Synerduino STM Fork of INAV and the Synerduino Target

Synerduino STM Target Compilation into Hexfile

Prepare to Build the Hex File

Download the INAV
Release 5.1.0
Release 6.0.0
Release 7.0.0

First you need to download the INAV release version

These are available in the official github page or Synerflight SynerduinoSTM in download tab

https://github.com/iNavFlight/inav/tree/release_5.1.0
https://github.com/iNavFlight/inav/tree/6.0.0
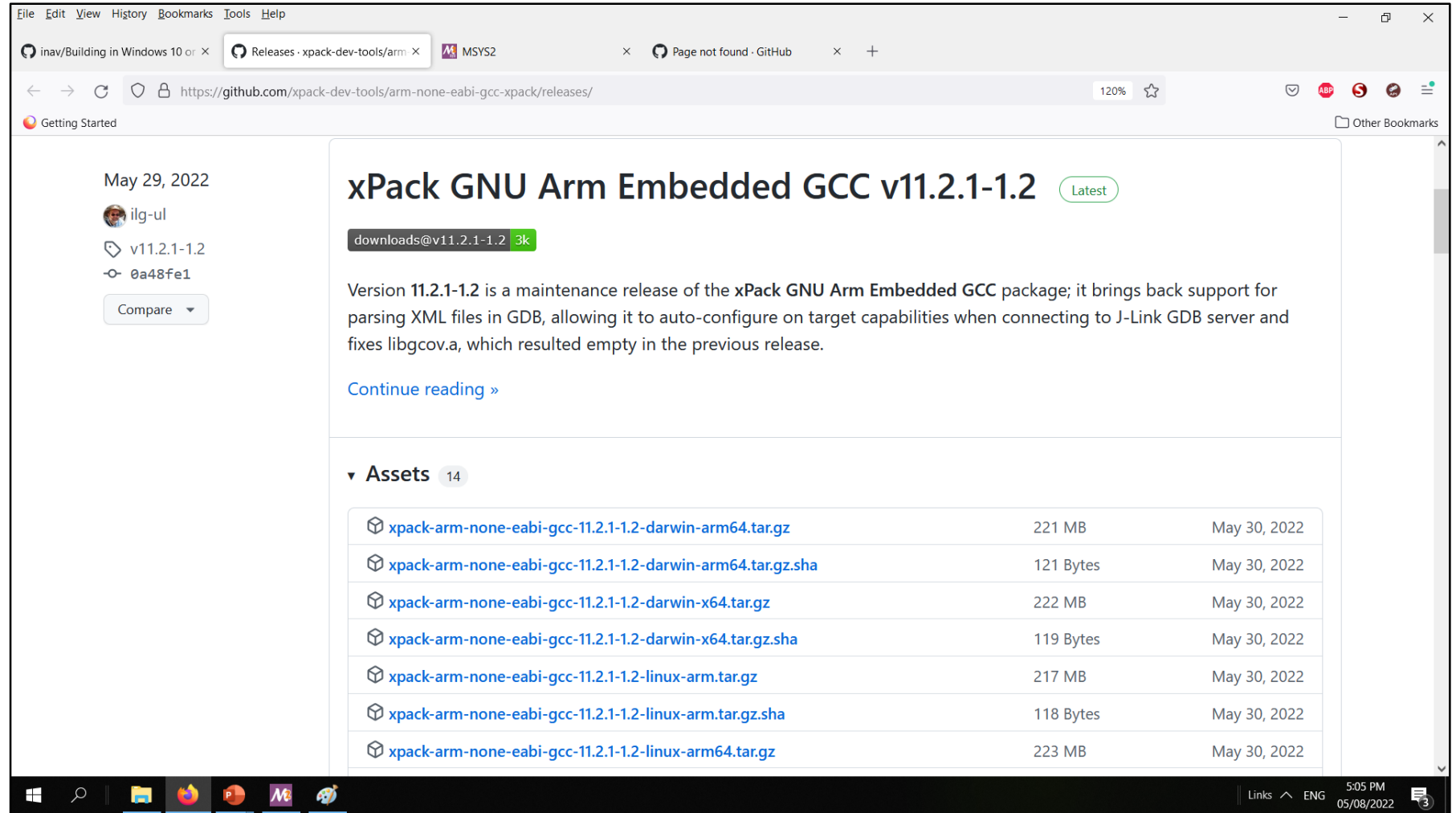https://github.com/iNavFlight/inav/tree/7.0.0

INAV–5.1.0
INAV-6.0.0
Download the Xpack
Release 10.2.1-1.1-
Win32-x64

INAV–7.0.0
Download the Xpack
Release 10.3.1-2.2-
Win32-x64

These are available in the official github page or Synerflight SynerduinoSTM in download tab

https://github.com/xpack-dev-tools/arm-none-eabi-gcc-xpack/releases/

https://github.com/xpack-dev-tools/arm-none-eabi-gcc-xpack/releases/download/v9.2.1-1.1/xpack-arm-none-eabi-gcc-9.2.1-1.1-win32-x64.zip
https://github.com/xpack-dev-tools/arm-none-eabi-gcc-xpack/releases/download/v10.2.1-1.1/xpack-arm-none-eabi-gcc-10.2.1-1.1-win32-x64.zip
https://github.com/xpack-dev-tools/arm-none-eabi-gcc-xpack/releases/download/v10.3.1-2.2/xpack-arm-none-eabi-gcc-10.3.1-2.2-win32-x64.zip

