NUMERISATION DES SPECIMENS
SERVICE SCIENTIFIQUE DU PATRIMOINE

Cette instruction décrit les modalités de numérisation des spécimens.

	Acteur	**Etape**
1	Scientifique Conservateur Gestionnaire de collection	Utiliser selon le choix du conservateur la numérisation par: photogrammétrie (Agisoft) focus stacking (Zerene Stacker) par scanner à lumière structurée
2	Encodeur Gestionnaire de collection Conservateur	Numériser les étiquettes ou les marquages sur l'objet permettant l'identification
3	Encodeur Gestionnaire de collection Conservateur	Numériser le spécimen selon les HOW-TO de chaque technique: A) Focus stacking B) Photogrammetry C) Structured light HDI
4	Encodeur Gestionnaire de collection Conservateur	Sauver les données dans l'un des formats demandés
6	Encodeur Gestionnaire de collection Conservateur	Placer le fichier sur virtualcollections.naturalsciences.be si le document est destiné à être publié ou sur MARS si il doit rester privé. Réaliser une copie sur un disque dur de backup long terme.

A) Focus stacking

	Acteur	Etape
1	Scientifique Conservateur Gestionnaire de collection	Before switching on the StackShot Controller by connecting it to the Electrical network, make sure the following steps are ok: • The camera is connected to the Stackshot controller (Shutter cable) • The StackShot controller is connected to the StackShot Rail • The camera is connected to the PC All ok? Plug in the StackShot Controller
2	Encodeur Gestionnaire de collection Conservateur	Switch on the camera • Open 'EOS Utility' • Select 'Camera settings/Remote Shooting' Now the window appears to select your camera settings etc. Follow further instructions
3	Encodeur Gestionnaire de collection Conservateur	Switch on the light inside the closet
4	Encodeur Gestionnaire de collection Conservateur	Switch on 'Live View Shoot' (Bottom left in the EOS Utility window)
5	Encodeur Gestionnaire de collection Conservateur	Set the Shutter speed on 'BULB' (click on the shutter speed and press ↓)
6	Encodeur Gestionnaire de collection Conservateur	Set the power of the speed lights: if you use a Grey Background • ½ or ¼ for 3x to 5x magnification • 1/8 to 1/16 for 1x to 3x magnification • 1/32 or 1/64 for regular macro lenses test if the flash lights work by pressing the remote
7	Encodeur Gestionnaire de collection Conservateur	Place the specimen in the closet in the centre of the lens
8	Encodeur Gestionnaire de collection Conservateur	If you use the MP-E 65 mm Macro Photo, set the approx. desired Magnification Sensor filling size 1x 22.5 mm 2x 11.3 mm 3x 7.5 mm 4x 5.6 mm 5x 4.5 mm
9	Encodeur Gestionnaire de collection Conservateur	Make sure that 'Mode: Auto-Dist' is selected on the StackShot controller, if not press 'up' or 'down' on the controller till it appears.
10	Encodeur Gestionnaire de collection Conservateur	Move the camera up or down by pressing 'Fwd' or 'Back' till the specimen is in-focus (Confirm through Live View in EOS Utility).
11	Encodeur Gestionnaire de collection Conservateur	Set the distance the camera needs to travel between each picture by pressing 'select' once and 'up' or 'down' to increase or decrease the 'Dist/Step'. Guidelines for the Step Size: Magnification Step Size 1x 150 μm to 300 μm

