

# Corsika installation

```
=====
                        Welcome to COCONUT (v3.1)
                        -- the CORSIKA CONFIGURATION UTILITY --
=====

        create an executable of a specific CORSIKA version

        Please read the documentation for a detailed description
        of the options and how to use it.

        Try './coconut -h' to get some help about COCONUT
        Use './coconut --expert' to enable additional configuration steps.

        (press 'Enter' to select an option followed by "[DEFAULT]" or "[CACHED]")
=====
```

```
*****
* WARNING: Your system does support 64bit binaries. *
*          Some CORSIKA features are only supported in 32bit mode (because of *
*          incompatible binary data structures)! *
*          Therefore by default CORSIKA uses the "-m32" flag to force 32bit mode. *
*****
```

```
-----
Compile in 32 or 64bit mode ?
  1 - Force 32bit mode [DEFAULT]
  2 - Use compiler default ('-m64' on a 64bit machine)

  r - restart
  x - exit make
```

I choose 1 since its the default, and in order to make sure, it works. Somebody should try, if it works in 64bit mode as well though.

```
-----
Which high energy hadronic interaction model do you want to use ?
  1 - DPMJET 2.55
  2 - EPOS 1.99
  3 - NEXUS 3.97
  4 - QGSJET 01C (enlarged commons) [DEFAULT]
  5 - QGSJETII.3
  6 - SIBYLL 2.1
  7 - VENUS 4.12

  r - restart
  x - exit make

        (only one choice possible):
```

I went for the default as well

```
-----
Which low energy hadronic interaction model do you want to use ?
  1 - GHEISHA 2002d (double precision) [DEFAULT]
  2 - FLUKA
  3 - URQMD 1.3cr

  r - restart
  x - exit make

  (only one choice possible): 2
  SELECTED path to installation: "/fhgfs/groups/app/mc_workshop/software/fluka"
  SELECTED      : FLUKA
  NOT COMPATIBLE TO: DPMJET INTTEST
```

As one can see, I chose FLUKA. Therefor I installed a new version of FLUKA, just for the fun of it.

```
-----
Which detector geometry do you have ?
  1 - horizontal flat detector array [DEFAULT]
  2 - non-flat (volume) detector geometry
  3 - vertical string detector geometry

  r - restart
  x - exit make

  (only one choice possible):
  SELECTED      : HORIZONTAL
```

Here I chose a flat detector, since an IACT is definitely neither a volume and nor a string detector.

-----  
options: FLUKA FLUKADIR HORIZONTAL QGSJET01 TIMEAUTO M32  
selection:

Which additional CORSIKA program options do you need ?

- 1 - Cherenkov version for rectangular detector grid
- 2 - Cherenkov version for telescope system (using bernlohr IACT C-routines)
- 3 - apply atm. absorption, mirror reflectivity & quantum eff.
- 4 - external atmosphere functions (table interpolation)  
(using bernlohr C-routines)
- 5 - THINning version
- 6 - NEUTRINO version
- 7 - shower PLOT version (PLOTSH) (only for single events)
- 72 - shower PLOT(C) version (PLOTSH2) (only for single events)
- 8 - interaction test version (only for 1st interaction)
- 9 - SLANT depth instead of vertical depth for longi-distribution
- a - CURVED atmosphere version
- b - UPWARD particles version
- c - view-cone version
- d - ANALysis HISTos & THIN (instead of particle file)
- e - Auger-info file instead of dbase file
- f - Auger-histo file & THIN
- g - Auger Cherenkov longitudinal distribution
- h - PRESHOWER version for EeV gammas
- i - STACEE experiment output Cherenkov photons  
(includes: CERENKOV CEFFIC THIN)
- j - COMPACT particle output file
- k - annitest cross-section version (obsolete)
- l - LPM-effect without thinning
- m - STACK INput of secondaries, no primary particle
- n - primary neutrino version with HERWIG (NUPRIM)
- q - CHARMed particle/tau lepton version with PYTHIA
- s - preHISTORY of muons: mother and grandmother
- t - TAU LEPTon version with PYTHIA
- -----
- y - \*\*\* Reset selection \*\*\*
- z - \*\*\* Finish selection \*\*\* [DEFAULT]

r - restart  
x - exit make

(multiple selections accepted, leading '-' removes option):

---

If one chooses 1, one gets these follow-up choices:

-----  
Cherenkov light vertical (longitudinal) distribution option ?

- 1 - Photons counted only in the step where emitted [DEFAULT]
- 2 - Photons counted in every step down to the observation level  
(compatible with old versions but inefficient)
- 3 - No Cherenkov light distribution at all

r - restart  
x - exit make

(only one choice possible):  
SELECTED : INTCLONGSTD

-----  
Do you want Cherenkov light emission angle wavelength dependence ?

