UEFISCDI INOVARE SI CREATIVITATE / MINISTERUL EDUCAȚIEI NAȚIONALE		Proiecte colaborative de cercetare aplicativă				
21	PN-II-PT-PCCA-2013-4-0262	SISTEM DE ALERTARE TIMPURIE SI ASISTARE COMPUTERIZATA A DECIZIILOR,BAZAT PE EVALUAREA ANTICIPATIVA A DINAMICII RAPIDE A VULNERABILITATILOR INDUSE IN TERITORIU DE OBIECTIVELE NUCLEARE	Vasile Dan	Vamanu	INSTITUTUL NATIONAL DE CERCETARE - DEZVOLTARE PENTRU FIZICA SI INGINERIE NUCLEARA " HORIA HULUBEI " - IFIN - HH	SIVECO ROMANIA SA; UNIVERSITATEA POLITEHNICA DIN BUCURESTI

Domeniul 8: Spaţiu şi securitate
Direcţia de cercetare 8.5. Sisteme şi infrastructura de securitate
Tematica de cercetare 8.5.3. Sisteme pentru asigurarea unui management eficient al situaţiilor de criză şi al intervenţiilor în cazul dezastrelor, sisteme de detecţie, prevenire şi alertă.
Aprobat: Ordinul MEN nr. 298/23.06.2014
Contract Nr. 298

SISTEM DE ALERTARE TIMPURIE SI ASISTARE COMPUTERIZATA A DECIZIILOR, BAZAT PE EVALUAREA ANTICIPATIVA A DINAMICII RAPIDE A VULNERABILITATILOR INDUSE IN TERITORIU DE OBIECTIVELE NUCLEARE.

N-WATCHDOG
Raport tehnic #2
Decembrie, 2014

Institutul National de Cercetare-Dezvoltare pentru Fizica si Inginerie Nucleara 'Horia Hulubei'

SIVECO

Universitatea Politehnica din Bucuresti

Etapa 1
Proiectarea Demonstratorului funcţional de concept N-WATCHDOG (PoC)
Act 1.2 Proiectul structurii modulare a PoC.

Proiectul Demonstratorului de fezabilitate (PoC)

RAPORT TEHNIC #2

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Cuprins

Pro Memoria: Planul de realizare, Etapa 1

Plan de realizare a proiectului

SISTEM DE ALERTARE TIMPURIE SI ASISTARE COMPUTERIZATA A DECIZIILOR, BAZAT PE EVALUAREA ANTICIPATIVA A DINAMICII RAPIDE A VULNERABILITATILOR INDUSE IN TERITORIU DE OBIECTIVELE NUCLEARE (N-WATCHDOG)

An	Etape/ Denumirea Activităţii	Partener implicat	Categoria de activitate *)	Data de finalizare a etapei	Necesar resurse financiare **) (valoare exprimata in lei) din care:			Rezultate asteptate
					Total	Finantare de la bugetul de stat	Contributie financiara proprie	
0	1	2	3	4	5	6	7	8
2014	**Etapa I Proiectarea Demonstratorului functional de concept N-WATCHDOG (PoC)**	CO P1 P2		15.12.2014	104766	85646	19120	1. Baza de cunostinte, modelele, cerintele de date, solutii de implementare IT (Raport tehnic, IFIN-HH). 2. Proiectul Demonstratorului de fezabilitate (PoC) (Raport tehnic, IFIN-HH) 3. Raport de analiza a Sistemului Informatic (Raport tehnic, SIVECO, UPB)
	Activitate I.1 Documentarea cunostintelor de Fizica; a datelor si a modelelor specifice, adaptate proceselor PoC-executabile; si a bibliotecilor de date. Solutii de implementare IT.	CO	A.2		9280	9280	0	Baza de cunostinte, modelele, cerintele de date, solutii de implementare IT (Raport tehnic, IFIN-HH).
		P1			8439	5485	2954	
	Activitate I.2 Proiectul structurii modulare a PoC.	CO	A.2		13920	13920	0	Proiectul Demonstratorului de fezabilitate (PoC) (Raport tehnic, IFIN-HH)
	Activitate I.3 Analiza Sistemului Informatic (IT System Analysis)	P1	A.2		25469	16555	8914	Raport de analiza a Sistemului Informatic (Raport tehnic, SIVECO, UPB)
		P2			12760	12760	0	
	Activitatea I.4 Dezvoltarea software si implementarea structurii modulare a Demonstratorului N-WATCHDOG si a inventarelor de date structurate, Partea I	CO	A.2		14178	14178	0	Demonstratorul functional al conceptului N-WATCHDOG (PoC) Partea I: N- WATCHDOG Light (IFIN-HH)
		P1			20720	13468	7252	
2015	**Etapa II Dezvoltarea software si implementarea Demonstratorului N-WATCHDOG (PoC)**	CO P1 P2		30.06.2015	532797	441414	91383	1. Demonstratorul functional al conceptului N-WATCHDOG (PoC) (IFIN-HH). 2.Software, subsisteme educationale si suport decizional pentru asigurarea tranzitiei de la PoC la livrabilul final N-WATCHDOG, Model Experimental (EM) (Raport tehnic, SIVECO, UPB) 3. Termeni de referinta si repere tehnice ale asimilarii PoC in EM (Raport tehnic, UPB). 4. Articole si lucrari stiintifice (Raport de diseminare, UPB)
	Activitatea II.1 Dezvoltarea software si implementarea structurii modulare a Demonstratorului N-WATCHDOG si a inventarelor de date structurate, Partea a II-a	CO	A.2		69822	69822	0	Demonstratorul functional al conceptului N-WATCHDOG (PoC), Partea a II-a : Platforma integrala de referinta (IFIN-HH)
		P1			105843	68798	37045	

1. Introducere

Make everything as simple as possible, but not simpler.
Albert Einstein

Prezentul Raport prezinta structura Demonstratorului de concept N-WATCHDOG PoC (*Proof of Concept*). Impreuna cu breviarul livrat de *Raportul tehnic #1 - Baza de cunostinte, modelele, cerintele de date, solutii de implementare IT* [1], Proiectul PoC constituie, in logica Proiectului PCCA aprobat, referinta-reper a Dezvoltatorului produsului final – Modelul Experimental N-WATCHDOG EM.

1.1. Problema de comunicare

Autorii Proiectului PoC sunt cercetatori in domeniul Fizicii, iar destinatarii sunt experti in Stiintele Informatiei si dezvoltare IT. Dincolo de o formatie intelectuala si un substrat educational impartasit, diferentele de profil profesional pot avea un ecou considerabil in calitatea si eficienta comunicarii dintre cele doua parti in colaborare. Astfel,

- In cercetarea de Fizica rutinele procesului creativ sunt, in larga masura, intemeiate pe intuitie, construite prin inductie si consolidate prin iterare (proces *'trial and error'*), iar formalizarea comunicarii rezultatelor este (cu unele exceptii in cercetarea experimentala) de natura mai degraba protocolara, cultivand cutume academice consolidate prin simplul consens al comunitatii stiintifice, in general fara constrangerile unor configuratii fixe (*architectural patterns*), solutii de proiectare (*MVC* etc.), sau standarde (ISO etc.).
- In Stiintele Informatiei si dezvoltarea IT procesul creativ – nu mai putin provocativ-intelectual si laborios - este, dimpotriva, puternic constrans de rigoarea conceptelor si disciplina formala a arhitecturilor, solutiilor de proiectare consacrate si standardelor – o situatie intimidanta pentru *outsideri* ca fizicienii, ce se vor afla intotdeauna in dificultate incercand sa explice expertilor IT, 'ce vor ei, fizicienii, de fapt'.

Pentru o corecta intelegere a situatiei, urmatoarele observatii trebuie tinute permanent in atentie:

- Pentru fizicienii ce au initiat si elaborat conceptul, N-WATCHDOG PoC este un *mijloc* – si nu scopul.
- Pentru expertii IT ce vor evalua PoC, vor rafina conceptul si vor dezvolta produsul final, N-WATCHDOG EM este *scopul* – si nu un mijloc.

Constienti de aceste aspecte ale colaborarii, autorii – fizicieni lipsiti de o educatie IT formala si stapanind doar uneltele de programare simple, lesne inteligibile, populare si *low-cost* ce le-au putut servi rapid si eficient scopurile – fac in acest Raport o tentativa riscanta de apropiere de cultura IT, incercand in masura posibilului *realizarea unei analogii intre limbajele de comunicare ale Fizicii si Stiintei Informatiei*.

Din partea IT se solicita indulgenta fata de inevitabila abuzare a unor notiuni si sensuri - sacre, fara indoiala, in domeniul strict de profil.

1.2. Stilul

Raportul prezinta versiunea PoC a N-WATCHDOG cu o marcata preocupare pentru facilitarea tranzitiei spre produsul final, N-WATCHDOG EM. In acest sens, s-a procedat la (i) un recurs minimal la explicatii, cu accent pe aspectele PoC intuite ca neconventionale din punct de vedere IT-formal; si (2) un recurs insistent la reprezentari vizuale – diagrame si schite de intentie (*storyboard-grade images*) recoltate selectiv din procesul in curs, de dezvoltare efectiva a PoC, a carui finalizare este prevazuta in urmatoarea etapa a PCCA.

2. Structura N-WATCHDOG

N-WATCHDOG PoC este o platforma IT de analiza si calcul (*Software Platform*, Figura 1), ce instrumenteaza un sistem DSS (*Decision Support System*) de veghe continua si monitorizare a dinamicii situatiei radiologice si vulnerabilitatii induse de obiectivele nucleare in zona lor de influenta semnaland eventualele nivele de alerta posibile.

Fig.1. Platforma N-WATCHDOG, concept (*storyboard layout*) al interfeţei de intrare: secţiunile de misiune şi modulele funcţionale.

Platforma ierarhizeaza, articuleaza si deschide accesul la o *colectie de module functionale* convergente spre scopul propus.

Modulele functionale (*Executables*) instrumenteaza (a) aplicatiile principale (*Core Apps*), ce implementeaza modelele fizice descrise in Raportul Tehnic #1 [1]; si (b) aplicatiile ancilare (*Supportive Apps*), menite sa asiste utilizatorul in utilizarea aplicatiilor principale.

Executables sunt organizate la interfata de intrare a platformei in *sectiuni de misiune* (*Missions*), ce fac clara pentru utilizator vocatia acestora.

Tabelul 1 rezuma aceasta structura.

Tabelul 1. N-WATCHDOG PoC: platforma, secţiunile de misiune, modulele funcţionale şi funcţiunile acestora.

The Platform	Mission Sections	Executables	Functions
N-WATCHDOG PoC	APPLICATIONS	THE FAR-FIELD WATCHDOG*	The 24/7 automatic forecasting of the radiological situation (RadSit) and the consequent territorial vulnerabily, over areas of radii in the order of tens to a few hundred kilometres.
		THE NEAR-FIELD WATCHDOG*	The 24/7 automatic forecasting of the radiological situation (RadSit) and the consequent territorial vulnerabily, over areas of radii in the order of one to a few ten kilometres.
	TUTORIALS	The Far-Field Trainer*	Assissted, step-by-step initiation of users in understanding and operating the Far-Field Watchdog app.
		The Near-Field Trainer*	Assissted, step-by-step initiation of users in understanding and operating the Near-Field Watchdog app.
		SFX – Complex Terrain Issues*	Addresses special situations – RDD (Radioactive Dispersion Devices) events, that feature specific source terms and consequencial environmental factors including site topography affecting RadSit and territorial vulnerability.
	UTILITIES	Source Terms**	Interactive evaluation of atmospheric radioactive emissions Source Terms, based on plant condition.
		Meteo Forecasts**	Acquisition, processing and precautionary storage of meteorological forecasts for use in the RadSit and vulnerability anticipative assessments.
		Maps and GIS**	Introduction to WATCHDOG's mapping and GIS-handling facilities.
		Radiological Data**	Introduction to WATCHDOG's data libraries: contents and updating.
		Static Vulnerability Assessment**	A tool to understand, assess and store for further use the Static Vulnerability of communities.

	RECORDS	The Watchdog Archives*	A desktop-based fast-reconstructor-viewer of cases already assessed by the applications under Missions 'APPLICATIONS' and 'TUTORIALS', based on the respective inputs.
		The Watchdog Server*	A platform-embedded server for the 'Situation Reports' – the standard, comprehensive, web-publishable documents generated by the RadSit and vulnerability assessment apps.
	DOCUMENTS	Essentials**	An introduction to N-WATCHDOG.
		The Reading Room**	A runtime library of technical documents and papers, meant to enhance user perception of, and body of information on Nuclear Safety issues and solutions.
		Useful links**	Web links to key facilities and institutions relevant in the project context.

* Core apps.
** Ancillary apps

Anexa 1 prezinta un *storyboard* preliminar al paginilor de introducere in modulele N-WATCHDOG.
Anexa 2 ilustreaza informatia furnizata de sistem, in diferitele expresii, grafice si textuale, cunoscute de autori drept preferate de operatorii de management al urgentelor nucleare.

2.1. 'Arhitectura' Core Apps

In spirit, daca nu si in litera, 'arhitectura' aplicatiilor principale (*Core Apps*) N-WATCHDOG PoC este de tip MVC [v. 2, 3 si bibliografia acestor surse] (Figura 2).

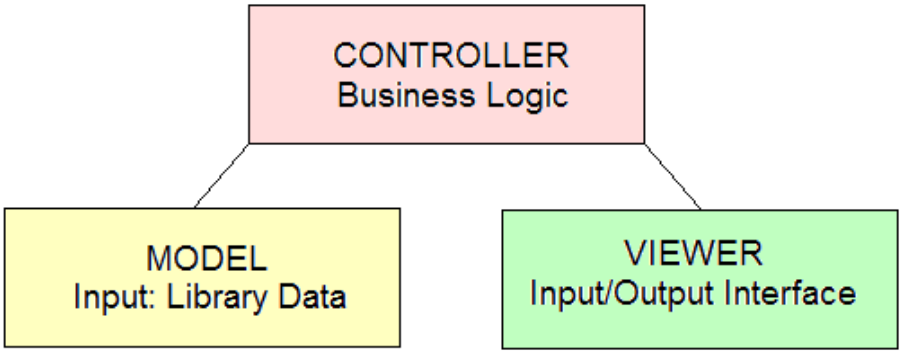

Fig. 2. Analogia MVC în N-WATCHDOG PoC.

Figurile 3 si 4 detaliaza analogia.

	MODEL: Aplicatiile ▪ THE FAR-FIELD WATCHDOG* ▪ THE NEAR-FIELD WATCHDOG* ▪ The Far-Field Trainer* ▪ The Near-Field Trainer* ▪ SFX – Complex Terrain Issues* ▪ Source Terms** ▪ Meteo Forecasts** ▪ Maps and GIS** ▪ Radiological Data** ▪ Static Vulnerability Assessment** ▪ The Watchdog Archives* ▪ The Watchdog Server* ▪ Essentials** ▪ The Reading Room** ▪ Useful links** Grafica de pagina
CONTROLLER: Codul \N-WATCHDOG.exe	
	VIEWER: Interfata GUI n-WATCHDOG Logo

Fig. 3. Emularea conceptului MVC în cazul Platformei N-WATCHDOG PoC.

'Controlerul' Platformei este, de fapt, un simplu dispecer ce trateaza drept 'Model', sau 'Date' lista de aplicatii prezentate la interfata ('View') si selectionabile interactiv pentru executie. In acest caz 'Controller decisions' au in spate rationamentul utilizatorului (‘expert judgement’).

In sensul explicat in Introducere, al unei *emulari liberale a conceptelor formale IT*, ‘controlerele’ modulelor functionale manipuleaza 'clase' care pot fi

- programe independente (*.exe si *.tkn – formatul executabil '*token*' al limbajului *Liberty Basic* (LB 4.03) – un dialect derivat din *SmallTalk*); si
- rutine incorporate (*embedded*) furnizand expresii digitale ale outputului (Figura 5).

MODEL:
Date:
- Radiological data: \PUBLIC\DATA*.*
- GIS data: \PUBLIC\COMMLIB*.*

Grafica de pagina: \PUBLIC\MySERVER*.*

CONTROLLER
Codul
\!N-WATCHDOG-PuffsTracker-FCT-Auto-Globe-GMGE-QB64-MyTimer-Web.tkn
(Main)

'Clase':
- Source localizer: \!!!N-WATCHDOG-X-Locator-SAW-direct.tkn
- Meteo Forecast: !WATCHDOG-SA-MeteoWorksX-FCT-AutoWeb.tkn
- Source Term: embedded routine in \Main
- Radiological Engine: embedded routines in \Main
- Digital All-Output Generator: embedded routines in \Main

VIEWER:

GUI
- Interactive raster maps widget
- Interactive contour maps widget
- ATL web widget, for
  Google Maps
  Google Earth Plugin
- Texteditor widgets

WEB

HTML5 Framework for Situation Reports (SitReps), including
- Interactive canvas maps;
- Link to Google Maps output rendering;
- Link to Google Earth output rendering;
- I/O reporting Textareas

Fig. 4. Emularea conceptului MVC in cazul modulelor functionale ale N-WATCHDOG PoC. Exemplul ales: *The 24/7 Far-Field Watcher*.

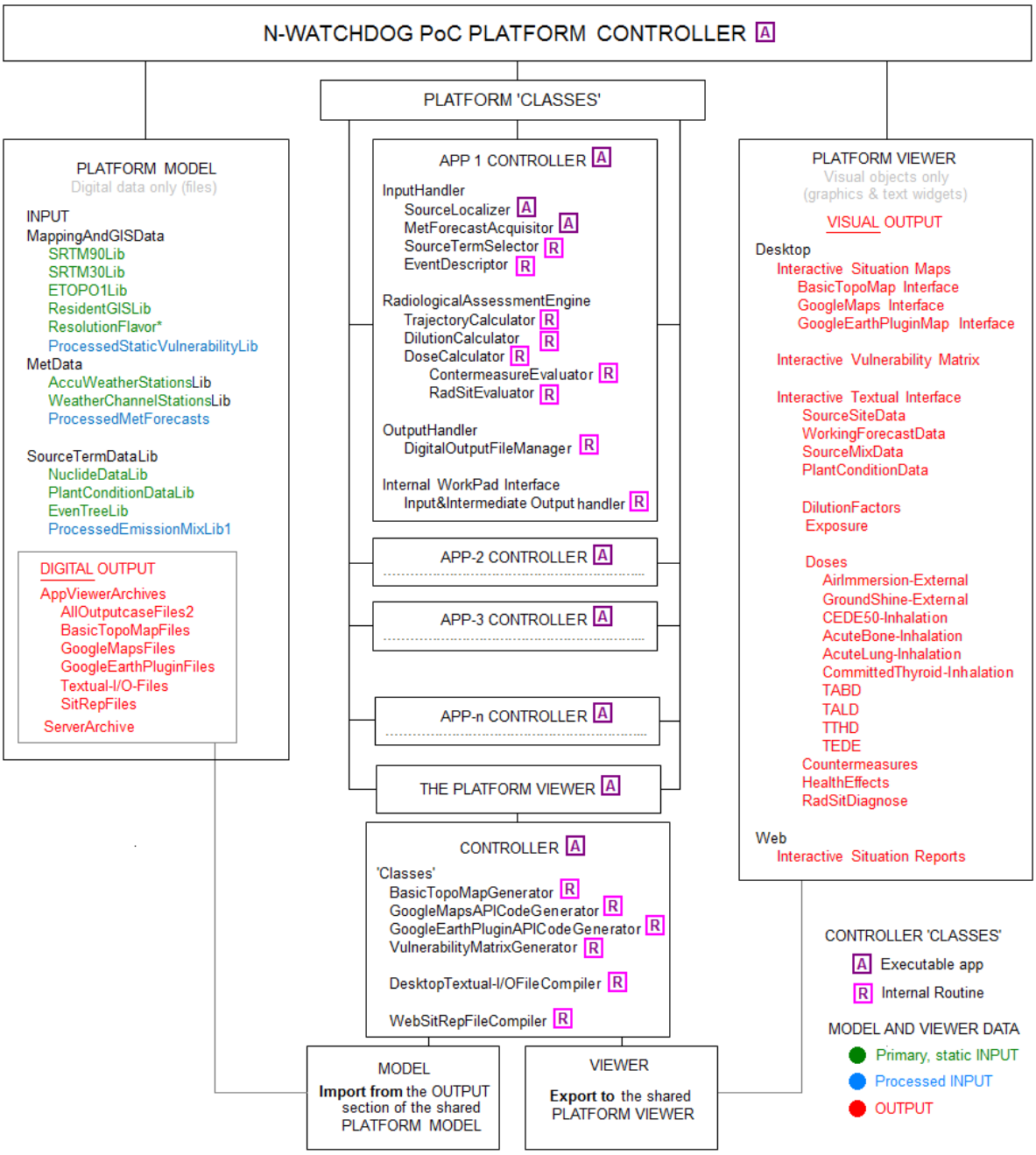

Fig.5. Distributia obiectelor de programare in structura Platformei N-WATCHDOG PoC.

Deosebirea in modul de tratare a 'claselor' – autonoma sau prin incorporare - in programarea efectiva a controlerelor PoC decurge dintr-o ratiune de fond; si o ratiune de convenienta:

- Pe fond, s-a urmarit o practicare rationala a principiului *'Separation of Concerns'*, fara expulzarea obstinata in numele unei *'procedural correctness'* inflexibile a componentelor de factura 'Model' sau 'Viewer' ce furnizeaza *output intermediar* folosit ca input in zone cronologic-apropiate ale fluxului operatiilor de implementare a *modelelor fizice* (v. Raportul Tehnic #1), necesitand astfel afisare imediata la interfata.
- Pentru convenienta, s-au urmarit:
  - Realizarea unui *shared* VIEWER autonom, pentru toate aplicatiile; si, pentru uzul dezvoltatorilor PoC,

- O lungime (numar de linii) a codurilor-sursa ce poate fi bine stapanita in cursul numeroaselor reveniri necesare (actualizarea solutiilor IT, *'trial-and-error*', *debugging*) in procesul inductiv de dezvoltare a PoC.

2.2. Elemente de programare

Programele de calcul N-WATCHDOG reflecta structura si principiile de 'arhitectura informala' prezentate urmarind, in masura posibilului, disciplina *'Separation of Concerns'*.

Urmatoarele caracteristici se reproduc sistematic in programarea tuturor executabilelor listate in coloana 3 a Tabelului 1:

- Fiecare executabil listat este un 'Controller' *sui generis*. La randul lor, 'clasele' de tip program executabil manipulate de controlerul unei aplicatii prezinta si ele o anatomie de factura MVC, ceea ce poate conduce la o imagine (metaforica) a N-WATCHDOG ca emuland un *'Hierarchical MVC*'.

- Fiecare executabil are la baza propriul sau cod-sursa, **[nume].bas**, generat in IDE (*Integrated Development Environment*) al limbajului de baza – *Liberty BASIC* 4.0.3., **liberty.exe**, numit in continuare LB. Facilitatile LB – dialect BASIC de nivel inalt, interpretat, permit:
  - rularea codurilor sursa, [nume].bas scrise la interfata, direct in IDE, de catre interpretorul nativ LB;
  - crearea executabilelor *token*, **[nume].tkn** specifice LB si rularea lor in IDE;
  - debugging *'lite*' sau extins al codurilor sursa si verificarea automata de eroare in [nume.tkn], de catre pseudo-compilerul (encripterul) nativ LB, integrat IDE;
  - crearea optionala a unui executabil conventional, **[nume].exe**, prin customizarea *LB Runtime Engine* **DO.EXE**, schimband 'DO.' cu [nume].

Liberty BASIC (LB) is a commercial computer programming language and integrated development environment (IDE). It has an interpreter developed in Smalltalk, which recognizes its own dialect of the BASIC programming language. It runs on 16-bit, 32-bit and 64-bit Windows.

A central idea in creating Liberty BASIC was to model the handling of windows after the syntax for file handling. Thus, (v. LB Help File): "The OPEN command opens communication with a device, which can be a disk file, a window, a dynamic link library or a serial communications port."

Though Liberty BASIC has its share of limitations in its design for advanced programming, it makes a credible and very usable introductory integrated development environment, IDE, for moderate to advanced users of Windows. DLLs are available with functions allowing users to overcome most of the limitations in Liberty BASIC. Liberty Basic is not a true compiler. Liberty Basic translates the code written in the IDE to an encrypted file with the extension "tkn". This file is then interpreted by an executable file that carries the same file name.

In practica, deosebirea dintre [nume].tkn si [nume].exe rezida in faptul ca, in timp ce [nume].tkn poate rula independent de IDE numai in dependenta unui alt [nume.tkn] sau [nume.exe], care il chema prin comanda interna 'run [nume.tkn]', codurile [nume].exe sunt autentice '.exe' pe care Windows OS le recunoaste si le executa ca atare, independent sau in mod *Shell*. Ambele varietati favorizeaza insa crearea ‘cascadelor’ de executie cu cel putin doua nivele ce se pot recunoaste in implementarile PoC.

- Executabilele din categoria *Core App*, precum si unele ancilare au in dependenta (pseudo)'clase', reprezentate in fapt
  - de programe distincte cu functionalitati specifice; sau
  - de rutine interne apelabile *gosub*, *sub*, *function*, sau prin *branching* (*goto*) – un privilegiu al BASIC, detestat insa de limbajele si mediile profesionale avansate.
- O aplicatie .bas/.tkn/.exe poate adresa orice 'clasa' de tip .bas/.tkn/.exe, sau .htm(l) operand sau nu cu scripturi, precum si orice date de tip numar sau string – suficiente in aplicatiile N-WATCHDOG PoC, fara tipizare explicita.

- Toate executabilele de implementare a modelelor fizice de evaluare radiologica sau a vulnerabilitatii folosesc aceeasi facilitate 'View' (MVC) de redare a outputului esential – cu minore variatii in parametrii de intrare, astfel asigurandu-se un aspect important SoC, precum si un format uniform al raportarilor.
- Fiecare executabil apeleaza la resurse de date, gazduite de sub-foldere ale folderului \PUBLIC al sistemului ('MODEL' MVC section...). Datele de 'Model' operate de executabilele PoC *nu* sunt baze de date, ci biblioteci de date structurate in raport cu necesitatile de acces si format ale aplicatiilor. Bibliotecile sunt constituite din fisiere, de tip I/O secvential, sau *random access*.

Figura 5 detaliaza distributia obiectelor de programare ale PoC, in structura Platformei.

Anexa 3 (51 pagini) ofera o versiune editata si comentata (la un minimum suficient orientarii) a unui cod-sursa de *Core Application* N-WATCHDOG-PoC.

2.2.1. Aspecte in programarea desktop

Toate componentele triadei MVC au, la momente oportune decise de controlere, ecouri vizibile la interfata. Nevoia de interactivitate a interfetelor – stipulata in Proiect si satisfacuta consecvent pe intinderea fluxurilor de operatii – a necesitat echiparea interfetelor cu diferite controale (*controls*) oferite de sistemul de operare (MS Windows 7, 8). Sub acest aspect, controlerele N-WATCHDOG se pot califica drept '*event-driven'*.

Tabelul 2. Controale efectiv utilizate in proiectarea interfetelor interactive N-WATCHDOG – o solutie simpla pentru coduri-sursa scurte si lesne de inteles.

Control	**LB 4.03 wrapper command** (case-insensitive)
Windows	OPEN "Window Title" for type as #handle 'type': window, dialog, graphics, text, popup
Menus	MENU #handle, "title", "text", [branchLabel], "text2", [branchLabel2], | , . . . or MENU #handle, "title", "text", subName1, "text2", subName2, |, ... with obvious notations
Boxes	GRAPHICBOX #handle.ext, xOrg, yOrg, width, height TEXTBOX #handle.ext, xOrg, yOrg, wide, high TEXTEDITOR #handle.ext, xOrg, yOrg, wide, high
Buttons	BUTTON #handle.ext, "label", returnVar, corner, x, y {, width, height} returnVar: [branchlabel] for goto, or subroutine label (SUB) 'corner': UL, LR (upper-left, lower-right) { } – optional BMPBUTTON #handle.ext, filespec, returnVar, corner, x,y 'filespec': a bitmap (.bmp) file
Selectors	LISTBOX #handle.ext, array$(), eventHandler, x, y, wide, high 'array$()': an array of ASCII strings 'eventHandler': [branchlabel] for goto, or subroutine label(SUB) COMBOBOX #handle.ext, array$(), eventHandler, x, y, wide, high RADIOBUTTON #handle.ext, "label", setHandler, resetHandler, x, y, wide, high with obvious notations
File managers	FILEDIALOG titleString$, templateString$, receiverVar$ 'titleString$': a string that needs 'Open' to open a file, or 'Save' to save the file to disk 'templateString$': tipuri de fisier cautate, e.g "*.txt; *.bmp; *.png" etc. ' receiverVar$': variabila caii complete a fisierului ales.

Messages	CONFIRM string$; responseVar 'string$': textual context of box 'responseVar$': 'yes', or 'no', usually resulting in code's goto, gosub, or SUB NOTICE "string expression", the equivalent of an Alert message of sorts.

Toate controalele accepta optiuni de fonta, *styling* (WS_...) si un set de 16 culori de *background*; controalele text accepta si *foreground color*.

Comenzile disponibile pentru controale acopera virtual toate nevoile unei interfete interactive si expresive.

LB ofera amplu acces la integrarea directa in codurile-sursa de *call*-uri pentru majoritatea functiilor Windows API – facilitate efectiv folosita in programarea PoC. Pentru programarea aplicatiilor desktop de prim interes s-au dovedit:

- Posibilitatea unei integrari, minimale dar suficiente, a bibliotecii Windows ATL.dll, ce converteste dinamic un control GUI *graphicbox* in alte moduri de rendering, inclusiv si in special de fisiere HTML/JavaScript, ca hartile web Google Maps/Earth, ce pot deveni astfel obiecte GUI *sui generis*;
- Aspecte de gestiune a menu-urilor;
- Integrarea de functii ale unor biblioteci grafice *3rd party* (*freeware*).

2.2.2. Aspecte in programarea web

Facilitatile dependente de web ale N-WATCHDOG sunt urmatoarele:

- Achizitia de prognoze meteorologice de la site-uri publice de profil, in mod *offline browsing*;
- Localizarea surselor de emisie pe harti web interactive si apel la servicii de *geocoding*;
- Generarea de harti de situatie prin apel la serviciile *Google Maps* si *Google Earth*;
- Serverul N-WATCHDOG, unitate de publicare web a Rapoartelor de Situatie.

2.2.2.1. Scrierea aplicatiilor

Solutia de programare consta in *scrierea dinamica de catre cod, in runtime*, *de fisiere* .htm *adecvate aplicatiei,* ce tin obiectele relevante si comenzile in scripturi JS parcate in <head>. Fisierele .htm se scriu de catre 'clasele' comandate de controlere (aplicatii *executables* sau rutine interne) si sunt stocate in arhive dedicate N-WATCHDOG, din zona ce s-a considerat prin adoptie de termeni 'Model' in sensul liberal MVC.

Cheia retetei o constituie artificiile folosite:

(i) in toate cazurile, pentru *importul* de date din fisierele de output ale N-WATCHDOG in variabilele JavaScript: prin concatenare de stringuri; si

(ii) numai in cazul masinilor de localizare - *exportul* de date obtinute de scripturile JS de la serviciile web de harta sau geocoding,in aplicatiile LB care le-au solicitat: prin initializare de *ActiveXObject* si crearea de obiecte JS de tip *Scripting.FileSystemObject*.

Fisierele .htm constituie date de intrare (componente 'Model') pentru

(i) Viewerul de modele functionale principale (*Core app*) – o singura aplicatie *shared*

(ii) pentru toate *core apps*;

(iii) Viewerul general al arhivei desktop 'The Watchdog Archive' (v. Figura 1) – masina de reconstructie rapida si vizualizare a cazurilor deja evaluate si arhivate; si

(iv) Serverul N-WATCHDOG – in cazul Rapoartelor de Situatie (SitReps).

O schita generica ilustrativa a solutiei de programare se reda in Tabelul 3.

Tabelul 3. Schita de programare a unei aplicatii de harta web, in N-WATCHDOG PoC.

```
<!DOCTYPE html>
<html>

  <head>

    <meta http-equiv="content-type" content="text/html; charset=utf-8" />
    <meta http-equiv="X-UA-Compatible" content="IE=9"> //asigura compatibilitatea 'downwards'

    <style type="text/css">
      body {font-family:arial; font-size: 11px;}
      #map {height: 924px; width: 924px;}              //campul unei aplicatii tip harta
    </style>

    //Sectiunea de fond, JS

    <script type="text/javascript"                     //servicii web si biblioteci JS...
                src="http://maps.google.com/maps/api/js?sensor=false"></script>
    <script type="text/javascript" src="https://www.google.com/jsapi?"></script>
    <script type="text/javascript">
      google.load('earth', '1');
    ...

 //Initializare...
 function init() {
   map=new google.maps.Map(document.getElementById('map'), {//specificatii: zoom, etc.
       });

  try {googleEarth = new GoogleEarth(map);}      //teste de acces si mesaje de eroare
  catch (e) {...}

  finally {                      //asigura incarcarea obiectlor overlay la deschidere
            google.maps.event.addListenerOnce(map, 'tilesloaded', addOverlays);
           }
      }

 //Creaza un obiect de afisare atasabil la markere
   function addInfowindow(marker, infowindow) {
    google.maps.event.addListener(marker, 'click', function() {
      infowindow.open(map, marker);
   });

 //Introduce informatia, prin markere localizate si interogabile on-click.
 //Datele se culeg din fisierul de output al aplicatiei respective, fdata$
 //Markerele se incarca pe rand, iar harta se redimensioneaza automat spre a le acomoda.
   function addOverlays() {

   // Add markers

             var bounds = new google.maps.LatLngBounds();

   open fdata$ for input as #o    //citeste fisierul de output al aplicatiei
                                  //creaza markerul, il localizeaza si ataseaza la infowindow
   while eof(#o)=0
   line input #o,wo$
   Lola$=trim$(word$(wo$,1,"|"))
    Lo=val(trim$(word$(Lola$,1,",")))
    la=val(trim$(word$(Lola$,2,",")))
   descript$=trim$(word$(wo$,2,"|"))
   ico=8-val(trim$(word$(wo$,3,"|")))

     var marker = new google.maps.Marker({          //creaza markerul
     position: new google.maps.LatLng(laJS,LoJS),   //laJS, LoJS - variabile JS pentru
     draggable : false,                             //variabilele LB la, Lo
     title : '',
     icon : '"+ico$(ico)+"'"
     });

     infowindow = new google.maps.InfoWindow({      //ataseaza informatia la marker
      content: '     //variabila JS pentru descript$, extras de LB din fisierul de date// '
      });
      addInfowindow(marker, infowindow);
      marker.setMap(map);
```

```
     var laLn = new google.maps.LatLng(laJS,LoJS)); //laJS, LoJS - variabile JS pentru la,Lo
     bounds.extend(laLn);              // extinde bounding box
    wend

    close #o

             map.fitBounds(bounds);    //redimensioneaza harta in raport cu noul marker

      };

//'Asculta'...
google.maps.event.addDomListener(window, 'load', init);

</script>    //inchide sectiunea de fond, JS

</head>

<body>
  <div id="map"></div>
</body>

</html>
```

2.2.2.2. Serverul

Serverul N-WATCHDOG este o aplicatie *RunBASIC* – produs descris, in rezumat, astfel:

Run BASIC is a web application server, based on the Liberty BASIC version of the BASIC programming language.
Run BASIC uses a desktop programming model. Web pages are not kept in individual files or dealt with as templates but are generated dynamically as determined by the programmer. It can be programmed in two styles. With procedural programming, applications are made using subroutines and functions. With object-oriented programming, applications can be componentized into objects with methods called on them. Any object can render itself into a web page as a way to have different parts of a web page managed in a modular way.
Run BASIC favors a widget-based approach where the user interface (UI) is programed without using HyperText Markup Language (HTML). High-level commands automatically generate HTML. Colors, fonts, backgrounds and layout can be adjusted using Cascading Style Sheets (CSS). If needed, HTML or JavaScript can be injected into a page. Interactivity is similar to that of desktop applications, with callbacks tying user actions to program routines.
Marshaling web requests and dispatching user actions to procedures is automatic.
Run BASIC can draw graphics and render them into web pages; fetch files from other web sites using GET and POST and use a built-in XML parser to extract data; and includes a database capability using the SQLite database engine.
Run BASIC is not an add-on module like Perl or PHP is for Apache. The BASIC compiler and execution model is integrated tightly with its own HTTP server. If needed, it can be proxied behind another web server, such as Apache. Session management is transparent to programmers. When a web application starts, it is given a session. If it is then inactive long enough (duration is customizable), the session times out and memory is reclaimed. Session logic need not be put in the code.
Supported operating systems include Microsoft Windows 2000, XP, Vista, Mac OS X, and Linux. Supported web browsers include Internet Explorer, Mozilla Firefox, and Safari. Licenses include commercial and freeware.

'Controlerul' aplicatiei este \Server.tkn, un *token* (executabil LB, .tkn) oferit la interfata Platformei, ce efectueaza urmatoarele operatii:

- Lanseaza Cmd.exe al Windows OS pe optiunea **cmd /K ipconfig**, informand la interfata 'View' asupra identitatii IP sistemului de calcul; conteaza IPv4;
- Preia **IPv4** al sistemului de calcul, pe care utilizatorul a fost instruit (mesaj) sa il preia manual si sa-l introduca in controlul LB textbox, dedicat (*copy/paste*);
- Actualizeaza folderul \PUBLIC\SERVER – 'Model' al aplicatiei in sens MVC, copiind fisierele Rapoartelor de Situatie ([SitRep Name].html) impreuna cu toate fisierele din dependenta acestuia (*.png – grafica de pagina web; *.bmp – harti topografice de situatie; *.htm – harti web de situatie Google Maps/Earths; *.txt – raport I/O comprehensiv, textual, de situatie), din arhivele corespunzatoare, \PUBLIC\ARCHIVE-[name]*.*, reprezentand 'Model' in sens MVC pentru *Core Apps*.

- Lanseaza consola **RunBASIC Server**, instruind utilizatorul sa deschida serverul pe controlul (buton) **'Start Serving'**), indicand adresa (**URL**) ce trebuie comunicata clientilor autorizati spre a accesa, pe browserele proprii, Serverul N-WATCHDOG:

  http://[IPv4 al sistemului-server]:8008/N-WATCHDOG-Server.html

Testele conduse pana in prezent au indicat o limitare a RunBASIC - *framework* al Serverului N-WATCHDOG - in privinta numarului de clienti ce pot fi serviti simultan. Se recomanda in consecinta ca in proiectarea produsului final sa se aiba in vedere recurgerea la solutiile server mai robuste practicate in mediile de specialitate.

2.3. Remember

Dupa cum s-a indicat si in Raportul tehnic #1, partenerul academic ce va evalua si rafina sub aspect IT-formal conceptul produsului precum si dezvoltatorul produsului final N-WATCHDOG EM vor avea acces, in conditii ce se vor conveni, la toate codurile-sursa si resursele de date/cunostinte ale PoC.

Anticipand, autorii PoC se asteapta la un anumit disconfort din partea expertilor IT, in fata aparentei neconventionale a listingurilor PoC. Tinem, prin urmare, sa evocam din nou deosebirea dintre modul de lucru efectiv al fizicienilor autori ai PoC si maniera de abordare prezumata a analistilor si dezvoltatorilor profesionisti care il vor prelua ca reper si il vor transfigura intr-un software profesional (Figura 6).

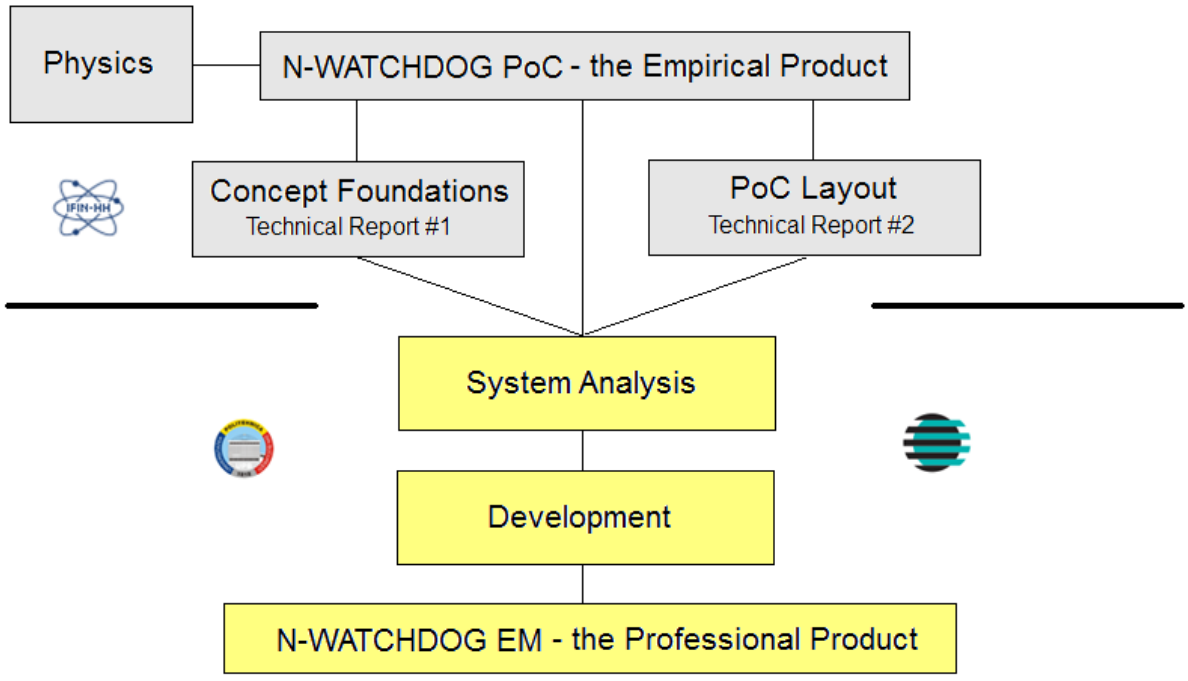

Fig.6. Geneza livrabilelor pivotale ale PCCA: 'the odd way vs. the right way'.

Proiectul N-WATCHDOG PoC ce a format obiectul acestui Raport Tehnic este, in fapt, rezultatul unui *act de relevare* a unui produs in curs de conceptualizare si dezvoltare inductiva si empirica asteptat a se finaliza in iunie 2015. PoC a debutat si continua sa evolueze sub imperativul exclusiv al nevoii de a modela, din perspectiva Fizicii, fenomenologia emisiilor atmosferice radioactive si a impactului potential al acestora asupra organismului si activitatilor umane. Parcursul de la acest ‘cadastru’ al problemelor si solutiilor ce insoteste demonstrarea fezabilitatii conceptului pana la N-WATCHOG EM ramane in

sarcina expertilor academici si practicienilor IT profesionisti, parteneri in proiect, alaturi de care autorii PoC vor continua a contribui conform prevederilor PCCA.

In pofida deosebirilor intre modurile de abordare – rezultat inerent ale specificului muncii partenerilor, se exprima convingerea ca ansamblul va functiona, si va produce.

Nota: Autorii multumesc Dr. Bogdan I. Vamanu pentru contributia esentiala adusa la solutionarea unor probleme de analiza si dezvoltare IT a N-WATCHDOG PoC – proces in curs de desfasurare. Afilierea curenta a colegului si colaboratorului nostru este *EC Joint Research Centre Ispra, Institute for Energy and Transport*.

Referinţe

1. Vamanu D.V., Acasandrei V.T. (2014). *Sistem de alertare timpurie si asistare computerizata a deciziilor, bazat pe evaluarea anticipativa a dinamicii rapide a vulnerabilitatilor induse in teritoriu de obiectivele nucleare – N-WATCHDOG*. Raport de etapa, Decembrie 2014.

2. Microsoft Developer Network (2014). *Model-View-Controller*. http://msdn.microsoft.com/en-us/library/ff649643.aspx.

3. Wikipedia: *Model-view-controller*. http://en.wikipedia.org/wiki/Model%E2%80%93view%E2%80%93controller

Bibliografie de bază

CNCAN (2000). Normele fundamentale de securitate radiologica. NSR-01.

CNCAN (2004). Normele privind calculul dispersiei efluentilor radioactivi evacuati in mediu de instalatiile nucleare. NSR-23. Ordinul Presedintelui CNCAN nr. 360 / 20.10.2004.

CNCAN (2005). Norma privind monitorizarea emisiilor radioactive de la instalatiile nucleare sau radiologice. NSR-21. Ordinul Presedintelui CNCAN nr. 276 / 26.09.2005.

CNCAN (2005). Norma privind monitorizarea radioactivitatii mediului in vecinatatea unei instalatii nucleare sau radiologice. NSR-22. Ordinul Presedintelui CNCAN nr. 275 / 26.09.2005.

EUROPEAN COMMISSION (1996). *Council Directive 96/29/EURATOM of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionizing radiation*. http://ec.europa.eu/energy/nuclear/radioprotection/doc/legislation/9629_en.pdf.

Rasmussen N. et al. (1975). *Reactor Safety Study. An Assessment of Accident Risks in U.S. Commercial Nuclear Power Plants*. WASH-1400 (NUREG 751014), U.S. Nuclear Regulatory Commission, October 1975.

U.S. National Intelligence Council (2012). *Global Trends 2030: Alternative Worlds*. NIC 2012-001, April 2012.

National Governors' Association (1979). *Comprehensive Emergency Management. A Governor's Guide*. NGA Center for Policy Research. Washington, D.C. (May,1979)

Wikipedia. *Emergency Management*. http://en.wikipedia.org/wiki/Emergency_management (December, 2013)

M.E. Baird (2010). *The "Phases" of Emergency Management*. Background Paper, Prepared for the Intermodal Freight Transportation Institute (IFTI), University of Memphis. (January 2010). Online at: http://www.vanderbilt.edu/vector/research/emmgtphases.pdf

U.S. DHS (2011). *National Preparedness Plan*. U.S. Department of Homeland Security (2011). Online at: http://www.fema.gov/media-library-data/ 20130726-1828-25045-9470/national_preparedness_goal_2011.pdf.

Real Time Online Decision Support System for Nuclear Emergency Management. (*http://www.rodos.fzk.de/rodos.html*)

Jones J.A., Mansfield P.A. et al. (1996). *PC Cosyma (version 2): An Accident Consequence Assessment Package for Use on a PC*. Report EUR 16239 EN. (*http://bookshop.europa.eu/en/pc-cosyma-pbCGNA16239/*)

Prolog Development Center White Paper: *ARGOS CBRN Information System for Emergency Management*. Version 0.9, March 2011. (*http://www.pdc.dk/Argos/decision.asp*)

CEA/DASE/SRCE – *Presentation CERES* – Journees SFRP.
(*http://www.sfrp.asso.fr/IMG/pdf/E6-Monfort.pdf*)

Sullivan T.J., Ellis J.S. et al. (1993). *Atmospheric Release Advisory Capability. Real-Time Modeling of Airborne Hazardous Material*. Bulletin of the American Meteorological Society, Vol. 74, No. 12, U.S.A.
(*https://narac.llnl.gov/uploads/pbamqmed.pdf*)

Athey G.F., McGuire S.A. et al. (2007). *RASCAL 3.0.5 Workbook*. NUREG-1889.
(*http://pbadupws.nrc.gov/docs/ML0729/ML072970068.pdf*)

Homann S.G. (2011). *HotSpot Health Physics Codes version 2.07.2*. LLNL-SM-483991
(*https://narac.llnl.gov/HotSpot/HotSpot.html*)
19. Napier B.A.(2011). *GENII Version 2 Users' Guide*. PNNL-14583, Rev.3.
(*http://www.pnnl.gov/main/publications/external/technical_reports/PNNL-14583Rev3.pdf*)

Chanin D., Young M.L. et al.(1998). *Code Manual for MACCS2: Volume 1, User's Guide*. NUREG-CR-6613, SAND97-0594.
(*http://www.doeal.gov/SWEIS/OtherDocuments/481%20MACCS2%20Vol%201.pdf*)

Imai K., Chino M. et al. (1985). *SPEEDI: A Computer Code System for the Real-Time Prediction of Radiation Dose to the Public due to an Accidental Release*. Japan Atomic Energy Research Institute. JAERI-1297.
(*http://jolissrch-inter.tokai-sc.jaea.go.jp/pdfdata/JAERI-1297.pdf*)

Vamanu D.V., Gheorghe A.V., Acasandrei V.T. and Vamanu B.I. *Environmental Modeling for Blue Collars*. International Journal of Environment and Pollution Vol. 46, Nos. 3/4, pp. 246–266, 2011.

