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6 Application of Symbolic Processing to Command and Control: An Advanced Information Presentation System

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report describes the work performed in the second year of the three-year contract to explore the application of symbolic processing to command and control (C2); specifically, the graphics interface between the C2 user and a complex C2 decision support system. → next page In Volume I, the goals and approaches used in the design of the prototype system, AIPS (<u>A</u> dvanced <u>I</u> nformation <u>P</u> resentation <u>S</u> ystem), are discussed, as		

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well as the year's efforts to extend the prototype. An overview of the current AIPS system is also provided.

Volume II contains the complete AIPS knowledge base. This document provides the fully-inherited structure that the system sees during operation.

Volume III contains the programs that manipulate the knowledge base and provide the active behavioral component of the system.

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**APPLICATION OF SYMBOLIC PROCESSING
TO COMMAND AND CONTROL:**

AN ADVANCED INFORMATION PRESENTATION SYSTEM

Frank Zdybel, Jeff Gibbons, Norton Greenfeld and Martin Yonke

August 1981

Annual Technical Report #2
Volume 2 - AIPS Knowledge Base

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1. CONCEPT INDEX

This volume contains the AIPS system knowledge base. It is printed here in full KL-ONE form, with all concepts having their complete inherited attribute structure visible. While there are only 233 concepts listed, it is clear from the size of this volume that the structure is complex. It is recommended that Volume One be used as a guide to the general structure of the knowledge base, and Volume Three (the program sources) be used as a final reference point to disambiguate any detailed questions raised by the first two volumes.

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2. THE KNOWLEDGE BASE

[1]

ROLE#66

type: Individual
individuates: ROLE, THING
meta-describes:
 RoleSet Name in Context AIPSDOMAINMETA
is role value of (** IRole 1) of ENEMYNTDSSHIAPL1)

[2]

ROLE#59

type: Individual
individuates: ROLE, THING
meta-describes:
 RoleSet Name in Context AIPSDOMAINMETA
is role value of

((** IRole 2) of FRIENDLYNTDSSUBIAPL1)

[3]

ROLE#65

type: Individual
individuates: ROLE, THING
meta-describes:
 RoleSet EngagementStatus in Context AIPSDOMAINMETA
is role value of

((** IRole 193) of ENEMYNTDSSHIAPL1)

[4]

ROLE#64

type: Individual
individuates: ROLE, THING
meta-describes:
 RoleSet Position in Context AIPSDOMAINMETA
is role value of (** IRole 4) of ENEMYNTDSSHIAPL1)

[5]

NTDSMAP

type: Generic
specializes: RECTANGULARMAP, MAP, DISPLAY,
 PRESENTATION, DISPLAYITEM, THING

roles:
 (** ScaleUnit 2) ((ScaleUnit of RECTANGULARMAP))

```

ValDescs = (DISTANCEUNIT)
Number = 1
Modality = Optional
has attached IData:
  (DefaultFiller NIL)
  (CKLGetNamedConcept NM)
FriendlyShipSym ((Item of MAP),
  (Realization of PRESENTATION))
ValDescs = (FRIENDLYNTDSSHIP)
Number = (0 NIL)
Modality = Obligatory
has attached IData:
  (Derivation MakeMapItems)
    [(Prerequisites EntityList
      Application Ground)
      (Arguments
        (CKLFindNode $$CONCEPT
          Application)
        (CAR (CKLFindNode $$CONCEPT
          EntityList))
        (CAR (CKLFindNode $$CONCEPT
          Ground)]
  (FillWhenMade NIL)
  T
FriendlySubSym ((Item of MAP),
  (Realization of PRESENTATION))
ValDescs = (FRIENDLYNTDSSUB)
Number = (0 NIL)
Modality = Obligatory
FriendlyPlaneSym ((Item of MAP),
  (Realization of PRESENTATION))
ValDescs = (FRIENDLYNTDSPLANE)
Number = (0 NIL)
Modality = Obligatory
has attached IData:
  (Derivation MakeMapItems)
    [(Prerequisites EntityList
      Application Ground)
      (Arguments
        (CKLFindNode $$CONCEPT
          Application)
        (CAR (CKLFindNode $$CONCEPT
          EntityList))
        (CAR (CKLFindNode $$CONCEPT
          Ground)]
  (FillWhenMade NIL)
  T
EnemyShipSym ((Item of MAP),
  (Realization of PRESENTATION))
ValDescs = (ENEMYNTDSSHIP)
Number = (0 NIL)

```

```

Modality = Obligatory
has attached IData:
  (Derivation MakeMapItems)
    [(Prerequisites EntityList
      Application Ground)
    (Arguments
      (CKLFindNode $$CONCEPT
        Application)
      (CAR (CKLFindNode $$CONCEPT
        EntityList))
      (CAR (CKLFindNode $$CONCEPT
        Ground])
    (FillWhenMade NIL)
      T
EnemySubSym ((Item of MAP),
  (Realization of PRESENTATION))
ValDescs = (ENEMYNTDSSUB)
Number = (0 NIL)
Modality = Obligatory
has attached IData:
  (Derivation MakeMapItems)
    [(Prerequisites EntityList
      Application Ground)
    (Arguments
      (CKLFindNode $$CONCEPT
        Application)
      (CAR (CKLFindNode $$CONCEPT
        EntityList))
      (CAR (CKLFindNode $$CONCEPT
        Ground])
    (FillWhenMade NIL)
      T
EnemyPlaneSym ((Item of MAP),
  (Realization of PRESENTATION))
ValDescs = (ENEMYNTDSPLANE)
Number = (0 NIL)
Modality = Obligatory
has attached IData:
  (Derivation MakeMapItems)
    [(Prerequisites EntityList
      Application Ground)
    (Arguments
      (CKLFindNode $$CONCEPT
        Application)
      (CAR (CKLFindNode $$CONCEPT
        EntityList))
      (CAR (CKLFindNode $$CONCEPT
        Ground])
    (FillWhenMade NIL)
      T
UnknownShipSym ((Item of MAP),

```

```

                (Realization of PRESENTATION))
    ValDescs = (UNKNOWNNTDSSHIP)
    Number = (0 NIL)
    Modality = Obligatory
    UnknownSubSym ((Item of MAP),
                  (Realization of PRESENTATION))
    ValDescs = (UNKNOWNNTDSSUB)
    Number = (0 NIL)
    Modality = Obligatory
    has attached IData:
        (Derivation MakeMapItems)
            [(Prerequisites EntityList
              Application Ground)
             (Arguments
              (CKLFindNode $$CONCEPT
                Application)
              (CAR (CKLFindNode $$CONCEPT
                    EntityList))
              (CAR (CKLFindNode $$CONCEPT
                    Ground)]
            (FillWhenMade NIL)
            T
    UnknownPlaneSym ((Item of MAP),
                    (Realization of PRESENTATION))
    ValDescs = (UNKNOWNNTDSPLANE)
    Number = (0 NIL)
    Modality = Obligatory
    has attached IData:
        (Derivation MakeMapItems)
            [(Prerequisites EntityList
              Application Ground)
             (Arguments
              (CKLFindNode $$CONCEPT
                Application)
              (CAR (CKLFindNode $$CONCEPT
                    EntityList))
              (CAR (CKLFindNode $$CONCEPT
                    Ground)]
            (FillWhenMade NIL)
            T
    (** DomainCoordSys 3) of RECTANGULARMAP) (
    (DomainCoordSys of MAP))
    ValDescs = (CARTESIANSYSTEM)
    Number = 1
    Modality = Optional
    has attached IData:
        (Derivation FindDomainCoordinateSystem)
            [(Prerequisites EntityList)
             (Arguments
              (CAR (CKLFindNode $$CONCEPT

```



```

EntityList))
(KLFindVRsOfRole
(KLFindOneNamedGenericRole
$$CONCEPT
(QUOTE DomainCoordSys]
(FillWhenMade NIL)
T
(** MapItemTransform 4) of RECTANGULARMAP) (
(MapItemTransform of MAP))
ValDescs = (2DLINEARTRANSFORM)
Number = 1
Modality = Obligatory
(ScaleDistance of RECTANGULARMAP)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(** Border 4) of RECTANGULARMAP) ((Border of MAP),
(Realization of
PRESENTATION))
ValDescs = (RECTANGLE)
Number = 1
Modality = Optional
(** Ground 6) of RECTANGULARMAP) (
(Ground of DISPLAY))
ValDescs = (VIEWSURFACE)
Number = 1
Modality = Obligatory
has attached IData:
(Derivation Prerequisites)
(MapItemTransform)
(EntityList of MAP)
ValDescs = (LISTP)
Number = 1
Modality = Optional
(** Name 3) of MAP) ((Name of DISPLAY))
ValDescs = (STRINGP)
Number = 1
Modality = Obligatory
has attached IData:
(FillWhenMade NIL)
T
(Label of MAP) ((Realization of PRESENTATION))
ValDescs = (TEXT)
Number = 1
Modality = Optional
has attached IData:
(Derivation MakeMapLabel)
[(Prerequisites Name Ground)
(Arguments

```

```

(CAR (CKLFindNode $$CONCEPT
      Name))
(CAR (CKLFindNode $$CONCEPT
      Ground])
  (FillWhenMade NIL)
    T
  (Legend of MAP) ((Realization of PRESENTATION))
    ValDescs = (MAPLEGEND)
    Number = 1
    Modality = Optional
    has attached IData:
      (Derivation MakeSimpleMapLegend)
        ((Prerequisites Name Item)
          (Arguments
            (CAR (CKLFindNode $$CONCEPT
                    Name))
            (CKLFindNode $$CONCEPT Item)))
      (FillWhenMade NIL)
        T
    (ReferenceGrid of MAP) (
  (Realization of PRESENTATION))
    ValDescs = (MAPGRID)
    Number = 1
    Modality = Optional
  (Item of MAP) ((Realization of PRESENTATION))
    ValDescs = (MAPITEM)
    Number = (1 NIL)
    Modality = Obligatory
    has attached IData:
      (Derivation MakeMapItems)
        [(Prerequisites EntityList
          Application Ground)
          (Arguments
            (CKLFindNode $$CONCEPT
              Application)
            (CAR (CKLFindNode $$CONCEPT
                    EntityList))
            (CAR (CKLFindNode $$CONCEPT
                    Ground])
      (FillWhenMade NIL)
        T
    (** Realization 5) of DISPLAY) (
  (Realization of PRESENTATION))
    ValDescs = (DISPLAYITEM)
    Number = (0 NIL)
    Modality = Optional
  (Application of PRESENTATION)
    ValDescs = (THING)
    Number = (0 NIL)

```

```

Modality = Optional
(Location of DISPLAYITEM)
ValDescs = (LISTP)
Number = 1
Modality = Optional
has attached IData:
  (DefaultFiller NIL)
  (LIST 0 0)
(Size of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has attached IData:
  (DefaultFiller NIL)
  1
(Orientation of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Width of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Height of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Envelope of DISPLAYITEM)
ValDescs = (CLOSEDCURVE)
Number = 1
Modality = Optional

```

[6]

NTDSITEMIAPL1

type: Individual

individuates: TEMPLATE, THING

roles:

```

(** IRole 194) ((ConceptGroup of TEMPLATE))
  ValDescs = (CONCEPT#29)
(** IRole 195) ((ConceptGroup of TEMPLATE))
  ValDescs = (CONCEPT#30)
(** IRole 196) ((ConceptGroup of TEMPLATE))
  ValDescs = (CONCEPT#31)
(** IRole 197) ((RoleGroup of TEMPLATE))
  ValDescs = (ROLE#32)
(** IRole 198) ((RoleGroup of TEMPLATE))
  ValDescs = (ROLE#33)
(** IRole 199) ((RoleGroup of TEMPLATE))
  ValDescs = (ROLE#23)
(** IRole 200) ((RoleGroup of TEMPLATE))
  ValDescs = (ROLE#34)

```

```

(** IRole 201) ((RoleGroup of TEMPLATE))
  ValDescs = (ROLE#35)
(** IRole 202) ((RoleGroup of TEMPLATE))
  ValDescs = (ROLE#36)
(** IRole 203) ((RoleGroup of TEMPLATE))
  ValDescs = (ROLE#37)

```

[7]

NTDSENGAGEMENTMARKIAPL1

```

type: Individual
individuates: TEMPLATE, THING
roles:
  (** IRole 204) ((ConceptGroup of TEMPLATE))
    ValDescs = (CONCEPT#103)
  (** IRole 144) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#100)
is role value of

```

```

(** IRole 205) of NTDSENGAGEMENTMARKABSTR),
  (** IRole 206) of
NARROWNTDSENGAGEMENTMARKABSTR)

```

[8]

NTDSSTRENGTHMARK

```

type: Generic
specializes: THING
is role value of (GroupStrengthMarker of NTDSITEM)

```

[9]

NTDSITEMABSTR

```

type: Individual
individuates: DISPLAYABSTRACTION,
  DISPLAYITEMABSTRACTION, ABSTRACTION,
  THING

```

roles:

```

(IntendedApplication of DISPLAYABSTRACTION)
  ValDescs = (TEMPLATE)
  Number = (1 NIL)
  Modality = Optional
(InformationRequirement of DISPLAYABSTRACTION)
  ValDescs = (TEMPLATE)
  Number = (1 NIL)
  Modality = Optional
(FixedComponent of DISPLAYITEMABSTRACTION)
  ValDescs = (DISPLAYFORM)
  Number = (1 NIL)
  Modality = Optional

```

[10]

NTDSVELOCITYLEADER

type: Generic

specializes: DISPLAY, PRESENTATION, DISPLAYITEM,
THING

has abstraction: NTDSVELOCITYLEADERABSTR

roles:

Leader ((Realization of PRESENTATION))

ValDescs = (LINESEGMENT)

Number = (0 NIL)

Modality = Obligatory

has attached IData:

(DefaultFiller NIL)

(Make LINESEGMENT)

(Ground of DISPLAY)

ValDescs = (VIEWSURFACE)

Number = 1

Modality = Obligatory

(Name of DISPLAY)

ValDescs = (STRINGP)

Number = 1

Modality = Optional

(Application of PRESENTATION)

ValDescs = (THING)

Number = (0 NIL)

Modality = Optional

(Location of DISPLAYITEM)

ValDescs = (LISTP)

Number = 1

Modality = Optional

has attached IData:

(DefaultFiller NIL)

(LIST 0 0)

(Size of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

has attached IData:

(DefaultFiller NIL)

1

(Orientation of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

(Width of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

(Height of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

```
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of (VelocityLeader of NTDSITEM)
has attached IData:
  (ToDraw NIL)   TDDisplay
  (ToLocate NIL) TLDisplay TLDisplayItem
```

[11]

POINT#61

```
type: Individual
individuates: POINT, DISPLAYATOM, DISPLAYFORM,
              DISPLAYITEM, THING
```

roles:

```
(** IRole 19) ((Location of DISPLAYITEM))
  ValDescs = ((0 0))
  has attached IData:
    (DefaultFiller NIL)
    (LIST 0 0)
```

```
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    1
```

```
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
```

```
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
```

```
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
```

```
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
```

is role value of

```
(** IRole 207) of ENEMYNTDSSHIPABSTR)
has attached IData:
  (ToDraw NIL)   TDPoint
  (ToErase NIL) TEDisplayAtom
  (ToLocate NIL) TLDisplayAtom TLDisplayItem
```

[12]

NARROWNTDSENGAGEMENTMARK

type: Generic

specializes: NTDSENGAGEMENTMARK, DISPLAY,
PRESENTATION, DISPLAYITEM, THING

has abstraction: NARROWNTDSENGAGEMENTMARKABSTR

roles:

(** Realization 5) of DISPLAY) (

(Realization of PRESENTATION))

ValDescs = (DISPLAYITEM)

Number = (0 NIL)

Modality = Optional

(Ground of DISPLAY)

ValDescs = (VIEWSURFACE)

Number = 1

Modality = Obligatory

(Name of DISPLAY)

ValDescs = (STRINGP)

Number = 1

Modality = Optional

(Application of PRESENTATION)

ValDescs = (THING)

Number = (0 NIL)

Modality = Optional

(Location of DISPLAYITEM)

ValDescs = (LISTP)

Number = 1

Modality = Optional

has attached IData:

(DefaultFiller NIL)

(LIST 0 0)

(Size of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

has attached IData:

(DefaultFiller NIL)

1

(Orientation of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

(Width of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

(Height of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

```

(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of

(** EngagementMark 7) of UNKNOWNNTDSSHIP),
  (** EngagementMark 8) of UNKNOWNNTDSSUB)
,
  (** EngagementMark 9) of
UNKNOWNNTDSPLANE)
has attached IData:
  (ToDraw NIL) TDDisplay
  (ToLocate NIL) TLDisplay TLDisplayItem

```

[13]

EDGESET#60

```

type: Individual
individuates: EDGESET, DISPLAYATOM, DISPLAYFORM,
              DISPLAYITEM, THING

```

roles:

```

(** IRole 208) ((VertexList of EDGESET))
  ValDescs = (((-6 0) (0 6) (6 0) (0 -6) (-6 0)))
(** IRole 22) ((Location of DISPLAYITEM))
  ValDescs = ((0 0))
  has attached IData:
    (DefaultFiller NIL)
    (LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional

```


is role value of

```
(** IRole 23) of ENEMYNTDSSHIPABSTR
has attached IData:
  (ToErase NIL) TEDisplayAtom
  (ToLocate NIL) TLDisplayAtom TLDisplayItem
```

[14]

POINT#54

```
type: Individual
individuates: POINT, DISPLAYATOM, DISPLAYFORM,
              DISPLAYITEM, THING
```

roles:

```
(** IRole 209) ((Location of DISPLAYITEM))
  ValDescs = ((0 0))
  has attached IData:
    (DefaultFiller NIL)
    (LIST 0 0)
```

```
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    1
```

```
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
```

```
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
```

```
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
```

```
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
```

is role value of

```
(** IRole 210) of FRIENDLYNTDSSUBABSTR
has attached IData:
  (ToDraw NIL) TDPoint
  (ToErase NIL) TEDisplayAtom
  (ToLocate NIL) TLDisplayAtom TLDisplayItem
```

[15]

TEXTABSTR

```

type: Individual
individuates: DISPLAYABSTRACTION,
              DISPLAYITEMABSTRACTION, ABSTRACTION,
              THING
roles:
  (IntendedApplication of DISPLAYABSTRACTION)
    ValDescs = (TEMPLATE)
    Number = (1 NIL)
    Modality = Optional
  (InformationRequirement of DISPLAYABSTRACTION)
    ValDescs = (TEMPLATE)
    Number = (1 NIL)
    Modality = Optional
  (FixedComponent of DISPLAYITEMABSTRACTION)
    ValDescs = (DISPLAYFORM)
    Number = (1 NIL)
    Modality = Optional

```

[16]

NTDSENGAGEMENTMARKABSTR

```

type: Individual
individuates: DISPLAYABSTRACTION,
              DISPLAYITEMABSTRACTION, ABSTRACTION,
              THING
has schema: NTDSENGAGEMENTMARK
roles:
  (** IRole 132) (
(FixedComponent of DISPLAYITEMABSTRACTION))
  ValDescs = (LINESEGMENT#102)
  (** IRole 205) (
(IntendedApplication of DISPLAYABSTRACTION))
  ValDescs = (NTDSENGAGEMENTMARKIAPL1)
  (InformationRequirement of DISPLAYABSTRACTION)
  ValDescs = (TEMPLATE)
  Number = (1 NIL)
  Modality = Optional

```

[17]

TEXT

```

type: Generic
specializes: DISPLAY, PRESENTATION, DISPLAYITEM,
            THING
roles:
  (** Realization 6) ((Realization of PRESENTATION))
  ValDescs = (DISPLAYITEM)
  Number = 0
  Modality = Optional
String
  ValDescs = (STRINGP)

```

```

Number = 1
Modality = Obligatory
Font
  ValDescs = (THING)
  Number = 1
  Modality = Optional
LineSpacing
  ValDescs = (SMALLP)
  Number = 1
  Modality = Optional
(** Height 8) ((Height of DISPLAYITEM))
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(** Width 7) ((Width of DISPLAYITEM))
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Ground of DISPLAY)
  ValDescs = (VIEWSURFACE)
  Number = 1
  Modality = Obligatory
(Name of DISPLAY)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
(Application of PRESENTATION)
  ValDescs = (THING)
  Number = (0 NIL)
  Modality = Optional
(Location of DISPLAYITEM)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    (LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1

```

Modality = Optional
 is role value of (** Item 7) of TEXTROW,
 (** Item 8) of TEXTCOLUMN),
 (Label of MAP), (Label of MAPITEM),
 (Label of MAPLEGEND),
 (ReferenceLabel of MAPGRID)

[18]

NTDSENGAGEMENTMARK

type: Generic
 specializes: DISPLAY, PRESENTATION, DISPLAYITEM,
 THING
 has specializer: NARROWNTDSENGAGEMENTMARK
 has abstraction: NTDSENGAGEMENTMARKABSTR
 roles:
 (** Realization 5) of DISPLAY) (

(Realization of PRESENTATION))
 ValDescs = (DISPLAYITEM)
 Number = (0 NIL)
 Modality = Optional
 (Ground of DISPLAY)
 ValDescs = (VIEWSURFACE)
 Number = 1
 Modality = Obligatory
 (Name of DISPLAY)
 ValDescs = (STRINGP)
 Number = 1
 Modality = Optional
 (Application of PRESENTATION)
 ValDescs = (THING)
 Number = (0 NIL)
 Modality = Optional
 (Location of DISPLAYITEM)
 ValDescs = (LISTP)
 Number = 1
 Modality = Optional
 has attached IData:
 (DefaultFiller NIL)
 (LIST 0 0)
 (Size of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 has attached IData:
 (DefaultFiller NIL)
 1
 (Orientation of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1

```

    Modality = Optional
    (Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
    is role value of (EngagementMark of NTDSITEM)
    has attached IData:
      (ToDraw NIL)   TDDisplay
      (ToLocate NIL) TLDisplay TLDisplayItem

```

[19]

NARROWNTDSENGAGEMENTMARKABSTR

```

    type: Individual
    individuates: DISPLAYABSTRACTION,
                  DISPLAYITEMABSTRACTION, ABSTRACTION,
                  THING
    has schema: NARROWNTDSENGAGEMENTMARK
    roles:
      (** IRole 211) (
        (FixedComponent of DISPLAYITEMABSTRACTION))
        ValDescs = (LINESEGMENT#104)
        (** IRole 206) (
          (IntendedApplication of DISPLAYABSTRACTION))
          ValDescs = (NTDSENGAGEMENTMARKIAPL1)
          (InformationRequirement of DISPLAYABSTRACTION)
          ValDescs = (TEMPLATE)
          Number = (1 NIL)
          Modality = Optional

```

[20]

FRIENDLYNTDSSUBIAPLI

```

    type: Individual
    individuates: TEMPLATE, THING
    roles:
      (** IRole 212) ((ConceptGroup of TEMPLATE))
      ValDescs = (CONCEPT#55)
      (** IRole 191) ((RoleGroup of TEMPLATE))
      ValDescs = (ROLE#56)
      (** IRole 213) ((RoleGroup of TEMPLATE))
      ValDescs = (ROLE#33)
      (** IRole 31) ((RoleGroup of TEMPLATE))

```

```

ValDescs = (ROLE#57)
(** IRole 214) ((RoleGroup of TEMPLATE))
ValDescs = (ROLE#58)
(** IRole 33) ((RoleGroup of TEMPLATE))
ValDescs = (ROLE#35)
(** IRole 215) ((RoleGroup of TEMPLATE))
ValDescs = (ROLE#44)
(** IRole 2) ((RoleGroup of TEMPLATE))
ValDescs = (ROLE#59)

```

is role value of

```
(** IRole 216) of FRIENDLYNTDSSUBABSTR)
```

[21]

EDGESET#46

type: Individual

individuates: EDGESET, DISPLAYATOM, DISPLAYFORM,
DISPLAYITEM, THING

roles:

```

(** IRole 217) ((VertexList of EDGESET))
ValDescs = (
  ((-6. 0.0) (-5.70634 1.8541) (-4.8541
3.52671) (-3.52671 4.8541) (-1.8541 5.70634) (0.0 6.) (
1.8541 5.70634) (3.52671 4.8541) (4.8541 3.52671) (5.70634
1.8541) (6. 0.0)))
(Location of DISPLAYITEM)
ValDescs = (LISTP)
Number = 1
Modality = Optional
has attached IData:
  (DefaultFiller NIL)
  (LIST 0 0)
(Size of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has attached IData:
  (DefaultFiller NIL)
  1
(Orientation of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Width of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Height of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1

```

Modality = Optional
(Envelope of DISPLAYITEM)
ValDescs = (CLOSEDCURVE)
Number = 1
Modality = Optional
is role value of

((** IRole 218) of FRIENDLYNTDSPLANEABSTR)
has attached IData:
(ToErase NIL) TEDisplayAtom
(ToLocate NIL) TLDisplayAtom TLDisplayItem

[22]

ROLE#52
type: Individual
individuates: ROLE, THING
meta-describes:
RoleSet Name in Context AIPSDOMAINMETA
is role value of

((** IRole 219) of FRIENDLYNTDSPLANEIAPL1)

[23]

ROLE#53
type: Individual
individuates: ROLE, THING
meta-describes:
RoleSet EngagementStatus in Context AIPSDOMAINMETA
is role value of

((** IRole 214) of FRIENDLYNTDSSUBIAPL1)

[24]

DEFAULT
type: Generic
specializes: THING

[25]

ROLE#51
type: Individual
individuates: ROLE, THING
meta-describes:
RoleSet EngagementStatus in Context AIPSDOMAINMETA
is role value of

((** IRole 220) of FRIENDLYNTDSPLANEIAPL1)

[26]

ROLE#57

type: Individual
 individuates: ROLE, THING
 meta-describes:
 RoleSet Position in Context AIPSDOMAINMETA
 is role value of

((** IRole 31) of FRIENDLYNTDSSUBIAPL1)

[27]

DISPLAYITEMABSTRACTION

type: Generic
 specializes: ABSTRACTION, THING
 has specializer: DISPLAYABSTRACTION
 has individuators: TEXTABSTR, MAPABSTR, MAPITEMABSTR,
 NTDSITEMABSTR,
 FRIENDLYNTDSSHIPABSTR,
 FRIENDLYNTDSPLANEABSTR,
 FRIENDLYNTDSSUBABSTR,
 ENEMYNTDSSHIPABSTR,
 ENEMYNTDSSUBABSTR,
 ENEMYNTDSPLANEABSTR,
 UNKNOWNNTDSSHIPABSTR,
 UNKNOWNNTDSSUBABSTR,
 UNKNOWNNTDSPLANEABSTR,
 NTDSENGAGEMENTMARKABSTR,
 NARROWNTDSENGAGEMENTMARKABSTR,
 NTDSVELOCITYLEADERABSTR

roles:

FixedComponent
 ValDescs = (DISPLAYFORM)
 Number = (1 NIL)
 Modality = Optional

[28]