- 1 - Emission angle is wavelength independent [DEFAULT]
- 2 - Emission angle depending on wavelength

r - restart  
x - exit make

(only one choice possible):  
SELECTED : CERWLENOFF  
SELECTED : CERENKOV  
NOT COMPATIBLE TO: COMPACT VOLUME CORR INTTEST ANAHIST AUGERHIST AUGCERLONG

If one chooses 2: one gets these follow-up choices:

```
-----
IACTEXT external output file option ?
 1 - Particles at detector level not stored to IACT file [DEFAULT]
 2 - Particles at detector level are stored to IACT file

r - restart
x - exit make

(only one choice possible):
SELECTED      : NOPART
ADDING REQUIRED : CERENKOV
```

```
-----
Cherenkov light vertical (longitudinal) distribution option ?
 1 - Photons counted only in the step where emitted [DEFAULT]
 2 - Photons counted in every step down to the observation level
    (compatible with old versions but inefficient)
 3 - No Cherenkov light distribution at all

r - restart
x - exit make

(only one choice possible):
SELECTED      : INTCLONGSTD
```

```
-----
Do you want Cherenkov light emission angle wavelength dependence ?
 1 - Emission angle is wavelength independent [DEFAULT]
 2 - Emission angle depending on wavelength

r - restart
x - exit make

(only one choice possible):
SELECTED      : CERWLENOFF
SELECTED      : CERENKOV
NOT COMPATIBLE TO: COMPACT VOLUME CORR INTTEST ANAHIST AUGERHIST AUGCERLONG
SELECTED      : IACT
NOT COMPATIBLE TO: INTTEST ANAHIST AUGERHIST AUGCERLONG COMPACT VOLUME CORR
```

---

If one chooses 3:

```
-----
Cherenkov light vertical (longitudinal) distribution option ?
 1 - Photons counted only in the step where emitted [DEFAULT]
 2 - Photons counted in every step down to the observation level
    (compatible with old versions but inefficient)
 3 - No Cherenkov light distribution at all

r - restart
x - exit make

(only one choice possible):
SELECTED      : INTCLONGSTD
```

```
-----
Do you want Cherenkov light emission angle wavelength dependence ?
 1 - Emission angle is wavelength independent [DEFAULT]
 2 - Emission angle depending on wavelength

r - restart
x - exit make

(only one choice possible):
SELECTED      : CERWLENOFF
SELECTED      : CERENKOV
NOT COMPATIBLE TO: COMPACT VOLUME CORR INTTEST ANAHIST AUGERHIST AUGCERLONG
SELECTED      : CEFFIC
NOT COMPATIBLE TO: INTTEST CURVED AUGCERLONG
```

If one tries to choose a and c, i.e. CURVED and VIEWCONE. This seems not to be forbidden during installation time. As a test, I built Corsika now with these settings:

```

SELECTED      : M32
SELECTED      : QGSJET01
SELECTED path to installation: "/fhgfs/groups/app/mc_workshop/software/fluka"
SELECTED      : FLUKA
NOT COMPATIBLE TO: DPMJET INTTEST
SELECTED      : HORIZONTAL
ADDING CACHED OPTIONS : CERENKOV IACT VIEWCONE
SELECTED      : INTCLONGSTD
SELECTED      : CERWLENOFF
SELECTED      : CERENKOV
NOT COMPATIBLE TO: COMPACT VOLUMECORR INTTEST ANAHIST AUGERHIST AUGCERLONG
SELECTED      : NOPART
SELECTED      : IACT
NOT COMPATIBLE TO: INTTEST ANAHIST AUGERHIST AUGCERLONG COMPACT VOLUMECORR
SELECTED      : VIEWCONE
NOT COMPATIBLE TO: VOLUMECORR INTTEST

```

```

-----
options:  FLUKA FLUKADIR HORIZONTAL QGSJET01 TIMEAUTO M32
selection: IACT VIEWCONE CERENKOV IACTDIR

```

The compilation ran without problems.

```

--> "corsika6990Linux_QGSJET_fluka" successfully installed in :
    /fhgfs/groups/app/mc_workshop/software/corsika/corsika-6990/run/

```

```

--> You can run CORSIKA in /fhgfs/groups/app/mc_workshop/software/corsika/corsika-6990/run/ using
for instance :
    ./corsika6990Linux_QGSJET_fluka < all-inputs > output.txt

```

So I proceeded with this test. I had to add one single line to this test-input-card file all-inputs defining the position (x,y,z) and radius of my simulated telescope.

```
TELESCOPE 0. 0. 0. 500.
```

So the entire input card looked like this:

RUNNR	1	run number
EVTNR	1	number of first shower event
NSHOW	1	number of showers to generate
PRMPAR	14	particle type of prim. particle
ESLOPE	-2.7	slope of primary energy spectrum
ERANGE	1.E3 1.E3	energy range of primary particle
THETAP	20. 20.	range of zenith angle (degree)
PHIP	-180. 180.	range of azimuth angle (degree)
SEED	1 0 0	seed for 1. random number sequence
SEED	2 0 0	seed for 2. random number sequence
OBSLEV	110.E2	observation level (in cm)
FIXCHI	0.	starting altitude (g/cm**2)
MAGNET	20.0 42.8	magnetic field centr. Europe
HADFLG	0 0 0 0 0 2	flags hadr.interact.&fragmentation
ECUTS	0.3 0.3 0.003 0.003	energy cuts for particles
MUADDI	T	additional info for muons
MUMULT	T	muon multiple scattering angle
ELMFLG	T T	em. interaction flags (NKG,EGS)
STEPFC	1.0	mult. scattering step length fact.
RADNKG	200.E2	outer radius for NKG lat.dens.distr.
ARRANG	0.	rotation of array to north
LONGI	T 20. T T	longit.distr. & step size & fit & out
ECTMAP	1.E3	cut on gamma factor for printout
MAXPRT	100	max. number of printed events
DIRECT	./	output directory
DATBAS	T	write .dbase file
PAROUT	T F	write DAT file
USER	you	user
DEBUG	F 6 F 1000000	debug flag and log.unit for out
TELESCOPE	0. 0. 0. 500.	
EXIT		terminates input

This test seems to have run successfully.