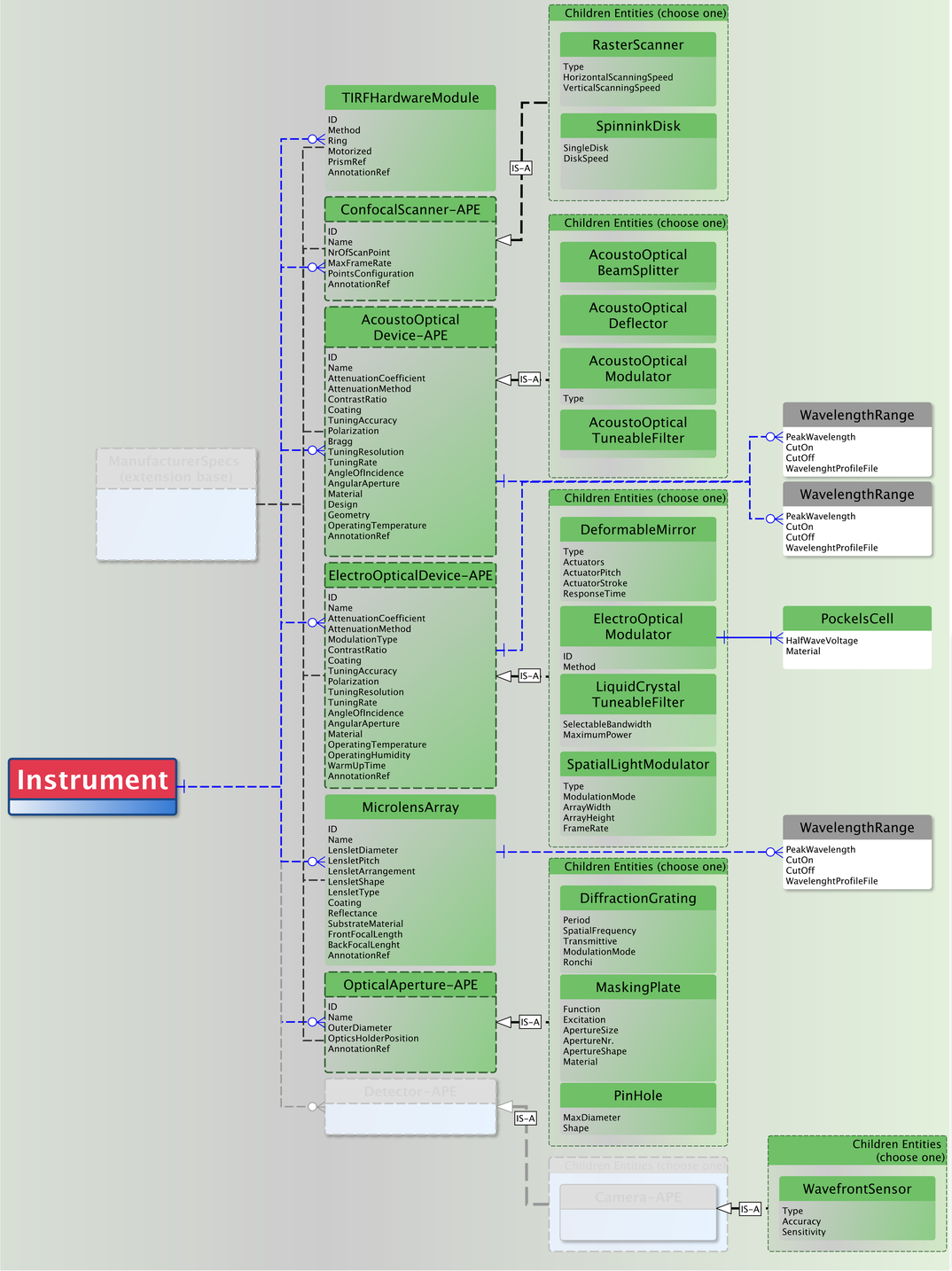
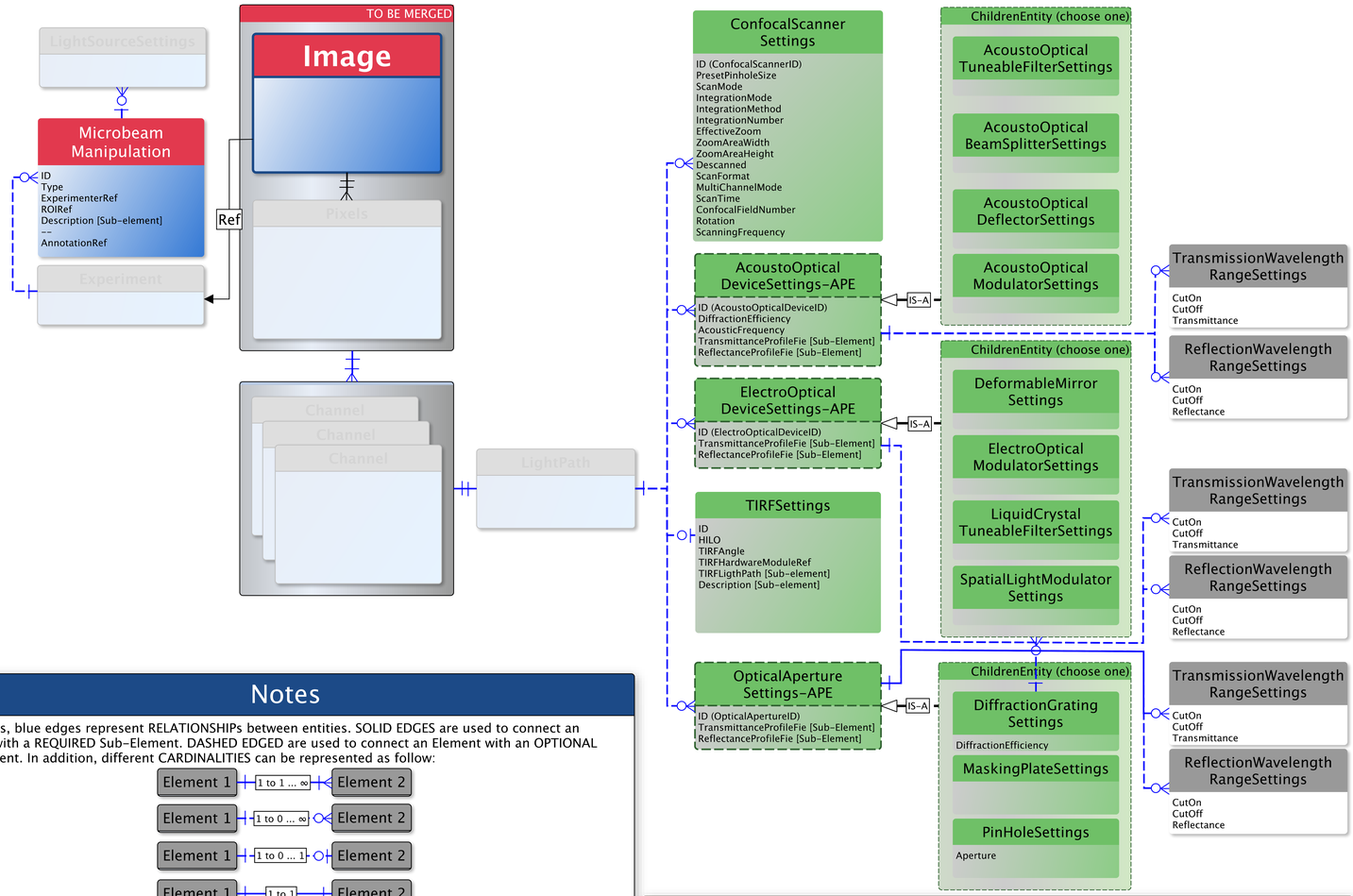
4DN-BINA-OME Advanced & Confocal Extension
Microscope HARDWARE Specifications



