



सत्यमेव जयते

Government of India
Ministry of Science & Technology
Department of Science & Technology



20 Major Success Stories of DST in 2020

The major challenges that 2020 put before the world helped India emerge as a forerunner in underscoring the critical role of science and technology in bringing positive transformations for a safe, secure, better society well prepared for the future.

The country pole-vaulted into one of the top nations in science & technology indices and reached laudable positions in several domains of science technology and innovations.



India has a rich legacy in science, technology and innovation. Our scientists have done path breaking research. Our tech industry is at the forefront of solving global problems. But, India wants to do more. We look at the past with pride but want an even better future.

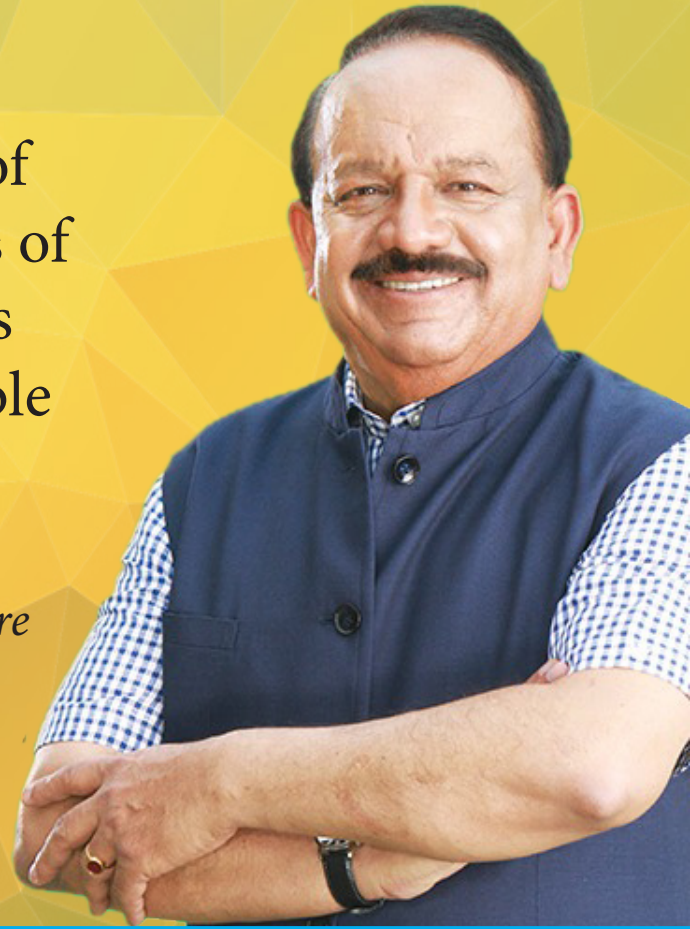
Prime Minister Shri Narendra Modi





Science and technology is one of the most powerful departments of the country for solving all kinds of problems - agriculture, potable water, energy, health and so on.

*Minister for Science & Technology,
Earth Sciences, Health & Family welfare
Dr. Harsh Vardhan*



Science and Technology are the strongest foundations on which the future can be built. India is progressing rapidly towards self reliance by connecting the invention ecosystem to the innovation ecosystem with democratisation and diversity of science becoming the drivers of development.

*Secretary, Department Of Science &
Technology
Professor Ashutosh Sharma*



1. INDIA'S RANKING IN PUBLICATIONS, R&D & INNOVATIONS HAS RISEN EXPONENTIALLY

India is placed 3rd among countries in scientific publication as per NSF database. The country has featured within the top 50 innovative economies globally (at 48th rank), as per Global Innovation Index (GII). It has also reached 3rd Position in term of no of PhDs, in size of Higher Education System; as well as in terms of No of Startups.



