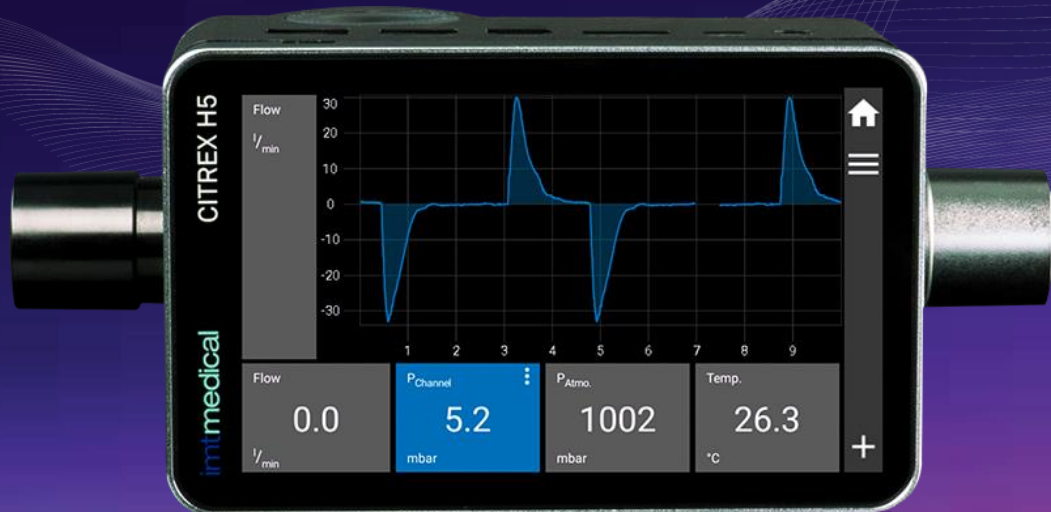




# SCiCHART

## CASE STUDY



Performed by

IMT AG, Engineering

Industry

Engineering, Healthcare

### Realtime Charts for the Citrex H5

The ideal all-in-one testing device for biomedical engineers, independent service organisations, anaesthesia device and ventilator manufacturers.

“The best mobile test device in its class”



# Project Motivation & Goals

The purpose of the IMT Citrex H5 project was to build a mobile ventilator tester that will measure the performance of the breathing ventilators.

Described as a 'Gas Flow Analyzer', the Citrex H5 is the 'ideal all-in-one testing device for biomedical technicians, independent service organisations, anaesthesia device and ventilation manufacturers'.

The device uses about 20 to 30 sensors, and enables users to measure and test a variety of medical equipment including airflow, pressure, temperature etc...

The results to be shown on a device for the medical device engineers to verify the accuracy of the ventilators performance and provide the necessary maintenance.



## The Challenge

IMT AG needed to have smooth real-time line and mountain charts on a testing device / embedded system for medical industry with very low power & low cost hardware.

The first choice was between evaluating real-time chart components or port existing C# code to Java.

None of the existing components were targeting high performance scalability and none had the "spirit" to take on this challenge.. But SciChart did.

## Hardware limitations

- Freescale iMX-6 Running Android Lollipop 5.1.1
- Dual Core A9 CPU @ 692MHz with 1 GB RAM
- Vivante GC 320 GPU



*It was actually IMT's prompting and early adoption of SciChart Android which caused us to develop this platform, so we really have to thank them for their input into making this product!"*

Andrew Burnett-Thompson,  
SciChart CEO

# Requirements

Chart types: Single X-Axis (relative time) with one or two Y-Axis;

Scrolling behavior data rollover:

Once the values reach the end of the X-Axis (time), the data needs to rollover and replaces the oldest data. Between the oldest and the newest data should be a placeholder gap;

Presentation: Single X-Axis with one Y-Axis with independent scaling. A title, legend and a label for each axis can be configured. The scale for each axis can be adjusted;

