



Information Brochure

Smart Portable Machinery (SPM)



National Agricultural Higher Education Project

CENTRE OF EXCELLANCE : DIGITAL FAMING SOLUTIONS FOR ENHANCING
PRODUCTIVITY BY ROBOTS, DRONES AND AGVS

Vasantrya Naik Marathwada Krishi Vidyapeeth Parbhani,
Maharashtra (INDIA)

<https://nahep.vnmkv.org.in> & <https://nahep.vnmkv.org.in/fpa/>

Smart Portable Machinery center (SPM) portfolio

Smart farming is the integration of existing farming practices with advanced technologies. Similarly, smart portable machines are the devices/ tools embedded with advanced computing / information technologies such as artificial intelligence (AI), machine learning or deep learning, all of which it uses to reason, problem solve, make decisions and even ultimately take actions. Most of the current and impending agricultural technologies fall into three categories that are expected to become the pillars of the smart farm i.e. autonomous robots, drones, sensors and the Internet of Things (IoT). Agricultural operations are exceptionally labour intensive with repetitive and standardized tasks which are an opportunities for automation and robotics. This new wave of smart equipment will make it possible to produce higher quality food with less manpower.

SPM Portfolio Human Resources :



Dr. G.U. Shinde
Principal Investigator



Prof. S.N. Pawar
Co- Principal Investigator



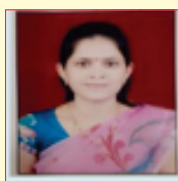
Er. Ravikumar Kollji
Research Associate



Er. Shivanand Shivpuje
Junior Research Fellow



Er. Apurva Deshmukh
Junior Engineer (JE)



Mrs. R.B. Dhage
Office Assistant



Mr. J.R. Mane
Field Assistant

Objectives of Smart Portable Machinery (SPM)

1. Development of advanced laboratories for Designing & developing Agri-Bots, Agri-Drones, Agri-AGVs and smart portable farm machinery.
2. Development the capacity amongst the faculties/scientist/PG-Ph.D. students/ rural entrepreneurs for the development and adoption of the mechatronics devices and precision agricultural machinery.
3. Development of different mobile applications, software programs, Decision support systems etc. on digital farming for effective dissemination of advanced farming technologies among different stake holders.
4. Integration of advanced engineering & technologies for research and development into existing farming practices to increasing the production efficiency.
5. Organization National/ International seminars, conferences/exhibitions/ stakeholder interface meetings for upscaling students and faculty research approach.

Elective courses under Agri-AGVs

1. Digital farming solutions for smart farming practices.
2. Introduction to AGV's
3. Advances in agricultural mechanization
4. Rapid prototype design & analysis of autonomous vehicles.

Activities Performed Under SPM

1. Autonomous and Robotic labours
2. Driverless tractors
3. Seeding and planting autonomous machinery/vehicles
4. Weeding and crop maintenance through AI
5. Reducing labour, increasing yield and efficiency of work

Brain Storming Workshop

Brainstorming workshops was organized for PG/Ph. D. Students, the purpose of organizing the workshop to brainstorming in seminars to encourage brainstorming session at agriculture departments where 5 faculty and 30 students has participated.

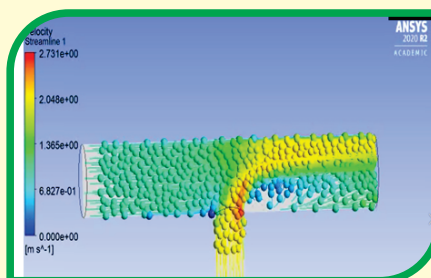
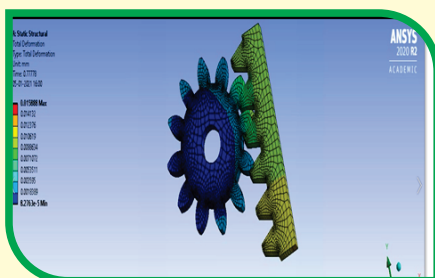
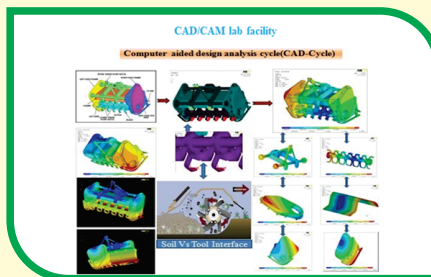


Facility available for PG/Ph.D. & Faculty at NAHEP Centre

- Agri- Bot Laboratory
- Agri- Drone Laboratory
- Agri- AGVs Laboratory
- CAD/CAM Laboratory
- Farm Machinery Workshop
- Pneumatic, Hydraulic and Mechatronics Laboratory
- NAHEP Book Library
- High Speed Internet Network
- Scissor Lift
- Image Sensing and Monitoring Camera
- Different types of Sensors
- 3D Printer
- 3D Scanner
- Solar Operator Spraying Robot

Establishment CAD/CAM/CAE advanced laboratories

We have well developed advanced CAD/CAM/CAE laboratory which is used for a holistic model can developed and analysis it in Ansys software and to make it ready for 3D printing. It saves the time. Because CAD/CAM technology will capture and display your model tools in a 3D image system on a computer screen which is then sent to the lab, it enables you to work faster and get the perfect design of the digital technology machine. It is also used for designing the agriculture small portable machinery, small tools and equipment for precision farming. CAD/CAM Lab have been installed as shown in figure below.