After installation Go Create a Workspace folder in your local Drive in my case Drive E , and extract and place the following directories INAV-5.1.0 / INAV-6.0.0 / INAV-7.0.0 Folder , Xpack folder
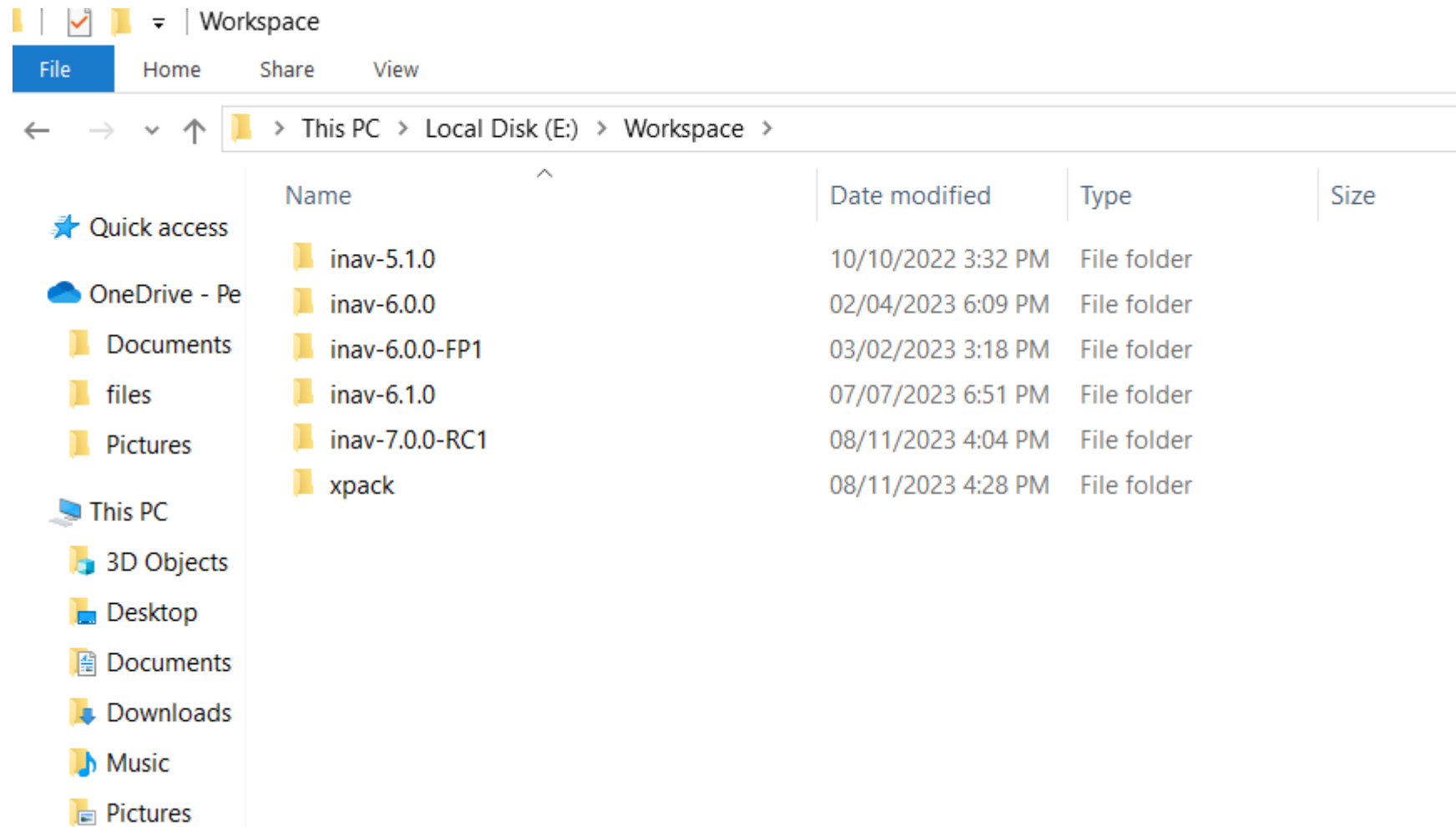
Note: I place my Workspace Folder on Drive E: as I was using SSD on my Drive C so not to fill it up

Create new folder inside INAV 5.1.0 INAV 6.0.0 INAV 7.0.0 Directory and Name it build

inav-6.0.0

File   Home   Share   View

← → ∨ ↑   > This PC > Local Disk (E:) > Workspace > inav-6.0.0 >

Search ina...

.github
board
build
cmake
dev
docs
lib
src
.dockerignore
.gitattributes
.gitignore
.travis.sh
.travis.yml
AUTHORS
build.sh
build_docs.sh
CMakeLists.txt
Dockerfile
fake_travis_build.sh
JLinkSettings.ini
LICENSE

