



獵風者衛星海面風速資料現況

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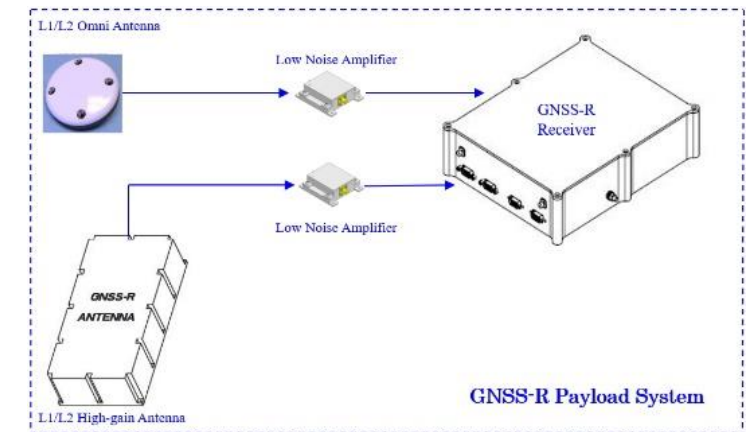
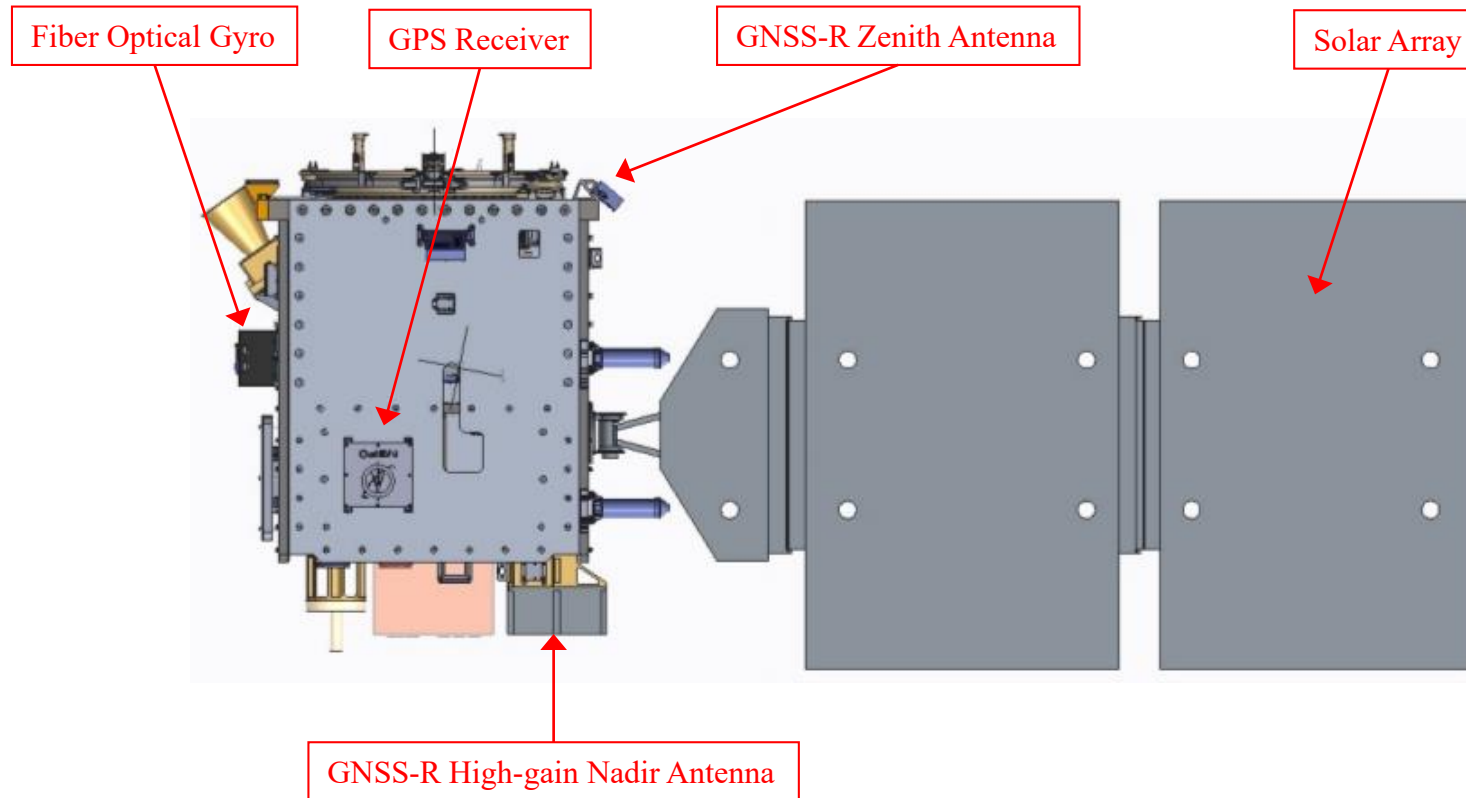
³ 國立中央大學, 全球大氣觀測與資料應用研究中心



