

Raw IF Measurements from Spire Global, Inc

As part of the CSDA sustained purchase agreement with Spire Global, Inc., Spire has delivered a set of Raw Intermediate Frequency (Raw IF) measurements

- As there are a limited number of these measurements, they will not be integrated into the Smallsat Data Explorer (SDX) tool.
- These data can be directly requested from the CSDA program under the same licensing and restrictions as the other Spire products
- Further description of these data is provided on the following slides

To acquire the Raw IF data:

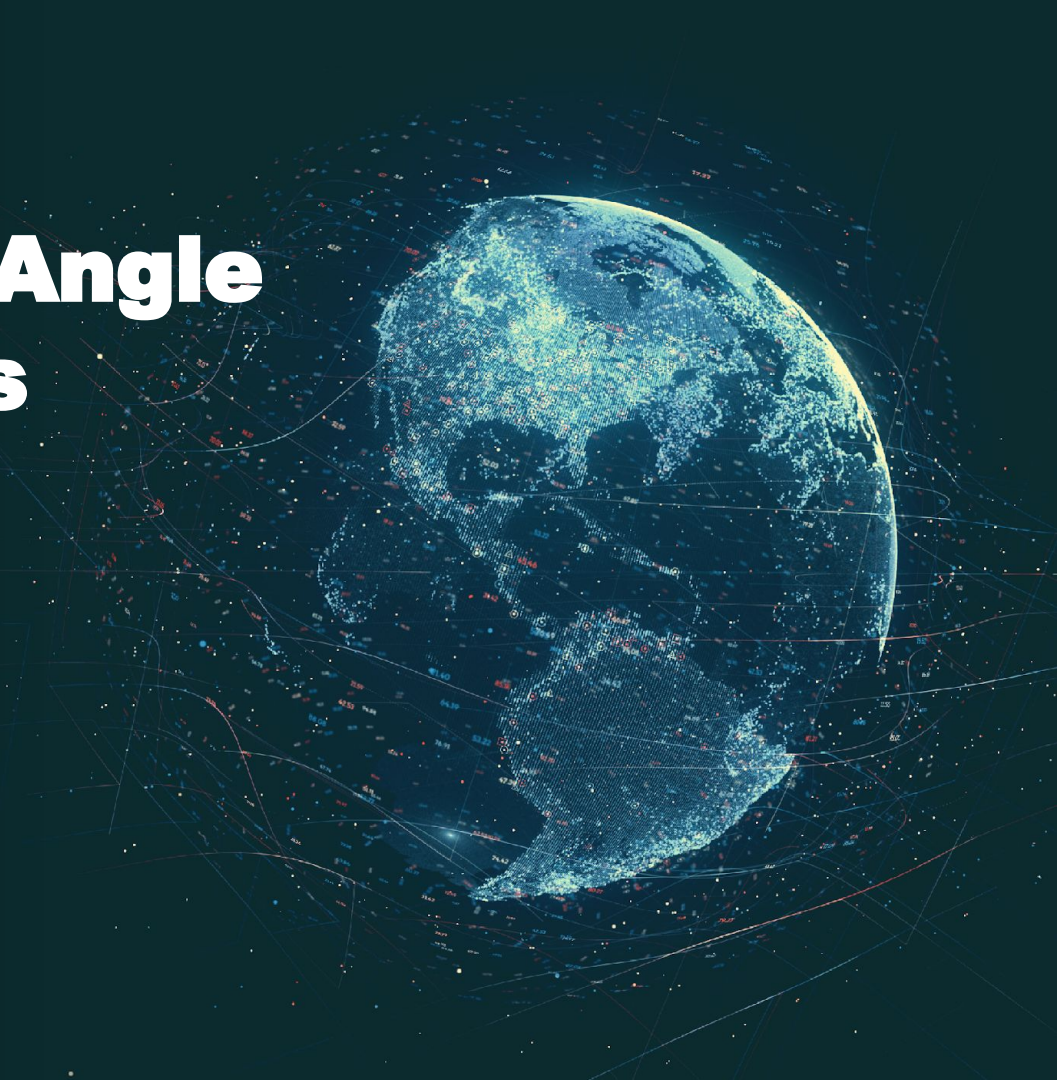
- If not already authorized to use Spire data, request authorization and access via NASA Earthdata
 - [CSDA Program Authorization Request Form \(nasa.gov\)](#)
- Once approved, request the data from the CSDA Program Data Management Team by emailing csdap@uah.edu

