CONVENTION SUR L'INTERDICTION DE LA MISE AU POINT, DE LA FABRICATION ET DU STOCKAGE DES ARMES BACTERIOLOGIQUES (BIOLOGIQUES) OU A TOXINES ET SUR LEUR DESTRUCTION

Mesures de Confiance de 2015

Rapport de la Belgique sur les activités en 2014

Soumis le 24 avril 2015

Version publique

Formules révisées pour les informations à présenter dans le cadre des mesures de confiance

À la troisième Conférence d'examen, il a été convenu que tous les États parties présenteraient la déclaration ci-après, modifiée par la suite à la septième Conférence d'examen:

Mesure	*Rien à déclarer*	*Rien de nouveau à déclarer*	*S'il n'y a rien de nouveau à déclarer, indiquer l'année de la dernière déclaration*	*Page*
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Date: 15 avril 2015 - État partie à la Convention: Belgique - Date de ratification de la Convention ou d'adhésion à celle-ci: le 10 juillet 1978

Point de contact national: Frank MEEUSSEN - Tel. +32 2 501 87 61 - frank.meeussen@diplobel.fed.be - Service Publique Fédérale Affaires Etrangères, Commerce Extérieure et Coopération au Développement - Directorat pour la Non-Prolifération, le Désarmement et le Contrôle sur les Armes.

Formulaire A – Partie 1 : échange de données sur les centres de recherche et laboratoires

Formule A − Partie 1 i)

Niveau de sécurité biologique 4 - Rien à déclarer

Formule A − Partie 1 ii)

Si aucune installation BSL4 n'est déclarée dans la formule A, partie 1 i), indiquer le niveau de sécurité biologique le plus élevé mis en œuvre dans les installations manipulant des agents biologiques[1] sur le territoire de l'État partie:

Niveau de sécurité biologique 3[2]	oui
Niveau de sécurité biologique 2[3] (le cas échéant)	oui

Toute autre information utile:

Le Laboratoire Fédéral d'Orientation/Federaal oriëntatielab (FOL) est un laboratoire de niveau de sécurité équivalent à 3 qui a été créé au sein des laboratoires de la défense (DLD) pour réceptionner et traiter des échantillons suspect à caractère CBRN. Ce laboratoire est possède les équipements de protection nécessaires pour travailler aussi bien sur des agents chimiques, biologique ou radiologique en ce y compris des échantillons pouvant contenir plusieurs dangers simultanément.

La mission du laboratoire fédéral d'orientation est de réceptionner des échantillons suspects à caractère inconnu (Exemple des enveloppes à poudre), d'évaluer les dangers éventuellement présents dans ces échantillons (pré-analyses) et de préparer des sous échantillons de manière sécurisée en vue de l'analyse de ces sous-échantillons par les laboratoires de référence nationaux. Ainsi, lorsque le laboratoire de référence spécialisé réceptionne un échantillon émanant du FOL, il peut être certain que si ce sous-échantillon contient un danger, seul le danger contre lequel le laboratoire spécialisé est protégé peut encore être présent. Autrement dit, un échantillon qui sort du FOL et qui arrive au laboratoire d'analyse chimique ne contient plus que le danger chimique. Donc, cela veut dire que ces échantillons ont été biologiquement inactivés. L'échantillon destiné au laboratoire biologique ne contiendra plus que le danger biologique. Cet échantillon sera emballé dans trois barrières ; chaque barrière étant décontaminée.

Depuis l'inauguration du FOL en 2009, de nombreuses recherches ont été effectuées en vue de mettre au point des procédures permettant la sécurisation. Différentes études ont été réalisées ou sont encore en cours afin de « séparer » les différents dangers potentiellement présent dans un échantillon. Les résultats d'une de ces études, la DLD02, sont actuellement en phase de mise en service dans les procédures appliquées au FOL par le chercheur engagé sur cette étude.

[1] Micro-organismes pathogènes pour l'homme et/ou l'animal.

[2] Conformément à la dernière version du *Manuel de sécurité biologique en laboratoire* de l'OMS, du *Manuel terrestre* de l'OIE ou d'un autre ouvrage équivalent reconnu au plan international.

[3] Conformément à la dernière version du *Manuel de sécurité biologique en laboratoire* de l'OMS, du *Manuel terrestre* de l'OIE ou d'un autre ouvrage équivalent reconnu au plan international.

Formulaire A - Partie 2 : échanges d'information sur les programmes nationaux de recherche-développement en matière de défense biologique

Formulaire A - Partie 2 (i)

Déclaration de programmes nationaux de recherche-développement en matière de défense biologique : **OUI**

Formulaire A - Partie 2 (ii)

Au sein du DLD-Bio/CTMA, un programme était en cours au sein de la Défense pour l'année 2014. Ce programme couvert les études suivantes:

Etude MED 08 (prolongation de l'étude MED 03) :« Identification rapide et spécifique des microorganismes du bio-terrorisme dans les milieux difficiles (les échantillons biologiques et environnementaux, notamment sol, air, sang, pus, matières fécales) »

Etude MED 04 :« Profil de résistance et de virulence génétique bactérienne aux antibiotiques recommandés dans le traitement des agents biologiques bactériens »

Etude MED 05 et 06 :« Diagnostic rapide des agents biologiques viraux hautement contagieux par technologie moléculaire »

1. Objectifs :

Développement des méthodes d'identification des agents biologiques (bactéries, virus et champignons) dans les matrices difficiles. Développement des méthodes rapides de détection de la résistance des agents biologiques aux antibiotiques

a) Détection spécifique de *Mycobacterium avium subsp. paratuberculosis* par PCR en temps réel dans les matières fécales de veaux atteints de la maladie de Johne ;

b) Développement d'une méthode de discrimination entre *Mycobacterium tuberculosis* complex *Mycobacterium avium subsp. avium* et *Mycobacterium avium subsp. Paratuberculosis ;*

c) Optimisation de méthodes d'extraction d'acides nucléiques dans les échantillons biologiques et environnementaux ;

d) Développement et optimisation des méthodes de séparation entre agents biologiques dangereux et agents chimiques ;

e) Détection des staphylocoques (staphylocoques dorés, staphylocoques coagulase-négative, staphylocoques multi-résistants) dans les liquides biologiques (liquide céphalo-rachidien, produit de lavage bronchiolo-alvéolaire, liquide d'ascite, spondylodiscite, prothèses artificielles, tissus et le sang de patients infectés) ;

f) Détection spécifique des bactéries gram négative impliquées dans des infections nosocomiales (*H. Influenza, Enterobacter aerogenes & cloacae, Citrobacter freundii, E Coli, Acinetobacter baumanii, Morganella, Proteus mirabilis & vulgaris, Klebsiella pneumoniae & oxytoca, Serratia marcescens*) ;

g) Détection spécifique des bactéries pathogènes susceptibles d'être utilisées dans le bioterrorisme (*Bacillus anthracis, Burkholderia mallei, Burkholderia pseudomallei, Yersinia pestis, Brucella, Francisella tularensis*) ;

h) Détection spécifique des orthopoxvirus (variole, vaccine, monkeypox) et parapoxvirus ; détection spécifique des virus des fièvres hémorragiques (CCHF) et du virus de l'encéphalite équine (VEE) ;

i) Détection des agents fongiques pathogènes pour l'homme ;

j) Développement d'une méthode moléculaire de détection rapide de la résistance aux fluoroquinolones chez *Acinetobacter baumannii* et chez les *Enterobacteriaceae ;*

k) Développement et validation d'une biopuce pour la détection des marqueurs de la résistance aux beta-lactamases et aux aminoglycosides ;

l) Développement d'une capacité opérationnelle mobile (laboratoire déployable de génétique moléculaire) pour la détection et l'identification des agents pathogènes endémiques et épidémiques (développement du prototype et validation en condtions opérationnelles lors d'un déploiement militaire en avril-mai 2009, Kananga, Kasaï occidental, République Démocratique du Congo – déploiement opérationelle en Guinée depuis décembre 2014).

2. Financement : Voir A.2 iii)

3. Non, ce programme est exécuté en milieu universitaire [adresse du labo : cfr Partie 3 (iii)].

   La partie universitaire du programme est connectée à des partenariats technologiques industriels et permet le développement d'activité de type spin off. Les fonds militaires (matériel et financement) sont octroyés à titre scientifique et destinés exclusivement au développement des projets, SANS contrepartie. Nous sommes attentifs à la protection de la propriété intellectuelle des développements technologiques. Ces protections (brevets ou accords de licence) visent en effet à protéger la valorisation des développements technologiques d'intérêt menés en collaboration avec des entreprises actives en biotechnologie.

4. Voir A.2 iii)

5. Nihil

6. Hiérarchie :

   a. Hiérarchie sur le site
   - Professeur JL. Gala, Med Col, coordonnateur du programme de recherche,
   - 1 Dr en médecine et Dr en Sciences (MD, PhD),
   - 4 Dr en sciences (PhD),
   - 2 Dr en Sciences Appliquées et Ingénieur,
   - 7 Licenciés,
   - 3 techniciens A1: assistance technique,
   - Intervention ponctuelle des techniciens du laboratoire de biologie moléculaire

   b. Hiérarchie militaire
   - Directeur (coordonnateur) des études MED 04, 05, 08, 20 et LAND 06
   - PdC ACOS Ops&Trg pour la R&T
   - DG-FMn / R&T
   - Comité de Coordination R&T
   - Comité Directeur R&T
   - Chef d'Etat-major de la Défense (CHOD)
   - Ministre de la Défense (MDN)

7. Déclaration

Voir le formulaire A partie 2 (iii)

Formulaire A - Partie 2 (iii)

Installations du DLD sur site de l'UCL (CTMA/DLD-Bio) (1er Programme)

1. Nom de l'installation :
   (a) Centre de Technologies Moléculaires Appliquées / DLD-Bio (CTMA/DLD-Bio)
   (b) BLS3 (laboratoire de classe 3) ; Université Catholique de Louvain, Louvain-La-Neuve
   (c) Disponible, procédure d'accréditation en cours : DLD (Laboratoires de la Defense - Defense Laboratory Department), Vilvoorde (Peutie).

