VOEvent 2.0 Schema limitations

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- **– Problem in WhereWhen field for Time & Coordinate it doesn’t fit !!!!**
  - **For planetary science data**
  - **Satellite based observation**
  - **For large region of observation (gravitational waves)**

VOEVENTS Schema propositions

```
<xs:complexType name="AstroCoordSystem">
  <xs:annotation>
    <xs:documentation> Part of WhereWhen</xs:documentation>
  </xs:annotation>
  <!-- The empty sequence closes this to content -->
  <xs:sequence>
    <xs:element minOccurs="0" name="TimeFrame" type="TimeFrameType"/>
    <xs:element minOccurs="0" name="SpaceFrame" type="SpaceFrameType"/>
  </xs:sequence>
  <xs:attribute name="id" type="xs:string"/>
 </xs:complexType>
```

VOEVENTS Schema propositions

```
<xs:complexType name="TimeFrameType">
 <xs:annotation>
  <xs:documentation>A CoordFrame has to have at least an Id</xs:documentation>
 </xs:annotation>
 <xs:sequence>
  <xs:element minOccurs="0" name="Name" type="xs:string"/>
  <xs:element minOccurs="0" name="ReferencePosition" type="xs:string">
   <xs:annotation>
    <xs:documentation>Origin of the coordinate reference frame: either a "known place" such as geocenter or barycenter, or a position defined in a known coordinate system</xs:documentation>
   </xs:annotation>
  </xs:element>
  <xs:element minOccurs="0" name="TimeScale" type="xs:string">
   <xs:annotation>
    <xs:documentation>The time reference frame consists of a time scale, a time format, and a reference time, if needed</xs:documentation>
   </xs:annotation>
  </xs:element>
 </xs:sequence>
 <xs:attribute name="id" type="xs:string"/>
</xs:complexType>
```

VOEVENTS Schema propositions

```
<xs:complexType name="SpaceFrameType">
 <xs:annotation>
  <xs:documentation>A CoordFrame has to have at least an Id</xs:documentation>
 </xs:annotation>
 <xs:sequence>
  <xs:element minOccurs="0" name="name" type="xs:string"/>
  <xs:element minOccurs="0" name="SpaceRefFrame" type="xs:string">
   <xs:annotation>
    <xs:documentation>Coordinate reference frame: optional equinox with either a standard reference system (ICRS, FK5, FK4) and optional standard pole (equatorial, ecliptic, galactic, etc.), or pole (positive Z-axis) and positive X-axis direction </xs:documentation>
   </xs:annotation>
  </xs:element>
  <xs:element minOccurs="0" name="CoordFlavor" type="xs:string">
   <xs:annotation>
    <xs:documentation>Provides the coordinate definitions: number of axes, SPHERICAL, CARTESIAN, UNITSPHERE, POLAR, or HEALPIX, presence of velocities</xs:documentation>
   </xs:annotation>
  </xs:element>
  <xs:element minOccurs="0" name="ReferencePosition" type="xs:string">
   <xs:annotation>
    <xs:documentation>Origin of the coordinate reference frame: either a "known place" such as geocenter or barycenter, or a position defined in a known coordinate system</xs:documentation>
```

VOEVENTS Schema propositions

```
    </xs:annotation>
  </xs:element>
 </xs:sequence>
 <xs:attribute name="id" type="xs:string"/>
</xs:complexType>
```

VOEVENTS Schema propositions

```
<xs:complexType name="AstroCoords">
 <xs:annotation>
  <xs:documentation> Part of WhereWhen</xs:documentation>
 </xs:annotation>
 <xs:all>
  <xs:element name="Time" type="Time" minOccurs="0">
   <xs:annotation>
    <xs:documentation>Time instant or Time Interval for the event</xs:documentation>
   </xs:annotation>
  </xs:element>
  <xs:element minOccurs="0" name="PostionName" type="xs:string">
   <xs:annotation>
    <xs:documentation>Named position ofr the event</xs:documentation>
   </xs:annotation>
  </xs:element>
  <xs:element name="Position2D" type="Position2D" minOccurs="0">
   <xs:annotation>
    <xs:documentation>Position for the event (2D coordSystem)</xs:documentation>
   </xs:annotation>
  </xs:element>
  <xs:element name="Position3D" type="Position3D" minOccurs="0">
   <xs:annotation>
...
```

VOEVENTS Schema propositions

```
<xs:complexType name="Time">
  <xs:annotation>
    <xs:documentation> Part of WhereWhen</xs:documentation>
  </xs:annotation>
  <xs:choice maxOccurs="unbounded">
    <xs:element name="TimeInstant" type="TimeInstant"/>
    <xs:element name="TimeInterval" type="TimeInterval" minOccurs="0"/>
    <xs:element name="Error" type="xs:float" minOccurs="0"/>
  </xs:choice>
  <xs:attribute name="unit" type="xs:string"/>
 </xs:complexType>
```

