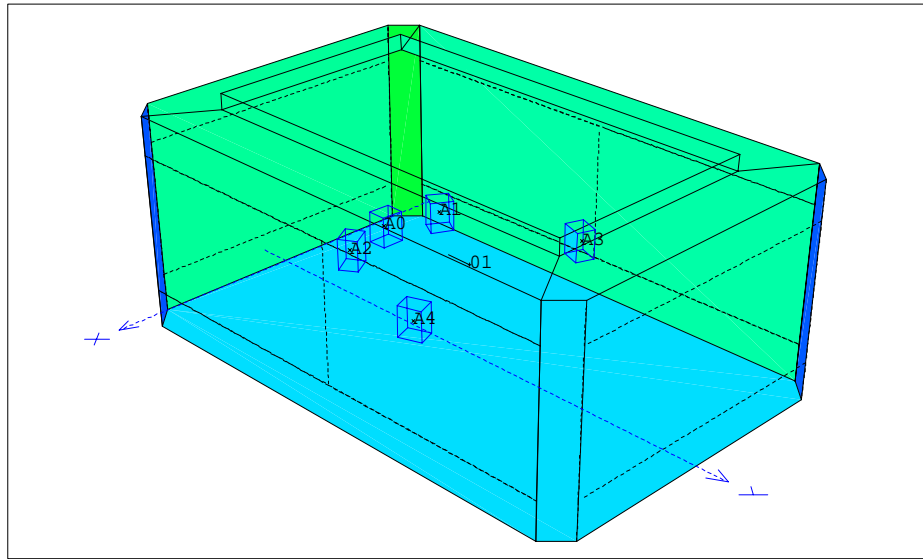# Concept Halls for CATT-Acoustic
Listening Room # 1

This *Concept Hall* model is created to be a flexible listning room for stereo or 5-channel surround. The model can be transformed by adjusting a number of named room measures (lengths, widths, heights etc.), surface properties as well as different speaker setups.

All measures and materials are edited in `MASTER.GEO` that then includes `IMPLEMENT.GEO` where the actual implementation of the design is made based on the measures in the master-file.

