Comment template for theme 'Orthoimage'

	1	2	(3)	4	5	(6)	(7)
Id[1]	**Name**	**Chapter, section or clause no./ Subclause No./ Annex**[2]	**Paragraph/ Figure/Table/ Note**[3]	**Type of com-ment**[4]	**Comment (justification for change)**	**Proposed change**[5]	**WG A observations** on each comment submitted
1	**swisstopo**	**1**	**All**	**G**	**Thank you for including many of the remarks in the first review round - the document has improved considerably!**	**Before the final release, I suggest a language editing by a native speaker.**	**Thanks for the compliment**
2	**swisstopo**	**1**	**4**	**E**	**Definition of orthoimage could be more precise. I would also add someplace the term orthophoto as it is as commonly used.**	**An orthoimage, *also called orthophoto*, is *a satellite or aerial* raster image that has been […]**	**A (adding orthophoto)** **A (better definition)** **WGA has kept this definition that is extracted from the INSPIRE one but WGA has added a sentence about the interest of georeferencing.**
3	**NLS Finland**	**2.1.2**		**G**	**Considering the paragraph *"The 'recommendation for content' document is meant for medium level decision makers. It is written in natural and not too technical language."* is defining the target group being medium level decision makers, this objective should be kept in mind when revising the document. For a professional it's easy reading, but should the document include more use cases, explanations, examples, graphics?**	**Use a test group consisting of the intended target group for comments.**	**Ap** **WGA has tried to add some explanations.** **However, this document is about 'Recommendations for content" and to ensure easy and quick reading, WG A has also to keep it relatively short without transforming it into a training guide about OI.**

[1] For internal use only. Not to be completed by reviewers.
[2] Use "3.1" instead of "Clause 3.1" or "Chapter 6.1". This makes grouping of comments easier.
[3] E.g., Table 1
[4] Type of comment can be G (general), E (editorial), T (technical), or Q (question)
[5] The proposed change must be as precise and concrete as possible.

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4	IGN Spain	2.3.1		G	Additionally, more detailed Data Specifications for producing and checking orthoimages should be made.		NA This is not the purpose of this deliverable. The objective is to define the result product to be made available, not its detailed production and validation processes.
5	Spain	2,4		E	DMS: Digital Surface model	DMS: Digital Surface Model	A
6	swisstopo	2,5	Table	E	There is a chapter 2.5 and 2.5.1 and none else on the same level.	Delete 2.5 Glossary and upgrade 2.5.1 to 2.5 Levels of detail, as it is just that	A
7	swisstopo	3,1	Figure 1	T	I don't see the reason for this figure as you cannot tell these are orthoimages (or what's special about them). In addition, I don't see why introducing infrared imagery from a satellite. Should you want to show the difference from an aerial image (in image geometry) to the geometrically corrected orthoimage, you could use something like this: https://shop.swisstopo.admin.ch/en/products/images/aerial_images/aerial_images_digital (scroll down). Note these are historical images, we operate push-broom scanners today, not frame imagers, I'm certain there are better (colored) examples...	Either show the difference between raw images (i.e. in sensor geometry) and the same image orthorectified or maybe a block of frame images and the final, homogeneous and orthorectified orthomosaic product. Alternatively, you could skip the image entirely.	AwM A first set of illustrations is showing the principle of orthoimage. The current illustration has been kept and is showing different types of orthoimages (aerial / satellite, various bands)
8	Spain	2,1		E	(pag. 9) NOTE 2: … Digital terrain Model...	… Digital Terrain Model… or … digital terrain model...	A
9	swisstopo	3,1	2	E	This paragraph is a collection of buzzwords in photogrammetry and remote sensing and not helpful in the topic of orthoimage.	Delete paragraph	NA The paragraph is explaining the orthorectification process and so relevant for theme Orthoimage. In addition, WG A received opposite comments asking for more explanations in order to make the document more understandable, i.e. understandable by persons who are not remote sensing experts.
10	Spain	3,2		E	Figure 3: map of use…	basisfor	A
11	swisstopo	3,2	Figure 3	E	This figure still needs revision both in the layout and content.	What is the benefit of different colors, frames etc.? If none, refrain from using colours. The figure elements should also be better aligned.	AwM Colour coding has been simplified in order to get more intuitive legend. Yellow is about indirect use, green is about direct use. More vivid colour is for stronger use.