Questions or Issues: Contact the CSDA Project Scientist at Will.McCarty@nasa.gov



Raw IF Grazing Angle Data Collections

January, 2021 v1



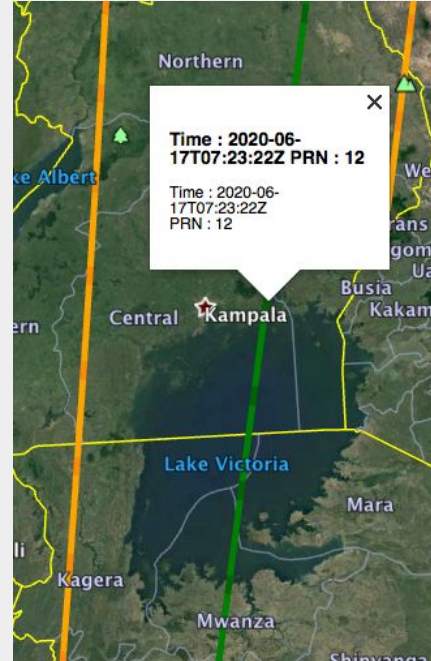
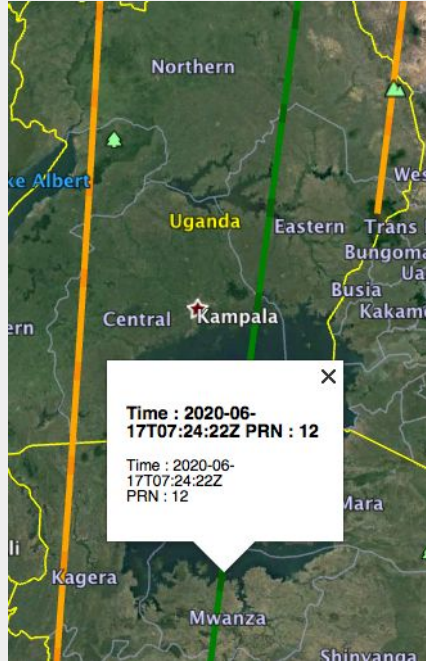
Summary of Collections

No	Event Metadata							LEO Receiver			Collocation		
	Event Start Time	Duration (sec)	GNSS	Surface Type	Location	Elevation (deg)	Azimuth from antenna boresight (deg)	Spire Satellite Name	Spire ID	Antenna	Satellite	Delta Time (hours)	Dist (km)
Track2	2020-06-17T 07:23:22Z	60	G12	Lake	Lake Victoria	24	4	LEMUR-2-JOHANLORAN	099	POD+RO	S3A	0.4	20
Track3	2020-06-20T 09:48:10Z	60	G05	Open Ocean	Adriatic Sea	19	45	LEMUR-2-ELHAM	101	POD+RO	S3A	0.2	3
Track4	2020-06-21T 13:13:40Z	60	G15	Open Ocean	Indonesian Sea	18	-1	LEMUR-2-VICTOR-ANDREW	102	POD+RO	S3A	0.3	3
Track6	2020-09-08T 02:38:12Z	60	G06	Lake	Lake Superior	5.5	-12	LEMUR-2-VICTOR-ANDREW	102	POD+RO	--	--	--

