SDMA Application Migration Strategy

WebAppBuilder to Experience Builder - RPAS Data Loader Widget

Document Version: 1.0
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Focus Area: RPAS Data Loader Widget (RPAS Elevation & TLS Elevation)

Executive Summary: This document outlines the migration strategy for the RPAS Data Loader Widget from ESRI WebAppBuilder to Experience Builder, incorporating the new FME Flow-based backend architecture to replace the existing Jenkins + Python automation.

Key Changes

- **Frontend:** WebAppBuilder → Experience Builder Custom Widget
- **Backend:** Jenkins + Python Scripts → FME Flow + Webhook
- **Processing:** Maintained geoprocessing logic with improved automation
- **Integration:** Webhook-based communication with FME Flow

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1. **Existing Architecture**

Widget Components:

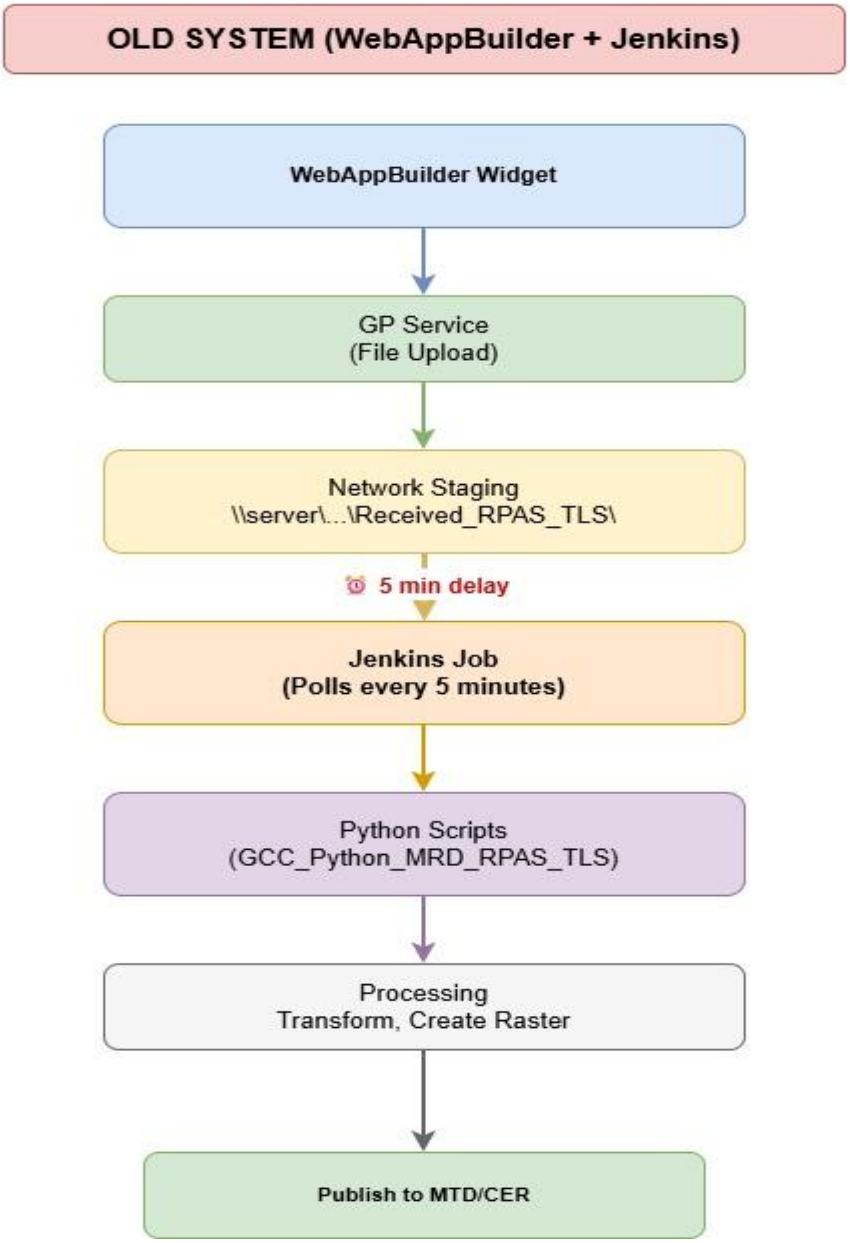
1. **RPAS Elevation -** LAS file upload calling geoprocessing service
2. **TLS Elevation -** TLS file upload calling geoprocessing service

