QUESTION TIME

Questions asked by Ronald Karel to Friedemann Freund and his team

Methodology:

If understood correctly the earthquake prediction methodology is based on the cross-analysis of the data collected from nine different ground sensors plus satellites. Is this correct?

In principle, yes. The cross analysis shall not be limited to 9 types of ground station sensors, however. There are more pre-EQ indicators under consideration and still more will come with further progress.
Likewise, the data from satellites can be broken down into data available from existing operational satellites and data to be obtained from satellites yet to be built and launched.

If the above assumption is correct, then;

(a)- What are those nine sensors?

1. Standard weather station to provide basic information about the local environment
2. Air ionization sensors for positive and negative airborne ions
3. Magnetic field sensors, triaxial x-y-z components, desired sensitivity at least 1 nTesla
4. Tilt and vibration sensor (VolksMeter)
5. Infrasound sensor
6. Water chemistry sensor: cations, anions, pH, temperature
7. Water chemistry sensor: fluorescence
8. Radon sensor
9. Soil resistivity
10.

Are these devices manufactured by separate individual companies?

Yes
What are their current use?

Very diverse uses

(b)- How different;y will those sensors deployed, compared to their current/standardized deployment? Is such different deployment possible without any technological/arhictectural modifications of such sensors and will such modifications cost anything additionally?

Sensors 1 and 2 can be co-deployed above ground (weatherproofed)
Sensors 3 require shallow below-ground deployment (weatherproofed)
Sensors 4 require stable anchorage in solid rock or cement platform (to be protected from wind/rain)
Sensors 5 require vertical placement into shallow boreholes (weatherproofed)
Sensors 6 and 7 required pump line to local groundwater or well water supply (weatherproofed)
Sensors 8 and 9 require shallow below-ground deployment (weatherproofed)
With the exception of sensor 4 all others require only minimal installation efforts and costs.
Sensor 4 can be placed into the basement of a house

(c)- How will the streamed-in data be analyzed?

All data must be transmitted in real time through wireless communication links to a data center, which can be regional (for instance in Turkey) or centralized (for instance in Switzerland or California).

Is there any methodology develeoped?

There will be a steep learning curve over the first 2-3 years to develop and optimize the data analysis for each sensor type in conjunction with the development of machine-learning algorisms to interpret the results.

Is it patentable?

Definitely yes.

(d) Who or what will be analyzing the data streamed in from the sensors and the satellites? Real persons or artificial intelligence, ie software?

Over the first 2-3 years there will be a need for people to look at intermediate data and fine-tune the automated intelligent analysis by computer. An even larger challenge will be to merge the data from regional ground station networks to data streams coming in from satellite assets, probably first collected at a "master" data center and then distributed in real time to regional data centers. The ultimate goal will be to collect all data, global from satellites and regional from ground station networks, and merge them into a graphical display, for instance onto a computer hyperwall, where operators will be able to check the overall situation, if and when the computers put out alerts for recurring anomalies.

(d-1) If there will be real persons; who are they and how will they be trained?

The people doing the analysis will be IT people. They will have to be trained by GeoCosmo staff.

(d-2)

If there will be a specific software, who owns the source code and is the source code patented?

Definitely yes. Software will have to be developed by GeoCosmo, which can then either be treated as trade secret or patented for IP protection. GeoCosmo will own the codes and license them to the regional partners.

At the final stage, the data is said to be transmitted to NASA GeoCosmo . What sort of activity will be performed at NASA GeoCosmo?

Since this is a global effort, covering the whole World, there must be a place where the information from all regions flows together and will be made available for in-depth scientific analysis.
It is not planned at this stage to transfer the rights to the data and methods to governmental agencies such as NASA or AFAD, unless these agencies acquire the right to own and run the operation.

If GeoCosmo receives government funding to help develop the Earthquake Forecast System, either globally or regionally, the government may require to make all data publically available for scientific purposes. This requirement can be fulfilled by releasing the data publically with a given time delay, say 1 month. In this case the data no longer have a commercial value as an earthquake predictive tool. Parties who would like to have access to the data in near-real time will have to be partners in the Global Earthquake Forecast System and participate in the installation and/or operational costs.