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23 items   1 item selected
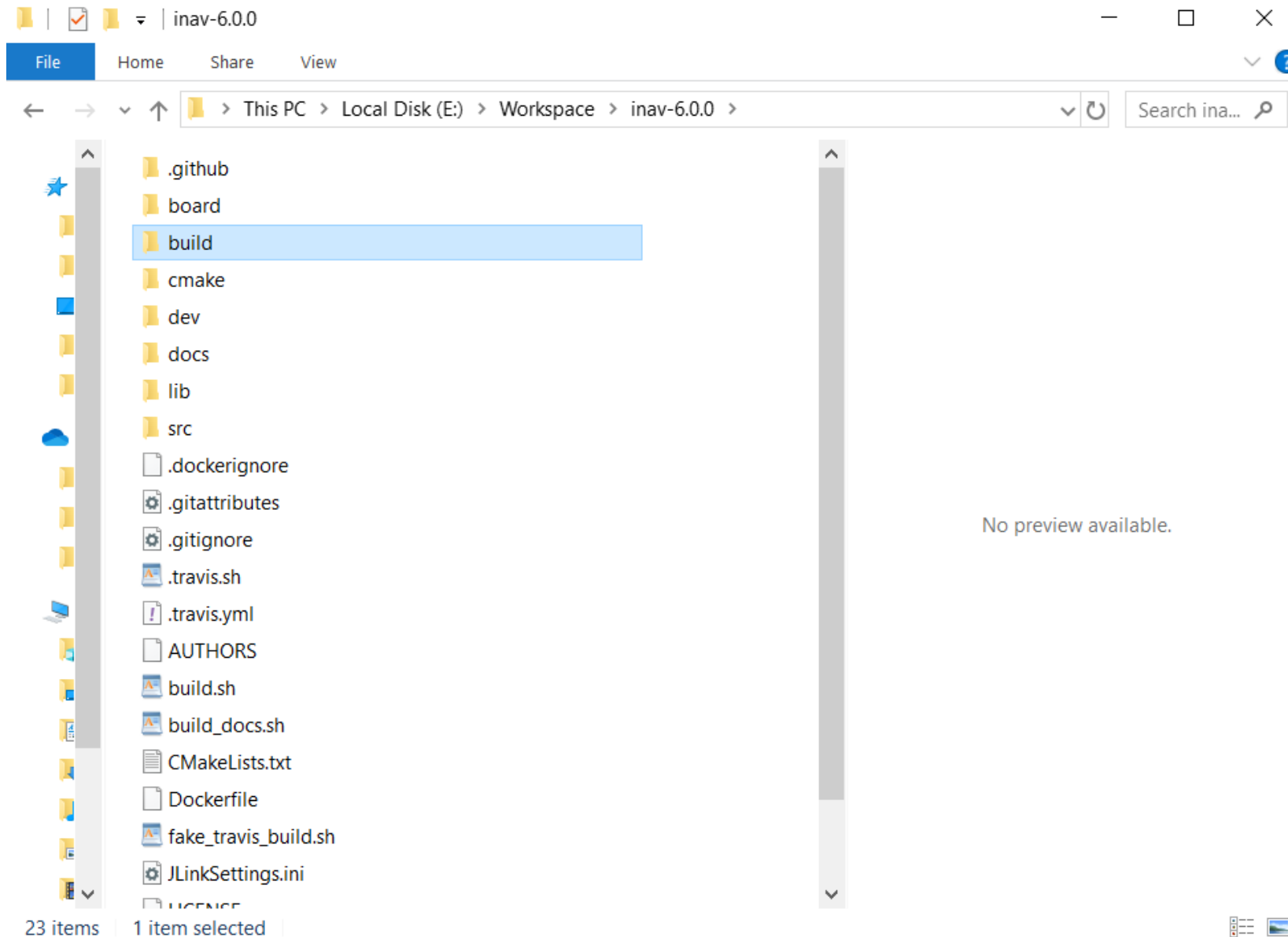
Inside the Xpack Folder Extract the xpack-arm-none-eabi-gcc -10.2.1-1.1
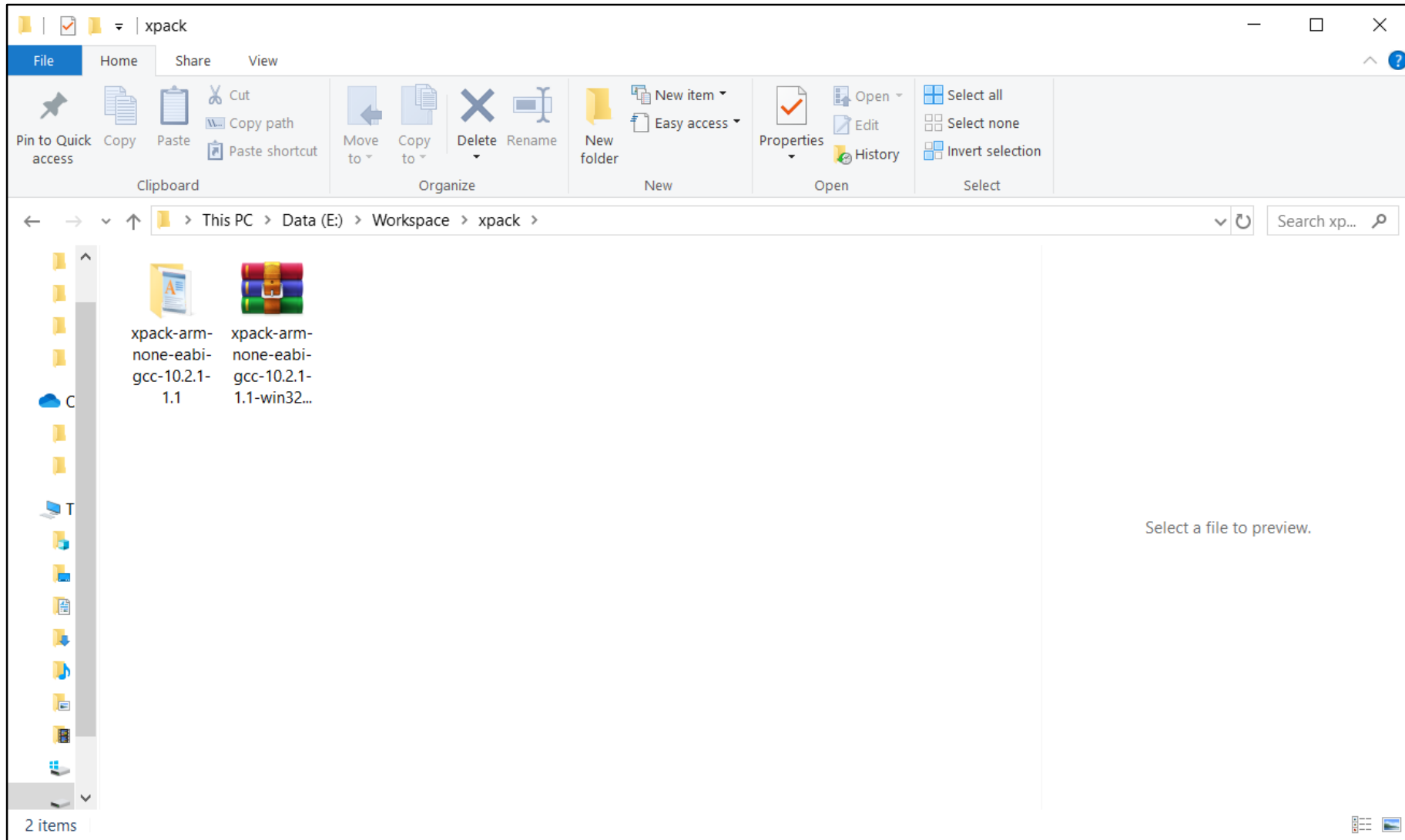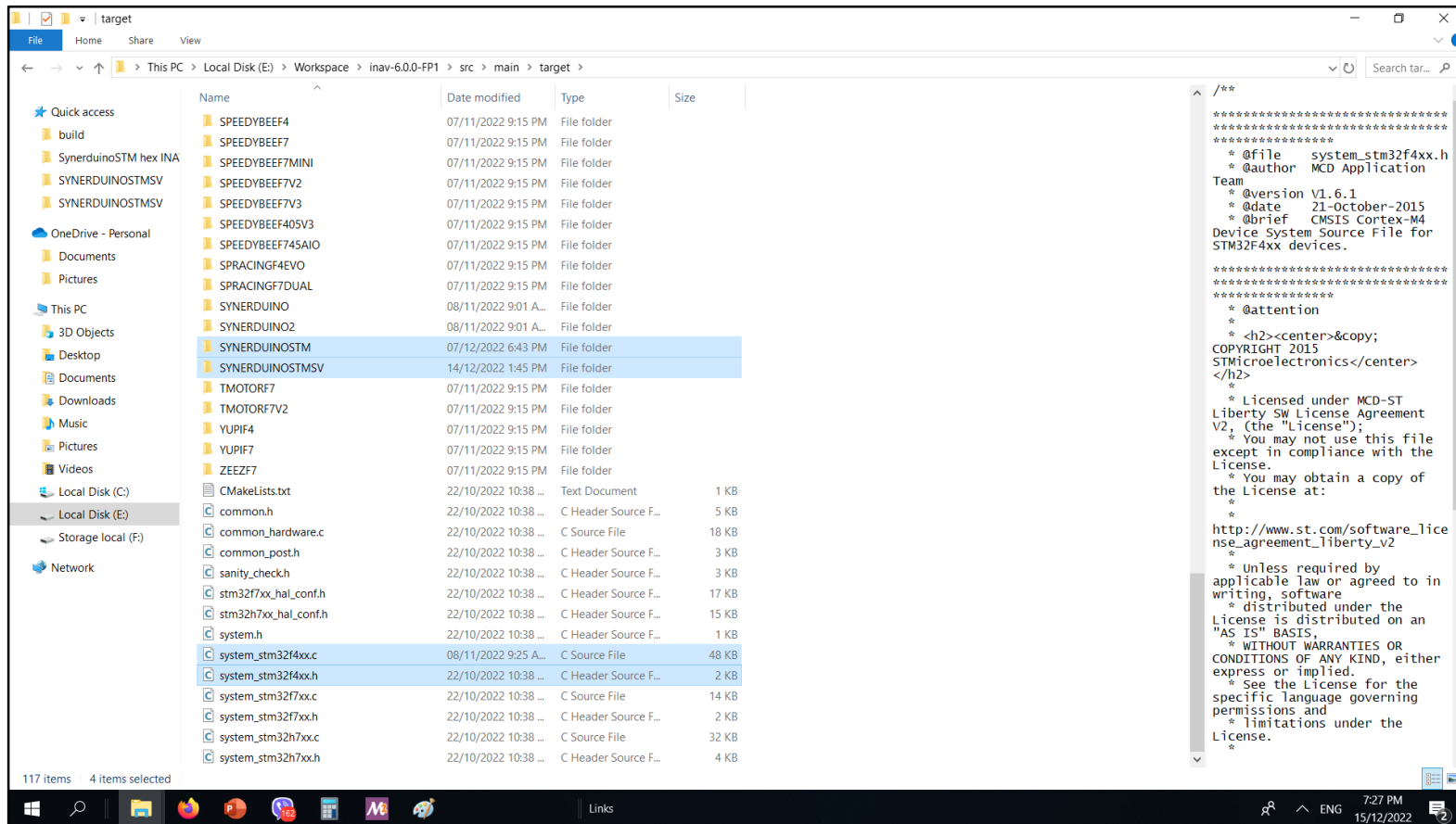
Create an xplack folder in Workspace folder and place it in there