Room measures

Surface properties
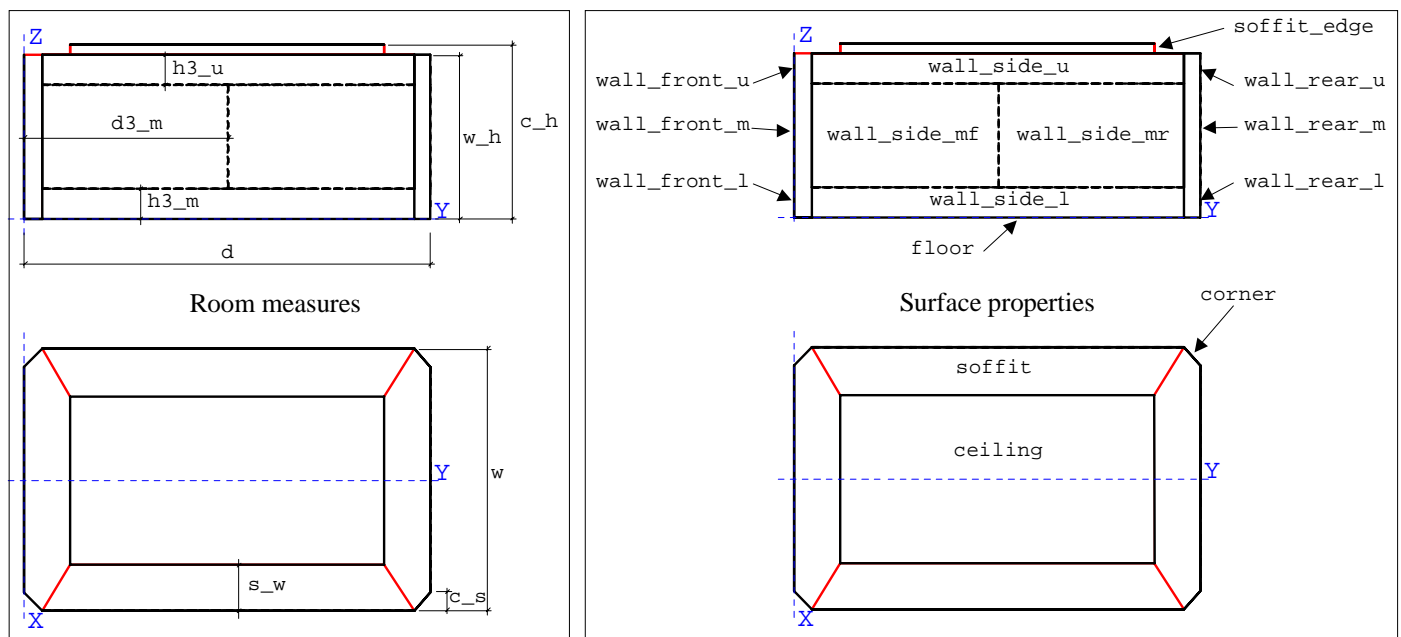
Source configurations
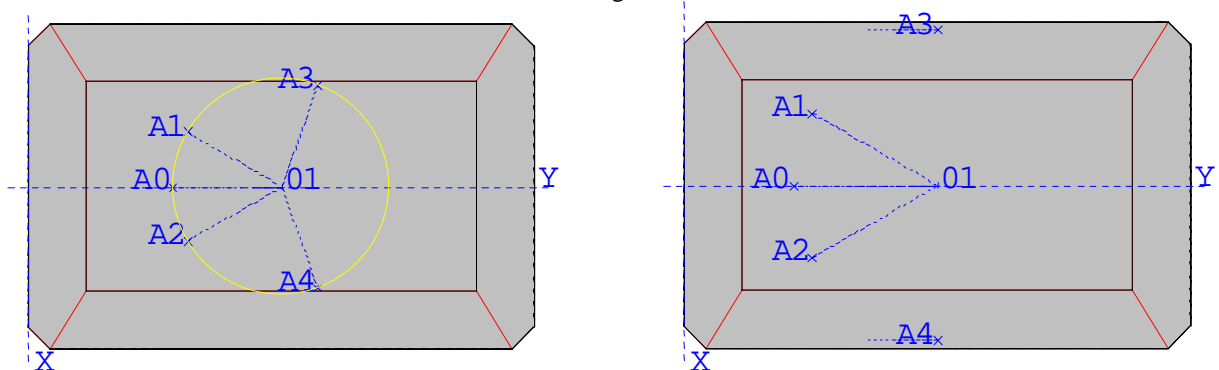
Two source-files are included one with *Matching Surrounds* consisting of five speakers on a circle (CIRCLE_Src.LOC) and one with *Dipole Surrounds* THX-format speakers where the rear two are placed laterally and are dipole-types (THX_Src.LOC, note that the phase of a dipole speaker is not modeled). The appropriate source-file is selected in the **General settings** dialog. Generic speaker directivities are included: Front.SD0, Rear.SD0 and THX_Dipole.SD2 (requires v7.1). These are included just to make the model work and can either be edited to match particular speakers or other directivities can be used (before using the model the supplied directivity files have to be placed in the CATT\SD folder). The receiver position around which the speakers are placed is in Rec.LOC.

