Ventilators for Panama Initiative

Rolando A. Gittens INDICASAT AIP

Foro PTB-COVID Feb 24, 2021



INDICASAT AIP

Research and Education based in Innovation

• We believe in the power of research and education to elevate the human condition and create leaders that can face the challenges of the XXI century.





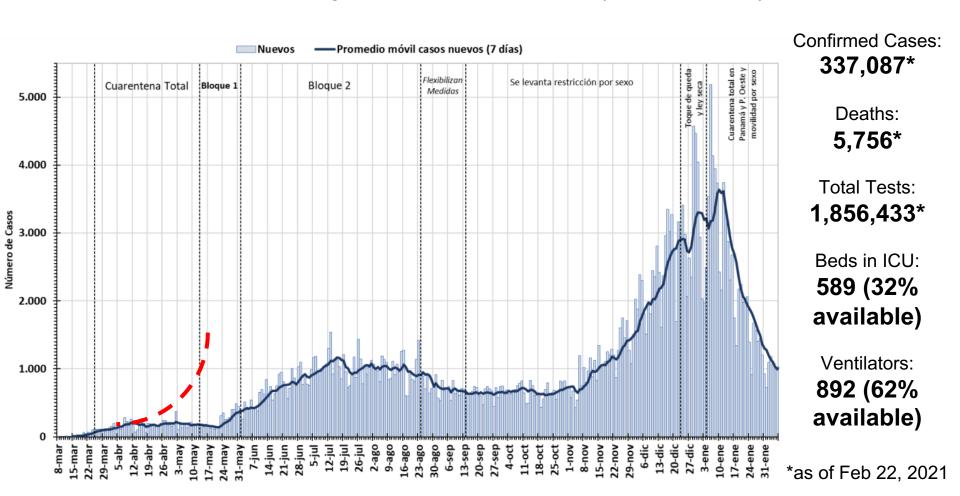






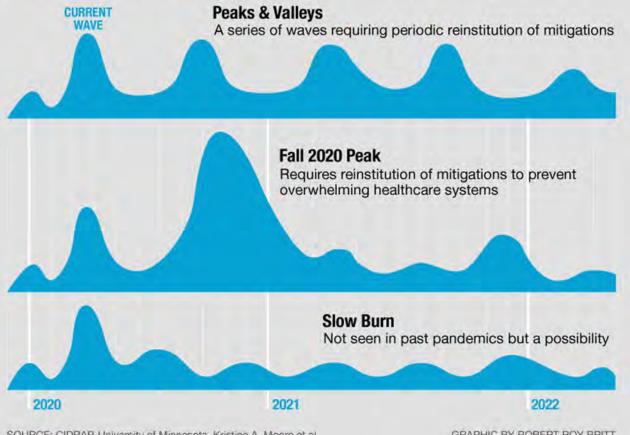


COVID-19: Epidemiologic Curve in Panama (Feb 6, 2021)



Pandemic Possibilities

Potential waves of Covid-19 infections in the Northern Hemisphere, in three scenarios based on past influenza pandemics and the known spreadability of Covid-19. Among the wildcards that would affect each scenario: starting and stopping preventive mitigations.



