

**Technology Innovation in Exploration & Mining
Foundation [TexMin]**

IIT (ISM) Dhanbad

MINUTES

**1ST MEETING OF THE
HUB GOVERNING BOARD**

**05 FEBRUARY, 2021 5.30 P.M.
(online)**

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Attendees

A	Director, IIT (ISM) Dhanbad	Chairman
	• Prof. Rajiv Shekhar	
B	Academic Representatives:	Members
	• Prof. Shalivahan , Professor, Applied Geophysics and Dean (R&D), IIT (ISM) Dhanbad	
	• Prof. R. M. Bhattacharjee , Professor (CIL Chair) & Head of the Department, Mining Engineering, IIT (ISM) Dhanbad	
	• Prof. Laxmidhar Behera , Department of Electrical Engineering, IIT Kanpur	
	• Dr. Nabarun Bhattacharyya , Senior Director & Centre Head, CDAC, Kolkata	
C	Industry Representatives:	Members
	• Mr. Binay Dayal , Director (Technical), Coal India Limited	
	• Mr. Arun Misra , Chief Executive Officer, Hindustan Zinc	
	• Dr. S. Ravi, Director (G), National Centre of Mineral Targeting (NCMT), Geological Survey of India	
D	Mission Director, Mission Office, DST	Member
	• Dr. K. R. Murali Mohan , Mission Director, NM-ICPS and Scientist-G & Head, Interdisciplinary Cyber Physical Systems Division, DST, Govt. of India	
E	Project Director, TIH	Member-Secretary
	• Prof. Dheeraj Kumar , Professor, Mining Engineering, IIT (ISM) Dhanbad	

Leaves of absence were received from

- **Mr. Gautam N. Mehra**, Chairman & Managing Director, Savita Oil Technologies Limited & Member, BoG, IIT (ISM) Dhanbad
- **Dr. Barun Gorain**, Managing Director, ORE2METAL Inc.



Agenda Transacted

Item No. 1/1: Welcome to the Members of HGB and their brief introductions

Prof. Rajiv Shekhar, Chairman, Hub Governing Board (HGB) & Director, IIT (ISM) introduced all the members of the HGB and welcomed them [**Annexure I:** A brief profile of HGB]

Item No. 1/2: Briefing about the TIH and its mandated objectives

Prof. Dheeraj Kumar presented a brief about the TexMin Hub and its mandated objectives, goals, targets, deliverables, execution of mandated activities, finance, governance model, etc. as per the NM-ICPS mandates [**Annexure II:** A brief presentation about TexMin]

Item No. 1/3 : Notification about constitution of HGB and appointment of Project Director, TIH

The notification regarding constitution of HGB and appointment of Prof. Dheeraj Kumar, IIT (ISM) as the Project Director of TexMin Hub was noted by the members and agreed upon.

Item No. 1/4: Role of the HGB in TexMin Hub

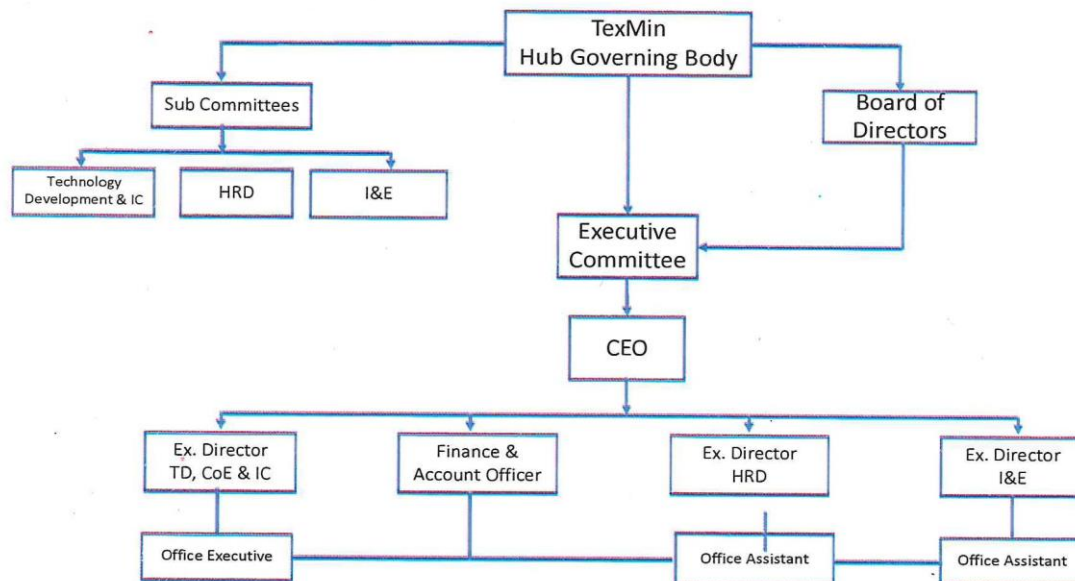
The Terms of Reference of Hub Governing Body (As per the mandate of NM-ICPS, DST) was presented before the HGB. Members expressed their commitment to provide full support to TexMin Hub in meeting its mandated objectives [**Annexure III:** Hub Notification including ToR of HGB].

Item No. 1/5: Hub Governing Model and Delegation of Financial Authority

A proposal on Financial Delegation of Authority (FDA) [prepared in accordance with the existing FDA in IIT (ISM) Dhanbad] in the TexMin to the Chairman, HGB; Project Director; BoD; CEO and other designated officials was put before the HGB for its consideration.



The Hub governance model was also presented before the board as outlined below:

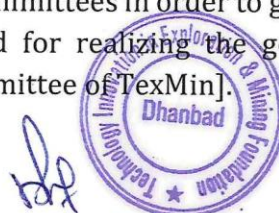


Dr. Murali Mohan, Mission Director, NM-ICPS, DST gave a detailed insight into the vision of Govt. of India in setting up 25 Hubs. He further explained how synergy between the HGB and TexMin Foundation company could be established for carrying out Hub activities in a seamless manner. It was opined that the Hub policies [purchase, financial delegation of authority etc.] of IHFC, IIT Delhi and other established Hubs could be looked into for the TexMin Hub.

The board after due deliberations, approved the Hub governance model with following salient features.

- The HGB headed by the Director, IIT (ISM) Dhanbad [Host Institute] as the permanent Chairman will have functional autonomy to realize the goals and objectives of TexMin Hub.
- The HGB will be assisted by sub-committees as constituted by HGB/Chairman, HGB.
- An Executive Committee (EC) in line with IHFC Hub at IIT Delhi will be constituted by the Chairman, HGB with Project Director, TexMin as Chairman and CEO, TexMin as Member Secretary. The EC will have members from different domain areas for executing the Hub activities.
- The HGB may delegate the different level of financial power to the Chairman, HGB; Project Director; TexMin BoD; CEO and other designated officials of the TexMin in the pattern of financial powers of Director, Dean and other authorities at IIT (ISM) Dhanbad.
- Functional autonomy may also be given by the HGB to sub-committees, Board of Directors (BoD) of TexMin and Executive Committee of TexMin.

