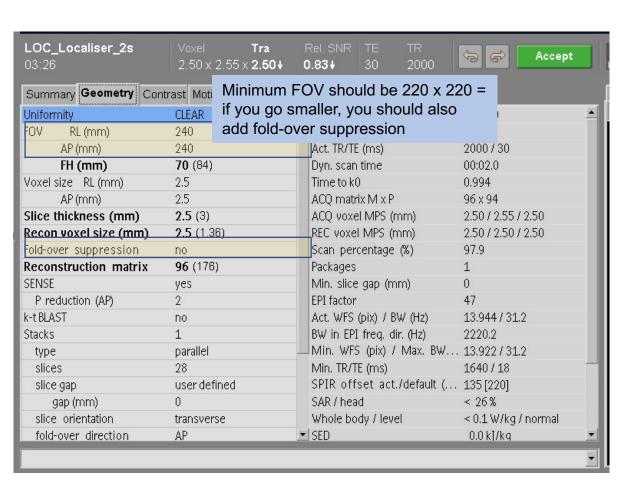
# Protocol Party

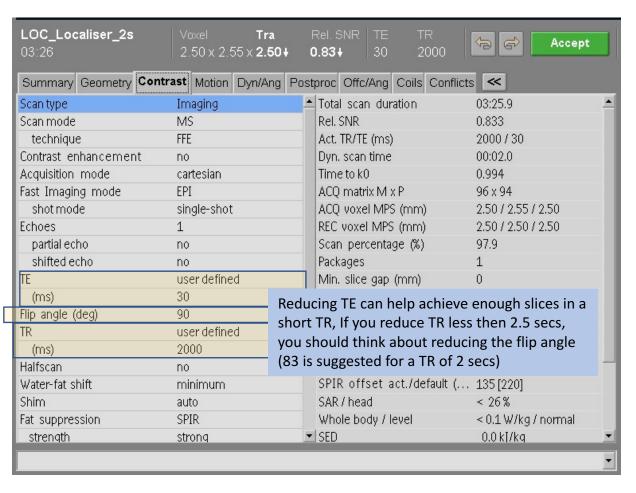
BIG Meeting Jan 19 2017

### Parameter Tabs - Geometry



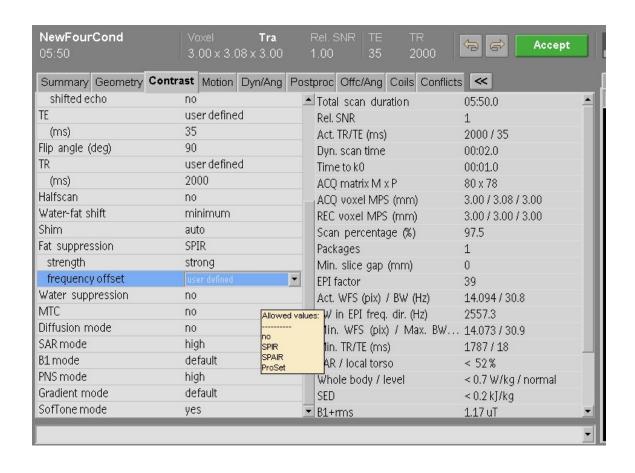
03:26	2.50 x 2.55 x <b>2.50 ↓</b>	<b>0.83</b> + 30 2000	Accept Accept
Summary Geometry Contr	rast Motion Dyn/Ang F	ostproc Offc/Ang Coils Conflicts	<b>«</b>
Slice thickness (mm)	2.5 (3)	▲ Total scan duration	03:25.9
Recon voxel size (mm)	<b>2.5</b> (1.36)	Rel. SNR	0.833
Fold-over suppression	no	Act. TR/TE (ms)	2000 / 30
Reconstruction matrix	<b>96</b> (176)	Dyn. scan time	00:02.0
SENSE	yes	Time to k0	0.994
P reduction (AP)	2	ACQ matrix M x P	96 x 94
k-t BLAST	no	ACQ voxel MPS (mm)	2.50 / 2.55 / 2.50
Stacks	1	REC voxel MPS (mm)	2.50 / 2.50 / 2.50
type	parallel	Scan percentage (%)	97.9
slices	28	Packages	1
slice gap	user defined	Min. slice gap (mm)	0
gap (mm)	0	EPI factor	47
slice orientation	transverse	Act. WFS (pix) / BW (Hz)	13.944 / 31.2
fold-over direction	AP	BW in EPI freq. dir. (Hz)	2220.2
fat shift direction	P	Min. WFS (pix) / Max. BW	13.922 / 31.2
Minimum number of pa	1	Min. TR/TE (ms)	1640 / 18
Slice scan order	ascend	SPIR offset act./default (	135 [220]
PlanAlign	no	SAR / head	< 26%
REST slabs	0	Whole body / level	< 0.1 W/kg / normal
Interactive positioning	no	▼ SED	0.0 kJ/kg

