

**COMMISSION ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT  
(CSTD)**

**Geneva, Switzerland**

Contribution by

**Brazil**

to the CSTD call for information sharing on initiatives against COVID-19

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## **BRAZILIAN CTI INSTITUTIONS RESEARCH ON COVID-19**

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### **INTRODUCTION**

Several Brazilian CTI institutions have launched contests and calls for research proposals on technological solutions aimed at fighting the COVID-19 virus and the difficulties arising from the social distancing required to face the pandemic.

This national effort has also engaged startups that already present solutions to mitigate some of the effects of the crisis and are contributing to traditional Brazilian research institutes that rely on accumulated experience in order to address this epidemiological crisis. Those initiatives - some of which are described below - started in the first spreading stage of the virus in Brazil and have the objective of providing different concrete solutions to reduce the impact of Covid-19 in Brazilian society and economy.

### **CONTESTS AND CALLS FOR RESEARCH PROPOSALS MCTIC VIRUS NETWORK**

The Ministry of Science, Technology, Innovations and Communications of Brazil (MCTIC) established an advisory committee and strategic plan to provide integrated and quick responses to emerging viruses. It coordinates the efforts of research laboratories with a view to identifying complementarities of infrastructure and activities in the ongoing research on covid-19, influenza and others. The objectives of the network are the integration of scientific research and development efforts in the area of emerging viruses; definition of research priorities; coordination of ongoing R,D&I initiatives related to emerging viruses; and development of technologies to assist the country in facing those challenges.

Researchers and representatives of MCTIC, the Ministry of Health and development agencies participate in the initiative. The initiative already counts on the collaboration of institutions like the research facilities of Fiocruz, Butantan, CNPEM /LNBio and universities like USP, Unicamp, UFMG, UFC and UFRJ.

Within this network, the National Center for Research in Energy and Materials (CNPEM) is already employing tools like computational biology and AI to evaluate the effectiveness of about 2 thousand existing drugs against Covid-19. Computational data tests use atomic structure data and the behavior of covid-19 proteins to examine the interaction of molecules of available medications with these target proteins, and to pre-select those that show promise in interfering with the infection. Selected molecules will then be tested in vitro to verify its effectiveness in eliminating the virus, which will allow the new use of already available medications.

The MCTIC also sent a provisional law proposal to the Presidency for the emergency release of R\$ 100 million (100 million Brazilian reais) from the National Scientific and Technological Development Fund (FNDCT), which awaits the approval

of the Ministry of Economy to be applied in Research Networks, National Institutes of Science and Technology (INCT) and public calls via the Brazilian National Council for Scientific and Technological Development (CNPq) and the Funding for Studies and Projects (Finep).

### **FINEP-FAPESP: DEVELOPMENT OF TECHNOLOGIES FOR PRODUCTS, SERVICES AND PROCESSES TO FIGHT INFECTIOUS DISEASE BY THE CORONA VIRUS 2019 (COVID-19)**

Fapesp and Finep, under the PIPE / PAPPE Grant Program, launched a call for research projects on the development of technologies for products, services and processes to fight Covid-19. The research call will allow that participants from previous phases of the Grant program (Phase 1 or Phase 2) to commercialize emergency products or services.

### **FAPESP: SUPPLEMENTS FOR QUICK IMPLEMENTATION AGAINST COVID-19**

The São Paulo Research Foundation (FAPESP) launched a call for research proposals on COVID-19 within the time limit of 24 months, with a view to understanding the virus` epidemiological characteristics, developing tests and therapies, conducting research on clinical procedures, identifying and evaluating innate immune responses and issues related to the social behavior of the affected population. The total amount of the research call is R\$ 10 million and the deadline for submission of proposals is June 22nd, 2020.

