



**INTERNATIONAL STANDARD ISO/IEC 23090-10:2022**  
**TECHNICAL CORRIGENDUM 1**

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# **Information technology — Coded representation of immersive media — Part 10: Carriage of visual volumetric video-based coding data**

## **TECHNICAL CORRIGENDUM 1**

*Technologies de l'information — Représentation codée de média immersifs — Partie 10: Transport de données de codage basé sur la vidéo volumétrique*

*RECTIFICATIF TECHNIQUE 1*

Technical Corrigendum 1 to ISO/IEC 23090-10:2022 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.



## 1 v3c\_unit and nal\_unit types

In the syntax of V3CDecoderConfigurationRecord the v3c\_parameter\_set is using the v3c\_unit type which is defined in ISO/IEC 23090-5 but not in ISO/IEC 23090-10.

```
v3c_unit v3c_parameter_set(v3c_parameter_set_length);
```

Even worse is the fact that while the syntax defines the parameter set to be a v3c\_unit, the semantics section only refers to a V3C Unit payload:

v3c\_parameter\_set is a V3C unit payload for V3C unit of type V3C\_VPS, as defined in ISO/IEC 23090-5.

This is clearly a mismatch between semantics and the syntax, because ISO/IEC 23090-5 defines the v3c\_unit, as a v3c\_unit\_header + v3c\_unit\_payload.

Similarly, nal\_unit is also defined in ISO/IEC 23090-5 and should be replaced by generic bit(8) type. It is also proposed to remove unnecessary inline comments.

### 1.1 Proposed corrigendum

*In 7.2.1.2, replace:*

```
aligned(8) class V3CDecoderConfigurationRecord {

    // version 0

    unsigned int(3) unit_size_precision_bytes_minus1;

    unsigned int(5) num_of_v3c_parameter_sets;

    for (int i=0; i < num_of_v3c_parameter_sets; i++) {

        unsigned int(16) v3c_parameter_set_length;

        // v3c_unit() as defined in ISO/IEC 23090-5

        v3c_unit v3c_parameter_set(v3c_parameter_set_length);

    }

    unsigned int(8) num_of_setup_unit_arrays;

    for (int j=0; j < num_of_setup_unit_arrays; j++) {

        unsigned int(1) array_completeness;

        bit(1) reserved = 0;

        unsigned int(6) nal_unit_type;

        unsigned int(8) num_nal_units;

        for (int i=0; i < num_nal_units; i++) {

            unsigned int(16) setup_unit_length;

            // nal_unit(size) as defined in ISO/IEC 23090-5
```

```

        nal_unit setup_unit(setup_unit_length);

    }

}

// additional fields
}

with:
aligned(8) class V3CDecoderConfigurationRecord(int version) {
    if(version == 0){
        unsigned int(3) unit_size_precision_bytes_minus1;
        unsigned int(5) num_of_v3c_parameter_sets;
        for (int i=0; i < num_of_v3c_parameter_sets; i++) {
            unsigned int(16) v3c_parameter_set_length;
            bit(8) v3c_parameter_set[v3c_parameter_set_length];
        }
        unsigned int(8) num_of_setup_unit_arrays;
        for (int j=0; j < num_of_setup_unit_arrays; j++) {
            unsigned int(1) array_completeness;
            bit(1) reserved = 0;
            unsigned int(6) nal_unit_type;
            unsigned int(8) num_nal_units;
            for (int i=0; i < num_nal_units; i++) {
                unsigned int(16) setup_unit_length;
                bit(8) setup_unit[setup_unit_length];
            }
        }
    }
}

```

*In 7.2.1.3, replace:*

v3c\_parameter\_set\_length indicates the size, in bytes, of the v3c\_parameter\_set field.  
v3c\_parameter\_set is a V3C unit payload for V3C unit of type V3C\_VPS, as defined in ISO/IEC 23090-5.

...

setup\_unit\_length indicates the size, in bytes, of the setup\_unit field. The length field includes the size of both the NAL unit header and the NAL unit payload but does not include the length field itself.

setup\_unit contains a NAL unit according to related nal\_unit\_type. When present in setup\_unit, NAL\_PREFIX\_ESEI, NAL\_PREFIX\_NSEI, NAL\_SUFFIX\_ESEI, or NAL\_SUFFIX\_NSEI contain SEI messages of a 'declarative' nature, that is, those that provide information about the stream as a whole. An example of such an SEI could be a user-data SEI.

*with:*

v3c\_parameter\_set\_length indicates the size, in bytes, of the v3c\_parameter\_set array. The signalled value shall not be equal to 0.

v3c\_parameter\_set is an array of data containing the entire v3c\_unit of the type V3C\_VPS, as defined in ISO/IEC 23090-5.