#### Parameter Tabs - Contrast



LOC_Localiser_2s 03:26	Voxel <b>Tra</b> 2.50 x 2.55 x <b>2.50 ↓</b>	Rel. SNR   TE   TR	Accept	
Summary Geometry Co	ntrast Motion Dyn/Ang F	Postproc Offc/Ang Coils Conflict	ts «	
TE	user defined	▲ Total scan duration	03:25.9	_
(ms)	30	Rel. SNR	0.833	
Flip angle (deg)	90	Act. TR/TE (ms)	2000 / 30	
TR	user defined	Dyn. scan time	00:02.0	
(ms)	2000	Time to k0	0.994	
Halfscan	no	ACQ matrix M x P	96 x 94	
Water-fat shift	minimum	ACQ voxel MPS (mm)	2.50 / 2.55 / 2.50	
Shim	auto	REC voxel MPS (mm)	2.50 / 2.50 / 2.50	
Fat suppression	SPIR	Scan percentage (%)	97.9	
strength	strong	Packages	1	
frequency offset	user defined (defa		0	
offset (Hz)	<b>135</b> (100)	EPI factor	47	
Water suppression	no	Act. WFS (pix) / BW (Hz)	13.944 / 31.2	
MTC	no	BW in EPI freq. dir. (Hz)	2220.2	
Diffusion mode	no	Min. WFS (pix) / Max. BW	. 13.922 / 31.2	
SAR mode	high	Min. TR/TE (ms)	1640 / 18	
B1 mode	default	SPIR offset act./default (	. 135 [220]	
PNS mode	moderate	SAR / head	< 26%	
Gradient mode	default	Whole body / level	< 0.1 W/kg / normal	
SofTone mode	no	▼ SED	0.0 k]/kg	v
				v

