



THE CHALLENGE:

International travel has all but ceased due to the coronavirus pandemic. Air travel has declined by 90% since the outbreak: impacting airlines, airport operators, and citizens alike. While countries are now beginning to reopen both borders and economies, pandemic control restrictions – such as 14-day quarantines for international travellers – continue to stress the travel sector. With such measures in place, a trip of a few days - for business, employment, or family purposes - can require a month of self-isolation; with attendant consequences on wellbeing. Under these circumstances, international travel will face a long, slow recovery: with continued primary and secondary impacts on those who operate and are employed in the sector.

ENTER iWARRANT:

We are already seeing COVID-19 tests at the point of departure for repatriation flights and, in some cases, on arrival as a means of avoiding quarantine requirements. Priced at around USD\$220.00, which some see as discriminatory, the latter service is positioned as an easement to restrictions and represents a new level of ‘on arrival’ expedience. However, such testing is currently a piecemeal point solution with no means of providing through-life certification of a traveller’s COVID-19 status. As such, there is the potential for travellers to ‘fall through the cracks’ and for cases to missed, with all the attendant consequences.

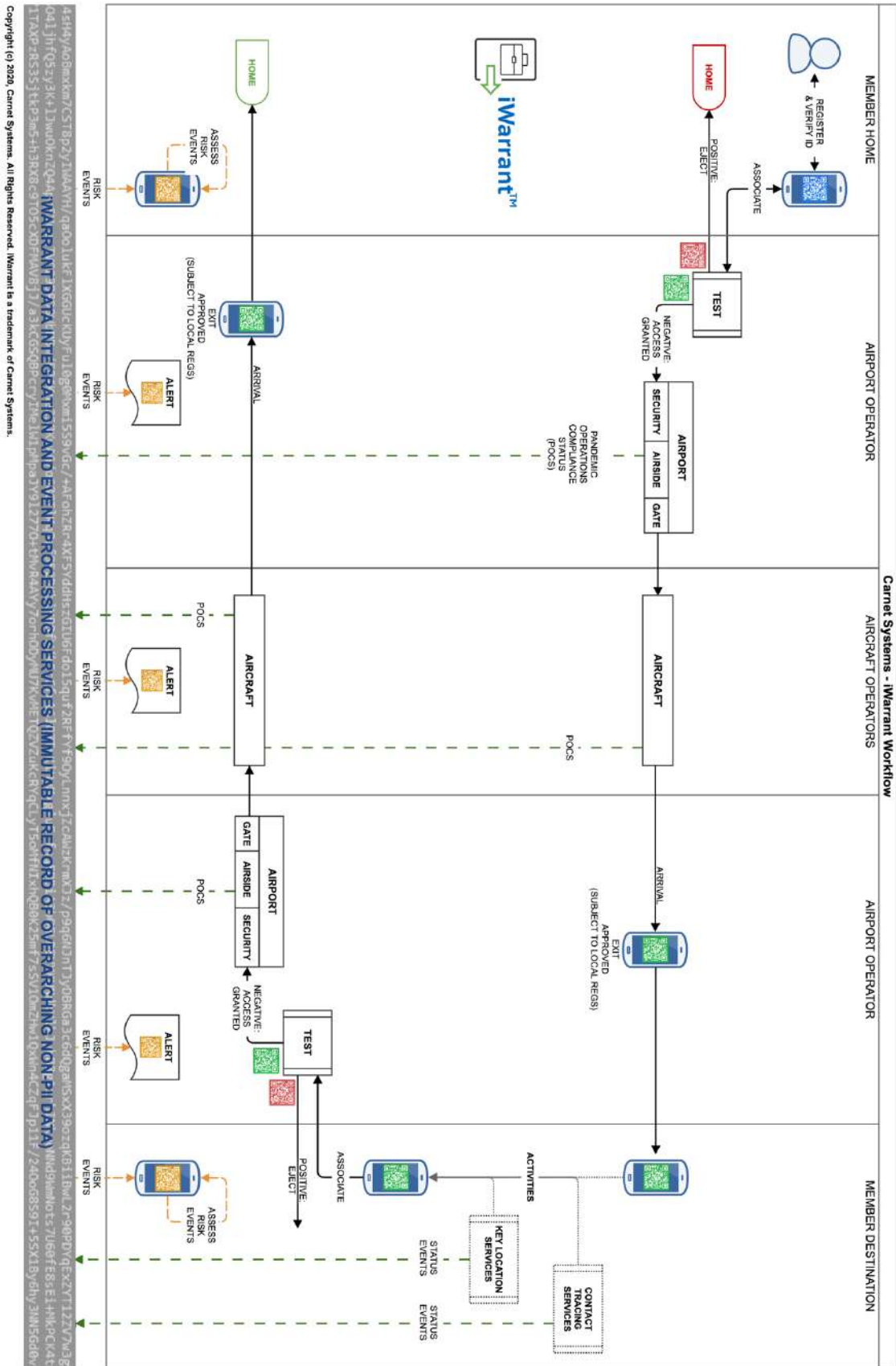
iWarrant delivers a privacy-first digital technology wrapper to COVID-19 testing for international travel. Currently in partnership with iCgene Ltd., iWarrant wraps Loop Mediated Isothermal Amplification (LAMP) testing at point of sample in a secure software ecosystem that provides through-life assurance of traveller status. With minimal training, and a system sensitivity of up to 2 viruses per μl of fluid taken from a swab, iWarrant delivers high specificity digital certification in approximately 45 minutes and, most importantly, at a cost less than one-fifth that seen elsewhere. iWarrant can, therefore, be implemented at scale and with only a minor increment to both traditional check-in times and travel costs.

