Resumen: D2-DMS-TEC-TSP-02-2B-Operations Concept

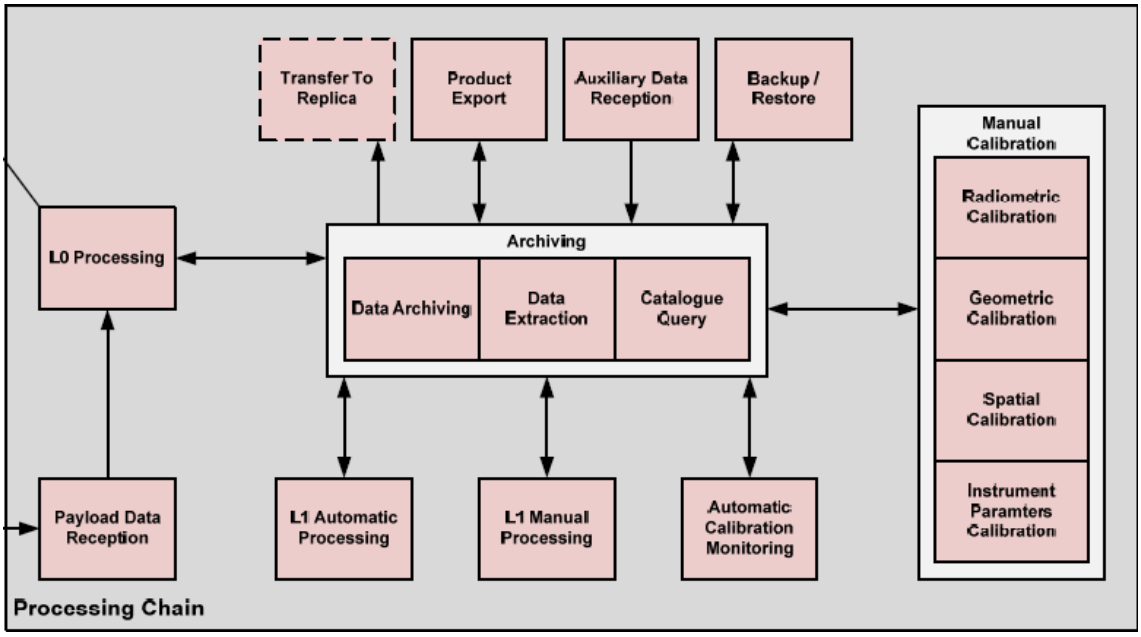

Figure 1. Nominal GS Operations: Processing Chain

3.2. Processing Chain Operations

It contains all the tasks needed to ingest, to process, and to archive the payload data downlinked from the S/C up to the required processing level.

3.2.1. Payload Data Reception

The PDGS checks that new payload data is received at the G/S and retrieves it.

3.2.1.1. Purpose

This sequence describes the tasks performed by the PDGS in order to receive Payload Data.

3.2.1.2. Relation to other sequences

This sequence interacts with:

- Pass Management
- L0 Processing

3.2.1.3. Steps

The following table describes each of the steps as well as the relations with other sequences:

Step	Activity	Actor	Description
1	Data Circulation from G/S to PDGS	DC	DC detects new Payload data to be moved to the PDGS. This links with Pass Management sequence
2	Storage in Shared Area	DC	DC moves data to the MAC Shared Area. This links with L0 Processing sequence

3.2.2. L0 Processing

The received payload data is processed into L0 products and the corresponding reports are generated, including an acquisition report that is sent to the MPS. The generated L0 products are ingested in the MAC ARC.

3.2.2.1. Purpose

This sequence describes the tasks performed by the PDGS in order to process payload data into Level 0
and generate the telemetry report.

