JOINT INSTITUTE FOR VLBI IN EUROPE

Software pipeline BlackHoleCam

Work-package management plan

Revision	1.1
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Version changes

Version	Date	Change
1.1	7-11-2014	Adjusted communications schedule

Introduction

As partner in the BlackHoleCam (BHC) consortium, JIVE is responsible for two work-packages related to software development. This document focuses on one of them: the development of a software pipeline. The purpose of this pipeline is to produce science quality images from observations with mm-VLBI telescopes, in order to enable detection of emission from the scales closest to the black hole in our Galaxy and M87.

Strong focus will be on developing the fringe finding step, a crucial element to all VLBI observations, but particularly challenging for mm-VLBI. In the past JIVE has been involved in development of fringe finding algorithms for the CASA package under the ALBiUS RadioNet FP7 programme. This project will use the accumulated knowledge and code from that programme, as well as tap into existing experience in the global mm-VLBI community.

In addition, the pipeline will have to deal with atmospheric corrections, gain calibration and imaging (self-calibration), as well as quality control at each of these steps. The output of the pipeline should also contain phase closure relations and other useful non-imaging products.

Scope

The work-package (WP) involves the planning, development, testing and implementation of the required software components in one or more standard astronomical data reduction packages. It also includes reporting on the progress, documentation of the development and use, and a direction for future work.

Deliverables

1. Document describing the current standard of mm-VLBI software:
   a. available astronomical software packages and scripts of fringe finders
   b. advantages and disadvantages of each package/script
   c. package potential for pipeline development
   d. portability of scripts
   e. recommendation for package to use for the pipeline
2. A requirements and design document for the pipeline. This should also include a first suggestion of the fringe finding algorithm.
3. A beta-version of the fringe finding algorithm implemented in the package of choice.
4. Testing and verification of the fringe finder with simulated and real data.
5. Initial version of the pipeline and user documentation.

Timeline and team

The planning of the project is based on the current availability of funds: 2 person-years for the next two years, with a starting date on October 1, 2014. The first phase is focused on making an inventory of available software and current standards, and making an inventory of the wishes of the pipeline performance in the community. This should lead to a list of requirements, a design and algorithm selection. The actual coding and implementation of new software components is planned to start in 2015.

Deliverable	Description	Deadline	Owner
1. Document	Current status, platform advice	12 - 2014	PS
2. Document	Requirements and design	04 - 2015	PS & CS
3. Fringe finder	Initial implementation	10 - 2015	PS & CS
4. Verification	Simulations and tests	04 - 2016	PS & CS
5. Pipeline	Beta version & docs	09 - 2016	WPM & PS

Table 1. Timeline of the planned deliverables and owner of the process. The first person listed as owner has the main responsibility and serves as the point of contact for this deliverable. The owner acronyms are: PS = work-package project scientist, CS = WP coding specialist, WPM = work-package manager. The deadline is considered to be the last day of the month listed in the table.

The JIVE team consists of the WP manager Arpad Szomoru, WP project scientist Ilse van Bemmel and WP coding specialist(s) TBD. The main points of contact outside JIVE are the BHC project manager Remo Tilanus, and the BHC project scientist Ciriaco Goddi.

The WP manager is responsible for assigning the work and managing the funds related to this project. The WP project scientist maintains the communications with the external project members and represents JIVE in project meetings or conferences related to this work. The coding specialist is responsible for software (component) development and basic testing and debugging.

The WP project scientist constructs the requirements and algorithms in close collaboration with the coding specialist. The testing and verification will be done by the WP project scientist, in close collaboration with the coding specialist, and including experienced mm-VLBI astronomers from around the world.

Communications

To keep everyone involved up-to-date, regular communications are necessary. The table below lists the intended structure and responsibilities. The owner is responsible for calling the meetings, and where necessary to distribute an agenda, maintain minutes and inform the participants that were absent. The PI meeting and status meeting are BHC project based meetings which alternate on a 4-6 week schedule. The review is related to deliverables and planned as required.

Type	Frequency	Format	Contents	Owner	To
Internal meeting	Every 2 weeks	In person	Progress and status in team	PS	JIVE team
PI meeting	Every 2-3 weeks	Telecon	Actions and status in BHC	BHC-PS?	PS, BHC PS, BHC PM, WPM
Status meeting	Every 2-3 weeks	Telecon	Actions and status in BHC	BHC-PS?	JIVE team BHC team
Review	3-4 months	In person/ telecon	Project updates, status report	PS, WPM	PS, BHC-PM, BHC-PS

Table 2. Planned communications in the work-package. PS = WP project scientist, BHC-PM = BlackHoleCam project manager, WPM = work-package manager.

Distribution list of final document

Name	Role	Affiliation
Arpad Szomoru	work-package manager	JIVE
Huib Jan van Langevelde	director	JIVE
Remo Tilanus	project manager	Univ. of Leiden
Ciriaco Goddi	project scientist	Univ. of Nijmegen
TBD	coding specialist	JIVE

List of acronyms

ALBiUS	Advanced Long Baseline interoperable User Software
BHC	BlackHoleCam
BHC-PM	BlackHoleCam project manager (external)
BHC-PS	BlackHoleCam Project Scientist (external)
CS	work-package Coding Specialist
FP7	7th Framework Programme from the European Union (2009-2011)
JIVE	Joint Institute for VLBI in Europe
mm-VLBI	millimeter-VLBI
PS	work-pacakge Project Scientist (internal)
VLBI	Very Long Baseline Interferometry
WP	Work-Package
WPM	Work-Package Manager