Alignment Rules from GBO to GMO

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1 Alignments from GBO to GMO

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@prefix time: <http://www.w3.org/2006/time#> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
```

$hasDescription(x, z) \leftrightarrow describedBy(x, y) \wedge InformationObject(y) \wedge hasDescription(y, z)$
$hasTitle(x, z) \leftrightarrow describedBy(x, y) \wedge InformationObject(y) \wedge hasCanonicalName(y, z)$
$hasAbstract(x, z) \rightarrow describedBy(x, y) \wedge InformationObject(y) \wedge hasDescription(y, z)$

$Identifier(x) \leftrightarrow Identifier(x)$
$hasIdentifierScheme(x, y) \leftrightarrow hasIdentifierScheme(x, y)$
$hasIdentifierValue(x, y) \leftrightarrow hasIdentifierValue(x, y)$
$hasIdentifier(x, z) \leftrightarrow describedBy(x, y) \wedge InformationObject(y) \wedge hasPrimaryIdentifier(y, z)$
$isIdentifierOf(x, z) \leftrightarrow describedBy(z, y) \wedge InformationObject(y) \wedge hasPrimaryIdentifier(y, x)$

$Place(x) \leftrightarrow Place(x)$
$PlaceType(x) \leftrightarrow rdfs{:}subClassOf(x, Place)$
$hasPlaceType(x, y) \rightarrow rdf{:}type(x, Place)$
$isPlaceTypeOf(x, y) \rightarrow rdf{:}type(y, Place)$
$GeoFeature(x) \rightarrow Place(x)$
$GeoFeatureType(x) \rightarrow rdfs{:}subClassOf(x, Place)$
$hasGeoFeatureType(x, y) \rightarrow rdf{:}type(x, Place)$
$isGeoFeatureTypeOf(x, y) \rightarrow rdf{:}type(y, Place)$

$Award(x) \leftrightarrow FundingAward(x)$
$hasAward(x, y) \leftrightarrow fundedBy(x, y)$
$isAwardOf(x, y) \leftrightarrow fundedBy(y, x)$
$Award(x) \wedge hasCoPrincipalInvestigator(x, z) \leftrightarrow$
$\quad FundingAward(x) \wedge providesAgentRole(x, y) \wedge CoPrincipalInvestigatorRole(y) \wedge performedBy(y, z)$
$Award(z) \wedge isCoPrincipalInvestigatorOf(x, z) \leftrightarrow$
$\quad FundingAward(z) \wedge providesAgentRole(z, y) \wedge CoPrincipalInvestigatorRole(y) \wedge performedBy(y, x)$
$Award(x) \wedge hasPrincipalInvestigator(x, z) \leftrightarrow$
$\quad FundingAward(x) \wedge providesAgentRole(x, y) \wedge PrincipalInvestigatorRole(y) \wedge performedBy(y, z)$
$Award(z) \wedge isPrincipalInvestigatorOf(x, z) \leftrightarrow$
$\quad FundingAward(z) \wedge providesAgentRole(z, y) \wedge PrincipalInvestigatorRole(y) \wedge performedBy(y, x)$
$Award(x) \wedge hasProgramManager(x, z) \leftrightarrow$
$\quad FundingAward(x) \wedge providesAgentRole(x, y) \wedge ProgramManagerRole(y) \wedge performedBy(y, z)$
$Award(z) \wedge isProgramManagerOf(x, z) \leftrightarrow$
$\quad FundingAward(z) \wedge providesAgentRole(z, y) \wedge ProgramManagerRole(y) \wedge performedBy(y, x)$
$Award(x) \wedge hasSponsor(x, z) \leftrightarrow$
$\quad FundingAward(x) \wedge providesAgentRole(x, y) \wedge SponsorRole(y) \wedge performedBy(y, z)$
$Award(z) \wedge isSponsorOf(x, z) \leftrightarrow$
$\quad FundingAward(z) \wedge providesAgentRole(z, y) \wedge SponsorRole(y) \wedge performedBy(y, x)$
$Award(x) \wedge hasEndDate(x, z) \leftrightarrow$
$\quad FundingAward(x) \wedge endsOnDate(x, y) \wedge time{:}Instant(y) \wedge time{:}inXSDDate(y, z)$
$Award(x) \wedge hasStartDate(x, z) \leftrightarrow$

$FundingAwards(x) \wedge startsOnDate(x, y) \wedge time{:}Instant(y) \wedge time{:}inXSDDate(y, z)$

$Program(x) \leftrightarrow Program(x)$
$hasProgram(x, y) \leftrightarrow associatedWithProgram(x, y)$
