



Changes in the technical guidelines

Technical Guidelines

- Focus on Art 30 of R. 796/04: agri parcel areas shall be determined by any means assuring measurement of quality at least equivalent to the technical standard, as drawn up at EC level -> JRC to draft technical standard
- Revision of AGRI doc 60363/2005 Rev 1 (OTS checks of area according to articles 23-32 of R. 796/04) & JRC technical tolerance document (5834/2006) & other JRC documents
=> now on WikiCAP, under Art30 category

<http://marsmap.jrc.it/romuald/mediawiki/index.php/Category:Art30>

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Category:Art30

Pages linked to Article 30 of Reg 796/04 are listed below, in alphabetical order. These pages (called "article" in the Wiki) represent the scope of the guidance identified in that text:

1. *Agricultural parcel areas shall be determined by any means proven to assure measurement of quality at least equivalent to that required by applicable technical standard, as drawn up at Community level.*

Articles in category "Art30"

There are 9 articles in this category.

A <ul style="list-style-type: none">■ Agricultural parcel■ Area determined■ Area measurement	D <ul style="list-style-type: none">■ Definition of the area to be measured G <ul style="list-style-type: none">■ General considerations for conducting on-the-spot checks P <ul style="list-style-type: none">■ Planning of the inspection programme S <ul style="list-style-type: none">■ Specific considerations for area measurement	T <ul style="list-style-type: none">■ Technical tolerance U <ul style="list-style-type: none">■ Use of LPIS in on the spot checks
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Planning of the inspection programme

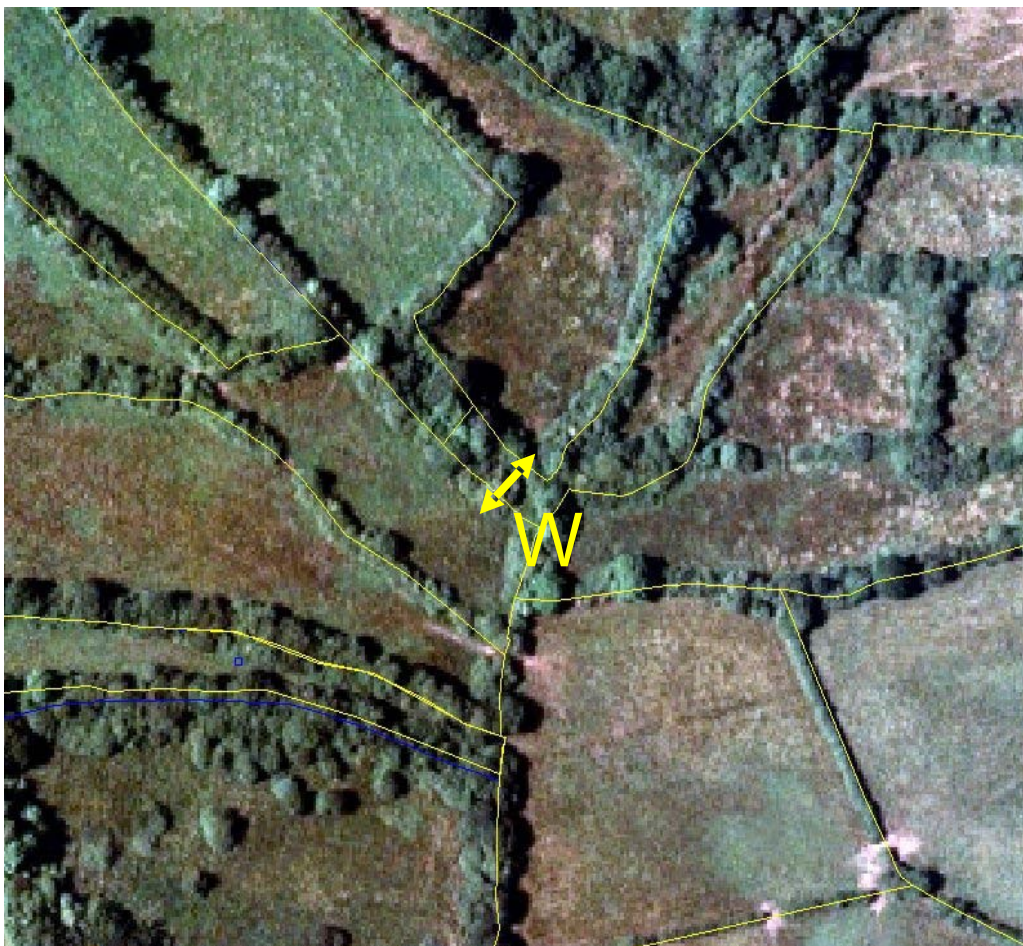
- Parcel sampling in an OTS check
 - ③MS may select a sample of ($\geq 50\%$) the agri parcels provided sample guarantees a **representative level of control** in respect of **area** checked & **aid** claimed; criteria for the selection to be justified
 - ③Advice: select parcels representing a risk by their nature
 - e.g. high value crop, boundary problem on LPIS, parcel remote from main farm parcels
 - Or no previous measurement
 - Or target 80% of claimed area & at least 1 parcel per crop group
 - ③Any reduction $< 3\%$ observed on the sample is to be applied to the whole crop group (since representative sample)
- Advance warning: keep to min, up to 14 days (cf. Art 23a of R. 796/04)