Ventilators for Panama Initiative: Coordination Commitee





Dr. Julio Escobar Ministerio de la Presidencia



Dr. Víctor Sánchez SENACYT



Dr. Eduardo Ortega-Barría SENACYT



Dr. José Trujillo Intensivista / CSS



Dr. Fernando Alfaro Intensivista / CSS



Dr. Xavier Sáez-Llorens Infectólogo / Hosp. del Niño



Dr. Rolando A. Gittens Bioingeniero / INDICASAT



Dra. Elida de Obaldía Física / UTP



Gilberto Gómez Políticas Públicas

Ventilators for Panama Initiative: Engineering Teams







Fundación 100 Panas

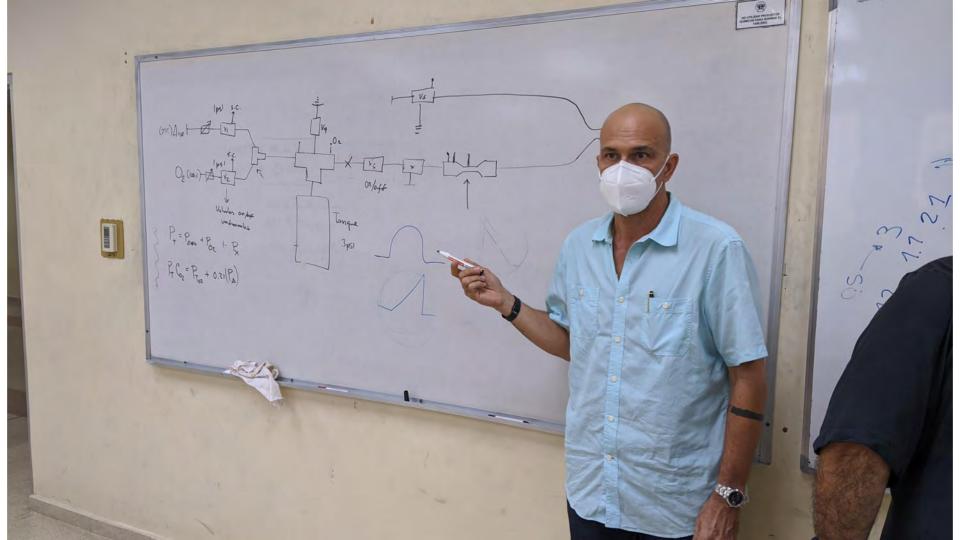


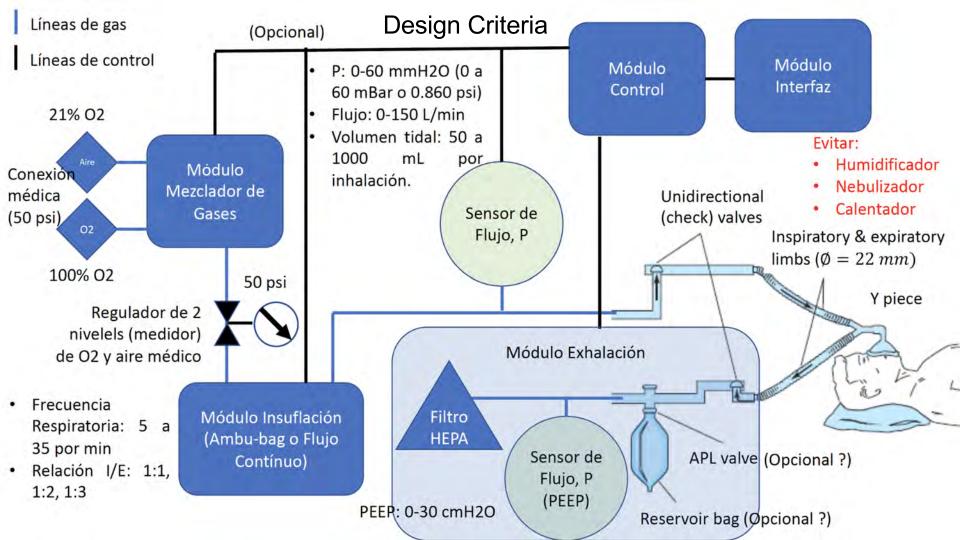




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Validation Tests: Three (3) Phases



Phase 1: Functional Tests with medical simulation mannequins.

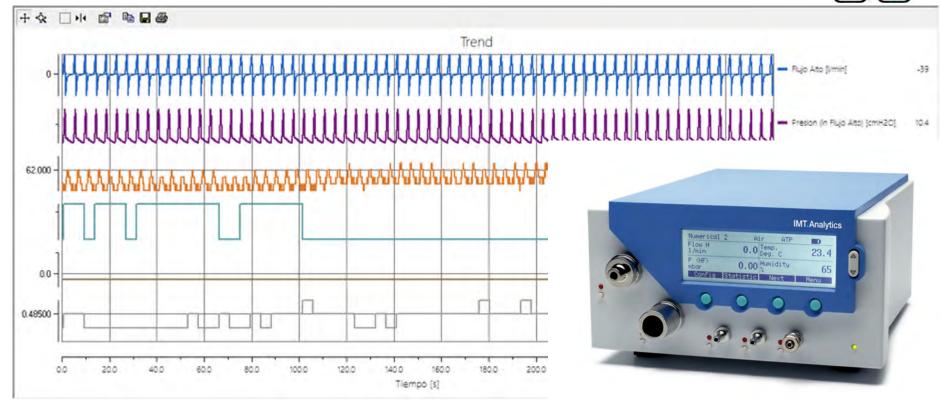
 Phase 2: Preclinical evaluation with healthy animals.

 Phase 3: Preclinical evaluation with a lung injury model to simulate breathing difficulties from COVID-19.