The HGB authorized Chairman, HGB for formation of sub-committees in order to get the TexMin Hub activities executed efficiently and monitored for realizing the goal of TexMin [Annexure IV: Sub-Committees and Executive Committee of TexMin].



HGB also authorized chairman, HGB to adopt the Hub policies [purchase, financial delegations, etc.] of well established hubs at IIT Delhi, IIT Madras etc. with minor modifications as per the need of TexMin [Annexure V: TexMin Purchase Policy and Financial Delegation of Authority in line with IIT Delhi].

Item No. 1/6: Manpower Recruitment in TexMin and Initiating activities of TIH under the broad guidelines of DPR

Manpower Recruitment: The draft recruitment notices/advertisements for the positions of CEO, Account Executive, Office Executive and Office Assistant were presented before the board.

The board approved the recruitment process and authorized Chairman, HGB for initiating all such recruitments and carryout the selection process including appointments.

The board also approved appointment of Prof. Dheeraj Kumar, Project Director, TexMin Hub as the interim CEO of TexMin Foundation.

Major Activities of TexMin: The HGB was informed about initiating major activities of the TexMin as listed below in line with DPR.

- Technology Development: (Transnational research, Establish world-class R&D in CPS research base, IP, Licensing, Patents, Products, Publications)
- Innovation, Entrepreneurship and Start-up Ecosystem: TBI, Start-ups, Grand Challenges, Promoting early innovators & entrepreneurs, Seed support, Job creation
- HRD and Skill Development: UG/ PG, Ph.D., Post-Doctoral & Faculty Fellowship, Chair Professors, Skill Development.
- International Collaborations: To establish and strengthen the international collaborative research for cross-fertilization of ideas.

Some of the activities related to Technology Development such as development of facilities for R&D Projects, call for R&D project proposals [TRL 1 -3, 4-6, and 7-10] including initial grants for proof of concepts (PoC) and prototype development etc. have already been started in line with the guidelines laid in the DPR.

The board was informed about the possible collaboration with UiT The Arctic University of Norway for development of new global paradigms of exploration and mining in environmentally vulnerable zones through joint research, creating a better experienced workforce, and triggering innovation and entrepreneurship in sustainable mining.

In order to support the goals of sustainable Exploration & Exploitation Research (SEER) and for accelerating the pace of developments in this important global need, TexMin will support the funding of 5 PhD students at IIT (ISM) dedicated to the research undertaken in SEER. The funding from TexMin will cover PhD fellowships and annual contingency



fund for 5 years, excluding the scholarship support during the exchange-related mobility (which is being funded by UTFORSK). TexMin has already been given target to provide 23 Doctoral fellowships.

The HGB, after due deliberations approved the proposal. Mission Director, DST also suggested to explore the agreement between Govt. of India and Norway in this regard.

Item No. 16/7: Collaborations with Academic & Research Institutions and Industries

The HGB was briefed about the proposed collaboration of TexMin with C-DAC, Coal India, HZL-Sandvik, NVIDIA, PM Infrasciences, and other organizations and industries.

It was further informed to the board about association of C-DAC Kolkata as the academic partner of TexMin in the following activities:

- Development and hosting TexMin web portal (development, hoisting, ssl certificate incorporation, security audit and maintenance) with all its activities showcased in on-line including development of TexMin Logo.
- Development and hosting of e-PMS (Project proposal submission, evaluation, awarding, monitoring etc.)
- Carrying out joint R&D projects on CPS applications in Exploration & Mining (AI in exploration, dump slope monitoring & prediction, smart communication and navigations in UG mines etc.)
- Developing computing infrastructure, software framework development, HPC infrastructure at Hub.
- Providing the existing HPC facilities for the TIH projects on mutual terms and conditions.
- Organizing training programmes in CPS (AI and Sensor Technologies) for faculty, students and project coordinators on mutual agreed terms and conditions.

The board was further informed about the proposal of Sandvik for setting of Sandvik Mine Automation Learning Centre at TexMin Hub with HZL as Industry partner.

The committee authorized chairman, HGB to approve such collaborations in the interests of TexMin.

Shri Binay Dayal, Director, Technical Coal India Limited suggested to explore possibilities of collaborating with Accenture to take the TexMin Activities forward.

The meeting ended with vote of thanks.

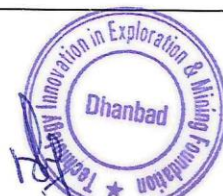

(Dheeraj Kumar)

Project Director, TexMin & Member Secretary, HGB



ANNEXURE I: PROFILE OF HGB

A	Prof. Rajiv Shekhar, Director, IIT (ISM) Dhanbad	Chairman
	Prof. Shekhar is having 24+ years of teaching and research experience at IIT Kanpur with focus on industrial applications. Well-rounded, go-getter academic with experience ranging from institution building, engineering R&D, project management, policy, and administration. Multi-disciplinary expertise: metals extraction, manufacturing, environmental remediation, engineering economics, solar thermal energy, electric power system optimization and policy. Good understanding of process for scaling technology from laboratory to industry. Good contacts in industry, R&D organizations, and multi-lateral institutions.	
B	Academic Representatives:	Members
	Prof. Shalivahan, Professor, Applied Geophysics and Dean (R&D), IIT (ISM) Dhanbad Prof Shalivahan having research expertise in optimization of Geophysical data sets using swarm intelligence, mineral exploration and solid earth geophysics, having academic experience of more than 20 years. Currently he holding position as Dean R&D at IIT (ISM) Dhanbad.	
	Prof. R. M. Bhattacharjee, Professor (CIL Chair) & Head, Mining Engineering, IIT (ISM) Dhanbad Prof. Bhattacharjee is having vast experience of more than 32 years in the field Industrial mining and exploration, his research Interest are Underground coal mining technology, Risk assessment and Safety Management, Emergency Response & Disaster Management, Accident investigation, Mine fire and explosion.	
	Prof. Laxmidhar Behera, Department of Electrical Engineering, IIT Kanpur Dr. Laxmidhar Behera is currently associated with the Department of Electrical Engineering as a Professor (HAG) in the Control and Automation Specialization. He is also holding Poonam & Prabhu Goel Chair position. He heads the Intelligent Systems and Control Laboratory at IIT Kanpur and extensively focuses on developing automation solutions to industrial and domestic problems. His area of specialization is Robotics and Artificial Intelligence.	
	Dr. Nabarun Bhattacharyya, Senior Director & Centre Head, CDAC, Kolkata Dr. Nabarun Bhattacharyya graduated from the Department of Electronics & Telecommunication Engineering, Jadavpur University, Kolkata, India. He has Ph. D. (Eng.) degree from Jadavpur University. He has over 30 years of research experiences. His fields of interest include agri-electronics, machine olfaction, soft computing, and pattern recognition, Biosensors etc. He has authored/co-authored over 159 papers in different international journals, conferences and 12 book chapters. He has got 35 patents and copyrights in his name. He is recipient of number of awards and Honors that include CSIR award, Intel award and CDAC's best scientist award. He has guided 18 PhDs and 5 more PhD scholars are pursuing PhD under him.	
C	Industry Representatives:	Members
	Mr. Gautam N. Mehra, Chairman & Managing Director, Savita Oil Technologies Limited & Member, BoG, IIT (ISM) Dhanbad Mr. Mehra is a Chemical Engineer and has an MBA from University of California (Berkeley). He has total experience of more than three decades in the industry. He has successfully led the core business of Petroleum Specialties of the Company to new heights year after year. His entrepreneurial vision, led the Company to successfully explore the Renewable Energy sector and launch its own brand of automotive lubricants.	