Outlines

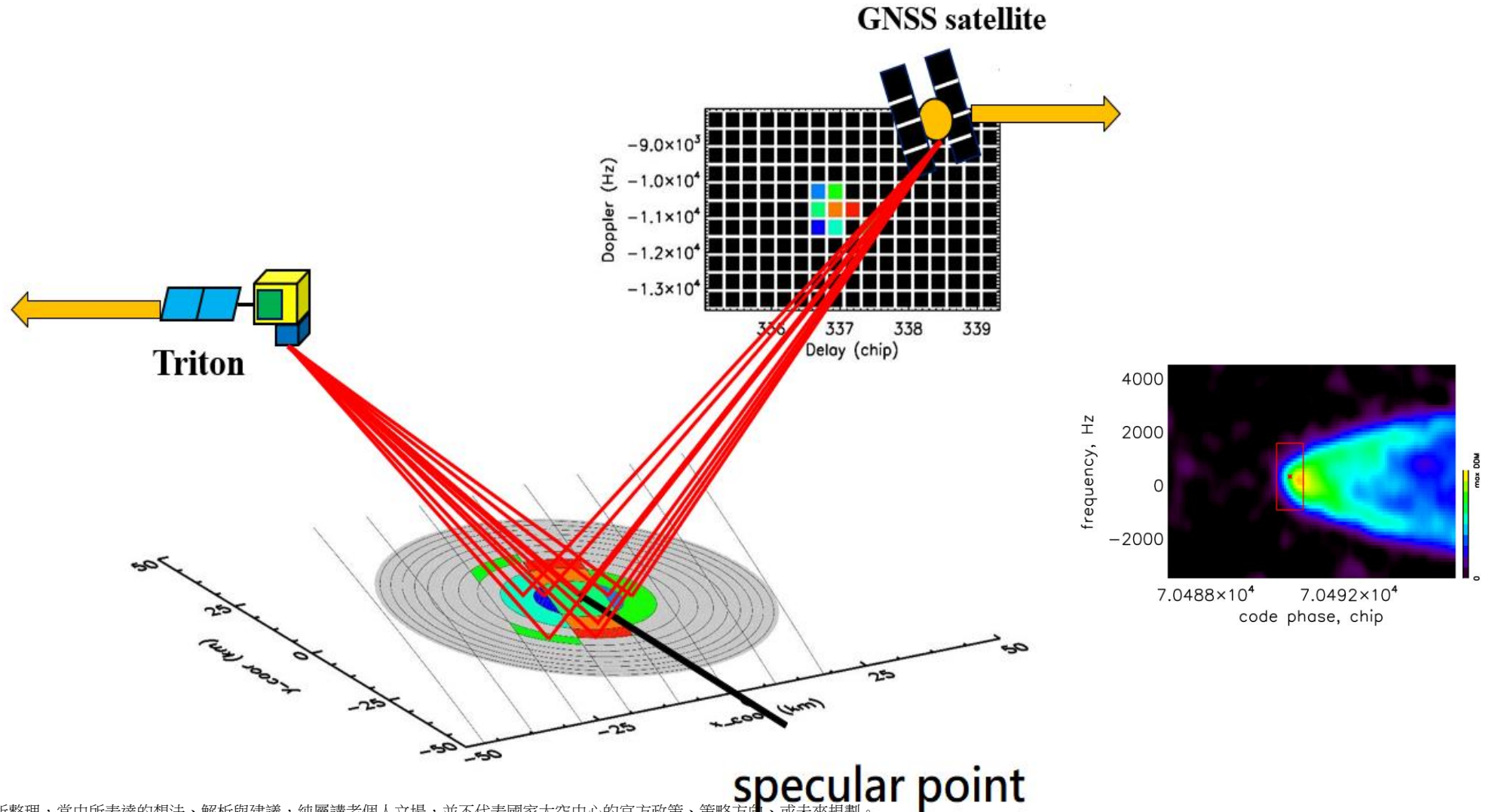
- ◆ TRITON satellite mission
- ◆ TRITON data process system
- ◆ Version update and note
- ◆ Future plans

TRITON Satellite Configurations



GNSS-R Mission Payload

Principle of delay-Doppler map (DDM)



聲明: 本簡報內容係根據講者的專業研究與經驗所整理，當中所表達的想法、解析與建議，純屬講者個人立場，並不代表國家太空中心的官方政策、策略方向、或未來規劃。

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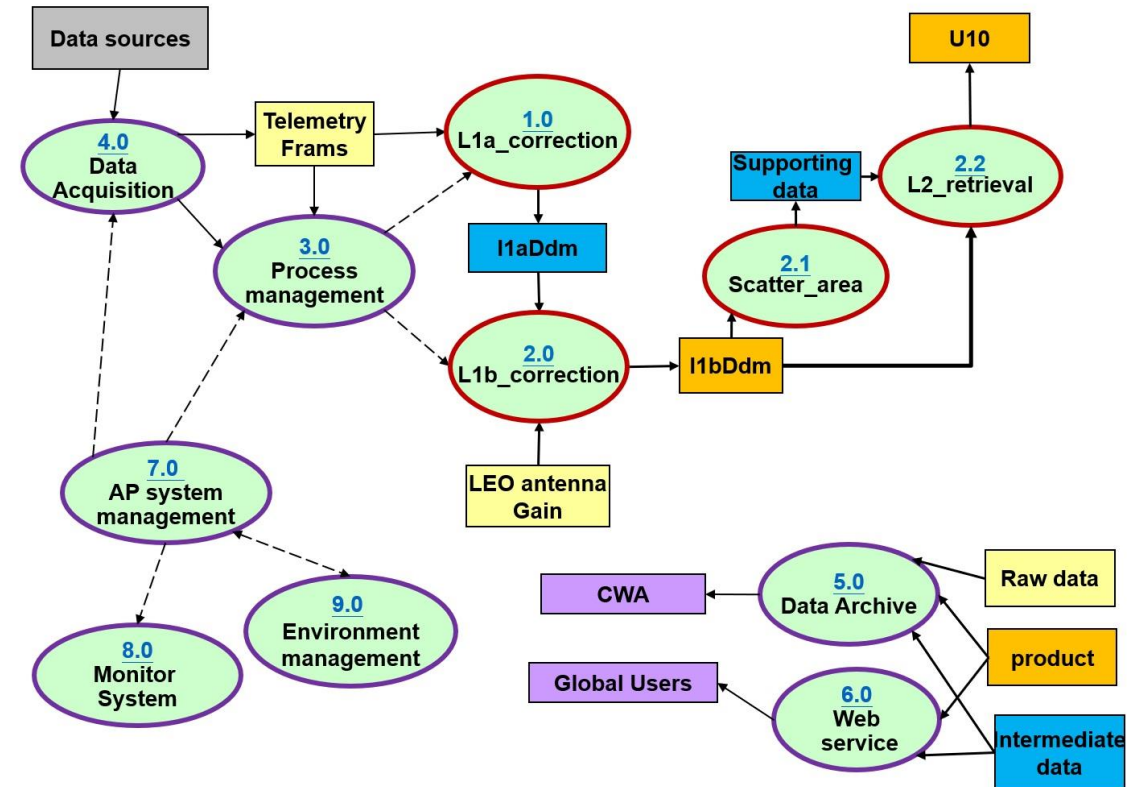
TRITON data process system

