

MM no. 14/11 - concernente l'estensione dello sgravio fiscale alla Ditta SAPHYRION Sagl

Al Consiglio comunale di Bioggio

Egregio signor Presidente,

Egregi signori Consiglieri,

quale premessa dobbiamo indicare che con l'entrata in vigore, nel 1998, della legge sul promovimento economico e il relativo regolamento d'applicazione, la competenza per la concessione di sgravi fiscali spetta al Consiglio Comunale, vedi articoli seguenti:

Legge per l'innovazione economica - 25 giugno 1997

Agevolazioni fiscali

Art. 6 ¹Il Cantone può concedere alle nuove aziende agevolazioni per le imposte cantonali (sull' utile e sul capitale), di regola per un massimo di 5 anni, e fino all' esonero completo. In casi eccezionali, l' agevolazione può estendersi per un periodo massimo di 10 anni. Un cambiamento essenziale dell' attività aziendale può essere equiparato ad una neocostituzione di un' azienda.

²Il Comune può concedere alle aziende agevolazioni per le imposte comunali, previa autorizzazione del Consiglio di Stato.

Regolamento di applicazione della Legge per l'innovazione economica - 28 gennaio 1998

Agevolazioni fiscali comunali

(art. 6, cpv 2 L-inn)

Art. 9 ¹Su richiesta dell'azienda interessata, i Comuni singolarmente o a gruppi, possono concedere esoneri totali o parziali dal pagamento delle imposte comunali sul capitale e sull'utile, indipendentemente da una decisione di promovimento del Cantone, a condizione che siano rispettate le condizioni di cui all'art. 6 del presente Regolamento.

²La proposta del Municipio, prima della presentazione del relativo Messaggio al Legislativo comunale, dev'essere sottoposta alla Sezione del promovimento economico e del lavoro (in seguito: SPEL) per autorizzazione.

³La SPEL sente il parere della Sezione degli enti locali, per verificare l'incidenza della misura sulle finanze comunali e sul fondo di compensazione.

Considerazione di fondo

Prima di presentare ed entrare nella situazione specifica e nella domanda della Ditta che chiede l'esenzione fiscale dobbiamo indicare che la stessa prenderà prossimamente dimora nel nuovo Tecnopolo a Bioggio. Uno stabile dove aveva sede, sino a qualche anno orsono, la Banca Unione di Credito poi rilevata di recentemente dalla Banca della Svizzera italiana. Un Istituto bancario che con l'Università della svizzera italiana, la Città di Lugano e altri privati ha fatto nascere una nuova struttura: la Tecnopolo Lugano SA.

La società Tecnopolo Lugano SA, in sostanza, sostiene la creazione di uno spazio e di condizioni quadro per promuovere, sollecitare ed assistere nuove attività (start-up) nella regione di Lugano. In particolare essa intende stimolare e raccogliere idee imprenditoriali innovative selezionandole e guidandole fino all'inserimento nel mercato direttamente o tramite altre organizzazioni o enti aventi scopi analoghi. Essa promuove il Transfer tecnologico e la collaborazione in rete con e tra Istituti di Formazione, altri Tecnoparchi ed Aziende locali o estere. Queste attività devono concorrere a creare nella Regione di Lugano un ambiente imprenditoriale innovativo e competitivo dotato di strutture sostenibili, efficienti e flessibili.

Ma perché la nascita di un Tecnopolo?

Per questa domanda si rimanda all'allegato in cui il Direttore, sig. D. Gai disquisisce sulla portata della Teconopolo Lugano SA.

La richiesta specifica che ci è stata sottoposta

L'Azienda Saphyrion Sagl, è una Ditta che ha sviluppato una tecnologia unica nel suo genere all'avanguardia nel modo soprattutto in componenti di collegamenti nel capo aeronautico e spaziale. Ha raggiunto notorietà ed è stata menzionata ad alti livelli.

La Ditta ha ancora un'unità operativa a Lugano, ha già però una residenza a Bioggio e intende, come si diceva, ben presto insediarsi nel descritto Tecnopolo a Bioggio. La Ditta, da quanto ci è stato descritto, punta ad una determinata leadership in un campo di nicchia, come quello spaziale, aeronautico e di ricerca, sempre attento alla nuova ed importante tecnologia.

L'Autorità cantonale – Sezione della promozione economica – ha deciso di concedere alla Ditta Saphyrion, Bioggio, dopo accurati approfondimenti, un esonero fiscale cantonale sul capitale e sull'utile, nella misura del 100% per una durata di 5 anni (2011 – 2015).

Il Municipio, dopo ponderata valutazione, si allinea, di principio ma con determinate modalità, alla decisione cantonale e pertanto vi propone l'autorizzazione, che dovrà essere avallata pure dall'Autorità fiscale cantonale, a concedere le seguenti agevolazioni:

Imposta comunale dal 2011 al 2015 – 5 anni

- *esenzione del 100%*

A detta agevolazione non sarà attribuito il moltiplicatore d'imposta.

La concessione dello sgravio presuppone la presentazione di un rendiconto sul rispetto degli obiettivi, ogni anno, a contare da terzo anno – quindi per il 2013, 2014 e 2015.

Qualora gli obiettivi non fossero raggiunti o conformi agli intendimenti il Municipio può presentare al Legislativo comunale una revoca immediata della presente decisione.

Riteniamo che questo accordo garantisca:

- al Comune di Bioggio di effettivamente proporre un qualcosa di tangibile in una situazione di non alta congiuntura e ancora di incertezza economica. Non sarà forse molto ma è pur sempre un segnale;
- usufruendo degli sgravi fiscali comunali, la Ditta ha la possibilità di proporre una sua prima sede e di poi rafforzare la sua attività a Bioggio;

- si ripresenta una domanda di agevolazione fiscale per una Ditta con sede a Bioggio. Come è già stato il caso in passato il tutto ha permesso di aiutare dell'Aziende nei primi anni di vita, per poi ritrovarle, qualche anno dopo, anche tra i pilastri portanti del nostro gettito fiscale / dato dalle PG.

Si fa altresì notare che nella Ditta Saphyrion è attivo, quale collaboratore, un cittadino del nostro Comune.

Restando a disposizione per ogni ulteriore informazione che vi necessitasse in sede d'esame, invitiamo l'Onorando Consiglio Comunale a voler

risolvere:

1. Alla Ditta Saphyrion Sagl, Bioggio è concesso uno sgravio sulle imposte comunali dal 2011 al 2015, quindi per una durata di 5 anni, calcolato nel seguente modo:

- *nella misura del 100%.*

A detta agevolazione non sarà attribuito il moltiplicatore d'imposta.

La concessione dello sgravio presuppone l'effettiva realizzazione ed il mantenimento del Business Plan e quindi della relativa presentazione di una relazione, a partire dal 2013, che presenti il rispetto degli obiettivi di crescita dell'Azienda.

2. Qualora la Ditta non mantenesse gli obiettivi il Municipio, a partire dal 2013, può presentare al Consiglio comunale la revoca di questa decisione.
3. Il presente accordo è vincolato all'approvazione del Consiglio di Stato.

Con stima e cordialità.



RM. no. 157/11 del 7 febbraio 2011

Va per rapporto a:

G	E	AP	P	CT GA	PR
X					

- Municipale / Capodicastero incaricato: signor L. Piffaretti

Allegati: documentazione relativa alla Ditta in oggetto + considerazioni sulla Tecnopolo Lugano SA.