Area to be measured (1/2)

- Considerations for forage parcels -> general
 - ③Exclude Woods (area with tree density > 50 trees/ha, except justified otherwise beforehand), paths (non due to animals), (permanent) ponds
 - ③Shrubs:



Area to be measured (2/2)



Landscape features

- excluded if internal to agri parcel & $W > 2\text{m}$, or if boundary between 2 parcels & $W > 4\text{m}$

- included for SPS payment if part of GAEC obligation or SMR (art 30(3) of R. 796/04)

⇒ **Need to digitize features** recognized eligible for SPS payment and with $W > 2\text{m}$ (if internal) or 4m (if boundary) **in LPIS GIS**

⇒ possible control of maintenance

Area measurement

- Check LPIS boundaries before using the reference area in the “deduction method”
- In the deduction method, use the tolerance applied in the LPIS creation (old text); if no tolerance was applied, use a tolerance appropriate for the data/tool used.
- use area projected in the national IACS GIS system (already in AGRI 60363 Rev 1)

Specific considerations

- forage extensification premium referred to in Art 131 & 132 of R. 1782/03 no more applicable
- Nuts
 - ③no more reference to single trees in Art 15 of R. 1973/04 so references to single trees removed
 - ③Check based on minimum parcel size and density (function of species)

Technical tolerance 2008

- buffer width of max 1.5 m (Art 30 of R. 796/04)
 - ^a measurement tool should give area and perimeter
- If tool has been certified through the JRC area measurement validation scheme, use certificate value (i.e. 1.25m if certificate states “better than 1.25m”)
- With VHR prime sensor images, rule of thumb (1.5 x GSD) is considered appropriate on the basis of available validation tests
- With back up VHR images with GSD>1m, use 1.5m
- For linear features > 100m, use 2m linear tolerance with GPS stand alone

Tolerance to be used with VHR imagery

- VHR prime / back up sensors available for the campaign
- Rule of thumb ($1.5 \times \text{GSD}$) versus results of validation tests: -> buffer recommendations for VHR images
- effect of using 1.5 m buffer with images with $\text{GSD} > 1\text{m}$

VHR Prime or back up sensor

- Conditions to qualify as **prime sensor**:
 - ③ Geometric accuracy: 1D RMSE on check points $< 2.5\text{m}$ with commercial SW (and DEM with $\text{RMSE } z < 5\text{m}$)
 - ③ and Buffer width $< 1.5\text{m}$ in parcel area measurement validation test
 - ③ and multispectral (XS) information, for 2008
- Otherwise back up sensor
 - Assuming imagery can be orthorectified with commercial SW

Two prime sensors for 2008

Sensor (bands), GSD	Georeferencing accuracy: 1D RMSE < 2.5m ?	Area measurement Buffer width < 1.5m ?
Ikonos (P+XS), 1m (P)	Yes (JRC & contractors)	Yes, 1.2m (PL test)
Quickbird (P+XS) 0.6m (P)	Yes (JRC & contractors)	Not formally tested but assumed OK

Five back up sensors for 2008 (1/2)

Sensor (bands), GSD	Georeferencing accuracy: 1D RMSE < 2.5m ?	Area measurement Buffer width < 1.5m?
Spot supermode (P), 2.5m	No < 5m	No 3.2m (PL test)
Eros A (P only), 1.8m	~2.5m?, except for vector scene (<3.5m)	No 2.8m (PL test)
Formo.2 (P+XS) 2m (P)	No < 5m	No? (to be tested)

