

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding (MOU) is made on 20 September, 2022 between:

- a) **Indian Institute of Information Technology Design and Manufacturing (IIITDM), Kurnool**, a technical education institute in the field of Information Technology established by MHRD, Government of India in 2015 having its registered office at Kurnool, Andhra Pradesh, India referred as **Project Management Unit for UAS Programme** (hereinafter called “PMU” which expression shall wherever the context so submits mean and include its successors and assigns) of the FIRST PART;
- AND**
- b) **Indian Institute of Technology (Indian School of Mines) Dhanbad** having its registered office at Police Lines. Sardar Patel Nagar, Hirapur, Dhanbad, Jharkhand 826004 referred as **Participating Institute, Academic** for UAS Project (hereinafter called as PI-Academic, which expression shall wherever the context so submits mean and include its successors and assigns) of the SECOND PART;

Indian Institute of Technology (Indian School of Mines) Dhanbad, PI Academic, and PMU is hereinafter individually referred to as “Party” and collectively referred to as “Parties” as the context may require.

WHEREAS “Capacity building for Human Resource Development in Unmanned Aircraft System (Drone and related Technology)” (hereinafter referred to as the Project), is an approved project under the HRD Division, MeitY, to be implemented jointly by the PMU and identified implementing agencies.

AND WHEREAS, the objectives of the Project are as follows:

The primary objective of the programme is to leverage collaborative activities in human resource development through capacity building in education and training in the area of Unmanned Aircraft System (UAS). The programme is conceived to achieve the following broad objectives:

- To enhance the capacity & capabilities of select institutions in identified Work Themes (WTs) on Unmanned Aircraft Systems.
- To institutionalize a collaborative ecosystem through identified Resource Centres (RCs) and Participating Institutions (PIs) for synergy of capabilities & expertise.
- To foster development of competent human resources at various levels including Post Graduate & Graduate programs, PG Diploma/Certificate programs, Faculty Updation and Master Trainers in niche areas of UAS
- To promote entrepreneurial mindset and nurture technical talent among the student community through innovative interventions such as Bootcamps and Proof-of Concepts (PoC)
- To nurture technical talent and ideation among the student community through IPR generation, Competitions, Workshops / Conferences, etc.

The Programme aims to achieve a multitude of objectives as outlined in the Annexure to the Administrative Approval dated 11.07.2022 (**Annexure-I**) which is an integral part of the MoU, including any future amendments to the Administrative Approval issued by MeitY.

Now, therefore, it is agreed among the Parties to reduce the agreements amongst the Parties into writing in the form of this MoU containing the following terms and conditions set forth in the **Articles 1 to 20** along with **Annexure I to IV** for a clear understanding:

1- DEFINITIONS

Unless otherwise stated, for the purpose of this MOU, the capitalized terms given hereunder shall have the following meanings:

- i. **PMU:** Project Management Unit
- ii. **Annexure:** Any annexure to this MOU as enumerated and cross-referred in these articles



- iii. **Articles:** Any Clause of this MOU or partial clause with separate marginal number as referred to anywhere in the workings of this MoU or its Annexures
- iv. **IITDM:** Indian Institute of Information Technology Design and Manufacturing
- v. **C-DAC:** Centre for Development of Advanced Computing
- vi. **NIELIT:** National Institute of Electronics & Information Technology
- vii. **GC:** Group Coordinator, MeitY
- viii. **GFR:** General Financial Rules, 2017 (as amended from time to time)
- ix. **GIA:** Grant-In-Aid
- x. **HRD Division:** Human Resource Development, Division, MeitY
- xi. **IPR:** Shall mean all rights, benefits, title or interest in or to any Intellectual Property (whether registered or not and include all applications for the same).
- xii. **RC:** Resource Centre
- xiii. **PI:** Participating Institute
- xiv. **MeitY:** Ministry of Electronics and Information Technology, Government of India having its office at Electronics Niketan, 6, CGO Complex, New Delhi – 110003
- xv. **MoU:** Memorandum of Understanding
- xvi. **Party/Parties:** Resource Centre or/and Participating Institutes or/and Project Management Unit (PMU)
- xvii. **PRSG:** Project Review and Steering Group
- xviii. **EAC:** Expert Advisory Committee
- xix. **WT-EG:** WT Specific Expert Groups
- xx. **ESS:** EAC Subcommittee in UAS/Drone Skilling
- xxi. **ESK:** EAC Subcommittee in UAS/Drone Knowledge Sharing
- xxii. **Implementing agencies:** The implementation of the programme would be carried out by IITDM Kurnool (PMU) through the following:
 - RC: Five (5) Resource Centres (RCs)
 - PI(Academic): Fifteen (15) Participating Institutes (Academic)
 - PI(CDAC/NIELIT): Ten (10) Participating Institutes (CDAC/NIELIT)
 - PMU would be supported by C-DAC Hyderabad.
- xxiii. **UAS:** Unmanned Aircraft System
- xxiv. **WT:** Work Theme
- xxv. **SSC:** Sector Skill Council
- xxvi. **ESSCI:** Electronics Sector Skills Council of India
- xxvii. **TSSC:** Telecom Sector Skill Council
- xxviii. **DFI:** Drone Federation of India
- xxix. **FICCI:** Federation of Indian Chambers of Commerce & Industry

2- SCOPE OF MEMORANDUM OF UNDERSTANDING

The Articles 1 to 20 and Annexure I to IV to this MOU form an integral part of MOU between the Parties. The terms herein referred in the MOU and Annexures shall be binding on the Parties. The MOU together with the Annexures indicates the responsibilities and obligations of the Parties to this MOU including terms and conditions, financial arrangement, intellectual property rights (IPR), monitoring mechanism etc. of the Project.

3- BROAD IMPLEMENTATION METHODOLOGY

- I- The proposed programme titled “Capacity building for Human Resource Development in Unmanned Aircraft System (Drone and related Technology)” is conceptualized to leverage and augment capacity and capability of academic and related institutions through a unique collaborative framework. The programme is being framed to further strengthen the identified institutes with a mission to create quality human resources which contributes skilled professionals and workforce to UAS industry.
- II- Capacity building for Human Resource Development in Unmanned Aircraft System (Drone and related Technology) aim is to design and implement a national-level programme over a period of 5 years to achieve
 - (a) Institutionalization of a collaborative ecosystem through identified Resource Centre (RC) and Participating Institution (PI)
 - (b) Enhance capacity & capabilities of select institutions in identified Work Themes (WTs)
 - (c)

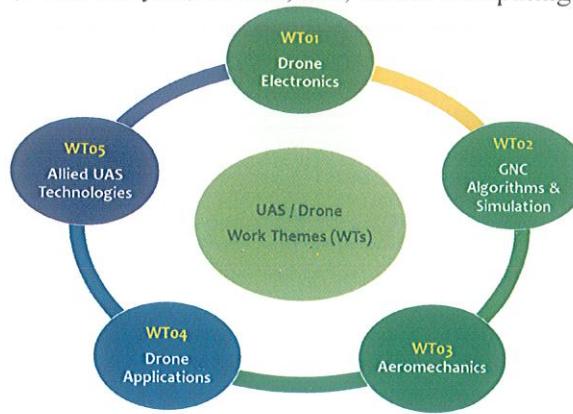


Foster development of competent human resources at various levels including Post Graduate & Graduate programs, Certificate programs, and Master Trainers in areas of UAS (d) Upgrade the knowledge and skills of Faculties (e) Promote entrepreneurial mindset through innovative interventions and (f) Nurture technical talent and ideation. The indicative list of Work Theme (WT) based activities involve (a) Specialized / New M. Tech in UAS (b) Minor Degree / Retrofitting of courses (c) conducting Master Trainer / Faculty Updation Programmes (d) Post Graduate Diploma programme in UAS/Drones (e) Ideation and Innovation through PoC and Bootcamps (f) IPR generation, Annual Competitions, Workshops / Conferences, etc.

III- The programme is envisaged to be implemented in an RC-PI model through 30 institutions in a hub-n-spoke mode for 5 Work-Themes (WTs)

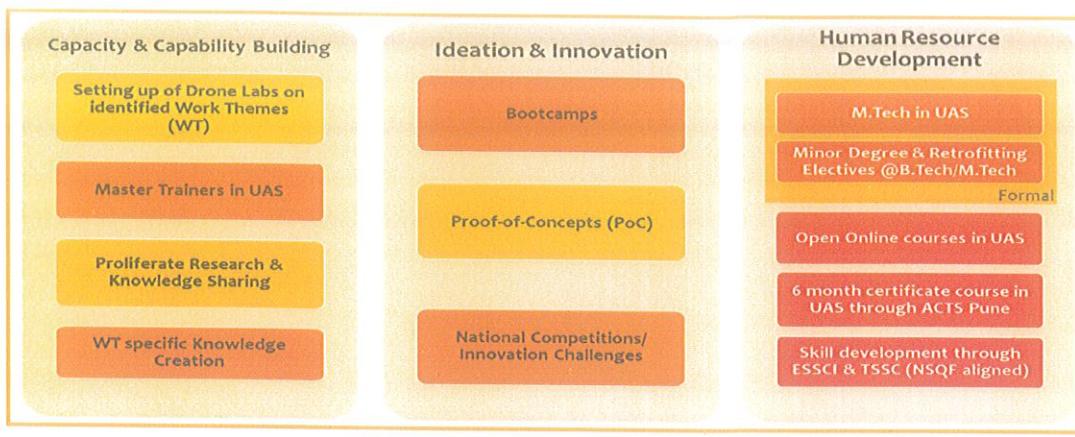
IV- Technology specific Work Themes (WTs): Toward creating a Drone based multidisciplinary ecosystem as envisaged in the above objectives, the core technical activities of the overall programme would be categorized into five Working Themes (WTs) for focused interdisciplinary collaboration across faculties and institutes to build a strategic network and competence for Human Resource Development. The identified five (5) Work Themes would facilitate a focused approach towards building and strengthening the capacity and capabilities in defined Activity Verticals of the UAS programme. The WTs identified and recommended by Expert Committee are as follows:

- a) Drone Electronics (Sensors, Onboard Computers, Comm. Technology etc.)
- b) GNC Algorithms & Simulation
- c) Aeromechanics
- d) Drone Applications (including domain-specific applications & security)
- e) Allied UAS Technologies (Data Analysis, AI/ML, IoT, Cloud Computing etc.)



V- Activity Verticals (AVs): The proposed programme would undertake the overall implementation of the activities / Outcomes under Activity Verticals (AVs), which complements the technology specific WTs. The three (3) Activity Verticals includes: (a) Capacity and Capability building, (b) Ideation and Innovation & (c) Human Resource Development. The activity verticals to be carried out by the Resource Centres (RCs) and Participating Institutes (PIs) are further subdivided into sub-activities for implementation by UAS network institutions. A broad schematic diagram of the proposed UAS framework which spans across the three (3) Activity Verticals and related sub-activities is given below.





a) Activity Vertical – 01: Capacity and Capability building

- **Establishment of WT based laboratories:** The programme defines five (5) Work-themes on UAS and related systems. This would create Laboratory facilities in UAS and related domains at RCs and PIs.
- **Faculty Development/Master Trainers creation in UAS:** This activity focusses on faculty empowerment in various defined Work themes so as to specialize them in UAS and related areas. The objective is to conduct Faculty development by each RC in order to create Master Trainers in PIs so that they may further disseminate the knowledge and learning gained by the program to other faculties/students in the concerned domain.
- **Knowledge Creation:** The activity heads encompass IPR creation RCs and PI. The envisaged activities consist of publishing of technical papers in reputed journals / conferences and patent filing.
- **Research & Knowledge sharing:** It is a cluster/theme (WT)-based activity which is required to be coordinated by each RC of the specific cluster through support of concerned Cluster PIs. The aim is to proliferate and spread knowledge in UAS and related technologies through National level workshops/seminars and International Conferences. The decision upon the theme and sessions shall be undertaken by the Expert Advisory Committee (EAC).

b) Activity Vertical – 02: Ideation and Innovation

- **Proof of concept (PoC):** POCs are envisage to act as a means to carryout ideation and innovation concerning UAS and related technologies It shall focus and promote the indigenous feasibility and viability of demonstrated models/ prototypes. The activity shall be encouraged to be take up jointly by RCs and PIs.
- **Bootcamps:** Under Ideation and Innovation vertical, it is envisaged to conduct Bootcamps where participants shall be trained through an intense training session to prepare candidates in Industry ready technological aspects in UAS and related areas. Bootcamps would be organized by Participating Institutes (PI) in the identified Work Themes on topics as recommended WT Expert Groups.
- **National Competition / Innovation Challenge:** The National Competitions/innovation challenges are to be organized to inculcate the creativity and confidence in solving real world problems and challenges. The Competitions/challenges shall define the problem statements as identified by the EAC/WT Expert Groups. The selected participants would be further mentored, guided and required resources would be allocated for prototyping.