	Mr. Binay Dayal, Director (Technical), Coal India Limited Mr. Dayal has assumed the charge of Director (Technical), Coal India Limited from 11th Oct'17. Shri Dayal is Board member of CMPDIL, BCCL, HURL and TFL. He was graduated in Mining Engineering in 1983 from Indian School of Mines (ISM), Dhanbad. He is holder of 1st Class Mine Manager's Certificate of Competency from DGMS, Dhanbad. He obtained MBA from BIT, Mesra. He has vast experience spanning over three and half decades in Indian Coal Industry
	Mr. Arun Misra, Chief Executive Officer, Hindustan Zinc Mr. Misra brings with him a vast experience of 31 years having held several leadership roles. Prior to joining Hindustan Zinc as CEO, was associated with Tata Steel as Vice President - Raw Materials. He is also the Vice President of Indian Institute of Mineral Engineers and has published several papers in their journal of national repute. He completed his Bachelor in Electrical Engineering from IIT – Kharagpur with a Diploma in Mining and Beneficiation from New South Wales Sydney, and another diploma in General Management from CEDEP, France
	Dr. S. Ravi, Director (G), National Centre of Mineral Targeting (NCMT), Geological Survey of India Dr. Ravi has the distinction of carrying out exploration for search of Kimberlites and Lamproites in Central India and South India Dimond Provinces with an experience of more than 27 years. Dr. Ravi is a recipient of National Mineral Award from Govt. of India for his significant contribution to Diamond Exploration. He has done his PhD from IIT Bombay. He has authored quite a good no. of research papers and completed several R&D projects. Dr. Ravi has been also associated as a faculty in GSITI, GSI.
D	Mission Director, Mission Office, DST Member
	Dr. K. R. Murali Mohan, Mission Director, NM-ICPS and Scientist-G & Head, Interdisciplinary Cyber Physical Systems Division, DST, Govt. of India Dr. K R Murali Mohan is serving the DST from 1998 onwards and presently he is Mission Director, NM-ICPS and Scientist-G. He is heading the Frontier & Futuristic Technology Division. Dr. Mohan has done his Ph D in Computer Engineering from Delhi College of Engineering, Delhi University and an alumni of S V University, Tirupati. He also attended Science, Technology, Innovation and Policy (STIP) programme at Kennedy School of Govt, Harvard University, Boston, USA. He has developed number of new R&D network based cluster initiatives. His multidisciplinary academic background coupled with multi-institutional scientific exposure spanning over 20 years provides him an edge in identifying and in conceptualizing niche scientific areas of research. The programmes he developed/ under development, synergizes the core concepts of Big Data, Geo-Sciences, Information & Communication Technologies (GeoICT) and brings in the fundamental and applied aspect of this emerging spectrum of Science.
E	Project Director, TIH Member-Secretary
	Prof. Dheeraj Kumar, Professor, Mining Engineering, IIT (ISM) Dhanbad Prof. Dheeraj Kumar is presently working Professor in the Department of Mining Engineering, and Dean (International Relations & Alumni Affairs), IIT (ISM) Dhanbad. He completed his M. Tech from Indian School of Mines (ISM), Dhanbad and Ph.D. in Mining Engineering from Indian Institute of Technology (IIT), Kharagpur. He has more than 16 years' experience of teaching & research and completed more than 70 (Seventy) industrial consultancy and R&D projects. Dr. Kumar has also trained more than 500 mining executives on various mining and allied disciplines. He is a recipient of "Meritorious Scholar" award at IIT Kharagpur for consecutive three years, SBI 2nd Best Researcher award for five consecutive years during 2012-16, and "Hindustan Zinc Limited Award" by the Institution of Engineers (INDIA).



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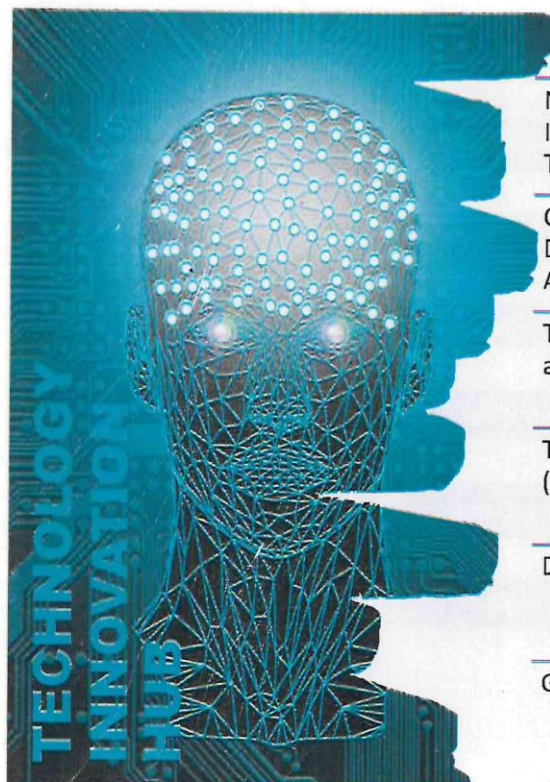


INDIAN INSTITUTE OF TECHNOLOGY
(INDIAN SCHOOL OF MINES)
DHANBAD



Technology Innovation Hub in Exploration & Mining (TexMin) National Mission on Interdisciplinary Cyber- Physical Systems (NM-ICPS)

A not-for Profit HUB funded by Department of Science & Technology, Government of India



National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS), Department of Science & Technology (DST) : Established 25 TIHs

CPS encompasses technology areas of Cybernetics, Mechatronics, Design and Embedded systems, Internet of Things (IoT), Big Data, Artificial Intelligence (AI) etc.

