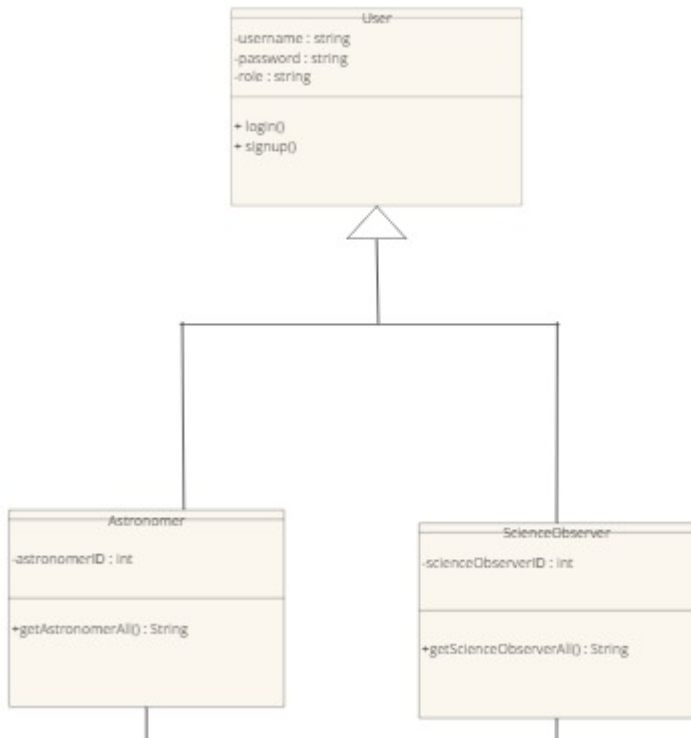


LoginController

```
@Autowired
- private UserRepository userRepository;
@Autowired
- private AstronomerRepository astronomerRepository;
@Autowired
- private ScienceObserverRepository scienceObserverRepository;
```

```
+showLoginPage() : String
+ login( String username, String password, String role)): Object
+ showsignupPage() : String
+ addNewUser( String username, String password, String role)): Object
+ getAllUsers() : Iterable<User>
+getAllSciencObserver() : Iterable<ScienceObserver>
+getAllAstronomer() : Iterable<Astronomer>
```



SciencePlanController

```

+ tics()
+ createSciencePlan(int planNo, String creator, String submitter, double fundingInUSD,
String objectives, String starSystem, String startDate, String endDate,
SciencePlan.TELESCOPELOC telescopeLocation, String fileType, String fileQuality, String
colorType, double contrast, double brightness, double saturation, double highlights,
double exposure, double shadows, double whites, double blacks, double luminance,
double hue ): Object
+ submitSciencePlans(int planNo) : ModelAndView
+ getByPlanNo(int planNo) : ModelAndView
+ testSciencePlan(SciencePlan sp) : String
+ showAstronomerCreateSIPPage() : String
+ showAstronomerSubmitSIPPage() : String
    
```

ObservingProgramController

```

+ getAllSciencePlans(Model model) : String
+ showScienceObserverCreateOPT() : String
+ getByPlanNo(int planNo) : ModelAndView
+ createObservingProgram(SciencePlan sp, String opticsPrimary, double fStop, double
opticsSecondaryBMS, double scienceFoldMirrorDegree,
ObservingProgramConfigs.FoldMirrorType scienceFoldMirrorType, int moduleContent,
ObservingProgramConfigs.CalibrationUnit calibrationUnit,
ObservingProgramConfigs.LightType lightType, TelePositionPair[] telePositionPair) :
ModelAndView
+ getAllObservingPrograms(Model model) : String
    
```

1..*

1..*

SciecnccePlanController

+ocs()

+ createSciencePlan(int planNo, String creator, String submitter, double fundingInUSD, String objectives, String starSystem, String startDate, String endDate, SciencePlan.TELESCOPELOC telescopeLocation, String fileType, String fileQuality, String colorType, double contrast, double brightness, double saturation, double highlights, double exposure, double shadows, double whites, double blacks, double luminance, double hue): Object

+ submitSciencePlans(int planNo) : ModelAndView

+getByPlanNo(int planNo) : ModelAndView

+testSciencePlan(SciencePlan sp) : String

+showAstronomerCreateSPPage() : String

+showAstronomerSubmitSPPage() : String

ObservingProgramController

```
+getAllSciencePlans(Model model) : String  
+ showScienceobserverCreateOP(): String  
+ getByPlanNo(int planNo) : ModelAndView  
+ createObservingProgram(SciencePlan sp, String opticsPrimary, double fStop, double  
opticsSecondaryRMS, double scienceFoldMirrorDegree,  
ObservingProgramConfigs.FoldMirrorType scienceFoldMirrorType, int moduleContent,  
ObservingProgramConfigs.CalibrationUnit calibrationUnit,  
ObservingProgramConfigs.LightType lightType, TelePositionPair[] telePositionPair) :  
ModelAndView  
+ getAllObservingPrograms(Model model) : String
```