12	**IGN Spain**	**4.1.1**	**Core Recommendation 1**	**T**	**The infrared band could be optional**	**spectral resolution: Red Green Blue +Infrared (optional)**	**NA** **The infrared is offering a wide range of potential uses.** **Core data is about defining data that is widely required (even if not yet available everywhere).**
13	**IGN Spain**	**4.1.1**	**Core Recommendation 1**	**T**	**The planimetric accuracy for 20cm-GSD images should be better than that for 1m-GSD ones. So, the planimetric accuracy (RMSE) should be specified in terms of pixel size (In Spain we use RMSE ≤ 2 GSD).**	**Planimetric accuracy: RMSE ≤ 2 GSD**	**NA** **One of the purposes of this chapter is to define what we mean by Master level 1 for theme OI.** **The level of detail of theme OI is defined both by the image resolution and by the absolute accuracy. CR1 is providing the overview of the expected product.** **The planimetric accuracy doesn't depend only on the pixel size but it depends also and even mainly on other factors, such as quality of georeferencement, DTM used, overlap between images ….** **From experience, planimetric accuracy better than 2 pixels looks too optimist.** **However, it is true that better planimetric accuracy is generally expected from 20 cm –GSD images than from 1m-GSD ones. This will be considered in the chapter about quality.**
14	**ESTAT**	**4.1.1**	**Core recommendation 1**	**T**	**"planimetric accuracy: better than 5m"** **The planimetric accuracy is expected to vary according to the spatial resolution (pixel size).**	**Define planimetric accuracy based on the pixel size, such as it is done in section 4.3 for "good practice 5".** **"planimetric accuracy: better than 2 pixels"**	
15	**Armenia**	**4.1.1 Data content**	**NOTE 4**	**Q**	**According to the recommendation the 3 years frequency is a minimum value corresponding to user requirements for Master Level 1 and only for remote mountainous areas a lower frequency may be accepted as an exception.**	**Taking into account the fact of the high cost of aerial surveys in general and complicated terrain conditions of the territory of many member countries we think it would be better to recommend 3-5 years of minimal frequency for the whole territory**	**AwM** **CR1 remains unchanged but NOTE 4 has been extended to "complicated terrain conditions".**
16	**IGNF**	**4.1.1**			**What about military zones or other "secrecy" areas?**		**A NOTE has been added to deal with this issue**

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17	**Spain**	**4.1.1.**		**G**		**Review better for resolution or frequency cases; I think it must be high**	**NA** **Core data is rather about minimum data to fulfil most of user requirements rather than about ideal data.** **WGA received opposite comments asking for lower requirements.**
18	**Spain**	**4.1.2.1**		**E**	**a DTM with grid 10m x 10m grid size...**	**a DTM with grid 10 m x 10 m grid size...**	**A**
19	**ESTAT**	**4.1.2.1**	**Good practice 1**	**E**	**For the reader it is difficult to understand why great care has to be taken**	**Reformulate – why is a continuation of structural topographic elements important**	**Some reformulation has been done but this was already explained by the notes and illustrations following Good practice 1.**
20	**IGN Spain**	**4.1.2.1**	**Paragraph 1**	**T**	**Visual enhancement by image procesing (contrast stretch, high pass filtering, etc..) is also needed.**	**(…….) the quality of the production process (ortho-rectification, mosaicking *and visual enhancement*)**	**A**
21	**IGN Spain**	**4.1.2.1**		**E**	**Paragraphs marked as NOTE 1 and NOTE 2 appear twice**		**First set applies as notes to Core Recommendation n°2 whereas the second set applies as notes to Good Practice n°1.**

22	**IGN Spain**	**4.1.2.1**	**2th NOTE 2**	**T**	**GRID size of 10m x 10m would be suitable to produce orthoimages of 1m GSD.** **To produce orthoimages of 25cm or 20cm GSD a DTM of GRID size 5m x 5m would be more suitable.** **To produce orthoimages of better resolutions a DTM of GRID size 2 m x 2 m or better would be more suitable.** **Better definition of DTM's vertical accuracy in terms of orthophoto pixel size would also be needed.**	**GRID size: 10 x GSD or better** **Vertical accuracy: RMSE ≤ 4 x GSD**	**There is some misunderstanding. In this paragraph, the DTM characteristics (grid size and accuracy) are given as an example of the way to mitigate the discontinuity issue on an orthoimage.** **It is not about matching DTM resolution to OI accuracy. The proposed matching rules are of great interest and look quite reasonable but won't be integrated in this deliverable for following reasons:** - **the accuracy of an ortho-image depends not only on the DTM resolution but also on other factors** - **the state-of-play conducted by WG A has shown that your proposed rules are not always applied; there is some variety in the practices (e.g. because accurate DTM not available everywhere).** **A NOTE has been added in 4.1.2.3 about adapting the DTM characteristics to the OI resolution.**
23	**ESTAT**	**4.1.2.3**	**Temporal aspects**	**E**	**This section should address the case of historical images.** **This is addressed in section 5.3 "good practice 9", but it would better fit in 4.1.2.3.**	**Move content of section 5.3 on historical images to section 4.1.2.3 OR add a note in section 4.1.2.3 with a reference to section 5.3.**	**A** **A note has been added.**
24	**Spain**	**4,2**		**E**	**… a spatial resolution of 10m, ...**	**… a spatial resolution of 10 m, ...**	**A**