Current Workflow:

User Upload → Widget Validation → File Staging → Jenkins Polling (5 min)

→ Python Processing → Transformation → MTD Publishing → Email Notification

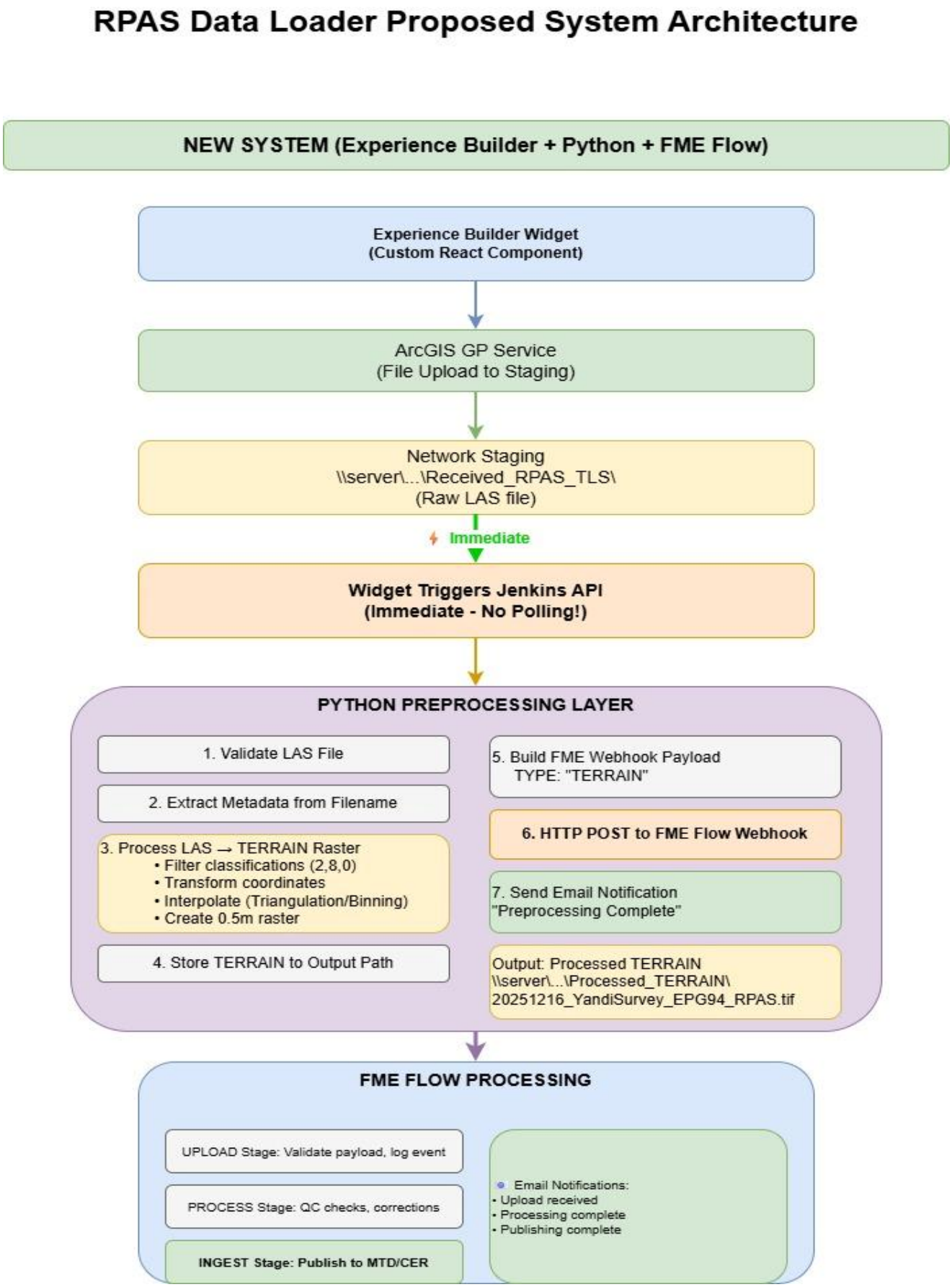
RPAS Data Loader Existing System Architecture



Key Systems:

- WebAppBuilder custom widget (frontend)
- Jenkins jobs (MRD - RPAS TLS Autorun)
- Python scripts (GCC_Python_MRD_RPAS_TLS)
- ArcGIS Geoprocessing Services
- Network file shares (staging locations), and SDE Mosaic Dataset (MTD)
- Central Elevation Repository (CER)

3. Proposed Architecture



2.2 Technology Stack

Frontend:

- ArcGIS Experience Builder
- Custom React-based widget
- ArcGIS JavaScript API 4.x
- File upload component

Backend:

- FME Flow (replaces Jenkins + Python)
- ArcGIS Server (Geoprocessing Services)
- Network file shares (staging)
- SDE Database (MTD/CER)

Integration:

- RESTful webhook (HTTP POST)
- JSON payload
- Email notifications (SMTP)

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3. Detailed Component Design

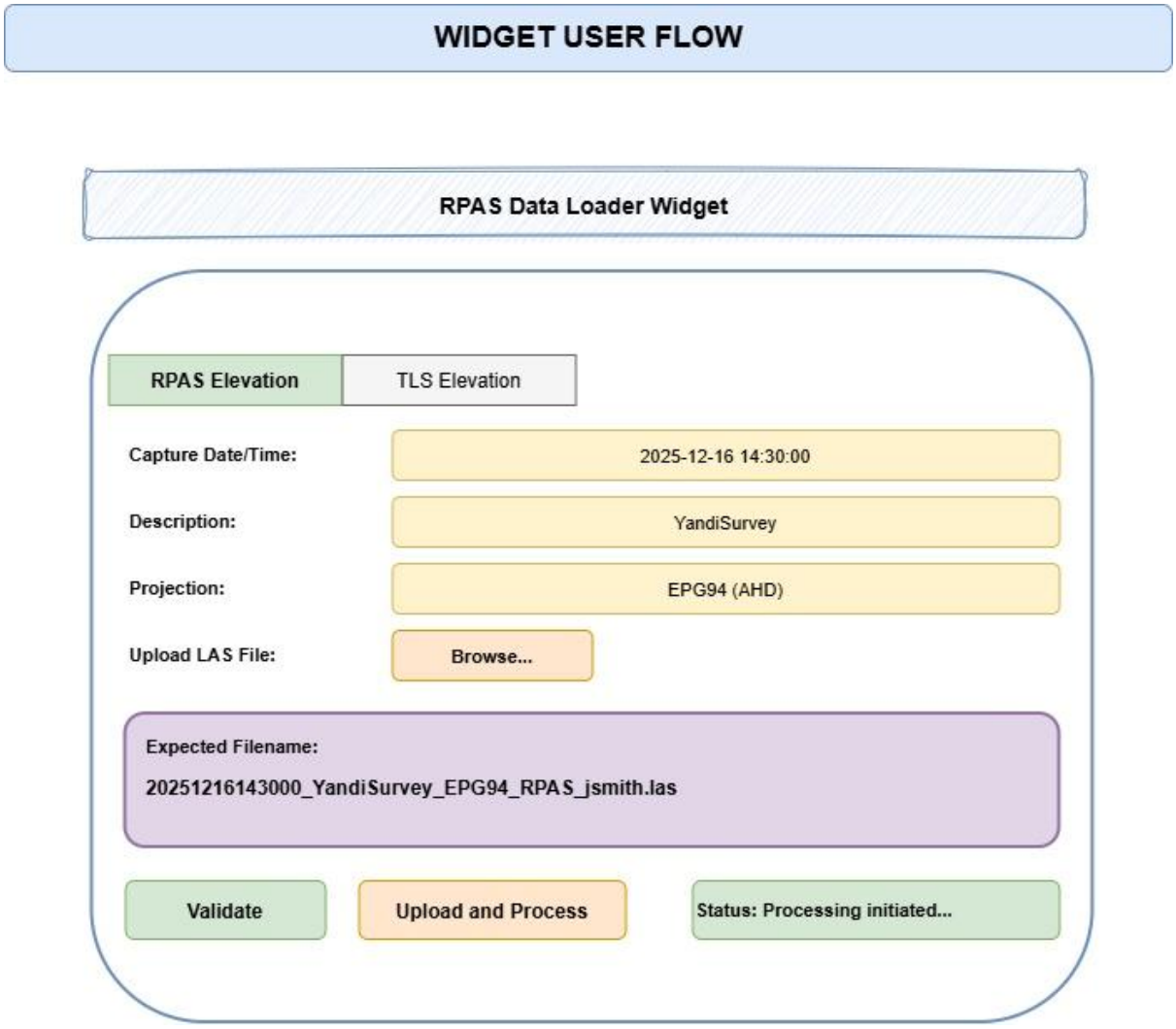
3.1 Experience Builder Custom Widget

3.1.1 Widget Structure

```
RPAS-Data-Loader-Widget/
├── src/
│   ├── runtime/
│   │   ├── widget.tsx              # Main widget component
│   │   ├── RPASElevation.tsx       # RPAS elevation tab
│   │   ├── TLSElevation.tsx        # TLS elevation tab
│   │   ├── FileUploader.tsx        # File upload component
│   │   ├── ValidationService.ts    # Client-side validation
│   │   ├── WebhookService.ts       # FME Flow webhook calls
│   │   └── styles.css
│   ├── setting/
│   │   └── setting.tsx             # Widget configuration
│   └── config.json
├── manifest.json
└── icon.svg
```

3.1.2 User Interface Components

Tab 1: RPAS Elevation and Tab 2: TLS Elevation



3.1.3 Validation Rules (Client-Side)

File Naming Convention:

```
interface FileNamingParams {
  datetime: string;      // YYYYMMDDhhmmss - 14 digits
  description: string;   // No spaces, alphanumeric, max 100 chars
  projection: string;    // From approved list
  captureMethod: string;  // RPAS or TLS
  userId: string;       // Valid company email prefix
}

// Naming pattern
const fileNamePattern = /^(\d{14})_([A-Za-z][A-Za-z0-9]{0,99})_(CPG94|EPG94|ER94|NP94|PHG94|WB94|YAN94|MGA50|MGA51)_(RPAS|TLS)_([a-zA-Z0-9]+)\.las$/;
```

Validation Checks:

1. DateTime is valid 14-digit format
2. DateTime is before current time