SciencePlanModelGDDG

```
-creator : String
-submitter : String
-fundingInUSD : double
-objectives : String
-startDate : Date
-endDate : Date
-SciencePlan.STATUS : Enum
-SciencePlan.TELESCEPELOC : Enum
-fileType : String
-fileQuality : String
-colorType : String
-contrast : double
-brightness : double
-saturation : double
-highlights : double
-exposure : double
-shadow : double
-white : double
-black : double
-luminance : double
-hue : double
```

```
+ sciencePlan()
+ sciencePlan(String creator, String submitter, double fundingInUSD, String objectives, StarSystem.CONSTELLATIONS starSystem, Date startDate, Date
endDate, SciencePlan.TELESCEPELOC telescopeLocation, String fileType, String fileQuality, String colorType, double contrast, double brightness, double
saturation, double highlights, double exposure, double shadow, double white, double black, double luminance, double hue )
+ getter and setter for all method
+ getCreator() : String
+ setCreator(String) : void
+ getSubmitter() : String
+ setSubmitter(String) : void
+ getFundingInUSD() : double
+ setFundingInUSD(double) : void
+ getObjectives() : String
+ setObjectives(String) : void
+ getStarSystem() : StarSystem.CONSTELLATIONS
+ setStarSystem(StarSystem.CONSTELLATIONS) : void
+ getStartDate() : String
+ setStartDate(String) : void
+ getEndDate() : String
+ setEndDate(String) : void
+ getTelescopeLocation() : SciencePlan.TELESCEPELOC
+ setTelescopeLocation(SciencePlan.TELESCEPELOC) : void
+ getDataProcRequirements() : ArrayList<DataProcRequirements>
+ setDataProcRequirements(String fileType, String fileQuality, String colorType, double contrast, double brightness, double saturation, double
highlights, double exposure, double shadow, double white, double black, double luminance, double hue) : void
+ getPlanNo() : int
+ setPlanNo(int) : void
+ getStatus() : SciencePlan.STATUS
+ setStatus(SciencePlan.STATUS) : void
+ toString() : String
```

ObservingProgramModelGDDG

```
- planNo : int
-opticsPrimary : String
-fStop : double
-opticsSecondaryITMS : double
-scienceOfOldMirrorDegree : double
-scienceOfOldMirrorType : ObservingProgramConfigs.OldMirrorType
-moduleContent : int
-calibrationUnit : ObservingProgramConfigs.CalibrationUnit
-lightType : ObservingProgramConfigs.LightType[]
-telPositionPair : TelePositionPair[]
```

```
+ observingProgram()
+ observingProgram(int planNo, String opticsPrimary, double fStop, double opticsSecondaryITMS, double
scienceOfOldMirrorDegree, ObservingProgramConfigs.OldMirrorType scienceOfOldMirrorType, int moduleContent,
ObservingProgramConfigs.CalibrationUnit calibrationUnit, ObservingProgramConfigs.LightType lightType, TelePositionPair[]
telePositionPair)
+ getPlanNo() : int
+ setPlanNo(int) : void
+ getGeminLocation() : String
+ setGeminLocation(String) : void
+ getOpticsPrimary() : String
+ setOpticsPrimary(String) : void
+ setfStop(double) : void
+ getfStop() : double
+ getOpticsSecondary(ITMS) : double
+ setOpticsSecondary(ITMS)(double) : void
+ getScienceOfOldMirror(Degree) : double
+ setScienceOfOldMirror(Degree)(double) : void
+ getScienceOfOldMirror(Type) : ObservingProgramConfigs.OldMirrorType
+ setScienceOfOldMirror(Type)(ObservingProgramConfigs.OldMirrorType) : void
+ getModuleContent() : int
+ setModuleContent(int) : void
+ getCalibrationUnit() : ObservingProgramConfigs.CalibrationUnit
+ setCalibrationUnit(ObservingProgramConfigs.CalibrationUnit) : void
+ getLightType() : ObservingProgramConfigs.LightType
+ setLightType(ObservingProgramConfigs.LightType) : void
+ getTelePositionPair() : TelePositionPair[]
+ setTelePositionPair(TelePositionPair[]) : void
+ getValidationStatus() : boolean
+ setValidationStatus(boolean) : void
+ validateObservingCondition(ObservingProgram : ObservingProgram
+ toString() : String
```