La **Tecnopolo Lugano SA**

Qui di seguito riportiamo alcuni stralci e considerazioni del signor D. Gai, Direttore di Tecnopolo Lugano SA:

- Ticino, tempo di crisi, tempo di nuove imprese. Questa situazione potrà sembrare un paradosso, ma proprio con l'innovatività e l'apertura internazionale che si potrà dare una risposta alla situazione attuale. Quali sono, dunque, i criteri da seguire, per portare nuove aziende in Ticino? Bisogna pensare contemporaneamente in piccolo ed in grande. Piccolo, dal punto di vista dei mattoni e dei metri quadri. Le fabbriche trovano delle piazze più competitive altrove. Grande, dal punto di vista delle idee, dei valori aggiunti. Pensiamo, ad esempio, alle biotecnologie. Sono sempre aziende piccole, una dozzina di dipendenti in media. Eppure sviluppano i farmaci che cambieranno il corso della medicina, e possono produrre valore aggiunto per miliardi di franchi. Qui ad esempio citiamo il caso della Newron che è una società italiana che sviluppa farmaci per malattie neurologiche. Tre anni fa si è quotata alla borsa svizzera raccogliendo più di cento milioni di franchi: i dipendenti erano solo una trentina. Uno dei suoi fondatori si è da poco trasferito in Ticino, per fondare una nuova azienda: poche persone in poche stanze, ma con un network di idee e di relazioni scientifiche che abbraccia quattro continenti.

Facciamo quindi due passi indietro, per osservare meglio il quadro. Qual'è la lezione che si può trarre da questa esperienza? Quella del primato della proprietà intellettuale su quella materiale. Questa nuova visione deve essere condivisa da tutti. Innanzitutto dalla piazza finanziaria: le banche devono essere più coraggiose, e cominciare a finanziare le idee. Anche il politico deve poi adattare la propria legislatura a sostegno delle imprese di questo tipo.

Abituiamoci al nuovo, e di conseguenza ad accettare chi, osando, talora sbaglia. Le giovani aziende innovative hanno un alto tasso di mortalità. Chi le fonda deve essere in grado di rialzarsi e inventarsi qualcosa di nuovo, senza essere emarginato dalla comunità finanziaria ed economica. Gli americani da sempre ragionano in questo modo, e il loro tasso d'innovatività è molto superiore al nostro. Dobbiamo, in sintesi comportarci come Galileo Galilei, descritto da Bertold Brecht, il quale sosteneva che "visto che è così, non deve rimanere così".

Quando le acque sono agitate è ancora più importante riflettere. Produrre idee innovative, sapersi reinventare, correre in avanti con la forza delle proprie convinzioni. Quindi una sorta di neoimprenditorialità per creare anche nuovi posti di lavoro in un periodo di crisi economica. Nel descritto Tecnopolo hanno già trovato sede alcune ditte che stanno sviluppando le loro intenzioni secondo un determinato piano d'azione che è preventivamente valutato e sezionato in ogni situazione -.

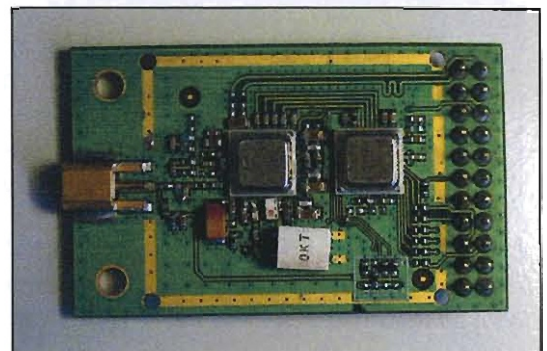
SAPHYRION SAGL: breve presentazione aziendale

Le origini

L'idea imprenditoriale di SAPHYRION fonda le sue radici in un'attività avviata nel 2002: lo sviluppo di circuiti integrati per applicazioni spaziali, in particolare componenti integrati per sistemi di navigazione satellitare per strumentazione scientifica di bordo.

All'epoca l'attività era svolta come attività accessoria della società Nemerix SA, con sede a Manno. Nemerix, orientata allo sviluppo e la vendita di circuiti integrati per sistemi di navigazione satellitari per prodotti di massa quali ad esempio i telefoni cellulari, nel 2008 ha cessato la sua attività vendendo a terzi gran parte delle sue proprietà intellettuali.

Angelo Consoli, program manager delle attività spaziali Nemerix e membro del comitato federale degli affari spaziali nonché membro del comitato di politica tecnologica della Confederazione, ha valutato la situazione e deciso che le particolarità e le qualità delle conoscenze acquisite nel corso degli anni potevano e dovevano essere mantenute e intensificate in un nuovo contesto: SAPHYRION.



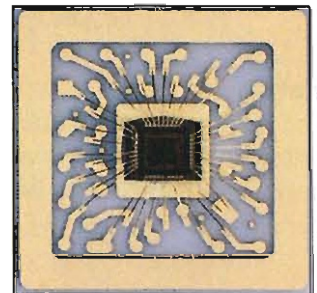
SAPHYRION tuttavia non è orientata, contrariamente a Nemerix, ai mercati di massa ormai pressoché saturi e di difficile penetrazione, ma al contrario si orienta a mercati di nicchia ed ad alto valore aggiunto come lo possono essere il settore aerospaziale, quello dei sistemi di rilevazione di posizione professionali o quello della strumentazione scientifica di laboratorio.

Stato attuale

Attualmente SAPHYRION occupa 8 ingegneri provenienti da tutto il Cantone (Luganese, Mendrisiotto, Locarnese e Riviera)

Ad uno staff di esperti di prim'ordine (il team che ha creato i primi chip spaziali che oggi figurano nel catalogo dei prodotti SAPHYRION), l'azienda affianca un «junior staff» formato da neo diplomati della SUPSI e Fachhochschule Winterthur.

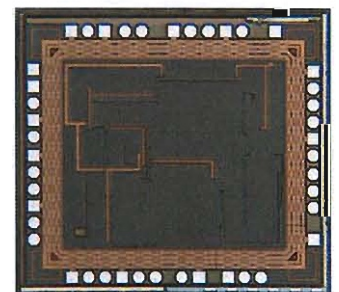
Dalla sua fondazione in Marzo 2009, SAPHYRION ha degli uffici a Lugano presso il Centro Promozione Start-up. Oggi l'azienda si trova nella fase di consolidamento e sta valutando il passaggio ad uffici presso il Tecnopolo a Bioggio.



Attività

Le attività di SAPHYRION possono essere suddivise in cinque categorie principali:

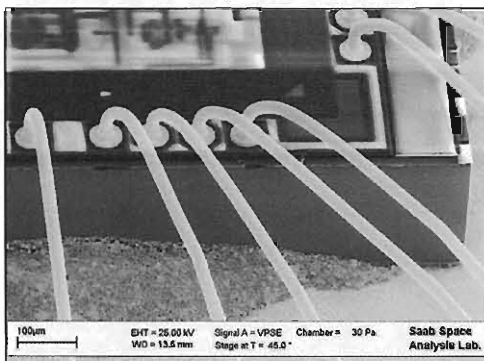
- Design e realizzazione circuiti integrati radio frequenza GNSS per il proprio catalogo di prodotti (spaziale e professionale)
- Design e realizzazione di sistemi elettronici GNSS per il proprio catalogo di prodotti
- Ricerca e sviluppo nel ambito di circuiti integrati radio frequenza GNSS (sotto forma di un mandato diretto o come membro di consorzio)



- Design e realizzazione di sistemi e/o sottosistemi elettronici per conto terzi
- Consulenza nel ambito di sistemi per la navigazione satellitare

Per quanto riguarda i prodotti, è possibile affermare che SAPHYRION è l'unica azienda in Europa a offrire circuiti integrati radio frequenza GNSS qualificati per ricevitori satellitari (tolleranti alle radiazioni). SAPHYRION ha terminato la qualifica spaziale dei propri circuiti integrati in ottobre 2010 ed è oggi fornitrice dell'Ente Spaziale Europeo (ESA) e delle aziende che operano per essa nel ambito della realizzazione di satelliti o di navigatori di bordo (RUAG, ThalesAleniaSpace, EADS Astrium per citarne alcuni).

