



HTZ COMMUNICATIONS AUTOMATION

Command-line Scripting

Guide to automation codes

This is a technical guideline to help users run HTZ Communications in automation mode

Version: Final 1.0

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Date: May 22nd 2019

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1. List of action codes

Action code	Short desc	Description
1007	TIF conversion	Convert & incorporate 32-bit tiff files into currently attached GEO file in project
1008	Coverage computation	Import Station on map from SQL database linked and compute coverage
1006	Export FSR (dBuV/m)	Import Station on map from SQL database linked and display coverage, export field strength to TIF/TFW + KMZ to destination specified
1003	Export Best server (#)	Import Station on map from SQL database linked and display Best server coverage in # (also applies to 3G/4G/5G)
1004	Export RS (dBm)	Import Station on map from SQL database linked and display RS coverage in dBm (stations 3G/4G/5G)
1005	Export PR (dBm)	Import Station on map from SQL database linked and display composite coverage in dBm
1013	Export C/I+N (dB)	Import Station on map from SQL database linked and calculate C/I+N and export result in dB
1014	Export 4G/5G PDSCH SINR	Import Station on map from SQL database linked and calculate SINR (4G/5G) and export result in dB
1015	Export 4G/5G throughput (kbps)	Import Station on map from SQL database linked and calculate Throughput (4G/5G) and export result in kbps
1002	MW Path budget (SQL)	Import MW on map from SQL database linked and perform Path Budget (ITU 530), save report and send email if minimum height clearance not met for any of the links
1001	Export Overlap	Import Station on map from SQL database linked and display Best server + Overlapping coverage in # (also applies to 3G/4G/5G)
1016	Mine Plan Analysis	Import SHP Mine Plan and carry out RF analysis up to 3 months. Export results in CSV. Calculate coverage percentage per polygon. List trailers within blasting zone (300m)

2. Use case

Description	CML
Insert list of tif files from "source" into current project "DNM3112GDA942m.PRO"	"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO" -ADMIN 1007 "D:\TIF Conversion Test\source"
Calculate coverage for all sites in linked SQL table and within the map boundary and save results back to SQL	"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO" -ADMIN 1008 1000
Delete all previous analysis output generated	del "D:\TIF Conversion Test\destination*.KMZ" del "D:\TIF Conversion Test\destination*.TIF" del "D:\TIF Conversion Test\destination*.TFW" del "D:\TIF Conversion Test\destination*.PRJ"
Export all power received heat-map for all stations within the map boundary located in linked SQL table. Save results in folder "destination"	"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO" -ADMIN 1005 1000 "D:\TIF Conversion Test\destination"

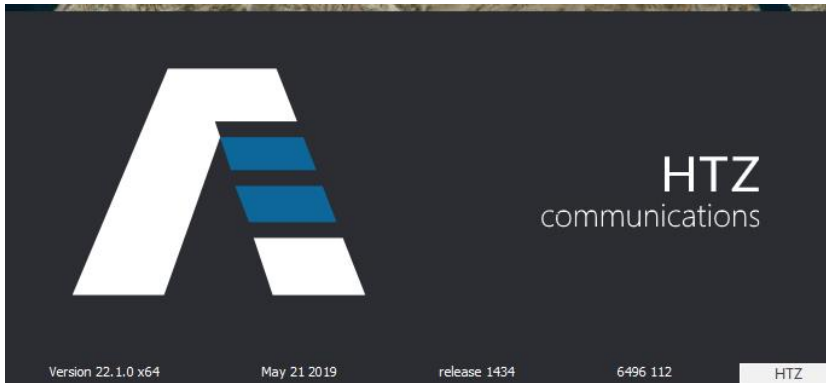
Video:

<https://www.youtube.com/watch?v=A7CPlceiNil&list=PLsZH2LJkFZLmb8AplXyVbbDdQja4FZqde&index=1>

3. HTZ Communications version

Date: 30/05/2019

Version: V22.1.0



4. Action code 1007 (Tif conversion)

Description:

Automatically convert all TIF files within a specific folder to ATDI IC2 format then insert into current GEO file in a project followed by interpolation for -9999.

Syntax example:

```
"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion
Test\DNM_3112_GDA94_2m.PRO" -ADMIN 1007 "D:\TIF Conversion Test\source"
```

Parameter	Note
"C:\ATDI\HTZ communications x64\HTZcx64.exe"	Full path to HTZ Communications executable
"D:\TIF Conversion Test\DNM_3112_GDA94_2m.PRO"	Full path to HTZ Communications project file
ADMIN	Required always for action codes
1007	TIF to GEO conversion action code
"D:\TIF Conversion Test\source"	Source folder for all 32-bit TIFF files

HTZcx64.exe **PathToHTZCommProject.PRO** -ADMIN 1007 **PathToSourceTifFolder**

Notes,

- It is important to have quotes "" especially if there are blank spaces and special characters in the files name
- Read/Write permission is required on the source TIF folder. The tool will generate some temporary files during the conversion process
- The tool can not extend the existing GEO (Terrain) file beyond its current area. So only the intersection areas between the GEO file and the TIFF files would be updated
- The TIF files must be of the same GRID code (EPSG) as that of the GEO files concerned

5. Action code 1008 (Coverage calculation)

Description:

Automatically connect to pre-defined SQL link, extract all stations within map boundary, insert on the map, calculate advanced coverage using attached PRM file and send the coverage results back to the SQL table. Station signal type and re-sampling factor can be defined.

Syntax examples:

Example (1):

```
"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO"
-ADMIN 1008 1 1000
```

Example (2):

```
"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO"
-ADMIN 1008 2 70
```

Parameter	Note
"C:\ATDI\HTZ communications x64\HTZcx64.exe"	Full path to HTZ Communications executable
"D:\TIF Conversion Test\DNM3112GDA942m.PRO"	Full path to HTZ Communications project file
ADMIN	Required always for action codes
1008	Import stations from SQL and calculate coverage then save results back to SQL
1000	All signal types (all T/R stations)
1, 2	Terrain resampling factor 1 or 2
70	WIFI signal type only

HTZcx64.exe **PathToHTZCommProject.PRO** -ADMIN SF 1008 **SignalType**

Notes,

- It is important to have quotes "" especially if there are blank spaces and special characters in the files name
- Default SQL link must be established in HTZ Communications Ev for the computer concerned. Please refer to Database>>SQL Database
- Read/Write permission is required on the linked SQL table
- SF: Sampling factor >= 1
- If sampling factor = 1: coverage calculation is performed at the best resolution project (or area - distance limited) the application can load. If sampling factor is > 1, the project is loaded with this sampling factor and coverage calculation is performed at the project resolution
- Output result file names are stamped (date/time) with a precision of 1 second. Two command lines with same project and same action code must be spaced a second apart

6. Action code 1006 (Composite FS coverage)

Description:

Automatically connect to pre-defined SQL link, extract all stations within map boundary, insert on the map, display composite coverage and export the results to KMZ and TIF/TFW files. Station signal type can be defined. The export location can also be defined as an argument.

Syntax examples:

Example (1):

```
"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO"
-ADMIN 1006 1000 "D:\TIF Conversion Test\destination"
```

Example (2):

```
"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO"
-ADMIN 1006 70 "D:\TIF Conversion Test\destination"
```

Parameter	Note
"C:\ATDI\HTZ communications x64\HTZcx64.exe"	Full path to HTZ Communications executable
"D:\TIF Conversion Test\DNM3112GDA942m.PRO"	Full path to HTZ Communications project file
ADMIN	Required always for action codes
1006	Field strength action code
1000	All signal types (all T/R stations)
70	WIFI signal type only
"D:\TIF Conversion Test\destination"	Location where KMZ and TIF/TFW to be saved

HTZcx64.exe **PathToHTZCommProject.PRO** -ADMIN 1006 **SignalType** **PathToExportFolder**

Notes,

- It is important to have quotes "" especially if there are blank spaces and special characters in the files name
- Default SQL link must be established in HTZ Communications Ev for the computer concerned. Please refer to Database>>SQL Database
- Read/Write permission is required on the destination folder
- Generated KMZ is always Decimal degrees WGS-84
- Generated TIF file has same EPSG (grid-code) as that of the GEO (terrain) file in the project
- Ideally project file name (*.PRO) would not have special characters such as while space and ' _ '.
- Output result file names are stamped (date/time) with a precision of 1 second. Two command lines with same project and same action code must be spaced a second apart

Output file name convention:

There are three files in the output,

- ProjectFileName-DateTime-FSdBu.kmz
- ProjectFileName-DateTime-FSdBu.tif
- ProjectFileName-DateTime-FSdBu.tfw
- ProjectFileName-DateTime-FSdBu.prj

The KMZ export doesn't accept special characters such as “_”. Hence the project name must not have such chars.

If project name is “DNM3112GDA942m.PRO” then the outputs would be:

- DNM3112GDA942m-20190413092433-FSdBu.kmz
- DNM3112GDA942m-20190413092433-FSdBu.tif
- DNM3112GDA942m-20190413092433-FSdBu.tfw
- DNM3112GDA942m-20190413092433-FSdBu.prj

Where “20190413092433” is 2019, April, 9:24:33 AM.

Since the file name is always changing – it is advised to delete previously generated KMZ/TIF/TFW files before executing this action code.

An example is provided below:

- del "D:\TIF Conversion Test\destination*.KMZ"
- del "D:\TIF Conversion Test\destination*.TIF"
- del "D:\TIF Conversion Test\destination*.TFW"
- del "D:\TIF Conversion Test\destination*.PRJ"
- "C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO" -ADMIN 1006 1000 "D:\TIF Conversion Test\destination"

7. Action code 1003 (Best server)

Description:

Automatically connect to pre-defined SQL link, extract all stations within map boundary, insert on the map, display best server coverage and export the results to KMZ and TIF/TFW files. Station signal type can be defined. The export location can also be defined as an argument.

This function applies special rules to 3G/4G/5G signals.