Consultancy meeting *'Advising on evaluating options for the development of assessment capabilities related to source term calculations for nuclear power plant accidents'*. IAEA, Incidents and Emergency Center, 9-10 April 2013.

Till J.E., Grogan H.A. (2008). Radiological Risk Assessment and Environmental Analysis. Oxford University Press. ISBN 978–0 19–512727–0.

IAEA (1997). Generic Assessment Procedures for Determining Protective Actions During a Reactor Accident. IAEA-TECDOC-955, ISSN 1011-4289.

Acasandrei V.T., Vamanu D.V., Vamanu B.I. (2012). Fast Methods for Source Term Assessment. CNCAN, Afumati, 3-5 December, 2012.

U.S. NRC (1995). *International RTM-95 Response Technical Manual.* U.S. Nuclear Regulatory Commission, Washington D.C., May 1995.

McKenna T., Trefethen J., Gant K., Jolicoeur J., Kuzo G., Athey G. (2006). RTM-96 Response Technical Manual. NUREG/BR-0150, Vol.1, Rev.4*,* March 1996. U.S. Nuclear Regulatory Commission, Washington D.C.

Ministère de l'Ecologie et du Développement Durable – République Francaise (2002). *Méthodes pour l'évaluation et la prévention des risques accidentels, Dispersion atmosphérique* (*Mécanismes et outils de calcul*). DRA-006, Ω-12, INERIS-DRA-2002-25427.

Gheorghe A.V., Vamanu D.V. *Disaster Risk and Vulnerability Management. From Awareness to Practice,* in Gheorghe A.V. (Ed.), Integrated Risk and Vulnerability Management Assisted by Decision Support Systems. Relevance and Impact on Governance, Springer, Dordrecht, ISBN-10 1-4020-3451-2 (HB), ISBN-13 978-1-4020-3451-0 (HB), ISBN-10 1-4020-3721-X (e-book), ISBN-13 978-4020-3721-4 (e-book), Volume 8, pp. 1-320, 2005.

Vamanu D.V., Vamanu B.I., Acasandrei V.T. Slavnicu D.S., and Gheorghiu D. *Urgenta radiologica la transportul de combustibil nuclear uzat LEU tip EK-10. Accidentul ipotetic, de severitate superioara*

autorizarii. Suplimente tehnice la solicitarea CNCAN. Partea I. Accident pe segmentul aerian.. IFIN-HH, Raport tehnic intern, comanda 684/09.04.2012, aprilie 2012.

Vamanu D.V., Vamanu B.I., Acasandrei V.T. Slavnicu D.S., and Gheorghiu D. *Urgenta radiologica la transportul de combustibil nuclear uzat LEU tip EK-10. Accidentul ipotetic, de severitate superioara autorizarii. Suplimente tehnice la solicitarea CNCAN. Partea II. Accident pe segmentul rutier*. IFIN-HH, Raport tehnic intern, comanda 684/09.04.2012, mai 2012.

Vamanu D.V., Galeriu D., Slavnicu D.S., Gheorghiu D., Melintescu A., Acasandrei V.T. *Dezafectarea Reactorului VVR-S al IFIN-HH. Scenarii de accident sever*. IFIN-HH, Raport tehnic intern, comanda nr. 545/18.03.2009, aprilie 2009.

Calida B.Y., Gheorghe A.V., Unal R., Vamanu D.V., and Radu C.V. *Complexity-Induced Vulnerability Assessment: How Resilient are Our Academic Programs?* In Infranomics - Sustainability, Engineering Design and Governance. A.V. Gheorghe, M. Masera, P. F. Katina – Editors. ISBN: 978-3-319-02492-9 (Print), 978-3-319-02493-6 (Online). Topics in Safety, Risk, Reliability and Quality, Volume 24, pp 377-393, 2014.

Adrian V. Gheorghe and Dan V. Vamanu. *Faces of Resilience*. In "Energy Security. International and Local Issues, Theoretical Perspectives, and Critical Energy Infrastructures". NATO Science for Peace and Security Series-C. Part II. Theoretical Prespectives for Energy Security. Edited by A.Gheorghe and L.Muresan. Published by Springer, The Nethelands. ISBN 978-94-007-0721-4 (PB); ISBN 978-94-007-0718-4 (HB); ISBN 978-94-007-0719-1 (e-book), pp. 79-109, 2011.

Gheorghe A.V., Vamanu D.V. *Towards QVA - Quantitative Vulnerability Assessment: A Generic Practical Model.* Journal Risk Research, 7 (6), 616-628, 2004

Gheorghe A.V. and Vamanu D.V. *Resilience and vulnerability in critical infrastructure systems – a physical analogy.* International Journal of Critical Infrastructures, Volume 5, Number 4, pp. 389-397, 2009.

Gheorghe A.V., Vamanu D.V. *System of Systems concept for Vulnerability Assessment of Large Scale Critical Infrastructures.* Atlantic Treaty Association (ATA) Meeting, Norfolk, Virginia, USA, 18 February 2009.

Gheorghe A.V. and Vamanu D.V. *Mining intelligence data in the benefit of critical infrastructures security: vulnerability modelling, simulation and assessment, system of systems engineering.* International Journal of System of Systems Engineering, Vol. 1, Nos. 1/2, 2008, pp. 189-221, 2008

BUWAL (1991). *Federal Ordinance of April the 1st, 1991*, and the ensuing implementation guidelines and manuals. Bundesamt fur Umwelt, Wald und Landschaft Storfallverordnong.

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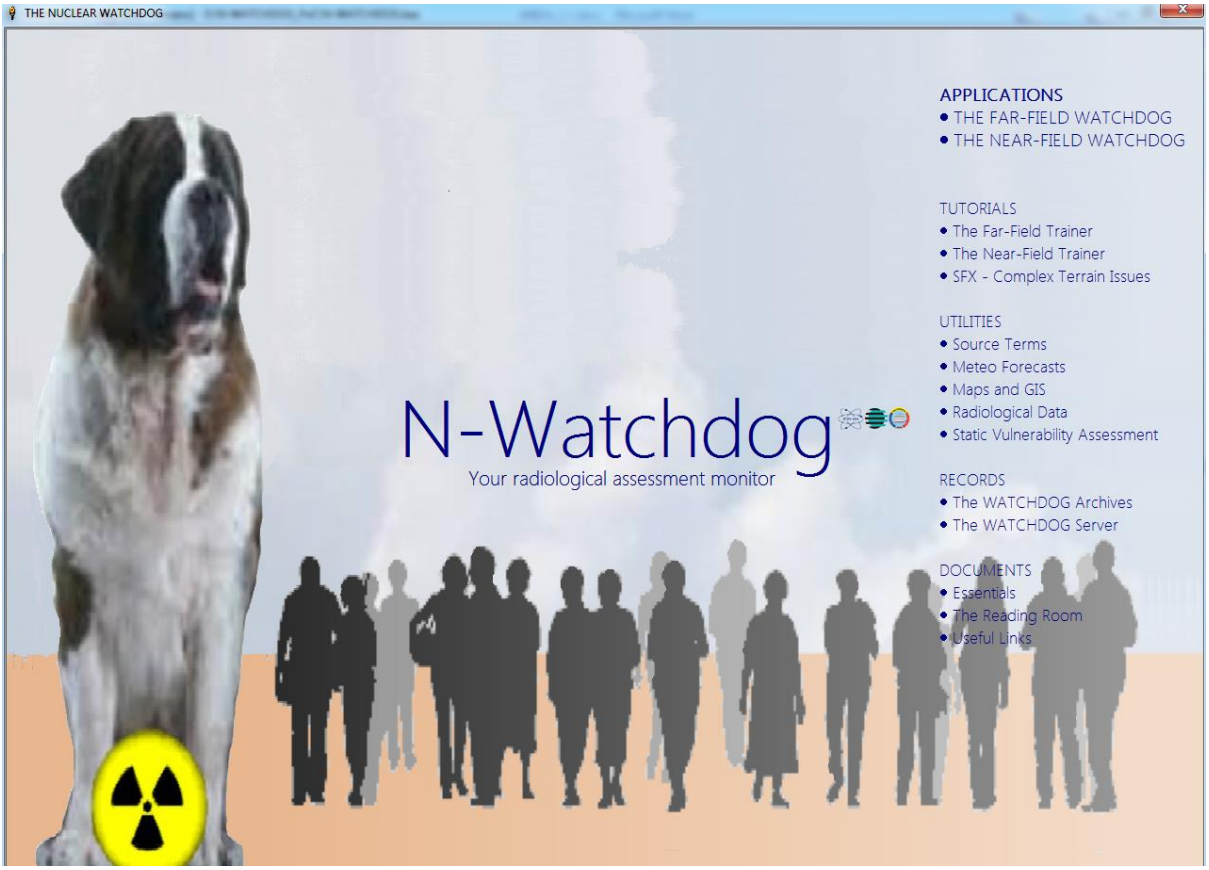
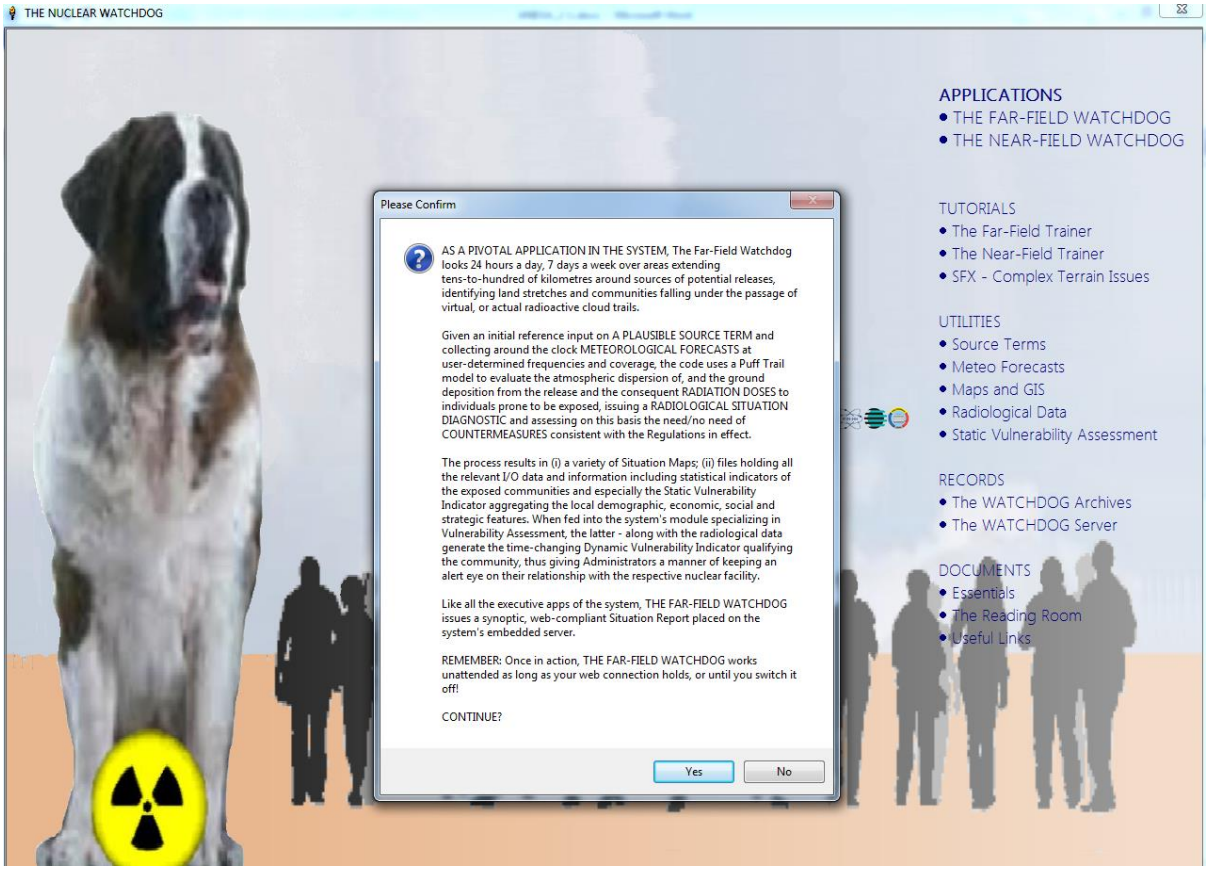
ANEXA 1.

Introducere în facilităţile N-WATCHDOG PoC
– ‘storyboard’ –

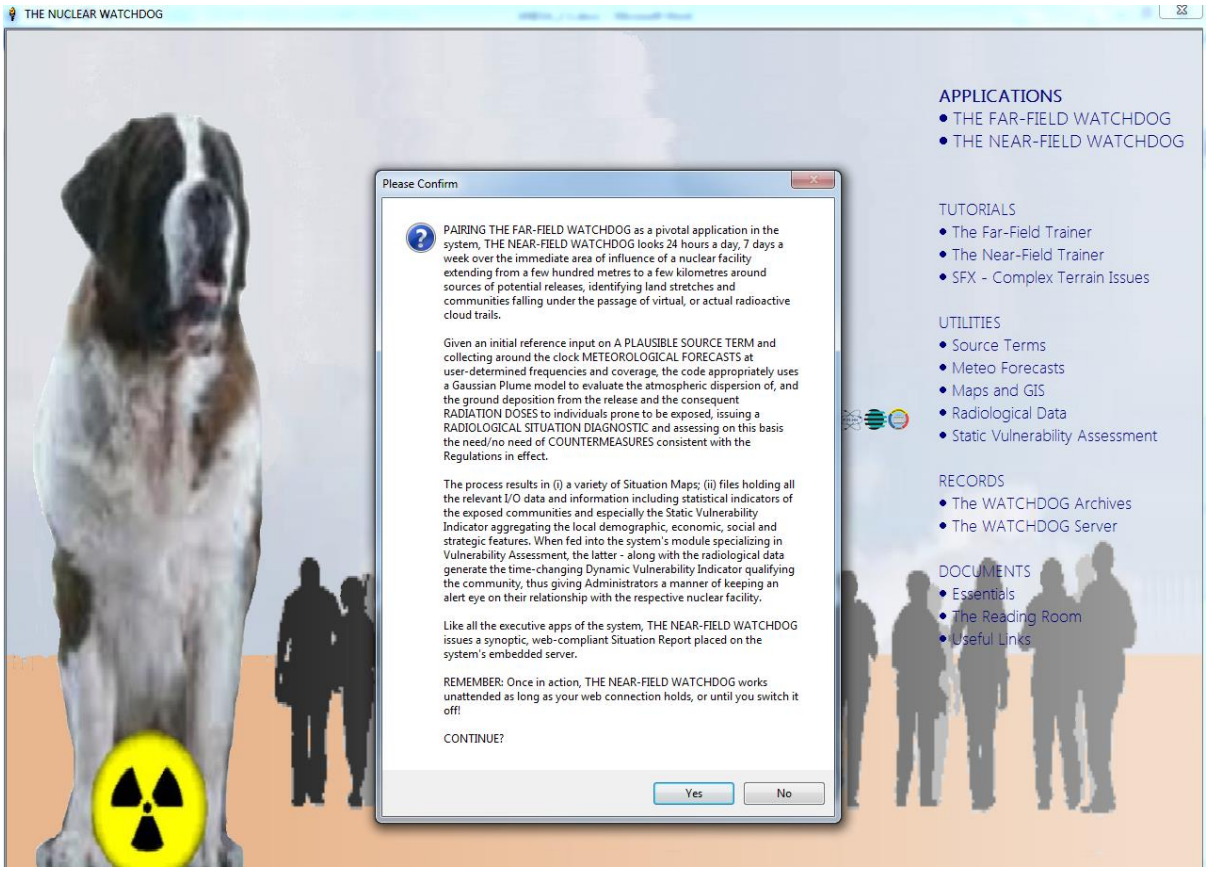


Capturi de ecran ale paginilor de acces în modulele funcţionale în curs de dezvoltare.
Pentru o lectură confortabilă a textelor,
utilizaţi funcţiunea *zoom* a viewerului dumneavoastră.

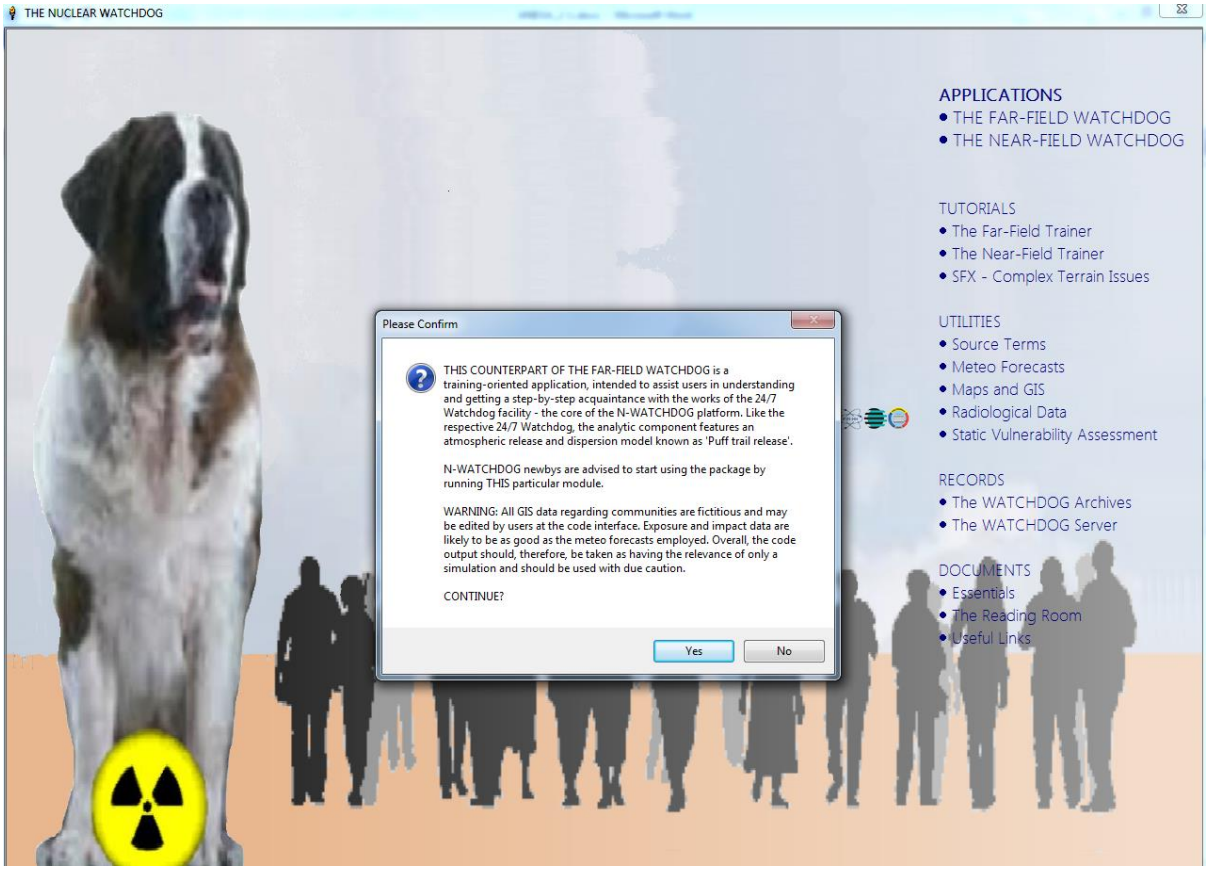
THE FAR-FIELD WATCHDOG



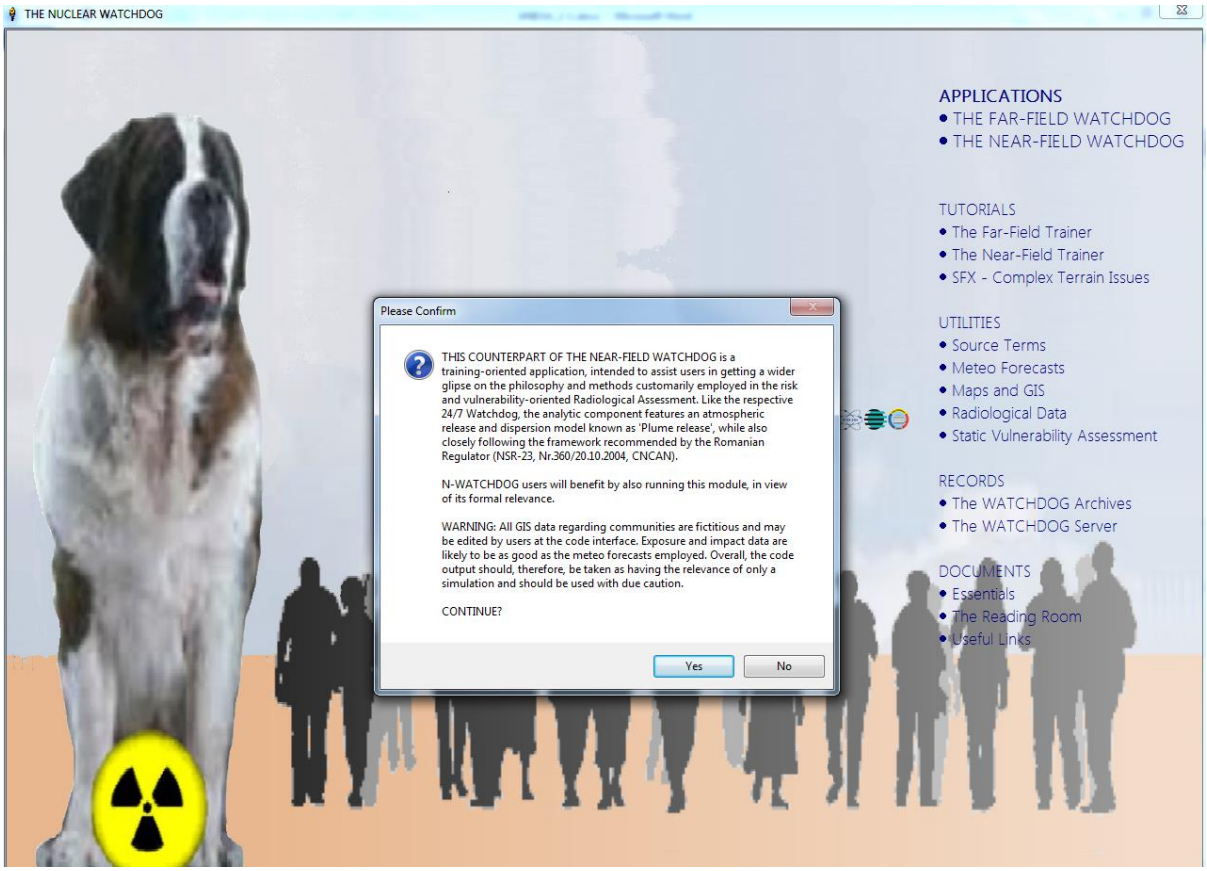
THE NEAR-FIELD WATCHDOG



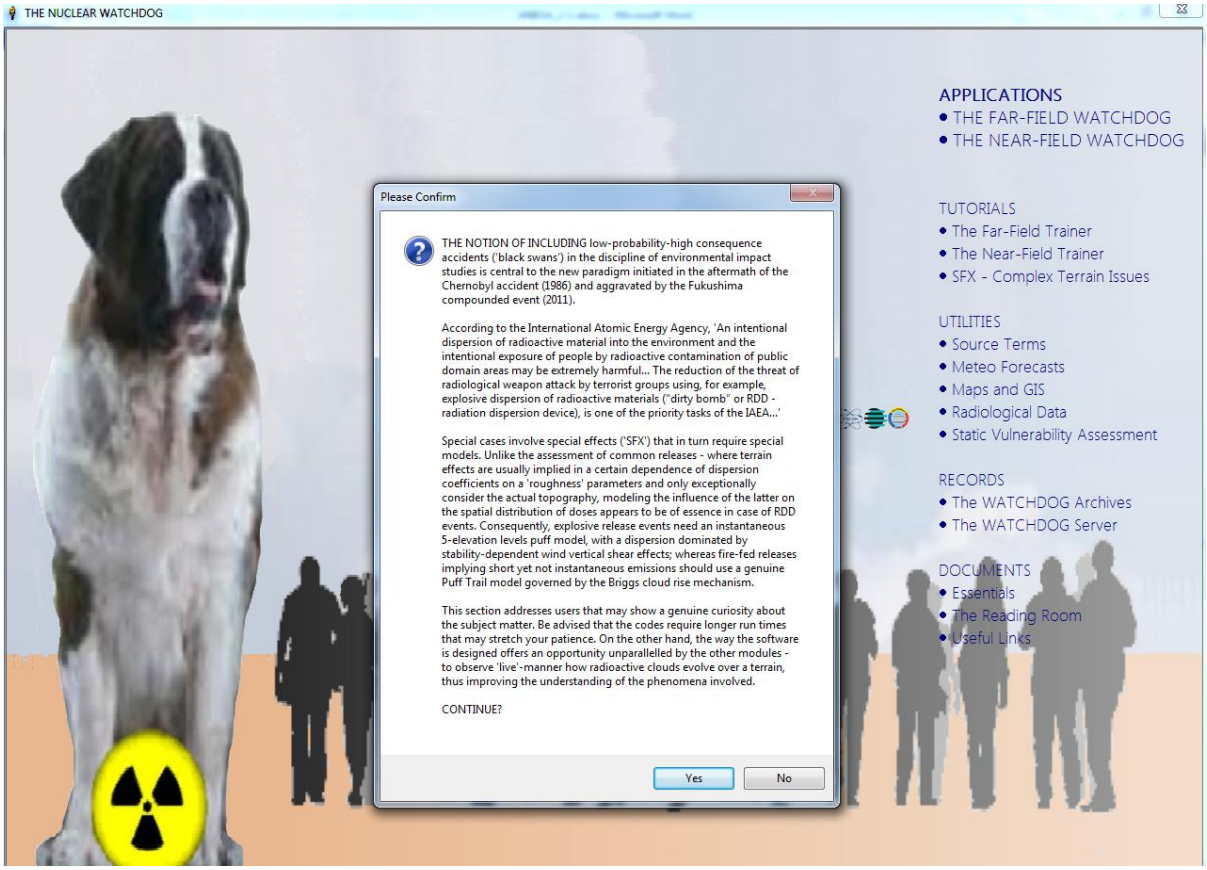
TUTORIALS - The Far-Field Trainer



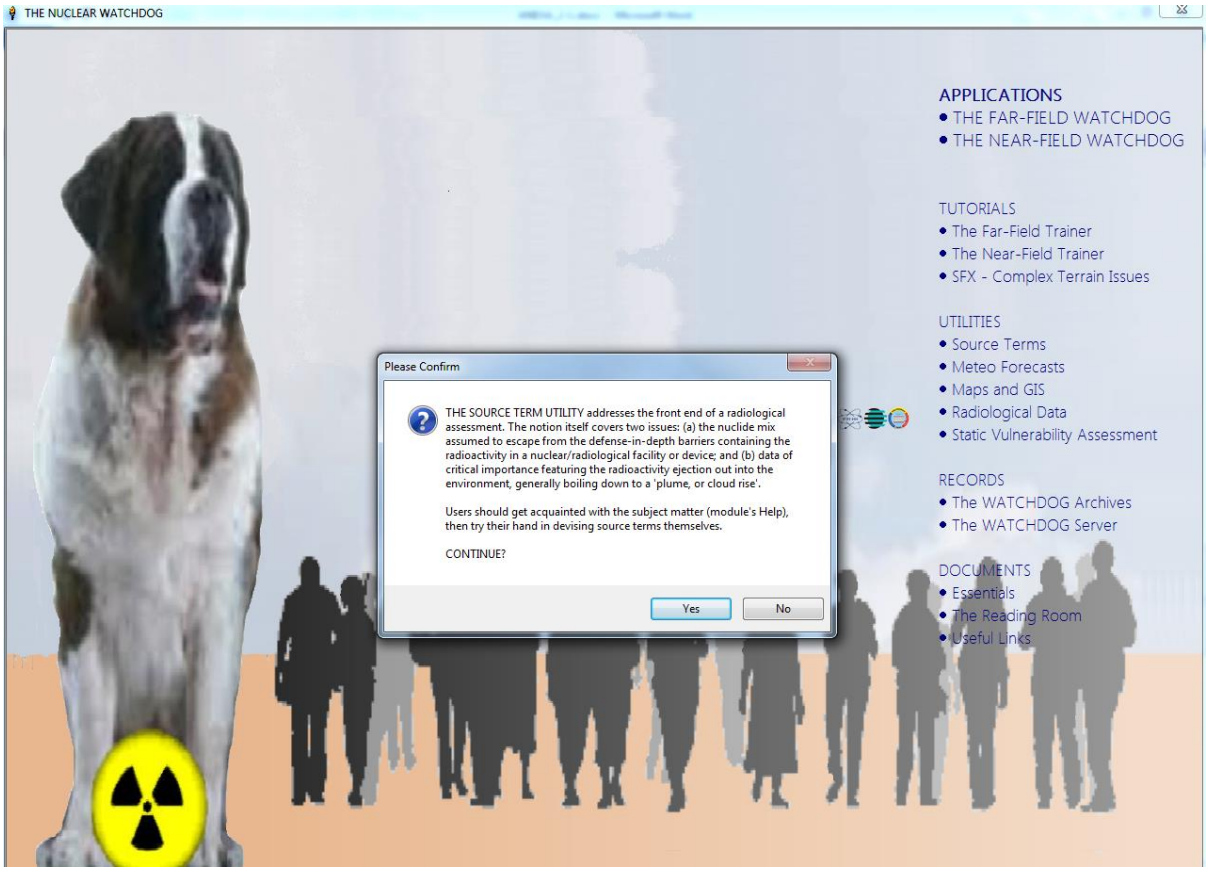
TUTORIALS - The Near-Field Trainer



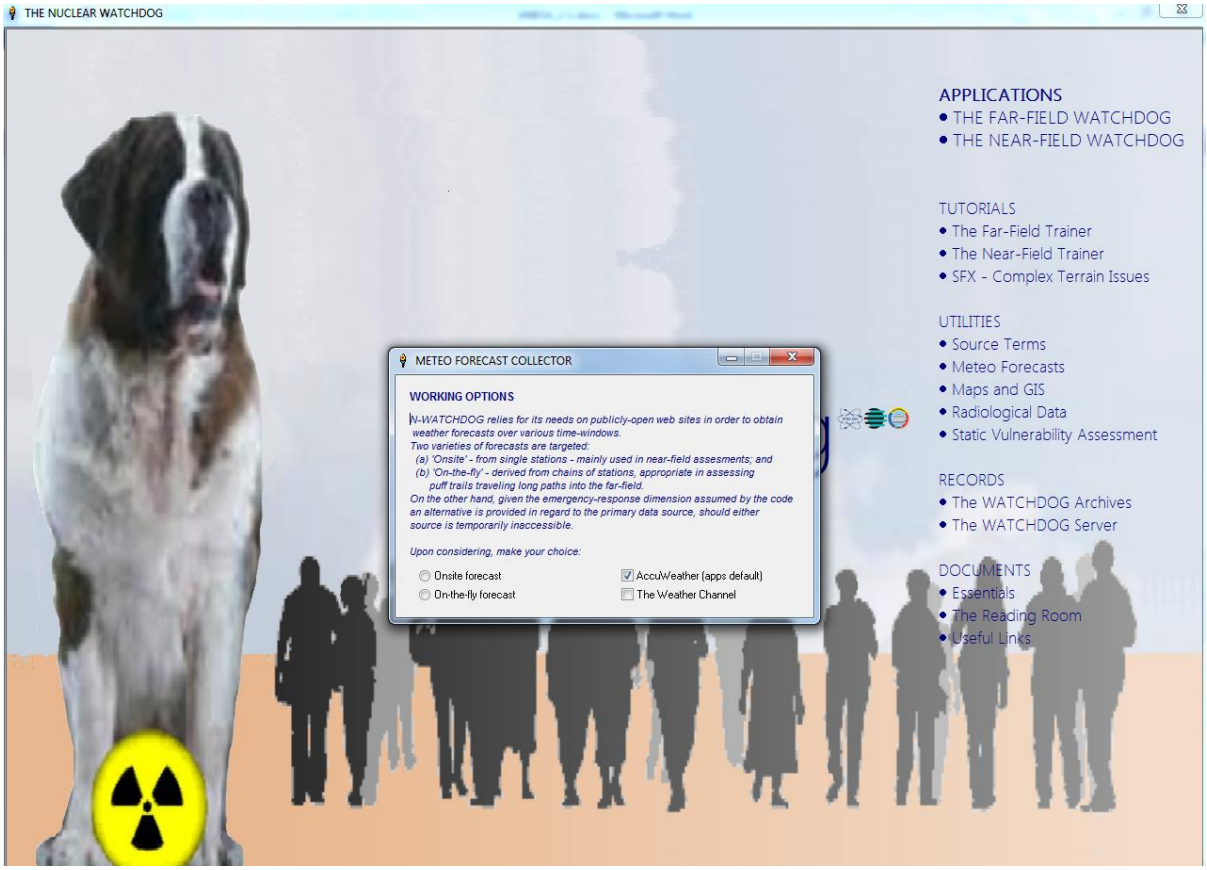
TUTORIALS - SFX – Complex Terrain Issues



UTILITIES - Source Terms

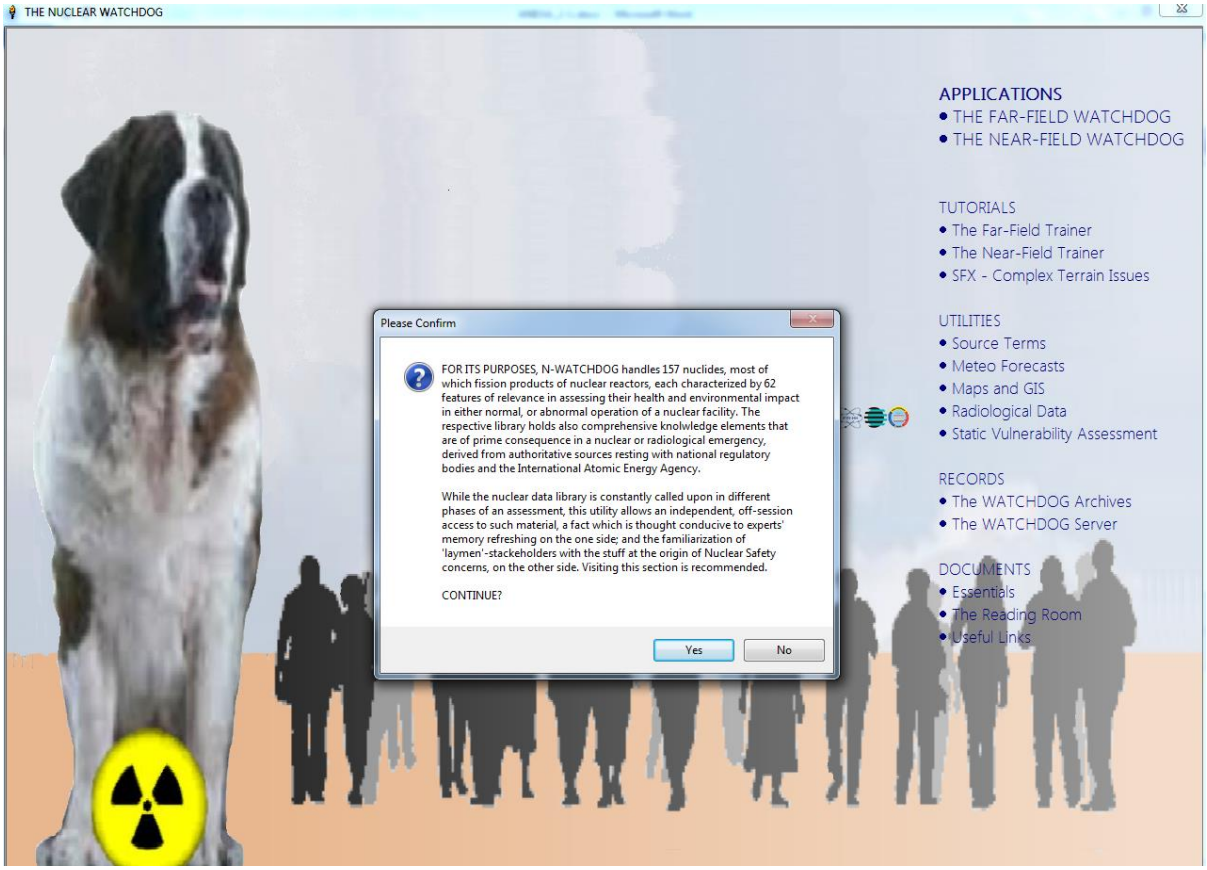


UTILITIES - Meteo Forecasts

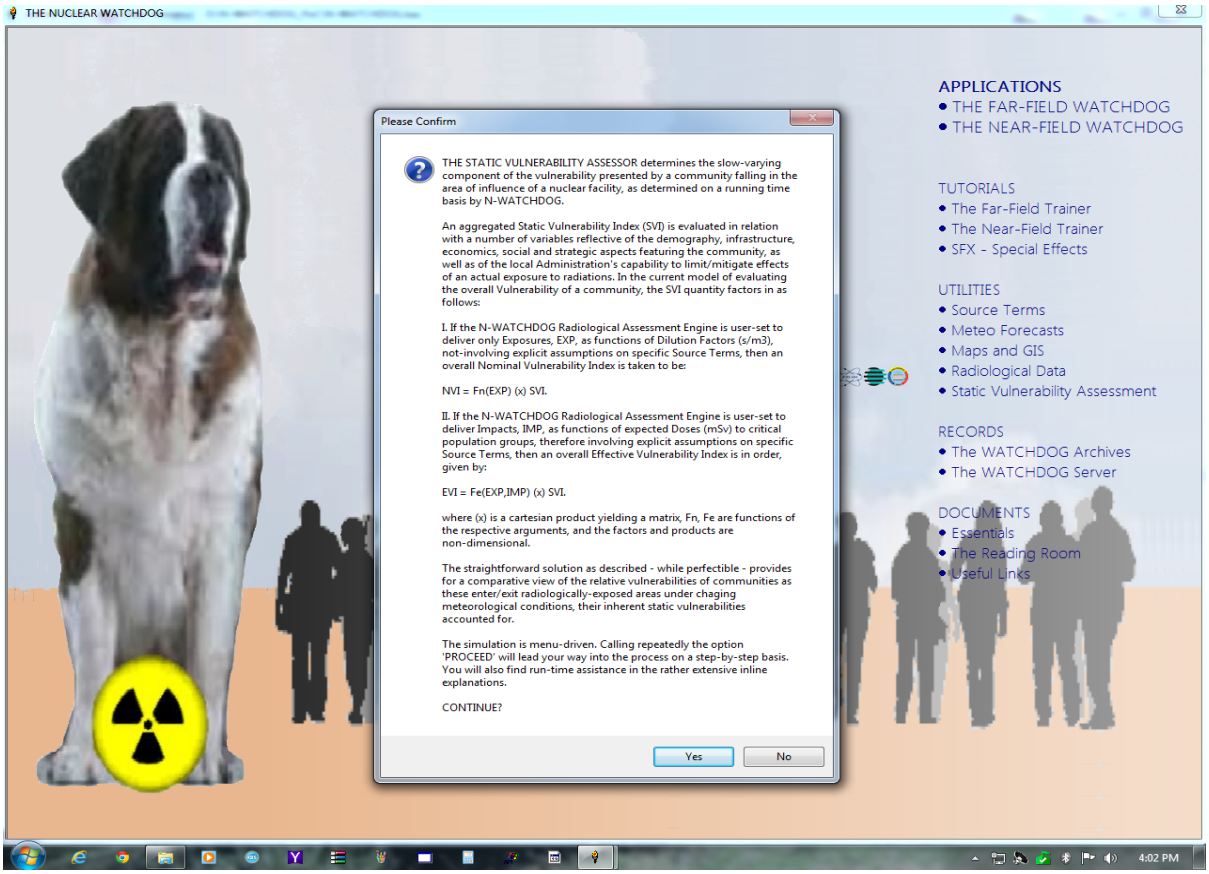


UTILITIES - Maps and GIS

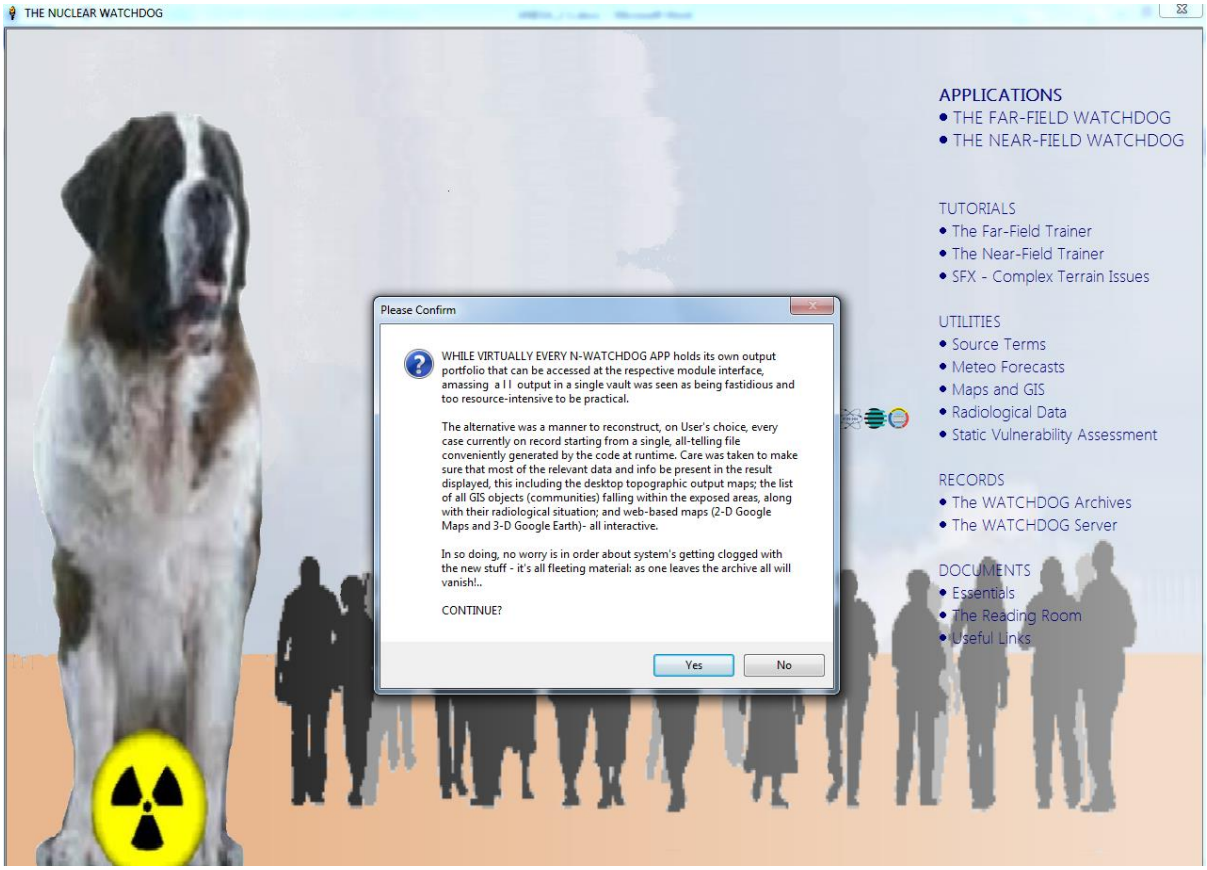
UTILITIES - Radiological Data



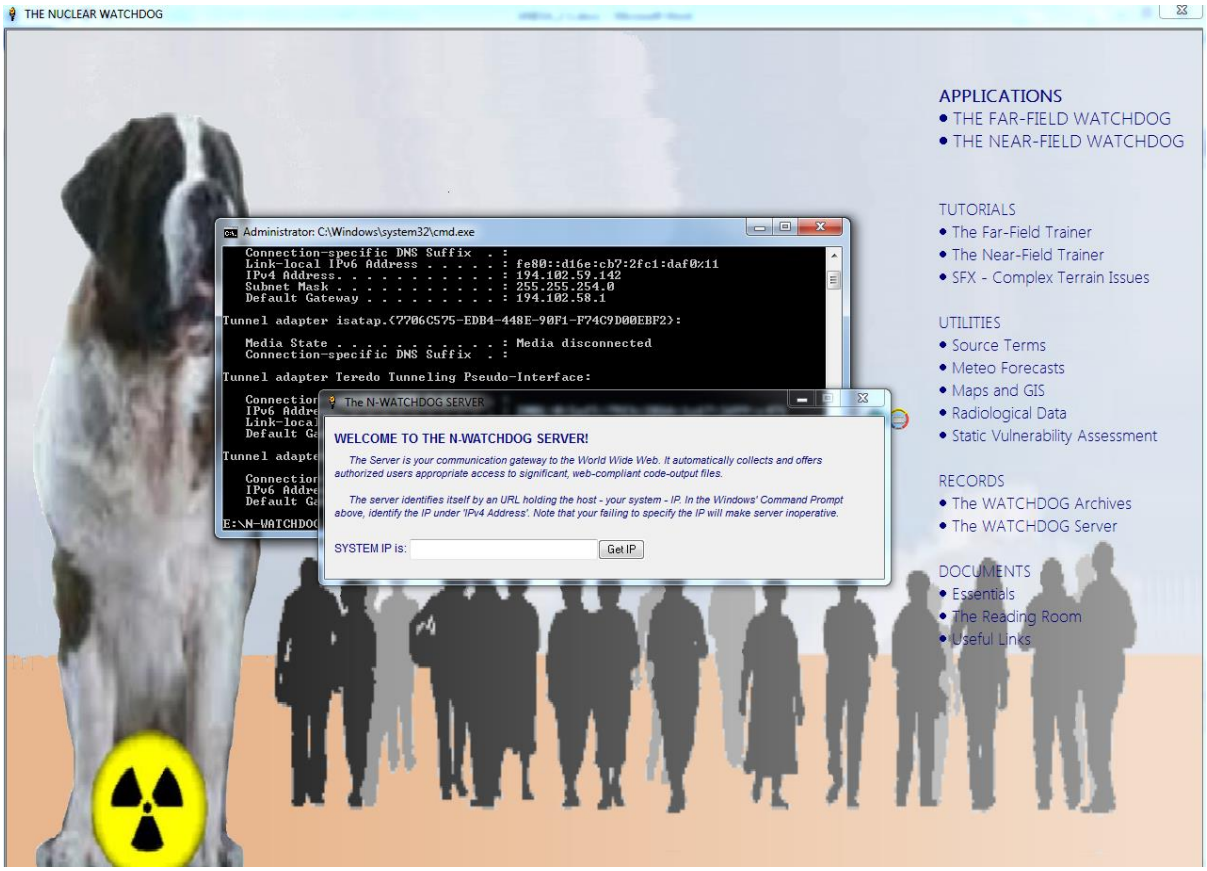
UTILITIES - Static Vulnerability Assessment