2. Emplacement de l'installation
   (a) Labo : CTMA/DLD-Bio
   Université catholique de Louvain,
   Ecole de Santé Publique (ESP)
   Clos Chapelle aux Champs, 30, BP 30.46
   1200 Bruxelles.
   Localisation : ESP niveau +1
   &
   Centre de Technologie Moléculaire Appliquée - Mycologie
   Chemin du Cyclotron, 2
   1348 Louvain-la-Neuve

   (b) P3 :
   (1) UCL, Faculté des Sciences Agronomiques, Unité de microbiologie,
   Place Croix du sud,
   1348, Louvain-La-Neuve
   (2) DLD (Defense Laboratory Department),
   Quartier Major Housiau, Martelarenstraat, 181
   1800 Vilvoorde Peutie

3. Superficie des secteurs de laboratoire, par niveau de confinement (BSL= BioSafety Level).
   BSL2 : 95 m^2 (surface totale de 6 laboratoires BSL2 distincts)
   BSL3 :
   - UCL : 30 m^2 inauguré en mars 2004
   - DLD : +/- 145 m^2

   BSL4 : non disponible
   Superficie totale des laboratoires (2.a [675 m^2+ 200 m^2] + 2.b [200]) = ~1100 m^2

4. Organigramme de l'installation
   i) Total des effectifs affectés au projet : 32
   ii) Répartition du personnel
   Militaire : 10
   Civil : 22
   iii) Répartition du personnel par catégorie
   Scientifique : 17
   Technique : 10
   Administratif : 5
   iv) Liste des disciplines scientifiques représentées au sein du personnel scientifique et technique

Dr Sciences	:	10	(Dont deux Dr Médecine et deux ingénieurs)
Dr Médecine	:	2	(Sont également Dr Sciences)
Ingénieur	:	5	(Dont deux Dr Sciences, deux administratifs)
Master	:	9	

Techniciens A1 : 9
Management administratif : 2

v) Fonds extérieurs :
- Fonds régionaux ou européens ou industriels : 2 MSc Dr Sciences, 1 MSc Eng (Ir), 2 MSc, 1 technicien A1
- Fonds UCL : 1 MSc Eng (Ir) Dr Sciences, 2 MSc Dr Sciences, 1 MSc Eng, 4 MSc, 1 Administratif
- Fonds Cliniques Universitaires Saint-Luc : 2 MSc Dr Sciences, 1 Msc Eng, 4 technicien A1,1 Administratif
- Défense
  - Statutaires Défense : 1 médecin Officier supérieur Dr en Sciences, 1 médecin Dr en Sciences (MD, PhD), 1 Technicien B1
  - Contractuels Défense : 2 Dr en sciences, 2 Licenciés et 3 Techniciens B1

vi) L'activité est partiellement financée par le Ministère de la Défense (fonctionnement + matériel + personnel ventilé en 4 technologues B1 + 2 licenciés +1 MSc PhD + 1 MSc Eng (Ir) PhD + 1 MD, PhD + 1 Off Sup MD, PhD).

vii) Recherche et Développement (hors personnel) en 2014 : 402.000 €

viii) Les travaux donnant lieu à une publication internationale mentionnent les personnes directement impliquées dans l'étude (Med Col Gala, Dr Irenge, Y. Deccache, M. Bouyer, M. Bentahir, C. Dumont, E. Carlier, S. Van Cauwenberghe) ainsi que les contributeurs dont l'aide ou l'expertise ont été requises pour l'aboutissement de l'étude. L'institution militaire et l'institution universitaire d'accueil sont mentionnées ainsi que l'origine des fonds de recherche (IRSD-RSTD).

5. Rapports, abstracts, et publications

i) <u>Rapports adressés à Dg Fmn / RSTD rapports (postérieurs à 2008)</u>

1. Projets DLD-04, DLD-05 et HFM14-8 de mars 2015
2. Projets DLD-04, DLD-05, HFM14-8 d'avril 2014
3. Raport final projet MED-20 d'avril 2014
4. Projets DLD-04, DLD-05 et MED-20 d'avril 2013
5. Rapports finaux LAND-06 et MED-05 d'avril 2013
6. Projets DLD-04, LAND-06, MED-08, MED-20 et MED-05 d'avril 2012
7. Projets MED-08, MED-20 et MED-05 d'avril 2011
8. Projets MED-08, MED-20 et MED-05 d'avril 2010
9. Rapport final projet MED-04 d'avril 2010
10. Projets MED-08, MED-04 et MED-05 d'avril 2009

ii) <u>Abstracts / oral presentation (postérieures à 2008)</u>

2014

- SES and Luxembourg Air Rescue, discussion Demo phase of the B-LiFE project, Luxembourg 08/01/2014.
- Kick off meeting of the European Community's Seventh Framework Programme project FP7-SEC-MIRACLE [MobIle Laboratory for the Rapid Assessment of CBRN Threats Located within and outside the EU (CTMA coordination)] (Coordination CTMA) 13-14 Januari 2014.
- MIRACLE as a case illustrating selected CBRN-E projects and the way of Strengthening Science-Policy-Industry in the CBRN-E sector; Brussels, 30th January 2014; organised under the EDEN Demonstration Project, Brussels
- The Belgian National Contact Points and the Belgian Programme Committee members for Horizon 2020 - Societal Challenge Secure Societies Friday 31 January 2014.
- Participation of Prof JL Gala as expert to the final conference of European Community's Seventh Framework Programme, Project FP7-SEC-SLAM [Standardisation of Laboratory

Analytical Methods]; Workshop on harmonization of European analytical capability for CBRN incidents. Hotel Renaissance, Brussels, 19th Februari 2014.

- Participation of Prof JL Gala as expert to the European Community's Seventh Framework Programme, FP7-SEC-project CATO [CBRN Architectures, Technologies and Operational procedures): user Workshop; 12-13 March 2014, Berlin.
- KHID/Royal Higher Institute of Defence: " CBRN – From Technological Innovation to Enhanced Operational Capacity" Colloquium 12th March 14. Speaker Prof JL Gala: "Detection Methods in Mobile & Deployable Laboratories for CBRN Emergencies".
- EDA T&E BIODIM workshop held in EDA, Brussels, 26-27 February 2014. Test and Evaluation (T&E) Standards Establishment Process for United States (US) Department Of Defense (DOD).
- Strengthening Science-Policy-Industry links in the CBRN-E sector. Brussels, 30th January 2014 An event organised under the EDEN Demonstration Project BAO Conference Centre, rue Félix Hap 11, 1040 Brussels: the MIRACLE project, by Jean-Luc GALA, UCL/BE-Defense (Belgium).
- Penalized regression models for multiplex SNPs pyrosequencing data analysis. Ambroise J, Valentina B, Tombal B, Robert A, Gala JL. XXVII International Biometric BIOMETRICConference, 6-11 July 2014 Florence, Italy (Oral presentation JA).
- Light Fieldable [LiFi] Laboratory for Biological and possibly Chemical Sampling and Detection, European Community's Seventh Framework Programme, Project PRACTICE [Preparedness and Resilience against CBRN Terrorism using Integrated Concepts and Equipment]; Deployment and demonstration in Pionki, Warschaw, Poland; 22 – 25 Avril 2014.

2013

- KHID/Royal Higher Institute of Defence: "Science & Technology for Defence: Luxury or Need? Colloquium 7th Mar 13. Speaker : Prof JL Gala "On-going and future research in the chemical, biological, radiological & nuclear (CBRN) Domain"
- EC-EDA workshop Madrid. March 2013: CBRN European Framework Cooperation: «Civ-Mil research cooperation under the EFC CBRN: achievements & future challenges » "CBRN mobile labs (B-LIFE). Civ-Mil cooperation within EFC between ESA, EDA and EC". Speaker : Prof JL Gala
- ESA and Agenzia Spaziale Italiana. Annual ARTES Applications Workshop, 18th_19th April 2013 Centre for High Defence Studies (CASD), Palazzo Salviati, Piazza della Rovere 83, Rome, Italy. Speaker: Prof JL Gala "B-LiFE- Biological Light Field Laboratory for Emergencies".
- RoundtableFP7-SEC-ARCHIMEDES "External Dimension of Security: EU Science and Technology" April 24 - 25, 2013. The University Foundation, Room A Rue d'Egmont 11, 1000-Brussels.
- EC/DG-ECHO, Brussels. 15-16 May, 2013: 4th European Civil Protection Forum, "Disasters - Protecting and responding together". Charlemagne Building Speaker : Prof JL Gala "How can a Biological Light Fieldable Laboratory for Emergencies support your operations".
- ESA/ESTEC. Noordwijk, The Netherlands. 17th May 2013: Final Presentation of the ARTES 20 Feasibility Study, "B-LiFE – Biological Light Fieldable laboratory for Emergencies"
- Brochure SEREN (Network of Security NCPs): Benchmark of European research infrastructure of interest to the security sector (3 infrastructures per country) In Belgium: RMA and CTMA / DLD-bio selected.
- Reviewer appointed by the European commission for the CATO Consortium meeting & 1st CATO Conference 7-10 October 2013. European Commission Directorate General Entreprise and Industry
- NATO workshop on CBRN Activities of the Science for Peace and Security Programm,. Brussels, 22-24 October 2013. Speaker: Prof. Dr. Jean-Luc Gala,. "Civil-Military Cooperation in CBRN Defence".