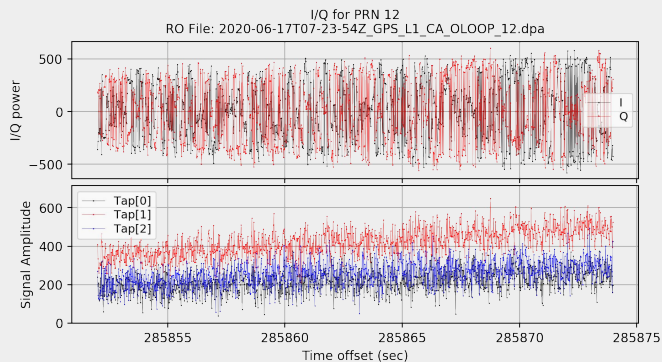


Track 2: 2020-06-17 Lake Victoria

No	Event Metadata							LEO Receiver			Collocation		
	Event Start Time	Duration (sec)	GPS	Surface Type	Location	Elevation (deg)	Azimuth from antenna boresight (deg)	Spire Satellite Name	Spire ID	Antenna	Satellite	Delta Time (hours)	Dist (km)
Track2	2020-06-17T07:23:22Z	60	12	Lake	Lake Victoria	24	4	LEMUR-2-JOHANLORAN	099	POD+RO	S3A	0.4	20

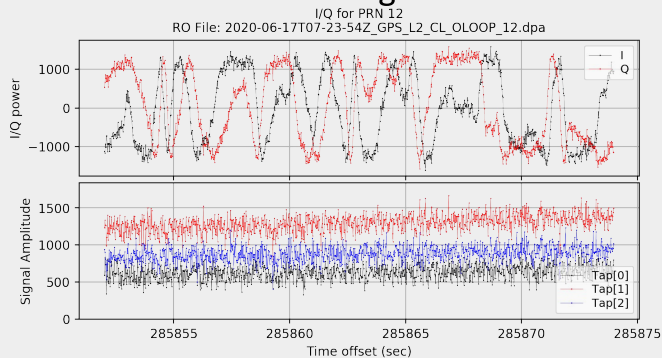


Track 2: 2020-06-17 Lake Victoria



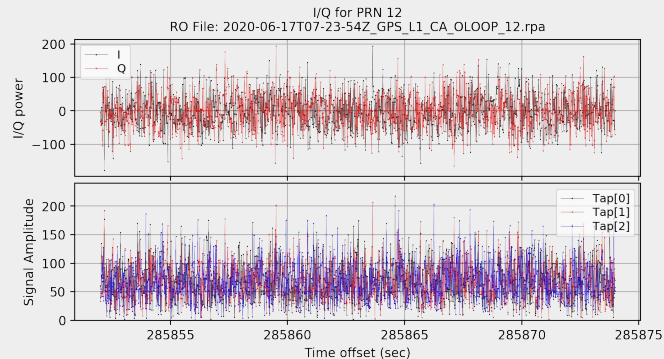
Week 2110 SoW 285851.999633 = 2020-06-17T07:23:53.99Z
Week 2110 SoW 285873.972153 = 2020-06-17T07:24:15.97Z
(Duration = 22.0 sec)

L1 Direct Signal



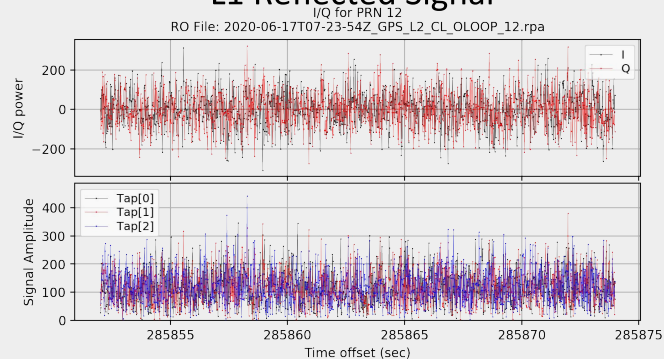
Week 2110 SoW 285851.999634 = 2020-06-17T07:23:53.99Z
Week 2110 SoW 285873.972153 = 2020-06-17T07:24:15.97Z
(Duration = 22.0 sec)

L2 Direct Signal



Week 2110 SoW 285851.999677 = 2020-06-17T07:23:53.99Z
Week 2110 SoW 285873.973133 = 2020-06-17T07:24:15.97Z
(Duration = 22.0 sec)