### **EMBRAPII-SEBRAE: TECHNOLOGICAL SOLUTIONS BY STARTUPS AND SMALL AND MEDIUM-SIZED ENTERPRISES**

Brazilian Micro and Small Business Support Agency (SEBRAE) will assign R\$ 2 million to the development of technological solutions by startups and other small and medium-sized enterprises with a view to help the

Brazil face Covid-19. The funds will add up to R\$ 4 million from the Brazilian Industrial Research and Innovation Company (EMBRAPII) and contributions by participating companies and accredited research and innovation centers. Joint resources are expected to reach the total of R\$ 10 million. The resources may be used for software development, system devices, hardware, medical parts and equipment, and others.

### **SENAI: MISSION AGAINST COVID-19**

The National Service for Industrial Training (SENAI), through the "Innovation Call for Industry", will select projects that help prevent, diagnose and treat Covid-19. It foresees the destination of R\$ 10 million for proposals on solutions against problems caused by the virus, with immediate application and results within 40 days, in the areas of consulting, metrology, testing, analysis, research, development and

innovation. Examples of these solutions are the manufacture of mechanical respirators and the development of rapid tests for the detection the disease.

### **CONFAP: EUROPEAN UNION EMERGENCY RESEARCH CALL FOR CORONAVIRUS DIAGNOSIS**

The National Council of State Foundations of Research Support (CONFAP) released a proposal for Brazilian institutions to join the so-called "Development of therapy and diagnosis for fighting coronavirus infections" launched by `Innovative Medicines Initiative`, in cooperation with European Union and the European Federation of Pharmaceutical Industries and Associations (EFPIA). The research call has an emergency nature and the deadline for submission of proposals is this March 31st. Its objective is to identify new therapeutic agents, early diagnostic systems, and reliable data related to Covid-19.

Brazilian partners can participate in a co-financing scheme. The European side plans to disburse EUR 45 million.

### **MPPE-SES / PE-PORTO DIGITAL: CHALLENGE COVID-19**

The Covid Challenge 19 is an initiative by the Public Prosecutor`s Office of the State of Pernambuco (MPPE), the State Health Secretariat of Pernambuco (SES-PE) and Porto Digital. The MPPE and SES-PE offer R\$ 1.3 million for innovative and high-impact solutions that can be adopted in a short term, with a view to fighting the virus. The challenge already includes the submission of 543 ideas on 5 areas: a) monitoring the risk groups; b) information flow management; c) monitoring social isolation; d) support for health agents; and e) testing and diagnosis.

### **ARAUCÁRIA-SETI / PR-SESA / PR FOUNDATION: SUPPORT PROGRAM FOR THE PREVENTION, CARE AND FIGHT AGAINST THE PANDEMIC OF CORONAVIRUS**

The program was launched by the Araucária Foundation for the Support of Scientific and Technological Development of the State of Parana, the General Superintendence of Science, Technology and Higher Education (SETI) of Parana and the State of Parana`s Department of Health (SESA). This program aims to allocate R\$ 8 million for the development of projects aimed at prevention, care and fight against Covid-19 by higher education institutions in that state. The proposal submission deadline is March 23rd and the result is expected to be released on the following day.

### **USP**

The University of São Paulo (USP) is conducting researches for vaccine development with a quick response against the virus. The work takes advantage of results from previous studies on other types of coronaviruses, which, hopefully, can

help in the case of Covid-19. Brazilian research is comparatively safer, as it is based on the creation of a particle similar to coronavirus, the VLP (virus-like particle), equivalent to a hollow virus, without the genetic material and therefore without the transmissibility of the disease.

## **STARTUPXCVID**

The Governance & New Economy Community (Gonew.co), with the support from the Brazilian Association of Startups (Abstartups), launched the campaign StartupsxCovid19, which seeks to map companies with innovative solutions to face the coronavirus crisis. Among other initiatives, mapping will be used to provide information to entities such as the Ministry of Health.