### Fat Suppression

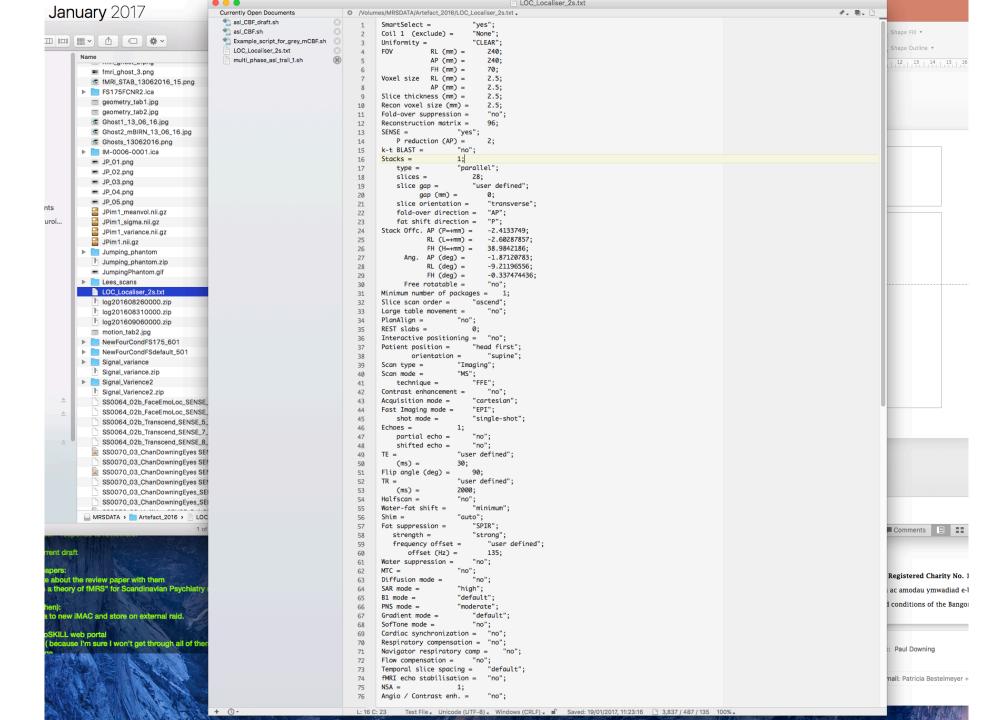


NewFour 05:50	Cond		oxel 00 x 3.08	<b>Tra</b> x 3.00		Rel. S 1.00	SNR   TE		R 000	<b>6</b>	Accept	t
Summary	Geometry	Contrast	Motion D	yn/Ang	Post	proc	Offe/Ang	Coils	Conflicts	<b>«</b>		
shifted ed	cho	no			_	Total	scan du	uration		05:50.0		<b>A</b>
TE		use	er defined			Rel. S				1		
(ms)		35				Act.	TR/TE (m	s)		2000/35		
Flip angle (	deg)	90					scan tim	•		00:02.0		
TR		use	er defined				to k0			00:01.0		
(ms)		200	00			ACQ	matrix M	I x P		80 x 78		
Halfscan		no				ACQ	voxel Mi	PS (mm	)	3.00 / 3.08	/ 3.00	
Water-fat sh	hift	mir	nimum				voxel MF			3.00 / 3.00	/ 3.00	
Shim		aut	:0			Scan	percent	age (%)		97.5		
Fat suppres	ssion	SPI	IR .			Pack	ages			1		
strength			ong			Min.	slice gap	(mm)		0		
frequenc	y offset		er defined	l (defa		EPI f	actor			39		
offset	(Hz)	179	5.00		↑ V	Act.	WFS (pix)	/ BW (	Hz)	14.094 / 3	0.8	
Water supp	ression	no				BW i	n EPI fre	q. dir. (l	Hz)	2557.3		
MTC		no				Min.	WFS (p	ix) / Ma	ax. BW	14.073 / 3	0.9	
Diffusion m	iode	no				Min.	TR/TE (m	ns)		1787 / 18		
SAR mode		hig				SPIR	offset	act./de	efault (	175 [220]		
B1 mode		det	fault			SAR	/ local to	rso		< 52%		
PNS mode		hig	h			Who	le body /	level		< 0.7 W/kg	g / normal	
Gradient mo	ode	det	fault		•	SED				< 0.2 kJ/kd	1	¥
												v

## Motion and Dynamics

3:26	2.50 x 2.55 x <b>2.50 ↓</b>	<b>0.83↓</b> 30 2000	Accept Accept
Summary Geometry Contra	st <b>Motion</b> Dyn/Ang Po	ostproc Offc/Ang Coils Conflicts	«
Cardiac synchronization	no	Total scan duration	03:25.9
Respiratory compensation	no	Rel. SNR	0.833
Navigator respiratory comp	no	Act. TR/TE (ms)	2000 / 30
Flow compensation	no	Dyn. scan time	00:02.0
Temporal slice spacing	default	Time to k0	0.994
fMRI echo stabilisation	no	ACQ matrix M x P	96 x 94
NSA	1	ACQ voxel MPS (mm)	2.50 / 2.55 / 2.50
		REC voxel MPS (mm)	2.50 / 2.50 / 2.50
		Scan percentage (%)	97.9
		Packages	1
		Min. slice gap (mm)	0
		EPI factor	47
		Act. WFS (pix) / BW (Hz)	13.944 / 31.2
		BW in EPI freq. dir. (Hz)	2220.2
		Min. WFS (pix) / Max. BW	13.922 / 31.2
		Min. TR/TE (ms)	1640 / 18
		SPIR offset act./default (	135 [220]
		SAR / head	< 26%
		Whole body / level	< 0.1 W/kg / normal
		SED	0.0 k]/kg

