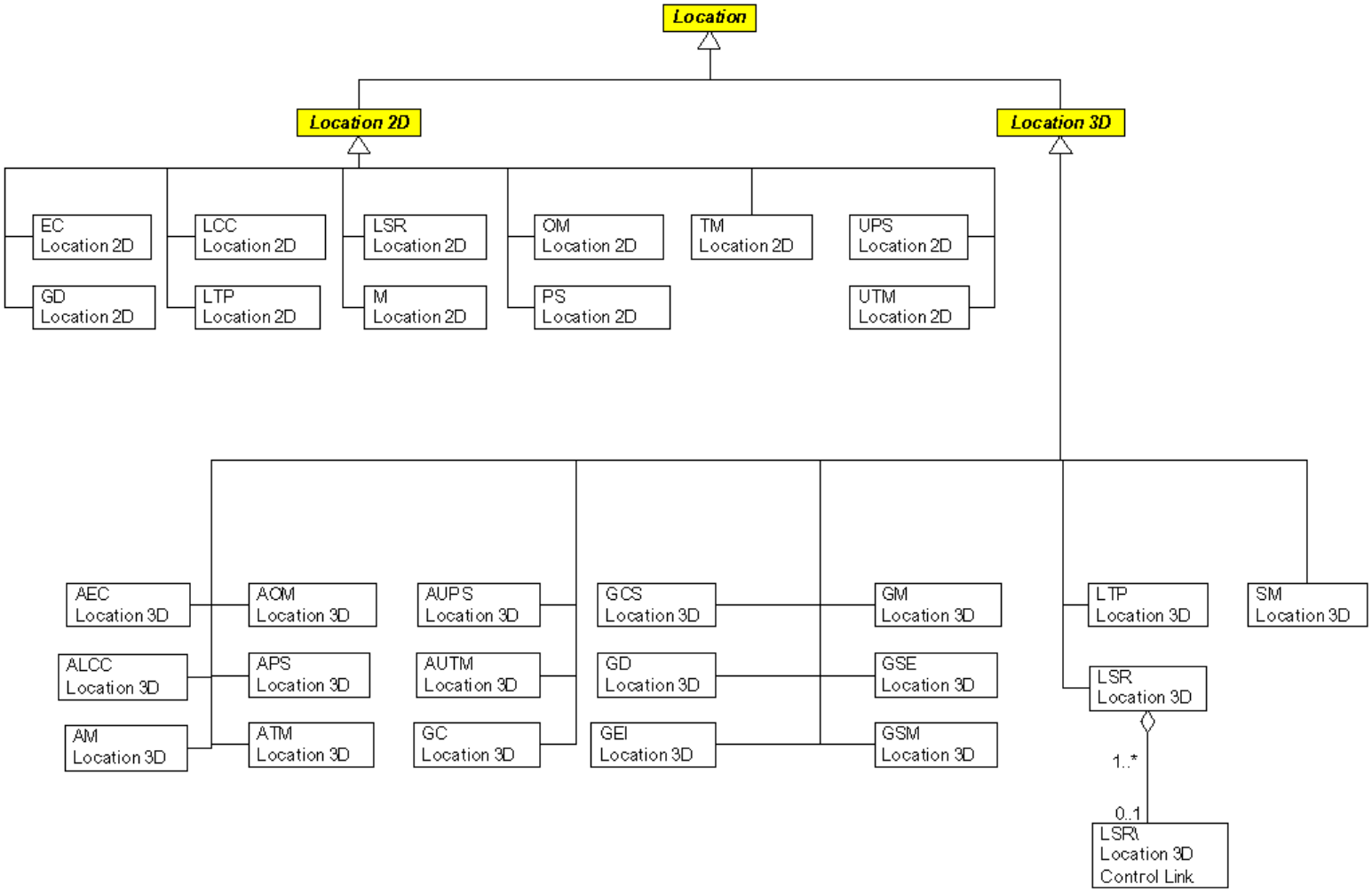
