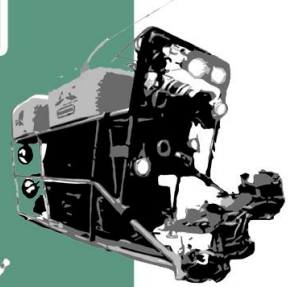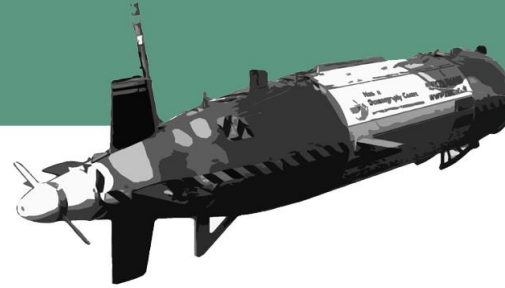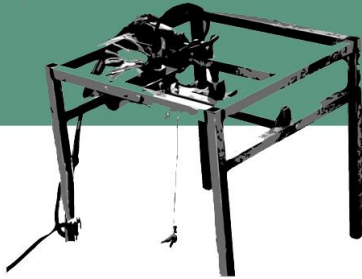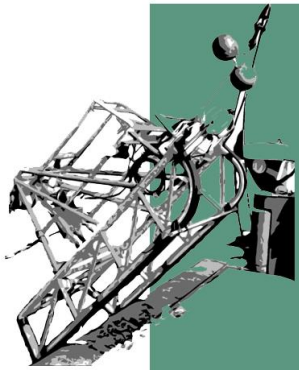# THE BIG PICTURE II
Benthic Imagery Workshop 2021

IMAGE ANNOTATION SOFTWARE
Mark Burton & James King
Natural Resources Wales
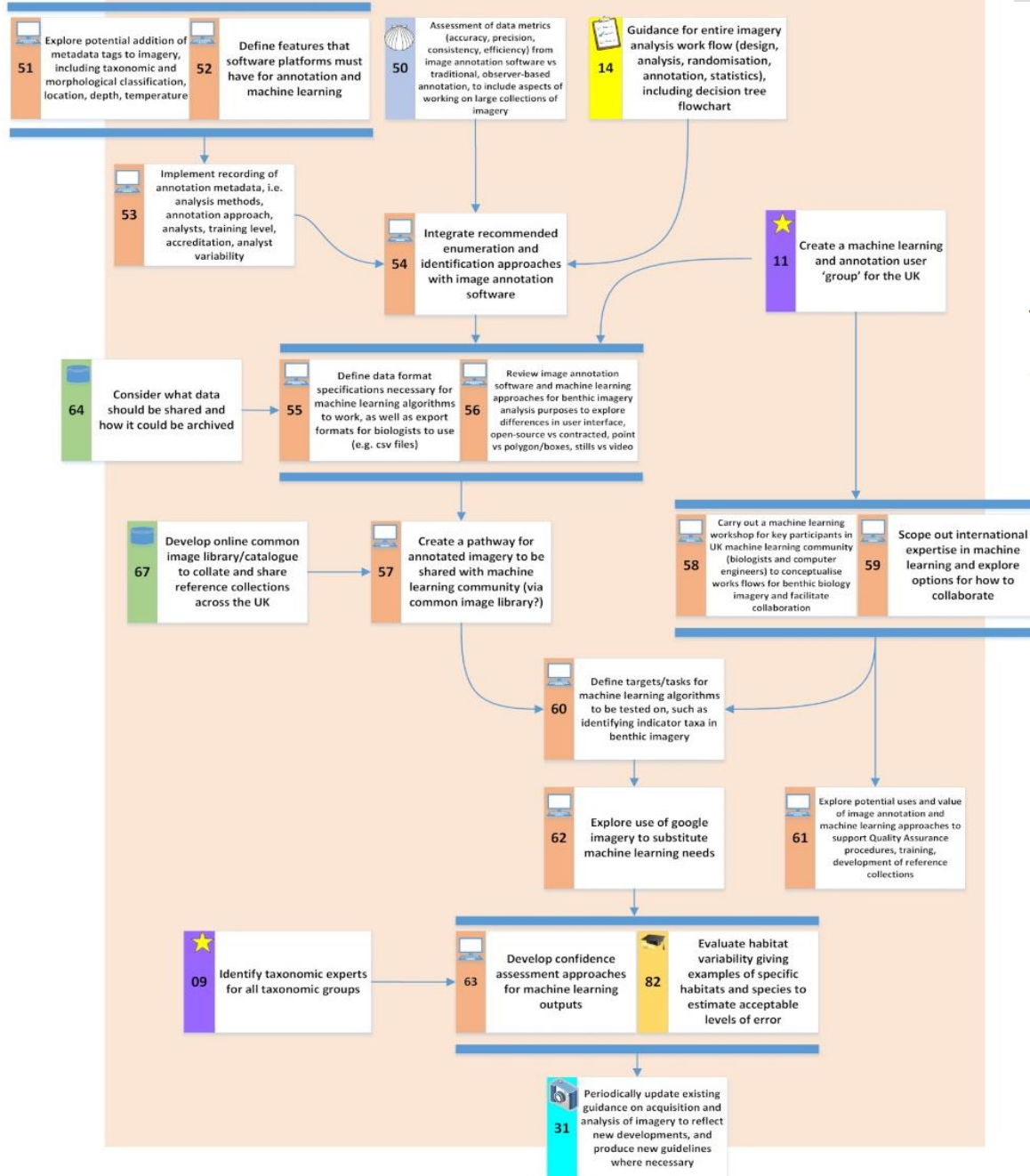
Review