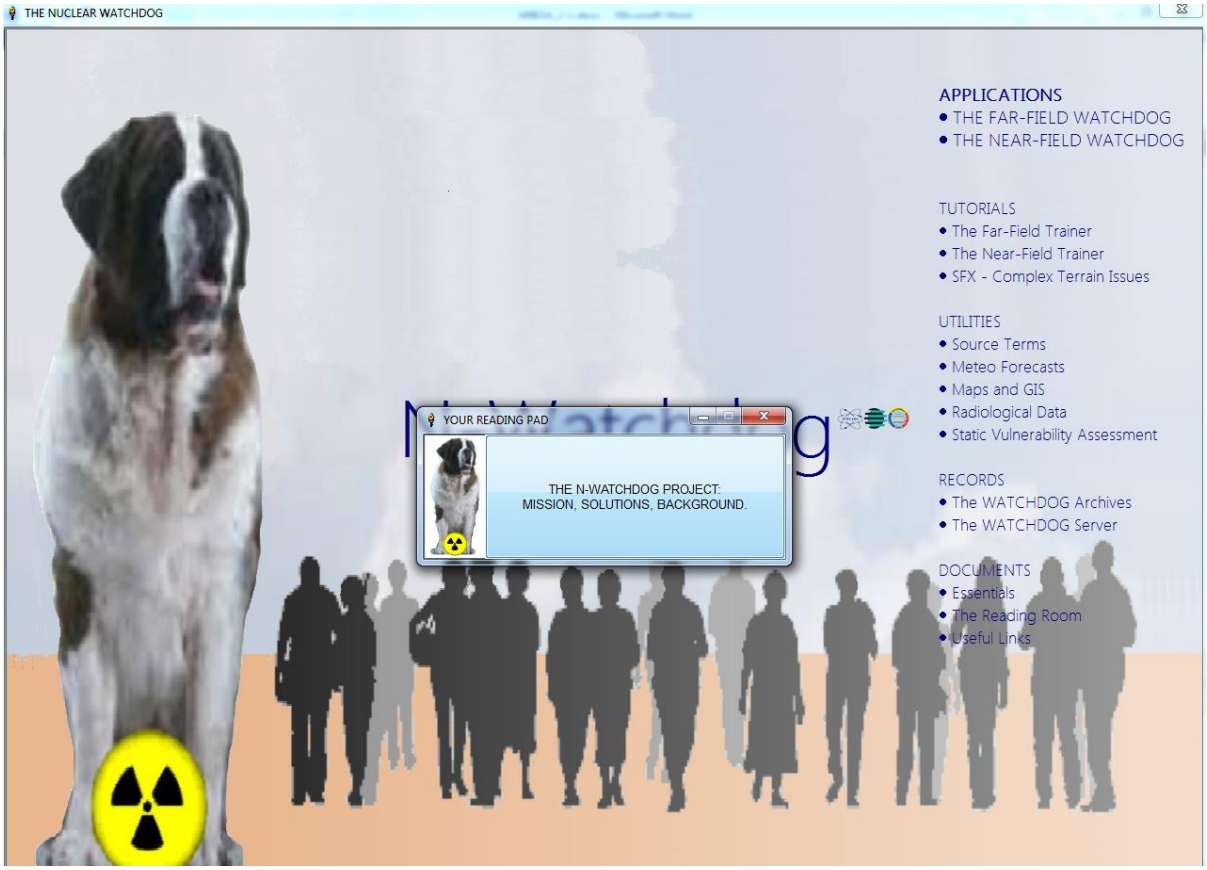
RECORDS - The WATCHDOG Archives



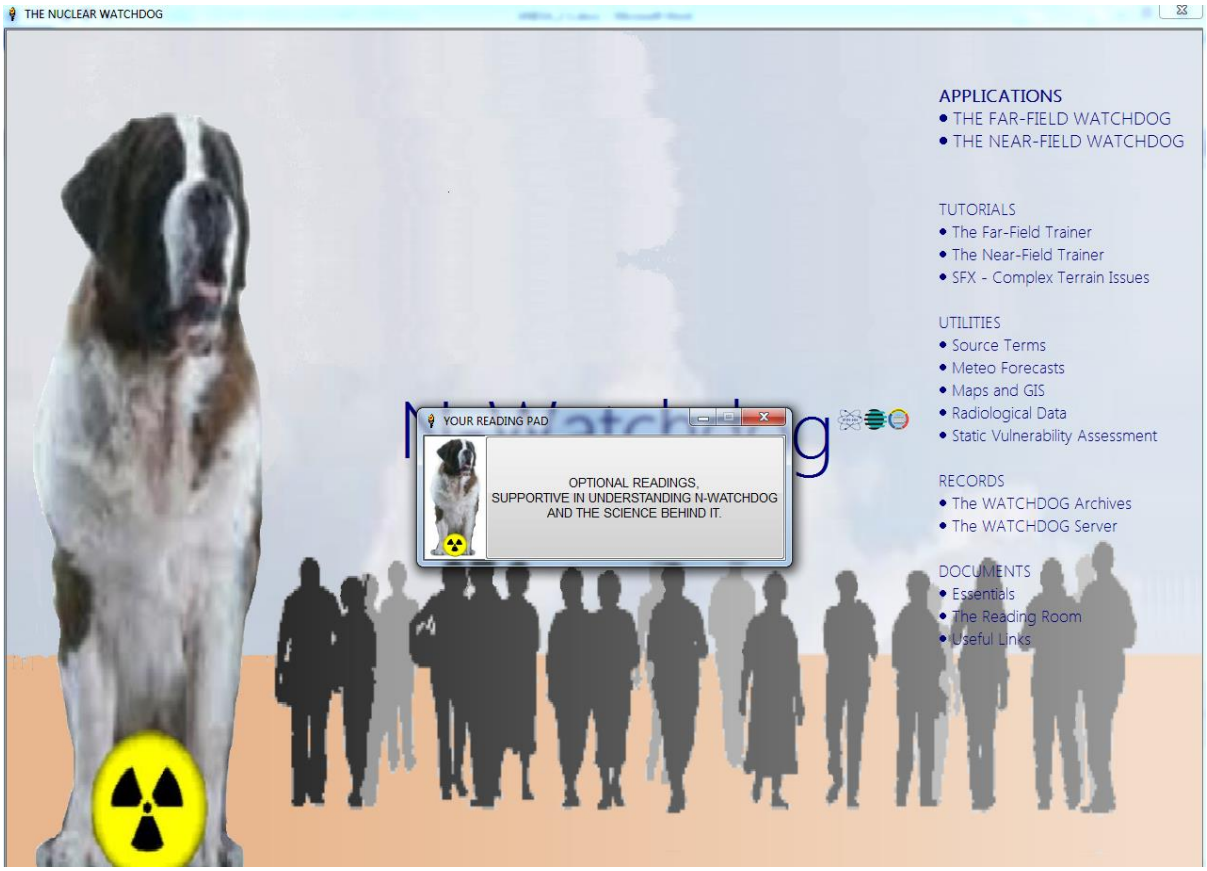
RECORDS - The WATCHDOG Server



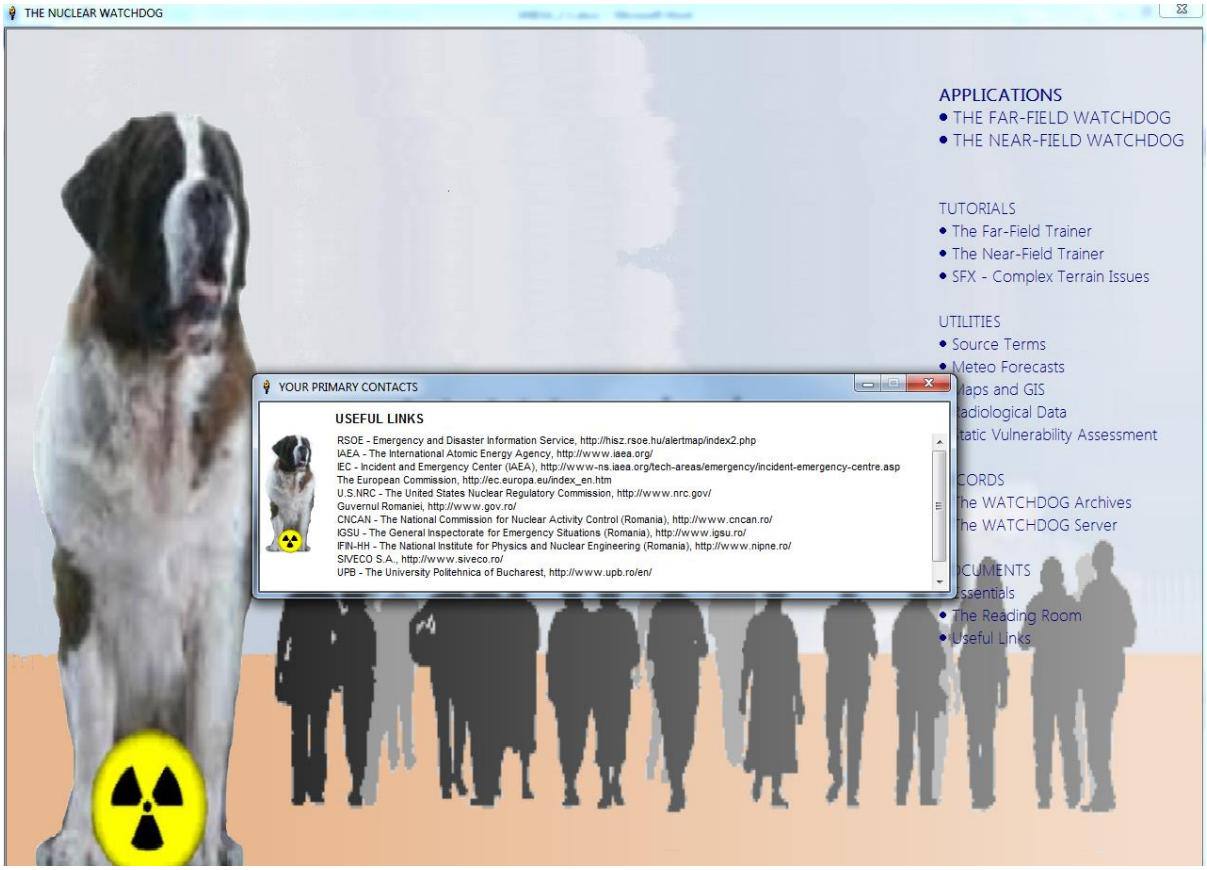
DOCUMENTS - Essentials



DOCUMENTS – The Reading Room

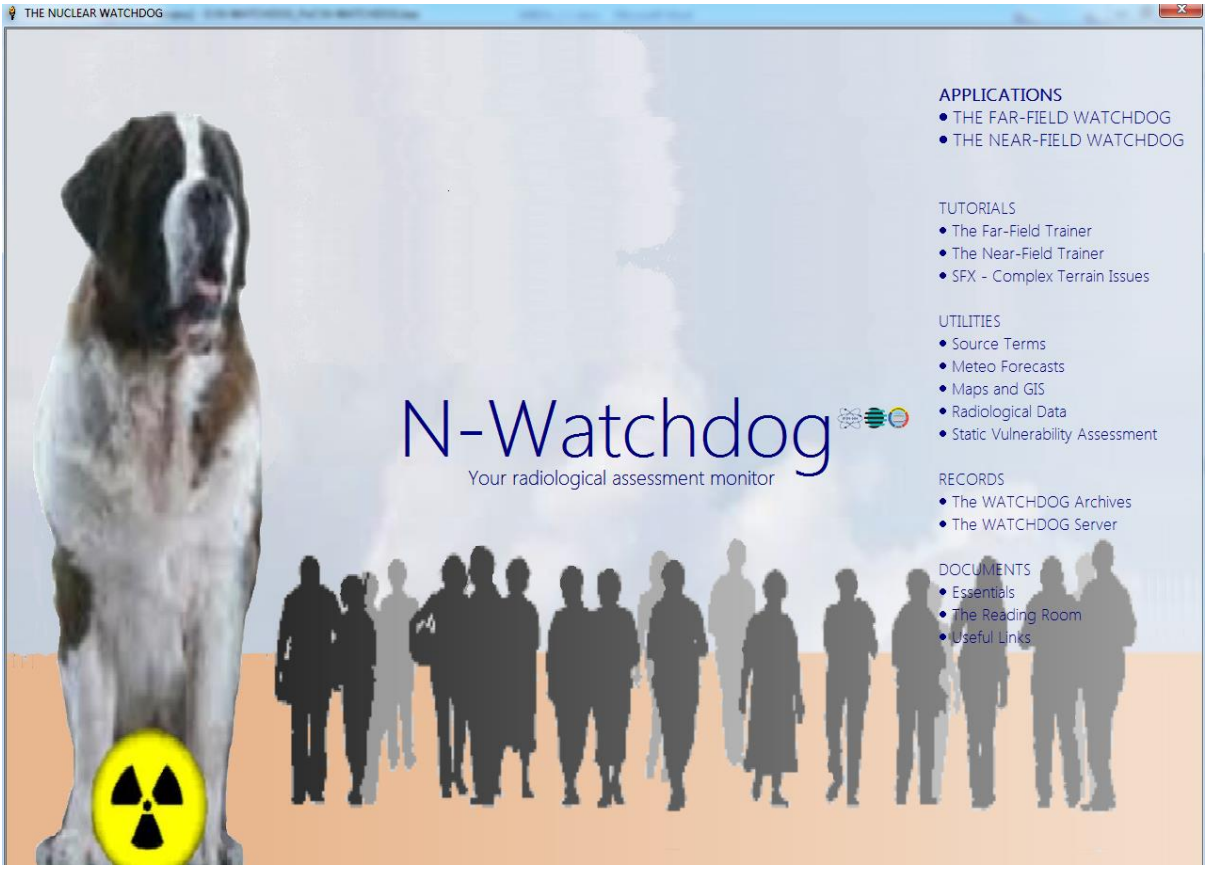


DOCUMENTS – Useful Links



ANEXA 2.

Rezultate N-WATCHDOG PoC: mostre de output
– ‘storyboard’ –



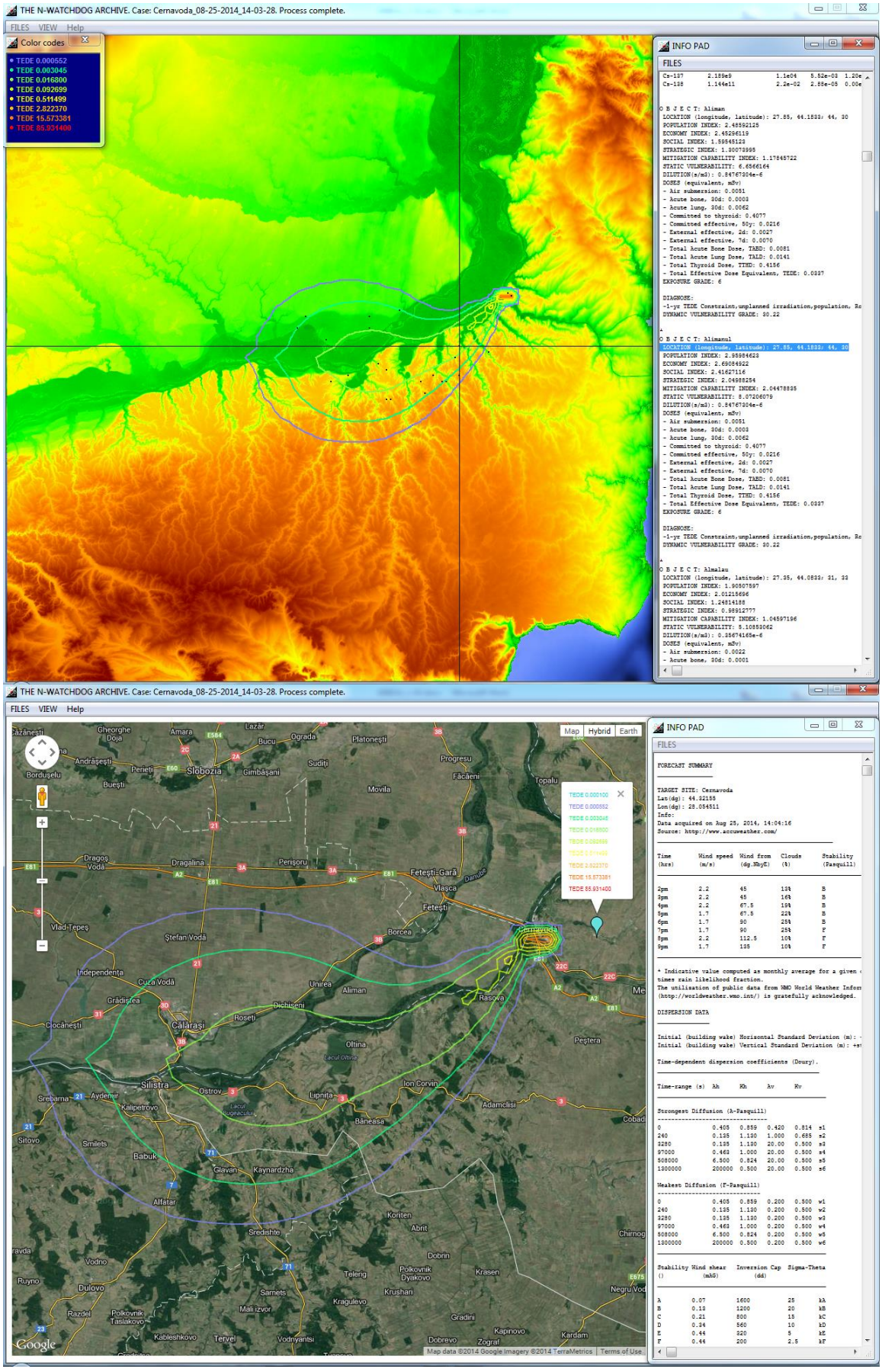
Capturi de ecran din Viewerul platformei în curs de dezvoltare.

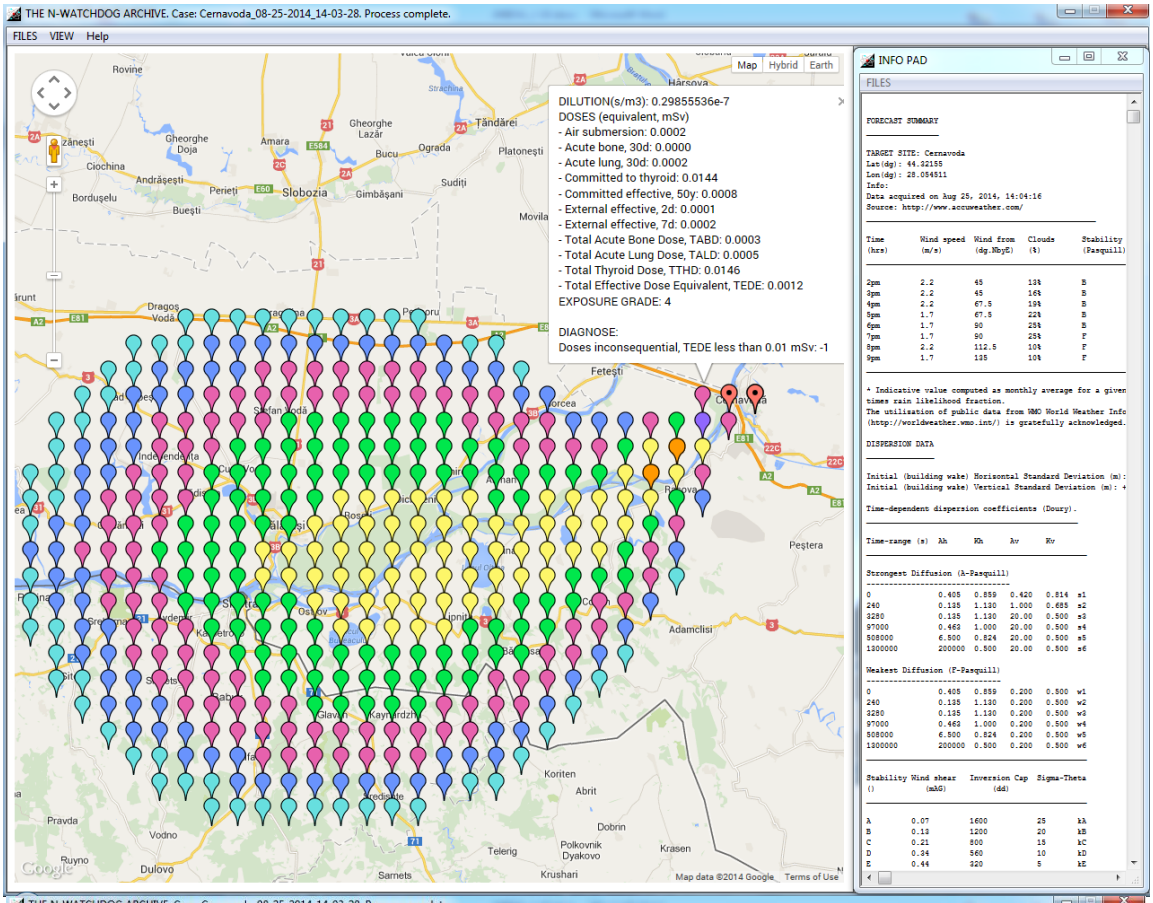
Pentru fiecare modul funcţional:

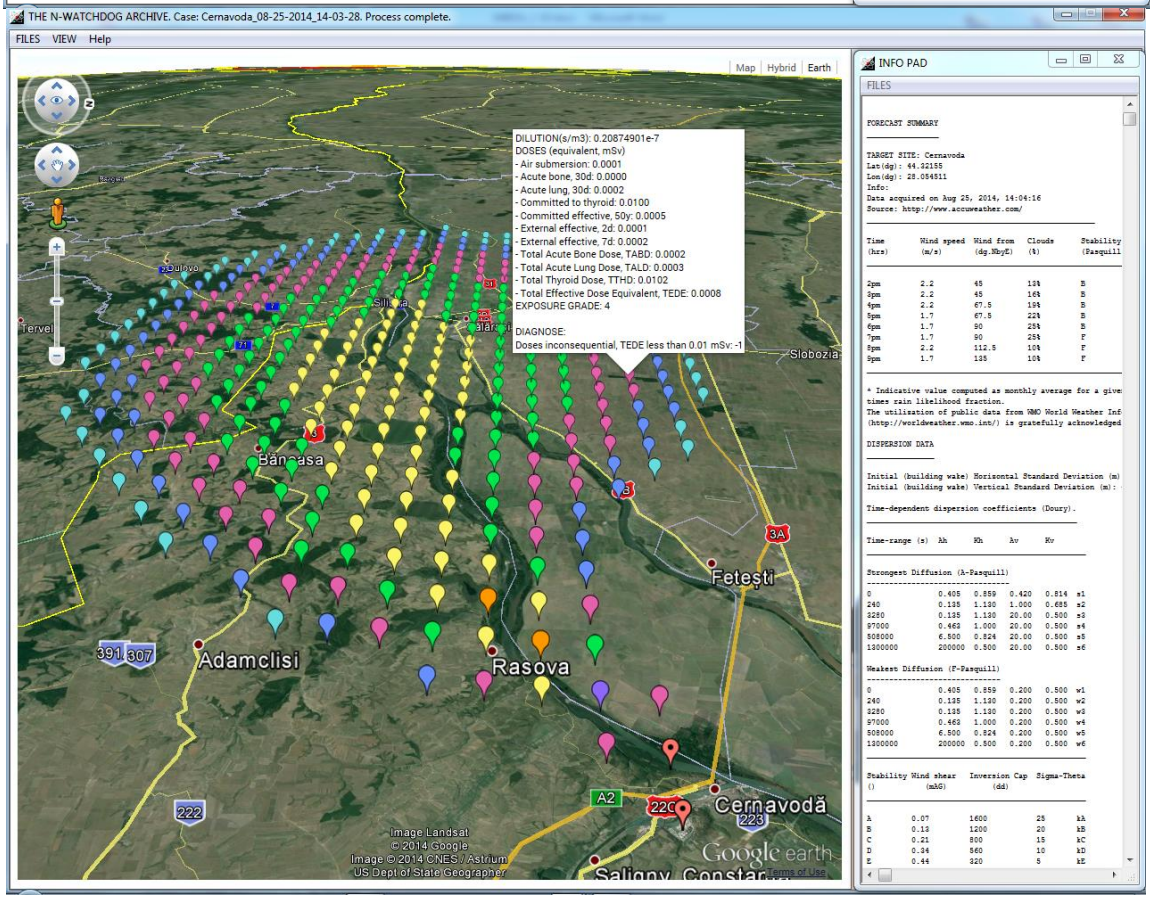
- Harta topografică de bază
- Harta de izodose (*GoogleMaps*/*EarthPlugin*/*hybrid*)
- Hărti 2-D ale câmpului de expunere (*GoogleMaps*/*map*/*hybrid*)
- Hărti 3-D ale câmpului de expunere (*GoogleEarthPlugin*/*OpenGL*)
- Matricea de vulnerabilitate

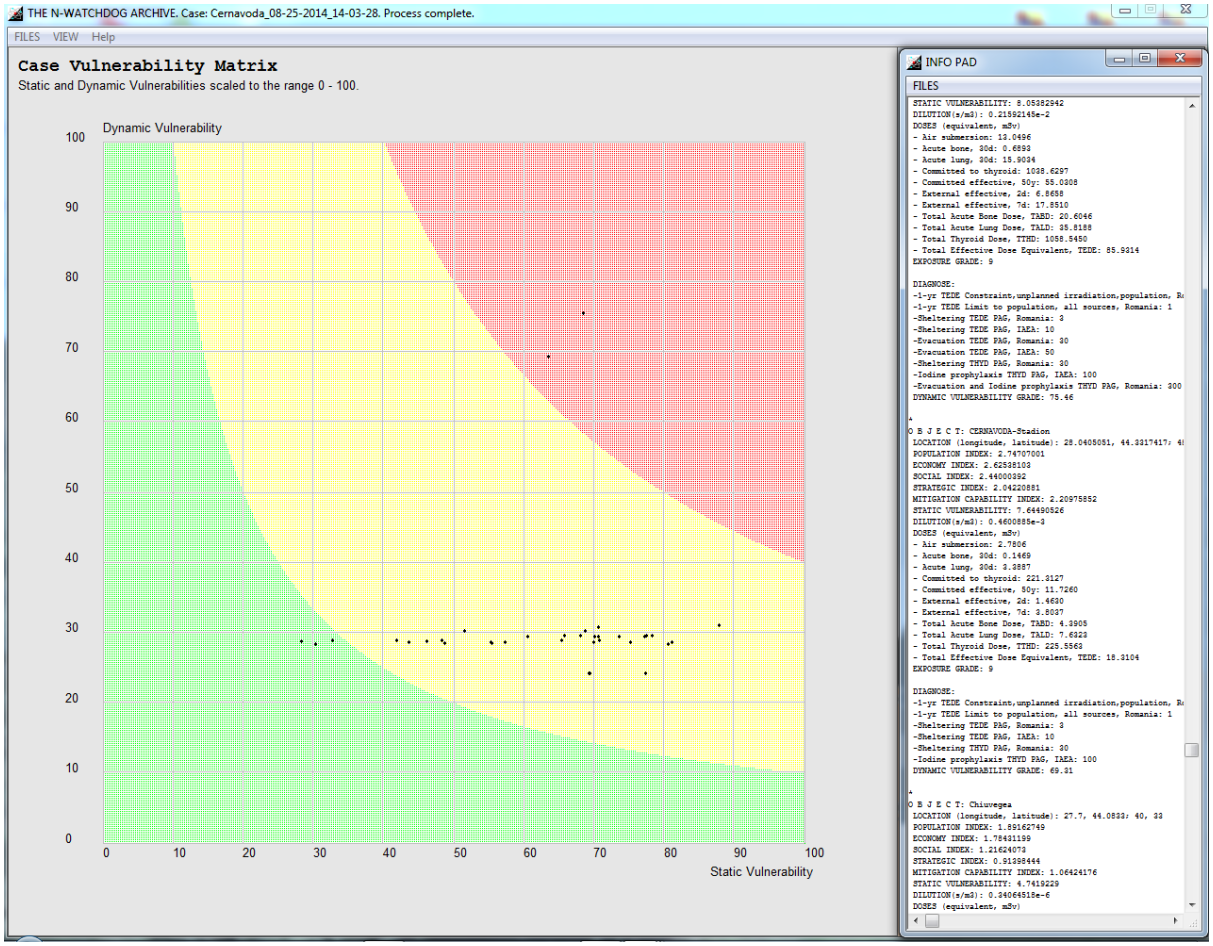
Pentru alte aplicaţii – ecrane reprezentative, selectiv

THE FAR-FIELD WATCHER

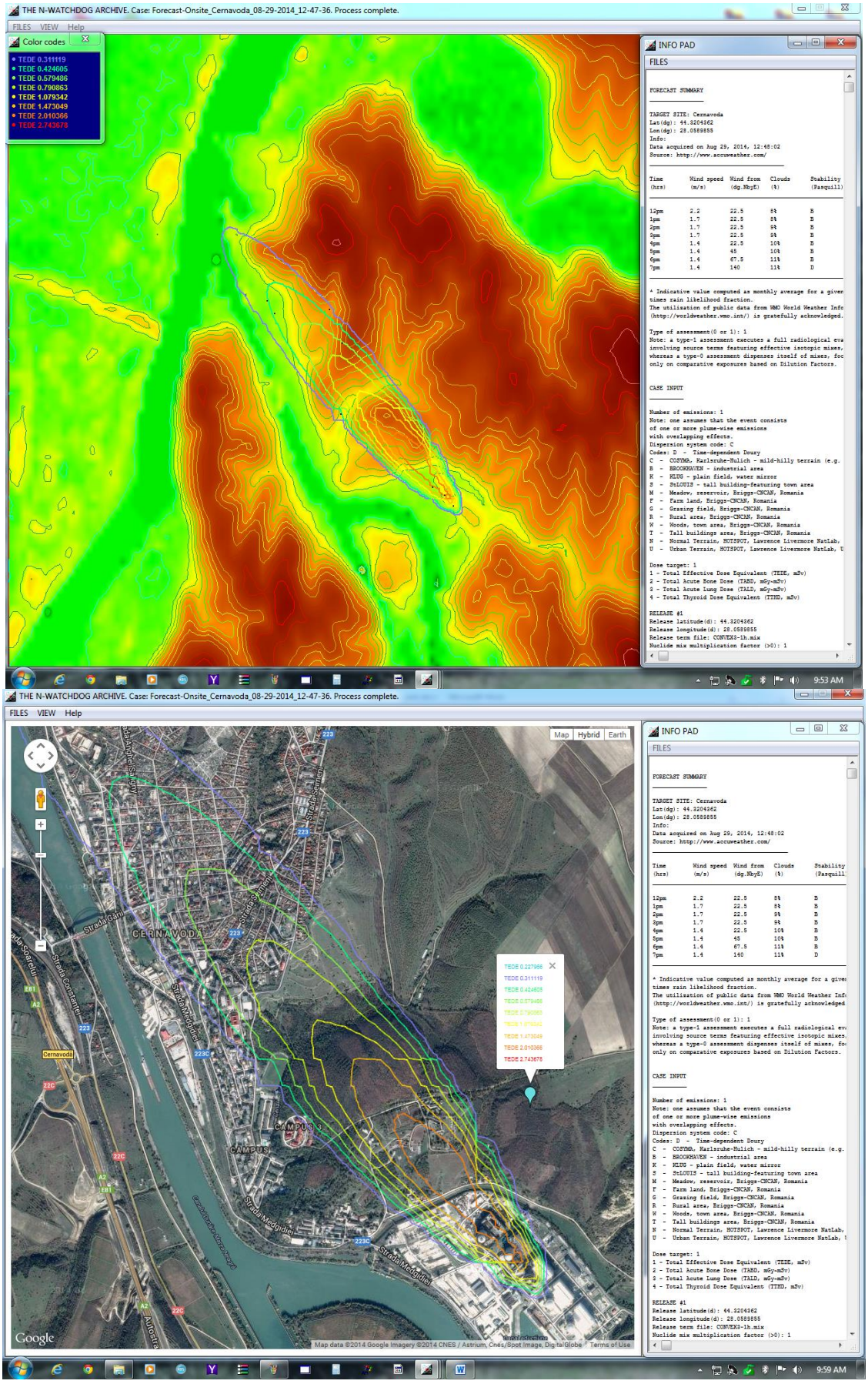


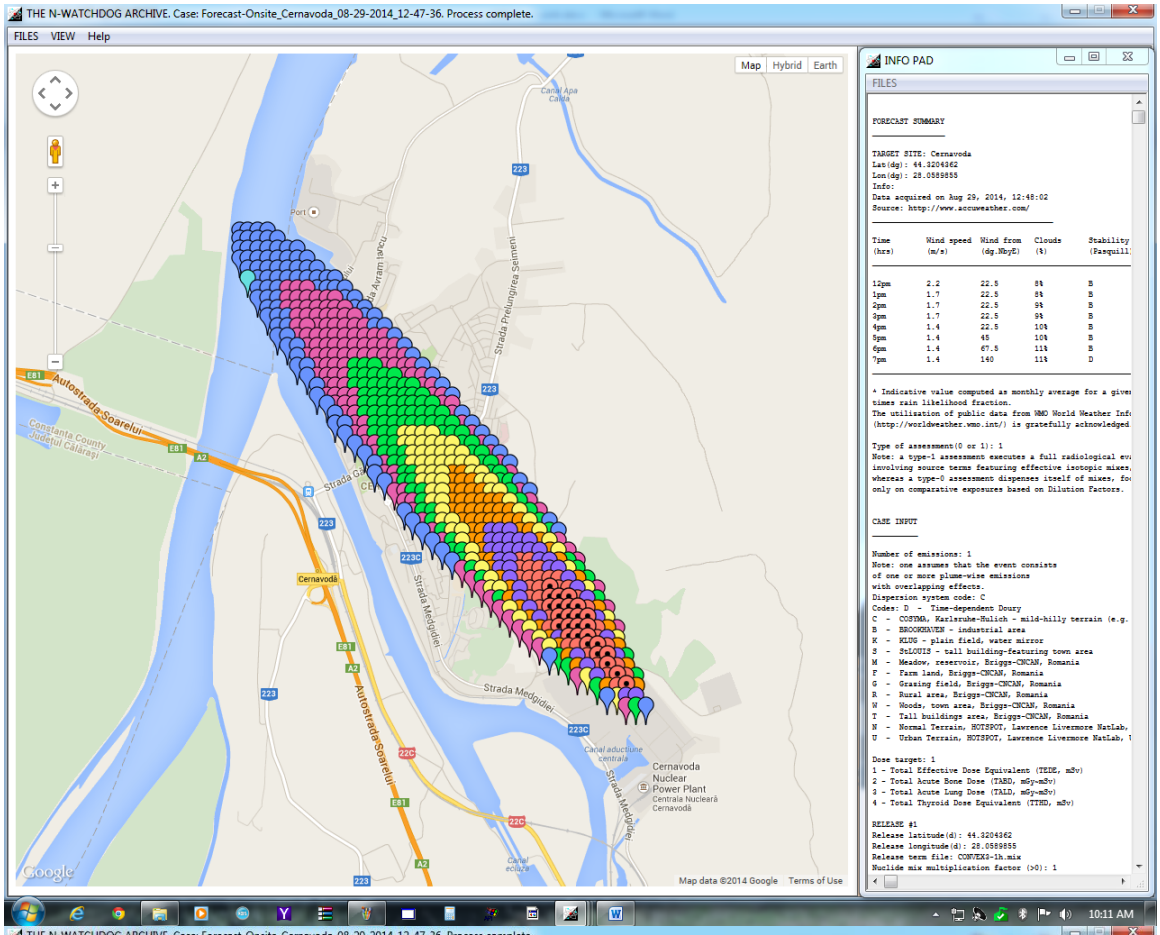

THE N-WATCHDOG ARCHIVE. Case: Cernavoda_08-25-2014_14-03-28. Process complete.
FILES VIEW Help
Map Hybrid Earth
DILUTION(s/m3): 0.29855536e-7
DOSES (equivalent, mSv)
- Air submersion: 0.0002
- Acute bone, 30d: 0.0000
- Acute lung, 30d: 0.0002
- Committed to thyroid: 0.0144
- Committed effective, 50y: 0.0008
- External effective, 2d: 0.0001
- External effective, 7d: 0.0002
- Total Acute Bone Dose, TABD: 0.0003
- Total Acute Lung Dose, TALD: 0.0005
- Total Thyroid Dose, TTHD: 0.0146
- Total Effective Dose Equivalent, TEDE: 0.0012
EXPOSURE GRADE: 4
DIAGNOSE:
Doses inconsequential, TEDE less than 0.01 mSv: -1
INFO PAD
FILES
FORECAST SUMMARY
TARGET SITE: Cernavoda
Lat(dg): 44.32155
Lon(dg): 28.054511
Info:
Data acquired on Aug 25, 2014, 14:04:16
Source: http://www.accuweather.com/
Time (hrs) Wind speed (m/s) Wind from (dg.NbyE) Clouds (%) Stability (Pasquill)
2pm 2.2 45 13% B
3pm 2.2 45 16% B
4pm 2.2 67.5 19% B
5pm 1.7 67.5 22% B
6pm 1.7 90 25% B
7pm 1.7 90 25% F
8pm 2.2 112.5 10% F
9pm 1.7 135 10% F
* Indicative value computed as monthly average for a given times rain likelihood fraction.
The utilization of public data from WMO World Weather Info (http://worldweather.wmo.int/) is gratefully acknowledged.
DISPERSION DATA
Initial (building wake) Horizontal Standard Deviation (m):
Initial (building wake) Vertical Standard Deviation (m):
Time-dependent dispersion coefficients (Doury).
Time-range (s) Ah Kh Av Kv
Strongest Diffusion (A-Pasquill)
0 0.405 0.859 0.420 0.814 s1
240 0.135 1.130 1.000 0.685 s2
3280 0.135 1.130 20.00 0.500 s3
97000 0.463 1.000 20.00 0.500 s4
508000 6.500 0.824 20.00 0.500 s5
1300000 200000 0.500 20.00 0.500 s6
Weakest Diffusion (F-Pasquill)
0 0.405 0.859 0.200 0.500 w1
240 0.135 1.130 0.200 0.500 w2
3280 0.135 1.130 0.200 0.500 w3
97000 0.463 1.000 0.200 0.500 w4
508000 6.500 0.824 0.200 0.500 w5
1300000 200000 0.500 0.200 0.500 w6
Stability Wind shear (1) (mAG) Inversion Cap (dd) Sigma-Theta
A 0.07 1600 25 kA
B 0.13 1200 20 kB
C 0.21 800 15 kC
D 0.34 560 10 kD
E 0.44 320 5 kE
Fetești
Adamclisi
Rasova
Cernavodă
Map data ©2014 Google Terms of Use

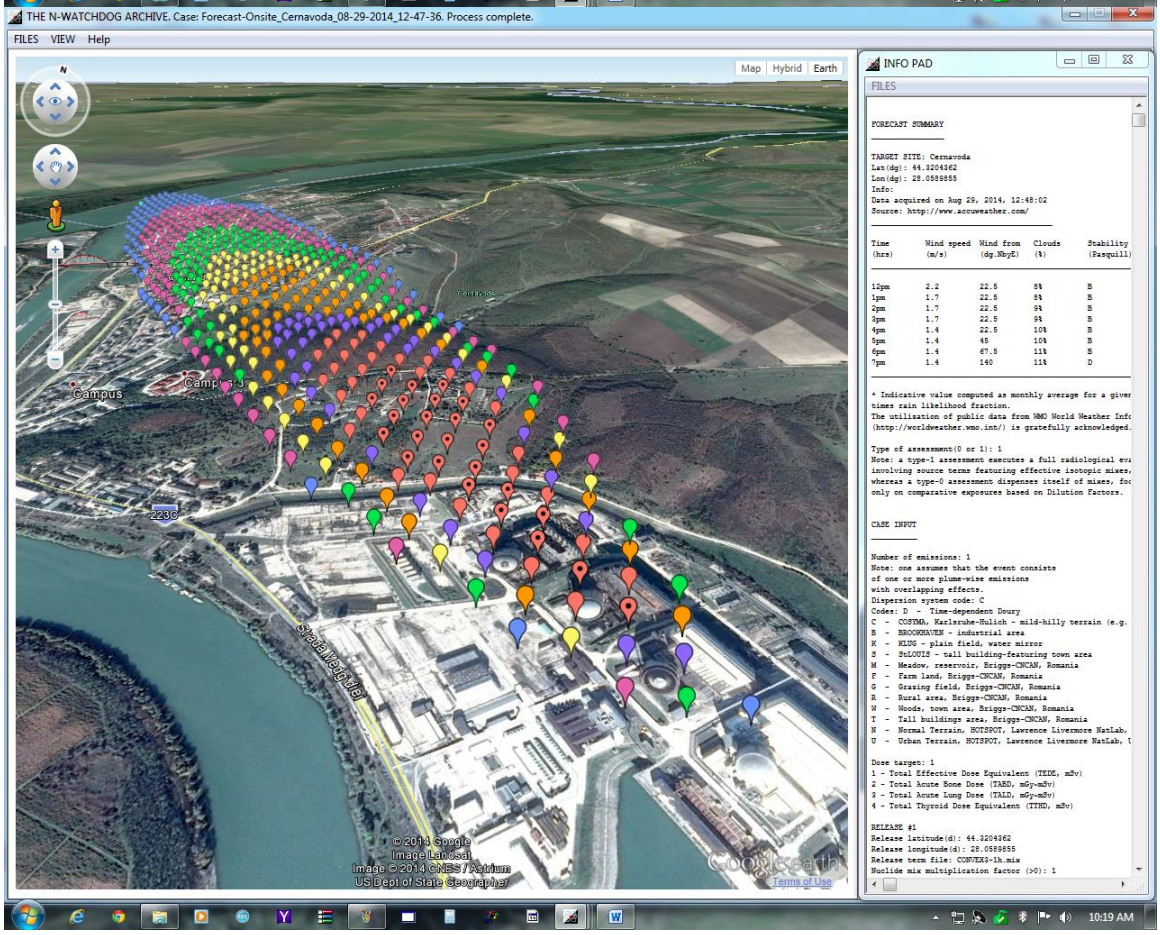

THE N-WATCHDOG ARCHIVE. Case: Cernavoda_08-25-2014_14-03-28. Process complete.
FILES VIEW Help
Map Hybrid Earth
DILUTION(s/m3): 0.20874901e-7
DOSES (equivalent, mSv)
- Air submersion: 0.0001
- Acute bone, 30d: 0.0000
- Acute lung, 30d: 0.0002
- Committed to thyroid: 0.0100
- Committed effective, 50y: 0.0005
- External effective, 2d: 0.0001
- External effective, 7d: 0.0002
- Total Acute Bone Dose, TABD: 0.0002
- Total Acute Lung Dose, TALD: 0.0003
- Total Thyroid Dose, TTHD: 0.0102
- Total Effective Dose Equivalent, TEDE: 0.0008
EXPOSURE GRADE: 4
DIAGNOSE:
Doses inconsequential, TEDE less than 0.01 mSv: -1
INFO PAD
FILES
FORECAST SUMMARY
TARGET SITE: Cernavoda
Lat(dg): 44.32155
Lon(dg): 28.054511
Info:
Data acquired on Aug 25, 2014, 14:04:16
Source: http://www.accuweather.com/
Time (hrs) Wind speed (m/s) Wind from (dg.NbyE) Clouds (%) Stability (Pasquill)
2pm 2.2 45 13% B
3pm 2.2 45 16% B
4pm 2.2 67.5 19% B
5pm 1.7 67.5 22% B
6pm 1.7 90 25% B
7pm 1.7 90 25% F
8pm 2.2 112.5 10% F
9pm 1.7 135 10% F
* Indicative value computed as monthly average for a given times rain likelihood fraction.
The utilization of public data from WMO World Weather Info (http://worldweather.wmo.int/) is gratefully acknowledged.
DISPERSION DATA
Initial (building wake) Horizontal Standard Deviation (m)
Initial (building wake) Vertical Standard Deviation (m):
Time-dependent dispersion coefficients (Doury).
Time-range (s) Ah Kh Av Kv
Strongest Diffusion (A-Pasquill)
0 0.405 0.859 0.420 0.814 s1
240 0.135 1.130 1.000 0.685 s2
3280 0.135 1.130 20.00 0.500 s3
97000 0.463 1.000 20.00 0.500 s4
508000 6.500 0.824 20.00 0.500 s5
1300000 200000 0.500 20.00 0.500 s6
Weakest Diffusion (F-Pasquill)
0 0.405 0.859 0.200 0.500 w1
240 0.135 1.130 0.200 0.500 w2
3280 0.135 1.130 0.200 0.500 w3
97000 0.463 1.000 0.200 0.500 w4
508000 6.500 0.824 0.200 0.500 w5
1300000 200000 0.500 0.200 0.500 w6
Stability Wind shear (1) (mAG) Inversion Cap (dd) Sigma-Theta
A 0.07 1600 25 kA
B 0.13 1200 20 kB
C 0.21 800 15 kC
D 0.34 560 10 kD
E 0.44 320 5 kE
Fetești
Adamclisi
Rasova
Cernavodă
Image Landsat
© 2014 Google
Image © 2014 CNES / Astrium
US Dept of State Geographer
Google earth

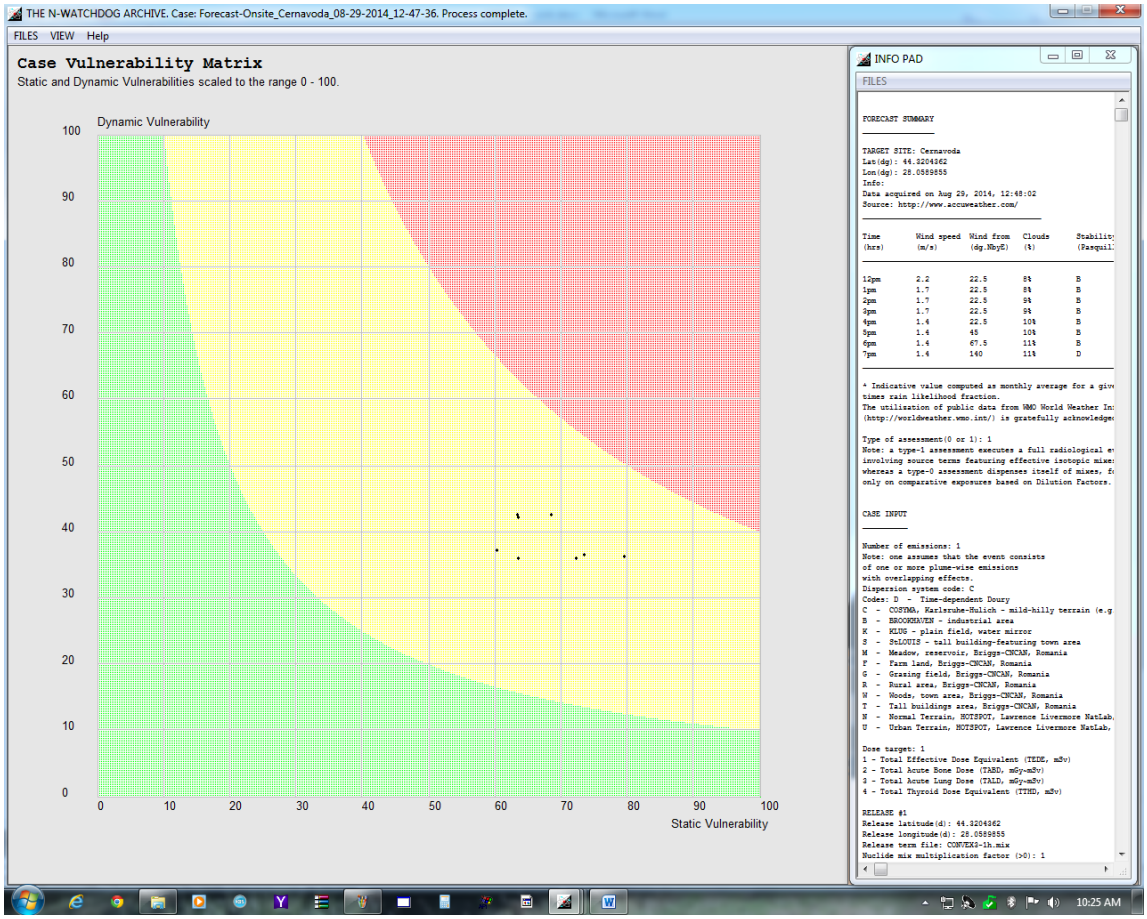

THE N-WATCHDOG ARCHIVE. Case: Cernavoda_08-25-2014_14-03-28. Process complete.
FILES VIEW Help
Case Vulnerability Matrix
Static and Dynamic Vulnerabilities scaled to the range 0 - 100.
Dynamic Vulnerability
Static Vulnerability
INFO PAD
FILES

