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Cayenne Flight Program 11/03/2015

Use of PLANET for Cayenne flight operations

PLANET System : Hardware

	Falcon-20	NRC Convair	Honeywell B757
Hardware			
Weight	3 kg	3 kg	6 Kg
Size	13.3 x 15.24 x 14.6 cm	13.3 x 15.24 x 14.6 cm	1U Rack
Supply Voltage	9-36 VDC	9-36 VDC	100-240 VAC
Satellite	Iridium	Iridium	Inmarsat
Delivery Status	Delivered	Scheduled end of March	Scheduled end of March
Integration /Tests	On-Going	Planned Mid-April	Planned Mid-April

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PLANET System : Hardware in Falcon-20



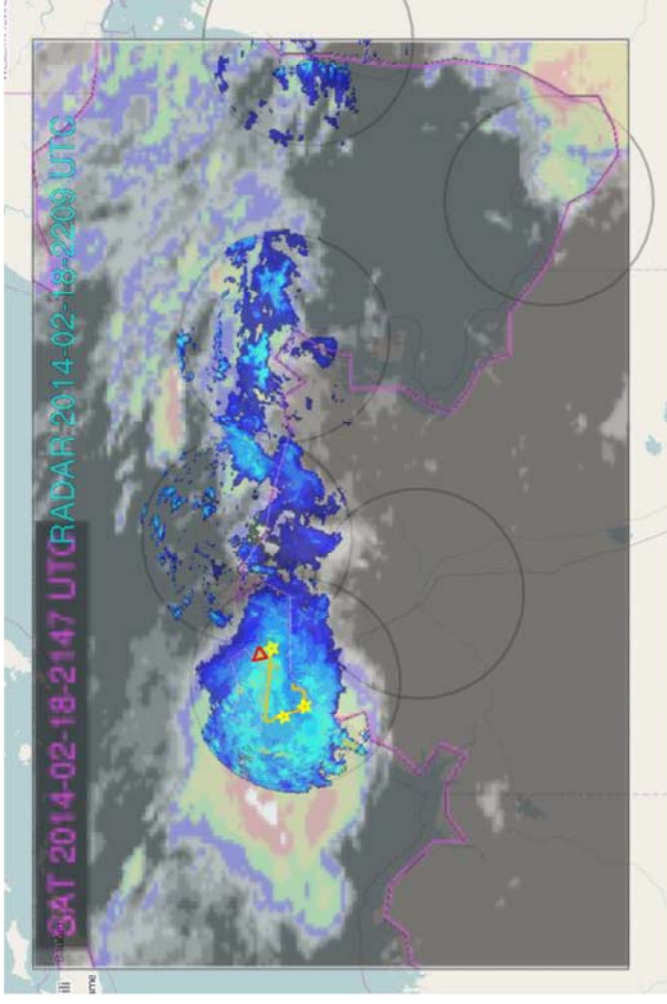
PLANET System : Communication Protocol

Main improvement: Secure the communication with IP protocol for better performance and quality of experience

Task ID	Task Description	Status
T02-01	Replace IRIDIUM RUDICS STD PROD by PPP (IP) on STD PROD to facilitate integration and uniformization with other communication systems (i.e. cellular modem)	Done
T02-02	Integrate IRIDIUM RUDICS using IP tunneling for better management of communication outages (i.e. buffering done by IP in tunnel)	Done
T02-03	Integrate 4G communication (terrestrial)	Done
T02-04	Implementation of a specific QoS policy for IP over Iridium (providing a high/low prioritisation of data transfer for each PLANET and weather product)	Done
T02-05	Improve the file transfer protocol over PLANET (use of http instead of proprietary protocol)	Done
T02-06	Make the switch between 4G and Iridium communication	Done
T02-07	Archive all communication logs for the whole campaign	Done
T02-08	Add the prioritization of communication transfer as following: 1) Chat, tracking and geomarkers 2) Weather information (images and polygon objects) 3) Special file transfer	Done