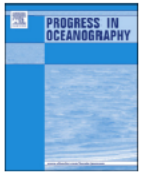# Current and future trends in marine image annotation software

Jose Nuno Gomes-Pereira [a,x,*], Vincent Auger [w], Kolja Beisiegel [b], Robert Benjamin [c], Melanie Bergmann [d], David Bowden [e], Pal Buhl-Mortensen [f], Fabio C. De Leo [g], Gisela Dionísio [h,i,x], Jennifer M. Durden [j,k], Luke Edwards [l], Ariell Friedman [m], Jens Greinert [n], Nancy Jacobsen-Stout [o], Steve Lerner [p], Murray Leslie [g], Tim W. Nattkemper [n], Jessica A. Sameoto [c], Timm Schoening [n], Ronald Schouten [g], James Seager [q], Hanumant Singh [p], Olivier Soubigou [r], Inês Tojeira [s], Inge van den Beld [t], Frederico Dias [u], Fernando Tempera [a,v], Ricardo S. Santos [a]
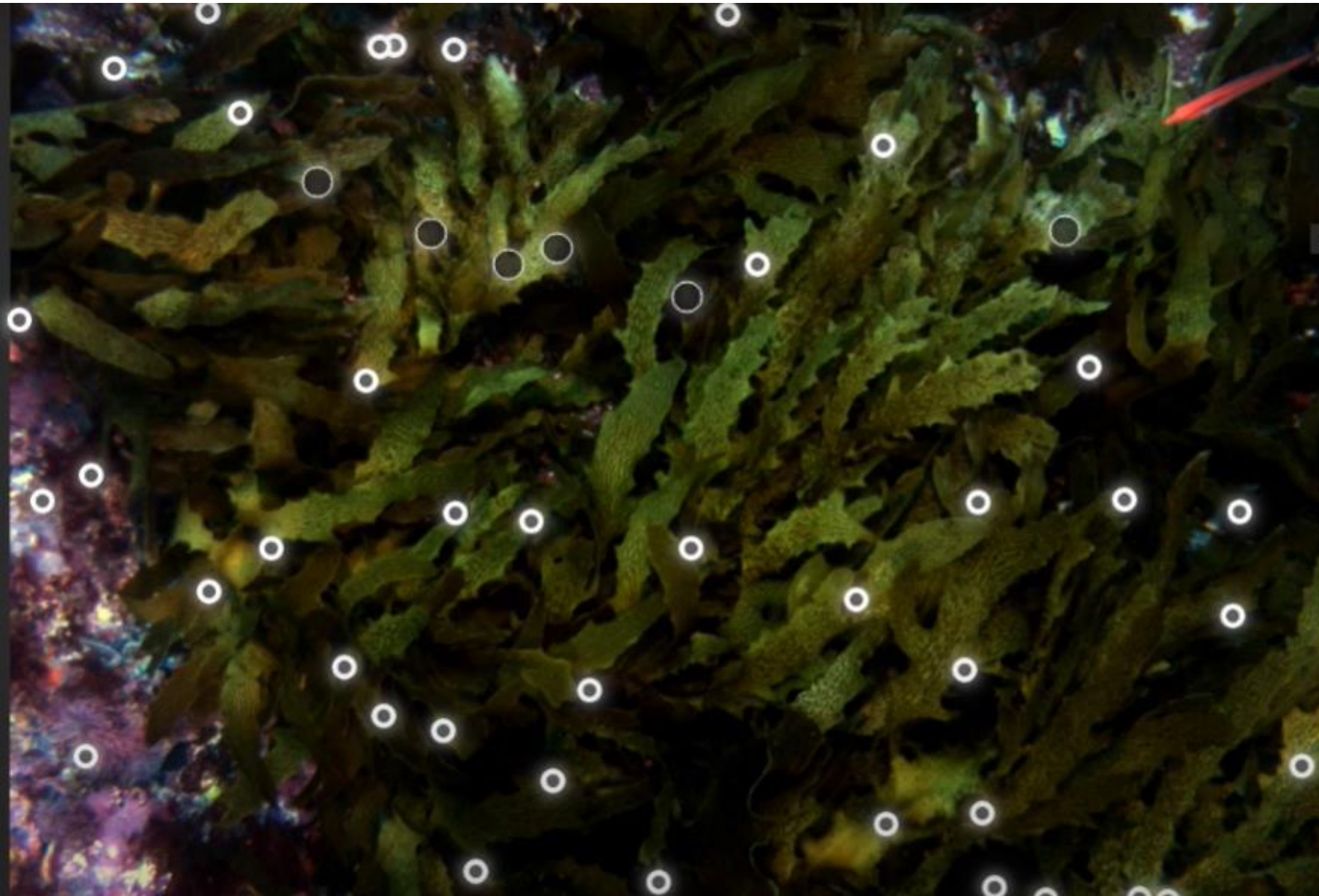
Marine Image Annotation Softwares

