BIOMASS - A P-BAND SAR MISSION TO MAP FOREST BIOMASS AT GLOBAL SCALE

Malcolm Davidson1, Thuy Le Toan2, Heiko Baltzer3, Philippe Paillou4, Stephen Plummer5, Kostas Papathanassiou6, Shaun Quegan7, Lars Ulander8, Sassan Saatchi9, Hank Shugart10

1 ESA, 2 CESBIO, 3 University of Leicester, 4 University of Bordeaux, 5 IGBP Joint Projects Office Italy, 6 DLR, 7 University of Sheffield, 8 Swedish Defence Research Agency, 9 JPL, 10 University of Virginia

1. INTRODUCTION

The Earth Explorer missions within ESA's living planet programme seek to advance the understanding of the different Earth system processes, including the demonstration of associated new observing techniques. In March 2005, ESA released a call for new mission ideas for the next Earth Explorer mission (7th Earth Explorer) to the science community. One of the 6 candidate missions selected for assessment studies is BIOMASS. The scientific objective of BIOMASS is to determine for the first time, in a consistent manner, the global distribution of forest biomass, to reduce uncertainties in the calculations of carbon stocks and fluxes associated with the terrestrial biosphere. BIOMASS will be used to improve quantification of:

- the terrestrial carbon stocks and fluxes in forests,
- terrestrial carbon sources and sinks, by monitoring and quantifying disturbances and recovery in forests.

The main outcome of the mission will be greatly improved knowledge of the size and distribution of the terrestrial carbon pool, and much improved estimates of terrestrial carbon fluxes.

2. THE MISSION

BIOMASS is envisaged to be a P-band Synthetic Aperture Radar (SAR) mission which will provide first observations of the global distribution of forest biomass at a resolution and accuracy compatible with the needs of international reporting on carbon stocks and terrestrial carbon models. The mission will exploit the unique sensitivity of P-band SAR to forest biomass and employ advanced retrieval methods to map forest biomass globally across the whole biomass range encountered in tropical, temperate and boreal forests. BIOMASS will also provide the first opportunity of exploring the Earth's surface at the P-band wavelength.

3. THE PRESENTATION

The presentation will provide the programmatic context to the mission and outline key elements of the mission including observation requirements, technical concepts and key challenges in preparing the mission concept for implementation.