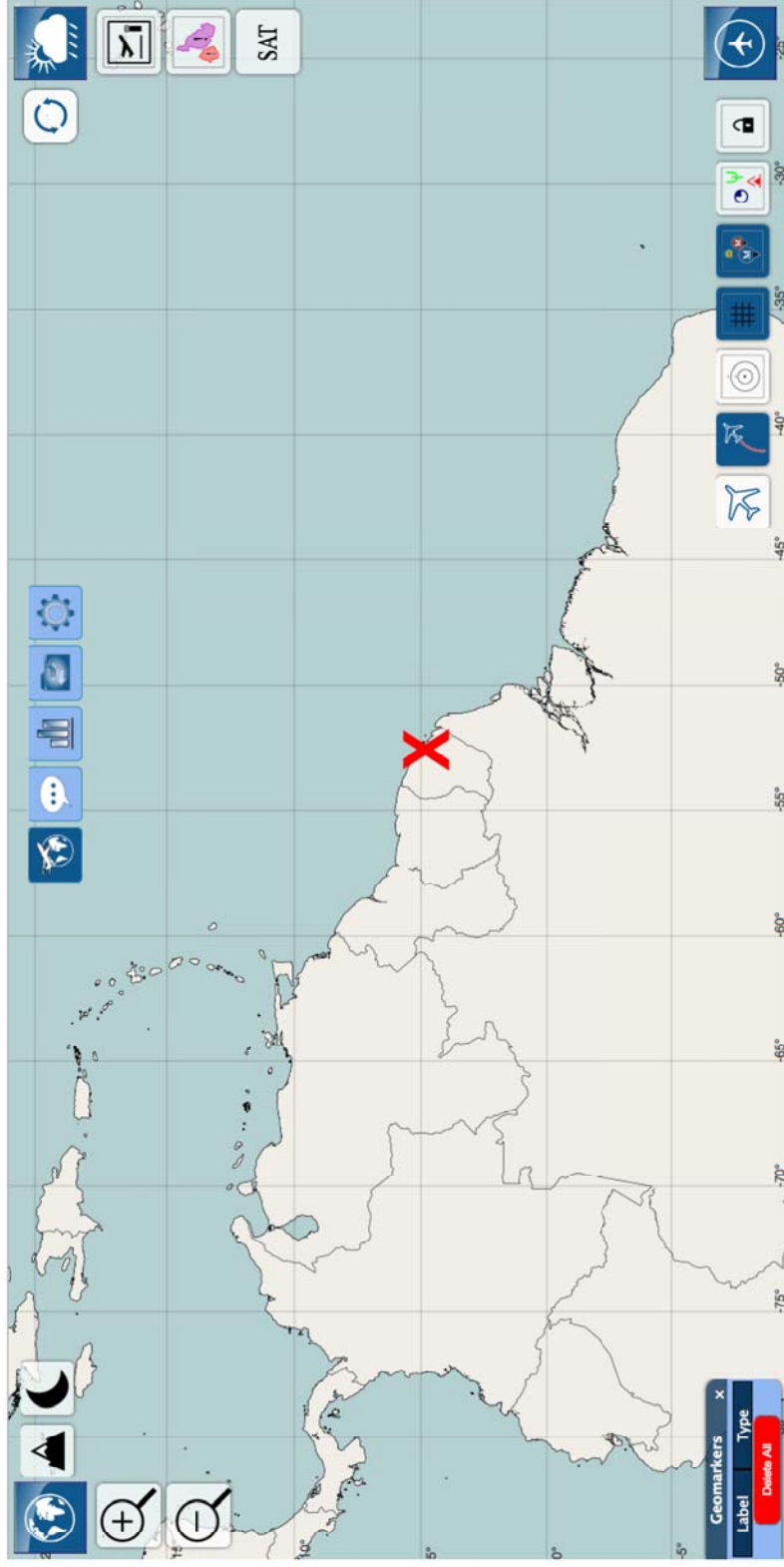
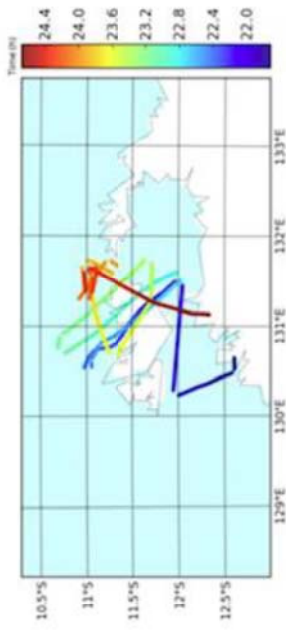
PLANET System : Service