The hubs will be equipped and supported to function independently as stand-alone entities

TIH at IIT (ISM): Technology Vertical 'Technologies for Mining' (Exploration & Mining)

DST Grant-In-Aid: Rs 110.00 crore (Max.) over a period of 5 years

Guiding Document: Detailed Project Report (DPR)



HUB ACTIVITIES

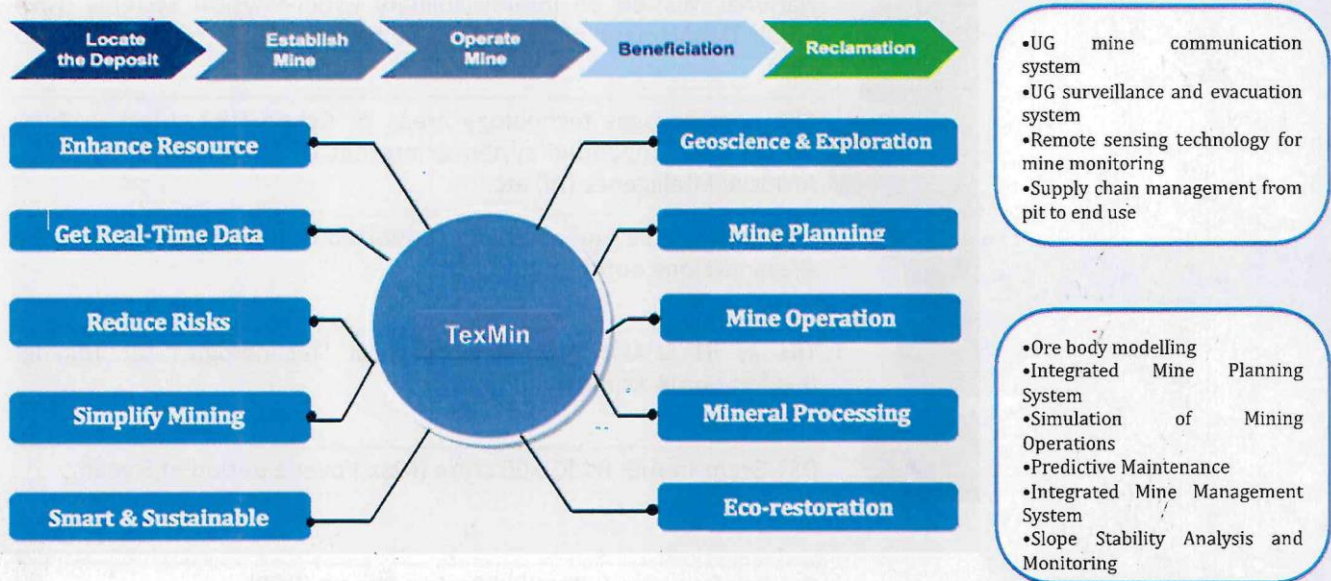
Technology Development: (Transnational research, Establish world-class R&D in CPS research base, IP, Licensing, patents, Products, Publications)

Innovation, Entrepreneurship and Start-up Ecosystem: TBI, Start-ups, Grand Challenges, Promoting early innovators & entrepreneurs, Seed support, Job creation

HRD And Skill Development: UG/ PG, Ph.D., Post-Doctoral & Faculty Fellowship, Chair Professors, Skill Development.

International Collaborations: To establish and strengthen the international collaborative research for cross-fertilization of ideas.

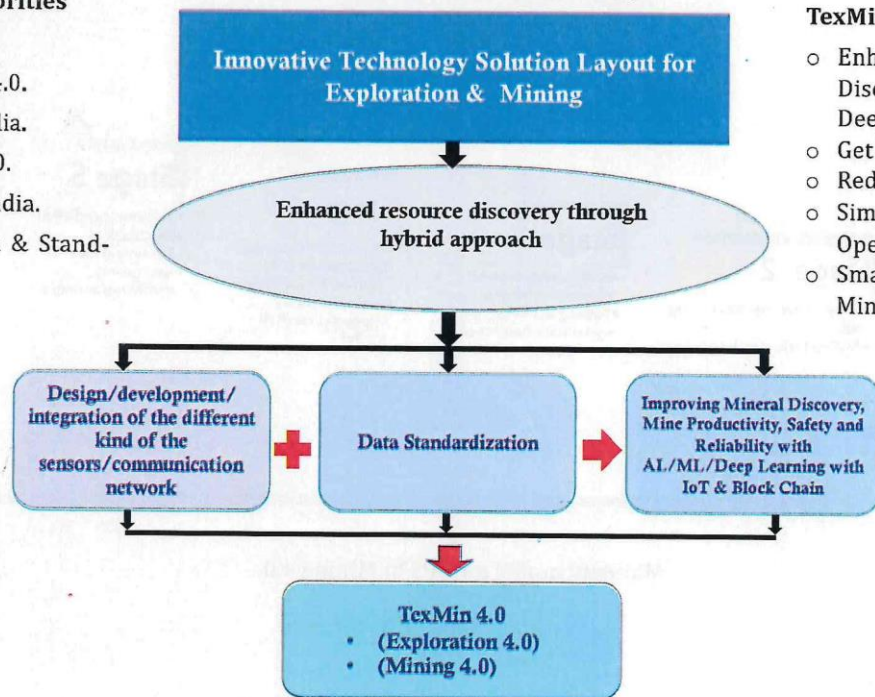
PROBLEMS TO BE ADDRESSED THROUGH CPS INTERVENTION



National Priorities

- ☐ SDG
- ☐ Industry 4.0.
- ☐ Digital India.
- ☐ Society 5.0.
- ☐ Make in India.
- ☐ Skill India & Stand-up India

GOALS & OBJECTIVES



TexMin Specific Goals

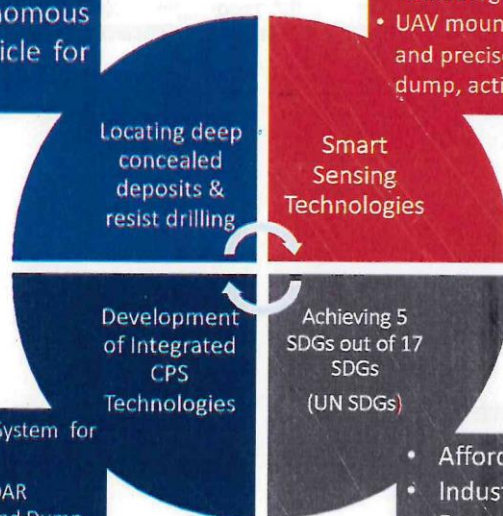
- Enhance Resource Discoveries and Locating Deep Concealed Deposits
- Get Real-Time Data
- Reduce Risk
- Simplify Mining Operations
- Smart & Sustainable Mining

