test_coordonees_perceptives

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February 12, 2014

In [1]:

```
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
```

In [2]:

```
from parametres import VPs, volume, p, d_x, d_y, d_z, calibration, DEBUG
from modele_dynamique import arcdistance, orientation, xyz2azel, rae2xyz
```

```
DEBUG parametres , position croix:  [ 0.          3.76999998  1.37
]
```

In [3]:

```
print xyz2azel.__doc__
```

```
    renvoie le vecteur de coordonnées perceptuelles en fonction des
coordonnées physiques

    xyz = 3 x N x ...

    Le vecteur OV désigne le centre des coordonnées sphériques,
    - O est la référence des coordonnées cartésiennes et
    - V les coordonnées cartesiennes du centre (typiquement du
videoprojecteur).

    cf. https://en.wikipedia.org/wiki/Spherical_coordinates
```

Plotting function:

In [21]:

```
def plot_xyz2azel(motion, vp=VPs[0]):
    """
    Let's define a function that displays for a particular motion
    (a collection of poistions in the x, y, z space --- usually
    continuous) the resulting spherical coordinates (wrt to vp).

    """
    fig = plt.figure(figsize=(18,10))
    t = np.linspace(0, 1, motion.shape[1])[:, np.newaxis]*np.ones((1, motion.shape[2]))
    rae_VC = xyz2azel(motion, np.array([vp['x'],
                                        vp['y'],
                                        vp['z']]))
    #print rae_VC.shape
    for i_ax, axe_perc in enumerate(['t', 'r', 'az', 'el']):
        for j_ax, axe_xyz in enumerate(['x', 'y', 'z']):
            #print i_ax, j_ax, 3*i_ax + j_ax
            ax = fig.add_subplot(4, 3, 1 + 3*i_ax + j_ax)
            if i_ax == 0:
                #ax.plot(t, rae_VC[i_ax, :, :])
                #print motion_x[j_ax, :, :].shape, t.shape
                ax.plot(motion[j_ax, :, :], t)
            else:
```

```
                #print motion_x[j_ax, :, :].shape, rae_VC[i_ax-1, :, :].shape
                ax.plot(motion[j_ax, :, :], rae_VC[i_ax-1, :, :])
            ax.plot([vp[axe_xyz]], [0.], 'D')
            ax.set_xlabel(axe_xyz)
            ax.set_ylabel(axe_perc)
    plt.show()
    return rae_VC
print plot_xyz2azel.__doc__
```

```
    Let's define a function that displays for a particular motion
    (a collection of poistions in the x, y, z space --- usually
    continuous) the resulting spherical coordinates (wrt to vp).
```

In [22]:

```
vp = VPs[1]
print vp
```

```
{'cz': 1.36, 'cy': 3.5, 'cx': 0, 'pc_min': 0.001, 'address':
'10.42.0.55', 'y': 3.77, 'x': 10.84, 'pc_max': 1000000.0, 'z': 1.36,
'foc': 21.802535306060136}
```