L1 Reflected Signal



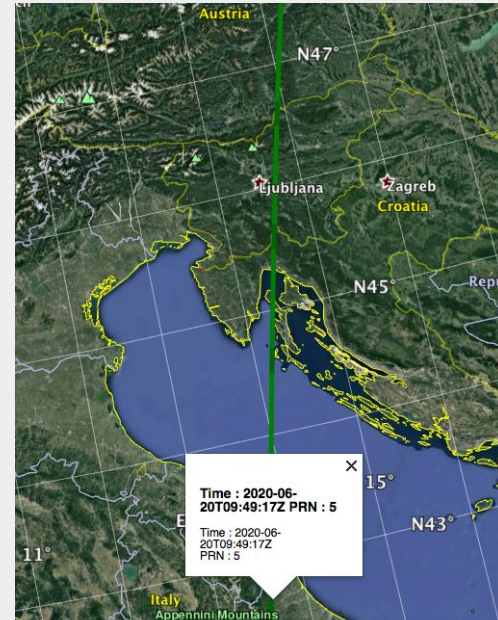
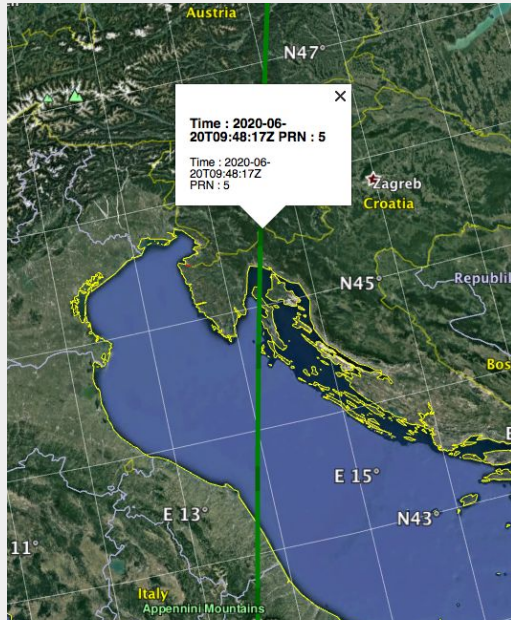
Week 2110 SoW 285851.999678 = 2020-06-17T07:23:53.99Z
Week 2110 SoW 285873.973133 = 2020-06-17T07:24:15.97Z
(Duration = 22.0 sec)

L2 Reflected Signal

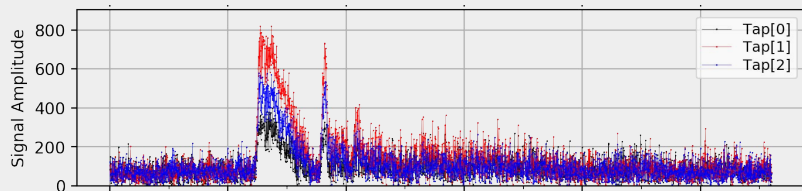


Track 3: 2020-06-20 Adriatic Sea

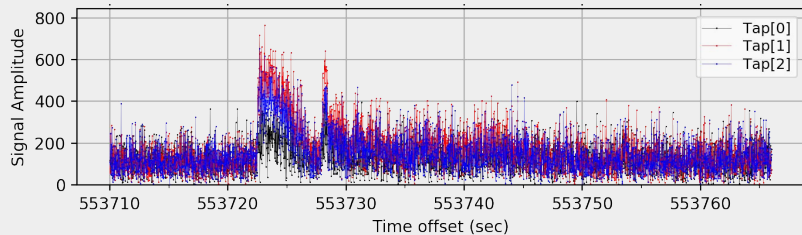
No	Event Metadata							LEO Receiver			Collocation		
	Event Start Time	Duration (sec)	GPS	Surface Type	Location	Elevation (deg)	Azimuth from antenna boresight (deg)	Spire Satellite Name	Spire ID	Antenna	Satellite	Delta Time (hours)	Dist (km)
Track3	2020-06-20T09:48:10Z	60	5	Open Ocean	Adriatic Sea	19	45	LEMUR-2-ELHAM	101	POD+RO	S3A	0.2	3