3.2.2.2. Relation to other sequences

This sequence interacts with:

- ☐ Payload Data Reception
- ☐ Data Archiving
- ☐ L1 Processing
- ☐ Plan Update
- ☐ Transfer to Replica

3.2.2.3. Steps

The following table describes each of the steps as well as the relations with other sequences:

Step	Activity	Actor	Description
1	ORC data driven processing	DC/ORC	The DC automatically polls the shared area looking for new payload data. It links with Payload Data Reception sequence. If new payload data is detected an event is triggered and the ORC is called. The ORC commands the WPS manager to generate a L0 job order and execute it.
2	L0 Job Order Creation	WPS manager	The WPS manager creates the jobOrder and forwards it to the WPS node
3	Job order Queue and processor triggering	WPS node	The job order is placed in a queue and when possible the relevant L0 processor is triggered. The processor health is then monitored.
4	L0 Processor execution	L0 Processor	L0 processing is performed.
5	L0 Output data production	L0 Processor	Output products and reports are left in the shared area.
6	The L0 processing ends	WPS	The WPS informs the ORC that the L0 processing has ended.
7	Trigger TLM report generation	ORC / WPS manager	The ORC creates a PM jobOrder and commands the PM toolbox to generate it through the WPS.
8	PM Report (Telemetry Report) generation	PM toolbox	The PM toolbox creates the TLM report (PM Report).
9	TLM generation output	PM Toolbox	Once created the PM toolbox leave the TLM report in the shared area.
10	PM Report generation ends	WPS	The WPS informs the ORC that the PM toolbox processing has ended.
11	Output storage	ORC	The ORC issues an order through the CSW to store the generated L0 product and TLM report into the MAC .
12	Data archival	Data Acquisition	The generated files are stored and catalogued. This links with the Data Archiving sequence.
13	ORC data driven processing	DC / ORC	Again this step is repeated for each Payload data from a pass. When no more payload data is available, the acquisition report is generated (PM report). This links with the ACQ report generation sequence. It also links with the L0R sequence.

3.2.2.4. Acquisition Report Generation

3.2.2.4.1. Purpose

This sequence describes the tasks performed by the PDGS while performing the automatic Acquisition
Report generation

3.2.2.4.2. Relation to other sequences

This sequence interacts with:

- L0 Processing
- Data Archiving
- Data Extraction
- Catalogue Query

3.2.2.4.3. Steps

The following table describes each of the steps as well as the relations with other sequences:

Step	Activity	Actor	Description
1	New Report Query	ORC	The ORC queries the MAC through the CSW to get the payload scenario file and all the telemetry reports that matches with that payload scenario file. It links with Catalogue Query sequence.
2	Trigger PM report generation	ORC / WPS manager	The ORC creates a PM Job Order and commands the PM toolbox to generate it through the WPS.
3	PM Report (Acquisition Report) generation	PM toolbox	The PM toolbox creates the ACQ report.
4	PM generation output	PM Toolbox	Once created the PM toolbox leave the ACQ report in the shard area, and in the outtray to send the report to the MPS facility (FOS).
5	ACQ Report generation ends	WPS	The WPS informs the ORC that the PM toolbox processing has ended.
6	Output storage	ORC	The ORC issues an order to store ACQ report generated into the MAC through the CSW.
7	Data archival	Data Acquisition	The generated file is stored and catalogued. This links with the Data Archiving report sequence.
8	Send report to MPS	DC	The DC send the generate ACQ report to the MPS facility for further analysis.

3.2.2.5. L0R Automatic Processing

3.2.2.5.1. Purpose

This sequence describes the tasks performed by the PDGS while performing the automatic Level 0R
processing.