I circuiti integrati radio frequenza SAPHYRION saranno montati su una decina di satelliti nel corso dei prossimi anni e in particolare verranno utilizzati in due missioni ESA per l'osservazione della Terra : « La



missione denominata SWARM che porterà in orbita tre satelliti il cui scopo principale sarà il monitoraggio del campo magnetico terrestre. I circuiti integrati SAPHYRION saranno parte integrante del sistema per la determinarne la posizione dei satelliti nelle loro orbite (precisioni centimetriche per un satellite di ca. 18m di lunghezza). La seconda missione, denominata SENTINEL, è volta a effettuare una serie di misurazioni scientifiche che spaziano dal monitoraggio della superficie terrestre tramite immagini radar allo studio oceanografico».

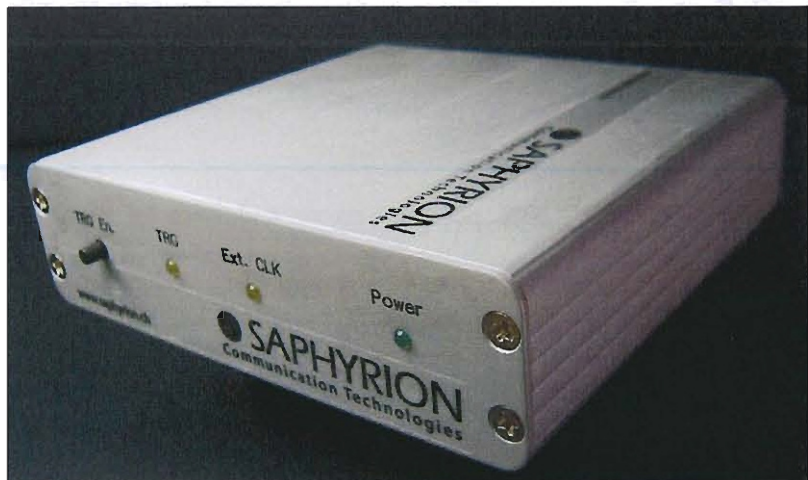
SAPHYRION, conscia del fatto i volumi che caratterizzano il mercato spaziale sono piuttosto contenuti ha, sin dalla sua fondazione, coltivato una strategia di avvicinamento al mercato di terra professionale.

In particolar modo attualmente l'azienda è impegnata nello sviluppo di 2 linee di prodotti:

- la prossima generazione dei circuiti integrati spaziali che si differenziano da quelli attualmente in catalogo per le maggiori prestazioni e per il fatto di essere stati sviluppati in modo da rispondere pienamente anche alle necessità degli attori del mercato high-end e professionale (ad es. Leica Geosystems).
- un sistema cattura e studio dei segnali emessi dai satelliti GNSS. Il sistema supporta tutte le costellazioni di radionavigazione satellitari attualmente operativi e previsti per il corto termine: GPS (USA), GLONASS (Russia), Compass (China) e Galileo (Europa).

Futuro

Per i prossimi anni, l'azienda prevede uno sviluppo costante, un consolidamento della propria leadership nel settore specifico di attività a livello di ricerca e di sviluppo di nuovi prodotti tecnologici. Per il 2016 si prevede l'allargamento del team che è previsto contare 24 posti di lavoro altamente tecnologici e di prestigio per Comune, Cantone e Confederazione.



Document for the official request of support according to the

ECONOMIC INNOVATION ACT

(of 25 June 1997)

Business Plan

Applicant

Company, Name	SAPHYRION SAGL
Address	Via San Maurizio 1 ; 6934 BIOGGIO
Contact person	Angelo Consoli
Telephone	+41 91 220 11 00
Fax	+41 91 220 11 01
E-mail	contact@saphyrion.ch

To be sent to:

Ufficio della promozione e della consulenza
Viale S. Franscini 17
CH-6501 Bellinzona

The Department of Finance and Economy will consider applications only if the information given in this questionnaire is complete.

The realization of the investments cannot begin until a final decision of the department is issued. For particular cases, the Department can give an authorization for the early beginning of the investments.

List of items to be developed

1. General information on the company's business

1.1 short description of the company

1.1.1 history

SAPHYRION is a privately owned research and development company focused on both semiconductor and board level designs, as well as software development. The head office is in Lugano, southern Switzerland. The business of SAPHYRION is centred on high quality high value designs - both own and bespoke - especially in the GNSS field. SAPHYRION originates from the Space business unit of the former Nemerix SA (NX). Taking the heritage of NX, SAPHYRION has the capability of developing low power analog, RF and base-band processors ASICs for GNSS applications with their firmware, board level products, as well as special techniques such as antenna beam forming, inertial navigation or OFDM and data communication systems. Further information can be found at <http://www.saphyrion.ch>

Thanks to its legacy in the former NX Space business unit, SAPHYRION has a demonstrated capability to develop and productize high reliability rad-hard ASICs - i.e. the SY10xx space-qualified devices, which are to be added to SAPHYRION space-qualified offering. These devices include many custom IP blocks and techniques that allowed them to fulfil space requirements despite the use of a standard commercial process in their design.

As part of RF ASIC design, SAPHYRION has developed a good experience in back-end activities, i.e. characterization, assembly, qualification and production screening of ASIC devices.

A base-band GNSS processor supporting both GPS L1 and Galileo E1 signals is in the development phase at SAPHYRION. This base-band processor is a fully autonomous system and plans to use the Leon-3 or Leon-4 processor from the European Space Agency (ESA) as its CPU. Since no silicon is planned at this time, it is being developed on an FPGA board. Some higher sensitivity techniques are also being developed for this device.

Low power consumption has been one of the most valuable assets of NX. This capability is now fully available to SAPHYRION and will benefit current, as well as future designs.

The capability of SAPHYRION also covers board level products and applications, such as different logging platforms able to handle signals up to 240Mbps, 3-axis INS navigation systems including accelerometers and gyroscopes, multi-channel GNSS RF receiver board and an FPGA board (Altera Cyclone-3) for fast prototyping activities that include GNSS base-band and Gb Ethernet communication. A beam forming demonstrator consisting of a 7 element antenna array and signal processing has also been developed as part of SAPHYRION's research activity.

1.1.2 future developments

Saphyrion's road-map includes *own products* at IC, FPGA and board levels, as well as *contracted services* for customers needing custom designs or products.

With the acquisition of NX space activities, SAPHYRION entered the space ASIC business. Four already developed ASICs for GNSS RF front-end applications (the radio section) were acquired as part of the deal. These devices, that were designed under European Space Agency (ESA) contracts, will need to be productized and qualified for space.

