



**REQUEST FOR INFORMATION (RFI)**  
**FOR THE REQUIREMENT OF:**  
**CANADIAN CONTRIBUTION TO THE WIDE-FIELD INFRARED SURVEY**  
**TELESCOPE (WFIRST) SPACE ASTRONOMY MISSION**  
**FOR THE:**  
**CANADIAN SPACE AGENCY**



**Response Submission Deadline:**

**June 6<sup>th</sup>, 2014 at 4:00 PM (EDT)**

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Reference: CSA File No. **9F052-140111/A**

**May 15, 2014**

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# **1 Introduction**

## **1.1 Purpose**

This RFI is a consultation document intended to solicit feedback from industry and academia with respect to the matters described in this RFI. This is not a bid solicitation.

The Canadian Space Agency (CSA) is seeking information from interested parties on potential contributions to the NASA Wide-Field Infrared Survey Telescope (WFIRST) space astronomy mission. The information received will help to develop a mission concept RFP aimed better defining a Canadian contribution to WFIRST.

## **1.2 General Information**

This Request for Information (RFI) shall not be construed to be a Request for Proposal (RFP) and/or Announcement of Opportunity (AO), and no agreement/contract will be entered into with/awarded to any vendor based on responses to this RFI, and it shall in no way be considered as authorization by Canada for respondents to undertake any work which would result in costs to the CSA. The CSA shall not be liable for, nor shall it reimburse any of the respondents, or any third-party, for any costs, fees or expenses, incurred in the preparation or submission of a response to this RFI.

Nothing in this RFI shall be construed as a commitment to issue a RFP or an AO. Response to this RFI will not create any obligation. The CSA shall not be bound by anything stated herein. Respondents shall not be bound by any aspect of their response to this RFI.

Respondents should mark any portions of their response that they consider proprietary or confidential. All responses to this RFI will be held by the CSA on a confidential basis (subject to applicable legislation) and remain the property of the CSA once they have been received. Respondents are advised, however, that information submitted may be used in the development of future RFPs or AOs. Vendors answering this RFI shall specify if the information or comments provided are confidential or exclusive to the company. Not responding to this RFI shall in no way penalize bidders to any future RFP or AO. Canada may, at its discretion, contact any respondents to follow up with additional questions or for clarification of any aspect of a response.

## 2 Documents

### 2.1 Applicable Documents

There are no Applicable Documents in this RFI.

### 2.2 Reference Documents

The following documents provide additional information or guidelines that either may clarify the contents or are pertinent to the history of this RFI.

**TABLE 2-1 - REFERENCE DOCUMENTS**

RD No.	Document Number	Document Title	Rev. No.	Date
RD-1		Canadian Astronomical Society Long Range Plan <a href="http://www.casca.ca/lrp2010/11093_Astronomy_LRP_V16web.pdf">http://www.casca.ca/lrp2010/11093_Astronomy_LRP_V16web.pdf</a>		2010
RD-2		NASA WFIRST mission website <a href="http://wfirst.gsfc.nasa.gov/science/">http://wfirst.gsfc.nasa.gov/science/</a>		
RD-3		Wide-Field InfraRed Survey Telescope-Astrophysics Focused Telescope Assets WFIRST-AFTA Final Report by the Science Definition Team (SDT) and WFIRST Project <a href="http://wfirst.gsfc.nasa.gov/science/sdt_public/WFIRST-AFTA_SDT_Final_Report_Rev1_130523.pdf">http://wfirst.gsfc.nasa.gov/science/sdt_public/WFIRST-AFTA_SDT_Final_Report_Rev1_130523.pdf</a>		May 23, 2013
RD-4		Evaluation of the Implementation of WFIRST/AFTA in the Context of New Worlds, New Horizons in Astronomy and Astrophysics, NRC National Academies <a href="http://www.nap.edu/openbook.php?record_id=18712&amp;page=R1">http://www.nap.edu/openbook.php?record_id=18712&amp;page=R1</a>		Pre pub 2014
RD-5		WFIRST-AFTA SDT Interim Report April 2014 <a href="http://wfirst.gsfc.nasa.gov/science/sdt_public/WFIRST-AFTA_SDT_Interim_Report_April_2014.pdf">http://wfirst.gsfc.nasa.gov/science/sdt_public/WFIRST-AFTA_SDT_Interim_Report_April_2014.pdf</a>		April 30, 2014

## 3 Background

The CSA Exploration Core Program operates in the context of Canadian Space Exploration Plan (CSEP) where CSA's vision for space exploration is stated as "Canada will join in the human and robotic exploration of the solar system and space-based astronomical observation of the Universe beyond. The CSA will maintain a robust and balanced space exploration program to ensure that, as a nation, Canadians share in the discoveries, technological breakthroughs, societal impact and economic benefits stemming from the global exploration endeavour".

