Non-invasive intra-cardiac pressure monitoring

Game changing approach to cardiology diagnostics and heart failure management

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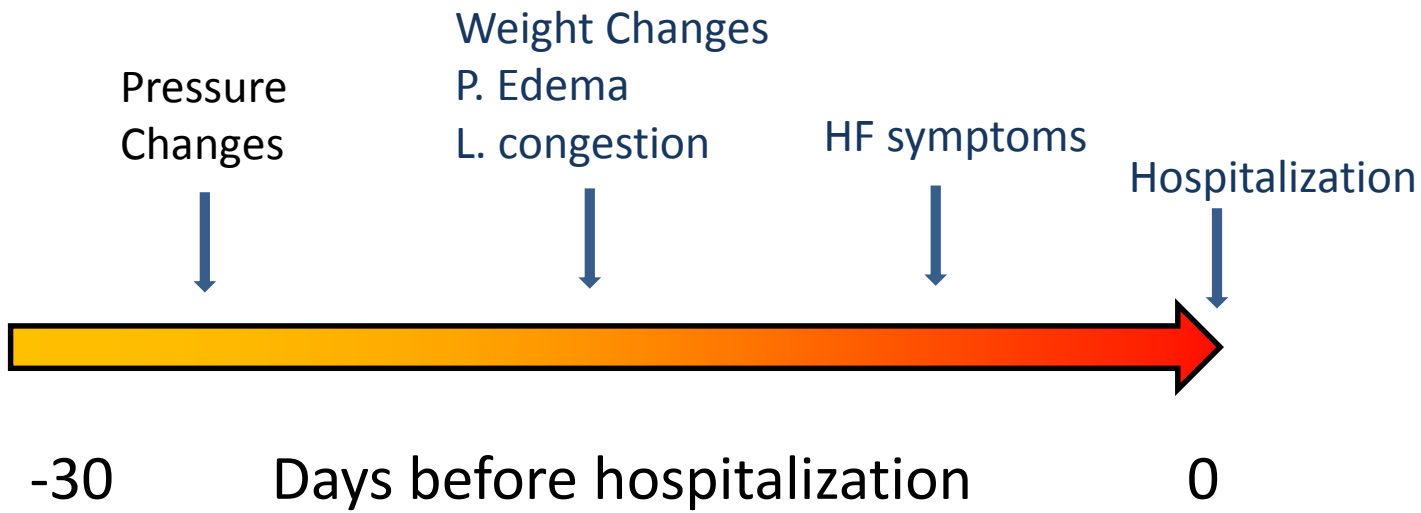
600,000 new CHF patients are diagnosed every year

and added to more than 5,700,000 CHF patients in USA only

Challenge: Cardiac Pressure monitoring to improve CHF management and delay NIHA Class II patients progressing to Classes III-IV

Physiological progression of ADHF



Hemodynamic Information is critical:

Cardiac pressure changes occur long before other HF symptoms become visible

ICPM meeting this challenge by assessing hemodynamic changes in:

LVEDP = Left Ventricle End-Diastolic Pressure – acknowledged marker for CHF and MI
RVEDP = Right Ventricle End-Diastolic Pressure – acknowledged marker for RCM

ICPM Goals:

- control and improvement of life quality and expectancy for patients with CHF/CM
- marked reduction of costs and reduce (re)-hospitalization rate by monitoring LVEDP, RVEDP and relevant heart chamber pressures

ICPM – Innovative Non-Invasive Real-Time Intra-Cardiac pressure monitoring system