THE NEAR-FIELD WATCHER

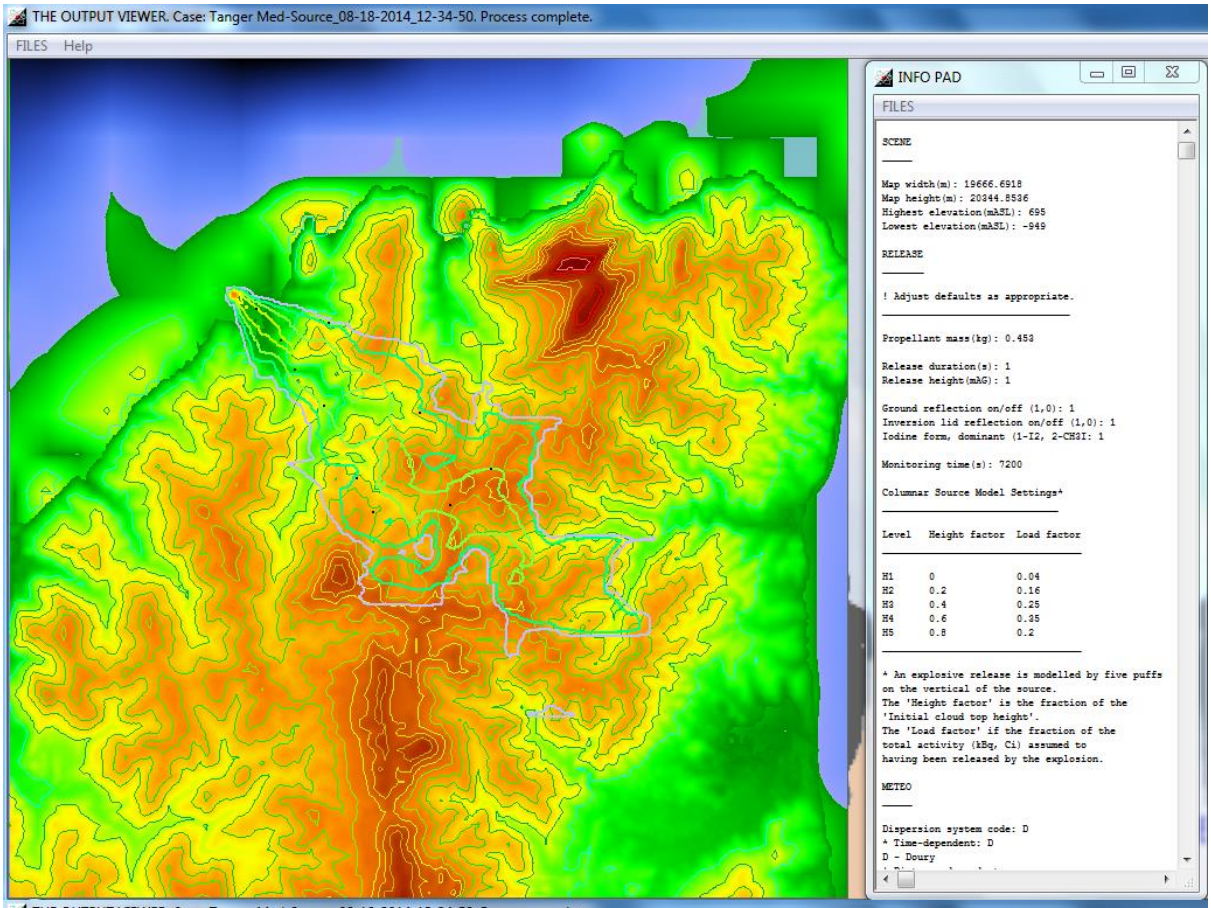


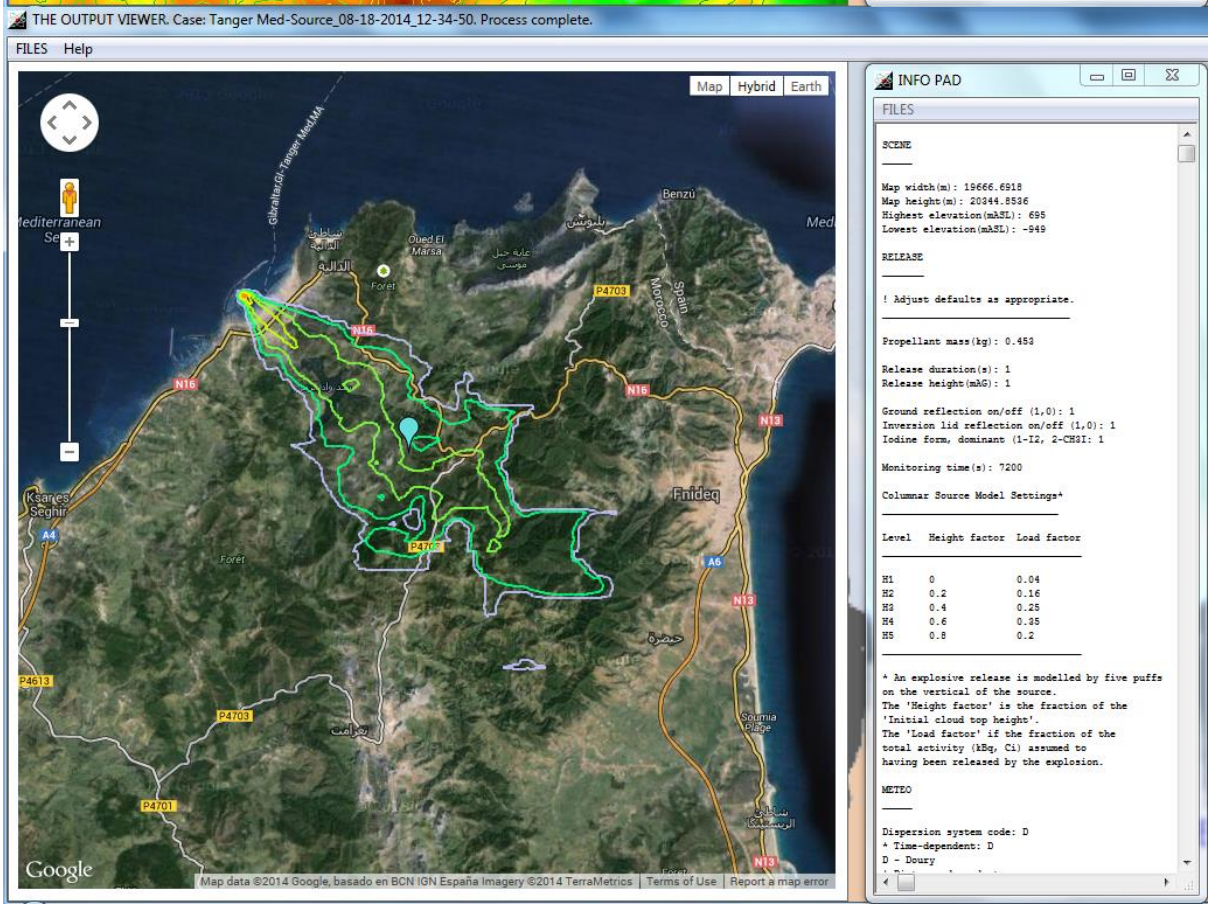

THE N-WATCHDOG ARCHIVE. Case: Forecast-Onsite_Cernavoda_08-29-2014_12-47-36. Process complete.
FILES VIEW Help
Map Hybrid Earth
INFO PAD
FILES
FORECAST SUMMARY
TARGET SITE: Cernavoda
Lat(dg): 44.3204362
Lon(dg): 28.0589855
Info:
Data acquired on Aug 29, 2014, 12:48:02
Source: http://www.accuweather.com/
Time (hrs) Wind speed (m/s) Wind from (dg.NbyE) Clouds (%) Stability (Pasquill)
12pm 2.2 22.5 8% B
1pm 1.7 22.5 8% B
2pm 1.7 22.5 9% B
3pm 1.7 22.5 9% B
4pm 1.4 22.5 10% B
5pm 1.4 45 10% B
6pm 1.4 67.5 11% B
7pm 1.4 140 11% D
* Indicative value computed as monthly average for a given
times rain likelihood fraction.
The utilization of public data from WMO World Weather Info
(http://worldweather.wmo.int/) is gratefully acknowledged.
Type of assessment(0 or 1): 1
Note: a type-1 assessment executes a full radiological eva
involving source terms featuring effective isotopic mixes,
whereas a type-0 assessment dispenses itself of mixes, fo
only on comparative exposures based on Dilution Factors.
CASE INPUT
Number of emissions: 1
Note: one assumes that the event consists
of one or more plume-wise emissions
with overlapping effects.
Dispersion system code: C
Codes: D - Time-dependent Doury
C - COSYMA, Karlsruhe-Hulich - mild-hilly terrain (e.g.
B - BROOKHAVEN - industrial area
K - KLUG - plain field, water mirror
S - StLOUIS - tall building-featuring town area
M - Meadow, reservoir, Briggs-CNCAN, Romania
F - Farm land, Briggs-CNCAN, Romania
G - Grazing field, Briggs-CNCAN, Romania
R - Rural area, Briggs-CNCAN, Romania
W - Woods, town area, Briggs-CNCAN, Romania
T - Tall buildings area, Briggs-CNCAN, Romania
N - Normal Terrain, HOTSPOT, Lawrence Livermore NatLab,
U - Urban Terrain, HOTSPOT, Lawrence Livermore NatLab,
Dose target: 1
1 - Total Effective Dose Equivalent (TEDE, mSv)
2 - Total Acute Bone Dose (TABD, mGy-mSv)
3 - Total Acute Lung Dose (TALD, mGy-mSv)
4 - Total Thyroid Dose Equivalent (TTHD, mSv)
RELEASE #1
Release latitude(d): 44.3204362
Release longitude(d): 28.0589855
Release term file: CONTEX3-1h.mix
Nuclide mix multiplication factor (>0): 1
Cernavoda
Nuclear
Power Plant
Centrala Nucleară
Cernavoda
Autostrada Soarelui
Strada Medgidiei
Strada Peluginea Semenii
Constanta County
Județul Călărași
Google
Map data ©2014 Google Terms of Use
10:11 AM

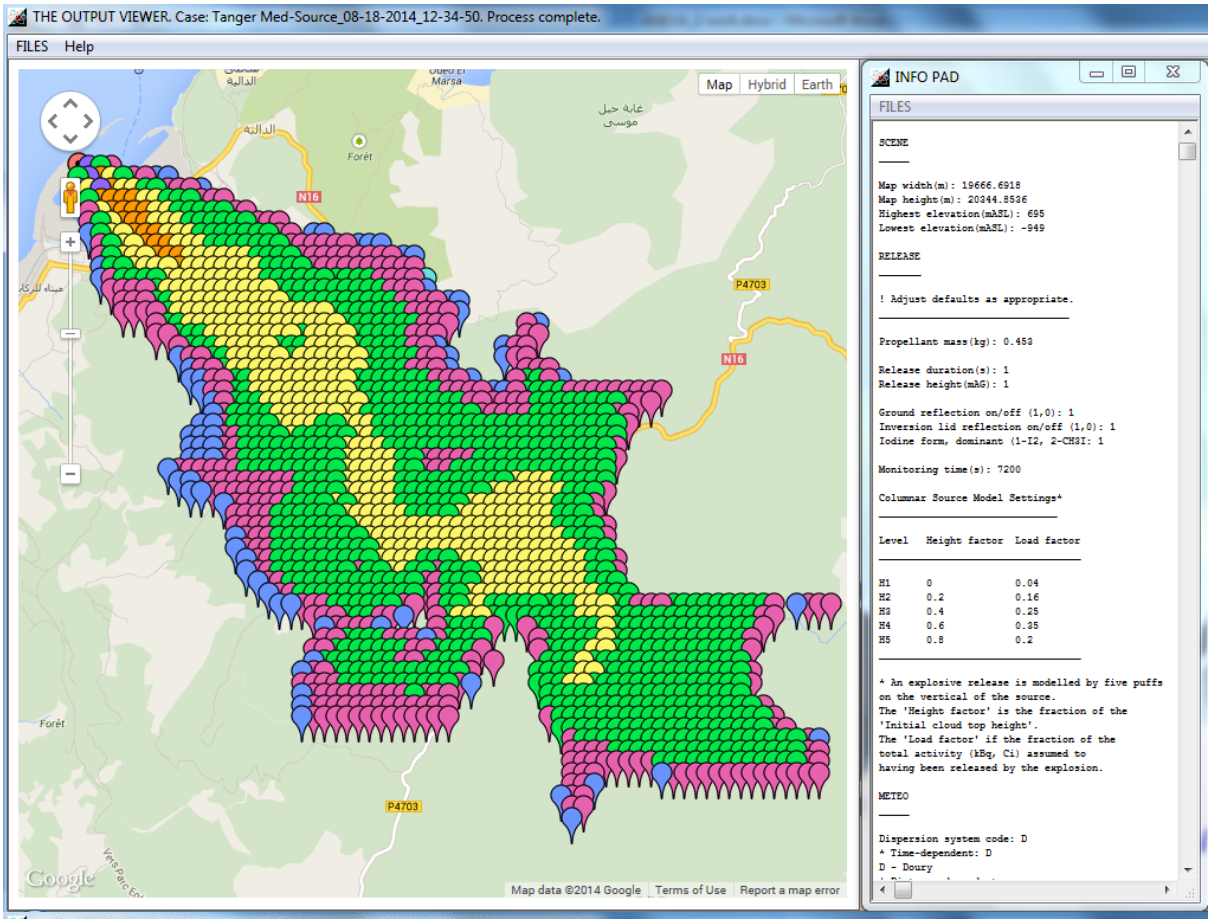

THE N-WATCHDOG ARCHIVE. Case: Forecast-Onsite_Cernavoda_08-29-2014_12-47-36. Process complete.
FILES VIEW Help
Map Hybrid Earth
INFO PAD
FILES
FORECAST SUMMARY
TARGET SITE: Cernavoda
Lat(dg): 44.3204362
Lon(dg): 28.0589855
Info:
Data acquired on Aug 29, 2014, 12:48:02
Source: http://www.accuweather.com/
Time (hrs) Wind speed (m/s) Wind from (dg.NbyE) Clouds (%) Stability (Pasquill)
12pm 2.2 22.5 8% B
1pm 1.7 22.5 8% B
2pm 1.7 22.5 9% B
3pm 1.7 22.5 9% B
4pm 1.4 22.5 10% B
5pm 1.4 45 10% B
6pm 1.4 67.5 11% B
7pm 1.4 140 11% D
* Indicative value computed as monthly average for a given
times rain likelihood fraction.
The utilization of public data from WMO World Weather Info
(http://worldweather.wmo.int/) is gratefully acknowledged.
Type of assessment(0 or 1): 1
Note: a type-1 assessment executes a full radiological eva
involving source terms featuring effective isotopic mixes,
whereas a type-0 assessment dispenses itself of mixes, fo
only on comparative exposures based on Dilution Factors.
CASE INPUT
Number of emissions: 1
Note: one assumes that the event consists
of one or more plume-wise emissions
with overlapping effects.
Dispersion system code: C
Codes: D - Time-dependent Doury
C - COSYMA, Karlsruhe-Hulich - mild-hilly terrain (e.g.
B - BROOKHAVEN - industrial area
K - KLUG - plain field, water mirror
S - StLOUIS - tall building-featuring town area
M - Meadow, reservoir, Briggs-CNCAN, Romania
F - Farm land, Briggs-CNCAN, Romania
G - Grazing field, Briggs-CNCAN, Romania
R - Rural area, Briggs-CNCAN, Romania
W - Woods, town area, Briggs-CNCAN, Romania
T - Tall buildings area, Briggs-CNCAN, Romania
N - Normal Terrain, HOTSPOT, Lawrence Livermore NatLab,
U - Urban Terrain, HOTSPOT, Lawrence Livermore NatLab,
Dose target: 1
1 - Total Effective Dose Equivalent (TEDE, mSv)
2 - Total Acute Bone Dose (TABD, mGy-mSv)
3 - Total Acute Lung Dose (TALD, mGy-mSv)
4 - Total Thyroid Dose Equivalent (TTHD, mSv)
RELEASE #1
Release latitude(d): 44.3204362
Release longitude(d): 28.0589855
Release term file: CONTEX3-1h.mix
Nuclide mix multiplication factor (>0): 1
Campus
223C
Strada Medgidiei
© 2014 Google
Image Landsat
Image © 2014 CNES / Astrium
US Dept of State Geographer
Google earth
Terms of Use
10:19 AM

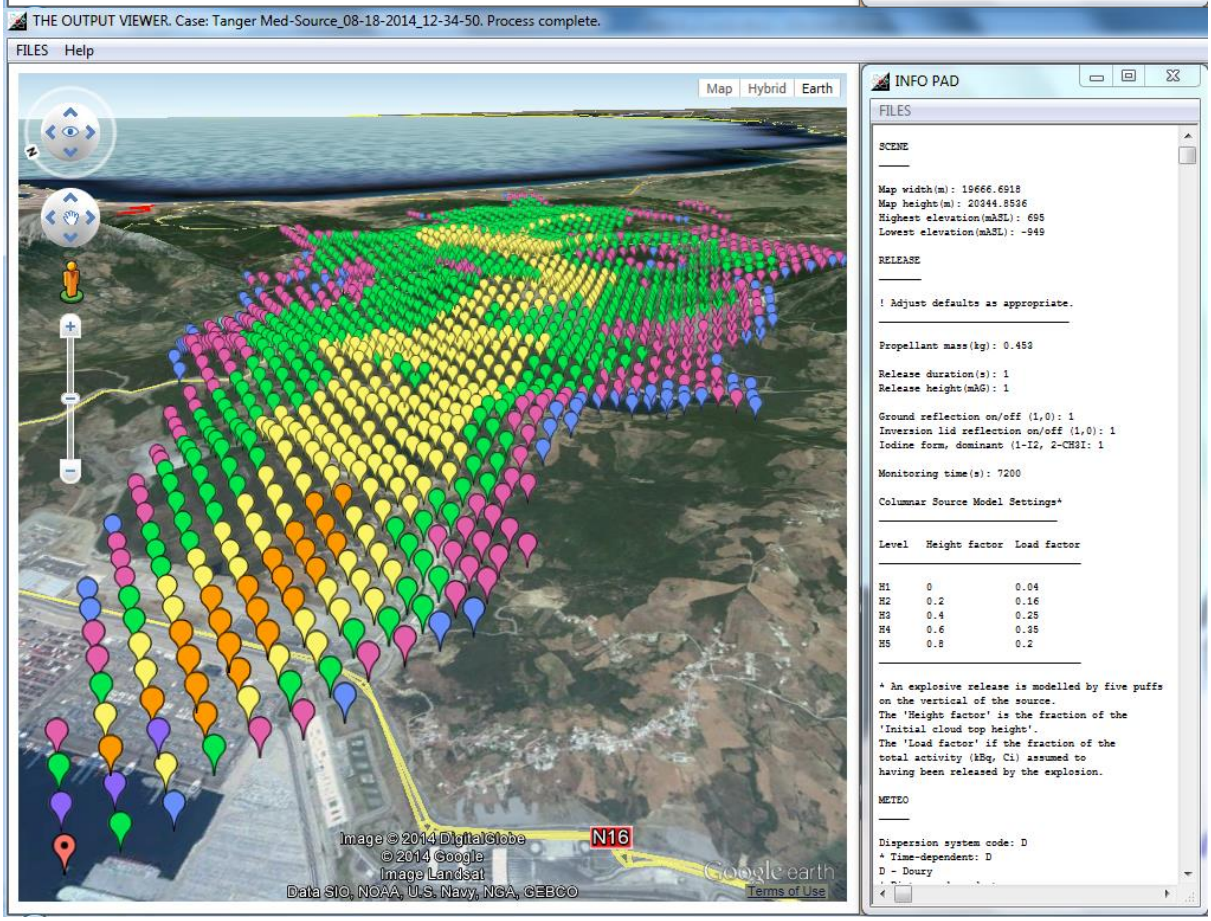

THE N-WATCHDOG ARCHIVE, Case: Forecast-Onsite_Cernavoda_08-29-2014_12-47-36. Process complete.
FILES VIEW Help
Case Vulnerability Matrix
Static and Dynamic Vulnerabilities scaled to the range 0 - 100.
Dynamic Vulnerability
Static Vulnerability
INFO PAD
FILES
FORECAST SUMMARY
TARGET SITE: Cernavoda
Lat(dg): 44.3204362
Lon(dg): 28.0589855
Info:
Data acquired on Aug 29, 2014, 12:48:02
Source: http://www.accuweather.com/
Time (hrs) Wind speed (m/s) Wind from (dg.NbyE) Clouds (%) Stability (Pasquil
12pm 2.2 22.5 8% B
1pm 1.7 22.5 8% B
2pm 1.7 22.5 8% B
3pm 1.7 22.5 9% B
4pm 1.4 22.5 10% B
5pm 1.4 45 10% B
6pm 1.4 67.5 11% B
7pm 1.4 140 11% D
* Indicative value computed as monthly average for a giv
times rain likelihood fraction.
The utilization of public data from WMO World Weather In
(http://worldweather.wmo.int/) is gratefully acknowledge
Type of assessment(0 or 1): 1
Note: a type-1 assessment executes a full radiological e
involving source terms featuring effective isotopic mixe
whereas a type-0 assessment dispenses itself of mixes, f
only on comparative exposures based on Dilution Factors.
CASE INPUT
Number of emissions: 1
Note: one assumes that the event consists
of one or more plume-wise emissions
with overlapping effects.
Dispersion system code: C
Codes: D - Time-dependent Doury
C - COSTMA, Karlsruhe-Hulich - mild-hilly terrain (e.g
B - BROOKHAVEN - industrial area
K - KLUG - plain field, water mirror
S - StLOUIS - tall building-featuring town area
M - Meadow, reservoir, Briggs-CNCAN, Romania
F - Farm Land, Briggs-CNCAN, Romania
G - Grazing field, Briggs-CNCAN, Romania
R - Rural area, Briggs-CNCAN, Romania
W - Woods, town area, Briggs-CNCAN, Romania
T - Tall buildings area, Briggs-CNCAN, Romania
N - Normal Terrain, HOTSPOT, Lawrence Livermore NatLab,
U - Urban Terrain, HOTSPOT, Lawrence Livermore NatLab,
Dose target: 1
1 - Total Effective Dose Equivalent (TEDE, mSv)
2 - Total Acute Bone Dose (TABD, mGy-mSv)
3 - Total Acute Lung Dose (TALD, mGy-mSv)
4 - Total Thyroid Dose Equivalent (TTHD, mSv)
RELEASE #1
Release latitude(d): 44.3204362
Release longitude(d): 28.0589855
Release term file: CONTEX3-1h.mix
Nuclide mix multiplication factor (>0): 1
10:25 AM

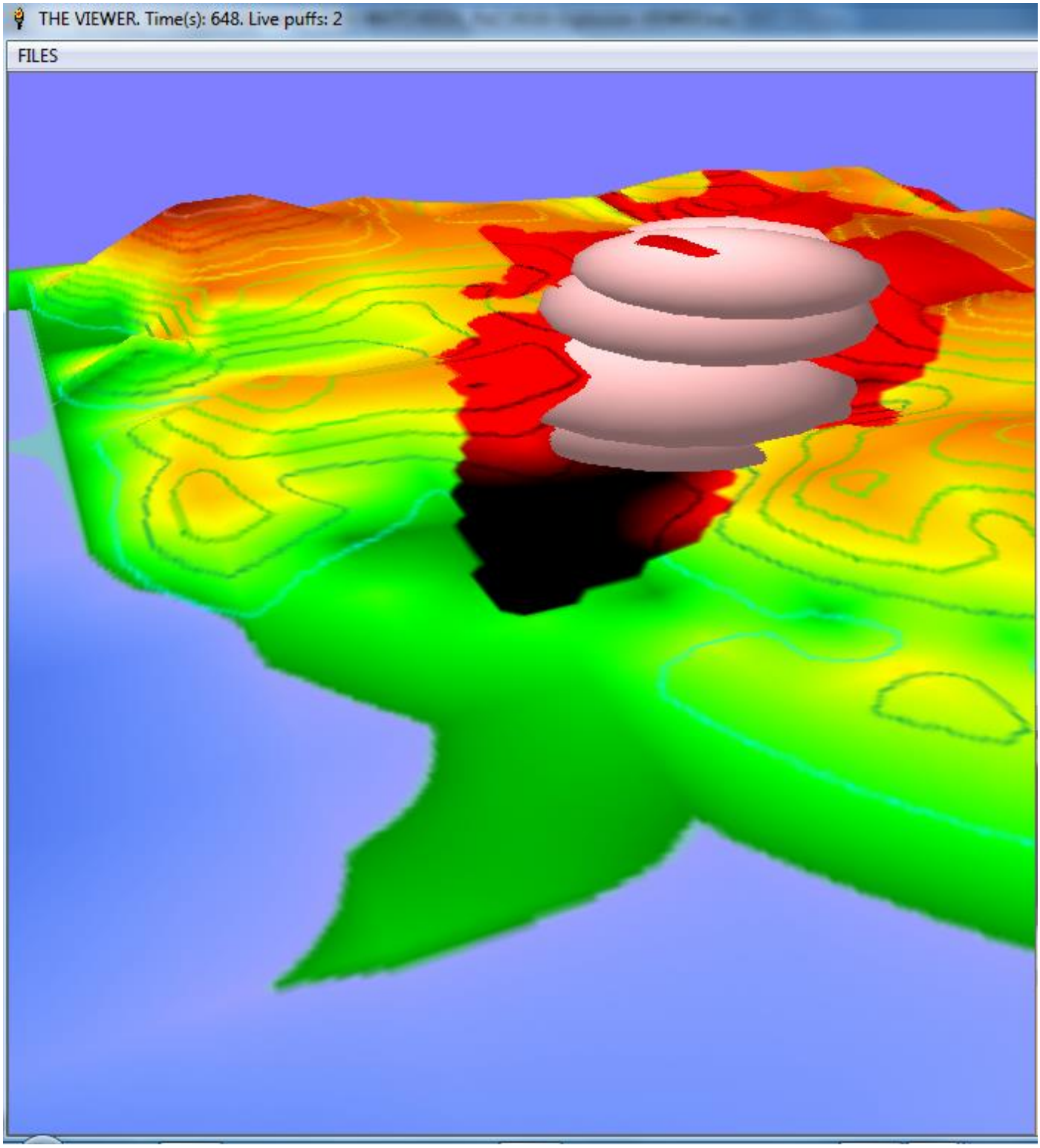
SPECIAL EFFECTS – RADIOACTIVE DISPERSION DEVICES (RDD)
A. EXPLOSIVE RDDs

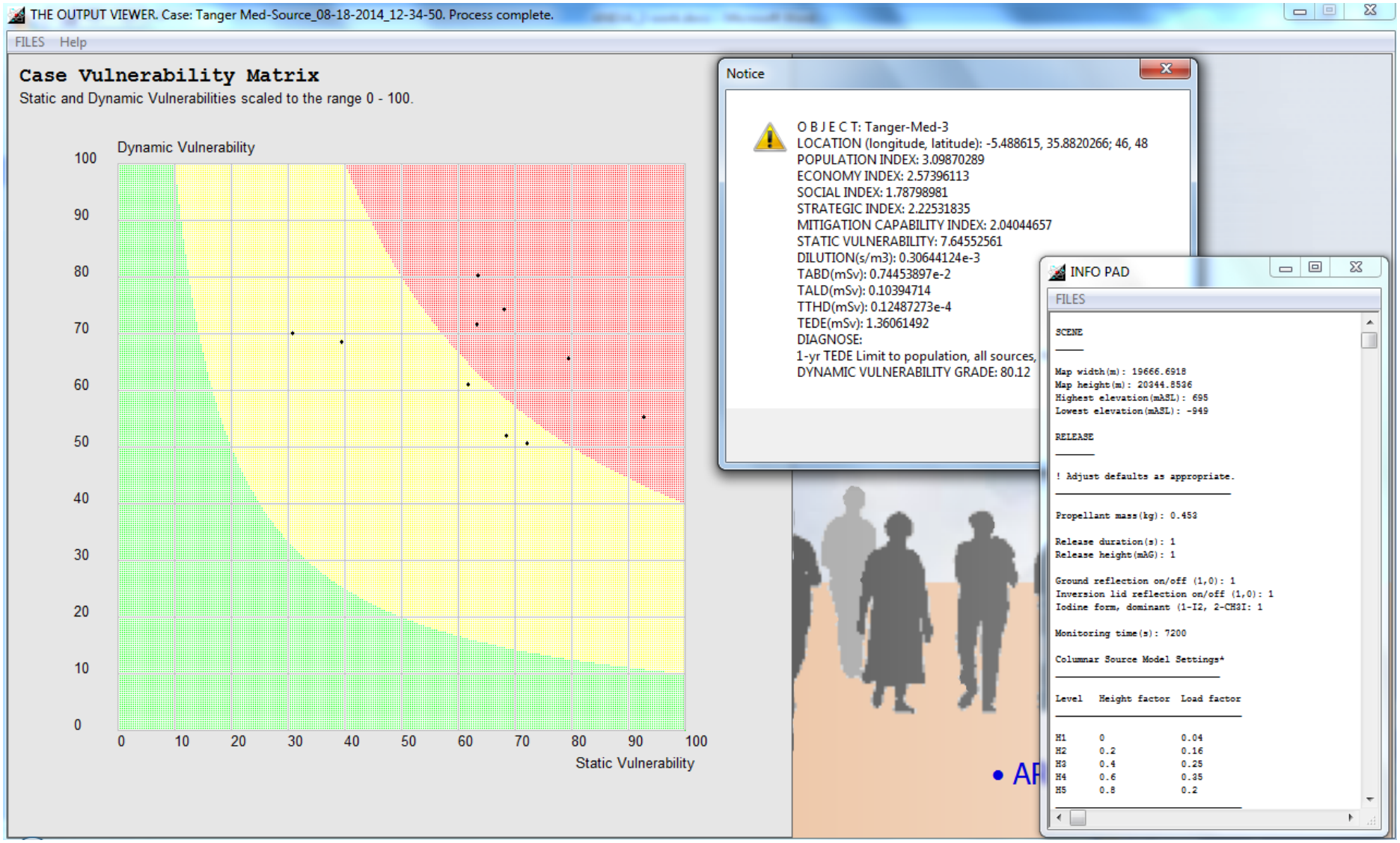




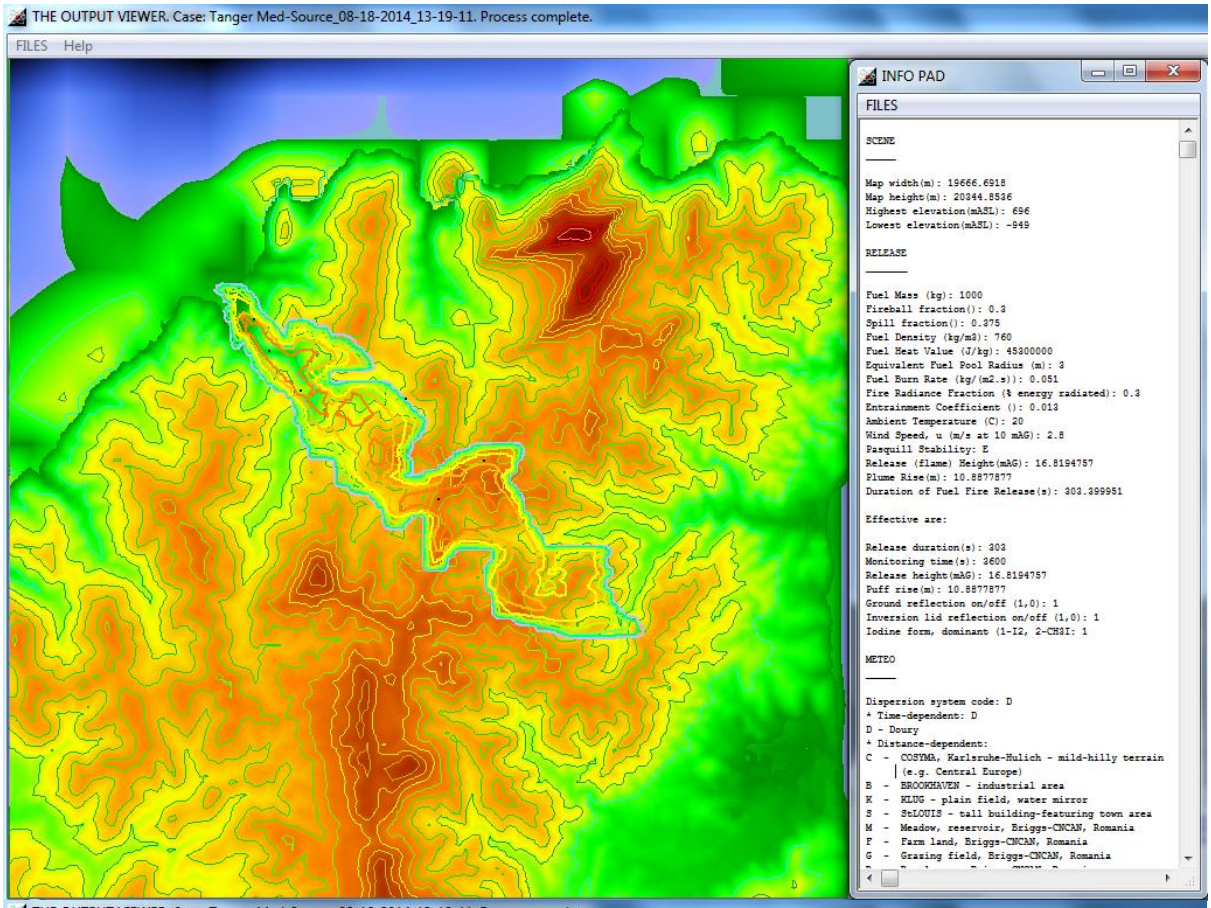

THE OUTPUT VIEWER. Case: Tanger Med-Source_08-18-2014_12-34-50. Process complete.
FILES Help
Map Hybrid Earth
INFO PAD
FILES
SCENE
Map width(m): 19666.6918
Map height(m): 20344.8536
Highest elevation(mASL): 695
Lowest elevation(mASL): -949
RELEASE
! Adjust defaults as appropriate.
Propellant mass(kg): 0.453
Release duration(s): 1
Release height(mAG): 1
Ground reflection on/off (1,0): 1
Inversion lid reflection on/off (1,0): 1
Iodine form, dominant (1-I2, 2-CH3I: 1
Monitoring time(s): 7200
Columnar Source Model Settings*
Level Height factor Load factor
H1 0 0.04
H2 0.2 0.16
H3 0.4 0.25
H4 0.6 0.35
H5 0.8 0.2
* An explosive release is modelled by five puffs on the vertical of the source.
The 'Height factor' is the fraction of the 'Initial cloud top height'.
The 'Load factor' if the fraction of the total activity (kBq, Ci) assumed to having been released by the explosion.
METEO
Dispersion system code: D
* Time-dependent: D
D - Doury
Map data ©2014 Google Terms of Use Report a map error

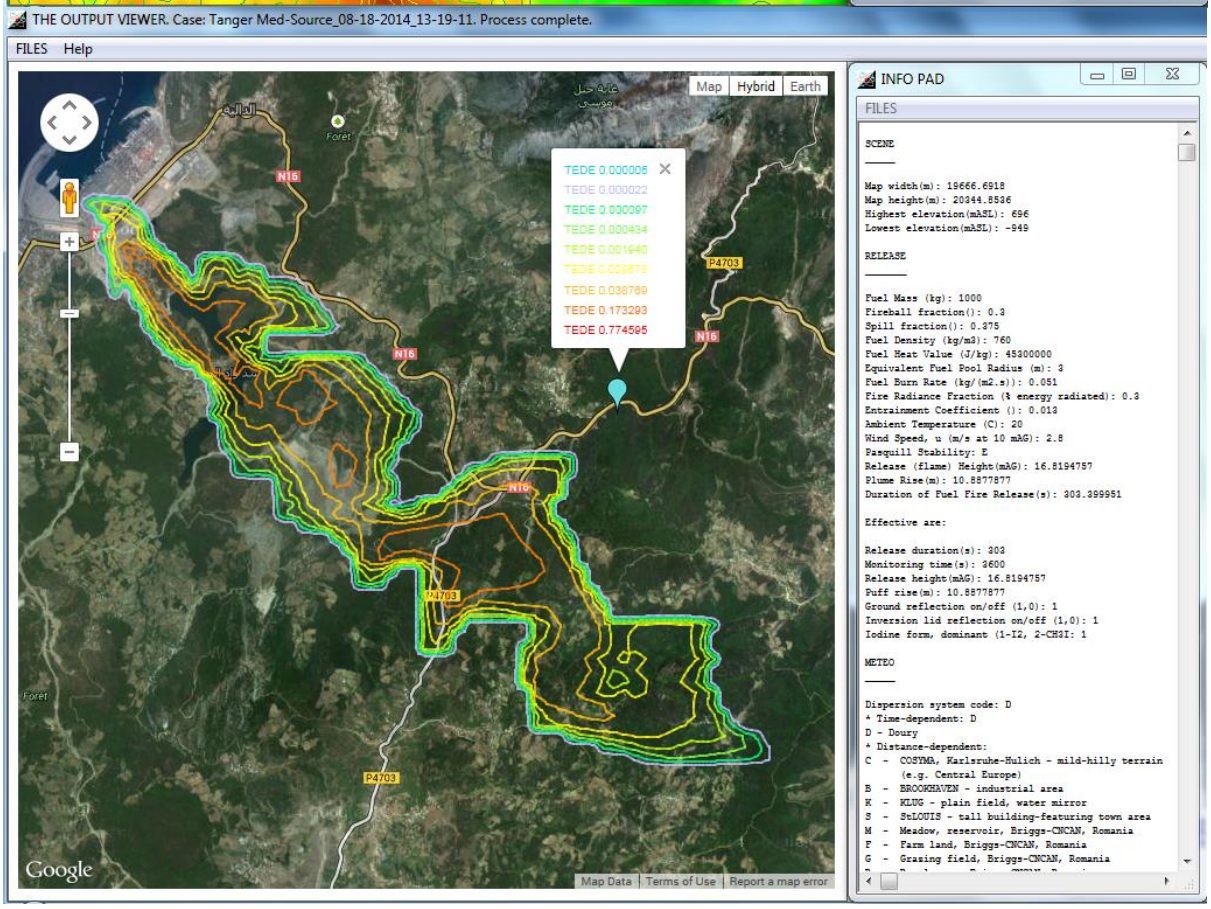

THE OUTPUT VIEWER. Case: Tanger Med-Source_08-18-2014_12-34-50. Process complete.
FILES Help
Map Hybrid Earth
INFO PAD
FILES
SCENE
Map width(m): 19666.6918
Map height(m): 20344.8536
Highest elevation(mASL): 695
Lowest elevation(mASL): -949
RELEASE
! Adjust defaults as appropriate.
Propellant mass(kg): 0.453
Release duration(s): 1
Release height(mAG): 1
Ground reflection on/off (1,0): 1
Inversion lid reflection on/off (1,0): 1
Iodine form, dominant (1-I2, 2-CH3I: 1
Monitoring time(s): 7200
Columnar Source Model Settings*
Level Height factor Load factor
H1 0 0.04
H2 0.2 0.16
H3 0.4 0.25
H4 0.6 0.35
H5 0.8 0.2
* An explosive release is modelled by five puffs on the vertical of the source.
The 'Height factor' is the fraction of the 'Initial cloud top height'.
The 'Load factor' if the fraction of the total activity (kBq, Ci) assumed to having been released by the explosion.
METEO
Dispersion system code: D
* Time-dependent: D
D - Doury
Image © 2014 DigitalGlobe
© 2014 Google
Image Landsat
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
N16
Google earth
Terms of Use

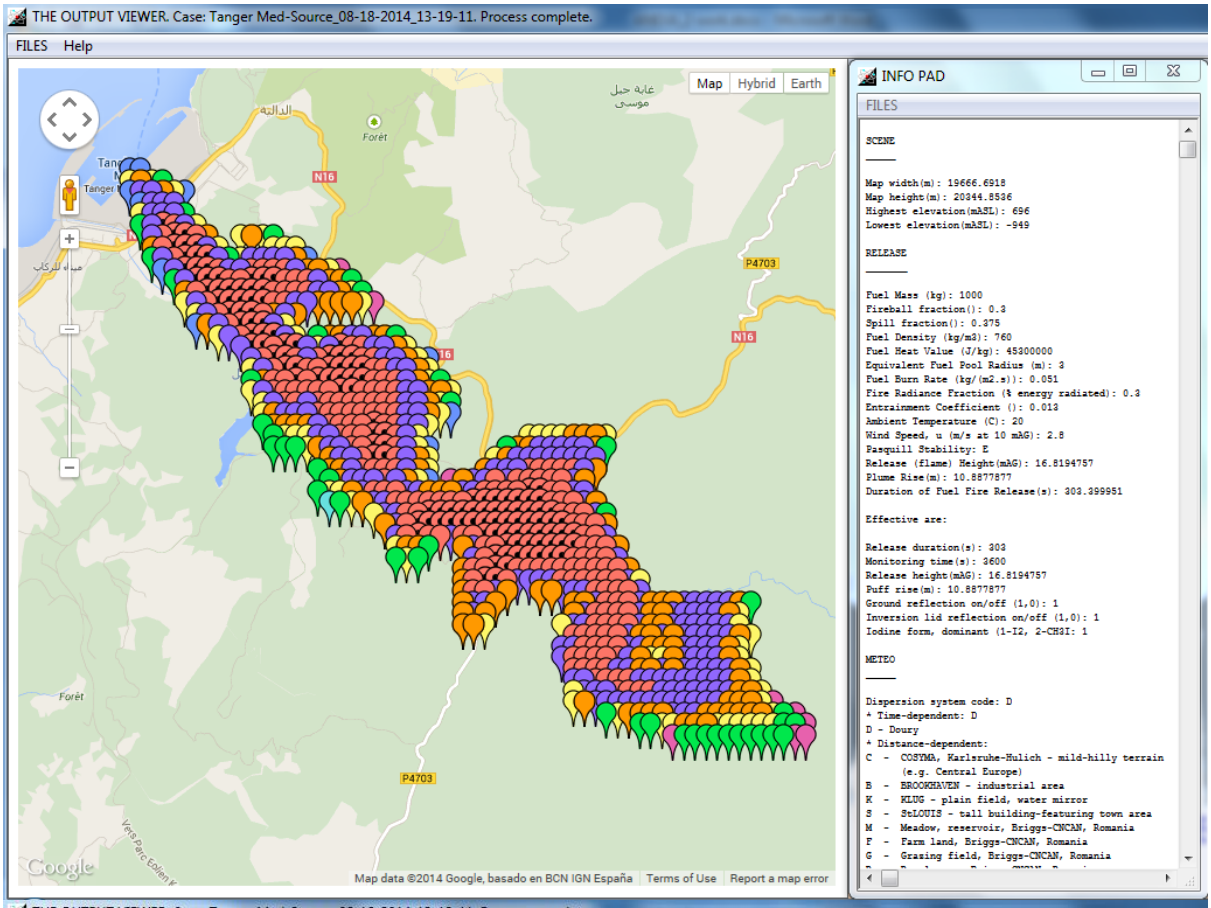

THE VIEWER. Time(s): 648. Live puffs: 2
FILES

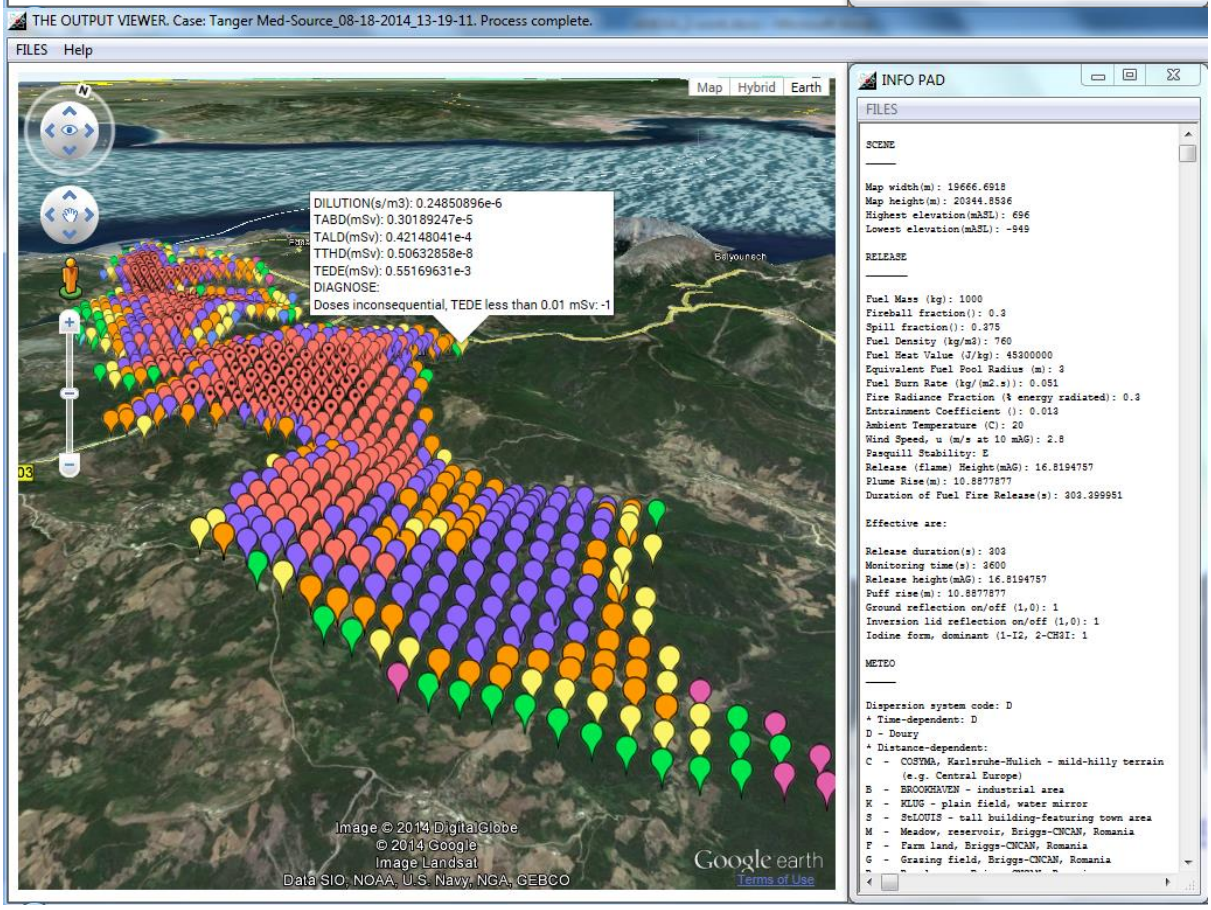

THE OUTPUT VIEWER. Case: Tanger Med-Source_08-18-2014_12-34-50. Process complete.
FILES Help
Case Vulnerability Matrix
Static and Dynamic Vulnerabilities scaled to the range 0 - 100.
Dynamic Vulnerability
100
90
80
70
60
50
40
30
20
10
0
0 10 20 30 40 50 60 70 80 90 100
Static Vulnerability
Notice
O B J E C T: Tanger-Med-3
LOCATION (longitude, latitude): -5.488615, 35.8820266; 46, 48
POPULATION INDEX: 3.09870289
ECONOMY INDEX: 2.57396113
SOCIAL INDEX: 1.78798981
STRATEGIC INDEX: 2.22531835
MITIGATION CAPABILITY INDEX: 2.04044657
STATIC VULNERABILITY: 7.64552561
DILUTION(s/m3): 0.30644124e-3
TABD(mSv): 0.74453897e-2
TALD(mSv): 0.10394714
TTHD(mSv): 0.12487273e-4
TEDE(mSv): 1.36061492
DIAGNOSE:
1-yr TEDE Limit to population, all sources,
DYNAMIC VULNERABILITY GRADE: 80.12
INFO PAD
FILES
SCENE
Map width(m): 19666.6918
Map height(m): 20344.8536
Highest elevation(mASL): 695
Lowest elevation(mASL): -949
RELEASE
! Adjust defaults as appropriate.
Propellant mass(kg): 0.453
Release duration(s): 1
Release height(mAG): 1
Ground reflection on/off (1,0): 1
Inversion lid reflection on/off (1,0): 1
Iodine form, dominant (1-I2, 2-CH3I: 1
Monitoring time(s): 7200
Columnar Source Model Settings*
Level Height factor Load factor
H1 0 0.04
H2 0.2 0.16
H3 0.4 0.25
H4 0.6 0.35
H5 0.8 0.2