c) Activity Vertical – 03: Human Resource Development in UAS

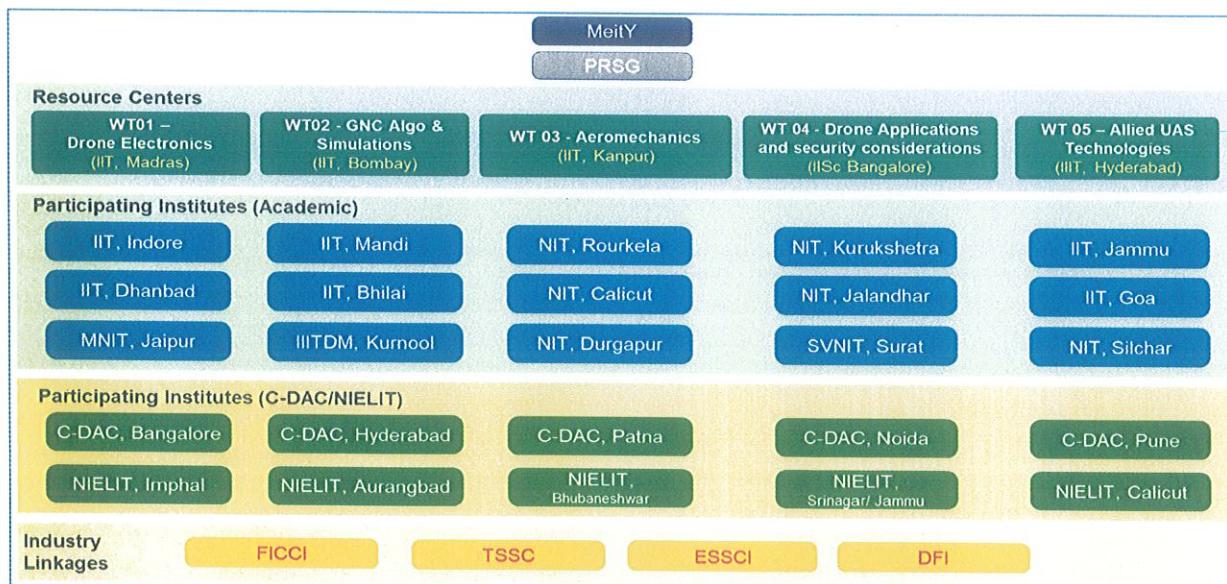
- **M.Tech in UAS:** The aim for the activity is to launch a new / specialized M.Tech in Unmanned Aerial System technology to develop future professionals for handling advanced design / developmental works, entrepreneurship etc.
- **Minor Degree/retrofitting Electives:** To promote the knowledge in UAS and related technologies among students during graduation, Minor Degree/retrofitting Electives would be introducing with an option to choose courses and laboratories in the discipline of UAS/Drones.



- **Open online courses in UAS:** As part of the activity open online courses on UAS and related technologies would be created by Resource Centres in respective Work Themes which would further supplement the minor degree/retro-fitting course activity.
- **PG Diploma in UAS:** EAC would develop model curriculum for this activity in UAS and related technologies. The course will be designed, developed, approved, managed and coordinated by ACTS, Pune and would be implemented through PI (CDAC/NEILIT) Centres twice in a year.
- **Course creation in new job roles:** New Job roles created by Sector Skill Councils in UAS and related areas are essential to be leveraged among graduates/Post Graduate students. Towards this, courses would be introduced on new Job Roles in a collaborative manner by CDAC/ NEILIT/ ESSCI/ TSSC.

VI- Institutional Framework:

- a. Capacity building for human resource development in UAS would be undertaken through a network of identified Resource Centres and Participating Institutions (PIs), which would include Academic Institutions such as, IIT, IISc, IIIT, NIT, IIITDM, and other training institutions such as C-DAC and NIELIT. The activities would also be leveraged through industry groups like DFI, ESSCI, FICCI and TSSC which are actively involved in leveraging UAS and related areas.
- b. Towards creating an institutional framework for the programme, a network of around 30 institutions in a hub-n-spoke mode for 5 Work-Themes (WTs), i.e., One (1) Resource Centre per WT supported by three (3) Academic Institutions and two (2) C-DAC/NIELIT Centres would be incorporated.
- c. The five (5) Resource Centres (RCs) would act as a mentor for the twenty-five (25) Participating Institutes (PI), which have been categorized into two (a) Academic Institutions: Fifteen (15) Institutes comprising of Engineering Colleges & (b) Institutions for non-formal programs: Ten (10) CDAC/NIELIT centres. These institutions would be grouped together as RC, PI (Academic) and PI (CDAC/NIELIT) under a hub and spoke mode as depicted in figure below.



VII- In addition, the Electronic Sector Skill Council of India (ESSCI), Telecom Sector Skill Council (TSSC), FICCI Committee on Drones and Drone Federation of India (DFI) would also actively involve and contribute towards the overall effort of skilled manpower generation. The WTs, RCs and PIs need to encourage and actively take up industry collaboration and linkages for various activities undertaken as part of the project which facilitate in exposure of students / beneficiaries to latest advancements in the field of UAS/Drones.

VIII- IIITDM Kurnool would act as the Programme Management Unit (PMU) with the support of C-DAC Hyderabad for the overall programme monitoring and implementation.

IX- Leveraging Ecosystem:

- a) The project aims to create a 3-layered institutionalized mechanism for sharing of knowledge and expertise to carry out human resource development activities in the area of UAS/Drone covering the



formal as well as non-formal segments. This ecosystem would facilitate the participating institutes to evolve a robust and sustainable structure for capacity building and training, even beyond the project period. Towards this, the project includes the establishment of laboratories in the identified Work Themes (WT) and creation of curriculum/course development during the initial phase of this program. However, the costs towards any civil infrastructural facilities (such as classrooms, libraries, labs, etc.) including recurring/ operational cost in terms of maintenance, electrical, internet data charges etc. would be met by implementing institutes, through their internal resources. In addition, the expert faculty members of the implementing institutes would guide the project team during the launch of various courses, besides mentoring students as per the defined curriculum of the program. Also, the implementing institutes would be carrying out all the administrative facilitation for the formal and non-formal courses, including admission, enrollment, examination, certification, etc.

b) Active contribution and involvement with industry by implementing institutes is essential for the following aspects:

- Conducting National level Competitions in Drones: The national level competitions would incorporate real world problems / challenges faced, along with prototyping aspects which are brought in by industries, DFI, etc. The members from industry would actively be steering the problem definitions, review committee and selection processes.
- Conducting Workshops and Seminars for Knowledge Sharing to participants and faculties in collaboration with RCs and FICCI/Sector Skills
- Collaborative bootcamps with PIs to bring in prototyping and design capabilities
- Representatives to participate in developing industry relevant curriculum, course materials and case studies for Formal and Non-Formal courses
- Participate in Work Theme based brainstorming sessions to identify the real-world problems for Proof-of-Concepts. Also, facilitating activity specific Industry academia collaboration along with providing access to proprietary equipment/software/environment on a case-to-case basis.
- Job offerings to the beneficiaries of the programme.

c) Partnership with Sector Skill Councils (TSSC, ESSC etc.), FICCI and Drone Federation of India (DFI) to be carried out by implementing institutes for the following:

- Prototype and introduce courses in new job roles through a collaborative mode between Sector Skill Council and CDAC/NIELIT. This would facilitate in fast-tracking the UAS/Drone based Job roles to be brought into a structured curriculum for students to pursue. Further, the SSCs would rope in more Ed-tech industries to take forward the developed Courses.
- Conduct National competitions/PoC/Seminars workshops in collaboration with industry bodies. Such active industry participation would bring in real world technology challenges to the project; which inturn would facilitate in enhancing the quality of Research, Prototyping, Training and entrepreneurship development as part of the programme.

d) The UAS/Drone programme would develop model curriculum for formal and non-formal courses with the active involvement of experts from varied fields. Such course materials in the identified Work themes (WTs) are to be developed keeping in view the multi-disciplinary nature of the technology domain. These model curricula need to be shared with AICTE and Institutes associated with MoCA (RGNAU and IGRUA) for further adoption to a larger ecosystem.

e) **Involvement of more Institutions, Centres, Mentors etc.:** The program aims to support the ecosystem for creation of competent human resources in Drone/ UAS and allied technologies. In this context, besides the institutionalized framework of 30 premier institutions connected in a hub-n-spoke mode, the activities envisaged in this project would need to involve additional spokes for further proliferation and outreach. Towards this, the activities envisaged include:

- Involvement of more institutions and centres for (a) Bootcamps and National Competitions to encourage active industry collaboration (b) Workshops/Seminars and International Conference in a collaborative mode involving other academic/research institutions and industries.
- The model curriculum for formal/non-formal courses would also be shared with other institutions for launching similar programs. Also, tie-up with technical universities would be explored for leveraging the retrofitting courses and minor degree programs.



- Faculty Development programs by RCs would also include master trainers across various academic institutions to create an indirect training ecosystem at institutions beyond the project implementing institutes.
- A list of mentors in UAS/Drones would also be prepared by WTs/RCs in association with industry and academic/research institutes for providing necessary support to students in formal/non-formal courses, IPR, POC, Competitions and related aspects. The WT specific Expert Group, EAC and PRSG would also incorporate provisions to include more experts, as and when required by the group for mentoring the implementation team in specific activities.
- A mid-term review of the programme in the second year would be carried out to evaluate the progress of activities across implementing institutes (RC/PI) and gather feedback for necessary course correction, if any. Basis the same, tie-ups and onboarding of more institutes / centres would be considered.

Details of the broad implementation methodology of the project are attached at **Annexure-II**.

4. ROLES AND RESPONSIBILITIES

4.1 IIITDM Kurnool as Project Management Unit (PMU): IIITDM Kurnool would act as PMU for the programme with the support of C-DAC Hyderabad. The PMU will Monitor, Support and ensure that all components envisaged as part of the initiative would be implemented as per the norms and guidelines. Considering the involvement of 30 RC/PI institutions and nature of programmes/activities being carried out as part of the programme, the envisaged PMU activities are as under:

- i. To professionally manage and provide support to the nodal department in MeitY with regard to the overall implementation, coordination and monitoring modalities, including activities related to coordination with all stakeholders.
- ii. To enter into MOU with the identified implementing agencies (Academic Institutes, C-DAC / NIELIT centres and other Stakeholders) of the UAS project.
- iii. To designate a Chief Investigator (as PMU Head) and a Co-Chief Investigator from the institute to promote interface across the Parties, provide the requisite logistic and co-ordination support in close liaison with MeitY, Resource Centres, Participating Institutions, and other stakeholders.
- iv. PMU act as an overarching mechanism for the overall project in Monitoring, Supporting and Ensuring that all Components and Activities of the Project are being administered as per the norms and guidelines of the Programme.
- v. To Co-ordinate the overall implementation of the project as per administrative approval, Programme Guidelines/SOP etc. in achieving the desired outcomes/deliverables
- vi. To provide monthly information pertaining to enrolments and completions/ certifications to various formal and non-formal courses as part of the project.
- vii. To provide secretariat facility to the nodal department of MeitY, including preparation of progress reports, periodic analysis reports, presentations, minutes etc.
- viii. To provide technical and/or administrative support and create necessary reports, minutes etc. to various expert committees involving PRSG, EAC, WT-EG, ESS, and ESK.
- ix. To devise necessary advocacy and awareness strategies which are effectively realized through respective implementing agencies of the project
- x. Timely distribution of GIA funds to the identified implementing agencies of the project based on the recommendation of PRSG and approval / sanction order by MeitY.
- xi. To collaborate with agencies or stakeholders in conducting joint activities involving seminars, workshops, conferences, competitions, discussion forums, etc.
- xii. The PMU would adopt suitable strategies from time to time in entrusting the necessary roles and responsibilities across the Resource Centres (RCs) and Participating Institutes (PIs).
- xiii. To take up any other issues and aspects related to the successful implementation of the project, as may be necessary.

4.2 Indian Institute of Technology (Indian School of Mines) Dhanbad, as Participating Institutes (Academic)



- i. Work Theme (WT) specific implementation of the proposed programme titled “Capacity building for Human Resource Development in Unmanned Aircraft System (Drone and related Technology)” to achieve the envisaged targets in a hub and spoke model under the guidance of RCs and WT Specific Committee / Expert Groups.
- ii. To ensure that all components and activities assigned to the institute is implemented as per the norms and guidelines of the project.
- iii. Establishment of WT based labs which would cater to the overall Training and Research ecosystem involving Formal (Minor Degree/Retrofitting Courses) and Non-Formal training (PG Diploma), Bootcamps, Master Training programs, POCs, Workshops, Knowledge Pool creation/dissemination related activities. The list of identified lab equipments in respective WT would be identified by Expert Committee / Groups.
- iv. Achieving the envisaged Outcomes/ Deliverables for PI as per project norms/guidelines: The brief qualitative and the quantitative outcomes envisaged under the project are as under:
 - Establish a collaborative Work Theme (WT) specific ecosystem in Unmanned Aircraft Systems and related technologies through identified Resource Centres (RCs), Participating Institutions (PIs) and other stakeholders
 - Enhance the capacity & capabilities of institution in Unmanned Aircraft Systems in assigned Work Theme (WT).
 - IPR generation and collaborative knowledge creation through papers/patents published in WT specific journals/conferences as per yearly targets.
 - Fostering ideation & innovation capabilities among students @ academia through conduction of bootcamps and innovation challenges as per targets assigned
 - Design and Develop Proof-of-Concepts (PoCs) under respective WTs in a collaborative manner with WT specific RC/PIs which nurture developmental mindset among student community. This would entail continuous mentorship & handholding support to participants and corresponding institutions.
 - Support in Design and Development of UAS model curriculum for Formal (Major/Minor Degree and Retrofitting Electives) and Non-Formal Courses in a timely manner as required by the Expert Committee.
 - Launch and Conduction of Minor Degree programs and retrofitting of electives in UAS /related areas to achieve the envisaged targets as part of the project.
 - Conduction of 5 WT based national workshops and 2 international conferences @ academia in collaboration with RCs/PIs in a timely manner to achieve the envisaged deliverables.
- v. Launch / initiation of activities and achievement of assigned targets/deliverables in a faster pace as per timelines placed at Appendix-B of Annexure-I.
- vi. To take up any other issues and aspects related to the successful implementation of the project, as may be necessary.