1.0 L1a_correction : Transfer the data format from satellite downlink format to NetCDF format.

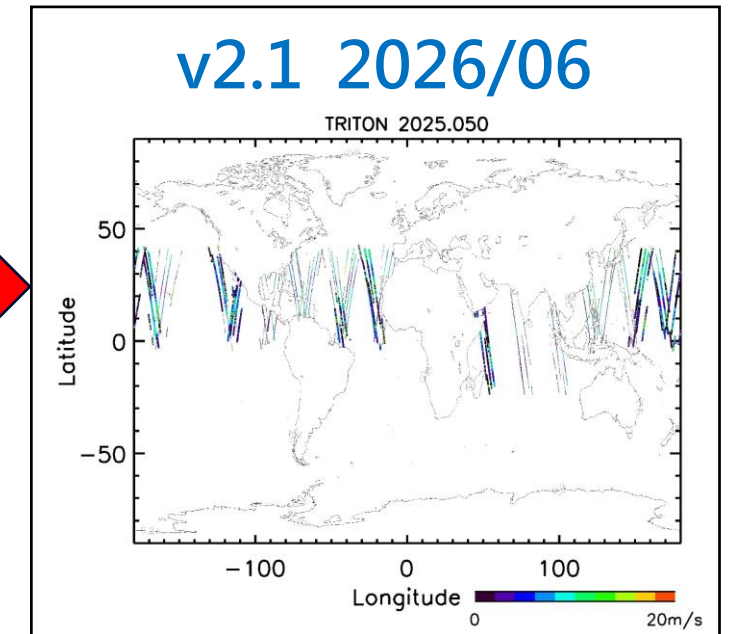
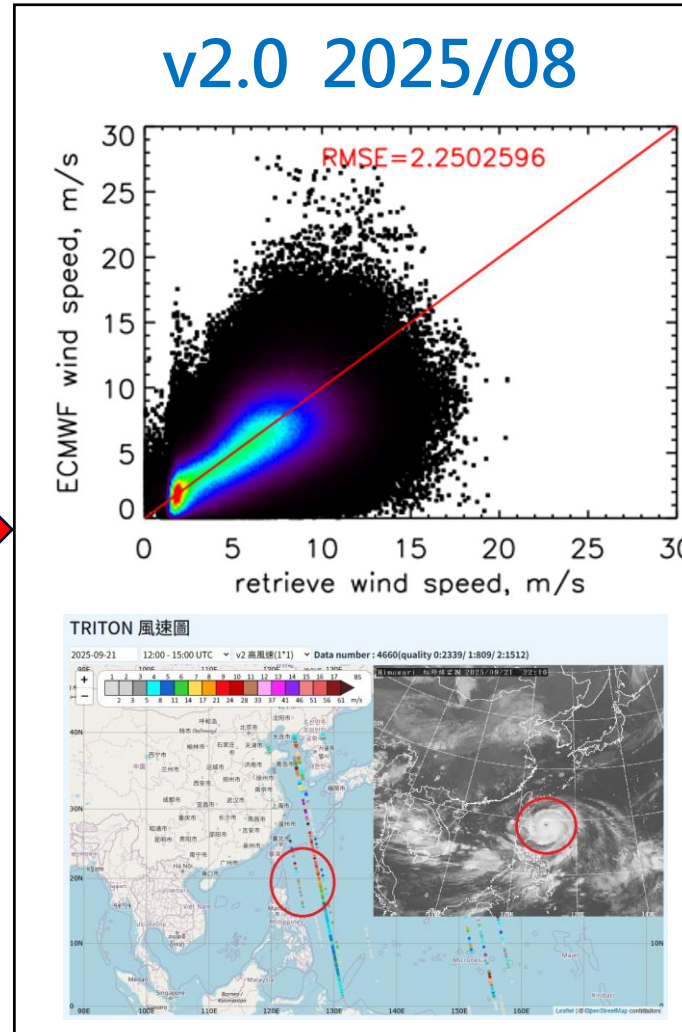
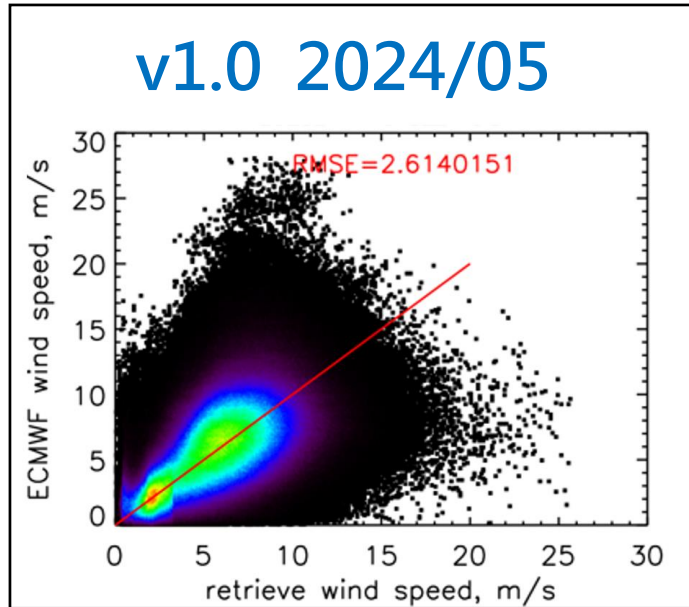
2.0 L1b_correction : DDM calibration, which is used to remove the influence of payload hardware in the signal strength.

2.1 Scatter_area : Calculate the supporting data, such like effective scattering data (ESA) and normalized bistatic radar cross section (NBRCS).