2. THE COUNTRY IS A KEY MOVER OF GLOBAL S&T EFFORTS

India has emerged as an inevitable member of leading international scientific coalitions – notably, global efforts in vaccine research, development and supply, and global partnership on artificial intelligence (GPAI) to name a few. India was elected as Chair of the World Health Organization's (WHO) executive board which is a yet another remarkable achievement and recognition of India's S&T prowess.



3. DRAFT 5TH SCIENCE, TECHNOLOGY, AND INNOVATION POLICY RELEASED FOR PUBLIC CONSULTATION



The draft of the 5th National Science Technology and Innovation Policy has been finalized and is now available for public consultation. The policy drafted through a 4 track process of consultations during last 6 months aims to bring about profound changes through short, medium and long-term mission mode projects by building a nurtured ecosystem that promotes research and innovation on the part of both individuals and organizations.

It aims to foster, develop, and nurture a robust system for evidence and stakeholder-driven STI planning, information, evaluation, and policy research in India. The objective of the policy is to identify and address strengths and weaknesses of the Indian STI ecosystem to catalyse socio-economic development of the country and also make the Indian STI ecosystem globally competitive.

‘Science’ and ‘Science-Advice’ became the core of decision making. The share of scientific and science-informed debates in mainstream media jumped manifold, and the general populations’ confidence and trust in Science & Technology increased significantly.

Seamless industry-academia collaborations and inter-disciplinary partnerships led to quicker solutions and products in an energised STI ecosystem in 2020.



4. S&T BECAME CORE OF DECISION MAKING, CLAIMED INCREASED MEDIA SPACE, GAINED PUBLIC TRUST



5. DST'S PROGRAMMES TRIGGERED EXTRAORDINARY PERFORMANCE OF INNOVATION ECOSYSTEM



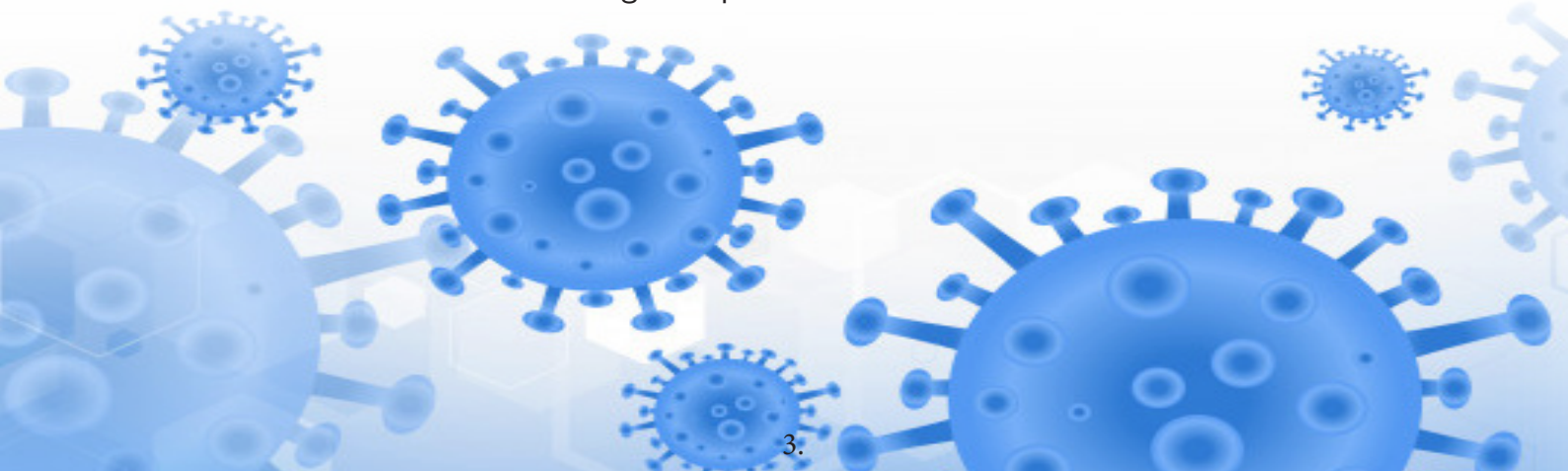
The National Initiative for Developing and Harnessing Innovation (NIDHI) made some major impacts on India's Innovation ecosystem by **nurturing 3,681 startups** through a **network of 153 incubators** created by DST, which generated **65,864 jobs** as cumulative direct employment, created a **wealth of Rs 27,262 crores** and generated **1,992 intellectual property**.