Syntax examples:

Example (1):

```
"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO"
-ADMIN 1003 1000 "D:\TIF Conversion Test\destination"
```

Example (2):

```
"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO"
-ADMIN 1003 70 "D:\TIF Conversion Test\destination"
```

Example (6):

```
"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO"
-ADMIN 1003 60 "D:\TIF Conversion Test\destination"
```

Parameter	Note
"C:\ATDI\HTZ communications x64\HTZcx64.exe"	Full path to HTZ Communications executable
"D:\TIF Conversion Test\DNM3112GDA942m.PRO"	Full path to HTZ Communications project file
ADMIN	Required always for action codes
1003	Best server (#) action code
1000	All signal types (all T/R stations)
70	WIFI signal type only
60	LTE-FDD, RS based best server
"D:\TIF Conversion Test\destination"	Location where KMZ and TIF/TFW to be saved

HTZcx64.exe **PathToHTZCommProject.PRO** -ADMIN 1003 **SignalType** **PathToExportFolder**

Notes,

- It is important to have quotes "" especially if there are blank spaces and special characters in the files name
- Default SQL link must be established in HTZ Communications Ev for the computer concerned. Please refer to Database>>SQL Database

- Read/Write permission is required on the destination folder
- Generated KMZ is always Decimal degrees WGS-84
- Generated TIF file has same EPSG (grid-code) as that of the GEO (terrain) file in the project
- Ideally project file name (*.PRO) would not have special characters such as while space and ‘_’.
- In Example (3), the signaltype specified in the argument is of the type 4G, hence the best server analysis is based on RS (RSRP).
- Output result file names are stamped (date/time) with a precision of 1 second. Two command lines with same project and same action code must be spaced a second apart

Output file name convention:

There are three files in the output,

- ProjectFileName-DateTime-BS.kmz
- ProjectFileName-DateTime-BS.tif
- ProjectFileName-DateTime-BS.tfw
- ProjectFileName-DateTime-BS.prj

The KMZ export doesn't accept special characters such as “_”. Hence the project name must not have such chars.

If project name is “DNM3112GDA942m.PRO” then the outputs would be:

- DNM3112GDA942m-20190413092433-BS.kmz
- DNM3112GDA942m-20190413092433-BS.tif
- DNM3112GDA942m-20190413092433-BS.tfw
- DNM3112GDA942m-20190413092433-BS.prj

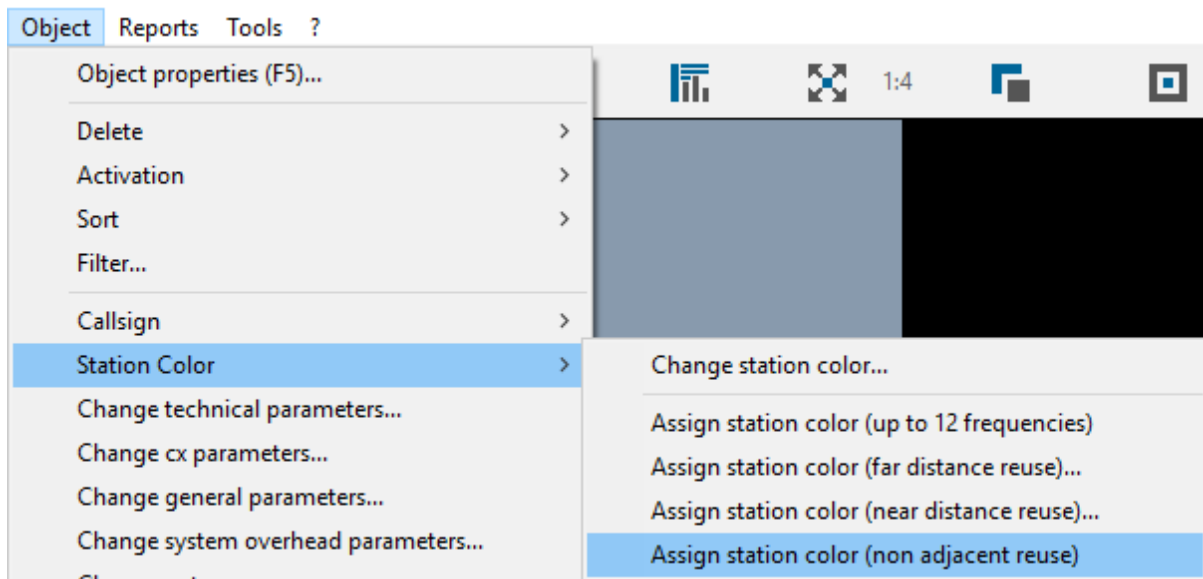
Where “20190413092433” is 2019, April, 9:24:33 AM.

Since the file name is always changing – it is advised to delete previously generated KMZ/TIF/TFW files before executing this action code.

An example is provided below:

- del "D:\TIF Conversion Test\destination*.KMZ"
- del "D:\TIF Conversion Test\destination*.TIF"
- del "D:\TIF Conversion Test\destination*.TFW"
- del "D:\TIF Conversion Test\destination*.PRJ"
- "C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO" -ADMIN 1003 1000 "D:\TIF Conversion Test\destination"

Server color is automatically assigned based on “Assign station color (non-adjacent reuse)”.



1) 3G/4G/5G

If (overlap or best server) and signaltype is 3G/4G/5G as argument

Then RS based analysis

If (overlap or best server) and signaltype not 3G/4G/5G as argument

Then RSSI based analysis

If (overlap or best server) and signaltype is All as argument

Then RSSI based analysis

8. Action code 1001 (Overlap)

Description:

Automatically connect to pre-defined SQL link, extract all stations within map boundary, insert on the map, display coverage overlap and export the results to KMZ and TIF/TFW files. Station signal type can be defined. The export location can also be defined as an argument.

This function applies special rules to 3G/4G/5G signals.

Syntax examples:

Example (1):

```
"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO"
-ADMIN 1001 1000 "D:\TIF Conversion Test\destination"
```

Example (2):

```
"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO"
-ADMIN 1001 70 "D:\TIF Conversion Test\destination"
```

Example (3):

```
"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO"
-ADMIN 1001 60 "D:\TIF Conversion Test\destination"
```

Parameter	Note
"C:\ATDI\HTZ communications x64\HTZcx64.exe"	Full path to HTZ Communications executable
"D:\TIF Conversion Test\DNM3112GDA942m.PRO"	Full path to HTZ Communications project file
ADMIN	Required always for action codes
1001	Overlap server (#) action code
1000	All signal types (all T/R stations)
70	WIFI signal type only
60	LTE-FDD, RS based best server
"D:\TIF Conversion Test\destination"	Location where KMZ and TIF/TFW to be saved

HTZcx64.exe **PathToHTZCommProject.PRO** -ADMIN 1001 **SignalType** **PathToExportFolder**

Notes,

- It is important to have quotes "" especially if there are blank spaces and special characters in the files name
- Default SQL link must be established in HTZ Communications Ev for the computer concerned. Please refer to Database>>SQL Database

- Read/Write permission is required on the destination folder
- Generated KMZ is always Decimal degrees WGS-84
- Generated TIF file has same EPSG (grid-code) as that of the GEO (terrain) file in the project
- Ideally project file name (*.PRO) would not have special characters such as while space and ‘_’.
- If more than one station overlap; color would be pink (#=255)
- In Example (3), the signaltype specified in the argument is of the type 4G, hence the best server analysis is based on RS (RSRP).
- Output result file names are stamped (date/time) with a precision of 1 second. Two command lines with same project and same action code must be spaced a second apart

Output file name convention:

There are three files in the output,

- ProjectFileName-DateTime-OVERLAP.kmz
- ProjectFileName-DateTime-OVERLAP.tif
- ProjectFileName-DateTime-OVERLAP.tfw
- ProjectFileName-DateTime-OVERLAP.prj

The KMZ export doesn't accept special characters such as “_”. Hence the project name must not have such chars.

If project name is “DNM3112GDA942m.PRO” then the outputs would be:

- DNM3112GDA942m-20190413092433-OVERLAP.kmz
- DNM3112GDA942m-20190413092433-OVERLAP.tif
- DNM3112GDA942m-20190413092433-OVERLAP.tfw
- DNM3112GDA942m-20190413092433-OVERLAP.prj

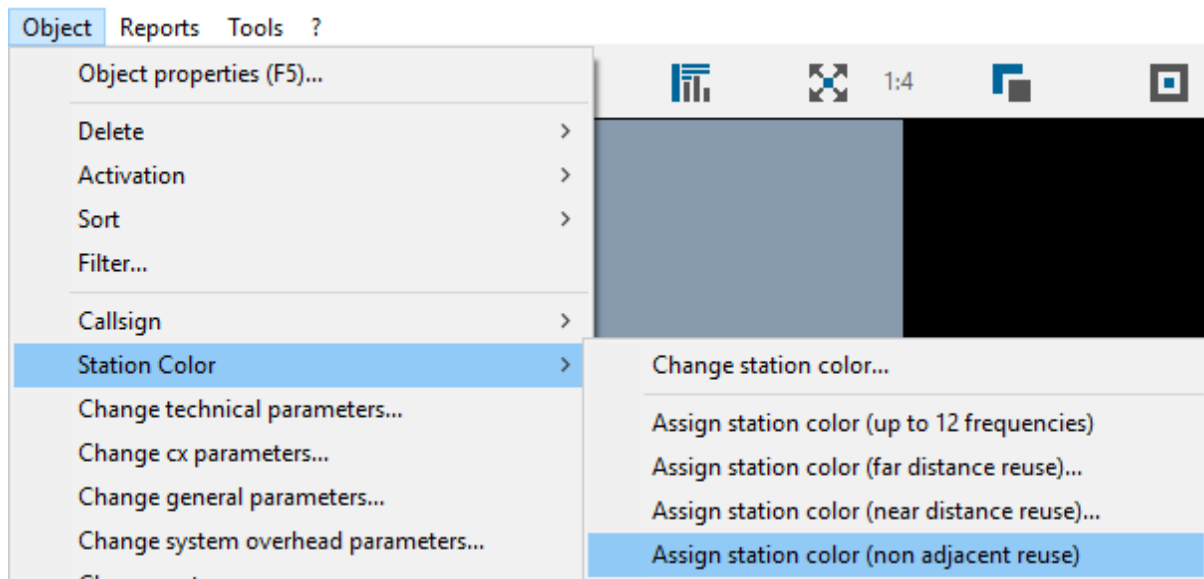
Where “20190413092433” is 2019, April, 9:24:33 AM.

Since the file name is always changing – it is advised to delete previously generated KMZ/TIF/TFW files before executing this action code.

An example is provided below:

- del "D:\TIF Conversion Test\destination*.KMZ"
- del "D:\TIF Conversion Test\destination*.TIF"
- del "D:\TIF Conversion Test\destination*.TFW"
- del "D:\TIF Conversion Test\destination*.PRJ"
- "C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO" -ADMIN 1001 1000 "D:\TIF Conversion Test\destination"

Server color is automatically assigned based on “Assign station color (non-adjacent reuse)”.



1) 3G/4G/5G

If (overlap or best server) and signaltype is 3G/4G/5G as argument

Then RS based analysis

If (overlap or best server) and signaltype not 3G/4G/5G as argument

Then RSSI based analysis

If (overlap or best server) and signaltype is All as argument

Then RSSI based analysis

9. Action code 1004 (RS dBm)

Description:

Automatically connect to pre-defined SQL link, extract all stations within map boundary, insert on the map, display RS (3G/4G/5G) coverage and export the results to KMZ and TIF/TFW files. Station signal type can be defined. The export location can also be defined as an argument.