- ADELIE
- BIIGLE
- CATAMI
- ClassAct Mapper
- COVER
- CORALNET
- CPCe
- DIAS
- Ecotaxa
- EventMeasure
- FISH_ROCK
- Frame-Grabber
- ImageJ
- IRLS

- Morphocluster
- NICAMS
- OFOP
- photoQuad
- Seascape
- SeaScribe/Seatube
- Squidle+
- TransectMeasure
- VARS
- VIDEOMON
- Video Navigator
- VirtualVan
- ZooImage

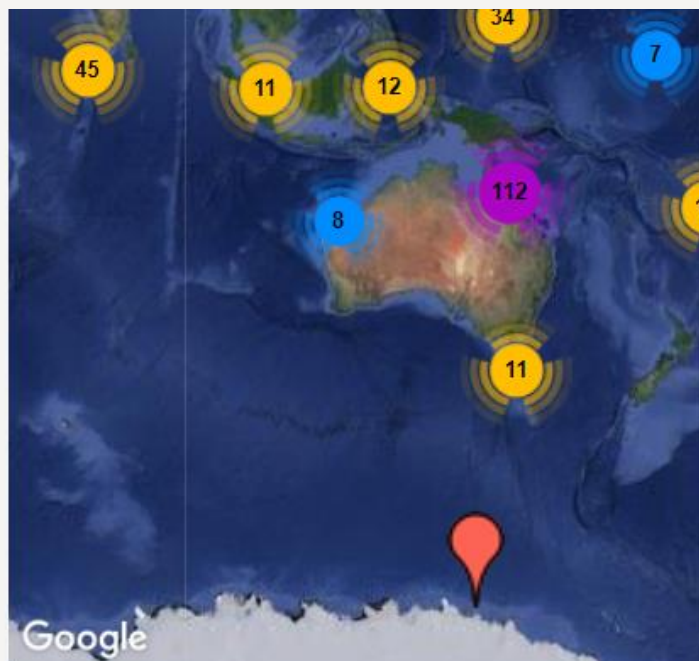| Specifications/acronym	ADELIE	BIIGLE	CATAMI	ClassAct	COVER	CPCe	DIAS	EventMeasure	FISH_ROCK	Frame-Grabber	ImageJ	IRLS	NICAMS	OFOP	photoQuad	Seascape	SeaScribe	Squidle	TransectMeasure	VARS	VIDEOMON	Video Navigator	VirtualVan
Descriptors of image annotation interface	Buttons Lists (tree) Rulers	Lists	Lists	Buttons Lists	Buttons Lists and Rulers	Buttons	Buttons Lists	Buttons	Buttons Lists	Text Entries	–	Buttons Lists	Buttons Lists – Database search	Buttons Lists	Buttons Lists Rulers	Lists	Buttons Lists	Buttons Lists	Buttons	Buttons Lists	Buttons Touch-screen	Buttons Lists	Buttons Lists
Real-time Video input/capture still image	Y/Y	–	–	–	–	–	–	–	–	Y/Y	–	Y/Y	Still image	Y/Y	–	–	Y/Y (G)	–	–	Y/Y	–	–	Y/Y
Receive other data inputs	–	–	–	Y (N)	–	–	–	–	–	Y	–	Y (U)	Y (P)	Y (P)	–	–	Y (O)	–	–	–	Y(X)	–	Y
Display data	Y	–	–	Depth Navigation	–	–	–	–	–	Depth Nav Sci Inst	–	All ROV Data	–	All Ship & Sub + customizable	–	–	Sub, +other metadata	–	–	Y	Y	–	Depth Nav Sci Inst
Posterior annotation Display data	Y	Depth, Nav, Temp, etc.	Nav.	–	Depth	–	Nav.	–	Date Time Depth Nav. Alti Area	Nav. Attitude other	–	All ROV Data, logger name	–	Ship & Sub – Nav.	–	–	–	Depth, nav, meta data, terrain, mosaics	–	Y	–	Y	Depth Nav Sci Inst