3. Description contains no spaces or special characters
4. Description starts with letter (not number)
5. Description ≤ 100 characters
6. Projection matches approved list
7. Capture method is RPAS or TLS
8. User ID matches current user
9. File extension is .las
10. File size is reasonable (< 5GB)

Approved Projections:

```
const approvedProjections = {
  'CPG94': { datum: 'AHD', wkid: 28349 },
  'EPG94': { datum: 'AHD', wkid: 28350 },
  'ER94':  { datum: 'ADPH', wkid: 28351 },
  'NP94':  { datum: 'AHD', wkid: 28352 },
  'PHG94': { datum: 'AHD', wkid: 28353 },
  'WB94':  { datum: 'ADPH', wkid: 28354 },
  'YAN94': { datum: 'AHD', wkid: 28355 },
  'MGA50': { datum: 'AHD', wkid: 28350 },
  'MGA51': { datum: 'AHD', wkid: 28351 }
};
```

3.2 File Processing Workflow

3.2.1 Widget Processing Steps

```
1. User Input
   ├─ Capture Date/Time entry
   ├─ Description entry
   ├─ Projection selection
   └─ File selection

2. Client-Side Validation
   ├─ Validate all parameters
   ├─ Generate expected filename
   ├─ Display preview to user
   └─ Enable/disable upload button

3. File Upload to ArcGIS Server
   ├─ Call GP Service: importFile
   ├─ Rename file with validated name
   ├─ Copy to staging location
   └─ Return success/failure

4. Trigger FME Flow Webhook
   ├─ Build JSON payload
   ├─ POST to FME Flow webhook URL
   ├─ Receive acknowledgment
   └─ Display processing status

5. User Notification
   ├─ Show upload success message
   ├─ Provide tracking information
   └─ Display email notification expectation
```

3.2.2 FME Flow Webhook Payload


```
{
  "TYPE": "TERRAIN",
  "TIFF_PATH": "",
  "LAZ_PATH": "\\\\server\\path\\to\\Elevation\\Received_RPAS_TLS\\202512161430
  "SURVEY_NAME": "YandiSurvey",
  "ACQUISITION_DATE": "2025-12-16",
  "CAPTURE_METHOD": "RPAS",
  "SURVEYOR": "COMPANY",
  "RESOLUTION": null,
  "ALTITUDE": null,
  "COORDSYSTEMXY": 28350,
  "COORDSYSTEMZ": 5711,
  "HORIZONTAL_ACCURACY": "0.3",
  "VERTICAL_ACCURACY": "0.1",
  "SITE": "Yandi",
  "LAZ_CLASSIFICATION": "2, 8, 0",
  "PIXEL_SIZE": 0.5,
  "NO_DATA": "",
  "STAGES": "UPLOAD,PROCESS,INGEST",
  "USER_EMAIL": "username@company.com"
}
```

