

SPACE RESEARCH AT UNB



Looking back 165 years into UNB's storied past, we find ... space research.

In 1851, UNB built British North America's first astronomical observatory, equipped with the best instruments of the day - the William Brydone Jack Observatory, a National Historic Site of Canada. In collaboration with the Harvard observatory, UNB astronomical research determined the longitude of several New Brunswick cities and corrected errors in the

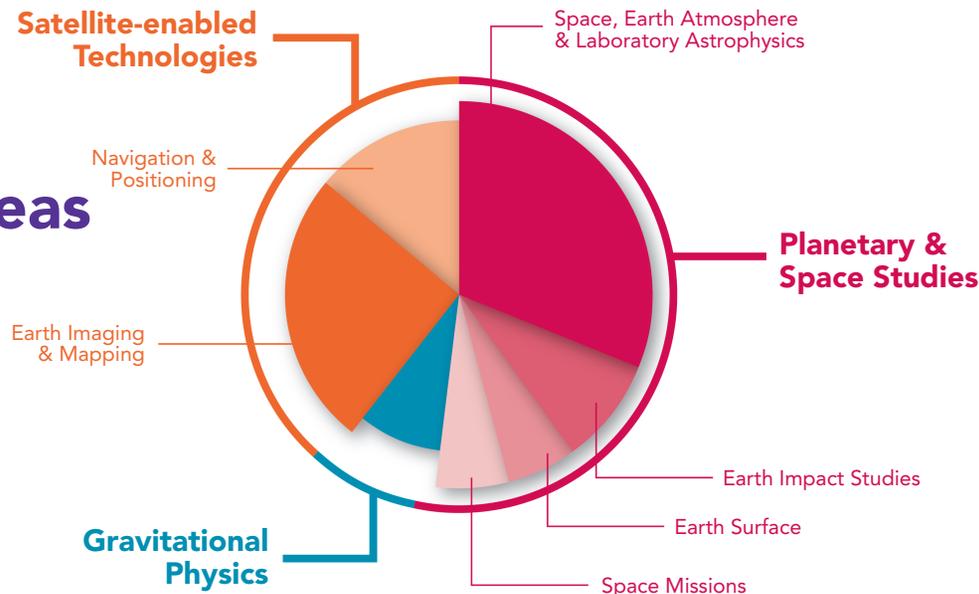
international boundary. Today, the amount, diversity and impact of UNB research related to space testify to its leadership among Canadian academic institutions investigating this field of study. UNB has assembled significant expertise, which has enabled research covering a broad range of fields in both fundamental and applied science related to space.

Even a cursory glance at UNB's research yields evidence of its importance, benefits and influence: from searching for answers to fundamental questions

regarding gravity and the nature of the universe – to joining in the search for signs of life on Mars; from rigorous research to understand the coupling processes of space weather to our atmosphere – to developing predictive models and designing techniques for mitigating its negative effects on satellite-based technologies and other sensitive infrastructure; from breakthrough-advances in the accuracy of satellite-based positioning that allow shipping container gantries to be maneuvered using signals from space and that make possible the monitoring of the slightest deformations in critical structures such as New Brunswick's Mactaquac Dam – to the development of new algorithms that utilize satellite-mounted sensors to monitor fuel moisture in boreal forests and in the grasslands of South Africa.

The practices of fundamental scientific research and applied research are complementary – advances in either one can spur new research opportunities in the other. For example, UNB's extensive research of the Earth's atmosphere not only has deepened fundamental understanding, but also has enabled improvements to the applied technology of global positioning and navigation. Researchers at UNB have developed an accurate

Research Focus Areas



computer model for atmospheric effects that is included in the operating software of many of the GPS receivers being marketed today. Similarly, the expertise and research facility assembled at UNB to investigate the extreme geological processes that occur in the seconds following the high-speed impact of an asteroid, have also been used for applications in aerospace, such as the

testing of new impact-resistant wings, and for the research and development of materials that could protect satellites and other spacecraft from impact damage. UNB expertise and research in the advanced processing of satellite images stimulated the development of software employing an automated image-fusion technique that has had a significant impact on remote sensing applications

for fundamental research and applied science – evident in its use across five continents and by leading organizations, including NASA, the Canadian Space Agency, the National Oceanic and Atmospheric Administration, the US Geological Survey, Google Earth, Natural Resources Canada, and the Department of National Defence.

20

Average number of faculty undertaking research in this area each year

\$1.9 million

Average amount of funding received for research in this area each year

22

Average number of research projects in this area each year

6 Faculties and Departments pursuing research in this area

- **Computer Science**
- **Engineering:**
 - Geodesy and Geomatics Engineering
- **Forestry and Environmental Management**
- **Science:**
 - Earth Sciences
 - Mathematics and Statistics
 - Physics (bi-campus)

9 Facilities and Groups conducting research in this area

- **Major Research Groups and Facilities**
 - Advanced Geomatics Image Processing Laboratory (AGIP)
 - Canadian Centre for Geodetic Engineering (CCGE)
 - Centre for Laser, Atomic and Molecular Studies (CLAMS)
 - Infrared and Microwave
 - Spectroscopy Laboratory
 - Laser Spectroscopy Laboratory
 - Canadian High Arctic Ionospheric Network (CHAIN)
- Geodetic Research Laboratory (GRL)
- Planetary and Space Science Centre (PASSC)
 - *Earth Impact Database (EID)*
 - *High-speed Impact Research and Technology (HIRT) Facility*
 - *Regional and Planetary Image Facility (RPIF)*
- Radio-Physics Laboratory
- Space and Atmospheric Physics Laboratory
- UNB Gravity Group

2 Research Chairs engaging in research in this area

- **Canadian Research Chairs (CRC)**
 - Advanced Geomatics Image Processing
 - Planetary Materials