Syntax examples:

Example (1):

```
"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO"
-ADMIN 1004 1000 "D:\TIF Conversion Test\destination"
```

Example (2):

```
"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO"
-ADMIN 1004 60 "D:\TIF Conversion Test\destination"
```

Parameter	Note
"C:\ATDI\HTZ communications x64\HTZcx64.exe"	Full path to HTZ Communications executable
"D:\TIF Conversion Test\DNM3112GDA942m.PRO"	Full path to HTZ Communications project file
ADMIN	Required always for action codes
1004	RS action code (RSRP, RSCP..)
1000	All signal types (all T/R stations)
60	LTE-FDD signal type only
"D:\TIF Conversion Test\destination"	Location where KMZ and TIF/TFW to be saved

HTZcx64.exe **PathToHTZCommProject.PRO** -ADMIN 1004 **SignalType** **PathToExportFolder**

Notes,

- It is important to have quotes "" especially if there are blank spaces and special characters in the files name
- Default SQL link must be established in HTZ Communications Ev for the computer concerned. Please refer to Database>>SQL Database
- Read/Write permission is required on the destination folder
- Generated KMZ is always Decimal degrees WGS-84
- Generated TIF file has same EPSG (grid-code) as that of the GEO (terrain) file in the project
- Ideally project file name (*.PRO) would not have special characters such as while space and ' _ '.
- % Ref. Signal is defined for the 3G/4G/5G cells concerned
- Output result file names are stamped (date/time) with a precision of 1 second. Two command lines with same project and same action code must be spaced a second apart

- Output result file names are stamped (date/time) with a precision of 1 second. Two command lines with same project and same action code must be spaced a second apart

Output file name convention:

There are three files in the output,

- ProjectFileName-DateTime-RSdBm.kmz
- ProjectFileName-DateTime-RSdBm.tif
- ProjectFileName-DateTime-RSdBm.tfw
- ProjectFileName-DateTime-RSdBm.prj

The KMZ export doesn't accept special characters such as “_”. Hence the project name must not have such chars.

If project name is “DNM3112GDA942m.PRO” then the outputs would be:

- DNM3112GDA942m-20190413092433-RSdBm.kmz
- DNM3112GDA942m-20190413092433-RSdBm.tif
- DNM3112GDA942m-20190413092433-RSdBm.tfw
- DNM3112GDA942m-20190413092433-RSdBm.prj

Where “20190413092433” is 2019, April, 9:24:33 AM.

Since the file name is always changing – it is advised to delete previously generated KMZ/TIF/TFW files before executing this action code.

An example is provided below:

- del "D:\TIF Conversion Test\destination*.KMZ"
- del "D:\TIF Conversion Test\destination*.TIF"
- del "D:\TIF Conversion Test\destination*.TFW"
- del "D:\TIF Conversion Test\destination*.PRJ"

“C:\ATDI\HTZ communications x64\HTZcx64.exe” "D:\TIF Conversion Test\DNM3112GDA942m.PRO"
-ADMIN 1004 1000 "D:\TIF Conversion Test\destination"

10.Action code 1005 (composite or PR in dBm)

Description:

Automatically connect to pre-defined SQL link, extract all stations within map boundary, insert on the map, display composite coverage in dBm and export the results to KMZ and TIF/TFW files. Station signal type can be defined. The export location can also be defined as an argument.

Syntax examples:

Example (1):

```
"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO"
-ADMIN 1005 1000 "D:\TIF Conversion Test\destination"
```

Example (2):

```
"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO"
-ADMIN 1005 60 "D:\TIF Conversion Test\destination"
```

Parameter	Note
"C:\ATDI\HTZ communications x64\HTZcx64.exe"	Full path to HTZ Communications executable
"D:\TIF Conversion Test\DNM3112GDA942m.PRO"	Full path to HTZ Communications project file
ADMIN	Required always for action codes
1005	Composite or PR dBm action code
1000	All signal types (all T/R stations)
60	LTE-FDD signal type only
"D:\TIF Conversion Test\destination"	Location where KMZ and TIF/TFW to be saved

HTZcx64.exe **PathToHTZCommProject.PRO** -ADMIN 1005 **SignalType** **PathToExportFolder**

Notes,

- It is important to have quotes "" especially if there are blank spaces and special characters in the files name
- Default SQL link must be established in HTZ Communications Ev for the computer concerned. Please refer to Database>>SQL Database
- Read/Write permission is required on the destination folder
- Generated KMZ is always Decimal degrees WGS-84
- Generated TIF file has same EPSG (grid-code) as that of the GEO (terrain) file in the project
- Ideally project file name (*.PRO) would not have special characters such as while space and ' ' .
- Global rx antenna gain is used in FS to dBm conversion (TBT)
- Output result file names are stamped (date/time) with a precision of 1 second. Two command lines with same project and same action code must be spaced a second apart

Output file name convention:

There are three files in the output,

- ProjectFileName-DateTime-PRdBm.kmz
- ProjectFileName-DateTime-PRdBm.tif
- ProjectFileName-DateTime-PRdBm.tfw
- ProjectFileName-DateTime-PRdBm.prj

The KMZ export doesn't accept special characters such as “_”. Hence the project name must not have such chars.

If project name is “DNM3112GDA942m.PRO” then the outputs would be:

- DNM3112GDA942m-20190413092433-PRdBm.kmz
- DNM3112GDA942m-20190413092433-PRdBm.tif
- DNM3112GDA942m-20190413092433-PRdBm.tfw
- DNM3112GDA942m-20190413092433-PRdBm.prj

Where “20190413092433” is 2019, April, 9:24:33 AM.

Since the file name is always changing – it is advised to delete previously generated KMZ/TIF/TFW files before executing this action code.

An example is provided below:

- del "D:\TIF Conversion Test\destination*.KMZ"
- del "D:\TIF Conversion Test\destination*.TIF"
- del "D:\TIF Conversion Test\destination*.TFW"
- del "D:\TIF Conversion Test\destination*.PRJ"

```
"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO"  
-ADMIN 1005 1000 "D:\TIF Conversion Test\destination"
```

11.Action code 1013 (C/N+I map)

Description:

Automatically connect to pre-defined SQL link, extract all stations within map boundary, insert on the map, calculate C/N+I map in dB and export the results to KMZ and TIF/TFW files. Station signal type can be defined. The export location can also be defined as an argument.

Syntax examples:

Example (1):

```
"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO"
-ADMIN 1013 1000 "D:\TIF Conversion Test\destination"
```

Example (2):

```
"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO"
-ADMIN 1013 70 "D:\TIF Conversion Test\destination"
```

Parameter	Note
"C:\ATDI\HTZ communications x64\HTZcx64.exe"	Full path to HTZ Communications executable
"D:\TIF Conversion Test\DNM3112GDA942m.PRO"	Full path to HTZ Communications project file
ADMIN	Required always for action codes
1013	C/N+I action code
1000	All signal types (all T/R stations)
70	WIFI signal type only
"D:\TIF Conversion Test\destination"	Location where KMZ and TIF/TFW to be saved

HTZcx64.exe **PathToHTZCommProject.PRO** -ADMIN 1013 **SignalType** **PathToExportFolder**

Notes,

- It is important to have quotes "" especially if there are blank spaces and special characters in the files name
- Default SQL link must be established in HTZ Communications Ev for the computer concerned. Please refer to Database>>SQL Database
- Read/Write permission is required on the destination folder
- Generated KMZ is always Decimal degrees WGS-84
- Generated TIF file has same EPSG (grid-code) as that of the GEO (terrain) file in the project
- Ideally project file name (*.PRO) would not have special characters such as while space and ' _ '.
- All other configuration related parameters would be defined in the PRM file
- Output result file names are stamped (date/time) with a precision of 1 second. Two command lines with same project and same action code must be spaced a second apart

Output file name convention:

There are three files in the output,

- ProjectFileName-DateTime-CNIDB.kmz
- ProjectFileName-DateTime-CNIDB.tif
- ProjectFileName-DateTime-CNIDB.tfw
- ProjectFileName-DateTime-CNIDB.prj

The KMZ export doesn't accept special characters such as “_”. Hence the project name must not have such chars.

If project name is “DNM3112GDA942m.PRO” then the outputs would be:

- DNM3112GDA942m-20190413092433-CNIDB.kmz
- DNM3112GDA942m-20190413092433-CNIDB.tif
- DNM3112GDA942m-20190413092433-CNIDB.tfw
- DNM3112GDA942m-20190413092433-CNIDB.prj

Where “20190413092433” is 2019, April, 9:24:33 AM.

Since the file name is always changing – it is advised to delete previously generated KMZ/TIF/TFW files before executing this action code.

An example is provided below:

- del "D:\TIF Conversion Test\destination*.KMZ"
- del "D:\TIF Conversion Test\destination*.TIF"
- del "D:\TIF Conversion Test\destination*.TFW"
- del "D:\TIF Conversion Test\destination*.PRJ"

```
"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO"  
-ADMIN 1013 1000 "D:\TIF Conversion Test\destination"
```

12.Action code 1014 (4G/5G SINR)

Description:

Automatically connect to pre-defined SQL link, extract all stations within map boundary, insert on the map, calculate SINR (4G/5G) map in dB and export the results to KMZ and TIF/TFW files. Station signal type can be defined. The export location can also be defined as an argument.

Syntax examples:

Example (1):

```
"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO"
-ADMIN 1014 1000 "D:\TIF Conversion Test\destination"
```

Example (2):

```
"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO"
-ADMIN 1014 60 "D:\TIF Conversion Test\destination"
```

Parameter	Note
"C:\ATDI\HTZ communications x64\HTZcx64.exe"	Full path to HTZ Communications executable
"D:\TIF Conversion Test\DNM3112GDA942m.PRO"	Full path to HTZ Communications project file
ADMIN	Required always for action codes
1014	PDSCH (4G/5G) action code
1000	All signal types (all T/R stations)
60	LTE-FDD signal type only
"D:\TIF Conversion Test\destination"	Location where KMZ and TIF/TFW to be saved

HTZcx64.exe **PathToHTZCommProject.PRO** -ADMIN 1014 **SignalType** **PathToExportFolder**

Notes,

- It is important to have quotes "" especially if there are blank spaces and special characters in the files name
- Default SQL link must be established in HTZ Communications Ev for the computer concerned. Please refer to Database>>SQL Database
- Read/Write permission is required on the destination folder
- Generated KMZ is always Decimal degrees WGS-84
- Generated TIF file has same EPSG (grid-code) as that of the GEO (terrain) file in the project
- Ideally project file name (*.PRO) would not have special characters such as while space and ' _ '.
- All other configuration related parameters would be defined in the PRM file
- Output result file names are stamped (date/time) with a precision of 1 second. Two command lines with same project and same action code must be spaced a second apart

Output file name convention:

There are three files in the output,

- ProjectFileName-DateTime-PDSCHdB.kmz
- ProjectFileName-DateTime-PDSCHdB.tif
- ProjectFileName-DateTime-PDSCHdB.tfw
- ProjectFileName-DateTime-PDSCHdB.prj

The KMZ export doesn't accept special characters such as “_”. Hence the project name must not have such chars.