3D Scanner :

3D scanner lab has been installed at NAHE- DFSRDA, VNMKV centre and demonstration in front with our chief guest Hon. Vice Chancellor Dr. Ashok Dhawan VNMKV, Parbhani. 3D scanner is an innovative technology that helps businesses cut costs and develops new methods of production. Simplicity of use of 3D scanner is to scan the object and save it in our computer and almost unlimited customization possibilities has resulted in 3D printers becoming more and more popular as design tools. 3D scanner has been installed as shown in figure below.

Installation of 3D Scanner



3D Printer :

3D printer lab has been installed at NAHE- DFSRDA, VNMKV centre and demonstration in front with our chief guest Hon. Vice Chancellor Dr. Ashok Dhawan VNMKV, Parbhani. 3D printer is an innovative technology that helps businesses cut costs and develops new methods of production. It is also called as additive manufacturing. A 3D printer allows users to print an object as 3-Dimensional CAD (Computer Aided Design) images. 3D printer has been installed as shown in figure below.

Installation of 3D Printer



Farm Machinery workshop lab setup :

This workshop will develop for performing different, mechanical tasks like welding; drilling, cutting, manufacturing of different equipment's used in Agri-bots, Agridrones, and Agri AGV. It is useful for performing experimental research work and different agricultural field operational tasks and manufacturing of small tools, equipment whatever the design has developed in CAD/CAM software. In this workshop gas welding machine, rod cutting machine, different types of workshop accessories have been purchased and installed.

Farm Machinery workshop lab setup



Development of Automatic Spraying Vehicle under custom fabrication

Automatic Spraying Vehicle is a multipurpose small machine developed by NAHEP CAAST, VNMKV, and Parbhani. This machine can done spraying with 180 degree moving. It is operated by charged battery and solar photovoltaic power. It having sound buzzer so that crop can protect from wild animals and birds. It has vice and recording camera to store the data. It is automatic spraying the crop

Development of Automatic Spraying Vehicle under custom fabrication



Organization National/ International seminars, conferences, E- Training &workshop:

Sr. No.	National & International Events	No. of participants	Duration	Activity
1	One day E-Training on “Aerial grasping Application for Agriculture Researchers: An Overview by UAV”.	72	23/5/2020	
2	One week online training on “Present & Futuristic trends in Agriculture mechanization”.	424	18/06/2020 - 23/06/2020	
3	One day online-training program on “Power of Digital manufacturing for new product development- 3D printing”.	323	25/06/2020	
4	As a part of MoU joint activity done with IIT Khragpur organized a two week online short term course on “Application of Digital Technologies in Agriculture”	40	13/07/2020 - 24/07/2020	

Sr. No.	National & International Events	No. of participants	Duration	Activity
5	As a part of MoU Joint activity done with IIT Bombay organized Three weeks online short term course for students and faculties on “Application of digital technologies for smart agriculture”	45	10/8/2020 - 28/8/2020	
Hands on training after Pandemic				
1	Two weeks “Hands on Training on ANSYS 2020 R2” in collaboration with ARK Info Solution, Mumbai	60	10/08/2020 - 13/08/2020	
2	One-week hands on training on “GIS and Remote Sensing Applications in Agriculture” jointly organized by CAAST-DFSRDA, VNMKV, Parbhani and IIT, Powai, Bombay,	45	20/01/2021 - 25/01/2021	
National & International Seminar				
1	International Seminar (Online) on “Digital Technologies for smart agricultural: Futuristic plan”	70	10/08/2020 - 13/08/2020	
National Level Essay Competition				
1	National Level Essay Competition On “Adoption of Digital Technologies by Indian Farmers During and After COVID-19 Pandemic” On the occasion of National Farmer's Day 23rd December 2020.	45	23/12/2020	

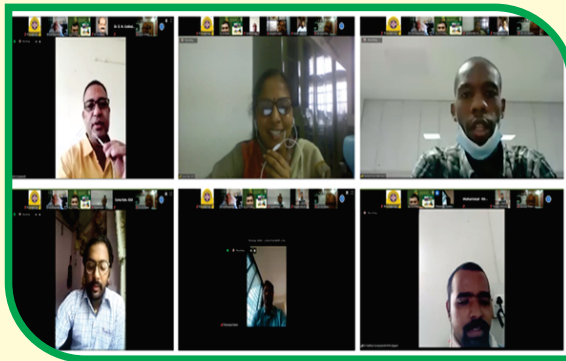
Inauguration Function of Essay computation



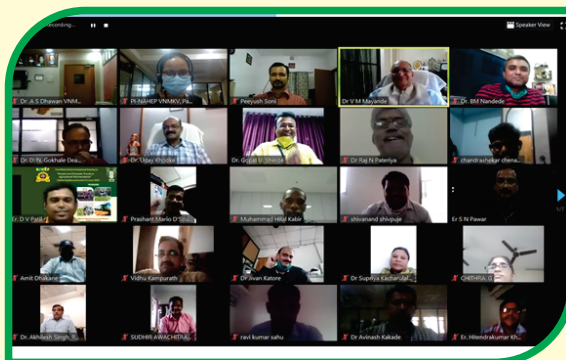
Inauguration Function of international training



Feedback from Participants of International Training



Valedictory Function international training



GIS Training for PG/Ph.D & Faculty



Demonstration of Robotic Robot at NAHEP- CAAST DFSRDA Centre



3D Printing Demonstration at Big Zero Technology, Pune





Contact

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