The "Million Minds Augmenting National Aspirations and Knowledge (MANAK)" programme brought **3.8 mn ideas** from middle and high schools across the country, out of which some brilliant ones have been shortlisted for showcasing at district, state and then at the National Level Exhibition & Project Competition.

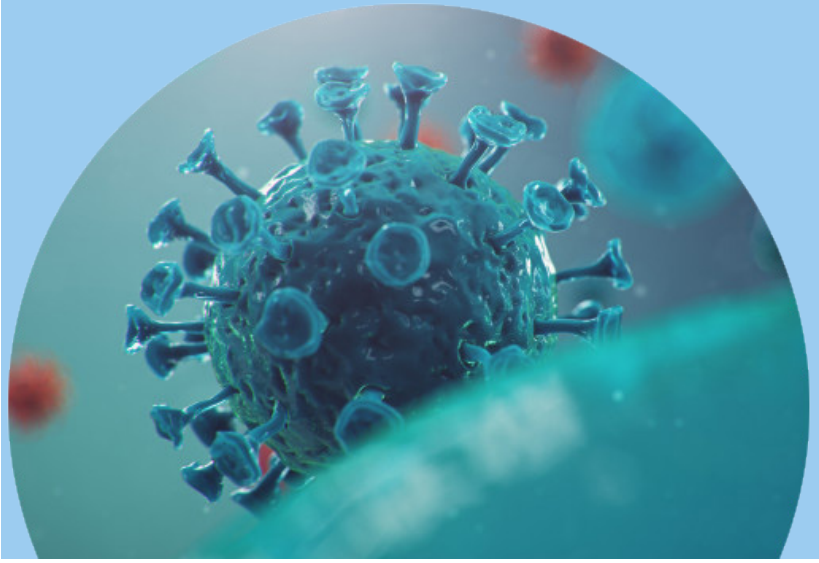
6. A VICTORIOUS MARCH TO COMBAT COVID 19



The collective strength and power of NIDHI, its incubator network and its startups was tested successfully during the COVID-19 pandemic through the "**Centre for Augmenting WAR with COVID-19 Health Crisis (CAWACH)**" program by supporting various solutions to resolve the crisis. The efforts of CAWACH to scout, evaluate and support the innovations and startups that address COVID-19 challenges led to a slew of technologies, diagnostics & drugs, disinfectants & sanitizers, ventilators & medical equipment, PPEs and informatics as solutions to contain, treat and manage the pandemic.



7. MATHEMATICAL MODEL PREDICTS THE RISE AND FALL OF THE PANDEMIC



India National Supermodel Committee predicted the rise and fall of the pandemic over time. The modelling study called the 'COVID-19 India National Supermodel' deduced that India passed its COVID-19 peak in September and, if current trends continue, there will be 'minimal cases' by February.

However, they warned that there is no place for complacency and existing personal safety protocols need to continue in full measure. The deduction is the result of analysis by an expert committee consisting of mathematicians and epidemiologists.