- Medical Biodefense Conference Munich Germany 25-27 October 2013
  - Poster: Ambroise J, DeccacheY, Irenge L, and Gala JL. New Signal-Processing Method for Multiplex Pyrosequencing Results Analysis.
  - Poster : Bentahir M, Laduron F, Irenge L, Gala JL. Rapid and Efficient Filtration-Based Procedure for Separation and Safe processing of CBRN Mixed Samples.
  - Oral Presentation: **Irenge L**, **Dumont C**, Magazani EK, Garin D, Muyembe JJ, **Bentahir M, Gala JL**. Rapid Diagnosis and Assessment of Causative Agents of Skin Rash lllness Outbreak in Kasai Occidental Province (Democratie Republic of Congo) by Quantitative Real-Time PCR and Pyrosequencing of Hu man Specimens.
- Light Fieldable [LiFi] Laboratory for Biological and possibly Chemical Sampling and Detection, Grand Hall. Oral presentation (speaker Prof JL Gala) - CB(RN) Simulation Exercise organized by the Belgian Authorities Square Meeting Centre, Brussels, International meeting with CBRN Risk Mitigation Center of Excellence, EC-DG-DEVCO/EEAS, Oct 2013.
- Belgian representative, CAPTECH MEETING ESM04. EDA, Rue des Drapiers 17-23, Brussels 6/7 November 2013. Speaker: Prof JL Gala
- Hautes Etudes Sécurité et Défense 2013-2014. Séminaire 3 : Facteurs d'instabilité « speaker Prof JL Gala « Menaces CBRN » , 23 Nov 2013.
- TWOBIAS – FP7-SEC: The biological detection and identification system. Dissemination Conference, Brussels December 5th 2013.
- Les Jeudis de Fleurus, ACORATA Belgique. Formation continuée en Biologie Clinique : « Intolérance médicamenteuse et pharmacogénétique : le point de la question » ; orateur : Prof JL Gala, 12 décembre 2013.

2012

- UN-meeting. Geneva 13 Dec 2012. Biological & Toxin Warfare Convention. Meeting of States Parties . UN Building, JLGala: "Health Crisis Response: Light Mobile Laboratories for Rapid & Reliable Identification of Pathogens".
- ESA meeting, Naples 2012: 63rd International Astronautical Congress 2012. Symposium on integrated applications End-to-End Solutions. R Gueubel and JL Gala. "B-LIFE Project : New Services for Biological Emergencies".

2011

- "European Perspectives in Personalised Medicine" organisée par le « Health Directorate of the European Commission's Research, Directorate General" : video recording 25 mars 2011 "Place of pharmacogenetics in individualized medicine" JL Gala.
- Characterization of new isolates of Bacillus of the cereus group recovered from environmental samples. L M. Irenge, E Carlier, J Minguet, JS Olsen, JF Durant, and JL Gala. International conference on Bacillus anthracis, B. Cereus et B. Thuringienssis, Bruges, 7-11 août 2011.
- Next Generation Detection for B and C agents and Modeling & Simulation of CBRN DIM architectures and operations. Join Integration Programme CBRN workshop call 1 - European Framework Cooperation on CBRN protection. Chairmanship: JL Gala. UCL Bruxelles, 15 Septembre 2011.
- From a reach back capacity to the rapid deployment of a light mobile fieldable laboratory for genetic analysis: a case for better European crisis management of natural, emerging and gentic diseases. JL Gala. Oral presentation. Medical Biodefense Conference, Munich, 25-27 October 2011
- Irenge LM. Characterization of two isolates of B. cereus closely-related to B. anthracis. Prague June 2011

2009

- Gala JL. Detection of EGFR Mutations by Molecular Genetics. December, 1th Luxembourg.
- Gala JL. Optical Fiber Biosensor and their use in a mobile rapidly deployable analytical capacity . Research & Technology Organisation-NATO. 28 October.
- Gala JL .BELCOAST. Life demo of the the deployable mobile laboratory as a tool for rapid and reliable, monitoring detection and identification of biological agents. Oostende 14-15 october 2009.

iii) Publications (postérieures à 2008)

Remarque: noms indiqués en gras = personnel Défense

1. Piette As, Vybornova O, Bentahir M, Gala JL. CBRN detection and identification innovations. Crisis Response Journal. 2014, 10: 36-38.
2. Aydin S, Dekairelle AF, Ambroise J, Durant JF, Heusterspreute M, Guiot Y, Cosyns P, Gala JL. Unambiguous Detection of Multiple TP53 Gene Mutations in AAN-Associated Urothelial Cancer in Belgium Using Laser Capture microdissection. PLoS One, 2014. 9(9): p. e106301.
3. Irenge LM, Kabego L, Vandenberg O, Chirimwami RB and Gala JL. Antimicrobial resistance in urinary isolates from inpatients and outpatients at a Tertiary Care Hospital in South-Kivu Province (Democratic Republic of Congo). BMC Research Notes, 2014, 7:374.
4. Dumont C, Irenge LM, Magazani EK, Garin D, Muyembe JJT, Bentahir M, Gala JL. Simple technique for in field samples collection in the cases of skin rash illness and subsequent PCR detection of orthopoxviruses and varicella zoster virus. PLoS One, 2014. 9(5): p. e96930.
5. Bentahir M, Laduron F, Irenge LM, Ambroise J, Gala JL. Rapid and Efficient Filtration-based Procedure for Separation and Safe Handling of CBRN mixed samples. PLoS One, 2014. 9(2): p. e88055.
6. Vu Hoang PT, Ambroise J, Dang Chi VL, Dekairelle AF, Dupont S, Huynh N, Nguyen TB, Robert A, Gala JL, Vermylen C. Comparison of Long-Term Outcome between Belgian and Vietnamese Children treated for Acute Lymphoblastic Leukemia according to the Fralle 2000 Protocol. J Pediatr Hematol Oncol, 2014. 36(7): p. 534-40.
7. Ambroise J, Deccache Y, Irenge LM, Savov E, Robert A, Gala JL. Amplicon identification using SparsE Representation of Multiplex PYROsequencing signal (AdvISER-M-PYRO): Application to bacterial resistance genotyping. Bioinformatics 2014, 30; 24, 3590-97.
8. Van Langendonckt A, Romeu L, Ambroise J, Amorim C, Bearzatto B, Gala JL, Donnez J, Dolmans MM. Microarray approach to investigate gene expression in human ovarian tissue after xenografting. Mol Hum Reprod. 2014;20:514-25.
9. Butoescu V, Ambroise J, Stainier A, Dekairelle AF, **Gala JL**, Bertrand T. Does genotyping of risk-associated single nucleotide polymorphisms improve patient selection for prostate biopsy when combined with a prostate cancer risk calculator? Prostate. 2014;74:365-71.
10. Ambroise J, **Piette AS**, **Delcorps C**, Rigouts L, de Jong B, Irenge L, Robert A, **Gala JL**. *AdvISER-PYRO: Amplicon Identification using SparsE Representation of PYROsequencer signal* **Bioinformatics** 2013, 29:1963-9
11. Scheers I, Lombard C, Paganelli M, Campard D, Najimi N, **Gala JL**, Decottignies A, Sokal E. *Human Umbilical Cord Matrix Stem Cells Maintain Multilineage Differentiation Abilities And Do Not Transform During Long-Term Culture.* **PLoS One (PONE-D-12-38527R2)**
12. Persu A, Lambert M, Deinum J, Cossu M, de Visscher N, **Irenge L**, Ambroise J, Minon JM,. Nesterovitch AB, Churbanov A,. Popova IA, Danilov SM, Jan Danser AH, **Gala JL**. *A Novel Splice-Site Mutation in Angiotensin I-Converting Enzyme (ACE) gene, c.3691+1G>A (IVS25+1G>A), causes a dramatic increase in circulating ACE through*

deletion of the transmembrane anchor **PLoSOne** Epub 2013 Apr1. **(8(4):e59537;doi:10.1371/journal.pone.0059537.**

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iv) Brevets

(1) Method for analysing a pyro-sequencing signal (AdvISER-PYRO: Amplicon Identification using SparsE Representation of PYROsequencing signal).
Patent application number 13 07 913.2, 2 May 2013 (internal file reference number: UCL-057)
(2) Method for normalization of quantitative PCR and microarrays. Filed under No. 61/556.655 (U.S. provisional filed 07/11/2011).
(3) Protection juridique par dépôt certifié des codes sources; Nouveaux programmes d'analyse bioinformatique (Septembre 2007)

v) Réseaux et projets

(1) **Réseaux OTAN**

Participation to NATO-SIBCRA Sub Group to NAAG JCG CBRN exercices NATO/NAAG/JCG/CBRN. Ongoing
NATO- Sampling Identification Chemical Radiological Agents [SIBCRA], NATO Army Armaments Group [NAAG], Joint Capability Group [JCG], Chemical Biological Radiological Nuclear Defence meeting [CBRN] Sampling and Identification of Biological, Chemical and Radiological Agents (SIBCRA)

- NATO annual meeting
- NATO Round robin tests (last in 2010)
- NATO Mixed Samples Exercise's (2007 – 2009)
  Oganizer: an EU country
- NATO, NAAG, JCG, CBRN-SIBCRA subgroup - Annual SIBA exercise - Organizer: US Army

(2) **Réseaux européens European Defence Agency (EDA)**

EDA JIP CBRN
EDA/JIP2/CBRN – Catégorie A- **BFREE** Biological Free mixed CBRN samples for safe handling and analysis (2012-2015) - Ongoing
Aim: obtain an efficient sample processing and risk mitigation method for ensuring safe handling and preparation of mixed CBRN samples; to develop a set of European validated harmonized procedures for separating and preparing a potential mixture of CBRN agents into distinct C, B, RN aliquots for simultaneous and/or successive identification analyses which are sample matrix-independent; to reduce the turn-around-time for the entire handling and analysis procedure.
EDA/JIP2/CBRN – Catégorie A - **RACED** - Risk Assessment for CB Exposure after Decontamination (2015-2017) – Starts in May 2015
In the aftermath of CRBRN agents dispersion, the challenge is to obtain insight into the status of decontaminated objects with regard to the remaining hazard knowing that removal of the last molecule or last viable cell is utopic. The remaining number of agent molecules or viable cells has to be below a critical level which does not pose a health hazard. In an operational military setting it is not possible to assess the remaining hazard. The overall challenge can subsequently be formulated as the need to find out how much of what is left, how that can reach and affect humans and how can that risk be managed. To counteract this cascade of challenges, RACED proposes the following staged approach: to decontaminate a representative number of CB agents/surfaces by standard means /procedures; to apply state-of-the art analytical & micro/molecular biological assays to identify and quantify residual agent; to simulate and understand transport from decontaminated surface to human exposure (lung, skin); to relate exposure to toxicity and infectiousness, respectively; to design a risk profile and identify measures to mitigate or a t least manage those risks. The end-result is a risk management tool that allows the operational decision

maker to rationally and confidently declare an asset clean, or to re-launch a decontamination step or to abandon an asset as too dangerously contaminated to maintain.