2.2 L2_retrieval : Retrieve ocean surface wind speed by using calibrated DDM and the supporting data processed from L1b_correction and Scatter_area modules



Version update and note

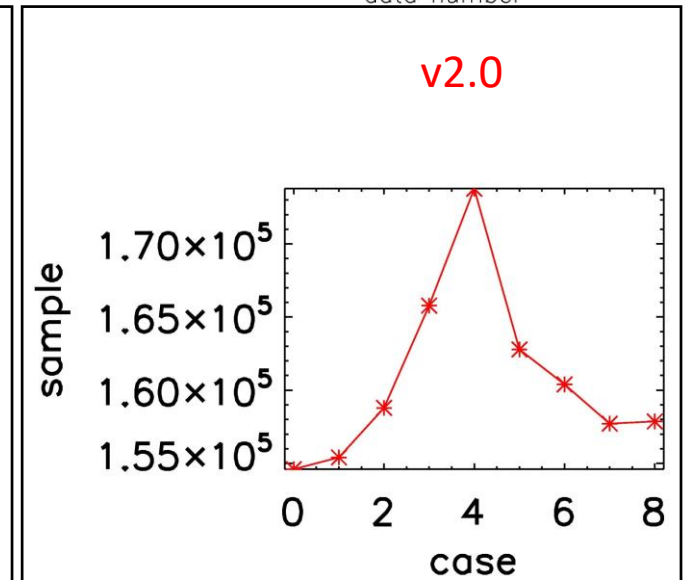
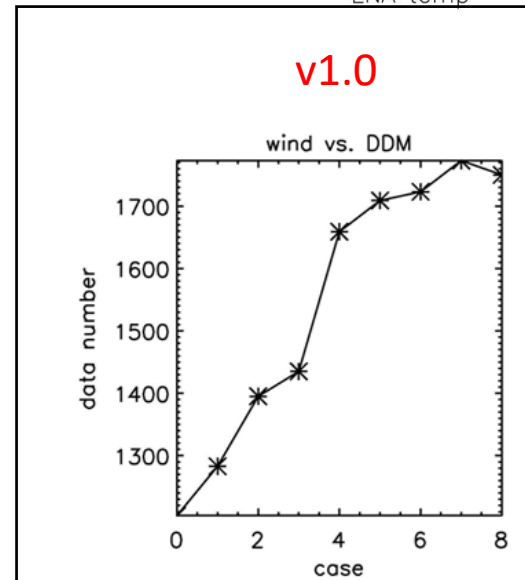
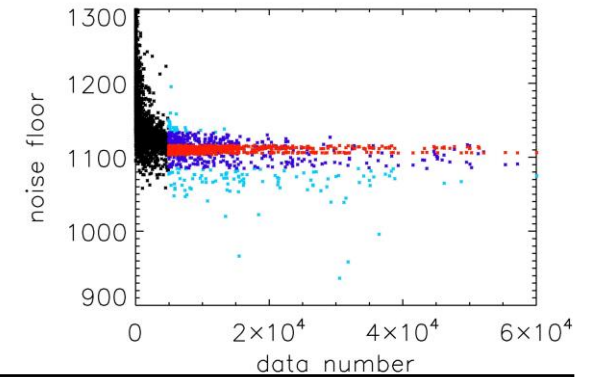
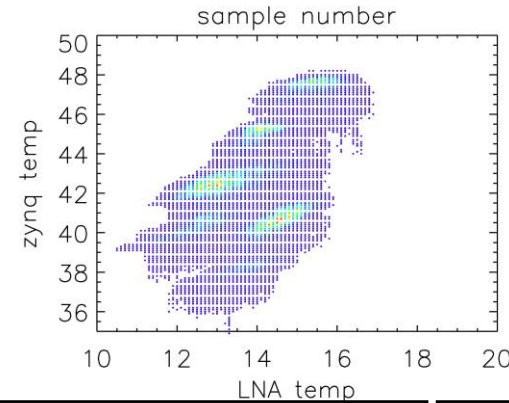
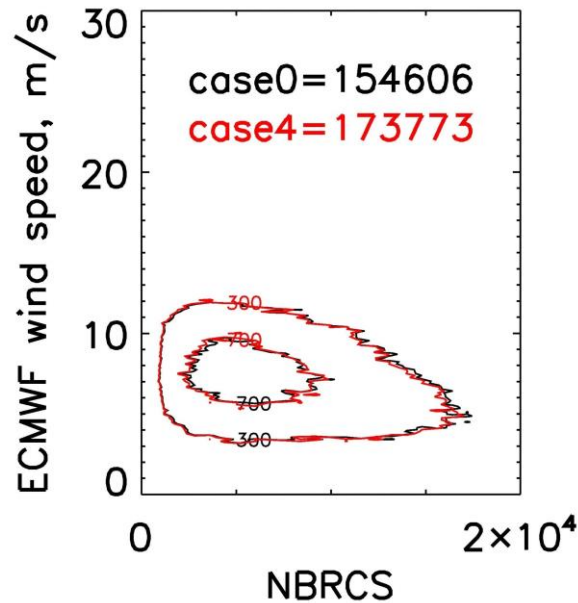


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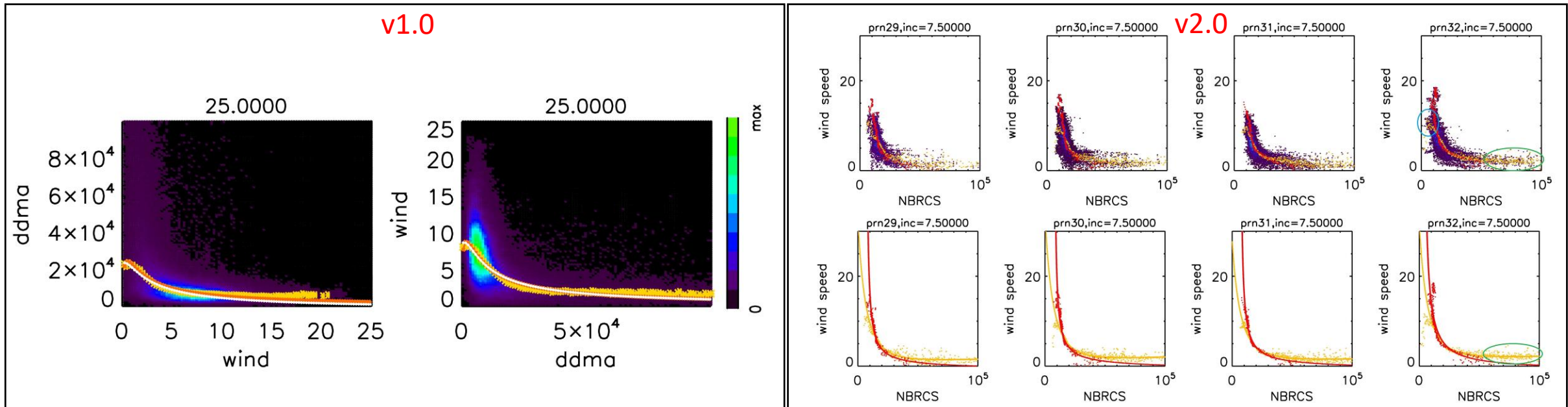
Accuracy improvement v1.0 to v2.0 (2.0 L1b_correction)