Another 2 ASICs, again for GNSS RF front-end applications and under ESA contracts, are planned. Their development should start within a few months and keep SAPHYRION engineers occupied for the next 3-4 years. At the end of this development phase, the SAPHYRION catalog will include the following devices:

- **SY1007/08:** GNSS RF front-ends, cover all GPS, Galileo and GLONASS frequencies.
- **SY1017/17C:** AD/DA-converter ASICs, for all GNSS signals up to a bandwidth of 25MHz.
- **SY1018:** AD/DA-converter ASIC for wide-band GNSS signals up to 70MHz.
- **2 channels RF front-end:** ASIC for L1, L2 and L5 frequencies, up to 25MHz bandwidth (it should become available by year 2014).

The development of a **base-band processor** for GPS and Galileo is just started under a research contract. This device - that will be implemented on FPGA technology - will process GPS and Galileo signals on the L1 and L5 bands and will ideally complement the 2 channel RF front-end ASIC. Inertial navigation and antenna beam forming techniques will be used in order to achieve improved performance when the GNSS signals are obscured or disturbed by some ground-based jammer. This rather big design will take about 3 years to complete. If market conditions justify it, this product will be ported to a semi-custom ASIC.

On the board level front SAPHYRION is developing the **GDAS-1**, a 3 to 6 channels GNSS data acquisition system. This system allows acquisition of up to 6 GNSS signals with a bandwidth of 24MHz at the same time. On-board digital filters shape and decimate the signals, which can be downloaded to a computer (via USB interface) for processing. This device, whose development started in early 2010, is expected to be market-ready by early 2011.

A compact **GNSS RF front-end board**, tunable to almost every GNSS signal, has been designed. This board with robust RF performances allows a simplified development of the RF section of GNSS receivers, thus saving on development costs. A new design with improved performances is planned and should become available by early 2011.

Custom design services are also offered by SAPHYRION. A single photon avalanche diode (SPAD) **3D camera sensor ASIC** for a disdrometer application has been developed for the Delft university, while a **GPS/GLONASS receiver ASIC** is under development for a French customer.

A **two-channel GNSS receiver front-end board** has been designed under contract from Thales, France. This device, based on SAPHYRION's ICs, allows simultaneous reception of two GNSS L1 signals. A new design is in the development phase for the same customer.

The **Himalaya** GNSS receiver, currently under development in a consortium that includes ThalesAleniaSpace France, SAGEM Wireless, ST Ericsson as well as Greenwich consulting, is a receiver for GPS and Galileo signals. It will use inertial navigation sensors to yield improved navigation performances under obscured or jammed GNSS signal conditions.

Apart from GNSS processing, SAPHYRION is planning to develop **GNSS aiding** via digital broadcasting (**OFDM** modulation) in a consortium with other partners. By transmitting aiding information on existing DAB/DRM radio channels, improved GNSS performances and faster acquisition can be achieved at lower cost than other channels (cellphones).

1.1.3 importance of the company for the regional economy

(labour market, additional tax income, training, etc.)

The main repercussions of SAPHYRION on Ticino's economy may be listed as follows:

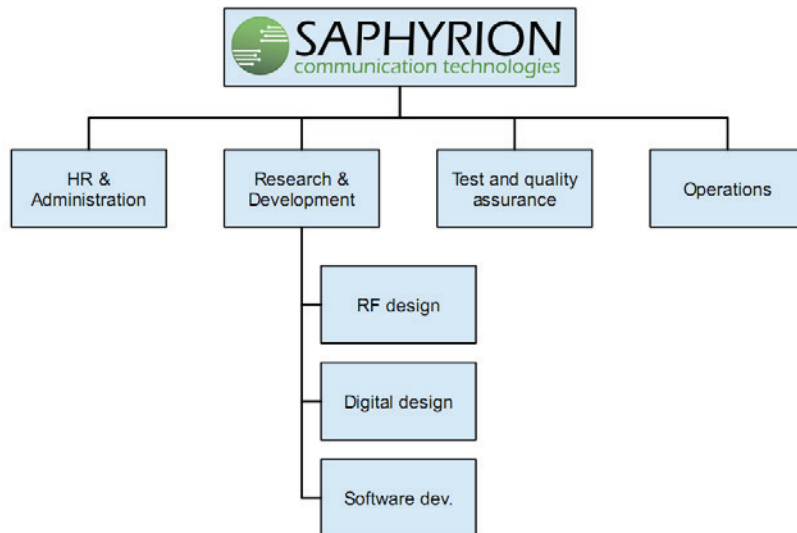
- Qualified work places to both young and experienced engineers.
- New highly qualified (ETH, SUP) work forces may be needed in the near future.
- Collaboration with SUPSI and USI on research projects.
- Cooperation with other companies in the region, both for research and manufacturing.
- Prestige and visibility of regional industry at Swiss and International level.

1.2 description of the company structure

1.2.1 company structure

SAPHYRION is a SAGL company.

The structure of SAPHYRION is shown in the figure. Since SAPHYRION is truly oriented toward engineering, the company is mainly composed by technical professionals (coming from ETHZ, EPFL and SUPSI) at this time. The hire of a part-time business development partner is being considered. The target is around one year or so, i.e. once the development of the first products is complete .



The key personnel at SAPHYRION is the same who worked in the Space business unit at Nemerix. The know-how is therefore preserved and represents the best guarantee that SAPHYRION will be able to complete all open space-related projects, as well as start new ones. This would allow the Company to maintain and reinforce the expertise and the position of the Swiss industry in the domains of space instrumentation and high-end solutions for navigation and telecommunications.

1.2.2 membership of the Board of Directors

The board of directors:

Angelo Consoli
Steve Crivelli

M.Sc. ETHZ
SUP and SCSFA

Managing director
Chief financial Officer

1.2.3 management profile, experience and role in the company

The management team consists of experienced professional with many years of experience each in its domain of competence.

Angelo Consoli Managing director

- Co-founder and managing director of SAPHYRION.
- M. Sc. in Electrical Engineering from ETH, Zürich in 1989.
- Member of the Swiss Experts Commission for Space Affairs.
- Experience in telecommunications (Siemens AG, AIG, ...) as HW & SW developer.
- Aerospace programme manager and project manager Nemerix SA.
- Lecturer for telecommunications and security at the university of applied sciences of southern Switzerland (SUPSI).

Steve Crivelli Chief financial officer

- Co-founder and CFO of SAPHYRION.
- Bachelor in Business and Economics administration at SSQEA (now SUP) in 1997.
- Diploma of Swiss certified specialist for finance and accounting (SCSFA) in 2009.
- Experience in the banking system (UBS).
- Founder of Stevemarco SAGL, a company active in market survey and monitoring activities as well as financial administration and consultancy for various companies as well as the public administration.

1.2.3.1 Scientific Committee

The Scientific Committee is composed of the following members:

- Angelo Consoli
- Francesco Piazza

1.2.4 location of the decision-making centre if the company belongs to a group

SAPHYRION is an independent, privately owned small company that does not belong to any group. The company is not originated from the fusion of other companies nor from the restructuring of a prior existing entity. The whole decision making process is internally managed. SAPHYRION has currently 2 premises:

- administrative address: Via S. Maurizio 1, 6934 Bioggio;

- technical and operative address: c/o CP Startup, Via C. Maderno 24, 6900 Lugano.

The company plans to establish itself in own offices in the Lugano region by end of 2011, mainly for proximity reasons to the main facilities (technology pole, airport, train station, motorway) and for possible cooperation (e.g. for joint research projects with Academic Institutions).

1.3 description of the production process and products

1.3.1 production process and products

SAPHYRION is mainly a research and development company active in the telecommunications field. Its principal activity is the design of products for the GNSS and general data communications markets and its products are integrated circuits, PCB-level products and software (mainly firmware).