4.3 DELIVERABLES / TARGETS of Participating Institutes Academic (PI- Academic)

Year-wise quantitative outcomes/deliverables (in terms of participants) envisaged for various components by individual Participating Institutes (Academic) is given below:

a) Deliverables (In terms of number of beneficiaries) to be achieved by individual Participating Institutes - Academic (PI-Academic):

I	Particulars	Year I	Year II	Year III	Year IV	Year V	Total
A	Minor Degree / Retrofitting Electives in UAS/Drones (Academic)	0	50	50	50	50	200
B	2 Weeks bootcamp (Year-1: 4 nos and Year 2-5: 8 nos per annum)	120	240	240	240	240	1080
	Sub-Total	120	290	290	290	290	1280

b) Deliverables (In terms of minimum number of activities/items/programs etc.) to be achieved by individual PI-Academic:



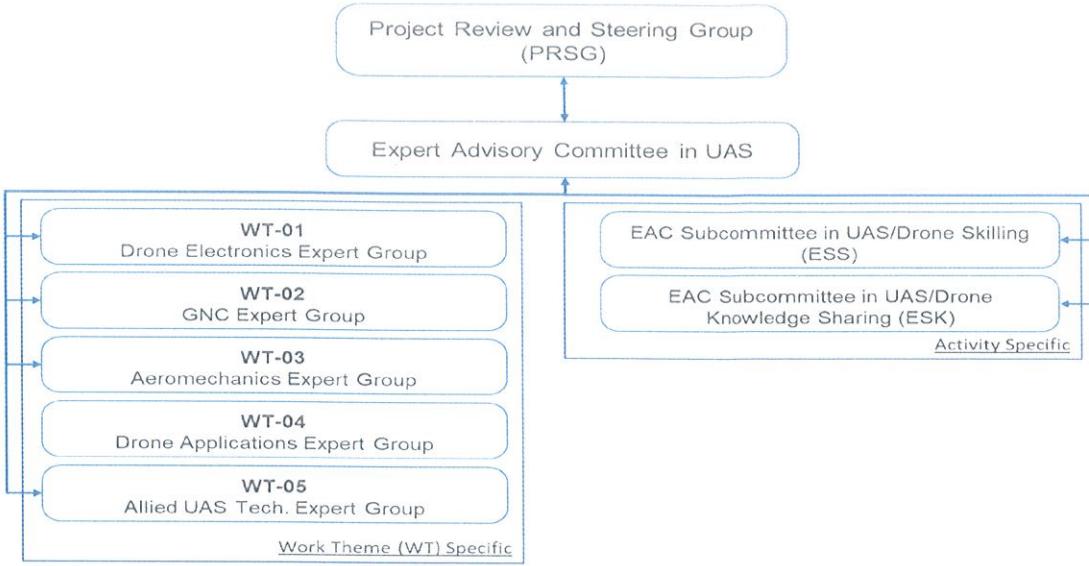
Sl. No.	Particulars	Year I	Year II	Year III	Year IV	Year V	Total	Remarks
A	Research-oriented paper publication in WT [†]	1	1	1	1	1	5	<ul style="list-style-type: none"> ➤ Reputed national/international Journals & Conferences as recommended by WT-EG. ➤ Estimate to have an involvement of four participants per paper
B	Patent filing [†]		1	1	1	1	4	<ul style="list-style-type: none"> ➤ Jointly / Individually with RCs/ PIs. WT-EG to decide annual targets. Estimate to have an involvement of 4 participants each
C	Proof-of-Concepts (PoC) [†]	1	1	1	1	1	5	<ul style="list-style-type: none"> ➤ Proposal to be submitted prior to EAC for concept approval. ➤ Estimate to have an involvement of 6 participants from institute
D	Bootcamps [†]	4	8	8	8	8	36	<ul style="list-style-type: none"> ➤ To be conducted in close collaboration with other institutes / industry. ➤ Duration of 2 weeks / 10 working days each ➤ Intake of 30 per batch
E	Support conduction of National Workshop/ Seminars in WT [†]	1	1	1	1	1	5	<ul style="list-style-type: none"> ➤ Support to be provided to RC for conduction ➤ Atleast 60 participants for each Workshop
F	Support conduction of International Conference [†]	0	0	1	0	1	2	<ul style="list-style-type: none"> ➤ EAC would identify specific Resource Centres (RCs) for coordinating and conducting each programme
G	Support conduction of National Competitions/ Innovation Challenges [†]	0	1	0	1	0	2	<ul style="list-style-type: none"> ➤ EAC would identify specific institute / organization for coordinating and conducting each programme

- PI-Academic to establish atleast one Work Themes (WT) specific Lab with identified equipments recommended by WT-EG / EAC
- In addition (a) the EAC would identify specific Resource Centres (RCs) for coordinating and conducting respective International Conference and National Competitions/ Innovation Challenges (b) Active Industry involvement to be there for each activity
- [†]Activity Linked target to be achieved. GIA allocation / reimbursement for activity-based funding would be released by the PMU (IITDM) on case-to-case basis as per guidelines / approval by the Expert Committee / Competent Authority.

5. MONITORING OF THE PROJECT

The overall UAS programme would be monitored & reviewed by a three-level approach involving PRSG, Expert Advisory Committee (EAC) and WT Specific Expert Group as per the following schematic:





The PRSG constituted under the chairmanship of GC (HRD), MeitY would monitor and review the technical and financial progress of the activities and steer the overall implementation. The MeitY constituted Expert Advisory Committee (EAC) would guide and monitor the overall implementation of the project across the participating institutes. EAC would evolve technical strategies, guidelines and recommendations as needed for the efficient implementation of the programme. The EAC would be supported by the following 2 (two) sub-committees to ensure that this project is closely monitored and the activities are implemented in a time-bound manner. These sub-committees are expected to provide bi-monthly reports to the EAC on the project implementation status:

- EAC Subcommittee in UAS/Drone Skilling (ESS) for guiding and monitoring activities involving National Competitions, Bootcamps, Certificate Courses and PoC.
- EAC Subcommittee in UAS/Drone Knowledge (ESK) Sharing for guiding and monitoring the Workshops, Seminars, IPR and Conferences.

In addition, for each work-theme, a Work-Theme specific Expert Group would be created by EAC with members from Academia, Industry, R&D institutions etc. to provide technology specific guidance and monitoring of implementation aspects.

6- FINANCIAL DETAILS OF THE PROGRAMME

6.1 Copy of the Administrative Approval dated 11.07.2022 is at **Annexure-I**.

6.2 Total outlay of the project is Rs. 8987.02 Lakhs (Rupees Eighty-nine crore eighty-seven Lakhs two thousand only). The head-wise budget summary is provided at Administrative Approval dated 11.07.2022. The indicative breakup of costs between Resource Centres and Participating Institutes along with details of manpower are placed at **Annexure-I and III**.

6.3 **Fund Flow to RCs, PIs and PMU:** Funds from MeitY shall be disbursed to IIITDM Kurnool. IIITDM Kurnool would then transfer the earmarked and allocated funds to respective Implementing Agencies. Details regarding fund flow is further elaborated in **Appendix-A of Annexure-I**.

6.4 The Year-wise break-up of Institution Allocated and Activity Linked Grants-in-Aid for the << Name of Institute>> is as provided in the table below:

a) **Year wise Break-Up of individual PI (Academic) Budget:**

(Rs.in Lakh)

Sr	Particulars	Year I	Year II	Year III	Year IV	Year V	Total
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I.A	Laboratory establishment in UAS at twenty-five PI						
1	Laboratory Establishment	20.00	0.00	0.00	10.00	0.00	30.00
	Sub-Total (I-A)	20.00	0.00	0.00	10.00	0.00	30.00
I.B	PI Manpower						
1	Activity & Lab Co-ordination - 1 Project Lead	9.00	9.90	10.89	11.98	13.18	54.95
2	SRF/JRF/RA/PA (2 per institute)	10.80	11.88	13.08	14.38	15.82	65.96
	Sub-Total (I-B)	19.80	21.78	23.97	26.36	29.00	120.91
	Total (Overall)	39.80	21.78	23.97	36.36	29.00	150.91

b) Year wise Break-Up of Activity Linked Pool Budget (Overall Allocation for RCs and PIs). Yearly activity/program distribution to individual RC/PI would be as per Deliverables/Target for RC/PI and/or based on recommendation by Expert Advisory Committee (EAC):

(Rs. in Lakh)

Sr	Particulars	Year I	Year II	Year III	Year IV	Year V	Total
II.A	Knowledge Creation (POC & IPR)						
1	POC Expenses - 40 Short Listed Ideas / year @ Rs. 2.5 lakh/annum/Ideas	100.00	100.00	100.00	100.00	100.00	500.00
2	Filing of Patents (10 Nos per Annum) @ Rs. 0.5 lakh per patent filed in India		5.00	5.00	5.00	5.00	20.00
3	Technical Papers (40 papers per Annum) @ Rs. 0.75 lakh/paper	30.00	30.00	30.00	30.00	30.00	150.00
	Sub-Total (II-A)	130.00	135.00	135.00	135.00	135.00	670.00
II.B	International Conferences						
1	International Conference (2 Overall)			25.00		25.00	50.00
	Sub-Total (II-B)	0.00	0.00	25.00	0.00	25.00	50.00
II.C	National competitions/ Innovation Challenges						
1	National competitions/ Innovation Challenges (2 Overall)		75.00		75.00		150.00
	Sub-Total (II-C)	0.00	75.00	0.00	75.00	0.00	150.00
II.D	Bootcamp by PI (Academic/CDAC/NIELIT)						
1	Courseware and Lab Consumables (25 Institutes @ 1.0L per Bootcamp)	100.00	200.00	200.00	200.00	200.00	900.00
	Sub-Total (II-D)	100.00	200.00	200.00	200.00	200.00	900.00

6.5 Broad guidelines for release of GIA

- The fund release for the 1st instalment would be made to Implementing Agencies subject to signing the MOU and submission/approval of action plans.



ii. All subsequent releases to be based on the recommendations of the Project Review & Steering Group (PRSG) to be constituted by MeitY. The fund release would be based on target achieved in terms of actual candidates trained or activities carried out and subject to receipt of Utilization Certificate for the previous instalment(s).

iii. GIA support for activity-based funding would be released by the PMU (IITDM) on case to case basis as per guidelines / approval by the Expert Committee / Competent Authority.

6.6 The Grants-in-Aid will be regulated in accordance with the provisions contained in Chapter 9 of the General Financial Rules, 2017, as amended from time to time, read with the Government of India's decisions incorporated there-under, and any other guidelines which may be issued in this regard. The standard terms & conditions governing Gants-in-Aid (**Annexure-IV**) is accepted by all concerned agencies. All financial transactions will be subject to the requirement of the Fiscal responsibility & Budget management Act.

7 APPOINTMENT OF CHIEF INVESTIGATOR & CO-CHIEF INVESTIGATOR

To ensure the successful implementation of the Programme, PMU, Resource Centres and Participating Institutes will appoint a Chief Investigator and a Co-Chief Investigator for the Programme. The Chief Investigator will have the overall responsibility of the implementation of the Programme. During the period the Chief Investigator is not available, the Co-Chief Investigator will perform the duties for the Chief Investigator. The Chief and Co-Chief Investigator of the Programme will not be changed as far as possible during the course of the Programme.

8 DURATION OF THE PROGRAMME

The Programme duration would be for a period of five years from the date of Administrative Approval. Detailed timeline is at Appendix-B of Administrative Approval placed at **Annexure-I**. Any need for its extension, if essential, will be reviewed by the PRSG for its further consideration and approval by MeitY. However, it would be the endeavor of all parties to this MoU to complete the project within the stipulated period. MeitY will not bear any expenditure towards recurring, upgradation or maintenance expenses after the completion of the project.

9 COMPLETION OF PROJECT

The programme shall be deemed to have been successfully completed when implementing agencies achieves the desired objectives of the programme as brought out in this MoU and Administrative Approval of MeitY. The implementing agency will submit a Completion Report within one month of the completion of the programme.

10 INTELLECTUAL PROPERTY RIGHTS (IPRs)

10.1 The implementing agency, and MeitY shall make all efforts to protect Intellectual Property generated out of the Project. They will first examine IPR protection issues in consultation with IPR Cell, MeitY to file patents, register copyrights, designs, trademarks etc., before making it public by publishing in the technical journals and books, presenting finding in conferences etc.

10.2 Intellectual Property and the rights associated with it shall be assigned jointly to MeitY and corresponding implementing agency. In cases where funding has been done jointly with other organizations, the IP Rights would be appropriately shared.

11 REPRESENTATION AND WARRANTIES

The parties hereby represent and warrant to each other:

- i. That it is duly established and existing under the laws of jurisdiction stated against its name herein above and has the power and authority to sign this MOU and implement the Programme agreed to herein.