- The **maximum value** is used for statistical analysis for v1.0
- The **NBRCS** is used for statistical analysis for v2.0



Accuracy improvement v1.0 to v2.0 (2.2 L2_retrieval)

- The **NBRCS** and **signal incident angle** are used for classification and Geophysical Model Function (GMF) development for v1.0
- The **NBRCS**, **signal incident angle**, **PRN**, **signal azimuth** and **polar angle** of antenna are used for classification and GMF development for v2.0
- More classification for v2.0



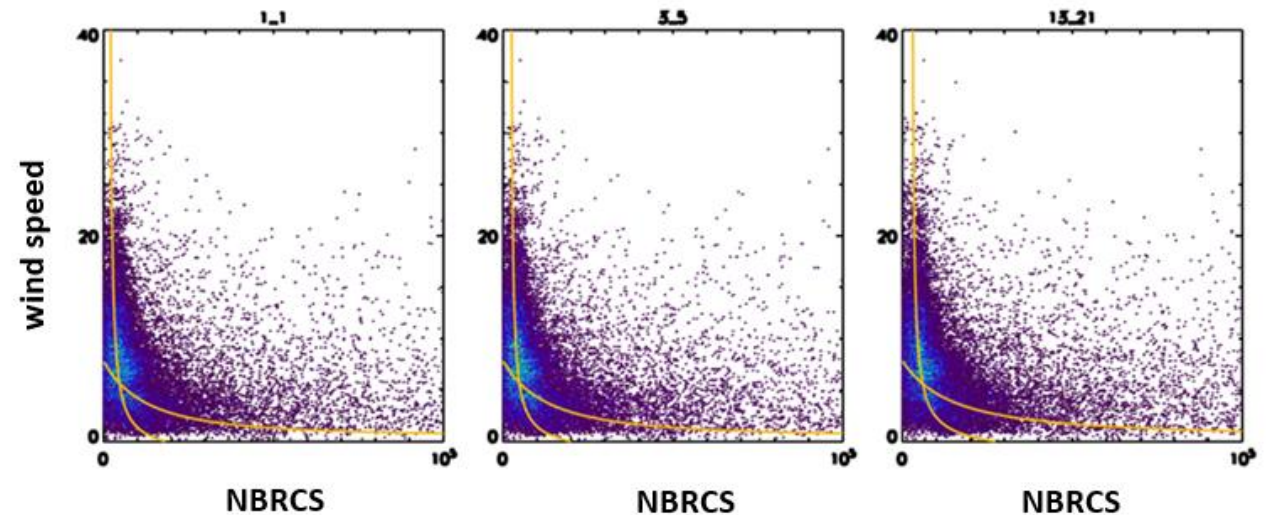
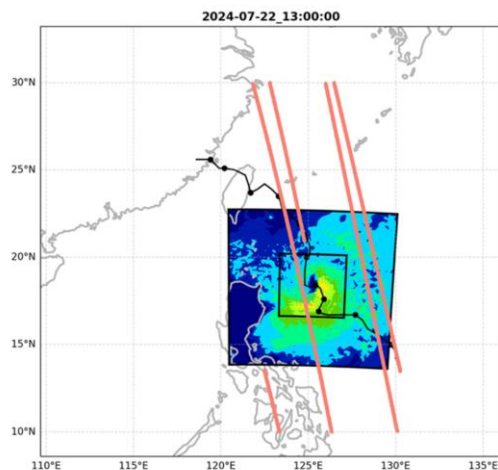
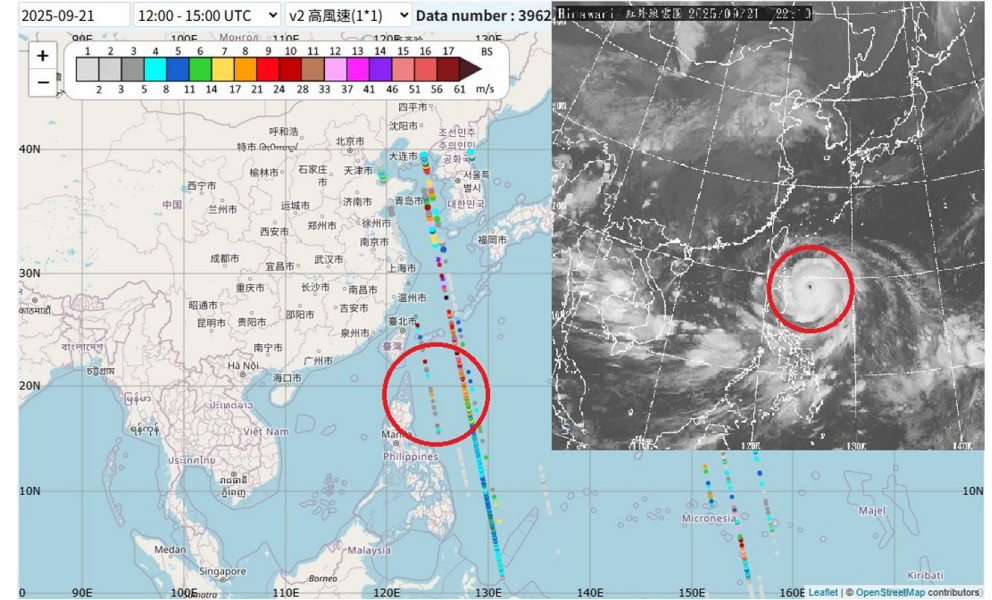
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High wind mode in v2.0 (2.2 L2_retrieval) 獵風者風速圖 vs. 衛星雲圖

樺加沙(RAGASA)
2025/09/21 14:20 UTC

- Wind speed of Typhoon simulation is used to replace the ECMWF for GMF development

