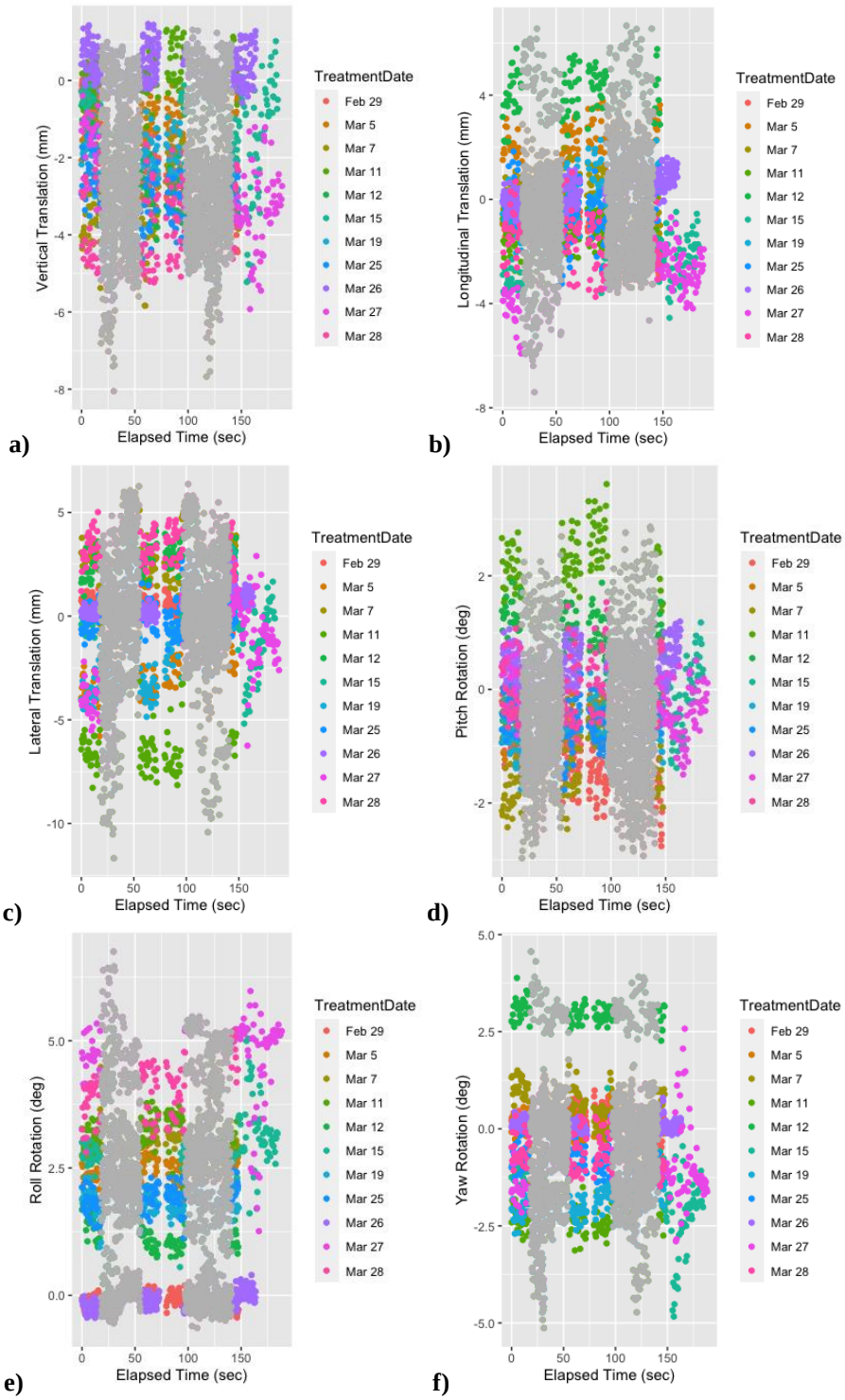
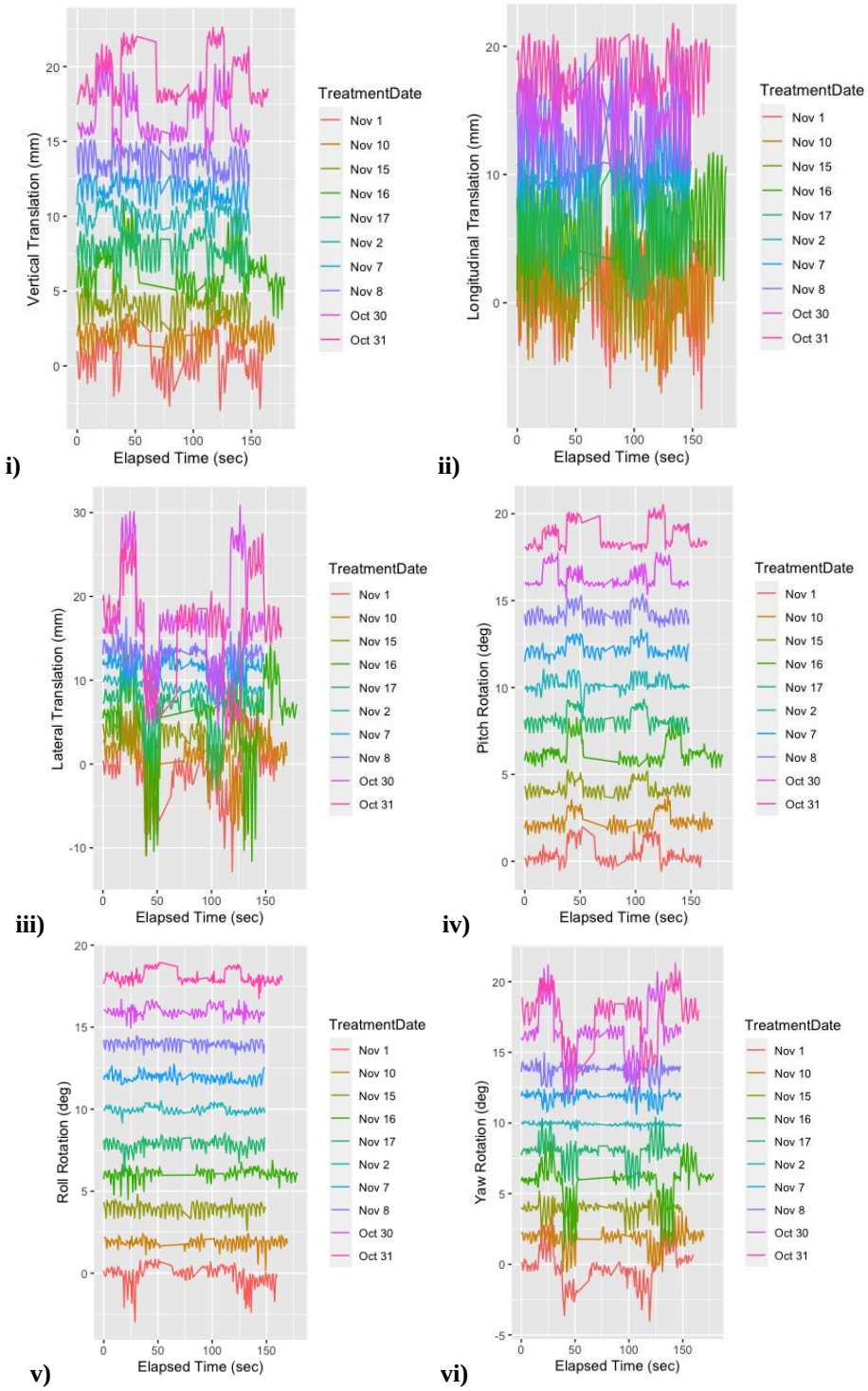
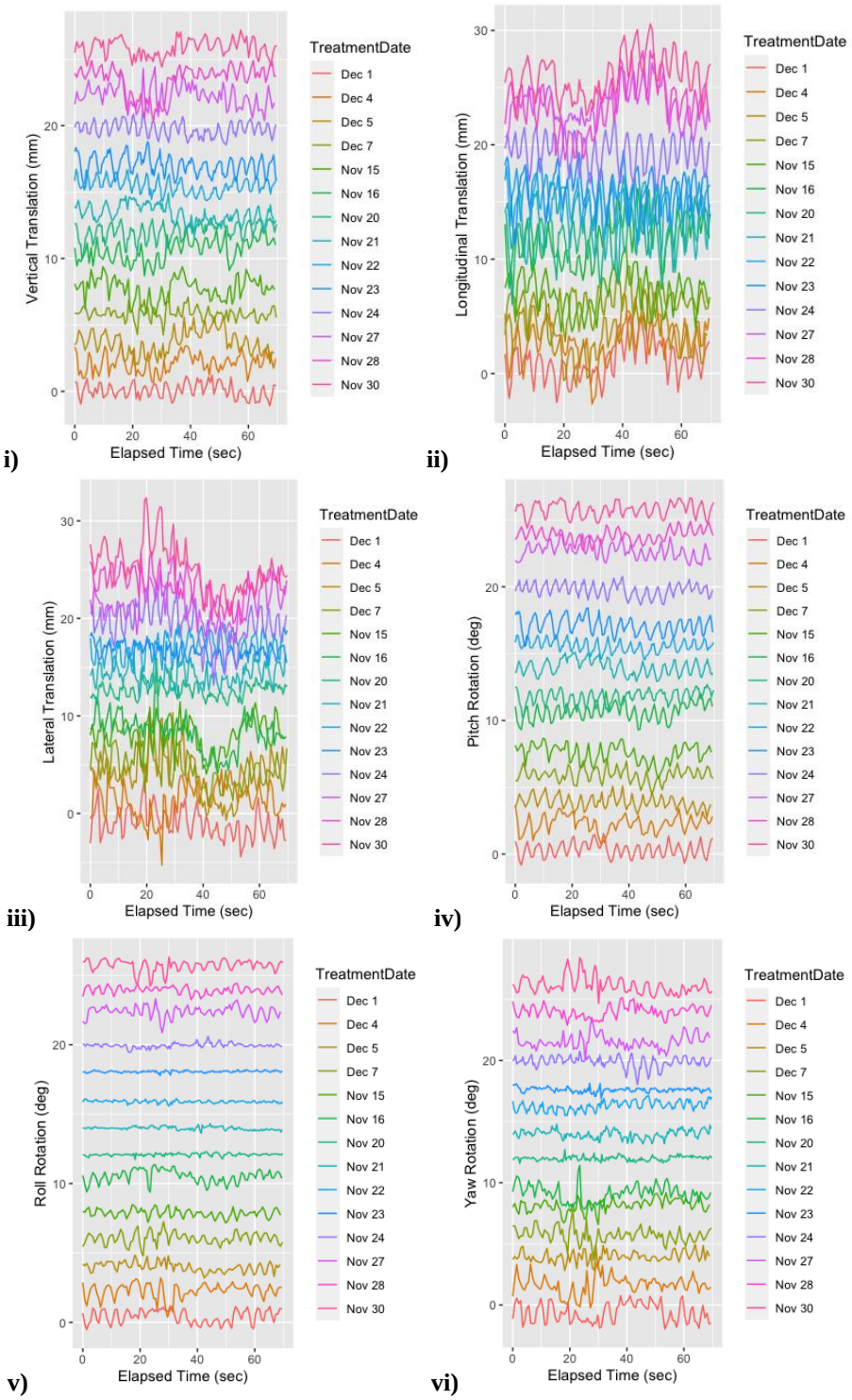
Appendices



