES/SRQA     | LPSC   |
| 13     | DR. SUJITH S         | QA-CSFSD/SR-CPES/SRQA     | LPSC   |
| 14     | CHUNA RAM            | SR-SUVG/SR-ESES/SRQA      | LPSC   |
| 15     | SHABEEB ALI TK       | APDD/ABSG/CMSE            | VSSC   |
| 16     | VIVEK SG             | CMPD/CCQG/CMSE            | VSSC   |
| 17     | SHANKAR KUMAR        | APPD/ABSG/CMSE            | VSSC   |
| 18     | NITIN KUMAR JAIN     | QCD/QMPG/MVIT/TERLS       | MVIT   |
| 19     | SHASHI BHUSHAN SINGH | PED/PSCG/PCM/VRC          | VSSC   |
| 20     | SINDHU KP            | PED/PSCG/PCM/VRC          | VSSC   |
| 21     | MIDHUN C             | AMFF/CASG/ESAE/70 ACRE    | VSSC   |
| 22     | VIGNESH R            | CSD/CSMG/ADRD/70 ACRE     | VSSC   |
| 23     | ANJU J               | PED/PSCG/PCM/VRC          | VSSC   |
| 24     | VISHNU SURESH NAIR   | ESSD/ESSG/ESES/VMC        | LPSC   |
| 25     | ABU FAISAL           | SR-ESES/SRQA/VMC          | LPSC   |
| 26     | AZHAR K              | FCVD/CSVVG/CSC/VMC        | LPSC   |
| 27     | VASU SRIVASTAVA      | SR-ESBSD/SR-ESES/SRQA/VMC | LPSC   |

### SEA DIARY

New EC after taking over on Jan, 20<sup>th</sup>, 2024 got the new SEA diary printed in the month of February and were distributed to SEA members in the month of February. SEA extends appreciation to the diary team for the release of Diary with modification, newer inputs and unique cover design. If any of the SEA members has not received till now are requested to contact Jt. Secretary / Gen Secretary.

### SEA NEWS inputs

It is proposed to add interesting articles, lessons learned, experiences of senior members, achievements of children of our members, articles/poems and experience on tour etc in the upcoming editions. You are requested to mail your inputs/writeups to [space.eng.asc@gmail.com](mailto:space.eng.asc@gmail.com). You are also requested to share your feedback/suggestions to the above mail.



# City Beneath the Sea

**Dr. P. SASIKUMAR**  
**CSMD/CSMG/CMSE**

When you see the title, don't think that I'm going to tell you about some fairy tale city. Usually, when referring to each city, we mention how high it is above sea level. But I recently visited a place called Kuttanadu in Kerala. In this article, I will share the information I gathered on that trip.

Parts of three districts, namely Pathanamthitta, Alappuzha, and Kottayam, are included in Kuttanad. Thanjavur was once defined as the rice bowl of Tamil Nadu. But even today, Kuttanad can be called the rice bowl of Kerala. Water is available here to grow rice twice a year. Let's see how it goes.

You must have heard of a country called the Netherlands. It is named to mean that the country is below the sea. Twenty-six percent of the country's land area is below sea level. As sea water levels rise by a meter, 59 percent of the land area is likely to fall below sea level. Kuttanad is a similar piece of land. Most of this peninsula is below sea level. It would be more correct to say that Lake Vembanadu here is spread out and flows rather than it is in this region. The specialty of Kuttanad is that the agricultural land is lower than the water level of Lake Vembanad. When you say lake, don't think of a lake like Sembarambakkam

in Chennai. It is a giant island lake with a length of 96.5 km and a maximum width of 14 km. This is also the largest lake in India. Six major rivers and more than 10 tributaries join the lake and lead to its water source.

Covering an area of 2000 square kilometers, 10 percent of the lake is below sea level, and 20 percent of the lake is one meter above sea level. Two hundred years ago, it was a much larger lake than it is today. When dams were built to shore up, much of the lake was converted to farmland. This work was started in 1865 during the reign of the Maharaja of Travancore. Then, because there is no motor to pump the water in the lake, the wheels are driven. Water has been pumped by humans. The embankments are made of the soil that was pumped in. Over a period of 33 years till 1888, 600 acres of the lake were converted into agricultural land.