4DN-BINA-OME Advanced & Confocal Extension
Image ACQUISITION Settings



Notes

Blue edges, blue edges represent RELATIONSHIPs between entities. SOLID EDGES are used to connect an Element with a REQUIRED Sub-Element. DASHED EDGED are used to connect an Element with an OPTIONAL Sub-Element. In addition, different CARDINALITIES can be represented as follow:

Black dashed arrows, these arrows simbolize an inheritance relationship similar to what would connect an hypothetical "Feline" parent element with a "Cat" child element. In this example, while the "Cat" element represents a "concrete" entity that exist in the real world, the "Feline" element represents an "abstract" category that is only useful for categorization pruposes. In a similar manner, these arrows connect concrete elemennts that represents actual microscope hardware components, with their Abstract Parent Elements (APE), which are useful for making the model less repetitive. These arrows should be read as follows, a "Laser" IS-A "LightSource".

Dashed grey edges, these edges signify "Extends" and they should be read as follows: "Objective" extends "ManufacturerSpecs". In this example, the concept of extension indicates that Objective is of type "ManufacturerSpecs" but it has additional attributes that are unique to it and distinguishes from other similar "ManufacturerSpecs" extensions.
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Units are omitted for simplicity sake.

AnnotationRef, This element always refers to a Comment/Annotation element as described for Channel. However for simplicity sake most Comment/Annotation elements have been omitted and the AnnotationRef has been inserted in the referring element as an attribute.

[Sub-Element], For semplicity sake, when indicated Sub-Elements are listed within the referring element as an attribute.

References, For simplicity sake, when indicated Reference elements (e.g., ImageRef) are listed whithin the referring element as attributes.

Attributes listed after a --- separator have been added to the OME Core as part of the proposed revision. Attributes listed after .... and in parenthesis have been removed as part of the proposed revision.

APE, Abstract Parent Entity (see explanation above).

Legend

This is a Entity-Relationship diagrammatic representation of a proposed REVISION of the OME Core data model (blue/red boxes) along side a proposed OME BASIC EXTENSION (grey boxes) developed by members of the Imaging Working Group of the 4D Nucleome network (https://www.4dnucleome.org) and by members of the BINA Quality Control and Data Management Working Group (https://www.bioimagingna.org/qc-dm-wg).

The Entity-Relationship formalism represents information about a real world situation/object
(in our case a microscopic INSTRUMENT and an IMAGE acquired using that Instrument) by using three types of model elements:
1) Entities = Boxes;
2) Relationships = lines connecting boxes;
3) Attributes = fields within boxes

When describing a real life situation/object:
1) ENTITIES corresponds to NOUNS = the things we want to collect information about.
2) RELATIONSHIPS corresponds to VERBS = actions/state/occurrence that connect Entities with each other
3) ATTRIBUTES corresponds to ADJECTIVES = the actual information about each Entity we want to collect

In order to interpret the schema please start from either the <INSTRUMENT> or the <IMAGE> elements for the Hardware Specifications and Image Acquisition Settings section respectively. Then follow the blue lines to the connected boxes and think something like:
1) An Instrument has a MicroscopeStand and a LightSource, and might rest on a MicroscopeTable etc.;
2) An Image was produced as part of a specific Experiment, was collected in a specific ImagingEnvironment, was collected using specific MicroscopeSettings etc.

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