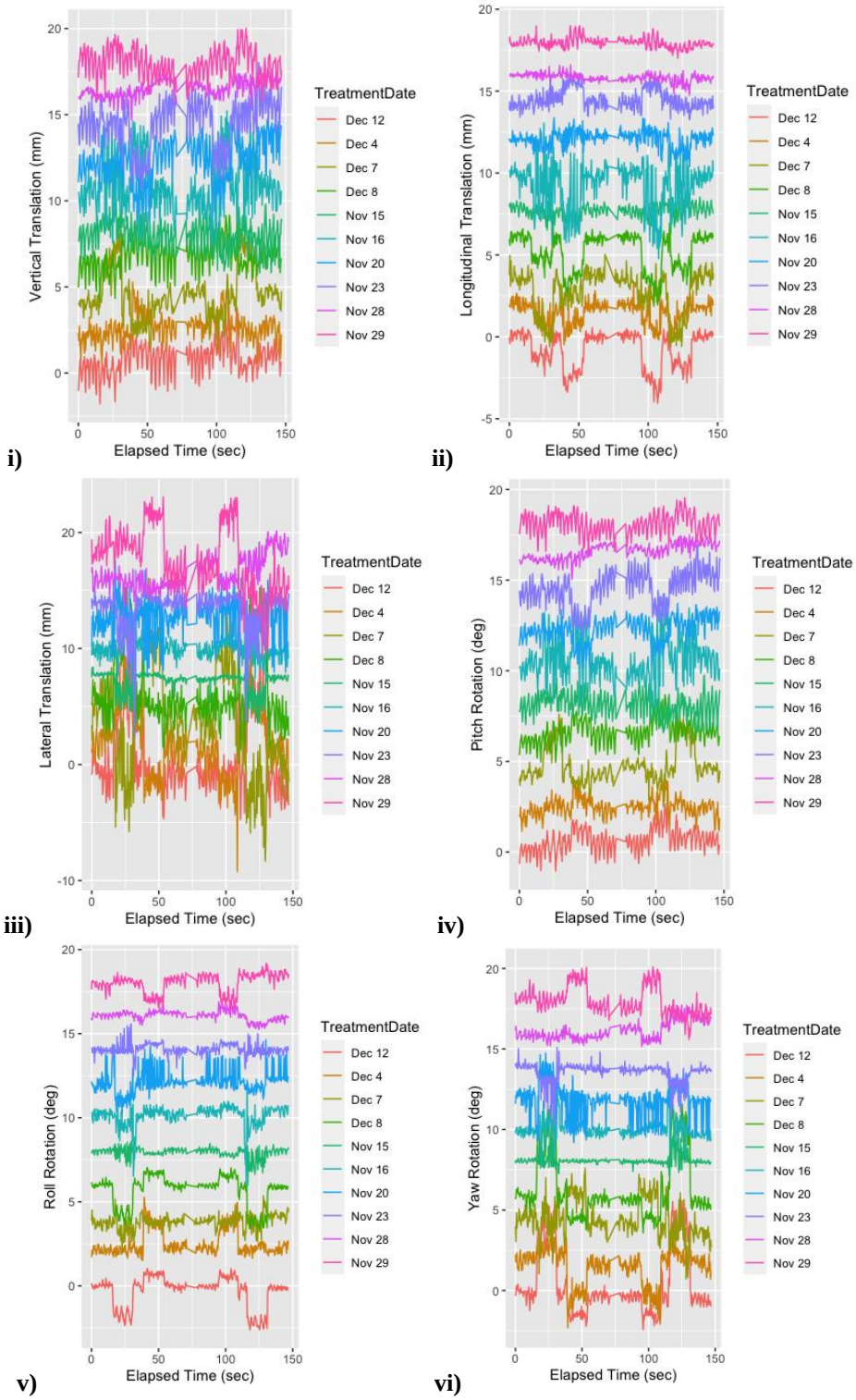
Appendix 1. Example of Translations and Rotations as Recorded by AlignRT Across the Length (2 arcs) of Patient D's Treatment Fraction. Data is recorded relative to the DICOM planning CT as the reference surface. Data points shaded in grey represent the sections where the gantry blocks the collection of representative and accurate surface monitoring. Coloured data points represent the data used for intrafractional motion results, with each colour representing a different treatment fraction. a) Vertical (AP) translations; b) Longitudinal (SI) translations; c) Lateral (LR) translations; d) Pitch rotations; e) Roll rotations; f) Yaw rotations. This figure was created using R.