If project name is “DNM3112GDA942m.PRO” then the outputs would be:

- DNM3112GDA942m-20190413092433-PDSCHdB.kmz
- DNM3112GDA942m-20190413092433-PDSCHdB.tif
- DNM3112GDA942m-20190413092433-PDSCHdB.tfw
- DNM3112GDA942m-20190413092433-PDSCHdB.prj

Where “20190413092433” is 2019, April, 9:24:33 AM.

Since the file name is always changing – it is advised to delete previously generated KMZ/TIF/TFW files before executing this action code.

An example is provided below:

- del "D:\TIF Conversion Test\destination*.KMZ"
- del "D:\TIF Conversion Test\destination*.TIF"
- del "D:\TIF Conversion Test\destination*.TFW"
- del "D:\TIF Conversion Test\destination*.PRJ"

```
"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO"  
-ADMIN 1014 60 "D:\TIF Conversion Test\destination"
```

Parameters:

4G / 5G SNIR maps

SNIR PDSCH

Action

- SNIR (xPDSCH)
- SNIR (PDSCH)
- SNIR (PDCCH)
- SNIR (PBCH)
- RSRQ

Normal distrib % stddev (dB): 5.5

Throughput map

Carrier aggregation

SNIR to QCI map

Unwanted = activated

Unwanted = de-activated and activated

Server = activated/deactivated stations

Display best server if SNIR >= -2 dB

Max server latency (0=n.a) (us) 0

KTBF (1) -100 dBm

Rx gain 9.03 dB

No. arrays 8

MIMO adaptive switching modes (AAS):

- Spatial Multiplexing
- MU/M-MIMO (Multi-user / Massive MIMO)
- Tx Div (Transmit Diversity) - MISO
- Single Antenna Port (SISO or SIMO)

IRF mask (dB)

N=0	0	<input checked="" type="checkbox"/> used	N=10	50	<input type="checkbox"/> used
N=1	20	<input type="checkbox"/> used	N=11	50	<input type="checkbox"/> used
N=2	30	<input type="checkbox"/> used	N=12	50	<input type="checkbox"/> used
N=3	40	<input type="checkbox"/> used	N=13	50	<input type="checkbox"/> used
N=4	50	<input type="checkbox"/> used	N=14	50	<input type="checkbox"/> used
N=5	50	<input type="checkbox"/> used	N=15	50	<input type="checkbox"/> used
N=6	50	<input type="checkbox"/> used			
N=7	50	<input type="checkbox"/> used			
N=8	50	<input type="checkbox"/> used			
N=9	50	<input type="checkbox"/> used			

Use mask as filter

IRF from tables (ETSI/ITU/IEEE)

CNC-DNRc61 CNC-DNRc54 FCC

IRF from Tx/Rx C/I

IRF from NFD / TS-RIF

Global XPD 0 dB C/H or V: 3 dB protection except if global XPD=0

Traffic load factor (Interferer)

Remaining traffic load factor (Server)

Smart antenna discrimination

Thresholds: -125 dBm RS / 35 dBu

ICIC enhancement 0 dB

Calculates DL SNIR (PDSCH) according to the Noise floor of a receiver on each point of the terrain. Only activated stations are taken into account.

Tx bandwidth / Tx bandwidth

Rx ant disc

- None
- 419/GE
- OET69
- User

OK Cancel Palette... Station list... Load... Save... Options...

(1) 0 = from station parameter KTBF

(AAS) BS antenna must be set to AAS

in red options to be defined

in green options predefined

in blue options from PRM

For the red options:

- 1) Should be both for now (assuming the tool switches automatically between the two modes depending on SINR or Throughput)
 - a. Spatial multiplexing **checked**
 - b. Tx diversity **checked**
- 2) Traffic load factor must be **checked**
- 3) Smart antenna must be **unchecked** for now
- 4) ICIC should be 0 dB for now
- 5) Everything else is ok and PRM related parameters we will take care

13.Action code 1015 (4G/5G Throughput)

Description:

Automatically connect to pre-defined SQL link, extract all stations within map boundary, insert on the map, calculate Throughput map in kbps and export the results to KMZ and TIF/TFW files. Station signal type can be defined. The export location can also be defined as an argument.

Syntax examples:

Example (1):

```
"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO"
-ADMIN 1015 1000 "D:\TIF Conversion Test\destination"
```

Example (2):

```
"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO"
-ADMIN 1015 60 "D:\TIF Conversion Test\destination"
```

Parameter	Note
"C:\ATDI\HTZ communications x64\HTZcx64.exe"	Full path to HTZ Communications executable
"D:\TIF Conversion Test\DNM3112GDA942m.PRO"	Full path to HTZ Communications project file
ADMIN	Required always for action codes
1015	4G/5G throughput map, action code
1000	All signal types (all T/R stations)
60	LTE-FDD signal type only
"D:\TIF Conversion Test\destination"	Location where KMZ and TIF/TFW to be saved

HTZcx64.exe **PathToHTZCommProject.PRO** -ADMIN 1015 **SignalType** **PathToExportFolder**

Notes,

- It is important to have quotes "" especially if there are blank spaces and special characters in the files name
- Default SQL link must be established in HTZ Communications Ev for the computer concerned. Please refer to Database>>SQL Database
- Read/Write permission is required on the destination folder
- Generated KMZ is always Decimal degrees WGS-84
- Generated TIF file has same EPSG (grid-code) as that of the GEO (terrain) file in the project
- Ideally project file name (*.PRO) would not have special characters such as while space and ' _ '.
- All other configuration related parameters would be defined in the PRM file
- Output result file names are stamped (date/time) with a precision of 1 second. Two command lines with same project and same action code must be spaced a second apart

Output file name convention:

There are three files in the output,

- ProjectFileName-DateTime-TPTkpbs.kmz
- ProjectFileName-DateTime-TPTkpbs.tif
- ProjectFileName-DateTime-TPTkpbs.tfw
- ProjectFileName-DateTime-TPTkpbs.prj

The KMZ export doesn't accept special characters such as “_”. Hence the project name must not have such chars.

If project name is “DNM3112GDA942m.PRO” then the outputs would be:

- DNM3112GDA942m-20190413092433-TPTkpbs.kmz
- DNM3112GDA942m-20190413092433-TPTkpbs.tif
- DNM3112GDA942m-20190413092433-TPTkpbs.tfw
- DNM3112GDA942m-20190413092433-TPTkpbs.prj

Where “20190413092433” is 2019, April, 9:24:33 AM.

Since the file name is always changing – it is advised to delete previously generated KMZ/TIF/TFW files before executing this action code.

An example is provided below:

- del "D:\TIF Conversion Test\destination*.KMZ"
- del "D:\TIF Conversion Test\destination*.TIF"
- del "D:\TIF Conversion Test\destination*.TFW"
- del "D:\TIF Conversion Test\destination*.PRJ"

```
"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO"  
-ADMIN 1015 60 "D:\TIF Conversion Test\destination"
```

Parameters:

4G / 5G SNIR maps

SNIR PDSCH

Action

- SNIR (xPDSCH)
- SNIR (PDSCH)
- SNIR (PDCCH)
- SNIR (PBCH)
- RSRQ

Normal distrib % stddev (dB): 5.5

Throughput map

Carrier aggregation

SNIR to QCI map

Unwanted = activated

Unwanted = de-activated and activated

Server = activated/deactivated stations

Display best server if SNIR >= -2 dB

Max server latency (0=n.a) (us) 0

KTBF (1) -100 dBm

Rx gain 9.03 dB

No. arrays 8

MIMO adaptive switching modes (AAS):

- Spatial Multiplexing
- MU/M-MIMO (Multi-user / Massive MIMO)
- Tx Div (Transmit Diversity) - MISO
- Single Antenna Port (SISO or SIMO)

IRF mask (dB)

N=0	0	<input checked="" type="checkbox"/> used	N=10	50	<input type="checkbox"/> used
N=1	20	<input type="checkbox"/> used	N=11	50	<input type="checkbox"/> used
N=2	30	<input type="checkbox"/> used	N=12	50	<input type="checkbox"/> used
N=3	40	<input type="checkbox"/> used	N=13	50	<input type="checkbox"/> used
N=4	50	<input type="checkbox"/> used	N=14	50	<input type="checkbox"/> used
N=5	50	<input type="checkbox"/> used	N=15	50	<input type="checkbox"/> used
N=6	50	<input type="checkbox"/> used			
N=7	50	<input type="checkbox"/> used			
N=8	50	<input type="checkbox"/> used			
N=9	50	<input type="checkbox"/> used			

Use mask as filter

IRF from tables (ETSI/ITU/IEEE)

CNC-DNRc61 CNC-DNRc54 FCC

IRF from Tx/Rx C/I

IRF from NFD / TS-RIF

Global XPD 0 dB C/H or V: 3 dB protection except if global XPD=0

Traffic load factor (Interferer)

Remaining traffic load factor (Server)

Smart antenna discrimination

Thresholds: -125 dBm RS / 35 dBu

ICIC enhancement 0 dB

Calculates DL SNIR (PDSCH) according to the Noise floor of a receiver on each point of the terrain. Only activated stations are taken into account.

Rx ant disc

- None
- 419/GE
- OET69
- User

OK Cancel Palette... Station list... Load... Save... Options...

(1) 0 = from station parameter KTBF

(AAS) BS antenna must be set to AAS

Tx bandwidth / Tx bandwidth

For the red options:

- 1) Should be both for now (assuming the tool switches automatically between the two modes depending on SINR or Throughput)
 - a. Spatial multiplexing **checked**
 - b. Tx diversity **checked**
- 2) Traffic load factor must be **checked**
- 3) Smart antenna must be **unchecked** for now
- 4) ICIC should be 0 dB for now
- 5) Everything else is ok and PRM related parameters we will take care

14. Action code 1002 (MW Path budget)

Description:

Automatically connect to pre-defined SQL link, extract all microwaves within map boundary, insert on the map, analyses path budget, export the results to CSV and send email notification only if configured and if minimum clearance defined is not met. The export location can also be defined as an argument.

