


**SENSOR  
SYSTEMS**

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## Volume of investments required – \$ 800 thousand

### Summary

1. **Production** – “electronic tongue” multisensor systems for artificial taste assessment and quality control in food and pharma industry.
2. **Trade marks** – XC-001.
3. **Sales 2007** – \$60 ths.

### Company profile

**Date of establishment** – 03.05.2006.

**Description and value of capital assets** – \$ 40 ths.

**Previous rounds of investments** – self-investment.

**Signs of public recognition** – golden medal from “Eureka-2007” Innovation Exhibition (Belgium, Brussels); 3<sup>rd</sup> Prize from BIT-SPB-2008 Contest; numerous interviews in the international media and at the federal Russian TV channels.

**Number of employees** – 5 persons.

### Structure of ownership

Natural persons (3)	100% (33%, 33%, 34%)
Aggregate share of government property	0%

### Team

**Kirsanov Dmitry** – CEO, 28 y.o. PhD in analytical chemistry from St. Petersburg State University; graduated from FastTrac Entrepreneurship Courses from USA-Russian Entrepreneurship Center; co-authored more than 40 scientific papers in the field of the project; participated in a variety of joint research and commercialization projects supported by FILAS, FP6-Warmer, NATO, and others. In 2000–2008 worked at different European universities and research centers. Within the last several years became a winner of different contests from FASIE, Russian President Administration and others.

**Legin Andrey** – Leading Scientific Consultant, 49 y.o. Leading research scientist, Laboratory of chemical sensors, St. Petersburg University; PhD in analytical chemistry from St. Petersburg State University. In 1993 supervised research work on development of a new analytical technique – electronic tongue; starting from 1996 co-authored more than 250 scientific papers in the field of the project. Head of Laboratory of chemical sensors in SPbGU. In 1996–2002 worked at different European universities and research centers. Supervisor and participant of the numerous research and commercialization projects supported by FILAS, FP6-Warmer, NATO, and others.

### Production

Raw material assessment, process follow-up and the end product quality control are essential and necessary steps for any responsible food industry or pharmaceutical company. Taste parameters of foods and beverages, drugs and health care products can only be controlled by trained sensory (taste) panel. This type of analysis is inevitably associated with subjectivity of the assessors and results of such estimation depend a lot on health, temperament, mood and other changing parameters of human individuals. Moreover, a trained sensory panel is extremely expensive, if available at all, and such analysis is a time-consuming procedure.

We have developed an analytical device – the Electronic Tongue – which is capable of taste assessment of different foods and beverages and pharmaceuticals without necessity of involvement of trained human assessors. The Electronic Tongue (ET), which is a system (an array) of chemical sensors, also allows performing conventional chemical analysis of the samples with respect to numerous chemical parameters, e.g. concentration of important nutrients. ET measurements are simple, direct, fast and comparatively cheap. All essential IP, related to the project, does exist as know-how, which was never disclosed and never published in any open sources, including scientific literature. Subjects of the IP are sensor membrane compositions and sensor array compositions and, partly, methodology and multidimensional data processing for different analytical tasks. Sensor membranes are complex mixture of organic substances in polymer matrix and even being subjected to the modern chemical analysis these sensor compositions could not be deciphered.

At the moment, only one European company is attempting to produce a kind of ET systems for sale, but according to their customers response their device performance is unsatisfactory for the vast of the applications. Sensor array of their device is consisting of 7 ISFETs (ion-selective field effect transistors) and this array is used always, for any purpose, without proper respect to analytical task and target media/compounds. This leads to poor performance of the device. The ET system developed by project authors has an adjustable, tunable platform and for each particular

application a particular precise set of the sensors might be developed and produced, the total number of the sensors in the array for a task may usually vary from 10 to 20.

### Current state

At the present moment, the authors of the project had invested about €150 ths of their own resources. The engineering documentation for the pilot version of the serial device is at the refining stage now. Besides that, Sensor Systems LLC is serially producing now chemical sensors XC-001, customers for this product are different laboratory supply companies as well as end-users (analytical laboratories of different enterprises).

### Development strategy

#### Use of funds

- |                                  |     |
|----------------------------------|-----|
| 1. Marketing                     | 60% |
| 2. Acquisition of current assets | 30% |
| 3. Other                         | 10% |

#### Prospective outcome of investment

As a result of the investment mass production of “electronic tongue” multisensor systems will be established, a broad marketing campaign will be performed and well-tuned sales system will be organized.

#### Marketing & Markets

Potential ET customers are research centers, chemistry labs and quality control services of all kinds of big and medium food, beverage and pharmaceutical companies who are employing or outsourcing sensory panel services. When new product is under development or an outdated one is being improved, a huge number of sensory panel sessions is necessary. The use of ET system instead of sensory panel will allow reducing significantly time and money for this process, will ensure high preciseness and reproducibility of the analysis thus given to a customer valuable competition advantages. Within the last 8 years project team has found out a great interest to the ET product while performing joint research projects with the biggest international industrial partners (Procter & Gamble, PepsiCo, GlaxoSmithKline, Martell, InBev, etc.). All of the partners were interested in purchase of the commercial ET system. To enter the market, active participation in specialized industrial exhibitions and advertisement in the industrial media is planned. The market for ET systems is only under development now and if appropriate activities will be preformed Sensor Systems could take 20–40% of the future market for this systems which is preliminary estimated at \$700–1400 mln per year only in Europe.

#### Interaction with investor

Investor is offered to have 51% share in the project company with estimated price of the share \$8 mln in 2013.

#### Financial characteristics, \$ thousand

Data	Facts			Forecast	Forecast with the investment required			
	2004	2005	2006	2007	2008	2009	2010	2011
Sales	-	15	60	170	300	800	2 500	6 500
Operating income	-	5	20	70	-300	-30	1 500	4 000