- Lower the cost of exploration through pattern matching, predictive analytics and computer Vision systems (AR & VR)
- Development of an autonomous multirotor unmanned aerial vehicle for geophysical survey

- AI based Predictive Maintenance of Mining Equipment for improving productivity
- Spatial Visualization using AR, VR and LIDAR Technologies
- UAV mounted sensors for real time continuous and precise movement monitoring of waste dump, active as well as old dumps

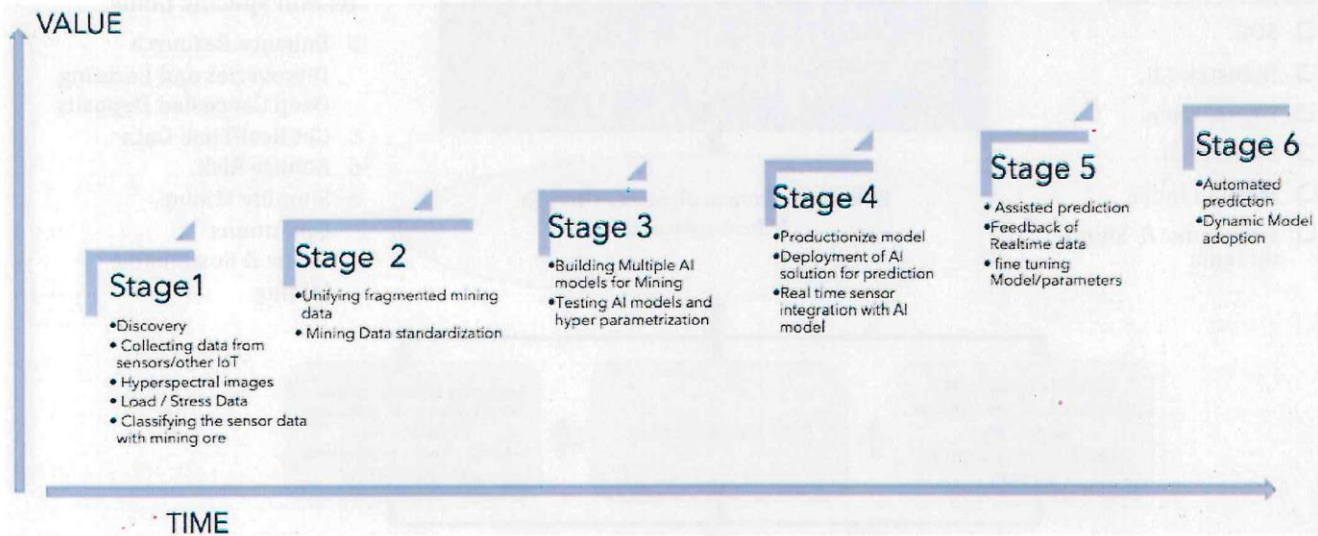
DELIVERABLES

- Robotic based Surveillance and Evacuation System for Underground Mine Safety
- Development of a low-cost AI/ML portable RADAR system for Monitoring and prediction of Rock and Dump Slopes failure in Open Cast Mines
- Machine learning algorithms for accurate extraction of features in mine areas and characterization of geo-hazards



- Affordable and Clean Energy
- Industry, Innovation
- Responsible Consumption and Production
- Life on Land
- Partnerships to achieve the goal





Maturity model for CPS in Mining 4.0

TARGETS : TECHNOLOGY DEVELOPMENT

		1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	Total
(a)	No of Technologies (IP, Licensing, Patents etc)	20	2	3	5	5	20
(b)	Technology Products	15	1	2	2	5	15
(c)	Publications, IPR and other Intellectual activities	45	5	10	10	10	45
(d)	Increase in CPS Research Base	70	5	10	15	20	70



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TARGETS : INNOVATION & ENTREPRENEURSHIP

(a)	Technology Business Incubator (TBI)	1	1	0	0	0	0	1
(b)	Start-ups & Spin-off companies	35	5	10	10	10	0	35
(c)	GCC - Grand Challenges & Competitions	1		1		-	-	1
(d)	Promotion and Acceleration of Young and Aspiring technology entrepreneurs (PRAYAS)	1	1	0	0	0	0	1
(e)	CPS-Entrepreneur In Residence (EIR)	21	10	11	0	0	0	21
(f)	Dedicated Innovation Accelerator (DIAL)	1	1	0	0	0	0	1
(g)	CPS-Seed Support System (CPS- SSS)	1	1	0	0	0	0	1
(h)	Job Creation	8750	150	1100	2000	2500	3000	8750

TARGETS : HRD & IC

3.	HRD							
(a)	Graduate Fellowships	220	40	40	40	50	50	220
(b)	Post Graduate Fellowships	42	10	10	10	12	0	42
(c)	Doctoral Fellowships	23	5	8	10	-	-	23
(d)	Faculty Fellowships	3	-	2	1	-	-	3
(e)	Chair Professors	3	-	2	1	-	-	3
(f)	Skill Development	410	35	75	100	100	100	410
4.	International Collaboration							
(a)	International Collaboration	1	1	0	0	0	0	1



HUB FINANCE

Initial funding of 110 crores is to be made by Department of Science & Technology, Govt in next 5 years



Budget Head	Budget in Rs Crores (DST)					
	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	Total
Recurring	11.00	20.00	35.00	8.00	4.38	78.38
Non-Recurring	7.00	15.00	8.00	1.00	0.62	31.62
Total	18.00	35.00	43.00	9.00	5.00	110.00

A portion of the (around 50%) funds provided for development of technology products to Hubs will be earmarked for technologies/ products developed by multiple Hubs having complementary goals to work together

HUB REVENUE GENERATION

Self-sustainable after 5 years however 3 years onwards the HUB need to get support from industries to maintain sustainability model.