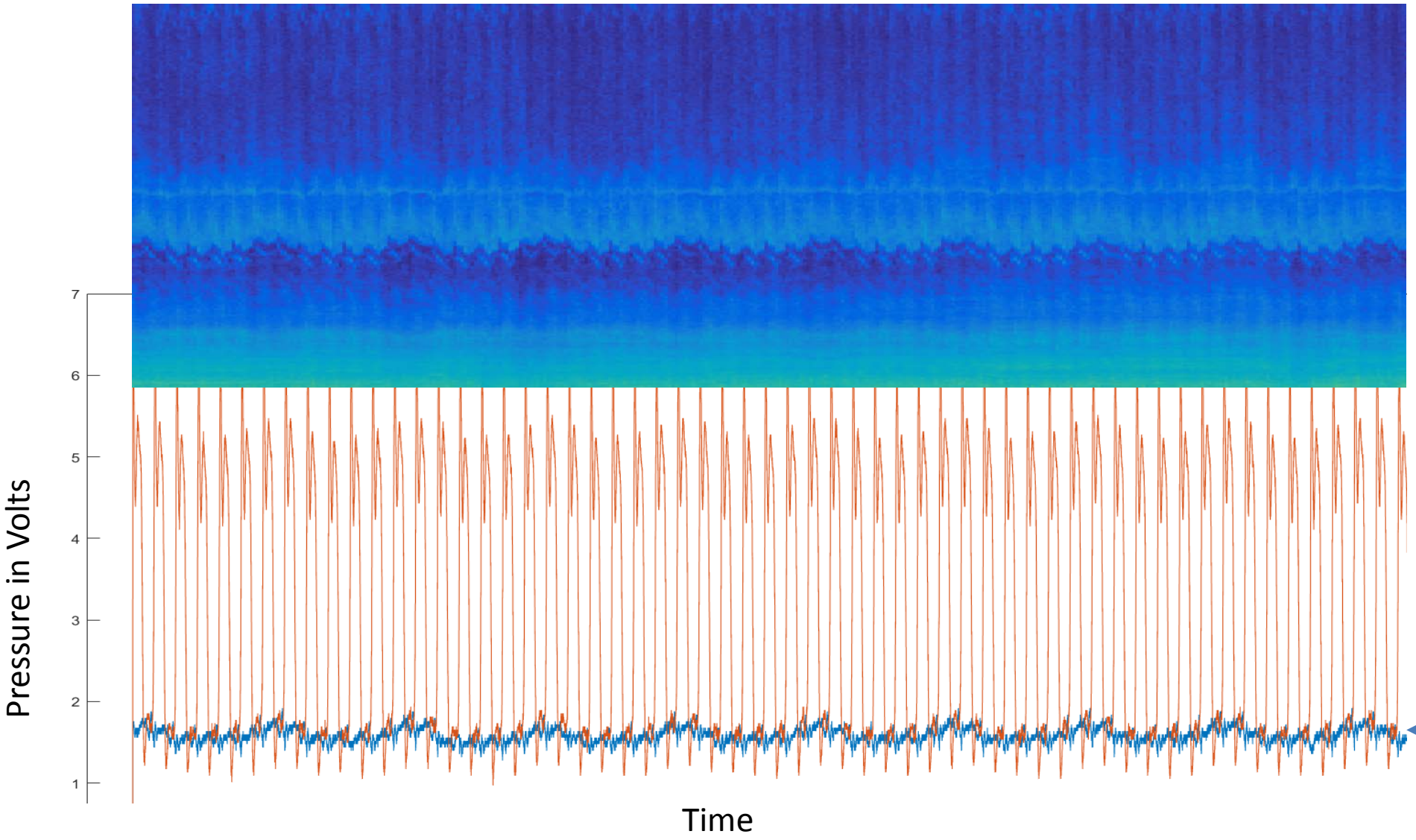
ICPM usage simplicity:

- **Portable Ultrasound Device**
- **Cell Phone or any mobile device**

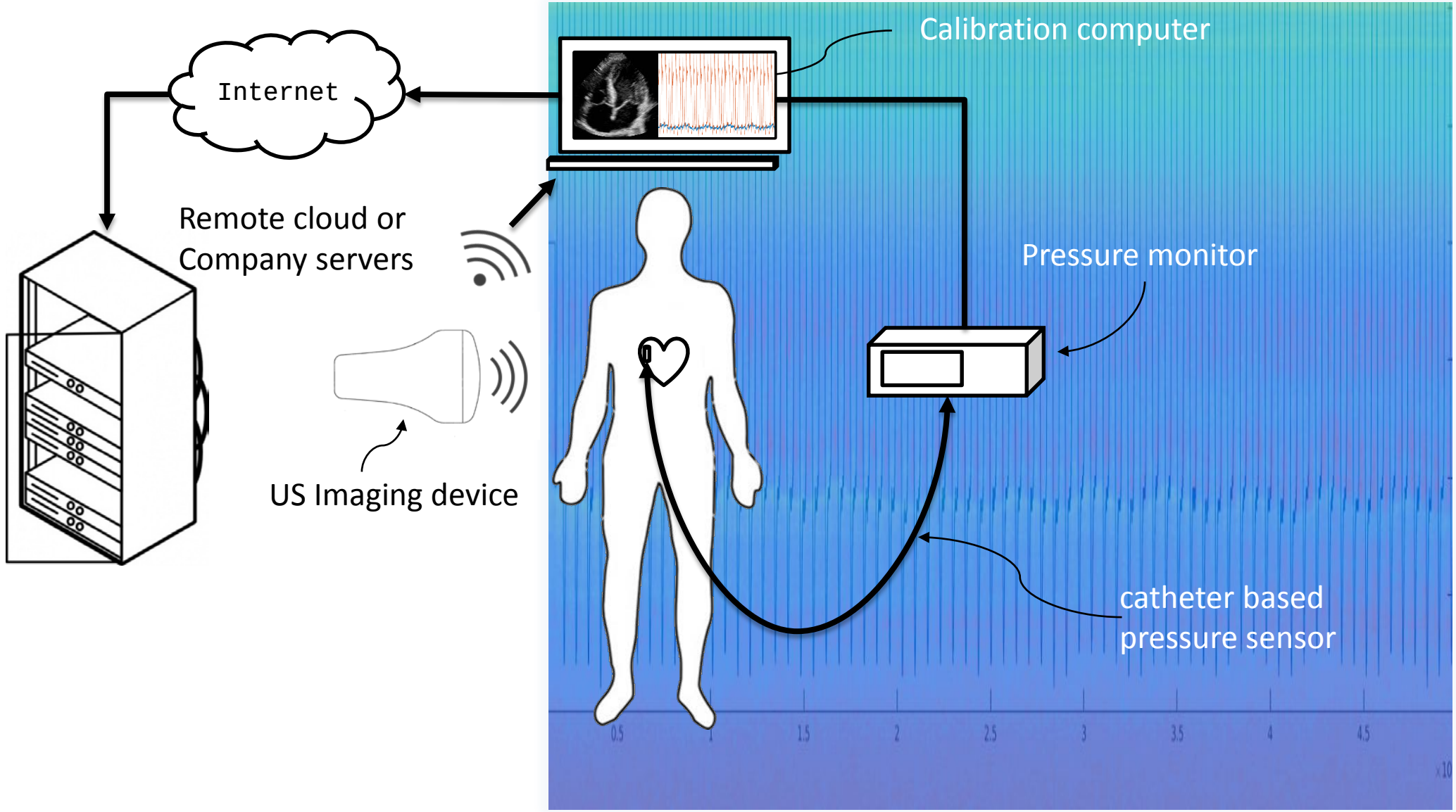
Connectivity to Cloud, API to healthcare providers