- **Tracking:** Add time identification using colored segments
- **Geomarkers:** Delete obsolete ones, add new icons
- **Messages:** Multi Channel Chat / Eliminate bad characters display
- **Graphs Monitoring:** Zoom for specific period
- **Satellite and Lightning images:** Process all files from new sources
- **RDT and high IWC Objects:** Implement as polygon objects on-board and ground WUI
- **In Situ Measurements:** TWC from Robust Probe, Lightning from Stormscope, IWC from RASTA
- **Other File:** Transfer to ground or on-board any file type (txt, pdf, png, jpg, gif) if size is lower than 50 kB (less than 5 min. to transfer)



PLANET Tracking

Tracking can be colored based on
time evolution or
TWC values (from Robust Probe)



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PLANET Geomarkers

Create Line/Polygon Geomarker x

Type :
Line/Polygon

Label:

Text:

Lon:

Lat:

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PLANET Message

● Connected

Show/Hide History

ALL 1 2 3 4 5

Thu, 27 Nov 2014 12:29:14 GMT <PLMT>
Thu, 27 Nov 2014 12:30:15 GMT <PLMT>
Thu, 27 Nov 2014 12:30:49 GMT <PLMT>
Thu, 27 Nov 2014 12:31:26 GMT <PLMT>
Thu, 27 Nov 2014 12:32:22 GMT <PLMT>
Thu, 27 Nov 2014 12:33:31 GMT <PLMT>
Thu, 27 Nov 2014 12:33:53 GMT <PLMT>
Thu, 27 Nov 2014 12:34:36 GMT <PLMT>
Thu, 27 Nov 2014 12:35:10 GMT <PLMT>
Thu, 27 Nov 2014 12:36:05 GMT <PLMT>
Thu, 27 Nov 2014 12:36:42 GMT <PLMT>

PLMT: May you please check instrument 12 status
Board PI: Instrument is in lock state. Restart procedure applied
PLMT: OK. We'll look forwarnd to receive data stream again
Ground PI: Due to situation evolution market P1 has been updated
Pilot: Market P1 update received, WILCO. ETA 14 minutes
Pilot : OK
PLMT: Instrument 12 stream alive !
Board PI: Great. Will have a check on other instrument now
Roger: Vince may you read I13 data ?
Ground PI: to all : system is going eastwards. Convection rapidly growing
Vince: I13 reads 12 ppm