The design, lab test and validation of all products is done in-house while the whole production - except for the construction of small numbers of PCB-level prototypes - is outsourced to companies in Ticino (whenever possible) or in Europe (i.e. a fabless model is used).

The company also offers consultancy and support services for technology projects. This activity of system and subsystem development and testing is often directly related to the sales of SAPHYRION's products.

1.3.2 any special activity in the area of research and development

In addition to the development of an own product line, important research activities are carried out. SAPHYRION works is contracted from European entities (e.g. the European Space Agency) for the study and development of innovative solutions.

In addition to the direct negotiation of contracts, the company takes part to call for proposals in open competition as coordinator or member of consortia focused on specific topics, in line with the company business strategy. These activities guarantee a good level of visibility and good relationship with key players on the market (e.g. RUAG Space and ThalesAleniaSpace), which are the future customers of the company.

The research and development activities requiring a high level of know-how are mainly the following:

- GNSS Base-band processor and firmware (know-how available in-house).
- Antenna beam forming (in collaboration with an external institute).
- RF design, IC and subsystems (know-how available in-house).
- Radiation tolerant IC designs (know-how available in-house).

1.3.3 any partners in the production process

The following table shows the partners needed in the value chain.

The partners and suppliers are classified in 2 product typologies of SAPHYRION:

- Chip production
- Printed circuit boards (PCBs), which are designed and produced with two objectives:
 - as a part of subsystem, therefore offered on the company's product catalog,
 - as a test board, used to test and validate the chips under development.

The partners currently active for the SAPHYRION's business are shown with their principal function in the production chain. Other partners will be searched when needed.

Integrated circuits:

Silicon production	AMS, Austria
Ceramic substrates	KYOCERA, Japan, Germany
Metal Lids	KYOCERA, Japan, Germany; Williams, United Kingdom
Device assembly	AEMtec, Germany; Micross (TS2micro), United Kingdom
IC testing and qualification	ROOD Microtec, Germany

PCB subsystems and products

PCB manufacturing	Micro PCB, Thundorf, Switzerland Eurocircuits (Switzerland, France, Germany)
PCB assembly	Deving SA, Mendrisio, Switzerland HYBRID - Microbonding SA, Chez Le Bart, Switzerland Metallux SA, Mendrisio, Switzerland

1.4 sales markets

1.4.1 shares of total sales by outlet markets and different product families

SAPHYRION is a young company that was founded in March 2009. Since all products are in development or just planned no sales exist today.

1.4.2 (last 3 years and outlook for the next 3 years)

list of customers representing more than 10% of sales (name and share of sales)

Being a young company, SAPHYRION has no consolidated customer portfolio for the moment. Several contacts are actively producing important cooperation and may take to mandates for delivery of SAPHYRION's products and consultancy for the setup phase (see 1.3.2). Important customers already active are: RUAG Space, ThalesAleniaSpace, EADS Astrium, EPFL, ALTIS Semiconductors.

1.4.3 competition and market conditions (market share, special niches, etc.)

Competition in the aerospace business is expected to come mainly from mid-sized semiconductor and communications companies that are already well positioned in that market and can invest far more money than SAPHYRION can do. The countermeasures planned are mainly:

- Attack niche markets for which larger companies show little interest. Stay away from the mainstream. The rad-hard space market is a relatively free niche, especially if RF ASIC designs are considered.
- Enter markets at the very beginning, when they are (still) small, or possibly almost non-existent. The Galileo market is very new and still relatively unencumbered, especially if services other than E1 are considered.
- Exit markets when they become too big, require high investments and larger companies start to show too much interest.
- Work with partners, especially with the ESA, in order to have customers in advance, before a new development starts. ESA-funded consortia are particularly well suited to small companies like SAPHYRION.

1.4.4 sales organisation structure

SAPHYRION relies on external partners for its sales. Sales is currently planned to be either via ESA or via some partner that participated to the development or at least to the consortium that lead to the development of a given product. SAPHYRION doesn't currently have an own sales organization department as it focuses on research and development activities for this starting phase. Apart from the promotion made by the partners, SAPHYRION will:

- Publish all necessary documents (brochures, data sheets, applications notes, etc.) on its website (www.saphyrion.ch).
- Participate to conferences and exhibits, mainly the ones organized by ESA.

A part-time business development and sales partner is planned to be hired within the first 3 years of activity, if a good one can be found. Finding skilled sales and business development people seems an exceedingly difficult job in fact, often resulting in large expenses and very little return, while in the aerospace business factual data, relationship as well as word-of-mouth are much more important than advertising and promotion.

The products are planned and developed together with partners like RUAG Space AG (Switzerland, Austria and Sweden), Thales Alenia Space (France and Italy), Skysoft (Portugal) and GMV (Spain). Other potential partners and customers like SSTL (UK), EADS Astrium (Germany) and Carlo Gavazzi Space have shown already a strong interest in SAPHYRION's activities and products.

1.4.5 any sales partners

SAPHYRION relies on the sales potential of its business partners.

The support of the Swiss Space Office plays an important role for the visibility of the company and its products at European level and for their deployment in ESA missions. Actually 2 missions with SAPHYRION space ASICs are planned to be launched: SWARM and the SENTINEL programs.

1.5 personnel

1.5.1 see table on next page (present and future jobs)

1.5.2 any comments on personnel structure (trend, training, re-training, etc.)

SAPHYRION is a research and development company focused on the aerospace market. As such it will always require highly trained personnel, graduated mainly from ETH, SUP or other polytechnic institutes. Some difficulty in finding the right personnel on the job market in Ticino can therefore be anticipated.

At the moment, the company counts exclusively graduated personnel.

The policy of the company being focused on the creation of new work places in Ticino with local resources (whenever possible), the technical team at SAPHYRION is composed by experienced/senior staff (4 former Nemerix employees) and young local staff (2 SUPSI electrical engineers).

By the end of 2010, the company plans to create 2 additional work places for 2 engineers (an electrical and an information technology) with bachelor and/or master degree from high schools in Ticino (SUPSI and/or USI).

As all production is outsourced, semi-skilled or unskilled personnel is not needed at SAPHYRION. Since electronic production requires high investments it is very unlikely that SAPHYRION may decide to make any production in-house. The expected production numbers will not justify any expense on this front.

1.5.1 present and future jobs

	PRESENT JOBS (year 2009) for existing companies					PLANNED JOBS				
	Total	Of which cross- border personnel	Men	Women	Average annual salary or wage 2009	Total planned jobs *				
						2010	2011	2012	2013	2014
Top and middle management	1		1		110'000				1	
Research and development										
- graduates or technicians	1.6		1.6		90'000	1	1			1
- qualified personnel					70'500					
- semi-qualified and unskilled personnel					48'000					
Production and control										
- graduates or technicians	1		1		65'000	1		1		1
- qualified personnel					55'000					
- semi-qualified and unskilled personnel					45'000					
Services and administration										
- graduates or technicians					70'000		0.5			
- qualified personnel					60'000					
- semi-qualified and unskilled personnel					42'000					
Other jobs (to be specified)										
- graduates or technicians										
- qualified personnel										
- semi-qualified and unskilled personnel										
Total	4		4			2	1	1	1	2
Company personnel	4		4			7	8	9	10	12
Administrative apprentices										
Technical apprentices										

* after project implementation (existing and new companies)

2. Information on the project

2.1 description of the project

The intention of this project is to develop the building blocks needed to make a multi-standard GNSS navigation system. These blocks consist of:

- A GNSS base-band processor for GPS L1/L5 and Galileo E1/E5a signals (on FPGA).
- RF front-end ASICs and subsystems.
- Antenna beam forming system for antenna arrays up to 9 elements.
- Inertial navigation system with 3-axis accelerometers, gyros and magnetometers (compass).
- Firmware and algorithms for the GNSS base-band processor.

