

Vilnius, IACS wshop 28-30<sup>th</sup> of May, 2018

Resumé from the session “Optimizing the use of image data” held 29 May 2018; short summary of discussions / conclusions

Chair: Alain Vander Velde, JRC coordinator: Pär Johan Åstrand

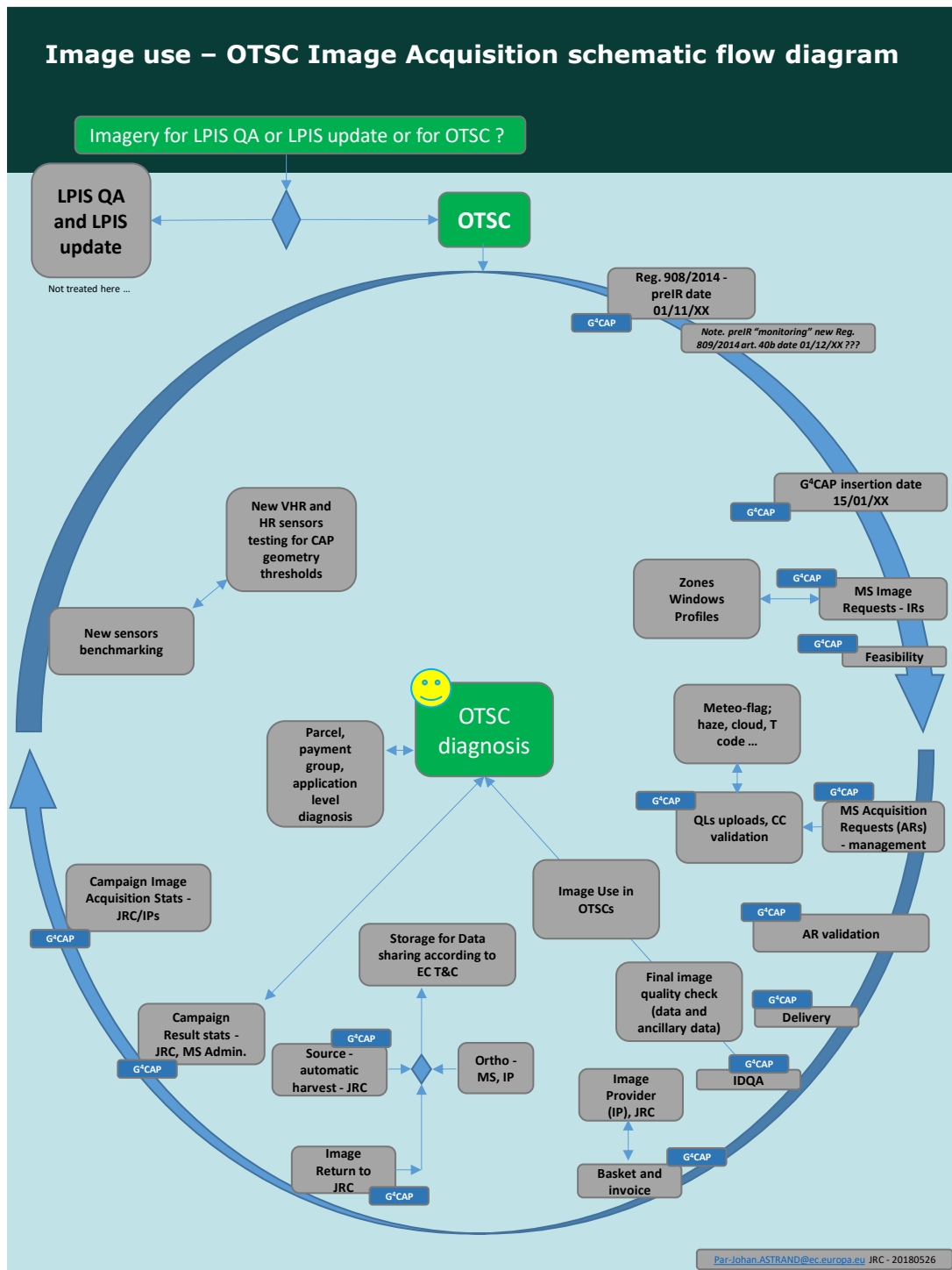


Figure - OTSC Image Acquisition Schematic workflow

Approximately 20 staff from MS Administrations, or their contractors, met up to discuss the *actual use (or the optimization of use) of imagery in the present CAP On-The-Spot-Checks (OTSCs), and in the processes of the Land Parcel Identification System (Quality Assurance, or updating)*. All participants, strive to solve issues of today's CAP, but obviously also have their thoughts on the need to address future steps in image handling with the move towards monitoring<sup>1</sup>. It is worth emphasizing some differences between today and tomorrow. The future monitoring relies mainly on dense time series and an observed behavior through automated processing; it is clear that a few HHR or VHR snapshots are not significantly different from an OTSC approach and is not the monitoring that is envisaged. Further, the resolution/ground sampling distance (GSD) of the presently EC financed VHR data is optimized for CAPI, and finally there will never be enough EC financing available for large-scale deployment of VHR or HHR imagery for the monitoring approach.

The group consisted of some very experienced CwRS specialists, some in LPIS only, and some administrative staff. The former allowed some very detailed discussions regarding issues concerning imagery of the CwRS. Five presentations<sup>2</sup> relevant to one or more of the six themes<sup>3</sup> introduced the discussions, guided also by some JRC's background information distributed to the group participants. The chair from DG AGRI or the JRC coordinator introduced each theme and acted as moderators.

### Theme 1

The discussions regarding the methods of control and efficient image use was approached looking at some charts of volumes (km<sup>2</sup>) of VHR and HR imagery used by the MS Administrations through the years, and how methods have changed (or not changed) with reforms of the CAP. So, information from as far back as the Fischler Reform (2003), to the enlargement (2004), to the CAP Health check (2008) and finally moving to the last CAP reform (2015) introducing the Direct Payments of today was displayed. It is indeed quite clear that image requests follow some of these CAP changes, and also tendentially follow the EC guidelines of image use issued during these years. However, it was argued that MS seek a 'fit for purpose' and an EC 'accepted' method of control, which if performed correctly gives an 'OK' in audits. This drives and decides the amount of imagery requested. This is also a blocking factor for changes since the MS seemed satisfied with the OTSC method of today, and therefore reluctant to changes (aka future monitoring...). However, it was made clear by the EC that the missing environmental effect of the greening and the difficulties in efficient controls of many related measures should be seen as a trigger for change. Further, even if the OTSC image budget should not drive the control methods, the MS argued that they need to know their "image share" (EC accepted amount for that MS) as early as possible for efficient planning of their controls. The EC and JRC responded that this is being calculated efficiently now by use of indicators and efficient budget distribution, but it is up to the MS to reason correctly and to justify an efficient image use, which in turn could/should raise or reduce the EC image budget. The