Vince

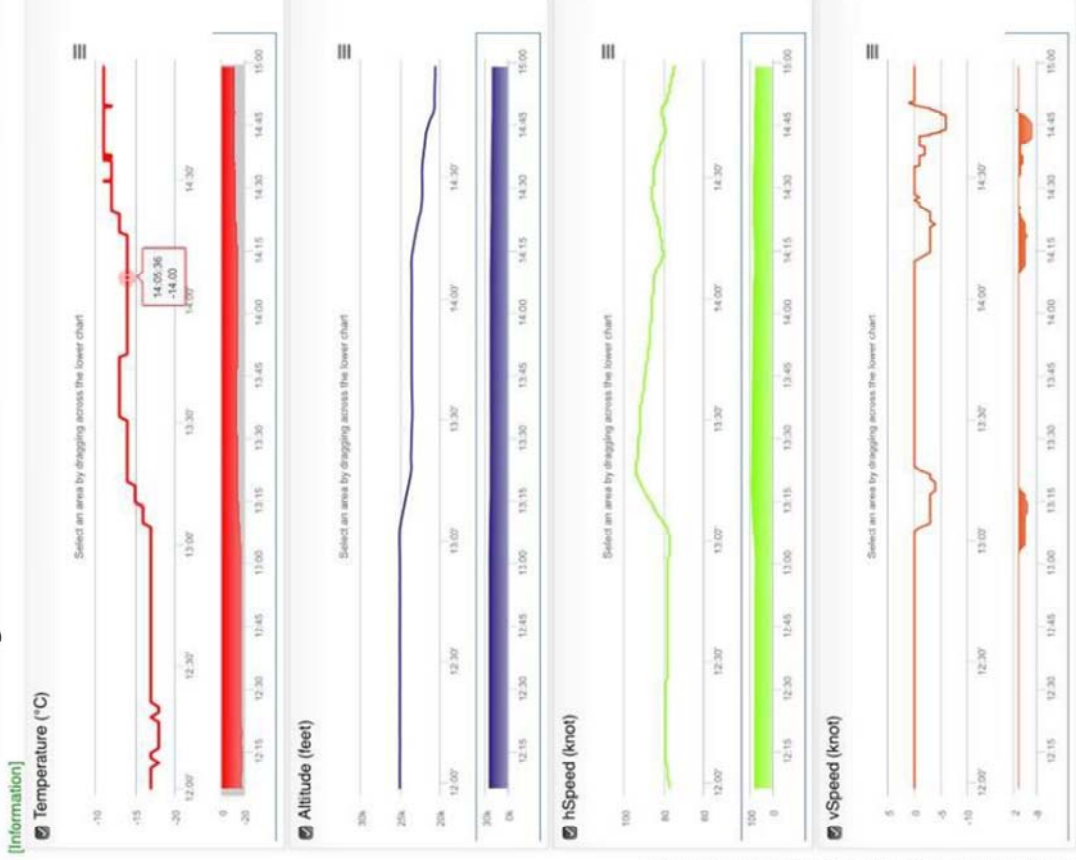
Message

Send Broadcast



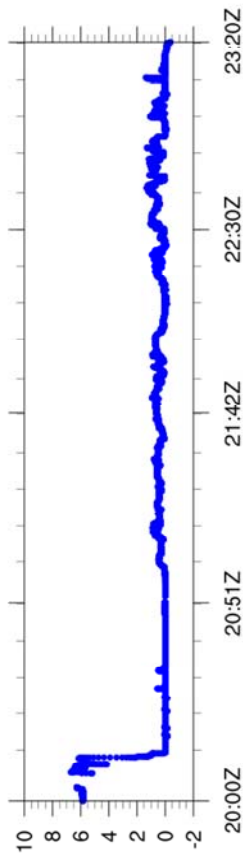
PLANET In Situ Measurements Monitoring

Dynamic time series

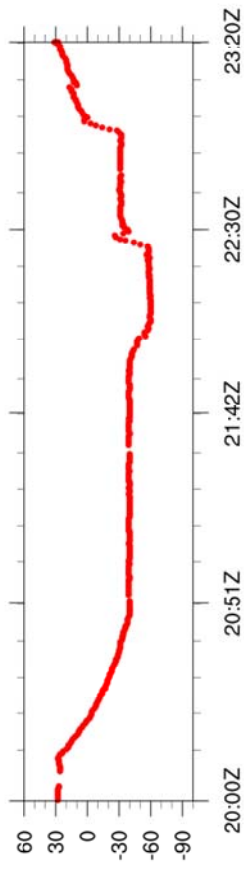


Static time series (PNG) (Updated every minute)