Track 3: 2020-06-20 Adriatic Sea



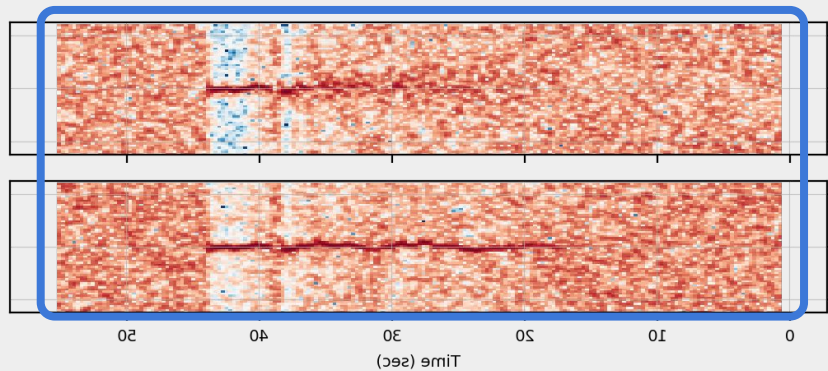
L1 Reflected Signal



Week 2110 SoW 553710.000129 = 2020-06-20T09:48:12.00Z
Week 2110 SoW 553765.998073 = 2020-06-20T09:49:07.99Z
(Duration = 56.0 sec)

L2 Reflected Signal

Raw IF collection (60 sec)



Reflected signal

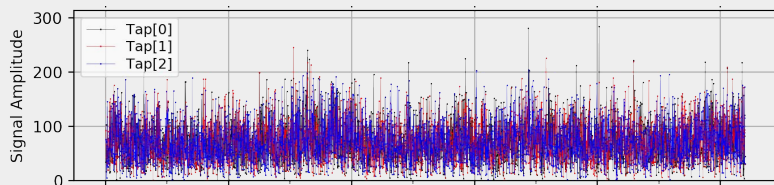


Track 4: 2020-06-21 Indonesian Sea

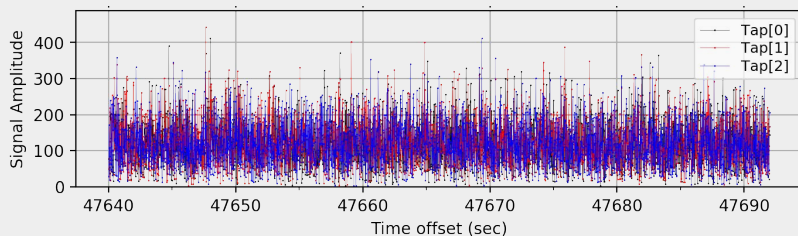
No	Event Metadata							LEO Receiver			Collocation		
	Event Start Time	Duration (sec)	GPS	Surface Type	Location	Elevation (deg)	Azimuth from antenna boresight (deg)	Spire Satellite Name	Spire ID	Antenna	Satellite	Delta Time (hours)	Dist (km)
Track4	2020-06-21T 13:13:40Z	60	15	Open Ocean	Indonesian Sea	18	-1	LEMUR-2-VICTOR-ANDREW	102	POD+RO	S3A	0.3	3



Track 4: 2020-06-21 Indonesian Sea

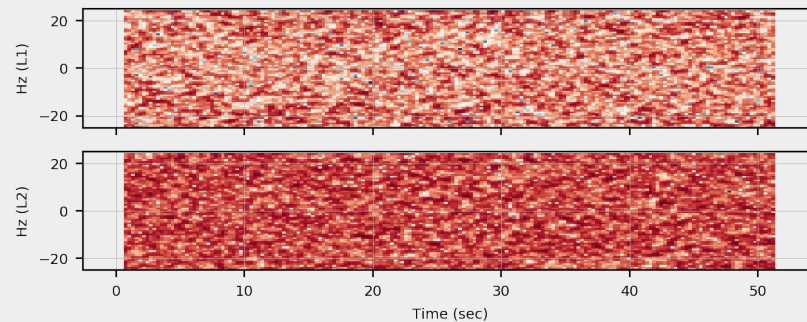


L1 Reflected Signal



Week 2111 SoW 47639.999950 = 2020-06-21T13:13:41.99Z
Week 2111 SoW 47691.993826 = 2020-06-21T13:14:33.99Z
(Duration = 52.0 sec)

L2 Reflected Signal



Week 2111 SoW 47639.999949 = 2020-06-21T13:13:41.99Z
Week 2111 SoW 47691.993826 = 2020-06-21T13:14:33.99Z
(Duration = 52.0 sec)