INAV 5.1.0 INAV 6.0.0   xpack-arm-none-eabi-gcc-10.2.1-1.1 is extracted to the Xpack folder

INAV 7.0.0 INAV 7.1.0   xpack-arm-none-eabi-gcc-10.3.1-2.2 is extracted to the Xpack folder

Download the Synerduino Target Folder and Extract to Local drive and place it in the following
(E/Workspace/inav-5.1.0/scr/main/target)
(E/Workspace/inav-6.0.0/scr/main/target)
(E/Workspace/inav-7.0.0/scr/main/target)

Readme file is also available in the download

System_stm32f4xx.c – is modify to suit the Synerduino STM

INAV 7.0.0 when F411 BP became official)

Other Download of the Synerduino Target Folder is the sensor driver this is also Extract to Local drive and place it in the following
(E/Workspace/inav-5.1.0/scr/main/drivers/accgyro) ,
(E/Workspace/inav-6.0.0/scr/main/drivers/accgyro) ,
(E/Workspace/inav-7.0.0/scr/main/drivers/accgyro)
(E/Workspace/inav-7.1.0/scr/main/drivers/accgyro)

Readme file is also available in the download (accgyro_BMI160) is also modify to use with the SynerduinoSTM shield
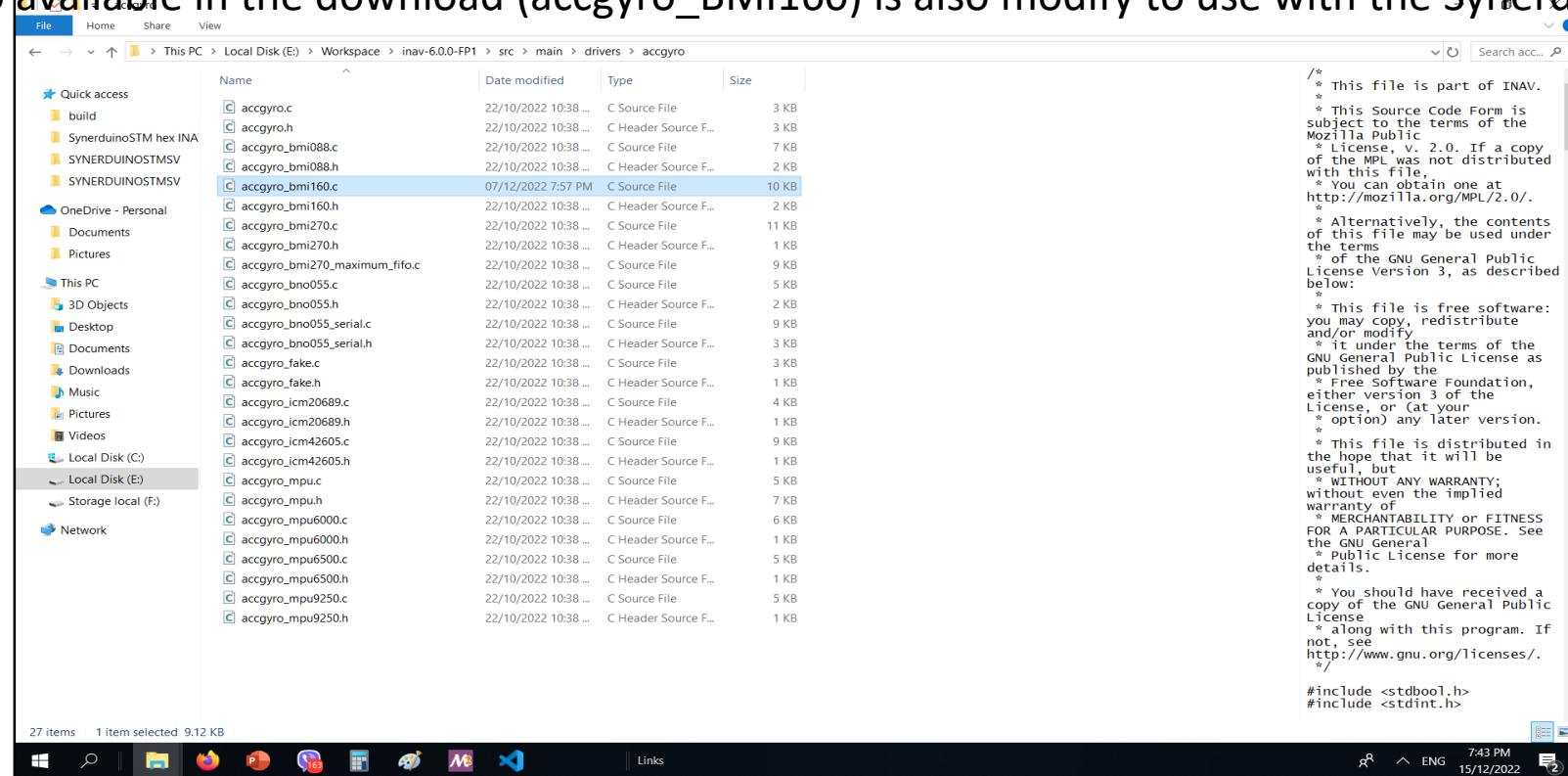
General Info

This is a guide on how to use Windows MSYS2 distribution and building platform to build iNav firmware. This environment is very simple to manage and does not require installing docker for Windows which may get in the way of VMWare or any other virtualization software you already have running for other reasons. Another benefit of this approach is that the compiler runs natively on Windows, so performance is much better than compiling in a virtual environment or a container.

