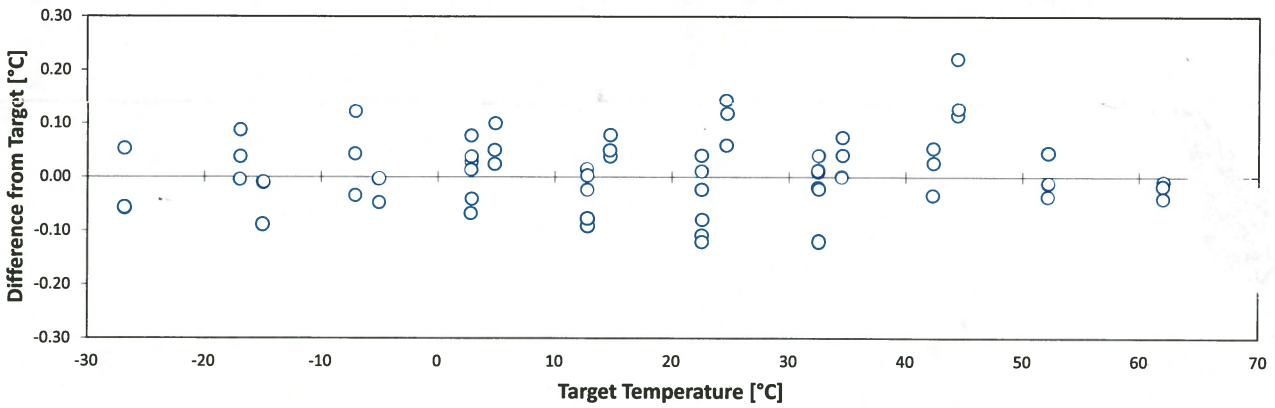
apogee
INSTRUMENTS
721 West 1800 North
Logan, UT 84321

Certificate of Calibration
Apogee Instruments Infrared Radiometer
SI-400 and MI-200 Series

Calibration Overview		
Model/Serial Number	:	**SI-4H1-SS_3286**
Calibration Date	:	21-May-2018
Recommended Recalibration Date	:	20-May-2020
Mean of Differences from Target	:	0.010 °C
Target Temperature Uncertainty (95% confidence) from -30 to 65°C	:	**0.135 °C**
Maximum Difference from Target	:	0.219 °C
Minimum Difference from Target	:	-0.120 °C
Maximum Detector Response	:	0.324 mV
Minimum Detector Response	:	-0.193 mV
Average Output Sensitivity	:	15.974 µV / °C

Coefficient Correction Errors



Calibration Procedure

An Infrared Radiometer (IRR) combines a thermopile detector and a National Institute of Standards and Technology (NIST) traceable thermistor to measure a mV response proportional to the thermal radiation balance between the target temperature and the thermopile temperature (sensor body temperature). IRRs are placed in a temperature controlled housing, which is thermally insulated from a blackbody cone. The housing, pointed at a blackbody cone, is temperature cycled through various sensor body set-points. The blackbody cone temperature (measured with NIST traceable thermistors) is likewise cycled through multiple temperature set-points relative to each sensor body temperature set-point. A linear fit is used to model each sensor body set-point with the respective blackbody cone set-points versus the thermopile signal at those set-points. The slopes and y-intercepts of all linear fits corresponding to each sensor body temperature are then fit to a second order polynomial in order to adequately interpolate between the calibrated set-points. These two sets of second order polynomial coefficients represent the custom calibration coefficients as given above.

Traceability

All thermistors are measured for accuracy in a constant temperature bath that is directly traceable to the NIST. The overall measurement system uncertainty for all the bath and measurement allowances combined for error is typically less than 0.1°C and completely traceable to National Standards.

Technical Manager : Jacob Bingham

Date : 21-May-2018

Please keep this document for your records