**Memorandum of Understanding between INGV, INFN and ERI**

**DRAFT PROPOSAL**

**GENERAL STRUCTURE**

**Structure of the collaboration**

The collaboration will have the following structure:

General coordination

Technical coordination

Data Reconstruction and Analysis coordination

Geophysical conventional measurements

Geophysical coordination

**Detectors:**

INFN detector : 4 telescopes with 1sqm sensitive area.

ERI detector: calorimetric telescope with 2 sqm sensitive area

**Data property:**

Data belongs to the Collaboration and publications will be agreed by the Collaboration

**MEASUREMENT CAMPAIGNS**

**1) Vesuvius measurement campaign**

**Responsibilities of the Institutions**

**INFN**

1.1 Construction, commissioning, maintenance and remote control of the INFN detector

1.2 Validation of the detector

1.3 On site interventions

1.4 Construction of the passive shielding and of its support frame for the ERI detector ( on the basis of technical drawings provided by ERI)

1.5 Data quality of the INFN detector

1.6 Slow control of the INFN detector

1.7 Reconstruction software of the INFN detector

1.8 Contribution to data analysis

1.9 Contribution to geophysical analysis

**INGV**

1.10 Civil engineering

1.11 Installation and operation logistic

1.12 Data transmission

1.13 Gravimetry measurement campaign

1.14 Gravimetry analysis

1.15 Geophysical analysis

**ERI**

1.16 Construction, commissioning, maintenance and remote control of the ERI detector

1.17 Transportation of the active part of the ERI detector to Naples and back to Japan

1.18 Assembling, commissioning and decommissioning of the ERI detector in Naples

1.19 Data quality of the ERI detector

1.20 Slow control of the ERI detector

1.21 Reconstruction software of the ERI detector

1.22 Contribution of the data analysis

1.23 Contribution to the geophysical analysis

**2) Japan measurement campaign**

**Responsibilities of the Institutions**

**INFN**

2.1 Construction, commissioning, maintenance and remote control of the INFN detector

2.2 Transportation of the INFN detector from Naples to Japan and back to Naples

2.3 Assembling, commissioning and decommissioning of the INFN detector in Japan

2.4 Data quality of the INFN detector

2.5 Slow control of the INFN detector

2.6 Reconstruction software of the INFN detector

2.7 Contribution to data analysis

2.8 Contribution to geophysical analysis

**INGV**

2.9 Payment of the transportation of the INFN detector from Naples to Japan and back to Naples

2.11 Geophysical analysis

**ERI**

2.12 Construction, commissioning, maintenance and remote control of the ERI detector

2.13 Data quality of the ERI detector

2.14 Slow control of the ERI detector

2.15 Reconstruction software of the ERI detector

2.16 Contribution to data analysis

2.17 Contribution to geophysical analysis

**3) Tentative schedule**

**DEFINITIONS**

**T0**: the time when the infrastructure at Vesuvius will be ready for detector installation.

**PROMPT ACTION**: action to be taken in response to a request by Japanese authorities for muography of a Japanese volcano.in a pre-eruption or eruption condition.

**TIME SCHEDULE**

3.1 The ERI telescope will be transported and installed at T0, provided that its lead absorber is ready and unless at that time it is in use in Japan for monitoring an active volcano. In this case the installation will be postponed until ERI believes that the monitoring of the active volcano can be stopped.

The ERI detector will acquire data at the Vesuvius for a period of at least 1 year, unless a PROMPT ACTION is required.

3.2 After its validation the INFN detector will acquire data at the Vesuvius for at least 1 year. If during this period a PROMPT ACTION is required, only the ERI detector will be transported in Japan.

3.3 In case of a PROMPT ACTION the INFN detector will acquire data at the Japanese volcano for a period to be agreed by the Collaboration, depending on the geophysical and logistic conditions .

**4) Follow-up proposal:**

ERI will collaborate to the development of a second generation of INFN detectors, contributing to their construction and providing funding for detectors to be operated in Japan.

In case of a Prompt action these telescopes will be installed in Japan immediately after testing, without any minimum time of data taking at the Vesuvius.