As part of its plan for space-based astronomy, CSA explores opportunities for missions that address dark energy, one of the key science priorities identified in the Canadian Long Range Plan for astronomy (LRP). Currently NASA is undertaking pre-formulation studies of the Wide-Field Infrared Survey Telescope (WFIRST) mission addressing dark energy and other key investigations. NASA is exploring possible international partnerships and contributions and has invited CSA to consider potential flight hardware contributions that would allow Canada to join the mission.

The Wide-Field Infrared Survey Telescope (WFIRST) is an observatory designed to perform wide-field imaging and slitless spectroscopic surveys of the near infrared (NIR) sky. The current Astrophysics Focused Telescope Assets (AFTA) design of the mission makes use of an existing 2.4 m telescope. WFIRST-AFTA will settle essential questions in both exoplanet and dark energy research and will advance topics ranging from galaxy evolution to the study of objects within the galaxy and within the solar system. The main instrument is a wide-field multi-filter NIR imager and spectrometer. With the 2.4 m telescope, a coronagraph instrument has been added to the payload for direct imaging of exoplanets and debris disks. More details of the reference missions, science, instruments, spacecraft are available in the Reference Documents above.

There are no identified Canadian contributions to WFIRST at this point. The purpose of this RFI is to explore possibilities within a set of options listed below. Responses to this RFI, with expression on the level of interest, capabilities, and heritage, will help CSA formulate and focus a mission concept study that will elaborate and assess potential Canadian contribution(s) to WFIRST.

## **4 Contribution Options**

This RFI addresses several potential options that can be considered as contributions to WFIRST. These options will be subject to further development and evaluations by NASA/WFIRST before they can be committed and are therefore subject to change in design and even availability. For the purpose of scoping the level of contribution, it can be assumed, considering that WFIRST is a large mission, that the total Canadian contribution would be valued in the \$10's millions.

Responses can apply to one or all or any combination of these options:

- 1) Instrument (flight hardware):
  - a) Coronagraph:
    - i) Camera for the coronagraph (such as EMCCD);
    - ii) IFS Integral Field Spectrograph in the coronagraph.
  - b) Main focal plane instrument components such as:
    - i) Integral Field Unit (IFU);
    - ii) Fine Guidance Sensor (FGS);
    - iii) Element Wheel (EW).

- c) Other potential and appropriate contributions where significant Canadian expertise can be applied can be suggested, but would be subject to option availability.

2) Science segment:

- a) Canadian science expertise to support the mission contribution and/or instrument development and requirements: academic or scientific community interest, expertise, capacity in DE investigations, in particular microlensing, exoplanets, guest observer program, other WFIRST science goals.
- b) Ground segment: Data reduction, pipeline.

## **5 Requested Information**

Respondents are invited to submit information related to any or all of the options described in section 4.

The information should describe the kind of contribution that the respondent would be able to make to a (potential) concept study, based on high level baseline design and given high level requirements provided in the Reference Documents. A future concept study will require to develop a functional design with feasibility assessment, technology assessment and readiness, risks, schedule and cost for full development. The RFI information submitted should also be supported by a description of industrial or academic capacity, expertise, knowledge, heritage, technology available and TRL, resources and infrastructure available.

## **6 Response Protocol**

Responses should be as concise as possible. Respondents may submit more than one proposal for consideration.

Each response should include sufficient contact information (names, address, e-mail address, telephone number) in order to allow CSA to contact the respondent for further clarification, if required. Aside from potential clarifications, CSA does not expect to provide any response or acknowledgement to any respondent to this RFI.

## **7 Official Languages**

Responses to this RFI may be in one of the official languages of Canada, French or English.

## **8 Submittal of Responses**

Written responses to this RFI shall be transmitted to the CSA by facsimile or e-mail (PDF or Microsoft Office document) no later than 4:00 pm (EDT) June 6, 2014. Questions and formal written responses to this RFI shall be addressed to:

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## 9 Acronyms

AFTA	Astrophysics Focused Telescope Assets
AO	Announcement of Opportunity
CSA	Canadian Space Agency
CSEP	Canadian Space Exploration Plan
DE	Dark Energy
EDT	Eastern daylight Time
EMCCD	Electron Multiplying Charged Coupled Device
ExCore	Exploration Core
EW	Element Wheel
FGS	Fine Guidance Sensor
IFS	Integral Field Spectrograph
IFU	Integral Field Unit
LTP	Long Term Plan
NIR	Near Infrared
RFI	Request for Information
RFP	Request For Proposal
TRL	Technology Readiness Level
WFIRST	Wide-Field Infrared Survey Telescope