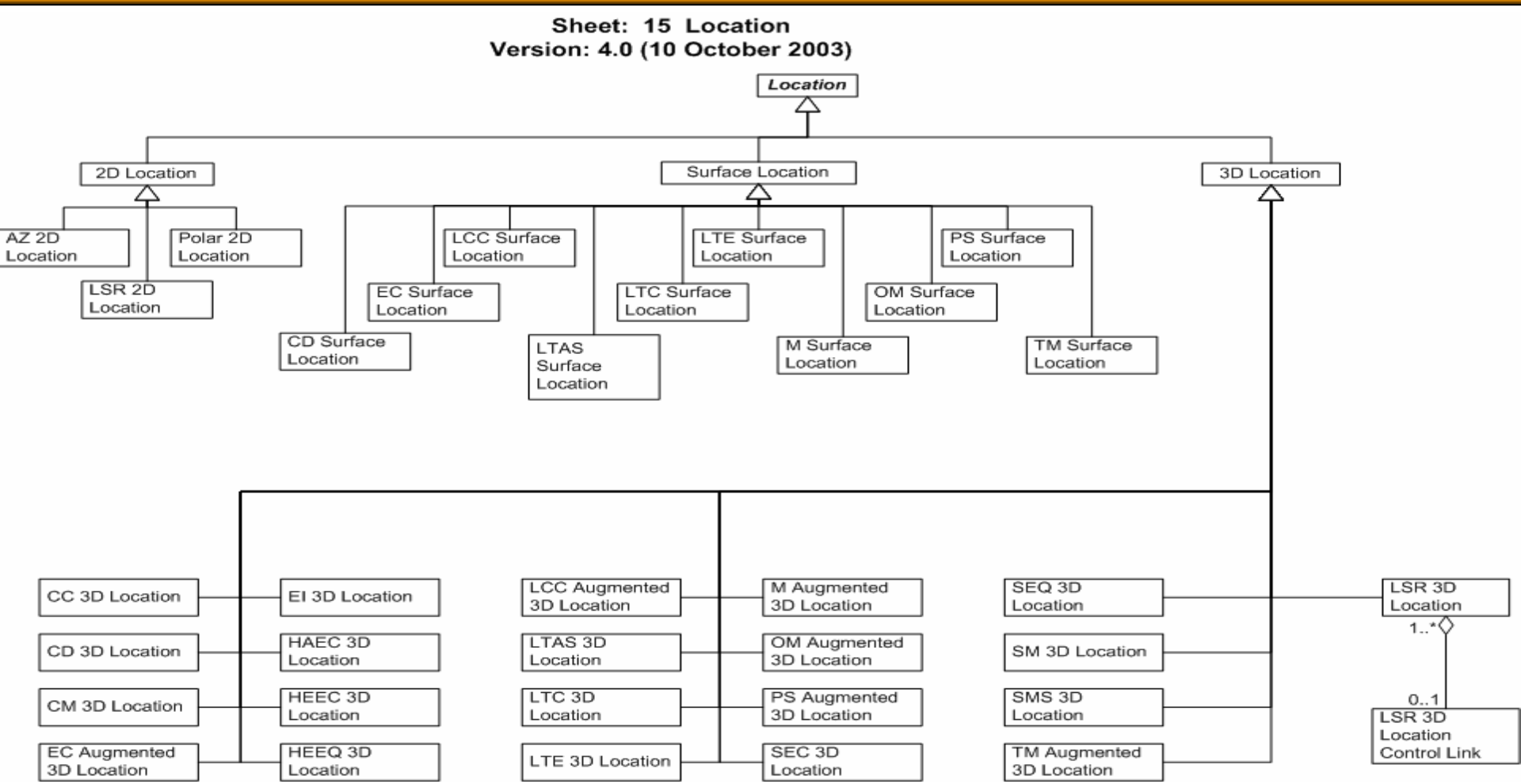
Summary of Location Class Changes