Browse annotation file/edit	Y/Y	Y (B)/Y	–/–	Y (J)/Y	–/–	–/Y	Y/Y	Y/Y	–/Y	Y/–	–/–	Y/Y	Y/Y	–/Y (D)	–/Y	–/Y	–/Y	–	Y/Y	Y/Y	–	Y	Y/–
Multiple annotation	–	Y	Y	–	–	–	Y	–	–	–	–	Y	Y	Y	–	–	Y	Y	–	–	–	Y	–
Extra tools Capture still image from video	Y	–	–	–	Y	–	–	Y	–	Y	–	Y	–	Y (Y)	–	–	– (G)	–	Y	Y	–	–	Y
Browse pictures	Y	Y	Y	–	Y	Y	Y	Y	Y	Y	–	Y	Y	Y	–	Y (M)	–	Y	–	Y	–	–	Y
Other tools for image analysis	–	Y	Y	–	Fixed and random point count	Random point count	Length or area, point count	Y	Length or area meas.	–	Y	–	Y	–	–	Image Segmentation	–	Y	–	Y	–	–	–
Annotation data analysis	Y	Y	Y	–	–	–	–	Y	–	–	–	–	–	–	–	–	– (B)	Y	Y	– (B)	–	–	Y
Process navigation data	Y	–	–	–	–	–	–	–	–	–	–	–	–	Y	–	–	Y	.	–	–	–	–	Y
Integrate annotation file	Y	–	–	–	–	–	–	–	–	Y	–	Y	–	Y	–	–	Y	Y	–	Y via database	–	–	Y
Automated annotation Event detection/object identification	–/–	–(H)/Y (I)	–/Y	–/–	–/–	–/–	–/–	–/–	–/–	–/–	–/–	–/–	–/–	–/–	–/–	–/–	–/–	–/–	–/–	–/N	–	–	–/–
Database Functions and format	Y (T)	MySQL server	–	MDB (E)	–	–	PostgreSQL	–	Matlab	GeoBrowser/EIC	–	MySQL	PostGIS or Spatialite	–	–	–	Y (R)	–	–	Y (S)	–	–	GeoBrowser/EIC
Browse database	–	Y (B)	–	via MDB	–	–	Y	–	Matlab	Y	–	Y	db search tools or image-by-image review	–	–	–	Yes (via database application)	Yes	–	Y	–	–	Y

SQUIDLE+

VARS

CORALNET

A WEB SOLUTION FOR CORAL REEF ANALYSIS

Upload coral reef images, organize and annotate images, and view annotation statistics.