- ii. That it has the requisite legal power and authority to enter into this MOU, perform and comply with its duties and obligations hereunder.
- iii. That this MOU constitutes legal, valid and binding obligations enforceable against it in accordance with the terms hereof;
- iv. That the execution, delivery and performance of this MOU have been duly authorized by all requisite actions and will not constitute a violation of (a) any statute, judgment order, decree or regulation of any court, Governmental Instrument or arbitral tribunal applicable or relating to itself, its assets or its functions or (b) any other documents or to the best of its knowledge any indenture, contract or agreement to which it is a party or by which it may be bound.
- v. That there are no actions, suits or proceedings pending or, to the best knowledge threatened against it before any Court, Governmental Instrument or arbitral tribunal that restrain it from performing its duties and obligations under this MOU; and that no representation or warranty made herein contains any untrue statement.
- vi. Parties shall respect and abide by laws of India in carrying out respective responsibilities/fulfilling obligations under this MOU. Parties shall not commit any act/omission which will be illegal/unlawful/unethical/immoral.

12 CONFIDENTIALITY

The implementing agency undertakes on its behalf and on behalf of their sub-contractors/ employees to maintain strict confidentiality of the Project including, but without limitation to, the R&D work and know-how generated and prevent, disclosure thereof, for any purpose, other than in accordance with this MOU. MeitY, in turn, will also ensure confidentiality as required for the Project. The provisions of this clause will outlive this MOU. Nothing contained herein shall prevent a Party from making mandatory disclosures as required under applicable laws provided that prior notice of such disclosures is given to the other Parties.

13 UTILIZATION OF TECHNOLOGY GENERATED UNDER THE PROJECT

The Implementing agency will have the rights to distribute the technology developed or other IPRs generated through the Project for use by others. However, this arrangement is subject to the terms and conditions of Grant-in-Aid prescribed by MeitY. The implementing agency will also inform MeitY about such an arrangement.

14 FORCE MAJEURE

Neither party shall be held responsible for non-fulfillment of their respective obligations under this MOU due to the exigency of one or more of the force majeure events such as, but not limited to, Acts of God, war, flood, earthquakes, strike, lockouts, epidemics, riots, civil commotion etc., provided on the occurrence and in cessation of any such event, the party affected thereby shall give a notice in writing to the other party immediately after but not later than one month of such occurrence and cessation. The period between the occurrence and cessation of such event will be excluded while calculating the period during which the party has to perform his obligations under this MOU. If the force majeure conditions continue beyond six months, the parties shall then mutually decide about the future course of action.

15 TERMINATION OF THE PROJECT

- 15.1 MeitY will have the right to terminate the MoU based on recommendation of the PRSG at any stage, if it is satisfied that:
 - a) The money released has not been properly utilized, or
 - b) Appropriate progress on the Project is not being made, or
 - c) The Project is not being carried out as per the terms and conditions and/or as per the nature and scope of work as defined in the administrative approval and approved proposal.
- 15.2 If implementing agency faces difficulties in implementing the Project for any techno-economic and reasons other than the above, based on the recommendations of the PRSG and as directed by MeitY, the implementing agency shall pay back all unspent MeitY grants released and Hardware



& Software supplied for the Project and interest accrued thereon and/or any amounts recoverable by way of disposal of assets procured out of MeitY funds.

- 15.3 If Implementing agency abandons the Project on its own without approval of MeitY, then MeitY will have the right to recover from implementing agency, as the case may be, the money disbursed and Hardware/Software procured for the Project, along with 12% simple interest.

16 SAVING PROVISIONS

The implementing agency agrees to disclose and provide MeitY or its authorized representative or agency, such disclosure, the know-how, the related process and the intellectual property rights to use and practice the same for the purpose of experimentation and/or further research or development thereof, with the right to manufacture, sell and vend the "Products" in such a manner as Government of India may, in its judgment decide, for "Government purposes", or otherwise in public interest.

MeitY may compensate implementing agency for such commercial exploitation of the know-how, process and related IPR. Decision of Secretary, MeitY in regard to such compensation shall be final.

17 VALIDITY

- 17.1 The Project commencement will be w.e.f from the date of the Administrative approval
17.2 The duration of this MOU will be for period of five years or till completion of the Project.
17.3 Any matter not covered specifically in the MoU may be settled by mutual agreement. On points of disagreement, the matter may be referred to Secretary, MeitY for decision, which shall be final and binding on all Parties.

18 MODIFICATIONS TO THE MEMORANDUM OF UNDERSTANDING

The MOU can be modified through mutual written consent of all the parties to this MOU.

19 SEAL OF PARTIES

In witness whereof the parties hereto have signed this MEMORANDUM OF UNDERSTANDING on the day, month and year mentioned hereinbefore.

DVLN Somayajulu
20/9/2022
[For and on behalf of the
PMU]
IIITDM Kurnool
Kurnool,
Andhra Pradesh, India
D V L N Somayajulu
Director
डि वि एल एन सोमायाजुलु
निदेशक
IIITDM Kurnool.

Signature: *[Signature]*
Name: Dr. J. KRISHNAIAH
Designation: ASSOCIATE PROFESSOR
Address: IIITDM KURNool

Sagar
Dean (Research & Development)
Indian Institute of Technology
(Indian School of Mines)
Dhanbad - 826004 (INDIA)
[For and on behalf of
PI]
Indian Institute of Technology (Indian School of
Mines) Dhanbad
Police Lines. Sardar Patel Nagar, Hirapur,
Dhanbad, Jharkhand 826004

IN THE PRESENCE OF WITNESSES

Signature: *[Signature]*
Name: Ravi Kumar Rangwala
Designation: Associate Dean (R&D: SRIC)
Address: IIITUSM Dhanbad

LIST OF ANNEXURES

- Annexure I** : Administrative Approval dated 11.07.2022
- Annexure II** : Broad Implementation Methodology
- Annexure III** : Manpower Estimate for RC/PI
- Annexure IV** : Terms & Conditions governing Grant-In-Aid



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No. L-14011/29/2021-HRD
 Government of India
 Ministry of Electronics and Information Technology
 6, CGO Complex, New Delhi: 110003

Dated: 11.07.2022

Administrative Approval

Subject: Capacity building for human resource development in Unmanned Aircraft System (Drone and related Technology)- reg

The undersigned is directed to convey the Administrative Approval for implementation of the project entitled “Capacity building for human resource development in Unmanned Aircraft System (Drone and related Technology)” with the total budget outlay of Rs. 89.87 Crore (Rupees Eighty Nine crore Eighty Seven Lakhs only) over a period of 05 years. The details of the Project are given in the Annexure enclosed.

2. The funds would be released under the project from Manpower Development Scheme of MeitY.

3. This issues in exercise of the powers conferred on this Ministry in consultation with the Integrated Finance Division, MeitY vide e-file no. 3082759 dated 04.05.2022 and the approval of Secretary vide e-file no. 3082759 dated 28.06.2022.

S
 (D.K. Sagar)
 Joint Director

Copy to:

1. The Principal Director of Audit, (Finance & Communications), Sham Nath Marg, Civil Lines, New Delhi - 110054
2. Pay & Accounts Officer, MeitY
3. Drawing & Disbursing Section, MeitY
4. Finance Section, MeitY
5. IIIDM, Kurnool, Jagannathagattu Hill, Kurnool, Andhra Pradesh 518007
6. C-DAC, Hyderabad
7. GC(HRD)/HoD(HRD)
8. Sanction Folder

S
 (D.K. Sagar)
 Joint Director



Annexure

- 1) Name of project Capacity building for human resource development in Unmanned Aircraft System (Drone and related Technology)
- 2) Objectives The primary objective of the programme is to leverage collaborative activities in human resource development through capacity building in education and training in the area of Unmanned Aircraft System (UAS). The programme is conceived to achieve the following broad objectives
- To enhance the capacity & capabilities of select institutions in identified Work Themes (WTs) on Unmanned Aircraft Systems
 - To institutionalize a collaborative ecosystem through identified Resource Centres (RCs) and Participating Institutions (PIs) for synergy of capabilities & expertise.
 - To foster development of competent human resources at various levels including Post Graduate & Graduate programs, PG Diploma Certificate programs, Faculty Updation and Master Trainers in niche areas of UAS
 - To promote entrepreneurial mindset and nurture technical talent among the student community through innovative interventions such as Bootcamps and Proof-of Concepts (PoC)
 - To nurture technical talent and ideation among the student community through IPR generation, Competitions, Workshops / Conferences, etc..
- 3) Outcome
- Establish a collaborative ecosystem in Unmanned Aircraft Systems and related technologies through identified Resource Centres (RCs) and Participating Institutions (PIs)
 - Establishing five (5) Work Themes (WTs) to enhance capacity & capabilities of select institutions in Unmanned Aircraft Systems
 - 50 Faculty Updation and Master Training in niche areas of UAS under five identified work Themes (WTs)
 - Supporting collaborative knowledge creation in Work Themes through support for 200 papers/patents in UAS and related technology areas.
 - Fostering ideation & innovation capabilities among students through 900 bootcamps and 2 innovation challenges to bring out technical talent and nurture entrepreneurial mind-set.
 - Nurturing developmental mindset among student community by way of supporting and shortlisting of 200 ideas leading to POCs in academics through a continuous mentorship & handholding support in line with the AatmaNirbhar Bharat initiative
 - UAS model curriculum for Formal Sector(Major/Minor Degree and Retrofitting Electives)



- M.Tech degree in UAS / related area by IIT Kanpur.
- 20 academic institutes shall offer Minor Degree Retrofitting of electives in UAS and related areas.
- 10 Open online courses for UG/PG students to complement the repository of courses at NPTEL/SWAYAM platform.
- 10 institutes to offer PG Diploma courses for non-formal training activities.
- Supporting conduction of 25 national workshops (5 per Work Theme) and 2 international conferences@ academia

4) Deliverables

Under the proposed programme, it is envisaged to create overall trained manpower of 42,560 Nos which includes 100 candidates undertaking M.Tech Degree in UAS Drones, 4000 candidates undertaking Minor Degree/Retrofitting courses in UAS Drones, 1000 Master Trainer FUP,32,400 students trained through non-formal short term and certificate course.

5) Name of Implementing Agency

The implementation of the programme carried out by IIITDM Kurnool (PMU) through the following:

- Five (5) Resource Centres (RCs)
- Fifteen (15) Participating Institutes (Academic)
- Ten (10) Participating Institutes (CDAC/NIELIT)
- PMU would be supported by C-DAC Hyderabad.

7) Project Duration

05 Years(Timeline attached at [Appendix-B](#))

8) Total Outlay

Rs. 89.87 Crore(Fund flow attached at [Appendix-A](#))

(Rs. in Lakh)

UAS / Drone Programme Budget Estimate							
S. no.	Particulars	Year I	Year II	Year III	Year IV	Year V	Total
I RC (5 Nos) - Institutions Allocated budget							
A	New M Tech in UAS by IIT Kanpur	249.19	62.94	63.29	63.68	40.66	479.76
B	Laboratory establishment in UAS at five RC	300.00	0.00	0.00	75.00	0.00	375.00
C	Open online course development in UAS	0.00	75.00	75.00	0.00	0.00	150.00
D	Master Trainer Faculty Updation	30.00	30.00	30.00	30.00	30.00	150.00
E	Workshops Seminars @ Academia	5.00	5.00	5.00	5.00	5.00	25.00
F	RC Manpower	99.00	108.90	119.85	131.80	145.00	604.55
Sub Total		683.19	281.84	293.14	305.48	220.66	1784.31
II PI (25 Nos) - Institutions Allocated budget							
A	Laboratory establishment in UAS at twenty five PI	650.00	0.00	0.00	300.00	0.00	950.00
B	6 month certificate program in Drones (CDAC/NIELIT)	85.00	125.00	125.00	135.00	125.00	595.00



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C	PI Manpower	495.00	544.50	599.25	659.00	725.00	3022.75
	Sub Total	1230.00	669.50	724.25	1094.00	850.00	4567.75
III Activity Linked Budget @ PMU (IITDM, Kurnool)							
A	Knowledge creation (POC & IPR)	130.00	135.00	135.00	135.00	135.00	670.00
B	International Conferences	0.00	0.00	25.00	0.00	25.00	50.00
C	National competitions Innovation Challenges	0.00	75.00	0.00	75.00	0.00	150.00
D	Launch new Course Job role	50.00	50.00	50.00	50.00	50.00	250.00
E	Boetcamp by PI (Academic CDAC NIELIT)	100.00	200.00	200.00	200.00	200.00	900.00
	Sub Total	280.00	460.00	410.00	460.00	410.00	2020.00
IV Institutional Mechanism/PMU (IITDM + C-DAC HYD)							
A	Capital Equipments	18.00	0.00	0.00	0.00	0.00	18.00
B	Manpower	84.84	93.35	102.68	112.96	124.28	518.11
C	Travel & Training	4.00	4.00	4.00	4.00	4.00	20.00
D	Consumables Office Expenses	4.00	4.00	4.00	4.00	4.00	20.00
E	Contingency	0.90	0.00	0.00	0.00	0.00	0.90
F	Overheads	4.65	5.07	5.55	6.06	6.62	27.95
	Sub Total	116.39	106.42	116.23	127.02	138.90	604.96
V Impact Assessment							
A	Impact Assessment					10.00	10.00
	Sub Total	0.00	0.00	0.00	0.00	10.00	10.00
	Total (Overall)	2309.58	1517.76	1543.62	1986.50	1629.56	8987.02