- **Three abstract classes instead of two**
  - 3.1: 2D/3D
  - 4.0: 2D/Surface/3D classes
- **One concrete class per SRF Template**
- **Renamed Geo → Celestio**
- **Introduced new classes**
- **Removed:**
  - AUPS 3D/UPS 2D → PS 3D/PS Surface
  - GCS 3D → LTE 3D
  - AUTM 3D/UTM 2D → TM Augmented 3D/TM Surface

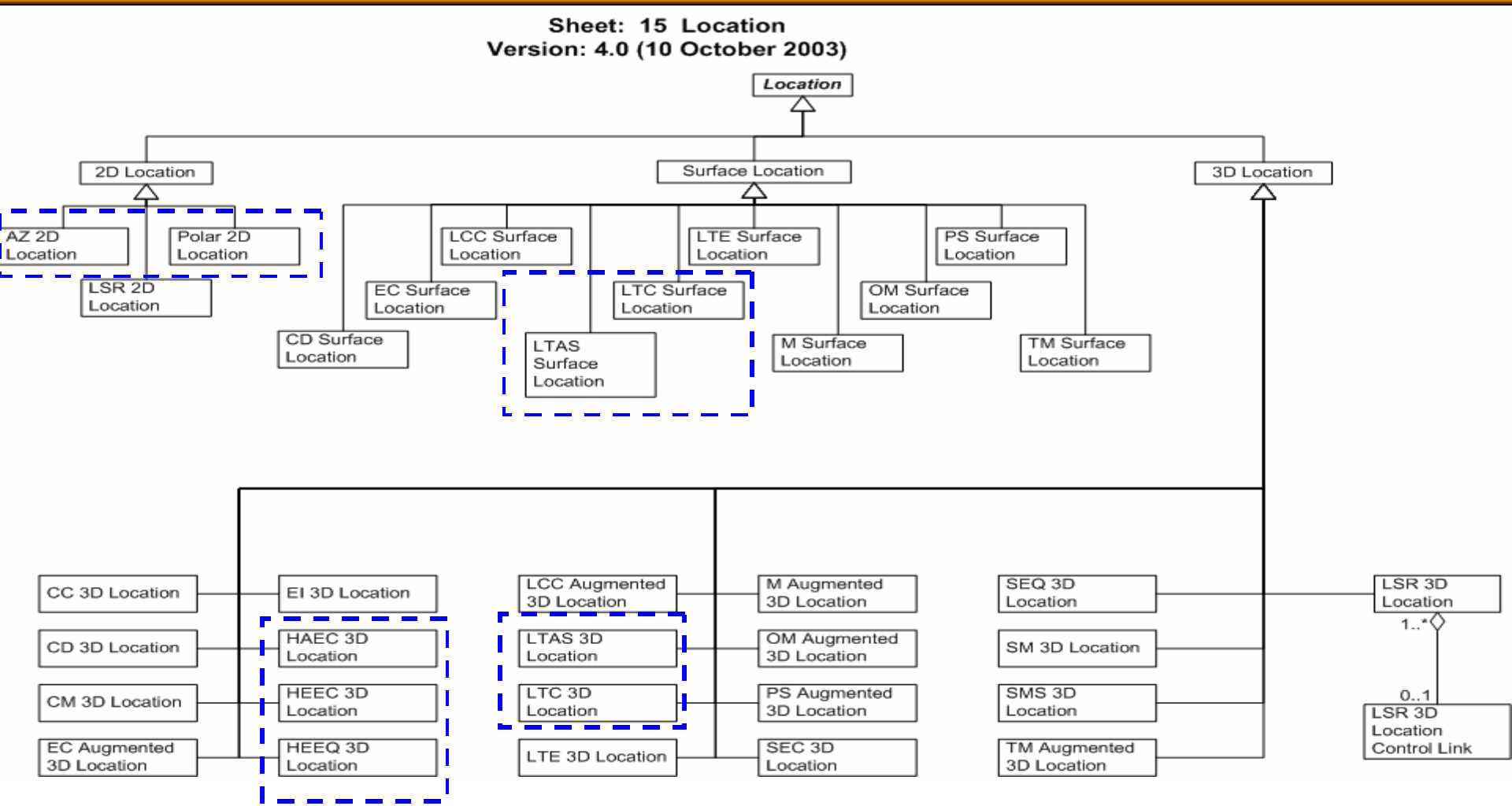
SRM Changes: 3.1 Location Classes



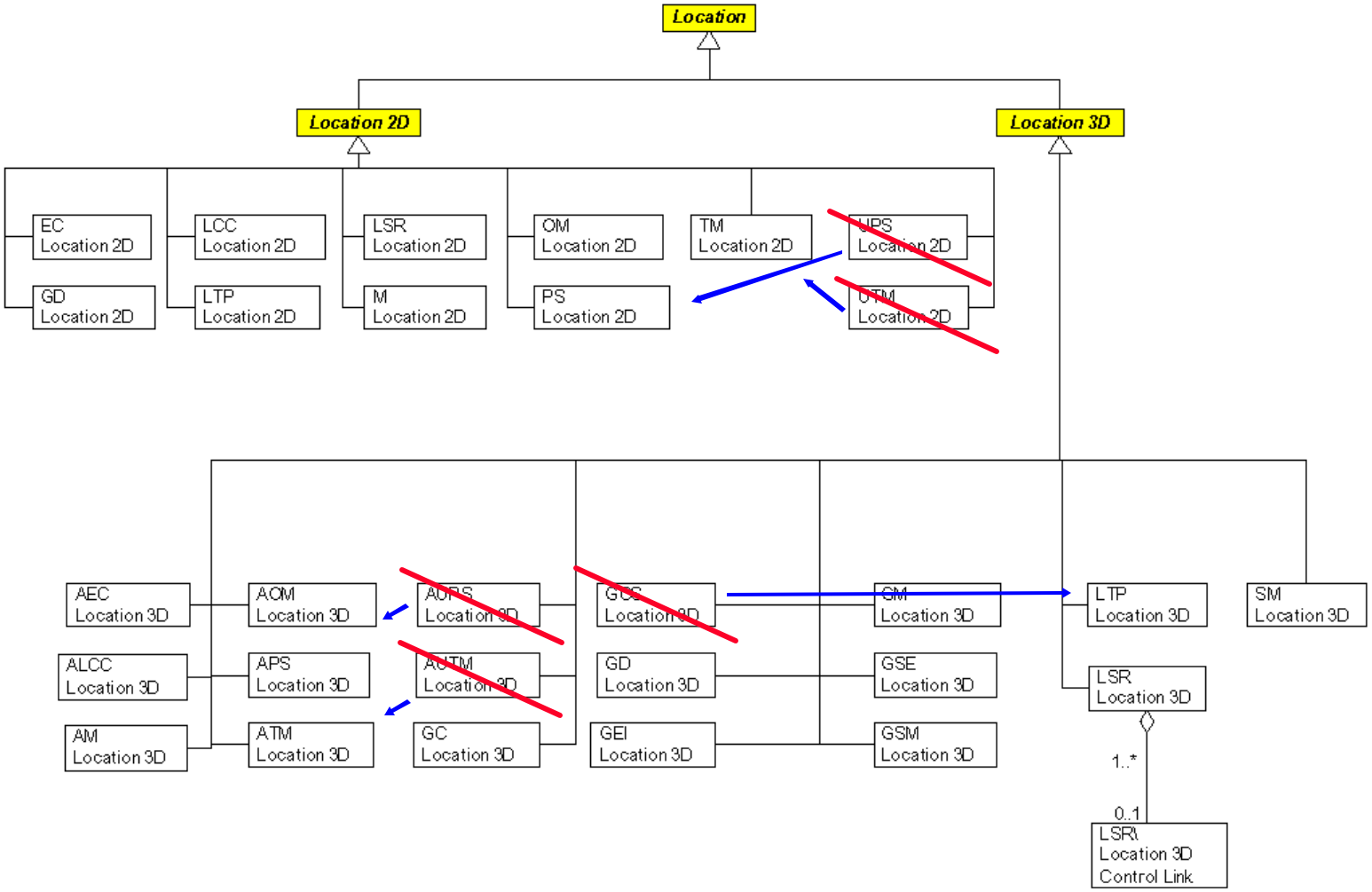
SRM Changes: 4.0 Location Classes



SRM Changes: New Location Classes



SRM Changes: Deleted Location Classes



SRM Units in Transmittals

- **In 3.1, 1st and 2nd value of location data were given in metres and 3rd value was either metres or feet for linear data.**
- **In 3.1 location values of angular data were provided in arcdegrees.**
- **In 4.0, the units for location data are specified in the SE_SRF_Info fields:**

```
EDCS_Unit_Code  angular_unit;
EDCS_Unit_Code  linear_unit;
EDCS_Scale_Code linear_scale;
```

- **The units specified in the SE_SRF_Info applies to all location data within scope. Thus all linear location values must be consistent.**

SRF Parameters in a Transmittal

- **In 3.1, there was only one way to store the SRF parameters information.**
  - Large structure with one entry per SRF parameters
- **For 4.0, all 3.1 SRF parameters map to a smaller set of 4.0 Template parameters, so information is condensed**
  - Example, UTM parameters map to TM parameters
- **In 4.0, Set Code and Set Member Codes are provided with defined parameter information such as UTM & GCS**
- **In 4.0, SRF Codes are defined for specific SRFs**
  - SRF Codes are also provided with defined parameter information

SRF Parameters in a Transmittal

- **SRF information can be stored in three different manners:**
  1. *Using Set/Set Member*
  2. *SRF Instance codes*
  3. *Using SRF Template parameters*
- **Example of 2 exclusive methods for specifying the UTM Southern Hemisphere Zone 12 SRF information:**
  - Using Set/Set Member:
    - *Set Code:* **SRFS_UNIV_TRANS_MERC;**
    - *Member Code:* **SRM_UTM_SOUTHERN_HEMI_12**
  - Using TM SRF Template parameters:

```
orm = SRM_ORM_WGS_1984;
origin_longitude = 0.0
origin_latitude = -111.0
central_scale = 0.9996
false_easting = 500000.0
false_northing = 0.0
```