...

setup\_unit\_length indicates the size, in bytes, of the setup\_unit array. The signalled value shall not be equal to 0.

setup\_unit is an array of data containing the entire nal\_unit as defined in ISO/IEC 23090-5. The contained NAL unit shall be of the same type as specified by nal\_unit\_type. When present in setup\_unit, NAL\_PREFIX\_ESEI, NAL\_PREFIX\_NSEI, NAL\_SUFFIX\_ESEI, or NAL\_SUFFIX\_NSEI contain SEI messages of a 'declarative' nature, that is, those that provide information about the stream as a whole. An example of such an SEI could be a user-data SEI.

*In 7.2.2.2, replace:*

```
class V3CConfigurationBox extends FullBox('v3cC', version = 0, 0) {
    V3CDecoderConfigurationRecord();
}
```

*with:*

```
class V3CConfigurationBox extends FullBox('v3cC', version = 0, 0) {
    V3CDecoderConfigurationRecord v3c_config(version);
}
```

*In 7.2.2.3, replace:*

V3CDecoderConfigurationRecord is defined in subclause 7.2.1

*with:*

v3c\_config is an instance of V3CDecoderConfigurationRecord as defined in subclause 7.2.1.

## 2 sample\_stream\_nal\_unit type definition

In the context of ISO/IEC 23090-10 the sample\_stream\_nal\_unit type is undefined. The following syntax of V3CAtlasSample addresses the problem.

### 2.1 Proposed corrigendum

*In 7.4.4.2, replace:*

```
aligned(8) class V3CAtlasSample {
    // sample_size value is the size of the sample from the SampleSizeBox
    for (int i=0; i < sample_size; ) {
        sample_stream_nal_unit ss_nal_unit; // as defined in ISO/IEC 23090-5
        i += ss_nal_unit.ssnu_nal_unit_size +
            V3CDecoderConfigurationRecord.unit_size_precision_bytes_minus1 + 1;
    }
}
```

*with:*

```
aligned(8) class V3CAtlasSample {
    // sample_size value is the size of the sample from the SampleSizeBox
    for (int i=0; i < sample_size; ) {
        unsigned int((v3c_config.unit_size_precision_bytes_minus1 + 1)*8) nal_size;
        bit(8) ss_nal_unit[nal_size];
        i += nal_size + v3c_config.unit_size_precision_bytes_minus1 + 1;
    }
}
```

*In 7.4.4.3, replace:*

`ss_nal_unit` contains a single NAL unit in NAL unit sample stream format as defined in ISO/IEC 23090-5 :2021, Annex D.

`ssnu_nal_unit_size` specifies the size, in bytes, of the sample stream NAL unit. The number of bits used to represent `ssnu_nal_unit_size` is equal to  $(V3CDecoderConfigurationRecord.unit\_size\_precision\_bytes\_minus1 + 1) * 8$ .

*with:*

`nal_size` specifies the size, in bytes, of the `ss_nal_unit` array. This size is equivalent to the sample stream NAL unit size `ssnu_nal_unit_size` as defined in ISO/IEC 23090-5 :2021, Annex D.

`ss_nal_unit` is an array of data containing a single NAL unit as defined in ISO/IEC 23090-5.

NOTE Both, `nal_size` and `ss_nal_unit` replicate the sample stream NAL unit format `sample_stream_nal_unit` as defined in ISO/IEC 23090-5.

### 3 v3c\_unit\_header

In the context of ISO/IEC 23090-10 the `v3c_unit_header` type is undefined. The following change addresses the problem and removes unnecessary comment.

#### 3.1 Proposed corrigendum

*In 8.5.3.2, replace:*

```
aligned(8) class V3CUnitHeaderProperty() extends ItemFullProperty('vutp',
version=0, 0) {

    v3c_unit_header header(); // 4 bytes

}
```

*with:*

```
aligned(8) class V3CUnitHeaderProperty() extends ItemFullProperty('vutp',
version=0, 0) {
    bit(8) header[4];
}
```

### 4 v3c\_parameter\_set type

Remove undefined syntax elements from `V3CConfigurationProperty` by updating the specification as defined in the subclauses.

#### 4.1 Proposed corrigendum

*In 8.5.2.2, replace:*

```
aligned(8) class V3CConfigurationProperty

    extends ItemProperty('v3cp', version=0, flags) {

        unsigned int(16) v3c_parameter_set_length;

        // v3c_parameter_set() as defined in ISO/IEC 23090-5

        v3c_parameter_set v3c_parameter_set(v3c_parameter_set_length);
```

```
}
```

*with:*

```
aligned(8) class V3CConfigurationProperty extends ItemProperty('v3cp', version=0,
flags) {
    unsigned int(16) v3c_parameter_set_length;
    bit(8) v3c_parameter_set[v3c_parameter_set_length];
}
```

*In 8.5.2.3, replace:*

`v3c_parameter_set_length` specifies the size in bytes of the `v3c_parameter_set()`.

`v3c_parameter_set` contains a V3C parameter set as defined in ISO/IEC 23090-5.

*with:*

`v3c_parameter_set_length` specifies the size in bytes of the `v3c_parameter_set` array. The signalled value shall not be equal to 0.

`v3c_parameter_set` is an array of data containing a V3C parameter set as defined in ISO/IEC 23090-5.