

***MSG Level 1.5 Native Format  
File Definition***

## **1.1 MSG Level 1.5 Native format**

### **1.1.1 Product file structure :**

*{OutputProduct}* : single file.

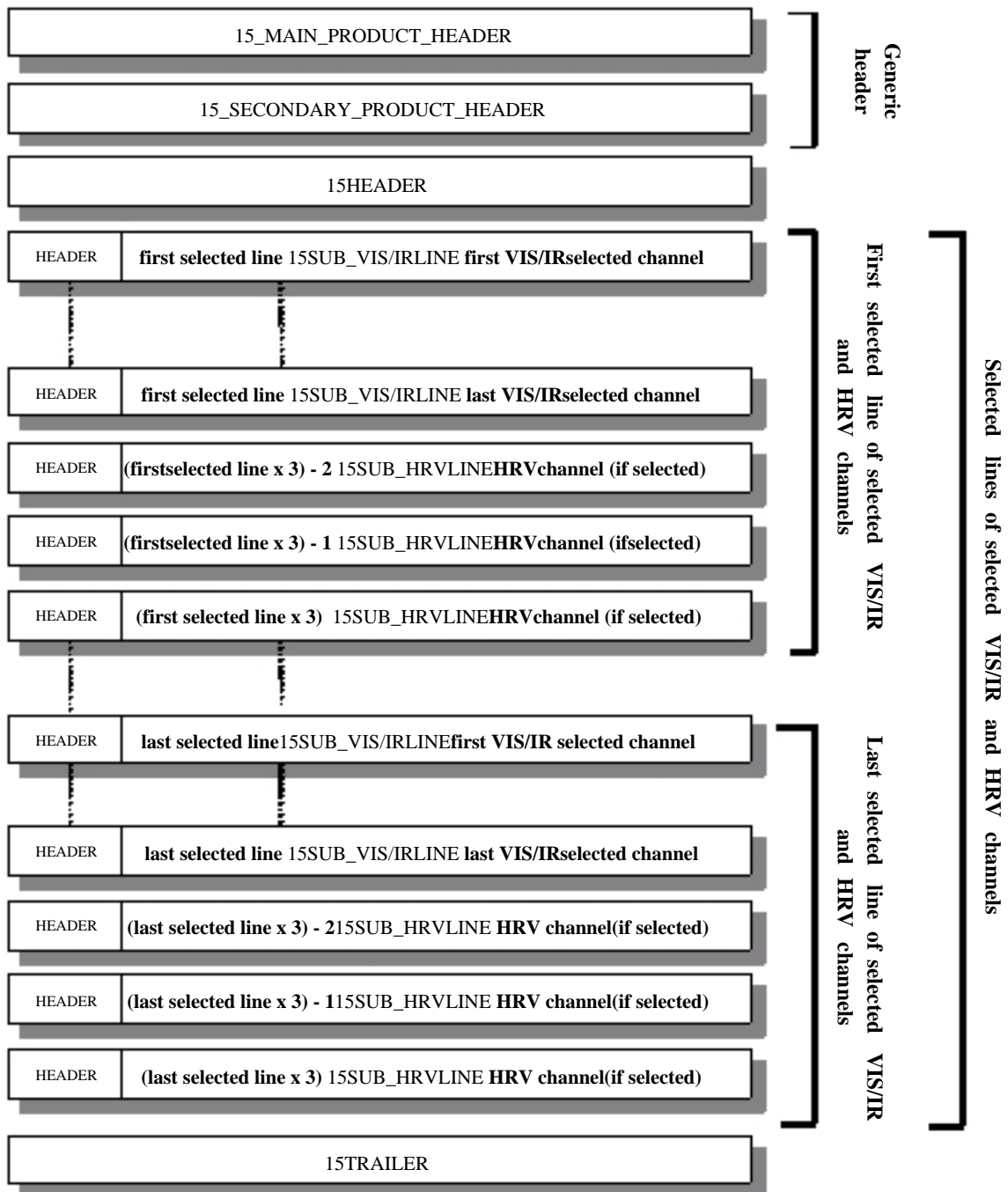
### **1.1.2 Product name :**

*{OutProductName}* = MSGn-*{AIID}*-15-*{AVBA}*-*{AVPA}*-  
YYYYMMDDHHMM-*OrderId*.nat