Field Mapping:

Widget Input	JSON Field	Notes
Capture DateTime	ACQUISITION_DATE	Convert to YYYY-MM-DD
Description	SURVEY_NAME	From filename
Projection	COORDSYSTEMXY	Map to WKID
Projection	COORDSYSTEMZ	Map height datum to WKID
Capture Method	CAPTURE_METHOD	RPAS or TLS → RPAS/Terrestrial Survey
User ID	USER_EMAIL	Append @company.com
File Path	LAZ_PATH	Full UNC path
-	SURVEYOR	Default: "BHP"
-	HORIZONTAL_ACCURACY	Default: "0.3"
-	VERTICAL_ACCURACY	Default: "0.1"
-	LAZ_CLASSIFICATION	Default: "2, 8, 0"
-	STAGES	Default: "UPLOAD,PROCESS,INGEST"

3.3 FME Flow Processing: ??

3.3.2 Error Handling

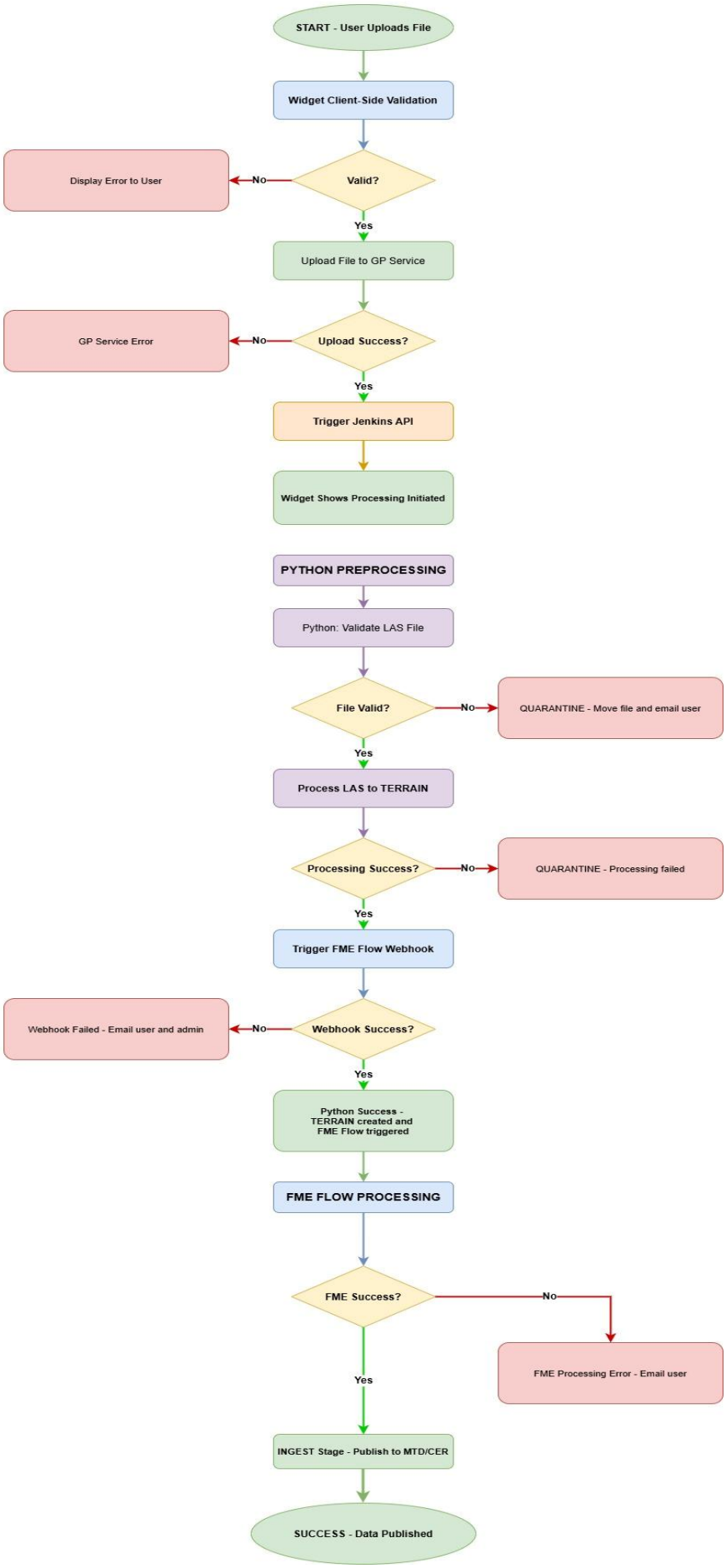
RPAS Data Loader - Error Handling and Decision Flow