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25	**IGN Spain**	**4.2**	**Between good practice 3 and 4**	**G**	**The generation of orthorectified Sentinel 1 GRD data could overcome the limitation of clouds-smoke in certain emergency scenarios**	**Include Sentinel 1 GRD dataset as orthorectified product to be produced in the document as master level 2**	**NA** **Sentinel 1 will be mentioned as mitigation solution.** **However, it is not promoted as good practice as its potential use may be limited (resolution is only 30 m, it is radar data that is difficult to be interpreted, no flexible date to get data). More generally, Radar OI has been excluded from core data because it is reserved to experts (and so, with quite more limited use than optical OI).**
26	**IGN Spain**	**4.3**	**Use case 2**	**T**	**I'm afraid we don't understand properly the use case proposed.** **Use cases could be: Smart Cities, Fifth-Generation (5G) Telecommunications Technologies, etc……..**		**A** **The proposed use cases have been added.**
27	**ESTAT**	**4.3**	**Note 3**	**E**	**We are missing comments on the required accuracy of the underlying DEMs for the ortho-rectification process**	**Add information**	**A**
28	**IGN Spain**	**4.3**	**Use case 1**	**T**	**DSM-Ortho could be more suitable for this use case to avoid buildings tilt in the final product.**	**(…..) A high resolution orthoimage (DSM-ortho is advisable) provides a detailed view…..**	**NA** **Both solutions have their advantages and drawbacks. For instance, pavements close to bottom of buildings may be better seen with classical otho than with true orthoimage (DSM ortho).**

29	**IGN Spain**	**4.3**		**T**	**Some of those aspects related to quality as: % clouds, solar angle, image radiometric values, technical specifications of camera and GNSS-INS , vertical accuracy of the DTM, etc. and geometric aspects as overlaps, are only mentioned in Urban orthoimage chapter (Master 0). But they are not mentioned nor in Master 1 neither in Master 2.**	**To include some recommendations about this topics in each kind of orthophoto: Master 0, Master 1 and Master 2**	**AwM** **Some of these recommendations (e.g. about radiometric quality) were already included and some more have been added for Master level 1.** **Good practice related to Master level 2 is based on existing S-2 images (that are taken as-is)** **More generally, due to the high accuracy required, there are very specific requirements for urban OI whereas more ordinary rules for remote sensing data process are enough for Master levels 1 and 2 (e.g. about image overlaps).**
30	**swisstopo**	**4,3**	**Both Good Practices (5 & 6)**	**T**	**You mention a channel encoding of "at least 1 byte". First, typically, we use "bit" for the radiometric resolution in remote sensing. Second, 8 bit (= 1 byte) might be useful in the final product, though modern sensors capture typically a much higher dynamic range (e.g. 11-16 bit), enabling to get contrast/information e.g. in shadows or the accumulation area on glaciers (snow) which would not be possible in 8 bits.**	**Delete "each channel being encoded at least on 1 byte"**	**NA** **There is no contradiction between the comment and the recommendation about "<u>at least</u> 1 byte".**
31	**swisstopo**	**4,3**	**Good practice 6**	**E**	**There is no NOTE 2.**	**NOTE 3 --> NOTE 2;**	**A**
32	**swisstopo**	**5.1.1**	**Title**	**E**	**As there is no Chapter 5.1.2, I would only keep 5.1 CRS**	**Delete sub-chapter title 5.1.1**	**NA** **It is common template for all core themes and for some of them, 3D or 2.5D data have to be considered.** **In addition, it makes very explicit that OI is 2D data.**
33	**NLS Finland**	**5**	**Good practice 7**	**G**	**The meaning of CRS, Datum and term 'ETRS89' is not explained at all.**	**Consider if an easily adoptable explanation is needed.**	**It might require long text to provide good explanations about these geodetic terms whereas WG A aims to keep the document relatively short to ensure easy reading.** **ETRS has been added to the list of acronyms.**