Syntax examples:

Example (1):

```
"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO"
-ADMIN 1002 30 "D:\TIF Conversion Test\destination"
```

Example (2):

```
"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO"
-ADMIN 1002 20 "D:\TIF Conversion Test\destination"
```

Parameter	Note
"C:\ATDI\HTZ communications x64\HTZcx64.exe"	Full path to HTZ Communications executable
"D:\TIF Conversion Test\DNM3112GDA942m.PRO"	Full path to HTZ Communications project file
ADMIN	Required always for action codes
1002	Microwave Path budget analysis code
30, 20	30, 20 meter minimum clearance required
"D:\TIF Conversion Test\destination"	Location where CSV report to be saved

HTZcx64.exe **PathToHTZCommProject.PRO** -ADMIN 1002 minClearance **PathToExportFolder**

Notes,

- It is important to have quotes "" especially if there are blank spaces and special characters in the files name
- Default SQL link must be established in HTZ Communications Ev for the computer concerned. Please refer to Database>>SQL Database
- Read/Write permission is required on the destination folder
- Ideally project file name (*.PRO) would not have special characters such as while space and ' _ '.
- All other configuration related parameters would be defined in the PRM file
- E-mail transmitted only if one or more links do not meet the minimum clearance specified by the user through the command line (minClearance)
- Analysis is based on ITU-R 530

- Output result file names are stamped (date/time) with a precision of 1 second. Two command lines with same project and same action code must be spaced a second apart

Output file name convention:

There is only one file generated in the output:

- ProjectFileName-DateTime-MW.csv

If project name is “DNM3112GDA942m.PRO” then the outputs would be:

- DNM3112GDA942m-20190413092433-MW.csv

Where “20190413092433” is 2019, April, 9:24:33 AM.

Since the file name is always changing – it is advised to delete previously generated CSV files before executing this action code.

An example is provided below:

- del "D:\TIF Conversion Test\destination*.CSV"

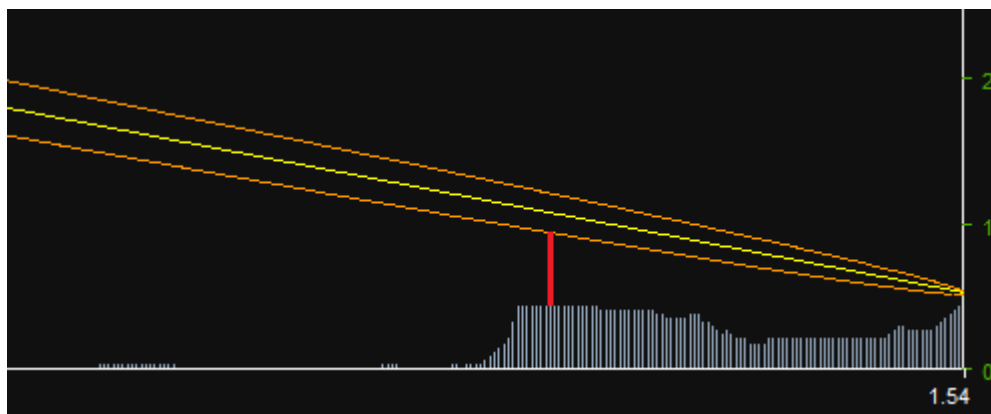
“C:\ATDI\HTZ communications x64\HTZcx64.exe” "D:\TIF Conversion Test\DNM3112GDA942m.PRO" -ADMIN 1002 30 "D:\TIF Conversion Test\destination"

Sample output (CSV):

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
From stati	Adr	To station	Adr	Ident	Frequency	Power dBm	Margin dB	Pr dBm	Mode	Gain req.1	Reliability	Reliability	Dynamic d	Outage	Outage (if	(Adaptive r	Kbits/s	Rain mm/t	Kn	FZ clearance
11	Daunia Ce	12	Daunia Rai	14	19480	22	68.19	-24.4	LOS	-48.19	99.99998	99.99998	0	0	0	F: undefin	0	55.98	0	4.7
15	Daunia Rai	16	Daunia Ce	3	18470	22	68.66	-23.94	LOS	-48.66	99.99998	99.99998	0	0	0	F: undefin	0	56.06	0	4.7
17	Daunia Wc	18	Daunia Ce	4	18525	22	63.26	-29.34	LOS	-43.26	99.99998	99.99998	0	0	0	F: undefin	0	56.06	0	8.1
19	Daunia Ce	20	Daunia Wc	5	19535	22	62.8	-29.8	LOS	-42.03	99.99998	99.99002	0	0	52	F: undefin	0	56.11	0	8.2
7	Daunia Rai	8	Daunia Rai	12	18580	10	50.78	-41.82	LOS	-30.75	99.99998	99.99003	0	0	52	F: undefin	0	56.1	0	8.4
9	Daunia Rai	10	Daunia Rai	13	19590	10	50.32	-42.28	LOS	-28.92	99.99998	99.99004	0	0	52	F: undefin	0	55.98	0	8.4
13	South Spoi	14	Filter Build	2	18470	20	53.87	-38.73	LOS	-33.87	99.99998	99.99998	0	0	0	F: undefin	0	56.1	0	10.3
3	Filter Build	4	South Spoi	10	19480	20	53.41	-39.19	LOS	-33.41	99.99998	99.99997	0	0	0	F: undefin	0	55.98	0	10.4
23	Ramp 40 S	24	Poitrel Mir	7	18580	18	56.68	-35.92	LOS	-33.38	99.99998	99.99	0	0	53	F: undefin	0	56.07	0	15.3
1	Poitrel Mir	2	Ramp 40 S	1	19590	18	56.22	-36.38	LOS	-31.37	99.99998	99.99001	0	0	53	F: undefin	0	55.9	0	15.4
5	South Spoi	6	Poitrel Mir	11	18580	18	60.28	-32.32	LOS	-40.28	99.99998	99.99998	0	0	0	F: undefin	0	56.09	0	15.5
27	Poitrel Mir	28	South Spoi	9	19590	18	59.82	-32.78	LOS	-39.82	99.99998	99.99998	0	0	0	F: undefin	0	55.98	0	15.5
21	South Spoi	22	Poitrel Mir	6	18525	18	60.1	-32.49	LOS	-40.1	99.99998	99.99995	0	0	0	F: undefin	0	56.07	0	24.4
25	Poitrel Mir	26	South Spoi	8	19535	18	59.64	-32.95	LOS	-39.64	99.99998	99.99995	0	0	0	F: undefin	0	55.98	0	24.4

Definition of clearance:

The minimum height clearance between the lower part of the ellipsoid (FZ) and the terrain+clutter height for the entire path-profile.



Clearance for given pixel along path:

- Clearance = Terrain elevation - Height of base of ellipsoid (with heights above sea level)

In the CSV report,

- Clearance = Height of base of ellipsoid (with heights above sea level) - Terrain elevation

Hence, if clearance (CSV) < 0 then the FZ is blocked.

If clearance (CSV) > 0 then it's clear.

If clearance (CSV) = 10 meter, then the lowest distance between the ellipsoid and the ground+ clutter is 10 meters.





Mail services:

All automation action-codes have a mail services attached to them. This action code is special due to adoption of minimum clearance condition. The mail is transmitted if one of the links or more do not exceed the minimum clearance required. The clearance (meters) is passed as an argument.

Mail service configurations are located at:

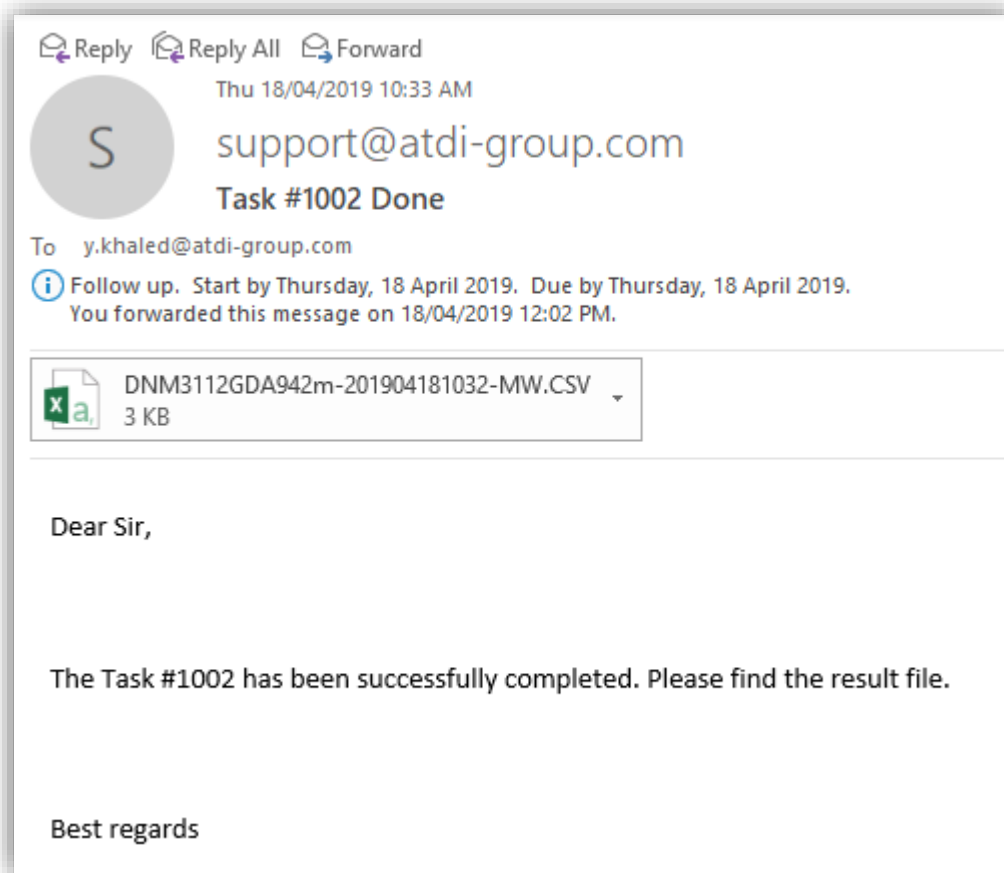
"C:\ATDI\HTZ Communications EV x64\PLUGS\MailsService"

OS (C:) > ATDI > ICS telecom EV x64 > PLUGS > MailsService

Name	Date modified	Type	Size
 template1	16/03/2019 8:54 PM	Text Document	1 KB
 template1002	27/03/2019 11:29 ...	Text Document	1 KB
 template1007	27/03/2019 11:29 ...	Text Document	1 KB
 conf	16/04/2019 1:18 PM	XML Document	1 KB

A template with the same action-code must exist for the mail service to operate under this action code.