The target market is civil aerospace and professional ground-based applications. The customers for this system will be mainly the European Space Agency (ESA) and its partner companies.

2.2 strategic motivation of the investment (possibly supported by market research data)

According to ESA database, currently there is no European supplier of RF ASIC solutions for the civil aerospace market. SAPHYRION, with its multi-frequency RF front-end ASICs, will be one of the leaders in the European market in this field. Most European high-end GNSS systems available today are meant mainly for static (reference, monitoring) applications. SAPHYRION's system is designed for moving platforms and – differently from other mobile (mainly military) systems it will not be under market or export restrictions.

In addition to several market surveys and declaration of interests of potential future customers, SAPHYRION defined its product line for the space borne devices after having studied the ESA's technical dossier on European Space Technology Harmonization for On board Radio Navigation Receivers (A. Garcia-Rodriguez (TEC-ETN), 16 April 2008). This publication presents the technology status overview (also showing the SAPHYRION's SY10xx under qualification) and draws the mission needs and market perspectives of GNSS-based space applications. It presents also the road map of the proposed ESA activities and their requirements. The market estimate for on board navigation receivers leads to an annual average potential accessible market of some tenth of devices, which will be sold together with engineering activity to design and develop a reference board available for the different missions. Taking this idea to the next level, SAPHYRION intends to use its devices and its expertise to develop subsystems, particularly systems needing high RF skills.

2.3 innovative features of the project

2.3.1 complete list of new products and/or technological innovations at the planned level

GNSS base-band processor handling the following signals:

- GPS L1 C/A-code and L5 (maybe also GPS P(Y)-code).
- Galileo E1, E5a.
- Supports various aiding mechanisms (e.g. INS).
- Autonomous, ESA Leon-2 (SPARC V8) processor on-board.
- FPGA design, may be converted to ASIC if market requires it.

GNSS 3 and 6 channel data logger:

- GNSS recording and replay system.
- Records 1 to 6 GNSS signals in any combination.
- Digital channel filtering and decimation.
- Output is I/Q centered around 0Hz.

GNSS RF front-end ASICs handling the following signals:

- GPS L1, L2 and L5 (C/A-code, P(Y)-code, L1c and L2c).
- GLONASS L1 and L2.
- Galileo E1, E5a, E5b, E5ab, E6.

Inertial navigation platform:

- 3-axis gyros.
- 3-axis accelerometers.
- 3-axis magnetometer (compass).
- Tight GNSS/INS coupling.

Antenna beam forming system:

- For GNSS receiver application.
- Supports arrays of 3 to 9 antennas.
- Up to 16 independent beams (pointed towards SVs).
- For C/No enhancement (up to 9.5dB with 9 antennas) and interference rejection.

OFDM receiver for GNSS aiding:

- Uses digital radio/TV broadcasting channels (DAB, DRM, DVB).
- Does not depend on cellphones – service can be for free.
- Transmits SV ephemeris, precise time and (if available) approximate position.
- Low data rate (100-200bps), does not impact main radio service significantly.

2.3.2 how the products are innovative and advanced from a technological standpoint

First GNSS RF integrated circuits fulfilling ESA ESCC9000 requirements for space applications.
First base band processors for dynamic applications handling GPS, Galileo signals and INS.
First mobile antenna beam former for civil applications (interference rejection, heading determination and C/No improvement).
Small form factor GNSS data logger for mobile applications (current data loggers are large format systems for static laboratory use).
Use of digital broadcast radio (DAB, DRM) as a means to transmit GNSS aiding.

2.3.3 place where the investment will be implemented

The largest part of the investment will be mainly in salaries and IC design software (likely Cadence).
Apart from that, important investments are expected in suppliers and assembly companies.

2.4 repercussions of the project on company structure, production, research and development, marketing, etc.

As soon as the SY10xx devices are complete and qualified they can be sold to customers. This means that customer support needs to be built. Apart from preparing all the necessary documentation (data sheets, applications notes, qualification and quality reports), technical support needs to be made available. Its task is to reply to customer's questions, possibly solve their problems, review their designs, make needed corrections and in some cases actually do the design-in. One or two field applications engineers may need to be hired, especially after the dual channel RF front-end becomes available.

The development of the GNSS base-band processor is at this time mainly based on computer software, simulations and tests with simulated GNSS signals, and can currently be handled by the available design group. As soon as the design evolves however the need for sophisticated software development, validations, field tests etc. will substantially increase, while customer support will again be necessary. New workforces, both in the development/test and in the field applications will likely need to be hired.

If the GNSS base-band processor is ported to a semi-custom ASIC there will be need for integrating, validating and qualifying it. The use of a semi-custom ASIC, although it is not the cheapest per-piece solution, will result in substantially simplified design since the largest part of the prototyping and validation can be done on FPGAs. IC validation and qualification will however still be needed. This task will likely be handled by the same people currently handling the productization of the SY10xx devices.

Given the high-value nature of these devices, sales is currently planned to be either via ESA or via some partner. On SAPHYRION's website some promotion material as well as all necessary documents (brochures, data sheets, applications notes, etc.) will be published, while the participation to conferences and exhibits is planned (mainly the ones organized by ESA). Apart from that no further effort is planned on the Sales front. In the aerospace business factual data as well as word-of-mouth are much more important than advertising and promotion. If possible the sales structure will remain like that.

3. Financial aspects (see attachment 1: profit and loss sheet)

3.1 deadlines

3.11 schedule for the implementation of the various stages of the investment project

