

# Advanced Ultrasound Imaging Summer School 2015

## Dual stage beamforming using In-Vivo data acquired from a BK3000 scanner

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### 1. Introduction

This exercise is the second of the two exercises of synthetic aperture sequential beamforming. The exercise concerns with performing the offline second stage beamforming on in-vivo data acquired with a BK3000 scanner.

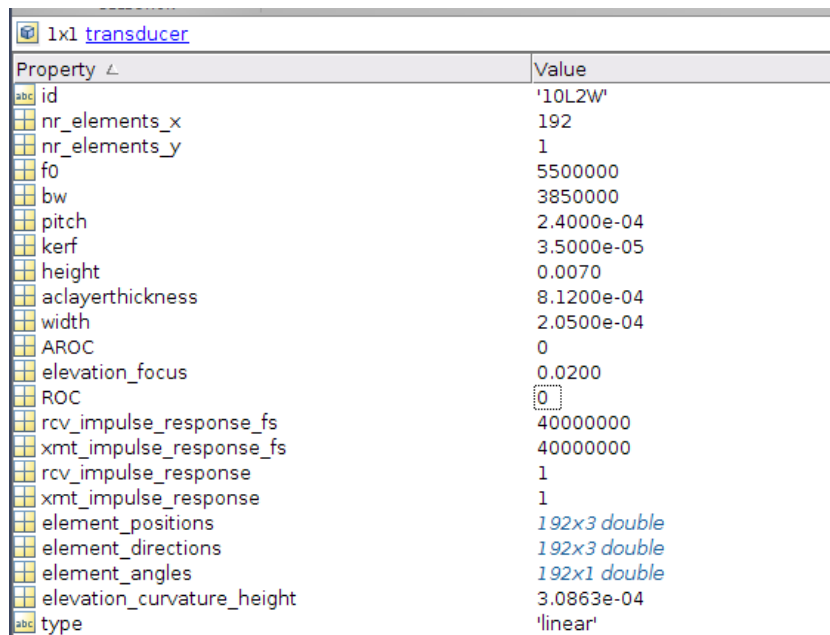
In-vivo data acquired by each group will be available on the Campusnet under AUI 2015 > file sharing, soon after each scan session finished. You are also provided with a set of first stage data acquired by the BK3000 to start the exercise.

### 2. Preparation

To start with this exercise, you must have completed the implementation of the second stage beamformer in exercise 4.

### 3. Exercise

The transducer used in this exercise is the “10L2W” linear probe BK medical Aps. The specifications of the probe are listed as follows:



Property	Value
id	'10L2W'
nr_elements_x	192
nr_elements_y	1
f0	5500000
bw	3850000
pitch	2.4000e-04
kerf	3.5000e-05
height	0.0070
aclayerthickness	8.1200e-04
width	2.0500e-04
AROC	0
elevation_focus	0.0200
ROC	0
rcv_impulse_response_fs	40000000
xmt_impulse_response_fs	40000000
rcv_impulse_response	1
xmt_impulse_response	1
element_positions	192x3 double
element_directions	192x3 double
element_angles	192x1 double
elevation_curvature_height	3.0863e-04
type	'linear'

Add the folder “Support” to access all the required functions in this exercise.

- a) Start by loading the 10L2W.xml and generating the transmit parameters (xmt) and the useCaseParams structures. Use the function “generate\_useCaseParams.m” for this purpose:

```
[useCaseParams,xmt] = generate_useCaseParams(loadpath);
```

The 10L2W.xml includes all the transducer parameters and scan geometries needed for further manipulation of the acquired data.

- b) Load your acquired first stage data. Data includes 30 frames in-vivo data acquired using the BK3000.

```
[data] = scannerdata2mat(datascanner,datamatlab);
```

Note: A single frame first stage beamformed data from the phantom (CIRS Model 040GSE) is provided for you to start with the exercise (frame\_n\_0\_p\_1\_0.hdf5).

- c) Determine the pixel positions for the second stage beamformation.

```
[useCaseParams,rcv,tstart] = second_stage_setup(useCaseParams);
```

- d) Perform the second stage beamformation on each acquired in-vivo frame. Use your implemented function in the exercise 4.

- e) Generate a movie sequence of your second stage beamformed in-vivo data.

The second stage beamformed data of the phantom is shown, so you can compare your implementation.