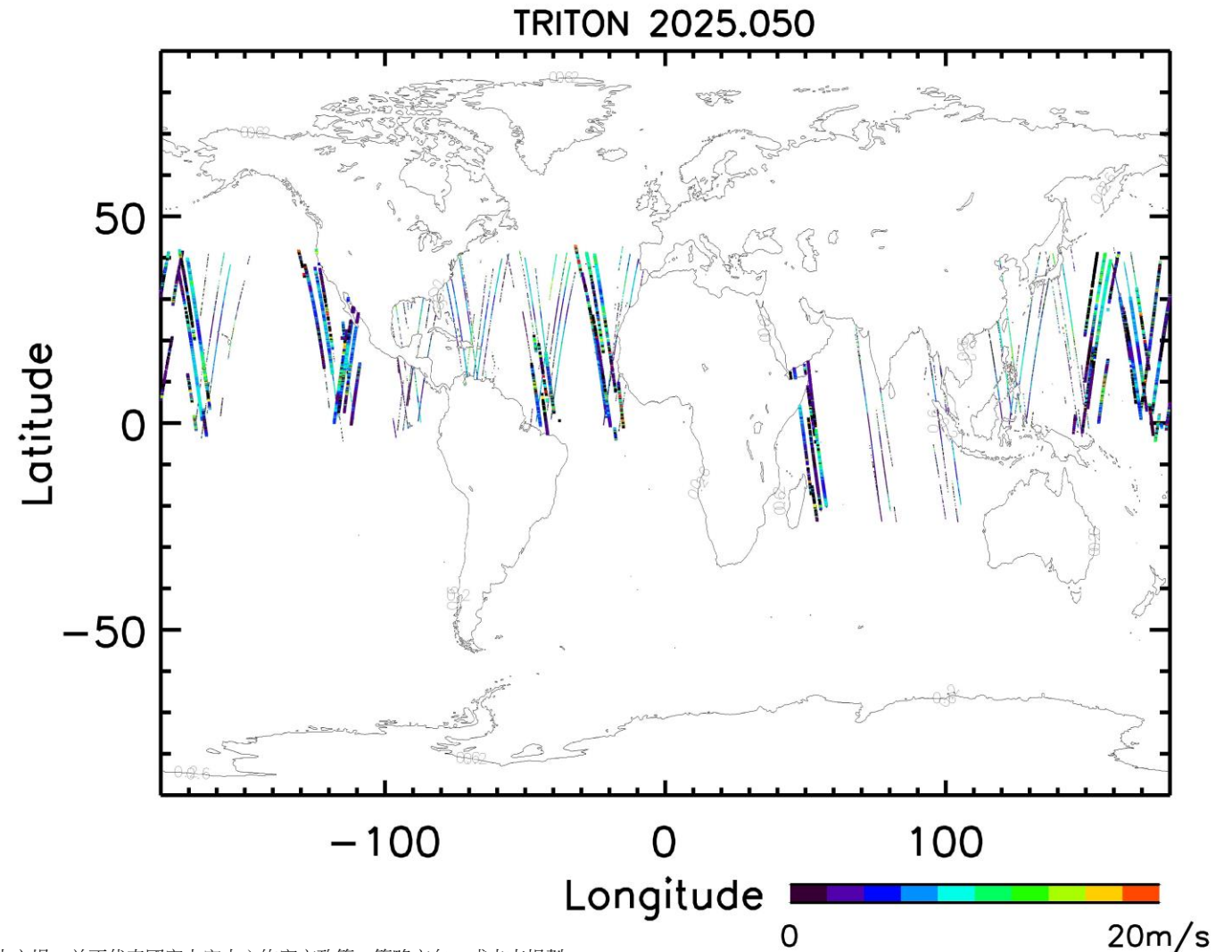


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Improvement of data quantity v2.0 to v2.1 (1.0 L1a_correction)

- v2.1 delivers a 10% increase in data quantity than v2.0



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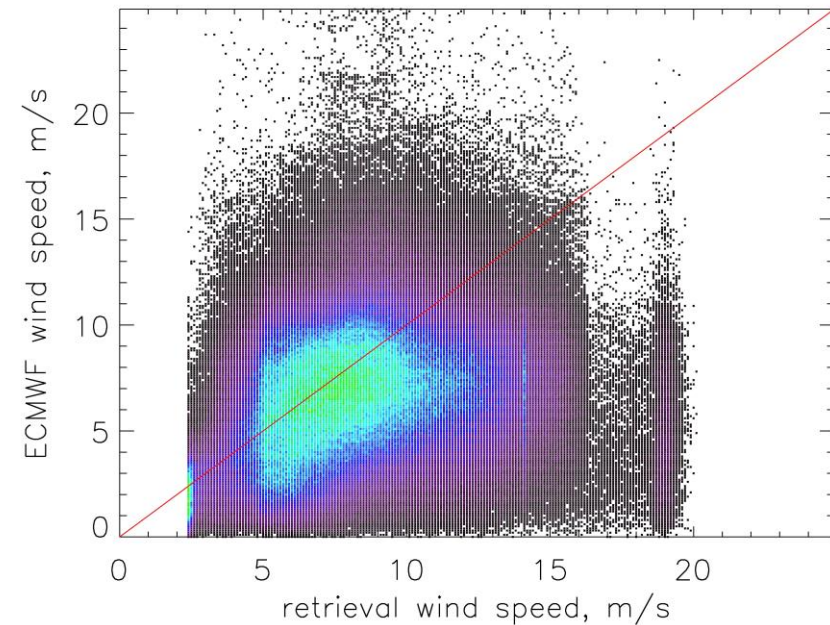
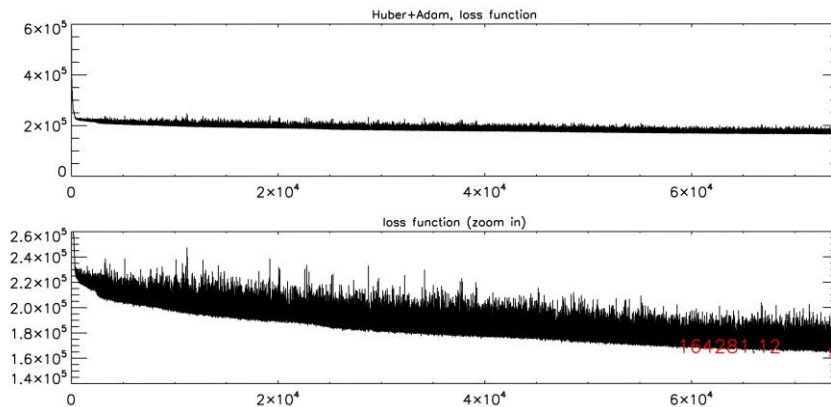
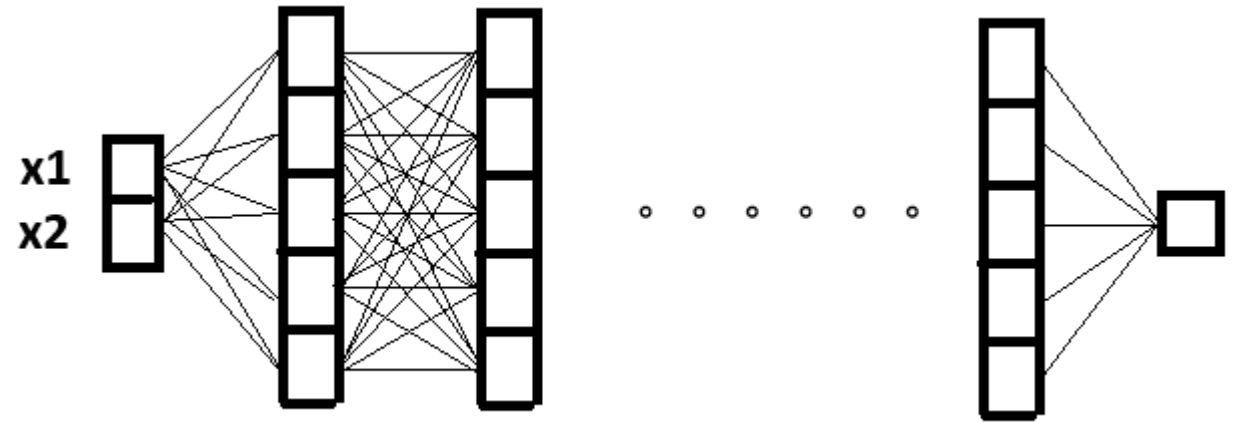
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Future plans