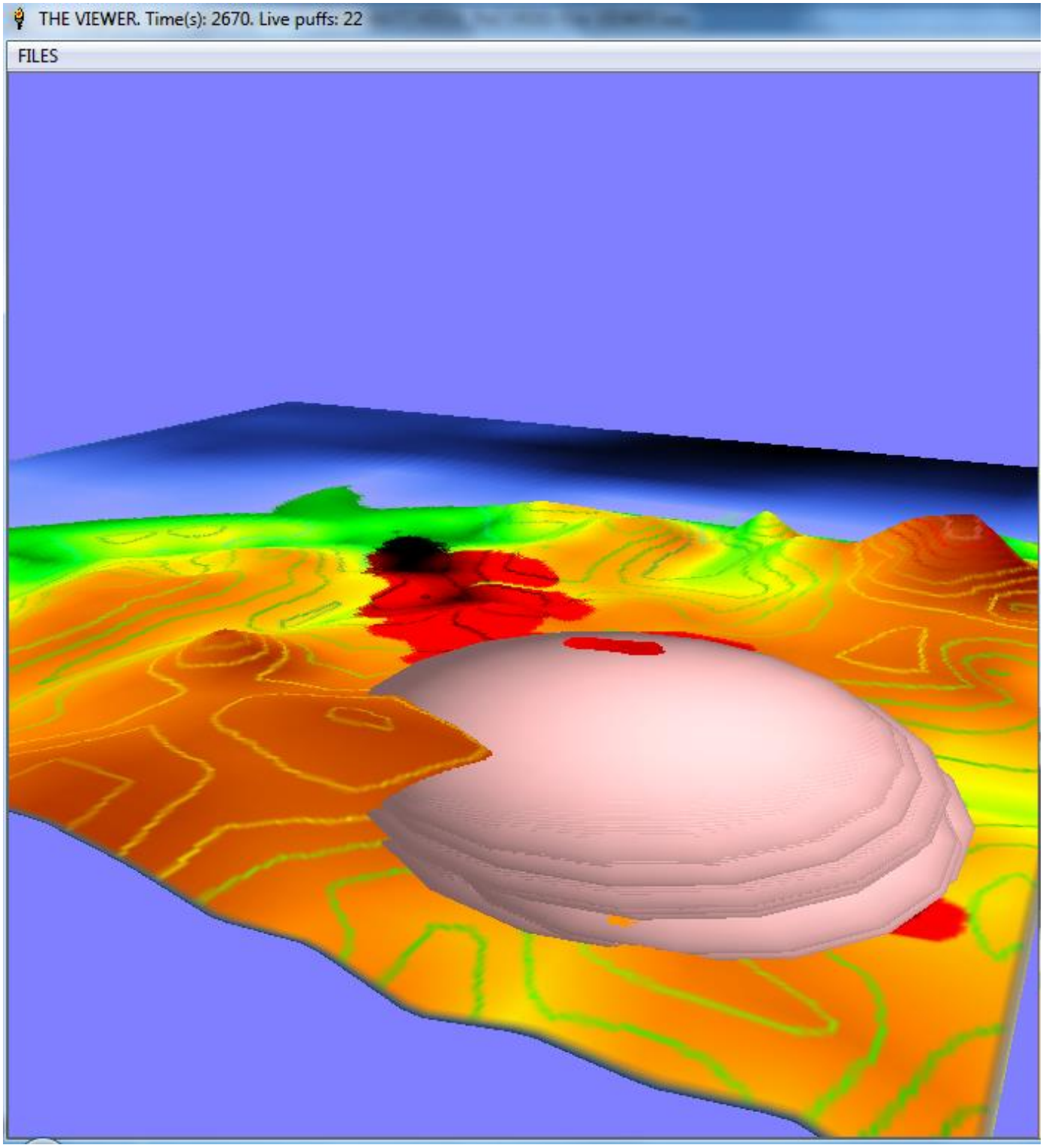
SPECIAL EFFECTS –RADIOACTIVE DISPERSION DEVICES (RDD)
B. INCENDIARY RDDs

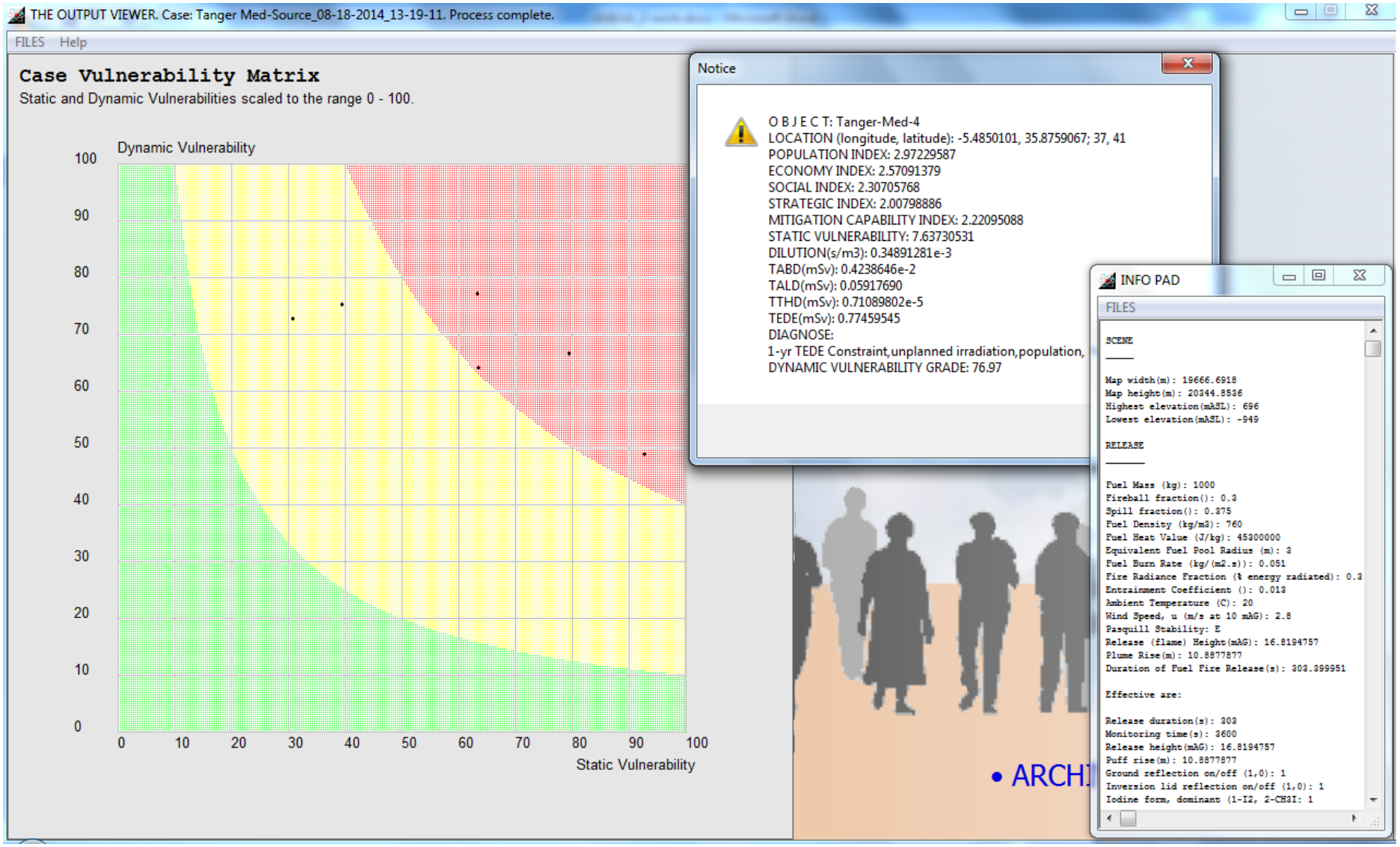





THE OUTPUT VIEWER. Case: Tanger Med-Source_08-18-2014_13-19-11. Process complete.
FILES Help
Map Hybrid Earth
INFO PAD
FILES
SCENE
Map width(m): 19666.6918
Map height(m): 20344.8536
Highest elevation(mASL): 696
Lowest elevation(mASL): -949
RELEASE
Fuel Mass (kg): 1000
Fireball fraction(): 0.3
Spill fraction(): 0.375
Fuel Density (kg/m3): 760
Fuel Heat Value (J/kg): 45300000
Equivalent Fuel Pool Radius (m): 3
Fuel Burn Rate (kg/(m2.s)): 0.051
Fire Radiance Fraction (% energy radiated): 0.3
Entrainment Coefficient (): 0.013
Ambient Temperature (C): 20
Wind Speed, u (m/s at 10 mAG): 2.8
Pasquill Stability: E
Release (flame) Height(mAG): 16.8194757
Plume Rise(m): 10.8877877
Duration of Fuel Fire Release(s): 303.399951
Effective are:
Release duration(s): 303
Monitoring time(s): 3600
Release height(mAG): 16.8194757
Puff rise(m): 10.8877877
Ground reflection on/off (1,0): 1
Inversion lid reflection on/off (1,0): 1
Iodine form, dominant (1-I2, 2-CH3I: 1
METEO
Dispersion system code: D
* Time-dependent: D
D - Doury
* Distance-dependent:
C - COSYMA, Karlsruhe-Hulich - mild-hilly terrain
(e.g. Central Europe)
B - BROOKHAVEN - industrial area
K - KLUG - plain field, water mirror
S - StLOUIS - tall building-featuring town area
M - Meadow, reservoir, Briggs-CNCAN, Romania
F - Farm land, Briggs-CNCAN, Romania
G - Grazing field, Briggs-CNCAN, Romania
Map data ©2014 Google, basado en BCN IGN España
Terms of Use
Report a map error


THE OUTPUT VIEWER. Case: Tanger Med-Source_08-18-2014_13-19-11. Process complete.
FILES Help
Map Hybrid Earth
DILUTION(s/m3): 0.24850896e-6
TABD(mSv): 0.30189247e-5
TALD(mSv): 0.42148041e-4
TTHD(mSv): 0.50632858e-8
TEDE(mSv): 0.55169631e-3
DIAGNOSE:
Doses inconsequential, TEDE less than 0.01 mSv: -1
INFO PAD
FILES
SCENE
Map width(m): 19666.6918
Map height(m): 20344.8536
Highest elevation(mASL): 696
Lowest elevation(mASL): -949
RELEASE
Fuel Mass (kg): 1000
Fireball fraction(): 0.3
Spill fraction(): 0.375
Fuel Density (kg/m3): 760
Fuel Heat Value (J/kg): 45300000
Equivalent Fuel Pool Radius (m): 3
Fuel Burn Rate (kg/(m2.s)): 0.051
Fire Radiance Fraction (% energy radiated): 0.3
Entrainment Coefficient (): 0.013
Ambient Temperature (C): 20
Wind Speed, u (m/s at 10 mAG): 2.8
Pasquill Stability: E
Release (flame) Height(mAG): 16.8194757
Plume Rise(m): 10.8877877
Duration of Fuel Fire Release(s): 303.399951
Effective are:
Release duration(s): 303
Monitoring time(s): 3600
Release height(mAG): 16.8194757
Puff rise(m): 10.8877877
Ground reflection on/off (1,0): 1
Inversion lid reflection on/off (1,0): 1
Iodine form, dominant (1-I2, 2-CH3I: 1
METEO
Dispersion system code: D
* Time-dependent: D
D - Doury
* Distance-dependent:
C - COSYMA, Karlsruhe-Hulich - mild-hilly terrain
(e.g. Central Europe)
B - BROOKHAVEN - industrial area
K - KLUG - plain field, water mirror
S - StLOUIS - tall building-featuring town area
M - Meadow, reservoir, Briggs-CNCAN, Romania
F - Farm land, Briggs-CNCAN, Romania
G - Grazing field, Briggs-CNCAN, Romania
Image © 2014 DigitalGlobe
© 2014 Google
Image Landsat
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Google earth
Terms of Use


THE VIEWER. Time(s): 2670. Live puffs: 22
FILES


THE OUTPUT VIEWER. Case: Tanger Med-Source_08-18-2014_13-19-11. Process complete.
FILES Help
Case Vulnerability Matrix
Static and Dynamic Vulnerabilities scaled to the range 0 - 100.
Dynamic Vulnerability
100
90
80
70
60
50
40
30
20
10
0
0 10 20 30 40 50 60 70 80 90 100
Static Vulnerability
Notice
O B J E C T: Tanger-Med-4
LOCATION (longitude, latitude): -5.4850101, 35.8759067; 37, 41
POPULATION INDEX: 2.97229587
ECONOMY INDEX: 2.57091379
SOCIAL INDEX: 2.30705768
STRATEGIC INDEX: 2.00798886
MITIGATION CAPABILITY INDEX: 2.22095088
STATIC VULNERABILITY: 7.63730531
DILUTION(s/m3): 0.34891281e-3
TABD(mSv): 0.4238646e-2
TALD(mSv): 0.05917690
TTHD(mSv): 0.71089802e-5
TEDE(mSv): 0.77459545
DIAGNOSE:
1-yr TEDE Constraint,unplanned irradiation,population,
DYNAMIC VULNERABILITY GRADE: 76.97
INFO PAD
FILES
SCENE
Map width(m): 19666.6918
Map height(m): 20344.8536
Highest elevation(mASL): 696
Lowest elevation(mASL): -949
RELEASE
Fuel Mass (kg): 1000
Fireball fraction(): 0.3
Spill fraction(): 0.375
Fuel Density (kg/m3): 760
Fuel Heat Value (J/kg): 45300000
Equivalent Fuel Pool Radius (m): 3
Fuel Burn Rate (kg/(m2.s)): 0.051
Fire Radiance Fraction (% energy radiated): 0.3
Entrainment Coefficient (): 0.013
Ambient Temperature (C): 20
Wind Speed, u (m/s at 10 mAG): 2.8
Pasquill Stability: E
Release (flame) Height(mAG): 16.8194757
Plume Rise(m): 10.8877877
Duration of Fuel Fire Release(s): 303.399951
Effective are:
Release duration(s): 303
Monitoring time(s): 3600
Release height(mAG): 16.8194757
Puff rise(m): 10.8877877
Ground reflection on/off (1,0): 1
Inversion lid reflection on/off (1,0): 1
Iodine form, dominant (1-I2, 2-CH3I: 1

UTILITIES - SOURCE TERMS

REACTOR ACCIDENT SOURCE TERMS

FILES TOOLS Help

D-13

Containment Leakage - Dry/ With Spray
Gap Release

Core	Containment			Dose[b] mSv @ 1.5-2.0 km			
Condition	Conditions	Hold up Time[a]	Leak Rate	TABD[c]	TEDE[d]	Thyroid[e]	
Gap Release Uncovered 15-30 min	Spray off	< 1 hr	100%/hr	1.3E+03	5.1E+03	1.1E+05	#1
		1-12 hr	100%/hr	5.0E+02	2.2E+03	4.9E+04	#2
			100%/day	2.0E+01	9.0E+01	2.0E+03	#3
			0.1%/day	1.7E-02	8.7E-02	2.0E+00	#4
		> 12 hr	100%/hr	3.5E+01	1.6E+02	3.5E+03	#5
			100%/day	1.4E+00	6.4E+00	1.4E+02	#6
			0.1%/day	<1.0E-02	<1.0E-02	1.4E-01	#7
	Spray on	< 1hr	100%/hr	1.1E+02	2.7E+02	4.4E+03	#8
		1-12 hr	100%/hr	4.8E+01	1.5E+02	2.7E+03	#9
			100%/day	1.9E+00	5.9E+00	1.1E+02	#10
			0.1%/day	<1.0E-02	<1.0E-02	1.1E-01	#11
		> 12 hr	100%/hr	1.4E+01	5.6E+01	1.2E+03	#12
			100%/day	5.2E-01	2.2E-00	4.6E+01	#13
			0.1%/day	<1.0E-02	<1.0E-02	4.6E-02	#14

a. Average time radioactive material release from core remains in containment before release.
b. Dose to an adult performing light activity from a 1 hour ground level release with average meteorological condition (D stability 1.8 m/s wind speed and no rain) with building wake.
c. TABD - Total acute bone dose - includes cloud shine, 2 days of dose following inhalation, and 7 days of ground shine.
d. TEDE - Total effective dose equivalent - includes cloud shine, CEDE from inhalation, and 7 days of ground shine.
e. Thyroid is CDE from inhalation of iodine only.

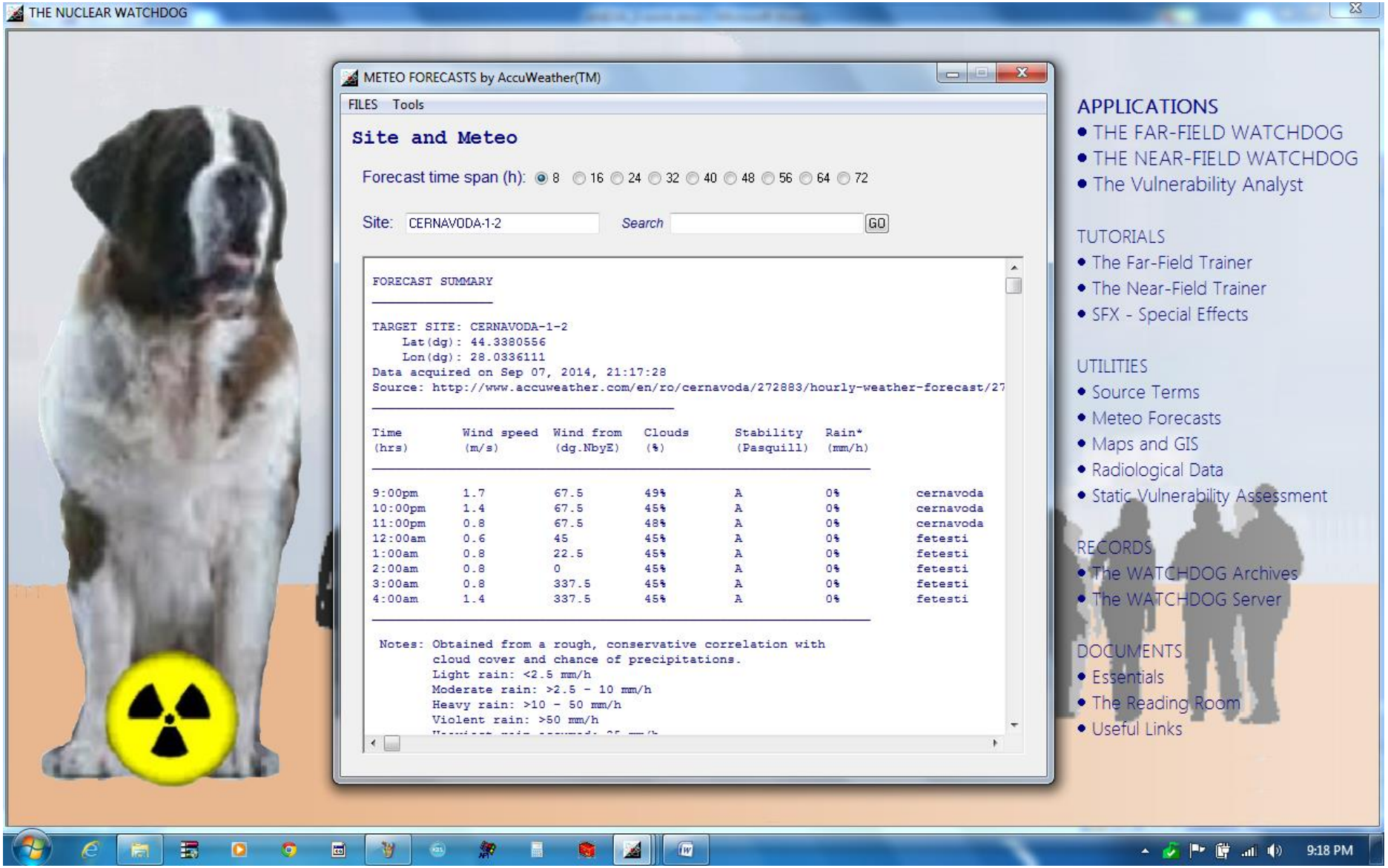
May 15, 1995 LWR Accident Consequence Assessment Figures

EXAMINE CASE. Arrow buttons to expand/collapse.

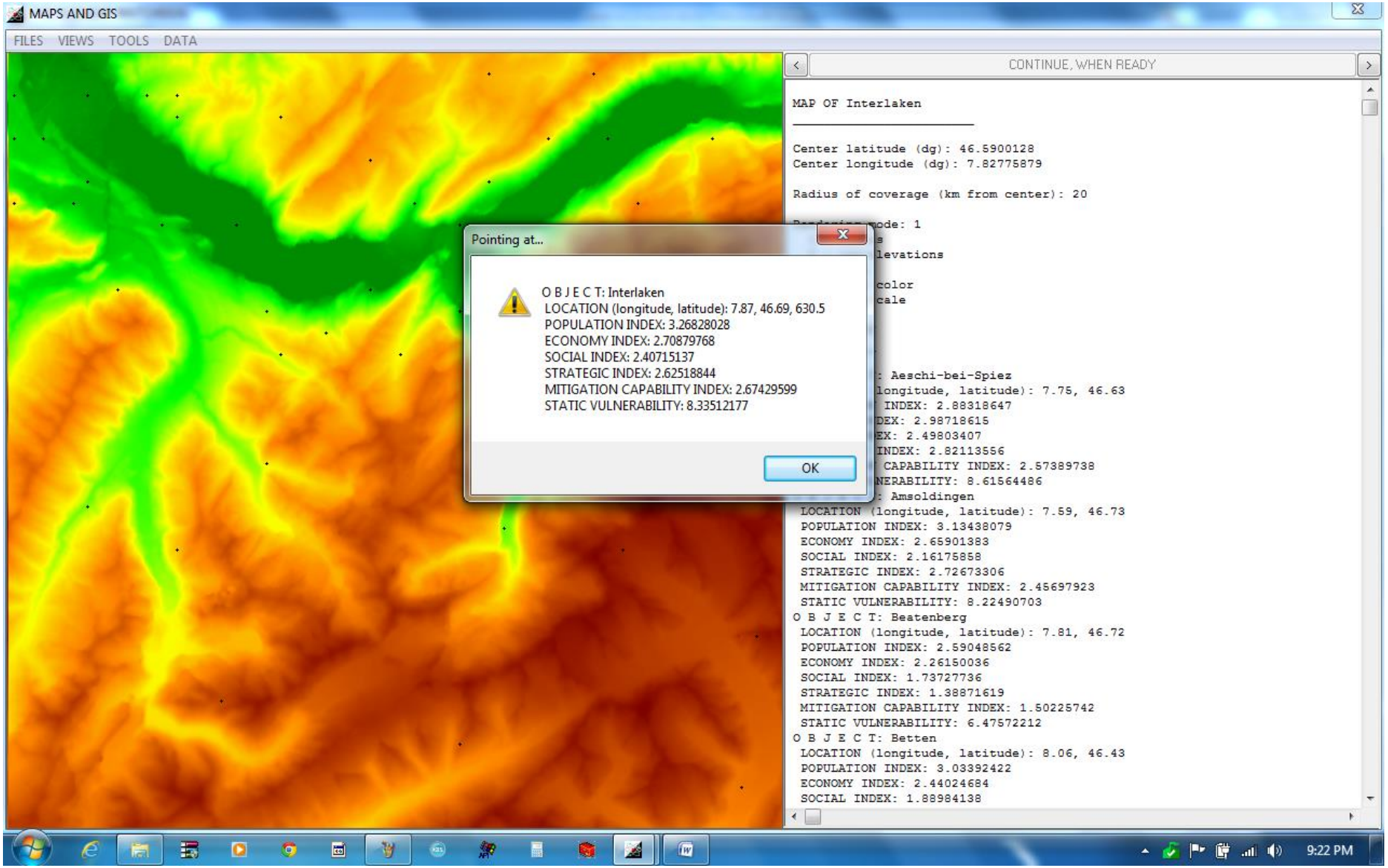
```
SOURCE TERM ASSESSMENT
______________________

Done Jan 13, 2014, 11:47:58
_____________________________

S O U R C E   T E R M
____________________

Case: Containment leakage dry/with spray, gap release | 5
Scenario: Fault Tree Branch #1
_____________________________________________

NUCLIDE      ACTIVITY          Halflife DCFe,50   DCFbone   DCFlung   DCFth
-                                       (mSv/h)/  (mSv/h)/  (mSv/h)/  (mSv/
-            (Ci)              (d)      (kBq/m3)  (kBq/m3)  (kBq/m3)  (kBq/
_____________________________________________________________________________

Kr-85        20979.7249        3.9e03   1.98e-07 0.00e00   0.00e00   0.00e
Kr-85m       900000            1.9e-01  1.26e-07 0.00e00   0.00e00   0.00e
Kr-87        1763513.1         5.3e-02  4.22e-07 0.00e00   0.00e00   0.00e
Kr-88        2554053.75        1.2e-01  1.01e-06 0.00e00   0.00e00   0.00e
I-131        3192567.22        9.6e-02  1.13e-04 1.68e-05  3.24e-04  1.68e
I-132        4500000           8.7e-01  1.80e-03 2.74e-05  8.64e-04  3.36e
I-133        6375000           3.7e-02  5.40e-05 7.32e-06  1.68e-04  3.12e
I-134        7125000           2.8e-01  3.84e-04 2.64e-05  5.18e-04  6.84e
I-135        5625000           1.2e01   0.00e00  0.00e00   0.00e00   0.00e
Xe-131m      37500             5.2e00   5.19e-07 0.00e00   0.00e00   0.00e
Xe-133       6375000           2.2e00   0.00e00  0.00e00   0.00e00   0.00e
Xe-133m      225000            3.8e-01  6.81e-07 0.00e00   0.00e00   0.00e
Xe-135       1277026.65        1.1e-02  0.00e00  0.00e00   0.00e00   0.00e
Xe-138       6375000           7.5e02   7.92e-03 2.01e-04  8.20e-04  0.00e
Cs-134       281756.722        8.4e08   8.28e-04 1.66e-05  2.02e-04  0.00e
Cs-136       112500            1.1e04   5.52e-03 1.20e-04  8.60e-04  0.00e
Cs-137       176351.31         2.2e-02  2.88e-05 0.00e00   0.00e00   0.00e
_____________________________________________________________________________

TOTAL Activity (Ci): 46916248.5

THIS SESSION  I N P U T
_____________________

Examine default values and fix these according to your references.
When ready, 'RUN THE ADJUSTED INPUT'.
For convenience, the input is performed in a number of successive steps,
calling attention on specific topics.
_____________________________________________
```

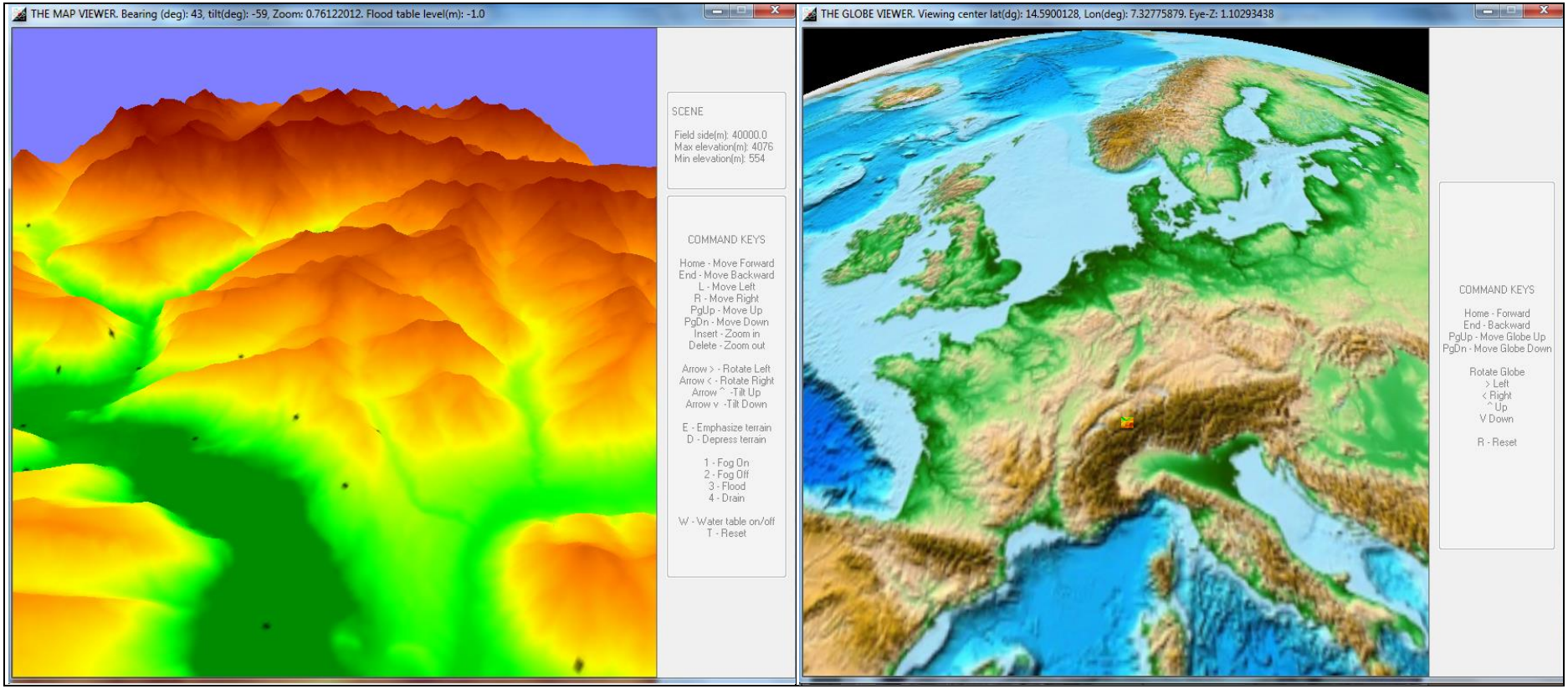
9:12 PM

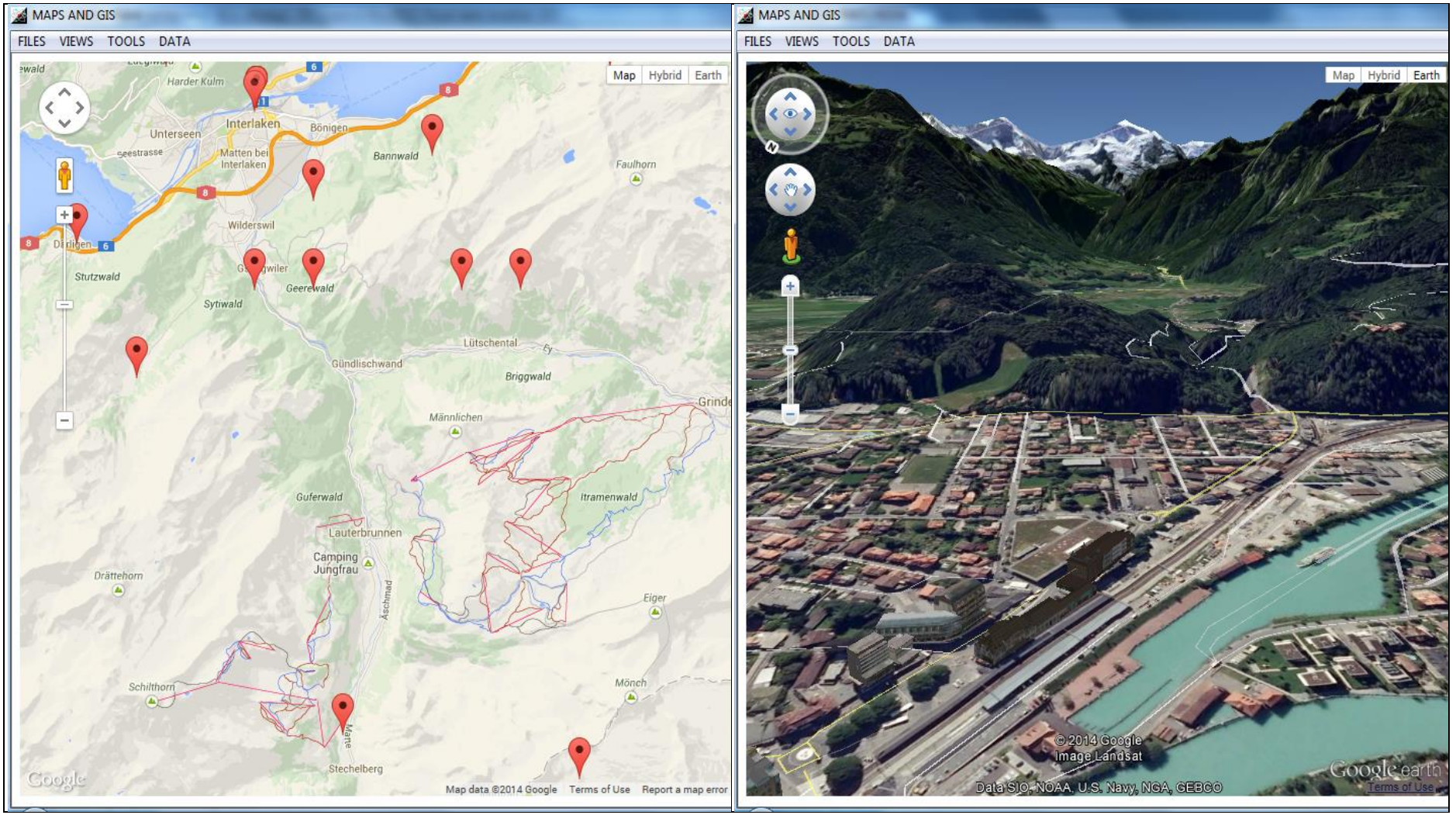
UTILITIES – METEO FORECASTS



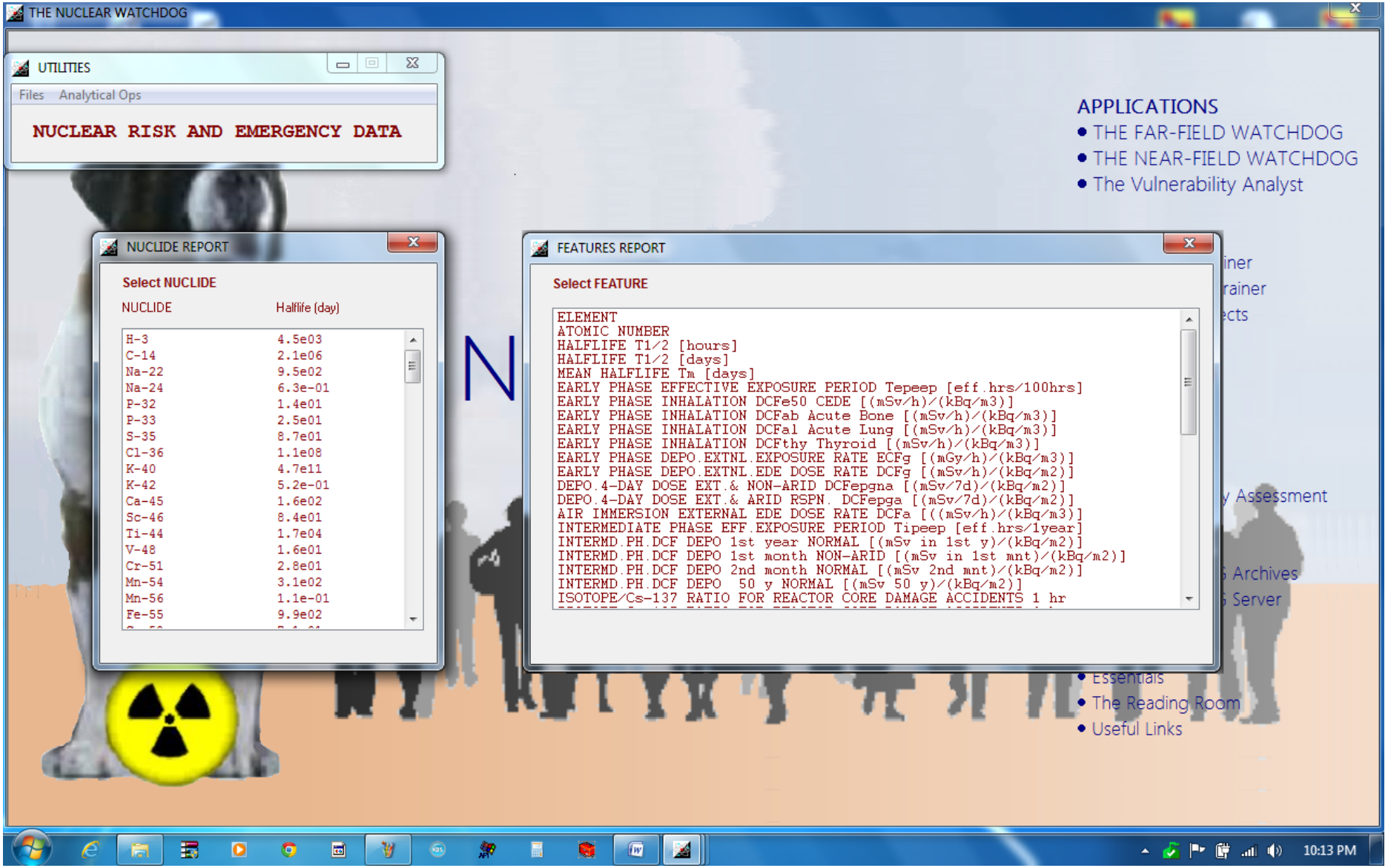
UTILITIES - MAPS AND GIS

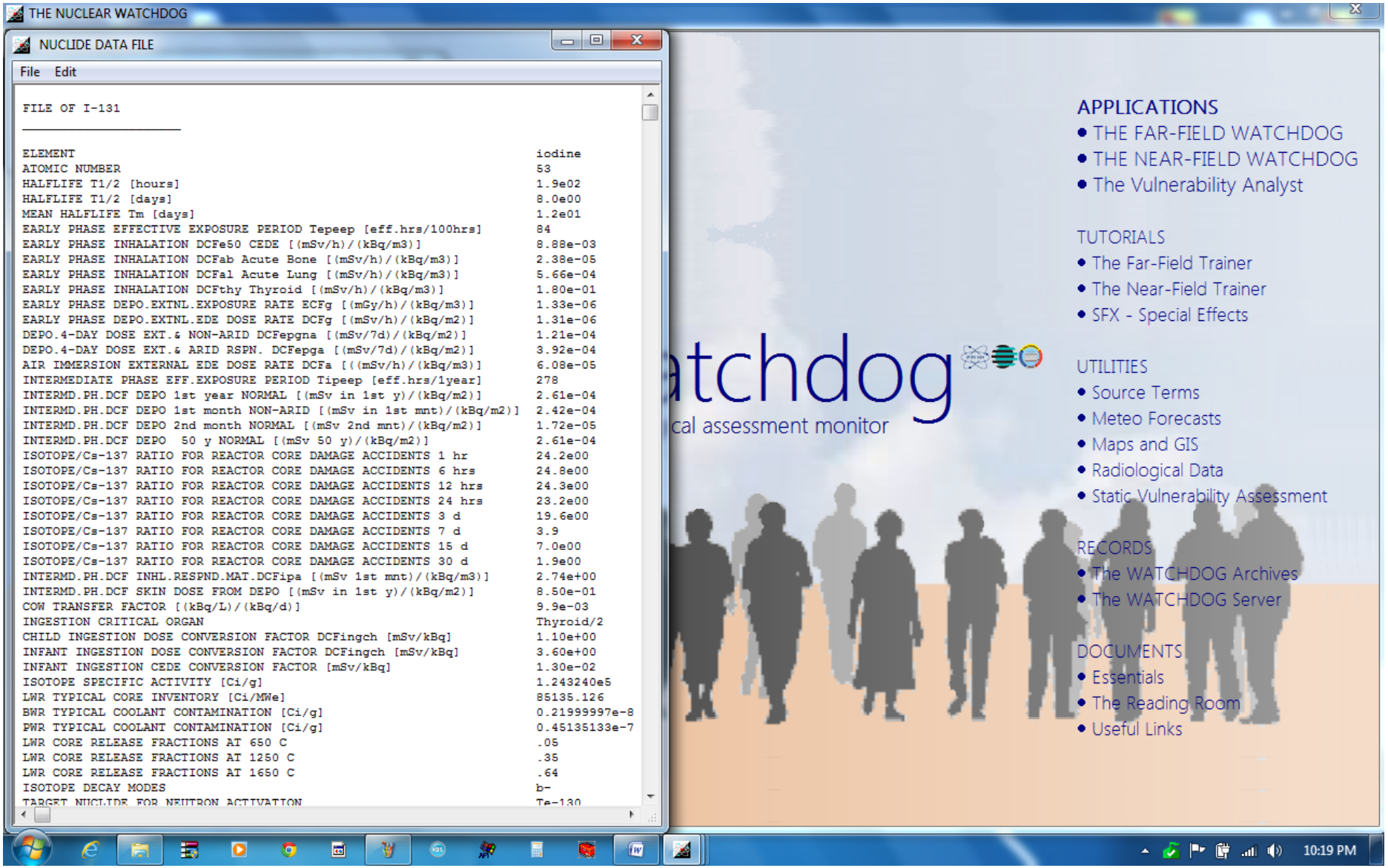



THE MAP VIEWER. Bearing (deg): 43, tilt(deg): -59, Zoom: 0.76122012. Flood table level(m): -1.0
SCENE
Field side(m): 40000.0
Max elevation(m): 4076
Min elevation(m): 554
COMMAND KEYS
Home - Move Forward
End - Move Backward
L - Move Left
R - Move Right
PgUp - Move Up
PgDn - Move Down
Insert - Zoom in
Delete - Zoom out
Arrow > - Rotate Left
Arrow < - Rotate Right
Arrow ^ -Tilt Up
Arrow v -Tilt Down
E - Emphasize terrain
D - Depress terrain
1 - Fog On
2 - Fog Off
3 - Flood
4 - Drain
W - Water table on/off
T - Reset
THE GLOBE VIEWER. Viewing center lat(dg): 14.5900128, Lon(deg): 7.32775879. Eye-Z: 1.10293438
COMMAND KEYS
Home - Forward
End - Backward
PgUp - Move Globe Up
PgDn - Move Globe Down
Rotate Globe
> Left
< Right
^ Up
V Down
R - Reset


MAPS AND GIS
FILES VIEWS TOOLS DATA
Map Hybrid Earth
Harder Kulm
Interlaken
Unterseen
Matten bei Interlaken
Bönigen
Bannwald
Faulhorn
Wilderswil
Stutzwald
Geerewald
Sytiwald
Lütschental
Gündlischwand
Briggwald
Männlichen
Guferwald
Itramenwald
Lauterbrunnen
Camping Jungfrau
Drättehorn
Eiger
Mönch
Schilthorn
Stechelberg
Google
Map data ©2014 Google
Terms of Use
Report a map error
MAPS AND GIS
FILES VIEWS TOOLS DATA
Map Hybrid Earth
© 2014 Google
Image Landsat
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Google earth
Terms of Use