Modified SRM structures

- **SRM_SRF_Parameters → SE_SRF_Info**
  - Vertical Datum separated from SRF parameters and corresponds to Vertical Offset Surface Code
  - Unit information made explicit

```
typedef struct
{
   SRM_Vertical_Offset_Surface_Code vos_code;
   EDCS_Unit_Code  angular_unit;
   EDCS_Unit_Code  linear_unit;
   EDCS_Scale_Code linear_scale;
   SRM_SRF_Parameters_Info     srf_params_info
} SE_SRF_Info;
```

SRF Parameters Info

```
typedef struct
{
   SRM_SRF_Params_Info_Code srf_params_info_code;
   union
    {
       SRM_SRF_Template_Parameters   srf_template;
       SRM_SRF_Set_Info              srf_set;
       SRM_SRF_Code                  srf_instance;
    } srf_params_info;
} SRM_SRF_Parameters_Info;
```

SRF Template Parameters

```
typedef struct
{
   SRM_SRF_Template_Code srf_template;
   union
    {
       SRM_ORM_Parameters              cc_srf_params;
       SRM_LSR_3D_SRF_Parameters       lsr_3d_srf_params;
       SRM_LSR_2D_SRF_Parameters       lsr_2d_srf_params;
       SRM_ORM_Parameters              cd_srf_params;
       . . . .
       SRM_EC_SRF_Parameters           ec_srf_params;
    } parameters;
} SRM_SRF_Template_Parameters;
```

ORM Parameters

ORM_Code to ORM_Code, HSR_Code

- Problem because need to be able to differentiate between specification and transformation
- ORM is the reference model
- HSR is the transformations applied to this model
  - *Allows no transformation as well*

```
typedef struct
{
   SRM_ORM_Code    orm_code;
   SRM_HSR_Code    hsr_code;
} SRM_ORM_Parameters
```

SRF Parameters

```
typedef struct
{
   SRM_Long_Float          origin_longitude;
   SRM_Long_Float          origin_latitude;
   SRM_Long_Float          central_scale;
   SRM_Long_Float          false_easting;
   SRM_Long_Float          false_northing;
} SRM_TM_Parameters;

typedef struct
{
   SRM_ORM_Parameters      orm_params;
   SRM_TM_Parameters       tm_params;
} SRM_TM_SRF_Parameters;
```

SRF Set Info

```
typedef struct
{
    SRM_SRF_Params_Info_Code srf_params_info_code;
    union
    {
         SRM_SRF_Template_Parameters      srf_template;
         SRM_SRF_Set_Info                 srf_set;
         SRM_SRF_Code                     srf_instance;
     } srf_params_info;
} SRM_SRF_Parameters_Info;
```

```
typedef struct
{
   SRM_SRF_Set_Code              set_code;
   SRM_SRF_Set_Member_Code       member_code;
   SRM_ORM_Parameters            orm_params
} SRM_SRF_Set_Info;
```

SRF Parameters in a Transmittal: Storing in a Transmittal

```
//Storing SRF Set/Set Member Codes
srf_param_info_code = SRM_SRFPI_SET;
srf_param_info.srf_set.set_code = SRM_SRFS_UNIV_TRANS_MERC;
srf_param_info.set.set.member_code = SRM_UTM_SOUTHERN_HEMI_12;
srf_param_info.set.orm_params.orm_code = SRM_ORM_WGS_1984;
srf_param_info.set.orm_params.hsr_code = SRM_HSR_WGS_1984;
```

SRF Parameters in a Transmittal: Storing in a Transmittal

```
// TM Template Parameters

srf_param_info_code = SRF_INFO_CODE_TEMPLATE;

srf_param_info.parameters.srf_template = SRFT_TRANSVERSE_MERCATOR;

srf_param_info.parameters.tm_srf_params.orm_params.orm_code =
SRM_ORM_WGS_1984;

srf_param_info.parameters.tm_srf_params.orm_params.hsr_code =
SRM_HSR_WGS_1984;

srf_param_info.parameters.tm_srf_params.tm_params.origin_longitude = 0.0

srf_param_info.parameters.tm_srf_params.tm_params.origin_latitude = -
111.0

srf_param_info.parameters.tm_srf_params.tm_params.central_scale = 0.9996

srf_param_info.parameters.tm_srf_params.tm_params.false_easting =
500000.0

srf_param_info.parameters.tm_srf_params.tm_params.false_northing = 0.0
```