		2x	120 µm to 200 µm
		3x	75 µm to 150 µm
		4x	50 µm to 80 µm
		5x	30 µm to 60 µm
		Normally you'll end up with a stack of 15 to 40 pictures for the mean values.	
12	Encodeur Gestionnaire de collection Conservateur	Set the appropriate f-stop and speed light power • 3x to 5x magnification f/4.0 or f/4.5, flash ½ nd or ¼ th • 1x to 3x magnification f/4.5 to f/5.6 flash 1/8 th till 1/16 th • Press test shooting in the Live view window, a new window appears • close the Live View window, otherwise the speed lights won't flash • press the white squared button upper right • alter the f-stop and/or flash power	
13	Encodeur Gestionnaire de collection Conservateur	Select the upper most part of the specimen by travelling upwards • press 'Back' on the controller till the entire specimen is out of focus • press 'Fwd' till a part (the upper most part), is in focus • press 'up' or 'down' • 'Select End Pos' appears	
14	Encodeur Gestionnaire de collection Conservateur	Select the most distant part • Press 'Fwd' on the controller till the entire specimen is out of focus • Press 'Back' till a part (the most distant) is in focus • Press 'up' or 'down'	
15	Encodeur Gestionnaire de collection Conservateur	Close Live View window and check again if the speed lights work (press the button of the transmitter on the camera)	
16	Encodeur Gestionnaire de collection Conservateur	Select the folder to save the pictures and make sure you take both RAW and Large pictures if desired.	
17	Encodeur Gestionnaire de collection Conservateur	Press the 'Up' or 'Down' button to start the process of taking pictures	
18	Encodeur Gestionnaire de collection Conservateur	Open Zerene Stacker (not the safe mode)	
19	Encodeur Gestionnaire de collection Conservateur	Press 'ok' on the welcome screen	
20	Encodeur Gestionnaire de collection Conservateur	Click 'add files' in the 'File' menu Select all the images in the selected folder press 'add'	
21	Encodeur Gestionnaire de collection Conservateur	In the 'Stack' menu select one of the following parameters: • Align and Stack PMax • Align and Stack DMap • Align and stack both it is possible to stack without aligning by selecting the images in the 'input' window and select 'Stack selected (PMax)' or 'Stack selected (DMap)' in the Stack menu	
22	Encodeur Gestionnaire de collection Conservateur	After the stacking process is done, select all the out files and press 'Save output images' in the 'File' menu.	
23	Encodeur Gestionnaire de collection Conservateur	Click on 'Show batch dialog' in the Batch menu tab (a new window appears).	

24	Encodeur Gestionnaire de collection Conservateur	In the Batch Queue window the left part is to select folders and to choose what to do with project files. The right part is to decide how to stack and safe the stacked images.
25	Encodeur Gestionnaire de collection Conservateur	LEFT: Click on 'Add Projects and Folders' and select the folders to be stacked (important each folder is one view). Decide to Save the project folders in case of type material.
26	Encodeur Gestionnaire de collection Conservateur	RIGHT: Click on 'Add' and Select 'PMax' and 'DMap' (Align and Stack) and press OK
27	Encodeur Gestionnaire de collection Conservateur	Select 'Save in Source Folders' and Press 'Run all Batches'. You can close the Batch Queue Window.
28	Encodeur Gestionnaire de collection Conservateur	If you want that automatically the name of the folder is saved as name for the stacked image, do as follows: Open the 'Preference' submenu in the 'Options' menu and choose 'Image saving'. Below you find 'Output Image Names' and write the following in the space below: {sourcefolder} ZS {method} Press on 'Apply' and OK

B) Photogrammetry

	Acteur	**Etape**
1	Scientifique Conservateur Gestionnaire de collection	Make 3 sets of 36 views of the specimen
2	Encodeur Gestionnaire de collection Conservateur	Import picture(s) in Agisoft
3	Encodeur Gestionnaire de collection Conservateur	Mask • create a mask with photoshop/gimp and use automatic masking if smooth background + check mask • manual masking (lasso or lasso+ctrl)
4	Encodeur Gestionnaire de collection Conservateur	Align picture • Delete picture with dot out of the point cloud
5	Encodeur Gestionnaire de collection Conservateur	Create dense point cloud
6	Encodeur Gestionnaire de collection Conservateur	Create model • cleaning the model with the gradual selection or lasso if necessary • close hole if necessary
7	Encodeur Gestionnaire de collection Conservateur	Create texture (4096x4096)
8	Encodeur Gestionnaire de collection Conservateur	Export in the wanted format DAE for Surface and texture for Meshlab and Unity PLY for Surface and texture for Meshlab STL for surface for Meshlab, Gom Inspect and LhP FusionBox

