

C. Passive IRIS Features

C.1 Overview

For most installations, IRIS is in “active” control of the radar and antenna via the RVP processor and the RCP. However, for some installations, the radar and antenna are controlled by an external RCP and IRIS is merely connected to the radar by the signal processor. In this case, the external control system performs the scanning and IRIS simply “listens” to the signal processor in “passive” mode. In passive mode, the radar TASKS in IRIS are configured to match the scanning that is performed by the external control system and IRIS synchronizes to the external scanning, i.e., IRIS deduces which TASK should be running, starts the TASK and acquires the TASK data from the signal processor.

Passive IRIS is ideal when IRIS must be installed in parallel with an existing data acquisition system. The existing system can then “do its own thing” and IRIS will simply follow along. Another application is when two radars at different frequencies (and correspondingly two IRIS’s) share the same antenna. In this case, one of the IRIS systems can operate in active mode and the other operate in passive mode to allow simultaneous data collection from both radars. Another application is when using time series playback.

Passive IRIS requires that antenna angle information be supplied to the RVP. It requires a minimum of the RVP7. For time series playback, a minimum of RVP8.

C.2 Passive IRIS Configuration in setup

Passive IRIS is enabled in the **setup** utility (Ingest/Scanning Options). Please refer to the *IRIS Utilities Manual* for details. Please be sure to also turn off noise sampling.

TASK Scheduling Control (select one of)

- **Active Only**- the normal IRIS active control.
- **Passive Only**- for a system that can function only in passive mode. This is the most common type of passive IRIS.
- **Active/Passive**- for systems that can assume either role. In this case, the selection of active versus passive is done in the TASK Scheduler menu.

Passive: use external trig rate (Yes/No)

This tells IRIS that we should monitor the current PRF and use it to help guess which task is currently running. This assumes we are using an external trigger, or are playing back time series.

Passive type

See section C.3.

C.3 TASK Configuration, Scheduling and Synchronization

Passive IRIS must determine what the active system is doing and then follow along acquiring data. The TASK Configuration and TASK Scheduler menus must be properly configured for this to work.

TASK Configuration

For each “TASK” that is run by the active system, you must configure a corresponding TASK to be run on the passive system. For example, if the active system is running a volume scan, then you would configure a corresponding volume scan in the passive system with exactly the same elevation angles.

Aside from the angles, the only other critical element of the TASK Configuration is the radar trigger. If the trigger is generated externally, then you must configure the correct PRF. Note that dual PRF is not supported by passive IRIS when an external trigger is used. If the RVP is generating the trigger then you can configure any allowed trigger including dual PRF.

TASK Scheduler

With regard to the other signal processing you have complete flexibility to configure any processing options. Thus while passive IRIS must scan the same as the active system it can be doing very different processing.

The TASK Scheduler should be configured with the same TASK’s as are run by the active system. It is required that the TASK’s be in the same order as are run on the active system unless you are using Status–Slaving (see below). Also if your system can run in Active or Passive mode, then the Active/Passive menu selection at the top of the TASK Scheduler should be set to “Passive”. This state is saved when you save the TASK Scheduler configuration.

TASK Scheduler Synchronization (Passive type)

There are four ways that passive IRIS synchronizes the TASK that it is running to the the active control system. The TASK Scheduler in the passive system must be configured to contain the TASK’s that are being run by the active system and all TASKS must be set to “Scheduled”. The methods are:

- **Multi–Tasking**

In this case, Passive IRIS tries to run the first TASK in the schedule. It waits until the PRF and the starting angle match the TASK configuration and then starts acquiring data for the TASK. Passive IRIS then waits for the PRF and angle for the 2nd TASK in the Scheduler and so on. If at any time it notices that the PRF and elevation angle are a better match for the start of a different task, then it will interrupt to switch tasks. Note that this mode only supports continuous PPI scans.

In all cases it may be necessary to adjust the angle tolerances in **Setup/ingest** to tune the TASK so that it runs properly. For example, if the angles of the TASK are very close together, then the angle tolerance should be set smaller than the angle spacing.