Example : MSG1-SEVI-15-NA-NA-2000071000-9999.nat

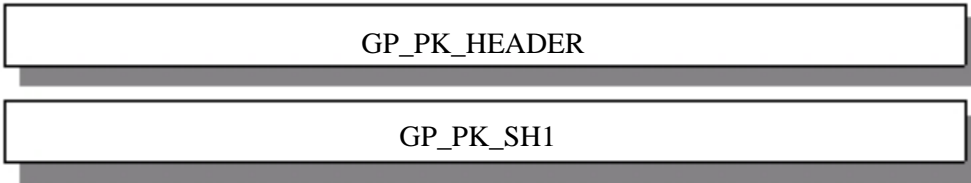
### **1.1.3 Product internal format :**

### 1.1.3.1 MSG15 Native format definition



15HEADER and 15TRAILER are defined in ICD/003 §4.3.

### 1.1.3.2 HEADER definition



GP\_PK\_HEADER and GP\_PK\_SH1 are defined in ICD/003 §4.3.

### 1.1.3.3 15\_MAIN\_PRODUCT\_HEADER definition

```
15_MAIN_PRODUCT_HEADER ::= RECORD
  {FormatName           15_PH_DATA,
  FormatDocumentName    15_PH_DATA,
  FormatDocumentMajorVersion 15_PH_DATA,
  FormatDocumentMinorVersion 15_PH_DATA,
  CreationDateTime     15_PH_DATA,
  CreatingCentre       15_PH_DATA,
  DataSetIdentification ARRAY SIZE(1..27) OF 15_PH_DATA_IDENTIFICATION,
  TotalFileSize       15_PH_DATA,
  GORT                15_PH_DATA,
  ASTI                15_PH_DATA,
  LLOS                15_PH_DATA,
  SNIT                15_PH_DATA,
  AIID                15_PH_DATA,
  SSBT                15_PH_DATA,
  SSST                15_PH_DATA,
  RRCC                15_PH_DATA,
  RRBT                15_PH_DATA,
  RRST                15_PH_DATA,
  PPRC                15_PH_DATA,
  PPDT                15_PH_DATA,
  GPLV                15_PH_DATA,
  APNM                15_PH_DATA,
  AARF                15_PH_DATA,
  UUDT                15_PH_DATA,
  QQOV                15_PH_DATA,
  UDSP                15_PH_DATA}
```

For GORT, ASTI, LLOS, SNIT, AIID, SSBT, SSST, RRCC, RRBT, RRST, PPRC, PPDT, GPLV, APNM, AARF, UUDT, QQOV, UDSP, these attributes are defined in Appendix B.

Detailed description of the *DataSetIdentification* array:

Field 1: Main product header identification.

Filed 2: Second product header identification.

Field 3: Header identification.

Field 4: Image data set identification.

Field 5: Trailer identification.

#### 1.1.3.4 15\_SECONDARY\_PRODUCT\_HEADER definition

```
15_SECONDARY_PRODUCT_HEADER ::= RECORD
    { ABID                15_PH_DATA,
      SMOD                15_PH_DATA,
      APXS                15_PH_DATA,
      AVPA                15_PH_DATA,
      LSCD                15_PH_DATA,
      LMAP                15_PH_DATA,
      QDLC                15_PH_DATA,
      QDLP                15_PH_DATA,
      QQAI                15_PH_DATA,
      SelectedBandIDs    15_PH_DATA,
      SouthLineSelectedRectangle 15_PH_DATA,
      NorthLineSelectedRectangle 15_PH_DATA,
      EastColumnSelectedRectangle 15_PH_DATA,
      WestColumnSelectedRectangle 15_PH_DATA,
      NumberLinesVISIR    15_PH_DATA,
      NumberColumnsVISIR 15_PH_DATA,
      NumberLinesHRV     15_PH_DATA,
      NumberColumnsHRV   15_PH_DATA }
```

For ABID, SMOD, APXS, AVPA, LSCD, LMAP, QDLC, QDLP, QQAI, these attributes are defined in Appendix B.