After that, a case was filed in Madras High Court in 1898 that the lake should not be converted into agricultural land. The case lasted for 15 years. In that case, they assured that they are going to convert only a small portion of the lake into agricultural land to meet the demand for rice. Accordingly, 12,000 acres of land were converted back into agricultural land from 1913 to 1920 with permission from the court. One estimate says that 18,000 acres of the lake's land are agricultural land as of today.

The major rivers that flow into this lake are Achankovil, Manimalai, Meenachil River, Muvattupuzha River, Pampa, and Periyar. People travel in Luxury boats on this lake mistakenly think it is saltwater that came in from the sea. It is wrong; it is freshwater because water from rivers mixes with it. So it helps in farming. Rivers form in the mountains and fill lakes, ponds, and eventually flow into the ocean. Each river has its inflow depending on the



## SEA NEWS

annual average rainfall. Take Kaveri, for example, 400 TMC of water per year flows through Kaveri. That is enough water to fill Mettur Dam four times. One TMC means 2400 crore liters. Remember here that one TMC of water can fill Madurai Theppakulam 10 times.

As such, the Pampai river has the most water among the rivers that merge into Lake Vembanadu. One hundred ten TMC of water flows in this river every year. The amount of water available to this lake from all the rivers is more than 200 TMC every year. It is noteworthy that this water is 30 percent of the water produced by all the rivers in Kerala. The river water mixes with the lake and then flows towards the sea. When the water in the lake recedes, there is a chance that seawater will enter the lake. Therefore, a barrage was built in 1974 at the place called Thanneer Mukkam to stop the saltwater from entering the lake. Beyond the barrage is salty seawater. This can be seen while boating in Alappuzha.

The depth of this lake varies in many places, but the maximum depth is 40 feet. The volume of water stored in this lake up to the ThanneerMukkam dam is approximately 30 TMC. That is equivalent to the capacity of the Bhavanisagar Dam at Sathyamangalam and two times capacity of Thenmala Dam.



When there is more water in the lake during the rainy season, the water is released to the sea through Thanneer Mukkam. At the same time, it is used to prevent seawater from mixing with the lake and turning it into saltwater when the lake water recedes in summer. Instead of sluices that normally open when the dam fills, there are spillway to let excess

water out automatically when the dam is full. As the surplus water is released through the 16 eye spillway at Mettur.

Similarly, when there is too much water in the river Pamba, there are spillways to take the excess water out to the sea at a place called Thotapalli. The total area of Kuttanad is 500 square kilometers. Some of its land is two feet to eight feet below mean sea level. Around 18 lakh people live in Alappuzha and Kuttanadu regions, and this region fulfills more than 30 percent of Kerala's total rice demand. Overall, 50 percent of the land in Kuttanadu is below sea level.

As agricultural land is lower than the lake water, enough water will reach the fields if the sluices are opened. But during the rainy season, the paddy crops will be destroyed due to excessive standing water. So there is a need to pump that water back into the lake with an electric motor. In other states of India, an electric motor is used to bring water out of wells and borewells.

But in Kuttanad, electric motors are used to bring the excess water from the field back to the lake. There is a structure where the field is slightly elevated and the excess water drains down into a small drain so that the water does not stagnate in the fields. The canal stretches from the shore of the lake to the last piece of agricultural land. When the water is released into the lake near the bank of the lake, the water at other places starts to decrease.

There are electric motors like this everywhere. Farmers operate them in small groups. They decide who runs the electric motor for how many hours, and since there is always water, farming is not a problem. But planting and harvesting all have to be done at the same time.

So all the fields are cultivated at the same time because of the difficulty of bringing out the straws after harvest; they are often left in the field. They wait a few days for the hays to turn back into compost for the land. After that, they start sowing again for the next phase.

There are no roads in many places around the lake. Building roads is not an easy task. As it is a place where there is always water and the population is sparse, there are not even footpaths. Every house built here is connected only by boats. The first thing



children learn here is how to swim. Next, they learn how to use the small boat that every household has.

Just like how we travel by bike and car, here they use the small boat they have to go to their desired place. Just like our city has a city bus to go between cities, there are also ferries here. Up to 100 people can travel on that boat. For a ticket of 15 rupees, you can travel a distance of 25 km in about 2 hours by these boats, and there are stops in between. They travel, stopping at every stop to pick up and drop off people.

It was a strange experience for me, who had paid several hundred rupees to travel for a few minutes, to travel for hours on a few rupees. It was amazing how people used the ship as a mode of transportation. There are two people to drive the boat. There will be someone there to give tickets. There will be two people to stop at the right place and to tie ropes and make way for passengers to board and disembark. Just as there are two people to drive a bus, there are five people to drive a boat. This boat trip is a great way to get to know the lifestyle of these people.