LOC_Localiser_2s 03:26	Voxel <b>Tra</b> 2.50 x 2.55 x <b>2.50 ↓</b>		<b>← Accept</b>
Summary Geometry Contra	ast Motion Dyn/Ang	Postproc Offc/Ang Coils Conflict	s «
Angio / Contrast enh.	no	Total scan duration	03:26.0
Quantitative flow	no	Rel. SNR	0.833
Manual start	yes	Act. TR/TE (ms)	2000 / 30
Dynamic study	individual	Dyn. scan time	00:02.0
dyn scans	96	Time to k0	00:01.0
dyn scan times	shortest	ACQ matrix M x P	96 x 94
fov time mode	default	ACQ voxel MPS (mm)	2.50 / 2.55 / 2.50
dummy scans	5	REC voxel MPS (mm)	2.50 / 2.50 / 2.50
immediate subtraction	no	Scan percentage (%)	97.9
fast next scan	no	Packages	1
synch, ext, device	yes	Min. slice gap (mm)	0
start at dyn.	1	EPI factor	47
interval (dyn)	1	Act. WFS (pix) / BW (Hz)	13.944 / 31.2
dyn stabilization	no	BW in EPI freq. dir. (Hz)	
prospect. motion corr.	no (yes)	Min. WFS (pix) / Max. BW	. 13.922 / 31.2
Keyhole	no	Min. TR/TE (ms)	1640 / 18
Arterial Spin labeling	no	SPIR offset act./default (	. 135 [220]
		SAR / head	< 25%
		Whole body / level	< 0.1 W/kg / normal
		SED	0.0 k]/kq



```
Minimum number of packages = 1;
Slice scan order =
                                  "ascend";
Large table movement =
                                                  "no";
PlanAlign =
                                                  "no";
REST slabs =
                                                  0;
                                 "no";
Interactive positioning =
                                  "head first";
Patient position =
                                 "supine";
    orientation =
Scan type =
                                                  "Imaging";
                                                  "MS";
Scan mode =
 technique =
                                                  "FFE";
                                                  "no";
Contrast enhancement =
Acquisition mode =
                                                  "cartesian";
Fast Imaging mode =
                                                  "EPI";
                                                  "single-shot";
 shot mode =
Echoes =
                                                  1;
  partial echo =
                                 "no";
  shifted echo =
                                 "no";
TE =
                                                                   "user defined";
 (ms) =
                                                  30;
Flip angle (deg) =
                                 90;
                                                                   "user defined";
TR =
  (ms) =
                                                  2000;
Halfscan =
                                                  "no";
Water-fat shift =
                                  "minimum";
Shim =
                                                                   "auto";
Fat suppression =
                                  "SPIR";
 strength =
                                                  "strong";
 frequency offset =
                                                  "user defined";
   offset (Hz) =
                                 135;
```

```
Minimum number of packages = 1;
Slice scan order =
                                 "ascend";
                                                  "no";
Large table movement =
PlanAlign =
                                                  "no";
REST slabs =
                                                  0;
Interactive positioning =
                                 "no";
                                 "head first";
Patient position =
                                 "supine";
    orientation =
                                                  "Imaging";
Scan type =
Scan mode =
                                                  "MS";
                                                  "FFE";
 technique =
                                                  "no";
Contrast enhancement =
Acquisition mode =
                                                  "cartesian":
                                                  "EPI";
Fast Imaging mode =
                                                  "single-shot";
  shot mode =
Echoes =
                                                  1;
 partial echo =
                                 "no";
                                 "no";
  shifted echo =
TE =
                                                                   "user defined";
 (ms) =
                                                  30;
Flip angle (deg) =
                                 90;
TR =
                                                                   "user defined";
 (ms) =
                                                  2000;
                                                  "no";
Halfscan =
Water-fat shift =
                                 "minimum";
                                                                   "auto";
Shim =
Fat suppression =
                                 "SPIR";
 strength =
                                                  "strong";
 frequency offset =
                                                  "user defined";
   offset (Hz) =
                                 135;
```

```
Water suppression =
                                                   "no";
                                                                    "no":
MTC =
                                  "no":
Diffusion mode =
SAR mode =
                                                   "high";
B1 mode =
                                                   "default":
PNS mode =
                                                   "moderate":
Gradient mode =
                                                   "default":
                                                   "no";
SofTone mode =
Cardiac synchronization =
                                  "no":
Respiratory compensation =
                                  "no":
Navigator respiratory comp =
                                  "no":
                                                   "no":
Flow compensation =
Temporal slice spacing =
                                  "default":
fMRI echo stabilisation =
                                  "no":
NSA =
                                                                    1;
                                                   "no";
Angio / Contrast enh. =
                                                   "no";
Quantitative flow =
                                                   "yes";
Manual start =
Dynamic study =
                                                   "individual":
 dyn scans =
                                                   96;
                                                   "shortest":
  dvn scan times =
 fov time mode =
                                                   "default":
                                  5;
  dummy scans =
                                  "no":
 immediate subtraction =
  fast next scan =
                                  "no":
 synch. ext. device =
                                  "yes";
    start at dvn. =
                                                   1;
    interval (dyn) =
                                  1;
  dyn stabilization =
                                                   "no":
```

```
prospect. motion corr. =
                                         "no":
                                                              "no";
Kevhole =
                                          "no";
Arterial Spin labeling =
Preparation phases = Interactive F0 =
                                                               "full";
                                          "no";
                                                              "no";
B0 field map =
                                                              "no";
"M", (3) "no";
"M";
(4) "no";
"Grey matter";
MIP/MPR =
Images =
Autoview image =
Calculated images =
Reference tissue =
                                                              "No";
Recon compression =
Preset window contrast =
                                          "soft":
                                                              "real time";
Reconstruction mode =
                                                              "no";
"no";
  reuse memory =
Save raw data =
Hardcopy protocol =
                                                               "no":
                                                              "system default";
Image filter =
Geometry correction =
                                                              "default";
1634755923;
IF info séperator =
                                                              "03:26.0";
0.833332419;
Total scan duration =
Rel. SNR =
Act. TR/TE (ms) =
                                          "2000 / 30":
Dyn. scan time =
                                          "00:02.0";
Time to k0 =
                                                               "00:01.0";
ACO matrix M x P =
                                                               "96 x 94":́
                                                              "2.50 / 2.55 / 2.50";
"2.50 / 2.50 / 2.50";
ACQ voxel MPS (mm) = REC voxel MPS (mm) =
Scan percentage (%) =
                                                               97.9166641;
                                                              1;
-0;
47;
Packages =
Min. slice gap (mm) =
EPI factor =
                                         "13.944 / 31.2";
"2220.2";
"13.922 / 31.2";
Act. WFS (pix) / BW (Hz) = \frac{1}{2}
BW in EPI freq. dir. (Hz) =
Min. WFS (pix) / Max. BW (Hz) =
                                                              "1640 / 18";
Min. TR/TE (ms) =
SPIR offset act./default (Hz) =
                                          "135 [220]";
                                                             "< 25 %";
"< 0.1 W/kg / normal";
" 0.0 kJ/kg";
SAR / head =
Whole body / level =
SED =
                                                             "1.18 uT";
"1.18 uT";
"63 % / normal";
B1+rms =
Max B1+rms =
PNS / level =
dB/dt =
Sound Pressure Level (dB) =
                                          17.287077;
```