EDA – Catégorie B - EBLN - Establishment & management of a common Database of B-agents - Ongoing
DLD-Bio est membre actif du projet "Europena Biodefense Laboratory Network». - (*Genetic signature and profiling of deadly B-agents and builit up a European military reference database*). Le groupe « European Biodefense Laboratories Network (EBLN) » est un projet de la catégorie B (catB) du groupe « Environment, Systems and Modeling (ESM) » de l'Agence de Défense Européenne (EDA) ; ESM4 = Human Factors & CBR Protection. The objective of this project is to contribute to the establishment of a strategic European Bio-defence laboratory network (EBLN). The project will improve the EU capability to verify the use of biological agents (B – agents) in the military and civil context such as international regulations, e.g. BTWC (Biological and Toxin Weapon Convention).

EDA - Bio EDEP Programme phase-1 [Biological Enhancement and Developement of Equipements Program] 2009-2011 - Ended
CTMA a participé à 4 programmes de recherche internationaux dans le cadre de la phase 1 du programme de l'Agence Européenne de Défense « *Biological Detection Identification Monitoring Equipment Development and Enhancement Research Program [BIOEDEP] »*. CTMA a joué un rôle actif dans 4 des 8 projets de ce programme international, à savoir:
BELGIUM as PILOT

- Projet n°1: Biological Aerosol Collector for individual biological hazard surveillance and monitoring (BIO-Dosimeter).

BELGIUM as ACTIVE CONTRIBUTOR

- Projet n°2: Second Generation Deployable Tactical Field Biological Analysis System", *CTMA, membre du consortium* (Espagne pilote)
- Projet n°3 : Biological Residue Detection System for Decontamination Control CTMA, membre du consortium (Allemagne, pilote)
- Projet n°8: Biological Reconnaissance Defence System Integration Project (BIRD) *CTMA, membre du consortium* (France, pilote)

EDA : CAP TEC – EMS 4 - Ongoing
Participation of Col Med JL Gala, Study Director, to EMS4 as CAP TEC

EDA: JIP-CBRN-Deputy MC Member - Ongoing
Participation du Col Med JL Gala, Study Director, en tant que Deputy member à la préparation active du programme de recherche catégorie A1 « JIP-CBRN »

v)(3) **EC 7FP**

CTMA Research program Commission Européenne: FP7, Technical expertise service and Support action.

- CTMA has been active in a series of recent or still ongoing European networks (COST B28-EMERGARRAY , [Array Technologies for BSL3 and BSL4 Pathogens] and PASR / Bio3R2006 [Resilience, Reaction, Research] in Bioterrorism, reference number PASR-204300).
- Est partenaire de plusieurs projets FP7 répondant aux calls de la commission européenne en matière de sécurité (programme FP7)

European Commission 7th Framework Program			
Nom du projet	**Type**	**Statut**	**Description**
PANDEM	FP7 - SEC EC funded Security projects	2015-2016 Accepted to start in 2015	Pandemic Risk and Emergency Management. PANDEM will focus on the needs and requirements of users and first responders across the spectrum of pandemic risk management. PANDEM will bring together highly skilled and multi-disciplinary senior experts from the health, security, defence, microbiology, communications, information technology and emergency management fields. Given the cross-border and multi-sectoral context of the health and security challenge for building pandemic risk management capacity, a systems-based methodology will be applied and the final outcome will be developed for use in a pan-European setting.
CAREUS	FP7 - SEC EC funded Security projects	2014-2015 Ongoing	Evidence-based policy for post-crisis stabilization: bridging the gap. CAERUS aims to identify humanitarian relief actions that pave the way for human development and stability in post-conflict societies. Why have some countries successfully escaped the cycle of violence and conflict where others seem to be trapped? What has been the specific role of national, international and particularly European post-conflict relief action and development cooperation in these cases? This project will undertake humanitarian policy analysis on a global and regional scale, examining ways in which these policies support or undermine development and international security. It will also implement population-based studies in key crises-affected areas to obtain field evidence.
EDEN	FP7 - SEC EC funded Security projects	2013-2016 Ongoing	End-user driven DEmo for CBRNE. EDEN wants to demonstrate the added value of a Light Fieldable Biology Laboratory (LBFL) for the response to specific B threat scenarios. The LFBL integrates a set of bricks either operational or at least characterized by high TRL. Short cycle R&D in collaboration with EDEN partners is required to allow full integration of innovative system (e.g. rapid low cost bio inactivation assessment)
MIRACLE	FP7 - SEC EC funded Security projects	2013-2015 Ongoing	MIRACLE = MobIle Laboratory for the Rapid Assessment of CBRN Threats Located within and outside the EU. Topic SEC-2012.4.4-1 Coordination and support action: Development of mobile laboratories, structures and functions to support rapid assessment of CBRN events with a cross-border or international impact. The overall objective of this feasibility study is to provide a global deliverable "CBRN mobile laboratory architecture(s)" that relies (a) on a better understanding and definition of the need and optimal solutions for mobile lab, and (b) on a clear and straightforward interface with existing EU capabilities / structures.
PRACTICE	FP7 - SEC EC funded Security projects	2011-2014 Ended	Preparedness and Resilience against CBRN Terrorism using Integrated Concepts and Equipment. This project will improve the preparedness and resilience of EU member states and associated countries from an attack by a terrorist group using non-conventional weapons, specifically an attack with CBRN (Chemical, Biological, Radiological and/or Nuclear) materials.

ARCHIMEDES	FP7 - SEC EC funded Security projects	2012-2014 Ended	ARCHIMEDES is an integrating project, bringing together 6 European cities to address problems and opportunities for creating environmentally sustainable, safe and energy efficient transport systems in medium sized urban areas. The objective of ARCHIMEDES is to introduce innovative, integrated strategies for clean, energy-efficient, sustainable urban transport to achieve significant impacts in fields of energy, transport, and environmental sustainability policy.
C-TES	EC funded Security projects (DG-HOME)	2011-2013 Ended	Technical Expertise Services to Support the Implementation of CBRN Policies in Europe
CBRNEMAP	FP7 - SEC EC funded Security projects	2010-2011 Ended	The CBRNEmap address the cross-cutting activity of the becoming CBRNE Demonstrator using a holistic approach, putting end-users, industrialists and other stake-holders together with members of the R&T community in the front seat from the start of the activity. The CBRNEmap will evaluate the complex matrix of temporal events (before, under and after), against sectors (law enforcement, Civil protection rescue and Health together with such processes as e.g. Boarder control, Mass Transport), taking in consideration that each of the letters CBRNE, may have its own aspects of vulnerabilities, priorities and possible solutions. These generic needs will be matched by advanced technological solutions integrated at the system level to become the CBRNE Demonstrator.
COST B28	EC Funded Eu Cooperation in Scientific and Technical Research	2005-2010 Ended	EMERGARRAY: creation of a network of experts dealing with “Array Technologies for BSL3 and BSL4 Pathogens” on order to improve the biomonitoring and detection of highly pathogenic agents
Bio3R-PASR	EC funded Security projects PASR : Preparatory action in Security and Research	2007-2008 Ended	BIO3R aims at tackling three key words for a global and comprehensive policy: • RESEARCH : an evaluation of the state of the art, in relation with the risk assessment and the identification of operational requirements, will help to select priorities for research; • REACTION : one issue is the reinforcement of crisis management policies, through an improvement of the networking and a better integration of public and law strategies at European, national and local levels; • RESILIENCE: the objective is to make EU societies stronger and more resistant to aggression by reinforcing the awareness and the preparation of the EU citizens regarding the biothreat, through and reliable information, education and training, and thus by acting on their perception.