SciencePlanModelGDDG

- creator : String
- submitter: String
- fundingInUSD: double
- objectives : String
- startDate : Date
- endDate : Date
- SciencePlan.STATUS* : Enum
- SciencePlan.TELESCEPELOC* : Enum
- fileType : String
- fileQuality: String
- colorType: String
- contrast: double
- brightness: double
- saturation: double
- highlights: double
- exposure: double
- shadows: double
- whites: double
- blacks: double
- luminance: double
- hue: double

- + sciencePlan()
- + sciencePlan(String creator, String submitter, double fundingInUSD, String objectives, StarSystem.CONSTELLATIONS starSystem, Date startDate, Date endDate, SciencePlan.TELESCEPELOC telescopeLocation, String fileType, String fileQuality, String colorType, double contrast, double brightness, double saturation, double highlights, double exposure, double shadows, double whites, double blacks, double luminance, double hue)
- + getter and setter for all method
- + getCreator() : String
- + setCreator(String) : void
- + getSubmitter() : String
- + setSubmitter(String) : void
- + getFundingInUSD() : double
- + setFundingInUSD(double) : void
- + getObjectives() : String
- + setObjectives(String) : void
- + getStarSystem() : StarSystem.CONSTELLATIONS
- + setStarSystem(StarSystem.CONSTELLATIONS) : void
- + getStartDate() : String
- + setStartDate(String) : void
- + setStartDate(Date) : void
- + getEndDate() : String
- + setEndDate(String) : void
- + setEndDate(Date) : void
- + getTelescopeLocation() : SciencePlan.TELESCEPELOC
- + setTelescopeLocation(SciencePlan.TELESCEPELOC) : void
- + getDataProcRequirements() : ArrayList<DataProcRequirement>
- + setDataProcRequirements(String fileType, String fileQuality, String colorType, double contrast, double brightness, double saturation, double highlights, double exposure, double shadows, double whites, double blacks, double luminance, double hue) : void
- + getPlanNo() : int
- + setPlanNo(int) : void
- + getStatus() : SciencePlan.STATUS
- + setStatus(SciencePlan.STATUS) : void
- + toString() : String

ObservingProgramModelGDDG

- planNo : int
- opticsPrimary : String
- fStop : double
- opticsSecondaryRMS : double
- scienceFoldMirrorDegree : double
- scienceFoldMirrorType : ObservingProgramConfigs.FoldMirrorType
- moduleContent : int
- calibrationUnit : ObservingProgramConfigs.CalibrationUnit
- lightType : ObservingProgramConfigs.LightType
- telePositionPair : TelePositionPair[]

- + observingProgram()
- + observingProgram(int planNo, String opticsPrimary, double fStop, double opticsSecondaryRMS, double scienceFoldMirrorDegree, ObservingProgramConfigs.FoldMirrorType scienceFoldMirrorType, int moduleContent, ObservingProgramConfigs.CalibrationUnit calibrationUnit, ObservingProgramConfigs.LightType lightType, TelePositionPair[] telePositionPair)
- + getPlanNo() : int
- + setPlanNo(int) : void
- + getGeminiLocation() : String
- + setGeminiLocation(String) : void
- + getOpticsPrimary() : String
- + setOpticsPrimary(String) : void
- + setfStop(double) : void
- + getfStop() : double
- + getOpticsSecondaryRMS() : double
- + setOpticsSecondaryRMS(double) : void
- + getScienceFoldMirrorDegree() : double
- + setScienceFoldMirrorDegree(double) : void
- + getScienceFoldMirrorType() : ObservingProgramConfigs.FoldMirrorType
- + setScienceFoldMirrorType(ObservingProgramConfigs.FoldMirrorType) : void
- + getModuleContent() : int
- + setModuleContent(int) : void
- + getCalibrationUnit() : ObservingProgramConfigs.CalibrationUnit
- + setCalibrationUnit(ObservingProgramConfigs.CalibrationUnit) : void
- + getLightType() : ObservingProgramConfigs.LightType
- + setLightType(ObservingProgramConfigs.LightType) : void
- + getTelePositionPair() : TelePositionPair[]
- + setTelePositionPair(TelePositionPair[]) : void
- + getValidationStatus() : boolean
- + setValidationStatus(boolean) : void
- + validateObservingCondition(ObservingProgram) : ObservingProgram
- + toString() : String

SciencePlan

- creator : String
- submitter: String
- fundingInUSD: double
- objectives : String
- startDate : Date
- endDate : Date
- SciencePlan.STATUS* : Enum
- SciencePlan.TELESCEPELOC* : Enum
- fileType : String
- fileQuality: String
- colorType: String
- contrast: double
- brightness: double
- saturation: double
- highlights: double
- exposure: double
- shadows: double
- whites: double
- blacks: double
- luminance: double
- hue: double