$isProgramOf(x, y) \leftrightarrow associatedWithProgram(y, x)$
$Program(x) \wedge hasCoPrincipalInvestigator(x, z) \leftrightarrow$
$Program(x) \wedge providesAgentRole(x, y) \wedge CoPrincipalInvestigatorRole(y) \wedge performedBy(y, z)$
$Program(z) \wedge isCoPrincipalInvestigatorOf(x, z) \leftrightarrow$
$Program(z) \wedge providesAgentRole(z, y) \wedge CoPrincipalInvestigatorRole(y) \wedge performedBy(y, x)$
$Program(x) \wedge hasPrincipalInvestigator(x, z) \leftrightarrow$
$Program(x) \wedge providesAgentRole(x, y) \wedge PrincipalInvestigatorRole(y) \wedge performedBy(y, z)$
$Program(z) \wedge isPrincipalInvestigatorOf(x, z) \leftrightarrow$
$Program(z) \wedge providesAgentRole(z, y) \wedge PrincipalInvestigatorRole(y) \wedge performedBy(y, x)$
$Program(x) \wedge hasProgramManager(x, z) \leftrightarrow$
$Program(x) \wedge providesAgentRole(x, y) \wedge ProgramManagerRole(y) \wedge performedBy(y, z)$
$Program(z) \wedge isProgramManagerOf(x, z) \leftrightarrow$
$Program(z) \wedge providesAgentRole(z, y) \wedge ProgramManagerRole(y) \wedge performedBy(y, x)$
$Program(x) \wedge hasAcronym(x, z) \rightarrow$
$Program(x) \wedge describedBy(x, y) \wedge InformationObject(y) \wedge alsoKnownAs(y, z)$
$Program(x) \wedge hasEndDate(x, z) \leftrightarrow$
$Program(x) \wedge endsOnDate(x, y) \wedge time{:}Instant(y) \wedge time{:}inXSDDate(y, z)$
$Program(x) \wedge hasStartDate(x, y) \leftrightarrow$
$Program(x) \wedge startsOnDate(x, y) \wedge time{:}Instant(y) \wedge time{:}inXSDDate(y, z)$

$Organization(x) \leftrightarrow Organization(x)$
$Organization(x) \wedge fromCountry(x, y) \rightarrow$
$Organization(x) \wedge hasSite(x, y) \wedge Place(y)$
$Organization(y) \wedge isCountryOf(x, y) \rightarrow$
$Organization(y) \wedge hasSite(y, x) \wedge Place(x)$
$hasSubOrganization(x, y) \leftrightarrow hasSubOrganization(x, y)$
$isSubOrganizationOf(x, y) \leftrightarrow hasSubOrganization(y, x)$

$Person(x) \leftrightarrow Person(x)$
$Person(x) \wedge hasAffiliation(x, z) \leftrightarrow$
$Organization(z) \wedge providesAgentRole(z, y) \wedge AffiliationRole(y) \wedge performedBy(y, x)$
$Person(z) \wedge isAffiliationOf(x, z) \leftrightarrow$
$Organization(x) \wedge providesAgentRole(x, y) \wedge AffiliationRole(y) \wedge performedBy(y, z)$
$Person(x) \wedge hasFullName(x, z) \rightarrow$
$Person(x) \wedge hasPersonalInfoItem(x, y) \wedge PersonalInfoItem(y) \wedge hasLiteralValue(y, z)$
$Person(x) \wedge hasFullName(x, y) \leftrightarrow$
$Person(x) \wedge hasPersonName(x, y) \wedge PersonName(y) \wedge fullName(y, z)$
$Person(x) \wedge hasGivenName(x, z) \rightarrow$
$Person(x) \wedge hasPersonalInfoItem(x, y) \wedge PersonalInfoItem(y) \wedge hasLiteralValue(y, z)$
$Person(x) \wedge hasGivenName(x, z) \leftrightarrow$
$Person(x) \wedge hasPersonName(x, y) \wedge PersonName(y) \wedge firstOrGivenName(y, z)$
$Person(x) \wedge hasFamilyName(x, z) \rightarrow$
$Person(x) \wedge hasPersonalInfoItem(x, y) \wedge PersonalInfoItem(y) \wedge hasLiteralValue(y, z)$
$Person(x) \wedge hasFamilyName(x, z) \leftrightarrow$
$Person(x) \wedge hasPersonName(x, y) \wedge PersonName(y) \wedge familyOrSurname(y, z)$

$Platform(x) \leftrightarrow Platform(x)$
$PlatformType(x) \leftrightarrow rdfs{:}subClassOf(x, Platform)$
$Platform(x) \wedge hasOwner(x, z) \rightarrow$