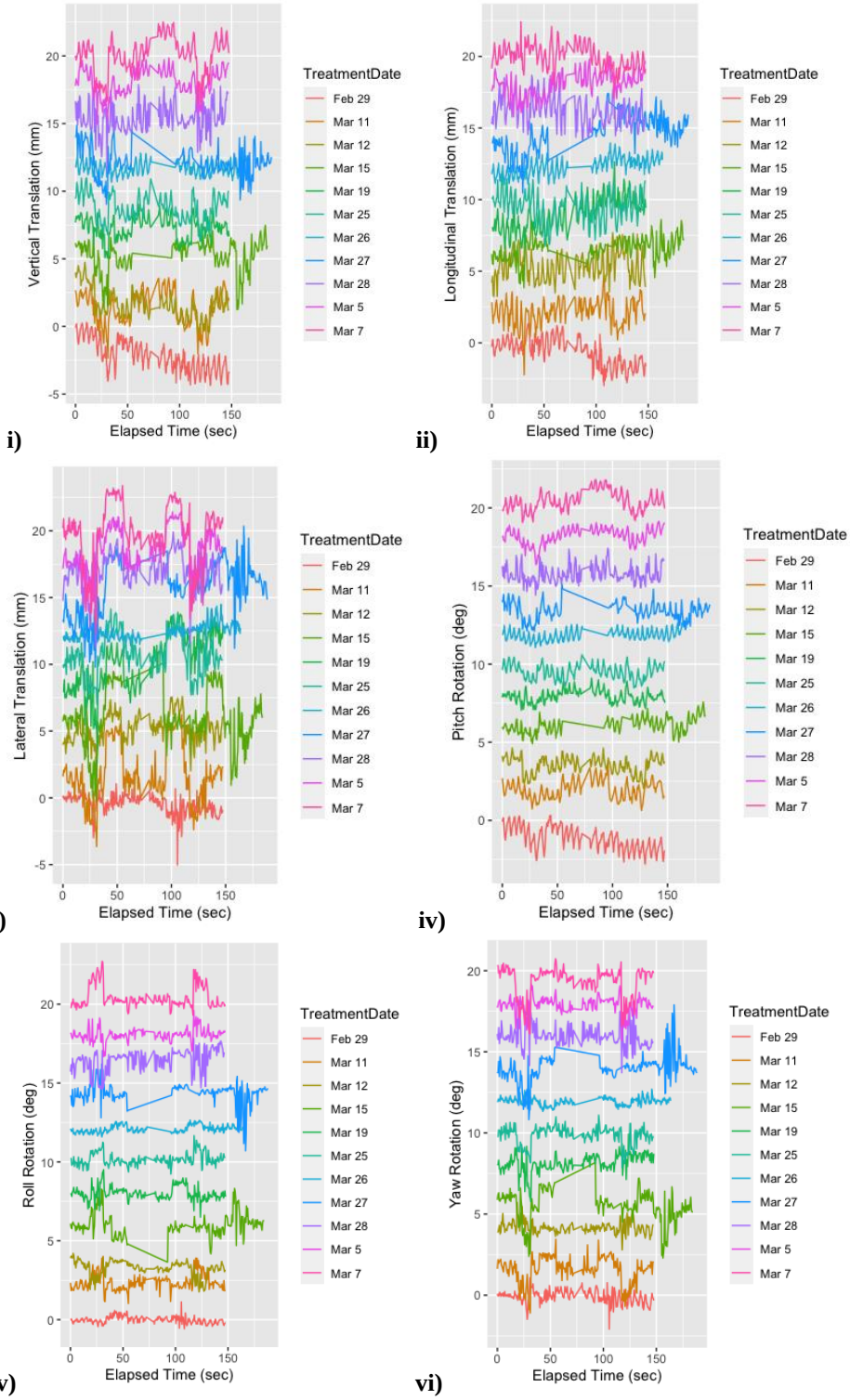
Appendix 2A. Raw AlignRT Data Collected from Patient A Log Files. Data from each treatment date is represented by a coloured line, offset by 2mm between each date. Data is recorded relative to the average of the first 10 points where the treatment beam was active for each treatment fraction. Consistent, thin peaks and valleys represent breathing cycles of the patient. Flat regions across all patients exemplify gaps of time where the radiation beam was turned off due to patient difficulties or delays between arcs. i) Vertical (AP) translations; ii) Longitudinal (SI) translations; iii) Lateral (LR) translations; iv) Pitch rotations; v) Roll rotations; vi) Yaw rotations. This figure was created using R.