Download Arm Embedded GCC toolkit from The xPack Project

https://xpack.github.io/arm-none-eabi-gcc/

msys2-x86_64-20
220603.exe
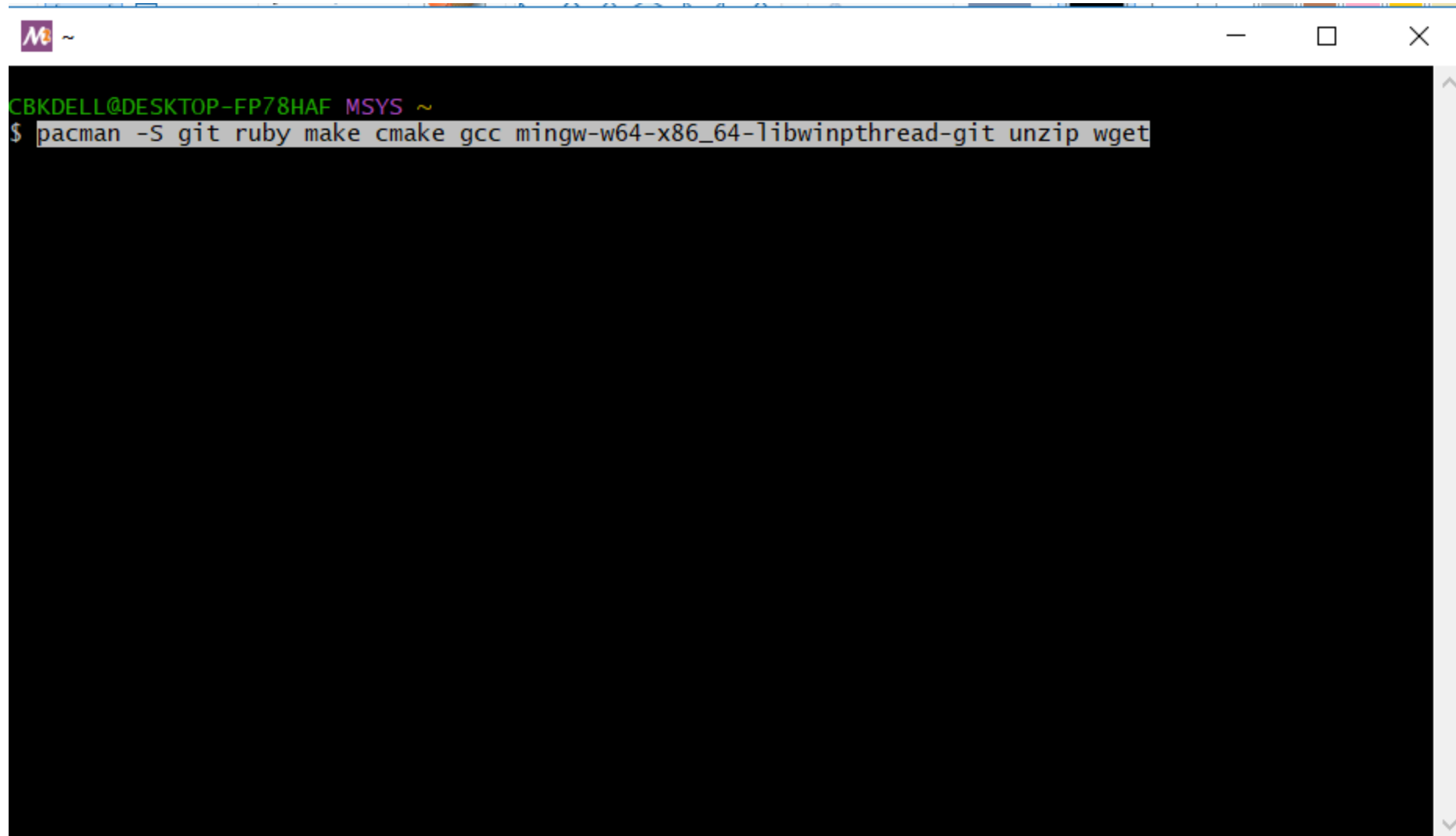
Download MSYS2 for your architecture (most likely 64-bit)

https://www.msys2.org/wiki/MSYS2-installation/

Install and Run msys2-x86
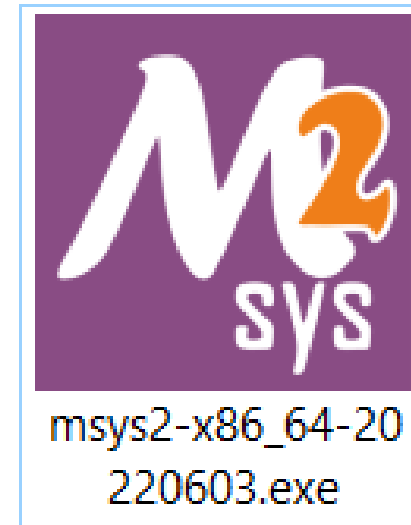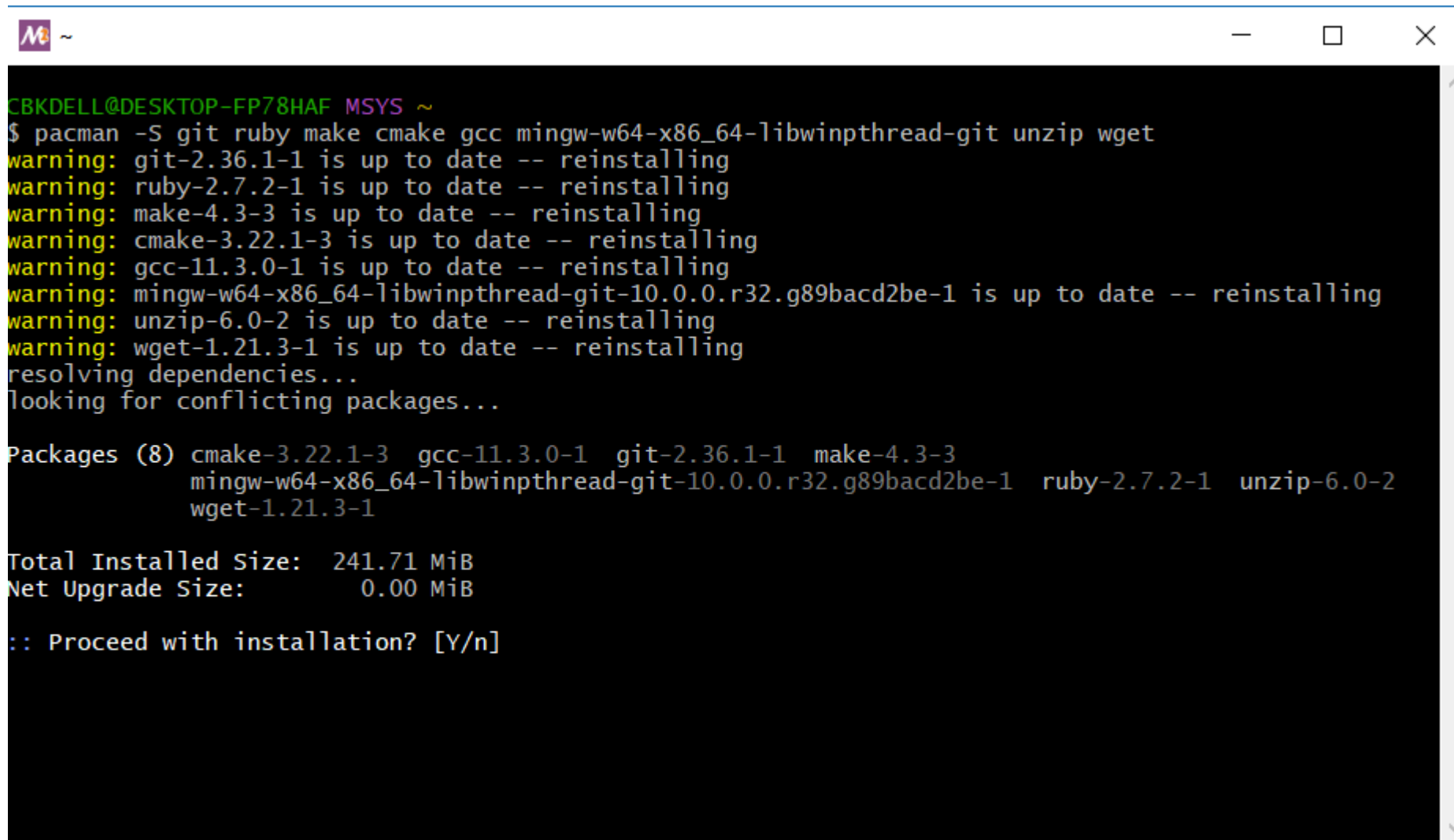
Copy and paste this script to install Ruby ,Cmake , Make and Gcc


```
CBKDELL@DESKTOP-FP78HAF MSYS ~
$ pacman -S git ruby make cmake gcc mingw-w64-x86_64-libwinpthread-git unzip wget
```