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<sup>1</sup> Reg. 746/2018 amending Regulation 809/2014, and further with a new basic act envisaged with the new CAP 2020+

<sup>2</sup> Presentations [https://marswiki.jrc.ec.europa.eu/wikicap/index.php/Vilnius\\_discussion](https://marswiki.jrc.ec.europa.eu/wikicap/index.php/Vilnius_discussion)

<sup>3</sup> Themes:

1. Optimizing CwRS methods - ask for right amount of images and make right use;
2. Acquisition windows fitting OTSC controls - feasibility, and image acquisition efficiency
3. Use of correctly processed imagery, image quality issues; CwRS imagery and LPIS QA imagery
4. Image Requirements workflow issues - regulatory, administrative, procedural, data sharing etc.
5. The regular LPIS update and the actual use of [any] imagery.
6. Future use of data; S1, S2, micro-satellites, HAPs, RPAS etc. as input to monitoring, or to QC of systems/methods

MS insisted on continued need of VHR and HHR imagery, while not objecting to the tendency:

- Optimization of the VHR window positioning in time, resulting in a reduction of VHR2 window volumes request (clearly seen in 2017, and 2018).
- A further use of Sentinel2 which has completely substituted the HR, and also some of the HHR;

## Theme 2

Some detailed discussion was made on optimization of acquisition window, its placement in time, its length, and on how feasibility works clarifying some issues such as the need from the MS to have specific windows for the successful checks of some agricultural activities such as crop differentiation (CD), sowing, mowing etc. To obtain best feasibility for such requests the MS need to use correctly the earliest start date, the latest start date and window length which are options to a large extent in their hands. The feasibility is especially complex for the HHR making use of two proposals from the image provider (a 'best case', and a 'worst case') with relative levels of predicted success, to be accepted or refused by the MS. An issue that was brought up was that MS experience that VHR image acquisition is performing better in certain regions (cloud prone) compared to the HHR. This is not proven, however, since very often the acquisition windows span over different time periods. One agreement amongst the MS was that they experience the acquisition windows resulting from the feasibility (proposed by providers) in general to be too long, especially the VHR one. Indeed, this is being analysed at present by the JRC where some new approaches of evaluating both the feasibility 'accuracy' and the 'goodness' of a proposed change (e.g. a proposed extension) is being made. To be reliable such analysis must however include results from a series of VHR and HHR campaigns.