Apart from this, you can check Alappuzha luxury cruises. They are 30 feet long and 20 feet wide. There are luxury yachts ranging from one bedroom to four bedrooms. It will be comfortable to stay there and spend the night. Night boats do not stop in the middle of the lake. A bank is set aside at some point and tied to a strong tree or a suitable place. Thus, they ensure a safe shelter from storms and wind. Also, the electricity required for the night ship is also obtained from the houses on the shore. At night, boating is prohibited because there is a method of catching fish by lighting a lamp and casting a net using a method called Chinese netting.

These boats charge between 5000 to 25,000 for a day stay and sightseeing and show you around from Thanneer Mukkam to Dam.

The ships have to obtain permission from the government before they are put into service. We can see that every ship has a registration number just like our vehicles have a registration number. These luxury yachts range in price from several lakhs of rupees to a few crores. More than a thousand ships are floating in Vembanadu Lake. One estimate puts the approximate value of the vessels moored in the lake at over 2000 crores.

There are two types of ship bottoms, iron and wooden. A ship made of iron is less expensive but has a shorter lifespan as it remains in water. The lifespan of ships ranges from 15 years to 45 years. Not all parts of the lake can be traveled by luxury cruise. It should be at least 5 to 7 feet deep. Small boats ply wherever canals connect villages.

A type of sticky algae known as barnacle clings to the submerged surface of the ship. Cleaning the barnacle requires the help of swimmers. The help of carpenters is also required to pave the boat. But the only problem here is that he has to do his work inside the water. The workers here say that there are only a few people and the cost is high.

A driving license is required for sailors operating this vessel. Like driving a two-wheeler, 18 years is the age limit for driving a boat. Stopping, turning, and driving the ship must be done and demonstrated.

Vessels ply across the lake not only for travel but also for various cargo uses. Cargo ships can be seen transporting earthmoving machines and building materials.

Generators are installed on board to generate the electricity needed to run the AC. Since the entire Vembanad lake is freshwater, the water itself is pumped and purified and used for use in ships. They are loaded from the ground when the ship is docked for cooking and drinking. As there is a rule not to pollute the lake, it is forbidden to directly mix sewage from ships into the lake.

The next time you visit Alappuzha, take a look at the science hidden in Lake Vembanadu.



# Superannuation

OCTOBER 2023



**GIRIJA J**  
VS21819  
RFSG - SCI/ENG.-H  
Joined on: 26-11-1986

NOVEMBER 2023



**JESWIN VETHA  
JEYASINGH J**  
VS22536  
IFF - SCI/ENG.-H  
Joined on: 28-10-1986



**MATHEW  
SEBASTIAN**  
VS23717  
CCQG - SCI/ENG.-H  
Joined on: 09-01-1987



**MOHAN S**  
VS23787  
EFA - SCI/ENG.-G  
Joined on: 04-07-1991

DECEMBER 2023



**MURALI SANKAR AR**  
VS23780  
LSFG - SCI/ENG.-G  
Joined on: 05-10-1990



**SRIDHARAN P**  
VS27161  
RPP - SCI/ENG.-G  
Joined on: 10-08-1990

JANUARY 2024



**ATHULA DEVI S**  
VS20385  
AVN - SCI. O S  
Joined on: 21-01-1987



**RAMACHANARAN V**  
VS25630  
HESG - SCI.O S  
Joined on: 22-12-1988

FEBRUARY 2024



**GEOGI GEORGE**  
VS21855  
QDAS - SCI/ENG.-G  
Joined on: 04-05-1987



**KARTHIKEYAN B**  
VS25572  
NDTF - SCI/ENG.-SG  
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**RADHAKRISHNAN MB**  
VS26985  
SPRE - SCI/ENG.-G  
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**SATHEESH KUMAR N**  
VS26985  
SPRE - SCI.O S  
Joined on: 04-09-1986



**PRASHANTHAN ARAYIL**  
VS24680  
SDAG - SCI/ENG.-G  
Joined on: 31-07-1989



**RAJAN PUTHALATH**  
VS25730  
QDAC - SCI/ENG.-SG  
Joined on: 15-01-1987

**SEA**  
*Wishes happy and  
purposeful retired life.*