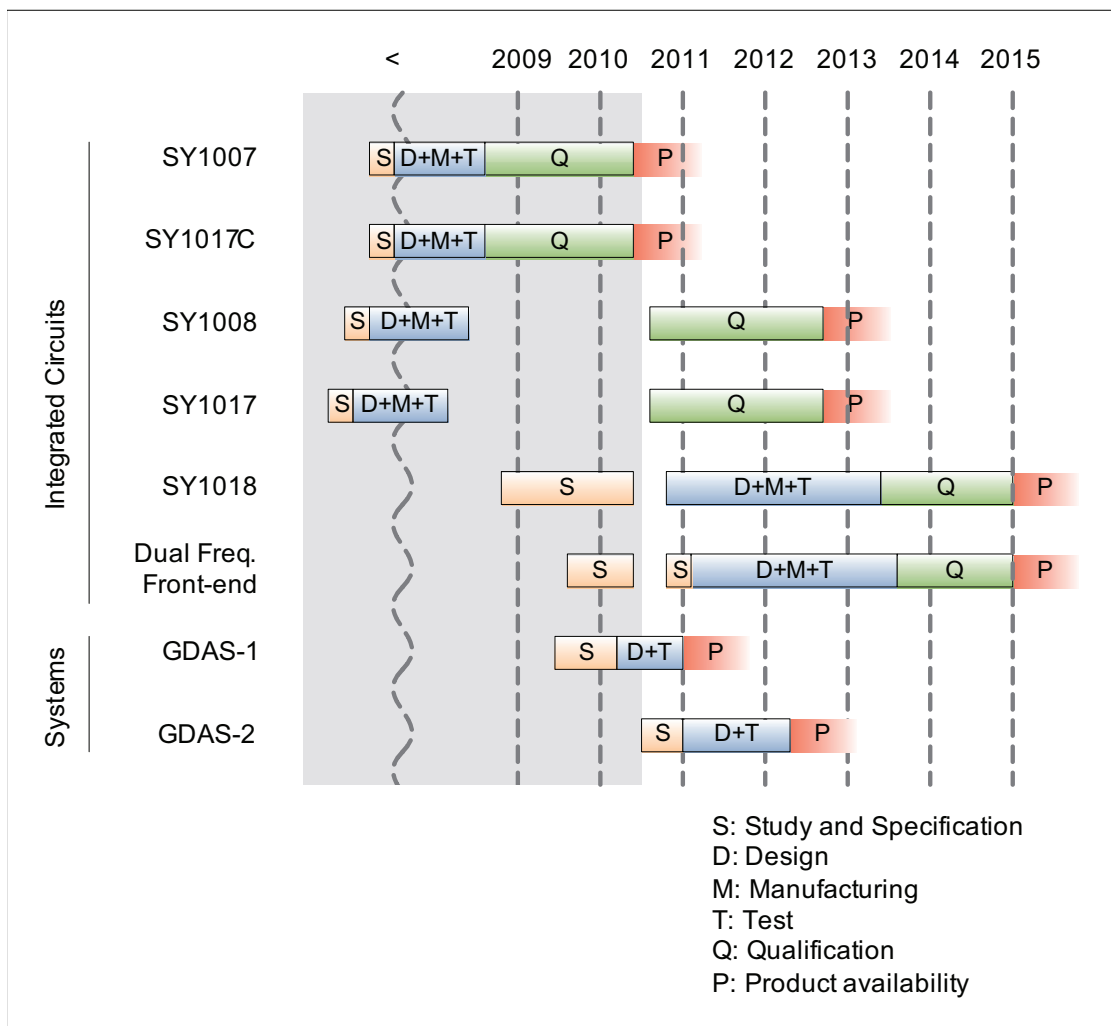


Figure 1: road map for SAPHYRION products

The **SY1007** and **SY1008** ASICs are radiation hardened L-band RF down-converters for GNSS receivers aimed at the professional and space markets. These devices are designed in a 0.35µm SiGe process and include all functional blocks needed to implement the complete RF front-end of multi-band GNSS receivers. They directly interface to the SAPHYRION base-band products and to ESA AGGA-4 GNSS base-band processor.

The **SY1017** ASIC is a radiation hardened AD/DA-converter and interface ASIC. It is synergistically designed to operate together with the SY1007 and SY1008 GNSS RF front-ends and its purpose is to interface these two devices to a digital GNSS base-band processor.

The **dual-channel RF front-end** and the **SY1018** are GNSS RF front-end and ADC/DAC ASICs respectively and represent next-generation devices. By offering wide-band RF path and a higher sampling frequency than the SY1017, these devices will be able to receive all GNSS signals, including Galileo E5ab.

The **GNSS base-band processor** currently under development is meant to process GPS L1 C/A-code and Galileo E1 and E5a signals. This device will be augmented with **antenna beam forming** and **inertial navigation (INS)**, in order to cope with weak signals, interferences and to be able to give a valid navigation solution in the complete absence of GNSS signals (e.g. inside tunnels or if heavy jamming is present). It is a fully autonomous system, and uses a ESA Leon-2 (SPARC V8) processor on which both navigation firmware and application software can be executed.

The **GNSS data logger** is a device meant to record and replay up to 6 independent GNSS signals. This system acquires 1 to 6 GNSS raw signals from its RF front-ends in any combination and transmits them to a computer (via a USB-2 interface) where they are processed. It is mainly a scientific instrument used for signal analysis and for base-band algorithms development. Differently from currently available GNSS logging systems, this device is meant for portable/mobile applications and will therefore have a suitably small form factor and reduced power consumption. The device includes digital channel filtering and decimation – freely programmable by the user – and its output is near base-band I/Q. The RF section uses the SY10xx ASICs while the digital section is implemented on a FPGA.

In order to improve signal acquisition and navigation performances under poor GNSS signal conditions (e.g. in urban canyons), GNSS aiding can be used. Aiding via cellphones is today well standardized and used, although it has a service cost and is less than practical in many applications where a cellphone interface is not typically present (e.g. car navigation). By transmitting GNSS aiding over existing **DAB/DRM** broadcast networks (**OFDM** modulation) that limit can be overcome, and aiding be transmitted on an already deployed, strong and easily receivable channel that is already used by navigators (e.g. for traffic information). The drawback is that – due to the large size of some broadcasting networks (SFN or large short-wave circuits) - position is not always known with sufficient accuracy and approximations or assumptions need to be done.

3.1 Summary of investments and financing

Investments

Yearly recurrent investments		Amount in ,000 CHF	
		Period (2010 – 2012)	
Leasing of software and infrastructures			
	Infrastructures		180
	software		259
Research, Development and Prototype			
	personnel		1'051
	materials		126
Total investments			1616

Financing of the project

Financing of the project: self funding		Amount in ,000 CHF	
		Period (2010 – 2012)	
	owner's equity		1616
Total financing			1616

4. Miscellaneous

4.1 existing bank relationship(s)

4.1.1 list and name of relationship(s) manager

RAIFFEISEN BANK, Via Indipendenza, 6826 RIVA SAN VITALE

4.2 auditors

No auditing company selected until present.

4.3 company insuring the building and the machines

The technical infrastructure (IT as well as lab equipment and development tools) is hired from different, specialized external entities.

4.4 comments

5. Declaration

I declare that the information given in this questionnaire is complete and true.

By signing this form, the undersigned authorises other cantonal services to provide to the Sezione della promozione economica any complementary information concerning the company that may be required.

Place and date:

Signature and title of the authorised signatory:

Bioggio, 16.07.2010

Steve Crivelli, Cheaf Financial Officer

List of enclosures

1. Profit and loss sheet
2. Detail of products and services revenue

The economic promotion can request other documents: balance sheet and cash flow outlook, details on social contributions and taxes, agreements, construction permit, etc.

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
RICAVI												
(provvisorio)												
TOTALE RICAVI	381'000	1'117'500	1'341'000	1'743'750	1'800'000	2'100'000	2'475'000	2'805'000	3'093'500	3'358'000	3'611'000	3'921'500
- 1007+1017		464'100	516'000	228'750	200'000	150'000	110'000	55'000	46'000	46'000	46'000	11'500
- 1008		0	345'000	315'000	250'000	250'000	330'000	385'000	402'500	460'000	460'000	287'500
- 1018		90'000	0	750'000	300'000	400'000	440'000	440'000	460'000	460'000	460'000	345'000
- GNSS Data Acquisition System (GDAS-1)		121'500	0	375'000	400'000	350'000	440'000	495'000	575'000	575'000	575'000	402'500
- servizi		246'600	390'000	0	450'000	500'000	550'000	550'000	575'000	575'000	575'000	920'000
- moduli con circuiti integrati saphyrion		195'300	90'000	75'000	200'000	250'000	220'000	220'000	230'000	230'000	230'000	230'000
- prossima generazione di circuiti integrati (2channel RF FE)						200'000	385'000	495'000	460'000	552'000	805'000	1'035'000
- nuovo prodotto: ricevitore completo Galileo GPS Glonass								165'000	345'000	460'000	460'000	690'000