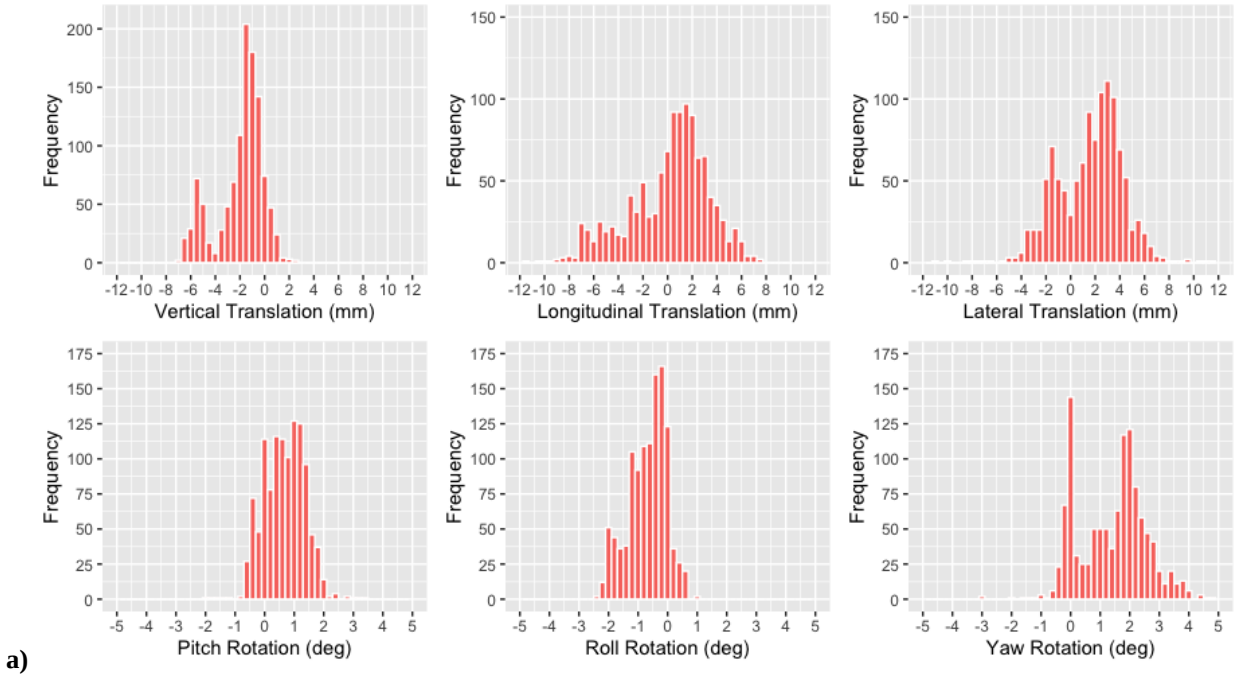
Appendix 2B. Raw AlignRT Data Collected from Patient B Log Files. Data from each treatment date is represented by a coloured line, offset by 2mm between each date. Data is recorded relative to the average of the first 10 points where the treatment beam was active for each treatment fraction. Consistent, thin peaks and valleys represent breathing cycles of the patient. Flat regions across all patients exemplify gaps of time where the radiation beam was turned off due to patient difficulties or delays between arcs. i) Vertical (AP) translations; ii) Longitudinal (SI) translations; iii) Lateral (LR) translations; iv) Pitch rotations; v) Roll rotations; vi) Yaw rotations. This figure was created using R.