pacman -S git ruby make cmake gcc mingw-w64-x86_64-libwinpthread-git unzip wget

Y to Proceed installation


```
CBKDELL@DESKTOP-FP78HAF MSYS ~
$ pacman -S git ruby make cmake gcc mingw-w64-x86_64-libwinpthread-git unzip wget
warning: git-2.36.1-1 is up to date -- reinstalling
warning: ruby-2.7.2-1 is up to date -- reinstalling
warning: make-4.3-3 is up to date -- reinstalling
warning: cmake-3.22.1-3 is up to date -- reinstalling
warning: gcc-11.3.0-1 is up to date -- reinstalling
warning: mingw-w64-x86_64-libwinpthread-git-10.0.0.r32.g89bacd2be-1 is up to date -- reinstalling
warning: unzip-6.0-2 is up to date -- reinstalling
warning: wget-1.21.3-1 is up to date -- reinstalling
resolving dependencies...
looking for conflicting packages...

Packages (8) cmake-3.22.1-3  gcc-11.3.0-1  git-2.36.1-1  make-4.3-3
             mingw-w64-x86_64-libwinpthread-git-10.0.0.r32.g89bacd2be-1  ruby-2.7.2-1  unzip-6.0-2
             wget-1.21.3-1

Total Installed Size:  241.71 MiB
Net Upgrade Size:        0.00 MiB

:: Proceed with installation? [Y/n]
```

pacman -S git ruby make cmake gcc mingw-w64-x86_64-libwinpthread-git unzip wget

After installation


```
resolving dependencies...
looking for conflicting packages...

Packages (8) cmake-3.22.1-3  gcc-11.3.0-1  git-2.36.1-1  make-4.3-3
             mingw-w64-x86_64-libwinpthread-git-10.0.0.r32.g89bacd2be-1  ruby-2.7.2-1  unzip-6.0-2
             wget-1.21.3-1

Total Installed Size:   241.71 MiB
Net Upgrade Size:         0.00 MiB

:: Proceed with installation? [Y/n]
(8/8) checking keys in keyring                        [###########################] 100%
(8/8) checking package integrity                     [###########################] 100%
(8/8) loading package files                          [###########################] 100%
(8/8) checking for file conflicts                    [###########################] 100%
(8/8) checking available disk space                  [###########################] 100%
:: Processing package changes...
(1/8) reinstalling git                               [###########################] 100%
(2/8) reinstalling ruby                              [###########################] 100%
(3/8) reinstalling make                              [###########################] 100%
(4/8) reinstalling cmake                             [###########################] 100%
(5/8) reinstalling gcc                               [###########################] 100%
(6/8) reinstalling mingw-w64-x86_64-libwinpthread-git [###########################] 100%
(7/8) reinstalling unzip                             [###########################] 100%
(8/8) reinstalling wget                              [###########################] 100%
:: Running post-transaction hooks...
(1/1) Updating the info directory file...

CBKDELL@DESKTOP-FP78HAF MSYS ~
```

pacman -S git ruby make cmake gcc mingw-w64-x86_64-libwinpthread-git unzip wget

Set a Path for the Exported GCC to the Environment Pls make sure the directory is same name as the folder

```
:: Proceed with installation? [Y/n]
(8/8) checking keys in keyring                          [##############################] 100%
(8/8) checking package integrity                       [##############################] 100%
(8/8) loading package files                            [##############################] 100%
(8/8) checking for file conflicts                      [##############################] 100%
(8/8) checking available disk space                    [##############################] 100%
:: Processing package changes...
(1/8) reinstalling git                                 [##############################] 100%
(2/8) reinstalling ruby                                [##############################] 100%
(3/8) reinstalling make                                [##############################] 100%
(4/8) reinstalling cmake                               [##############################] 100%
(5/8) reinstalling gcc                                 [##############################] 100%
(6/8) reinstalling mingw-w64-x86_64-libwinpthread-git  [##############################] 100%
(7/8) reinstalling unzip                               [##############################] 100%
(8/8) reinstalling wget                                [##############################] 100%
:: Running post-transaction hooks...
(1/1) Updating the info directory file...

CBKDELL@DESKTOP-FP78HAF MSYS ~
$ export PATH=/e/Workspace/xpack/xpack-arm-none-eabi-gcc-10.2.1-1.1/bin:$PATH
```

INAV 5.1.0 – 6.1.0	export PATH=/e/Workspace/xpack/xpack-arm-none-eabi-gcc-10.2.1-1.1/bin:$PATH

INAV 7.0.0 – 7.1.0	export PATH=/e/Workspace/xpack/xpack-arm-none-eabi-gcc-10.3.1-2.2/bin:$PATH

get the toolkit version you need for your INAV version

for INAV version 5.0.0, 5.1.0 , 6.0.0 toolchain version needed is 10.2.1

for INAV version 7.0.0 , 7.1.0 toolchain version needed is 10.3.1

```
-- Configuring done
-- Generating done
-- Build files have been written to: /e/Workspace/inav-5.1.0/build

CBKDELL@DESKTOP-FP78HAF MSYS /e/Workspace/inav-5.1.0/build
$ cd /e/Workspace/xpack
CBKDELL@DESKTOP-FP78HAF MSYS /e/Workspace/xpack
$ cat /e/Workspace/inav-5.1.0/cmake/arm-none-eabi-checks.cmake | grep "set(arm_none_eabi_gcc_version"
| cut -d\" -f2
10.2.1

CBKDELL@DESKTOP-FP78HAF MSYS /e/Workspace/xpack
$
```

Source the version number that needs to be downloaded

Go to Xpack directory by typing

cd /e/Workspace/xpack

cat /e/Workspace/inav-7.1.0/cmake/arm-none-eabi-checks.cmake | grep "set(arm_none_eabi_gcc_version" | cut -d\" -f2