3.2.2.5.2. Relation to other sequences

This sequence interacts with:

- L0 Processing
- Data Archiving
- Data Extraction
- Catalogue Query

3.2.2.5.3. Steps

The following table describes each of the steps as well as the relations with other sequences:

Step	Activity	Actor	Description
1	New Product Query	ORC / CSW	ORC queries the MAC through the CSW to find the L0 products of the same acquisition scenario. It links with Catalogue Query sequence.
2	Job Order Creation	ORC	After successful fulfilment of rules, the job order is created.
3	Input data retrieval	ORC	Input data is requested to the MAC and moved to the processors shared area (data could already be there, depending on retention policies). This links with Data Extraction sequence.
4	Processing request	WPS manager	The WPS sends the job order to the WPS node for its execution.
5	Job order Queue and processor triggering	WPS	The job order is placed in a queue and when possible the relevant L0R processor is triggered. The processor health is then monitored.
6	L0R Processor execution	L0R Processors	L0R processing is performed.
7	Output data production	L0R Processors	Output products and reports are left in the shared area.
8	Process termination	WPS node	The processing end and the WPS node detects the result of the activity and reports to WPS manager and ORC.
9	Output storage	ORC	The ORC issues an order through the CSW to store the generated L0R product into the MAC
10	Data archival	Data Acquisition	The generated files are stored and catalogued. This links with the Data Archiving sequence.

3.2.3. L1 Automatic Processing

After the generation of a L0 product the L1 automatic processing chain is triggered and the corresponding L1 products generated and archived.

3.2.3.1. Purpose

This sequence describes the tasks performed by the PDGS in while performing the automatic Level 1
processing.

3.2.3.2. Relation to other sequences

This sequence interacts with:

- Payload Data Reception
- Data Archiving
- Data Extraction
- Catalogue Query

3.2.3.3. Steps

The following table describes each of the steps as well as the relations with other sequences:

Step	Activity	Actor	Description
1	New Product Query	ORC	ORC queries the MAC for new unprocessed files. It links with Catalogue Query sequence.
2	Job Order Creation	ORC	After successful fulfilment of rules, the job order is created.
3	Input data retrieval request	ORC	Input data is requested thought the CSW to the MAC. This links with Data Extraction sequence.
4	Input data retrieval	ARC	The ARC puts the necessary files into the shared area (data could already be there, depending on retention policies).

Step	Activity	Actor	Description
5	Processing request	WPS	The WPS manager sends the job order to the WPS Node for its execution.
6	Job order Queue and processor triggering	WPS Node	The job order is placed in a queue and when possible the relevant L1 processor is triggered. The processor health is then monitored.
7	L1 Processor execution	L1 Processors	L1 processing is performed.
8	Output data production	L1 Processors	Output products and reports are left in the shared area.
9	Process termination	WPS Node	The processing end and the WPS Node detects the result of the activity and reports to WPS manager and ORC.
10	Output storage	ORC	The ORC issues an order through the CSW to store the generated L1 product into the MAC
11	Data archival	Data Acquisition	The generated files are stored and catalogued. This links with the Data Archiving sequence.

3.2.4. L1 Manual Processing

After the last automatic L1 product step is performed the operators perform a manual orthorectification process and the generated products are archived.

3.2.4.1. Purpose

This sequence describes the tasks within the PDGS to perform Level 1 Manual processing.

3.2.4.2. Relation to other sequences

This sequence interacts with:

- Data Archiving
- Data Extraction
- Catalogue Query

3.2.4.3. Steps

The following table describes each of the steps as well as the relations with other sequences:

Step	Activity	Actor	Description
1	MAC HMI start	MAC HMI	This activity will only be initiated if required. It is an on-demand activity. The operator starts the MAC HMI.
2	Catalogue query for input products and ADF	MAC HMI	The operator, through the MAC HMI, queries the MAC for the required input products. This includes L1b, reference images (if available), etc. It links with Catalogue Query sequence.

Step	Activity	Actor	Description
3	Input data retrieval to external out tray	MAC HMI / CSW	After operator selection and confirmation, input data is moved to the external out tray. This links with Data Extraction sequence.
4	Manual PP HMI execution	Manual PP HMI	The operator starts the Manual Processor HMI, accessing the external out tray, using also, if needed, references images, and, helped by the tool. First it generates GCP and then triggers the generation of the L1c. This could be an iterative process, until the required accuracy is reached.
5	Output data production	Manual PP HMI	Output products and reports are left in the external out tray.
6	Output data selection	MAC HMI	Through the MAC HMI, the operator selects the products to be stored (linking them to the inputs used) and requests product archival.
7	Data archival	CSW	Output data is archived and the processing task is finally completed. This links with Data Archiving sequence.

