Application Date:

Mr. Toshiaki Sato
Director
Management and Integration Department
Space Technology Directorate I
Japan Aerospace Exploration Agency (JAXA)
2-1-1 Sengen, Tsukuba, Ibaraki, 305-8505 JAPAN

Application Form for the 2nd Research Announcement on the Earth Observations Collaborative Research Agreement (Non-Funded) between the Japan Aerospace Exploration Agency (JAXA) and the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA)

Dear Mr. Sato,

We, on behalf of IBAMA, have read and agreed with all the terms and conditions stated in "the 2nd Research Announcement on the Earth Observations Collaborative Research Agreement (Non-Funded) between the Japan Aerospace Exploration Agency (JAXA) and the IBAMA" and apply for the Collaborative Research Agreement.

PI Name: Edson Eyji Sano (PI No. ER2A2N046)

Research Title: JJ-FAST ACCURACY AND USEFULNESS ANALYSIS

Research Category:

Product Development :	☐GCOM-W Algorithm ☐GPM Algorithm ☐AMSR Algorithm	☐GCOM-C Algorithm ☐MORI Algorithm
Standard Algorithm Calibration/validation :	☐GCOM-W Calibration/validation ☐GPM Calibration/validation ☐ALOS-4 Calibration/validation ☐EarthCARE Calibration/validation	☐GCOM-C Calibration/validation ☐ALOS-3 Calibration/validation ☐MORI Calibration/validation
Application Research :	☐GCOM-W Application ☐GPM Application	☐GCOM-C Application ■ALOS-2 Application

Work Schedule: See Form 1 “Research Plan”

Pedro Alberto Bignelli
General Coordinator/IBAMA/CENIMA
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The 2nd Research Announcement on the Earth Observations (Non-Funded)

Form 1

Research Plan

PI Name	EDSON EYJI SANO	PI Number	ER2A2N046
Research Title	Deforestation Detection by JJ-FAST over the Brazilian Amazon for law enforcement procedures: challenges and usefulness		
Purpose of Research	The objectives of this proposal are four-fold: 1) to continue the evaluation of the accuracy of the JJ-FAST do detect deforestation in the Brazilian Amazon in the wet season during the time period of 2019 (ALOS-2), 2020 (ALOS-2), and 2021 (ALOS-4); 2) to continue the field validation during the years of 2019, 2020, and 2021 to take into consideration state-based particularities of the deforestation in the Brazilian Amazon (e.g., influence of precipitation conditions and average size of deforestation); 3) to develop a technique to separate what is deforestation and what is degradation (by selective logging or by burning activities) in the JJ-FAST detection (they have been detected as deforestation in the current version of JJ-FAST); and 4) to analyze sets of StripMap mode ALOS-2 and ALOS-4 images over different regions of the Brazilian Amazon to help understand the causes of omission and commission errors of the JJ-FAST.		
Content of Research and Its Target	The major data set of this study consists of the ALOS-2/PALSAR-2, Scanning Synthetic Aperture Radar (ScanSAR) acquisition mode images obtained at 50-m pixel spacing, HH polarization, HV polarization, and HH/HV ratio, with incidence angle of 17-42° and 359 km of swath width. The deforestation polygons detected by the JJ-FAST using ScanSAR images from April 2019 until December 2021 over the study area will be assessed in terms of both omission and commission errors. The possibilities of correct deforestation detection or misdetection are: a) natural forest converted to deforestation (correct JJ-FAST detection); b) natural forest remained as natural forest (JJ-FAST misdetection); c) natural forest converted to degraded forest (correct JJ-FAST detection); and d) deforested areas remained as deforested areas or converted into secondary vegetation (JJ-FAST misdetection). The same optical overpasses will visually analyzed in order to estimate the omission errors. In this case, false-color composites of red, near-infrared and middle infrared spectral bands will be analyzed in a computer screen at a visual scale from 1:30,000 to 1:50,000. Deforestation polygons larger than 3 hectares will be considered in the omission error analysis. At least one field campaign per year in different states of the Legal Amazon will be conducted for validation purposes over the arc of deforestation where most of the ongoing deforestation occur (mainly in the states of Rondônia, north of Mato Grosso, and south of Pará). During this field campaign, a special attention will be dedicated for identifying polygons corresponding to deforestation and polygons corresponding to degradation. Detailed ScanSAR image analysis will be conducted after the field surveys to discriminate deforestation from degradation in the JJ-FAST products. Two study areas located in the states of Pará and Mato Grosso will be selected for more detailed analysis of StripMap mode imageries (single look complex, dual-pol data, 10-meter spatial resolution data; and single look complex, quad-pol, 6-meter spatial resolution data, namely, SM3 and SM2 data).		
Research Period	From: the date designated in the Confirmation Sheet To: 30 March 2022		

Schedule (JFY2019 period)	Items	(Start)XX/2019	(End) March/2020
	Accuracy analysis of the JJ-FAST deforestation detection	August/2019	March/2020
	Field campaigns	October/2019	November/2019
	ALOS-2 StripMap image processing and analysis	August/2019	March/2020

The 2nd Research Announcement on the Earth Observations (Non-Funded)

Full Schedule of Research Period (max. 3 years)	Items	JFY2019	JFY2020	JFY2021
	Accuracy analysis of the JJ-FAST deforestation detection	Aug./2019 to Mar./2020	Apr./2020 to Mar./2021	Apr./2021 to Mar./2022
	Field campaigns	Oct./2019 and Nov./2019	Sept./2020 and Oct./2020	Sept./2021 and Oct./2021
	ALOS-2 StripMap image processing and analysis	Aug./2019 to Mar./2020	Apr./2020 to Mar./2021	Apr./2021 to Mar./2022
	Reports & papers		Apr./2020 to Mar./2021	Apr./2021 to Mar./2022

Place of Research and Equipments for works	PI side : Brazilian Institute of Environment and Renewable Natural Resources (IBAMA)	JAXA side : Earth Observation Research Center (EORC)
JAXA's Researchers	JAXA/EORC	

Co-Investigators	Name	Organization Name and Job Title	E-mail (*)
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RO's Person in Charge of This Research Agreement	Name	Pedro Alberto Bignelli		
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COAPI: Coordination of Analysis and Production of Information
CENIMA: National Center of Monitoring and Environmental Information