(4) **ESA/IAP/ARTES20**

Nom du projet	Type	Statut	Description
B-LiFE	ESA IAP/ARTES20	Phase I Feasibility Study	Biological Light Fieldable Laboratory for Emergencies The B-LIFE (Biological Light Fieldable laboratory for Emergencies) project is focused on delivering services for field analysis of biological threats and emergencies using a light fieldable laboratory system autonomous and able to

		2012-2013 Ended Phase II Demonstrati on Phase 2014-2017 Ongoing	be quickly deployed nearby the crisis area and to integrate space assets (georeferencing of the team and samples; tools for earth observation; duplex communications and image transmission). Phase I has demonstrated that the B-LiFE concept is feasible. The main tasks of Phase II will focus on development/integration of satellite communication and navigation tools, integration of laboratory and mission management software into communication systems for interoperability purposes, operational site selection and monitoring, optional UAVs, development of inactivation system for biological samples, possible transfer and integration of technologies developed for space applications for power supply, portable glovebox and reduction of cold chain dependency. B-LiFE - Biological Light Fieldable Laboratory for Emergencies – Ebola Mission at N'Zerekore (Guinia Conakry) - Phase II – CCN#1 /Demonstration Following international request assistance and approval of the Belgian government authorities, the B-LiFE laboratory is deployed since 20 December 2014 in Guinea (NZERE KORE) as part of the humanitarian assistance protocol B-FAST (Belgian First Aid and Support Team). This Ebola mission is a new task (first addendum to the B-LiFE Phase II contract (CCN#1)), performed in parallel with the planned activities in the B-LiFE Demonstration Project. The CCN#1 provides the opportunity of a precursor deployment in the frame of which user needs and requirements will be gathered and consolidated in a realistic scenarios.

(5) **Commission universitaire pour le développement**

<u>Projet Interuniversitaire Ciblé (PIC-2012) :</u> Support to improve the capacity for detecting and identifying infectious agents in the province of South Kivu in the Democratic Republic of Congo

2012-2016 Ongoing

Coopération du CTMA/DLD-Bio avec l'université de Bukavu, République Démocratique du Congo. Coordination Projets interuniversitaires ciblés – PIC / Conseil interuniversitaire de la Communauté française de Belgique / Commission universitaire pour le Développement (CIUF/CUD). Africa is the cradle of some of the most deadly infections. Management of infectious diseases in the province of South Kivu (DR Congo) is a challenge according to the serious impact of infectious disease on related morbidity and mortality and the risk of extension of outbreaks from remote areas to crowded cities and from RDC to European countries. The goal of the project is to improve the capabilities of identifying infectious agents in each health district hospital in the province of South Kivu.

(6) **Projets fédéraux (Ministère de la Défense belge)**

Code	Statut	Titre
HFM14-8	2014-2018 Ongoing	Novel multiplex method for identification of genetically modified or acquired bacterial resistance mechanisms
DLD05	2013-2016 Ongoing	Rapid detection and characterization of micro-organisms responsible for infections orthopedic
DLD04	2012-2015 Ongoing	Development of a portable platform allowing simultaneous identification of the main biological pathogens in operating conditions (bacterial agents of Class A CDC and WHO list of 12 bastards)

MED20	2010-2014 Ended	Profile of genetic resistance to bacterial beta-lactams and aminoglycosides
LAND06	Ended 2012	Study on optimal sample processing of mixed CBRN samples in a specialized laboratory. (Mixed sample study)
MED05	Ended 2012	Rapid diagnosis of viral highly contagious biological agents by molecular technology
MED08	Ended 2011	Rapid and specific identification of microorganisms of bioterrorism in harsh environments.
MED04	Ended 2010	Profile of resistance and virulence gene bacterial antibiotic recommended in the treatment of bacterial biological agents

(7) Grands projets de recherche régionaux

Région Bruxelloise

Elaboration et caractérisation d'un test ELISA et utilisation d'aptamères comme nouveaux nouveaux biomarqueurs.

2010-2012 - Ended

Convention entre la Région de Bruxelles-Capitale, ClinEuroDiag, CTMA et Prof Devuyst (RBC/ 10 R 181

Région Wallonne

ALLERT - Handheld Allergens Detector

2014 – 2016 - Ongoing

The scope of ALLERT project is to provide a practical, portable, rapid and effective diagnostic system to detect allergens in foods. This project does not focus on the IgE detection against specific allergens. The first level is our answer to the need of testing quickly several allergens in the same time. The second level includes innovation in photonic allowing a better collection of image data to enhance quality of detection adapted to a mobile testing. The third innovative level will be the preparation of samples. By using a standard preparation device and a standard sample collection and filtration technique we will avoid the extreme variation in sample preparation quality. The fourth innovative level will be in the data analysis using specific algorithms to clean images, analyze multiplexed spots and delivering a result with traceability, communication features.

BIOBACTIL WB - Health Optofluidic biosensor immunoassay for detecting and identifying bacteria in human samples matrixes.

2014 – 2016 – Ongoing The aim of the project is to develop a lab-on-chip demonstrator for detecting and identifying the presence of Neisseria meningitidis in cerebrospinal fluid samples. The untreated sample is deposited on the chip, than a "all or nothing" diagnostic answer is provided within 15 minutes. During the development, the effectiveness of the system will be compared to a standard enzyme-linked immunosorbent assay.

CRISTALL - Evaluation of risk factors for development of allergy in young children.

Phase I : 2006 – 2011 Phase II : 2011-2013 - Ended A significant number of children have allergic disorders that tend to evolve and persist into adulthood. This disease affects significantly patient's quality of life. Cristall aims to study and characterize the immunological and genetic factors associated with the development of allergy in order to identify early those who are at risk. CTMA has assessed gene expression profile in young children using high density microarray (GeneChip HGU 133 Plus 2.0). Successive analyses were carried out to identify a set of predictive markers of allergic development in young children aged 0 to 6 months. The signature will be used as a low-density array diagnostic assay (using customized arrays) for early detection of this allergic predisposition in order to improve prevention strategies in children at risk.

BIOSE - Development of an optic biosensor with high sensitivity for rapid detection of ambulatory pathogens in biological liquids
2009 – 2013 - Ended
Rapid detection of chemical and biological threats and substances appears increasingly as a key concern in improving and anticipating problems related to health, both in the field of medicine and environment quality. The current analysis techniques are very expensive and require staff and specialized infrastructure. The main need is to perform tests that are sensitive, rapid (<1 hour), low cost (<50 € per test), bedside or outside specialized infrastructure (e.g. in a care center, school or at home in case of emergency) before unambiguous identification in a specialized laboratory.

ORTHOGEN – Integrated Traceability and Management Information System
2010 – 2013 - Ended
Development and validation of an integrated system of traceability and multidisciplinary inference information analysis approach to optimize the diagnosis and treatment of infections of osteoarticular prostheses. This work includes the development of DNA-based algorithms for identifying causative agents for chronic or acute orthopedic infections.

RHEUMAGEN - Development of a new Method for Diagnosis of Arthritis.
Phase I: 2010 – 2011 / Phase II: 2011 – 2013 - Ended
The aim of this project is to validate the diagnostic value of transcriptomic and/or proteomic profiles of synovial material in early inflammatory or infectious disease (arthritis). It is based on preliminary data showing that gene expression profiles in synovial biopsies from patients with arthritis are able to discriminate patient samples according to the underlying disorder. The large-scale confirmation of these data after this two-year project will lead to the development of a prototype of a diagnostic tool to be used in routine rheumatology practice.

(8) **Projets avec l' industrie**

Stallergènes
2013 – 2016 - Ongoing
The project aims at producing freeze dried, gamma inactivated, fungal raw material for use in allergy research & treatment, starting from pure cultures & inert substrates. A service type contract has recently been signed with a biopharmaceutical industry leader specialized in the treatment of severe respiratory allergies.Consequently, selected strains have been deposited at Mycothèque de l'Université catholique de Louvain (BCCM/MUCL). The production of biomasses can be adjusted to the specificities of any customer (scientific community or industrial sector) in order to guarantee the quality of allergen extracts made using our products. UCL-CTMA/MYCO meets strict quality & safety standards, in compliance with European regulatory requirements (origin, processing, identification & purity). It has the equipment & expertise allowing detection, identification & monitoring of microbial contaminants of indoor & outdoor air. Detection & monitoring is based on surface & air sampling methods. Identification of airborne particles is achieved by standard light microscopy, culture, SDS-PAGE profiling & DNA signature sequences. Another goal of the project is to perform research on the quantification and analysis of proteins for test and control purposes and in the context of allergy test

(9) **Laboratoire mobile déployable d'identification génétique moléculaire des agents pathogènes et susceptibilité génétique humaine prédisposant aux infections**

Phase de développement :
Le développement par le CTMA d'un laboratoire de génétique moléculaire mobile et de sa capacité d'analyse moléculaire rapide s'est fait après une mission préparatoire de reconnaissance et de coordination à Kinshasa et à Kananga en janvier 2008 à la demande du VICE-CHOD of BE Defence. Ce laboratoire mobile a été inauguré conjointement en mars 2009 par le Ministre de la Défense, Monsieur Pieter De Crem, et le Ministre de la Recherche Scientifique, de l'Emploi et de l'Economie en Région de Bruxelles Capitale, Monsieur Benoît Cerexhe.

Déploiements opérationnels :
(a) En mars et avril 2009, il a été déployé avec succès au Kasaï occidental, en République Démocratique du Congo dans des conditions opérationnelles, permettant à une équipe de deux chercheurs CTMA dirigé par le

Med Col Gala, d'identifier rapidement au moyen de tests innovants développés par CTMA des affections génétiques (drépanocytose) et infectieuses contagieuses (EBOLA, tuberculose, monkeypox...).