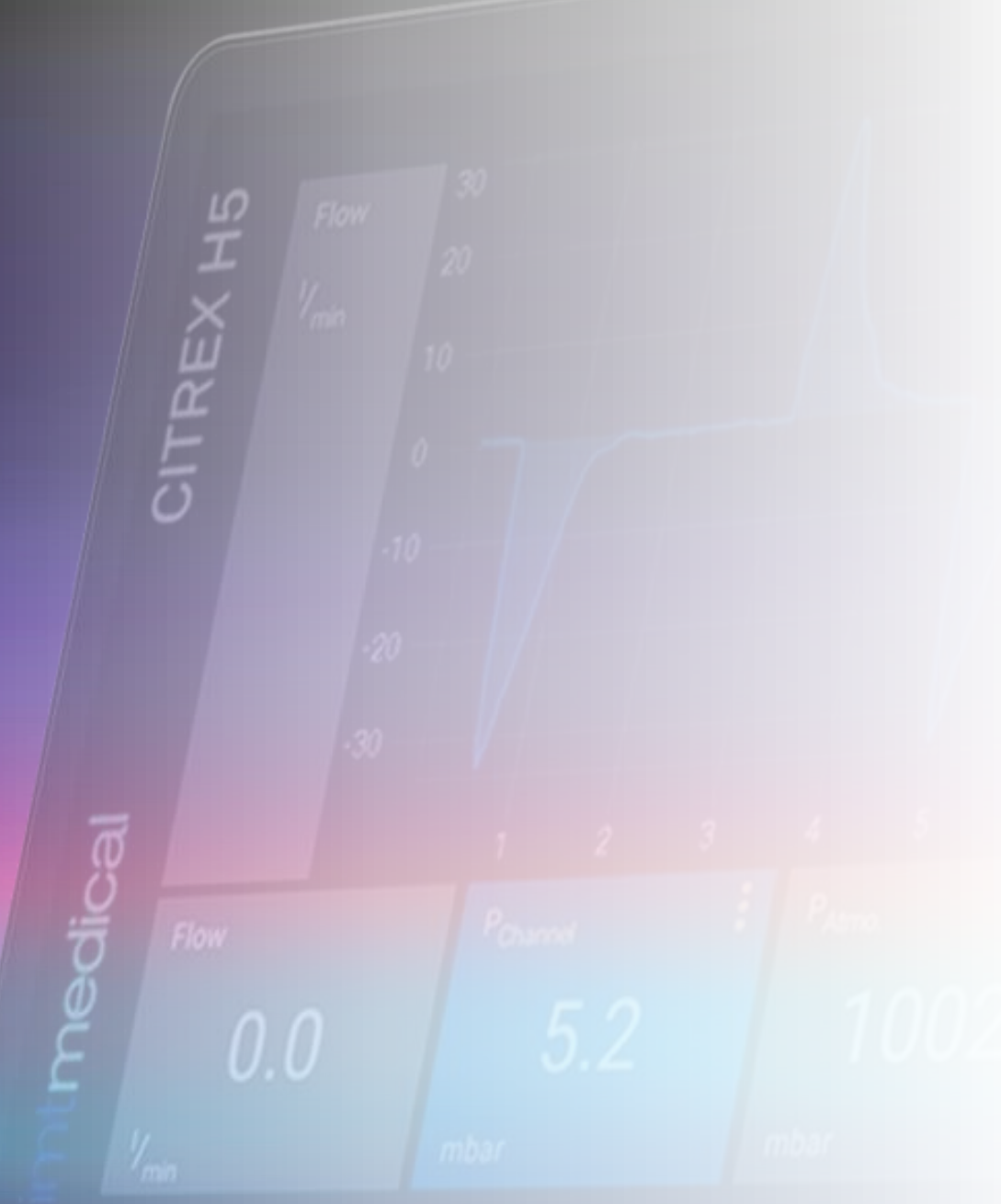
Zooming & Interactivity: solutions requires auto scaling, multi touch drag, pan, scroll and multi chart synchronization;

Annotations: Line annotations with a label to be added to the chart (e.g. to visualize a limit). The position and visibility of the annotation can be programmatically manipulated.

Theming & Styling: color (for of background, axis, grid lines and line series ) and font (for Font style and color of title, axis labels, axis values and legend ) need to be configurable

Performance:

Data is added with 2000Hz update frequency (new data each 0.5ms).



# Solution

**Android Chart Design & Integration**  
SciChart Android Charts were designed in collaboration with Michael Guntli from IMT in order to meet the specifications of their bespoke hardware. This allowed us to build a library which was extremely high performance, efficient and lean.

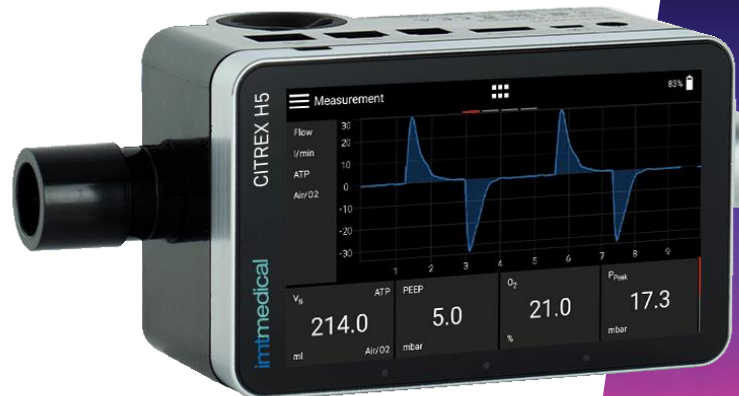
**High Performance Capabilities**  
SciChart's high performance capabilities were developed and honed on the extremely low power hardware provided by IMT AG, including a Freescale IMX-6 'Wandboard' which was given to us for testing.

Using a mixture of Java, C++ with the Android NDK, and OpenGL ES2.0, SciChart's developers refined the performance of our Realtime charts until they were able to run at 30 FPS on only 400MHz of CPU.

**Smooth, rich touch interaction**  
was enabled, to allow Pinch to Zoom, Drag/Touch to Pan, Axis Drag and tooltips on all SciChart.Android charts.

CASE STUDY  
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**imt.**  
making ideas work



## About SciChart

SciChart is a cross-platform WPF, iOS, Android and Xamarin Scientific & Financial Charting Library.

SciChart supports rendering of complex, interactive, real-time charts with many millions of data points for demanding scientific, medical and financial applications and embedded systems that require high performance, rich interaction and smooth updates.

Find out more about SciChart at <https://scichart.com>

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