## **TECHNOLOGICAL SOLUTIONS AND BRAZILIAN STARTUPS INITIATIVES**

### **HI TECHNOLOGIES**

The startup Hi Technologies, based in Curitiba, State of Parana, announced the development of a rapid test for Covid-19 detection that provides results in 10 minutes. The large-scale production of the test kit is underway, with delivery of kits in April. The startup is known for the Hilab device, which integrates internet of things (IoT) and artificial intelligence to perform remote exams by collecting drops of blood in the Hilab (available in pharmacies), that transmits information to the laboratory responsible for analyzing the result, issuing and signing the respective report. Hilab is already capable of testing for HIV, dengue, zika and hepatitis, in addition to measuring cholesterol levels, blood glucose and other issues.

Company's contact details:

Hi Technologies

6.400B, Rua Eduardo Sprada, Cidade Industrial, Curitiba, Parana.  
<https://hitechnologies.com.br/site/>

contact @ hitechnologies

+55 41 3022-3461

CEO - Marcus Figueredo

### **ROCKET CHAT**

The startup Rocket Chat (a participant of the Startout Brasil Program) is a

platform for the organization of hackathons based in Brazil and in the United States. The company is organizing hackathons to seek innovation and collaborations ideas to fight COVID-19. The marathon will include participants from 20 Brazilian cities. Considering the emergency of the situation, registration was closed on March 23rd. The link to the hackathon is:

<https://covid19.rocket.chat>.

Contact details:

Rocket Chat

Rua Dr Jorge Fayet, 757, Porto Alegre, Rio Grande do Sul, Brazil

<https://rocket.chat/>

## **TRUCKPAD**

Another participant in the Startout Brasil Program, the startup Truckpad operates in the area of logistics and is one of the largest digital cargo and truck drivers connection platforms in Latin America.

Truckpad will offer free and voluntary transportation to goods donated to hospitals and medical assistance initiatives in Brazil. Those interested in making donations must access the website [www.transportevoluntario.com.br](http://www.transportevoluntario.com.br).

Contact details:

Truckpad <https://www.truckpad.com.br/>

CEO Carlos Mira

## **JOINT VENTURE EMBRAPII (BRAZILIAN COMPANY OF RESEARCH AND INDUSTRIAL INNOVATION)/ELDORADO INSTITUTE/BRAILLE COMPANY**

EMBRAPII approved a grant of BRL 2.3 million (approximately USD 450 thousand) for the development of an Extracorporeal Membrane Oxygenation (ECMO), in partnership with the Eldorado Institute (one of the units comprising the EMBRAPII system) and the Braille Company. This ECMO adds oxygen and removes carbon dioxide from the bloodstream, in a machine outside the human body (such as in

hemodialysis). Although this equipment already exists outside Brazil, the technology supported domestically is more efficient, allowing for the improvement of medical interventions at lower costs. The manufacturing of the device will be 100% national. The equipment should be ready for delivery in eight weeks for an initial batch of 100 units to be distributed to 21 facilities already capable to perform extracorporeal oxygenation.

Besides aiding the treatment against acute respiratory failure, one of the main outcomes of COVID-19 severe cases, the use of the equipment is also advised for adults or children in several other conditions, such as cases of heart transplantation, myocardial infarction and cardiac arrest. EMBRAP II will bear 50% of the costs of the projects designed to combat COVID-19 infections.

## **NATIONAL LABORATORY FOR SCIENTIFIC COMPUTING (LNCC)**

On 25 March, the LNCC announced that it had identified and sequenced 19 different genomes of the COVID-19, from samples coming from different regions of Brazil, in less than 48 hours. The effort was made possible thanks to the Brazilian supercomputer "Santos Dumont". This initiative had the participation of several universities in Brazil, the Oxford University, and other national research institutions, funding agencies and the Ministry of Science, Technology, Innovation and Communications.

The identification of different virus strains through genetic sequencing is fundamental to identify possible viral mutations, the transmission chains and the origin of the virus found in a specific region. The study carried out at the LNCC could confirm, for instance, that most samples descend from viruses originating in Europe, while a smaller sample arrived in Brazil directly from China.