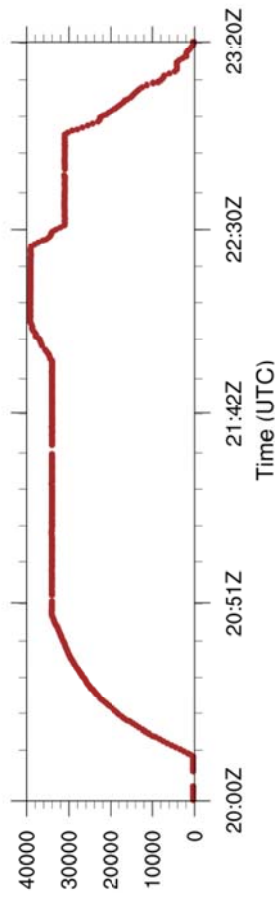
TWC (g/m3) - Latest Data: 2014-01-23 23:20:12Z



Temperature (C)

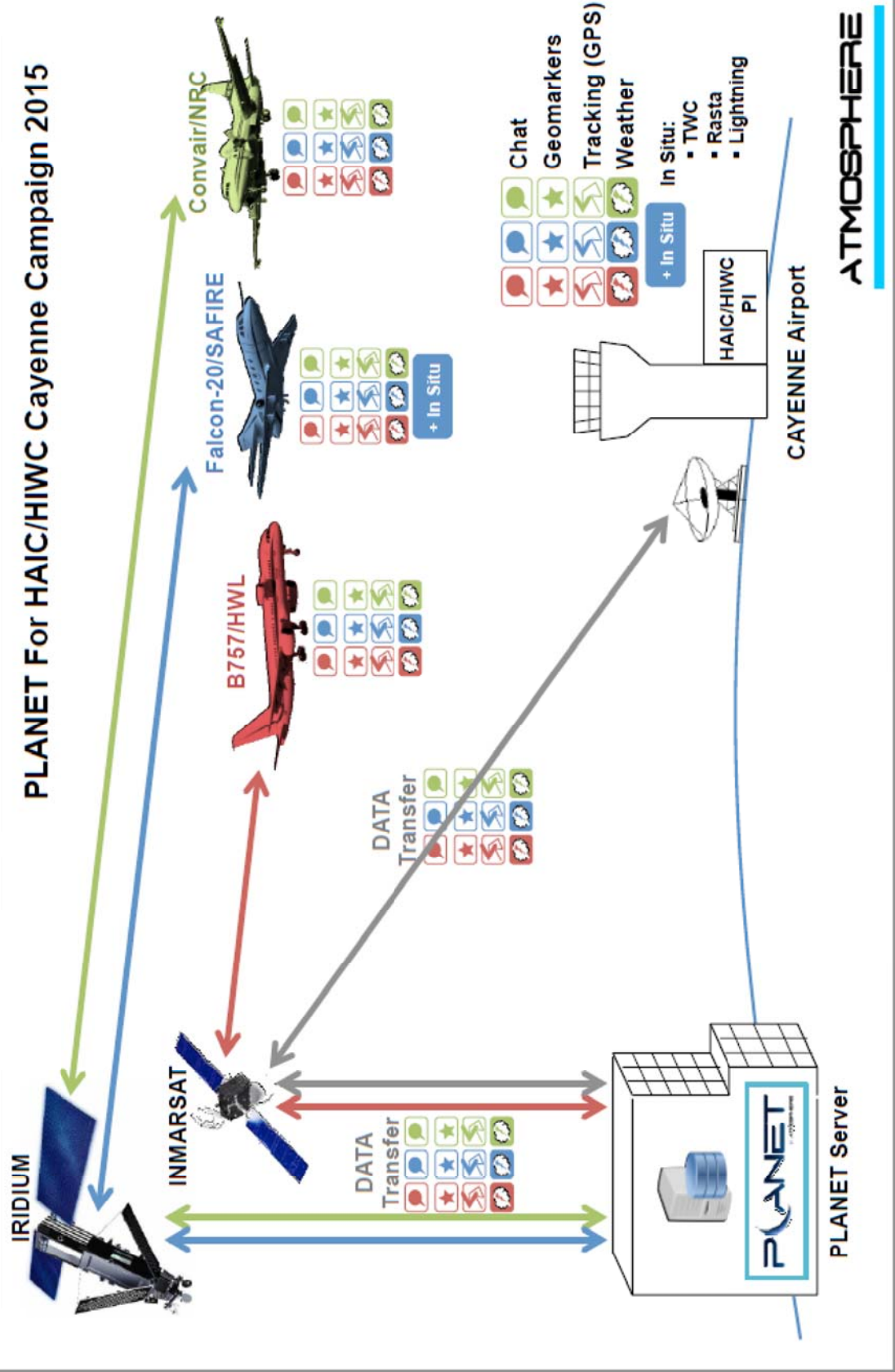


Altitude (feet)