- + sciencePlan()
- + sciencePlan(String creator, String submitter, double fundingInUSD, String objectives, StarSystem.CONSTELLATIONS starSystem, Date startDate, Date endDate, SciencePlan.TELESCEPELOC telescopeLocation, String fileType, String fileQuality, String colorType, double contrast, double brightness, double saturation, double highlights, double exposure, double shadows, double whites, double blacks, double luminance, double hue)
- + getter and setter for all method
- + getCreator() : String
- + setCreator(String) : void
- + getSubmitter() : String
- + setSubmitter(String) : void
- + getFundingInUSD() : double
- + setFundingInUSD(double) : void
- + getObjectives() : String
- + setObjectives(String) : void
- + getStarSystem() : StarSystem.CONSTELLATIONS
- + setStarSystem(StarSystem.CONSTELLATIONS) : void
- + getStartDate() : String
- + setStartDate(String) : void
- + setStartDate(Date) : void
- + getEndDate() : String
- + setEndDate(String) : void
- + setEndDate(Date) : void
- + getTelescopeLocation() : SciencePlan.TELESCEPELOC
- + setTelescopeLocation(SciencePlan.TELESCEPELOC) : void
- + getDataProcRequirements() : ArrayList<DataProcRequirement>
- + setDataProcRequirements(String fileType, String fileQuality, String colorType, double contrast, double brightness, double saturation, double highlights, double exposure, double shadows, double whites, double blacks, double luminance, double hue) : void
- + getPlanNo() : int
- + setPlanNo(int) : void
- + getStatus() : SciencePlan.STATUS
- + setStatus(SciencePlan.STATUS) : void
- + toString() : String



ObservingProgramModelGDDG

- planNo : int
- opticsPrimary : String
- fStop : double
- opticsSecondaryRMS : double
- scienceFoldMirrorDegree : double
- scienceFoldMirrorType : ObservingProgramConfigs.FoldMirrorType
- moduleContent : int
- calibrationUnit : ObservingProgramConfigs.CalibrationUnit
- lightType : ObservingProgramConfigs.LightType I
- telePositionPair : TelePositionPair[]

- + observingProgram()
- + observingProgram(int planNo, String opticsPrimary, double fStop, double opticsSecondaryRMS, double scienceFoldMirrorDegree, ObservingProgramConfigs.FoldMirrorType scienceFoldMirrorType, int moduleContent, ObservingProgramConfigs.CalibrationUnit calibrationUnit, ObservingProgramConfigs.LightType lightType, TelePositionPair[] telePositionPair)
- + getPlanNo() : int
- + setPlanNo(int) : void
- + getGeminiLocation() : String
- + setGeminiLocation(String) : void
- + getOpticsPrimary() : String
- + setOpticsPrimary(String) : void
- + setfStop(double) : void
- + getfStop() : double
- + getOpticsSecondaryRMS() : double
- + setOpticsSecondaryRMS(double) : void
- + getScienceFoldMirrorDegree() : double
- + setScienceFoldMirrorDegree(double) : void
- + getScienceFoldMirrorType() : ObservingProgramConfigs.FoldMirrorType
- + setScienceFoldMirrorType(ObservingProgramConfigs.FoldMirrorType) : void
- + getModuleContent() : int
- + setModuleContent(int) : void
- + getCalibrationUnit() : ObservingProgramConfigs.CalibrationUnit
- + setCalibrationUnit(ObservingProgramConfigs.CalibrationUnit) : void
- + getLightType() : ObservingProgramConfigs.LightType
- + setLightType(ObservingProgramConfigs.LightType) : void
- + getTelePositionPair() : TelePositionPair[]
- + setTelePositionPair(TelePositionPair[]) : void
- + getValidationStatus() : boolean
- + setValidationStatus(boolean) : void
- + validateObservingCondition(ObservingProgram) : ObservingProgram
- + toString() : String

Data Processing Request

- fileType : String
- fileQuality: String
- colorType: String
- contrast: double
- brightness: double
- saturation: double
- highlights: double
- exposure: double
- shadows: double
- whites: double
- blacks: double
- luminance: double
- hue: double

DataProcRequirements (String fileType, String fileQuality, String colorType, double contrast,double brightness, double saturation, double highlights, double exposure, double shadows, double whites, double blacks, double luminance, double hue)

- + getFileType(): String
- + setFileType(String): void
- + getFileQuality(): String
- + setFileQuality(String): void
- + getColorType(): String
- + setColorType(String): void
- + getContrast(): double
- + setContrast(double): void
- + getBrightness(): double
- + setBrightness(double): void
- + getSaturation(): double
- + setSaturation(double): void
- + getHighlights(): double
- + setHighlights(double): void
- + getExposure(): double
- + setExposure(double): void
- + getShadows(): double
- + setShadows(double): void
- + getWhites(): double
- + setWhites(double): void
- + getBlacks(): double
- + setBlacks(double): void
- + getLuminance(): double
- + setLuminance(double): void
- + getHue(): double
- + setHue(double): void