$Platform(x) \wedge providesAgentRole(x, y) \wedge AgentRole(y) \wedge performedBy(y, z)$
$Platform(z) \wedge isOwnerOf(x, z) \rightarrow$
$Platform(z) \wedge providesAgentRole(z, y) \wedge AgentRole(y) \wedge performedBy(y, x)$
$hasPlatformType(x, y) \rightarrow rdf{:}type(x, Platform)$
$isPlatformTypeOf(x, y) \rightarrow rdf{:}type(y, Platform)$

$Vessel(x) \leftrightarrow Vessel(x)$
$Vessel(x) \wedge hasOwner(x, z) \leftrightarrow$
$\quad Vessel(x) \wedge providesAgentRole(x, y) \wedge VesselOwnerRole(y) \wedge performedBy(y, z)$
$Vessel(z) \wedge isOwnerOf(x, z) \leftrightarrow$
$\quad Vessel(z) \wedge providesAgentRole(z, y) \wedge VesselOwnerRole(y) \wedge performedBy(y, x)$

$Cruise(x) \leftrightarrow Cruise(x)$
$CruiseType(x) \leftrightarrow rdfs{:}subClassOf(x, Cruise)$
$hasCruiseType(x, y) \rightarrow rdf{:}type(x, Cruise)$
$isCruiseTypeOf(x, y) \rightarrow rdf{:}type(y, Cruise)$
$Cruise(x) \wedge hasChiefScientist(x, z) \rightarrow$
$\quad Cruise(x) \wedge providesAgentRole(x, y) \wedge AgentRole(y) \wedge performedBy(y, z)$
$Cruise(z) \wedge isChiefScientistOf(x, z) \rightarrow$
$\quad Cruise(z) \wedge providesAgentRole(z, y) \wedge AgentRole(y) \wedge performedBy(y, x)$
$Cruise(x) \wedge hasCoChiefScientist(x, z) \rightarrow$
$\quad Cruise(x) \wedge providesAgentRole(x, y) \wedge AgentRole(y) \wedge performedBy(y, z)$
$Cruise(z) \wedge isCoChiefScientistOf(x, z) \rightarrow$
$\quad Cruise(z) \wedge providesAgentRole(z, y) \wedge AgentRole(y) \wedge performedBy(y, x)$
$Cruise(x) \wedge hasScientist(x, z) \rightarrow$
$\quad Cruise(x) \wedge providesAgentRole(x, y) \wedge AgentRole(y) \wedge performedBy(y, z)$
$Cruise(z) \wedge isScientistOf(x, z) \rightarrow$
$\quad Cruise(z) \wedge providesAgentRole(z, y) \wedge AgentRole(y) \wedge performedBy(y, x)$
$Cruise(x) \wedge hasEducator(x, y) \rightarrow$
$\quad Cruise(x) \wedge providesAgentRole(x, y) \wedge AgentRole(y) \wedge performedBy(y, z)$
$Cruise(z) \wedge isEducatorIn(x, z) \rightarrow$
$\quad Cruise(z) \wedge providesAgentRole(z, y) \wedge AgentRole(y) \wedge performedBy(y, x)$
$Cruise(x) \wedge hasStudent(x, z) \rightarrow$
$\quad Cruise(x) \wedge providesAgentRole(x, y) \wedge AgentRole(y) \wedge performedBy(y, z)$
$Cruise(z) \wedge isStudentIn(x, z) \rightarrow$
$\quad Cruise(z) \wedge providesAgentRole(z, y) \wedge AgentRole(y) \wedge performedBy(y, x)$
$Cruise(x) \wedge hasObserver(x, y) \rightarrow$
$\quad Cruise(x) \wedge providesAgentRole(x, y) \wedge AgentRole(y) \wedge performedBy(y, z)$
$Cruise(z) \wedge isObserverIn(x, z) \rightarrow$
$\quad Cruise(z) \wedge providesAgentRole(z, y) \wedge AgentRole(y) \wedge performedBy(y, x)$
$Cruise(x) \wedge hasOperator(x, z) \rightarrow$
$\quad Cruise(x) \wedge providesAgentRole(x, y) \wedge AgentRole(y) \wedge performedBy(y, z)$
$Cruise(z) \wedge isOperatorOf(x, z) \rightarrow$
$\quad Cruise(z) \wedge providesAgentRole(z, y) \wedge AgentRole(y) \wedge performedBy(y, x)$
$Cruise(x) \wedge hasScheduler(x, z) \rightarrow$
$\quad Cruise(x) \wedge providesAgentRole(x, y) \wedge AgentRole(y) \wedge performedBy(y, z)$
$Cruise(z) \wedge isSchedulerOf(x, z) \rightarrow$
$\quad Cruise(z) \wedge providesAgentRole(z, y) \wedge AgentRole(y) \wedge performedBy(y, x)$
$Cruise(x) \wedge hasTechnician(x, z) \rightarrow$
$\quad Cruise(x) \wedge providesAgentRole(x, y) \wedge AgentRole(y) \wedge performedBy(y, z)$