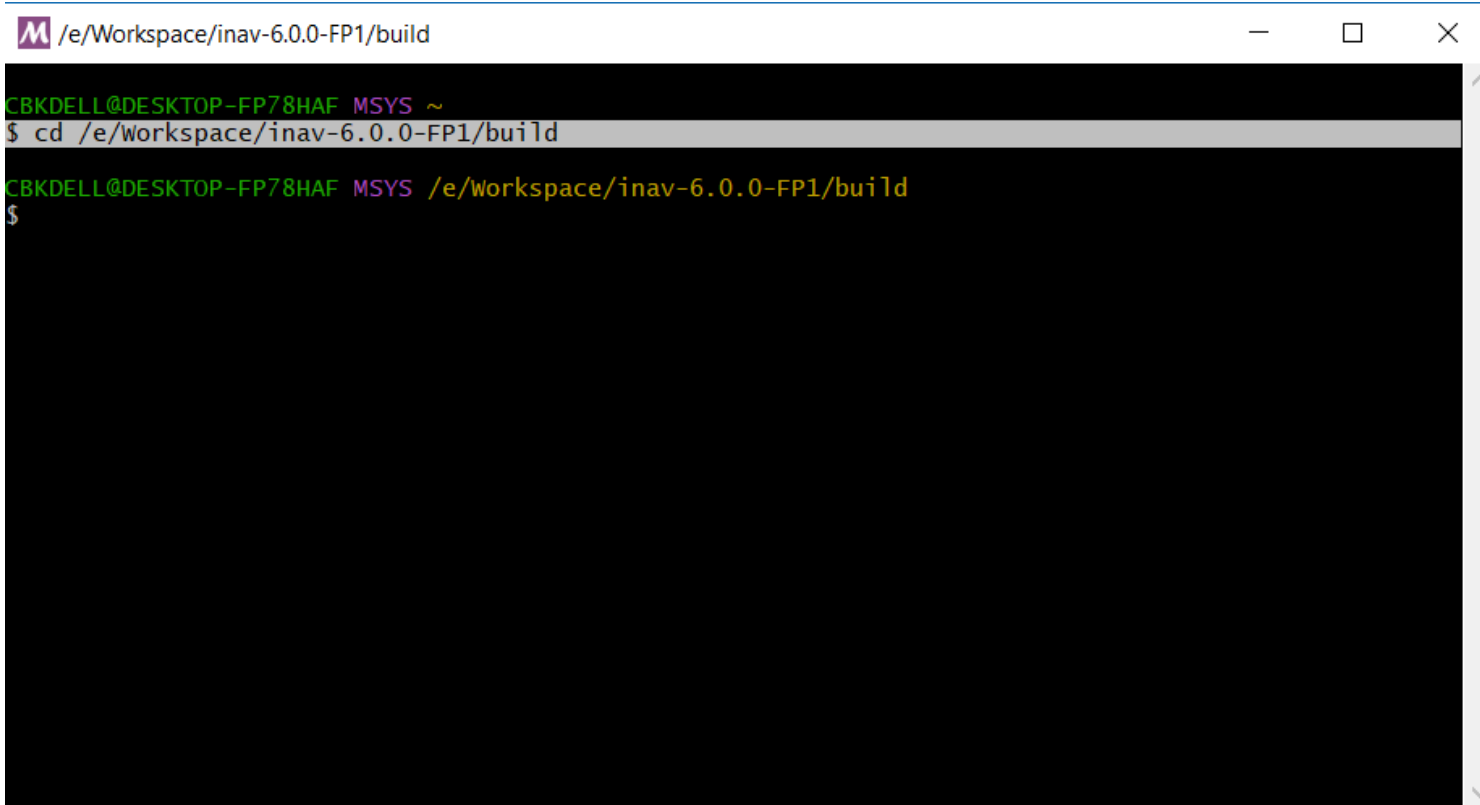cat /e/Workspace/inav-7.0.0/cmake/arm-none-eabi-checks.cmake | grep "set(arm_none_eabi_gcc_version" | cut -d\" -f2

cat /e/Workspace/inav-7.0.0-RC1/cmake/arm-none-eabi-checks.cmake | grep "set(arm_none_eabi_gcc_version" | cut -d\" -f2

cat /e/Workspace/inav-5.1.0/cmake/arm-none-eabi-checks.cmake | grep "set(arm_none_eabi_gcc_version" | cut -d\" -f2

cat /e/Workspace/inav-6.0.0/cmake/arm-none-eabi-checks.cmake | grep "set(arm_none_eabi_gcc_version" | cut -d\" -f2

Go to the build directory by entering this command

```
/e/Workspace/inav-6.0.0-FP1/build                                    —   □   ✕

CBKDELL@DESKTOP-FP78HAF MSYS ~
$ cd /e/Workspace/inav-6.0.0-FP1/build

CBKDELL@DESKTOP-FP78HAF MSYS /e/Workspace/inav-6.0.0-FP1/build
$
```

cd /e/Workspace/inav-5.1.0/build

cd /e/Workspace/inav-6.0.0/build

cd /e/Workspace/inav-7.0.0-RC1/build

cd /e/Workspace/inav-7.0.0/build

cd /e/Workspace/inav-7.1.0/build

This will extract the Cmake into the build folder creating the Environment


```
M /e/Workspace/inav-6.0.0-FP1/build                              —   □   ✕

CBKDELL@DESKTOP-FP78HAF MSYS /e/Workspace/inav-6.0.0-FP1/build
$ export PATH=/e/Workspace/xpack/xpack-arm-none-eabi-gcc-10.2.1-1.1/bin:$PATH

CBKDELL@DESKTOP-FP78HAF MSYS /e/Workspace/inav-6.0.0-FP1/build
$ Cmake ..
-- found arm-none-eabi-gcc 10.2.1 at /e/Workspace/xpack/xpack-arm-none-eabi-gcc-10.2.1-1.1/bin/arm-n
one-eabi-gcc.exe
-- The C compiler identification is GNU 10.2.1
-- The CXX compiler identification is GNU 10.2.1
-- Detecting C compiler ABI info
-- Detecting C compiler ABI info - done
-- Check for working C compiler: /e/Workspace/xpack/xpack-arm-none-eabi-gcc-10.2.1-1.1/bin/arm-none-
eabi-gcc.exe - skipped
-- Detecting C compile features
-- Detecting C compile features - done
-- Detecting CXX compiler ABI info
-- Detecting CXX compiler ABI info - done
-- Check for working CXX compiler: /e/Workspace/xpack/xpack-arm-none-eabi-gcc-10.2.1-1.1/bin/arm-non
e-eabi-g++.exe - skipped
-- Detecting CXX compile features
-- Detecting CXX compile features - done
-- The ASM compiler identification is GNU
-- Found assembler: /e/Workspace/xpack/xpack-arm-none-eabi-gcc-10.2.1-1.1/bin/arm-none-eabi-gcc.exe
-- toolchain: arm-none-eabi, WARNINGS_AS_ERRORS: OFF
-- Could not find openocd, debugging won't be available
-- DEBUG_HARDFAULTS: OFF, SEMIHOSTING: OFF
```

Cmake ..