3.2.5. Archiving

The Archiving operation sequences give support for all most of the PDGS operations sequences and are basically manage by the MAC element. It includes the following sub-sequences:

- Data Archiving. The MAC receives an Archiving Request from external components at the CSW interface, validates the inputs and ingests the data in the MAC ARC, adding the corresponding metadata on the MAC CAT.
- Data Extraction. The MAC receives a Data Request from external components at the CSW interface, looks for the corresponding data on its ARC component checking if the data is already placed in the MAC Shared Area and copies the data to the requested destination.
- Catalogue Query. The MAC receives a Catalogue Query or Browse Request from external components at the CSW interface and generated the corresponding response from the information stored in the MAC CAT. The response is sent through the same request connection. The internal mechanism of these MAC operation sequences are described in detail in the MAC ADD and ICD.

3.2.6. Automatic Calibration Monitoring

3.2.6.1. Purpose

This sequence describes the tasks performed by the PDGS to run automatic calibration monitoring
functions. It is equivalent to the L1 Automatic Processing chain.

3.2.6.2. Relation to other sequences

This sequence interacts with:

- Data Archiving
- Data Extraction
- Catalogue Query

3.2.6.3. Steps

The following table describes each of the steps as well as the relations with other sequences:

Step	Activity	Actor	Description
1	New Product Query	ORC	ORC queries the MAC for the existence of files that could trigger the Automatic Calibration Monitoring function (according to the configured rules, in principle due to an acquisition over calibration sites). It links with Catalogue Query sequence.

Step	Activity	Actor	Description
2	Input data retrieval	MAC	After successful fulfilment of rules, input data is requested to the MAC and moved to the shared area (data could already be there, depending on retention policies). This links with Data Extraction sequence.
3	Job Order Creation	ORC	As a continuation of step 2, the job order is created and sent to the WPS node via WPS manager.
4	Job order Queue and Calibration Toolbox triggering	WPS node	The job order is placed in a queue and when possible the relevant Calibration Toolbox is triggered. The toolbox health is then monitored.
5	Calibration Toolbox execution	Cal Toolboxes	Cal Toolboxes are executed.
6	Output data production	Cal Toolboxes	The result of the toolbox is left in the shared area and reports are also published in the web server (accessed through CAL HMI).
7	Toolbox termination	WPS node	The toolbox ends and the WPS node detects the result of the activity, informing ORC of the result of the execution.
8	Data archival request	ORC	ORC received message from WPS node and collects output data, requesting its storage.
9	Data archival	Data Acquisition	Data Acquisition is commanded by ORC to archive output data, finally completing the calibration task. This links with Data Archiving sequence.

3.2.10. Transfer to Replica

When the L0 products are archived they are also distributed to the GS replica with the corresponding ADFs. (In case that the GS is configured with a replica configuration).

3.2.10.1. Purpose

This sequence describes how the PDGS delivers L0 and ADF data to the replica (optional process, depending on the GS deployment configuration).

3.2.10.2. Relation to other sequences

This sequence interacts with:

- L0 Processing
- Manual Calibration

3.2.10.3. Steps

The following table describes each of the steps as well as the relations with other sequences:

Step	Activity	Actor	Description
1	L0 or ADF data left in special shared area	DC	L0 and ADF files are available in shared area, as outputs of L0 Processing sequence and Manual Calibration sequence.
2	Data Distribution polling for data to be replicated	DC	The DC polls the shared area for new data to be replicated to the Replica GS
3	Product delivery to replica	DC	Upon detection of files to be replicated the Data Distribution delivers them to the Replica GS