Table-II: Yearly Break-Up of RC Budget

S.No.	Particulars	RC Budget Estimate					(Rs. in Lakh)
		Year I	Year II	Year III	Year IV	Year V	
I.A NewM.Techin UASby IITKanpur							
1	NewM.TechinUAS@IITKanpur -Lab Establishment	200.00	0.00	0.00	0.00	0.00	200.00
2	Scholarship/assistantshipto60% Students @ Rs. 12,400	22.32	44.64	44.64	44.64	22.32	178.56
3	ManpowerBudget(Two LabAssist @ 25K /month)	3.00	3.30	3.63	4.00	4.40	18.33
4	Consumables	6.00	6.00	6.00	6.00	6.00	30.00
5	OtherCost (IndustryVisits,Industrylectures,etc.)	5.00	5.00	5.00	5.00	5.00	25.00
6	Travel (Domestic)&Training	1.00	1.00	1.00	1.00	1.00	5.00
7	Contingencies(5%)	10.00	0.00	0.00	0.00	0.00	10.00
8	Overheads(5%)	1.87	3.00	3.02	3.04	1.94	12.87
	Sub-Total (I-A)	249.19	62.94	63.29	63.68	40.66	479.76



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I.B	Laboratory establishment in UAS at twenty five PIs						
1	Laboratory(5 RCs) (@Rs 75 lakh per RC)	300.00	0.00	0.00	75.00	0.00	375.00
	Sub-Total(I-B)	300.00	0.00	0.00	75.00	0.00	375.00
I.C	Open online course development in UAS(10 Nos)						
1	40H Open Online NPTEL Courses in UAS(15L per course)	0.00	75.00	75.00	0.00	0.00	150.00
	Sub-Total (I-C)	0.00	75.00	75.00	0.00	0.00	150.00
I.D	Master Trainer/ Faculty Updation(Design, Develop & Delivery)						
1	Master Trainer FUP(2 Weeks-2 Nos per institution)	30.00	30.00	30.00	30.00	30.00	150.00
	Sub-Total (I-D)	30.00	30.00	30.00	30.00	30.00	150.00
I.E	Workshops/Seminars @ Academia						
1	National Workshops/Seminars(1 Nos per WI/RC per year)	5.00	5.00	5.00	5.00	5.00	25.00
	Sub-Total(I-E)	5.00	5.00	5.00	5.00	5.00	25.00
I.F	RC Manpower						
1	Activity & Lab Co-ordination -1 Project Lead(Rs. 75k per month)	45.00	49.50	54.45	59.90	65.90	274.75
2	SRF/JRF/RA/PA(2 per institute per year) (Rs. 45k per month)	54.00	59.40	65.40	71.90	79.10	329.80
	Sub-Total(I-F)	99.00	108.90	119.85	131.80	145.00	604.55
	Total(Overall)	683.19	281.84	293.14	305.48	220.66	1784.31

Table-III: Yearly Break-Up of PIBudget

PI Budget Estimate (Rs. in Lakh)							
S.No.	Particulars	Year I	Year II	Year III	Year IV	Year V	Total
II.A Laboratory establishment in UAS at twenty five PI							
1	Laboratory(PI-Academic)-15 Institutions(@Rs.30 lakh per PI)	300.00	0.00	0.00	150.00	0.00	450.00
2	Laboratory (PI-CDAC/NIELIT) - 10 Institutions(@Rs.50 lakh per PI)	350.00	0.00	0.00	150.00	0.00	500.00
	Sub-Total(II-A)	650.00	0.00	0.00	300.00	0.00	950.00
II.B 6 Month certificate course in Drones(CDAC/NIELIT)							
1	Design & Development of courseware (2 Courses 12 Modules)	20.00			10.00		30.00
2	Delivery / Conduction Expenses(10 CDAC/NIELIT @6L per Institute Course)	60.00	120.00	120.00	120.00	120.00	540.00
3	Advocacy Awareness expenses	5.00	5.00	5.00	5.00	5.00	25.00
	Sub-Total(II-B)	85.00	125.00	125.00	135.00	125.00	595.00
II.C PI Manpower							



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1	Activity & Lab Co-ordination-1 Project Lead(Rs. 75k per month)	225.00	247.50	272.25	299.50	329.50	1373.75
2	SRF JRF RA PA(2 per institute Per year) (Rs. 45k per month)	270.00	297.00	327.00	359.50	395.50	1649.00
	Sub-Total(II-C)	495.00	544.50	599.25	659.00	725.00	3022.75
	Total(Overall)	1230.00	669.50	724.25	1094.00	850.00	4567.75

Table IV: Activity Linked Budget at PMU (IITDM, Kurnool)

Activity Specific RC/PI Budget Allocated at PMU (Rs. in Lakh)							
S.No.	Particulars	Year I	Year II	Year III	Year IV	Year V	Total
III.A Knowledge Creation(POC & IPR)							
1	POC Expenses - 40 Short Listed Ideas year at Rs. 2.5 lakh annum Ideas	100.00	100.00	100.00	100.00	100.00	500.00
3	Filing of Patents (10 Nos per Annum) at Rs. 0.5 lakh per patent filed in India		5.00	5.00	5.00	5.00	20.00
4	Technical Papers(40 papers per Annum) at Rs. 0.75 lakh paper	30.00	30.00	30.00	30.00	30.00	150.00
	Sub-Total(III-A)	130.00	135.00	135.00	135.00	135.00	670.00
III.B International Conferences							
1	International Conference(2 Overall)			25.00		25.00	50.00
	Sub-Total(III-B)	0.00	0.00	25.00	0.00	25.00	50.00
III.C National competitions/Innovation Challenges							
1	National competitions Innovation Challenges(2 Overall)		75.00		75.00		150.00
	Sub-Total(III-C)	0.00	75.00	0.00	75.00	0.00	150.00
III.D Launch of new courses/ job role (twice per annum)							
1	Launch of new courses job role (twice per annum)	50.00	50.00	50.00	50.00	50.00	250.00
	Sub-total(III-D)	50.00	50.00	50.00	50.00	50.00	250.00
III.E Bootcamp by PI(Academic/CDAC/NIELIT)							
1	Courseware and Lab Consumables(25 Institutes at 1.0L per Course Annum)	100.00	200.00	200.00	200.00	200.00	900.00
	Sub-Total(III-E)	100.00	200.00	200.00	200.00	200.00	900.00
	Total(Overall)	280.00	460.00	410.00	460.00	410.00	2020.00

Table V: Yearly Break-up of PMU Budget

Yearly Break-up of PMU Budget (Rs. in Lakh)							
S.No.	Particulars	Year I	Year II	Year III	Year IV	Year V	Total
1	PMU Costing						
1	Capital Equipments	18.00	0.00	0.00	0.00	0.00	18.00
2	Manpower	84.84	93.35	102.68	112.96	124.28	518.11
3	Travel & Training	4.00	4.00	4.00	4.00	4.00	20.00
4	Consumables/Office Expenses	4.00	4.00	4.00	4.00	4.00	20.00
5	Contingency(5%)	0.90	0.00	0.00	0.00	0.00	0.90
6	Overhead(5%)	4.65	5.07	5.55	6.06	6.62	27.95
	Total	116.39	106.42	116.23	127.02	138.90	604.96



S.No.	HTIDM,Kurnool	Rs. in Lakh					
		Year I	Year II	Year III	Year IV	Year V	Total
II	PMU Costing						
1	Capital Equipments	6.00					6.00
2	Manpower	33.24	36.58	40.23	44.26	48.70	203.01
3	Travel & Training	2.00	2.00	2.00	2.00	2.00	10.00
4	Consumables, Office Expenses	2.00	2.00	2.00	2.00	2.00	10.00
5	Contingency(5%)	0.30					0.30
6	Overhead(5%)	1.87	2.03	2.22	2.42	2.64	11.18
	Total	45.41	42.61	46.45	50.68	55.34	240.49

S.No.	CDACHyderabad	Rs. in Lakh					
		Year I	Year II	Year III	Year IV	Year V	Total
III	PMU Costing						
1	Capital Equipments	12.00					12.00
2	Manpower	51.60	56.77	62.45	68.70	75.58	315.10
3	Travel & Training	2.00	2.00	2.00	2.00	2.00	10.00
4	Consumables, Office Expenses	2.00	2.00	2.00	2.00	2.00	10.00
5	Contingency(5%)	0.60					0.60
6	Overhead(5%)	2.78	3.04	3.33	3.64	3.98	16.77
	Total	70.98	63.81	69.78	76.34	83.56	364.47

9) Stages for release of payment

Release No.	Pre-condition: Status of implementation	Documentation to be supplied by Implementing Agency	Amount to be released
1 st Release	Issue of Administrative Approval for release of Instalment	Signing of Terms & conditions and MOU	2309.58
2 nd Release		Review of the deliverables & recommendations by PRSG and submission of previous UCs	1517.76
3 rd Release		Review of the deliverables & recommendations by PRSG and submission of previous UCs	1543.62
4 th Release		Review of the deliverables & recommendations by PRSG and submission of previous UCs	1986.50
5 th Release		Review of the deliverables & recommendations by PRSG and submission of previous UCs	1629.56
		Total	8987.02

9) Implementing Agency is advised to keep the grant in an interest bearing account and earning out of grant (if any) may be remitted into the consolidated funds of India, as per extent instruction of MoI. Implementing agencies are requested to observe due economy in respect of overall expenditure of the project.

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Joint Director



S.No.	HITDM,Kurnool	(Rs. in Lakh)					
		Year I	Year II	Year III	Year IV	Year V	Total
II	PMU Costing						
1	Capital Equipments	6.00					6.00
2	Manpower	33.24	36.58	40.23	44.26	48.70	203.01
3	Travel & Training	2.00	2.00	2.00	2.00	2.00	10.00
4	Consumables/Office Expenses	2.00	2.00	2.00	2.00	2.00	10.00
5	Contingency(5%)	0.30					0.30
6	Overhead(5%)	1.87	2.03	2.22	2.42	2.64	11.18
	Total	45.41	42.61	46.45	50.68	55.34	240.49

S.No.	CDACHyderabad	(Rs. in Lakh)					
		Year I	Year II	Year III	Year IV	Year V	Total
III	PMU Costing						
1	Capital Equipments	12.00					12.00
2	Manpower	51.60	56.77	62.45	68.70	75.58	315.10
3	Travel & Training	2.00	2.00	2.00	2.00	2.00	10.00
4	Consumables/Office Expenses	2.00	2.00	2.00	2.00	2.00	10.00
5	Contingency(5%)	0.60					0.60
6	Overhead(5%)	2.78	3.04	3.33	3.64	3.98	16.77
	Total	70.98	63.81	69.78	76.34	83.56	364.47

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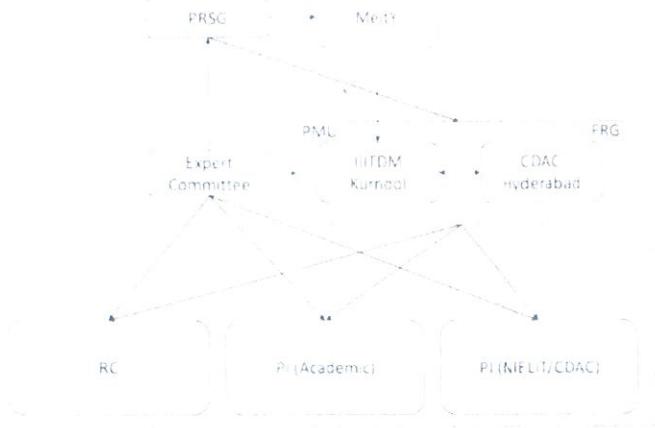
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(D.K. Sagar)
Joint Director



Fund Flow

- The GIA amount would be released by MeitY to IIITDM Kurnool. IIITDM Kurnool would further release the GIA amount to 30 RCs, PIs and PMU as per the recommendation of PRSG. IIITDM Kurnool would be responsible for releasing the GIA amount to institutions in a timely manner for efficient implementation of the programme.
- IIITDM Kurnool would enter into a Memorandum of Understanding (MOU) with RC/PIs for releasing of Grant-in-Aid (GIA) amount.
- GIA for Pool Based Activities (POC, IPR, Bootcamps, International Conferences, National competitions, and Launch new Job role-based courses) would be managed and maintained by IIITDM Kurnool. The activity specific release to implementing institutes would be as per the direction of PRSG.
- The fund flow diagram is depicted below:



- The Finance Review Group (FRG) with members involving Centre Director Head of IIITDM Kurnool and CDAC Hyderabad, Chief Investigator (CI) and Finance Officers, with the Finance Officer of IIITDM, Kurnool as the Member-Convenor would ensure that GIA is released to implementing agencies (RC/PI etc.) from IIITDM Kurnool as per recommendations and instructions issued from time to time by PRSG/MeitY.
- *****