Example, there must be a template file with name "template1002.txt". Also, the conf.xml file must be configured accordingly.

Sample email received:

15.Action code 1016 (Mine Plan Analysis)

Description:

Automatically connect to pre-defined SQL link, extract all stations within map boundary, insert on the map. Also import Mine Plan in ESRI SHP format; filter polygons for the next 3 months, identify blasting polygons and extend by 300 meters. Finally conduct coverage percentage analysis and list trailers within blasting zone.

Resulting report (CSV) is saved in the same location as that of the source SHP file.

Syntax examples:

Example (1):

```
"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO"
-ADMIN 1016 1000 "D:\TIF Conversion Test\source\MinePlan.shp"
```

Example (2):

```
"C:\ATDI\HTZ communications x64\HTZcx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO"
-ADMIN 1016 60 "D:\TIF Conversion Test\source\MinePlan.shp"
```

Parameter	Note
"C:\ATDI\HTZ communications x64\HTZcx64.exe"	Full path to HTZ Communications executable
"D:\TIF Conversion Test\DNM3112GDA942m.PRO"	Full path to HTZ Communications project file
ADMIN	Required always for action codes
1016	RF Mine Plan Analysis
1000	All signal types (all T/R stations)
60	LTE-FDD signal type only
"D:\TIF Conversion Test\source\MinePlan.shp"	Source ESRI SHP file used in the analysis
"D:\TIF Conversion Test\source\"	Location where the output CSV file is saved

HTZcx64.exe **PathToHTZCommProject.PRO** -ADMIN 1016 **SignalType** **PathToSourceShpFile**

Notes,

- It is important to have quotes "" especially if there are blank spaces and special characters in the files name
- Default SQL link must be established in HTZ Communications Ev for the computer concerned. Please refer to Database>>SQL Database
- Read/Write permission is required on the source folder
- Source ESRI SHP file must be in EPSG 3112 which is GDA94 in ATDI terminology
- Ideally project file name (*.PRO) would not have special characters such as while space and ' _ .

- Output result file names are stamped (date/time) with a precision of 1 second. Two command lines with same project and same action code must be spaced a second apart
- The blast extension is hard-coded to 300 meter
- This automation action-code can transmit email with attachment upon execution if template configured

Output file name convention:

There are three files in the output,

- ShpFileName-DateTime-SHP.CSV

Example: PTM_FY20_mod-20190512190330-SHP

Where,

- PTM_FY20_mod is the SHP File name
- 20190512190330 is 2019, May 12, 7:03:30 PM

Since the file name is always changing – it is advised to delete previously generated CSV files before executing this action code.

An example is provided below:

- del "D:\TIF Conversion Test\source*.CSV"

1) Process

- 1) Import station of signal type yyyy from SQL table into map
- 2) Display RSSI level (if non-RS) or RS of 3G/4G/5G (see rx settings RSRP/RSCP)
- 3) Load ESRI SHP file
- 4) Select all objects if "WeekStart" attribute value is greater than or equal to today's date and less than or equal to "Today's date + 3 months"
 - a. Make sure, attribute "WeekStart" case in-sensitive
 - b. Date structure: YEAR-MONTH-DAY
- 5) Import all "polygons" matching criteria in (2) to vector layer including the following attributes (GUI mode, import to attached vector, automation mode, import to temporary vector file but don't attach to project)
 - a. Ramp
 - b. Strip
 - c. Block
 - d. Horizon
 - e. ActGroup
 - f. WeekStart
 - g. ATDI COMMENT = Ramp_Strip_Block_Horizon_ActGroup
- 6) Check if ActGroup == Blasting (make it case in-sensitive)
 - a. If yes, extend polygon by x meters (x=buffer as per action code above)
 - b. Ignore the non-extended Blasting polygon; we only need the extended one
- 7) Unique identifier for every polygon is "Ramp_Strip_Block_Horizon_ActGroup"
- 8) Calculate percentage coverage for every polygon matching criteria in (2) if not "Blasting"

- a. If RS based technology, then RS based analysis
 - b. WIFI/TETRA/Other,,,, RSSI based.
 - c. Find the best serving station in this polygon and report it (**If possible**). Use ADDRESS as identifier
- 9) List stations within the extended “Blasting” polygons only- regardless of their signal type
- 10) Export CSV file, name: “ICSTProjectName_nameOfShpFile-TIMESTAMP.csv” (to be confirmed)
- a. Ramp_Strip_Block_Horizon_ActGroup, WeekStart, percentage %, total area, Best Serving Cell (Address)
 - b. Ramp_Strip_Block_Horizon_ActGroup, WeekStart, Blasting, ADDRESS1, ADDRESS2, ADDRESSx
- 11) Send email with CSV file attached every time this automation action code is executed

Ramp_Strip_Block_Horizon_ActGroup, WeekStart, percentage %, total area, Best Serving Cell (Address)
 Ramp_Strip_Block_Horizon_ActGroup, WeekStart, Blasting, ADDRESS1, ADDRESS2, ADDRESSx,...

FID	Shape	ActType	ResName	Horizon	Pit	Block	Strip	Ramp	ResType	ActGroup	Site	WeekStart
102	Polygon ZM	Partings/Poststrip	EXD0001	L12P1	PTM	18	S21	R30NA	Large Excavator	Poststrip	PTM	2019-07-01
1185	Polygon ZM	Partings/Poststrip	EXD0010	V1P1	PTM	3	S25	R40N	Large Excavator	Poststrip	PTM	2019-07-01
1934	Polygon ZM	Explosives Loaded	Blast Crew	L12P2	PTM	11	S23	R10S	Blast Crew	Loading	PTM	2019-07-01
2012	Polygon ZM	Coal Mined Truck	EXD0001	L3	PTM	19	S21	R30NA	Large Excavator	Coal Mining	PTM	2019-07-01
2369	Polygon ZM	Partings/Poststrip	EXD0001	V1P1	PTM	5	S25	R30S	Large Excavator	Poststrip	PTM	2019-07-01
2389	Polygon ZM	Partings/Poststrip	EXD0001	L12	PTM	19	S21	R30NA	Large Excavator	Poststrip	PTM	2019-07-01
2397	Polygon ZM	Partings/Poststrip	EXD0002	V1P1	PTM	15	S22	R30NB	Large Excavator	Poststrip	PTM	2019-07-01
2399	Polygon ZM	Other Blasting	Blasting Time	L12P2	PTM	11	S23	R10S	Blast Crew	Blasting	PTM	2019-07-01
2910	Polygon ZM	Coal Mined Truck	EXD0001	L3	PTM	18	S21	R30NA	Large Excavator	Coal Mining	PTM	2019-07-01
3943	Polygon ZM	Coal Mined Truck	EXD0001	L12	PTM	18	S21	R30NA	Large Excavator	Coal Mining	PTM	2019-07-01
3960	Polygon ZM	Partings/Poststrip	EXD0002	V1	PTM	12	S22	R30NB	Large Excavator	Poststrip	PTM	2019-07-01
4391	Polygon ZM	Explosives Loaded	Blast Crew	L12P2	PTM	14	S23	R30NB	Blast Crew	Loading	PTM	2019-07-01
4400	Polygon ZM	Other Drilling	Drill 0001	L12P2	PTM	14	S23	R30NB	Drill	Drilling	PTM	2019-07-01
4466	Polygon ZM	Other Drilling	Drill 0001	L12	PTM	2	S26	R40N	Drill	Drilling	PTM	2019-07-01
4476	Polygon ZM	Coal Mined Truck	EXD0001	L12	PTM	19	S21	R30NA	Large Excavator	Coal Mining	PTM	2019-07-01
4867	Polygon ZM	Partings/Poststrip	EXD0010	V1P1	PTM	2	S25	R40N	Large Excavator	Poststrip	PTM	2019-07-01
4903	Polygon ZM	Dozing	Dozer Push 1	L12	PTM	3	S32	R40S	Dozer	Dozing	PTM	2019-07-01
4913	Polygon ZM	Coal Mined Truck	LWD0002	L4	PTM	19	S21	R30NA	Wheel Loader	Coal Mining	PTM	2019-07-01
4945	Polygon ZM	Partings/Poststrip	EXD0002	V1P1	PTM	13	S22	R30NB	Large Excavator	Poststrip	PTM	2019-07-01
4949	Polygon ZM	Dozing	Dozer Push 1	L12	PTM	2	S32	R40S	Dozer	Dozing	PTM	2019-07-01
4955	Polygon ZM	Prestrip	EXD0003	L12P2	PTM	14	S22	R10S	Small Excavator	Prestrip	PTM	2019-07-01
4970	Polygon ZM	Coal Mined Truck	LWD0002	L4	PTM	18	S21	R30NA	Wheel Loader	Coal Mining	PTM	2019-07-01
6579	Polygon ZM	Partings/Poststrip	EXD0001	L12P1	PTM	19	S21	R30NA	Large Excavator	Poststrip	PTM	2019-07-01
6955	Polygon ZM	Partings/Poststrip	EXD0002	V1P1	PTM	14	S22	R30NB	Large Excavator	Poststrip	PTM	2019-07-01
7429	Polygon ZM	Partings/Poststrip	EXD0067	L12	PTM	11	S26	R30S	Large Excavator	Poststrip	PTM	2019-07-01
108	Polygon ZM	Coal Mined Truck	EXD0002	V1	PTM	13	S22	R30NB	Large Excavator	Coal Mining	PTM	2019-07-08
109	Polygon ZM	Coal Mined Truck	EXD0002	V1	PTM	12	S22	R30NB	Large Excavator	Coal Mining	PTM	2019-07-08
113	Polygon ZM	Partings/Poststrip	EXD0002	V1	PTM	13	S22	R30NB	Large Excavator	Poststrip	PTM	2019-07-08
652	Polygon ZM	Other Drilling	Drill 0001	L12	PTM	2	S26	R40N	Drill	Drilling	PTM	2019-07-08
1102	Polygon ZM	Partings/Poststrip	EXD0001	V1P1	PTM	6	S25	R30S	Large Excavator	Poststrip	PTM	2019-07-08
1136	Polygon ZM	Partings/Poststrip	EXD0067	L12	PTM	11	S26	R30S	Large Excavator	Poststrip	PTM	2019-07-08
1141	Polygon ZM	Partings/Poststrip	EXD0010	V1P1	PTM	5	S25	R40N	Large Excavator	Poststrip	PTM	2019-07-08
1152	Polygon ZM	Partings/Poststrip	EXD0002	V1	PTM	12	S22	R30NB	Large Excavator	Poststrip	PTM	2019-07-08
1199	Polygon ZM	Dozing	Dozer Push 1	L12	PTM	2	S32	R40S	Dozer	Dozing	PTM	2019-07-08
1932	Polygon ZM	Dozing	Dozer Push 1	L12	PTM	3	S15	R50	Dozer	Dozing	PTM	2019-07-08
2384	Polygon ZM	Coal Mined Truck	EXD0002	V1	PTM	15	S22	R30NB	Large Excavator	Coal Mining	PTM	2019-07-08
2394	Polygon ZM	Partings/Poststrip	EXD0003	V1P1	PTM	2	S25	R10N	Small Excavator	Poststrip	PTM	2019-07-08
2909	Polygon ZM	Explosives Loaded	Blast Crew	L12P2	PTM	14	S23	R30NB	Blast Crew	Loading	PTM	2019-07-08
3318	Polygon ZM	Partings/Poststrip	EXD0002	L12	PTM	4	S32	R40S	Large Excavator	Poststrip	PTM	2019-07-08