#### 1.1.3.5 15\_PH\_DATA definition

```
15_PH_DATA ::= RECORD
    { Name                CHARACTERSTRING SIZE (30),
      Value                CHARACTERSTRING SIZE (50) }
```

### 1.1.3.6 15\_PH\_DATA\_IDENTIFICATION definition

15_PH_DATA_IDENTIFICATION ::= RECORD	
{Name	CHARACTERSTRING SIZE (30),
Size	CHARACTERSTRING SIZE (16),
Address	CHARACTERSTRING SIZE (16)}

### 1.1.3.7 15SUB\_VIS/IRLINE definition

15SUB_VIS/IRLINE ::= RECORD	
{15VIS/IRLINEVersion UNSIGNED BYTE (0),	
LineSideInfo	RECORD
{SatelliteId	GP_SC_ID,
TrueRepeatCycleStart	TIME_CDS_EXPANDED,
LineNumberInVIS_IRGrid	INTEGER,
ChannelId	GP_SC_CHAN_ID,
L10LineMeanAcquisitionTime	TIME CDS SHORT,
LineValidity	ENUMERATED BYTE
	{Not Derived (0),
	Nominal (1),
	Based on missing data (2),
	Based on corrupted data (3),
	Based on replaced or interpolated data (4)},
LineRadiometricQuality	ENUMERATED BYTE {Not Derived (0),
	Nominal (1),
	Usable (2),
	Suspect (3),
	Do not use (4)},
LineGeometricQuality	ENUMERATED BYTE {Not Derived (0),
	Nominal (1),
	Usable (2),
	Suspect (3),
	Do not use (4)},
LineData	ARRAY OF UNSIGNED (10)}

LineData size is computed with PacketLength value defined in GP\_PK\_HEADER defined in ICD SPE/055 §2.6.21.

### 1.1.3.8 15SUB\_HRVLINE definition

15SUB_HRVLINE::=RECORD			
{15HRVLINEVersion UNSIGNED BYTE (0),			
<b>LineSideInfo</b>	RECORD		
{SatelliteId		GP_SC_ID,	
TrueRepeatCycleStart		TIME_CDS_EXPANDED,	
<b>LineNumberInVIS_IRGrid</b>		INTEGER,	
<b>ChannelId</b>		GP_SC_CHAN_ID,	
<b>L10LineMeanAcquisitionTime</b>		TIME CDS SHORT,	
<b>LineValidity</b>		ENUMERATED BYTE	
		{Not Derived	(0),
		Nominal	(1),
		Based on missing data	(2),
		Based on corrupted data	(3),
		Based on replaced or interpolated data	(4)},
<b>LineRadiometricQuality</b>		ENUMERATED BYTE	{Not Derived (0),
			Nominal (1),
			Usable (2),
			Suspect (3),
			Do not use (4)},
<b>LineGeometricQuality</b>		ENUMERATED BYTE	{Not Derived (0),
			Nominal (1),
			Usable (2),
			Suspect (3),
			Do not use (4)},
LineData	ARRAY OF UNSIGNED	(10)}	