#### Important parameters

```
FOV RL (mm) = 240;
AP (mm) = 240;
FH (mm) = 70; (set from number of slices x slice thickness)
```

If smaller then 200 set fold-over suppression to yes, and use 20 for both directions.

```
SENSE = "yes";
P reduction (AP) = 2;
```

We usually use SENSE of 2. Higher SENSE factor, allthough it will give you more slices in a shorter TR, will also increase artefacts

fold-over direction = "AP"; - Typical direction for EPI scans — distortion remains, but is from the back to the front, so doesnot distort symetry (images look better)

Minimum number of packages = 1;

You want to keep an eye on this as you change parameters — will switch to 2 if you are asking the system to try to do too many slices (with too many PE steps) within the TR you have set — this would double the time for 1 dynamic

```
TE = "user defined";

(ms) = 30;

Flip angle (deg) = 90;

TR = "user defined";

(ms) = 2000;
```

Standard timings – the flip angle could be reduced to 83, but 90 works fine.

Water-fat shift = "minimum";

For some protocols, we tweak this parameter and set it, but for most scans you will want to keep it to a minimum – this will also avoid conflicts if you change some other parameter that affects WFS.

```
Slice scan order = "ascend";
```

Note this is where you can change from ascending to interleaved. On Philips "Default" is a typical odd even interleave acquisition. "Interleaved" <a href="IS NOT!">IS NOT!</a> It will interleave slices on the basis of the square root of the number of slices (rounded up) which is not intuitive, and can be hard to compensate for when doing slice timing correction

Fat suppression = "SPIR";

strength = "strong";

frequency offset = "user defined";

offset (Hz) = 135;

This is the one you will definitely want to change in your sequence – use 135 for the offset. The default setting leads to some interesting off resonance effects where the CSF pulsation causes a phase and magnitude fluctuation in the image.

```
Gradient mode = "default";
SofTone mode = "no";
```

These two interact. You can not use softone unless the gradient mode is default (or possibly enhanced). Softone reduces the noise of the gradients by slowing down the ramp time for the imaging gradients as they are applied – this has a consequence on the maximum number of slices you can acquire for any given TE, TR combo. You have threeoptions here – Yes to turn Softone on, no to leave it off, and user defined to set the amount of softone your self. This can be useful if you want to reduce the nosie as much as possible.

```
PNS mode = "moderate";
```

Keep this at moderate – will also keep noise down.

```
Manual start = "yes";
Dynamic study = "individual"; (sets up for an fMRI run)
  dyn scans = 96; (Number of volumes)
  dyn scan times = "shortest"; (to go as fast as you can)
  fov time mode = "default";
  dummy scans = 5;
  immediate subtraction = "no";
  fast next scan = "no";
  synch. ext. device = "yes"; (sends TTL pulse)
    start at dyn. = 1; (when the first TTL is sent)
    interval (dyn) = 1; (when the next will be sent – will
repeat every interval)
  dyn stabilization = "no"; (do not use this in "yes" mode)
  prospect. motion corr. = "no"; (same here – doesnot
always work as advertised)
```