Data processing algorithm

Comparing Ultrasound Data to Measured Pressure



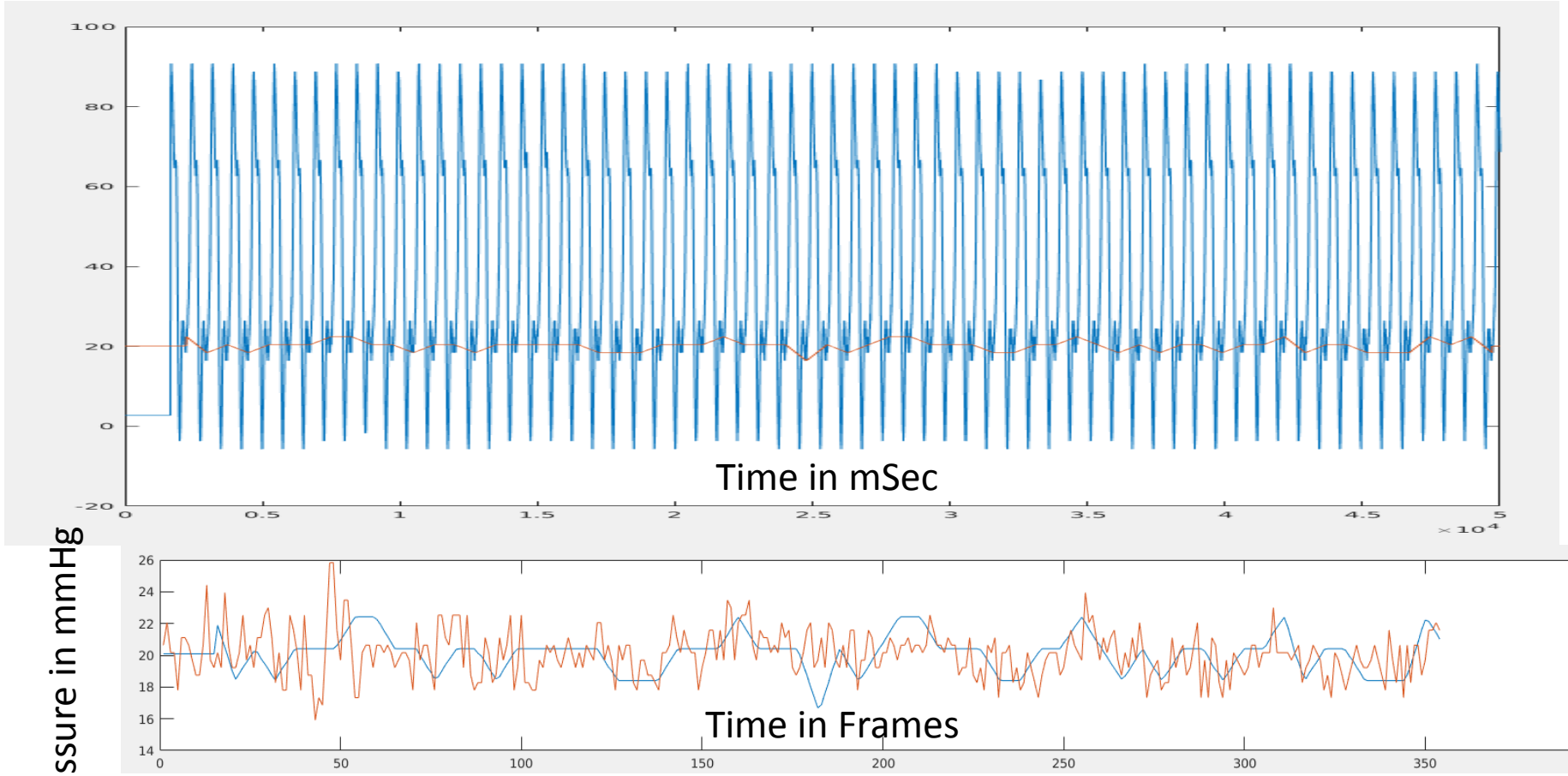
ICPM Calibration System Components



ICPM unique capabilities

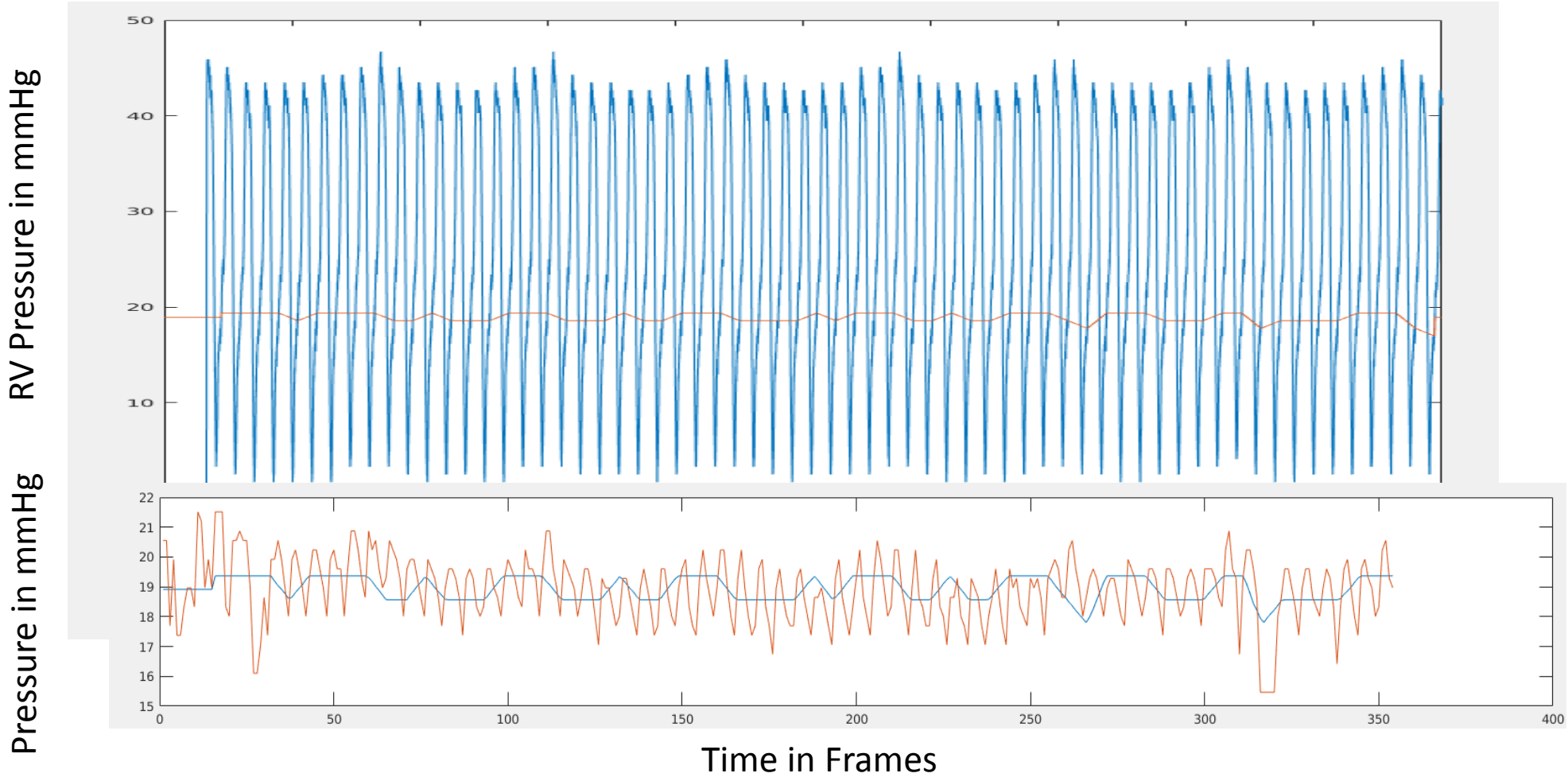
	Calibration	Heart Failure Parameters that can be Monitored	Remarks
Left heart Catheterization	• LAP, LVP • ECG • Additionally: Aortic Pressure	• **LAP** • **LVEDP**, LVSP • **RVEDP, RVSP**	• LVEDP, LVSP are calculated from LAP, LVP and ECG data
Right heart Catheterization	• PAP, RAP, RVP • ECG	• **PAP** • **RVEDP,RVSP**	• RVEDP, RVSP are calculated from RAP, RVP and ECG data
	• PCWP	• **LAP** • **LVEDP**, LVSP • RVEDP, RVSP	• LVEDP, LVSP are calculated from PCWP, RVSP and ECG data