1 Motion in depth

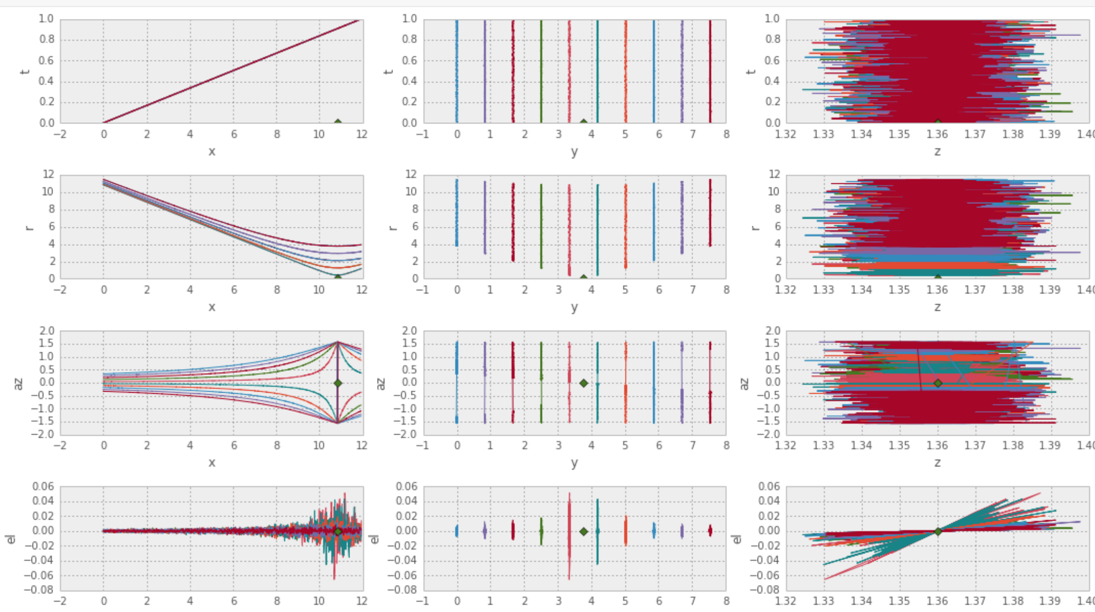
Let's define N_player trajectories of N_t points, where players are distributed in the width (y) and move in the axis of the VP (x):

In [23]:

```
N_player, N_t = 10, 1000
```

In [24]:

```
x = vp['x']*(np.linspace(0, 1.1, N_t)[np.newaxis, :, np.newaxis]*np.ones((1, 1, N_play
y = vp['y']*np.ones((1, N_t, 1))*np.linspace(0, 2, N_player, endpoint=True)[np.newaxis
z = vp['z']*np.ones((1, N_t, N_player)) # constant
#print x.shape, y.shape, z.shape
motion_x = np.vstack((x, y, z))
motion_x += .01*np.random.randn(3, N_t, N_player)
motion_x.shape
rae_VC = plot_xyz2azel(motion_x, vp=vp)
```



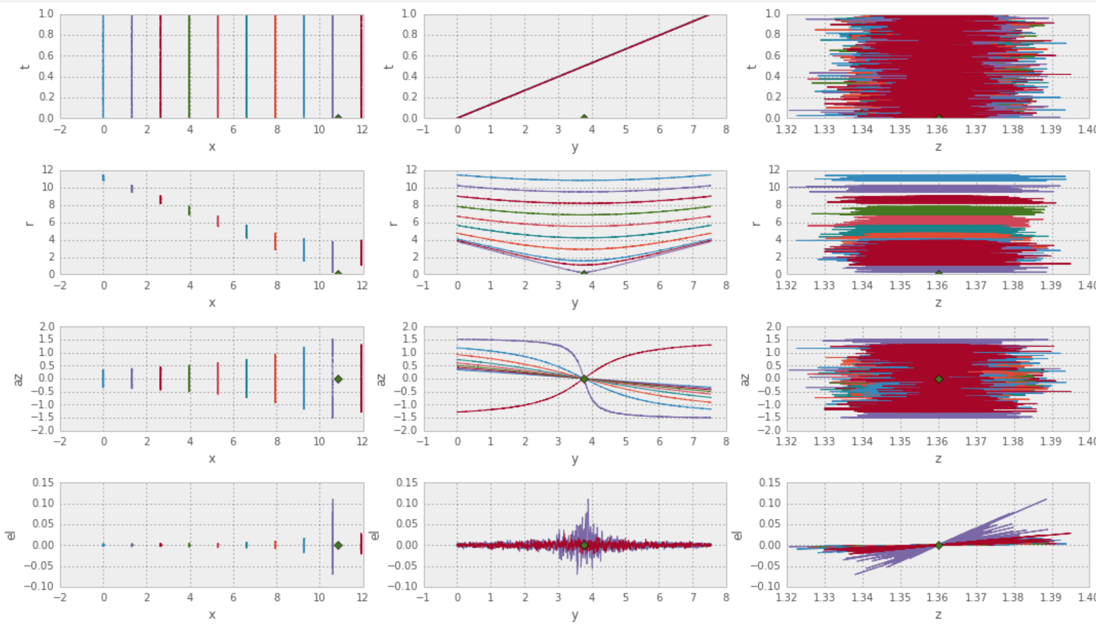
Note the small elevation:

In [25]:
```
el = rae_VC[2,:,:]
print el.min(), el.max(),  el.mean(),  el.std()
```

```
-0.0654056069324 0.0511505369906 1.55006380961e-05 0.00410409747327
```

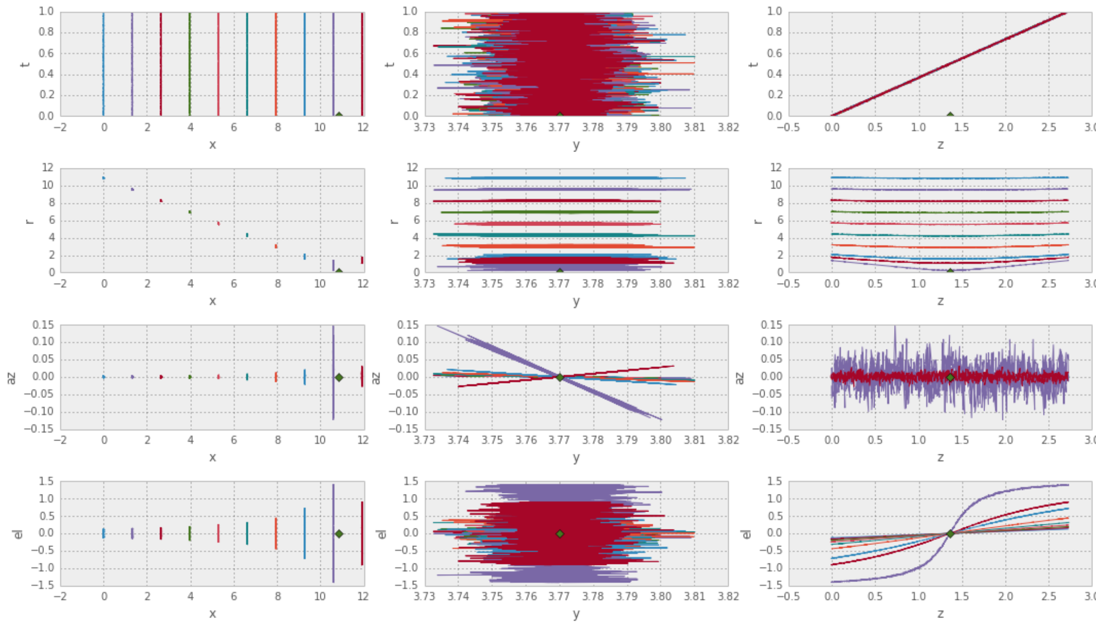
2 Motion in width

In [27]:
```
x = vp['x']*np.ones((1, N_t, 1))*np.linspace(0, 1.1, N_player, endpoint=True)[np.newax
y = vp['y']*(np.linspace(0, 2, N_t)[np.newaxis, :, np.newaxis]*np.ones((1, 1, N_player
z = vp['z']*np.ones((1, N_t, N_player)) # constant
motion_y = np.vstack((x, y, z))
motion_y += .01*np.random.randn(3, N_t, N_player)
rae_VC = plot_xyz2azel(motion_y, vp=vp)
```



3 Motion in height

In [31]:
```
x = vp['x']*np.ones((1, N_t, 1))*np.linspace(0, 1.1, N_player, endpoint=True)[np.newax
y = vp['y']*np.ones((1, N_t, N_player)) # constant
z = vp['z']*(np.linspace(0, 2., N_t)[np.newaxis, :, np.newaxis]*np.ones((1, 1, N_playe
motion_z = np.vstack((x, y, z))
motion_z += .01*np.random.randn(3, N_t, N_player)
rae_VC = plot_xyz2azel(motion_z, vp=vp)
```



t
x
y
z
r
az
el