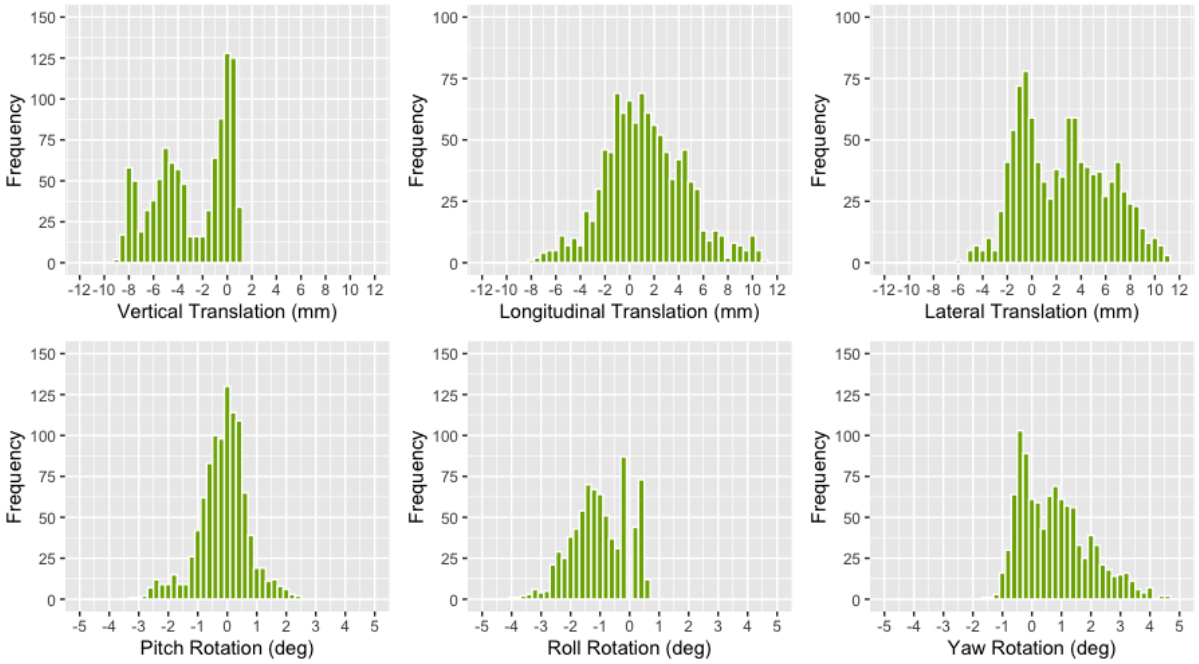
Appendix 2C. Raw AlignRT Data Collected from Patient C Log Files. Data from each treatment date is represented by a coloured line, offset by 2mm between each date. Data is recorded relative to the average of the first 10 points where the treatment beam was active for each treatment fraction. Consistent, thin peaks and valleys represent breathing cycles of the patient. Flat regions across all patients exemplify gaps of time where the radiation beam was turned off due to patient difficulties or delays between arcs. i) Vertical (AP) translations; ii) Longitudinal (SI) translations; iii) Lateral (LR) translations; iv) Pitch rotations; v) Roll rotations; vi) Yaw rotations. This figure was created using R.