## **EMBRAER**

EMBRAER has committed to contribute to the manufacturing of "control valves" and "flow sensors", which will greatly increase the national manufacturers production capacity of ventilators. The company also said it would work to adapt a model of ventilator to be used in the fight against COVID-19. The company has partnered with Albert Einstein Hospital to provide technical support for the development of exhaust fans for biological control, using technology of high-efficiency air filters used in aircrafts, thus facilitating the conversion of regular hospital units into intensive care facilities where COVID-19 patients can be treated.

## **"IN LOCO" STARTUP**

The "In Loco" startup is specialized in solutions for smartphone-based geolocation and has adapted its technology to monitor social isolation, including the generation of disaggregated isolation reports by specific neighborhoods, so that public authorities can create targeted educational campaigns and tailor-made inspection routines.

The technology developed can also monitor the growth of local hospital capacity and improve the allocation of health workers. The startup makes sure that the data are general, collective and respect people's privacy. The municipality of Recife has already adopted the tool.

## **COPPE/UFRJ**

A team of researchers at the "The Alberto Luiz Coimbra Institute for Graduate Studies and Research in Engineering", one of Latin America's largest center for research and education in engineering, based at the Federal University of Rio de Janeiro (UFRJ), will begin, on 6 April, testing a cheaper mechanic lung ventilator, produced with widely available materials in Brazil.

## **ACATE**

The Technology Association of Santa Catarina (ACATE) is leading an effort comprised of several startups such as "CogniSigns", "Anestech" and "Hefesto" to design and produce 3D-printed ventilators. The open source prototypes will allow other innovation hubs equipped with 3D printers to also "print" the products, increasing the number and diversifying manufacturers across the country. The initiative is supported by the Albert Einstein Hospital, from São Paulo, through its innovation hub, the "Eretz.bio".

## **PUBLIC CALL FOR PROJECTS: ABDI/SENAI/EMBRAPII**

The "Brazilian Agency of Industrial Development" (ABDI), together with the "Brazilian Company of Research and Industrial Innovation" (EMBRAPII) and the "National Service of Industrial Training" (SENAI), launched, on 26 March, a second public call for projects on technological innovations to tackle problems caused by the COVID-19 pandemic. The first phase of this project resulted in support grants for 6 projects that will receive up to BRL 10 million (approx. USD 2 million).

For this second phase, there are BRL 20 million available (around USD 4 million), to be invested in projects designed to prevent, diagnose and treat the COVID-19. The solutions should be immediately put in place and possible to be produced in under 40 days. The technological solutions could be related to issues such as: increasing the numbers of ventilators available; development of tests for the identification of the virus or of personal protective equipment that could replace masks, gloves and soaps; replacement of parts and components used in intensive care units (ICUs); among other related projects. The total amount destined to each project could be of up to R\$ 2 million (around USD 400 thousand).

A project presented by "Aredes Hospital Equipment" is among those selected in the first call for proposals. The technological solution will adapt veterinary mechanical ventilators for human use. The new equipment will be designed, manufactured and tested in the SENAI network of innovation institutes. The prospect is that, once the



device is approved by the National Regulatory Authority (ANVISA), it will reach a monthly production of one thousand units.

The call also selected the company "Novitech Medical Equipment". The project intends to expand the supply chain of components used by pulmonary respirator manufacturers, through the identification of possible bottlenecks, and potential new suppliers and through the assessment of alternatives options to manufacture the parts.

A project for the production of quick-tests for the Covid-19 presented by the company Hi Technologies (Hilab) was also selected. The company plans to deliver up to 15 thousand tests in seven days; 150 thousand in 40 days; and 450,000 tests in three months.

The company "MDI Indústria e Comércio de Equipamentos Médicos", in partnership with the SENAI Innovation Institute for Advanced Health Systems (located in the state of Bahia), was another selected project. It will develop a "golden standard" diagnosis test as recommended by WHO to promptly identify the COVID-19 through fluids samples acquired from the oral or nasal mucous membrane. The estimate is to produce up to 4.800 monthly tests.