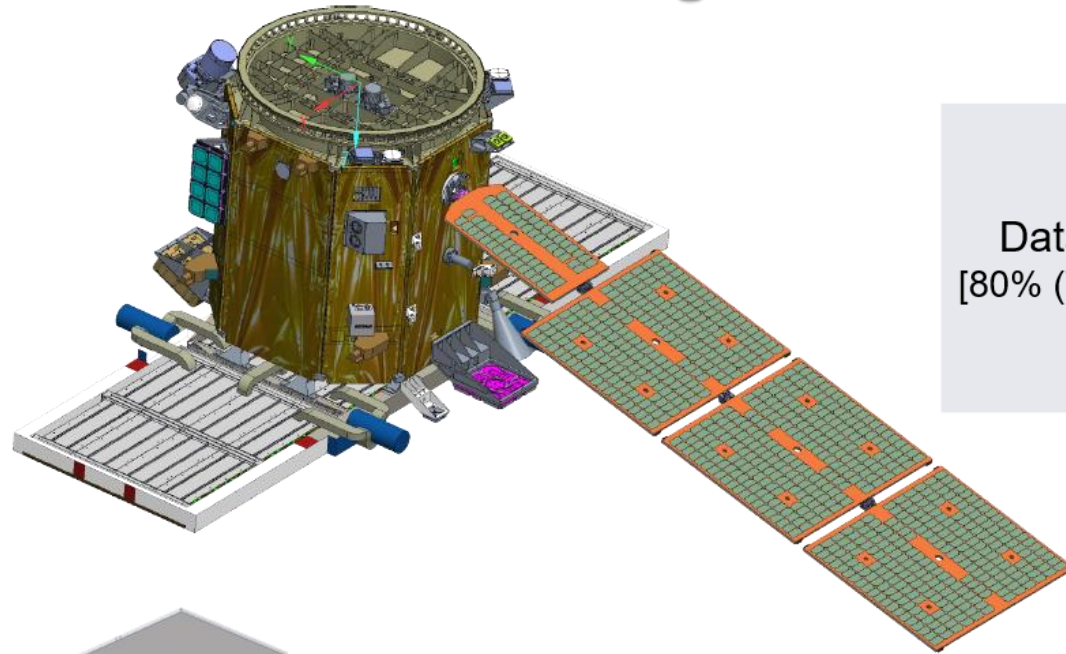
- ◆ v3.0 (or v2.2) in 2027?
- ◆ Future meteorological satellite mission of TASA

v3.0 (or v2.2) in 2027?