## Theme 3

MS were very reactive on image quality and processing (note that 3 out 5 presentation focused on this). It was interesting to understand from four experienced MSs that there is no need and no time to play around with 16 bit imagery at the CAPI stage. They claimed that image can very well be 3 selected bands (most often 4,3,2 or 3,2,1), of 8 bit, and with a good look up table stretch. This speeds up CAPI and gives homogeneous comparable results, from independent operators, to be brought to parcel-, group-, dossier-diagnosis. Only if classification is used (6 MS use multispectral classification in 2017) there was an agreement that all bands should be used as input, and rescaling from 16 to 8 should be avoided. Further, the DEM accuracy importance and related issues, were brought up, including for example the SPOT6, SPOT7 resulting ortho product accuracy. This product makes use of the Elevation30 dataset (Reference3D) and no ground control for orthorectification. Geometric correction is very important for the MS and therefore the JRC sensor's geometry benchmarks are appreciated, as are updates of any sensor geometry parameters. This is also crucial for future monitoring (aka harmony across sensors S2A/S2B, and envisaged S2 reprocessing due to better ground truth and DEM to start in springtime 2019). A further request was that JRC should make validation of satellite sensors for the single buffer tolerance (this is a time issue for JRC ...). Finally the session ended with the agreement that the quality of the LPIS imagery handled to the MS is satisfactory.

## Theme 4

When discussing the image acquisition workflow synthesized by a flowchart (see figure at end) handled out, no really big issues were encountered. Discussions concerning the regulatory deadlines for entering

the monitoring regime 01/12<sup>4</sup> cf. making the OTSC image requests 01/11<sup>5</sup> same year, seemed not to be a problem since the MS would already at the earlier deadline know which system or MS Region/Land would opt for monitoring by the earlier date so image requests would have been reduced accordingly. MS were asking the possibility to reduce Campaign Result statistics (G<sup>4</sup>CAP) (control year n), as similar statistics are anyway given to DG AGRI (July n+1). At last issues on image return<sup>6</sup> was discussed, and ended in an agreement that imagery is best returned, and kept at the JRC even though some tedious work is encountered by MS, their contractors, image providers, and the JRC on metadata, projections, checksums, and long transfer times etc. to enable this. It was reasoned that further problems would arise if MS were asked to keep the data for 10 years, and to make them available upon request. Indeed the source satellite imagery is handled efficiently already by the G<sup>4</sup>CAP application and stored at the JRC data centre, while an important step to take is the update and enhancement of the ortho image return routines. Some of the MS offered to give expert advice in this respect and will be contacted by the JRC.

### Theme 5

Theme 5 addressed the organisation and processes around the image use in the LPIS update. It gave valuable information from the MSs concerning the type of imagery used for updates, detecting needs for updates, methods used (systematic, risk based), and when in the year they are made. It was made clear by the MS that both aerial and surplus OTSC (or LPIS QA) satellite VHR imagery is used for the updates, and that some of the MS present make use of S2 imagery as a trigger to updates. MS confirmed not to have issues to report on the costs of imagery, on processing, or on IT infrastructure needs.

### Theme 6

The last theme (6) on future use of data was considered too important to address sufficiently in detail in the little time left of the day of discussions. However the MS showed a common concern on the use of S1 and S2 as regards to small parcels, permanent crops, and landscape features. Also concerns were expressed regarding how to deal with doubtful cases and that an increased number of reference parcels (RPs) to follow up than today should be avoided. The solution is to “stretch” the use of S1 and S2 methods for monitoring as much as possible and find a path/method through pilots, and a gradual (3 years) introduction (cf. the time it took to introduce CwRS which was nearly 10 years ...). A full understanding of the monitoring approach is still necessary before the OTSC with VHR and HHR imagery is abandoned.

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<sup>4</sup> Reg. 2018/746 art. 40b

<sup>5</sup> Reg. 908/2014 art. 26

<sup>6</sup> Reg. 1306/2013 art 21, and 908/2014 art. 26