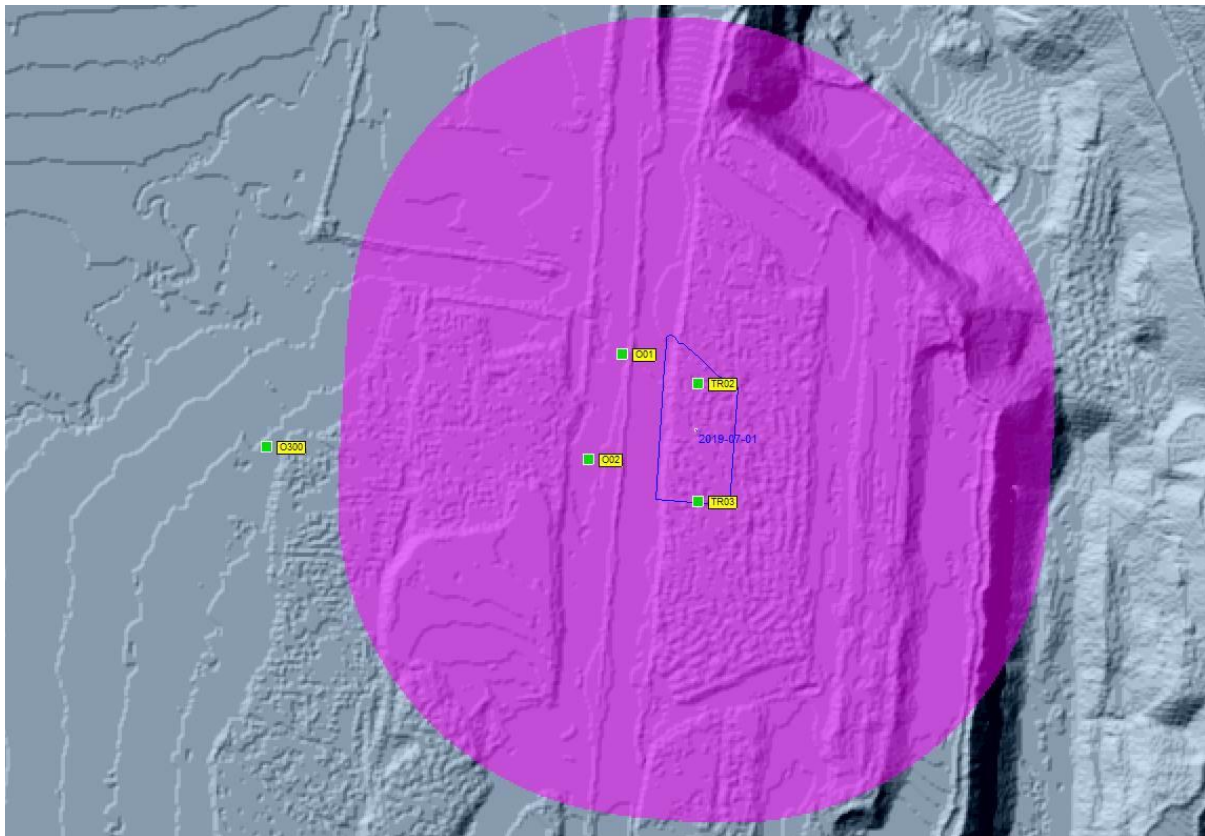
2) Sample output file

A	B	C	D	E	F	G	H	I	J
Ident	WeekStart	Percentage covered (pc)	Polygon area (km2)	Best serving cell (address)	Blasting (m)	Impacted stations (addresses)			
R30S_S26_10_L12P1_Poststrip	15/07/2019	100	0.012	newLTE180	n.a				
R30S_S26_10_L12P1_Poststrip	22/07/2019	100	0.012	newLTE180	n.a				
R40S_S32_5_L12P1_Poststrip	15/07/2019	100	0.0255	newLTE180	n.a				
R30NB_S22_15_V1_Coal Mining	8/07/2019	100	0.0038	newLTE180	n.a				
R30NA_S21_19_L12_Poststrip	1/07/2019	100	0.0067	newLTE180	n.a				
R30NA_S22_16_L12>Loading	12/08/2019	100	0.0024	newLTE180	n.a				
R10N_S25_2_V1P1_Poststrip	8/07/2019	100	0.0088	newLTE	n.a				
R30NB_S22_15_V1P1_Poststrip	1/07/2019	100	0.003	newLTE180	n.a				
R10S_S23_11_L12P2>Blasting	1/07/2019	n.a	0.0092	n.a	300	O01	O02	TR02	TR03
R30NB_S23_14_L12P2>Loading	8/07/2019	100	0.0074	newLTE180	n.a				
R30NA_S21_18_L3_Coal Mining	1/07/2019	100	0.0117	newLTE180	n.a				
R40S_S32_2_V1P1>Drilling	5/08/2019	100	0.0014	newLTE180	n.a				

Field description:

- Ident: Unique polygon identity which is compiled from “Ramp_Strip_Block_Horizon_ActGroup”
- WeekStart: From SHP file directly, YEAR-MONTH-DAY start date of the polygon activity
- Percentage covered (pc): Percentage of pixels within the polygon exceeding or equal to target signal level. RS based if 3G/3G/5G otherwise RSSI based. Only considers stations within map boundary and of the signalType specified in the command line argument
- Polygon area (km2): Total area of the polygon concerned
- Best serving cell (address): Serving cell (in or out of the polygons) of the signalType specified in the argument whose best server coverage is contributing to the highest number of pixels inside the polygon concerned. Blasting polygons are ignored.
- Blasting (m): The outward extension range in meters.
- Impacted stations (addresses): List of stations, identified by their addresses not callsign, who are found within the extended blasting polygon. The tool will list all stations regardless of their signal type.

Sample blasting polygon extension:



Note, similar manual function exists in HTZ Communications: “Map:/Vector layer/Display area around vector polygons”.

16. Email Service

All automation action-codes have email service capabilities. The idea is to automatically transmit email upon completion of the task.

Two main configurations required for the mail service to be active.

1. Mail server parameters must be configured

Once the mail server is configured – the tool gains the permission to access the mail server and compose emails. The conf file also supports SSL configurations.

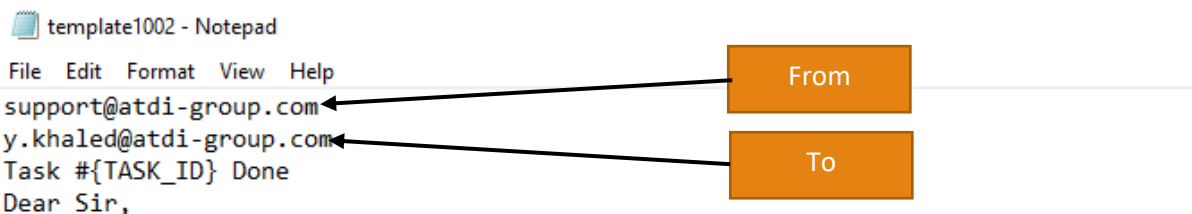
The file must be located at “C:\ATDI\HTZ Communications EV x64\PLUGS\MailsService\conf.xml”

```
<?xml version="1.0" encoding="utf-16" ?>
<MailSettings xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  <HostName>ss10.ovh.net</HostName>
  <Port>0</Port>
  <UseDefaultCredentials>>false</UseDefaultCredentials>
  <UserName>support@atdi-group.com</UserName>
  <Password>[REDACTED]</Password>
  <IsBodyHtml>>false</IsBodyHtml>
</MailSettings>
```

2. Template prepared for every action-code required to transmit email

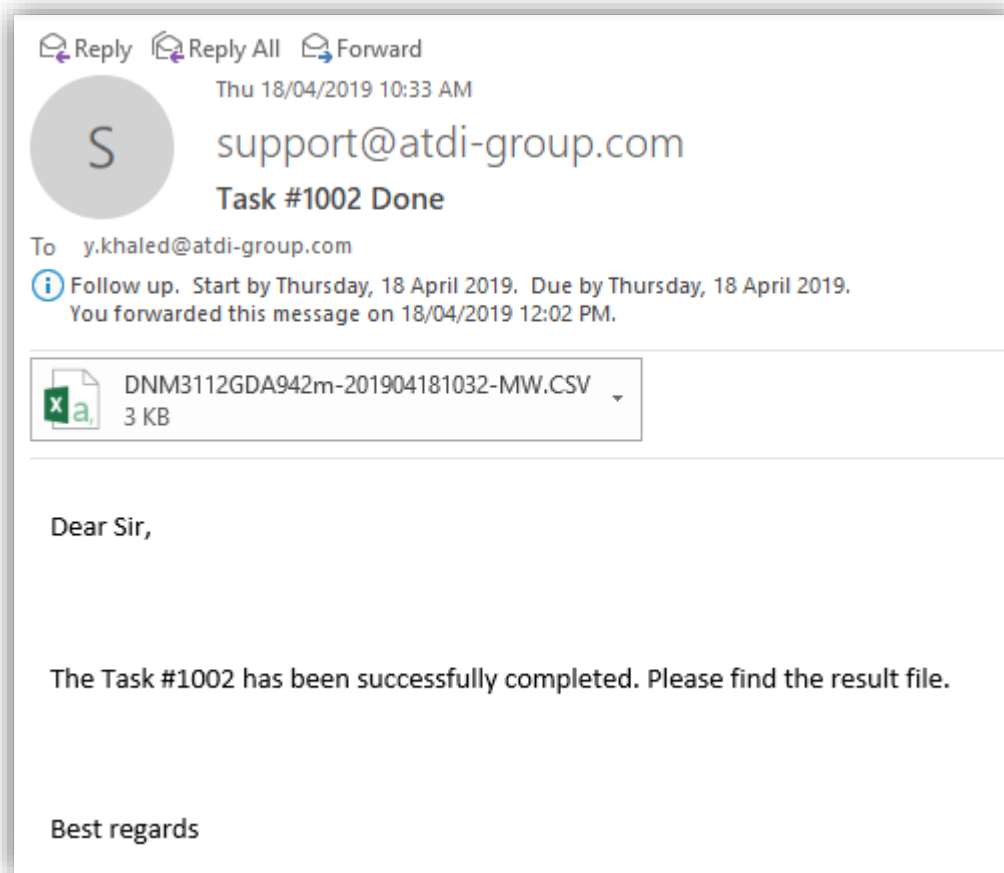
The action code can only transmit emails if a template file is available under “C:\ATDI\HTZ Communications EV x64\PLUGS\MailsService\”.