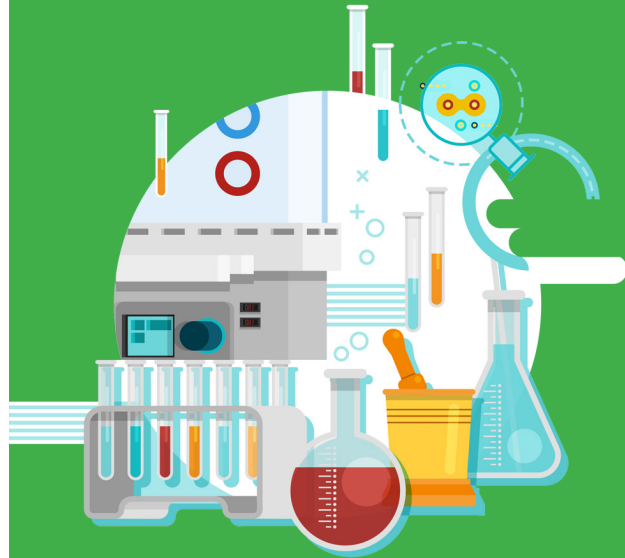
8. SUPERCOMPUTING POWER ESCALATED, MANUFACTURE INDIGENIZED: NATIONAL SUPERCOMPUTER MISSION

The National Super Computing Mission (NSM) is rapidly boosting High-Performance Computing (HPC) in the country to meet the increasing computational demands of academia, researchers, MSMEs, and startups in oil exploration, flood prediction, genomics, and drug discovery. Param Shivay, the first supercomputer assembled indigenously, was installed in IIT (BHU), followed by Param Shakti and Param Brahma at IIT-Kharagpur and IISER, Pune, respectively. Thereafter facilities were set up in two more institutions, and MoUs signed for providing it to 13 institutions. Param Siddhi the high-performance computing-artificial intelligence (HPC-AI) achieved global ranking of 63 among the top 500 most powerful non-distributed computer systems.



Sophisticated Analytical & Technical Help Institutes (SATHI) centres to house major analytical instruments have been established to provide common services of high-end analytical testing, thus reducing dependency on foreign sources. The DST has set up three such centres—at IIT Kharagpur, IIT Delhi and BHU under the SATHI programme which are being operated with a transparent, open-access policy to make professionally managed, S&T infrastructure readily accessible to academia, start-ups, industry and R&D labs. Five SATHI centres every year have been planned for the next four years.

9. CENTRES WITH SOPHISTICATED ANALYTICAL INFRASTRUCTURE ESTABLISHED TO PROVIDE STATE OF THE ART FACILITIES TO RESEARCHERS



10. NEW S&T AREAS OF CYBERPHYSICAL SYSTEMS LIKE AI, ROBOTICS, IOT RECEIVE BIG BOOST WITH RESEARCH SUPPORT & INNOVATION HUBS



New S&T areas of Cyberphysical systems like AI, Robotics, IOT receive big boost with the launch of the National Mission on Interdisciplinary Cyber-Physical Systems (ICPS). Its unique architecture of 25 innovation hubs and parks set up across the country is bringing about strong collaboration and co-ownership among industry, academia, and government, connecting them with full flexibility.

11. CLIMATE CHANGE RESEARCH MARKED BY IMPACTFUL PUBLICATIONS & CENTRES OF EXCELLENCE IN HIMALAYAN UNIVERSITIES

3 Centres of Excellence (CoE) were established in Himalayan Universities in Kashmir, and North Eastern States of Sikkim & Assam to lead climate change research. Research on monsoons, aerosols, glacial lake outburst floods saw significant publications. A study published in journal Science showed planetary wave from the North Atlantic is capable of derailing the Indian monsoon. Research published in the journal Atmospheric Chemistry and Physics' showed that aerosols increased incidents of high rainfall in the Himalayan foothills.



12. CELEBRATION OF SCIENCE INVITES ATTENTION OF TOP DIGNITARIES



President of India Ram Nath Kovind announced three key initiatives for gender advancement and equality in academic and research institutions on occasion and conferred national awards for science communication and popularization, including women excellence awards.

President of India graced the celebration of the National Science Day (NSD) for the first time. NSD is celebrated on 28th February to commemorate the announcement of the discovery of the 'Raman Effect' by Sir C.V. Raman for which he was awarded the Nobel Prize in 1930.