HOW IT WORKS:

On booking travel, the traveller is asked to register and verify their identity through the iWarrant app. This assigns an ‘untested’ status to the traveller who, on arrival at the airport, undergoes a swab test. Once processed, a negative test result automatically creates a visual reference in the iWarrant app which allows the traveller to enter security. Once the traveller enters security, the travel process continues as normal, subject to local regulations regarding social distancing, masks, etc. Subject to local regulations, the visual reference in the iWarrant app allows the traveller to exit their destination airport and go about their business without entering quarantine. Once that business is concluded, the traveller begins their return journey by undergoing a second swab test. Again, if negative, the traveller is permitted to enter security and the outbound process runs in reverse.

This process repeats for every journey: creating a secure, private, and immutable travel health record that, in conjunction with contact tracing, key location, and risk management services, can be used to help get travel back on track.

TRAVELSAFE SYSTEMS: iWARRANT AND iCGENE GETTING TRAVEL BACK ON TRACK DURING COVID-19





THE iCGENE TEST:

iCGENE, from iCgene Ltd., is a new and powerful system that is setting the standard for genetic molecular analysis based on LAMP technology. The iCGENE system is currently used in a range of diagnostic applications and is proven to be significantly quicker and more cost-effective than existing alternatives. iCGENE has developed tests for COVID-19, both on surfaces (available now) and in humans (available with CE IVD certification from June 2020), offering ground-breaking speed of results with high accuracy. The iCGENE system is portable at room temperatures and can be powered from a 12-volt source, making it ideal for immediate on-the-spot checks in the field.

LAMP technology allows rapid amplification of genetic material at constant temperatures using small sample quantities obtained from a nasopharyngeal or environmental swab. iCGENE analysis follows a three-stage process in which nucleic acid is extracted from the test sample; the extract is amplified using the LAMP technology (with any SARS-Cov2 RNA subject to a 6-point attachment by the iCGENE primers), and the fluorescence of the extract is analysed for the presence of the virus. The results are clearly expressed as either positive or negative and are either displayed on a local tablet app or uploaded for onward processing by iWarrant.

Binding with absolute precision to 6 unique points means that iCGENE very accurately identifies the RNA of the virus with a sensitivity of up to 2 viruses per μl of fluid. With a focus on minimal operator burden, the iCGENE test is simple and robust: occurring in one small tube to deliver high specificity results in approximately 45 minutes. The only other molecular test used for COVID-19 is a Polymerase Chain Reaction (PCR) test which requires laboratory conditions; has fewer binding points, and requires analysis equipment to cycle through a range of temperatures, often taking more than 2 hours to produce results. Additionally, PCR requires experienced, trained laboratory staff and additional reagents.

iCGENE is available as both a Bench-Top system, for laboratory use, and the portable iCGENE Health. A CE marked single-channel 12-well unit is currently available, with a 48-well multiplex unit undergoing CE IVD certification. The price per test depends on volumes ordered with no additional costs for reagents.