In ZIV Hospital 17-Jan-2019: Assessing LA and LVEDP by LV



Measured : 20.06 mmHg **Calculated: 20.09 mmHg**

In ZIV Hospital 17-Jan-2019: Assessing RA and RVEDP by RV



Measured : 18.91 mmHg **Calculated: 18.94 mmHg**

Ziv Medical Center
Affiliated to the Faculty of Medicine in Zefat, Bar Ilan University

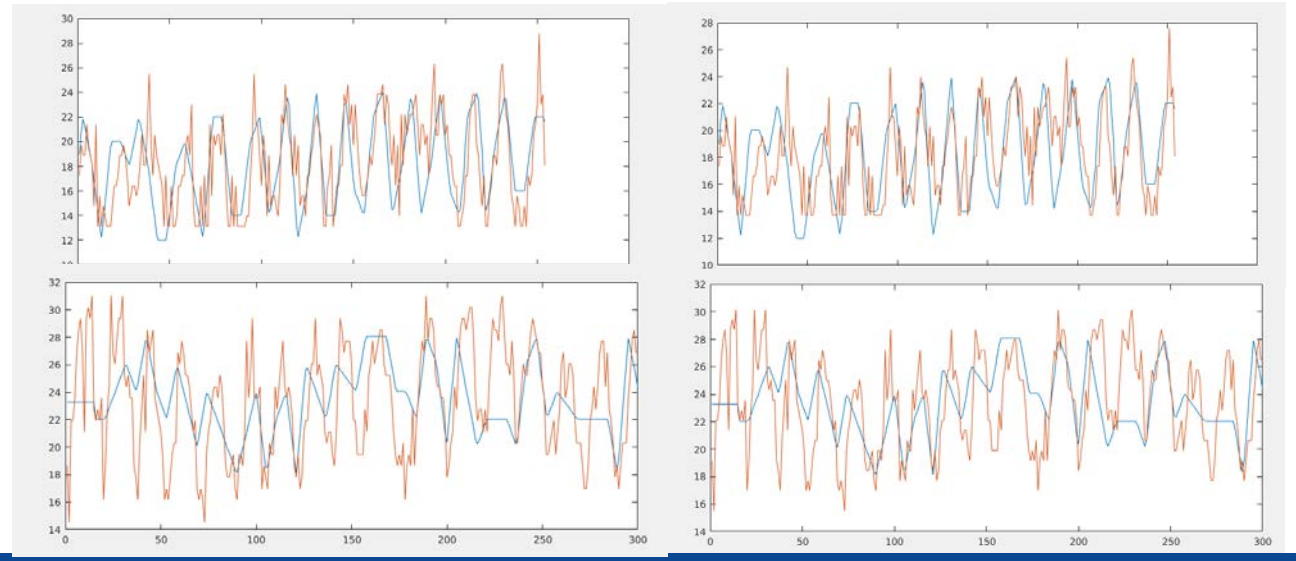
HARVEST

In ZIV Hospital 24-Mar-2019:

Assessing LVEDP with large differences before and after PCI

Cross-Calibration

	Pressure Before	Pressure After	Pressure Measured
US Before	18.24	18.28	18.24
US After	23.36	23.49	23.45



Conclusions

- A unique and novel non invasive system for Intra Cardiac Pressure Monitoring is presented.
- The system illustrates very high accuracy and reproducibility of calculated echo derived data as compared with catheter based pressures recordings.
- Further accumulation of data will presume the utilization of Machine Learning tools, lessening requirements for cardiac catheterization.
- This technology has the potential to become an ultimate non-invasive model for assessing CHF, PHT, CHD and more.

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Thank you!