13. GUIDELINES SET UP URGING INSTITUTIONS OF HIGHER EDUCATION AND RESEARCH TO SUPPORT DIVERSITY, INCLUSION AND EQUITY



Gender Advancement for Transforming Institutions (GATI), an innovative pilot project launched by the DST ushered a novel intervention for promoting gender equity in science and technology. It nudges institutions of higher education and research towards supporting diversity, inclusion and the full spectrum of talent for their own success and progression. In particular, it aspires to create an enabling environment for equal participation of women in Science, Technology, Engineering, Medicine and Mathematics (STEMM) disciplines at all levels.

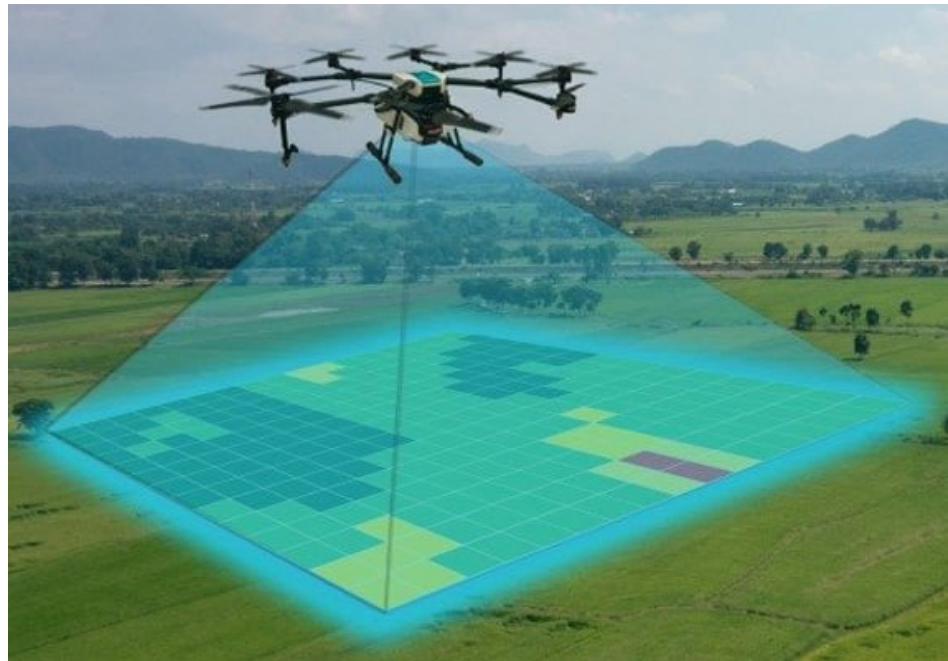
Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST) brought out several technologies and products that could be crucial to combat the diseases. It's one step confirmatory diagnostic kit for COVID 19 that responded to India's urgent need for rapid testing. The other R&D work on the issue included a UV Based Facemask Disposal Bin, which can be used by health workers in hospitals and in public places for decontamination of used facemask, overhead covers and face shields, a superabsorbent material for liquid respiratory and other body fluid solidification and disinfection for the safe management of infected respiratory secretions.

14. SRI CHITRA'S PROACTIVE EFFORTS HELP COMBAT THE PANDEMIC



15. SURVEY OF INDIA LAUNCHED PAN INDIA HIGH-RESOLUTION GEOSPATIAL MAPPING

The Survey of India (Sol), a subordinate department under the Department of Science & Technology has embarked on a pan-India geospatial mapping of the country at a very high resolution of 10 cm scale using most advanced technologies like drone technology. With this, India joins the select club of few nations to have Ultra High-resolution National Topographic Data as foundation data.