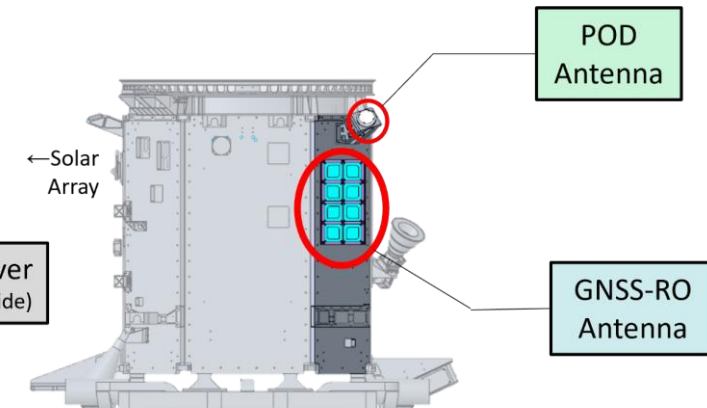
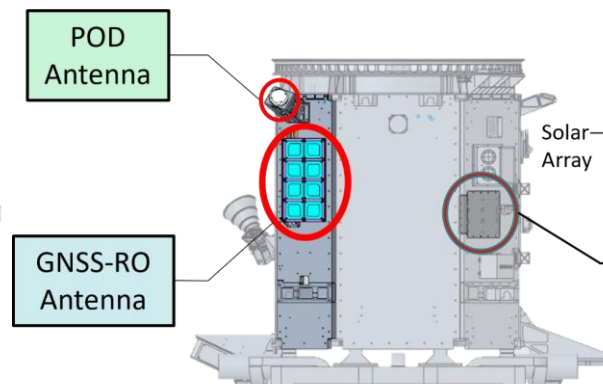
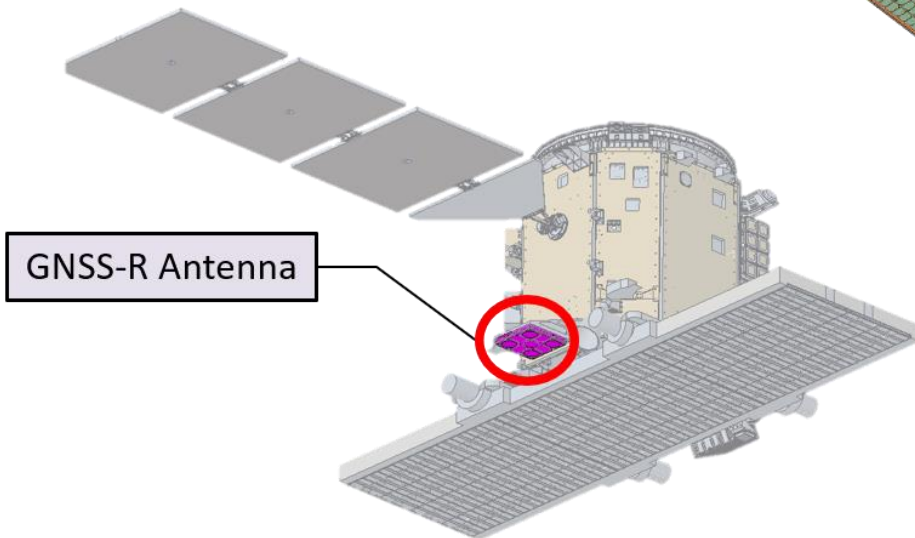
- Neural network is trying to used for wind speed retrieval
- Huber loss
- Adam learning rate
- Input: NBRCS, incident angle, satellite velocities, block



Future meteorological satellite mission of TASA (FORMOSAT-9A)

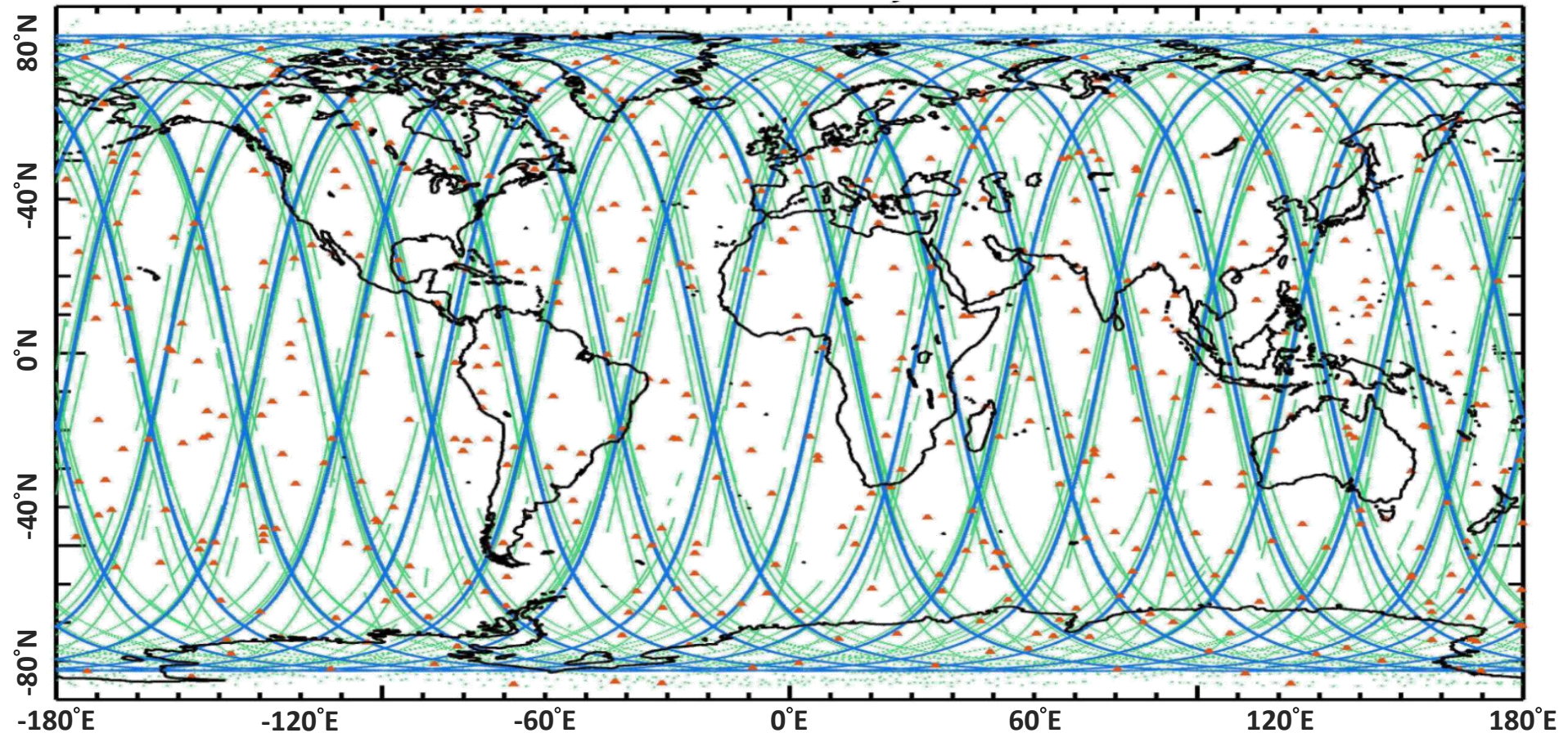


Data Availability [80% (TBR) duty cycle]	Atmosphere RO events	≥ 400 events per day
	Ionosphere RO events	≥ 350 events per day
	Reflectometry events	≥ 250000 events per day



Future meteorological satellite mission of TASA (FORMOSAT-9A)

Green line: GNSS-R(num=294,140) ; Red triangle: GNSS-RO(num=432)



- 24-hour simulation constructed by GPS signal only.
- Not Real time release (RT stream may by request or ground station collaboration)

Thank you for your attention