

GMES

TERRAFIRMA

ESRIN/Contract no. 17059/03/I-IW



D2: Service Network Configuration Master Document

Version 1

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Approved by: Project Contract Officer

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EXECUTIVE SUMMARY

This dossier provides information relating to the specifications of the tools and procedures employed in the making of Level 1 *Terrafirma* products by the Operational Service (InSAR) Providers.

An update to this dossier is scheduled for the first quarter of 2007.



CHANGE RECORD (version 1)

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1 INTRODUCTION

This shall be the reference document on the service network status. It shall include at least the following elements:

1.1 Services provided

Terrafirma offers two types of product - *Historical* and *Monitoring* - which vary in their degree of GIS integration according to a 'Level' (see below). *Historical* products use integrations of ERS-1/2 (1991-current) and ENVISAT (2002-current) radar data already acquired and residing in archive to make products that are as up to date as the last acquisition made.

Monitoring products, however, imply specific satellite tasking (or ordering) of future (or subsequent) 'visible' acquisition(s).

Historical *Terrafirma* product are offered in three *Levels* of sophistication:

- *Level 1* is a basic product providing 'raw' ground motion measurements.
- *Level 2* involves some analysis by a geo-physical expert when the result is integrated with other geospatial data to provide an initial interpretation of the cause of the motion observed. Level 2 products are made from Level 1 products.
- *Level 3* products involve geophysical modelling to provide a risk assessment or some forecast as to future events. Level 3 products are derived from Level 2 products.

Level 1 products comprise the digital output of the PSI processing. Levels 2 and 3 products comprise this output, plus other derived maps and reports synthesised from an array of different data and information types.

Landslide applications introduce two variants based on Level 2 and Level 3 products respectively: A Landslide Inventory product (LSI) which maps unstable slopes over whole basins incorporating SAR data from the archive, and a consequent Landslide Monitoring product (LSM) which focuses on the ongoing InSAR monitoring of specific slopes, incorporating data from new programmed acquisitions. LSI products are made from H1 products. LSM products are made from both LSI and M1 products. Both Landslide products utilise auxiliary data including geological, *in situ* and Very High Resolution optical imagery.

In summary:

Product	Level	Description
H-1	Level 1	OSP output. SAR/ASAR integration of data already in archive.
H-2	Level 2	Initial interpretation as to the cause of motion; in the format of a report and PPT.
H-3	Level 3	Modelled product (report and PPT).
M-2	Level 1	OSP output. H-1 + new acquisition(s).
LSI	N/A	H-1 product integrated with aux data to provide <i>inventory</i> of motion within a large area (e.g. watershed basin), in format of report and PPT.
LSM	N/A	LSI product + new acquisitions, giving more specific interpretation, in format of a report and PPT.

The Terrafirma portfolio of products



1.2 Service Network members and roles

Operational Service Provider (H-1 PSI providers)	H-2 Value-Adders Product validation Exploitation	H-3 Value-Adders Product validation	Landslide Inventory and Monitoring Value-adding
NPA	BGS	BGS	UNIFI
TRE	BRGM	BRGM	
Gamma	CESI	CESI	
Altamira	TNO	TNO	
DLR	TBD*		
	TBD*		
	TBD*		
	TBD*		

**To be derived from 4 x H-1 products yet to be processed*

More information relating to the partners and their roles is available in the Technical Proposal No. NPA-GSE-4704-B-TM version 4, dated 22nd September 2005.

1.3 Hardware operated or accessed

OSP	Hardware Operated	Comment
NPA	4 PCs running Linux.	Intel Pentium 4 3.2GHz processors, 8GB RAM, 2TB total PC storage, 1Gbit network. Attached hardware with 800GB of storage configured as 400GB 100% mirrored RAID.
TRE	PCs running Linux.	Also; LSF, Intel/GNU compilers. 32 Opteron processors, 512GB RAM, 8TB storage, 1Gbit network. Complemented by selected public domain, commercial and proprietary S/W including Matlab, ERMapper, ESRI.
Gamma	PCs running Linux.	
Altamira	8 CPU, 8GB RAM	Also, 3TB parallel processing station
DLR	GEMOS system.	2 x SunFire 440, 1 x SunFire 490, 2 x attached hardware RAID systems, total capacity ~ 5TB.
UNIFI	6 x IBM GIS workstations. 4 x single stereoscopes.	Also, 5 x PCs for reporting activities.

Hardware operated by OSPs



1.4 Quality Control procedures

Note that DLR are devising a common *Terrafirma* Quality Control Protocol (first version is due by the end of Phase 1 in October 2006). In the meantime, each OSP is using their own established QC procedures as listed in the table below:

OSP	QC Procedure	Comment
NPA	Internal.	Separate procedures for PSI, DifSAR and complete InSAR processing chain.
TRE	ITALCERT-SINCERT.	TRE system conforms to ISO 9001-2000 (# 290/05).
Gamma	Internal.	Separate procedures for SAR processing, image co-registration/geocoding and DifSAR/IPTA.
Altamira	Internal.	Ref: AI-TF2QCSPN05_010
DLR	Internal.	PSI processing checked against 'PS Quality Assessment' document, version 1.0.
UNIFI	Internal.	No formal system in place though the university is developing a common system to be ready next year.

Quality control procedures currently being used by OSPs

1.5 IPR patents held

OSP	Patents held	Comment
NPA	None.	
TRE	POLIMI PS Technique™ and PSInSAR™ are international trademarks.	Italy: No. MI99A001154, May 25 th 1999. USA: No. 6,583,751 B1, Jun 24 th 2003. EU: No. 1183551, Dec 17 th 2003.
Gamma	Patents pending to protect IPTA.	
Altamira	None.	
DLR	None.	.
UNIFI	None.	

IPR patents held by OSPs



1.6 List of data holdings

OSP	Data holding
NPA	All TF Stage 1 ERS-SAR datastacks (ERS raw data). PSI datastacks as per SLAs (ERS-SAR and Envisat ASAR). Various optical data and DEMs.
TRE	PSI datastacks as per SLAs (ERS-SAR and Envisat ASAR). Various optical data and DEMs.
Gamma	PSI datastacks as per SLAs (ERS-SAR and Envisat ASAR). Various optical data and DEMs.
Altamira	PSI datastacks as per SLAs (ERS-SAR and Envisat ASAR). Various optical data and DEMs.
DLR	PSI datastacks as per SLAs (ERS-SAR and Envisat ASAR). Various optical data and DEMs.
UNIFI	Topographic maps, aerial photos, VHR satellite images, geological maps, landslide inventory maps, local borehole data, water table measurements, geotechnical properties of terrain.

Data holdings by OSP

1.7 Software operated

OSP	Software	Comment
NPA	Gamma S/W version 21/10/2005. MSP version 11.5. ISP version 9.8. DIFF&GEO version 6.6. IPTA version 1.2	
TRE	PSInSAR™, PSproc version 1.0.	
Gamma	MSP version 11.5. ISP version 9.8. DIFF&GEO version 6.6. LAT version 2.4. IPTA version 1.2	
Altamira	Diapason version 4 and SPN version 2	Ref: DIAPASONV400_UG_06-101 SPNV210_TD_05-101
DLR	PSI-GENESIS, version PSIC4	All modules have CVS archive version numbering.
UNIFI	None specific.	

Software operated by OSPs

1.8 Support services provided to the SN by external partners

None



DOCUMENT END