This effort has been launched in three States -- Haryana, Maharashtra, and Karnataka and also for the Ganga basin. Sol has undertaken mapping of the Village Gaothan (Aabadi) areas in Maharashtra, covering more than 40,000 villages. Drone-based mapping for five districts of the state of Karnataka for the revenue department, including the village, semi-urban and urban areas, and LSM mapping for the complete state of Haryana has also been undertaken.

Drone survey will be pivotal to fix locations of village boundaries, canals, canal limits, agriculture field limits, and roads in these villages.

Sol has also launched web portals to facilitate the access of the digital map or data to every citizen of the country and help centre and state organizations in decision making, planning, monitoring, and governance. Sol has also provided a free to use mobile app, "SAHYOG".



16. SERB LAUNCHES POWER FOR WOMEN RESEARCHERS

Science and Engineering Research Board (SERB), a Statutory body of the Department of Science and Technology (DST), Government of India, initiated a Scheme to mitigate gender disparity in science and engineering research funding in Indian academic institutions and R&D laboratories. A well-thought-out Scheme titled “**SERB-POWER (Promoting Opportunities for Women in Exploratory Research)**” has been designed exclusively for women scientists and was launched on 29 October 2020. SERB-POWER promotes women researchers in regular service in academic and research institutions to take up R&D at the highest level through two categories of research support, namely, SERB – POWER Fellowship and SERB – POWER Research Grants.



SERB – Power Fellowship offers a personal Fellowship and a research grant to top performing women researchers for a period of three years, while SERB – Power Research Grants ensure funding to undertake highly impactful research across all disciplines of S&T. Call for projects for this program is already announced.

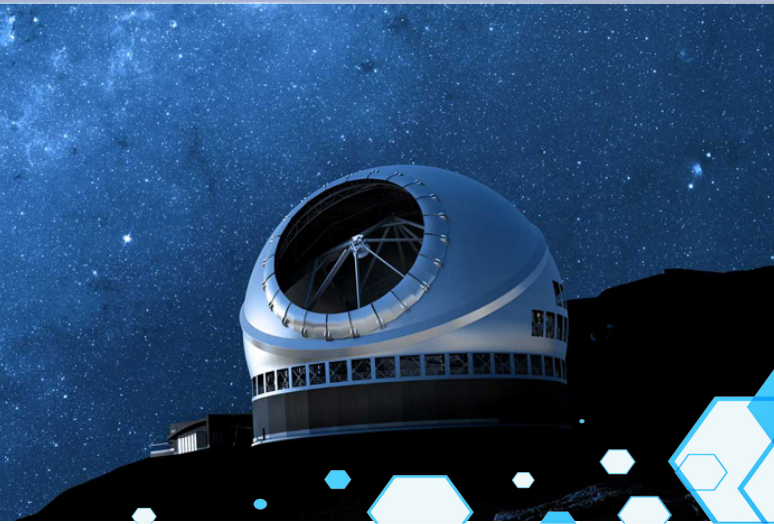


A phenomenal white paper on “Focused Interventions for ‘Make in India’: Post COVID 19” prepared by Technology Information, Forecasting and Assessment Council (TIFAC) provided recommendations for giving immediate technology and policy impetus to make India “ATMANIRBHAR,” specially in the aftermath of the pandemic. It captured sector-specific strengths, market trends, and opportunities in five sectors, critical from the country’s perspective, including healthcare, machinery, ICT, agriculture, manufacturing, and electronics with reference to supply and demand, self-sufficiency, and mass-scale production capacity. It has identified policy options primarily in the public health system, MSME sector, global relations: FDI, recalibrated trade alignments, new-age technologies, etc.

17. PHENOMENAL WHITE PAPER BY TIFAC PROVIDED RECOMMENDATIONS FOR FOCUSED INTERVENTIONS FOR ‘MAKE IN INDIA AFTER THE COVID 19 PANDEMIC



18. SCIENTISTS FROM IIA & ARIES COLLABORATED WITH NOBEL LAUREATE ON TMT



Indian astronomers have worked with 2020 Physics Nobel Laureate Prof. Andrea Ghez on the design of backend instruments and possible science prospects of the Thirty Meter Telescope (TMT) project being installed at Maunakea in Hawaii which can revolutionize the understanding of the universe and the enigmas in it. Scientists from the Indian Institute of Astrophysics (IIA) and Aryabhata Research Institute of Observational Sciences (ARIES) have collaborated with Prof. Ghez in the ongoing research and developmental activities of the TMT project.