## **FAPERJ**

The research funding agency from the state of Rio de Janeiro, FAPERJ, has launched an emergency call for COVID-19 related researches up to the cap of BRL 30 million (approx. USD 6 million). Locally based (Rio de Janeiro) SMEs and startups are allowed to participate. The projects could have a broad range of focus, such as the genetics of the virus, its pathology, clinical aspects, diagnosis, epidemiology, interaction virus-host, development of tests, therapy and control, innovative solutions to increase the availability of products related to the fight against the virus, among others.

The resources made available through the grants could be used for the construction or improvement of facilities or to finance expenses related to the research.

## **SAVELIVEZ**

The startup, which participated in the Startout Brazil Program, developed a virtual assistant called Livia.bot, which provides information on symptoms of the COVID-19 as well as on blood donation centers throughout Brazil.

## **NOKNOX**

The startup has created an app called "Vizinho do Bem" ("Nice Neighbor"), which creates a support network among neighbors to support individuals who are part of risk

groups.

## **ILHASOFT**

The startup developed, in partnership with UNICEF, a software called "HealthBuddy" that imitates the human voice to combat fakenews about COVID-19.

## **AYA TECH**

Through nanotechnology, the startup, which took part in the Startout Brasil program, created a disinfectant called Gy, which has the potential to substitute sanitizers and is capable of eliminating COVID-19 among other communicable diseases.

## **CONTESTS AND CALLS FOR RESEARCH PROPOSALS JOINT PROJECT CALL: CNPQ-MINISTRY OF HEALTH**

Within the scope of the approved federal financial package of BRL 3.4 billion (around USD 0.65 billion) for measures to combat the pandemic, the Ministry of Science, Technology, Innovation and Communications of Brazil (MCTIC), through the National Fund for Scientific and Technological Development (FNDCT), will receive BRL 100 million to finance research networks, activities from national science and technology institutes and public calls from the Brazilian National Council for Scientific and Technological Development (CNPq) and the Funding Authority for Studies and Projects (Finep).

Based on these funds, a joint public call from CNPq and the Ministry of Health of Brazil (MS) was launched, for financing BRL 50 million (BRL 30 million from FNDCT and BRL 20 million from Ministry of Health) for 7 lines of research: (i) treatments; (ii) vaccines; (iii) diagnosis; (iv) pathogenesis and natural history of the disease; (v) disease burden;

(vi) health care; and (VII) prevention and control. Proposals can be submitted until April, 27th through the electronic Carlos Chagas Platform. The final results will be announced on June, 15th. The public call rules are available at:

<[http://www.cnpq.br/web/guest/chamadas-publicas?p\\_p\\_id=Resultadosportlet\\_WAR\\_resultadoscnpqportlet\\_INSTANCE\\_0ZaM & filtration = open & details = callDivulgated & idDivulgacao = 9382](http://www.cnpq.br/web/guest/chamadas-publicas?p_p_id=Resultadosportlet_WAR_resultadoscnpqportlet_INSTANCE_0ZaM&filtration=open&details=callDivulgated&idDivulgacao=9382)>.

## **CALL FOR PROJECTS FOR PRODUCTION OF PERSONAL AND COLLECTIVE PROTECTION EQUIPMENT BY MCTIC**

The Ministry of Science, Technology, Innovation and Communications of Brazil (MCTIC) also launched a public call for accelerating and improving market solutions related to personal protection equipment and systems (PPE) and collective protection

equipment and systems (CPE) for the safety of health workers and supporting staff in the hospital medical care chain combating coronavirus.

With a budget of BRL 5 million, the target audience for this public call includes companies of all sizes from the value chain of medical and hospital supplies and related chains or others that have applicable technologies onto the equipment and systems mentioned, including startups and other technology-based companies. Projects should preferably be conducted in partnership with research and development centers and institutes and universities. The funds will come from the National Fund for Scientific and Technological Development (FNDCT), which is operated by the Funding Authority for Studies and Projects (Finep), a public company linked to the MCTIC.