PLANET Multi-Aircraft Operations

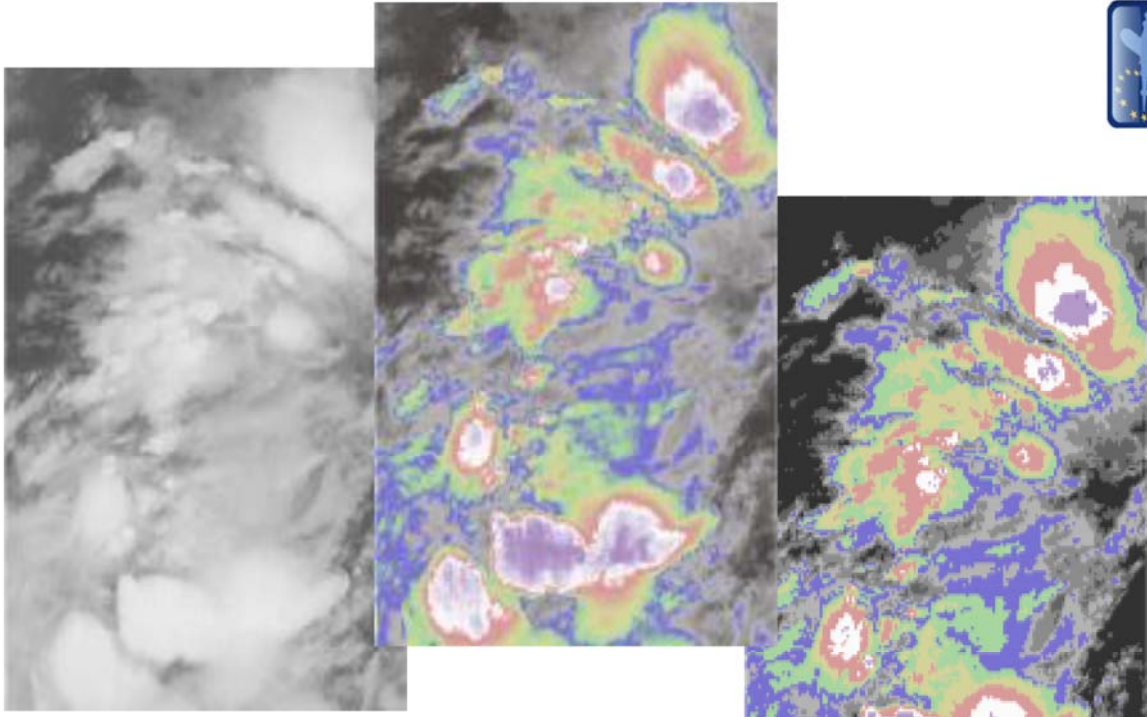
PLANET For HAIC/HIWC Cayenne Campaign 2015



ATMOSPHERE



IR Satellite Images for PLANET



SATELLITE LEGEND

Temperature Ranges (°C)		Color	Red	Green	Blue
Min	Max				
-110	-100		75	16	128
-100	-90		143	106	176
-90	-85		179	154	201
-85	-78		252	251	251
-78	-70		217	154	154
-70	-60		213	211	154
-60	-50		167	214	161
-50	-40		121	112	211
-40	-30		180	180	180
-30	-20		140	140	140
-20	-10		100	100	100
-10	57		50	50	50

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High Altitude Ice Crystals (HAIC, 314314)

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This project has received funding from the European Union's
Seventh Framework Programme for research, technological
development and demonstration under grant agreement
n° ACP2-GA-2012-314314.



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