Hubs with a Public Private Partnership (PPP) model to encourage additional support

Revenue channels with a focus on creating a self-sustaining model

- Applied technologies & Engineering
- IP Creation and Licensing
- Training and Consulting
- Policy Guidance and help in formulation
- Databank creation across strategic areas of focus



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HUB MANAGEMENT: AT MISSION



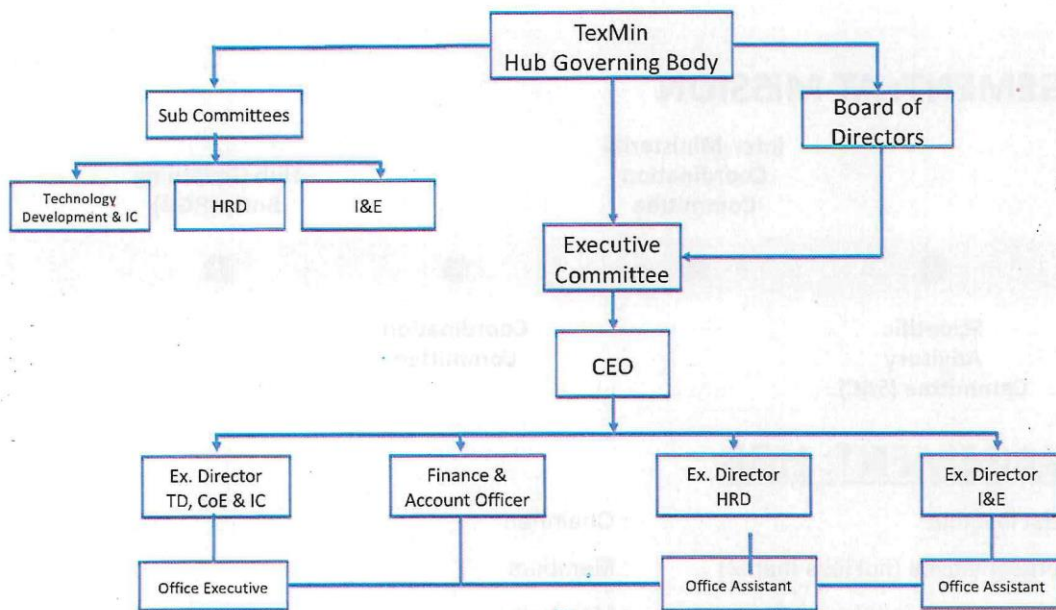
HUB MANAGEMENT: HGB

Director of Host Institute	: Chairman
Academic representatives (not less than 2)	: Members
Industry Representatives (not less than 2)	: Members
Mission Director, Mission Office, DST	: Member
Project Director, Hub:	: Member-Secretary

HGB : TOR

- HGB shall be the Apex body for overall supervision, control, directions and mid-course correction in the implementation of Hub at Host Institutes
- Will approve key guidelines for implementation of the Hub
- will be the final authority to provide guidelines for implementation and operating the Hub and all other matters related to them
- will have financial and administrative powers, including approvals to, re-appropriation of the budget within the ceiling of sanctioned budget
- hire the appropriate manpower as per industry standards, sign Memorandum of Understanding (MoU) with International institutions and approve Collaboration foreign visits,
- partner with industry, receive/ support for projects in their domain areas to academic, R&D institutions, Industry, other funding agencies and linkages with existing TBIs or create a new TBI
- Appoint sub-committees from time-to-time and assign and/or mandate them appropriate technical streams





TexMin FOUNDATION

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Innovation in mining technology



24



प्रो. राजीव शेखर
निदेशक
Prof. Rajiv Shekhar
Director

भारतीय प्रौद्योगिकी संस्थान (भारतीय खनि विद्यापीठ), धनबाद
धनबाद-826004, झारखण्ड, भारत
Indian Institute of Technology (Indian School of Mines), Dhanbad
Dhanbad-826004, Jharkhand, India

No. DT/95 (7)

Date: 25.01.2021

Notification

Sub: Hub Governing Body for Technology Innovation Hub on 'Technologies for Mining' at IIT (ISM) Dhanbad under NM-ICPS, DST

Department of Science and Technology (DST), Govt. of India has established the prestigious Technology Innovation Hub on **Technologies for Mining (Exploration and Mining)** at IIT (ISM) Dhanbad under the National Mission for Interdisciplinary Cyber-Physical Systems (NM-ICPS).

The TIH at IIT (ISM) will be governed by its Hub Governing Body (HGB) as constituted below:

A	Director, IIT (ISM) Dhanbad	Chairman
	• Prof. Rajiv Shekhar	
B	Academic Representatives:	Members
	• Prof. Shalivahan, Professor, Applied Geophysics and Dean (R&D), IIT (ISM) Dhanbad	
	• Prof. R. M. Bhattacharjee, Professor (CIL Chair) & Head of the Department, Mining Engineering, IIT (ISM) Dhanbad	
	• Prof. Laxmidhar Behera, Department of Electrical Engineering, IIT Kanpur	
	• Dr. Nabarun Bhattacharyya, Senior Director & Centre Head, CDAC, Kolkata	
C	Industry Representatives:	Members
	• Mr. Gautam N. Mehra, Chairman & Managing Director, Savita Oil Technologies Limited & Member, BoG, IIT (ISM) Dhanbad	
	• Mr. Binay Dayal, Director (Technical), Coal India Limited	
	• Mr. Arun Misra, Chief Executive Officer, Hindustan Zinc	
	• Dr. Barun Gorain, Managing Director, ORE2METAL Inc.	
	• Dr. S. Ravi, Director (G), National Centre of Mineral Targeting (NCMT), Geological Survey of India	
D	Mission Director, Mission Office, DST	Member
	• Dr. K. R. Murali Mohan, Mission Director, NM-ICPS and Scientist-G & Head, Interdisciplinary Cyber Physical Systems Division, DST, Govt. of India	
E	Project Director, TIH	Member-Secretary
	• Prof. Dheeraj Kumar, Professor, Mining Engineering, IIT (ISM) Dhanbad	





प्रो. राजीव शेखर
निदेशक
Prof. Rajiv Shekhar
Director

भारतीय प्रौद्योगिकी संस्थान (भारतीय खनि विद्यापीठ), धनबाद
धनबाद-826004, झारखण्ड, भारत
Indian Institute of Technology (Indian School of Mines), Dhanbad
Dhanbad-826004, Jharkhand, India

The Terms of Reference of Hub Governing Body (As per the mandate of NM-ICPS, DST):

- (a) The Hub Governing Body shall be the Apex body for overall supervision, control, directions and mid-course correction in the implementation of the TIH 'Technologies for Mining (Exploration and Mining)' at IIT (ISM) Dhanbad.
- (b) Will approve key guidelines for implementation of the Hub.
- (c) HGB will be the final authority to provide guidelines for implementation and operating the Hub and all other matters related to them. HGB will have full financial and administrative powers, including approval to, re-appropriation of the budget within the ceiling of sanctioned budget, hire the appropriate manpower as per industry standards, sign Memorandum of Understanding (MoU) with International institutions and approve collaboration, foreign visits, partner with industry, receive/ support for projects to academic, R&D institutions, Industry, other funding agencies and linkages with existing TBI or create a new TBI if there is no TBI in HI. Support for projects will be based on requirement, open call and with due scientific diligence and processes.
- (d) HGB may co-opt eminent people (India/ abroad) as members.
- (e) HGB would meet as often as required and at least once in a year.
- (f) Appoint sub-committees from time-to-time and assign and/or mandate them appropriate technical streams or assign tasks that fall within the scope of such Committees for efficient implementation of Hubs at Host Institutes.