ERROR HANDLING SUMMARY

ERROR POINTS:
1. Widget Validation
2. GP Service Upload
3. Python Validation
4. Python Processing
5. Webhook Trigger
6. FME Flow Processing

LEGEND

- Success Path
- Error or Failure
- Decision Point
- Processing Step



Appendices

Appendix A: Approved Projections Reference

Code	Name	Horizontal Datum	Vertical Datum	WKID	Z-WKID
CPG94	Cape Lambert Grid 1994	GDA94	AHD	28349	5711
EPG94	Eastern Pilbara Grid 1994	GDA94	AHD	28350	5711
ER94	East Ridge 1994	GDA94	ADPH	28351	5112
NP94	Newman Point 1994	GDA94	AHD	28352	5711
PHG94	Port Hedland Grid 1994	GDA94	AHD	28353	5711
WB94	West Basin 1994	GDA94	ADPH	28354	5112
YAN94	Yandi Grid 1994	GDA94	AHD	28355	5711
MGA50	MGA Zone 50	GDA94	AHD	28350	5711
MGA51	MGA Zone 51	GDA94	AHD	28351	5711

Appendix B: File Naming Examples

Valid Examples:

- *20251216143000_YandiSurvey_EPG94_RPAS_pathgi.las*
- *20251201000000_W55BCracking_EPG94_TLS_pathgi.las*
- *20250531235959_EastRidge2024_ER94_RPAS_pathgi.las*

Invalid Examples:

- *2025-12-16_YandiSurvey_EPG94_RPAS_jsmith.las (wrong date format)*
- *20251216143000_Yandi Survey_EPG94_RPAS_jsmith.las (space in description)*
- *20251216143000_55YandiSurvey_EPG94_RPAS_jsmith.las (starts with number)*
- *20251216143000_YandiSurvey_INVALID_RPAS_jsmith.las (invalid projection)*

Appendix C: Email Notification Templates

Upload Success:

Subject: RPAS/TLS Upload Started - [SurveyName]

Dear [UserName],

Your RPAS/TLS survey file has been successfully uploaded and processing has begun.

Survey Details:

- Survey Name: [SurveyName]
- Capture Date: [AcquisitionDate]
- Capture Method: [CaptureMethod]
- Projection: [Projection]

File: [Filename]

You will receive additional notifications when processing is complete.

Regards,

WAIO Geomatics Team

Processing Success:

Subject: RPAS/TLS Processing Complete - [SurveyName]

Dear [UserName],

Your RPAS/TLS survey has been successfully processed.

Processing Results:

- Raster created: [OutputPath]
- Pixel size: [PixelSize]m
- Extent: [Extent]
- Statistics: [Statistics]

The data is now ready for publishing to the Master Terrain Dataset.

Regards,

WAIO Geomatics Team

Publishing Success:

Subject: MTD Publishing Complete - [SurveyName]

Dear [UserName],

Your RPAS/TLS survey has been successfully published to the Master Terrain Dataset.

MTD Details:

- Dataset: IO SDI PUBLISH.PLANNING.MTD
- Name: [Name]
- Acquisition Date: [AcquisitionDate]
- View in Web Map: [WebMapURL]

The data is now available for use in SDMA and other applications.

Regards,

WAIO Geomatics Team

Processing Failure:

Subject: RPAS/TLS Processing Failed - [SurveyName]

Dear [UserName],

Unfortunately, your RPAS/TLS survey processing has failed.

Error Details:

- File: [Filename]
- Error: [ErrorMessage]
- Quarantine Location: [QuarantinePath]

Please review the error and resubmit your file. If you need assistance,

contact WAIO Geomatics at geomatics@company.com.

Regards,

WAIO Geomatics Team