Timeline

Duration	Activity
Immediately after project approval	Taking confirmation from implementing institutes, Mapping institutes to respective Work Themes (WT) and executing MoU for onboarding the RC/Pi institutions
<u>M.Tech</u>	
0-6 months	Curriculum development, Inter-departmental faculty identification
6-12 months	Lab establishment @ IIT Kanpur, M.Tech Launch @ IIT Kanpur
1 year	First batch to be inducted for the course
1-5 years	Running a full-fledged post graduate degree programme at IIT Kanpur in UAS
<u>Minor Degree</u>	
0-6 months	Curriculum development, Interdisciplinary faculty identification
6-12 months	Approvals by RC & Pi institutes for minor degree, model curriculum, First set of Open Online courses to be developed in UAS by RC's
12 months	Initiating the minor degree retrofit offerings at five (5) institutes
1-2 years	All RC's and Pi (Academic) institutes to launch minor degree
2-5 years	Running minor degree programme in UAS at 20 academic institutions
6-months Certificate Program	
0-3 months	Course Syllabus finalization and Source Book by experts
3-6 months	Lab Setup, SOP, NSQI Alignment and Guidelines
6-12 months	Launch of 6 months certificate program
1-5 years	Conduction of 6 months certificate program by 10 CDAC / NIELIT
<u>Bootcamps</u>	
0-3 months	Course finalization by experts in WTs
3-6 months	SOP and guidelines, Lab Setup, Identification of industry partners
6-9 months	Launch of 2 weeks bootcamp across WTs
Yearly	Conduction of bootcamps by 25 CDAC / NIELIT
<u>Master Trainer</u>	
0-3 months	Syllabus, Material Finalization (Development / Update)
Yearly	Conduction of ten faculty Updation at five RCs
<u>National Workshops</u>	
Yearly	Conduction of five National Workshop in specific WT
<u>Competitions (2 times)</u>	
0-3 months	Identification of Institutes and collaborative partners from industry
6-12 months	Identification of problem statements, infrastructure & consumable provisioning, logistic arrangements
9-18 months	Conduction of competitions across identified RC/Pi institutes
18-24 months	Leveraging outcome of competitions
<u>International conference (2 times)</u>	
0-6 months	Institute Identification, WT & track themes and setting up conferencing tools
6-12 months	Call for participation from authors, Logistic Arrangements
12-18 months	Conduction of conference in UAS
18-24 months	Publishing proceedings and related articles in identified digital libraries



Broad implementation methodology

1. Aim and Scope of the programme (in terms of specific physical achievement)

The scope of the project is to carryout Capacity building for Human Resource Development in domain of Unmanned Aircraft System (Drone and related Technology) through a Network of 20 Academic Institutions and 10 CDAC/NEILIT Centres in a Resource Centre (RC) and Participating Institute (PI) model over a period of 5 year of duration to create an overall trained manpower of 42,560 Nos which includes 100 M.Tech Degree in UAS/Drones through IIT Kanpur, 4,000 Minor Degree/Retrofitting courses in UAS/Drones, 1000 Master Trainer/FUP & 32,400 professionals trained through non-formal short term and certificate courses.

2. Detailed description of the Project

A. Project Objectives

The primary objective of the programme is to leverage collaborative activities in human resource development through capacity building in education and training in the area of UAS.

The programme is conceived to achieve the following broad objectives:

- To enhance capacity & capabilities of select institutions in identified WTs on Unmanned Aircraft Systems.
- To institutionalize a collaborative ecosystem through identified Resource Centres (RCs) and Participating Institutions (PIs) for synergy of capabilities & expertise.
- To foster development of competent human resources at various levels including Post Graduate & Graduate programs, PG Diploma/Certificate programs, Faculty Updation and Master Trainers in niche areas of UAS.
- To promote entrepreneurial mindset and nurture technical talent among the student community through innovative interventions such as Bootcamps and Proof-of Concepts.
- To nurture technical talent and ideation among the student community through IPR generation, Competitions, Workshops / Conferences, etc.

B. Overall Implementation Approach:

Toward creating a Drone based multidisciplinary ecosystem the following would be carried out:

- i. **Alignment of core technical activities of overall project into 5 Work Themes:** The core technical activities of the overall programme would be categorized into five Working Themes (WTs) for focused interdisciplinary collaboration across faculties and institutes to build a strategic network and competence for Human Resource Development.
The WTs identified and recommended by Expert Committee are as follows:
 - a) Drone Electronics (involving Sensors, Onboard Computers, Comm. Technology etc.)
 - b) GNC Algorithms & Simulation
 - c) Aeromechanics
 - d) Drone Applications (including domain-specific applications & security)
 - e) Allied UAS Technologies (Data Analysis, AI/ML, IoT, Cloud Computing etc.)
- ii. **Activity verticals:** The programme would undertake the overall implementation of the activities / Outcomes under Activity Verticals (AVs) which complements the technology specific WTs. The three (3) Activity Verticals includes:
 - a) Capacity and Capability building,
 - b) Ideation and Innovation &
 - c) Human Resource Development.
- iii. **Institutional Framework containing 30 Institutions to implement project activities through Hub & Spoke model:** Capacity building for human resource development in UAS would be undertaken through a network of identified Resource Centres (RC) and Participating Institutions (PIs) with support of Industrial group as follows:
 - a) Resource Centres(RC): Five(5) Academic Institutions such as, IIT, IISc, and IIIT
 - b) Participating Institutions (PIs)
 - a. Academic Institutions: Fifteen selected IITs / NITs as PI (Academic)
 - b. CDAC/NIELIT: Ten (10) CDACs / NIELIT Centres as PI (CDAC/NIELIT)
 - c) Supporting Industrial Groups : DFI, FICCI, ESSCI and TSSC



- iv. **PMU:** IIITDM Kurnool would act as the Programme Management Unit (PMU) with the support of C-DAC Hyderabad for the overall scheme monitoring and implementation.
- v. **Governance Strategy :** Overall project shall be guided and monitored through various group of Experts/Committees defined as follows:
 - a) Project Review and Steering Group (PRSG)
 - b) Expert Advisory Committee(EAC)
 - c) WT Specific Expert Groups setup for respective WTs

The details of each Activity Verticals is as elaborated in section below:

C. Capacity and Capability building in UAS and related technologies

Unmanned Aircraft Systems and related technologies involve various multidisciplinary activities which need to be carried out in a focused and collaborative manner across implementing agencies. Towards this, leveraging Work Theme based approach under the guidance of Expert Advisory Committee (EAC) in enhancing the Capacity and Capability of associated Resource Centres (RCs) and Participating Institutions (PIs) in a Hub-and-Spoke model is envisaged. The EAC with Experts from Academia, Industry and Research Bodies would technically mentor and guide the Work Themes in various activities associated with the ‘Capacity and Capability Building’ vertical.

The broad set of activities envisaged to be carried out as part of ‘Capacity & Capability Building’ is segregated into four (4) categories which involves a) Establishing Work Themes (WT) specific Labs (b) WT specific Knowledge Creation (c) Proliferate Research & Knowledge Sharing and (d) Master Trainers/ Faculty Updation in UAS.

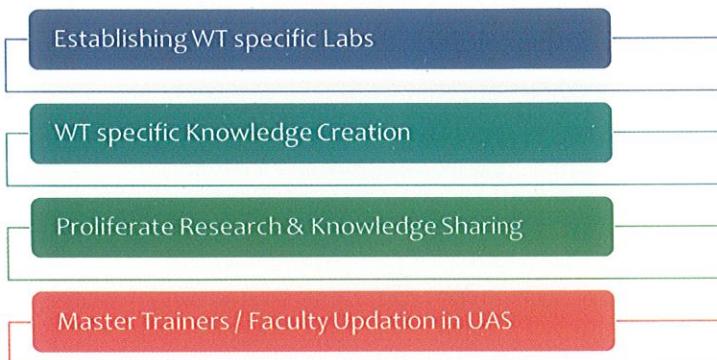


Fig: Capacity building activities in UAS and related areas

Each of the activities are further elaborated in subsequent section.

C.1 Establishing Work Themes (WT) specific Labs

The overall activity of Capacity and Capability building is envisaged to be carried out with a focus on five Work Themes. For each of the identified WTs, it is proposed to set-up an RC-PI cluster in a Hub-n-Spoke model comprising of one Resource Centre supported by three PI (Academic) Institutions and two PI (C-DAC/NIELIT) Centres. The overall UAS Institutions are categorized to respective WTs which act as a technical framework for various activities defined under the identified verticals.

Domain specific specialized laboratory facilities would be created for establishing state-of-the-art infrastructure facilities in RCs and PIs which would cater to the overall Training and Research ecosystem involving Formal and Non-Formal training, Knowledge Creation and Proliferation, Ideation and Innovation, Master Training, Bootcamps and related activities.

The WT Expert Groups would provide necessary guidance in identifying/endorsing infrastructure requirements, course curriculum etc. as needed towards setting-up/upgradation of labs and test-beds for simulation/emulation. RCs would facilitate in Design and implementation of Domain specific State-of-the-Art Laboratories, Faculty Development and Approach for technology specific knowledge creation and dissemination.

C.2 WT specific Knowledge Creation

Towards knowledge creation, the programme would provide support to faculty/researchers to publish research-oriented papers in reputed national/international Journals & Conference. Further, it is also



envisaged to support faculty/researchers in filing of patents in India/abroad. This would essentially leverage the knowledge creation ecosystem in UAS and related areas among implementing agencies. Expert Advisory Committee provide Guidelines and SOP for the knowledge creation vertical. The committee would regularly review and monitor the progress of the institutions and recommend measures for improvements.

In the programme duration of five years, the Resource Centres (5 nos) and Participating Institutes (25 nos) are envisaged to create 200 technical papers (Three per RC per annum and One per PI per annum) published in top-tier Journals/Conferences and 40 patents (10 per annum) filed over a period of five (5) years in specialized verticals.

C.3 Proliferate Research & Knowledge Sharing

As part of the initiative, the implementing agencies are envisaged to organize a series of National Workshops/Seminars and International Conferences by providing significance to respective Work Themes (WTs). Through these platforms the faculties would carryout Expert Lectures and Webinar Series to proliferating the research activities and also sharing the knowledge created in respective specialized domains. Expert Advisory Committee provide Guidelines and SOP for the vertical. The committee would also suggest institutes and WTs to implement the international conference. Further, the activities of vertical would be regularly reviewed and monitored and measures for improvements would be recommended.

It is envisaged to conduct a total of 25 workshops / seminars (One (1) per WT per annum) and two (2) International Conference over a period of five (5) years. The Resource Centres (RCs) of respective Work Themes (WTs) would be responsible for implementation of the activities and would further be coordinating the activity in respective clusters.

C.4 Master Trainers / Faculty Updation in UAS

As Unmanned Aerial Systems (UAS) is an evolving and upcoming field which is multidisciplinary in nature, it would take a couple of years to get matured to a level wherein various training materials, lab experiments etc. is available throughout. Considering this aspect, it is a significant challenge for the trainers of Participating Institutes and Engineering Faculties to get themselves trained and spread the knowledge to students and aspirants.

Towards this, the programme also envisages to provide uniform training and technical exposure in respective Work Themes (WTs) to all Trainers and faculties who are part of this initiative.

In this regard, it is envisaged to train a total of 1,000 participants which involves faculty, prospective faculty, researchers, etc. (Two 2-Weeks (10 days) training programme per RC per year) are envisaged to be trained by RCs in identified five (5) WTs over the next five years.

C.5 Roles and Responsibilities of Stakeholders

The following table elaborates various Roles and Responsibilities of respective stakeholders as part of 'Capacity & Capability Building'.

VERTICALS ACTIVITIES	CAPACITY & CAPABILITY BUILDING				
	Roles and Responsibilities				
Expert Advisory Committee	WT Expert Group/ Clusters	RCs	PI (Academic)	PI (CDAC/ NEILIT)	
ESTABLISHING WORK THEMES (WT) SPECIFIC LABS	Guidelines	Identify and recommend Laboratory & associated tools /infrastructure/solutions	Setup WT specific Labs	Setup WT specific Labs	Setup WT specific Labs
MASTER TRAINERS/ FACULTY	Guidelines / SOP	Need assessment and curriculum	Conduct Master Trainer programme	-	-



**UPDATION
IN UAS.
WT
SPECIFIC
KNOWLEDG
E
CREATION
(IPR)**

WT SPECIFIC KNOWLEDG E CREATION (IPR)	Guidelines SOP	/ Identify and recommend WT specific Journals/ conferences etc. wherein faculties/ students can publish	Create IPR through papers and patents	Create IPR through papers and patents	Create IPR through papers and patents
PROLIFERA TE RESEARCH & KNOWLEDG E SHARING (NATIONAL WORKSHOP / SEMINAR)	Guidelines SOP	/ Recommend Timeline and WT specific technical tracks for workshops and seminars	Co-ordinate Workshop/ seminar conduction	Support RC in conduction of activity under vertical	Support RC in conduction of activity under vertical
PROLIFERA TE RESEARCH & KNOWLEDG E SHARING (INTERNATI ONAL CONFEREN CES)	Guidelines SOP, identifying WT cluster/ Institutes for conference and recommending timeline	/ WT specific technical tracks for International Conferences	Co-ordinate Workshop/ seminar conduction	Support RC in conduction of activity under vertical	Support RC in conduction of activity under vertical

C.6Envisaged Outcome/Deliverable of Capacity & Capability building vertical

The Overall Activities and Outcomes as part of the Capacity & Capability building is as indicated below:

Envisaged year-wise deliverables for Capacity Building Activity Vertical							
S. No.	Particulars	Year I	Year II	Year III	Year IV	Year V	Total
1	Master Trainers / Faculty Updation	200	200	200	200	200	1000
2	Participants of Workshops / Seminars	300	300	300	300	300	1500
3	Participants of International Conference	0	0	200	0	200	400
4	Participants of knowledge creation through IPRs	160	200	200	200	200	960
Sub-Total of participants		660	700	900	700	900	3860

D. Ideation and Innovation in UAS and related technologies

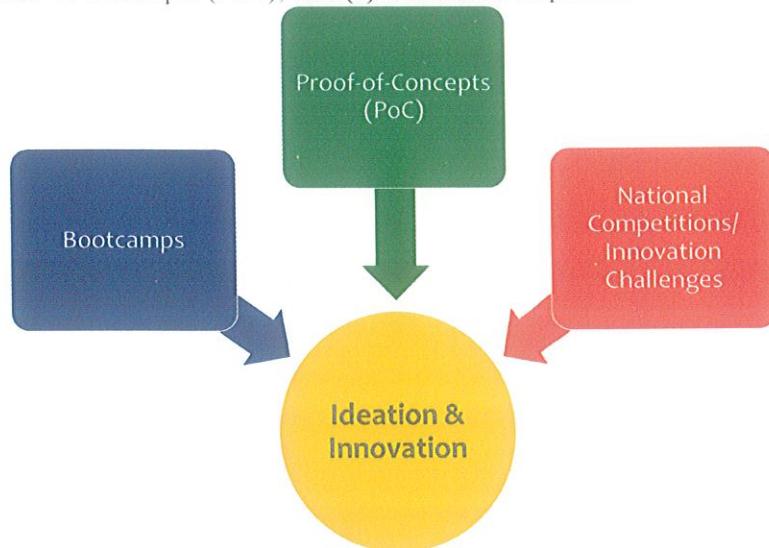
Ideation and Innovation activities are envisaged to facilitate thinking, learning, brainstorming, developing entrepreneurial mind-set and generation of new prototypes / solutions in UAS and related technologies. The key objective here is to scale up innovation talent pool as part of the programme.