Reflected signal



Track 6: 2020-09-08 Lake Superior

No	Event Metadata							LEO Receiver			Collocation		
	Event Start Time	Duration (sec)	GPS	Surface Type	Location	Elevation (deg)	Azimuth from antenna boresight (deg)	Spire Satellite Name	Spire ID	Antenna	Satellite	Delta Time (hours)	Dist (km)
Track6	2020-09-08T02:38:12Z	60	6	Lake	Lake Superior	5.5	-12	LEMUR-2-VICTOR-ANDREW	102	POD+RO	--	--	--

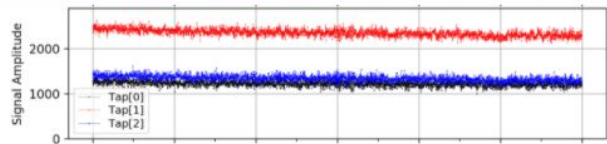


Track 6: 2020-09-08 Lake Superior

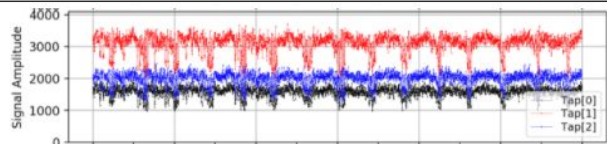
Real-time (onboard) Processing

GPS PRN06 PA Event

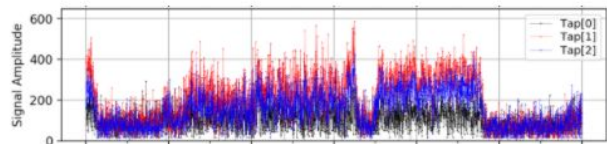
L1 Direct



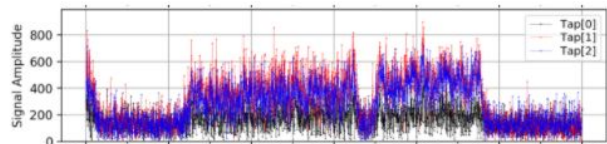
L2 Direct



L1 Reflected



L2 Reflected

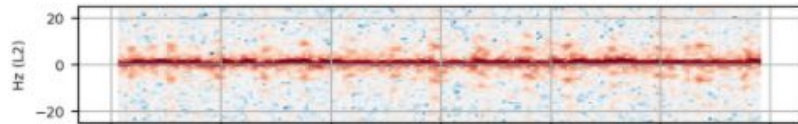
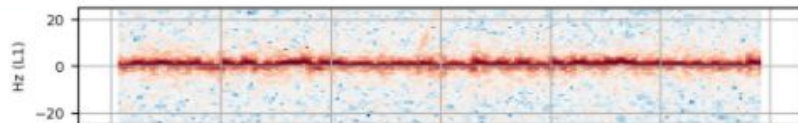


Week 2122 SoW 182310.000000 = 2020-09-08T02:38:12.00Z
Week 2122 SoW 182369.965956 = 2020-09-08T02:39:11.96Z
(Duration = 60.0 sec)

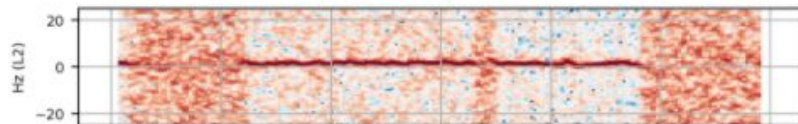
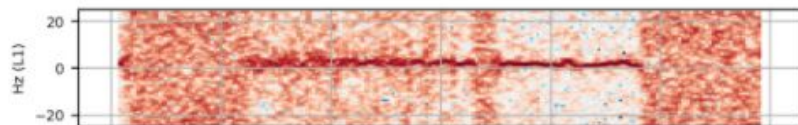
Real-time (onboard) Processing

GPS PRN06 PA Event

Spectrogram Direct



Spectrogram Reflected



Week 2122 SoW 182310.000000 = 2020-09-08T02:38:12.00Z
Week 2122 SoW 182369.965956 = 2020-09-08T02:39:11.96Z
(Duration = 60.0 sec)