This supersedes earlier notification dated 03.07.2020

Rp &

(Rajiv Shekhar)
Chairman, HGB



TECHNOLOGY INNOVATION IN EXPLORATION & MINING FOUNDATION (TexMin)

TECHNOLOGY INNOVATION HUB (TIH)

Add: CRE Building, 3rd Floor, IIT (ISM) Dhanbad, JH- 826004 | Mail: texmin@iitism.ac.in

Annexure IV: Sub-Committees and Executive Committee of TexMin

SUB COMMITTEES

TECHNOLOGY DEVELOPMENT

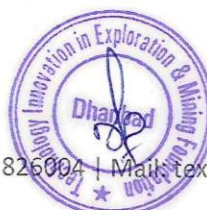
Exploration		
1.	Mr. Arun Mishra, CEO Hindustan Zinc & Member, HGB	Chairman
2.	Dr. S. Ravi, Director (G), SI & Member, HGB	Member
3.	Prof. Shalivahan, AGP, & Dean (R&D), IIT (ISM)	Member
4.	Prof. Dheeraj Kumar, PD TexMin Foundation	Member
5.	Prof. S. Datta Gupta, AGP, IIT (ISM) & Member, EC	Member Secretary
Mining		
1.	Mr. Binay Dayal, Director (Technical), CIL & Member, HGB	Chairman
2.	Dr. Nabarun Bhattacharyya, Senior Director & Centre Head, CDAC, Kolkata & Member, HGB	Member
3.	Prof. R. M. Bhattacharjee, HoD/Mining IIT (ISM) Dhanbad	Member
4.	Prof. Dheeraj Kumar, PD TexMin	Member
5.	Prof. R. K. Sinha, Mining, IIT (ISM) & Member, EC	Member Secretary

INNOVATION, INCUBATION AND ENTREPRENEURSHIP

1.	Mr. Gautam N. Mehra, Chairman & MD Savita Oil Ltd. & Member, HGB	Chairman
2.	Dr. Barun Gorain, Managing Director, ORE2METAL Inc. & Member, HGB	Member
3.	Representative from Accenture or other Industry partner	Member
4.	HoD CIIE, IIT (ISM), Dhanbad	Member
5.	Prof. Ajit Kumar, ME IIT (ISM) & Member, EC	Member Secretary

HRD & SKILL DEVELOPMENT

1.	Prof. Shalivahan (Director TexMin)	Chairman
2.	Representative from Sandvik other Industry partner	Member
3.	Prof. R. M. Bhattacharjee, HoD, ME IIT (ISM) Dhanbad	Member
4.	Prof. Dheeraj Kumar, PD TexMin	Member
5.	Prof. Ravi Gangwar, ECE IIT (ISM) & Member, EC	



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EXECUTIVE COMMITTEE

1.	Prof. Dheeraj Kumar, Project Director	Chairman
2.	Prof. R.K Siha, Mining Engineering	Member
3.	Prof. Barun Kumar Nandi, FMME	Member
4.	Prof. Haider Banka, Computer Science	Member
5.	Prof. Ravi Gangwar, Electronics	Member
6.	Prof. Arun Dayal Udai, Mechanical	Member
7.	Prof. Tarachand Amgoth, Computer Science	Member
8.	Prof. Raghvendra Kumar Chaudhary, Electronics	Member
9.	Prof. Sukanta Das, Electrical Engg.	Member
10.	Prof. Ajit Kumar, Mining Machinery	Member
11.	Prof. Saurabh Datta Gupta, Applied Geophysics	Member
12.	CEO, TexMin (TIH)	Member Secretary



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Annexure V: TexMin Purchase Policy and Financial Delegation of Authority in line with IIT Delhi

PURCHASE POLICY

1. PREAMBLE

The Purchase policy of TexMin Hub is in line with the Purchase policy of IHFC Hub of IIT Delhi.

These rules for purchase and accounting of various expenses of setting-up and running the organization and thereby provide a conducive working environment for employees/staff, partners and associated entities to promote excellence expected from and as such should be interpreted in that context, so that the procurement of the needed equipment/stores/services is done in time and without procedural wrangles, which permits the desired task to be pursued with greater vigor.

Every authority delegated with the financial powers of procuring goods/services in public interest shall have the responsibility and accountability to bring efficiency, economy, and transparency in matters relating to procurement and for fair equitable treatment of suppliers and promotion of competition in procurement. The procedure to be followed in making procurement must confirm to the following yardsticks.

1. The specification in the terms of quality, type, duration etc. and quantity of goods to be procured, should be clearly spelt out keeping in view the specific needs of the procuring entity without including non-essential features, which may result in unwarranted expenditure.
2. Offers should be invited following a fair, transparent and reasonable procedure.
3. The procuring authority should be satisfied that the equipment(s)/item(s)/material/service partner(s)/vendor(s) selected offer(s)/adequately meet(s) the requirement in all respects.
4. The procuring authority should satisfy itself that the price of the selected offer is reasonable and consistent with the quality required.
5. Purchase should not be split to avoid obtaining approval of appropriate competent financial authority.
6. The procedure to be followed for a purchase would follow the Financial DoA guidelines.