The Expert Advisory Committee (EAC) with Experts from Industry, Research Institutes & Academia would technically mentor and guide and also develop Guidelines, Standard Operating Procedure (SOP), Selection Criteria for Programmes (Hackathons, Competitions etc.) and in finalization of the Proof-of-Concept (PoC) for implementing agencies as per programme objectives and directives of PRSG. The WT Expert Groups would technically mentor and guide respective implementation team, frequently review the technical progress and recommend/suggest improvements of respective WT



based activities. The WT Expert Groups would also facilitate in finalization of domain specific problem statements for competitions/ challenges etc. in consultation with various stakeholders.

The Ideation and Innovation in UAS is categorized into three major activities which includes (a) Bootcamps, (b) Proof-of-Concepts (PoC), and (c) National Competitions/ Innovation Challenges.



The implementation of various activities defined under 'Ideation and Innovation' verticals shall be undertaken through a collective effort by RCs and PIs in respective WTs as is elaborated in the following section.

D.1 Bootcamps

Bootcamps are essentially programs which would provide participants hands-on exposure on fundamentals as well as advanced concepts. The activity is envisaged to provide an orientation towards ideation, design, and developmental aspects which further facilitate in taking-up higher-level activities like innovation challenge, etc.

The WT Expert Group in respective domain would formulate a calendar of bootcamps covering topics/ themes, eligibility & selection criteria, delivery & assessment mechanism, expected outcomes, etc. under the guidance of Expert Advisory Committee (EAC). The WT expert group would further co-ordinate and monitor progress on frequent basis with Participating Institutes (PIs) in conducting the Bootcamps in respective technology areas.

The responsibility of conducting the overall bootcamps assigned per annum resides with the Participating Institutes. The mode of conduction may be physical/blended with online/off-line learning resources, courseware provided to the learners by respective PI. Towards conduction of Bootcamps, the PIs would leverage domain specific labs and related facilities established. PIs may also leverage experts from academia, industry, Government, etc. as a part of bootcamps. The mentors are envisaged to conduct sessions and/or guide students in projects.

The host institution would carry-out implementation, assessment and certification as per the guidelines issued by EAC from time-to-time. The EAC in its guidelines and Standard Operating Procedure would review and recommend for finalization of the overall implementation mechanisms, intake, duration, etc. of bootcamps, keeping in view the Work Themes and related technical aspects involving lab established at institutes etc. for implementation. The guidelines and SOPs would be prepared and recommended by EAC with active involvement of experts from industry, Academia and Research institutions.

As part of the programme, it is envisaged to conduct eight (8) bootcamps per Participating Institute (PI) per annum, except first year wherein the number of bootcamps would be four (4). The duration of each bootcamp is envisaged to be 2 weeks / 10 working days. It is envisaged to train a total of 27,000 students over a period of five (5) years.

D.2 Proof-of-Concepts (PoC)

Towards promotion of ideation & innovation mindset among students in UAS and related areas, it is envisaged to undertake POCs with technology specific relevance as per work themes. The RCs and PIs would propose the POC which is envisaged to be carried out in a per annum basis to the expert advisory



committee (EAC). The EAC would review the proposals with the support of WT Expert groups and approve the activities which needs to be supported. Based on the same, the PMU would release the allocated fund for POC to the respective implementing agency. The fund support would essentially cover specific tools/kits/equipment, consumables, testing & fabrication charges and any other design and development charges.

WT Expert Groups would provide handholding support to faculties and student innovators who are implementing the POC through mentoring, access to external facilities & resources in other Implementing agencies. It is envisaged to generate at least 200 POCs through five RC and twenty-five PIs over a period of five years.

D.3 National Competitions/ Innovation Challenges

The National Competition/Innovation Challenge is envisaged to encourage participants in taking up real-world issues and challenges along with innovative new ideas for identified statements. The activity is expected to foster Product/Solution Development thought process to be inculcated across Student community in UAS and related technologies.

Towards this, EAC would prepare Guidelines and SOPs, whereas the Work-Theme Expert groups would elicit views for problem statements (involving expected outcomes, tracks, selection & evaluation criteria, and other operational modalities, etc.) from diverse groups involving industries, academics, ministry/departments etc. Further, the WT cluster Resource Centre (RC) would co-ordinate with Sector Skill Council (Electronics /Telecom), FICCI Committee on Drones and Drone Federation of India (DFI) to launch a National Level Programme which throws open the identified challenges to the students/faculties across Institutions.

The National Competition/Innovation Challenge would be taken up in 3 stages which involves: (a) **Preliminary stage** comprising of problem identification, promotional activities, call for proposals from eligible teams, formation of jury and shortlisting of participants, (b) **Intermediary stage** which involves Resource and Mentor allocation, implementation of shortlisted ideas (3-6 months), Expert guidance etc. and (c) Final stage involving selection of top 3 teams by a jury and certification/award. Winning teams would also be supported further though various means like linking them through a network of incubators in academia/industry, MeitY Startup Hub/ Startup India and also encouraged to register themselves as a ‘start-up’ to explore productization opportunities. The Innovation challenge would be carried out at a National scale in the 2nd and 4th Year under the guidance and mentorship of Expert Advisory Committee.

D.4 Roles and Responsibilities of Stakeholders

The following table elaborates various Roles and Responsibilities of respective stakeholders as part of ‘Ideation and Innovation’ vertical.

VERTICAL: IDEATION AND INNOVATION IN UAS

ACTIVITIES	Roles and Responsibilities				
	Expert Advisory Committee	WT Expert Group/ Clusters	RCs	PI (Academic)	PI (CDAC/ NEILIT)
BOOTCAMP S	Guidelines / SOP	WT specific topics/ area identification and recommendation to Cluster Institutes and Industry colalboration	-	Design, Develop and Conduct Bootcamps	Design, Develop and Conduct Bootcamps



PROOF-OF-CONCEPTS (POC)	Guidelines / SOP, Selection of Institutes for POC (Annual basis)	Technical support to institutes – Mentoring and Resources	Annual submission of Collaborative Proposals with PI to EAC and Implementation of accepted PoC	Annual submission of Collaborative Proposals with RC to EAC and Implementation of accepted PoC	Annual submission of Collaborative Proposals with RC to EAC and Implementation of accepted PoC
NATIONAL COMPETITIONS/ INNOVATION CHALLENGES	Guidelines / SOP, identifying WT cluster/ Institutes for Innovation Challenges, & recommending timeline	Identification of WT specific Challenges/ Problem Statements in association with DFI, SSC etc.	Co-ordinate National Competition s/ Innovation Challenge conduction	Support RC in conduction of activity under the vertical	Support RC in conduction of activity under the vertical

D.5 Envisaged Outcome/Deliverable of Ideation and Innovation

The Overall Activities and Outcomes as part of the Ideation and Innovation is as indicated below:

Envisaged year-wise deliverables for Ideation and Innovation Activity Vertical							
S. No.	Particulars	Year I	Year II	Year III	Year IV	Year V	Total
1	Bootcamp participants	3000	6000	6000	6000	6000	27000
2	Participants of National Competition / Innovation Challenges	0	300	0	300	0	600
3	Participants of Proof-of-Concepts (No. of PoCs)	240	240	240	240	240	1200
	Sub-Total of participants	3240	6540	6240	6540	6240	28800

E. Human Resource Development in UAS and related technologies

The ‘Human Resource Development in UAS and related technologies’ vertical would essentially inculcate the Educational and Technical skills in UAS and related technologies to graduates and undergraduates through Academic/Skilling channels across various categories of anticipated learners. The Expert Advisory Committee (EAC) with Experts from Industry, Research Institutes & Academia would be actively involved in the creation and mobilization of the HRD activity vertical. The further technology specific requirements and guidance would be provided by WT Expert groups from time to time or for explicit sub-activities like Online Courses that have WT based distribution.

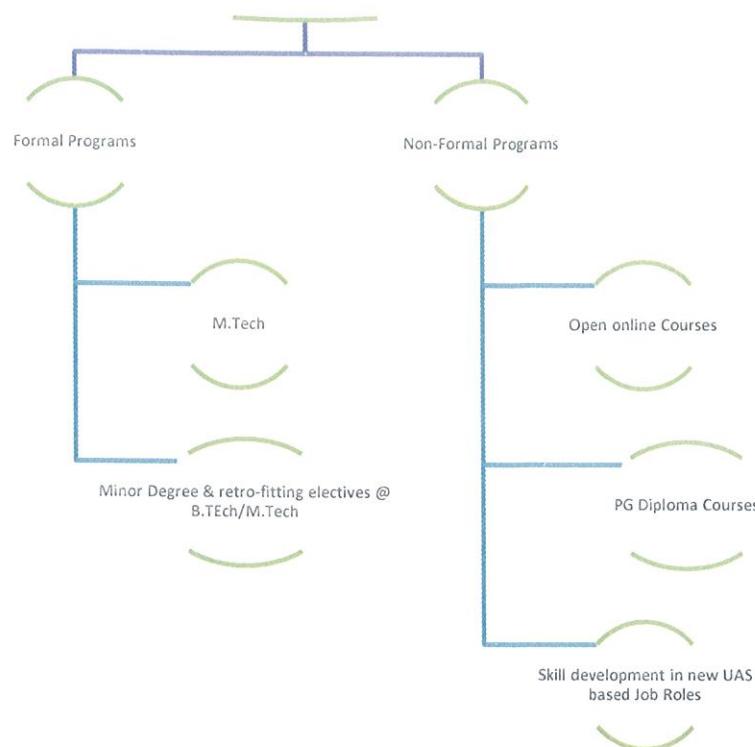
The overall activities of HRD in UAS is categorized into two type of programs namely (a) Formal and (b) Non-Formal. The same are further sub-categorized as follows:



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HRD in UAS & Related Technologies



Each of the activities are further elaborated in subsequent section.

E.1 Formal programs:

E.1.1 M.Tech in UAS

It is proposed to develop and launch a new M.Tech programme through selected institution(s). The objective of M.Tech in Unmanned Aerial System (UAS) is to develop and institutionalize a curriculum that prepares students to be capable of conceptualizing ideas aimed at engineering solutions in drone technology and related areas. On completion, the student is expected to embark on career opportunities in UAV design and development, including operational aspects associated with flight navigation in varied application scenarios.

The launch of new MTech in Unmanned Aerial System (UAS) would be carried out by the Department of Aerospace Engineering, IIT Kanpur. This is envisaged to be launched from the Academic Year 2022-23. As the programme is highly interdisciplinary, the department would leverage the expertise available for specific topics in other departments in order to address all the topics. The envisaged deliverables for M.Tech in UAS are 25 students per year for 4 years of the project duration.

E.1.2 Minor Degree/Retrofitting electives

As part of the programme and in line with the National Educational Policy 2020, it is proposed to evolve and implement minor degree/ retrofitting of electives for graduate and postgraduate students in the area of UAS/drone and related technologies. The Minor Degree and retrofitting of electives would be offered by RC and PI (Academic).

The WT Expert Groups of respective verticals would majority defining Syllabus Outline, Credits and Course Outcomes for fulfilling the minor degree requirements in Drones/UAS, whereas the delivery mode and other aspects would be based on respective implementing Institutes internal rules and regulations. In addition, suggestive provision would also be made available for taking up a few courses/ subjects of Minor degree through NPTEL or similar online mechanisms which is recognized by respective institutes and WTs. In addition, the possibility of integrating few courses / subjects of the minor degree programme on Drone and related technologies through NPTEL would also be explored. Towards this, the Resource Centres would also be developing open online course content (Video



lectures, Labs manuals etc.) in UAS/Drones for NPTEL or similar platforms, both as resources for students and faculty development.

The Expert Advisory Committee (EAC) would be developing Model curriculum, Guidelines and Standard Operating Procedures (SOP for Minor degree and retrofitting of electives. The mode of delivery (Online/Blended/Physical etc.) and related aspects would also be defined for implementation by the respective institutes.

The envisaged outcome under minor degree/ retrofitting of electives are as follows:

- 50 students per year for each RC, with an expected overall outcome of 250 students per year from RCs (five) for 4 years (To be offered from second year onwards).
- 50 students per year for each PI (Academic), with an expected overall outcome of 750 students each year from PI(Academic) – 15 nos for 4 years.