### **EMERGENCY CALL FOR PROJECTS FROM FAPEMIG**

The Minas Gerais Research Foundation (FAPEMIG) launched an emergency call, with a budget of BRL 2 million, to finance research on COVID-19. FAPEMIG also directed resources to the Vaccine Technology Center (CT-Vacinas), a laboratory of the National Institute of Science and Technology in Vaccines (INCT-V), installed at the Belo Horizonte Technology Park (BH-TEC). One of the studies aims to explore the influenza virus as a vector, since it infects the same cells as Covid-19.

### **DISCLOSURE OF THE RESULTS OF THE CALL FOR PROJECTS BY FAPESP**

The São Paulo Research Foundation (FAPESP) announced the first two projects approved by the call issued in March for the use of drugs to combat Covid-19. One of the projects aims to evaluate the effectiveness of two drugs in combating lung inflammation in critically ill COVID-19 patients. The other intends to evaluate the transmission dynamics of the new coronavirus in an Amazonian city which is endemic for malaria.

### **FAPDF AND FINATEC PARTNERSHIP**

The Federal District Research Foundation (FAPDF) and the Foundation for Scientific and Technological Enterprises (Finatec) established a partnership for the development and implementation of research, innovation and extension projects to combat Covid-19. BRL 30 million will be directed to three areas: (i) research calls launched by the University of Brasília (UnB); (ii) solutions for requests from the Health Department of the Federal District; and (iii) fostering of innovative productive sectors.

### **CALL FOR PROJECTS ON DIAGNOSTIC RESEARCH BY FAPESB**

The Bahia Research Foundation (FAPESB) launched an emergency call for research aimed at diagnosing, preventing and treating Covid 19. The funds allocated will amount to BRL 220,000.

## **MECHANICAL VENTILATOR PROJECT BY USP**

Researchers from the Polytechnic School (Poli) at the University of São Paulo (USP) are developing a project for a mechanical lung ventilator that can be produced by authorized manufacturers, rapidly and at low cost, to supply emergency units for patients affected by COVID-19. While a conventional respirator has a market price of around BRL 15,000, the ventilator designed by USP could be marketed for around BRL 1,000.

The project has an "open source" license, open for use by those interested in producing the ventilator. USP will lead the project designs, but the manufacture process will be carried out by the private sector. (<https://agenciabrasil.ebc.com.br/en/saude/noticia/2020-04/brazilian-scientists-create-low-cost-ventilators>)

## **DIAGNOSTICS TESTS CARRIED OUT BY EMBRAPA**

The Brazilian Agricultural Research Corporation (EMBRAPA) will task 47 laboratories with carrying out up to 43 thousand tests per day to detect Covid-19, with results in 24 hours, in collaboration with the Ministry of Health, Oswaldo Cruz Foundation (Fiocruz) and Adolfo Lutz Institute.

## **DEVELOPMENT OF TEST KITS BY THE AMAZON BIOTECHNOLOGY CENTER**

The Amazon Biotechnology Center (CBA) has also joined the efforts related to the production diagnostic test kits by developing antibodies and antigens for the kits. The test is based on immunochromatographic technology, similar to the one used on rapid tests for detection of dengue or HIV, in which a few drops of blood or human secretion, such as saliva, are placed on the kit tape and the result comes out in a few minutes. The distinguishing feature of the test produced by the CBA is the use of domestic antibodies and antigens, which can better identify the virus mutations in Brazil than it could done using imported antibodies and antigens. Upon approval of the regulatory bodies, CBA intends to supply the market with enough antibodies and antigens in 4 months, so that Brazilian companies can produce 30 thousand quick tests per day.

## **DEVELOPMENT OF THE PROTOTYPE OF AN ARTIFICIAL RESPIRATOR BY SENAI AMAZONAS**

The National Industrial Education Service of Amazonas (SENAI AMAZONAS) developed the prototype of an artificial ventilator with support from Samel Clinical Centers and technicians from the Transire Institute of Technology and Biotechnology of the Amazon. The model works for both the invasive procedure, with intubation, and the non-invasive one, through the use of a mask. It is expected that, after regulatory approval of the equipment, it will be possible to produce up to 5 basic modules per day.