ROLE#44

type: Individual
 individuates: ROLE, THING
 meta-describes:
 RoleSet Speed in Context AIPSDOMAINMETA
 is role value of

((** IRole 221) of FRIENDLYNTDSSHIPIAPL1),
 ((** IRole 222) of FRIENDLYNTDSPLANEIAPL1
), ((** IRole 215) of FRIENDLYNTDSSUBIAPL1),
 ((** IRole 223) of ENEMYNTDSSHIPIAPL1),
 ((** IRole 43) of ENEMYNTDSSUBIAPL1),
 ((** IRole 224) of ENEMYNTDSPLANEIAPL1),
 ((** IRole 225) of UNKNOWNNTDSSHIPIAPL1),


```

      (** IRole 175) of UNKNOWNNTDSSUBIAPL1),
      (** IRole 172) of UNKNOWNNTDSPLANEIAPL1)
,
      (** IRole 226) of
NTDSVELOCITYLEADERIAPL1)

```

[29]

ROLE#50

```

type: Individual
individuates: ROLE, THING
meta-describes:
  RoleSet Position in Context AIPSDOMAINMETA
is role value of

```

```

(** IRole 227) of FRIENDLYNTDSPLANEIAPL1)

```

[30]

DISPLAYABSTRACTION

```

type: Generic
specializes: DISPLAYITEMABSTRACTION, ABSTRACTION,
             THING
has individuators: TEXTABSTR, MAPABSTR, MAPITEMABSTR,
                  NTDSITEMABSTR,
                  FRIENDLYNTDSSHIPABSTR,
                  FRIENDLYNTDSPLANEABSTR,
                  FRIENDLYNTDSSUBABSTR,
                  ENEMYNTDSSHIPABSTR,
                  ENEMYNTDSSUBABSTR,
                  ENEMYNTDSPLANEABSTR,
                  UNKNOWNNTDSSHIPABSTR,
                  UNKNOWNNTDSSUBABSTR,
                  UNKNOWNNTDSPLANEABSTR,
                  NTDSENGAGEMENTMARKABSTR,
                  NARROWNTDSENGAGEMENTMARKABSTR,
                  NTDSVELOCITYLEADERABSTR

```

roles:

```

IntendedApplication
  ValDescs = (TEMPLATE)
  Number = (1 NIL)
  Modality = Optional
InformationRequirement
  ValDescs = (TEMPLATE)
  Number = (1 NIL)
  Modality = Optional
(FixedComponent of DISPLAYITEMABSTRACTION)
  ValDescs = (DISPLAYFORM)
  Number = (1 NIL)
  Modality = Optional

```

[31]

ROLE#49

type: Individual
individuates: ROLE, THING
meta-describes:
 RoleSet Ownership in Context AIPSDOMAINMETA
is role value of

((** IRole 228) of FRIENDLYNTDSPLANEIAPL1)

[32]

CONCEPT#55

type: Individual
individuates: CONCEPT, THING
meta-describes:
 Concept FRIENDLYSUB in Context AIPSDOMAINMETA
is role value of

((** IRole 212) of FRIENDLYNTDSSUBIAPL1)

[33]

TIME

type: Generic
specializes: THING
roles:
 Constraint
 ValDescs = (THING)
 Number = 1
 Modality = Optional
 Continuum
 ValDescs = (THING)
 Number = 1
 Modality = Optional

[34]

CONCEPT#48

type: Individual
individuates: CONCEPT, THING
meta-describes:
 Concept FRIENDLYPLANE in Context AIPSDOMAINMETA
is role value of

((** IRole 229) of FRIENDLYNTDSPLANEIAPL1)

[35]

EDGESET#53

type: Individual
individuates: EDGESET, DISPLAYATOM, DISPLAYFORM,

DISPLAYITEM, THING

roles:

```

(** IRole 230) ((VertexList of EDGESET))
  ValDescs = (
    ((-6. 0.0) (-5.70634 -1.8541) (-4.8541
-3.52671) (-3.52671 -4.8541) (-1.8541 -5.70634) (0.0 -6.) (
1.8541 -5.70634) (3.52671 -4.8541) (4.8541 -3.52671) (
5.70634 -1.8541) (6. 0.0))
  (Location of DISPLAYITEM)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
      (LIST 0 0)
  (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
      1
  (Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
  is role value of

```

```

(** IRole 231) of FRIENDLYNTDSSUBABSTR)
  has attached IData:
    (ToErase NIL) TEDisplayAtom
    (ToLocate NIL) TLDisplayAtom TLDisplayItem

```

[36]

POINT#47

```

type: Individual
individuates: POINT, DISPLAYATOM, DISPLAYFORM,
              DISPLAYITEM, THING

```

roles:

```

(** IRole 232) ((Location of DISPLAYITEM))
  ValDescs = ((0 0))
  has attached IData:
    (DefaultFiller NIL)
    (LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of

```

```

(** IRole 233) of FRIENDLYNTDSPLANEABSTR)
  has attached IData:
    (ToDraw NIL)   TDPoint
    (ToErase NIL)  TEDisplayAtom
    (ToLocate NIL) TLDisplayAtom TLDisplayItem

```

[37]

```

FRIENDLYNTDSSUB
  type: Generic
  specializes: NTDSITEM, MAPITEM, DISPLAY, PRESENTATION,
               DISPLAYITEM, THING
  roles:
    (** Application 5) of NTDSITEM) (
(Application of PRESENTATION))
  ValDescs = (THING)
  Number = (0 NIL)
  Modality = Optional
  has attached IData:
    (Derivation Consequents)
    (EngagementMark VelocityLeader

```

```

                                GroupStrengthMarker)
(VelocityLeader of NTDSITEM) (
(Realization of PRESENTATION))
  ValDescs = (NTDSVELOCITYLEADER)
  Number = 1
  Modality = Optional
(EngagementMark of NTDSITEM) (
(Realization of PRESENTATION))
  ValDescs = (NTDSENGAGEMENTMARK)
  Number = 1
  Modality = Optional
(GroupStrengthMarker of NTDSITEM) (
(Realization of PRESENTATION))
  ValDescs = (NTDSSTRENGTHMARK, DISPLAYITEM)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation MakeNTDSGroupStrengthMark?)
      ((Prerequisites Application)
        (Arguments (CKLFindNode $$CONCEPT
                    Application)))
(Label of MAPITEM) ((Realization of PRESENTATION))
  ValDescs = (TEXT)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation MakeMapItemLabel?)
      [(Prerequisites Application Ground)
        (Arguments
          (CAR (CKLFindNode $$CONCEPT
                Application))
          (CAR (CKLFindNode $$CONCEPT
                Ground]
    (FillWhenMade NIL)
      T
(** Realization 7) of DISPLAY) (
(Realization of PRESENTATION))
  ValDescs = (DISPLAYITEM)
  Number = (0 NIL)
  Modality = Optional
(Ground of DISPLAY)
  ValDescs = (VIEWSURFACE)
  Number = 1
  Modality = Obligatory
(Name of DISPLAY)
  ValDescs = (STRINGP)
  Number = 1

```

```

    Modality = Optional
  (Location of DISPLAYITEM)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      (LIST 0 0)
  (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      1
  (Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
  is role value of (FriendlySubSym of NTDSMAP)
  has attached IData:
    (ToDraw NIL) TDDisplay
    (ToLocate NIL) TLDisplay TLDisplayItem

```

[38]

VIEWSURFACE

```

  type: Generic
  specializes: RECTANGULARREGION, HOMOGENEOUSREGION,
               REGION, PLACE, THING
  has specializers: DISPLAYSURFACE, VISIBLESURFACE,
                   INVISIBLESURFACE
  roles:
    Window
      ValDescs = (WINDOW)
      Number = (0 NIL)
      Modality = Optional
      (** Boundary 4) of RECTANGULARREGION) (
  (Boundary of REGION), (Constraint of PLACE))

```

```

ValDescs = (RECTANGLE)
Number = 1
Modality = Obligatory
has attached IData:
    (Derivation TMRectangle)
        NIL
(** Continuum 5) of RECTANGULARREGION) (
(Continuum of PLACE))
    ValDescs = (CARTESIANSYSTEM)
    Number = 1
    Modality = Optional
(** Height 9) of RECTANGULARREGION) (
(Height of REGION))
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    has attached IData:
        (Derivation Copy)
            [(Prerequisites Boundary)
              (Arguments
                (CAR (CKLFindNode $$CONCEPT
                    Boundary
                    Height]
(** Width 8) of RECTANGULARREGION) (
(Width of REGION))
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
(** Aperture 3) of HOMOGENEOUSREGION) (
(Aperture of REGION), (Constraint of PLACE))
    ValDescs = (REGION)
    Number = 0
    Modality = Optional
(Constraint of PLACE)
    ValDescs = (THING)
    Number = 1
    Modality = Optional
is role value of (Ground of DISPLAY)
has attached IData:
    (ToSize NIL)    TSRectangularRegion

```

[39]

```

DISPLAYITEM
  type: Generic
  specializes: THING
  has specializers: DISPLAYFORM, DISPLAY,
                   MOTILEDISPLAYITEM,

```

STABLEDISPLAYITEM, DISPLAYATOM,
 DISPLAYCOMPOSITE, TEXT, ARRANGEMENT,
 MAP, MAPITEM, MAPGRID,
 NTDSENGAGEMENTMARK,
 NTDSVELOCITYLEADER, POINT, EDGESET,
 CURVE, ROW, COLUMN, TABLE,
 MAPLEGEND, RECTANGULARMAP,
 MAPWITHBACKGROUND, NTDSITEM,
 NARROWNTDSENGAGEMENTMARK,
 LINESEGMENT, CLOSEDCURVE, TEXTROW,
 TEXTCOLUMN, ROWTABLE, COLUMNTABLE,
 NTDSMAP, FRIENDLYNTDSSHIP,
 FRIENDLYNTDSPLANE, FRIENDLYNTDSSUB,
 ENEMYNTDSSHIP, ENEMYNTDSSUB,
 ENEMYNTDSPLANE, UNKNOWNNTDSSHIP,
 UNKNOWNNTDSSUB, UNKNOWNNTDSPLANE,
 ELLIPSE, POLYGON, CIRCLE,
 REGULARPOLYGON, RECTANGLE

has individuators: POINT#39, POINT#47, POINT#54,
 POINT#61, POINT#68, POINT#75,
 POINT#82, POINT#89, POINT#96,
 EDGESET#46, EDGESET#53, EDGESET#60,
 EDGESET#67, EDGESET#74, EDGESET#81,
 EDGESET#88, EDGESET#95,
 LINESEGMENT#26, LINESEGMENT#27,
 LINESEGMENT#102, LINESEGMENT#104,
 CIRCLE#38

roles:

Location

ValDescs = (LISTP)
 Number = 1
 Modality = Optional
 has attached IData:
 (DefaultFiller NIL)
 (LIST 0 0)

Size

ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 has attached IData:
 (DefaultFiller NIL)
 1

Orientation

ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional

Width

ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional

Height


```

    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
Envelope
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
is role value of (** Realization 7) of DISPLAY),
    (Separator of ARRANGEMENT)
has attached IData:
    (ToLocate NIL) TLDisplayItem

```

[40]

```

FRIENDLYNTDSSUBABSTR
type: Individual
individuates: DISPLAYABSTRACTION,
              DISPLAYITEMABSTRACTION, ABSTRACTION,
              THING
has schema: FRIENDLYNTDSSUB
roles:
    (** IRole 216) (
(IntendedApplication of DISPLAYABSTRACTION))
    ValDescs = (FRIENDLYNTDSSUBIAPL1)
    (** IRole 231) (
(FixedComponent of DISPLAYITEMABSTRACTION))
    ValDescs = (EDGESET#53)
    (** IRole 210) (
(FixedComponent of DISPLAYITEMABSTRACTION))
    ValDescs = (POINT#54)
    (InformationRequirement of DISPLAYABSTRACTION)
    ValDescs = (TEMPLATE)
    Number = (1 NIL)
    Modality = Optional

```

[41]

```

FRIENDLYNTDSPLANEIAPL1
type: Individual
individuates: TEMPLATE, THING
roles:
    (** IRole 229) ((ConceptGroup of TEMPLATE))
    ValDescs = (CONCEPT#48)
    (** IRole 228) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#49)
    (** IRole 234) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#33)
    (** IRole 227) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#50)
    (** IRole 220) ((RoleGroup of TEMPLATE))

```

```

    ValDescs = (ROLE#51)
  (** IRole 235) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#35)
  (** IRole 222) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#44)
  (** IRole 236) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#52)
  is role value of

  (** IRole 237) of FRIENDLYNTDSPLANEABSTR)

```

[42]

FRIENDLYNTDSSHIPIAPL1

```

  type: Individual
  individuates: TEMPLATE, THING
  roles:
    (** IRole 238) ((ConceptGroup of TEMPLATE))
      ValDescs = (CONCEPT#40)
    (** IRole 239) ((RoleGroup of TEMPLATE))
      ValDescs = (ROLE#41)
    (** IRole 240) ((RoleGroup of TEMPLATE))
      ValDescs = (ROLE#33)
    (** IRole 241) ((RoleGroup of TEMPLATE))
      ValDescs = (ROLE#42)
    (** IRole 242) ((RoleGroup of TEMPLATE))
      ValDescs = (ROLE#43)
    (** IRole 243) ((RoleGroup of TEMPLATE))
      ValDescs = (ROLE#35)
    (** IRole 221) ((RoleGroup of TEMPLATE))
      ValDescs = (ROLE#44)
    (** IRole 244) ((RoleGroup of TEMPLATE))
      ValDescs = (ROLE#45)
  is role value of

  (** IRole 245) of FRIENDLYNTDSSHIPABSTR)

```

[43]

ITEMPLATE

```

  type: Generic
  specializes: TEMPLATE, THING
  roles:
    (** ConceptGroup 3) ((ConceptGroup of TEMPLATE))
      ValDescs = (ICONCEPT, CONCEPT)
      Number = (0 NIL)
      Modality = Optional
    (RoleGroup of TEMPLATE)
      ValDescs = (ROLE)
      Number = (1 NIL)
      Modality = Obligatory

```

is role value of (Application of PRESENTATION)

[44]

PLACE

type: Generic

specializes: THING

has specializers: POSITION, REGION, HOMOGENEOUSREGION,
RECTANGULARREGION, VIEWSURFACE,
DISPLAYSURFACE, VISIBLESURFACE,
INVISIBLESURFACE

roles:

Constraint

ValDescs = (THING)

Number = 1

Modality = Optional

Continuum

ValDescs = (COORDINATESYSTEM)

Number = 1

Modality = Optional

is role value of (Position of PHYSOBJECT)

[45]

PRESENTATION

type: Generic

specializes: THING

has specializers: DISPLAY, TEXT, ARRANGEMENT, MAP,
MAPITEM, MAPGRID,
NTDSENGAGEMENTMARK,
NTDSVELOCITYLEADER, ROW, COLUMN,
TABLE, MAPLEGEND, RECTANGULARMAP,
MAPWITHBACKGROUND, NTDSITEM,
NARROWNTDSENGAGEMENTMARK, TEXTROW,
TEXTCOLUMN, ROWTABLE, COLUMNTABLE,
NTDSMAP, FRIENDLYNTDSSHIP,
FRIENDLYNTDSPLANE, FRIENDLYNTDSSUB,
ENEMYNTDSSHIP, ENEMYNTDSSUB,
ENEMYNTDSPLANE, UNKNOWNNTDSSHIP,
UNKNOWNNTDSSUB, UNKNOWNNTDSPLANE

roles:

Application

ValDescs = (THING)

Number = (0 NIL)

Modality = Optional

Realization

ValDescs = (THING)

Number = (0 NIL)

Modality = Optional

[46]

CIRCLE

```

type: Generic
specializes: ELLIPSE, CLOSEDCURVE, CURVE, DISPLAYATOM,
             DISPLAYFORM, DISPLAYITEM, THING
has individuator: CIRCLE#38
roles:
  Radius ((SemiMinorAxis of ELLIPSE),
          (SemiMajorAxis of ELLIPSE),
          (Size of DISPLAYITEM))
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Obligatory
  has attached IData:
    (DefaultFiller NIL)
    1
  (Center of ELLIPSE) ((Location of DISPLAYITEM))
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    (LIST 0 0)
  (Approximation of CURVE)
  ValDescs = (EDGESET)
  Number = 1
  Modality = Optional
  (Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    1
  (Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  (Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  (Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  (Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional

```

[47]

ENEMYNTDSSUBIAPL1

type: Individual

individuates: TEMPLATE, THING

roles:

(** IRole 68) ((ConceptGroup of TEMPLATE))

ValDescs = (CONCEPT#69)

(** IRole 181) ((RoleGroup of TEMPLATE))

ValDescs = (ROLE#70)

(** IRole 70) ((RoleGroup of TEMPLATE))

ValDescs = (ROLE#33)

(** IRole 190) ((RoleGroup of TEMPLATE))

ValDescs = (ROLE#71)

(** IRole 72) ((RoleGroup of TEMPLATE))

ValDescs = (ROLE#72)

(** IRole 246) ((RoleGroup of TEMPLATE))

ValDescs = (ROLE#35)

(** IRole 43) ((RoleGroup of TEMPLATE))

ValDescs = (ROLE#44)

(** IRole 169) ((RoleGroup of TEMPLATE))

ValDescs = (ROLE#73)

is role value of (** IRole 75) of ENEMYNTDSSUBABSTR

[48]

ROLE#42

type: Individual

individuates: ROLE, THING

meta-describes:

RoleSet Position in Context AIPSDOMAINMETA

is role value of

(** IRole 241) of FRIENDLYNTDSSHIPIAPL1

[49]

ABSTRACTION

type: Generic

specializes: THING

has specializers: DISPLAYITEMABSTRACTION,
DISPLAYABSTRACTIONhas individuators: TEXTABSTR, MAPABSTR, MAPITEMABSTR,
NTDSITEMABSTR,
FRIENDLYNTDSSHIPABSTR,
FRIENDLYNTDSPLANEABSTR,
FRIENDLYNTDSSUBABSTR,
ENEMYNTDSSHIPABSTR,
ENEMYNTDSSUBABSTR,
ENEMYNTDSPLANEABSTR,
UNKNOWNNTDSSHIPABSTR,
UNKNOWNNTDSSUBABSTR,
UNKNOWNNTDSPLANEABSTR,

NTDSENGAGEMENTMARKABSTR,
NARROWNTDSENGAGEMENTMARKABSTR,
NTDSVELOCITYLEADERABSTR

[50]

FRIENDLYNTDSSHIPABSTR

type: Individual

individuates: DISPLAYABSTRACTION,
DISPLAYITEMABSTRACTION, ABSTRACTION,
THING

roles:

(** IRole 245) (

(IntendedApplication of DISPLAYABSTRACTION))

ValDescs = (FRIENDLYNTDSSHIPIAPL1)

(** IRole 247) (

(FixedComponent of DISPLAYITEMABSTRACTION))

ValDescs = (CIRCLE#38)

(** IRole 248) (

(FixedComponent of DISPLAYITEMABSTRACTION))

ValDescs = (POINT#39)

(InformationRequirement of DISPLAYABSTRACTION)

ValDescs = (TEMPLATE)

Number = (1 NIL)

Modality = Optional

[51]

FRIENDLYNTDSSHIP

type: Generic

specializes: NTDSITEM, MAPITEM, DISPLAY, PRESENTATION,
DISPLAYITEM, THING

roles:

((** Application 5) of NTDSITEM) (

(Application of PRESENTATION))

ValDescs = (THING)

Number = (0 NIL)

Modality = Optional

has attached IData:

(Derivation Consequents)

(EngagementMark VelocityLeader

GroupStrengthMarker)

(VelocityLeader of NTDSITEM) (

(Realization of PRESENTATION))

ValDescs = (NTDSVELOCITYLEADER)

Number = 1

Modality = Optional

```

(EngagementMark of NTDSITEM) (
(Realization of PRESENTATION)
  ValDescs = (NTDSENGAGEMENTMARK)
  Number = 1
  Modality = Optional
(GroupStrengthMarker of NTDSITEM) (
(Realization of PRESENTATION)
  ValDescs = (NTDSSTRENGTHMARK, DISPLAYITEM)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation MakeNTDSGroupStrengthMark?)
      ((Prerequisites Application)
        (Arguments (CKLFindNode $$CONCEPT
                    Application)))
(Label of MAPITEM) ((Realization of PRESENTATION))
  ValDescs = (TEXT)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation MakeMapItemLabel?)
      [(Prerequisites Application Ground)
        (Arguments
          (CAR (CKLFindNode $$CONCEPT
                Application))
          (CAR (CKLFindNode $$CONCEPT
                Ground])
    (FillWhenMade NIL)
      T
(** Realization 8) of DISPLAY) (
(Realization of PRESENTATION)
  ValDescs = (DISPLAYITEM)
  Number = (0 NIL)
  Modality = Optional
(Ground of DISPLAY)
  ValDescs = (VIEWSURFACE)
  Number = 1
  Modality = Obligatory
(Name of DISPLAY)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
(Location of DISPLAYITEM)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)

```

(LIST 0 0)

(Size of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

has attached IData:

(DefaultFiller NIL)

1

(Orientation of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

(Width of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

(Height of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

(Envelope of DISPLAYITEM)

ValDescs = (CLOSEDCURVE)

Number = 1

Modality = Optional

is role value of (FriendlyShipSym of NTDSMAP)

has attached IData:

(ToDraw NIL) TDDisplay

(ToLocate NIL) TLDisplay TLDisplayItem

[52]

CONCEPT#40

type: Individual

individuates: CONCEPT, THING

meta-describes:

Concept FRIENDLYSHIP in Context AIPSDOMAINMETA

is role value of

(** IRole 238) of FRIENDLYNTDSSHIPIAPL1)

[53]

ROLE#45

type: Individual

individuates: ROLE, THING

meta-describes:

RoleSet Name in Context AIPSDOMAINMETA

is role value of

(** IRole 244) of FRIENDLYNTDSSHIPIAPL1)

[54]

FRIENDLYNTDSPLANEABSTR

type: Individual

individuates: DISPLAYABSTRACTION,
 DISPLAYITEMABSTRACTION, ABSTRACTION,
 THING

roles:

(** IRole 237) (

(IntendedApplication of DISPLAYABSTRACTION))

ValDescs = (FRIENDLYNTDSPLANEIAPL1)

(** IRole 218) (

(FixedComponent of DISPLAYITEMABSTRACTION))

ValDescs = (EDGESET#46)

(** IRole 233) (

(FixedComponent of DISPLAYITEMABSTRACTION))

ValDescs = (POINT#47)

(InformationRequirement of DISPLAYABSTRACTION)

ValDescs = (TEMPLATE)

Number = (1 NIL)

Modality = Optional

[55]

FRIENDLYNTDSPLANE

type: Generic

specializes: NTDSITEM, MAPITEM, DISPLAY, PRESENTATION,
 DISPLAYITEM, THING

roles:

(** Application 5) of NTDSITEM) (

(Application of PRESENTATION))

ValDescs = (THING)

Number = (0 NIL)

Modality = Optional

has attached IData:

(Derivation Consequents)

(EngagementMark VelocityLeader

GroupStrengthMarker)

(VelocityLeader of NTDSITEM) (

(Realization of PRESENTATION))

ValDescs = (NTDSVELOCITYLEADER)

Number = 1

Modality = Optional

(EngagementMark of NTDSITEM) (

(Realization of PRESENTATION))

ValDescs = (NTDSENGAGEMENTMARK)

Number = 1

```

    Modality = Optional
    (GroupStrengthMarker of NTDSITEM) (
(Realization of PRESENTATION))
    ValDescs = (NTDSSTRENGTHMARK, DISPLAYITEM)
    Number = 1
    Modality = Optional
    has attached IData:
        (Derivation MakeNTDSGroupStrengthMark?)
            ((Prerequisites Application)
              (Arguments (CKLFindNode $$CONCEPT
                          Application)))
    (Label of MAPITEM) ((Realization of PRESENTATION))
    ValDescs = (TEXT)
    Number = 1
    Modality = Optional
    has attached IData:
        (Derivation MakeMapItemLabel?)
            [(Prerequisites Application Ground)
              (Arguments
                (CAR (CKLFindNode $$CONCEPT
                      Application)
                  (CAR (CKLFindNode $$CONCEPT
                          Ground]
        (FillWhenMade NIL)
          T
    (** Realization 8) of DISPLAY) (
(Realization of PRESENTATION))
    ValDescs = (DISPLAYITEM)
    Number = (0 NIL)
    Modality = Optional
    (Ground of DISPLAY)
    ValDescs = (VIEWSURFACE)
    Number = 1
    Modality = Obligatory
    (Name of DISPLAY)
    ValDescs = (STRINGP)
    Number = 1
    Modality = Optional
    (Location of DISPLAYITEM)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
    has attached IData:
        (DefaultFiller NIL)
          (LIST 0 0)
    (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional

```

```

has attached IData:
  (DefaultFiller NIL)
  1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of (FriendlyPlaneSym of NTDSMAP)

```

[56]

```

ENEMYNTDSSHIPIAPL1
type: Individual
individuates: TEMPLATE, THING
roles:
  (** IRole 78) ((ConceptGroup of TEMPLATE))
    ValDescs = (CONCEPT#62)
  (** IRole 79) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#63)
  (** IRole 80) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#33)
  (** IRole 4) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#64)
  (** IRole 249) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#65)
  (** IRole 82) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#35)
  (** IRole 223) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#44)
  (** IRole 1) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#66)
is role value of
  (** IRole 250) of ENEMYNTDSSHIPABSTR)

```

[57]

```

ROLE#43
type: Individual

```

individuates: ROLE, THING
 meta-describes:
 RoleSet EngagementStatus in Context AIPSDOMAINMETA
 is role value of

((** IRole 242) of FRIENDLYNTDSSHIPIAPL1)

[58]

ENEMYNTDSSUBABSTR

type: Individual
 individuates: DISPLAYABSTRACTION,
 DISPLAYITEMABSTRACTION, ABSTRACTION,
 THING

has schema: ENEMYNTDSSUB

roles:

(** IRole 75) (

(IntendedApplication of DISPLAYABSTRACTION))

 ValDescs = (ENEMYNTDSSUBIAPL1)

(** IRole 84) (

(FixedComponent of DISPLAYITEMABSTRACTION))

 ValDescs = (EDGESET#67)

(** IRole 85) (

(FixedComponent of DISPLAYITEMABSTRACTION))

 ValDescs = (POINT#68)

(InformationRequirement of DISPLAYABSTRACTION)

 ValDescs = (TEMPLATE)

 Number = (1 NIL)

 Modality = Optional

[59]

ROLE#36

type: Individual

individuates: ROLE, THING

meta-describes:

 RoleSet Speed in Context AIPSDOMAINMETA

is role value of ((** IRole 251) of NTDSITEMIAPL1)

[60]