UTILITIES - RADIOLOGICAL DATA




THE NUCLEAR WATCHDOG
NUCLIDE DATA FILE
File Edit
FILE OF I-131
ELEMENT iodine
ATOMIC NUMBER 53
HALFLIFE T1/2 [hours] 1.9e02
HALFLIFE T1/2 [days] 8.0e00
MEAN HALFLIFE Tm [days] 1.2e01
EARLY PHASE EFFECTIVE EXPOSURE PERIOD Tepeep [eff.hrs/100hrs] 84
EARLY PHASE INHALATION DCFe50 CEDE [(mSv/h)/(kBq/m3)] 8.88e-03
EARLY PHASE INHALATION DCFab Acute Bone [(mSv/h)/(kBq/m3)] 2.38e-05
EARLY PHASE INHALATION DCFal Acute Lung [(mSv/h)/(kBq/m3)] 5.66e-04
EARLY PHASE INHALATION DCFthy Thyroid [(mSv/h)/(kBq/m3)] 1.80e-01
EARLY PHASE DEPO.EXTNL.EXPOSURE RATE ECFg [(mGy/h)/(kBq/m3)] 1.33e-06
EARLY PHASE DEPO.EXTNL.EDE DOSE RATE DCFg [(mSv/h)/(kBq/m2)] 1.31e-06
DEPO.4-DAY DOSE EXT.& NON-ARID DCFepgna [(mSv/7d)/(kBq/m2)] 1.21e-04
DEPO.4-DAY DOSE EXT.& ARID RSPN. DCFepga [(mSv/7d)/(kBq/m2)] 3.92e-04
AIR IMMERSION EXTERNAL EDE DOSE RATE DCFa [((mSv/h)/(kBq/m3)] 6.08e-05
INTERMEDIATE PHASE EFF.EXPOSURE PERIOD Tipeep [eff.hrs/1year] 278
INTERMD.PH.DCF DEPO 1st year NORMAL [(mSv in 1st y)/(kBq/m2)] 2.61e-04
INTERMD.PH.DCF DEPO 1st month NON-ARID [(mSv in 1st mnt)/(kBq/m2)] 2.42e-04
INTERMD.PH.DCF DEPO 2nd month NORMAL [(mSv 2nd mnt)/(kBq/m2)] 1.72e-05
INTERMD.PH.DCF DEPO 50 y NORMAL [(mSv 50 y)/(kBq/m2)] 2.61e-04
ISOTOPE/Cs-137 RATIO FOR REACTOR CORE DAMAGE ACCIDENTS 1 hr 24.2e00
ISOTOPE/Cs-137 RATIO FOR REACTOR CORE DAMAGE ACCIDENTS 6 hrs 24.8e00
ISOTOPE/Cs-137 RATIO FOR REACTOR CORE DAMAGE ACCIDENTS 12 hrs 24.3e00
ISOTOPE/Cs-137 RATIO FOR REACTOR CORE DAMAGE ACCIDENTS 24 hrs 23.2e00
ISOTOPE/Cs-137 RATIO FOR REACTOR CORE DAMAGE ACCIDENTS 3 d 19.6e00
ISOTOPE/Cs-137 RATIO FOR REACTOR CORE DAMAGE ACCIDENTS 7 d 3.9
ISOTOPE/Cs-137 RATIO FOR REACTOR CORE DAMAGE ACCIDENTS 15 d 7.0e00
ISOTOPE/Cs-137 RATIO FOR REACTOR CORE DAMAGE ACCIDENTS 30 d 1.9e00
INTERMD.PH.DCF INHL.RESPND.MAT.DCFipa [(mSv 1st mnt)/(kBq/m3)] 2.74e+00
INTERMD.PH.DCF SKIN DOSE FROM DEPO [(mSv in 1st y)/(kBq/m2)] 8.50e-01
COW TRANSFER FACTOR [(kBq/L)/(kBq/d)] 9.9e-03
INGESTION CRITICAL ORGAN Thyroid/2
CHILD INGESTION DOSE CONVERSION FACTOR DCFingch [mSv/kBq] 1.10e+00
INFANT INGESTION DOSE CONVERSION FACTOR DCFingch [mSv/kBq] 3.60e+00
INFANT INGESTION CEDE CONVERSION FACTOR [mSv/kBq] 1.30e-02
ISOTOPE SPECIFIC ACTIVITY [Ci/g] 1.243240e5
LWR TYPICAL CORE INVENTORY [Ci/MWe] 85135.126
BWR TYPICAL COOLANT CONTAMINATION [Ci/g] 0.21999997e-8
PWR TYPICAL COOLANT CONTAMINATION [Ci/g] 0.45135133e-7
LWR CORE RELEASE FRACTIONS AT 650 C .05
LWR CORE RELEASE FRACTIONS AT 1250 C .35
LWR CORE RELEASE FRACTIONS AT 1650 C .64
ISOTOPE DECAY MODES b-
TARGET NUCLIDE FOR NEUTRON ACTIVATION Te-130
atchdog
cal assessment monitor
APPLICATIONS
• THE FAR-FIELD WATCHDOG
• THE NEAR-FIELD WATCHDOG
• The Vulnerability Analyst
TUTORIALS
• The Far-Field Trainer
• The Near-Field Trainer
• SFX - Special Effects
UTILITIES
• Source Terms
• Meteo Forecasts
• Maps and GIS
• Radiological Data
• Static Vulnerability Assessment
RECORDS
• The WATCHDOG Archives
• The WATCHDOG Server
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• Essentials
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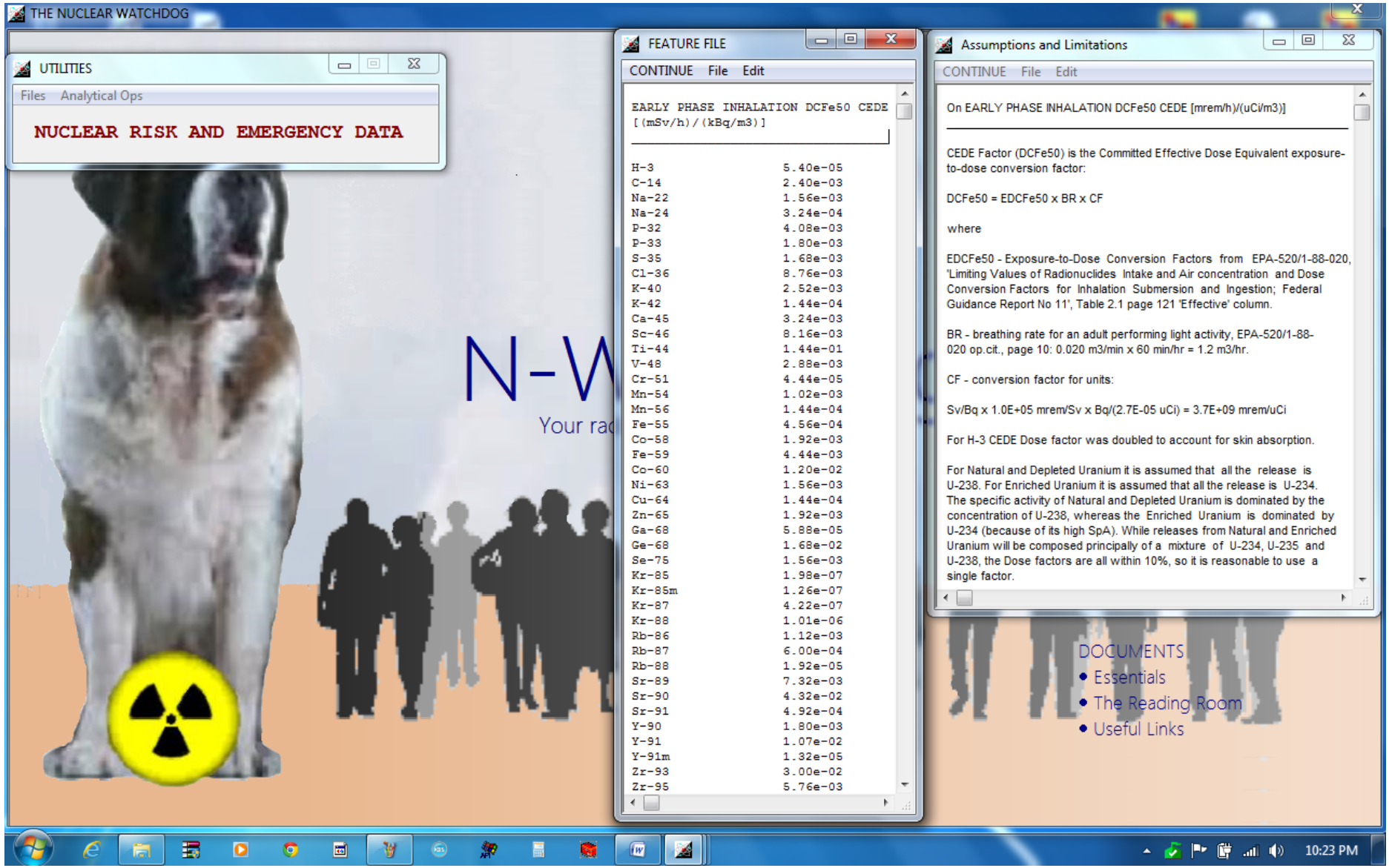
THE NUCLEAR WATCHDOG
UTILITIES
Files Analytical Ops
NUCLEAR RISK AND EMERGENCY DATA
FEATURE FILE
CONTINUE File Edit
EARLY PHASE INHALATION DCFe50 CEDE [(mSv/h)/(kBq/m3)]
H-3 5.40e-05
C-14 2.40e-03
Na-22 1.56e-03
Na-24 3.24e-04
P-32 4.08e-03
P-33 1.80e-03
S-35 1.68e-03
Cl-36 8.76e-03
K-40 2.52e-03
K-42 1.44e-04
Ca-45 3.24e-03
Sc-46 8.16e-03
Ti-44 1.44e-01
V-48 2.88e-03
Cr-51 4.44e-05
Mn-54 1.02e-03
Mn-56 1.44e-04
Fe-55 4.56e-04
Co-58 1.92e-03
Fe-59 4.44e-03
Co-60 1.20e-02
Ni-63 1.56e-03
Cu-64 1.44e-04
Zn-65 1.92e-03
Ga-68 5.88e-05
Ge-68 1.68e-02
Se-75 1.56e-03
Kr-85 1.98e-07
Kr-85m 1.26e-07
Kr-87 4.22e-07
Kr-88 1.01e-06
Rb-86 1.12e-03
Rb-87 6.00e-04
Rb-88 1.92e-05
Sr-89 7.32e-03
Sr-90 4.32e-02
Sr-91 4.92e-04
Y-90 1.80e-03
Y-91 1.07e-02
Y-91m 1.32e-05
Zr-93 3.00e-02
Zr-95 5.76e-03
Assumptions and Limitations
CONTINUE File Edit
On EARLY PHASE INHALATION DCFe50 CEDE [mrem/h)/(uCi/m3)]
CEDE Factor (DCFe50) is the Committed Effective Dose Equivalent exposure-to-dose conversion factor:
DCFe50 = EDCFe50 x BR x CF
where
EDCFe50 - Exposure-to-Dose Conversion Factors from EPA-520/1-88-020, 'Limiting Values of Radionuclides Intake and Air concentration and Dose Conversion Factors for Inhalation Submersion and Ingestion; Federal Guidance Report No 11', Table 2.1 page 121 'Effective' column.
BR - breathing rate for an adult performing light activity, EPA-520/1-88-020 op.cit., page 10: 0.020 m3/min x 60 min/hr = 1.2 m3/hr.
CF - conversion factor for units:
Sv/Bq x 1.0E+05 mrem/Sv x Bq/(2.7E-05 uCi) = 3.7E+09 mrem/uCi
For H-3 CEDE Dose factor was doubled to account for skin absorption.
For Natural and Depleted Uranium it is assumed that all the release is U-238. For Enriched Uranium it is assumed that all the release is U-234. The specific activity of Natural and Depleted Uranium is dominated by the concentration of U-238, whereas the Enriched Uranium is dominated by U-234 (because of its high SpA). While releases from Natural and Enriched Uranium will be composed principally of a mixture of U-234, U-235 and U-238, the Dose factors are all within 10%, so it is reasonable to use a single factor.
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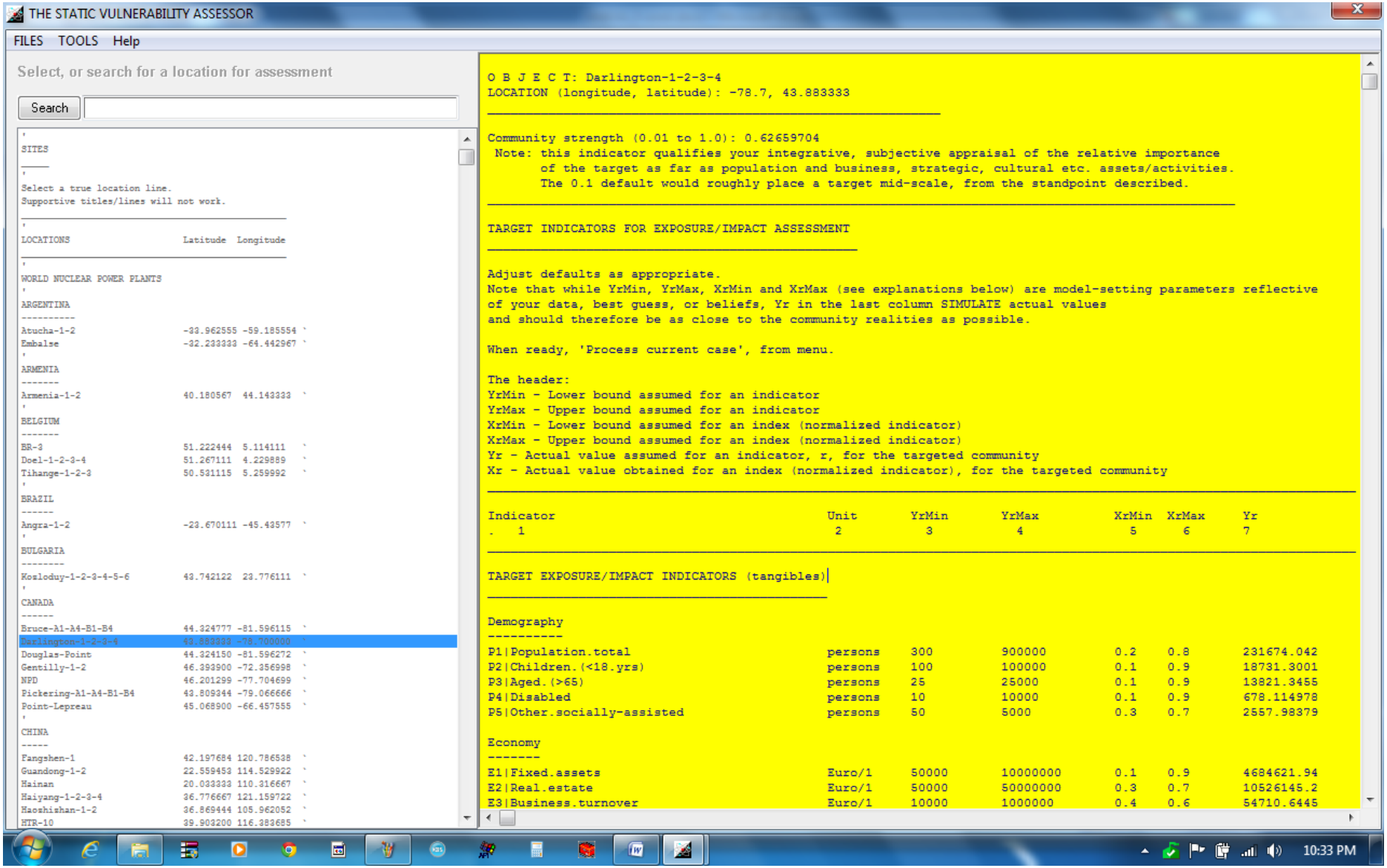
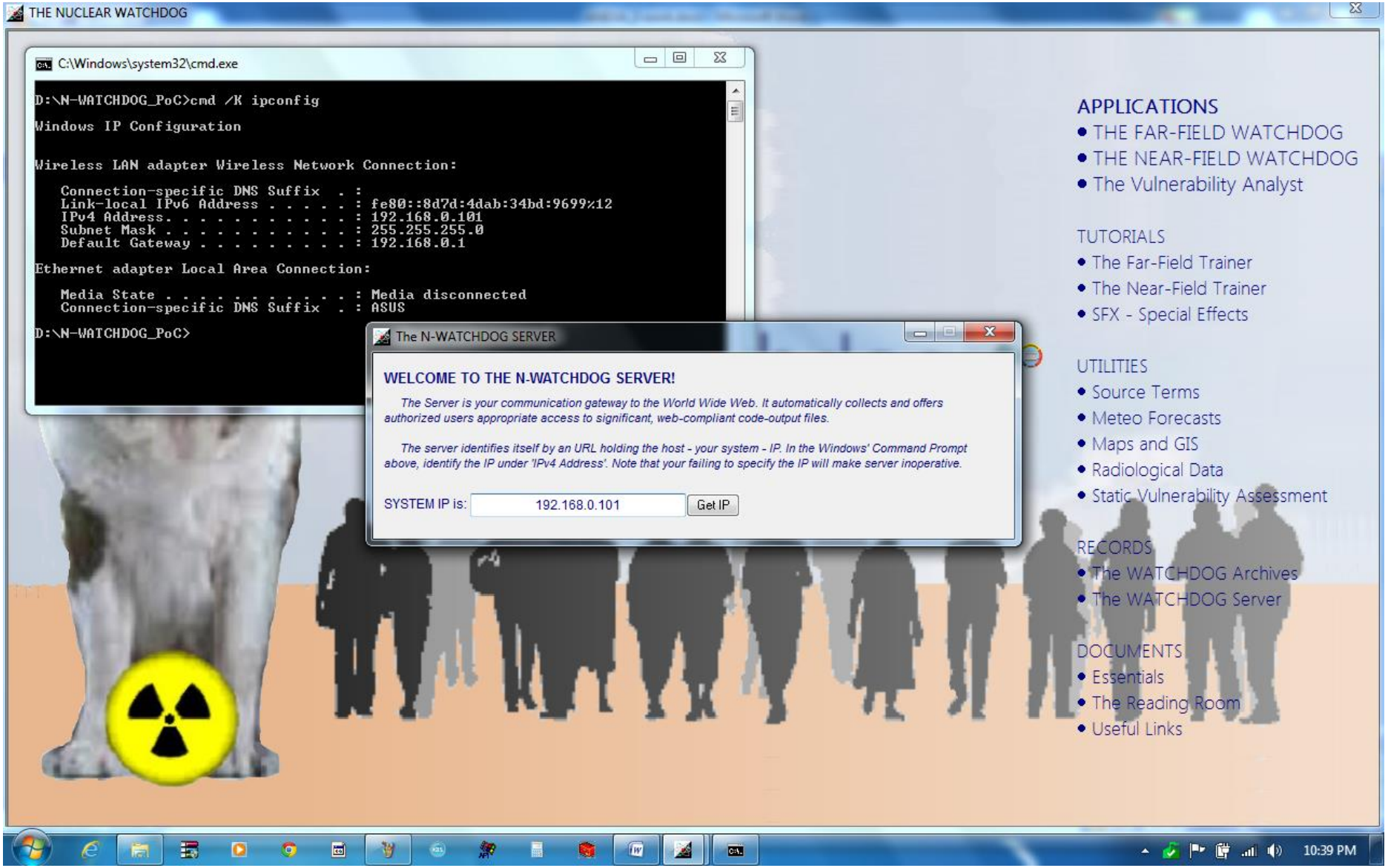
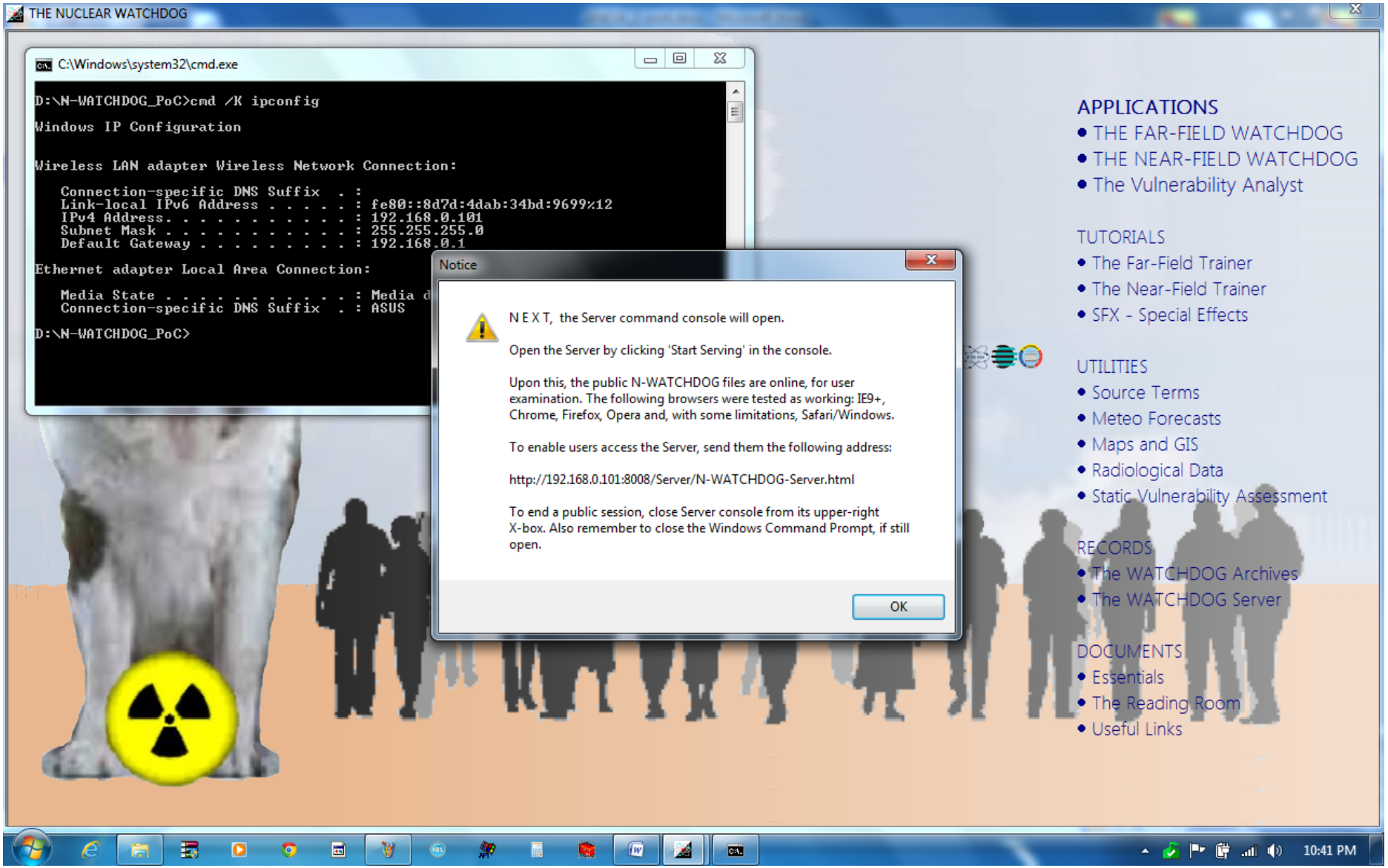
UTILITIES - STATIC VULNERABILITY ASSESSMENT



THE N-WATCHDOG SERVER




THE NUCLEAR WATCHDOG
C:\Windows\system32\cmd.exe
D:\N-WATCHDOG_PoC>cmd /K ipconfig
Windows IP Configuration
Wireless LAN adapter Wireless Network Connection:
Connection-specific DNS Suffix . :
Link-local IPv6 Address . . . . . : fe80::8d7d:4dab:34bd:9699%12
IPv4 Address. . . . . : 192.168.0.101
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 192.168.0.1
Ethernet adapter Local Area Connection:
Media State . . . . . : Media
Connection-specific DNS Suffix . : ASUS
D:\N-WATCHDOG_PoC>
Notice
N E X T, the Server command console will open.
Open the Server by clicking 'Start Serving' in the console.
Upon this, the public N-WATCHDOG files are online, for user examination. The following browsers were tested as working: IE9+, Chrome, Firefox, Opera and, with some limitations, Safari/Windows.
To enable users access the Server, send them the following address:
http://192.168.0.101:8008/Server/N-WATCHDOG-Server.html
To end a public session, close Server console from its upper-right X-box. Also remember to close the Windows Command Prompt, if still open.
OK
APPLICATIONS
THE FAR-FIELD WATCHDOG
THE NEAR-FIELD WATCHDOG
The Vulnerability Analyst
TUTORIALS
The Far-Field Trainer
The Near-Field Trainer
SFX - Special Effects
UTILITIES
Source Terms
Meteo Forecasts
Maps and GIS
Radiological Data
Static Vulnerability Assessment
RECORDS
The WATCHDOG Archives
The WATCHDOG Server
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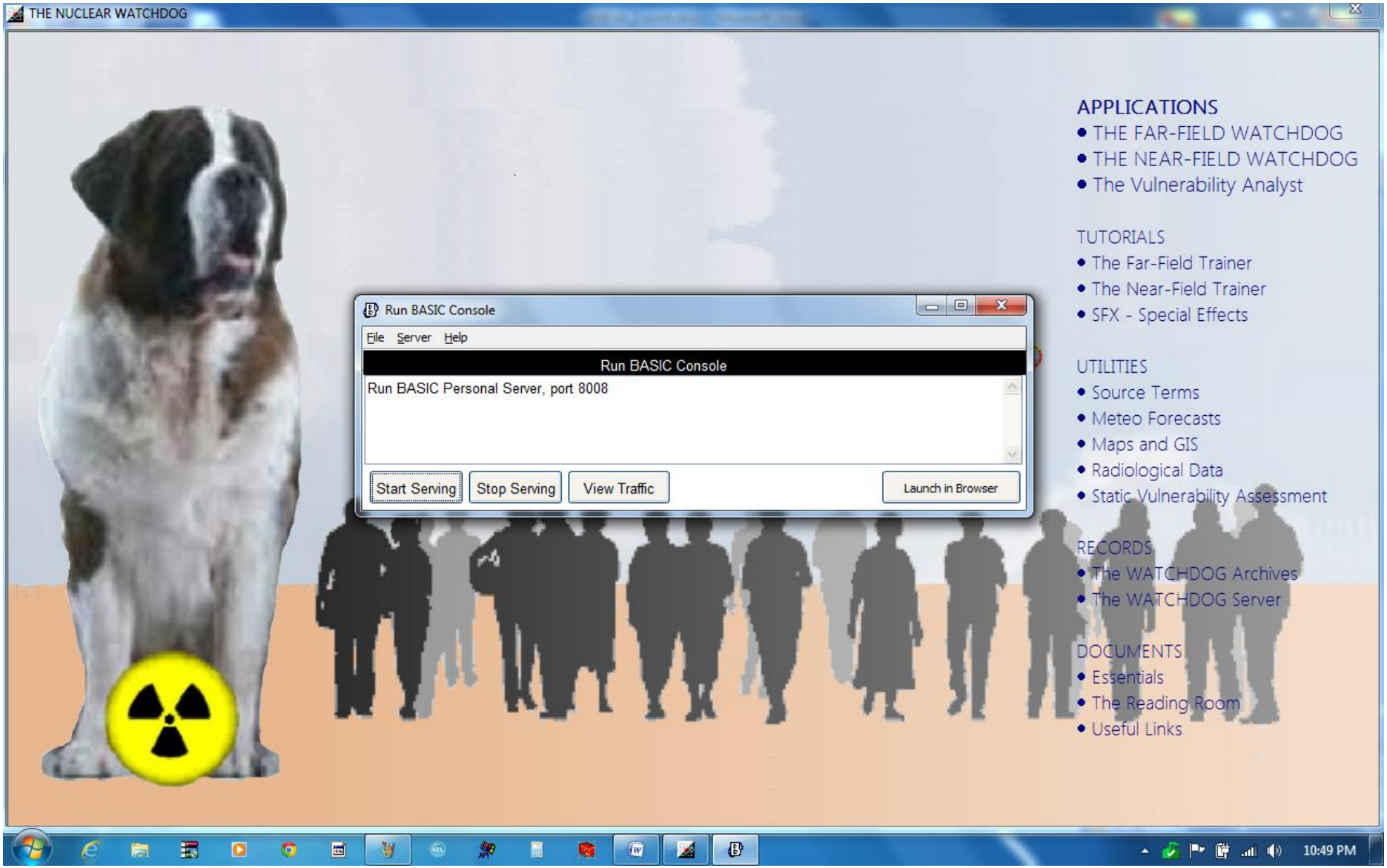
THE NUCLEAR WATCHDOG
Run BASIC Console
File Server Help
Run BASIC Console
Run BASIC Personal Server, port 8008
Start Serving
Stop Serving
View Traffic
Launch in Browser
APPLICATIONS
• THE FAR-FIELD WATCHDOG
• THE NEAR-FIELD WATCHDOG
• The Vulnerability Analyst
TUTORIALS
• The Far-Field Trainer
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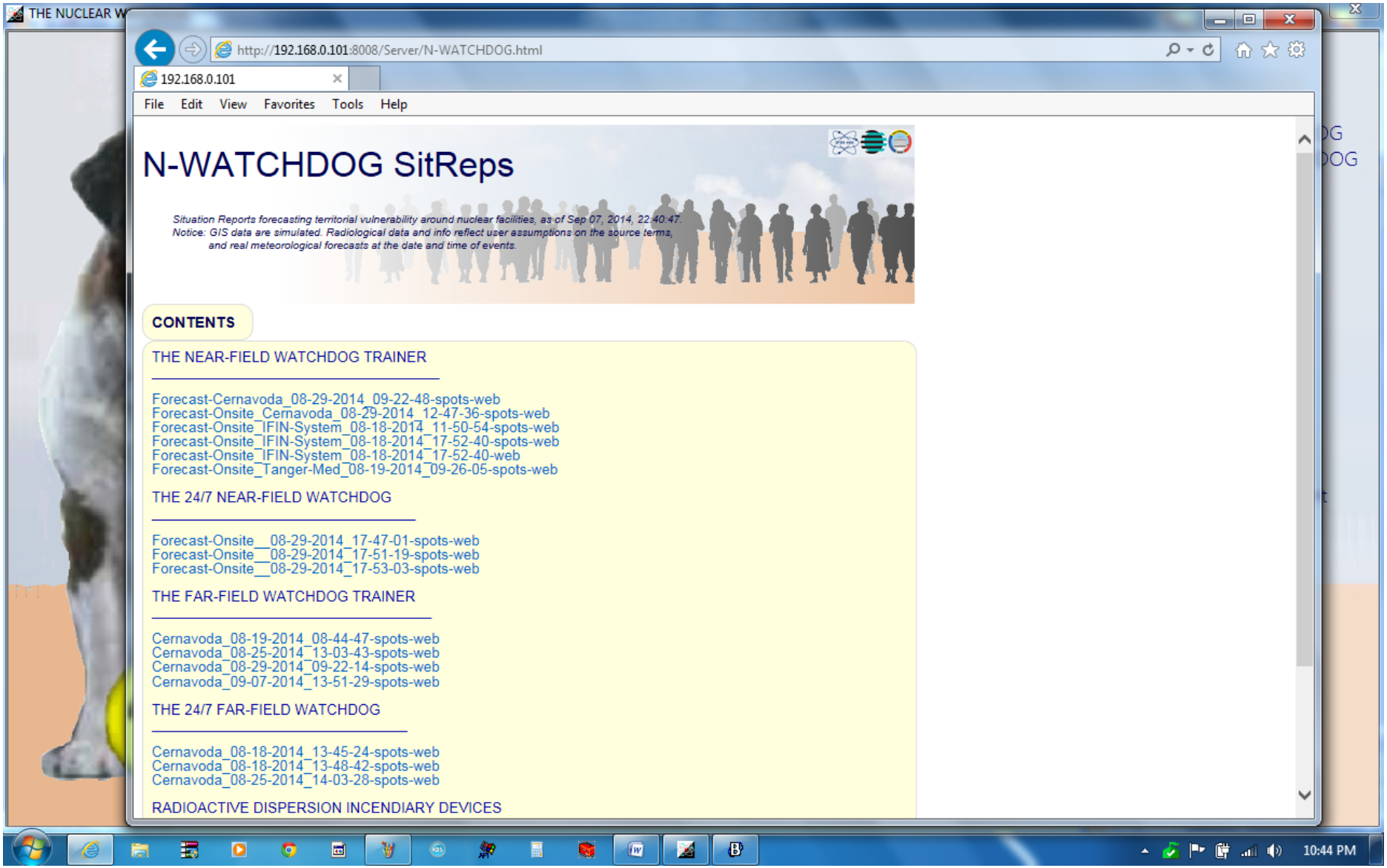
THE NUCLEAR W
http://192.168.0.101:8008/Server/N-WATCHDOG.html
192.168.0.101
File Edit View Favorites Tools Help
N-WATCHDOG SitReps
Situation Reports forecasting territorial vulnerability around nuclear facilities, as of Sep 07, 2014, 22:40:47.
Notice: GIS data are simulated. Radiological data and info reflect user assumptions on the source terms,
and real meteorological forecasts at the date and time of events.
CONTENTS
THE NEAR-FIELD WATCHDOG TRAINER
Forecast-Cernavoda_08-29-2014_09-22-48-spots-web
Forecast-Onsite_Cernavoda_08-29-2014_12-47-36-spots-web
Forecast-Onsite_IFIN-System_08-18-2014_11-50-54-spots-web
Forecast-Onsite_IFIN-System_08-18-2014_17-52-40-spots-web
Forecast-Onsite_IFIN-System_08-18-2014_17-52-40-web
Forecast-Onsite_Tanger-Med_08-19-2014_09-26-05-spots-web
THE 24/7 NEAR-FIELD WATCHDOG
Forecast-Onsite__08-29-2014_17-47-01-spots-web
Forecast-Onsite__08-29-2014_17-51-19-spots-web
Forecast-Onsite__08-29-2014_17-53-03-spots-web
THE FAR-FIELD WATCHDOG TRAINER
Cernavoda_08-19-2014_08-44-47-spots-web
Cernavoda_08-25-2014_13-03-43-spots-web
Cernavoda_08-29-2014_09-22-14-spots-web
Cernavoda_09-07-2014_13-51-29-spots-web
THE 24/7 FAR-FIELD WATCHDOG
Cernavoda_08-18-2014_13-45-24-spots-web
Cernavoda_08-18-2014_13-48-42-spots-web
Cernavoda_08-25-2014_14-03-28-spots-web
RADIOACTIVE DISPERSION INCENDIARY DEVICES
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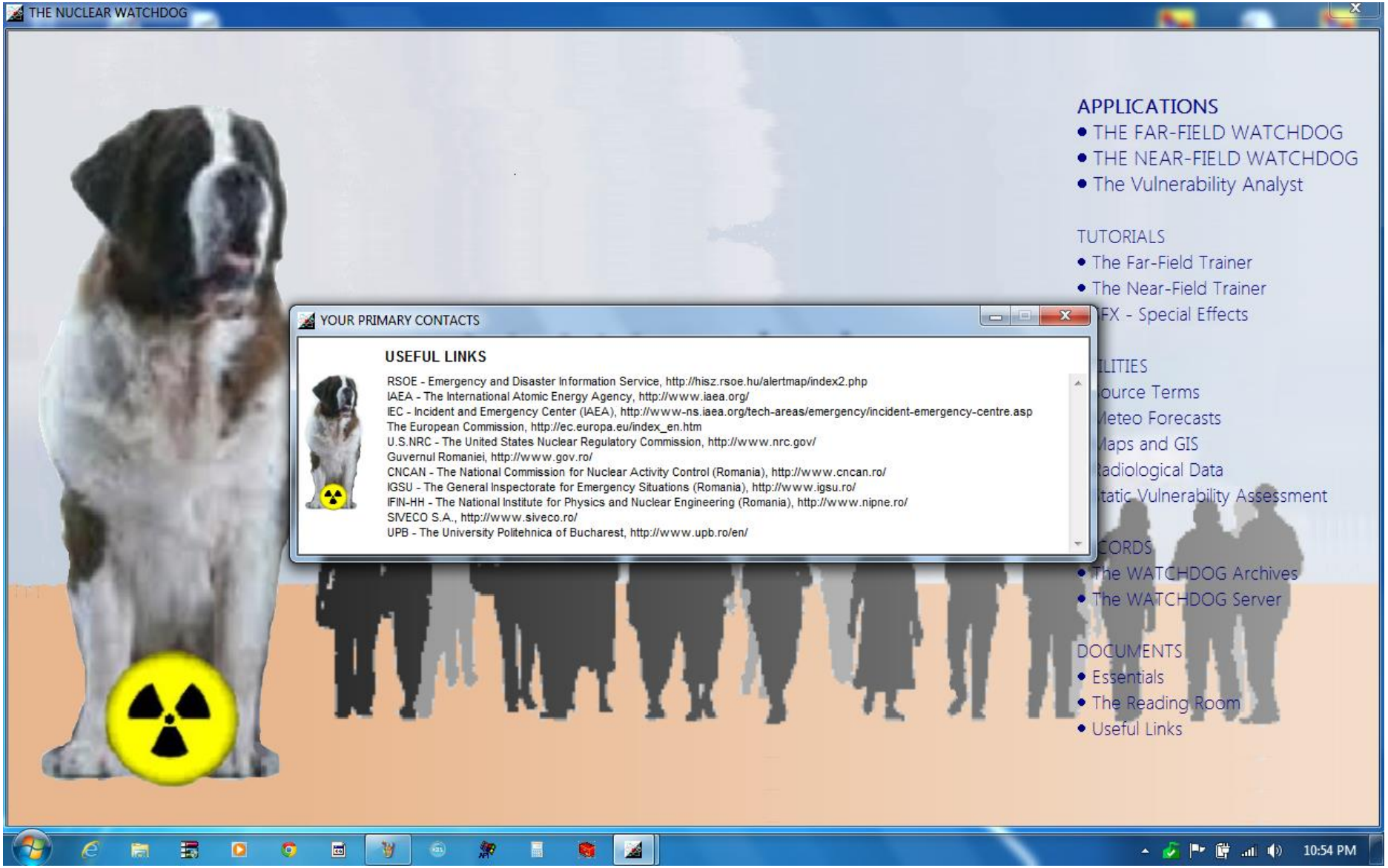
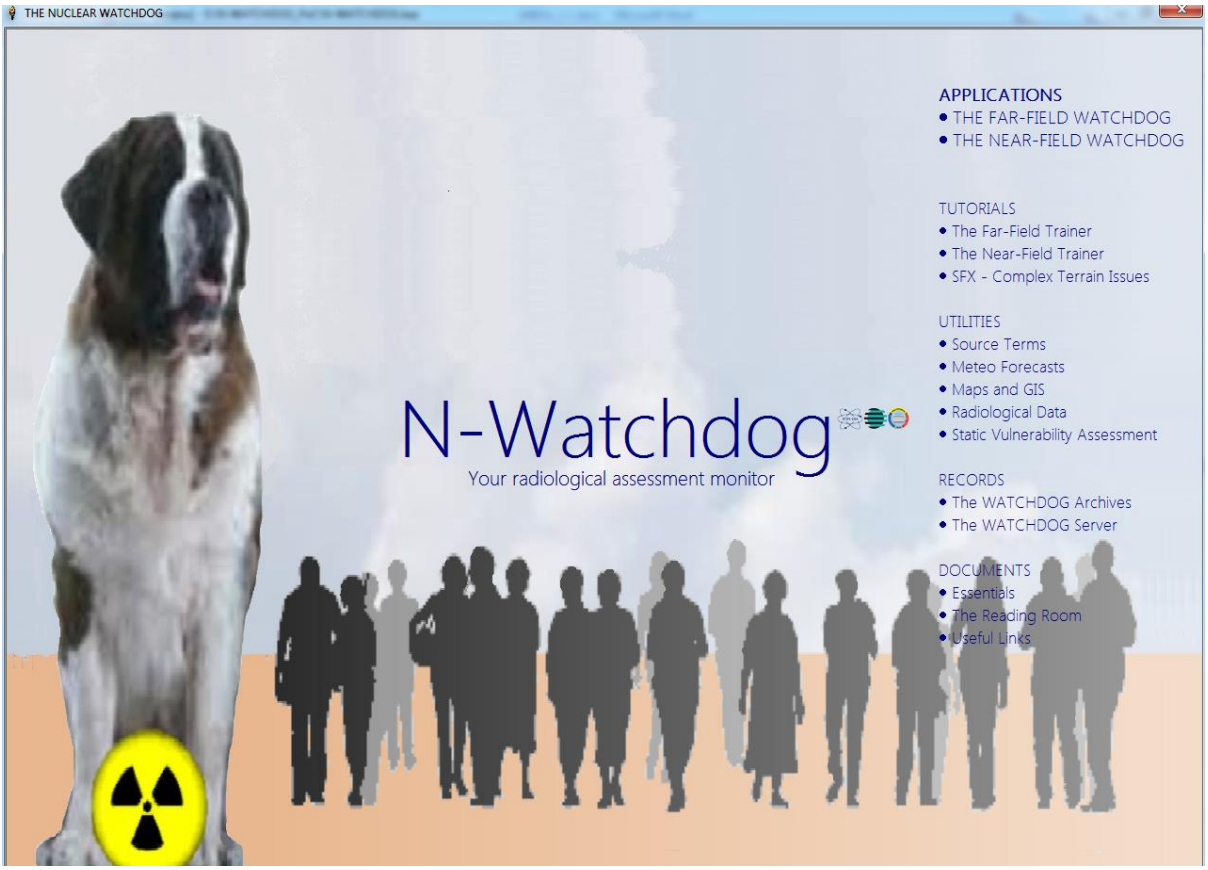
DOCUMENTS – USEFUL LINKS



ANEXA 3

Codurile N-WATCHDOG PoC:
- un exemplu comentat -



'The N-WATCHDOG Trainer
'version August, 2014 by Dan Vamanu,
'IFIN-HH/DFVM
'
'_____

'Cod-sursa al executabilului-'controller' cu acest nume.
'Ne-functional in absenta conexiunilor la 'Model' si 'Viewer'!
'In lucru...
'
'_____

Note: DefaultDir$ este directorul curent al N-WATCHDOG-PoC: [drive]:\N-WATCHDOG
info$() este un array generic utilizat de comanda 'files' de identificare a folderelor si fisierelor, redimensionat automat de cod la utilizarea comenzii
[nume] sunt etichete (*labels*) pentru *code branching* sau subrutine accesate gosub.
wait este comanda standard de asteptare a Liberty BASIC (LB).
Caracterul ' marcheaza un comentariu (rem) intern in cod.
Comentariile marcate rosu si titlurile marcate albastru apartin Raportului – si nu *code listing*.

_____

```
nomainwin         'Consola nativa LB hidden and disabled

dim info$(0,0)
```

'1. SETARI

```
open DefaultDir$+"\ADMIN\SKYFILE.txt" for input as #1              'Grafica logo
line input #1, sky$
close #1
skyfile$=DefaultDir$+"\public\myserver\"+sky$

dim info$(0,0)

open DefaultDir$+"\public\ZGold.txt" for input as #1               'Rezolutia gridului DEM de elevatii: 'Gold' – SRTM90 (cca 90x90 m); 'Silver' – SRTM30 (cca 1000x1000 m)
line input #1,wo$
close #1
lGold=val(wo$)    'hard-coded option

if lGold=0 then source$="DEM: U.S.NOAA-GLOBE&ETOPO1"
if lGold=1 then source$="DEM: U.S.NASA-SRTM30 and NOAA-GLOBE&ETOPO1"
if lGold=2 then source$="DEM: U.S.NASA-SRTM90 and NOAA-GLOBE&ETOPO1"

'-------------------------------------------------------------------------------------------
```

'2. DATE STATICE

'2.1. Date necesare manipularii DEM

```
SRTM90$=""
for d=65 to 90
files chr$(d)+":\",info$()
n=val(info$(0,0))
if n>0 then
 nf=val(info$(0,1))
 for i=1 to nf
 if instr(info$(n+i,0),"XSRTM-90")>0 then
  SRTM90$=chr$(d)+":"+info$(n+i,0)
 end if
 next
end if
next

global SRTM90$,arcc
global SRTM90disk$
'SRTM90disk$=left$(DefaultDir$,1)
'SRTM90$=SRTM90disk$+":\XSRTM-90"

global GTOPO30$,lelvUSGS
GTOPO30$=DefaultDir$+"\public\SRTM30"
lelvUSGS=1

global pi,pi2,kpi,arcc,arg,REarth,q13$,qb$,qbb$,qbh$
REarth=6378388
pi=3.14159265358979
pi2=pi/2
kpi=(2*pi)^1.5
arg=pi/180
arcc=0.008333333333333
qb$=chr$(13)
qbb$=chr$(13)+" "
qbh$="</br>"

'NOAA Globe tiles
dim tiles$(17)
tiles$(1)="xa10g 50 90 -180 -90 1 6098 10800 4800"
tiles$(2)="xb10g 50 90 -90 0 1 3940 10800 4800"
tiles$(3)="xc10g 50 90 0 90 1 4010 10800 4800"
tiles$(4)="xd10g 50 90 90 180 1 4588 10800 4800"
tiles$(5)="xe10g 0 50 -180 -90 1 5443 10800 6000"
tiles$(6)="xf10g 0 50 -90 0 1 6085 10800 6000"
tiles$(7)="xg10g 0 50 0 90 1 8752 10800 6000"
```

```
tiles$(8)="xh10g 0 50 90 180 1 7491 10800 6000"
tiles$(9)="xi10g -50 0 -180 -90 1 2732 10800 6000"
tiles$(10)="xj10g -50 0 -90 0 1 6798 10800 6000"
tiles$(11)="xk10g -50 0 0 90 1 5825 10800 6000"
tiles$(12)="xl10g -50 0 90 180 1 5179 10800 6000"
tiles$(13)="xm10g -90 -50 -180 -90 1 4009 10800 4800"
tiles$(14)="xn10g -90 -50 -90 0 1 4743 10800 4800"
tiles$(15)="xo10g -90 -50 0 90 1 4039 10800 4800"
tiles$(16)="xp10g -90 -50 90 180 1 4363 10800 4800"

'2.2. Date partiale necesare masinii de dispersie atmosferica

'Doury
dim timp(7)
dim Ah(2,7)
dim Kh(2,7)
dim Av(2,7)
dim Kv(2,7)

dim prel(7)
dim inv(7)

dim vDry(5)
dim aRain(5)
dim bRain(5)

dim z(1)
dim zm(1)

xyfile$=DefaultDir$+"\public\images\circle.txt"

if reso=1 then
 iub=136
 jub=136
else
 iub=68
 jub=68
end if
dim x(jub+1)
dim y(iub+1)
dim d(iub+1,jub+1)
dim dd(jub+1,iub+1)
dim dm(jub+1,iub+1)
dim gistmp$(jub+1,iub+1)
dim met$(1)

dim mix$(1)
```

```
dim dgn$(15)
dim dgl(15)
dim dgn$(15)
gosub [defaults]

lweb=0
```

3. INCEPE!..

```
[begin]
```

'3.1. Rezerva spatii structurate de date

```
redim x(jub+1)
redim y(iub+1)
redim d(iub+1,jub+1)
redim dd(jub+1,iub+1)
redim dm(136+1,136+1)
redim gistmp$(jub+1,iub+1)
redim met$(1)

redim mix$(1)

redim dgn$(15)
redim dgl(15)
redim dgn$(15)
gosub [defaults]
```