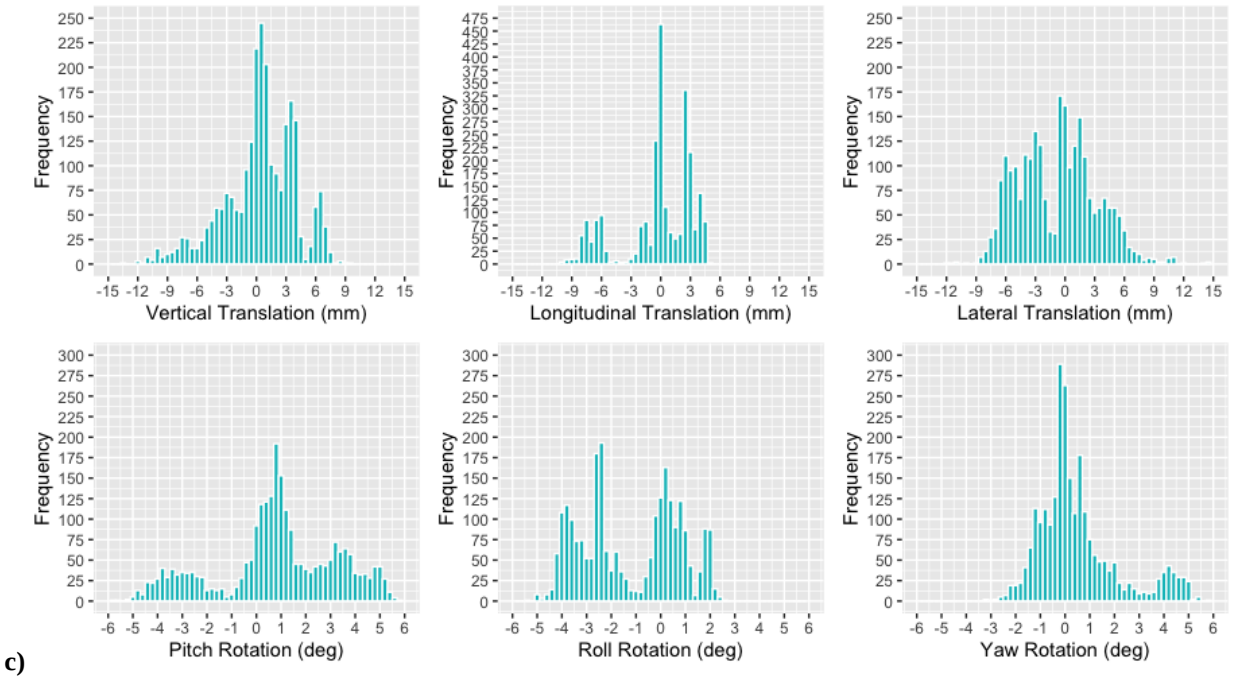
Appendix 2D. Raw AlignRT Data Collected from Patient D Log Files. Data from each treatment date is represented by a coloured line, offset by 2mm between each date. Data is recorded relative to the average of the first 10 points where the treatment beam was active for each treatment fraction. Consistent, thin peaks and valleys represent breathing cycles of the patient. Flat regions across all patients exemplify gaps of time where the radiation beam was turned off due to patient difficulties or delays between arcs. i) Vertical (AP) translations; ii) Longitudinal (SI) translations; iii) Lateral (LR) translations; iv) Pitch rotations; v) Roll rotations; vi) Yaw rotations. This figure was created using R.


Frequency
Vertical Translation (mm)
Longitudinal Translation (mm)
Lateral Translation (mm)
Pitch Rotation (deg)
Roll Rotation (deg)
Yaw Rotation (deg)

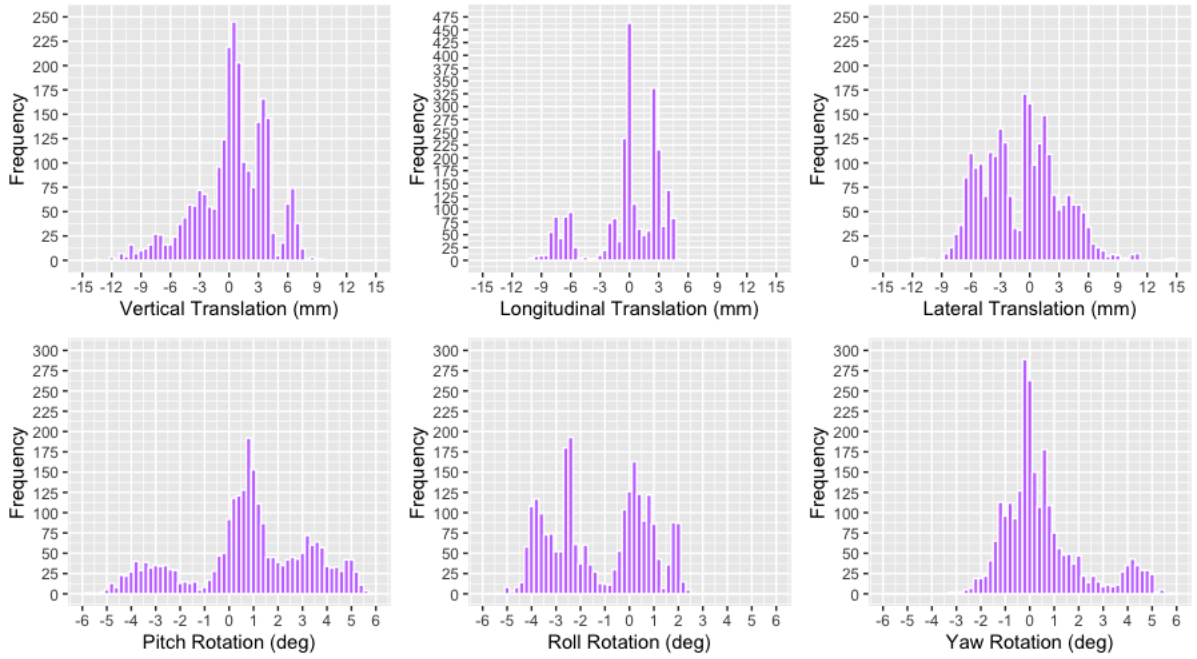
a)