Sign In   Register   About

Public sources
Private sources
Multiple sources

Imagery ©2021 NASA, TerraMetrics | Terms of Use

SITEWIDE STATISTICS

Number of sources: 1,785

Number of images: 1,641,522

Number of point annotations: 61,231,121

SITE NEWS

CoralNet is officially out of Beta

A new deep learning engine for CoralNet

Annotation tool bug fixes follow-up: checking potentially affected images

SeaScribe/ SeaTube

PAPARA(ZZ)I: An open-source software interface for annotating photographs of the deep-sea - ScienceDirect
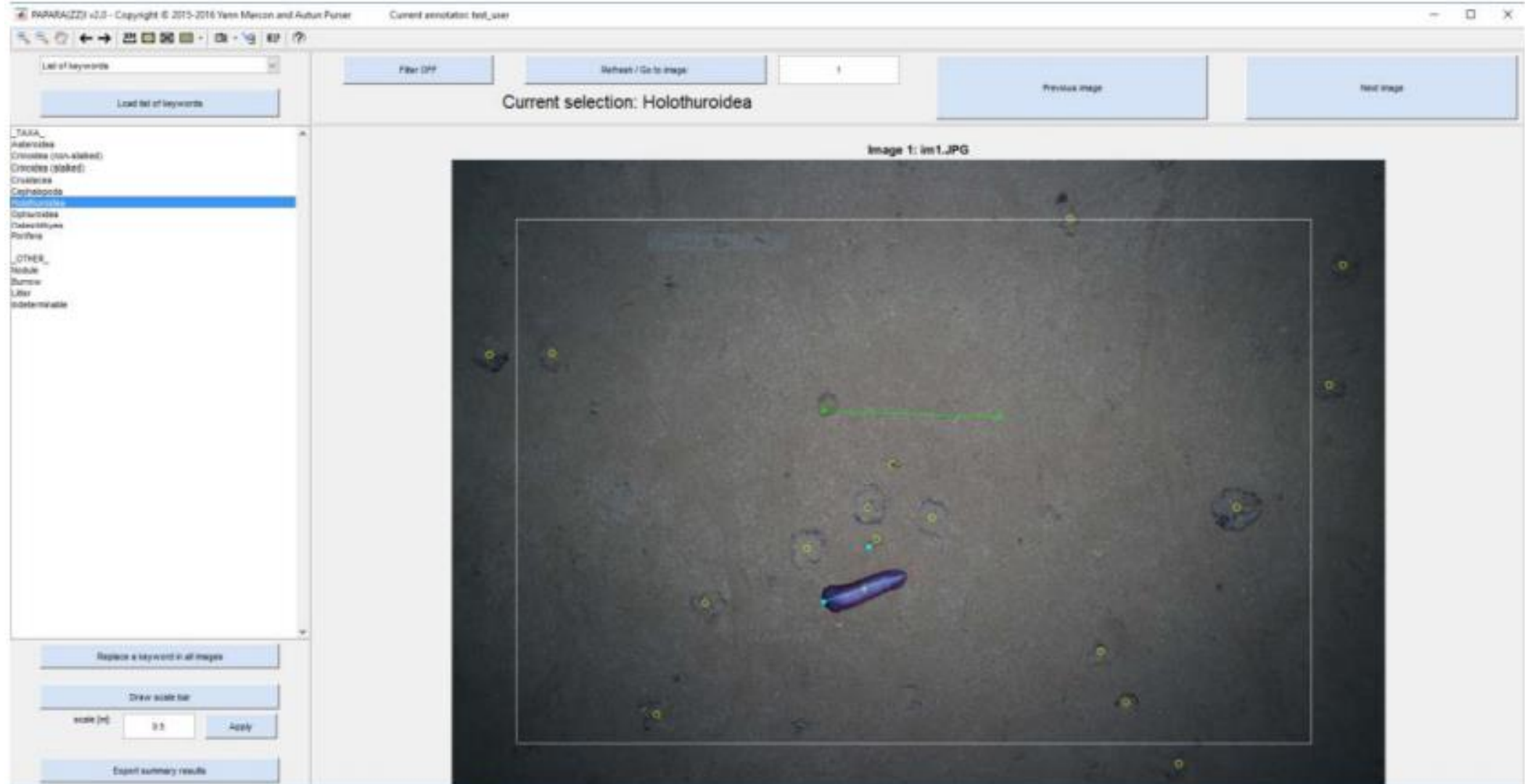
BIIGLE II