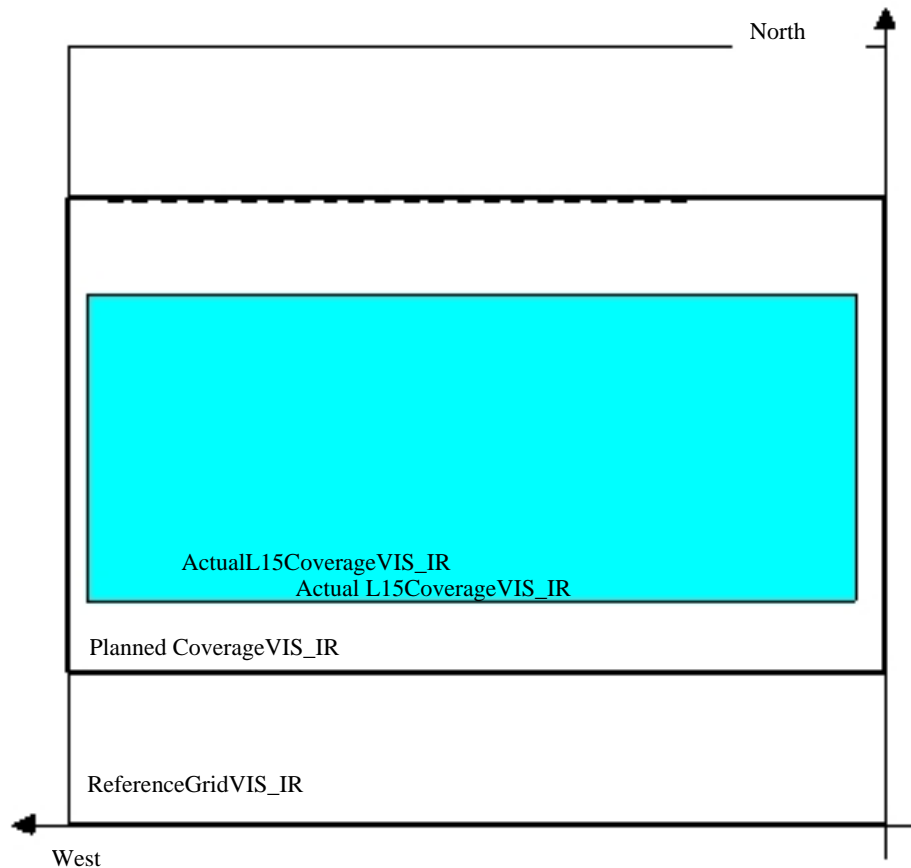
LineData size is computed with PacketLength value defined in GP\_PK\_HEADER defined in ICD SPE/055 §2.6.21.

### 1.1.3.9 Geographic subsetting

#### 1.1.3.9.1 VIS\_IR image

#### Structure of the VIS\_IR image:

Here is the general structure of the VIS\_IR image for MSG Level 1.5 format.



**Figure 1: VISIR image structure**

The difference between the planned and actual lines/columns is due to the rectification process. Only the number of lines is expected to differ from the "planned".

The actual and planned lines are tilted with respect to each other, because the actual image is computed into the reference grid geometry. For simplification reasons, this tilt does not appear on the above diagram.



**The VIS\_IR image is defined by:**

HEADER.ImageDescription.ReferenceGridVIS\_IR

HEADER.ImageDescription.PlannedCoverageVIS\_IR

TRAILER.ImageProductionStats.Actual15CoverageVIS\_IR

The ReferenceGridVIS\_IR is always 3712x3712 and the origin is defined by GridOrigin whose value is South-East corner. For Level 1\_5, the image scanning is modified according to ImageProcDirection and PixelGenDirection parameters.

The PlannedCoverageVIS\_IR has always 3712 pixels and normally 3712 lines except in case of ReducedScan