You may need to run rm -rf * in build directory if you had any failed previous runs now run cmake

This will build the Hexfile Targeted the Synerduino board and its settings to the Build Folder the Hexfile is use as Firmware when loading the configurator


```
-- Build files have been written to: /e/Workspace/inav-6.0.0-FP1/build

CBKDELL@DESKTOP-FP78HAF MSYS /e/Workspace/inav-6.0.0-FP1/build
$ make SYNERDUINOSTMSV
Generating SYNERDUINOSTMSV/settings_generated.h, SYNERDUINOSTMSV/settings_generated.c
Scanning dependencies of target SYNERDUINOSTMSV.elf
Building ASM object src/main/target/SYNERDUINOSTMSV/CMakeFiles/SYNERDUINOSTMSV.elf.dir/__/__/startup
/startup_stm32f411xe.s.obj
Building C object src/main/target/SYNERDUINOSTMSV/CMakeFiles/SYNERDUINOSTMSV.elf.dir/__/__/drivers/b
us_spi.c.obj
Building C object src/main/target/SYNERDUINOSTMSV/CMakeFiles/SYNERDUINOSTMSV.elf.dir/__/__/drivers/s
erial_uart.c.obj
Building C object src/main/target/SYNERDUINOSTMSV/CMakeFiles/SYNERDUINOSTMSV.elf.dir/__/system_stm32
f4xx.c.obj
Building C object src/main/target/SYNERDUINOSTMSV/CMakeFiles/SYNERDUINOSTMSV.elf.dir/__/__/config/co
nfig_streamer_stm32f4.c.obj
Building C object src/main/target/SYNERDUINOSTMSV/CMakeFiles/SYNERDUINOSTMSV.elf.dir/__/__/config/co
nfig_streamer_ram.c.obj
Building C object src/main/target/SYNERDUINOSTMSV/CMakeFiles/SYNERDUINOSTMSV.elf.dir/__/__/config/co
nfig_streamer_extflash.c.obj
Building C object src/main/target/SYNERDUINOSTMSV/CMakeFiles/SYNERDUINOSTMSV.elf.dir/__/__/drivers/a
dc_stm32f4xx.c.obj
Building C object src/main/target/SYNERDUINOSTMSV/CMakeFiles/SYNERDUINOSTMSV.elf.dir/__/__/drivers/b
us_i2c_stm32f40x.c.obj
Building C object src/main/target/SYNERDUINOSTMSV/CMakeFiles/SYNERDUINOSTMSV.elf.dir/__/__/drivers/s
erial_uart_stm32f4xx.c.obj
```

INAV6 | make SYNERDUINOSTM | INAV7 | make SYNERDUINOSTM_F411 |
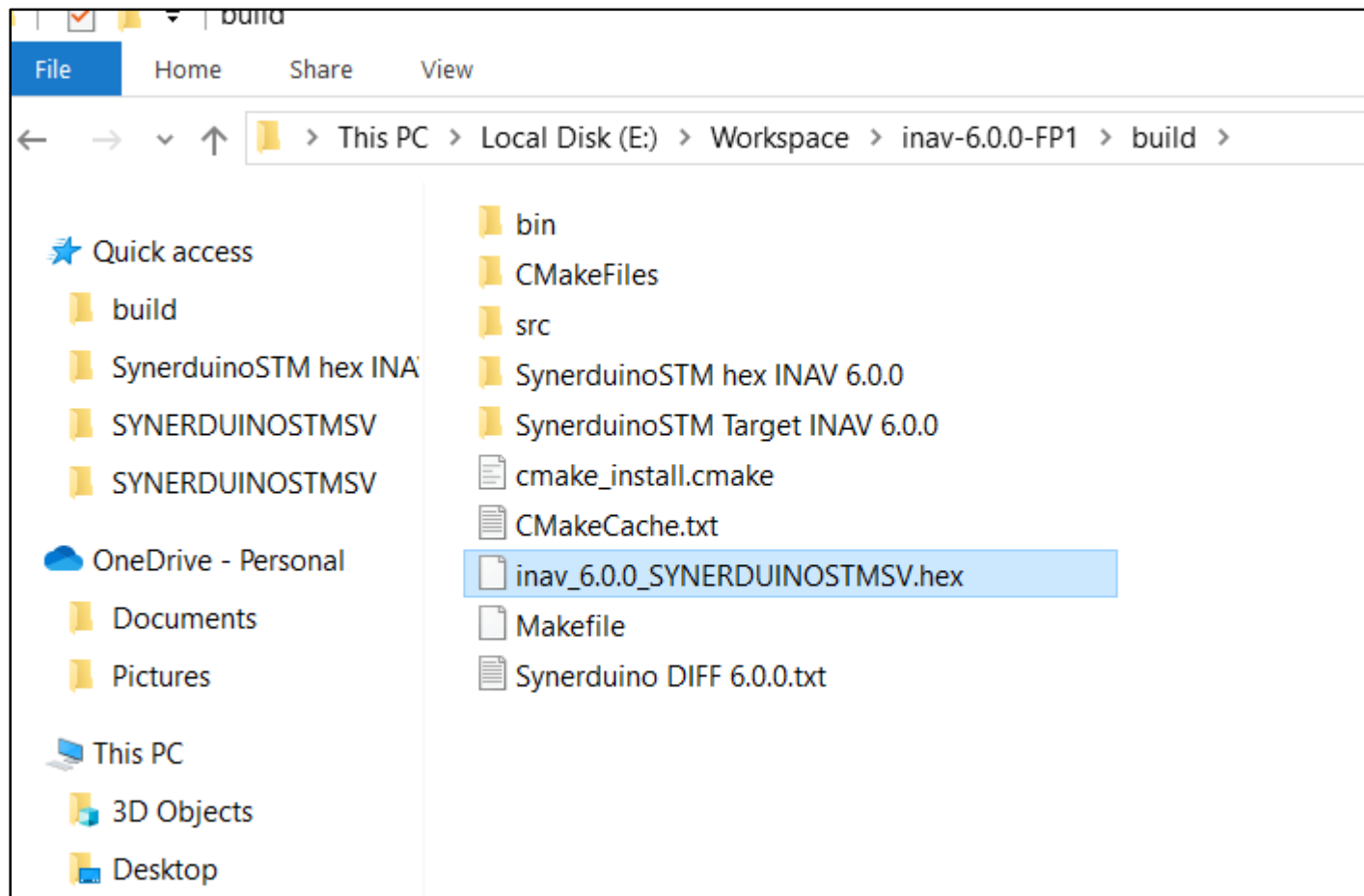
| make SYNERDUINOSTM2 |

| make SYNERDUINOSTMSV |

| make SYNERDUINOSTMSV2 |

Once completed the Hexfile can be found on the Build folder

And… its here .

INAV_5.1.0 SYNERDUINOSTM.hex
INAV_5.1.0 SYNERDUINOSTMSV.hex
INAV_6.0.0_SYNERDUINOSTM.hex
INAV_6.0.0_SYNERDUINOSTMSV.hex
INAV_7.0.0_ SYNERDUINOSTM_F411.hex

Open this file in the Configurator as this is the firmware
Find it in the Build folder of the INAV directory

cd /e/Workspace/inav-5.1.0/build

cd /e/Workspace/inav-6.0.0/build

cd /e/Workspace/inav-7.0.0/build

cd /e/Workspace/inav-7.1.0/build