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ADVANTAGES AND BENEFITS:

iWarrant, in conjunction with iCGENE, is focused on helping to get international travel back on track during COVID-19. Our objective is to provide an alternative to (potentially) multiple 14-day quarantine periods as a pandemic control measure: helping people to get back to work and families to get back together.

The key advantages and benefits of our approach are:

- An integrated, through-life traveller monitoring ecosystem that integrates testing with digital technology to permit international travel without the impacts of quarantine
- Ground-breaking speed and accuracy of the test in room temperature environments
- A simple, robust process with minimal operator training requirements
- Real-time testing and results at the point of departure that remain valid at the point of arrival
- Automated association of tests and allocation of results before entering security
- Clear and intuitive interface with immediate visual representation of traveller status
- Immutable, tamper-proof records held in a privacy-first, secure data architecture
- Permissioned and duration-based data sharing under the full control of the traveller
- Greater exposure control through independent testing on each leg of a journey
- Real-time incident communications to travellers, operators, and authorised others
- Management of COVID-19 status for airline crew, protecting both crews and passengers
- Support for dynamic, granular, and holistic risk assessments by ease of interface to:
 - Airport, airline, and hospitality Business Pandemic Practices¹
 - PNR/API/OneID systems and relevant contact/location tracing technologies
- A low price per test, subject to order volume, with:
 - No additional cost for reagents
 - No additional cost for download or use of the iWarrant app
- Test costs can be borne by the passenger directly or as a COVID-19 surcharge
- Open extensible architecture for integration with other results, travel systems, and more

¹ Business Pandemic Practices include compliance with socio-spatial controls, cleaning regimes, and incident reporting



Testing Process

TEST 1 Take swab test

Submit to onsite testing facility

From this point the 72 hour clock starts ticking

35-45 minutes later

25 -30 Minutes later

Positive result -potentially infected

I-warrant record updates

Red Light

Leave site and self isolate for 14 days

Negative result = virus clear

I-warrant record updates

Green light

Enter Green zone of production bubble

no social distancing needed

Normal working environment

71 Hours left after test result

After three days (72 hours)

I-warrant record updates

Grey light

Out to test time range

Test 2

re test all at the 3 day point. Every one to ensure they were not gestating but not detectable at the point of original test. if they get "2 greens" then there is in no need to further retest

Not necessarily infected

Classified as untested

Re start process as needed if

anyone who has left the site

anyone feeling unwell

If any body has entered the bubble untested for any reason

Comparing TravelSafe Systems' LAMP test with PCR:

Aspect	'Gold Standard' PCR	TravelSafe Systems LAMP
Used for?	Do you have the virus?	Do you have the virus?
Approved for use in humans?	Yes	Yes CE - IVD
What is required?	Swab from nose or throat	Swab from nose or throat
How does it work?	Looks for genetic material	Looks for genetic material
Required infrastructure	Centralised Laboratories	Distributed where needed
Use at point of requirement?	No	Yes
Other reagents required	Complex sample preparation requiring skilled Laboratory staff and multiple re-agents (Up to an hour prep)	Extraction process no additional reagents and 2 - minute prep time.
Thermal cycling required	Yes	No
Testing Protocol	Complex and fragile	Robust and simple
Skilled lab personnel required	Yes	No
Genetic (RNA) binding points	4	6
Sensitivity	10 viral copies in one microlitre	1 viral copy in one microlitre
False Negatives	YES	Highly unlikely
Detect before infectious	Possible	Yes
Speed of Process:	6-92 Hours (complexity of process, transport of material, releasing of results)	28-45 Minutes all local to test
Typical Cost per Test	€100-200	€40, reducing with volume
Delivery of results	Typically Paper, Email, SMS	Secure Digital Delivery i-warrant