ENEMYNTDSSUB

type: Generic

specializes: NTDSITEM, MAPITEM, DISPLAY, PRESENTATION,
 DISPLAYITEM, THING

has abstraction: ENEMYNTDSSUBABSTR

roles:

(** Application 5) of NTDSITEM) (

```

(Application of PRESENTATION)
  ValDescs = (THING)
  Number = (0 NIL)
  Modality = Optional
  has attached IData:
    (Derivation Consequents)
      (EngagementMark VelocityLeader
        GroupStrengthMarker)
  (VelocityLeader of NTDSITEM) (

(Realization of PRESENTATION))
  ValDescs = (NTDSVELOCITYLEADER)
  Number = 1
  Modality = Optional
  (EngagementMark of NTDSITEM) (

(Realization of PRESENTATION))
  ValDescs = (NTDSENGAGEMENTMARK)
  Number = 1
  Modality = Optional
  (GroupStrengthMarker of NTDSITEM) (

(Realization of PRESENTATION))
  ValDescs = (NTDSSTRENGTHMARK, DISPLAYITEM)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation MakeNTDSGroupStrengthMark?)
      ((Prerequisites Application)
        (Arguments (CKLFindNode $$CONCEPT
          Application)))
  (Label of MAPITEM) ((Realization of PRESENTATION))
  ValDescs = (TEXT)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation MakeMapItemLabel?)
      [(Prerequisites Application Ground)
        (Arguments
          (CAR (CKLFindNode $$CONCEPT
            Application))
          (CAR (CKLFindNode $$CONCEPT
            Ground])
    (FillWhenMade NIL)
      T
  (** Realization 8) of DISPLAY) (

(Realization of PRESENTATION))
  ValDescs = (DISPLAYITEM)
  Number = (0 NIL)
  Modality = Optional

```

```

(Ground of DISPLAY)
  ValDescs = (VIEWSURFACE)
  Number = 1
  Modality = Obligatory
(Name of DISPLAY)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
(Location of DISPLAYITEM)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    (LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of (EnemySubSym of NTDSMAP)
has attached IData:
  (ToDraw NIL)   TDDisplay
  (ToLocate NIL) TLDisplay TLDisplayItem

```

[61]

```

ROLE#41
type: Individual
individuates: ROLE, THING
meta-describes:
  RoleSet Ownership   in Context AIPSDOMAINMETA
is role value of

```

((** IRole 239) of FRIENDLYNTDSSHIAPL1)

[62]

ENEMYNTDSSSHIPABSTR

type: Individual

individuates: DISPLAYABSTRACTION,
DISPLAYITEMABSTRACTION, ABSTRACTION,
THING

has schema: ENEMYNTDSSSHIP

roles:

(** IRole 250) (

(IntendedApplication of DISPLAYABSTRACTION))

ValDescs = (ENEMYNTDSSHIAPL1)

(** IRole 23) (

(FixedComponent of DISPLAYITEMABSTRACTION))

ValDescs = (EDGESET#60)

(** IRole 207) (

(FixedComponent of DISPLAYITEMABSTRACTION))

ValDescs = (POINT#61)

(InformationRequirement of DISPLAYABSTRACTION)

ValDescs = (TEMPLATE)

Number = (1 NIL)

Modality = Optional

[63]

ENEMYNTDSPLANEIAPL1

type: Individual

individuates: TEMPLATE, THING

roles:

(** IRole 252) ((ConceptGroup of TEMPLATE))

ValDescs = (CONCEPT#76)

(** IRole 88) ((RoleGroup of TEMPLATE))

ValDescs = (ROLE#77)

(** IRole 253) ((RoleGroup of TEMPLATE))

ValDescs = (ROLE#33)

(** IRole 160) ((RoleGroup of TEMPLATE))

ValDescs = (ROLE#78)

(** IRole 170) ((RoleGroup of TEMPLATE))

ValDescs = (ROLE#79)

(** IRole 254) ((RoleGroup of TEMPLATE))

ValDescs = (ROLE#35)

(** IRole 224) ((RoleGroup of TEMPLATE))

ValDescs = (ROLE#44)

(** IRole 168) ((RoleGroup of TEMPLATE))

ValDescs = (ROLE#80)

is role value of

((** IRole 94) of ENEMYNTDSPLANEABSTR)

[64]

ENEMYNTDSSHIP

type: Generic

specializes: NTDSITEM, MAPITEM, DISPLAY, PRESENTATION,
DISPLAYITEM, THING

roles:

((** Application 5) of NTDSITEM) (

(Application of PRESENTATION))

ValDescs = (THING)

Number = (0 NIL)

Modality = Optional

has attached IData:

(Derivation Consequents)

(EngagementMark VelocityLeader

GroupStrengthMarker)

(VelocityLeader of NTDSITEM) (

(Realization of PRESENTATION))

ValDescs = (NTDSVELOCITYLEADER)

Number = 1

Modality = Optional

(EngagementMark of NTDSITEM) (

(Realization of PRESENTATION))

ValDescs = (NTDSENGAGEMENTMARK)

Number = 1

Modality = Optional

(GroupStrengthMarker of NTDSITEM) (

(Realization of PRESENTATION))

ValDescs = (NTDSSTRENGTHMARK, DISPLAYITEM)

Number = 1

Modality = Optional

has attached IData:

(Derivation MakeNTDSGroupStrengthMark?)

((Prerequisites Application)

(Arguments (CKLFindNode \$\$CONCEPT

Application)))

(Label of MAPITEM) ((Realization of PRESENTATION))

ValDescs = (TEXT)

Number = 1

Modality = Optional

has attached IData:

(Derivation MakeMapItemLabel?)

((Prerequisites Application Ground)

(Arguments

(CAR (CKLFindNode \$\$CONCEPT


```

Application))
(CAR (CKLFindNode $$CONCEPT
      Ground])
(FillWhenMade NIL)
      T
(** Realization 8) of DISPLAY) (
(Realization of PRESENTATION))
  ValDescs = (DISPLAYITEM)
  Number = (0 NIL)
  Modality = Optional
(Ground of DISPLAY)
  ValDescs = (VIEWSURFACE)
  Number = 1
  Modality = Obligatory
(Name of DISPLAY)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
(Location of DISPLAYITEM)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      (LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of (EnemyShipSym of NTDSMAP)
has attached IData:

```

(ToDraw NIL) TDDisplay
(ToLocate NIL) TLDisplay TLDisplayItem

[65]

POINT#39

type: Individual
individuates: POINT, DISPLAYATOM, DISPLAYFORM,
DISPLAYITEM, THING

roles:

(** IRole 255) ((Location of DISPLAYITEM))
ValDescs = ((0 0))
has attached IData:
(DefaultFiller NIL)
(LIST 0 0)

(Size of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has attached IData:
(DefaultFiller NIL)
1

(Orientation of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional

(Width of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional

(Height of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional

(Envelope of DISPLAYITEM)
ValDescs = (CLOSEDCURVE)
Number = 1
Modality = Optional

is role value of

((** IRole 248) of FRIENDLYNTDSSHIPABSTR)
has attached IData:
(ToDraw NIL) TDPoint
(ToErase NIL) TEDisplayAtom
(ToLocate NIL) TLDisplayAtom TLDisplayItem

[66]

CIRCLE#38

type: Individual
individuates: CIRCLE, ELLIPSE, CLOSEDCURVE, CURVE,
DISPLAYATOM, DISPLAYFORM, DISPLAYITEM,
THING

```

roles:
  (** IRole 256) ((Radius of CIRCLE),
                 (SemiMinorAxis of ELLIPSE),
                 (SemiMajorAxis of ELLIPSE),
                 (Size of DISPLAYITEM))
    ValDescs = (6, NUMBERP)
    has attached IData:
      (DefaultFiller NIL)
      1
  (** IRole 257) ((Center of ELLIPSE),
                 (Location of DISPLAYITEM))
    ValDescs = ((0 0))
    has attached IData:
      (DefaultFiller NIL)
      (LIST 0 0)
  (Approximation of CURVE)
    ValDescs = (EDGESET)
    Number = 1
    Modality = Optional
  (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    1
  (Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
  is role value of

```

```

(** IRole 247) of FRIENDLYNTDSSHIPABSTR)

```

[67]

ENEMYNTDSPLANE

type: Generic

specializes: NTDSITEM, MAPITEM, DISPLAY, PRESENTATION,

DISPLAYITEM, THING

roles:

```

(** Application 5) of NTDSITEM) (
(Application of PRESENTATION))
  ValDescs = (THING)
  Number = (0 NIL)
  Modality = Optional
  has attached IData:
    (Derivation Consequents)
      (EngagementMark VelocityLeader
        GroupStrengthMarker)
  (VelocityLeader of NTDSITEM) (
(Realization of PRESENTATION))
  ValDescs = (NTDSVELOCITYLEADER)
  Number = 1
  Modality = Optional
  (EngagementMark of NTDSITEM) (
(Realization of PRESENTATION))
  ValDescs = (NTDSENGAGEMENTMARK)
  Number = 1
  Modality = Optional
  (GroupStrengthMarker of NTDSITEM) (
(Realization of PRESENTATION))
  ValDescs = (NTDSSSTRENGTHMARK, DISPLAYITEM)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation MakeNTDSGroupStrengthMark?)
      ((Prerequisites Application)
        (Arguments (CKLFindNode $$CONCEPT
          Application)))
  (Label of MAPITEM) ((Realization of PRESENTATION))
  ValDescs = (TEXT)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation MakeMapItemLabel?)
      [(Prerequisites Application Ground)
        (Arguments
          (CAR (CKLFindNode $$CONCEPT
            Application))
          (CAR (CKLFindNode $$CONCEPT
            Ground))
        (FillWhenMade NIL)
        T
  (** Realization 8) of DISPLAY) (

```

```

(Realization of PRESENTATION))
  ValDescs = (DISPLAYITEM)
  Number = (0 NIL)
  Modality = Optional
(Ground of DISPLAY)
  ValDescs = (VIEWSURFACE)
  Number = 1
  Modality = Obligatory
(Name of DISPLAY)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
(Location of DISPLAYITEM)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      (LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of (EnemyPlaneSym of NTDSMAP)
has attached IData:
  (ToDraw NIL) TDDisplay
  (ToLocate NIL) TLDisplay TLDisplayItem

```

[68]

EDGESET

type: Generic

specializes: DISPLAYATOM, DISPLAYFORM, DISPLAYITEM,

THING

has individuators: EDGESET#46, EDGESET#53, EDGESET#60,
EDGESET#67, EDGESET#74, EDGESET#81,
EDGESET#88, EDGESET#95

roles:

VertexList

ValDescs = (LISTP)
Number = 1
Modality = Obligatory
(Location of DISPLAYITEM)
ValDescs = (LISTP)
Number = 1
Modality = Optional
has attached IData:

(DefaultFiller NIL)
(LIST 0 0)

(Size of DISPLAYITEM)

ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has attached IData:
(DefaultFiller NIL)

1

(Orientation of DISPLAYITEM)

ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Width of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional

(Height of DISPLAYITEM)

ValDescs = (NUMBERP)
Number = 1
Modality = Optional

(Envelope of DISPLAYITEM)

ValDescs = (CLOSEDCURVE)
Number = 1
Modality = Optional

is role value of (Approximation of CURVE)

[69]

ROLE#37

type: Individual
individuates: ROLE, THING
meta-describes:
RoleSet Name in Context AIPSDOMAINMETA
is role value of (** IRole 203) of NTDSITEMIAPL1)

[70]

ENEMYNTDSPLANEABSTR

type: Individual

individuates: DISPLAYABSTRACTION,
 DISPLAYITEMABSTRACTION, ABSTRACTION,
 THING

has schema: ENEMYNTDSPLANE

roles:

(** IRole 94) (

(IntendedApplication of DISPLAYABSTRACTION))

ValDescs = (ENEMYNTDSPLANEIAPL1)

(** IRole 188) (

(FixedComponent of DISPLAYITEMABSTRACTION))

ValDescs = (EDGESET#74)

(** IRole 258) (

(FixedComponent of DISPLAYITEMABSTRACTION))

ValDescs = (POINT#75)

(InformationRequirement of DISPLAYABSTRACTION)

ValDescs = (TEMPLATE)

Number = (1 NIL)

Modality = Optional

[71]

CONCEPT#31

type: Individual

individuates: CONCEPT, THING

meta-describes:

Concept PLANE in Context AIPSDOMAINMETA

is role value of ((** IRole 259) of NTDSITEMIAPL1)

[72]

NTDSITEM

type: Generic

specializes: MAPITEM, DISPLAY, PRESENTATION,
 DISPLAYITEM, THING

has specializers: FRIENDLYNTDSSHIP, FRIENDLYNTDSPLANE,
 FRIENDLYNTDSSUB, ENEMYNTDSSHIP,
 ENEMYNTDSSUB, ENEMYNTDSPLANE,
 UNKNOWNNTDSSHIP, UNKNOWNNTDSSUB,
 UNKNOWNNTDSPLANE

roles:

(** Application 5) ((Application of PRESENTATION))

ValDescs = (THING)

Number = (0 NIL)

Modality = Optional

has attached IData:

(Derivation Consequents)

```

                                (EngagementMark VelocityLeader
                                GroupStrengthMarker)
VelocityLeader ((Realization of PRESENTATION))
  ValDescs = (NTDSVELOCITYLEADER)
  Number = 1
  Modality = Optional
EngagementMark ((Realization of PRESENTATION))
  ValDescs = (NTDSENGAGEMENTMARK)
  Number = 1
  Modality = Optional
GroupStrengthMarker ((Realization of PRESENTATION))
  ValDescs = (NTDSSTRENGTHMARK, DISPLAYITEM)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation MakeNTDSGroupStrengthMark?)
      ((Prerequisites Application)
      (Arguments (CKLFindNode $$CONCEPT
                  Application)))
(Label of MAPITEM) ((Realization of PRESENTATION))
  ValDescs = (TEXT)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation MakeMapItemLabel?)
      [(Prerequisites Application Ground)
      (Arguments
        (CAR (CKLFindNode $$CONCEPT
                Application))
        (CAR (CKLFindNode $$CONCEPT
                Ground)]
    (FillWhenMade NIL)
      T
  (** Realization 8) of DISPLAY) (
(Realization of PRESENTATION))
  ValDescs = (DISPLAYITEM)
  Number = (0 NIL)
  Modality = Optional
(Ground of DISPLAY)
  ValDescs = (VIEWSURFACE)
  Number = 1
  Modality = Obligatory
(Name of DISPLAY)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
(Location of DISPLAYITEM)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional

```



```

has attached IData:
  (DefaultFiller NIL)
  (LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
has attached IData:
  (DefaultFiller NIL)
  1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
has attached IData:
  (ToDraw NIL) TDDisplay
  (ToLocate NIL) TLDisplay TLDisplayItem

```

[73]

ROWTABLE

```

type: Generic
specializes: TABLE, COLUMN, ARRANGEMENT, DISPLAY,
             PRESENTATION, DISPLAYITEM, THING

```

roles:

```

(** Ground 7) ((Ground of DISPLAY))
  ValDescs = (VIEWSURFACE)
  Number = 1
  Modality = Obligatory
  has attached IData:
    (Derivation MakeDefaultTableGround)
    NIL
(** ThemeList 3) ((ThemeList of TABLE))
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
Row ((Group of TABLE), (Item of ARRANGEMENT),
     (Realization of PRESENTATION))
  ValDescs = (TEXTROW)
  Number = (2 NIL)

```

```

Modality = Obligatory
Header ((Row of ROWTABLE), (Group of TABLE),
        (Item of ARRANGEMENT),
        (Realization of PRESENTATION))
ValDescs = (TEXTROW)
Number = 1
Modality = Obligatory
Foot ((Row of ROWTABLE), (Group of TABLE),
      (Item of ARRANGEMENT),
      (Realization of PRESENTATION))
ValDescs = (TEXTROW)
Number = 1
Modality = Optional
Entry ((Row of ROWTABLE), (Group of TABLE),
       (Item of ARRANGEMENT),
       (Realization of PRESENTATION))
ValDescs = (TEXTROW)
Number = (1 NIL)
Modality = Obligatory
(** ItemOrder 3) ((ItemOrder of ARRANGEMENT))
ValDescs = (LISTP)
Number = 1
Modality = Optional
has attached IData:
  (Derivation MakeTableRowOrderList)
    [(Arguments
      (CAR (CKLFindNode
            $$CONCEPT
            (Supply Header)))
      (CKLFindNode $$CONCEPT
                  (Supply Entry))
      (CAR (NLSETQ
            (CKLFindNode $$CONCEPT
                        Foot]

Column
  ValDescs = (TEXTCOLUMN)
  Number = 1
  Modality = Optional
  (** Application 6) of TABLE) (
(Application of PRESENTATION))
  ValDescs = (THING)
  Number = 1
  Modality = Optional
  (EntityList of TABLE)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
  (** Width 9) of COLUMN) ((Width of DISPLAYITEM))
  ValDescs = (NUMBERP)
  Number = 1

```

```

    Modality = Optional
    (Border of ARRANGEMENT) (
(Realization of PRESENTATION))
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
    (Separator of ARRANGEMENT) (
(Realization of PRESENTATION))
    ValDescs = (DISPLAYITEM)
    Number = (0 NIL)
    Modality = Optional
    (** Realization 8) of DISPLAY) (
(Realization of PRESENTATION))
    ValDescs = (DISPLAYITEM)
    Number = (0 NIL)
    Modality = Optional
    (Name of DISPLAY)
    ValDescs = (STRINGP)
    Number = 1
    Modality = Optional
    (Location of DISPLAYITEM)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
    has attached IData:
        (DefaultFiller NIL)
        (LIST 0 0)
    (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    has attached IData:
        (DefaultFiller NIL)
        1
    (Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional

```

[74]

CONCEPT#30

type: Individual
individuates: CONCEPT, THING
meta-describes:
 Concept SUB in Context AIPSDOMAINMETA
is role value of (** IRole 195) of NTDSITEMIAPL1)

[75]

ROLE#35

type: Individual
individuates: ROLE, THING
meta-describes:
 RoleSet Course in Context AIPSDOMAINMETA
is role value of (** IRole 201) of NTDSITEMIAPL1),
 (** IRole 243) of FRIENDLYNTDSSHIPIAPL1)
,
 (** IRole 235) of FRIENDLYNTDSPLANEIAPL1
) , (** IRole 33) of FRIENDLYNTDSSUBIAPL1),
 (** IRole 82) of ENEMYNTDSSHIPIAPL1),
 (** IRole 246) of ENEMYNTDSSUBIAPL1),
 (** IRole 254) of ENEMYNTDSPLANEIAPL1),
 (** IRole 260) of UNKNOWNNTDSSHIPIAPL1),
 (** IRole 261) of UNKNOWNNTDSSUBIAPL1),
 (** IRole 262) of UNKNOWNNTDSPLANEIAPL1)
,
 (** IRole 263) of
NTDSVELOCITYLEADERIAPL1)

[76]

CONCEPT#29

type: Individual
individuates: CONCEPT, THING
meta-describes:
 Concept SHIP in Context AIPSDOMAINMETA
is role value of (** IRole 194) of NTDSITEMIAPL1)

[77]

ROLE#34

type: Individual
individuates: ROLE, THING
meta-describes:
 RoleSet EngagementStatus in Context AIPSDOMAINMETA
is role value of (** IRole 200) of NTDSITEMIAPL1)

[78]

ROLE#28

type: Individual

individuates: ROLE, THING
 meta-describes:
 RoleSet Name in Context AIPSDOMAINMETA
 is role value of (** IRole 264) of MAPITEMIAPL1)

[79]

ROLE#33

type: Individual
 individuates: ROLE, THING
 meta-describes:
 RoleSet Medium in Context AIPSDOMAINMETA
 is role value of (** IRole 265) of NTDSITEMIAPL1),
 (** IRole 240) of FRIENDLYNTDSSHIPIAPL1)
 (** IRole 234) of FRIENDLYNTDSPLANEIAPL1
), (** IRole 213) of FRIENDLYNTDSSUBIAPL1),
 (** IRole 80) of ENEMYNTDSSHIPIAPL1),
 (** IRole 70) of ENEMYNTDSSUBIAPL1),
 (** IRole 266) of ENEMYNTDSPLANEIAPL1),
 (** IRole 178) of UNKNOWNNTDSSHIPIAPL1),
 (** IRole 267) of UNKNOWNNTDSSUBIAPL1),
 (** IRole 268) of UNKNOWNNTDSPLANEIAPL1)

[80]

LINESEGMENT#27

type: Individual
 individuates: LINESEGMENT, CURVE, DISPLAYATOM,
 DISPLAYFORM, DISPLAYITEM, THING
 roles:
 (** IRole 269) ((EndPoint of LINESEGMENT),
 (Location of DISPLAYITEM))
 ValDescs = ((-6 6))
 has attached IData:
 (DefaultFiller NIL)
 (LIST 0 0)
 (** IRole 270) ((EndPoint of LINESEGMENT),
 (Location of DISPLAYITEM))
 ValDescs = ((6 -6))
 has attached IData:
 (DefaultFiller NIL)
 (LIST 0 0)
 (Line of LINESEGMENT)
 ValDescs = (LINE)
 Number = 1
 Modality = Optional
 has attached IData:
 (Derivation DeriveLineEquationFromEndpoints)
 ((Prerequisites EndPoint))
 (Approximation of CURVE)

```

    ValDescs = (EDGESET)
    Number = 1
    Modality = Optional
(Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
has attached IData:
    (DefaultFiller NIL)
      1
(Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
(Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
(Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
(Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
is role value of (** IRole 271) of MAPITEMABSTR)
has attached IData:
    (ToDraw NIL)    TDLineSegment TDCurve
    (ToErase NIL)  TEDisplayAtom
    (ToLocate NIL) TLDisplayAtom TLDisplayItem

```

[81]

```

LINESEGMENT#26
type: Individual
individuates: LINESEGMENT, CURVE, DISPLAYATOM,
              DISPLAYFORM, DISPLAYITEM, THING
roles:
  (** IRole 272) ((EndPoint of LINESEGMENT),
                 (Location of DISPLAYITEM))
    ValDescs = ((-6 -6))
    has attached IData:
      (DefaultFiller NIL)
        (LIST 0 0)
  (** IRole 273) ((EndPoint of LINESEGMENT),
                 (Location of DISPLAYITEM))
    ValDescs = ((6 6))
    has attached IData:
      (DefaultFiller NIL)
        (LIST 0 0)
(Line of LINESEGMENT)

```

```

ValDescs = (LINE)
Number = 1
Modality = Optional
has attached IData:
  (Derivation DeriveLineEquationFromEndpoints)
  ((Prerequisites EndPoint))
(Approximation of CURVE)
ValDescs = (EDGESET)
Number = 1
Modality = Optional
(Size of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has attached IData:
  (DefaultFiller NIL)
  1
(Orientation of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Width of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Height of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Envelope of DISPLAYITEM)
ValDescs = (CLOSEDCURVE)
Number = 1
Modality = Optional
is role value of (** IRole 274) of MAPITEMABSTR)

```

[82]

ROLE#32

```

type: Individual
individuates: ROLE, THING
meta-describes:
  RoleSet Ownership in Context AIPSDOMAINMETA
is role value of (** IRole 197) of NTDSITEMIAPL1)

```

[83]

TEMPLATE

```

type: Generic
specializes: THING
has specializer: ITEMPLATE
has individuators: MAPIAPL1, MAPIAPL2, MAPITEMIAPL1,

```

NTDSITEMIAPL1,
 FRIENDLYNTDSSHIPIAPL1,
 FRIENDLYNTDSPLANEIAPL1,
 FRIENDLYNTDSSUBIAPL1,
 ENEMYNTDSSHIPIAPL1,
 ENEMYNTDSSUBIAPL1,
 ENEMYNTDSPLANEIAPL1,
 UNKNOWNNTDSSHIPIAPL1,
 UNKNOWNNTDSSUBIAPL1,
 UNKNOWNNTDSPLANEIAPL1,
 NTDSENGAGEMENTMARKIAPL1,
 NTDSVELOCITYLEADERIAPL1

roles:

ConceptGroup
 ValDescs = (CONCEPT)
 Number = (0 NIL)
 Modality = Optional

RoleGroup
 ValDescs = (ROLE)
 Number = (1 NIL)
 Modality = Obligatory

is role value of

(IntendedApplication of DISPLAYABSTRACTION),
 (InformationRequirement of
 DISPLAYABSTRACTION)

[84]

ROLE#25

type: Individual
 individuates: ROLE, THING
 meta-describes:
 RoleSet Boundary in Context AIPSDOMAINMETA
 is role value of (** IRole 275) of MAPIAPL2)

[85]

TEXTROW

type: Generic
 specializes: ROW, ARRANGEMENT, DISPLAY, PRESENTATION,
 DISPLAYITEM, THING

roles:

(** Item 9) ((Item of ARRANGEMENT),
 (Realization of PRESENTATION))
 ValDescs = (TEXT)
 Number = (2 NIL)
 Modality = Obligatory
 (** Height 10) of ROW) ((Height of DISPLAYITEM))
 ValDescs = (NUMBERP)
 Number = 1


```

    Modality = Optional
  (ItemOrder of ARRANGEMENT)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
  (Border of ARRANGEMENT) (
(Realization of PRESENTATION))
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
  (Separator of ARRANGEMENT) (
(Realization of PRESENTATION))
    ValDescs = (DISPLAYITEM)
    Number = (0 NIL)
    Modality = Optional
  (** Realization 8) of DISPLAY) (
(Realization of PRESENTATION))
    ValDescs = (DISPLAYITEM)
    Number = (0 NIL)
    Modality = Optional
  (Ground of DISPLAY)
    ValDescs = (VIEWSURFACE)
    Number = 1
    Modality = Obligatory
  (Name of DISPLAY)
    ValDescs = (STRINGP)
    Number = 1
    Modality = Optional
  (Application of PRESENTATION)
    ValDescs = (THING)
    Number = (0 NIL)
    Modality = Optional
  (Location of DISPLAYITEM)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    (LIST 0 0)
  (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    1
  (Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)

```

```

    Number = 1
    Modality = Optional
    (Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
    is role value of (Row of ROWTABLE),
                    (Row of COLUMNTABLE)

```

[86]

TRANSFIX

```

type: Generic
specializes: 2DLINEARTRANSFIX, TRANSLATION,
             2DLINEARTRANSFORM, LINEARTRANSFORM,
             MAPPING, THING

roles:
  (** To 6) of 2DLINEARTRANSFIX) ((To of MAPPING))
  ValDescs = (VIEWSYSTEM)
  Number = (1 NIL)
  Modality = Obligatory
  (** UnitVector 3) of TRANSLATION) (
(UnitVector of LINEARTRANSFORM))
  ValDescs = ((1 1))
  Number = 1
  Modality = Optional
  (** From 4) of 2DLINEARTRANSFORM) (
(From of MAPPING))
  ValDescs = (CARTESIANSYSTEM)
  Number = (1 NIL)
  Modality = Obligatory
  (Origin of LINEARTRANSFORM)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional

```

[87]