Also, the antenna may not actually achieve the desired elevation angle, in which case it is better to modify the TASK in passive IRIS to match the actual rather than the nominal elevation angles.

- **Single-Tasking**

In this case IRIS will allow only one task to be scheduled in the task scheduler. IRIS waits until the PRF and the starting angles match the TASK configuration and then starts acquiring data for the TASK. This mode supports all scans including RHIs.

- **Status-Slaving**

This case requires that a Status product be sent to the passive system. In the case when the active system is another IRIS, the Status product on the active system is generated automatically whenever a TASK is started and contains the name of the TASK that is currently running. When the passive system receives this, it starts (or continues running) the same TASK. The Status product must be configured to be output automatically over the network to the passive system. This mode supports any scan geometry including RHIs.

- **TS-Playback**

This is used when trying to synchronize to old time series being played back via the **tsarchive** utility. Support is required by **tsarchive** and by the **RVP8** or later processor. This is a variation of the Multi-Tasking mode described above. We are assuming that a single volume scan is being played back. This volume scan may be approximated in IRIS using a single task, multiple tasks, or a hybrid task. IRIS will aggressively try to remain synchronized to the sweeps of the original data. In the event that a sweep ends before the full 360 degrees were acquired, IRIS will immediately switch to the next to prevent losses at the start. Similarly if the sweep is filled before the data is complete, IRIS will continue to read rays from the RVP. This is important to make sure that the next sweep does not start with the last few rays of the previous sweep. This mode only supports continuous PPI scans.

C.4 TS Playback using tsarchive

Running passive IRIS on **tsarchive** playback data presents some unique challenges discussed here. This feature is only available on RVP8 and later DSPs. Make the following configurations in **setup**:

In **Ingest Signal Processing and Data Storage**:

Source of Recorded angles: RVP Tags
Source of recorded time: RVP Tags

In **Ingest Scanning Options**:

Passive type: TS-Playback
Passive: use external trig rate: Yes (not critical)
Optimize for continuous output: No

In **General Modes and Protocols**:

Timezone for data recording: UTC

Time is not current, possibly repeating

Much of the configuration of the playback RVP8 must be set the same as the RVP8 used for recording. Any easy way to do this is to use the same RVP8. They must both have the same IFD sample clock rate. The pulse widths and range resolutions must match. The local time zone must match, because IRIS will read this from the RVP8.

For successful playback, a task must be configured to match the original task name, and to have many matching characteristics. Things to match are: Major Mode, Range bin count, dual-prf unfolding, pulse width, Phase Modulation, Polarization, and PRF. Note that IRIS supports only integer PRFs. Select the next lower integer for data with non-integer PRFs. When you attempt to playback and there is a mismatch of one of these, you will get a signal pop-up. To see details of the mismatch please halt the task right then so the end of task code can read the time series configuration. You can also get the same information manually from **tsview**.

Since the playback data is not from the current time, it will appear in the Ingest Summary Menu under the data time. You cannot record the exact same time data multiple times in IRIS. To address this we have added a “playback version” number. All live data has the playback version number set to zero. To control this, first start the IRIS task. Then in **tsarchive** increment this value to some other value, then play the data once. In the Ingest Summary menu a 2-digit playback version number is added to the 3-character site code when the playback version is nonzero. The product generator will always run on the largest version file it finds.

C.5 Testing Passive IRIS

To verify the proper functioning of passive IRIS, use the following:

- Watch the TASK Scheduler and verify that the TASK’s are being sequenced properly (“Running” means a TASK is acquiring data).
- Observe the Ingest Summary menu to verify that all sweeps of each TASK are being collected.
- Use the **rays** utility to verify that there are no missing rays. Note that depending on the nature and accuracy of the antenna control system, it may not be possible to eliminate missing rays at the end of individual sweeps.
- Make individual PPI products for each sweep of a volume scan. An easy way to do this is to specify “ * “ (wild card) in the elevation angle field of the PPI Product Configuration. The PPI products will show any missing rays that are >2 degrees. Single missing rays will not be apparent.