1 Format description for repeat-pass interferometric E-SAR data

In the following some general conventions concerning the filenames used for the E-SAR processor as well as the format of parameter and image files are described.

1.1 Filenames

The names of the E-SAR data files are generated as follows:

`filename = header + root + (channel) + try + (type) + extention`

`<header>` of the filename: There are several headers used for the filenames as
`'e', 'i', 'r', 'stc', ... etc.`

`'e'`	=	the `'e'` indicates parameter, report and status files
`'r'`	=	the `'r'` indicates raw data files
`'i'`	=	the `'i'` indicates image files

`<root>` of the filename: `'98prosma0101x1'` for example must be read according to the following convention

`'98'`	=	year of data acquisition (2 characters)
`'prosma'`	=	name of campaign (6 characters)
`'01'`	=	mission number (2 characters)
`'01'`	=	pass number (2 characters)
`'x1'`	=	raw data tape number (2 characters)

`<channel>:`

`'_ch1'`	=	channel number (only if number of channels > 1)

`<try>:`

`'_t01'`	=	try number This number is changed if the same set of raw data is processed several times with different processing parameters as e.g. different number of looks or different resolutions.

`<type>:`

`'_slc'`	=	e.g. the type `'_slc'` describes a single look complex slant range image file.

`<extention>` of the filename:

`'.dat'`	=	data files
`'.sav'`	=	IDL save-format files (must be restored with IDL> restore,'filename')
`'.txt'`	=	ASCII text files
`'.log'`	=	ASCII text log files
`'.jou'`	=	ASCII text journal files (generated by IDL)
`'.rpt'`	=	ASCII text report files
`'.ps'`	=	ASCII PostScript files

1.2 SAR Processing Parameter File

All parameters which are necessary to control the SAR processor are stored in the SAR processing parameter file.

Filename: **`'e' + root + try + (channel) + '.sav'`**
(e.g. `'e99op99af0804x1_ch1_t01.sav'`)

The parameters are stored as a structure called `'init'` in the IDL-save-format (IDL Version 5.1).
The content of the save-file can be restored with the following IDL command:

```
IDL> restore,'e98prosma0101x1_ch1_t01.sav'
```

The content of `'init'` can be inspected with the following IDL command:

```
IDL> help,init,/struct
```

The content of `'init'` is also available as an ASCII text file named
`'e' + root + try + (channel) + '.txt'.`
For example: `'e98prosma0101x1_ch1_t01.txt'`

1.3 Image Files

Each image file contains a leading header of 2 long words (4 bytes each, 8 bytes in total) denoting the dimension of the image. The first long word denotes the record length. The second word denotes the number of records.

This convention is mandatory for all image files!

The filename of the image files is composed as follows:

`'i' + root + (channel) + try + type + '.dat'`

The following types of image files are used:

Single Look Complex	- slant range	- float :	`'_slc'`
Detected Multi Look	- slant range	- float :	`'_flt'`
Detected Multi Look	- ground range	- float :	`'_fltg'`
Detected Multi Look	- slant range	- signed integer :	`'_int'`
Detected Multi Look	- ground range	- signed integer :	`'_intg'`
Detected Multi Look	- geocoded	- signed integer :	`'_int_geo'`
Single Look Complex	- geocoded	- signed integer :	`'_int_slc_geo'`
Single Look Detected	- geocoded	- signed integer :	`'_int_sld_geo'`

1.3.1 SINGLE LOOK COMPLEX (SLC) SLANT RANGE IMAGE (FLOAT COMPLEX)

Filename: **`'i' + root + (channel) + try + '_slc.dat[.final]'`**

Example: `'i99op99af0804x1_ch1_t01_slc.dat'`
`'.final' means that the file has been resampled for co-registration`

Format: Header: 1st Long Word (4 bytes) = *complex* words per record
2nd Long Word (4 bytes) = number of records

Image: 1 Word = COMPLEX*8
IEEE XDR Float Format

Content: Single Look Complex Image, Slant Range
1 Record = 1 Range Line

1.3.2 DETECTED MULTI LOOK SLANT RANGE IMAGE (FLOAT)

Filename: **`'i' + root + (channel) + try + '_flt.dat'`**

Example: `'i99op99af0804x1_ch1_t01_flt.dat'`

Format: Header: 1st Long Word (4 bytes) = words per record
2nd Long Word (4 bytes) = number of records

Image: 1 Word = REAL*4
IEEE XDR Float Format

Content: Multi Look Detected Image, Slant Range
1 Record = 1 Range Line

1.4 Track Files

1.4.1 TRACKS OF THE ANTENNA IN WGS-84

Filename: **`'track_wgs84_slc' + root + (channel) + try + '.dat'`**

Example: `'track_wgs84_slc99op99af0804x1_ch1_t01.dat'`

Format: Header: 1st Long Word (4 bytes) = number record (i.e. 6)
2nd Long Word (4 bytes) = words per records