2DLINEARTRANSFORM

```

type: Generic
specializes: LINEARTRANSFORM, MAPPING, THING
has specializers: 2DLINEARTRANSFIX, TRANSLATION,
                 TRANSFIX

roles:
  (** From 4) ((From of MAPPING))
  ValDescs = (CARTESIANSYSTEM)

```

```

    Number = (1 NIL)
    Modality = Obligatory
    (** To 7) ((To of MAPPING))
    ValDescs = (CARTESIANSYSTEM)
    Number = (1 NIL)
    Modality = Obligatory
    (Origin of LINEARTRANSFORM)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
    (UnitVector of LINEARTRANSFORM)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
    is role value of

```

```

(** MapItemTransform 5) of RECTANGULARMAP)

```

[88]

CONCEPT#24

```

type: Individual
individuates: CONCEPT, THING
meta-describes:
    Concept REGION    in Context AIPSDOMAINMETA
is role value of (** IRole 276) of MAPIAPL2)

```

[89]

2DLINEARTRANSFIX

```

type: Generic
specializes: 2DLINEARTRANSFORM, LINEARTRANSFORM,
             MAPPING, THING
has specializer: TRANSFIX
roles:
    (** To 6) ((To of MAPPING))
    ValDescs = (VIEWSYSTEM)
    Number = (1 NIL)
    Modality = Obligatory
    (** From 4) of 2DLINEARTRANSFORM) (

```

```

(From of MAPPING))

```

```

    ValDescs = (CARTESIANSYSTEM)
    Number = (1 NIL)
    Modality = Obligatory
    (Origin of LINEARTRANSFORM)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
    (UnitVector of LINEARTRANSFORM)
    ValDescs = (LISTP)

```

Number = 1
Modality = Optional

[90]

VEHICLE

type: Generic
specializes: PHYSOBJECT, THING
has specializers: PLATFORM, SHIP, SUB, PLANE,
FRIENDLYSHIP, ENEMYSHIP,
UNKNOWNSHIP, FRIENDLYSUB, ENEMYSUB,
UNKNOWNSUB, FRIENDLYPLANE,
ENEMYPLANE, UNKNOWNPLANE

roles:

Medium

ValDescs = (ATOM)
Number = 1
Modality = Optional
has meta descriptions:
[in Context AIPSDOMAINMETA]
ROLE#33
type: Individual
individuates: ROLE
meta-describes:
RoleSet Medium in Context AIPSDOMAINMETA

Course

ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has meta descriptions:
[in Context AIPSDOMAINMETA]
ROLE#35
type: Individual
individuates: ROLE
meta-describes:
RoleSet Course in Context AIPSDOMAINMETA

Speed

ValDescs = (SPEED)
Number = 1
Modality = Optional
has meta descriptions:
[in Context AIPSDOMAINMETA]
ROLE#44
type: Individual
individuates: ROLE
meta-describes:
RoleSet Speed in Context AIPSDOMAINMETA

(Position of PHYSOBJECT)

ValDescs = (PLACE)
Number = 1
Modality = Optional
(Name of PHYSOBJECT)

```

ValDescs = (STRINGP)
Number = 1
Modality = Optional
has meta descriptions:
  [in Context AIPSDOMAINMETA]
    ROLE#101
      type: Individual
      individuates: ROLE
      meta-describes:
        RoleSet Name    in Context AIPSDOMAINMETA
                                                                [91]

```

INTEGERSYSTEM

```

type: Generic
specializes: COORDINATESYSTEM, THING
has specializer: VIEWSYSTEM
roles:
  (Name of COORDINATESYSTEM)
    ValDescs = (STRINGP)
    Number = 1
    Modality = Optional
  (Exit of COORDINATESYSTEM)
    ValDescs = (MAPPING)
    Number = (0 NIL)
    Modality = Optional
  (Entry of COORDINATESYSTEM)
    ValDescs = (MAPPING)
    Number = (0 NIL)
    Modality = Optional
  (Dimensionality of COORDINATESYSTEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Obligatory

```

[92]

TABLE

```

type: Generic
specializes: ARRANGEMENT, DISPLAY, PRESENTATION,
             DISPLAYITEM, THING
has specializers: ROWTABLE, COLUMNTABLE
roles:
  (** Application 7) ((Application of PRESENTATION))
    ValDescs = (THING)
    Number = 1
    Modality = Optional
  Group ((Item of ARRANGEMENT),
         (Realization of PRESENTATION))
    ValDescs = (ARRANGEMENT)
    Number = (2 NIL)
    Modality = Obligatory
EntityList

```

```

ValDescs = (LISTP)
Number = 1
Modality = Optional
ThemeList
ValDescs = (LISTP)
Number = 1
Modality = Optional
(ItemOrder of ARRANGEMENT)
ValDescs = (LISTP)
Number = 1
Modality = Optional
(Border of ARRANGEMENT) (
(Realization of PRESENTATION))
ValDescs = (CLOSEDCURVE)
Number = 1
Modality = Optional
(Separator of ARRANGEMENT) (
(Realization of PRESENTATION))
ValDescs = (DISPLAYITEM)
Number = (0 NIL)
Modality = Optional
(** Realization 8) of DISPLAY) (
(Realization of PRESENTATION))
ValDescs = (DISPLAYITEM)
Number = (0 NIL)
Modality = Optional
(Ground of DISPLAY)
ValDescs = (VIEWSURFACE)
Number = 1
Modality = Obligatory
(Name of DISPLAY)
ValDescs = (STRINGP)
Number = 1
Modality = Optional
(Location of DISPLAYITEM)
ValDescs = (LISTP)
Number = 1
Modality = Optional
has attached IData:
(DefaultFiller NIL)
(LIST 0 0)
(Size of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has attached IData:
(DefaultFiller NIL)
1

```

```

(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional

```

[93]

TIMESYSTEM

```

type: Generic
specializes: COORDINATESYSTEM, THING
roles:
  (** Dimensionality 3) (

```

```

(Dimensionality of COORDINATESYSTEM)
  ValDescs = (1, NUMBERP)
  Number = 1
  Modality = Obligatory
(Name of COORDINATESYSTEM)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
(Exit of COORDINATESYSTEM)
  ValDescs = (MAPPING)
  Number = (0 NIL)
  Modality = Optional
(Entry of COORDINATESYSTEM)
  ValDescs = (MAPPING)
  Number = (0 NIL)
  Modality = Optional
is role value of (Continuum of TIME)

```

[94]

COORDINATESYSTEM

```

type: Generic
specializes: THING
has specializers: INTEGERSYSTEM, 2DCOORDINATESYSTEM,
  ORTHOGONALSYSTEM, TIMESYSTEM,
  CARTESIANSYSTEM, VIEWSYSTEM
roles:

```

Name
 ValDescs = (STRINGP)
 Number = 1
 Modality = Optional
 Exit
 ValDescs = (MAPPING)
 Number = (0 NIL)
 Modality = Optional
 Entry
 ValDescs = (MAPPING)
 Number = (0 NIL)
 Modality = Optional
 Dimensionality
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Obligatory
 is role value of (From of MAPPING), (To of MAPPING),
 (Continuum of PLACE)

[95]

CONCEPT#22
 type: Individual
 individuates: CONCEPT, THING
 meta-describes:
 Concept PHYBJECT in Context AIPSDOMAINMETA
 is role value of (** IRole 277) of MAPIAPL1),
 (** IRole 278) of MAPITEMIAPL1)

[96]

2DCOORDINATESYSTEM
 type: Generic
 specializes: COORDINATESYSTEM, THING
 has specializers: CARTESIANSYSTEM, VIEWSYSTEM
 roles:
 (** Dimensionality 4) (
 (Dimensionality of COORDINATESYSTEM))
 ValDescs = (2, NUMBERP)
 Number = 1
 Modality = Obligatory
 (Name of COORDINATESYSTEM)
 ValDescs = (STRINGP)
 Number = 1
 Modality = Optional
 (Exit of COORDINATESYSTEM)
 ValDescs = (MAPPING)
 Number = (0 NIL)
 Modality = Optional
 (Entry of COORDINATESYSTEM)

ValDescs = (MAPPING)
 Number = (0 NIL)
 Modality = Optional
 is role value of (DomainCoordSys of MAP)

[97]

TEXTCOLUMN

type: Generic

specializes: COLUMN, ARRANGEMENT, DISPLAY,
 PRESENTATION, DISPLAYITEM, THING

roles:

(** Item 10) ((Item of ARRANGEMENT),
 (Realization of PRESENTATION))

ValDescs = (TEXT)

Number = (2 NIL)

Modality = Obligatory

((** Width 9) of COLUMN) ((Width of DISPLAYITEM))

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

(ItemOrder of ARRANGEMENT)

ValDescs = (LISTP)

Number = 1

Modality = Optional

(Border of ARRANGEMENT) (

(Realization of PRESENTATION))

ValDescs = (CLOSEDCURVE)

Number = 1

Modality = Optional

(Separator of ARRANGEMENT) (

(Realization of PRESENTATION))

ValDescs = (DISPLAYITEM)

Number = (0 NIL)

Modality = Optional

((** Realization 8) of DISPLAY) (

(Realization of PRESENTATION))

ValDescs = (DISPLAYITEM)

Number = (0 NIL)

Modality = Optional

(Ground of DISPLAY)

ValDescs = (VIEWSURFACE)

Number = 1

Modality = Obligatory

(Name of DISPLAY)

ValDescs = (STRINGP)

Number = 1

Modality = Optional

```

(Application of PRESENTATION)
  ValDescs = (THING)
  Number = (0 NIL)
  Modality = Optional
(Location of DISPLAYITEM)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      (LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of (Column of ROWTABLE),
                  (Column of COLUMNTABLE)

```

[98]

```

LISPDATA
  type: Generic
  specializes: THING

```

[99]

```

COLUMNTABLE
  type: Generic
  specializes: TABLE, ROW, ARRANGEMENT, DISPLAY,
              PRESENTATION, DISPLAYITEM, THING
  roles:
    (** Ground 8) ((Ground of DISPLAY))
      ValDescs = (VIEWSURFACE)
      Number = 1
      Modality = Obligatory
    (** ThemeList 4) ((ThemeList of TABLE))

```

```

ValDescs = (LISTP)
Number = 1
Modality = Optional
Column ((Group of TABLE), (Item of ARRANGEMENT),
        (Realization of PRESENTATION))
ValDescs = (TEXTCOLUMN)
Number = (2 NIL)
Modality = Obligatory
LeftIndex ((Column of COLUMNTABLE),
           (Group of TABLE), (Item of ARRANGEMENT),
           (Realization of PRESENTATION))
ValDescs = (TEXTCOLUMN)
Number = 1
Modality = Obligatory
has attached IData:
  (Derivation MakeTableLeftIndex)
    [(Arguments
      (CAR (CKLFindNode
            $$CONCEPT
            (Supply ThemeList)))
      (CAR (CKLFindNode
            $$CONCEPT
            (Supply Ground)

      (FillWhenMade NIL)
      T
    RightIndex ((Column of COLUMNTABLE),
                (Group of TABLE),
                (Item of ARRANGEMENT),
                (Realization of PRESENTATION))
    ValDescs = (TEXTCOLUMN)
    Number = 1
    Modality = Optional
    Entry ((Column of COLUMNTABLE), (Group of TABLE),
           (Item of ARRANGEMENT),
           (Realization of PRESENTATION))
    ValDescs = (TEXTCOLUMN)
    Number = (1 NIL)
    Modality = Obligatory
    (** ItemOrder 4) ((ItemOrder of ARRANGEMENT))
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
  Row
    ValDescs = (TEXTROW)
    Number = 1
    Modality = Optional
    has attached IData:
      (Derivation FindColumnTableRows)
        [(Prerequisites Column)
          (Arguments
            (CAR (CKLFindNode

```

```

                                $$CONCEPT
                                (Supply ItemOrder))
                                (FLENGTH
                                (CAR (CKLFindNode $$CONCEPT
                                        ThemeList]
(** Application 7) of TABLE) (
(Application of PRESENTATION))
  ValDescs = (THING)
  Number = 1
  Modality = Optional
(EntityList of TABLE)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
(** Height 11) of ROW) ((Height of DISPLAYITEM))
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Border of ARRANGEMENT) (
(Realization of PRESENTATION))
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
(Separator of ARRANGEMENT) (
(Realization of PRESENTATION))
  ValDescs = (DISPLAYITEM)
  Number = (0 NIL)
  Modality = Optional
(** Realization 8) of DISPLAY) (
(Realization of PRESENTATION))
  ValDescs = (DISPLAYITEM)
  Number = (0 NIL)
  Modality = Optional
(Name of DISPLAY)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
(Location of DISPLAYITEM)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
has attached IData:
  (DefaultFiller NIL)
                                (LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1

```

Modality = Optional
 has attached IData:
 (DefaultFiller NIL)
 1
 (Orientation of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Width of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Envelope of DISPLAYITEM)
 ValDescs = (CLOSEDCURVE)
 Number = 1
 Modality = Optional

[100]

SPEEDUNIT

type: Generic
 specializes: UNIT, THING
 roles:
 DistanceUnit
 ValDescs = (THING)
 Number = 1
 Modality = Optional
 IntervalUnit
 ValDescs = (THING)
 Number = 1
 Modality = Optional
 (** Subject 4) ((Subject of UNIT))
 ValDescs = (SPEED)
 Number = 1
 Modality = Optional
 is role value of (** Unit 5) of SPEED)

[101]

SPEED

type: Generic
 specializes: METRIC, THING
 roles:
 (** Unit 5) ((Unit of METRIC))
 ValDescs = (THING)
 Number = 1
 Modality = Optional
 (Magnitude of METRIC)
 ValDescs = (THING)
 Number = 1
 Modality = Optional
 is role value of (Speed of VEHICLE),

(** Subject 4) of SPEEDUNIT)

[102]

RECTANGLE

type: Generic

specializes: POLYGON, DISPLAYCOMPOSITE, CLOSEDCURVE,
CURVE, DISPLAYATOM, DISPLAYFORM,
DISPLAYITEM, THING

roles:

```

(** Order 2) ((Order of POLYGON))
  ValDescs = (THING)
  Number = 1
  Modality = Optional
(** Side 2) ((Side of POLYGON),
             (Component of DISPLAYCOMPOSITE))
  ValDescs = (THING)
  Number = 4
  Modality = Optional
LowerLeft ((Location of DISPLAYITEM))
  ValDescs = (THING)
  Number = 1
  Modality = Optional
UpperRight ((Location of DISPLAYITEM))
  ValDescs = (THING)
  Number = 1
  Modality = Optional
(** Height 12) ((Height of DISPLAYITEM))
  ValDescs = (THING)
  Number = 1
  Modality = Optional
(** Width 10) ((Width of DISPLAYITEM))
  ValDescs = (THING)
  Number = 1
  Modality = Optional
(CoordSys of DISPLAYCOMPOSITE)
  ValDescs = (CARTESIANSYSTEM)
  Number = 1
  Modality = Optional
(Approximation of CURVE)
  ValDescs = (EDGESET)
  Number = 1
  Modality = Optional
(Location of DISPLAYITEM)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
has attached IData:
  (DefaultFiller NIL)
  (LIST 0 0)
(Size of DISPLAYITEM)

```

```

ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has attached IData:
  (DefaultFiller NIL)
  1
(Orientation of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Envelope of DISPLAYITEM)
ValDescs = (CLOSEDCURVE)
Number = 1
Modality = Optional
is role value of ((** Border 5) of RECTANGULARMAP),
                  ((** Boundary 5) of RECTANGULARREGION)

```

[103]

MAP

```

type: Generic
specializes: DISPLAY, PRESENTATION, DISPLAYITEM,
             THING
has specializers: RECTANGULARMAP, MAPWITHBACKGROUND,
                  NTDSMAP
has abstraction: MAPABSTR
roles:
  EntityList
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
    (** Name 4) ((Name of DISPLAY))
    ValDescs = (STRINGP)
    Number = 1
    Modality = Obligatory
    has attached IData:
      (FillWhenMade NIL)
      T
  DomainCoordSys
    ValDescs = (2DCOORDINATESYSTEM)
    Number = 1
    Modality = Optional
  MapItemTransform
    ValDescs = (MAPPING)
    Number = 1
    Modality = Obligatory
  Label ((Realization of PRESENTATION))
    ValDescs = (TEXT)
    Number = 1
    Modality = Optional
    has attached IData:

```

```

(Derivation MakeMapLabel)
  [(Prerequisites Name Ground)
  (Arguments
    (CAR (CKLFindNode $$CONCEPT
          Name))
    (CAR (CKLFindNode $$CONCEPT
          Ground))]
(FillWhenMade NIL)
  T
Border ((Realization of PRESENTATION))
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
Legend ((Realization of PRESENTATION))
  ValDescs = (MAPLEGEND)
  Number = 1
  Modality = Optional
has attached IData:
  (Derivation MakeSimpleMapLegend)
    [(Prerequisites Name Item)
    (Arguments
      (CAR (CKLFindNode $$CONCEPT
            Name))
      (CKLFindNode $$CONCEPT Item))]
(FillWhenMade NIL)
  T
ReferenceGrid ((Realization of PRESENTATION))
  ValDescs = (MAPGRID)
  Number = 1
  Modality = Optional
Item ((Realization of PRESENTATION))
  ValDescs = (MAPITEM)
  Number = (1 NIL)
  Modality = Obligatory
has attached IData:
  (Derivation MakeMapItems)
    [(Prerequisites EntityList
      Application Ground)
    (Arguments
      (CKLFindNode $$CONCEPT
        Application)
      (CAR (CKLFindNode $$CONCEPT
            EntityList))
      (CAR (CKLFindNode $$CONCEPT
            Ground))]
(FillWhenMade NIL)
  T
(** Realization 8) of DISPLAY) (
(Realization of PRESENTATION))
  ValDescs = (DISPLAYITEM)

```



```

    Number = (0 NIL)
    Modality = Optional
  (Ground of DISPLAY)
    ValDescs = (VIEWSURFACE)
    Number = 1
    Modality = Obligatory
  (Application of PRESENTATION)
    ValDescs = (THING)
    Number = (0 NIL)
    Modality = Optional
  (Location of DISPLAYITEM)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      (LIST 0 0)
  (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      1
  (Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
  has attached data:
    DefaultPrototype
      (CKLGetNamedConcept RECTANGULARMAP)

```

[104]

CLOSEDCURVE

```

type: Generic
specializes: CURVE, DISPLAYATOM, DISPLAYFORM,
             DISPLAYITEM, THING
has specializers: ELLIPSE, POLYGON, CIRCLE,

```

REGULARPOLYGON, RECTANGLE
 has individuator: CIRCLE#38
 roles:
 (Approximation of CURVE)
 ValDescs = (EDGESET)
 Number = 1
 Modality = Optional
 (Location of DISPLAYITEM)
 ValDescs = (LISTP)
 Number = 1
 Modality = Optional
 has attached IData:
 (DefaultFiller NIL)
 (LIST 0 0)
 (Size of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 has attached IData:
 (DefaultFiller NIL)
 1
 (Orientation of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Width of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Height of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Envelope of DISPLAYITEM)
 ValDescs = (CLOSEDCURVE)
 Number = 1
 Modality = Optional
 is role value of (Envelope of DISPLAYITEM),
 (Boundary of REGION),
 (Border of ARRANGEMENT),
 (Border of MAP)
 has attached IData:
 (ToDraw NIL) TDCurve
 (ToErase NIL) TEDisplayAtom
 (ToLocate NIL) TLDisplayAtom TLDisplayItem

[105]

COLUMN

type: Generic
 specializes: ARRANGEMENT, DISPLAY, PRESENTATION,
 DISPLAYITEM, THING

has specializers: TEXTCOLUMN, ROWTABLE
roles:

```

(** Item 11) ((Item of ARRANGEMENT),
              (Realization of PRESENTATION))
  ValDescs = (DISPLAY)
  Number = (2 NIL)
  Modality = Obligatory
(** width 9) ((Width of DISPLAYITEM))
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(ItemOrder of ARRANGEMENT)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
(Border of ARRANGEMENT) (
(Realization of PRESENTATION))
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
(Separator of ARRANGEMENT) (
(Realization of PRESENTATION))
  ValDescs = (DISPLAYITEM)
  Number = (0 NIL)
  Modality = Optional
(** Realization 8) of DISPLAY) (
(Realization of PRESENTATION))
  ValDescs = (DISPLAYITEM)
  Number = (0 NIL)
  Modality = Optional
(Ground of DISPLAY)
  ValDescs = (VIEWSURFACE)
  Number = 1
  Modality = Obligatory
(Name of DISPLAY)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
(Application of PRESENTATION)
  ValDescs = (THING)
  Number = (0 NIL)
  Modality = Optional
(Location of DISPLAYITEM)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
has attached IData:
  (DefaultFiller NIL)

```

```

                                (LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional

```

[106]

MAPPING

```

type: Generic
specializes: THING
has specializers: LINEARTRANSFORM, 2DLINEARTRANSFORM,
                  2DLINEARTRANSFIX, TRANSLATION,
                  TRANSFIX

```

roles:

```

From
  ValDescs = (COORDINATESYSTEM)
  Number = (1 NIL)
  Modality = Obligatory
To
  ValDescs = (COORDINATESYSTEM)
  Number = (1 NIL)
  Modality = Obligatory
is role value of (Exit of COORDINATESYSTEM),
                  (Entry of COORDINATESYSTEM),
                  (MapItemTransform of MAP)

```

[107]

ROLE#23

```

type: Individual
individuates: ROLE, THING
meta-describes:
  RoleSet Position in Context AIPSDOMAINMETA
is role value of (** IRole 279) of MAPIAPL1),
                  (** IRole 280) of MAPITEMIAPL1),
                  (** IRole 199) of NTDSITEMIAPL1)

```

[108]

MAPWITHBACKGROUND

type: Generic

specializes: MAP, DISPLAY, PRESENTATION, DISPLAYITEM,
THING

roles:

```

(** Ground 9) ((Ground of DISPLAY))
  ValDescs = (VIEWSURFACE)
  Number = 1
  Modality = Obligatory
(** MapItemTransform 6) ((MapItemTransform of MAP))
  ValDescs = (MAPPING)
  Number = 1
  Modality = Obligatory
  has attached IData:
    (Derivation MakeMapTransformForMapWithBackground)
      [(Prerequisites Ground)
        (Arguments
          [CAR
            (KLFindVRsOfRole
              (KLFindOneNamedGenericRole
                $$CONCEPT
                (QUOTE MapItemTransform]
              (CAR (CKLFindNode $$CONCEPT
                DomainCoordSys))
              (CAR (CKLFindNode $$CONCEPT
                Ground]
          ]
      )
(** ReferenceGrid 2) ((ReferenceGrid of MAP),
  (Realization of PRESENTATION))
  ValDescs = (MAPGRID)
  Number = (0 0)
  Modality = Optional
  (EntityList of MAP)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
  (** Name 4) of MAP) ((Name of DISPLAY))
  ValDescs = (STRINGP)
  Number = 1
  Modality = Obligatory
  has attached IData:
    (FillWhenMade NIL)
      T
  (DomainCoordSys of MAP)
  ValDescs = (2DCOORDINATESYSTEM)
  Number = 1
  Modality = Optional
  (Label of MAP) ((Realization of PRESENTATION))
  ValDescs = (TEXT)

```

```

Number = 1
Modality = Optional
has attached IData:
  (Derivation MakeMapLabel)
    [(Prerequisites Name Ground)
     (Arguments
      (CAR (CKLFindNode $$CONCEPT
            Name))
      (CAR (CKLFindNode $$CONCEPT
            Ground])
     (FillWhenMade NIL)
     T
  (Border of MAP) ((Realization of PRESENTATION))
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
  (Legend of MAP) ((Realization of PRESENTATION))
  ValDescs = (MAPLEGEND)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation MakeSimpleMapLegend)
      ((Prerequisites Name Item)
       (Arguments
        (CAR (CKLFindNode $$CONCEPT
              Name))
        (CKLFindNode $$CONCEPT Item)))
      (FillWhenMade NIL)
      T
  (Item of MAP) ((Realization of PRESENTATION))
  ValDescs = (MAPITEM)
  Number = (1 NIL)
  Modality = Obligatory
  has attached IData:
    (Derivation MakeMapItems)
      [(Prerequisites EntityList
        Application Ground)
       (Arguments
        (CKLFindNode $$CONCEPT
          Application)
        (CAR (CKLFindNode $$CONCEPT
              EntityList))
        (CAR (CKLFindNode $$CONCEPT
              Ground])
       (FillWhenMade NIL)
       T
  (** Realization 8) of DISPLAY) (
(Realization of PRESENTATION))
  ValDescs = (DISPLAYITEM)
  Number = (0 NIL)

```

```

    Modality = Optional
  (Application of PRESENTATION)
    ValDescs = (THING)
    Number = (0 NIL)
    Modality = Optional
  (Location of DISPLAYITEM)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      (LIST 0 0)
  (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      1
  (Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
  has attached IData:
    (MinInterItemSpacing NIL)
      10
    (MinItemSpread NIL)
      150
    (ToDraw NIL) TDDisplay
    (ToLocate NIL) TLDisplay TLDisplayItem

```

[109]

ORTHOGONALSYSTEM

```

  type: Generic
  specializes: COORDINATESYSTEM, THING
  has specializers: CARTESIANSYSTEM, VIEWSYSTEM
  roles:
    (Name of COORDINATESYSTEM)
      ValDescs = (STRINGP)

```

```

    Number = 1
    Modality = Optional
  (Exit of COORDINATESYSTEM)
    ValDescs = (MAPPING)
    Number = (0 NIL)
    Modality = Optional
  (Entry of COORDINATESYSTEM)
    ValDescs = (MAPPING)
    Number = (0 NIL)
    Modality = Optional
  (Dimensionality of COORDINATESYSTEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Obligatory
  is role value of (** From 5) of LINEARTRANSFORM),
    (** To 8) of LINEARTRANSFORM)

```

[110]

PHYSOBJECT

```

  type: Generic
  specializes: THING
  has specializers: VEHICLE, PLATFORM, SHIP, SUB, PLANE,
    FRIENDLYSHIP, ENEMYSHIP,
    UNKNOWNSHIP, FRIENDLYSUB, ENEMYSUB,
    UNKNOWNSUB, FRIENDLYPLANE,
    ENEMYPLANE, UNKNOWNPLANE

```

roles:

```

  Position
    ValDescs = (PLACE)
    Number = 1
    Modality = Optional
  Name
    ValDescs = (STRINGP)
    Number = 1
    Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
    ROLE#101
      type: Individual
      individuates: ROLE
      meta-describes:
        RoleSet Name in Context AIPSDOMAINMETA

```

[111]

INTERVALUNIT

```

  type: Generic
  specializes: UNIT, THING
  roles:
    (** Subject 5) ((Subject of UNIT))
    ValDescs = (THING)

```


Number = 1
 Modality = Optional
 is role value of (** Unit 6) of INTERVAL),
 (IntervalUnit of SPEEDUNIT)