Five back up sensors for 2008 (2/2)

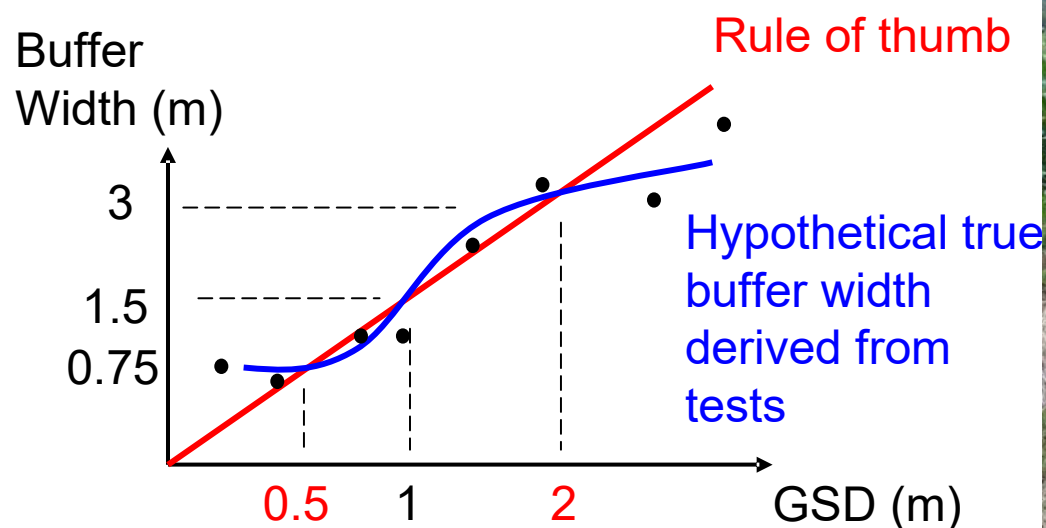
Sensor (bands), GSD	Georeferencing accuracy: 1D RMSE < 2.5m?	Area measurement Buffer width < 1.5m?
Eros B (P only), 0.7m	OK pending objective validation	Assumed OK (to be tested)
Worldview 1 (P only), 0.5m	Assumed OK (to be tested)	Assumed OK (to be tested)

Eros B and WV1 Candidates as prime sensor pending validation on

- geometric accuracy
- area measurement
- and tests on use of Pan only for CwRS

How good is the rule of thumb?

- Rule: buffer width = 1.5 x pixel size
- Range of validity
 - ③ From the tool point of view (intrinsic precision of the tool),
 - ③ From the object point of view (accuracy of the boundaries of the object to be measured)



Buffer widths derived from experiments

- PL 2005

36 parcels, ref = cadastre

③PAN Ortho 0.2m (actual scale 1/13,000)

③Colour ortho 0.75m (actual scale 1/26,000)

