

UVIT Data Analysis Pipeline

**Compiled by -
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Inputs from : UVIT team, SAC-ISRO team, ISAC-ISRO team, ...

End-to-end overview :

UVIT --> Science stream data -->
S/C Data Handling Unit -->
Solid State Recorder -->
Transmission to ground
(+ House Keeping data)



Ground reception -->
Data Ingest Front End Processor -->
Raw data -->
Level-1 data --> Data Analysis Pipeline
Level-2 data -->
(end-user / astronomer friendly)

.....



Key requirements of
Level-1 to Level-2
data processing pipeline :

Sky images in FUV / NUV / VIS,
corrected for various instrument effects,
spacecraft drifts, jitters, thermal effects

Recovering angular resolution,
& Absolute aspect

Quick Look Display (near real time)

(being carried out by SAC-ISRO in consultation
with UVIT team)

For Photon Counting (PC : FUV, NUV) & Integration (IM : VIS) Modes -

reject affected data : drop-outs, parity error, cosmic rays, ...

Instrumental effects corrected for :

- response variation over FoV; bad pixels
- temperature dependence of QE
- temperature dependence of MCP gain (IM only)
- distortion introduced by Detector
- distortion introduced by optic assembly
- systematic effects in extraction of photon location from event centroid (PC only) – dark, bias,
- thermal effects on inter-channel mis-alignment;

Spacecraft Drift :

normally -

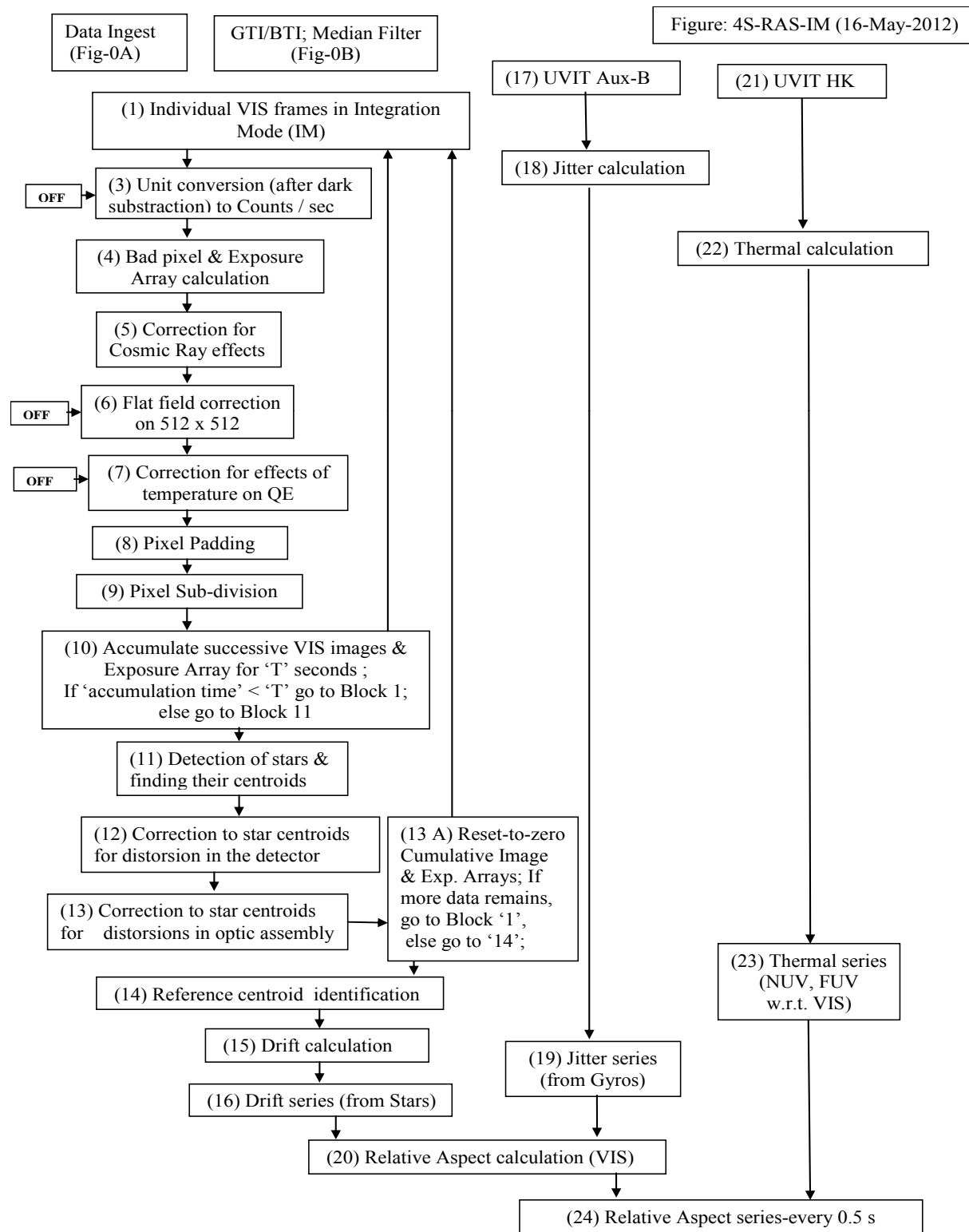
recovered from series of sky images in VIS channel taken in Integration Mode (IM) ~ at 1 Hz;
relative shifts / rotation extracted by comparing a set of detected bright stars;