C) Structured light HDI

Acteur	Etape
Scientifique Conservateur Gestionnaire de collection	**1. Calibration** • Depending on the object size, choose camera position. • Open FlexScan 3.3, in the tab « scanner », choose « Remove » and delete the previous HDI calibration. • Create a new HDI Advance. • On the left part of the screen, select cameras. ! The first camera is the second on the list ! • Position the calibration back-sided (white) and display the focus pattern (right part of the screen). Move the calibration plate until the black cross is approximately in the centre of both cameras. • Focus the projector so the focus pattern is sharp. • Turn the calibration plate with the checker pattern in front of the camera. Focus the cameras. • Place the calibration plate in front of the camera 1 and start capturing the pattern according to the schema. Then do the same with the second camera. • Press calibrate. Your calibration coverage should be superior to 65 % otherwise start again.
Encodeur Gestionnaire de collection Conservateur	**2. Scanning** • Place the object in the centre of the turntable. • Display the focus pattern and check the black cross is in the centre of the camera red cross. • Take out the object. Place the calibration plate, calibrate the turntable (press « Recalibrate » under the scan menu). • Put back your object, check colour texture if required, choose the numbers of scans wished (advice number of scans : 8). Uncheck « automatic combine » and press scan. • Unlock the scans and clean if necessary. To clean, select the unwanted part maintaining the Ctrl button pressed and delete. • Once cleaned, select the scans and press combine. Once combine hide the model by clicking off the check-box next to the thumbnail. • Turn your object on another side and press scan again. • Clean and combine. • Display the previous rotation by clicking on the check-box next to the thumbnail. With Alt button press, align roughly the two combined scans together and press align. • Combine • Repeat this operations until having a full model. • When your full model is combine, press finalize. • Rename the model and export. ! Don't forget to fill out the data-sheet next to the scanner, the parameters of the scan!
Encodeur Gestionnaire de collection Conservateur	**3. Shortcuts** Alt+LMB = rotate selected scan Alt+CMB = Translate selected scan Ctrl+LMB = select parts of the scan

| Encodeur
Gestionnaire de collection
Conservateur | **4. FAQ**

- ***Cameras are not working properly***

  Case 1 - Restart computer and unplug/replug the cameras

  1) Close the software and try to disconnect the power of the cameras, and plug it back in. Restart the software. (You may want to try that several time in a row)

  2) Restart the computer

  3) After re-plugging if issue didn't go away, please try case 2.

  Case 2 - Reset all the camera settings.

  1) Open FlyCap2 > Configure Selected > Advanced Camera Settings > Memory Channel drop down list > select Default, and click on the restore button. From the drop down, then select memory channel 1 > Save. Memory channel 2 > Save.

  2) Close this settings Windows. Open FlexScan3D to see if you are still seeing the split issue. Also, it might be good to verify if from FlyCap by opening FlyCap2 > select the camera, and click on "OK". This will generate a live video from FlyCap. If it's not showing up, please go into settings > Trigger / Strobe tab > check the "Enable /Disable Trigger" check box. Check to see if your video is still split in half. If you are seeing a black screen but see the the Framerate and the Timestamp running on the left hand side, then please change the aperture on the lens to make it brighter.

  3) If you don't see the video splitting in half, then please continue with step 4. Otherwise please skip to case 2.

  4) Go to camera settings > set the "Gain" to 0, "Shutter" to 16.66. Uncheck all the check boxes.

  5) Go to Advanced camera settings > save these settings to memory channel 1 and 2.

- ***I have combine misaligned scan, can I undo ?***

  « Undo » button or Ctrl+Z doesn't work, but you can uncombine and recombine.

  ! When uncombining, you are not going back to the previous step but all the scan are uncombined !

  Tip : Recombine by chunks of the number of scan of your rotation. |