VOEVENTS Schema propositions

```
<xs:complexType name="TimeInstant">
  <xs:annotation>
    <xs:documentation> Part of WhereWhen mid observation time</xs:documentation>
  </xs:annotation>
  <xs:choice maxOccurs="unbounded">
    <xs:element name="ISOTime" type="xs:string" minOccurs="0" maxOccurs="1"/>
    <xs:element name="TimeOffset" type="xs:float" minOccurs="0" maxOccurs="1"/>
    <xs:element name="TimeScale" type="xs:string" minOccurs="0" maxOccurs="1"/>
   <xs:element name="TimeOrigin" type="xs:string" minOccurs="0" maxOccurs="1"/>
  </xs:choice>
 </xs:complexType>
```

VOEVENTS Schema propositions

```
<xs:complexType name="TimeInterval">
  <xs:annotation>
    <xs:documentation> Part of WhereWhen mid observation time</xs:documentation>
  </xs:annotation>
  <xs:choice maxOccurs="unbounded">
    <xs:element name="StartTime" type="xs:string" minOccurs="0" maxOccurs="1"/>
    <xs:element name="StopTime" type="xs:string" minOccurs="0" maxOccurs="1"/>
   </xs:choice>
 </xs:complexType>
```

VOEVENTS Schema propositions

```
<xs:complexType name="Position3D">
  <xs:annotation>
    <xs:documentation> Part of WhereWhen</xs:documentation>
  </xs:annotation>
  <xs:all>
    <xs:element name="Name1" type="coordinate_axe" minOccurs="0"/>
    <xs:element name="Name2" type="coordinate_axe" minOccurs="0"/>
    <xs:element name="Name3" type="coordinate_axe" minOccurs="0"/>
    <xs:element name="Value3" type="Value3"/>
    <xs:element name="Error3" type="error3" minOccurs="0"/>
  </xs:all>
  <xs:attribute name="unit" type="xs:string"/>
 </xs:complexType>

 <xs:complexType name="coordinate_axe" mixed="true">
<xs:annotation>
  <xs:documentation>element for each axe</xs:documentation>
</xs:annotation>
  <xs:sequence/>
  <xs:attribute name="ucd" type="xs:string"/>
  <xs:attribute name="unit" type="xs:string"/>
 </xs:complexType>
```

VOEVENTS Schema propositions

```
<xs:complexType name="error3">
  <xs:annotation>
    <xs:documentation> Part of WhereWhen</xs:documentation>
  </xs:annotation>
  <xs:all>
    <xs:element name="C1" type="xs:float" minOccurs="0"/>
    <xs:element name="C2" type="xs:float" minOccurs="0"/>
    <xs:element name="C3" type="xs:float" minOccurs="0"/>
  </xs:all>
 </xs:complexType>
```

VOEVENTS Schema propositions

```
 <xs:complexType name="AstroCoordSystem">
   <xs:annotation>
    <xs:documentation> Part of
WhereWhen</xs:documentation>
   </xs:annotation>
   <!-- The empty sequence closes this to content
-->
   <xs:sequence/>
   <xs:attribute name="id" type= "xs:string"/>
  </xs:complexType>
```

```
<xs:attribute name="id" type="idValues"/>
 </xs:complexType>
 <xs:simpleType name="idValues">
  <xs:restriction base="xs:string">
    <xs:enumeration value="TT-ICRS-TOPO"/>
    <xs:enumeration value="UTC-ICRS-TOPO"/>
    <xs:enumeration value="TT-FK5-TOPO"/>
    <xs:enumeration value="UTC-FK5-TOPO"/>
    <xs:enumeration value="GPS-ICRS-TOPO"/>
    <xs:enumeration value="GPS-ICRS-TOPO"/>
    <xs:enumeration value="GPS-FK5-TOPO"/>
    <xs:enumeration value="GPS-FK5-TOPO"/>
    <xs:enumeration value="TT-ICRS-GEO"/>
    <xs:enumeration value="UTC-ICRS-GEO"/>
    <xs:enumeration value="TT-FK5-GEO"/>
    <xs:enumeration value="UTC-FK5-GEO"/>
    <xs:enumeration value="GPS-ICRS-GEO"/>
    <xs:enumeration value="GPS-ICRS-GEO"/>
    <xs:enumeration value="TDB-ICRS-BARY"/>
    <xs:enumeration value="TDB-FK5-BARY"/>
    <!-- this one for ObservatoryLocation -->
   <xs:enumeration value="UTC-GEOD-TOPO"/>
  </xs:restriction>
</xs:simpleType>
```

Conclusion

- We have firstly tried to reconnect VOEvent to STC 1.03. But it seems not retro compatible and complex. Not handle by all parse.

- We have build an evolution of VOEvent schema from 2.0 to 2.1 that should be a starting point.

- High Energy Astronomy and gravitational waves have specific requirements. Do we want each community to put things in What section as specific group. How to “Normalized” a semantic.