$Cruise(z) \wedge isTechnicianOf(x, z) \rightarrow$
$\quad Cruise(z) \wedge providesAgentRole(z, y) \wedge AgentRole(y) \wedge performedBy(y, x)$

$PortCall(x) \rightarrow Fix(x)$
$atPort(x, y) \leftrightarrow atPort(x, y)$
$isPortOf(x, y) \leftrightarrow atPort(y, x)$

$PhysicalSample(x) \leftrightarrow PhysicalSample(x)$
$PhysicalSampleType(x) \leftrightarrow rdfs{:}subClassOf(x, PhysicalSample)$
$hasSampleType(x, y) \rightarrow rdf{:}type(x, PhysicalSample)$
$isSampleTypeOf(x, y) \rightarrow rdf{:}type(y, PhysicalSample)$
$PhysicalSample(x) \wedge hasCollector(x, z) \leftrightarrow$
$\quad PhysicalSample(x) \wedge providesAgentRole(x, y) \wedge CollectorRole(y) \wedge performedBy(y, z)$
$PhysicalSample(z) \wedge isCollectorOf(x, z) \leftrightarrow$
$\quad PyhsicalSample(z) \wedge providesAgentRole(z, y) \wedge CollectorRole(y) \wedge performedBy(y, x)$

$PhysicalSample(x) \wedge hasContact(x, z) \leftrightarrow$
$\quad PhysicalSampel(x) \wedge providesAgentRole(x, y) \wedge ContactRole(y) \wedge performedBy(y, z)$
$PhysicalSample(z) \wedge isContactOf(x, z) \leftrightarrow$
$\quad PhysicalSample(z) \wedge providesAgentRole(z, y) \wedge ContactRole(y) \wedge performedBy(y, x)$
$PhysicalSample(x) \wedge hasContributor(x, z) \leftrightarrow$
$\quad PhysicalSample(x) \wedge providesAgentRole(x, y) \wedge ContributorRole(y) \wedge performedBy(y, z)$
$PhysicalSample(z) \wedge isContributorOf(x, z) \leftrightarrow$
$\quad PhysicalSample(z) \wedge providesAgentRole(z, y) \wedge ContributorRole(y) \wedge performedBy(y, x)$
$PhysicalSample(x) \wedge hasCurator(x, y) \leftrightarrow$
$\quad PhysicalSample(x) \wedge providesAgentRole(x, y) \wedge CuratorRole(y) \wedge performedBy(y, z)$
$PhysicalSample(z) \wedge isCuratorOf(x, z) \leftrightarrow$
$\quad PhysicalSample(z) \wedge providesAgentRole(z, y) \wedge CuratorRole(y) \wedge performedBy(y, x)$
$PhysicalSample(x) \wedge hasEditor(x, z) \leftrightarrow$
$\quad PhysicalSample(x) \wedge providesAgentRole(x, y) \wedge EditorRole(y) \wedge performedBy(y, z)$
$PhysicalSample(z) \wedge isEditorOf(x, z) \leftrightarrow$
$\quad PhysicalSample(z) \wedge providesAgentRole(z, y) \wedge EditorRole(y) \wedge performedBy(y, x)$
$PhysicalSample(x) \wedge hasRegistrant(x, z) \leftrightarrow$
$\quad PhysicalSample(x) \wedge providesAgentRole(x, y) \wedge RegistrantRole(y) \wedge performedBy(y, z)$
$PhysicalSample(z) \wedge isRegistrantOf(x, z) \leftrightarrow$
$\quad PhysicalSample(z) \wedge providesAgentRole(z, y) \wedge RegistrantRole(y) \wedge performedBy(y, x)$
$PhysicalSample(x) \wedge hasRightsHolder(x, z) \leftrightarrow$
$\quad PhysicalSample(x) \wedge providesAgentRole(x, y) \wedge RightsHolderRole(y) \wedge performedBy(y, z)$
$PhysicalSample(z) \wedge isRightsHolderOf(x, z) \leftrightarrow$
$\quad PhyiscalSample(z) \wedge providesAgentRole(z, y) \wedge RightsHolderRole(y) \wedge performedBy(y, x)$
$originatesFrom(x, y) \leftrightarrow originatesFrom(x, y)$
$isOriginOf(x, y) \leftrightarrow originatesFrom(y, x)$
$PhysicalSample(x) \wedge originatesFrom(x, z) \wedge PhysicalSample(z) \rightarrow$
$\quad PhysicalSample(x) \wedge derivedUsing(x, y) \wedge SamplingProcess(y) \wedge hasInputFeature(y, z)$
$PhysicalSample(z) \wedge isOriginOf(x, z) \wedge PhysicalSample(z) \rightarrow$
$\quad PhysicalSample(z) \wedge derivedUsing(z, y) \wedge SampingProcess(y) \wedge hasInputFeature(y, x)$