The Actual15CoverageVIS\_IR is included in PlannedCoverageVIS\_IR

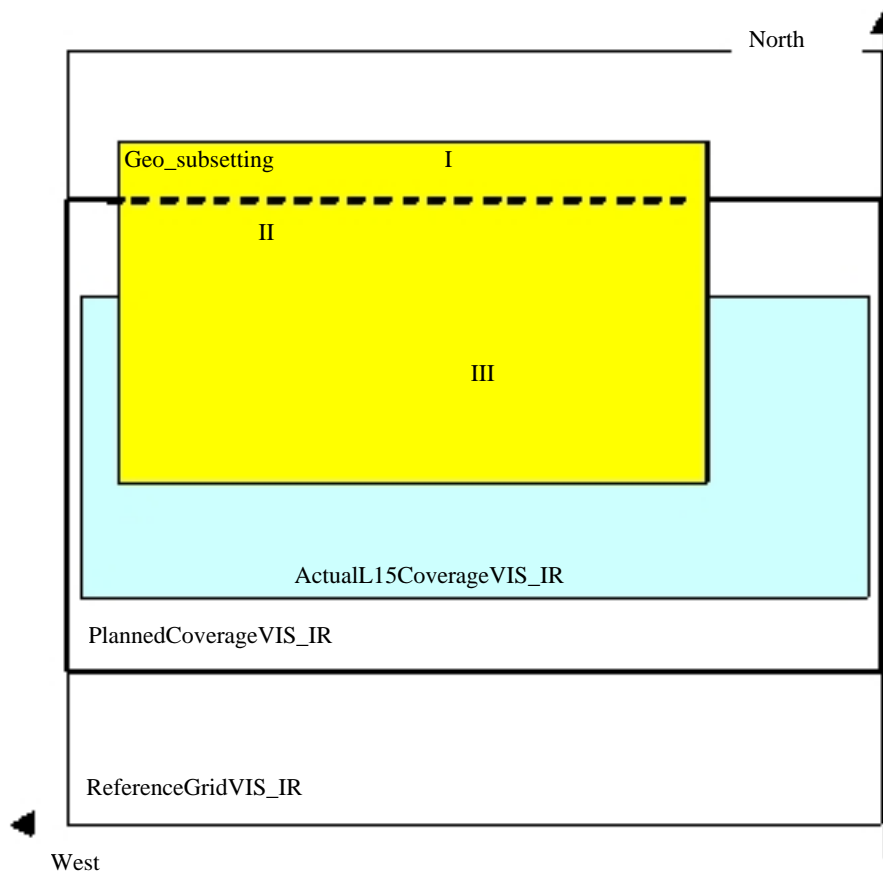
**The pixels are defined by:**

LineData ARRAY SIZE (1..3712) OF UNSIGNED (10)

LineData[0] = EasternColumnPlanned

LineData[3711] = WesternColumnPlanned

## VIS\_IR image in case of geo-subsetting:



### Areas definitions:

**I:** Area out of Planned coverage.

**II:** Area between Planned coverage and Actual coverage.

**III:** Actual Image.

Geo subsetting rectangle is defined in ReferenceGridVIS\_IR with SE corner origin.