34	**IGN Spain**	**5.1.1**	**Good Practice 7**	**T**	**A reference CRS should be defined for core data in order to get a continuous view of the territory.** **Web Mercator projection should be recommended (similar to EPSG:3857, but adapted to ITRF instead of WGS84) to avoid the UTM projection issues for example.**		**A** **Recommendation has been added in NOTE 3.**
35	**swisstopo**	**5,3**	**After Note 2**	**E**	**First sentence ("Industrial production…"): I wrote in the last review about Scheimpflug and his ortho-rectifier of 1896. This information was put there to show that orthoimages are not entirely new but came a long way. In the scope of this document, this detail is irrelevant, though. Another note: "nineties" alone is not enough.**	**Edit the first sentence to "Industrial production of orthoimages begun in the nineties of the last century, although methods to derive orthoimages already existed much longer."**	**A**
36	**swisstopo**	**5,3**	**After Note 2**	**E**	**Last sentence: "…over the last 20 years or so." As in many other countries, we're scanning all of our aerial images and provide orthophoto-mosaics. The oldest we're providing right now is from 1946 with older imagery still in the archive. The evolution of landscape is becoming more interesting the further back in time you go.**	**Refrain from using 20 years, maybe delete end of sentence.**	**A**
37	**IGN Spain**	**5.3**		**G**	**Orthorectified Sentinel 1 and 2 imagery may be useful but in order to be fully able to use the data at its maximum potential, some guidelines have to be made for storing, accessing and processing the data.**		**NA** **S-1 (radar) is not considered as core data (complex data used only by experts).** **For S-2 orthoimages, Good Practice 3 is considered relevant : it is generic enough and adaptable to user requirements that may evolve as these products are still relatively new.**
38	**IGN Spain**	**5.3**		**T**	**There are other aspects that are worth to be mentioned, apart from the files format. They are those related to the geographic extent of each file (i.e. the tiling schema, map sheets, administrative units, etc……). It is important to define the bounding box of each file before start the othophoto production and this is not mentioned nor in Master 0 neither in Master 1 or Master 2.**		**NA** **This document is about defining the result product and not its production process.** **Recommendations for data delivery are kept simple and don't pretend to be exhaustive.**

40	ESRI	5.3 Delivery	Core Recommendation 4:	T	"Core data should be made available under a few of the most current image formats including georeferencing." GeoTIFF can be none compressed or compressed lossless (eg using LZW/Deflate) or lossy compression (eg using JPEG). ECW is a proprietary format with usage restrictions and should not be recommended.	NOTE 1: A good solution might be to provide orthoimage data both in a format without compression and in a format with compression. For instance, non-compressed GeoTIFF may be used for orthoimages. GeoTIF with JPEG compression and geo-enabled JPEG2000 and GMLJP2 may be used for compressed orthoimages. Geo-enabled JPEG2000 formats include GMLJP2 (that is an OGC standard) and GeoJP2 (that is a de facto standard).	NA WG A is recommending only none compressed GeoTiff. The formats are provided as examples of possible solutions. A ECW has been be withdrawn from recommended formats.
41	ESRI	5.3 Delivery	Good Practice 9	G	"Data producers should make available for users the previous versions of their orthoimage products. " Adds recommendation for what type of images should be provided and why.	NOTE 1: Generally, the first versions of the orthoimages were not produced with such high standards as expected by the current practices and the recommendations of this document. However, they still provide quite valuable information. Where possible the none orthorectified scanned images should be provided as they can then be used newer orthorectification workflows as well as for stereo viewing.	NA The case of none rectified images is considered in chapter 6.
39	IGN Spain	5.3		G	Only the orthoimage product is considered in this document but in an orthoimage production process other necessary by-products are involved and they are not mentioned. Long term storing of those products is also necessary		A Some considerations on this topic have been added in NOTE 2
42	ESTAT	5.3	Good practice 9	E	We are missing with respect to storage of already existing OI – the aspect of preservation is missing from the document	Add information	A Some considerations on this topic have been added in NOTE 2
43	ESTAT	6.2	2nd paragraph	E	It is unclear what is the purpose of this paragraph in core specification document	Remove –	NA It is rationale to explain why it might be of interest to provide various images, some showing facades rather than just ground.
44	Spain	7,1		E	Figure 8: the vector mosaic…	Figure 9: the vector mosaic…	A
45	ESTAT	7.2.1	Last paragraph	E	Replace 'pour' by 'for'	adjust	A
46	ESTAT	5.3 and 7.1	-	T	We support the idea to introduce some flexibility with INSPIRE format and data models and rely rather on existing practices which have shown their relevance by the usage.	No change.	A

47	**ESTAT**	**7.2.3**		**E**	**ECW is a commercial product – does that need to have trademark/comment behind ? Another format which gains popularity is COG (COGEO.org) which allows for efficient Imagery Data Access, Reduced Duplication of Data and Legacy Compatibility**	**rephrase**	**A** **ECW has been removed and COG has been added (in chapter 5.3)**
48	**Spain**	**8,3**		**E**	**Figure 8: main use cases …**	**Figure 10: main use cases …**	**A**