(b) B-LiFE - Biological Light Fieldable Laboratory for Emergencies – Ebola Mission at N'Zerekore (Guinia Conakry) . Following international request assistance and approval of the Belgian government authorities, the B-LiFE laboratory is deployed since 20 December 2014 in Guinea (NZERE KORE) as part of the humanitarian assistance protocol B-FAST (Belgian First Aid and Support Team).
This Ebola mission is a new task (first addendum to the B-LiFE Phase II contract (CCN#1)), performed in parallel with the planned activities in the B-LiFE Demonstration Project. The CCN#1 provides the opportunity of a precursor deployment in the frame of which user needs and requirements will be gathered and consolidated in a realistic scenarios. B-LiFE laboratory is deployed in the Ebola Treatment Center NEZERE KORE led by the French non-governmental organization ALIMA (The Alliance for International Medical Action). There are actively contributing to the fight against the spread of the Ebola virus in Guinea. B-LiFE mission is focused to quickly identify the virus in biological samples and confirm infection in suspected patients. The mobile laboratory is also actively involved in the evaluation of the effectiveness of a new clinical trial testing the antiviral drug Favipiravir (French INSERM Study "JIGI" meaning "hope" in the local dialect). The aim is to reduce mortality among people infected with Ebola virus. Started on 26th of December 2014 the antiviral - developed by the laboratory Toyama Chemical, a subsidiary of Fujifilm - looks promising (cf INSERM press release, 5th Feb 2015). There is a 15% reduction in the number of deaths in adults and adolescents with low viral load. The lab is also piloting the evaluation of the Biofire technology, a new extremely rapid diagnostic strategy promoted by Biomerieux. In addition to its rapid diagnostic capacity of Ebola virus, it also features premium satellite communication capabilities provided by the Grand Duchy of Luxemburg Government emergency.lu that enable secure communications at very high speed to Belgian and international operational centers. It also has an epidemiological mapping capability of the disease through its collaboration with the European Space Agency, the European Commission (DG ECHO and ERCC) and COPERNICUS. **See detailed report in annex 1.**

B-Life Demonstration :

Ce même laboratoire été ensuite déployé dans le contexte de réunions internationales (à la demande du Ministre de la Défense à BELCOAST, Koksijde (2009), et à Ostende (2010) pendant la European Security and Research Conference (src'10)), dans le cadre de la présidence belge du Conseil Européen, à la demande de BELSPO (Ministère de la Politique Scientifique) et DG-Entreprise et Industrie de la Commission Européenne.

2013
International meeting with CBRN Risk Mitigation Center of Excellence, EC-DG-DEVCO/EEAS, Oct 2013. Light Fieldable [LiFi] Laboratory for Biological and possibly Chemical Sampling and Detection, Grand Hall. Oral presentation (speaker Prof JL Gala) - CB(RN) Simulation Exercise organized by the Belgian Authorities Square Meeting Centre, Brussels,

2012
- Rienne (Province Namur), MAYDAY exercise, May 2012
- Open Door Medical component, QAMH/HMKA, 9 Sept 2012
- ESA/ B-LIFE study: Proof of Concept, Centennial Park 29 Nov 2012

2010
EU Sec and Research Conference (SRC'10), BE Presidency of the EU Council. Ostend, Sept 2010

2009
- Kananga, Western Kasai, Democratic Republic of Congo, May 2009. Développement et déploiement d'un laboratoire mobile de génétique moléculaire pour l'identification de pathogènes dangereux (EX 01313du 7 avril au 3 mai).
- BELCOAST Koksijde, ACOS STRAT coordination, 14-15 Oct 2009

Follow-up and derived actions:

- **Présentations internationales (voir meetings internationaux):** L'expérience du deployment en Afrique a été commentées dans plusieurs meetings internationaux (NATO SIBCRA and RTO meeting , Madrid, Mai 2009) à l'EDA dans le cadre du programme BioEDEP program , et plus spécifiquement dans le cadre du projet de recherche BIOEDEP-n°6 (Second generation deployable tactical field analysis system).
- **Security and research conference 2010 (src'10),** Ostende, Belgium
  "Horizon 2020: The next steps". Invited speaker, Med Col Jean-Luc Gala.
- **EU CBRN Research Workshop, 9-10 Novembre 2010, Brussels**. Med Col Gala Personal invitation: Facts and figures regarding SEC-2007/2010 and SEC-2011 calls; new and merging challenges
- **EU-DG RELEX Workshop:** « *Establishment of Mobile Laboratories for Pathogens up to Risk Group 4 in combination with CBRN Capacity Building in sub-Saharan Africa* ». Organiser: Istituto Nazionale per le Malattie Infettive - IRCCS, L. Spallanzani - Roma (under ESF contract 245214 from EU-DG-DEVCO and AidCo Instrument de Stabilité program IFS/2011/272-372.). Réunion portant sur la création de trois laboratoires déployables dans le cadre du programme dans le cadre du programme AidCo « Mobiles lab in sub-Saharan Africa – CBRN capacity » - Brussel, 26 Oct. Med Col Gala JL. Invited speaker : *"From reach back to a mobile capacity for genetic testing on the field: the Belgian experience in Western Kasaï, Democratic Republic of Congo*".
- **Biodefence Conference, October 2011, Munich, Germany**. *From a reach back capacity to the rapid deployment of a light mobile fieldable unit: a case for better European crisis management of natural, emerging and terrorist biological threats* (JL Gala, L Irenge). JL Gala Oral presentation
- **Genève, United Nations conference, BE Side event, Biological and Toxin Weapon Convention (BWTC), 3d December 2012,** Switzerland : JLGala: "Health Crisis Response: Light Mobile Laboratories for Rapid & Reliable Identification of Pathogens".
- **EC-EDA workshop Madrid March 2013**: CBRN European Framework Cooperation: «Civ-Mil research cooperation under the EFC CBRN: achievements & future challenges » JLG: CBRN mobile labs (B-LIFE). Civ-Mil cooperation within EFC between ESA, EDA and EC.
- **ESA/ESTEC. Noordwijk, The Netherlands. 17th May 2013**: Final Presentation of the ARTES 20 Feasibility Study: "B-LiFE – Biological Light Fieldable laboratory for Emergencies"
- **EC/DG-ECHO, Brussels. 15-16 May, 2013**: 4th European Civil Protection Forum on Disasters - Protecting and responding together : "How can a Biological Light Fieldable Laboratory for Emergencies support your operations".
- **KHID/Royal Higher Institute of Defence**: "Science & Technology for Defence: Luxury or Need? Colloquium 7th Mar 13. : "On-going and future research in the chemical, biological, radiological & nuclear (CBRN) Domain".
- **NATO workshop on CBRN Activities of the Science for Peace and Security Programm**. Brussels, 22-24 October 2013. Speaker: Prof. Dr. Jean-Luc Gala,. "*Civil-Military Cooperation in CBRN Defence*".
- **Medical Biodefense Conference Munich Germany** 25-27 October 2013
- Oral Presentation: Irenge L, Dumont C, Magazani EK, Garin D, Muyembe JJ, Bentahir M, Gala JL. *Rapid Diagnosis and Assessment of Causative Agents of Skin Rash lllness Outbreak in Kasai Occidental Province (Democratie Republic of Congo) by Quantitative Real-Time PCR and Pyrosequencing of Human Specimens.*

Développements scientifiques sous-jacents (voir European network research program):
Les développements successifs de cette capacité opérationnelle sont issus de l'intégration de plusieurs projets de recherche successifs. Certains sont encore en cours

(a) EU-COST B28-EMERGARRAY , [Array Technologies for BSL3 and BSL4 Pathogens];
(b) EU-PASR/Bio3R2006 [Resilience, Reaction, Research] in Bioterrorism, reference number PASR-204300;
(c) FP7-CBRNE-map, FP7-SEC-2009-1 reference number FP7-242338**),**

(d) ESA- IAP / ARTES 20, "Biological Light Fieldable Laboratory for Emergencies (B-Life project)" , 2012

(e) Coordination of the MIRACLE project (MobIle Laboratory for the Rapid Assessment of CBRN Threats Located within and outside the EU) supported by the European Commission (Framework research programme 7, Topic SEC-2012.4.4-1). Start December 2013

(f) Participation to additional EU-FP7 project related to Security (PRACTICE; ARCHIMEDES; EDEN; CAERUS):

(g) Participation to the European Defence Agency projects Joint investment Program BFREE (Biological Free mixed CBRN samples for safe handling and analysis) and RACED

Conclusion: Ce projet laboratoire mobile permet donc de réaliser une étroite intégration entre tous les aspects de l'activité multimodale et multidisciplinaire tant académique, clinique que Défense de CTMA. Il constitue, à cet égard un exemple illustratif de la stratégie de recherche et développement de CTMA et de son utilisation dans la nouvelle vision académique du « service de la société ».

vi) **Chairmanship de IMGS [Integrated Mission Group in the field of Security]**

CTMA a collaboré activement à la création et au développement du consortium international IMGS [Integrated Mission Group in the field of Security], une organisation qui s'implique directement dans de l'étude des gaps existant dans le domaine sécurité et CBRN (roadmap sécurité 2010). IMGS compte plus de 21 états membres et 200 experts dans le domaine sécurité. On y compte plus de 80 entreprises européennes, des SME's (small and medium size entreprises), des RTO's (Research and Technology Organization), et des institutions académiques et militaires. CTMA chair actuellement le groupe de synthèse et de coordination de IMGS (mandat de 2 ans) et co-chair le sous-groupe TA6 (sous-groupe « Technology area 6 » spécifiquement dédié à la problématique CBRNE).

vii) **Institut royal supérieur de Défense (IRSD/KHID/RHID) – Séminaires des Hautes Etudes Sécurité et Défense – Cadres supérieurs**

Séminaire 3 : Facteurs d'instabilité. *Menaces CBRN*, Invited speaker, Med Col Jean-Luc Gala

Liste d'ADN des bactéries – voir annex 2.

Formulaire B : Informations sur les épidémies de maladies infectieuses et phénomènes analogues qui paraissent s'écarter de la normale

1) Maladies humaines

Rien à déclarer.