[112]

CARTESIANSYSTEM

type: Generic
 specializes: 2DCOORDINATESYSTEM, ORTHOGONALSYSTEM,
 COORDINATESYSTEM, THING
 has specializer: VIEWSYSTEM
 roles:
 (** Dimensionality 4) of 2DCOORDINATESYSTEM) (

(Dimensionality of COORDINATESYSTEM))

ValDescs = (2, NUMBERP)

Number = 1

Modality = Obligatory

(Name of COORDINATESYSTEM)

ValDescs = (STRINGP)

Number = 1

Modality = Optional

(Exit of COORDINATESYSTEM)

ValDescs = (MAPPING)

Number = (0 NIL)

Modality = Optional

(Entry of COORDINATESYSTEM)

ValDescs = (MAPPING)

Number = (0 NIL)

Modality = Optional

is role value of (** From 6) of 2DLINEARTRANSFORM),
 (** To 9) of 2DLINEARTRANSFORM),
 (CoordSys of DISPLAYCOMPOSITE),
 (** DomainCoordSys 4) of RECTANGULARMAP)

(** Continuum 6) of RECTANGULARREGION)

[113]

INTERVAL

type: Generic
 specializes: METRIC, THING
 roles:

(** Unit 7) ((Unit of METRIC))

ValDescs = (THING)

Number = 1

Modality = Optional

(Magnitude of METRIC)

ValDescs = (THING)

Number = 1

Modality = Optional
is role value of (** Subject 5) of INTERVALUNIT)

[114]

IROLE

type: Generic
specializes: THING

[115]

LINEARTRANSFORM

type: Generic
specializes: MAPPING, THING
has specializers: 2DLINEARTRANSFORM, 2DLINEARTRANSFIX,
TRANSLATION, TRANSFIX

roles:

(** From 5) ((From of MAPPING))
ValDescs = (ORTHOGONALSYSTEM)
Number = (1 NIL)
Modality = Obligatory
(** To 8) ((To of MAPPING))
ValDescs = (ORTHOGONALSYSTEM)
Number = (1 NIL)
Modality = Obligatory

Origin

ValDescs = (LISTP)
Number = 1
Modality = Optional

UnitVector

ValDescs = (LISTP)
Number = 1
Modality = Optional

[116]

ROLE

type: Generic
specializes: THING

has individuators: ROLE#23, ROLE#25, ROLE#28, ROLE#32,
ROLE#33, ROLE#34, ROLE#35, ROLE#36,
ROLE#37, ROLE#41, ROLE#42, ROLE#43,
ROLE#44, ROLE#45, ROLE#49, ROLE#50,
ROLE#51, ROLE#52, ROLE#56, ROLE#57,
ROLE#58, ROLE#59, ROLE#63, ROLE#64,
ROLE#65, ROLE#66, ROLE#70, ROLE#71,
ROLE#72, ROLE#73, ROLE#77, ROLE#78,
ROLE#79, ROLE#80, ROLE#84, ROLE#85,
ROLE#86, ROLE#87, ROLE#91, ROLE#92,
ROLE#93, ROLE#94, ROLE#98, ROLE#99,
ROLE#100, ROLE#101

is role value of (RoleGroup of TEMPLATE)

[117]

UNIT

type: Generic
 specializes: THING
 has specializers: DISTANCEUNIT, INTERVALUNIT,
 SPEEDUNIT

roles:

Subject
 ValDescs = (THING)
 Number = 1
 Modality = Optional
 is role value of (Unit of METRIC)

[118]

ICONCEPT

type: Generic
 specializes: THING
 is role value of (** ConceptGroup 4) of ITEMPLATE)

[119]

LEGENDTABLE

type: Generic
 specializes: THING
 is role value of (Table of MAPLEGEND)

[120]

DISTANCEUNIT

type: Generic
 specializes: UNIT, THING
 roles:
 (** Subject 6) ((Subject of UNIT))
 ValDescs = (THING)
 Number = 1
 Modality = Optional
 is role value of (** Unit 8) of DISTANCE),
 (DistanceUnit of SPEEDUNIT),
 (ScaleUnit of RECTANGULARMAP)

[121]

CONCEPT

type: Generic
 specializes: THING
 has individuators: CONCEPT#22, CONCEPT#24, CONCEPT#29,
 CONCEPT#30, CONCEPT#31, CONCEPT#40,
 CONCEPT#48, CONCEPT#55, CONCEPT#62,

CONCEPT#69, CONCEPT#76, CONCEPT#83,
CONCEPT#90, CONCEPT#97,
CONCEPT#103
is role value of (ConceptGroup of TEMPLATE)

[122]

METRIC

type: Generic
specializes: THING
has specializers: DISTANCE, INTERVAL, SPEED
roles:

Magnitude
ValDescs = (THING)
Number = 1
Modality = Optional

Unit
ValDescs = (THING)
Number = 1
Modality = Optional

is role value of (Subject of UNIT)

[123]

DEFAULTVALUE

type: Generic
specializes: THING

[124]

VIEWSYSTEM

type: Generic
specializes: INTEGERSYSTEM, CARTESIANSYSTEM,
2DCOORDINATESYSTEM, ORTHOGONALSYSTEM,
COORDINATESYSTEM, THING

roles:
(** Dimensionality 4) of 2DCOORDINATESYSTEM) (

(Dimensionality of COORDINATESYSTEM))

ValDescs = (2, NUMBERP)
Number = 1
Modality = Obligatory

(Name of COORDINATESYSTEM)
ValDescs = (STRINGP)

Number = 1
Modality = Optional
(Exit of COORDINATESYSTEM)

ValDescs = (MAPPING)
Number = (0 NIL)

Modality = Optional
(Entry of COORDINATESYSTEM)

ValDescs = (MAPPING)
 Number = (0 NIL)
 Modality = Optional
 is role value of (** To 10) of 2DLINEARTRANSFIX),
 (** Continuum 7) of DISPLAYSURFACE)

[125]

THING

type: Generic

has specializers: DEFAULT, DEFAULTVALUE, LISPDATA,
 ATOM, LISTP, STRINGP, NUMBERP,
 LITATOM, FIXP, FLOATP, SMALLP,
 CONCEPT, ICONCEPT, ROLE, IROLE,
 ABSTRACTION, DISPLAYITEM,
 COORDINATESYSTEM, MAPPING,
 PHYSOBJECT, PLACE, TIME, METRIC,
 UNIT, JINE, PRESENTATION, TEMPLATE,
 MAPSCALE, LEGENDTABLE,
 NTDSSTRENGTHMARK, WINDOW,
 DISPLAYITEMABSTRACTION, DISPLAYFORM,
 MOTILEDISPLAYITEM,
 STABLEDISPLAYITEM, INTEGERSYSTEM,
 2DCOORDINATESYSTEM,
 ORTHOGONALSYSTEM, TIMESYSTEM,
 LINEARTRANSFORM, VEHICLE, POSITION,
 REGION, DISTANCE, INTERVAL, SPEED,
 DISTANCEUNIT, INTERVALUNIT,
 SPEEDUNIT, DISPLAY, ITEMPLATE,
 DISPLAYABSTRACTION, DISPLAYATOM,
 DISPLAYCOMPOSITE, CARTESIANSYSTEM,
 2DLINEARTRANSFORM, PLATFORM, SHIP,
 SUB, PLANE, HOMOGENEOUSREGION, TEXT,
 ARRANGEMENT, MAP, MAPITEM, MAPGRID,
 NTDSENGAGEMENTMARK,
 NTDSVELOCITYLEADER, POINT, EDGASET,
 CURVE, VIEWSYSTEM, 2DLINEARTRANSFIX,
 TRANSLATION, FRIENDLYSHIP,
 ENEMYSHIP, UNKNOWNSHIP, FRIENDLYSUB,
 ENEMYSUB, UNKNOWNSUB, FRIENDLYPLANE,
 ENEMYPLANE, UNKNOWNPLANE,
 RECTANGULARREGION, ROW, COLUMN,
 TABLE, MAPLEGEND, RECTANGULARMAP,
 MAPWITHBACKGROUND, NTDSITEM,
 NARROWNTDSENGAGEMENTMARK,
 LINESEGMENT, CLOSEDCURVE, TRANSFIX,
 VIEWSURFACE, TEXTROW, TEXTCOLUMN,
 ROWTABLE, COLUMNTABLE, NTDSMAP,
 FRIENDLYNTDSSHIP, FRIENDLYNTDSPLANE,
 FRIENDLYNTDSSUB, ENEMYNTDSSHIP,
 ENEMYNTDSSUB, ENEMYNTDSPLANE,

UNKNOWNNTDSSHIP, UNKNOWNNTDSSUB,
UNKNOWNNTDSPLANE, ELLIPSE, POLYGON,
DISPLAYSURFACE, CIRCLE,
REGULARPOLYGON, RECTANGLE,
VISIBLESURFACE, INVISIBLESURFACE
has individuators: MAPIAPL1, MAPIAPL2, MAPITEMIAPL1,
NTDSITEMIAPL1,
FRIENDLYNTDSSHIPIAPL1,
FRIENDLYNTDSPLANEIAPL1,
FRIENDLYNTDSSUBIAPL1,
ENEMYNTDSSHIPIAPL1,
ENEMYNTDSSUBIAPL1,
ENEMYNTDSPLANEIAPL1,
UNKNOWNNTDSSHIPIAPL1,
UNKNOWNNTDSSUBIAPL1,
UNKNOWNNTDSPLANEIAPL1,
NTDSENGAGEMENTMARKIAPL1,
NTDSVELOCITYLEADERIAPL1,
CONCEPT#22, CONCEPT#24, CONCEPT#29,
CONCEPT#30, CONCEPT#31, CONCEPT#40,
CONCEPT#48, CONCEPT#55, CONCEPT#62,
CONCEPT#69, CONCEPT#76, CONCEPT#83,
CONCEPT#90, CONCEPT#97,
CONCEPT#103, ROLE#23, ROLE#25,
ROLE#28, ROLE#32, ROLE#33, ROLE#34,
ROLE#35, ROLE#36, ROLE#37, ROLE#41,
ROLE#42, ROLE#43, ROLE#44, ROLE#45,
ROLE#49, ROLE#50, ROLE#51, ROLE#52,
ROLE#56, ROLE#57, ROLE#58, ROLE#59,
ROLE#63, ROLE#64, ROLE#65, ROLE#66,
ROLE#70, ROLE#71, ROLE#72, ROLE#73,
ROLE#77, ROLE#78, ROLE#79, ROLE#80,
ROLE#84, ROLE#85, ROLE#86, ROLE#87,
ROLE#91, ROLE#92, ROLE#93, ROLE#94,
ROLE#98, ROLE#99, ROLE#100,
ROLE#101, MAPIAPL1, MAPIAPL2,
MAPITEMIAPL1, NTDSITEMIAPL1,
FRIENDLYNTDSSHIPIAPL1,
FRIENDLYNTDSPLANEIAPL1,
FRIENDLYNTDSSUBIAPL1,
ENEMYNTDSSHIPIAPL1,
ENEMYNTDSSUBIAPL1,
ENEMYNTDSPLANEIAPL1,
UNKNOWNNTDSSHIPIAPL1,
UNKNOWNNTDSSUBIAPL1,
UNKNOWNNTDSPLANEIAPL1,
NTDSENGAGEMENTMARKIAPL1,
NTDSVELOCITYLEADERIAPL1, TEXTABSTR,
MAPABSTR, MAPITEMABSTR,
NTDSITEMABSTR,
FRIENDLYNTDSSHIPABSTR,

FRIENDLYNTDSPLANEABSTR,
 FRIENDLYNTDSSUBABSTR,
 ENEMYNTDSSHIPABSTR,
 ENEMYNTDSSUBABSTR,
 ENEMYNTDSPLANEABSTR,
 UNKNOWNNTDSSHIPABSTR,
 UNKNOWNNTDSSUBABSTR,
 UNKNOWNNTDSPLANEABSTR,
 NTDSENGAGEMENTMARKABSTR,
 NARROWNTDSENGAGEMENTMARKABSTR,
 NTDSVELOCITYLEADERABSTR, POINT#39,
 POINT#47, POINT#54, POINT#61,
 POINT#68, POINT#75, POINT#82,
 POINT#89, POINT#96, EDGESET#46,
 EDGESET#53, EDGESET#60, EDGESET#67,
 EDGESET#74, EDGESET#81, EDGESET#88,
 EDGESET#95, LINESEGMENT#26,
 LINESEGMENT#27, LINESEGMENT#102,
 LINESEGMENT#104, CIRCLE#38

is role value of (Constraint of PLACE),
 (Constraint of TIME),
 (Realization of PRESENTATION)

[126]

DISTANCE

type: Generic

specializes: METRIC, THING

roles:

(** Unit 8) ((Unit of METRIC))

ValDescs = (THING)

Number = 1

Modality = Optional

(Magnitude of METRIC)

ValDescs = (THING)

Number = 1

Modality = Optional

is role value of (** Subject 6) of DISTANCEUNIT)

[127]

MAPSCALE

type: Generic

specializes: THING

is role value of (ScaleIkon of MAPLEGEND)

[128]

ARRANGEMENT

type: Generic

specializes: DISPLAY, PRESENTATION, DISPLAYITEM,

```

                THING
has specializers: ROW, COLUMN, TABLE, MAPLEGEND,
                TEXTROW, TEXTCOLUMN, ROWTABLE,
                COLUMNTABLE
roles:
  Item ((Realization of PRESENTATION))
    ValDescs = (DISPLAYITEM)
    Number = (2 NIL)
    Modality = Obligatory
  ItemOrder
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
  Border ((Realization of PRESENTATION))
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
  Separator ((Realization of PRESENTATION))
    ValDescs = (DISPLAYITEM)
    Number = (0 NIL)
    Modality = Optional
  (** Realization 8) of DISPLAY) (
(Realization of PRESENTATION))
  ValDescs = (DISPLAYITEM)
  Number = (0 NIL)
  Modality = Optional
(Ground of DISPLAY)
  ValDescs = (VIEWSURFACE)
  Number = 1
  Modality = Obligatory
(Name of DISPLAY)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
(Application of PRESENTATION)
  ValDescs = (THING)
  Number = (0 NIL)
  Modality = Optional
(Location of DISPLAYITEM)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    (LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:

```


(DefaultFiller NIL)
 1
 (Orientation of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Width of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Height of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Envelope of DISPLAYITEM)
 ValDescs = (CLOSEDCURVE)
 Number = 1
 Modality = Optional
 is role value of (Group of TABLE)

[129]

LINESEGMENT

type: Generic
 specializes: CURVE, DISPLAYATOM, DISPLAYFORM,
 DISPLAYITEM, THING
 has individuators: LINESEGMENT#26, LINESEGMENT#27,
 LINESEGMENT#102, LINESEGMENT#104

roles:

EndPoint ((Location of DISPLAYITEM))
 ValDescs = (LISTP)
 Number = 2
 Modality = Optional
 has attached IData:
 (DefaultFiller NIL)
 (LIST 0 0)

Line

ValDescs = (LINE)
 Number = 1
 Modality = Optional
 has attached IData:
 (Derivation DeriveLineEquationFromEndpoints)
 ((Prerequisites EndPoint))
 (Approximation of CURVE)
 ValDescs = (EDGESET)
 Number = 1
 Modality = Optional
 (Size of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional

```

has attached IData:
  (DefaultFiller NIL)
  1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of (Side of POLYGON),
  (Leader of NTDSVELOCITYLEADER)

```

[130]

MAPITEMIAPL1

```

type: Individual
individuates: TEMPLATE, THING
roles:
  (** IRole 278) ((ConceptGroup of TEMPLATE))
  ValDescs = (CONCEPT#22)
  (** IRole 280) ((RoleGroup of TEMPLATE))
  ValDescs = (ROLE#23)
  (** IRole 264) ((RoleGroup of TEMPLATE))
  ValDescs = (ROLE#28)
is role value of (** IRole 281) of MAPITEMABSTR)

```

[131]

MAPITEMABSTR

```

type: Individual
individuates: DISPLAYABSTRACTION,
  DISPLAYITEMABSTRACTION, ABSTRACTION,
  THING
roles:
  (** IRole 281) (
(IntendedApplication of DISPLAYABSTRACTION))
  ValDescs = (MAPITEMIAPL1)
  (** IRole 274) (
(FixedComponent of DISPLAYITEMABSTRACTION))

```

```

    ValDescs = (LINESEGMENT#26)
    (** IRole 282) (
(FixedComponent of DISPLAYITEMABSTRACTION))
    ValDescs = (LINESEGMENT#27)
    (InformationRequirement of DISPLAYABSTRACTION)
    ValDescs = (TEMPLATE)
    Number = (1 NIL)
    Modality = Optional

```

[132]

MAPIAPL1

```

type: Individual
individuates: TEMPLATE, THING
roles:
    (** IRole 283) ((ConceptGroup of TEMPLATE))
    ValDescs = (CONCEPT#22)
    (** IRole 279) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#23)
is role value of (** IRole 284) of MAPABSTR

```

[133]

RECTANGULARMAP

```

type: Generic
specializes: MAP, DISPLAY, PRESENTATION, DISPLAYITEM,
             THING
has specializer: NTDSMAP
roles:
    (** DomainCoordSys 4) ((DomainCoordSys of MAP))
    ValDescs = (CARTESIANSYSTEM)
    Number = 1
    Modality = Optional
    has attached IData:
        (Derivation FindDomainCoordinateSystem)
            [(Prerequisites EntityList)
             (Arguments
              (CAR (CKLFindNode $$CONCEPT
                  EntityList))
              (KLFindVRsOfRole
               (KLFindOneNamedGenericRole
                $$CONCEPT
                (QUOTE DomainCoordSys]
            (FillWhenMade NIL)
            T
    (** MapItemTransform 5) ((MapItemTransform of MAP))
    ValDescs = (2DLINEARTRANSFORM)
    Number = 1
    Modality = Obligatory
ScaleUnit
    ValDescs = (DISTANCEUNIT)

```

```

    Number = 1
    Modality = Optional
ScaleDistance
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
(** Border 6) ((Border of MAP),
              (Realization of PRESENTATION))
    ValDescs = (RECTANGLE)
    Number = 1
    Modality = Optional
(** Ground 10) ((Ground of DISPLAY))
    ValDescs = (VIEWSURFACE)
    Number = 1
    Modality = Obligatory
    has attached IData:
      (Derivation Prerequisites)
        (MapItemTransform)
(EntityList of MAP)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
(** Name 4) of MAP) ((Name of DISPLAY))
    ValDescs = (STRINGP)
    Number = 1
    Modality = Obligatory
    has attached IData:
      (FillWhenMade NIL)
        T
(Label of MAP) ((Realization of PRESENTATION))
    ValDescs = (TEXT)
    Number = 1
    Modality = Optional
    has attached IData:
      (Derivation MakeMapLabel)
        [(Prerequisites Name Ground)
         (Arguments
          (CAR (CKLFindNode $$CONCEPT
                  Name))
          (CAR (CKLFindNode $$CONCEPT
                  Ground])
        (FillWhenMade NIL)
          T
(Legend of MAP) ((Realization of PRESENTATION))
    ValDescs = (MAPLEGEND)
    Number = 1
    Modality = Optional
    has attached IData:
      (Derivation MakeSimpleMapLegend)
        ((Prerequisites Name Item)
         (Arguments

```

```

(CAR (CKLFindNode $$CONCEPT
      Name))
(CKLFindNode $$CONCEPT Item)))
(FillWhenMade NIL)
T
(ReferenceGrid of MAP) (
(Realization of PRESENTATION))
  ValDescs = (MAPGRID)
  Number = 1
  Modality = Optional
  (Item of MAP) ((Realization of PRESENTATION))
  ValDescs = (MAPITEM)
  Number = (1 NIL)
  Modality = Obligatory
  has attached IData:
    (Derivation MakeMapItems)
      [(Prerequisites EntityList
        Application Ground)
      (Arguments
        (CKLFindNode $$CONCEPT
          Application)
        (CAR (CKLFindNode $$CONCEPT
              EntityList))
        (CAR (CKLFindNode $$CONCEPT
              Ground])
      (FillWhenMade NIL)
      T
  (** Realization 8) of DISPLAY) (
(Realization of PRESENTATION))
  ValDescs = (DISPLAYITEM)
  Number = (0 NIL)
  Modality = Optional
  (Application of PRESENTATION)
  ValDescs = (THING)
  Number = (0 NIL)
  Modality = Optional
  (Location of DISPLAYITEM)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      (LIST 0 0)
  (Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)

```

```

      1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional

```

[134]

MAPIAPL2

```

type: Individual
individuates: TEMPLATE, THING
roles:
  (** IRole 285) ((ConceptGroup of TEMPLATE))
  ValDescs = (CONCEPT#24)
  (** IRole 275) ((RoleGroup of TEMPLATE))
  ValDescs = (ROLE#25)
is role value of (** IRole 286) of MAPABSTR

```

[135]

LISTP

```

type: Generic
specializes: THING
is role value of (Location of DISPLAYITEM),
                  (Origin of LINEARTRANSFORM),
                  (UnitVector of LINEARTRANSFORM),
                  (Location of POSITION),
                  (VertexList of EDGESET),
                  (ItemOrder of ARRANGEMENT),
                  (EntityList of TABLE),
                  (ThemeList of TABLE),
                  (EntityList of MAP)

```

[136]

LITATOM

```

type: Generic
specializes: THING

```

[137]

NUMBERP

type: Generic

specializes: THING

is role value of (Size of DISPLAYITEM),
(Orientation of DISPLAYITEM),
(Width of DISPLAYITEM),
(Height of DISPLAYITEM),
(Dimensionality of COORDINATESYSTEM),
(Course of VEHICLE),
(Height of REGION),
(Width of REGION),
(Magnitude of METRIC),
(Order of POLYGON),
(ScaledDistance of RECTANGULARMAP)

[138]

FIXP

type: Generic

specializes: THING

[139]

SMALLP

type: Generic

specializes: THING

is role value of (LineSpacing of TEXT),
(Background of DISPLAYSURFACE)

[140]

STRINGP

type: Generic

specializes: THING

is role value of (Name of COORDINATESYSTEM),
(Name of PHYSOBJECT),
(Name of DISPLAY), (String of TEXT)

[141]

MAPITEM

type: Generic

specializes: DISPLAY, PRESENTATION, DISPLAYITEM,
THING

has specializers: NTDSITEM, FRIENDLYNTDSSHIP,
FRIENDLYNTDSPLANE, FRIENDLYNTDSSUB,
ENEMYNTDSSHIP, ENEMYNTDSSUB,
ENEMYNTDSPLANE, UNKNOWNNTDSSHIP,
UNKNOWNNTDSSUB, UNKNOWNNTDSPLANE

has abstraction: MAPITEMABSTR

roles:

```

(** Application 8) ((Application of PRESENTATION))
  ValDescs = (THING)
  Number = (0 NIL)
  Modality = Optional
Label ((Realization of PRESENTATION))
  ValDescs = (TEXT)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation MakeMapItemLabel?)
      [(Prerequisites Application Ground)
        (Arguments
          (CAR (CKLFindNode $$CONCEPT
                    Application))
          (CAR (CKLFindNode $$CONCEPT
                    Ground])

      (FillWhenMade NIL)
      T
(** Realization 8) of DISPLAY) (
(Realization of PRESENTATION))
  ValDescs = (DISPLAYITEM)
  Number = (0 NIL)
  Modality = Optional
(Ground of DISPLAY)
  ValDescs = (VIEWSURFACE)
  Number = 1
  Modality = Obligatory
(Name of DISPLAY)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
(Location of DISPLAYITEM)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      (LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional

```



```

(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of (Item of MAP)
has attached IData:
  (ToDraw NIL)   TDDisplay
  (ToLocate NIL) TLDisplay TLDisplayItem

```

[142]

MAPLEGEND

```

type: Generic
specializes: ARRANGEMENT, DISPLAY, PRESENTATION,
             DISPLAYITEM, THING
roles:
  ScaleIkon ((Item of ARRANGEMENT),
             (Realization of PRESENTATION))
    ValDescs = (MAPSCALE, DISPLAYITEM)
    Number = 1
    Modality = Optional
  Table ((Item of ARRANGEMENT),
         (Realization of PRESENTATION))
    ValDescs = (LEGENDTABLE, DISPLAYITEM)
    Number = 1
    Modality = Obligatory
    has attached IData:
      (Derivation MakeLegendTableFromApplication)
        ((Prerequisites Application)
         (Arguments (CKLFindNode $$CONCEPT
                    Application)))
      (FillWhenMade NIL)
      T
  Label ((Item of ARRANGEMENT),
        (Realization of PRESENTATION))
    ValDescs = (TEXT)
    Number = 1
    Modality = Obligatory
    has attached IData:
      (DefaultFiller NIL)
      (Make TEXT String "LEGEND")
  (Item of ARRANGEMENT) (
(Realization of PRESENTATION))

```

```

    ValDescs = (DISPLAYITEM)
    Number = (2 NIL)
    Modality = Obligatory
  (ItemOrder of ARRANGEMENT)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
  (Border of ARRANGEMENT) (
(Realization of PRESENTATION))
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
  (Separator of ARRANGEMENT) (
(Realization of PRESENTATION))
    ValDescs = (DISPLAYITEM)
    Number = (0 NIL)
    Modality = Optional
  (** Realization 8) of DISPLAY) (
(Realization of PRESENTATION))
    ValDescs = (DISPLAYITEM)
    Number = (0 NIL)
    Modality = Optional
  (Ground of DISPLAY)
    ValDescs = (VIEWSURFACE)
    Number = 1
    Modality = Obligatory
  (Name of DISPLAY)
    ValDescs = (STRINGP)
    Number = 1
    Modality = Optional
  (Application of PRESENTATION)
    ValDescs = (THING)
    Number = (0 NIL)
    Modality = Optional
  (Location of DISPLAYITEM)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    (LIST 0 0)
  (Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    1

```

```

(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of (Legend of MAP)

```

[143]

MAPGRID

```

type: Generic
specializes: DISPLAY, PRESENTATION, DISPLAYITEM,
             THING

```

roles:

```

ReferenceLine ((Realization of PRESENTATION))
  ValDescs = (CURVE)
  Number = (4 NIL)
  Modality = Obligatory
ReferenceLabel ((Realization of PRESENTATION))
  ValDescs = (TEXT)
  Number = (4 NIL)
  Modality = Obligatory
(** Realization 8) of DISPLAY) (
(Realization of PRESENTATION))
  ValDescs = (DISPLAYITEM)
  Number = (0 NIL)
  Modality = Optional
(Ground of DISPLAY)
  ValDescs = (VIEWSURFACE)
  Number = 1
  Modality = Obligatory
(Name of DISPLAY)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
(Application of PRESENTATION)
  ValDescs = (THING)
  Number = (0 NIL)
  Modality = Optional

```

```

(Location of DISPLAYITEM)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      (LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of (ReferenceGrid of MAP)

```

[144]