Master-file:

```
;MASTER.GEO
;PROJECT=Concept Halls: Listening Room #1

ABS default        = <15 12 10 8 7 6>
ABS wall_rear_u    = default ;rear  wall upper  part
ABS wall_rear_m    = default ;rear  wall middle part
ABS wall_rear_l    = default ;rear  wall lower  part
ABS wall_front_u   = default ;front wall upper  part
ABS wall_front_m   = default ;front wall middle part
ABS wall_front_l   = default ;front wall lower  part
ABS wall_side_u    = default ;side walls upper  part
ABS wall_side_mf   = default ;side walls middle front part
ABS wall_side_mr   = default ;side walls middle rear part
ABS wall_side_l    = default ;side walls lower  part

ABS ceiling      = default
ABS floor        = default
ABS soffit_edge  = default
ABS soffit       = default
ABS corner       = default ; the corner boxes

;General room sizes
GLOBAL w   = 4.5 ; room width
GLOBAL d   = 7   ; room dpth (length)
GLOBAL c_h = 3   ; ceiling height
GLOBAL w_h = 2.8 ; wall height
GLOBAL s_w = 0.8 ; ceiling soffit width
GLOBAL c_s = 0.3 ; corner stuff side size

;vertical thirds
GLOBAL h3_m = 0.5     ; height of middle vertical abs/diff division
GLOBAL h3_u = w_h-0.5 ; height of upper  vertical abs/diff division

;middle vertical side wall third division
GLOBAL d3_m = d/2

;check for some impossible measures
IF c_h = w_h THEN
   BREAK ** c_h must be # w_h
ENDIF
IF h3_u <= h3_m THEN
   BREAK ** h3_m must be <= h3_u
ENDIF
IF c_s < 0.1 THEN
   BREAK ** c_s must be >= 0.1 m
ENDIF
IF s_w < 0.1 THEN
   BREAK ** c_w must be >= 0.1 m
ENDIF
```

```
;--------------------------------
;listening (receiver) position
;needed here since it is used
;also in the src-file to place
;the speakers.
GLOBAL r_x = 0
GLOBAL r_y = d/2
GLOBAL r_h = 1.2
;--------------------------------


INCLUDE implement.GEO ;here is where the actual room is created


CORNERS
    ;no corners defined here, all is done in implement.GEO
PLANES
    ;no planes defined here, all is done in implement.GEO
```

Source-file circle:

```
;Circle_Src.LOC
;PROJECT=Concept Halls: Listening Room #1


;Matching surrounds placement (on a circle at 30 and 110 degrees)


LOCAL spkr_h = 1.2 ; speaker height (all 5 of them)
LOCAL r  = 1.5 ;speaker radius for BS 775-1
LOCAL ra = 110 ;rear speaker angle
LOCAL fa =  30 ;front speaker angle


SOURCES
;front center speaker
 A0  r_x  r_y-r  spkr_h  Front.SD0  r_x r_y spkr_h <85 88 91 94 97 100>


;front left speaker
 A1  r_x-r*sin(fa)  r_y-r*cos(fa) spkr_h  Front.SD0  r_x r_y spkr_h <85 88 91 94 97 100>
;front right speaker
 A2  r_x+r*sin(fa)  r_y-r*cos(fa) spkr_h  Front.SD0  r_x r_y spkr_h <85 88 91 94 97 100>


;rear left speaker
 A3  r_x-r*sin(ra)  r_y-r*cos(ra) spkr_h  Back.SD0  r_x r_y spkr_h <85 88 91 94 97 100>
;rear right speaker
 A4  r_x+r*sin(ra)  r_y-r*cos(ra) spkr_h  Back.SD0  r_x r_y spkr_h <85 88 91 94 97 100>
```

Source-file THX:

```
;THX_Src.LOC
;PROJECT=Concept Halls: Listening Room #1


;Dipole surround a la THX

LOCAL spkr_h = 1.2 ; speaker height (all 5 of them)
LOCAL r  = 2 ;rear speaker radius
LOCAL fa =  30 ;front speaker angle
LOCAL xoff = 0.1 ;rear spaker offset from side wall

SOURCES
;front center speaker
 A0  r_x  r_y-r  spkr_h  Front.SD0  r_x r_y spkr_h <85 88 91 94 97 100>

;front left speaker
 A1  r_x-r*sin(fa)  r_y-r*cos(fa) spkr_h  Front.SD0  r_x r_y spkr_h <85 88 91 94 97 100>
;front right speaker
 A2  r_x+r*sin(fa)  r_y-r*cos(fa) spkr_h  Front.SD0  r_x r_y spkr_h <85 88 91 94 97 100>

;rear left speaker
 A3  -w/2+xoff  r_y spkr_h  THX_dipole.SD2 -w/2+xoff r_y-1 spkr_h <85 88 91 94 97 100>
;rear right speaker
 A4   w/2-xoff  r_y spkr_h  THX_dipole.SD2 w/2-xoff  r_y-1 spkr_h <85 88 91 94 97 100>
```

Receiver-file:

```
;REC.LOC
;PROJECT=Concept Halls: Listening Room #1


RECEIVERS
 1  r_x r_y r_h
```

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