2) Maladies chez les plantes et les animaux

Rien à déclarer

Formulaire C : encouragement à la publication des résultats et promotion d'utilisation des connaissances

Scientific Institute of Public Health WIV-ISP, Belgium

Scientific Publications on Infectious and Communicable Diseases, Biosafety and Epidemiology in 2014

Infectious and communicable diseases, Epidemiology and Biosafety

1. Een influenza-uitbraak in een woonzorgcentrum in Vlaams Brabant, april 2014.
   Litzroth,A., Braeye,T., Hombrouck,A., Thomas,I., Van Gucht,S., Van Gorp,J., Lefevre,S., Cox,P. Vlaams infectieziektebulletin, 2015, NA
2. Trends in serotype distribution and antimicrobial susceptibility in Salmonella enterica isolates from humans in Belgium, 2009 to 2013.
   Ceyssens,P.J., Mattheus,W., Vanhoof,R., Bertrand,S. Antimicrob.Agents Chemother., 2015, 59 (1), p.544-552.
3. Fast and accurate identification of dermatophytes by matrix-assisted laser desorption ionization-time of flight mass spectrometry: validation in the clinical laboratory.
   Packeu,A., De,Bel A., L'ollivier,C., Ranque,S., Detandt,M., Hendrickx,M. J.Clin.Microbiol., 2014, 52 (9), p.3440-3443.
4. Use of matrix assisted laser desorption ionization time-of-flight mass spectrometry for identification of molds of the Fusarium genus.
   Triest,D., Stubbe,D., De Cremer,K., Pierard,D., Normand,A.C., Piarroux,R., Detandt,M., Hendrickx,M. J.Clin.Microbiol., 2014, epub ()
5. DNA vaccines against tuberculosis. Bruffaerts,N., Huygen,K., Romano,M. Expert.Opin.Biol.Ther., 2014, 14 (12), p.1801-1813.
6. Evaluation of viability-qPCR detection system on viable and dead Salmonella serovar Enteritidis. Barbau-Piednoir,E., Mahillon,J., Pillyser,J., Coucke,W., Roosens,N.H., Botteldoorn,N. J.Microbiol.Methods, 2014, 103 (), p.131-137.
7. Antimicrobial and molecular analysis of Salmonella serovar Livingstone strains isolated from humans in Tunisia and Belgium. Guedda,I., Taminiau,B., Ferjani,A., Boukadida,J., Bertrand,S., Daube,G. J.Infect.Dev.Ctries., 2014, 8 (8), p.973-980.
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   Van Gucht S., Naze,F., El,Kadaani K., Bauwens,D., Francart,A., Brochier,B., Wuillaume,F., Thomas,I. J.Wildl.Dis., 2014, 50 (4), p.969-971.
9. Multilocus variable-number tandem repeat (MLVA) typing tools improved the surveillance of Salmonella Enteritidis: a 6 years retrospective study. Bertrand,S., De Lamine de Bex,G., Wildemauwe,C., Lunguya,O., Phoba,M.F., Ley,B., Jacobs,J., Vanhoof,R., Mattheus,W.
   PLoS ONE, 2014, NA ()
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    Kinross,P., van,Alphen L., Martinez,Urtaza J., Struelens,M., Takkinen,J., Coulombier,D., Makela,P., Bertrand,S., Mattheus,W., Schmid,D., Kanitz,E., Rucker,V., Krisztalovics,K., Paszti,J., Szogyenyi,Z., Lancz,Z., Rabsch,W., Pfefferkorn,B., Hiller,P., Mooijman,K., Gossner,C. Euro.Surveill, 2014, 19 (19), p..
11. Genetic diversity of Shiga toxin-producing Escherichia coli O157:H7 recovered from human and food sources. Elhadidy,M., Elkhatib,W., Abo Elfadl,E., Verstraete,K., Denayer,S., Barbau-Piednoir,E., De Zutter,L., Verhaegen,B., De Rauw,K., Pierard,D., De Reu,K., Heyndrickx,M. Microbiology, 2014, epub (), p..
12. Overexpression of DosR in Mycobacterium tuberculosis does not affect aerobic replication in vitro or in murine macrophages. Flores-Valdez,M.A., Freches,D., Bruffaerts,N., Romano,M., Schoolnik,G., Dolganov,G., Huygen,K. Ann.Microbiol., 2014, - (), p.1-8.

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14. Postoperatieve wondinfecties met Clostridium perfringens na orthopedische chirurgie: twee casussen met aandacht voor epidemiologisch onderzoek / Surgical site infections caused by Clostridium perfringens after orthopedic surgery: two case reports with attention to epidemiologic investigation. Jonckheere,S., Boel,A.M.A.I., De Beer,T., Delbrassinne,L., Van Vaerenbergh,K.M.C., De Beenhouwer,H.R.I.W. Tijdschr Infect, 2014, 9 (6), p.177-181.
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Biosafety

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Formulaire D

(Supprimée)

Formulaire E : Déclaration des mesures législatives, réglementaires et autres

Concernant	**Législation**	**Réglementation**	**Autres mesures**[4]	**Amendements depuis l'année écoulée**
a) Mise au point, fabrication, stockage, acquisition ou détention d'agents microbiens ou autres agents biologiques, ou de toxines, d'armes, de matériel et de vecteurs spécifiés à l'article premier	Oui	Non	Non	Non
b) Exportations de micro-organismes[5] et de toxines	Oui	Oui	Oui	Non
c) Importations de micro-organismes[13] et de toxines	Oui	Oui	Oui	Non
d) Sûreté[6] et sécurité[7] biologiques	Oui	Oui	Oui	Non

[4] Y compris les directives.

[5] Micro-organismes pathogènes à l'égard de l'homme, des animaux et des végétaux conformément à la Convention.

[6] Conformément à la dernière version du *Manuel de sûreté biologique en laboratoire de l'OMS* ou de directives nationales ou internationales équivalentes.

[7] Conformément à la dernière version du *Manuel de sécurité biologique en laboratoire de l'OMS* ou de directives nationales ou internationales équivalentes.

Sujet	Mesures législatives ou réglementaires
Assentiment de la BTWC	10 JUILLET 1978. - Loi portant approbation de la Convention sur l'interdiction de la mise au point, de la fabrication et du stockage des armes bactériologiques (biologiques) ou à toxines et sur leur destruction, faite à Londres, Moscou et Washington le 10 avril 1972. http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=fr&la=F&cn=1978071030&table_name=loi 20 DECEMBRE 1996. - Loi portant assentiment à la Convention sur l'interdiction de la mise au point, de la fabrication, du stockage et de l'emploi des armes chimiques et sur leur destruction, et des trois Annexes, faites à Paris le 13 janvier 1993. http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=fr&la=F&cn=1996122063&table_name=loi 17 JUIN 1925. - PROTOCOLE concernant la prohibition d'emploi a la guerre de gaz asphyxiants, toxiques ou similaires et de moyens bacteriologiques, signes a Geneve, le 17 juin 1925.
Législation armes fabrication et transferts	**Législation fédérale :** 5 AOUT 1991. - Loi relative à l'importation, à l'exportation [, au transit et à la lutte contre le trafic] d'armes, de munitions et de matériel devant servir spécialement [à un usage militaire ou de maintien de l'ordre] et de la technologie y afférente. http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=fr&la=F&cn=1991080568&table_name=loi 8 MARS 1993. - Arrêté royal réglementant l'importation, l'exportation et le transit d'armes, de munitions et de matériel devant servir spécialement [à un usage militaire ou de maintien de l'ordre] et de la technologie y afférente. http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=fr&la=F&cn=1993030834&table_name=loi 8 JUIN 2006. - Loi réglant des activités économiques et individuelles avec des armes. (aussi appelée "Loi sur les armes") http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=fr&la=F&cn=2006060830&table_name=loi **Législation régionale :** Région flamande - 15 JUIN 2012 – Décret concernant l'importation, l'exportation, le transit et le transfert de produits liés à la défense, d'autre matériel à usage militaire, de matériel de maintien de l'ordre, d'armes à feu civiles, de pièces et de munitions (le Décret sur le commerce des armes) http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=fr&la=F&cn=2012061505&table_name=loi Region flamande - 20 JUILLET 2012 - Arrêté du Gouvernement flamand portant exécution du Décret sur le commerce des armes du 15 juin 2012. http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=fr&la=F&cn=2012072044&table_name=loi Région wallonne - 21 JUIN 2012 - Décret relatif à l'importation, à l'exportation, au transit et au transfert d'armes civiles et de produits liés à la défense http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=fr&la=F&cn=2012062111&table_name=loi

	Union européenne RÈGLEMENT (CE) No 428/2009 du Conseil du 5 mai 2009 instituant un régime communautaire de contrôle des exportations, des transferts, du courtage et du transit de biens à double usage. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:134:0001:0269:fr:PDF
Biosécurité	Voir http://www.biosafety.be/ **Législation Fédérale belge :** 25 AVRIL 1997. - Accord de coopération entre l'Etat fédéral et les Régions relatif à la coordination administrative et scientifique en matière de biosécurité. http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=fr&la=F&cn=1997042558&table_name=loi 21 FEVRIER 2005 - Arrêté royal réglementant la dissémination volontaire dans l'environnement ainsi que la mise sur le marché d'organismes génétiquement modifiés ou de produits en contenant. Cet Arrêté implémente la directive européenne *2001/18/CE* et les *décisions qui y sont associées*. http://www.biosafety.be/LF/AROGM_2005/AROGM_TC.html 29 avril 1999 - Arrêté royal modifiant l'Arrêté royal du 4 août 1996 concernant la protection des travailleurs contre les risques liés à l'exposition à des agents biologiques au travail. Cette réglementation correspond à l'implémentation des directives européennes 90/679/CEE, 93/88/CEE, 95/30/EC, 97/59/EC *et* 97/65/EC.La directive 90/679/CEE a été abrogée en septembre 2000 par la directive 2000/54/CE. http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=fr&la=F&cn=1999042980&table_name=loi **Législations Régionales :** 1) Région wallonne • Arrêté du Gouvernement wallon du 4 juillet 2002 déterminant les conditions sectorielles relatives aux utilisations confinées d'organismes génétiquement modifiés ou pathogènes. (MB 21.09.2002, p. 41711) • Modifié par l'Arrêté du Gouvernement wallon du 5 juin 2008 modifiant l'arrêté du Gouvernement wallon du 4 juillet 2002 déterminant les conditions sectorielles relatives aux utilisations confinées d'organismes génétiquement modifiés ou pathogènes. (MB 26.06.2008, p. 32957) • Arrêté du Gouvernement wallon du 5 juin 2008 modifiant l'arrêté du Gouvernement wallon du 4 juillet 2002 relatif à la procédure et à diverses mesures d'exécution du décret du 11 mars 1999 relatif au permis d'environnement (MB 30.06.2008, p. 33316) • Décret du 11 mars 1999 relatif au permis d'environnement 2) Région bruxelloise • Arrêté du Gouvernement de la Région de Bruxelles-Capitale du 8 novembre 2001 relatif à l'utilisation confinée d'organismes génétiquement modifiés et/ou pathogènes et au classement des installations concernées. (MB 26.10.2002, p. 7209)