Frequency
Vertical Translation (mm)
Longitudinal Translation (mm)
Lateral Translation (mm)
Pitch Rotation (deg)
Roll Rotation (deg)
Yaw Rotation (deg)

b)

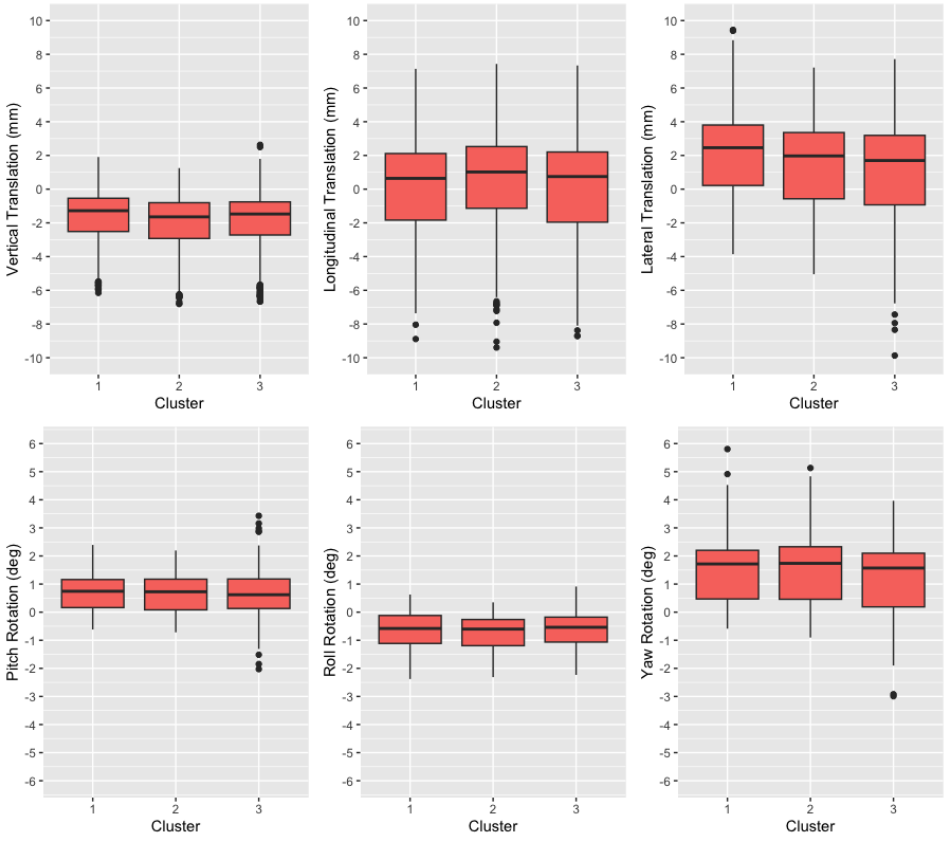


c)

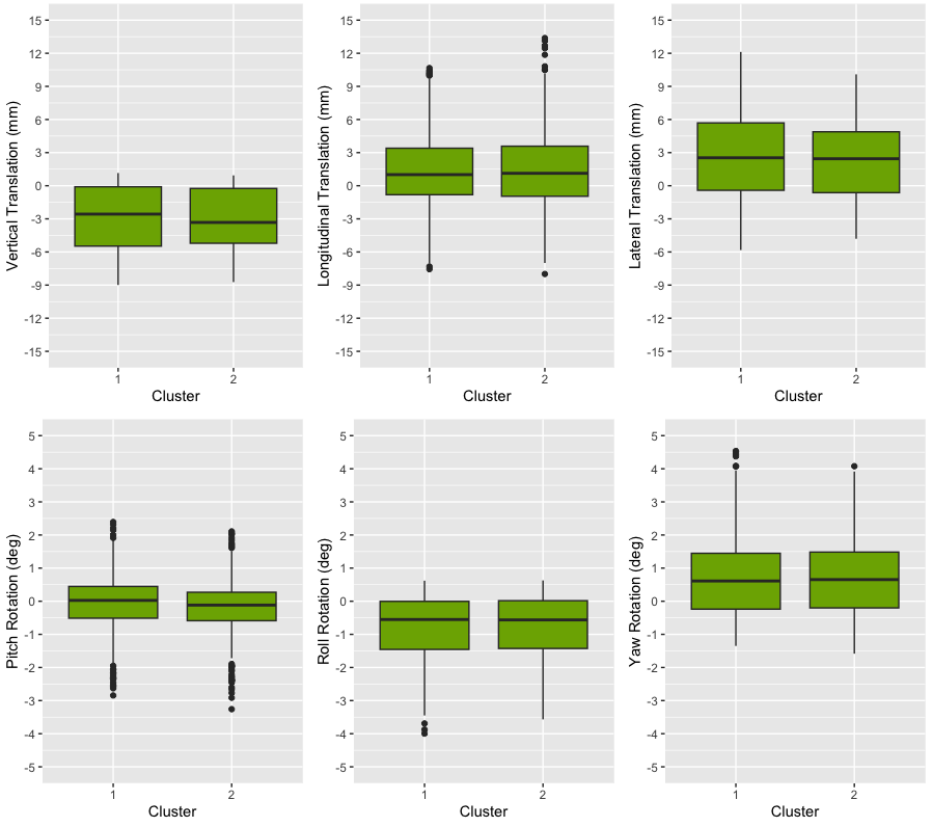


d)