'3.2. Dateaza sesiunea de lucru; timekey$ se va regasi in toate fisierele-output de raportare

```
D$=date$("mm/dd/yyyy")
DD$=""
for j=1 to len(D$)
c$=mid$(D$,j,1)
if c$="/" then c$="-"
DD$=DD$+c$
next
T$=time$()
TT$=""
for j=1 to len(T$)
c$=mid$(T$,j,1)
if c$=":" then c$="-"
TT$=TT$+c$
next
timekey$=DD$+"_"+TT$
```

```
'3.3. Creaza fereastra principala si controalele

WindowWidth=DisplayWidth: WindowHeight=DisplayHeight-32
UpperLeftX=1: UpperLeftY=1

ly=DisplayHeight-88
ly=8*int(ly/8)              'to fit display resolutions that are not multiples of 8
lx=ly

mX=lx: mY=ly
graphicbox #win.back,0,0,WindowWidth-8,WindowHeight-8

button #win.l," < ",[rsz1],UL,lx+1,0,24,24
button #win.b,"RUN THE ADJUSTED INPUT",[getinput],UL,lx+25,0,DisplayWidth-lx-65,24
button #win.r," > ",[rsz2],UL,lx+25+DisplayWidth-lx-65,0,24,24

stylebits #win.pop,_BS_MULTILINE,0,0,0
s$="CLICK 'Start Serving', THE CLICK  H E R E  TO CONTINUE."+qb$
s$=s$+"ON EXITING THE PROGRAM, PLEASE CLOSE SERVER CONSOLE."
button #win.pop,s$,[gogo],UL,(WindowWidth-400)/2,WindowHeight-220,400,48

xMic=lx: yMic=25: wMic=WindowWidth-lx-16: hMic=ly-26
xMare=lx/4-50: yMare=25: wMare=WindowWidth-lx+3*lx/4+45-11: hMare=ly-26

texteditor #win.ee,xMic,yMic,wMic,hMic

menu #win,"FILES",_
 "NEW CASE", [newcase],_
 "RUN A CASE ON A FORECAST ON RECORD", [metsim],|,_
 "CASE VIEWERS", [viewers],_
 "Reset code", [resetcode],|,_
 "Clear meteo forecast record", [clearforecast],_
 "Clear case record", [clearrecord],|,_
 "Close",[exit]
menu #win,"ENGINES",_
 "THE SOURCE TERM MIX ENGINE", [stengine],_
 "THE PLUME RISE ENGINE" ,[plumerise],_
 "THE METEO ENGINE", [meteorology],_
 "THE MAP ENGINE", [geography]
menu #win,"TOOLS",_
 "Meteo forecast simulation", [foresim],|,_
 "Source terms on record", [sourceterms],_
 "Potential release sources", [npplist],|,_
 "Dispersion", [dispersion],_
 "Nuclides", [ndata],_
 "DEM Resources", [versions],|,_
 "Regulatory assumptions", [regula]
```

```
menu #win,"Help",_
 "N-WATCHDOG: An Introduction", [presentation],|,_
 "Source Term Mix Model essentials", [help1],_
 "Dispersion Model essentials", [help2],|,_
 "Selected readings", [readings],|,_
 "About this code", [About]

ForegroundColor$="darkblue"

if lwin=1 then lwin=0: close #win
open "THE FAR-FIELD WATCHDOG TRAINER: A Step-by-Step Tutorial" for window as #win     'Fereastra principala
oldbar$="THE FAR-FIELD WATCHDOG TRAINER: A Step-by-Step Tutorial"

#win "trapclose [exit]"          'Pentru a inchide sesiunea din bara ferestrei...
lwin=1

Wnd=HWND(#win)
Wndg=HWND(#win.back)

calldll #user32,"GetDC",Wndg as long,hDCg as long

calldll #gdi32,"SetBkMode",_
 hDCg as long,_
 _TRANSPARENT as long,_
 res as long

calldLL #user32, "GetMenu",Wnd as ulong, hMainMenu as ulong
calldll #user32, "GetSubMenu", hMainMenu as ulong, 4 as long, hMainEdit As ulong
calldll #user32, "RemoveMenu", hMainMenu as ulong, hMainEdit as ulong, _MF_BYCOMMAND as ulong, res as boolean
calldll #user32, "DrawMenuBar", Wnd as ulong, res as boolean

#win.back "down"
#win.ee "!font courier_new 8"
'#win.ee "!font courier_new 7"

#win.l "!hide": #win.b,"!hide": #win.r "!hide"    'Mascheaza (si dezabiliteaza) controlalele ce nu sunt imediat necesare la deschidere
#win.ee,"!hide"

for i=0 to iub          'Randuri si coloane ale gridului de date, in raport cu dimensiunile lx, ly ale graphicbox
y(i)=i*ly/iub
next
for j=0 to jub
x(j)=j*lx/jub
next


#win.pop "!hide"
```

```
gosub [sky0]          'Afiseaza Logo

wait


[sky0]                'Rutina de afisare Logo
cursor hourglass
loadbmp "logo",skyfile$

#win.back "cls; drawbmp logo 0 0"

hBM=HBMP("logo")
swide=BitmapWidth(hBM)
shigh=BitmapHeight(hBM)
if swide>WindowWidth-8 then swide=WindowWidth-8
if shigh>WindowHeight-8 then shigh=WindowHeight-8

dwide=WindowWidth-8
dhigh=WindowHeight-8

calldll #gdi32, "SetStretchBltMode",_
 hDCg As Long,_          'device context
 _COLORONCOLOR As Long,_ 'color reduction mode
 res As Long
calldll #gdi32, "StretchBlt",_
 hDCg As Long, 0 As Long, 0 As Long, dwide As Long, dhigh As Long,_  'destination
 hDCg As Long, 0 As Long, 0 As Long, swide As Long, shigh As Long,_  'data desired from source
 _SRCCOPY As Ulong,_                                 'dwRasterOperation
 res As Boolean

tit$=chr$(149)+" The Far-Field Trainer"
#win.back "color 0 0 220"
#win.back "font tahoma 28"
#win.back, "stringwidth? tit$ ltit"
#win.back "place ";dwide-ltit-60;" ";dhigh-90
#win.back "|"+tit$

if hBM<>0 then unloadbmp "logo"
calldll #gdi32,"DeleteDC",hBM as long, r as boolean
#win.back "getbmp logo 0 0 ";lx;" ";ly
#win.back "drawbmp logo 0 0;flush"
unloadbmp "logo"

cursor normal

return
```

```
[sky]          'Logo refresh, cand este necesar...
#win.back "cls; drawbmp imgsky 0 0; flush"

return


'4. Sectiunea de incheiere normala a sesiunii de lucru.
    Raspunde la 'trapclose' al ferestrei, sau la comanda 'Close' din menu.
    Inchide fisierele; lichideaza contextele-dispozitiv-in-memorie; si inchide fereastra principala.

[exit]
if lweb=1 then
 s$="Notice"+qb$
 s$=s$+"THE PROGRAM WILL NOW CLOSE."+qb$
 s$=s$+"PLEASE DO NOT FORGET TO CLOSE SERVER,"+qb$
 s$=s$+"BY CLICKING THE RED X BUTTON OF ITS CONSOLE."
 notice s$
end if

if lwin=1 then
 if lmap=1 then
  lmap=0
  unloadbmp "map"
 end if
 if wof=1 then    '.elv
  close #o
  wof=0
 end if
 if wf=1 then     'MyGLOBE
  close #glb
  wf=0
 end if
 lwin=0
 if wtss=1 then   'SRTM90
  close #9
  osstile$=""
  wtss=0
  ocol=-1
  olin=-1
 end if
 if wst=1 then    'SRTM30
  osftile$=""
  wst=0
  close #usgs
 end if
close #win
 lwin=0
```

```
end if
if wopt=1 then wopt=0: close #opt
'if lwin=1 then lwin=0: close #win
calldll #user32,"ReleaseDC",Wndg as long,hDCg as long,res as long

end
```

5. Sectiunea "NEW CASE",[newcase],_ ' (comanda Menu)

```
[newcase]
if lweb=0 then
 confirm "ARE YOU ONLINE?";answer$
 if answer$="no" then
  lweb=0
  s$="BEING OFFLINE RESTRICTS YOUR WORK TO"+qb$
  s$=s$+"METEO FORECASTS ALREADY ON CODE's RECORD."+qb$+qb$
  s$=s$+"WILL YOU AGREE?"
  confirm s$; answer$
  if answer$="no" then wait
  goto [metsim]
 else
  lweb=1
 end if
end if

[gogo]
#win.pop "!hide"
gosub [mare]          'Redimensioneaza controlul ' texteditor #win.ee'

lGo=0
#win.b,"!hide"
#win.ee "!cls"
#win.ee "!origin 1 0"
#win.ee "!hide"

 '5.1. Indica sursa emisiilor atmosferice
 '      lansand executabilul " "\!WATCHDOG-SA-MeteoWorks-short.exe""
 '      Rezultatul este livrat in fisierul "\PUBLIC\Z-Coords.txt".
 '      In cazul unei singure surse, coordonatele se culeg drept laSrc, LoSrc (grade zecimale);
 '      in cazul mai multor surse coordonatele se dau intr-un vector de perechi latitudine, longitudine .

if lweb=1 then
 'file$=DefaultDir$+"\XXX-Locator.exe"
 'file$=DefaultDir$+"\!SingleSite-LOCATOR-NPP.exe"
 file$=DefaultDir$+"\!!!N-WATCHDOG-X-Locator-SAW-direct.exe"
 SEEMASKNOCLOSEPROCESS = 64 '0x40
```

```
Struct s, cbSize as ulong, fMask as ulong, hwnd as ulong,_
lpVerb$ as ptr, lpFile$ as ptr, lpParameters$ as ptr ,_
lpDirectory$ as ptr, nShow as long, hInstApp as ulong,_
lpIDList as long, lpClass as long, hkeyClass as ulong,_
dwHotKey as ulong, hIcon as ulong, hProcess as ulong
s.cbSize.struct=len(s.struct)
s.fMask.struct=SEEMASKNOCLOSEPROCESS
s.hwnd.struct=0
s.lpVerb$.struct="Open"
s.lpFile$.struct=file$
s.lpParameters$.struct=""
s.lpDirectory$.struct=DefaultDir$
s.nShow.struct=_SW_RESTORE
calldll #shell32 , "ShellExecuteExA",s as struct,r as long
if r<>0 then
 hProcess=s.hProcess.struct
else
 print "Error."
 end
end if
waitResult=-1
while waitResult<>0
calldll #kernel32, "WaitForSingleObject",_
hProcess as long,0 as long,_
waitResult as long
wend

'5.2. Achizitioneaza prognoza meteorologica
'      lansand executabilul ” \!!!N-WATCHDOG-X-Locator-SAW-direct.exe"

for ii=1 to 1000000:  next   'respiro...

 file$=DefaultDir$+"\!WATCHDOG-SA-MeteoWorks-short.exe"
SEEMASKNOCLOSEPROCESS = 64 '0x40
Struct s, cbSize as ulong, fMask as ulong, hwnd as ulong,_
lpVerb$ as ptr, lpFile$ as ptr, lpParameters$ as ptr ,_
lpDirectory$ as ptr, nShow as long, hInstApp as ulong,_
lpIDList as long, lpClass as long, hkeyClass as ulong,_
dwHotKey as ulong, hIcon as ulong, hProcess as ulong
s.cbSize.struct=len(s.struct)
s.fMask.struct=SEEMASKNOCLOSEPROCESS
s.hwnd.struct=0
s.lpVerb$.struct="Open"
s.lpFile$.struct=file$
s.lpParameters$.struct=""
s.lpDirectory$.struct=DefaultDir$
s.nShow.struct=_SW_RESTORE
```

```
 calldll #shell32 , "ShellExecuteExA",s as struct,r as long
 if r<>0 then
  hProcess=s.hProcess.struct
 else
  print "Error."
  end
 end if
 waitResult=-1
 while waitResult<>0
 calldll #kernel32, "WaitForSingleObject",_
 hProcess as long,0 as long,_
 waitResult as long
 wend
else
 run "!WATCHDOG-SA-MeteoWorksX-FCT.tkn"
end if

'Culege prognoza achizitionata, din fisierul "\public\images\forecastbuffer.txt"

open DefaultDir$+"\public\images\forecastbuffer.txt" for input as #1
line input #1,wo$
close #1

'Daca userul a ales sa renunte la achizitia online, se apeleaza [metsim] (v. mai jos),
'care culege prognoze stocate in sectiunea 'Model' – in folderul "\PUBLIC\Forecasts".
'Alternativ, se reseteaza sesiunea.

if wo$="none" then
 s$="NO VALID FORECAST AVAILABLE."+qb$
 s$=s$+"- TO TRY AGAIN, CLICK 'Yes'."+qb$
 s$=s$+"- TO WORK ON AN OLDER AND EDITABLE FORECAST, CLICK 'No'."
 confirm s$; answer$
 if answer$="yes" then [newcase]
 if answer$="no" then [metsim]
 wait
end if

ForecastFile$=DefaultDir$+"\public\forecast\"+wo$    'Prognoza meteo de lucru, procesata...

'5.3. Deschide si citeste fisierul de prognoza meteo,
'       Identifica elementele de continut-input si le stocheaza in variabile adecvate.
'       Afiseaza prognoza meteo procesata in controlul ' texteditor #win.ee'.

[displaymet]
#win.ee " "
open ForecastFile$ for input as #1
```

```
while eof(#1)=0
line input #1,wo$
if instr(wo$,"TARGET SITE")>0 then
 site$=trim$(word$(wo$,2,":"))
end if
if instr(wo$,"Lat(dg)")>0 then
 laSrc=val(trim$(word$(wo$,2,":")))
end if
if instr(wo$,"Lon(dg)")>0 then
 LoSrc=val(trim$(word$(wo$,2,":")))
end if
if instr(wo$,"Info:")>0 then
 urlsite$=trim$(word$(wo$,2,":"))+":"+trim$(word$(wo$,3,":"))
 exit while
end if
wend
close #1

if urlsite$="" then urlsite$="none"

open ForecastFile$ for input as #1
tMon=0
while eof(#1)=0
line input #1,wo$
#win.ee " "+wo$
if instr(wo$,"|met")>0 then
 tMon=tMon+1
end if
wend
close #1

redim met$(tMon+1)

open ForecastFile$ for input as #1
j=0
while eof(#1)=0
line input #1,wo$
if instr(wo$,"|met")>0 then
 j=j+1
 met$(j)=trim$(wo$)
end if
wend
close #1

#win.ee " "
open DefaultDir$+"\public\data\doury-short.txt" for input as #1
while eof(#1)=0
```

```
line input #1,wo$
#win.ee wo$
wend
close #1

'npuffs=tMon   '10   '60
tau=360   's
tRel=1    'hrs, minimum tau!
npuffsX=tRel*3600/tau
if tMon>=8 then
 Clim=val("1.0e-13")+(val("1.0e-11")-val("1.0e-13"))*(tMon-8)/(72-8)
else
 Clim=val("1.0e-13")
end if

H=30
hRise=0
lAssessment=1
lRGrd=1
lRInv=1

#win.ee " "
#win.ee " MATERIAL DATA"
#win.ee " _____"
#win.ee " "
#win.ee " Carrier type    Vdry      aRain       bRain"
#win.ee " ------------------------------------------------"
#win.ee " Aerosol          0.0010   0.0000800   0.8   "
#win.ee " I2                0.0100   0.0000800   0.6   "
#win.ee " CH3I              0.0005   0.0000008   0.6   "
#win.ee " Noble-gases   0.0000   0.0000000  0.0   "
#win.ee " "
#win.ee " Iodine form (1-I2, 2-CH3I): 1"
#win.ee " "
#win.ee " WORKING ASSUMPTIONS"
#win.ee " _____"
#win.ee " "
#win.ee " Adjust defaults as deemed appropriate,"


#win.ee " this including the dispersion coefficients"
#win.ee " _____"
#win.ee " "
#win.ee " Release duration ("+str$(tau/3600)+" to "+str$(tMon)+" hrs): "+str$(tRel)
'#win.ee " "
#win.ee " Release height (mAG): "+str$(H)
#win.ee " Puff rise (m): "+str$(hRise)
```

```
'#win.ee " Puff timing (s): "+str$(tau)
'#win.ee " Minimum accountable dilution (s/m3): "+str$(Clim)
#win.ee " "
#win.ee " Ground reflection fraction (0-1): "+str$(lRGrd)
#win.ee " Inversion lid reflection fraction (0-1): "+str$(lRInv)
#win.ee " "
#win.ee " Grid resolution: "+str$(reso)
#win.ee " "
#win.ee " ASSESSMENT MODE: "+str$(lAssessment)
#win.ee " 0 - Vulnerability based on DILUTION FACTOR (s/m3) only."
#win.ee " 1 - Vulnerability on Source Terms and DOSES (mSv)."
#win.ee " "

lhow=1
lPal=1
#win.ee " MAPPING PREFERENCES"
#win.ee " _____"
#win.ee " "
#win.ee " Topography details (1-best, 2-summary): "+str$(lhow)
#win.ee " Palette (1-full color, 2-greyscale): "+str$(lPal)

#win.ee "!show"
#win.l "!show": #win.b,"!show": #win.r "!show"

[grab]
InputFile$=DefaultDir$+"\public\archive-puffs\"+site$+"_"+timekey$+".ipf"
fspots$=left$(InputFile$,len(InputFile$)-4)+"-spots.txt"

#win.ee "!contents? s$"
open InputFile$ for output as #1
print #1,s$
close #1
s$=""

wait

[metsim]                    'Rutina adresata pentru culegerea de prognoze meteo stocate, din "\PUBLIC\Forecasts"
filedialog "Open a met forecast on record",DefaultDir$+"\public\forecast\*.txt", ForecastFile$
if ForecastFile$="" then wait

gosub [mare]
goto [displaymet]

wait


'5.4. Colectare de continut-input de la interfata.
```

```
'      La comanda controlului button #win.b,"RUN THE ADJUSTED INPUT",[getinput],...
'      culege continutul-input augmentat si procesat, direct din controlul " texteditor #win.ee'

[getinput]

'Culege inputul sursa; meteo; date de emisie.

redim timp(7)
redim Ah(2,7)
redim Kh(2,7)
redim Av(2,7)
redim Kv(2,7)
redim prel(7)
redim inv(7)

#win.ee "!origin 1 0"
#win.ee "!lines nols"
for j=1 to nols
#win.ee "!line "+str$(j): input #win.ee,wo$
wo$=trim$(wo$)
gosub [Doury1]
next

#win.ee "!origin 1 0"
for j=1 to nols
#win.ee "!line "+str$(j): input #win.ee,wo$
wo$=trim$(wo$)
if instr(wo$,"Release duration")>0 then
 tRel=val(trim$(word$(wo$,2,":")))
end if
if instr(wo$,"Release height")>0 then
 hRel=val(trim$(word$(wo$,2,":")))
end if
if instr(wo$,"Puff rise")>0 then
 hRise=val(trim$(word$(wo$,2,":")))
end if
if instr(wo$,"Ground reflection fraction")>0 then
 lRGrd=val(trim$(word$(wo$,2,":")))
end if
if instr(wo$,"Inversion lid reflection fraction")>0 then
 lRInv=val(trim$(word$(wo$,2,":")))
end if

if instr(wo$,"ASSESSMENT MODE")>0 then
 lAssessment=val(trim$(word$(wo$,2,":")))
end if
if instr(wo$,"Iodine form")>0 then
```

```
 iForm=val(trim$(word$(wo$,2,":")))
end if

if instr(wo$,"Topography")>0 then
 lhow=val(trim$(word$(wo$,2,":")))
end if
if instr(wo$,"Palette")>0 then
 lPal=val(trim$(word$(wo$,2,":")))
end if

next

if lhow<1 then lhow=1
if lhow>2 then lhow=2
if lPal<1 then lPal=1
if lPal>2 then lPal=2
open DefaultDir$+"\public\Mapping.txt" for output as #m
print #m,str$(lhow)
print #m,str$(lPal)
close #m

if tRel*3600<tau then
 s$="Notice"+chr$(13)
 s$=s$+"RELEASE DURATION CANNOT BE SHORTER"+chr$(13)
 s$=s$+"THAN "+str$(tau/3600)+chr$(13)
 s$=s$+"PLEASE RECONSIDER."
 notice s$
 wait
end if

#win.ee "!origin 1 0"
for j=1 to nols
#win.ee "!line "+str$(j): input #win.ee,wo$
wo$=trim$(wo$)
 if instr(wo$,"Aerosol")>0 then
  vDry(1)=val(trim$(word$(wo$,2)))
 aRain(1)=val(trim$(word$(wo$,3)))
 bRain(1)=val(trim$(word$(wo$,4)))
 end if
 if instr(wo$,"I2")>0 then
  vDry(2)=val(trim$(word$(wo$,2)))
  aRain(2)=val(trim$(word$(wo$,3)))
  bRain(2)=val(trim$(word$(wo$,4)))
 end if
 if instr(wo$,"CH3I")>0 then
  vDry(3)=val(trim$(word$(wo$,2)))
  aRain(3)=val(trim$(word$(wo$,3)))
```

```
  bRain(3)=val(trim$(word$(wo$,4)))
 end if
 if instr(wo$,"Noble")>0 then
  vDry(4)=val(trim$(word$(wo$,2)))
  aRain(4)=val(trim$(word$(wo$,3)))
  bRain(4)=val(trim$(word$(wo$,4)))
 end if
next

'maxG=int((-1)*log(Clim)/log(10))

npuffsX=int(tRel*3600/tau)
if tMon>=8 then
 Clim=val("1.0e-13")+(val("1.0e-11")-val("1.0e-13"))*(tMon-8)/(72-8)
else
 Clim=val("1.0e-13")
end if
'npuffsX=tRel*3600/tau
maxG=int((-1)*log(Clim)/log(10))

tSpan=tMon*3600        's

'hRel=H

#win.ee "!contents? ss$"
ss$=trim$(ss$)
Section1$=ss$

'Augmenteaza continutul-input:
'Apeleaza un termen-sursa considerat reprezentativ pentru cazul analizat.
'Scaleaza batch-style termenul-sursa (de)multiplicand activitatile nuclizilor implicati ('expert judgement');
'Proceseaza culegand input.
'Afiseaza.

filedialog "Open a Source Term Mix",DefaultDir$+"\public\mix\*.mix",MixFile$

if MixFile$="" then
 msg$="Notice"+qb$
 msg$=msg$+"A DOSE-ASSESSMENT REQUIRES A SOURCE TERM."+qb$
 msg$=msg$+"PROGRAM WILL RESTART."
 notice msg$
 goto [begin]
end if

#win.ee "!cls"
#win.ee "!origin 1 0"
#win.ee " "
```

```
nukes=0
kCi=1
open MixFile$ for input as #1
while eof(#1)=0
line input #1,wo$
#win.ee " "+wo$
if instr(wo$,"(Ci)")>0 then
 kCi=37000000
end if
if instr(wo$,"|sur")>0 then
 nukes=nukes+1
end if
wend
close #1
#win.ee "!origin 1 0"

redim mix$(nukes+1)

'#win.ee "!locate "+str$(xMare)+" "+str$(yMare)+" "+str$(wMare)+" "+str$(hMare)
'#win "refresh"
gosub [mare]

multFactor=1.0: multFactor$=str$(multFactor)
prompt "Scale the release"+chr$(13)+"MULTIPLICATION FACTOR:";multFactor$
multFactor=val(multFactor$)
if multFactor<=0 then multFactor=1

#win.ee "!cls"
#win.ee "!origin 1 0"
#win.ee " "
#win.ee " "+ss$
#win.ee " "
open MixFile$ for input as #1
jnuke=0
while eof(#1)=0
line input #1,wo$
if instr(wo$,"|sur")=0 then
 #win.ee " "+wo$
else
 wo1$=trim$(word$(wo$,1))+space$(20): wo1$=left$(wo1$,13)
 wo2$=trim$(word$(wo$,2))+space$(40)
  wo2$=str$(val(wo2$)*multFactor)+space$(80)
  wo2$=left$(wo2$,20)
 wo3$=""
 for j=3 to 10
 wo3$=wo3$+trim$(word$(wo$,j))+space$(20): wo3$=left$(wo3$,(j-2)*10)
 next
```

```
 woo$=wo1$+wo2$+wo3$
 #win.ee " "+woo$
 jnuke=jnuke+1
 mix$(jnuke)=woo$
 'print mix$(jnuke)
end if
wend
close #1

#win.ee "!origin 1 0"

#win.b,"!disable"                    'Dezabiliteaza controlul #win.b,"RUN THE ADJUSTED INPUT", care nu mai este necesar, deocamdata.

#win.ee "!contents? Section1$"     'Salveaza intregul continut-input al controlului 'texteditor #win.ee', in variabila  Section1$


'6. Calibreaza harta de situatie in raport cu extinderea asteptata a ariei efectiv expuse
'    in conditiile inputului dat.
'    Rezultatul este dat in variabilele Raza, respectiv Raza$, ca numar (float) si string.

[gauge]
gosub [mic]

cursor hourglass

bar$=oldbar$+". Computing Area Covered..."
calldll #user32,"SetWindowTextA",Wnd as long,bar$ as ptr,res as long

Raza=0: rPuffMax=0
for p=1 to npuffsX
laA=laSrc: LoA=LoSrc

da=0
for t=(p-1)*tau to tSpan step tau   'tSpan step tau

dispuff=0
age=t-(p-1)*tau         's
if age>0 then
 imet=int(t/3600)
 if imet<1 then imet=1
 if imet>tMon then imet=tMon
 wo$=met$(imet)
 wspd0=val(trim$(word$(wo$,2)))
 wdr=val(trim$(word$(wo$,3)))
 class=asc(trim$(word$(wo$,5)))-64
 iRain=val(trim$(word$(wo$,6)))
```

```
 prel=prel(class)
 hInv=hInv(class)
 wsp=wspd0*(hRel/10)^prel
 dispuff=dispuff+wsp*tau
 if dispuff<10*hRise then
  h=hRel+hRise*(dispuff/(10*hRise))^(2/3)
  hEff=h
 else
  h=hRel+hRise
  hEff=h
 end if
 if hEff>hInv then hEff=hInv

gosub [sigmas]         'sigmay, sigmaz
lnarg=tau*(1+lRGrd)*(Expo((-1)*hEff*hEff/(2*sigmaz*sigmaz))+lRInv*(Expo((-1)*(0-hEff-2*hInv)*(0-hEff-2*hInv)/(2*sigmaz*sigmaz)) + Expo((-1)*(0+hEff-2*hInv)*(0+hEff-2*hInv)/(2*sigmaz*sigmaz))
       + Expo((-1)*(0-hEff+2*hInv)*(0-hEff+2*hInv)/(2*sigmaz*sigmaz)) + Expo((-1)*(0+hEff+2*hInv)*(0+hEff+2*hInv)/(2*sigmaz*sigmaz)))/(kpi*sigmay*sigmay*sigmaz*Clim))
 if lnarg>=1 then
  rPuff=int(sigmay*sqr(2*log(lnarg)))
  if rPuff>rPuffMax then rPuffMax=rPuff
 else
  rPuff=0
 end if
 if rPuff>rPuffMax then rPuffMax=rPuff
 if rPuff>0 then
  da=1
  laLoB$=TrailC$(wsp*tau,laA,LoA,wdr+180)
  laB=val(trim$(word$(laLoB$,1,",")))  'la
  LoB=val(trim$(word$(laLoB$,2,",")))  'Lo
  gosub [RangeSrc]
  if disX>Raza then Raza=disX
  laA=laB: LoA=LoB
 else
  exit for
 end if
end if
next

if da=0 then exit for
next

calldll #user32,"SetWindowTextA",Wnd as long,oldbar$ as ptr,res as long

Raza=int(Raza+rPuffMax+0.5)
Raza$=str$(Raza)
```