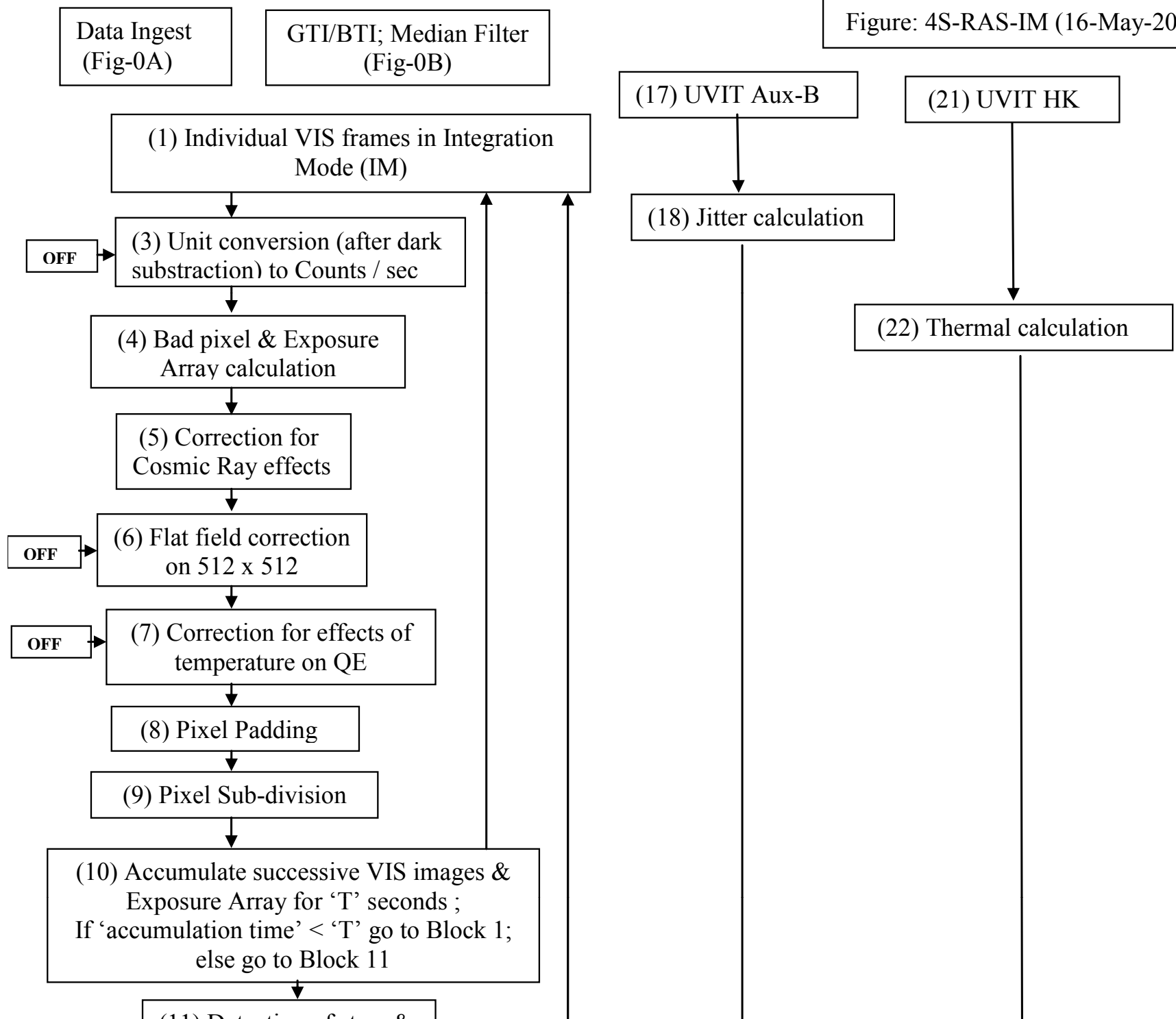
if VIS channel not available -

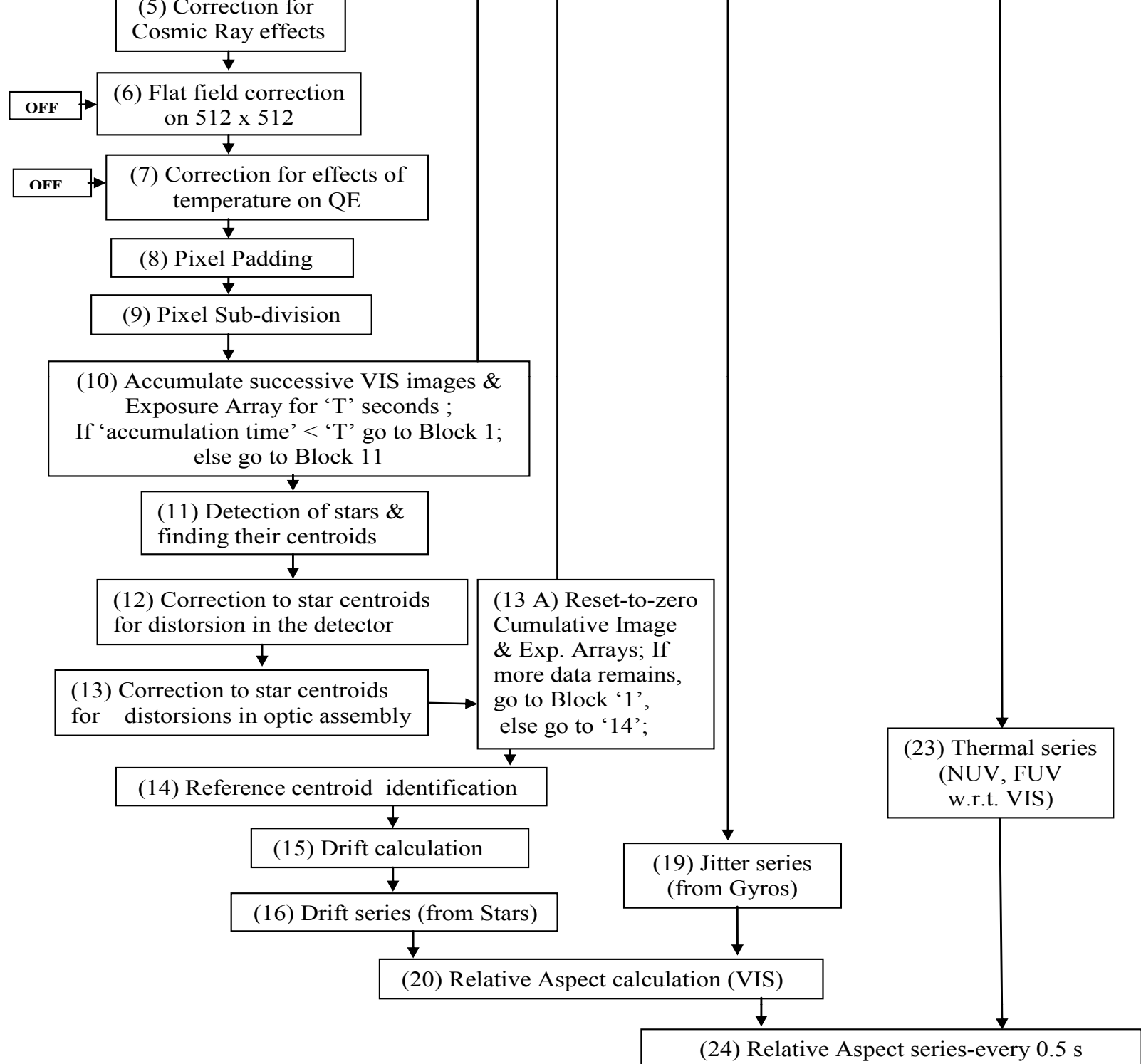
recovered from NUV channel images in PC mode;

Spacecraft Jitter :

recovered from Gyro signals after filtering & integration;







Current status :

Required inputs -

ICD of Level-1 data (available)

Sample Level-1 science data [being simulated]

Calibration Database (some available, others
being populated)

Pipeline -

flow of blocks finalized

documentation in progress

algorithms mostly available

CDR by ~July 2012

Quick Look Display -

First versions ready – under test