③Ikonos P+XS, 1m

③Eros A, Pan, 2m

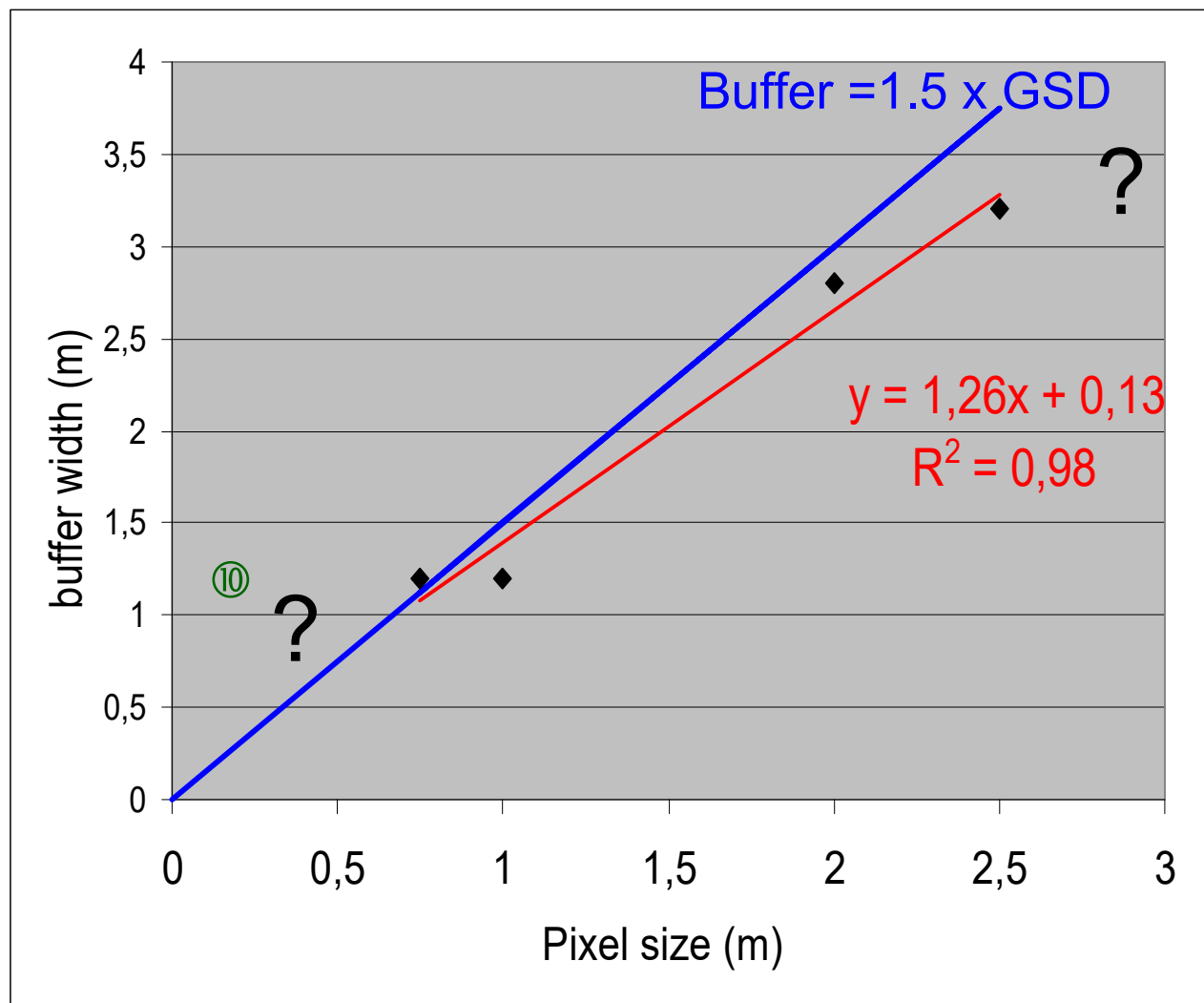
③Spot 5 supermode Pan, 2.5m

Buffer width: rule of thumb vs tests

Image	Buffer width = 1.5 x pixel	Buffer width (2.8 σ)	σ_{buffer} (PL test)
Archive Ortho P 0.20 m (1/13,000)	Rule of thumb	1.0m	0.37m
Colour ortho 0.75 m (1/26,000)		1.2m	0.44m
Ikonos P+XS 1m		1.2m	0.44m
Eros A 2m		2.8m	1.00m
Spot supermode 2.5m		3.2m	1.14m
	Test results		

NB: the GSD of the ortho 0.20m is due to scanning (~ to over-resampling)

Rule of thumb vs linear regression line



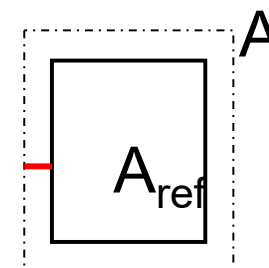
Recommendations 2008

GSD (m)	Model width (m)
0.5 (WV1)	0.8 (?) -> 1m
0.6 (QB nadir)	0.9
0.7 (Eros B)	1.0 1m
0.8 (QB max)	1.1
1.0 (IK nadir)	1.4 -> 1.5m

Relation between buffer width and variations in measured areas

- buffer width = reproducibility limit = $2.8 \sigma_{\text{buf}}$
- $\text{buf} = (A - A_{\text{ref}}) / P_{\text{ref}}$

$$\Rightarrow \sigma_{\text{buf}}^2 = \sigma_A^2 / P_{\text{ref}}^2 \Rightarrow \sigma_A = P_{\text{ref}} \cdot \sigma_{\text{buf}}$$