## **TECHNOLOGICAL SOLUTIONS AND BRAZILIAN STARTUPS INITIATIVES COVID-19 PLATFORM FOR FIOCRUZ RESEARCHERS**

The Oswaldo Cruz Foundation (Fiocruz) launched an electronic platform to allow access to surveys, situational maps and epidemiological reports, which is available to researchers (<https://portal.fiocruz.br/coronavirus-2019-ncov-informacoes-para-researchers-0>), and a podcast for providing information to the public.

### **CORONAVIRUS SUS**

The Ministry of Health of Brazil (MS) has a website with information about the pandemic and has developed an application called CoronavirusSUS, which provides information and recommendations to the public based on self-assessment of health conditions. It also contains a geolocation tool that indicates the health facility closest to the user. Brazil has already shared the application and its source code with interested countries, such as Argentina, Ecuador and Panama.

The application is available for iOS and Android systems (<https://play.google.com/store/apps/details?id=br.gov>).

### **WEBSENSORS - ARTIFICIAL INTELLIGENCE**

The Websensors tool, developed with support of FAPESP and designed for data and text mining, is being used to analyze the evolution of the COVID-19 pandemic. By being able to extract data from news texts, in order to get information about "what happened", "when it happened" and "where it happened", Websensors enables the daily adjustment of the models for the spread of the disease. The information gathered on the pandemic is openly accessible at: <http://websensors.net.br/projects/covid19/>.

### **COVID-19 CHALLENGE OF 100 OPEN STARTUPS**

The 100 Open Startups program, an international platform that focus on stimulating business between large companies and startups, launched the Covid-19 Challenge. The program invites companies to present their needs to startup companies for the development of solutions to combat the pandemic in the following areas: remote work (home office), health and care; retail, trade and logistics; education, information and awareness-raising; culture and entertainment; mobility; services for the elderly; access to laboratory supplies; mental, emotional and physical health; financial management; and support for communities.

### **TIMPEL**

The startup Timpel developed an electrical impedance tomography device and software to monitor patients requiring artificial ventilation. The device minimizes the side effects of using mechanical ventilation and decreases the time of dependency

on equipment by offering more objective criteria for its use, which otherwise would mostly rely on intuitive decision by the doctors. Developed through a project supported by FAPESP, more than 150 units of the device are already in operation in hospitals in Brazil, Europe, the United States, Japan and the Middle East.

## **BIOTECAM**

Biotecam, an environmental biotechnology startup, is adapting its registered cleaning polluted water device to become an air purifier suitable for areas with gatherings of people infected by Covid-19. The product innovates by its low energy consumption, 50% lower than the average of its competitors. The product was developed in partnership with the Instituto Federal Fluminense (IFF) and the Brazilian Company for Research and Industrial Innovation (Embrapii). It is estimated that the level of disinfection stays above 95%. For a field hospital, the estimated cost of manufacturing the equipment is BRL 50,000, and it is expected that the adaptation of the equipment will be ready in two months.

## **WEBSITES OF BRAZILIAN START-UPS WORKING IN INITIATIVES RELATED TO COVID-19**

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Multiple Brazilian start-ups have developed technological solutions that are available to other countries. The companies' webpages can be found bellow.

BRAILE: <https://braile.com.br/en/>

INLOCO: <https://www.inloco.com.br/en/>

HILAB: <https://hitechnologies.com.br/site/>

TIMPEL: <http://www.timpel.com.br/>

BIOCAM: <https://www.biocam.com.br/>

WEBSENSORS: <http://websensors.net.br/projects/covid19/>

SAVELIVEZ: <https://savelivez.com/en/>

NOKNOX: <https://noknox.com/>

ILHASOFT: <https://www.ilhasoft.com.br/en/>

AYATECH: <https://www.aya-tech.com.br/en/home-2/>

ROCKET CHAT: <https://rocket.chat/>

TRUCK PAD: <https://www.truckpad.com.br/>