

HOWTO: Supporting Quantities and Measures in the Tool API

The purpose of this HowTo is to provide examples for passing and returning measures and quantities from CASA tools. It will make tool use much easier if this convention is followed.

Example 1

The example below shows how a tool method should work with a quantity (e.g., 1 arcsecond, 2 meter, etc.). The example method simply takes in the argument and returns it. When defined as shown, the tool method could be called like:

```
q = hammer.identityForQuantity (hammer.identityForQuantity ("1arcsecond"))
```

This shows that the original caller can specify the quantity as a string (fairly common when writing task code) and the same interface can also take the return value of a method returning a quantity (represented in python as a dictionary) from the C++ layer. The heavy-lifting is done by `casa::casaQuantity` so tool method gains a more flexible interface without having significant work.

```
----- hammer.xml
```

```
<tool name="hammer" module="ToolTime">
<method type="function" name="identityForQuantity">
  <shortdescription>Example tool method that returns it's argument
  </shortdescription>
  <input>
    <param type="variant" name="aQuantity">
      <description>The argument quantity</description>
      <value>1</value>
    </param>
  </input>
  <returns type="record"/>
</method>
</tool>
```

```
----- Inside hammer_cmpt.cc
```

```
#include <stdcasa/StdCasa/CasacSupport.h>
::casac::record *
hammer::identityForQuantity (const ::casac::variant& aQuantity)
{
```

```

    casa::Quantity theQuantity = casaQuantity (aQuantity);
    return recordFromQuantity (theQuantity);
}

```

Example 2

This example is similar to example 1 above, but uses a measure rather and a quantity. The file CasacSupport.h provides converters for the most common measures (Epoch, Position, Direction, RadialVelocity, Frequency).

```

----- screwdriver.xml

```

```

<tool name="screwdriver" module="ToolTime">
<method type="function" name="identityForDirection">
    <shortdescription>Example tool method that returns it's argument
    </shortdescription>
    <input>
        <param type="variant" name="aDirection">
            <description>The argument direction</description>
            <value>1</value>
        </param>
    </input>
    <returns type="record"/>
</method>
</tool>

```

```

----- inside screwdriver_cmpt.cc

```

```

#include <stdcasa/StdCasa/CasacSupport.h>
::casac::record *
hammer::identityForDirection (const ::casac::variant& aDirection)
{
    casa::MDirection theDirection;
    casaMDirection (aDirection, theDirection);

    MeasureHolder holder (theDirection);
    Record outRec;
    String message;

    if (! holder.toRecord(message, outRec)){
        throw AipsError(message);
    }
}

```

```
    }  
    return fromRecord (outRec);  
}
```