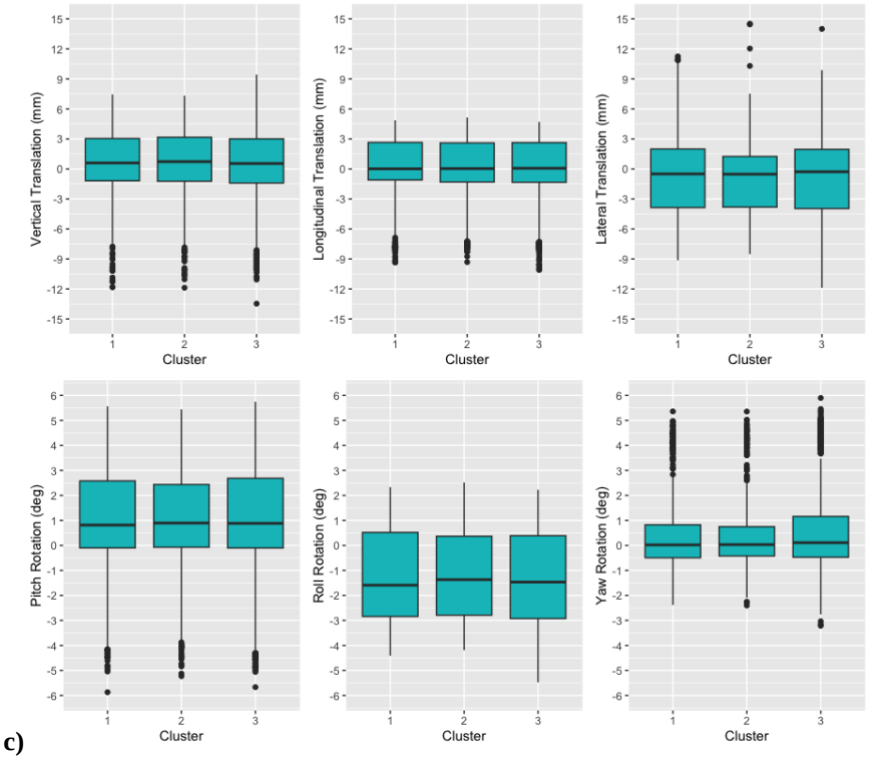
Appendix 3. Histograms of Patient Translational and Rotational Shifts As Determined by AlignRT Data. Each count of frequency corresponds to a single data point within the AlignRT dataset, recorded upon detecting movement in any direction. a) Patient A; b) Patient B; c) Patient C; d) Patient D. This figure was created using R.


Vertical Translation (mm)
Longitudinal Translation (mm)
Lateral Translation (mm)
Pitch Rotation (deg)
Roll Rotation (deg)
Yaw Rotation (deg)
Cluster

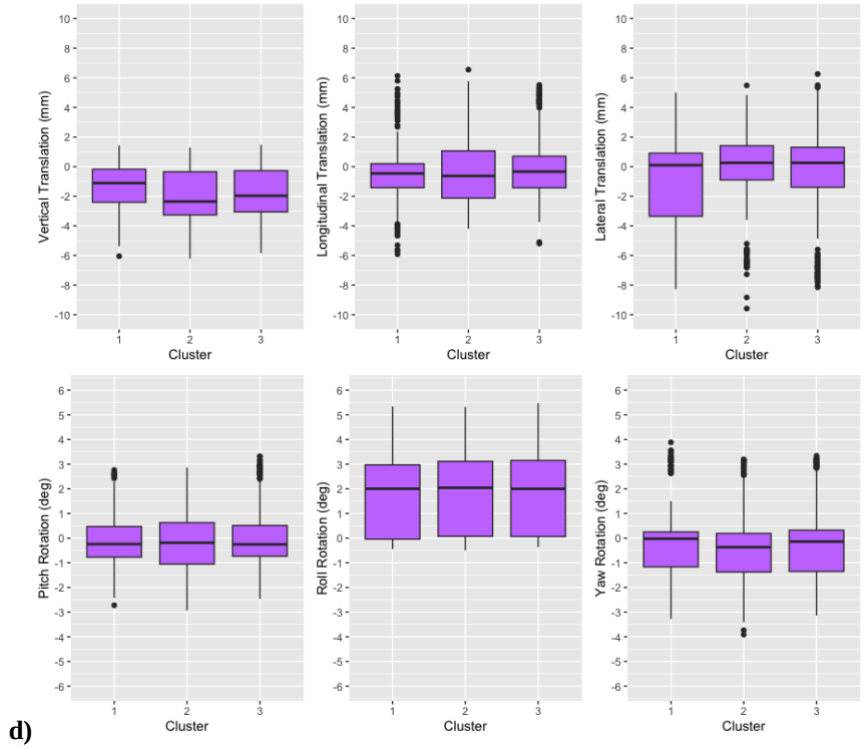
a)


Vertical Translation (mm)
Longitudinal Translation (mm)
Lateral Translation (mm)
Pitch Rotation (deg)
Roll Rotation (deg)
Yaw Rotation (deg)
Cluster

b)



c)



d)

Appendix 4. Boxplots of Patient Translational and Rotational Shifts As Determined by AlignRT Data, Organized by Clusters. Clusters represent different gantry angle positions during both arcs of a patient's treatment. Cluster 1: CW 180º to 270º, Cluster 2: CW 90º to 180º and CCW 180º to 90º, Cluster 3: CCW 270º to 180º; CW: clockwise, CCW: counter-clockwise. Each data point corresponds to a single data point within the AlignRT dataset, recorded upon detecting movement in any direction. a) Patient A; b) Patient B; c) Patient C; d) Patient D. This figure was created using R.