The format output file will cover the complete rectangle of the selected area:

- Area I: This area only exists in case of ReducedScan and thus the missing lines are filled with 0
- Area II: This area is included in LineData and the pixel value is already 0
- Area III: This area contains the ActualImage

In format output file:

PlannedCoverageVIS\_IR parameters are not modified

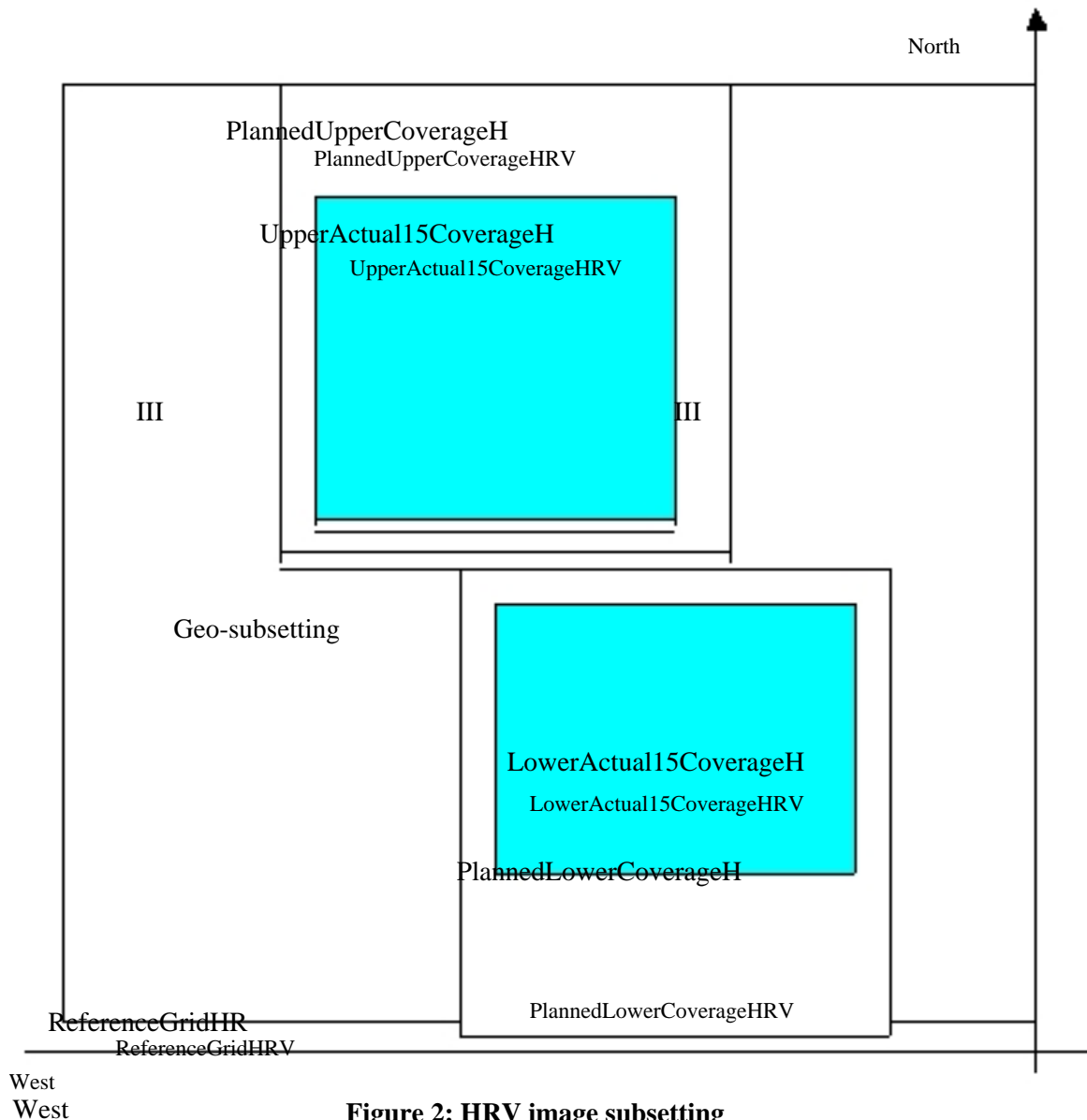
Actual15CoverageVIS\_IR are updated and correspond to area III