REGULARPOLYGON

type: Generic

```

specializes: POLYGON, DISPLAYCOMPOSITE, CLOSEDCURVE,
             CURVE, DISPLAYATOM, DISPLAYFORM,
             DISPLAYITEM, THING

```

roles:

```

Center ((Location of DISPLAYITEM))
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      (LIST 0 0)
Radius ((Size of DISPLAYITEM))
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional

```

```

has attached IData:
  (DefaultFiller NIL)
    1
  (** Orientation 2) ((Orientation of DISPLAYITEM))
    ValDescs = (THING)
    Number = 1
    Modality = Optional
  (Order of POLYGON)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Side of POLYGON) ((Component of DISPLAYCOMPOSITE))
    ValDescs = (LINESEGMENT)
    Number = (3 NIL)
    Modality = Obligatory
  (CoordSys of DISPLAYCOMPOSITE)
    ValDescs = (CARTESIANSYSTEM)
    Number = 1
    Modality = Optional
  (Approximation of CURVE)
    ValDescs = (EDGESET)
    Number = 1
    Modality = Optional
  (Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional

```

[145]

```

FLOATP
  type: Generic
  specializes: THING

```

[146]

```

POLYGON
  type: Generic
  specializes: DISPLAYCOMPOSITE, CLOSEDCURVE, CURVE,
              DISPLAYATOM, DISPLAYFORM, DISPLAYITEM,
              THING
  has specializers: REGULARPOLYGON, RECTANGLE
  roles:
    Order

```

```

ValDescs = (NUMBERP)
Number = 1
Modality = Optional
Side ((Component of DISPLAYCOMPOSITE))
ValDescs = (LINESEGMENT)
Number = (3 NIL)
Modality = Obligatory
(CoordSys of DISPLAYCOMPOSITE)
ValDescs = (CARTESIANSYSTEM)
Number = 1
Modality = Optional
(Approximation of CURVE)
ValDescs = (EDGESET)
Number = 1
Modality = Optional
(Location of DISPLAYITEM)
ValDescs = (LISTP)
Number = 1
Modality = Optional
has attached IData:
  (DefaultFiller NIL)
    (LIST 0 0)
(Size of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has attached IData:
  (DefaultFiller NIL)
    1
(Orientation of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Width of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Height of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Envelope of DISPLAYITEM)
ValDescs = (CLOSEDCURVE)
Number = 1
Modality = Optional

```

[147]

UNKNOWNSUB

type: Generic

specializes: SUB, PLATFORM, VEHICLE, PHYSOBJECT,
THING

```

roles:
  (** Ownership 10) ((Ownership of PLATFORM))
  ValDescs = (Unknown)
  Number = 1
  Modality = Optional
  (** Medium 7) of SUB) ((Medium of VEHICLE))
  ValDescs = (SubSurface)
  Number = 1
  Modality = Optional
  (EngagementStatus of PLATFORM)
  ValDescs = (ATOM)
  Number = 1
  Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
    ROLE#100
    type: Individual
    individuates: ROLE
    meta-describes:
      RoleSet EngagementStatus in Context
AIPSDOMAINMETA
  (Course of VEHICLE)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
    ROLE#35
    type: Individual
    individuates: ROLE
    meta-describes:
      RoleSet Course in Context AIPSDOMAINMETA
  (Speed of VEHICLE)
  ValDescs = (SPEED)
  Number = 1
  Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
    ROLE#44
    type: Individual
    individuates: ROLE
    meta-describes:
      RoleSet Speed in Context AIPSDOMAINMETA
  (Position of PHYSOBJECT)
  ValDescs = (PLACE)
  Number = 1
  Modality = Optional
  (Name of PHYSOBJECT)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional

```

```

has meta descriptions:
  [in Context AIPSDOMAINMETA]
  ROLE#101
  type: Individual
  individuates: ROLE
  meta-describes:
    RoleSet Name    in Context AIPSDOMAINMETA
has meta descriptions:
  [in Context AIPSDOMAINMETA]
  CONCEPT#90
  type: Individual
  individuates: CONCEPT
  meta-describes:
    Concept UNKNOWNSUB    in Context AIPSDOMAINMETA
                                                                    [148]

```

MAPABSTR

```

type: Individual
individuates: DISPLAYABSTRACTION,
              DISPLAYITEMABSTRACTION, ABSTRACTION,
              THING
has schema: MAP
roles:
  (** IRole 287) (
(IntendedApplication of DISPLAYABSTRACTION))
  ValDescs = (MAPIAPL1)
  (** IRole 286) (
(IntendedApplication of DISPLAYABSTRACTION))
  ValDescs = (MAPIAPL2)
  (InformationRequirement of DISPLAYABSTRACTION)
  ValDescs = (TEMPLATE)
  Number = (1 NIL)
  Modality = Optional
  (FixedComponent of DISPLAYITEMABSTRACTION)
  ValDescs = (DISPLAYFORM)
  Number = (1 NIL)
  Modality = Optional
                                                                    [149]

```

ATOM

```

type: Generic
specializes: THING
is role value of (Medium of VEHICLE),
                  (EngagementStatus of PLATFORM),
                  (Ownership of PLATFORM)
                                                                    [150]

```

UNKNOWNSHIP


```

type: Generic
specializes: SHIP, PLATFORM, VEHICLE, PHYSOJECT,
             THING
roles:
  (** Ownership 11) ((Ownership of PLATFORM))
    ValDescs = (Unknown)
    Number = 1
    Modality = Optional
  (** Medium 8) of SHIP) ((Medium of VEHICLE))
    ValDescs = (Surface)
    Number = 1
    Modality = Optional
  (EngagementStatus of PLATFORM)
    ValDescs = (ATOM)
    Number = 1
    Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
      ROLE#100
        type: Individual
        individuates: ROLE
        meta-describes:
          RoleSet EngagementStatus    in Context
AIPSDOMAINMETA
  (Course of VEHICLE)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
      ROLE#35
        type: Individual
        individuates: ROLE
        meta-describes:
          RoleSet Course    in Context AIPSDOMAINMETA
  (Speed of VEHICLE)
    ValDescs = (SPEED)
    Number = 1
    Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
      ROLE#44
        type: Individual
        individuates: ROLE
        meta-describes:
          RoleSet Speed    in Context AIPSDOMAINMETA
  (Position of PHYSOJECT)
    ValDescs = (PLACE)
    Number = 1
    Modality = Optional
  (Name of PHYSOJECT)

```

```

ValDescs = (STRINGP)
Number = 1
Modality = Optional
has meta descriptions:
  [in Context AIPSDOMAINMETA]
  ROLE#101
  type: Individual
  individuates: ROLE
  meta-describes:
    RoleSet Name    in Context AIPSDOMAINMETA
                                     [151]

```

UNKNOWNPLANE

```

type: Generic
specializes: PLANE, PLATFORM, VEHICLE, PHYSOJECT,
             THING

```

roles:

```

(** Ownership 12) ((Ownership of PLATFORM))
  ValDescs = (Unknown)
  Number = 1
  Modality = Optional
(** Medium 9) of PLANE) ((Medium of VEHICLE))
  ValDescs = (Air)
  Number = 1
  Modality = Optional
(EngagementStatus of PLATFORM)
  ValDescs = (ATOM)
  Number = 1
  Modality = Optional
has meta descriptions:
  [in Context AIPSDOMAINMETA]
  ROLE#100
  type: Individual
  individuates: ROLE
  meta-describes:
    RoleSet EngagementStatus    in Context

```

AIPSDOMAINMETA

```

(Course of VEHICLE)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
has meta descriptions:
  [in Context AIPSDOMAINMETA]
  ROLE#35
  type: Individual
  individuates: ROLE
  meta-describes:
    RoleSet Course    in Context AIPSDOMAINMETA
(Speed of VEHICLE)
  ValDescs = (SPEED)
  Number = 1

```

```

Modality = Optional
has meta descriptions:
  [in Context AIPSDOMAINMETA]
    ROLE#44
      type: Individual
      individuates: ROLE
      meta-describes:
        RoleSet Speed    in Context AIPSDOMAINMETA
(Position of PHYSOBJECT)
  ValDescs = (PLACE)
  Number = 1
  Modality = Optional
(Name of PHYSOBJECT)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
has meta descriptions:
  [in Context AIPSDOMAINMETA]
    ROLE#101
      type: Individual
      individuates: ROLE
      meta-describes:
        RoleSet Name    in Context AIPSDOMAINMETA
has meta descriptions:
  [in Context AIPSDOMAINMETA]
    CONCEPT#97
      type: Individual
      individuates: CONCEPT
      meta-describes:
        Concept UNKNOWNPLANE    in Context AIPSDOMAINMETA
                                                                    [152]

```

TRANSLATION

```

type: Generic
specializes: 2DLINEARTRANSFORM, LINEARTRANSFORM,
             MAPPING, THING
has specializer: TRANSFIX
roles:
  (** UnitVector 4) ((UnitVector of LINEARTRANSFORM))
    ValDescs = ((1 1))
    Number = 1
    Modality = Optional
  (** From 6) of 2DLINEARTRANSFORM) (
(From of MAPPING))
  ValDescs = (CARTESIANSYSTEM)
  Number = (1 NIL)
  Modality = Obligatory
  (** To 9) of 2DLINEARTRANSFORM) ((To of MAPPING))
  ValDescs = (CARTESIANSYSTEM)
  Number = (1 NIL)

```

Modality = Obligatory
 (Origin of LINEARTRANSFORM)
 ValDescs = (LISTP)
 Number = 1
 Modality = Optional

[153]

LINESEGMENT#102

type: Individual
 individuates: LINESEGMENT, CURVE, DISPLAYATOM,
 DISPLAYFORM, DISPLAYITEM, THING

roles:

(** IRole 288) ((EndPoint of LINESEGMENT),
 (Location of DISPLAYITEM))

ValDescs = ((-6 0))

has attached IData:

(DefaultFiller NIL)

(LIST 0 0)

(** IRole 289) ((EndPoint of LINESEGMENT),
 (Location of DISPLAYITEM))

ValDescs = ((6 0))

has attached IData:

(DefaultFiller NIL)

(LIST 0 0)

(Line of LINESEGMENT)

ValDescs = (LINE)

Number = 1

Modality = Optional

has attached IData:

(Derivation DeriveLineEquationFromEndpoints)

((Prerequisites EndPoint))

(Approximation of CURVE)

ValDescs = (EDGESET)

Number = 1

Modality = Optional

(Size of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

has attached IData:

(DefaultFiller NIL)

1

(Orientation of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

(Width of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

(Height of DISPLAYITEM)

ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Envelope of DISPLAYITEM)
 ValDescs = (CLOSEDCURVE)
 Number = 1
 Modality = Optional
 is role value of

(** IRole 290) of NTDSENGAGEMENTMARKABSTR
 has attached IData:
 (ToDraw NIL) TDLineSegment TDCurve
 (ToErase NIL) TEDisplayAtom
 (ToLocate NIL) TLDisplayAtom TLDisplayItem

[154]

ROLE#101

type: Individual
 individuates: ROLE, THING
 meta-describes:
 RoleSet Name in Context AIPSDOMAINMETA
 is role value of

(** IRole 291) of UNKNOWNNTDSPLANEIAPL1

[155]

VISIBLESURFACE

type: Generic
 specializes: DISPLAYSURFACE, VIEWSURFACE,
 RECTANGULARREGION, HOMOGENEOUSREGION,
 REGION, PLACE, THING

roles:

(DisplayStream of DISPLAYSURFACE)
 ValDescs = (THING)
 Number = 1
 Modality = Obligatory
 has attached IData:
 (DefaultFiller NIL)
 (DSPCREATE)
 (Background of DISPLAYSURFACE)
 ValDescs = (SMALLP)
 Number = 1
 Modality = Obligatory
 has attached IData:
 (DefaultFiller NIL)
 0

(** Continuum 7) of DISPLAYSURFACE) (

(Continuum of PLACE))
 ValDescs = (VIEWSYSTEM)

```

    Number = 1
    Modality = Optional
    (Window of VIEWSURFACE)
    ValDescs = (WINDOW)
    Number = (0 NIL)
    Modality = Optional
    (** Boundary 6) of RECTANGULARREGION) (
(Boundary of REGION), (Constraint of PLACE))
    ValDescs = (RECTANGLE)
    Number = 1
    Modality = Obligatory
    has attached IData:
        (Derivation TMRectangle)
            NIL
    (** Height 13) of RECTANGULARREGION) (
(Height of REGION))
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    has attached IData:
        (Derivation Copy)
            [(Prerequisites Boundary)
             (Arguments
              (CAR (CKLFindNode $$CONCEPT
                Boundary
                Height])
(** Width 11) of RECTANGULARREGION) (
(Width of REGION))
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    (** Aperture 4) of HOMOGENEOUSREGION) (
(Aperture of REGION), (Constraint of PLACE))
    ValDescs = (REGION)
    Number = 0
    Modality = Optional
    (Constraint of PLACE)
    ValDescs = (THING)
    Number = 1
    Modality = Optional
    has attached IData:
    (ToDraw NIL)    TDDisplaySurface
    (ToLocate NIL)  TLDisplaySurface
    (ToMake NIL)   TMDisplaySurface
    (ToSize NIL)   TSRectangularRegion

```

[156]

WINDOW

type: Generic
 specializes: THING
 is role value of (Window of VIEWSURFACE)

[157]

HOMOGENEOUSREGION

type: Generic
 specializes: REGION, PLACE, THING
 has specializers: RECTANGULARREGION, VIEWSURFACE,
 DISPLAYSURFACE, VISIBLESURFACE,
 INVISIBLESURFACE

roles:

(** Aperture 4) ((Aperture of REGION),
 (Constraint of PLACE))
 ValDescs = (REGION)
 Number = 0
 Modality = Optional
 (Boundary of REGION) ((Constraint of PLACE))
 ValDescs = (CLOSEDCURVE)
 Number = 1
 Modality = Optional
 has meta descriptions:
 [in Context AIPSDOMAINMETA]
 ROLE#25
 type: Individual
 individuates: ROLE
 meta-describes:
 RoleSet Boundary in Context

AIPSDOMAINMETA

(Height of REGION)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Width of REGION)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Constraint of PLACE)
 ValDescs = (THING)
 Number = 1
 Modality = Optional
 (Continuum of PLACE)
 ValDescs = (COORDINATESYSTEM)
 Number = 1
 Modality = Optional

[158]

LINESEGMENT#104

type: Individual

individuates: LINESEGMENT, CURVE, DISPLAYATOM,
 DISPLAYFORM, DISPLAYITEM, THING

roles:

(** IRole 292) ((EndPoint of LINESEGMENT),
 (Location of DISPLAYITEM))

ValDescs = ((-5 0))

has attached IData:

(DefaultFiller NIL)

(LIST 0 0)

(** IRole 293) ((EndPoint of LINESEGMENT),
 (Location of DISPLAYITEM))

ValDescs = ((5 0))

has attached IData:

(DefaultFiller NIL)

(LIST 0 0)

(Line of LINESEGMENT)

ValDescs = (LINE)

Number = 1

Modality = Optional

has attached IData:

(Derivation DeriveLineEquationFromEndpoints)

((Prerequisites EndPoint))

(Approximation of CURVE)

ValDescs = (EDGESET)

Number = 1

Modality = Optional

(Size of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

has attached IData:

(DefaultFiller NIL)

1

(Orientation of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

(Width of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

(Height of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

(Envelope of DISPLAYITEM)

ValDescs = (CLOSEDCURVE)

Number = 1

Modality = Optional

is role value of

((** IRole 294) of NARROWNTDSENGAGEMENTMARKABSTR)
 has attached IData:
 (ToDraw NIL) TDLineSegment TDCurve
 (ToErase NIL) TEDisplayAtom
 (ToLocate NIL) TLDisplayAtom TLDisplayItem

[159]

ROLE#98

type: Individual
 individuates: ROLE, THING
 meta-describes:
 RoleSet Ownership in Context AIPSDOMAINMETA
 is role value of

((** IRole 295) of UNKNOWNNTDSPLANEIAPL1)

[160]

STABILEDISPLAYITEM

type: Generic
 specializes: DISPLAYITEM, THING
 roles:
 (Location of DISPLAYITEM)
 ValDescs = (LISTP)
 Number = 1
 Modality = Optional
 has attached IData:
 (DefaultFiller NIL)
 (LIST 0 0)
 (Size of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 has attached IData:
 (DefaultFiller NIL)
 1
 (Orientation of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Width of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Height of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Envelope of DISPLAYITEM)
 ValDescs = (CLOSEDCURVE)
 Number = 1

Modality = Optional
has attached IData:
(ToLocate NIL) TLDisplayItem

[161]

MOTILEDISPLAYITEM

type: Generic
specializes: DISPLAYITEM, THING
roles:

(Location of DISPLAYITEM)
ValDescs = (LISTP)
Number = 1
Modality = Optional
has attached IData:
(DefaultFiller NIL)
(LIST 0 0)

(Size of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has attached IData:
(DefaultFiller NIL)
1

(Orientation of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional

(Width of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional

(Height of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional

(Envelope of DISPLAYITEM)
ValDescs = (CLOSEDCURVE)
Number = 1
Modality = Optional

has attached IData:
(ToLocate NIL) TLDisplayItem

[162]

CONCEPT#103

type: Individual
individuates: CONCEPT, THING
meta-describes:
Concept PLATFORM in Context AIPSDOMAINMETA
is role value of

((** IRole 296) of NTDSENGAGEMENTMARKIAPL1),

((** IRole 297) of
NTDSVELOCITYLEADERIAPL1)

[163]

FRIENDLYSUB

type: Generic
specializes: SUB, PLATFORM, VEHICLE, PHYSOBJECT,
THING

roles:

((** Ownership 13) ((Ownership of PLATFORM))
ValDescs = (Friendly)
Number = 1
Modality = Optional
((** Medium 10) of SUB) ((Medium of VEHICLE))
ValDescs = (SubSurface)
Number = 1
Modality = Optional
(EngagementStatus of PLATFORM)
ValDescs = (ATOM)
Number = 1
Modality = Optional
has meta descriptions:
[in Context AIPSDOMAINMETA]
ROLE#100
type: Individual
individuates: ROLE
meta-describes:
RoleSet EngagementStatus in Context

AIPSDOMAINMETA

(Course of VEHICLE)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has meta descriptions:
[in Context AIPSDOMAINMETA]
ROLE#35
type: Individual
individuates: ROLE
meta-describes:
RoleSet Course in Context AIPSDOMAINMETA
(Speed of VEHICLE)
ValDescs = (SPEED)
Number = 1
Modality = Optional
has meta descriptions:
[in Context AIPSDOMAINMETA]
ROLE#44
type: Individual
individuates: ROLE
meta-describes:

```

                RoleSet Speed    in Context AIPSDOMAINMETA
(Position of PHYSOBJECT)
  ValDescs = (PLACE)
  Number = 1
  Modality = Optional
(Name of PHYSOBJECT)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
has meta descriptions:
  [in Context AIPSDOMAINMETA]
    ROLE#101
      type: Individual
      individuates: ROLE
      meta-describes:
        RoleSet Name    in Context AIPSDOMAINMETA
has meta descriptions:
  [in Context AIPSDOMAINMETA]
    CONCEPT#55
      type: Individual
      individuates: CONCEPT
      meta-describes:
        Concept FRIENDLYSUB    in Context AIPSDOMAINMETA
                                                                    [164]

```

INVISIBLESURFACE

```

type: Generic
specializes: DISPLAYSURFACE, VIEWSURFACE,
             RECTANGULARREGION, HOMOGENEOUSREGION,
             REGION, PLACE, THING

```

roles:

```

(DisplayStream of DISPLAYSURFACE)
  ValDescs = (THING)
  Number = 1
  Modality = Obligatory
  has attached IData:
    (DefaultFiller NIL)
    (DSPCREATE)
(Background of DISPLAYSURFACE)
  ValDescs = (SMALLP)
  Number = 1
  Modality = Obligatory
  has attached IData:
    (DefaultFiller NIL)
    0
(** Continuum 7) of DISPLAYSURFACE) (
(Continuum of PLACE))
  ValDescs = (VIEWSYSTEM)
  Number = 1
  Modality = Optional

```

```

(Window of VIEWSURFACE)
  ValDescs = (WINDOW)
  Number = (0 NIL)
  Modality = Optional
  (** Boundary 6) of RECTANGULARREGION) (
(Boundary of REGION), (Constraint of PLACE))
  ValDescs = (RECTANGLE)
  Number = 1
  Modality = Obligatory
  has attached IData:
    (Derivation TMRectangle)
      NIL
  (** Height 13) of RECTANGULARREGION) (
(Height of REGION))
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation Copy)
      [(Prerequisites Boundary)
        (Arguments
          (CAR (CKLFindNode $$CONCEPT
            Boundary
            Height]
  (** Width 11) of RECTANGULARREGION) (
(Width of REGION))
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  (** Aperture 4) of HOMOGENEOUSREGION) (
(Aperture of REGION), (Constraint of PLACE))
  ValDescs = (REGION)
  Number = 0
  Modality = Optional
  (Constraint of PLACE)
  ValDescs = (THING)
  Number = 1
  Modality = Optional
  has attached IData:
    (ToDraw NIL)    TDDisplaySurface
    (ToLocate NIL)  TLDisplaySurface
    (ToMake NIL)   TMDisplaySurface
    (ToSize NIL)   TSRectangularRegion

```

[165]

```

RECTANGULARREGION
  type: Generic

```

specializes: HOMOGENEOUSREGION, REGION, PLACE, THING
 has specializers: VIEWSURFACE, DISPLAYSURFACE,
 VISIBLESURFACE, INVISIBLESURFACE

roles:

(** Boundary 6) ((Boundary of REGION),
 (Constraint of PLACE))
 ValDescs = (RECTANGLE)
 Number = 1
 Modality = Obligatory
 has attached IData:
 (Derivation TMRectangle)
 NIL
 (** Continuum 8) ((Continuum of PLACE))
 ValDescs = (CARTESIANSYSTEM)
 Number = 1
 Modality = Optional
 (** Height 13) ((Height of REGION))
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 has attached IData:
 (Derivation Copy)
 [(Prerequisites Boundary)
 (Arguments
 (CAR (CKLFindNode \$\$CONCEPT
 Boundary
 Height])
 (** Width 11) ((Width of REGION))
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (** Aperture 4) of HOMOGENEOUSREGION) (

(Aperture of REGION), (Constraint of PLACE))
 ValDescs = (REGION)
 Number = 0
 Modality = Optional
 (Constraint of PLACE)
 ValDescs = (THING)
 Number = 1
 Modality = Optional
 has attached IData:
 (ToSize NIL) TSRectangularRegion

[166]

EDGESET#95

type: Individual
 individuates: EDGESET, DISPLAYATOM, DISPLAYFORM,
 DISPLAYITEM, THING

roles:

(** IRole 298) ((VertexList of EDGESET))

```

    ValDescs = (((-5 0) (-5 5) (5 5) (5 0)))
(Location of DISPLAYITEM)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
      (LIST 0 0)
(Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
    has attached IData:
      (DefaultFiller NIL)
      1
(Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
(Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
(Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
(Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
is role value of

```

```

(** IRole 299) of UNKNOWNNTDSPLANEABSTR
has attached IData:
  (ToErase NIL) TEDisplayAtom
  (ToLocate NIL) TLDisplayAtom TLDisplayItem

```

[167]

FRIENDLYSHIP

```

type: Generic
specializes: SHIP, PLATFORM, VEHICLE, PHYSOBJECT,
             THING

```

roles:

```

(** Ownership 14) ((Ownership of PLATFORM))
    ValDescs = (Friendly)
    Number = 1
    Modality = Optional
(** Medium 11) of SHIP ((Medium of VEHICLE))
    ValDescs = (Surface)
    Number = 1

```

```
Modality = Optional
(EngagementStatus of PLATFORM)
ValDescs = (ATOM)
Number = 1
Modality = Optional
has meta descriptions:
  [in Context AIPSDOMAINMETA]
    ROLE#100
      type: Individual
      individuates: ROLE
      meta-describes:
        RoleSet EngagementStatus    in Context
AIPSDOMAINMETA
(Course of VEHICLE)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has meta descriptions:
  [in Context AIPSDOMAINMETA]
    ROLE#35
      type: Individual
      individuates: ROLE
      meta-describes:
        RoleSet Course    in Context AIPSDOMAINMETA
(Speed of VEHICLE)
ValDescs = (SPEED)
Number = 1
Modality = Optional
has meta descriptions:
  [in Context AIPSDOMAINMETA]
    ROLE#44
      type: Individual
      individuates: ROLE
      meta-describes:
        RoleSet Speed    in Context AIPSDOMAINMETA
(Position of PHYSOBJECT)
ValDescs = (PLACE)
Number = 1
Modality = Optional
(Name of PHYSOBJECT)
ValDescs = (STRINGP)
Number = 1
Modality = Optional
has meta descriptions:
  [in Context AIPSDOMAINMETA]
    ROLE#101
      type: Individual
      individuates: ROLE
      meta-describes:
        RoleSet Name    in Context AIPSDOMAINMETA
[168]
```


DISPLAYCOMPOSITE

type: Generic
 specializes: DISPLAYFORM, DISPLAYITEM, THING
 has specializers: POLYGON, REGULARPOLYGON, RECTANGLE
 roles:

Component
 ValDescs = (DISPLAYFORM)
 Number = (1 NIL)
 Modality = Obligatory
 CoordSys
 ValDescs = (CARTESIANSYSTEM)
 Number = 1
 Modality = Optional
 (Location of DISPLAYITEM)
 ValDescs = (LISTP)
 Number = 1
 Modality = Optional
 has attached IData:
 (DefaultFiller NIL)
 (LIST 0 0)
 (Size of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 has attached IData:
 (DefaultFiller NIL)
 1
 (Orientation of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Width of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Height of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Envelope of DISPLAYITEM)
 ValDescs = (CLOSEDCURVE)
 Number = 1
 Modality = Optional

[169]

ROLE#94

type: Individual
 individuates: ROLE, THING
 meta-describes:
 RoleSet Name in Context AIPSDOMAINMETA

is role value of
((** IRole 300) of UNKNOWNNTDSSUBIAPL1)

[170]

ENEMYSUB

type: Generic
specializes: SUB, PLATFORM, VEHICLE, PHYSOBJECT,
THING

roles:

(** Ownership 15) ((Ownership of PLATFORM))
ValDescs = (Enemy)
Number = 1
Modality = Optional
((** Medium 10) of SUB) ((Medium of VEHICLE))
ValDescs = (SubSurface)
Number = 1
Modality = Optional
(EngagementStatus of PLATFORM,
ValDescs = (ATOM)
Number = 1
Modality = Optional
has meta descriptions:
[in Context AIPSDOMAINMETA]
ROLE#100
type: Individual
individuates: ROLE
meta-describes:
RoleSet EngagementStatus in Context

AIPSDOMAINMETA

(Course of VEHICLE)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has meta descriptions:
[in Context AIPSDOMAINMETA]
ROLE#35
type: Individual
individuates: ROLE
meta-describes:
RoleSet Course in Context AIPSDOMAINMETA