COSTI

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
TOTALE COSTI	418'700	1'042'923	1'448'421	1'629'611	1'606'801	1'812'181	1'960'562	2'305'732	2'616'616	2'831'469	3'128'432	3'276'812
Totale Costi del personale	140'000	355'523	593'521	667'711	741'901	890'281	1'038'662	1'187'042	1'335'422	1'483'802	1'632'183	1'780'563
No. collaboratori	4	7	8	9	10	12	14	16	18	20	22	24
Totale costi diretti	277'700	673'000	794'000	901'000	804'000	861'000	861'000	1'037'333	1'198'438	1'263'628	1'410'984	1'410'984
Noleggio attrezzature	48'000	80'000	80'000	80'000	80'000	80'000	80'000	80'000	80'000	80'000	80'000	80'000
Licenze software	0	125'000	110'000	110'000	135'000	135'000	135'000	230'000	320'000	320'000	405'000	405'000
Prestazioni di terzi	11'1'000	240'000	240'000	260'000	260'000	260'000	260'000	294'667	324'974	352'760	379'337	379'337
Servizi esterni	100'700	138'000	243'000	300'000	243'000	275'000	275'000	311'667	343'722	373'111	401'222	401'222
Materiale	1'000	60'000	85'000	120'000	50'000	75'000	75'000	85'000	93'742	101'758	109'424	109'424
Spese di rappresentanza	3'000	6'000	8'000	6'000	8'000	8'000	8'000	8'000	8'000	8'000	8'000	8'000
Viaggi all'estero su progetto	14'000	24'000	28'000	25'000	28'000	28'000	28'000	28'000	28'000	28'000	28'000	28'000
Totale altri costi	1'000	14'400	60'900	60'900	60'900	60'900	60'900	81'357	82'756	84'038	85'265	85'265
Pigione	1'000	0	30'000	30'000	30'000	30'000	30'000	47'143	47'143	47'143	47'143	47'143
Costi accessori	0	0	3'000	3'000	3'000	3'000	3'000	4'714	4'714	4'714	4'714	4'714
Riparazioni, servizi veicoli	0	0	2'000	2'000	2'000	2'000	2'000	2'000	2'000	2'000	2'000	2'000
Carburanti veicoli	0	0	10'000	10'000	10'000	10'000	10'000	10'000	10'000	10'000	10'000	10'000
Assicurazioni veicoli	0	0	1'500	1'500	1'500	1'500	1'500	1'500	1'500	1'500	1'500	1'500
Materiale d'ufficio	0	2'000	2'000	2'000	2'000	2'000	2'000	2'267	2'500	2'714	2'918	2'918
Telefono	0	5'000	5'000	5'000	5'000	5'000	5'000	5'667	6'249	6'784	7'295	7'295
Onorari tenuta contabilità	0	5'000	5'000	5'000	5'000	5'000	5'000	5'667	6'249	6'784	7'295	7'295
Piccoli investimenti	0	2'400	2'400	2'400	2'400	2'400	2'400	2'400	2'400	2'400	2'400	2'400

RISULTATO D'ESERCIZIO

+ Utile / - perdita	-37'700	74'577	-107'421	114'139	193'199	287'819	514'438	499'268	476'884	526'531	482'568	644'688
+ Utile / - perdita cumulata	-37'700	36'877	-70'544	43'595	236'794	524'613	1'039'051	1'538'319	2'015'202	2'541'733	3'024'302	3'668'990

Dettaglio cifra d'affari		Ripartizione cifra d'affari per prodotto/servizi									
Anno	Moneta	Cliente	Nazione	circuiti integrati			GDAS	servizi	moduli con circuiti integrati SAPHYRION	per anno in CHF	
				1007+1017	1008	1018					
2010	EUR	Ruag Space AG, Austria	Austria	220'000							
	EUR	Ruag Space AG, Austria	Austria	75'000							
	EUR	TESV, Francia	Francia	7'800							
	EUR	Carlo Gavazzi Space, Italia	Italia	1'400							
	EUR	Ruag Space AG, Austria	Austria	5'200							
	EUR	ESA, Olanda	Olanda		60'000						
	EUR	GMV, Spagna	Spagna				21'000				
	EUR	Thales Alenia Space, Francia	Francia				60'000				
	EUR	Pegasus SPA, Italia	Italia					1'200			
	EUR	Altis Semiconductor SA, Francia	Francia					140'000			
	CHF	Pariani srl, Italia	Italia					34'800			
	EUR	EC, Belgio	Belgio						100'000		
	EUR	Thales Alenia Space, Francia	Francia						16'200		
	EUR	Thales Alenia Space, Francia	Francia						14'000		
	TOTALE										1'117'500
	2011	EUR	Ruag Space AG, Austria	Austria	100'000						
EUR		Ruag Space AG, Austria	Austria	100'000							
EUR		diversi clienti	EU	39'000							
EUR		Ruag Space AG, Austria	Austria	75'000							
EUR		Ruag Space AG, Austria	Austria	30'000							
EUR		Altis Semiconductor SA, Francia	Francia					260'000			
EUR		EC, Belgio	Belgio						10'000		
EUR		EC, Belgio	Belgio						50'000		
EUR		ThalesAleniaSpace, Italy	Italia		80'000						
EUR		ESA, Olanda	Olanda		150'000						
TOTALE										1'341'000	
2012		EUR	clienti diversi	EU	87'500						
	EUR	clienti diversi	EU	65'000							
	EUR	ESA, Olanda	Olanda			500'000					
	EUR	clienti diversi	EU				250'000				
	EUR	ThalesAleniaSpace, Italy	Italia		100'000						
	EUR	ESA, Olanda	Olanda		110'000						
EUR	clienti diversi	EU						50'000			
TOTALE										1'743'750	
RICAVI				EUR	805'900	440'000	560'000	331'000	401'200	240'200	
				CHF					34'800		
TOTALE in CHF				1'208'850	660'000	840'000	496'500	636'600	636'600	360'300	

Short description of Saphyrion's personnel

Name	Curriculum vitae	Empl. rate
Angelo Consoli (1965)	Co-founder and managing director at Saphyrion. MSc degree in Electrical Engineering from Swiss Federal Institute of Technology, Zurich (ETHZ), specialization: telecommunications.	50%
Steve Crivelli (1971)	Co-founder and chief financial officer at Saphyrion. School of management and business administration (SSQEA, now SUPSI). Swiss Certified Specialist for Finance and Accounting.	50%
Francesco Piazza (1962)	Former Nemerix founder and chief scientist. Chief scientist at Saphyrion. PhD at Swiss Federal Institute of Technology (ETH) Zürich.	100%
Joel Brenner (1972)	Team leader and senior GNSS system engineer at Saphyrion. BSc degree in Electrical Engineering from University of Applied Science of Southern Switzerland (SUPSI), specialization: telecommunications.	100%
Roberto Materni (1976)	Senior RF IC designer at Saphyrion. MSc in Electronic of Engineering at the University of Pavia, specialization in Microelectronic.	60%
David Francescato (1979)	Software developer at Saphyrion. Dipl. Ing. FH in Information Technologies from the University of Applied Sciences, Winterthur (ZHAW), specialization: Software Development	100%
Lorenzo Moriggia (1981)	Telecommunications and application engineer at Saphyrion. BSc in electrical engineering at SUPSI. Degree in electrical engineering at the Department of Innovative Technologies of SUPSI.	100%
Athos Ghiggi (1985)	Software developer and algorithm designer at Saphyrion. BSc in electrical engineering at SUPSI. MSc in Intelligent Systems at USI.	100%