E.2 Non-Formal Programs:

E.2.1 Open Online Courses in UAS

The Resource Centres would create Open Online courses in Drones/UAS and related areas under the guidance the Work Theme (WT) from second year onwards. This would be beneficial for institutes to take up Minor Degree programs in UAS / Drones, thereby creating a larger impact through this effort.

The Expert Advisory Committee would be providing necessary guidelines and SOP, whereas WT Expert Group would provide guidance for the overall implementation for courses based on technology coverage and related aspects. The activity envisages offering one Course per RC during 2nd and 3rd year of the project with a total design and development of 10 Open Online courses in the programme duration.

E.2.2 Six (6) months Post Graduate Diploma/ Certificate courses certification Course through ACTS Pune

Post Graduate Diploma/ Certificate courses are envisaged under the programme for capability enhancement of graduate students. It is expected that the knowledge / skills in Drone and related areas would help them to take advantage of opportunities in the area of UAS, including the growing application-based job roles that are emerging in this domain. The envisaged NSQF Level for the course is in Level-08 and the notional hours for the course is approx. 900 hours.

The course curriculum would be designed under the guidance of Expert Advisory Committee by ACTS C-DAC Pune keeping in view the latest trends in UAS/Drones as well as contemporary and futuristic human resource requirements. WT Expert Group would provide necessary module specific inputs for each WT. The courses would be coordinated through ACTS Pune and offered through 10 C-DAC and NEILIT PI Centers. The overall objective of the programme is to generate 5400 professionals.

E.2.3 Skill development in UAS courses based on new Job Roles

Sector Skill Councils such as ESSCI and TSSC are actively engaged in defining Job Roles / Qualification Packs (QPs), National Occupational Standard (NOS), Certification etc. for various courses related to Drones.

For upcoming Job Roles in UAS/Drones which are not currently being covered by Sector Skill Councils, it is proposed to takeup Course design and conduction of 2 prototype sessions in a collaborative mode with C-DAC/ NIELIT institutions, so that the time to launch and students getting benefited getting trained in latest job roles is optimized. This would further enhance the synergy between CDAC/NIELIT and Industries in UAS and related fields.

The overall guidelines and SOPs of this activity would be undertaken by Expert Advisory Committee (EAC). EAC would also identify institutes including CDAC/NIELIT and related implementation procedures.

E.2.4 Roles and Responsibilities of Stakeholders

The following table elaborates various Roles and Responsibilities of respective stakeholders as part of ‘Human Resource Development in UAS’ vertical.

VERTICALS

HUMAN RESOURCE DEVELOPMENT IN UAS



lectures, Labs manuals etc.) in UAS/Drones for NPTEL or similar platforms, both as resources for students and faculty development.

The Expert Advisory Committee (EAC) would be developing Model curriculum, Guidelines and Standard Operating Procedures (SOP for Minor degree and retrofitting of electives. The mode of delivery (Online/Blended/Physical etc.) and related aspects would also be defined for implementation by the respective institutes.

The envisaged outcome under minor degree/ retrofitting of electives are as follows:

- 50 students per year for each RC, with an expected overall outcome of 250 students per year from RCs (five) for 4 years (To be offered from second year onwards).
- 50 students per year for each PI (Academic), with an expected overall outcome of 750 students each year from PI(Academic) – 15 nos for 4 years.

E.2 Non-Formal Programs:

E.2.1 Open Online Courses in UAS

The Resource Centres would create Open Online courses in Drones/UAS and related areas under the guidance the Work Theme (WT) from second year onwards. This would be beneficial for institutes to take up Minor Degree programs in UAS / Drones, thereby creating a larger impact through this effort.

The Expert Advisory Committee would be providing necessary guidelines and SOP, whereas WT Expert Group would provide guidance for the overall implementation for courses based on technology coverage and related aspects. The activity envisages offering one Course per RC during 2nd and 3rd year of the project with a total design and development of 10 Open Online courses in the programme duration.

E.2.2 Six (6) months Post Graduate Diploma/ Certificate courses certification Course through ACTS Pune

Post Graduate Diploma/ Certificate courses are envisaged under the programme for capability enhancement of graduate students. It is expected that the knowledge / skills in Drone and related areas would help them to take advantage of opportunities in the area of UAS, including the growing application-based job roles that are emerging in this domain. The envisaged NSQF Level for the course is in Level-08 and the notional hours for the course is approx. 900 hours.

The course curriculum would be designed under the guidance of Expert Advisory Committee by ACTS C-DAC Pune keeping in view the latest trends in UAS/Drones as well as contemporary and futuristic human resource requirements. WT Expert Group would provide necessary module specific inputs for each WT. The courses would be coordinated through ACTS Pune and offered through 10 C-DAC and NEILIT PI Centers. The overall objective of the programme is to generate 5400 professionals.

E.2.3 Skill development in UAS courses based on new Job Roles

Sector Skill Councils such as ESSCI and TSSC are actively engaged in defining Job Roles / Qualification Packs (QPs), National Occupational Standard (NOS), Certification etc. for various courses related to Drones.

For upcoming Job Roles in UAS/Drones which are not currently being covered by Sector Skill Councils, it is proposed to takeup Course design and conduction of 2 prototype sessions in a collaborative mode with C-DAC/ NIELIT institutions, so that the time to launch and students getting benefited getting trained in latest job roles is optimized. This would further enhance the synergy between CDAC/NIELIT and Industries in UAS and related fields.

The overall guidelines and SOPs of this activity would be undertaken by Expert Advisory Committee (EAC). EAC would also identify institutes including CDAC/NIELIT and related implementation procedures.

E.2.4 Roles and Responsibilities of Stakeholders

The following table elaborates various Roles and Responsibilities of respective stakeholders as part of ‘Human Resource Development in UAS’ vertical.

VERTICALS

HUMAN RESOURCE DEVELOPMENT IN UAS



ACTIVITIES

Roles and Responsibilities

	Expert Advisory Committee	WT Expert Group/ Clusters	RCs	PI (Academic)	PI (CDAC/ NIELIT)
NEW M.TECH COURSE (FORMAL)	Guidelines / SOP and Model Course curriculum in UAS	Provide specific Technical Support for Model Course Curriculum in UAS	WT IIT Kanpur to take necessary approval and Design, Develop and Implement M.Tech in UAS	-	-
MINOR DEGREE & RETRO-FITTING ELECTIVES @ B.TECH/M.TECH	Guidelines / SOP and Model Course curriculum in UAS	Support for Model Course Curriculum in UAS	Design, Develop and Implement Minor Degree and retro-fitting electives @ B.Tech/M.Tech	Design, Develop and Implement Minor Degree and retro-fitting electives @ B.Tech/M.Tech	-
OPEN ONLINE COURSES	Guidelines / SOP	WT specific topics/ area identification and recommendation	Design and Develop 40H courses		
PG DIPLOMA COURSES	Guidelines / SOP	WT specific topics/ area identification and recommendation			C-DAC Pune to Co-ordinate the launch of PG diploma in UAS. CDAC and NIELIT to offer course.
SKILL DEVELOPMENT IN NEW UAS BASED JOB ROLES	Guidelines / SOP, Selection of CDAC/ NIELIT Institutes for collaborative courses in new job roles by SSC	WT specific recommendation to Cluster Institutes	-	-	Collaborate with ESSCI and TSSC for launching new courses.

E.2.5 Envisaged Outcome/Deliverable (HRD in UAS)

The Overall Activities and Outcomes as part of the HRD (Formal & Non-Formal) is as indicated below:

Envisaged year-wise deliverables for Human Resource Development in UAS Activity Vertical							
S. No.	Particulars	Year I	Year II	Year III	Year IV	Year V	Total
1	M.Tech in UAS		25	25	25	25	100
2	Minor Degree and retro-fitting electives for graduates/postgraduates	0	1000	1000	1000	1000	4000



3	Participants of new SSC collaborated courses (40 per course)	80	80	80	80	80	400
4	6 months certificate course (10 CDAC/NIELIT PI)	600	1200	1200	1200	1200	5400
	Sub-Total of participants	680	2305	2305	2305	2305	9900

F. UAS Programme - Outcomes/ Deliverables

The programme titled “Capacity building for Human Resource Development in Unmanned Aircraft System (Drone and related Technology)” is envisaged to generate a total of 42,560 candidates to be trained/impacted in five years. The brief qualitative and the quantitative outcomes envisaged under the project are as under:

- Establish a collaborative ecosystem in Unmanned Aircraft Systems and related technologies through identified Resource Centres (RCs) and Participating Institutions (PIs)
- Establishing five (5) Work Themes (WTs) to enhance capacity & capabilities of select institutions in Unmanned Aircraft Systems.
- 50 Faculty Updation and Master Training in niche areas of UAS under five identified Work Themes (WTs)
- Supporting collaborative knowledge creation in Work themes through support for 200 papers/patents in UAS and related technology areas.
- Fostering ideation & innovation capabilities among students @ academia through 900 bootcamps and 2 innovation challenges to bring-out technical talent and nurture entrepreneurial mind-set
- Nurturing developmental mindset among student community by way of supporting and shortlisting of 200 ideas leading to POCs in academics through a continuous mentorship & handholding support to facilitate Aatma Nirbhar Bharat initiative
- UAS model curriculum for Formal (Major/Minor Degree and Retrofitting Electives)
- M.Tech degree in UAS / related area by IIT Kanpur
- 20 academic institutes shall offer Minor Degree / Retrofitting of electives in UAS and related areas
- 10 Open Online courses for UG/PG students to complement the repository of courses at NPTEL/ SWAYAM platform
- 10 institutes to offer PG Diploma courses for non-formal/training activities
- Supporting conduction of 25 national workshops (5 per Work Theme) and 2 international conferences @ academia



Sagar

Manpower Estimates for RC/PI

Details of manpower estimated for various activities and monthly renumeration for carrying out the above activities is as follows:

For PI Academic:

SINo.	Component	Details
1	Overall UAS Project Activity & Lab Co-ordination at Institute	<ul style="list-style-type: none"> • One Project Lead (@Rs. 75k per month)
2	Technical and Coordination Manpower for project implementation at Institute (Workshops, Conference, Formal/Non-Formal, Bootcamps etc.)	<ul style="list-style-type: none"> • Two SRF/JRF/RA/PA (@Rs. 45k per month)



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(Terms & Conditions Governing the Grant-In-Aid)

- i. The grant is for the specific project as approved by Ministry of Electronics and Information Technology (MeitY) and shall be subject to the following conditions:
 - o The grant amount shall be spent for the project within the specified time.
 - o Any portion of the grant which is not ultimately required for expenditure for the approved purposes shall be duly surrendered to MeitY.
- ii. The grantee institution shall maintain an audited record in the form of a register in the prescribed proforma for permanent, semi-permanent assets acquired solely or mainly out of MeitY grant;
- iii. The assets referred to in (ii) above will be property of MeitY and should not, without prior sanction of MeitY, be disposed off or encumbered or utilised for the purposes other than those for which the grant has been sanctioned. An undertaking shall be given by the grantee institution that they agree to be governed by these conditions;
- iv. At the conclusion of the project, MeitY will be free to sell or otherwise dispose of the assets which are the property of MeitY and grantee institution shall render to MeitY the necessary facilities for facilitating the sale of these assets;
- v. The grantee institution shall send to the Ministry of Electronics and Information Technology at the end of each financial year as well as at the time of seeking further instalments of the grant a list of assets referred to in (ii) above;
- vi. Should at any time grantee institution cease to exist, such assets etc., shall revert to MeitY;
- vii. The grantee institution shall render progress-cum-achievement reports at interval of not exceeding six months on the progress made on all aspects of the project including expenditure incurred on various approved items during the period.
- viii. The grantee institution shall render an audited statement of accounts to MeitY.
- ix. The audited statement of accounts relating to grants given during financial year together with the comments of the auditor regarding the observance of the conditions governing the grant should be forwarded to the Ministry of Electronics and Information Technology within six months following the end of the relevant financial year;
- x. The utilisation of grant for the intended purposes will be looked into by the Auditor of grantee institution according to the directives issued by the Government of India at the instance of the Comptroller and Auditor General and the specific mention about it will be made in the audit report;
- xi. MeitY or its nominee/s will have the right of access to the books and accounts of the grantee institution for which a reasonable prior notice would be given;
- xii. The grantee institution should maintain separate audited account for the project. If it is found expedient to keep a part or whole of the grant in a bank account earning interest, the interest, thus earned should be reported to this Department. The interest so earned will be treated as a credit to the grantee to be adjusted towards future instalment of the grant;
- xiii. Sale proceeds of components, prototype, pilot project etc. fabricated as a result of the development of the project arising directly from funds granted by Ministry of Electronics and Information Technology shall be remitted to MeitY;
- xiv. The know-how generated by the project shall be property of MeitY. Any receipt by way of sale of knowhow transfer, royalties etc shall accrue to MeitY. MeitY may, in its discretion, allow or direct a portion of such receipts to be retained by the grantee organisation;
- xv. MeitY will have the right to call for drawings, specifications and other data necessary to enable the transfer of know-how to other parties and the grantee shall supply all the needed data at the request of MeitY;
- xvi. Application by grantee institution for any other financial assistance or receipt of grant/loan from any other Agency/Ministry/Department for this project should have the prior approval of Ministry of Electronics and Information Technology.
- xvii. The Grantee institution is not allowed to entrust the implementation of this project for which grant-in-aid is received to another institution and to divert the grant-in-aid received from Ministry of Electronics and Information Technology as assistance to the later institution