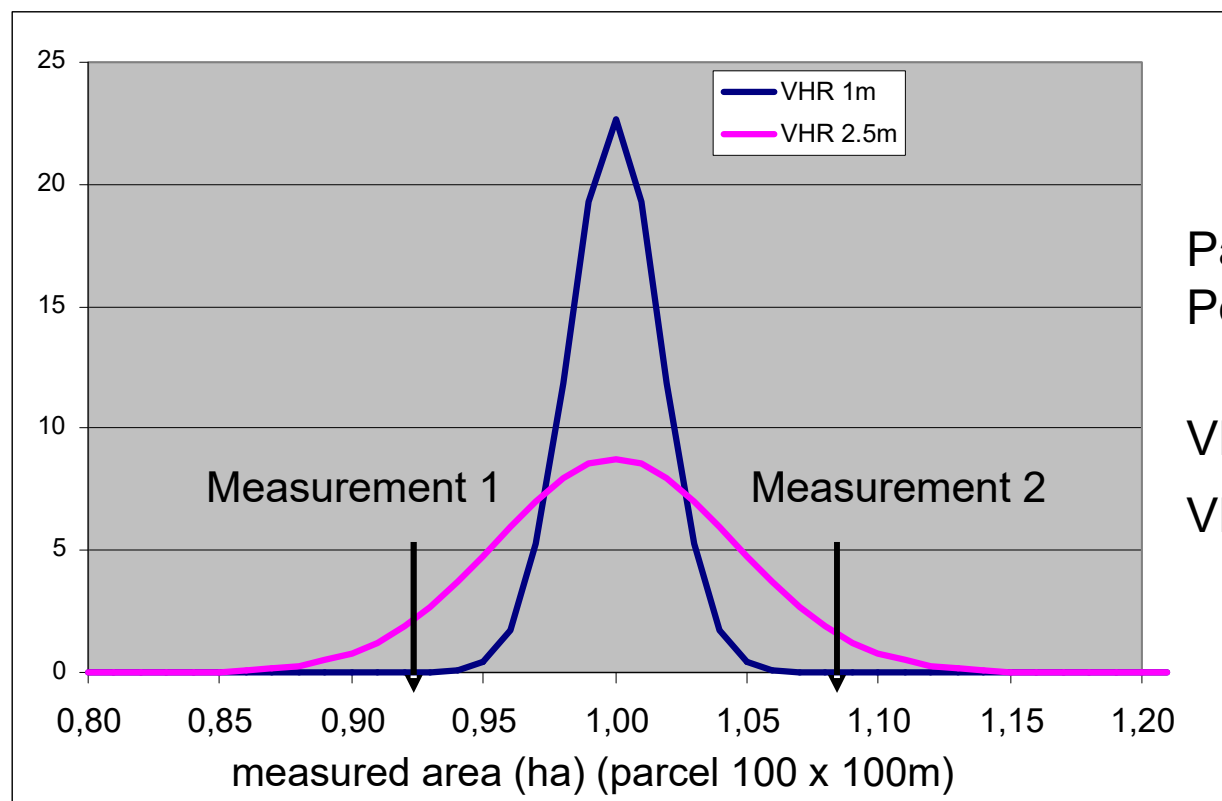


Sensor	$\sigma_A = \sigma_{\text{buf}} \cdot P \text{ (m}^2\text{)}$
IK 1m	$0.44 \times P$
Eros A 2m	$1.0 \times P$
Spot sm 2.5m	$1.1 \times P$

Std deviations used to model distribution of area measurements using Normal law (true area, σ_A)

Effect of stricter tolerance

Coarse tool => lower accuracy, higher dispersion of measured values, more values “far” from true value