Phase 1: Functional Tests with mannequins

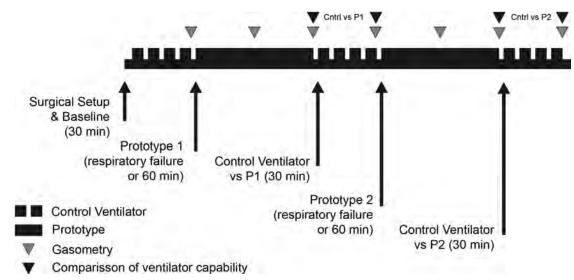




Phase 2: Preclinical Evaluation (healthy animals)

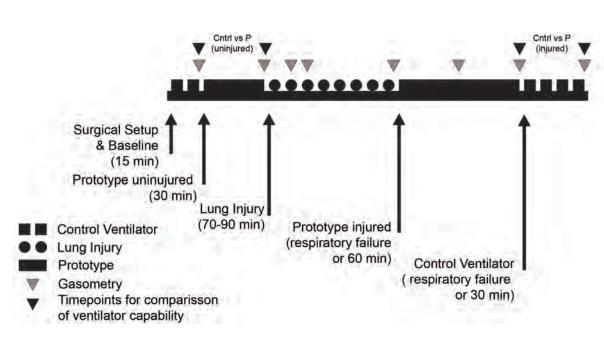


- Porcine model (n=6)
- Anesthesia: bolus injection and IV
- Evaluate ventilation after
 60 min, 2 devices per
 animal (healthy)
- Comparison against final control ventilator
- Effectivity criteria: blood gasometry (i.e., pO2, pCO2, pO2/FiO2)



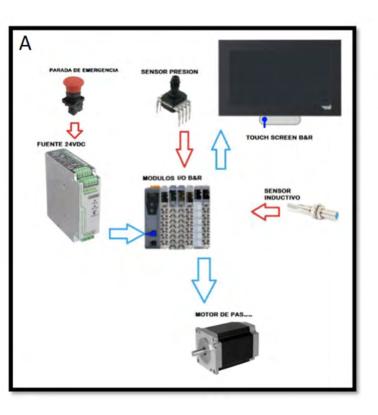
Phase 3: Preclinical Evaluation (lung injury model)

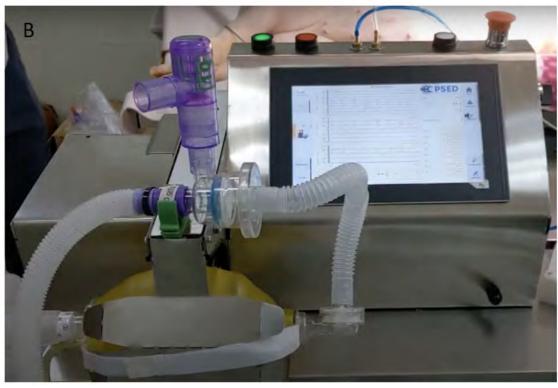
- Porcine model (n=6)
- Anesthesia: bolus injection and IV
- Lung injury: saline lavages (37C), every 10 min until pO2 < 90 mmHg for 60 min
- Rescue animal for 60 min
- Comparison against final control ventilator
- Effectivity criteria: blood gasometry (i.e., pO2, pCO2, pO2/FiO2)



Team PSED-AMBU-PLC (1)







Team PSED-AMBU-PLC (2)





Team PSED-AMBU-PLC (3)







Management system as per EN ISO 9001:2015

In accordance with TOV AUSTRIA CIERT procedures, it is hereby certified that



BAR Industrial Automation GmbH A-5142 Epgelsberg, B&R StraSe 1 A-5133 Gilgenberg, B&R Strafe 1

spokes a management system to line with the above standard for the

development, production and sale of components, systems and complete solutions for automation of stationary and mobile machinery as well as production and power plants. This is done based on a portfolio of scalable, integrated technology encompassing control systems (PLCs and I/O modules), industrial PCs, safety components, HMI products, drives and motors, CNC systems, robotics, process control systems and a uniform software technology

Cartificate Registration No. 20100431000086

Valid until October 07, 2022 Initial certification: June 16, 2004

M TOV AUSTRIA CERT GAMES

Vienna, October 11, 2019

This partification was conducted in accordance with TUV AUSTRIA CERT auditing and partification. procedures and is subject to regular curveflance audits.

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CERTIFICATE OF COMPLIANCE

Certificate Number 20190417-E115267

Report Reference E115267-19950323 Issue Date 2019-APRIL-17

issued to: B & R Industrial Automation GmbH

B&R Strasse 1

5142 Eggelsberg AUSTRIA

This certificate confirms that representative samples of PROGRAMMABLE CONTROLLERS

See addendum page

Have been investigated by UL in accordance with the

Standard(s) indicated on this Certificate.

Standardia) for Safety:

the products evaluated comply with the applicable requirements in UL 508 and CSA C22.2 No. 142-M1987.

Additional Information: See the UL Online Certifications Directory at https://g.ulprospector.com for additional information.