(Speed of VEHICLE)
ValDescs = (SPEED)
Number = 1
Modality = Optional
has meta descriptions:
[in Context AIPSDOMAINMETA]
ROLE#44
type: Individual
individuates: ROLE

```

        meta-describes:
            RoleSet Speed    in Context AIPSDOMAINMETA
(Position of PHYSOBJECT)
    ValDescs = (PLACE)
    Number = 1
    Modality = Optional
(Name of PHYSOBJECT)
    ValDescs = (STRINGP)
    Number = 1
    Modality = Optional
has meta descriptions:
    [in Context AIPSDOMAINMETA]
        ROLE#101
            type: Individual
            individuates: ROLE
            meta-describes:
                RoleSet Name    in Context AIPSDOMAINMETA
has meta descriptions:
    [in Context AIPSDOMAINMETA]
        CONCEPT#69
            type: Individual
            individuates: CONCEPT
            meta-describes:
                Concept ENEMYSUB    in Context AIPSDOMAINMETA
                                                                    [171]

```

```

ROLE#100
    type: Individual
    individuates: ROLE, THING
    meta-describes:
        RoleSet EngagementStatus    in Context AIPSDOMAINMETA
    is role value of

```

```

(** IRole 301) of UNKNOWNNTDSPLANEIAPL1),
    (** IRole 302) of
NTDSENGAGEMENTMARKIAPL1)

```

[172]

```

FRIENDLYPLANE
    type: Generic
    specializes: PLANE, PLATFORM, VEHICLE, PHYSOBJECT,
                THING
    roles:
        (** Ownership 16) ((Ownership of PLATFORM))
            ValDescs = (Friendly)
            Number = 1
            Modality = Optional
        (** Medium 12) of PLANE) ((Medium of VEHICLE))
            ValDescs = (Air)
            Number = 1

```

```

    Modality = Optional
  (EngagementStatus of PLATFORM)
  ValDescs = (ATOM)
  Number = 1
  Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
      ROLE#100
        type: Individual
        individuates: ROLE
        meta-describes:
          RoleSet EngagementStatus    in Context
AIPSDOMAINMETA
  (Course of VEHICLE)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
      ROLE#35
        type: Individual
        individuates: ROLE
        meta-describes:
          RoleSet Course    in Context AIPSDOMAINMETA
  (Speed of VEHICLE)
  ValDescs = (SPEED)
  Number = 1
  Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
      ROLE#44
        type: Individual
        individuates: ROLE
        meta-describes:
          RoleSet Speed    in Context AIPSDOMAINMETA
  (Position of PHYSOBJECT)
  ValDescs = (PLACE)
  Number = 1
  Modality = Optional
  (Name of PHYSOBJECT)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
      ROLE#101
        type: Individual
        individuates: ROLE
        meta-describes:
          RoleSet Name    in Context AIPSDOMAINMETA
  has meta descriptions:

```

[in Context AIPSDOMAINMETA]
CONCEPT#48
type: Individual
individuates: CONCEPT
meta-describes:
Concept FRIENDLYPLANE in Context
AIPSDOMAINMETA [173]

ROLE#93
type: Individual
individuates: ROLE, THING
meta-describes:
RoleSet EngagementStatus in Context AIPSDOMAINMETA
is role value of

((** IRole 303) of UNKNOWNNTDSSUBIAPL1) [174]

ROLE#99
type: Individual
individuates: ROLE, THING
meta-describes:
RoleSet Position in Context AIPSDOMAINMETA
is role value of

((** IRole 304) of UNKNOWNNTDSPLANEIAPL1) [175]

SUB
type: Generic
specializes: VEHICLE, PHYSOBJECT, THING
has specializers: FRIENDLYSUB, ENEMYSUB, UNKNOWNNSUB
roles:
(** Medium 10) ((Medium of VEHICLE))
ValDescs = (SubSurface)
Number = 1
Modality = Optional
(Course of VEHICLE)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has meta descriptions:
[in Context AIPSDOMAINMETA]
ROLE#35
type: Individual
individuates: ROLE
meta-describes:
RoleSet Course in Context AIPSDOMAINMETA

```

(Speed of VEHICLE)
  ValDescs = (SPEED)
  Number = 1
  Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
      ROLE#44
        type: Individual
        individuates: ROLE
        meta-describes:
          RoleSet Speed    in Context AIPSDOMAINMETA

```

```

(Position of PHYSOJECT)
  ValDescs = (PLACE)
  Number = 1
  Modality = Optional
(Name of PHYSOJECT)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
      ROLE#101
        type: Individual
        individuates: ROLE
        meta-describes:
          RoleSet Name    in Context AIPSDOMAINMETA

```

[176]

```

ROLE#92
  type: Individual
  individuates: ROLE, THING
  meta-describes:
    RoleSet Position    in Context AIPSDOMAINMETA
  is role value of

```

((** IRole 305) of UNKNOWNNTDSSUBIAPL1)

[177]

```

SHIP
  type: Generic
  specializes: VEHICLE, PHYSOJECT, THING
  has specializers: FRIENDLYSHIP, ENEMYSHIP,
                  UNKNOWNSHIP

```

```

roles:
  (** Medium 11) ((Medium of VEHICLE))
    ValDescs = (Surface)
    Number = 1
    Modality = Optional
  (Course of VEHICLE)
    ValDescs = (NUMBERP)

```

```

Number = 1
Modality = Optional
has meta descriptions:
  [in Context AIPSDOMAINMETA]
    ROLE#35
      type: Individual
      individuates: ROLE
      meta-describes:
        RoleSet Course    in Context AIPSDOMAINMETA
(Speed of VEHICLE)
ValDescs = (SPEED)
Number = 1
Modality = Optional
has meta descriptions:
  [in Context AIPSDOMAINMETA]
    ROLE#44
      type: Individual
      individuates: ROLE
      meta-describes:
        RoleSet Speed    in Context AIPSDOMAINMETA
(Position of PHYSOBJECT)
ValDescs = (PLACE)
Number = 1
Modality = Optional
(Name of PHYSOBJECT)
ValDescs = (STRINGP)
Number = 1
Modality = Optional
has meta descriptions:
  [in Context AIPSDOMAINMETA]
    ROLE#101
      type: Individual
      individuates: ROLE
      meta-describes:
        RoleSet Name    in Context AIPSDOMAINMETA
                                                                    [178]

```

DISPLAYSURFACE

```

type: Generic
specializes: VIEWSURFACE, RECTANGULARREGION,
             HOMOGENEOUSREGION, REGION, PLACE, THING
has specializers: VISIBLESURFACE, INVISIBLESURFACE
roles:
  DisplayStream
    ValDescs = (THING)
    Number = 1
    Modality = Obligatory
    has attached IData:
      (DefaultFiller NIL)
      (DSPCREATE)
Background

```

```

ValDescs = (SMALLP)
Number = 1
Modality = Obligatory
has attached IData:
  (DefaultFiller NIL)
  0
(** Continuum 7) ((Continuum of PLACE))
  ValDescs = (VIEWSYSTEM)
  Number = 1
  Modality = Optional
(Window of VIEWSURFACE)
  ValDescs = (WINDOW)
  Number = (0 NIL)
  Modality = Optional
(** Boundary 6) of RECTANGULARREGION) (
(Boundary of REGION), (Constraint of PLACE))
  ValDescs = (RECTANGLE)
  Number = 1
  Modality = Obligatory
has attached IData:
  (Derivation TMRectangle)
  NIL
(** Height 13) of RECTANGULARREGION) (
(Height of REGION))
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
has attached IData:
  (Derivation Copy)
    [(Prerequisites Boundary)
     (Arguments
      (CAR (CKLFindNode $$CONCEPT
                Boundary
                Height]
(** Width 12) of RECTANGULARREGION) (
(Width of REGION))
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(** Aperture 4) of HOMOGENEOUSREGION) (
(Aperture of REGION), (Constraint of PLACE))
  ValDescs = (REGION)
  Number = 0
  Modality = Optional
(Constraint of PLACE)
  ValDescs = (THING)
  Number = 1

```


Modality = Optional
 has attached IData:
 (ToDraw NIL) TDDisplaySurface
 (ToLocate NIL) TLDisplaySurface
 (ToMake NIL) TMDisplaySurface
 (ToSize NIL) TSRectangularRegion

[179]

PLATFORM

type: Generic
 specializes: VEHICLE, PHYSOBJECT, THING
 has specializers: FRIENDLYSHIP, FRIENDLYSUB,
 FRIENDLYPLANE, ENEMYSHIP, ENEMYSUB,
 ENEMYPLANE, UNKNOWNSHIP, UNKNOWNSUB,
 UNKNOWNPLANE

roles:

EngagementStatus
 ValDescs = (ATOM)
 Number = 1
 Modality = Optional
 has meta descriptions:
 [in Context AIPSDOMAINMETA]
 ROLE#100
 type: Individual
 individuates: ROLE
 meta-describes:
 RoleSet EngagementStatus in Context

AIPSDOMAINMETA

Ownership
 ValDescs = (ATOM)
 Number = 1
 Modality = Optional
 (Medium of VEHICLE)
 ValDescs = (ATOM)
 Number = 1
 Modality = Optional
 has meta descriptions:
 [in Context AIPSDOMAINMETA]
 ROLE#33
 type: Individual
 individuates: ROLE
 meta-describes:
 RoleSet Medium in Context AIPSDOMAINMETA

(Course of VEHICLE)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 has meta descriptions:
 [in Context AIPSDOMAINMETA]
 ROLE#35
 type: Individual

```

        individuates: ROLE
        meta-describes:
            RoleSet Course    in Context AIPSDOMAINMETA
(Speed of VEHICLE)
    ValDescs = (SPEED)
    Number = 1
    Modality = Optional
    has meta descriptions:
        [in Context AIPSDOMAINMETA]
        ROLE#44
        type: Individual
        individuates: ROLE
        meta-describes:
            RoleSet Speed    in Context AIPSDOMAINMETA
(Position of PHYSOJECT)
    ValDescs = (PLACE)
    Number = 1
    Modality = Optional
(Name of PHYSOJECT)
    ValDescs = (STRINGP)
    Number = 1
    Modality = Optional
    has meta descriptions:
        [in Context AIPSDOMAINMETA]
        ROLE#101
        type: Individual
        individuates: ROLE
        meta-describes:
            RoleSet Name    in Context AIPSDOMAINMETA
has meta descriptions:
    [in Context AIPSDOMAINMETA]
    CONCEPT#103
    type: Individual
    individuates: CONCEPT
    meta-describes:
        Concept PLATFORM    in Context AIPSDOMAINMETA
                                                                    [180]

```

ENEMYSHIP

```

type: Generic
specializes: SHIP, PLATFORM, VEHICLE, PHYSOJECT,
            THING
roles:
    (** Ownership 17) ((Ownership of PLATFORM))
        ValDescs = (Enemy)
        Number = 1
        Modality = Optional
    (** Medium 11) of SHIP) ((Medium of VEHICLE))
        ValDescs = (Surface)
        Number = 1
        Modality = Optional

```

```

(EngagementStatus of PLATFORM)
  ValDescs = (ATOM)
  Number = 1
  Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
      ROLE#100
        type: Individual
        individuates: ROLE
        meta-describes:
          RoleSet EngagementStatus   in Context
AIPSDOMAINMETA
(Course of VEHICLE)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
      ROLE#35
        type: Individual
        individuates: ROLE
        meta-describes:
          RoleSet Course   in Context AIPSDOMAINMETA
(Speed of VEHICLE)
  ValDescs = (SPEED)
  Number = 1
  Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
      ROLE#44
        type: Individual
        individuates: ROLE
        meta-describes:
          RoleSet Speed   in Context AIPSDOMAINMETA
(Position of PHYSOBJECT)
  ValDescs = (PLACE)
  Number = 1
  Modality = Optional
(Name of PHYSOBJECT)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
      ROLE#101
        type: Individual
        individuates: ROLE
        meta-describes:
          RoleSet Name   in Context AIPSDOMAINMETA
has meta descriptions:
  [in Context AIPSDOMAINMETA]

```

CONCEPT#62
type: Individual
individuates: CONCEPT
meta-describes:
Concept ENEMYSHIP in Context AIPSDOMAINMETA
[181]

CONCEPT#97
type: Individual
individuates: CONCEPT, THING
meta-describes:
Concept UNKNOWNPLANE in Context AIPSDOMAINMETA
is role value of

((** IRole 306) of UNKNOWNNTDSPLANEIAPL1)

[182]

POINT#96
type: Individual
individuates: POINT, DISPLAYATOM, DISPLAYFORM,
DISPLAYITEM, THING
roles:
(** IRole 307) ((Location of DISPLAYITEM))
ValDescs = ((0 0))
has attached IData:
(DefaultFiller NIL)
(LIST 0 0)
(Size of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has attached IData:
(DefaultFiller NIL)
1
(Orientation of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Width of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Height of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Envelope of DISPLAYITEM)
ValDescs = (CLOSEDCURVE)
Number = 1
Modality = Optional

is role value of

((** IRole 308) of UNKNOWNNTDSPLANEABSTR)
 has attached IData:
 (ToDraw NIL) TDPoint
 (ToErase NIL) TEDisplayAtom
 (ToLocate NIL) TLDisplayAtom TLDisplayItem

[183]

CONCEPT#90

 type: Individual
 individuates: CONCEPT, THING
 meta-describes:
 Concept UNKNOWNNSUB in Context AIPSDOMAINMETA
 is role value of

((** IRole 309) of UNKNOWNNTDSSUBIAPL1)

[184]

DISPLAYFORM

 type: Generic
 specializes: DISPLAYITEM, THING
 has specializers: DISPLAYATOM, DISPLAYCOMPOSITE,
 POINT, EDGESET, CURVE, LINESEGMENT,
 CLOSEDCURVE, ELLIPSE, POLYGON,
 CIRCLE, REGULARPOLYGON, RECTANGLE
 has individuators: POINT#39, POINT#47, POINT#54,
 POINT#61, POINT#68, POINT#75,
 POINT#82, POINT#89, POINT#96,
 EDGESET#46, EDGESET#53, EDGESET#60,
 EDGESET#67, EDGESET#74, EDGESET#81,
 EDGESET#88, EDGESET#95,
 LINESEGMENT#26, LINESEGMENT#27,
 LINESEGMENT#102, LINESEGMENT#104,
 CIRCLE#38

roles:

 (Location of DISPLAYITEM)
 ValDescs = (LISTP)
 Number = 1
 Modality = Optional
 has attached IData:
 (DefaultFiller NIL)
 (LIST 0 0)

 (Size of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 has attached IData:
 (DefaultFiller NIL)

1

(Orientation of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Width of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Height of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Envelope of DISPLAYITEM)
 ValDescs = (CLOSEDCURVE)
 Number = 1
 Modality = Optional
 is role value of

(FixedComponent of DISPLAYITEMABSTRACTION),
 (Component of DISPLAYCOMPOSITE)
 has attached IData:
 (ToLocate NIL) TLDisplayItem

[185]

PLANE

type: Generic
 specializes: VEHICLE, PHYSOBJECT, THING
 has specializers: FRIENDLYPLANE, ENEMYPLANE,
 UNKNOWNPLANE

roles:

(** Medium 12) ((Medium of VEHICLE))
 ValDescs = (Air)
 Number = 1
 Modality = Optional
 (Course of VEHICLE)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 has meta descriptions:
 [in Context AIPSDOMAINMETA]
 ROLE#35
 type: Individual
 individuates: ROLE
 meta-describes:
 RoleSet Course in Context AIPSDOMAINMETA
 (Speed of VEHICLE)
 ValDescs = (SPEED)
 Number = 1
 Modality = Optional
 has meta descriptions:
 [in Context AIPSDOMAINMETA]

```

ROLE#44
  type: Individual
  individuates: ROLE
  meta-describes:
    RoleSet Speed    in Context AIPSDOMAINMETA
(Position of PHYSOBJECT)
  ValDescs = (PLACE)
  Number = 1
  Modality = Optional
(Name of PHYSOBJECT)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
has meta descriptions:
  [in Context AIPSDOMAINMETA]
    ROLE#101
      type: Individual
      individuates: ROLE
      meta-describes:
        RoleSet Name    in Context AIPSDOMAINMETA
has meta descriptions:
  [in Context AIPSDOMAINMETA]
    CONCEPT#31
      type: Individual
      individuates: CONCEPT
      meta-describes:
        Concept PLANE    in Context AIPSDOMAINMETA

```

[186]

```

EDGESET#88
  type: Individual
  individuates: EDGESET, DISPLAYATOM, DISPLAYFORM,
                DISPLAYITEM, THING
roles:
  (** IRole 310) ((VertexList of EDGESET))
  ValDescs = (((-5 0) (-5 -5) (5 -5) (5 0)))
(Location of DISPLAYITEM)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    (LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    1
(Orientation of DISPLAYITEM)

```

```

    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
  (Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
  is role value of

```

```

(** IRole 311) of UNKNOWNNTDSSUBABSTR
  has attached IData:
    (ToErase NIL) TEDisplayAtom
    (ToLocate NIL) TLDisplayAtom TLDisplayItem

```

[187]

ENEMYPLANE

```

  type: Generic
  specializes: PLANE, PLATFORM, VEHICLE, PHYSOBJECT,
               THING

```

roles:

```

  (** Ownership 18) ((Ownership of PLATFORM))
    ValDescs = (Enemy)
    Number = 1
    Modality = Optional
  (** Medium 12) of PLANE) ((Medium of VEHICLE))
    ValDescs = (Air)
    Number = 1
    Modality = Optional
  (EngagementStatus of PLATFORM)
    ValDescs = (ATOM)
    Number = 1
    Modality = Optional
  has meta descriptions:
    [in Context AIPSDOMAINMETA]
      ROLE#100
        type: Individual
        individuates: ROLE
        meta-describes:
          RoleSet EngagementStatus in Context

```

AIPSDOMAINMETA

```

  (Course of VEHICLE)
    ValDescs = (NUMBERP)
    Number = 1

```



```

Modality = Optional
has meta descriptions:
  [in Context AIPSDOMAINMETA]
    ROLE#35
      type: Individual
      individuates: ROLE
      meta-describes:
        RoleSet Course    in Context AIPSDOMAINMETA
(Speed of VEHICLE)
ValDescs = (SPEED)
Number = 1
Modality = Optional
has meta descriptions:
  [in Context AIPSDOMAINMETA]
    ROLE#44
      type: Individual
      individuates: ROLE
      meta-describes:
        RoleSet Speed    in Context AIPSDOMAINMETA
(Position of PHYSOBJECT)
ValDescs = (PLACE)
Number = 1
Modality = Optional
(Name of PHYSOBJECT)
ValDescs = (STRINGP)
Number = 1
Modality = Optional
has meta descriptions:
  [in Context AIPSDOMAINMETA]
    ROLE#101
      type: Individual
      individuates: ROLE
      meta-describes:
        RoleSet Name    in Context AIPSDOMAINMETA
has meta descriptions:
  [in Context AIPSDOMAINMETA]
    CONCEPT#76
      type: Individual
      individuates: CONCEPT
      meta-describes:
        Concept ENEMYPLANE    in Context AIPSDOMAINMETA

```

[188]

DISPLAYATOM

```

type: Generic
specializes: DISPLAYFORM, DISPLAYITEM, THING
has specializers: POINT, EDGASET, CURVE, LINESEGMENT,
                  CLOSEDCURVE, ELLIPSE, POLYGON,
                  CIRCLE, REGULARPOLYGON, RECTANGLE
has individuators: POINT#39, POINT#47, POINT#54,
                  POINT#61, POINT#68, POINT#75,

```

POINT#82, POINT#89, POINT#96,
 EDGESET#46, EDGESET#53, EDGESET#60,
 EDGESET#67, EDGESET#74, EDGESET#81,
 EDGESET#88, EDGESET#95,
 LINESEGMENT#26, LINESEGMENT#27,
 LINESEGMENT#102, LINESEGMENT#104,
 CIRCLE#38

roles:

(Location of DISPLAYITEM)
 ValDescs = (LISTP)
 Number = 1
 Modality = Optional
 has attached IData:
 (DefaultFiller NIL)
 (LIST 0 0)

(Size of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 has attached IData:
 (DefaultFiller NIL)
 1

(Orientation of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional

(Width of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional

(Height of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional

(Envelope of DISPLAYITEM)
 ValDescs = (CLOSEDCURVE)
 Number = 1
 Modality = Optional

[189]

POINT

type: Generic
 specializes: DISPLAYATOM, DISPLAYFORM, DISPLAYITEM,
 THING

has individuators: POINT#39, POINT#47, POINT#51,
 POINT#61, POINT#63, POINT#75,
 POINT#82, POINT#89, POINT#96

roles:

(Location of DISPLAYITEM)
 ValDescs = (LISTP)
 Number = 1

```

Modality = Optional
has attached IData:
  (DefaultFiller NIL)
  (LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
has attached IData:
  (ToDraw NIL)   TDPoint
  (ToErase NIL)  TEDisplayAtom
  (ToLocate NIL) TLDisplayAtom TLDisplayItem

```

[190]

DISPLAY

```

type: Generic
specializes: PRESENTATION, DISPLAYITEM, THING
has specializers: TEXT, ARRANGEMENT, MAP, MAPITEM,
  MAPGRID, NTDSENGAGEMENTMARK,
  NTDSVELOCITYLEADER, ROW, COLUMN,
  TABLE, MAPLEGEND, RECTANGULARMAP,
  MAPWITHBACKGROUND, NTDSITEM,
  NARROWNTDSENGAGEMENTMARK, TEXTROW,
  TEXTCOLUMN, ROWTABLE, COLUMNTABLE,
  NTDSMAP, FRIENDLYNTDSSHIP,
  FRIENDLYNTDSPLANE, FRIENDLYNTDSSUB,
  ENEMYNTDSSHIP, ENEMYNTDSSUB,
  ENEMYNTDSPLANE, UNKNOWNNTDSSHIP,
  UNKNOWNNTDSSUB, UNKNOWNNTDSPLANE

```

roles:

```

(** Realization 9) ((Realization of PRESENTATION))
  ValDescs = (DISPLAYITEM)

```

```

    Number = (0 NIL)
    Modality = Optional
Ground
    ValDescs = (VIEWSURFACE)
    Number = 1
    Modality = Obligatory
Name
    ValDescs = (STRINGP)
    Number = 1
    Modality = Optional
(Application of PRESENTATION)
    ValDescs = (THING)
    Number = (0 NIL)
    Modality = Optional
(Location of DISPLAYITEM)
    ValDescs = (LISTP)
    Number = 1
    Modality = Optional
has attached IData:
    (DefaultFiller NIL)
    (LIST 0 0)
(Size of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
has attached IData:
    (DefaultFiller NIL)
    1
(Orientation of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
(Width of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
(Height of DISPLAYITEM)
    ValDescs = (NUMBERP)
    Number = 1
    Modality = Optional
(Envelope of DISPLAYITEM)
    ValDescs = (CLOSEDCURVE)
    Number = 1
    Modality = Optional
is role value of (** Item 12) of ROW),
                (** Item 11) of COLUMN)

```

[191]

ROLE#91
type: Individual

individuates: ROLE, THING
 meta-describes:
 RoleSet Ownership in Context AIPSDOMAINMETA
 is role value of

((** IRole 312) of UNKNOWNNTDSSUBIAPL1)

[192]

ELLIPSE

type: Generic
 specializes: CLOSEDCURVE, CURVE, DISPLAYATOM,
 DISPLAYFORM, DISPLAYITEM, THING
 has specializer: CIRCLE
 has individuator: CIRCLE#38
 roles:

- Center ((Location of DISPLAYITEM))
 - ValDescs = (LISTP)
 - Number = 1
 - Modality = Optional
 - has attached IData:
 - (DefaultFiller NIL)
 - (LIST 0 0)
- SemiMinorAxis ((Size of DISPLAYITEM))
 - ValDescs = (NUMBERP)
 - Number = 1
 - Modality = Obligatory
 - has attached IData:
 - (DefaultFiller NIL)
 - 1
- SemiMajorAxis ((Size of DISPLAYITEM))
 - ValDescs = (NUMBERP)
 - Number = 1
 - Modality = Obligatory
 - has attached IData:
 - (DefaultFiller NIL)
 - 1
- (Approximation of CURVE)
 - ValDescs = (EDGESET)
 - Number = 1
 - Modality = Optional
- (Size of DISPLAYITEM)
 - ValDescs = (NUMBERP)
 - Number = 1
 - Modality = Optional
 - has attached IData:
 - (DefaultFiller NIL)
 - 1
- (Orientation of DISPLAYITEM)
 - ValDescs = (NUMBERP)
 - Number = 1

```

Modality = Optional
(Width of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Height of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Envelope of DISPLAYITEM)
ValDescs = (CLOSEDCURVE)
Number = 1
Modality = Optional

```

[193]

POINT#89

```

type: Individual
individuates: POINT, DISPLAYATOM, DISPLAYFORM,
              DISPLAYITEM, THING

```

roles:

```

(** IRole 313) ((Location of DISPLAYITEM))
ValDescs = ((0 0))
has attached IData:
  (DefaultFiller NIL)
  (LIST 0 0)

```

```

(Size of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has attached IData:
  (DefaultFiller NIL)
  1

```

```

(Orientation of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional

```

```

(Width of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional

```

```

(Height of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional

```

```

(Envelope of DISPLAYITEM)
ValDescs = (CLOSEDCURVE)
Number = 1
Modality = Optional

```

is role value of

((** IRole 314) of UNKNOWNNTDSSUBABSTR)

has attached IData:
 (ToDraw NIL) TPoint
 (ToErase NIL) TDisplayAtom
 (ToLocate NIL) TDisplayAtom TDisplayItem

[194]

CURVE

type: Generic
 specializes: DISPLAYATOM, DISPLAYFORM, DISPLAYITEM,
 THING
 has specializers: LINESEGMENT, CLOSEDCURVE, ELLIPSE,
 POLYGON, CIRCLE, REGULARPOLYGON,
 RECTANGLE
 has individuators: LINESEGMENT#26, LINESEGMENT#27,
 LINESEGMENT#102, LINESEGMENT#104,
 CIRCLE#38

roles:

Approximation
 ValDescs = (EDGESET)
 Number = 1
 Modality = Optional
 (Location of DISPLAYITEM)
 ValDescs = (LISTP)
 Number = 1
 Modality = Optional
 has attached IData:
 (DefaultFiller NIL)
 (LIST 0 0)
 (Size of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 has attached IData:
 (DefaultFiller NIL)
 1
 (Orientation of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Width of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Height of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Envelope of DISPLAYITEM)
 ValDescs = (CLOSEDCURVE)
 Number = 1
 Modality = Optional

is role value of (ReferenceLine of MAPGRID)

[195]

ROLE#87

type: Individual
individuates: ROLE, THING
meta-describes:
 RoleSet Name in Context AIPSDOMAINMETA
is role value of