	• Le permis d'environnement: description et information 3) Région flamande • Arrêté du Gouvernement flamand du 6 février 2004 modifiant l'arrêté du Gouvernement flamand du 6 février 1991 fixant le règlement flamand relatif à l'autorisation écologique et modifiant l'arrêté du Gouvernement flamand du 1er juin 1995 fixant les dispositions générales et sectorielles en matière d'hygiène de l'environnement. (MB 01.04.2004, p. 18362) • Arrêté du Gouvernement flamand du 24 mars 1998 modifiant l'arrêté du Gouvernement flamand du 1er juin 1995 fixant les dispositions générales et sectorielles en matière d'hygiène de l'environnement • Arrêté du Gouvernement flamand du 1er juin 1995 fixant les dispositions générales et sectorielles en matière d'hygiène de l'environnement (chapitre 5.51. du VLAREM II - Biotechnologie) • Arrêté du Gouvernement flamand du 6 février 1991 (VLAREM I - Besluit van de Vlaamse Regering van 6 februari 1991 houdende vaststelling van het Vlaams reglement betreffende de milieuvergunning) • Législation environnementale en Région flamande Ces législations implémentent la directive européenne 2009/41/CE (cette nouvelle directive abroge la directive 90/219/CEE ainsi que ses modifications successives: la directive 94/51/CE, la directive 98/81/CE et la décision 2001/204/CE). **Union européenne** Directive 2000/54/EC of the European Parliament and of the Council of 18 September 2000 on the protection of workers from risks related to exposure to biological agents at work (seventh individual directive within the meaning of Article 16(1) of Directive 89/391/EEC) http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32000L0054:en:NOT COUNCIL DIRECTIVE 2000/29/EC of 8 May 2000 on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community http://eur-lex.europa.eu/LexUriServ/site/en/consleg/2000/L/02000L0029-20060414-en.pdf DIRECTIVE 2009/41/EC of the European Parliament and of the Council of 6 May 2009 on the contained use of genetically modified micro-organisms.

Formulaire F : Déclaration d'activités menées par le passé dans le cadre de programmes de recherche-développement biologique de caractère offensif et/ou défensif

Rien à déclarer.

Formulaire G : Déclaration des installations de fabrication de vaccins

Vaccins à usage HUMAIN produits en Belgique:

Liste des vaccins supprimée dans la version publique

Fabricant :
GlaxoSmithKline Biologicals S.A
Rue de l'Institut 89
1330 Rixensart

Annex 1

The Belgian Lab "B-LiFE/B-FAST" in Forest Guinea: Impact on analytical and therapeutic dogmas applied in Ebola Viral Disease containment?

The B-LiFE / B-FAST mission (*Biological Light fieldable laboratory / Belgian First Aid and Support Team*) was deployed N'Zerekore, Forest Guinea from 20th of December 2014 until 22 th of March 2015. This mission aimed to actively contribute to the international fight against the spread of the Ebola virus disease (EVD) in West Africa. The Belgian B-LiFE / B-FAST team consisted of a logistical support cell with 4 people (a decontamination expert from civil protection, an officer in charge of security and safety aspects, a military expert in satellite communication and a military nurse) and four researchers from the Applied Molecular Technology Center (CTMA / IREC / UCL). This mission was led by Prof JL Gala, director of CMTA and head of the mission B-LiFE / B-FAST, ensuring supervision of forthcoming rotations until the end of mission in Guinea.

The laboratory part of this project was financially supported by two international projects coordinated by CTMA: the B-LiFE project funded by the European Space Agency and the project FP7 MIRACLE (Mobile Laboratory Capacity for the Rapid Assessment of CBRN Threats Located within and outside the EU Infrastructure) funded by the European commission. The mission was supported by B-FAST during the first two months and then jointly by the Belgian Technical Cooperation and European Commission (DG ECHO) afterwards.

As part this mission, a light laboratory was deployed under a tent backing on the Ebola Treatment Centre (ETC) run by the medical NGO ALIMA (The Alliance for International Medical Action) in the outskirts of N'Zerekore. The main goal of this laboratory was to conduct a rapid DNA-based identification (~3 hours) of Ebola virus in samples from suspected patients originating from Forest Guinea (i.e., mainly swab samples from community death and blood samples from patients admitted in the CTE for suspicion of EVD). Meanwhile, several scientific projects were carried out concomitantly (e.g., favipiravir study under INSERM lead, validation of new rapid diagnostic tests with Biomérieux, cartography of Ebola contamination in patients' surroundings, viral excretion in Ebola patients ….).

The B-LiFE project and the "Emergency.lu" service provided by the Luxembourg Government enabled the laboratory to have an outstanding satellite communication capability allowing secure communications at very high speed to Belgian and international operational centers. This capacity benefited from a close collaboration with the European Space Agency, the European Commission (DG ECHO and ERCC) and COPERNICUS, which enabled the laboratory to integrate advanced technology developed by small and medium-sized Belgian enterprises (Nazka MAPPS, Aurea IMAGING and UCL spin off Eonix) and satellite operator SES TechCom Luxembourg. Through these extensive technological collaborations, an epidemiological mapping of Ebola disease in the N'zerekore region was developed as a pilot project based on the identification of infected patients and their living or working place. The generated results were stored into a central database that could be consulted by World Health Organization (WHO) and European Centre for Disease Control (ECDC) experts and helped them to monitor patients infected contacts.

While the threshold of 24.907 cases and 10.326 deaths of Ebola has now been reached, Guinea is the third most affected by Ebola countries with 3.429 cases and 2.263 deaths recorded on March 25, 2015 (end of the Belgium mission) according to the WHO. In the absence of specific Ebola treatment, a clinical trial testing the Favipiravir began on December 26 CTE Nzerekore, thanks to the rapid deployment of the Belgian laboratory. This trial began a week before in the center run by Doctors Without Borders in Gueckedou. From December2014 to March 2015, CTE's of N'Zerekore and Gueckedou were the only two centers involved in this promising therapeutic clinical research.

The Favipiravir, manufactured by the Japanese company Toyama Chemical Co, is an antiviral drug approved in Japan in March 2014 for the treatment of influenza virus. Its mode of action is to block the replication of RNA viruses. This antiviral drug demonstrated efficacy against Ebola virus in vitro as well as when tested in a mouse model (immunocompromised mice exposed to Ebola virus). The Favipiravir was already administered as compassionate medication in almost all patients with Ebola in Europe. However, the trial in Gueckedou and N'Zere kore was the first relying on a controlled clinical study in a cohort of patients with EVD. This test, supervised by the National Institute of Health French Medical Research (INSERM) and the Guinean authorities, was initiated within the framework defined by the WHO. It aimed to assess the efficacy of antiviral Favipiravir measured in terms of reduction of mortality.

Until 20 of March 2015, more than 100 patients were included in this study coming from both CTE's centers. This study prompted regular biochemical monitoring of patients under treatment. All laboratory tests (including analysis of blood electrolytes and renal function) required as part of the study were conducted by the Belgian laboratory. This type of work had undoubtedly had a substantial impact on analytical and therapeutic dogmas applied so far in Ebola Viral Disease containment. In a press release dated February 5, 2015, INSERM confirmed that the favipiravir study was producing promising therapeutic results on the cohort of patients treated in both CTEs.

Whereas lesser known aspects of the disease were also investigated (virus shedding in urine during the remission phase; viral shedding in breast milk and sweat from highly infected patients), the Belgian lab is sometimes confronted with more unexpected requests, like this recently made by the WHO. The Belgian team was indeed asked to collect samples from dead dogs suspected to have died from Ebola and to have transmitted it to villagers who have eaten them! A negative result following sampling by the team and rapid analysis in the laboratory enabled to quickly calm down rumors while ensuring the laboratory a reputation of flexibility, rapidity and efficiency.

The laboratory was also actively involved in the training of Guinean technical staff (more than 35 candidates presented spontaneously to offer their contribution to the laboratory!). The hope was to enable the Guinean laboratory to gain practical sufficient laboratory to become less dependent on international aid.

The continuation of this mission for three months was justified by the strategic position of N'Zerekore, a city at the crossroads of three African countries (Ivory Coast, Sierra Leone and Liberia) the last two being still confronted with cases of Ebola. It was also prompted by the fact that the N'Zerekore region was exposed to some communities which remained highly resistant to the actions taken by humanitarian organisations. Accordingly, the work was pursued during three successive shifts. After the end of the first rotation on January 22, a second shift took over on January 20, 2015 followed by a third shift on February 19, 2015.

This three-month mission has highlighted the value of the work carried out by the Belgian team in N'zerekore.

Annex 2

Liste d'ADN des bactéries supprimée dans la version publique.