For example, if user wishes for action-code 1002 to transmit emails upon completion – then there should be a template named “**template1002.txt**” under the folder above.



The Task #{TASK_ID} has been successfully completed. Please find the result file.

Best regards

Sample email received:

17. HTZ Communications Automation tool

It is a simple tool whose main purpose is to continuously monitor a source folder and detect any changes in all *.TIF files.

The tool would automatically start executing a sequence of commands once a change is detected.

Definition of change:

The changes that the tool is looking at:

- 1) New TIF files added or removed from the folder being monitored
- 2) Any change in the tif files contents (hash level)

The tool doesn't consider the files date or name when looking for changes. Any iteration in any pixel in any tif file would result in different hash key and hence would trigger the script execution.

Folder selection:

The user can manually select the folder to be monitored. The tool only monitors files with .TIF extensions located under the specified folder and its sub-directories (recursively). Other files are automatically ignored.

A reference database (db.csv) is automatically constructed once a folder is selected. The database is saved in the same folder being monitored.

Polling interval:

The tool allows the user to define the polling interval. It allows the engine to sleep for x minutes and start checking for changes in the TIF files once the timer expired. The timer is automatically re-set once the polling is completed. User is advised not to choose a very small interval as that will result in too frequent polling which can be un-necessary and can potentially result in slowing down the hard drive. The tool typically processes every single TIF file in the folder and build hash key table. This process can be intensive for big files. The polling is paused whenever a task is being executed or tif files being examined for changes. The idea is to prohibit multiple polling during the same run. The applicate is write-safe. Which means, the polling process will be prohibited momentarily if tif files are being written while running. The idea is to wait for new tif files to be copied completely before examining them.

Command sequence:

The command sequence can be loaded from an existing BASH (.bash) file. Every line is effectively an action-code or automation task. The acceptable format is:

"PathTo/HTZcx64.exe", "PathToProject.PRO" -ADMIN CODE

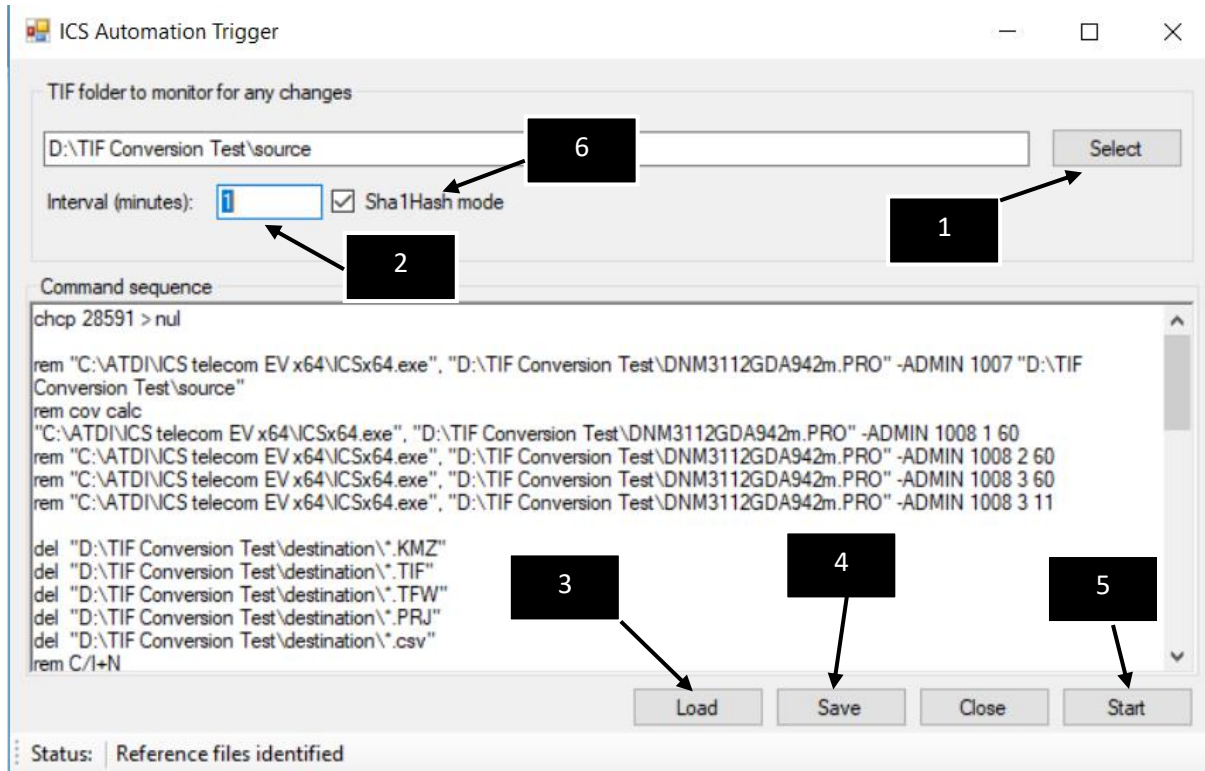
```
Command sequence
"C:\ATDINICS telecom EV x64\ICSx64.exe", "D:\TIF Conversion Test\DNM_3112_GDA94_2m.PRO" -ADMIN 1007 "D:\TIF Conversion Test\source"
"C:\ATDINICS telecom EV x64\ICSx64.exe", "D:\TIF Conversion Test\DNM_3112_GDA94_2m.PRO" -ADMIN 1008 1000
```

When loading a bash file – the tool will automatically introduce the “,” between HTZcx64.exe and the project file. This is mandatory for the tool to be able to execute correctly.

Example if acceptable bash file:


```
"C:\ATDI\ICS telecom EV x64\ICSx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO" -ADMIN 1006 60 "D:\TIF Conversion Test\destination"
"C:\ATDI\ICS telecom EV x64\ICSx64.exe" "D:\TIF Conversion Test\DNM3112GDA942m.PRO" -ADMIN 1005 60 "D:\TIF Conversion Test\destination"
```

Sample configuration:



- 1: Select folder with tif files to monitor
- 2: Specify the polling interval (10-60 min)
- 3: Load .bash file which is validated to comply with ATDI action-codes
- 4: Save settings so the tool would remember the folder, the interval and bash file location
- 5: Start monitoring
- 6: This option added later; if checked, the tool would use the Hash key to identify a tif file when looking for changes. If unchecked, the tool would use the time-stamp which is significantly faster. Hash mode requires reading the entire tif file to build a hash key. Whereas, time approach only requires reading the last-modified date. Hash is more accurate in some scenarios but resource intensive. Some users might find the time approach satisfactory for their requirements.

Note, the tool will execute the action-codes the first time the folder is setup. Once completed, no execution would be made unless a change is detected. If folder was pre-setup (db.csv) and user re-selected the folder – existing db.csv files would be replaced, and execution will commence just like initial setup.

Additional information:

The automation tool doesn't execute the bash file itself. But rather it runs through the bash script and copy the commands to the memory to be executed later. The tool itself doesn't execute all commands and currently its limited to the following format:

- \$ *.exe" *
 - The name of the application is not relevant
 - There must be .exe followed by " directly and blank space
 - .EXE" or .exe" doesn't matter
 - The blank space can be followed by any argument (*)
- \$ del *
 - "del" is delete and must be small letters
 - "del " must be followed by space
 - * means any argument – usually full path to the file to be deleted

Seeing other commands in the "Command sequence" space doesn't mean the command line can be executed. It will simply be skipped during the automation execution.

Changes in the source bash script are not executed by the automation tool unless restarted. In fact, the tool run through the script in two occasions only:

- 1) When the bash script is first selected (step 3)
- 2) When the automation tool is restarted – at load time the script is reloaded

18. Notes on Arc-GIS web client

Arc-GIS web client is a bit picky on the name convention and structure of the KML file.

KMZ is effectively a zip file contains “doc.kml” and other supporting images/folders etc ...

The web client seems to particularly look after “doc.kml” and doesn’t accept other names or other KML files. It also doesn’t accept upper-case for the suffix. For example, “doc.KML” will not be accepted.

This is an example of accepted KMZ file (renamed to .ZIP to open it):

Name	Size	Packed	Type	M
..			File folder	
doc.kml	5,205	1,045	KML	1
DNM3112GDA942m-201904181022-BS.png	63,259	46,831	PNG File	1
DNM3112GDA942m-201904181022-BSLeg.png	3,242	1,584	PNG File	1

19. Notes on SQL fields

OPTIONS field:

Two values:

- -En: Import from SQL to map disabled
- -Ey: Import from SQL to map enabled

Next Show all Sorting

ICST_STATUS	POLYGON	ANT_FILE	Peak_Pow	OPTIONS	Neighbours	STATION_ID	Color	STRINGC
0	(NULL)	(NULL)	0	-Ey	(NULL)	0	1	(NULL)
0	(NULL)	(NULL)	0	-Ey	(NULL)	0	1	(NULL)
0	(NULL)	(NULL)	0	-En	(NULL)	0	9	(NULL)
0	(NULL)	(NULL)	0	-Ey	(NULL)	0	9	(NULL)
0	(NULL)	(NULL)	0	-Ey	(NULL)	0	14	(NULL)
0	(NULL)	(NULL)	0	-Ey	(NULL)	0	14	(NULL)
0	(NULL)	(NULL)	0	-Ey	(NULL)	0	14	(NULL)
0	(NULL)	(NULL)	0	-Ey	(NULL)	0	14	(NULL)
0	(NULL)	(NULL)	0	-Ey	(NULL)	0	14	(NULL)
0	(NULL)	(NULL)	0	-Ey	(NULL)	0	14	(NULL)

This field can be used to de-commission a site but without deleting it from table.

Note, this field can not be updated from HTZ Communications GUI. Can only be updated from SQL database itself.