TECHNOLOGY INNOVATION IN EXPLORATION & MINING FOUNDATION**(TexMin)****TECHNOLOGY INNOVATION HUB (TIH)**Add: CRE Building, 3rd Floor, IIT (ISM) Dhanbad, JH- 826004 | Mail: texmin@iitism.ac.in**2. CLASSIFICATION OF STORES**

Non- Consumable Stores (NC)		Consumable Stores
Permanent Assets (PA)	Limited Time Assets (LTA)	
Stores satisfying anyone of the following conditions shall be classified as permanent Assets. 1. Stores which are intended to be used over prolonged period (more than 5 years) before becoming unusable or obsolete. 2. Office furniture and fixture	Stores satisfying anyone of the following condition shall be classified as Limited Time Assets. 1. Store consisting any amount and having useful life of less than five years, which rapidly lose their value/ relevance with the lapse of time or have very little or negligible disposal value 2. Stores which can be upgraded either by replacing components/parts or which can be rendered and obsolete by the release of new version of edition. 3. Stores which can be used over any period of time but costing less than Rs.75,000/ excluding office furniture and fixtures. 4. Examples of such item's PCs, Laptop, Tablet Cameras, Mobiles, Software Projector, LFT, monitors.	Stores satisfying anyone of the following condition shall be classified as Consumable stores. 1. Stores which exhaust rapidly with the lapse of time (normally within one year). 2. Stores which are rapidly rendered unusable due to normal wear and tear. 3. Stores which have negligible disposal value. 4. Spares of equipment etc. Examples, Chemicals, stationery items, printer toner/cartridge, and electronic storage media like pen drive, Computer parts requiring replacement such as the mother board, RAM hard disc etc. Batteries of any kind (like UPS, laptops/mobiles portables instruments etc.) electronic components like capacitors, connectors, electrical, wires, plugs switches, tool bits and hand tool etc.

Any item with value of greater than INR 2500 (including taxes) will automatically get classified as Non-Consumables. In case of any ambiguity with respect to classification of stores, the same may be resolved by the CEO TexMin and one of the Directors of TexMin.



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3. SALIENT FEATURES OF THE POLICY

- I. Upgradation and Repairs: In case of upgradation of assets, the old asset which has been upgraded will be treated as written-off i.e., its value will be written-off from the records. The upgraded new asset will be entered in the records. Sum of cost of old asset and the additional cost paid, will be considered as cost of the upgraded asset. For any repairs of Imported assets, in case the items is to be sent back to the OEM in foreign country, re-import process should be initiated.
- II. Purchase of Proprietary Items: TexMin Single Tender Enquiry form may kindly be used.
- III. Earnest Money: To safeguard against a bidder's withdrawing or altering its bids during the bid validity period, the Purchase Committee may obtain bid Security (also known as Earnest Money) (2.5% of the estimated cost).
- IV. Performance Guarantee: In order to ensure due performance of the contract, Purchase Committee may obtain performance security from the successful bidder awarded the contract (5-10% of the order value). Performance security may be obtained in the form of demand draft or Bank Guarantee from a scheduled bank in an acceptable form safeguarding the purchaser's interest in all respect.
- V. For all purchase above Rs. 25,000/-, Purchase Requisition Form needs to be used.
- VI. Role of Store Purchase Section.
 - a) Processing and clearance of Indian/International purchase.
 - b) E-Procurement, E-Publishing, E-Auction, Onboarding/Registration of Vendors.
 - c) Maintenance of TexMin Asset Registers for all items/ Vendor Details.
 - d) Conducting physical annual stock/contract verification.
 - e) Maintenance of Purchase Requisition Forms against all purchases.
- VII. Payment: Payment should be made to vendors through RTGS/Cheque/NEFT
- VIII. The value of a service contract would be considered basis its annual value (from the date of initiation of contract), irrespective of the tenure of the contract, for deciding the authority to finalize/terminate the vendor for that service
- IX. Employee recruitment would not be considered a part of service contracts and would be as per the HR and Recruitment Policy.



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- X. Write-off/Disposal/Re-use/abnormal loss /theft of Stores: TexMin will initiate the process of write-off/disposal/Re-use of stores after the completion of project life-time is over. It would be governed by Financial DoA.
- a) Any loss or shortage of public money, departmental revenue, receipt, stamps, stores or other property held by or on behalf of the TexMin. Irrespective of the cause of loss and manner of detection, shall be immediately reported to the next higher authority. Cases involving serious irregularities shall be brought to the notice of CEO/Project Director.
 - b) Report of loss contemplated in (a) above shall be made as follows - An initial report with the security officer should be made as soon as a suspicion arises that a loss has taken place. FIR be made immediately, and "Non-Traceable Report" issued by police station be submitted for the purpose of write —off of the item/s.
- XI. Any rule/purchase procedure not covered here shall be governed through requisite approval from Board of Directors/Hub Governing Body of TexMin



TECHNOLOGY INNOVATION IN EXPLORATION & MINING FOUNDATION (TexMin)

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TexMin - Financial Delegation of Authority (FDA)

(The FDA of TexMin Hub is in line with the financial delegation of authority at IHFC Hub, IIT Delhi)

1. Approval authority for store purchase/service contract

Amount (INR)	Process/ Guideline	Initiator	Recommendation	Approver
Upto 25k	Need to accompany actual invoices	Employee/PI	None	CEO
25k – 2.5 Lac	Single vendor allowed	Employee/PI	Two members purchase committee from the EC	CEO
2.5Lac - 10 Lac	Minimum 3 vendors	Employee/PI	Two members purchase committee from the EC	CEO
10 Lac - 25 Lac	Minimum 3 vendors	Employee/PI	Three members purchase committee from EC (CEO mandatory member)	Project Director
Above 25 Lac	Minimum 3 vendors	Employee/PI	Three members (Purchase committee from the EC (Project Director and CEO mandatory members))	Chairman, HGB

2. Approval authority for travel expenses

Amount (INR)	Process/ Guideline	Initiator	Approver
Upto 1 Lac	Need to accompany actual invoices for travel and requisite approval for travel from CEO, Project Director	Employee TexMin	CEO
1 Lac and above	Need to accompany actual Invoices for travel and requisite approval for travel from CEO/ Project Director.	Employee TexMin	Project Director

3. Approval authority for salary expenses

Process/Guideline/ Initiator	Recommendation	Approver
HR person to initiate the process basis employee records and contractual obligations*	CEO, TexMin	Project Director

*Authority to issue an offer letter or appointment letter would be with CEO or above



TECHNOLOGY INNOVATION IN EXPLORATION & MINING FOUNDATION

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4. Financial power to write-off the assets

Amount (INR)	Process/Guideline	Initiator	Recommendation	Approver
Upto 25k	As per Purchase Policy	Employee/PI/Vendor	None	CEO
25k — 2.5 Lac	As per Purchase Policy	Employee/PI/Vendor	Two members committee from the EC	CEO
2.5Lac - 10 Lac	As per purchase policy	Employee/PI/Vendor	Two members committee from the EC	CEO
10 Lac - 25 Lac	As per purchase Policy	Employee/PI/Vendor	Three-member purchase committee (CEO mandatory member)	Project Director
Above 25 Lac	As per purchase policy	Employee/PI/Vendor	Three members purchase committee (Project Director and CEO mandatory members)	Director

1. For any service contracts, financial authority would be defined based upon the annual value of contract, irrespective of the tenure of the contract
2. Any exception to the above DoA requires approval from the CEO and Project Director, TexMin.