ValidL15ImageLines are updated.

### 1.1.3.9.2 HRV image

#### Structure of the HRV image:

Here is the general structure of the HRV image for MSG Level 1.5 format.



**Figure 2: HRV image subsetting**

The difference between the planned and actual lines/columns is due to the rectification process. Only the number of lines is expected to differ from the "planned".

The actual and planned lines are tilted with respect to each other, because the actual image is computed into the reference grid geometry. For simplification reasons, this tilt does not appear on the above diagram.

**The HRV image is defined by:**

HEADER.ImageDescription.ReferenceGridHRV

HEADER.ImageDescription.PlannedCoverageHRV

TRAILER.ImageProductionStats.Actual15CoverageHRV

The ReferenceGridHRV is always 11136x11136 and the origin is defined by GridOrigin whose value is South-East corner. For Level1\_5, the image scanning is modified according to ImageProcDirection and PixelGenDirection parameters.

The PlannedCoverageHRV has always 5568 pixels and Upper + Lower areas have normally 11136 lines except in case of ReducedScan.

The Actual15CoverageHRV is included in PlannedCoverageHRV.

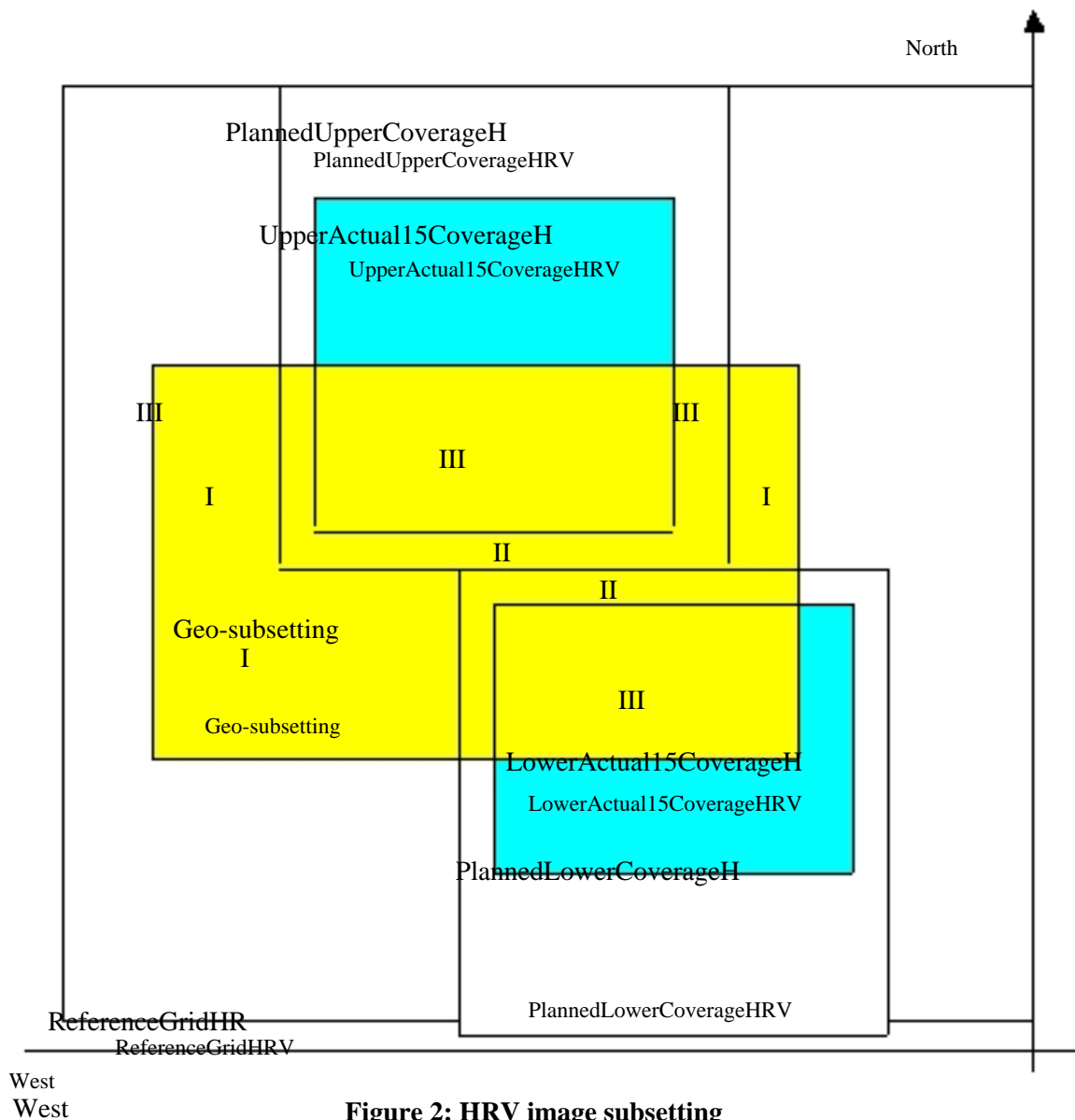
**The pixels are defined by** (Replace Lower by Upper for Upper area):

LineData ARRAY SIZE (1..5568) OF UNSIGNED (10)

LineData[0] = LowerEastColumnPlanned

LineData[5567] = LowerWestColumnPlanned

## HRV image in case of geo-subsetting:



**Figure 2: HRV image subsetting**

### Areas definitions:

**I:** Area out of Planned coverage

**II:** Area between Planned coverage and Actual coverage. The maximal size is 18 lines.

**III:** Actual Image

The geographic subsetting is a rectangle defined in the SPH (SECONDARY\_PRODUCT\_HEADER) by four parameters:

- SouthLineSelectedRectangle
- NorthLineSelectedRectangle
- EastColumnSelectedRectangle
- WestColumnSelectedRectangle

These co-ordinates are defined in ReferenceGridVIS\_IR with a Southeast origin. A multiplier factor of 3 is applied for HRV band to match with the higher definition of this band.

The complete rectangle is delivered in the formatted product. Missing data are filled with 0. The rectangle is composed with 1, 2 or 3 different areas defined in figures 1 and 2.

- Area I: This area only exists in case of ReducedScan and missing lines are filled with 0
- Area II: This area is included in LineData and the pixel value is already 0
- Area III: This area contains the ActualImage

In format output file:

PlannedCoverageHRV parameters are not modified

Actual15CoverageHRV are updated and correspond to area III.

ValidL15ImageLines are updated.