((** IRole 315) of UNKNOWNNTDSSHIAPL1)

[196]

ROLE#86

type: Individual
individuates: ROLE, THING
meta-describes:
 RoleSet EngagementStatus in Context AIPSDOMAINMETA
is role value of

((** IRole 316) of UNKNOWNNTDSSHIAPL1)

[197]

ROLE#85

type: Individual
individuates: ROLE, THING
meta-describes:
 RoleSet Position in Context AIPSDOMAINMETA
is role value of

((** IRole 317) of UNKNOWNNTDSSHIAPL1)

[198]

ROLE#78

type: Individual
individuates: ROLE, THING
meta-describes:
 RoleSet Position in Context AIPSDOMAINMETA
is role value of

((** IRole 318) of ENEMYNTDSPLANEIAPL1)

[199]

ROLE#84

type: Individual
individuates: ROLE, THING

meta-describes:

RoleSet Ownership in Context AIPSDOMAINMETA
is role value of

((** IRole 319) of UNKNOWNNTDSSHIAPL1)

[200]

CONCEPT#83

type: Individual

individuates: CONCEPT, THING

meta-describes:

Concept UNKNOWNSHIP in Context AIPSDOMAINMETA
is role value of

((** IRole 320) of UNKNOWNNTDSSHIAPL1)

[201]

POINT#82

type: Individual

individuates: POINT, DISPLAYATOM, DISPLAYFORM,
DISPLAYITEM, THING

roles:

((** IRole 321) ((Location of DISPLAYITEM))

ValDescs = ((0 0))

has attached IData:

(DefaultFiller NIL)

(LIST 0 0)

(Size of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

has attached IData:

(DefaultFiller NIL)

1

(Orientation of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

(Width of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

(Height of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

(Envelope of DISPLAYITEM)

ValDescs = (CLOSEDCURVE)

Number = 1

Modality = Optional
is role value of

((** IRole 322) of UNKNOWNNTDSSHIPABSTR)
has attached IData:
(ToDraw NIL) TDPoint
(ToErase NIL) TEDisplayAtom
(ToLocate NIL) TLDisplayAtom TLDisplayItem

[202]

EDGESET#81

type: Individual
individuates: EDGESET, DISPLAYATOM, DISPLAYFORM,
DISPLAYITEM, THING

roles:

((** IRole 323) ((VertexList of EDGESET))
ValDescs = (
((-5 -5) (-5 5) (5 5) (5 -5) (-5 -5)))

((** IRole 324) ((Location of DISPLAYITEM))
ValDescs = ((0 0))
has attached IData:
(DefaultFiller NIL)
(LIST 0 0)

(Size of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has attached IData:
(DefaultFiller NIL)
1

(Orientation of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional

(Width of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional

(Height of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional

(Envelope of DISPLAYITEM)
ValDescs = (CLOSEDCURVE)
Number = 1
Modality = Optional

is role value of

((** IRole 325) of UNKNOWNNTDSSHIPABSTR)
has attached IData:
(ToErase NIL) TEDisplayAtom

(ToLocate NIL) TLDisplayAtom TLDisplayItem

[203]

ROLE#80

type: Individual
 individuates: ROLE, THING
 meta-describes:
 RoleSet Name in Context AIPSDOMAINMETA
 is role value of

((** IRole 326) of ENEMYNTDSPLANEIAPL1)

[204]

ROLE#73

type: Individual
 individuates: ROLE, THING
 meta-describes:
 RoleSet Name in Context AIPSDOMAINMETA
 is role value of

((** IRole 327) of ENEMYNTDSSUBIAPL1)

[205]

ROLE#79

type: Individual
 individuates: ROLE, THING
 meta-describes:
 RoleSet EngagementStatus in Context AIPSDOMAINMETA
 is role value of

((** IRole 328) of ENEMYNTDSPLANEIAPL1)

[206]

UNKNOWNNTDSPLANEIAPL1

type: Individual
 individuates: TEMPLATE, THING
 roles:
 (** IRole 306) ((ConceptGroup of TEMPLATE))
 ValDescs = (CONCEPT#97)
 (** IRole 295) ((RoleGroup of TEMPLATE))
 ValDescs = (ROLE#98)
 (** IRole 329) ((RoleGroup of TEMPLATE))
 ValDescs = (ROLE#33)
 (** IRole 304) ((RoleGroup of TEMPLATE))
 ValDescs = (ROLE#99)
 (** IRole 301) ((RoleGroup of TEMPLATE))
 ValDescs = (ROLE#100)
 (** IRole 262) ((RoleGroup of TEMPLATE))

```

    ValDescs = (ROLE#35)
    (** IRole 330) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#44)
    (** IRole 291) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#101)
    is role value of

```

```

(** IRole 331) of UNKNOWNNTDSPLANEABSTR)

```

[207]

UNKNOWNNTDSSUBIAPL1

```

type: Individual

```

```

individuates: TEMPLATE, THING

```

```

roles:

```

```

    (** IRole 309) ((ConceptGroup of TEMPLATE))
    ValDescs = (CONCEPT#90)
    (** IRole 312) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#91)
    (** IRole 267) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#33)
    (** IRole 305) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#92)
    (** IRole 303) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#93)
    (** IRole 332) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#35)
    (** IRole 333) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#44)
    (** IRole 334) ((RoleGroup of TEMPLATE))
    ValDescs = (ROLE#94)
    is role value of

```

```

(** IRole 335) of UNKNOWNNTDSSUBABSTR)

```

[208]

ROW

```

type: Generic

```

```

specializes: ARRANGEMENT, DISPLAY, PRESENTATION,
             DISPLAYITEM, THING

```

```

has specializers: TEXTROW, COLUMNTABLE

```

```

roles:

```

```

    (** Item 12) ((Item of ARRANGEMENT),
                (Realization of PRESENTATION))
    ValDescs = (DISPLAY)
    Number = (2 NIL)
    Modality = Obligatory
    (** Height 14) ((Height of DISPLAYITEM))
    ValDescs = (NUMBERP)
    Number = 1

```

```

    Modality = Optional
  (ItemOrder of ARRANGEMENT)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
  (Border of ARRANGEMENT) (
(Realization of PRESENTATION))
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
  (Separator of ARRANGEMENT) (
(Realization of PRESENTATION))
  ValDescs = (DISPLAYITEM)
  Number = (0 NIL)
  Modality = Optional
  (** Realization 9) of DISPLAY) (
(Realization of PRESENTATION))
  ValDescs = (DISPLAYITEM)
  Number = (0 NIL)
  Modality = Optional
  (Ground of DISPLAY)
  ValDescs = (VIEWSURFACE)
  Number = 1
  Modality = Obligatory
  (Name of DISPLAY)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
  (Application of PRESENTATION)
  ValDescs = (THING)
  Number = (0 NIL)
  Modality = Optional
  (Location of DISPLAYITEM)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    (LIST 0 0)
  (Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    1
  (Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)

```

Number = 1
 Modality = Optional
 (Width of DISPLAYITEM)
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Envelope of DISPLAYITEM)
 ValDescs = (CLOSEDCURVE)
 Number = 1
 Modality = Optional

[209]

UNKNOWNNTDSSUBABSTR

type: Individual
 individuates: DISPLAYABSTRACTION,
 DISPLAYITEMABSTRACTION, ABSTRACTION,
 THING
 has schema: UNKNOWNNTDSSUB
 roles:

(** IRole 335) (

(IntendedApplication of DISPLAYABSTRACTION))

ValDescs = (UNKNOWNNTDSSUBIAPL1)

** IRole 311) (

(FixedComponent of DISPLAYITEMABSTRACTION))

ValDescs = (EDGESET#88)

(** IRole 314) (

(FixedComponent of DISPLAYITEMABSTRACTION))

ValDescs = (POINT#89)

(InformationRequirement of DISPLAYABSTRACTION)

ValDescs = (TEMPLATE)

Number = (1 NIL)

Modality = Optional

[210]

UNKNOWNNTDSSHIPIAPL1

type: Individual
 individuates: TEMPLATE, THING
 roles:

(** IRole 320) ((ConceptGroup of TEMPLATE))

ValDescs = (CONCEPT#83)

(** IRole 319) ((RoleGroup of TEMPLATE))

ValDescs = (ROLE#84)

(** IRole 336) ((RoleGroup of TEMPLATE))

ValDescs = (ROLE#33)

(** IRole 317) ((RoleGroup of TEMPLATE))

ValDescs = (ROLE#85)

(** IRole 316) ((RoleGroup of TEMPLATE))

ValDescs = (ROLE#86)

```
(** IRole 260) ((RoleGroup of TEMPLATE))
  ValDescs = (ROLE#35)
(** IRole 337) ((RoleGroup of TEMPLATE))
  ValDescs = (ROLE#44)
(** IRole 315) ((RoleGroup of TEMPLATE))
  ValDescs = (ROLE#87)
is role value of
```

```
((** IRole 338) of UNKNOWNNTDSSHIPABSTR)
```

[211]

ROLE#77

```
type: Individual
individuates: ROLE, THING
meta-describes:
  RoleSet Ownership in Context AIPSDOMAINMETA
is role value of
```

```
((** IRole 88) of ENEMYNTDSPLANEIAPL1)
```

[212]

ROLE#70

```
type: Individual
individuates: ROLE, THING
meta-describes:
  RoleSet Ownership in Context AIPSDOMAINMETA
is role value of
```

```
((** IRole 339) of ENEMYNTDSSUBIAPL1)
```

[213]

CONCEPT#76

```
type: Individual
individuates: CONCEPT, THING
meta-describes:
  Concept ENEMYPLANE in Context AIPSDOMAINMETA
is role value of
```

```
((** IRole 340) of ENEMYNTDSPLANEIAPL1)
```

[214]

POINT#75

```
type: Individual
individuates: POINT, DISPLAYATOM, DISPLAYFORM,
              DISPLAYITEM, THING
roles:
  (** IRole 183) ((Location of DISPLAYITEM))
```

```

ValDescs = ((0 0))
has attached IData:
  (DefaultFiller NIL)
  (LIST 0 0)
(Size of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
has attached IData:
  (DefaultFiller NIL)
  1
(Orientation of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Width of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Height of DISPLAYITEM)
ValDescs = (NUMBERP)
Number = 1
Modality = Optional
(Envelope of DISPLAYITEM)
ValDescs = (CLOSEDCURVE)
Number = 1
Modality = Optional
is role value of

(** IRole 341) of ENEMYNTDSPLANEABSTR
has attached IData:
  (ToDraw NIL) TDPoint
  (ToErase NIL) TEDisplayAtom
  (ToLocate NIL) TLDisplayAtom TLDisplayItem

```

[215]

```

NTDSVELOCITYLEADERIAPL1
type: Individual
individuates: TEMPLATE, THING
roles:
  (** IRole 297) ((ConceptGroup of TEMPLATE))
  ValDescs = (CONCEPT#103)
  (** IRole 342) ((RoleGroup of TEMPLATE))
  ValDescs = (ROLE#35)
  (** IRole 226) ((RoleGroup of TEMPLATE))
  ValDescs = (ROLE#44)
is role value of

(** IRole 343) of NTDSVELOCITYLEADERABSTR

```

[216]

EDGESET#74

type: Individual

individuates: EDGESET, DISPLAYATOM, DISPLAYFORM,
DISPLAYITEM, THING

roles:

(** IRole 187) ((VertexList of EDGESET))

ValDescs = (((-6 0) (0 6) (6 0)))

(Location of DISPLAYITEM)

ValDescs = (LISTP)

Number = 1

Modality = Optional

has attached IData:

(DefaultFiller NIL)

(LIST 0 0)

(Size of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

has attached IData:

(DefaultFiller NIL)

1

(Orientation of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

(Width of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

(Height of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

(Envelope of DISPLAYITEM)

ValDescs = (CLOSEDCURVE)

Number = 1

Modality = Optional

is role value of

(** IRole 344) of ENEMYNTDSPLANEABSTR)

has attached IData:

(ToErase NIL) TEdisplayAtom

(ToLocate NIL) TLDisplayAtom TLDisplayItem

[217]

POINT#68

type: Individual

individuates: POINT, DISPLAYATOM, DISPLAYFORM,
DISPLAYITEM, THING

roles:

```

(** IRole 345) ((Location of DISPLAYITEM))
  ValDescs = ((0 0))
  has attached IData:
    (DefaultFiller NIL)
    (LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of (** IRole 85) of ENEMYNTDSSUBABSTR)
has attached IData:
  (ToDraw NIL)   TDPoint
  (ToErase NIL)  TEDisplayAtom
  (ToLocate NIL) TLDisplayAtom TLDisplayItem

```

[218]

UNKNOWNNTDSSHIPABSTR

type: Individual

```

individuates: DISPLAYABSTRACTION,
              DISPLAYITEMABSTRACTION, ABSTRACTION,
              THING

```

roles:

(** IRole 338) (

(IntendedApplication of DISPLAYABSTRACTION))

ValDescs = (UNKNOWNNTDSSHIPIAPLI)

(** IRole 325) (

(FixedComponent of DISPLAYITEMABSTRACTION))

ValDescs = (EDGESET#81)

(** IRole 322) (

```
(FixedComponent of DISPLAYITEMABSTRACTION))
  ValDescs = (POINT#82)
  (InformationRequirement of DISPLAYABSTRACTION)
  ValDescs = (TEMPLATE)
  Number = (1 NIL)
  Modality = Optional
```

[219]

```
NTDSVELOCITYLEADERABSTR
  type: Individual
  individuates: DISPLAYABSTRACTION,
                DISPLAYITEMABSTRACTION, ABSTRACTION,
                THING
  has schema: NTDSVELOCITYLEADER
  roles:
    (** IRole 343) (
```

```
(IntendedApplication of DISPLAYABSTRACTION))
  ValDescs = (NTDSVELOCITYLEADERIAPL1)
  (InformationRequirement of DISPLAYABSTRACTION)
  ValDescs = (TEMPLATE)
  Number = (1 NIL)
  Modality = Optional
(FixedComponent of DISPLAYITEMABSTRACTION)
  ValDescs = (DISPLAYFORM)
  Number = (1 NIL)
  Modality = Optional
```

[220]

```
LINE
  type: Generic
  specializes: THING
  is role value of (Line of LINESEGMENT)
```

[221]

```
UNKNOWNNTDSPLANEABSTR
  type: Individual
  individuates: DISPLAYABSTRACTION,
                DISPLAYITEMABSTRACTION, ABSTRACTION,
                THING
```

```
roles:
  (** IRole 331) (
```

```
(IntendedApplication of DISPLAYABSTRACTION))
  ValDescs = (UNKNOWNNTDSPLANEIAPL1)
  (** IRole 299) (
```

```
(FixedComponent of DISPLAYITEMABSTRACTION))
  ValDescs = (EDGESET#95)
  (** IRole 308) (
```

(FixedComponent of DISPLAYITEMABSTRACTION)
ValDescs = (POINT#96)
(InformationRequirement of DISPLAYABSTRACTION)
ValDescs = (TEMPLATE)
Number = (1 NIL)
Modality = Optional

[222]

ROLE#72

type: Individual
individuates: ROLE, THING
meta-describes:
RoleSet EngagementStatus in Context AIPSDOMAINMETA
is role value of (** IRole 72) of ENEMYNTDSSUBIAPL1

[223]

POSITION

type: Generic
specializes: PLACE, THING
roles:
Location ((Constraint of PLACE))
ValDescs = (LISTP)
Number = 1
Modality = Optional
(Continuum of PLACE)
ValDescs = (COORDINATESYSTEM)
Number = 1
Modality = Optional

[224]

ROLE#71

type: Individual
individuates: ROLE, THING
meta-describes:
RoleSet Position in Context AIPSDOMAINMETA
is role value of

(** IRole 346) of ENEMYNTDSSUBIAPL1)

[225]

UNKNOWNNTDSPLANE

type: Generic
specializes: NTDSITEM, MAPITEM, DISPLAY, PRESENTATION,
DISPLAYITEM, THING
has abstraction: UNKNOWNNTDSPLANEABSTR
roles:
(** EngagementMark 10) (

```

(EngagementMark of NTDSITEM),
    (Realization of PRESENTATION))
    ValDescs = (NARROWNTDSENGAGEMENTMARK)
    Number = 1
    Modality = Optional
    has attached IData:
        (Derivation MakeNTDSEngagementMark?)
            [(Prerequisites Application Ground)
              (Arguments
                (CAR (CKLFindNode $$CONCEPT
                    Application))
                (CAR (CKLFindNode $$CONCEPT
                    Ground])

(** Application 9) of NTDSITEM) (
(Application of PRESENTATION))
    ValDescs = (THING)
    Number = (0 NIL)
    Modality = Optional
    has attached IData:
        (Derivation Consequents)
            (EngagementMark VelocityLeader
              GroupStrengthMarker)
    (VelocityLeader of NTDSITEM) (
(Realization of PRESENTATION))
    ValDescs = (NTDSVELOCITYLEADER)
    Number = 1
    Modality = Optional
    (GroupStrengthMarker of NTDSITEM) (
(Realization of PRESENTATION))
    ValDescs = (NTDSSSTRENGTHMARK, DISPLAYITEM)
    Number = 1
    Modality = Optional
    has attached IData:
        (Derivation MakeNTDSGroupStrengthMark?)
            ((Prerequisites Application)
              (Arguments (CKLFindNode $$CONCEPT
                Application)))
    (Label of MAPITEM) ((Realization of PRESENTATION))
    ValDescs = (TEXT)
    Number = 1
    Modality = Optional
    has attached IData:
        (Derivation MakeMapItemLabel?)
            [(Prerequisites Application Ground)
              (Arguments
                (CAR (CKLFindNode $$CONCEPT
                    Application))
                (CAR (CKLFindNode $$CONCEPT

```

Ground]

```

      (FillWhenMade NIL)
      T
      (** Realization 9) of DISPLAY) (
(Realization of PRESENTATION))
  ValDescs = (DISPLAYITEM)
  Number = (0 NIL)
  Modality = Optional
(Ground of DISPLAY)
  ValDescs = (VIEWSURFACE)
  Number = 1
  Modality = Obligatory
(Name of DISPLAY)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
(Location of DISPLAYITEM)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      (LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
      1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of (UnknownPlaneSym of NTDSMAP)
has attached IData:
  (ToDraw NIL)    TDDisplay
  (ToLocate NIL) TLDisplay TLDisplayItem

```

[226]

REGION

type: Generic
 specializes: PLACE, THING
 has specializers: HOMOGENEOUSREGION,
 RECTANGULARREGION, VIEWSURFACE,
 DISPLAYSURFACE, VISIBLESURFACE,
 INVISIBLESURFACE

roles:

Boundary ((Constraint of PLACE))
 ValDescs = (CLOSEDCURVE)
 Number = 1
 Modality = Optional
 has meta descriptions:
 [in Context AIPSDOMAINMETA]
 ROLE#25
 type: Individual
 individuates: ROLE
 meta-describes:
 RoleSet Boundary in Context

AIPSDOMAINMETA

Aperture ((Constraint of PLACE))
 ValDescs = (REGION)
 Number = (0 NIL)
 Modality = Optional
 Height
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 Width
 ValDescs = (NUMBERP)
 Number = 1
 Modality = Optional
 (Constraint of PLACE)
 ValDescs = (THING)
 Number = 1
 Modality = Optional
 (Continuum of PLACE)
 ValDescs = (COORDINATESYSTEM)
 Number = 1
 Modality = Optional
 is role value of (Aperture of REGION)

[227]

UNKNOWNNTDSSUB

type: Generic
 specializes: NTDSITEM, MAPITEM, DISPLAY, PRESENTATION,
 DISPLAYITEM, THING

roles:

```

(** EngagementMark 11) (
(EngagementMark of NTDSITEM),
      (Realization of PRESENTATION))
  ValDescs = (NARROWNTDSENGAGEMENTMARK)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation MakeNTDSEngagementMark?)
      [(Prerequisites Application Ground)
        (Arguments
          (CAR (CKLFindNode $$CONCEPT
                Application))
          (CAR (CKLFindNode $$CONCEPT
                Ground)]

(** Application 9) of NTDSITEM) (
(Application of PRESENTATION))
  ValDescs = (THING)
  Number = (0 NIL)
  Modality = Optional
  has attached IData:
    (Derivation Consequents)
      (EngagementMark VelocityLeader
        GroupStrengthMarker)
  (VelocityLeader of NTDSITEM) (
(Realization of PRESENTATION))
  ValDescs = (NTDSVELOCITYLEADER)
  Number = 1
  Modality = Optional
  (GroupStrengthMarker of NTDSITEM) (
(Realization of PRESENTATION))
  ValDescs = (NTDSSTRENGTHMARK, DISPLAYITEM)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation MakeNTDSGroupStrengthMark?)
      ((Prerequisites Application)
        (Arguments (CKLFindNode $$CONCEPT
                    Application)))
  (Label of MAPITEM) ((Realization of PRESENTATION))
  ValDescs = (TEXT)
  Number = 1
  Modality = Optional
  has attached IData:
    (Derivation MakeMapItemLabel?)
      [(Prerequisites Application Ground)
        (Arguments
          (CAR (CKLFindNode $$CONCEPT

```



```

Application))
(CAR (CKLFindNode $$CONCEPT
      Ground]

      (FillWhenMade NIL)
      T
      (** Realization 9) of DISPLAY) (
(Realization of PRESENTATION))
  ValDescs = (DISPLAYITEM)
  Number = (0 NIL)
  Modality = Optional
(Ground of DISPLAY)
  ValDescs = (VIEWSURFACE)
  Number = 1
  Modality = Obligatory
(Name of DISPLAY)
  ValDescs = (STRINGP)
  Number = 1
  Modality = Optional
(Location of DISPLAYITEM)
  ValDescs = (LISTP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    (LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of (UnknownSubSym of NTDSMAP)
has attached IData:

```

```
(ToDraw NIL) TDDisplay
(ToLocate NIL) TLDisplay TLDisplayItem
[228]
```

```
ROLE#63
  type: Individual
  individuates: ROLE, THING
  meta-describes:
    RoleSet Ownership in Context AIPSDOMAINMETA
  is role value of
  (** IRole 79) of ENEMYNTDSSHIAPL1
[229]
```

```
CONCEPT#69
  type: Individual
  individuates: CONCEPT, THING
  meta-describes:
    Concept ENEMYSUB in Context AIPSDOMAINMETA
  is role value of (** IRole 68) of ENEMYNTDSSUBIAPL1
[230]
```

```
UNKNOWNNTDSSHIP
  type: Generic
  specializes: NTDSITEM, MAPITEM, DISPLAY, PRESENTATION,
               DISPLAYITEM, THING
  roles:
    (** EngagementMark 12) (
      (EngagementMark of NTDSITEM),
      (Realization of PRESENTATION))
    ValDescs = (NARROWNTDSENGAGEMENTMARK)
    Number = 1
    Modality = Optional
    has attached IData:
      (Derivation MakeNTDSEngagementMark?)
      [(Prerequisites Application Ground)
      (Arguments
      (CAR (CKLFindNode $$CONCEPT
              Application))
      (CAR (CKLFindNode $$CONCEPT
              Ground])
    (** Application 9) of NTDSITEM) (
      (Application of PRESENTATION))
    ValDescs = (THING)
    Number = (0 NIL)
    Modality = Optional
    has attached IData:
```

```

      (Derivation Consequents)
      (EngagementMark VelocityLeader
      GroupStrengthMarker)
    (VelocityLeader of NTDSITEM) (
  (Realization of PRESENTATION))
      ValDescs = (NTDSVELOCITYLEADER)
      Number = 1
      Modality = Optional
    (GroupStrengthMarker of NTDSITEM) (
  (Realization of PRESENTATION))
      ValDescs = (NTDSSTRENGTHMARK, DISPLAYITEM)
      Number = 1
      Modality = Optional
      has attached IData:
        (Derivation MakeNTDSGroupStrengthMark?)
          ((Prerequisites Application)
          (Arguments (CKLFindNode $$CONCEPT
          Application)))
    (Label of MAPITEM) ((Realization of PRESENTATION))
      ValDescs = (TEXT)
      Number = 1
      Modality = Optional
      has attached IData:
        (Derivation MakeMapItemLabel?)
          [(Prerequisites Application Ground)
          (Arguments
          (CAR (CKLFindNode $$CONCEPT
          Application))
          (CAR (CKLFindNode $$CONCEPT
          Ground])
      (FillWhenMade NIL)
      T
    (** Realization 9) of DISPLAY) (
  (Realization of PRESENTATION))
      ValDescs = (DISPLAYITEM)
      Number = (0 NIL)
      Modality = Optional
    (Ground of DISPLAY)
      ValDescs = (VIEWSURFACE)
      Number = 1
      Modality = Obligatory
    (Name of DISPLAY)
      ValDescs = (STRINGP)
      Number = 1
      Modality = Optional
    (Location of DISPLAYITEM)
      ValDescs = (LISTP)
      Number = 1

```

```

Modality = Optional
has attached IData:
  (DefaultFiller NIL)
  (LIST 0 0)
(Size of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
  has attached IData:
    (DefaultFiller NIL)
    1
(Orientation of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Width of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Height of DISPLAYITEM)
  ValDescs = (NUMBERP)
  Number = 1
  Modality = Optional
(Envelope of DISPLAYITEM)
  ValDescs = (CLOSEDCURVE)
  Number = 1
  Modality = Optional
is role value of (UnknownShipSym of NTDSMAP)
has attached IData:
  (ToDraw NIL) TDDisplay
  (ToLocate NIL) TLDisplay TLDisplayItem

```

[231]

ROLE#56

```

type: Individual
individuates: ROLE, THING
meta-describes:
  RoleSet Ownership in Context AIPSDOMAINMETA
is role value of

```

((** IRole 347) of FRIENDLYNTDSSUBIAPL1)

[232]

CONCEPT#62

```

type: Individual
individuates: CONCEPT, THING
meta-describes:
  Concept ENEMYSHIP in Context AIPSDOMAINMETA
is role value of

```

((** IRole 78) of ENEMYNTDSSHIAPL1)

[233]

EDGESET#67

type: Individual

individuates: EDGESET, DISPLAYATOM, DISPLAYFORM,
DISPLAYITEM, THING

roles:

((** IRole 192) ((VertexList of EDGESET))

ValDescs = (((-6 0) (-6 -6) (6 0)))

(Location of DISPLAYITEM)

ValDescs = (LISTP)

Number = 1

Modality = Optional

has attached IData:

(DefaultFiller NIL)

(LIST 0 0)

(Size of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

has attached IData:

(DefaultFiller NIL)

1

(Orientation of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

(Width of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

(Height of DISPLAYITEM)

ValDescs = (NUMBERP)

Number = 1

Modality = Optional

(Envelope of DISPLAYITEM)

ValDescs = (CLOSEDCURVE)

Number = 1

Modality = Optional

is role value of ((** IRole 84) of ENEMYNTDSSUBABSTR)

has attached IData:

(ToErase NIL) TEdisplayAtom

(ToLocate NIL) TLdisplayAtom TLdisplayItem