Track: 1 Word = DOUBLE*8
IEEE XDR Float Format

Content: rectified track (first 3 records) and real track (second 3 records) in WGS-84 coordinates

1st and 4th record: WGS-84 X-coordinate

2nd and 5th record: WGS-84 Y-coordinate

3rd and 6th record: WGS-84 Z-coordinate

1.4.2 TRACKS OF THE ANTENNA IN A LOCAL CARTESIAN SYSTEM

Filename: **`'ref_track_slc' + root + (channel) + try + '.dat'`**

Example: `'ref_track_slc99op99af0804x1_ch1_t01.dat'`

Format: Header: Long Word (4 bytes) = words per record (equal to azimuth size of the scene)
Track: 1 Word = DOUBLE*8
IEEE XDR Float Format

Content: time axis (first record)

real track (first 3 records) and rectified (reference) track (second 3 records) in local coordinates (X – flight direction, Y – left, Z – up)

2st and 5th record: local X-coordinate

3nd and 6th record: local Y-coordinate

4rd and 7th record: local Z-coordinate

1.5 Interferometric Files

1.5.1 INTERFEROMETRIC PHASE IMAGE

Filename: **'if' + root1 + (channel) + try1 + root2 + (channel) + try2 + '.dat'**

Example: 'if99op99af0804x1_ch1_t01_99op99af0805x1_ch1_t01.dat'

Format: Header: 1st Long Word (4 bytes) = words per record
2nd Long Word (4 bytes) = number of records

Image: 1 Word = REAL*4
IEEE XDR Float Format

Content: Interferometric Phase Image without flat-Earth term (in radians)
1 Record = 1 Range Line

1.5.2 COHERENCE IMAGE

Filename: **'coh' + root1 + (channel) + try1 + root2 + (channel) + try2 + '.dat'**

Example: 'coh99op99af0804x1_ch1_t01_99op99af0805x1_ch1_t01.dat'

Format: Header: 1st Long Word (4 bytes) = words per record
2nd Long Word (4 bytes) = number of records

Image: 1 Word = REAL*4
IEEE XDR Float Format

Content: Coherence Image
1 Record = 1 Range Line

1.5.3 FLAT-EARTH PHASE VECTOR

Filename: **'phi_flat' + root1 + root2 + '.dat'**

Example: 'phi_flat99op99af0804x1_99op99af0805x1.dat'

Format: Header: 1st Long Word (4 bytes) = words per record
Image: 1 Word = DOUBLE*8
IEEE XDR Float Format

Content: flat-Earth Phase vector
1 Record = 1 Range Line

1.5.4 AVERAGE BASELINE

Filename: **'baseline' + root1 + (channel) + root2 + (channel) +'.txt'**

Example: 'baseline99op99af0804x1_ch1_99op99af0805x1_ch1.txt'

Format: ASCII - file

Content: average horizontal and vertical baseline component
(parallel and perpendicular to the WGS-84 ellipsoid)

1.5.5 VARIABLE BASELINE

Filename: **'baseline_var' + root1 + (channel) + root2 + (channel) +'.dat'**

Example: `'baseline_var99op99af0804x1_ch1_99op99af0805x1_ch1.dat'`

Format: Header: 1st Long Word (4 bytes) = words per record (2)
2nd Long Word (4 bytes) = no. of records
Image: 1 Word = FLOAT*4
IEEE XDR Float Format

Content: horizontal and vertical baseline variations
(parallel and perpendicular to the WGS-84 ellipsoid)

1.6 Auxiliary Files

1.6.1 SLANT RANGE HEIGHTS

Filename: **'h' + root + try + '.dat'**

Example: `'h99op99af0804x1_t01.dat'`

Format: Header: 1st Long Word (4 bytes) = words per record
2nd Long Word (4 bytes) = number of records

Image: 1 Word = REAL*4
IEEE XDR Float Format

Content: Heights converted from UTM to the radar slant range geometry (in m)
1 Record = 1 Range Line
Only for the master track, and only if the external DEM has been available for processing!

1.6.2 Phase to Height Factor (kz-Parameter)

Filename: **'kz' + root1 + try1 + root2 + try2 + '_slc.dat'**

Example: `'kz99op99af0804x1_t01_99op99af0805x1_t01_slc.dat'`

Format: Header: 1st Long Word (4 bytes) = words per record
2nd Long Word (4 bytes) = number of records

Image: 1 Word = REAL*4
IEEE XDR Float Format

Content: Factor for converting phase differences into height differences (in m/rad)
1 Record = 1 Range Line
Takes into account the baseline variation along azimuth and also topographic changes
(if DEM available). Fits to the SLC data.