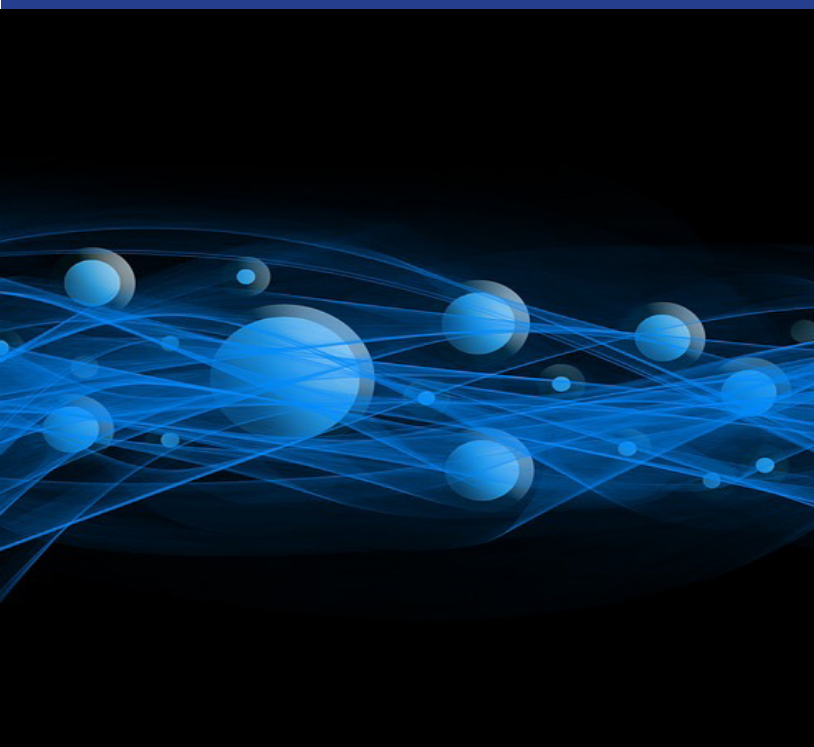


19. BSIP SCALES UP COVID TESTING FACILITIES, BECOMING THE TOP INSTITUTION THROUGHOUT THE COUNTRY IN TERMS OF AVERAGE PROCESSING TIME OF SAMPLES



BSIP joined hands with the Government of Uttar Pradesh to combat COVID-19 in the state, becoming one of the five Central Government research institutes in Lucknow, which took initial steps to start laboratory testing of COVID-19. With 1000 to 1200 samples being tested per day, BSIP is the top institution not only in the state but throughout the country in terms of the average processing time of samples.

20. RRI ACHIEVES FIRST SUCCESSFUL IMPLEMENTATION OF A HIGHLY SECURE EFFICIENT QUANTUM CRYPTOGRAPHIC SCHEME



The QuIC lab at RRI achieved the first successful implementation in India of a highly secure efficient Quantum Cryptographic scheme for an end to end free space QKD under the RRI-ISRO project on “Quantum Experiments using Satellite Technology”. The lab has also come up with an end-to-end simulation toolkit named as “qkdSim” to ensure safety in secure quantum communication platforms, a first of its kind that enables Quantum Key Distribution Protocol (QKD) experimentalists to obtain a realistic estimate of the result from an experimental setup meant to demonstrate a QKD protocol. They have also performed an experiment in collaboration with HRI Allahabad that demonstrates a novel quantum state estimation tool opening up a new paradigm in quantum state estimation.