Useful features of an annotation system:
- Consistent labels – which can be shared (ideally linked to the EIP)
- Measure as well as count
- QA features – e.g. the LARGO tool in Biigle
- Link with Machine Learning features (and output??)
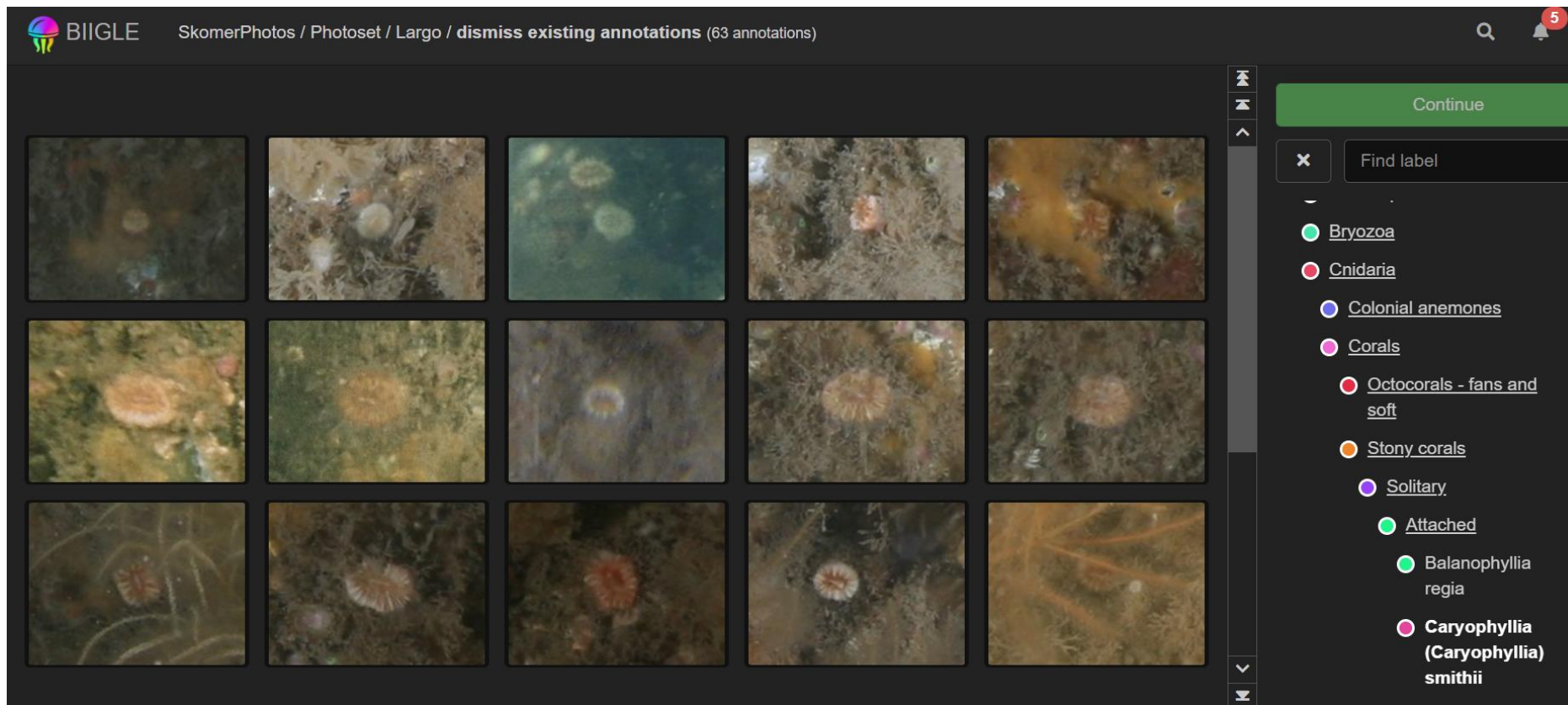
- WHAT SHOULD THE IMAGE ANNOATION GROUP DO?

- Proscribe which annotation systems should be used?
- OR keep up to date with developments and provide updates

- Provide a list of "desirable" features of an annotation tool
- Need to have very strong links with the EIP, data group and the Machine learning group.