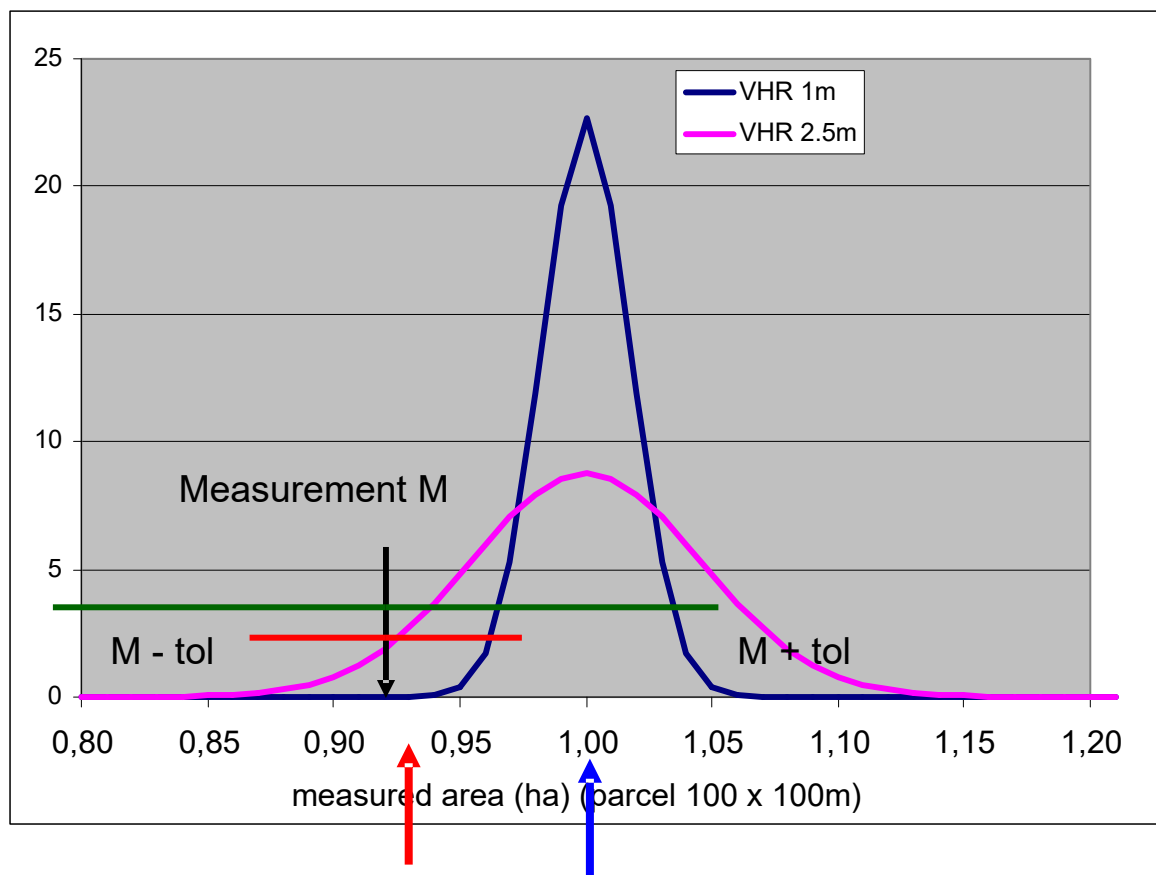


Parcel 1 ha, 100 x 100 m
Perimeter P = 400 m

VHR 1m $\sigma_A = 0.44$ P = 0.018 ha

VHR 2.5m $\sigma_A = 1.1$ P = 0.044 ha

Effect of stricter tolerance



Perimeter = 400 m



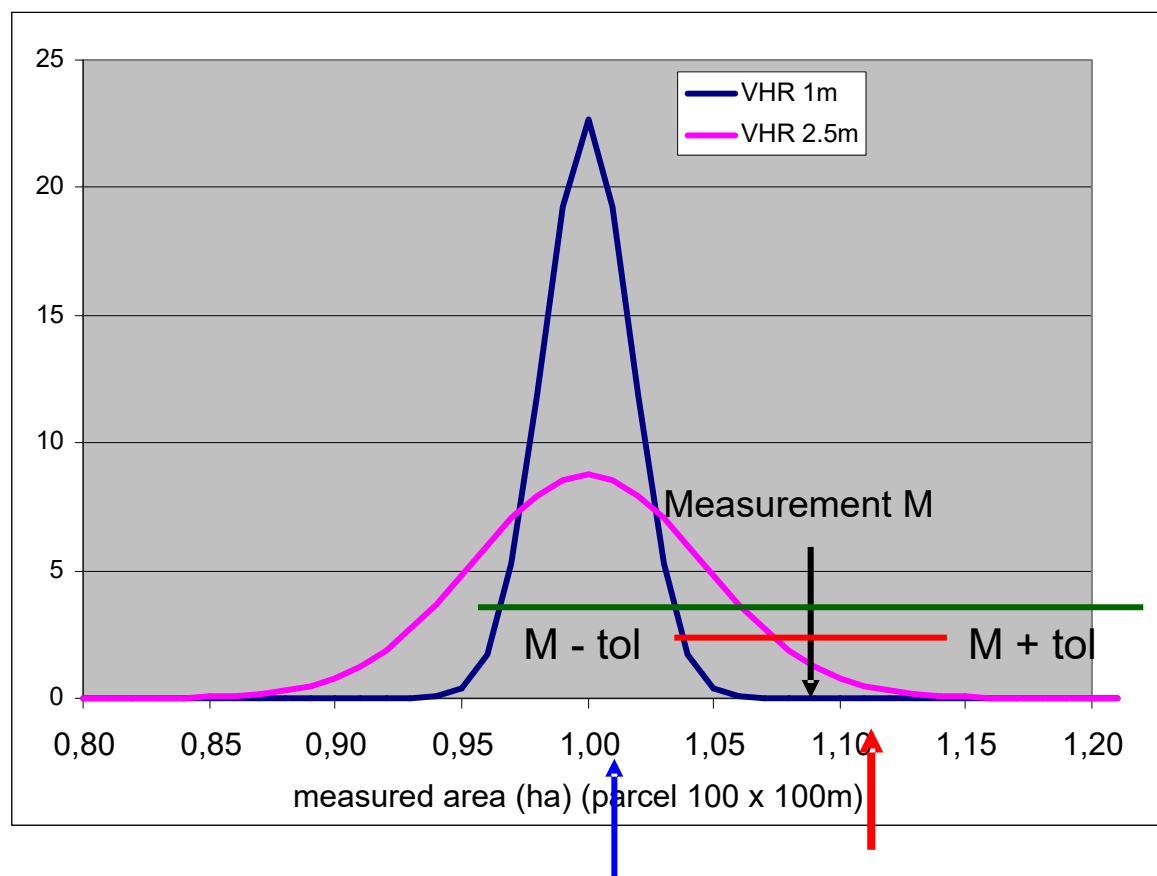
“true” buffer tolerance for VHR
2.5m: $3.2 \times P = 0.13 \text{ ha}$

1.5m buffer tolerance = 0.06 ha

Declared true value is
(wrongly) rejected (would be
accepted with “true” buffer,
effect of strict tolerance)

Underclaim is (wrongly)
accepted (effect of coarse tool;
case may also occur with 1m image,
with a lower probability)

Effect of stricter tolerance



Perimeter = 400 m



“true” buffer tolerance for VHR
2.5m: $3.2 \times P = 0.13$ ha

1.5m buffer tolerance = 0.06 ha

Declared true value is (wrongly)
rejected

Real **overclaim** is
(wrongly) accepted

Effect of stricter tolerance

- Coarser tool => higher range of measured values
- Increased risk to **reject correct declaration**
 - ③ Wrong decision leads to more inspections than necessary, no problem for the fund
- Increased risk to **accept wrong declaration**
 - ③ If underclaim: wrong decision penalises farmer, no risk for the fund
 - ③ If **overclaim**: wrong decision may lead to excess payment, but cap to LPIS area should prevent excess retained area (for SPS) in LPIS based on “agri” parcel, farmer’s block