This Certificate of Compliance does not provide authorization to apply the Ut. Mark. Only the Ut. Follow-Up. Services Procedure provides authorization to apply the UI, Mark

Only those products bearing the UE. Mark should be convidened as being UE. Certified and covered under UE's

Look for the UL Certification Mark on the product.



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B&R Straße 1, A-5142 Eggelsberg, Austria

EU Konformitätserklärung

EU Declaration of Conformity

B&R Industrial Automation GmbH Hersteller Marudecture:

Anschrift Address Product Groups

Produktgruppen Manach-Massivine Submittabellen

Place Panel Senso C. T. 800, PP. 15, 21 35, 41, 45, 65, 100, 200, 100, 400, 500, PTG

REP. REST, RET, REST, REST, REST, REST, REST, SAV, SCAT, SELT, SELT, SERT, SERT, SERT, SERT, SERT, MRESS", MRECP

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* shifts for our older western alphanumentsche Zeichen / " storste für von sit fallter applia namen.

Harmit erklären vir, dass die oben bezeichneten Produktgruppen in den von uns in Verkahr gebrechten. Ausführungen den Schutzenforderungen der unten genannten EU- Richtlinien entsprechen. Die Nachverfolgbarkeit der oben genannten Produktgruppen ist durch eine eindeutige Serialnummerspundnung. für jedes einzwine Produkt gegeben.

Die alleinige Verantvortung für die Ausstellung dieser Konformhältserklärung trägt der Harsteller. Im Einzelnen erfüllen die oben genannten Produktgruppen folgende harmonisierte Normen:

We hereby declare that the product groups referred to above that we place on the market comply with the projection requirements of the EU directives noted below. The traceability of the product proups referred to allows to other for each product to the form of an explicit rains rumber This declaration of conformity is issued under the sole responsibility of the manufacturer

in detail the product prouds specified above fulfill the following harmoniced standards:

EMV-Richtlinie 3014/30/EU

EN 41121-2 2007

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Team UTP-100P

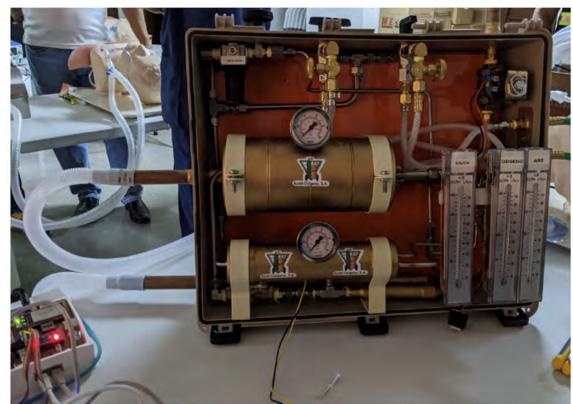


Ventiladores por Panamá

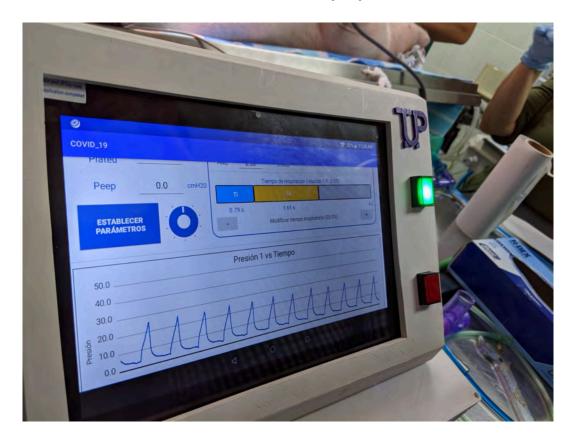
Modelo de Flujo Contínuo



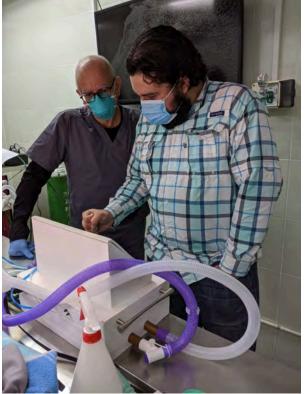




Team UTP-100P (2)







Lessons Learned / Future Challenges

Lessons:

- Panama has talented human resource to help solve major health, technological problems
- Ambitious projects can be achieved with limited funding, with the support of committed, interdisciplinary profesionals, institutions
- Collaborative approach (no choosing "winners")
- Learn, find expertise in local regulations, international accreditation
- Involve health authorities early, invite them to take ownership of initiative
- Tread the public communication path carefully: do not oversell the project or criticize authorities

Agradecimientos







Fundación 100 Panas





















































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¿Questions?