Number of cases where back up was needed in 2007

- 6 / 223 zones with failure of VHR prime acquisition
 - ③2.5 zones (1 BE, 1.5 IE): Eros A back up
 - ③2.5 zones (1 FR, 1.5 IE): no back up
 - ③1 zone (NL): aerial “back up” from 01/04
- 2 zones with failure of orthophoto acquisition
 - ③2 zones (1 FR, 1 DE): Spot supermode back up
 - ③4 zones with no ortho on 1/7 (DE) -> emergency VHR requested, 1 zone acquired with IK, 3 zones acquired with ortho (available at end 07)
- Back up used on 4.5 zones but potentially needed on 12 zones (4% of 223 + 93) in 2007 (exceptionally “bad” summer weather)

Use of back up imagery

- Use of back up imagery is **exceptional** (4% zones VHR prime & ortho in 2007)
- For VHR back up sensors with GSD>1m, apply 1.5m buffer even if “true” buffer > 1.5m
- Be aware that this tolerance may result in
 - ③1) **more (redundant) inspections with false negatives**
 - ③2) **accepting over (under) claimed areas wrongly**, mostly in LPIS based on **physical block**
- Practical Rules
 - ③Use recent archive <1m orthoimagery with >1m back up imagery to identify parcels with boundaries modified with respect to the archive orthoimagery;
 - ③Carry out FV in case of doubt on a parcel area measured on the back up imagery.