'7. Harta topografica de situatie:

```
'7.1. Seteaza harta
'       - centrul la sursa;
'       - bounding box (NWla,NWLo), (SEla,SELo) conform rezultatului calibrarii ('Raza').
'    Precautii tinand de limitarile in latitudine, in vecinatatea Polilor, a resurselor DEM.

RazMin=5000   '20000

LatLim=85
if laSrc>=0 then
 RangeLa=int((LatLim-laSrc)*arg*REarth)   'm
else
 RangeLa=int((LatLim+laSrc)*arg*REarth)   'm
end if
LonLim=180
if LoSrc>=0 then
 RangeLo=int((LonLim-LoSrc)*arg*REarth*cos(laSrc*arg))   'm
else
 RangeLo=int((LonLim+LoSrc)*arg*REarth*cos(laSrc*arg))   'm
end if
RazMax=RangeLa  'South Hemisphere on MyGLOBE only

prompt "MAX CIRCULAR AREA COVERED"+qb$+"RADIUS("+str$(RazMin)+"-"+str$(RazMax)+ " m): ";Raza$
if Raza$="" then wait
Raza=val(Raza$)

if Raza<RazMin then
 Raza=RazMin
 notice "RADIUS SET AT A MINIMUM OF "+str$(RazMin)+" m."
end if

if Raza>RazMax then
 Raza=RazMax
 notice "RADIUS SET AT A MAXIMUM OF "+str$(RazMax)+" m."
end if

Dia=2*Raza
NWla=laSrc+Raza/(arg*REarth)
SEla=laSrc-Raza/(arg*REarth)
NWLo=LoSrc-Raza/(arg*REarth*cos(laSrc*arg)): NWLo=LON(NWLo)
SELo=LoSrc+Raza/(arg*REarth*cos(laSrc*arg)): SELo=LON(SELo)
LatWidth=NWla-SEla
LonWidth=SELo-NWLo
if LonWidth<0 then LonWidth=LonWidth+360

'if laSrc<0 then lGold=0
if NWla>60 then lGold=1
```

```
datfile$=left$(InputFile$,len(InputFile$)-4)+".dat"
open datfile$ for output as #1
print #1,str$(NWla)
print #1,str$(SEla)
print #1,str$(NWLo)
print #1,str$(SELo)
close #1

pasla=LatWidth/iub
pasLo=LonWidth/jub
pasX=lx/jub
pasY=ly/iub

jSrc=int((LoSrc-NWLo)/pasLo)
iSrc=int((NWla-laSrc)/pasla)
crLo=0    'LoSrc-(NWLo+jSrc*pasLo)
crla=0    'laSrc-(NWla-iSrc*pasla)

#win.b,"!show"
#win.ee,"!show"

'7.2. Executa si stocheaza  harta topografica de situatie, in expresie numerica – fisier .bmp.
'       A se vedea in continuare 7.2.1. in sectiunea 'RUTINE ESENTIALE'

gosub [map]


'8. Calculele de traiectorie a secventei de pufuri (Puff trail)
'    si de dispersie a pufurilor.

cursor hourglass

'8.1. Calculul traiectoriei si Factorului de Dilutie, DF (s/m3)
'      - in centrul pufurilor; si
'      - pe gridul geografic al hartii zonei de influenta a emisiei.

for p=1 to npuffsX

bar$=oldbar$+". Puff #"+str$(p)+" of "+str$(npuffsX)+"."
calldll #user32,"SetWindowTextA",Wnd as long,bar$ as ptr,res as long

laA=laSrc: LoA=LoSrc

da=0
for t=(p-1)*tau to tSpan-(p-1)*tau step tau   'tSpan step tau

dispuff=0
```

```
age=t-(p-1)*tau         's
if age>0 then
 imet=int(t/3600)
 if imet<1 then imet=1
 if imet>tMon then imet=tMon
 wo$=met$(imet)
 wspd0=val(trim$(word$(wo$,2)))
 wdr=val(trim$(word$(wo$,3)))
 class=asc(trim$(word$(wo$,5)))-64
 iRain=val(trim$(word$(wo$,6)))

  prel=prel(class)
  hInv=hInv(class)
  wsp=wspd0*(hRel/10)^prel
  dispuff=dispuff+wsp*tau
  if dispuff<10*hRise then
   h=hRel+hRise*(dispuff/(10*hRise))^(2/3)
   hEff=h
  else
   h=hRel+hRise
   hEff=h
  end if
  if hEff>hInv then hEff=hInv

 gosub [sigmas]         'sigmay, sigmaz

lnarg=tau*(1+lRGrd)*(Expo((-1)*hEff*hEff/(2*sigmaz*sigmaz))+lRInv*(Expo((-1)*(0-hEff-2*hInv)*(0-hEff-2*hInv)/(2*sigmaz*sigmaz)) + Expo((-1)*(0+hEff-2*hInv)*(0+hEff-2*hInv)/(2*sigmaz*sigmaz))
        + Expo((-1)*(0-hEff+2*hInv)*(0-hEff+2*hInv)/(2*sigmaz*sigmaz)) + Expo((-1)*(0+hEff+2*hInv)*(0+hEff+2*hInv)/(2*sigmaz*sigmaz)))/(kpi*sigmay*sigmay*sigmaz*Clim))
 if lnarg>=1 then
  rPuff=sigmay*sqr(2*log(lnarg))
 else
  rPuff=0
 end if
 if rPuff>0 then

 vDry0=vDry(1)   'aerosols, Cs...
 nT=10
 w=age/nT
 Idry=0
 for ka=1 to nT
 x1=(ka-1)*w: tageBIS=x1:gosub [sigmasBIS]:sigma1=sigmazBIS: y1=Expo((-1)*hEff*hEff/(2*sigma1*sigma1))/sigma1
 x2=ka*w: tageBIS=x2:gosub [sigmasBIS]:sigma2=sigmazBIS: y2=Expo((-1)*hEff*hEff/(2*sigma2*sigma2))/sigma2
 Idry=Idry+w*(y1+y2)/2
 next
 Fdry0=Expo((-1)*vDry0*Idry)

 HalflifeDCs=1.01e4   'd
```

```
lambdaD0=0.69315/HalflifeDCs
Fdecay0=Expo((-1)*tageD*lambdaD0)

tRain=3600      's
aRain0=aRain(1) '1/s
bRain0=bRain(1)
Lrain0=aRain0*(iRain^bRain0)
Fwet0=Expo((-1)*Lrain0*tRain)   's, rain time
vWet0=sqr(pi/2)*Lrain0*sigmaz*Expo(hEff*hEff/(2*sigmaz*sigmaz))

vTot=vDry0+vWet0

DF=DF0*Fdecay0*Fwet0*Fdry0          'Factorul de Dilutie in centrul pufului,
                                      'corectat pentru efectele de saracire (depletion) prin dezintegrare radioactiva, depunere uscata si depunere umeda.
                                      ' Primul factor, DF0 este Raw Dilution Factor – fara corectii, calculat de rutina [sigmas] (v. mai sus, pe pagina).

jc=int((LoA-NWLo)/pasLo)
ic=int((NWla-laA)/pasla)

gosub [grid]                        'Pornind de la DF in centrul pufului – calculul Factorului de Dilutie in nodurile gridului geografic.
                                      'A se vedea in continuare 8.1.1.

r=255-int(255*imet/tMon): g=0: b=int(255*imet/tMon)

 da=1
 laLoB$=TrailC$(wsp*tau,laA,LoA,wdr+180)
 laB=val(trim$(word$(laLoB$,1,",")))  'la
 LoB=val(trim$(word$(laLoB$,2,",")))  'Lo
 laA=laB: LoA=LoB
else
 exit for
end if

end if
next
if da=0 then exit for
scan

next

'8.2. Crearea fisierului 'all-output' – elementul 'Model' (input de date) pentru un viewer local si viewerul shared al sistemului.
'      A se vedea in continuare 8.2.1.

      gosub [MakeSpots]

'9.   Afisarea rezultatelor evaluarii.
'     Transfer temporar al controlului la Viewerul local de caz, "!N-WATCHDOG_OUTPUT-VIEWER.exe",
```

```
'     rulat in Windows Shell.
'     ------------------------------------------------------------------------------------------------------------------------
'     Optiunile Viewer:
'     a) Harti interactive de situatie:
'        - Harta topografica de baza;
'        - Harti web
'             2-D:  Google Maps (Map, Hybrid);
'             3-D: GoogleearthPlugin
'    b) Sinopticul textual I/O al cazului.
'    c) Raportul de Situatie web-publishable (SitRep)
'    d) Matricea de Vulnerabilitate a cazului.

folder$="archive-puffs"
folderName$="Far Field Trainer"
open DefaultDir$+"\public\OutputViewerData.txt" for output as #1
print #1, folder$
print #1, folderName$
print #1, SeparateFile$(fspots$)
close #1
file$="!N-WATCHDOG_OUTPUT-VIEWER.exe"
 SEEMASKNOCLOSEPROCESS = 64 '0x40
 Struct s, cbSize as ulong, fMask as ulong, hwnd as ulong,_
 lpVerb$ as ptr, lpFile$ as ptr, lpParameters$ as ptr ,_
 lpDirectory$ as ptr, nShow as long, hInstApp as ulong,_
 lpIDList as long, lpClass as long, hkeyClass as ulong,_
 dwHotKey as ulong, hIcon as ulong, hProcess as ulong
 s.cbSize.struct=len(s.struct)
 s.fMask.struct=SEEMASKNOCLOSEPROCESS
 s.hwnd.struct=0
 s.lpVerb$.struct="Open"
 s.lpFile$.struct=file$
 s.lpParameters$.struct=""
 s.lpDirectory$.struct=DefaultDir$
 s.nShow.struct=_SW_RESTORE
 calldll #shell32 , "ShellExecuteExA",s as struct,r as long
 if r<>0 then
  hProcess=s.hProcess.struct
 else
  print "Error."
  end
 end if
 waitResult=-1
 while waitResult<>0
 calldll #kernel32, "WaitForSingleObject",_
 hProcess as long,0 as long,_
 waitResult as long
 wend
```

```
s$="Notice"+qb$
s$=s$+"THIS CONCLUDES THE SESSION."+qb$
s$=s$+"NEXT, COLAPSE/EXPAND THE TEXT,"+qb$
s$=s$+"AND CLICK LEFT THE MAP, FOR INFORMATION."+qb$
s$=s$+"WHEN READY, RESET CODE FROM MENU"+qb$
s$=s$+"AND TRY VARIOUS MENU OPTIONS."
notice s$

#win.l,"!enable"
#win.r,"!enable"

wait                    'Main session ends here ------------------------------------------------------------

'_____________________________________________________________________________________________________________


' RUTINE ESENTIALE
' ________________

'7.2.1. 'Rutina de creare a gridului de elevatii al hartii topografice de situatie (N-WATCHDOG Basic Map).
'         Interpoleaza datele DEM ('Model') la nivelul nodurilor de retea,
'         creand fisierul elvfile$ = left$(InputFile$,len(InputFile$)-4)+".elv", derivat din
'         InputFile$ = DefaultDir$+"\public\archive-puffs\"+site$+"_"+timekey$+".ipf"
[map]
#win.l,"!disable"
#win.r,"!disable"

lOK=0

redim dm(jub+1,iub+1)

zMin=19999: zMax=-19999

nXE=21601: nYE=10801

 osstile$=""   'SRTM90
 wtss=0
 ocol=-1
 olin=-1
 osftile$=""   'SRTM30
 wst=0

 oftile$=""    'MyGLOBE
 wf=0

elvfile$=left$(InputFile$,len(InputFile$)-4)+".elv"
```

```
open elvfile$ for output as #o
wof=1

oproc=-1

for i=0 to iub step 1   'iub
for j=0 to jub          'jub
la=NWla-i*pasla
Lo=LON(NWLo+j*pasLo)

if lGold=0 then
 gosub [GLOBEsub]                    'a se vedea sectiunea ALTE RUTINE DE CALCUL
 z=zz
end if

if lGold=1 then gosub [SRTM30]    'a se vedea sectiunea ALTE RUTINE DE CALCUL

if lGold=2 then gosub [SRTM90]    'a se vedea sectiunea ALTE RUTINE DE CALCUL

dm(j,i)=z

if z<zMin then zMin=z
if z>zMax then zMax=z

wo$=str$(j)+" "+str$(i)+" "+str$(z)+" "+str$(Lo)+" "+str$(la)
print #o,wo$

next

proc=int(100*i/iub)
if proc>oproc then
 bar$=oldbar$+". "+source$
 proc$=bar$+": "+string$(proc,".")+" "+str$(proc)+"%"
 calldll #user32,"SetWindowTextA",Wnd as long,proc$ as ptr,res as long
end if
scan

next

'close files and clear vars behind...
if wf=1 then
 close #glb
 oftile$=""
 wf=0
end if
if wst=1 then
 close #usgs
```

```
 osftile$=""
 wst=0
end if
if wtss=1 then
 close #9
 osstile$=""
 ocol=-1
 olin=-1
 wtss=0
end if

close #o
wof=0

bar$=oldbar$+". "+source$
calldll #user32,"SetWindowTextA",Wnd as long,bar$ as ptr,res as long
cursor normal

return

'8.1.1. Rutina de calcul al distributiei datelor radiologice pe gridul geografic,
'         pornind de la centrul fiecarui puff.

[grid]
for ii=ic to 0 step -1
la=laB+abs(ii-ic)*pasla

for jj=jc to 0 step -1
Lo=LoB-abs(jj-jc)*pasLo
      gosub [Range]         'a se vedea sectiunea "ALTE RUTINE DE CALCUL "
if dis<=rPuff then
 j=jj
 i=ii
 if j>0 and j<jub and i>0 and i<iub then
  d(j,i)=d(j,i)+DF*Expo((-1)*dis*dis/(2*sigmay*sigmay))
 else
  exit for
 end if
else
 exit for
end if
next

for jj=jc+1 to jub step 1
Lo=LoB+abs(jj-jc)*pasLo
      gosub [Range]         'a se vedea sectiunea "ALTE RUTINE DE CALCUL "
```

```
if dis<=rPuff then
 j=jj
 i=ii

if j>0 and j<jub and i>0 and i<iub then
  d(j,i)=d(j,i)+DF*Expo((-1)*dis*dis/(2*sigmay*sigmay))
 else
  exit for
 end if
else
 exit for
end if
next

next

for ii=ic to iub step 1
la=laB+abs(ii-ic)*pasla

for jj=jc to 0 step -1
Lo=LoB-abs(jj-jc)*pasLo
       gosub [Range]          'a se vedea sectiunea "ALTE RUTINE DE CALCUL "
if dis<=rPuff then
 j=jj
 i=ii
 if j>0 and j<jub and i>0 and i<iub then
  d(j,i)=d(j,i)+DF*Expo((-1)*dis*dis/(2*sigmay*sigmay))
 else
  exit for
 end if
else
 exit for
end if
next

for jj=jc+1 to jub step 1
Lo=LoB+abs(jj-jc)*pasLo
       gosub [Range]         'a se vedea sectiunea "ALTE RUTINE DE CALCUL "
if dis<=rPuff then
 j=jj
 i=ii
 if j>0 and j<jub and i>0 and i<iub then
  d(j,i)=d(j,i)+DF*Expo((-1)*dis*dis/(2*sigmay*sigmay))
 else
  exit for
 end if
```

```
else
 exit for
end if
next

next

return

'8.2.1. Rutina de crearea a fisierului 'all-output' fspots$ si dependentele ei.
'       fspots$ constituie materia prima ('Model') pentru controlerele viewerelor - executabilele local si all-platform-shared de afisare output.
'       Prin parsing de text, Viewerele extrag informatia proprie hartilor (basic topographic, GoogleMaps, GoogleEarthPlugin); informatia textuala;
'       informatia necesara construirii Matricilor de Vulnerabilitate si Rapoartelor de Situatie (SitReps), din fisierul 'all-output'.
'       In acest exemplu, InputFile$ = DefaultDir$+"\public\archive-puffs\"+site$+"_"+[timekey$]+".ipf"
'                         fspots$ = left$(InputFile$,len(InputFile$)-4)+"-spots.txt"

[MakeSpots]
open fspots$ for output as #o

for ix = jub - 1 to 0 step -1
for iy = 0 to iub - 1 step 1
dil=d(ix,iy)
if dil>0 then
 Lo=NWLo+LonWidth*ix/jub
 la=NWla-LatWidth*iy/iub

gosub [info]                    'Dependenta a [MakeSpots]; a se vedea in continuare

 for k=0 to ncp-1
 if dd(ix,iy)>=z(k) and dd(ix,iy)<z(k+1) then
  ico=int(dd(ix,iy))
  if ico<0 then ico=0
  if ico>8 then ico=8
  exit for
 end if
 next
 wos$=str$(Lo)+","+str$(la)+"|"+gistmp$(ix,iy)+pnt0$+"|"+str$(ico)+"|"+str$(ix)+","+str$(iy)  'already corrected
  print #o,wos$
 if iy=iSrc and ix=jSrc then
  print #o,wos$
 end if
end if
next
next

IOFile$=DefaultDir$+"\public\images\IOFile.txt"
open IOFile$ for output as #1
```

```
#win.ee "!lines nols"
for j=1 to nols
#win.ee "!line "+str$(j): input #win.ee,wo$
ibar=instr(wo$,"|")
if ibar>0 then
 wo$=left$(wo$,ibar-1)
end if
wo$=wo$+space$(250)
wo$=left$(wo$,110)+"`gis"
print #1,wo$
print #o,wo$
next
close #1

close #o

cursor normal

return

[info]
if lAssessment=1 then
Ha=0: CEDE=0: Thy=0: Bone=0: Lung=0: Hg1=0: Hg2=0
TABD=0: TALD=0: TTHD=0: TEDE=0
for jk=1 to nukes
 wk$=mix$(jk)
 nuke$=trim$(word$(wk$,1))
 activity=kCi*val(trim$(word$(wk$,2)))/npuffsX 'kBq
 halfLd=val(trim$(word$(wk$,3)))       'd
 dcfCEDE=val(trim$(word$(wk$,4)))      '(mSv/h)/(kBq/m3)
 dcfBone=val(trim$(word$(wk$,5)))      '(mSv/h)/(kBq/m3)
 dcfLung=val(trim$(word$(wk$,6)))      '(mSv/h)/(kBq/m3)
 dcfThy=val(trim$(word$(wk$,7)))       '(mSv/h)/(kBq/m3)
 dcfHg=val(trim$(word$(wk$,8)))        '(mSv/h)/(kBq/m2)
 dcfHa=val(trim$(word$(wk$,9)))        '(mSv/h)/(kBq/m3)

 halfH=halfLd*24                 'd.(h/d) = h
 lambdaH=0.6935/halfH            '1/h
 lambdaD=0.6935/halfLd
   vDry=0.001                    'm/s
   aRain=8.0e-5                  '1/s
   bRain=0.8                     '1
   select case
    case instr(nuke$,"I-")>0
     if iForm=1 then
      vDry=0.01
      aRain=8.0e-5
```

```
      bRain=0.6
     end if
     if iForm>1 then
      vDry=0.0005
      aRain=8.0e-7
      bRain=0.6
     end if
    case instr(nuke$,"Kr-")>0
     vDry=0.0
     aRain=0.0
     bRain=0.0
    case instr(nuke$,"Xe-")>0
     vDry=0.0
     aRain=0.0
     bRain=0.0
    case else
     vDry=0.001
     aRain=8.0e-5
     bRain=0.8
  end select

Fdecay=Fdecay0^(vDry/vDry0)

Fdry=Fdry0^(vDry/vDry0)

if iRain>0 then
 Lrain=aRain*(iRain^bRain)
 Fwet=Fwet0^(Lrain/Lrain0)
 vWet=vWet0*Lrain/Lrain0
else
 Fwet=1
 vWet=0
end if

vTot=vDry+vWet

DF=dil*Fdecay*Fwet*Fdry

vTotH=vTot*3600              '(m/s).(s/h) = m/h
DFh=dil/3600                 '(s/m3)/(s/h) = h/m3

Ha=Ha+activity*DFh*dcfHa                  'kBq.(h/m3).(mSv/h)/(kBq/m3) = mSv
CEDE=CEDE+activity*DFh*dcfCEDE            'kBq.(h/m3).(mSv/h)/(kBq/m3) = mSv
Thy=Thy+activity*DFh*dcfThy               'kBq.(h/m3).(mSv/h)/(kBq/m3) = mSv
Bone=Bone+activity*DFh*dcfBone            'kBq.(h/m3).(mSv/h)/(kBq/m3) = mSv
Lung=Lung+activity*DFh*dcfLung            'kBq.(h/m3).(mSv/h)/(kBq/m3) = mSv
```

```
 Hg1=Hg1+activity*vTotH*DFh*dcfHg*(1-Expo((-1)*lambdaH*2))/lambdaH      'kBq.(m/h).(h/m3).(mSv/h)/(kBq/m2)/(1/h) = mSv
 Hg2=Hg2+activity*vTotH*DFh*dcfHg*(1-Expo((-1)*lambdaH*7))/lambdaH      'kBq.(m/h).(h/m3).(mSv/h)/(kBq/m2)/(1/h) = mSv
next jk

TABD=Ha+Hg1+Bone  'mSv
TALD=Ha+Hg1+Lung  'mSv
TTHD=Ha+Hg1+Thy   'mSv
TEDE=Ha+Hg2+CEDE  'mSv
end if

pnt0$="DILUTION(s/m3): "+str$(dil)+qbh$
if lAssessment=1 then
 pnt0$=pnt0$+"DOSES (equivalent, mSv)"+qbh$
 pnt0$=pnt0$+"- Air submersion: "+trim$(using("################.####",Ha))+qbh$
 pnt0$=pnt0$+"- Acute bone, 30d: "+trim$(using("################.####",Bone))+qbh$
 pnt0$=pnt0$+"- Acute lung, 30d: "+trim$(using("################.####",Lung))+qbh$
 pnt0$=pnt0$+"- Committed to thyroid: "+trim$(using("################.####",Thy))+qbh$
 pnt0$=pnt0$+"- Committed effective, 50y: "+trim$(using("################.####",CEDE))+qbh$
 pnt0$=pnt0$+"- External effective, 2d: "+trim$(using("################.####",Hg1))+qbh$
 pnt0$=pnt0$+"- External effective, 7d: "+trim$(using("################.####",Hg2))+qbh$
 pnt0$=pnt0$+"- Total Acute Bone Dose, TABD: "+trim$(using("################.####",TABD))+qbh$
 pnt0$=pnt0$+"- Total Acute Lung Dose, TALD: "+trim$(using("################.####",TALD))+qbh$
 pnt0$=pnt0$+"- Total Thyroid Dose, TTHD: "+trim$(using("################.####",TTHD))+qbh$
 pnt0$=pnt0$+"- Total Effective Dose Equivalent, TEDE: "+trim$(using("################.####",TEDE))+qbh$
end if

DFgrade=int(maxG-(-1)*log(dil)/log(10)+.5)

pnt0$=pnt0$+"EXPOSURE GRADE: "+str$(DFgrade)+qbh$

if lAssessment=1 then

 gosub [diagnoseh]                'Dependenta a [MakeSpots] - [info]; a se vedea in continuare

 pnt0$=pnt0$+qbh$
 pnt0$=pnt0$+"DIAGNOSE:"+qbh$
 pnt0$=pnt0$+diagnose$

end if

return

[diagnoseh]
woTEDE$=""
for jd=1 to 7
if TEDE>=dgl(jd) then
 woTEDE$=woTEDE$+"-"+dgn$(jd)+qbh$
```

```
end if
next
woTTHD$=""
for jd=8 to 11
if TTHD>=dgl(jd) then
 woTTHD$=woTTHD$+"-"+dgn$(jd)+qbh$
end if
next
woTABD$=""
for jd=12 to 13
if TABD>=dgl(jd) then
 woTABD$=woTABD$+"-"+dgn$(jd)+qbh$
end if
next
woTALD$=""
if TALD>=dgl(jd) then
 woTALD$=woTALD$+"-"+dgn$(jd)+qbh$
end if
diagnose$=woTEDE$+woTTHD$+woTABD$+woTALD$
if diagnose$="" then
 diagnose$=dgn$(0)
end if
return

'_____________________________________________________________________

' ALTE RUTINE DE CALCUL
' ____________________________

'1. Rutinele de calcul al coeficientilor de dispersie
'   ____________________________________________

[sigmas]
tage=age         's
tageH=tage/3600   'H
tageD=tageH/24    'd
 if tage>0 then
  if tage>=timp(1) and tage<timp(2) then
   Ahs=Ah(1,1):Khs=Kh(1,1):Avs=Av(1,1):Kvs=Kv(1,1)
   Ahw=Ah(2,1):Khw=Kh(2,1):Avw=Av(2,1):Kvw=Kv(2,1)
  end if
  if tage>=timp(2) and tage<timp(3) then
   Ahs=Ah(1,2):Khs=Kh(1,2):Avs=Av(1,2):Kvs=Kv(1,2)
   Ahw=Ah(2,2):Khw=Kh(2,2):Avw=Av(2,2):Kvw=Kv(2,2)
  end if
  if tage>=timp(3) and tage<timp(4) then
   Ahs=Ah(1,3):Khs=Kh(1,3):Avs=Av(1,3):Kvs=Kv(1,3)
```

```
 Ahw=Ah(2,3):Khw=Kh(2,3):Avw=Av(2,3):Kvw=Kv(2,3)
end if
if tage>=timp(4) and tage<timp(5) then
 Ahs=Ah(1,4):Khs=Kh(1,4):Avs=Av(1,4):Kvs=Kv(1,4)
 Ahw=Ah(2,4):Khw=Kh(2,4):Avw=Av(2,4):Kvw=Kv(2,4)
end if
if tage>=timp(5) and tage<timp(6) then
 Ahs=Ah(1,5):Khs=Kh(1,5):Avs=Av(1,5):Kvs=Kv(1,5)
 Ahw=Ah(2,5):Khw=Kh(2,5):Avw=Av(2,5):Kvw=Kv(2,5)
end if
if tage>=timp(6) then
 Ahs=Ah(1,6):Khs=Kh(1,6):Avs=Av(1,6):Kvs=Kv(1,6)
 Ahw=Ah(2,6):Khw=Kh(2,6):Avw=Av(2,6):Kvw=Kv(2,6)
end if

if class<=4 then
 Ah=Ahs
 Kh=Khs
 Av=Avs
 Kv=Kvs
else
 Ah=Ahw
 Kh=Khw
 Av=Avw
 Kv=Kvw
end if

'prel=prel(class)
'hInv=hInv(class)
'wsp=wspd0*(hRel/10)^prel

sigmay=(Ah*tage)^Kh
sigmaz=(Av*tage)^Kv
 if sigmaz>hInv then sigmaz=0.8*hInv

else

if class<=4 then
 Ah=Ahs
 Kh=Khs
 Av=Avs
 Kv=Kvs
else
 Ah=Ahw
 Kh=Khw
 Av=Avw
 Kv=Kvw
```

```
 end if

 'prel=prel(class)
 'hInv=hInv(class)
 'wsp=wspd0*(hRel/10)^prel

 sigmay=sigmay0
 sigmaz=sigmaz0

end if

if sigmay=0 then sigmay=sigmay0
if sigmaz=0 then sigmaz=sigmaz0

'DF0=2*tau*Expo((-1)*hRel*hRel/(2*sigmaz*sigmaz))/(kpi*sigmay*sigmay*sigmaz)          's/m3, hourly!
DF0=tau*(1+lRGrd)*(Expo((-1)*hEff*hEff/(2*sigmaz*sigmaz))+lRInv*Expo((-1)*2*hInv*2*hInv/(2*sigmaz*sigmaz)))/(kpi*sigmay*sigmay*sigmaz)    'The Raw Dilution Factor

return

[sigmasBIS]
'tageBIS=age
if tageBIS>0 then
 if tageBIS>=timp(1) and tageBIS<timp(2) then
  Ahs=Ah(1,1):Khs=Kh(1,1):Avs=Av(1,1):Kvs=Kv(1,1)
  Ahw=Ah(2,1):Khw=Kh(2,1):Avw=Av(2,1):Kvw=Kv(2,1)
 end if
 if tageBIS>=timp(2) and tageBIS<timp(3) then
  Ahs=Ah(1,2):Khs=Kh(1,2):Avs=Av(1,2):Kvs=Kv(1,2)
  Ahw=Ah(2,2):Khw=Kh(2,2):Avw=Av(2,2):Kvw=Kv(2,2)
 end if
 if tageBIS>=timp(3) and tageBIS<timp(4) then
  Ahs=Ah(1,3):Khs=Kh(1,3):Avs=Av(1,3):Kvs=Kv(1,3)
  Ahw=Ah(2,3):Khw=Kh(2,3):Avw=Av(2,3):Kvw=Kv(2,3)
 end if
 if tageBIS>=timp(4) and tageBIS<timp(5) then
  Ahs=Ah(1,4):Khs=Kh(1,4):Avs=Av(1,4):Kvs=Kv(1,4)
  Ahw=Ah(2,4):Khw=Kh(2,4):Avw=Av(2,4):Kvw=Kv(2,4)
 end if
 if tageBIS>=timp(5) and tageBIS<timp(6) then
  Ahs=Ah(1,5):Khs=Kh(1,5):Avs=Av(1,5):Kvs=Kv(1,5)
  Ahw=Ah(2,5):Khw=Kh(2,5):Avw=Av(2,5):Kvw=Kv(2,5)
 end if
 if tageBIS>=timp(6) then
  Ahs=Ah(1,6):Khs=Kh(1,6):Avs=Av(1,6):Kvs=Kv(1,6)
  Ahw=Ah(2,6):Khw=Kh(2,6):Avw=Av(2,6):Kvw=Kv(2,6)
 end if
```

```
 if class<=4 then
  Ah=Ahs
  Kh=Khs
  Av=Avs
  Kv=Kvs
 else
  Ah=Ahw
  Kh=Khw
  Av=Avw
  Kv=Kvw
 end if

 'prel=prel(class)
 'hInv=hInv(class)
 'wsp=wspd0*(hRel/10)^prel

 sigmayBIS=(Ah*tageBIS)^Kh
 sigmazBIS=(Av*tageBIS)^Kv
  if sigmazBIS>hInv then sigmazBIS=0.8*hInv

else

 if class<=4 then
  Ah=Ahs
  Kh=Khs
  Av=Avs
  Kv=Kvs
 else
  Ah=Ahw
  Kh=Khw
  Av=Avw
  Kv=Kvw
 end if

 'prel=prel(class)
 'hInv=hInv(class)
 'wsp=wspd0*(hRel/10)^prel

 sigmayBIS=sigmay0
 sigmazBIS=sigmaz0

end if

if sigmayBIS=0 then sigmayBIS=sigmay0
if sigmazBIS=0 then sigmazBIS=sigmaz0

return
```

```
[Doury1]
if instr(wo$,"s1")>0 then
 timp(1)=val(trim$(word$(wo$,1)))
 Ah(1,1)=val(trim$(word$(wo$,2)))
 Kh(1,1)=val(trim$(word$(wo$,3)))
 Av(1,1)=val(trim$(word$(wo$,4)))
 Kv(1,1)=val(trim$(word$(wo$,5)))
end if
if instr(wo$,"s2")>0 then
 timp(2)=val(trim$(word$(wo$,1)))
 Ah(1,2)=val(trim$(word$(wo$,2)))
 Kh(1,2)=val(trim$(word$(wo$,3)))
 Av(1,2)=val(trim$(word$(wo$,4)))
 Kv(1,2)=val(trim$(word$(wo$,5)))
end if
if instr(wo$,"s3")>0 then
 timp(3)=val(trim$(word$(wo$,1)))
 Ah(1,3)=val(trim$(word$(wo$,2)))
 Kh(1,3)=val(trim$(word$(wo$,3)))
 Av(1,3)=val(trim$(word$(wo$,4)))
 Kv(1,3)=val(trim$(word$(wo$,5)))
end if
if instr(wo$,"s4")>0 then
 timp(4)=val(trim$(word$(wo$,1)))
 Ah(1,4)=val(trim$(word$(wo$,2)))
 Kh(1,4)=val(trim$(word$(wo$,3)))
 Av(1,4)=val(trim$(word$(wo$,4)))
 Kv(1,4)=val(trim$(word$(wo$,5)))
end if
if instr(wo$,"s5")>0 then
 timp(5)=val(trim$(word$(wo$,1)))
 Ah(1,5)=val(trim$(word$(wo$,2)))
 Kh(1,5)=val(trim$(word$(wo$,3)))
 Av(1,5)=val(trim$(word$(wo$,4)))
 Kv(1,5)=val(trim$(word$(wo$,5)))
end if
if instr(wo$,"s6")>0 then
 timp(6)=val(trim$(word$(wo$,1)))
 Ah(1,6)=val(trim$(word$(wo$,2)))
 Kh(1,6)=val(trim$(word$(wo$,3)))
 Av(1,6)=val(trim$(word$(wo$,4)))
 Kv(1,6)=val(trim$(word$(wo$,5)))
end if

if instr(wo$,"w1")>0 then
 timp(1)=val(trim$(word$(wo$,1)))
```

```
 Ah(2,1)=val(trim$(word$(wo$,2)))
 Kh(2,1)=val(trim$(word$(wo$,3)))
 Av(2,1)=val(trim$(word$(wo$,4)))
 Kv(2,1)=val(trim$(word$(wo$,5)))
end if
if instr(wo$,"w2")>0 then
 timp(2)=val(trim$(word$(wo$,1)))
 Ah(2,2)=val(trim$(word$(wo$,2)))
 Kh(2,2)=val(trim$(word$(wo$,3)))
 Av(2,2)=val(trim$(word$(wo$,4)))
 Kv(2,2)=val(trim$(word$(wo$,5)))
end if
if instr(wo$,"w3")>0 then
 timp(3)=val(trim$(word$(wo$,1)))
 Ah(2,3)=val(trim$(word$(wo$,2)))
 Kh(2,3)=val(trim$(word$(wo$,3)))
 Av(2,3)=val(trim$(word$(wo$,4)))
 Kv(2,3)=val(trim$(word$(wo$,5)))
end if
if instr(wo$,"w4")>0 then
 timp(4)=val(trim$(word$(wo$,1)))
 Ah(2,4)=val(trim$(word$(wo$,2)))
 Kh(2,4)=val(trim$(word$(wo$,3)))
 Av(2,4)=val(trim$(word$(wo$,4)))
 Kv(2,4)=val(trim$(word$(wo$,5)))
end if



if instr(wo$,"w5")>0 then
 timp(5)=val(trim$(word$(wo$,1)))
 Ah(2,5)=val(trim$(word$(wo$,2)))
 Kh(2,5)=val(trim$(word$(wo$,3)))
 Av(2,5)=val(trim$(word$(wo$,4)))
 Kv(2,5)=val(trim$(word$(wo$,5)))
end if
if instr(wo$,"w6")>0 then
 timp(6)=val(trim$(word$(wo$,1)))
 Ah(2,6)=val(trim$(word$(wo$,2)))
 Kh(2,6)=val(trim$(word$(wo$,3)))
 Av(2,6)=val(trim$(word$(wo$,4)))
 Kv(2,6)=val(trim$(word$(wo$,5)))
end if

if instr(wo$,"kA")>0 then
 prel(1)=val(trim$(word$(wo$,2)))
 hInv(1)=val(trim$(word$(wo$,3)))
```

```
 sigmatheta(1)=val(trim$(word$(wo$,4)))
end if
if instr(wo$,"kB")>0 then
 prel(2)=val(trim$(word$(wo$,2)))
 hInv(2)=val(trim$(word$(wo$,3)))
 sigmatheta(2)=val(trim$(word$(wo$,4)))
end if
if instr(wo$,"kC")>0 then
 prel(3)=val(trim$(word$(wo$,2)))
 hInv(3)=val(trim$(word$(wo$,3)))
 sigmatheta(3)=val(trim$(word$(wo$,4)))
end if
if instr(wo$,"kD")>0 then
 prel(4)=val(trim$(word$(wo$,2)))
 hInv(4)=val(trim$(word$(wo$,3)))
 sigmatheta(4)=val(trim$(word$(wo$,4)))
end if
if instr(wo$,"kE")>0 then
 prel(5)=val(trim$(word$(wo$,2)))
 hInv(5)=val(trim$(word$(wo$,3)))
 sigmatheta(5)=val(trim$(word$(wo$,4)))
end if
if instr(wo$,"kF")>0 then
 prel(6)=val(trim$(word$(wo$,2)))
 hInv(6)=val(trim$(word$(wo$,3)))
 sigmatheta(6)=val(trim$(word$(wo$,4)))
end if

sigmay0=50
sigmaz0=20

return



'2. Calcul de distante  in trigonometrie sferica
'_____________________________________________

[RangeSrc]
LoX=LoB: laX=laB
B=LoSrc-LoX
if LoSrc=LoX then
 disX=REarth*abs(laSrc-laX)*arg
 return
end if
if B=0 then B=0.000001
if abs(B)<180 then lcross=1 else lcross=-1
```

```
c=90-laX
a=90-laSrc
cosb=cos(c*arg)*cos(a*arg)+sin(c*arg)*sin(a*arg)*cos(B*arg)
if cosb>1 then cosb=1
if cosb<-1 then cosb=-1
b=acs(cosb)
disX=b*REarth

return

[Range]
B=LoB-Lo
if LoB=Lo then
 dis=abs(REarth*abs(laB-la)*arg)
 return
end if
if B=0 then B=0.000001
if abs(B)<180 then lcross=1 else lcross=-1
c=90-la
a=90-laB
cosb=cos(c*arg)*cos(a*arg)+sin(c*arg)*sin(a*arg)*cos(B*arg)
if cosb>1 then cosb=1
if cosb<-1 then cosb=-1
b=acs(cosb)
dis=abs(b*REarth)

return

'3. Calculul segmentelor de traiectorie a pufului la fiecare pas de timp,
'    din punctul (laL,LoL), pe distanta lineara s(metri), pe directia Hdg(grade) a vantului local.
'    Trigonometrie sferica.
'_____________________________________________________________________

Function TrailC$(s,laL,LoL,Hdg)

if s=0 then
  lat=laL
  Lon=LoL
  if Lon>180 then Lon=Lon-360
  if Lon<-180 then Lon=Lon+360
  TrailC$=str$(lat)+","+str$(Lon)
 else
  b=s/REarth
  c=90-laL
  sinlat=cos(b)*cos(c*arg)+sin(b)*sin(c*arg)*cos(Hdg*arg)
  lat=asn(sinlat)/arg
  Lon=LoL+arcul(cos(b)-cos(c*arg)*sinlat,sin(b)*sin(c*arg)*sin(Hdg*arg))/arg
```

```
  if Lon>180 then Lon=Lon-360
  if Lon<-180 then Lon=Lon+360
  TrailC$=str$(lat)+","+str$(Lon)
 end if

End Function

Function arcul(x,y)

if not(x=0 and y=0) then
  if x>0 then arcul=atn(y/x)
  if x<0 then arcul=atn(y/x)+pi
  if x=0 and y>0 then arcul=pi/2
  if x=0 and y<0 then arcul=(-1)*pi/2
 end if

End Function

'4. Rutinele de handling ale librariilor DEM
'_____________________________________

[SRTM30]
'(la,Lo)
if la<=-60 then
 gosub [GLOBEsub]
 z=zz
 return
end if
if Lo>140 then
 gosub [GLOBEsub]
 z=zz
 return
end if

select case
 case Lo>=-179.995833 and Lo<-139.995833 and la<=89.9958333 and la>39.9958333
  stile$="W180N90":slaMin=39.9958333:slaMax=89.9958333:sLoMin=-179.995833:sLoMax=-139.995833:nRs=6000:nCs=4800  ':zMin=1:zMax=6098
 case Lo>=-139.995833 and Lo<-99.9958333 and la<=89.9958333 and la>39.9958333
  stile$="W140N90":slaMin=39.9958333:slaMax=89.9958333:sLoMin=-139.995833:sLoMax=-99.9958333:nRs=6000:nCs=4800  ':zMin=1:zMax=4635
 case Lo>=-99.9958333 and Lo<-59.9958333 and la<=89.9958333 and la>39.9958333
  stile$="W100N90":slaMin=39.9958333:slaMax=89.9958333:sLoMin=-99.9958333:sLoMax=-59.9958333:nRs=6000:nCs=4800  ':zMin=1:zMax=2416
 case Lo>=-59.9958333 and Lo<-19.9958333 and la<=89.9958333 and la>39.9958333
  stile$="W060N90":slaMin=39.9958333:slaMax=89.9958333:sLoMin=-59.9958333:sLoMax=-19.9958333:nRs=6000:nCs=4800  ':zMin=1:zMax=3940
 case Lo>=-19.9958333 and Lo<20.0041667 and la<=89.9958333 and la>39.9958333
  stile$="W020N90":slaMin=39.9958333:slaMax=89.9958333:sLoMin=-19.9958333:sLoMax=20.0041667:nRs=6000:nCs=4800  ':zMin=-30:zMax=4536
 case Lo>=20.0041667 and Lo<60.0041667 and la<=89.9958333 and la>39.9958333
  stile$="E020N90":slaMin=39.9958333:slaMax=89.9958333:sLoMin=20.0041667:sLoMax=60.0041667:nRs=6000:nCs=4800  ':zMin=-137:zMax=5483
```

```
case Lo>=60.0041667 and Lo<100.004167 and la<=89.9958333 and la>39.9958333
 stile$="E060N90":slaMin=39.9958333:slaMax=89.9958333:sLoMin=60.0041667:sLoMax=100.004167:nRs=6000:nCs=4800  ':zMin=-152:zMax=7169
case Lo>=100.004167 and Lo<140.004167 and la<=89.9958333 and la>39.9958333
 stile$="E100N90":slaMin=39.9958333:slaMax=89.9958333:sLoMin=100.004167:sLoMax=140.004167:nRs=6000:nCs=4800  ':zMin=1:zMax=3877
case Lo>=140.004167 and la<=89.9958333 and la>39.9958333
 stile$="E140N90":slaMin=39.9958333:slaMax=89.9958333:sLoMin=140.004167:sLoMax=180.004167:nRs=6000:nCs=4800  ':zMin=1:zMax=4588

case Lo>=-179.995833 and Lo<-139.995833 and la<=39.9958333 and la>-10.0041667
 stile$="W180N40":slaMin=-10.0041667:slaMax=39.9958333:sLoMin=-179.995833:sLoMax=-139.995833:nRs=6000:nCs=4800  ':zMin=1:zMax=4148
case Lo>=-139.995833 and Lo<-99.9958333 and la<=39.9958333 and la>-10.0041667
 stile$="W140N40":slaMin=-10.0041667:slaMax=39.9958333:sLoMin=-139.995833:sLoMax=-99.9958333:nRs=6000:nCs=4800  ':zMin=-79:zMax=4328
case Lo>=-99.9958333 and Lo<-59.9958333 and la<=39.9958333 and la>-10.0041667
 stile$="W100N40":slaMin=-10.0041667:slaMax=39.9958333:sLoMin=-99.9958333:sLoMax=-59.9958333:nRs=6000:nCs=4800  ':zMin=1:zMax=6710
case Lo>=-59.9958333 and Lo<-19.9958333 and la<=39.9958333 and la>-10.0041667
 stile$="W060N40":slaMin=-10.0041667:slaMax=39.9958333:sLoMin=-59.9958333:sLoMax=-19.9958333:nRs=6000:nCs=4800  ':zMin=1:zMax=2843
case Lo>=-19.9958333 and Lo<20.0041667 and la<=39.9958333 and la>-10.0041667
 stile$="W020N40":slaMin=-10.0041667:slaMax=39.9958333:sLoMin=-19.9958333:sLoMax=20.0041667:nRs=6000:nCs=4800  ':zMin=-103:zMax=4059
case Lo>=20.0041667 and Lo<60.0041667 and la<=39.9958333 and la>-10.0041667
 stile$="E020N40":slaMin=-10.0041667:slaMax=39.9958333:sLoMin=20.0041667:sLoMax=60.0041667:nRs=6000:nCs=4800  ':zMin=-407:zMax=5825
case Lo>=60.0041667 and Lo<100.004167 and la<=39.9958333 and la>-10.0041667
 stile$="E060N40":slaMin=-10.0041667:slaMax=39.9958333:sLoMin=60.0041667:sLoMax=100.004167:nRs=6000:nCs=4800  ':zMin=1:zMax=8752
case Lo>=100.004167 and Lo<140.004167 and la<=39.9958333 and la>-10.0041667
 stile$="E100N40":slaMin=-10.0041667:slaMax=39.9958333:sLoMin=100.004167:sLoMax=140.004167:nRs=6000:nCs=4800  ':zMin=-40:zMax=7213
case Lo>=140.004167 and la<=39.9958333 and la>-10.0041667
 stile$="E140N40":slaMin=-10.0041667:slaMax=39.9958333:sLoMin=140.004167:sLoMax=180.004167:nRs=6000:nCs=4800   :zMin=1:zMax=4628

case Lo>=-179.995833 and Lo<-139.995833 and la<=-10.0041667 and la>-60.0041667
 stile$="W180S10":slaMin=-60.0041667:slaMax=-10.0041667:sLoMin=-179.995833:sLoMax=-139.995833:nRs=6000:nCs=4800  ':zMin=1:zMax=2732
case Lo>=-139.995833 and Lo<-99.9958333 and la<=-10.0041667 and la>-60.0041667
 stile$="W140S10":slaMin=-60.0041667:slaMax=-10.0041667:sLoMin=-139.995833:sLoMax=-99.9958333:nRs=6000:nCs=4800  ':zMin=1:zMax=910
case Lo>=-99.9958333 and Lo<-59.9958333 and la<=-10.0041667 and la>-60.0041667
 stile$="W100S10":slaMin=-60.0041667:slaMax=-10.0041667:sLoMin=-99.9958333:sLoMax=-59.9958333:nRs=6000:nCs=4800  ':zMin=1:zMax=6795
case Lo>=-59.9958333 and Lo<-19.9958333 and la<=-10.0041667 and la>-60.0041667
 stile$="W060S10":slaMin=-60.0041667:slaMax=-10.0041667:sLoMin=-59.9958333:sLoMax=-19.9958333:nRs=6000:nCs=4800  ':zMin=1:zMax=2863
case Lo>=-19.9958333 and Lo<20.0041667 and la<=-10.0041667 and la>-60.0041667
 stile$="W020S10":slaMin=-60.0041667:slaMax=-10.0041667:sLoMin=-19.9958333:sLoMax=20.0041667:nRs=6000:nCs=4800  ':zMin=1:zMax=2590
case Lo>=20.0041667 and Lo<60.0041667 and la<=-10.0041667 and la>-60.0041667
 stile$="E020S10":slaMin=-60.0041667:slaMax=-10.0041667:sLoMin=20.0041667:sLoMax=60.0041667:nRs=6000:nCs=4800  ':zMin=1:zMax=3484
case Lo>=60.0041667 and Lo<100.004167 and la<=-10.0041667 and la>-60.0041667
 stile$="E060S10":slaMin=-60.0041667:slaMax=-10.0041667:sLoMin=60.0041667:sLoMax=100.004167:nRs=6000:nCs=4800  ':zMin=1:zMax=2687
case Lo>=100.004167 and Lo<140.004167 and la<=-10.0041667 and la>-60.0041667
 stile$="E100S10":slaMin=-60.0041667:slaMax=-10.0041667:sLoMin=100.004167:sLoMax=140.004167:nRs=6000:nCs=4800  ':zMin=1:zMax=1499
case Lo>=140.004167 and la<=-10.0041667 and la>-60.0041667
 stile$="E140S10":slaMin=-60.0041667:slaMax=-10.0041667:sLoMin=140.004167:sLoMax=180.004167:nRs=6000:nCs=4800  ':zMin=1:zMax=3405

case Lo>=-179.995833 and Lo<-119.995833 and la<=-60.0041667 and la>=-90.0041667
 stile$="W180S60":slaMin=-90.0041667:slaMax=-60.0041667:sLoMin=-179.995833:sLoMax=-119.995833:nRs=3600:nCs=7200  ':zMin=1:zMax=4009
```

```
 case Lo>=-119.995833 and Lo<-59.9958333 and la<=-60.0041667 and la>=-90.0041667
  stile$="W120S60":slaMin=-90.0041667:slaMax=-60.0041667:sLoMin=-119.995833:sLoMax=-59.9958333:nRs=3600:nCs=7200  ':zMin=1:zMax=4743
 case Lo>=-59.9958333 and Lo<0.41666667e-2 and la<=-60.0041667 and la>=-90.0041667
  stile$="W60S60":slaMin=-90.0041667:slaMax=-60.0041667:sLoMin=-59.9958333:sLoMax=0.41666667e-2:nRs=3600:nCs=7200  ':zMin=1:zMax=2916
 case Lo>=0.41666667e-2 and Lo<60.0041667 and la<=-60.0041667 and la>=-90.0041667
  stile$="W000S60":slaMin=-90.0041667:slaMax=-60.0041667:sLoMin=0.41666667e-2:sLoMax=60.0041667:nRs=3600:nCs=7200  ':zMin=1:zMax=3839
 case Lo>=60.0041667 and Lo<120.004167 and la<=-60.0041667 and la>=-90.0041667
  stile$="E060S60":slaMin=-90.0041667:slaMax=-60.0041667:sLoMin=60.0041667:sLoMax=120.004167:nRs=3600:nCs=7200  ':zMin=1:zMax=4039
 case Lo>=120.004167 and la<=-60.0041667 and la>=-90.0041667
  stile$="E120S60":slaMin=-90.0041667:slaMax=-60.0041667:sLoMin=120.004167:sLoMax=180.004167:nRs=3600:nCs=7200  ':zMin=1:zMax=4363

 case else
  gosub [GLOBEsub]
  z=zz
  return
end select

sftile$=GTOPO30$+"\"+stile$+".dem"

if sftile$<>osftile$ then
 if wst=1 then close #usgs
 open sftile$ for binary as #usgs
 osftile$=sftile$
 wst=1
end if

xms=(Lo-sLoMin)/arcc
yms=(slaMax-la)/arcc
js=int(xms)
is=int(yms)
if js>nCs-2 then js=nCs-2
if is>nRs-2 then is=nRs-2
ks=is*nCs+js
kks=ks+ks
 seek #usgs,kks
 wo$=input$(#usgs,2)
 sz1=256*asc(mid$(wo$,1,1))+asc(mid$(wo$,2,1))
 if sz1>32767 then sz1=sz1-65535
ks=ks+1
kks=ks+ks
 seek #usgs,kks
 wo$=input$(#usgs,2)
 sz2=256*asc(mid$(wo$,1,1))+asc(mid$(wo$,2,1))
 if sz2>32767 then sz2=sz2-65535
ks=ks+nCs-1
kks=ks+ks
 seek #usgs,kks
```

```
 wo$=input$(#usgs,2)
 sz3=256*asc(mid$(wo$,1,1))+asc(mid$(wo$,2,1))
 if sz3>32767 then sz3=sz3-65535
ks=ks+1
kks=ks+ks
 seek #usgs,kks
 wo$=input$(#usgs,2)
 sz4=256*asc(mid$(wo$,1,1))+asc(mid$(wo$,2,1))
 if sz4>32767 then sz4=sz4-65535
Ps1=xms-js
Ps2=yms-is
z=(sz1+sz4-sz2-sz3)*Ps1*Ps2+(sz3-sz1)*Ps2+(sz2-sz1)*Ps1+sz1

if z<=zSea then
 gosub [GLOBEsub]
 z=zz
end if

[exelev]
wow=0

[exelev1]
return

[SRTM90]
'(la,Lo)
'SRTM90$=left$(DefaultDir$,2)+"\xsrtm-90"
arccc=0.0008333333333333
nClss=6000

z=1
col=int((Lo+180)/5)+1
lin=int((60-la)/5)+1

das=0
if col<>ocol then
 das=1
 ocol=col
 if wtss=1 then
  wtss=0
  close #9
 end if
end if
if lin<>olin then
 das=1
 olin=lin
 if wtss=1 then
```

```
  wtss=0
  close #9
 end if
end if

if das=1 then

 col$=str$(col):if len(col$)=1 then col$="0"+col$
 lin$=str$(lin):if len(lin$)=1 then lin$="0"+lin$
 sstile$=SRTM90$+"\"+col$+"_"+lin$+".bin"

 f$=col$+"_"+lin$+".bin"
 files SRTM90$+"\",f$,info$()
 if val(info$(0,0))>0 then
  tla0=60-(lin-1)*5
  tLo0=(col-1)*5-180
  open sstile$ for random as #9 len=2
  field #9,2 as v$
  lf=lof(#9)
  if lf>0 then
   wtss=1
  else
   wtss=0
   close #9
   kill sstile$
  end if
 end if
end if

if wtss=1 then

 ym=(tla0-la-arccc)/arccc     'arccc
 if ym>nClss-1 then ym=nClss-1
 xm=(Lo-tLo0)/arccc
 if xm>nClss-1 then xm=nClss-1

 iis=int(ym)
 jjs=int(xm)

 kss=iis*nClss+jjs+1
 get #9,kss
 sz1=128*asc(mid$(v$,2,1))+asc(mid$(v$,1,1))
 if sz1>9999 then sz1=9999-sz1

 kss=kss+1
 get #9,kss
 sz2=128*asc(mid$(v$,2,1))+asc(mid$(v$,1,1))
```

```
 if sz2>9999 then sz2=9999-sz2

 kss=kss+nClss-1
 get #9,kss
 sz3=128*asc(mid$(v$,2,1))+asc(mid$(v$,1,1))
 if sz3>9999 then sz3=9999-sz3

 kss=kss+1
 get #9,kss
 sz4=128*asc(mid$(v$,2,1))+asc(mid$(v$,1,1))
 if sz4>9999 then sz4=9999-sz4

else
 gosub [GLOBEsub]
 z=zz
 return
end if

P1ss=xm-jjs
P2ss=ym-iis
z=(sz1+sz4-sz2-sz3)*P1ss*P2ss+(sz3-sz1)*P2ss+(sz2-sz1)*P1ss+sz1

if z<=zSea then
 gosub [GLOBEsub]    '[ETOPO1]
 z=zz
end if

oz=z

return

[GLOBEsub]
select case
 case la>50 and la<90 and Lo>=-180 and Lo<-90
  Gtile$="xa10g": laMin=50: laMax=90: LoMin=-180: LoMax=-90: nColumns=10800: nRows=4800
 case la>50 and la<90 and Lo>=-90 and Lo<0
  Gtile$="xb10g": laMin=50: laMax=90: LoMin=-90: LoMax=0: nColumns=10800: nRows=4800
 case la>50 and la<90 and Lo>=0 and Lo<90
  Gtile$="xc10g": laMin=50: laMax=90: LoMin=0: LoMax=90: nColumns=10800: nRows=4800
 case la>50 and la<90 and Lo>=90 and Lo<180
  Gtile$="xd10g": laMin=50: laMax=90: LoMin=90: LoMax=180: nColumns=10800: nRows=4800

 case la>0 and la<50 and Lo>=-180 and Lo<-90
  Gtile$="xe10g": laMin=0: laMax=50: LoMin=-180: LoMax=-90: nColumns=10800: nRows=6000
 case la>0 and la<50 and Lo>=-90 and Lo<0
  Gtile$="xf10g": laMin=0: laMax=50: LoMin=-90: LoMax=0: nColumns=10800: nRows=6000
 case la>0 and la<50 and Lo>=0 and Lo<90
```

```
  Gtile$="xg10g": laMin=0: laMax=50: LoMin=0: LoMax=90: nColumns=10800: nRows=6000
 case la>0 and la<50 and Lo>=90 and Lo<180
  Gtile$="xh10g": laMin=0: laMax=50: LoMin=90: LoMax=180: nColumns=10800: nRows=6000

 case la>-50 and la<0 and Lo>=-180 and Lo<-90
  Gtile$="xi10g": laMin=-50: laMax=0: LoMin=-180: LoMax=-90: nColumns=10800: nRows=6000
 case la>-50 and la<0 and Lo>=-90 and Lo<0
  Gtile$="xj10g": laMin=-50: laMax=0: LoMin=-90: LoMax=0: nColumns=10800: nRows=6000
 case la>-50 and la<0 and Lo>=0 and Lo<90
  Gtile$="xk10g": laMin=-50: laMax=0: LoMin=0: LoMax=90:  nColumns=10800: nRows=6000
 case la>-50 and la<0 and Lo>=90 and Lo<180
  Gtile$="xl10g": laMin=-50: laMax=0: LoMin=90: LoMax=180:  nColumns=10800: nRows=6000

 case la>-90 and la<-50 and Lo>=-180 and Lo<-90
  Gtile$="xm10g": laMin=-90: laMax=-50: LoMin=-180: LoMax=-90: nColumns=10800: nRows=4800
 case la>-90 and la<-50 and Lo>=-90 and Lo<0
  Gtile$="xn10g": laMin=-90: laMax=-50: LoMin=-90: LoMax=0: nColumns=10800: nRows=4800
 case la>-90 and la<-50 and Lo>=0 and Lo<90
  Gtile$="xo10g": laMin=-90: laMax=-50: LoMin=0: LoMax=90: nColumns=10800: nRows=4800
 case la>-90 and la<-50 and Lo>=90 and Lo<180
  Gtile$="xp10g": laMin=-90: laMax=-50: LoMin=90: LoMax=180: nColumns=10800: nRows=4800

end select

ftile$=DefaultDir$+"\public\globe\"+Gtile$

if ftile$<>oftile$ then
 if wf=1 then
  close #glb
  wf=0
 end if
 open ftile$ for random as #glb len=2
 field #glb, 2 as wo2$
 lf=lof(#glb)/2
 wf=1
 oftile$=ftile$
end if

xm=(Lo-LoMin)/arcc
ym=(laMax-la)/arcc
jgl=int(xm)
igl=int(ym)

if jgl>nColumns-2 then jgl=nColumns-2
if igl>nRows-2 then igl=nRows-2

kk=igl*nColumns+jgl+1: get #glb,kk: az1=256*asc(mid$(wo2$,2,1))+asc(mid$(wo2$,1,1))
```

```
 if az1>32767 then az1=az1-65535
kk=kk+1: get #glb,kk: az2=256*asc(mid$(wo2$,2,1))+asc(mid$(wo2$,1,1))
 if az2>32767 then az2=az2-65535
kk=kk+nColumns-1: get #glb,kk: az3=256*asc(mid$(wo2$,2,1))+asc(mid$(wo2$,1,1))
 if az3>32767 then az3=az3-65535
kk=kk+1: get #glb,kk: az4=256*asc(mid$(wo2$,2,1))+asc(mid$(wo2$,1,1))
 if az4>32767 then az4=az4-65535

P1=xm-jgl
P2=ym-igl
zz=(az1+az4-az2-az3)*P1*P2+(az3-az1)*P2+(az2-az1)*P1+az1

return

Function LON(x)
 LON=x
 if x>180 then LON=x-360
 if x<-180 then LON=x+360
End Function


'APLICATII SI RUTINE ANCILARE COMANDATE DIN MENU-ul PRINCIPAL
‘ Comenzi Menu

'VIEWERE
'_________

[viewers]
cursor normal
calldll #user32,"SetWindowTextA",WndP as long,oldbar$ as ptr,res as long

filedialog "OPEN a Case", DefaultDir$+"\public\archive-puffs\*-spots.txt",fspots$
if fspots$="" then wait

folder$="ARCHIVE-PUFFS"
folderName$="Far-Field Trainer"
open DefaultDir$+"\public\OutputViewerData.txt" for output as #1
print #1, folder$
print #1, folderName$
print #1,SeparateFile$(fspots$)
close #1
run DefaultDir$+"\!N-WATCHDOG_OUTPUT-VIEWER-S.tkn"

wait

                                    * * *
[openbriefing]
```

```
filedialog "Open a web-ready briefing", DefaultDir$+"\public\archive-puffs\*-web.htm",HTMfile$
if HTMfile$="" then wait
[aagain]
run "explorer "+HTMfile$
confirm "BACK TO THE BRIEFING?";answer$
if answer$="yes" then [aagain]

wait


'DATA FOLDER MAINTENANCE
' Comenzi Menu
'_____

[clearrecord]
s$="Notice"+chr$(13)
s$=s$+"THIS OFFERS TO SELECTIVELY (AND IRRETRIEVABLY) DELETE OBSOLETE WORK FILES."+chr$(13)
s$=s$+"IN THE FILE DIALOG NEXT, SELECT A TARGET FILE AND CLICK 'Open'."+chr$(13)
s$=s$+"TO DISCONTINUE OR ABORT OPERATION, CLICK 'Cancel'."
notice s$

[clearagain]
filedialog "OPEN a case for deletion", DefaultDir$+"\public\archive-puffs\*.ipf", f0$
if f0$="" then
 'notice "NO FILE SELECTED FOR DELETION."
 wait
end if
f1$=left$(f0$,len(f0$)-4)+".dat"
f2$=left$(f0$,len(f0$)-4)+"-spots.dat"
f3$=left$(f0$,len(f0$)-4)+"-spots.elv"
f4$=left$(f0$,len(f0$)-4)+"-spots.gis"
f5$=left$(f0$,len(f0$)-4)+"-spots-canvas.bmp"
f6$=left$(f0$,len(f0$)-4)+"-spots-spots.htm"
f7$=left$(f0$,len(f0$)-4)+"-spots-lines.htm"
f8$=left$(f0$,len(f0$)-4)+"-spots-web.html"

files DefaultDir$+"\public\archive-puffs\",SeparateFile$(f1$),info$()
if val(info$(0,0))>0 then
 kill f1$
end if
files DefaultDir$+"\public\archive-puffs\",SeparateFile$(f2$),info$()
if val(info$(0,0))>0 then
 kill f2$
end if
files DefaultDir$+"\public\archive-puffs\",SeparateFile$(f3$),info$()
if val(info$(0,0))>0 then
 kill f3$
```

```
end if
files DefaultDir$+"\public\archive-puffs\",SeparateFile$(f4$),info$()
if val(info$(0,0))>0 then
 kill f4$
end if
files DefaultDir$+"\public\archive-puffs\",SeparateFile$(f5$),info$()
if val(info$(0,0))>0 then
 kill f5$
end if
files DefaultDir$+"\public\archive-puffs\",SeparateFile$(f6$),info$()
if val(info$(0,0))>0 then
 kill f6$
end if
files DefaultDir$+"\public\archive-puffs\",SeparateFile$(f7$),info$()
if val(info$(0,0))>0 then
 kill f7$
end if
files DefaultDir$+"\public\archive-puffs\",SeparateFile$(f8$),info$()
if val(info$(0,0))>0 then
 kill f8$
end if

kill f0$

notice "CASE "+SeparateFile$(f0$)+" DELETED."

goto [clearagain]

                                        * * *
[clearforecast]
files DefaultDir$+"\public\forecast\","*.*",info$()
nn=val(info$(0,0))
if nn<=3 then
 notice "NO CASE ON RECORD."
 wait
end if

ss$="W A R N I N G:"+qb$+qb$
ss$=ss$+"This will iretrievably waste all meteorological forecast files"+qb$
ss$=ss$+"thus preventing reconstruction of cases based on meteo history,"+qb$
ss$=ss$+"which may hinder the code's informative capability."+qb$+qb$
ss$=ss$+"Please choose wisely:"+qb$
ss$=ss$+"- To waste all forecast files, click 'Yes'."+qb$
ss$=ss$+"- To abort, click 'No'."+qb$
confirm ss$;answer$
if answer$="no" then wait
```

```
for j=1 to nn
f$=DefaultDir$+"\public\forecast\"+info$(j,0)
da=1
if instr(upper$(f$),"DO-NOT-DELETE-ME")>0 then da=0
if instr(f$,"-SIM.txt")>0 then da=0
if da=1 then
 kill f$
end if
next
notice "RECORD CLEARED."

wait
                                        * * *

'SUPPORTIVE APPS, ROUTINES, BRANCHED SNIPPETS
‘ Comenzi Menu
'_____________________________________________

[geography]
gosub [sky0]
run DefaultDir$+"\!N-WATCHDOG-Mapper-NEW-QB64-XX.tkn"
wait
                                        * * *
[meteorology]
gosub [sky0]
run DefaultDir$+"\!WATCHDOG-SA-MeteoWorksX.tkn"
wait
                                        * * *
[stengine]
run "!WATCHDOG-SA-SourceTermsEngine.tkn"
wait
                                        * * *
[plumerise]
run "plume-rise-fire.tkn"
wait
                                        * * *
[disdata]
run DefaultDir$+"\datadis.tkn"
wait
                                        * * *
[ndata]
run DefaultDir$+"\dataphys.tkn"
wait
                                        * * *
[dispersion]
if wtxtg=1 then wtxtg=0: close #txtg
if wtxt=1 then wtxt=0: close #txt
```

```
gosub [sky0]
dissysfile$=DefaultDir$+"\public\notepad\meteo\dis-sys.txt"
run "notepad.exe "+dissysfile$
wait
                                        * * *
[sourceterms]
if wtxtg=1 then wtxtg=0: close #txtg
if wtxt=1 then wtxt=0: close #txt
gosub [sky0]

filedialog "Open source term files", DefaultDir$+"\public\mix\*.mix",mixfile$
if mixfile$="" then wait

run "notepad.exe "+mixfile$

wait
                                        * * *
[regula]
UpperLeftX=100: UpperLeftY=80
WindowWidth=700: WindowHeight=420
if wreg=1 then wreg=0:close #reg
menu #reg,"Files",_
 "ACCEPT",[accept],_
 "Open an alternative",[openregs],|,_
 "Close",[exreg]
open "Regulatory Assumptions" for text as #reg
wreg=1
Wndreg=HWND(#reg)
calldll #user32,"GetParent",Wndreg as long,WndregP as long
#reg "!trapclose [exreg]"
#reg "!font courier_new 8"

calldLL #user32, "GetMenu",WndregP as ulong, hMainMenu as ulong
calldll #user32, "GetSubMenu", hMainMenu as ulong, 1 as long, hMainEdit As ulong
calldll #user32, "RemoveMenu", hMainMenu as ulong, hMainEdit as ulong, _MF_BYCOMMAND as ulong, res as boolean
calldll #user32, "GetSubMenu", hMainMenu as ulong, 1 as long, hMainEdit As ulong
calldll #user32, "RemoveMenu", hMainMenu as ulong, hMainEdit as ulong, _MF_BYCOMMAND as ulong, res as boolean
calldll #user32, "DrawMenuBar", WndregP as ulong, res as boolean

gosub [defaults]

[redo]
#reg "!cls"
#reg "!origin 1 0"
open DefaultDir$+"\public\data\REGS.txt" for input as #1
while eof(#1)=0
line input #1,wo$
```

```
#reg wo$
wend
close #1

#reg "!origin 1 0"
wait

[exreg]
if wreg=1 then wreg=0:close #reg
wait

[accept]
#reg "!modified? lmod$"
if lmod$="true" then
 s$="LIST HAS BEEN MODIFIED."+chr$(13)
 s$=s$+"DO YOU CONSIDER KEEPING THE CHANGES?"
 confirm s$; answer$
 if answer$="no" then [exreg]
end if

#reg "!lines nols"
nreg=0
for j=1 to nols
#reg "!line "+str$(j): input #reg,wo$
if instr(wo$,":")>0 then
 nreg=nreg+1
end if
next

if nreg=0 then
 notice "NO SPECS ON RECORD!"
end if

redim dgn$(nreg)
redim dgl(nreg)
jreg=-1
for j=1 to nols
#reg "!line "+str$(j): input #reg,wo$
if instr(wo$,":")>0 then
 jreg=jreg+1
 dgn$(jreg)=wo$
 dgl(jreg)=val(trim$(word$(wo$,2,":")))
 print dgn$(jreg),dgl(jreg)
end if
next

ok=1
```

```
for j=0 to nreg-1
if ((dgn$(j)="") or (dgl(j)=0)) then
 ok=0
 jerr=j
end if
next

if ok=0 then
 s$="Notice"+chr$(13)
 s$=s$+"AN INVALID FORMAT WAS DETECTED."+chr$(13)
 s$=s$+"SEE LINE: "+dgn$(jerr)+chr$(13)
 s$=s$+"PLEASE TRY AGAIN, OR ABORT."
 notice s$
 goto [redo]
end if

filedialog "Save your Alert Levels As", DefaultDir$+"\public\data\*.alr",newregs$
if newregs$="" then
 gosub [defaults]
 goto [exreg]
end if

#reg "!contents? s$"
open newregs$ for output as #r
print #r,s$
close #r

s$="Notice"+chr$(13)
s$=s$+"YOUR ALERT LEVELS WERE SAVED AS '"+SeparateFile$(newregs$)+"'."
notice s$

goto [exreg]

[openregs]
filedialog "Open a custom set of Alert Levels", DefaultDir$+"\public\data\*.alr",newregs$
if newregs$="" then
 wait
end if

#reg "!cls"
#reg "!origin 1 0"
open newregs$ for input as #1
while eof(#1)=0
line input #1,wo$
#reg wo$
wend
close #1
```

```
#reg "!origin 1 0"
wait
                                        * * *

[defaults]
redim dgn$(15)
redim dgl(15)
redim dgn$(15)
 dgn$(0)="Doses inconsequential, TEDE less than 0.01 mSv: -1"
 dgn$(1)="1-yr TEDE Constraint,unplanned irradiation,population, Romania: 0.01"
 dgn$(2)="1-yr TEDE Limit to population, all sources, Romania: 1"
 dgn$(3)="Sheltering TEDE PAG, Romania: 3"
 dgn$(4)="Sheltering TEDE PAG, IAEA: 10"
 dgn$(5)="Evacuation TEDE PAG, Romania: 30"
 dgn$(6)="Evacuation TEDE PAG, IAEA: 50"
 dgn$(7)="Hot Intervention Zone TEDE PAG, Romania: 100"
 dgn$(8)="Sheltering THYD PAG, Romania: 30"
 dgn$(9)="Iodine prophylaxis THYD PAG, IAEA: 100"
dgn$(10)="Evacuation and Iodine prophylaxis THYD PAG, Romania: 300"
dgn$(11)="Hypothyroidism in 1 or more yrs./8.0e-3 risk of fatal thy.cancer THYD PAG IAEA: 5000"
dgn$(12)="Vomiting in 1 day TABD PAG, IAEA: 500"
dgn$(13)="Death in 1-2 mnt./1.0e-1 risk of fatal cancer TABD PAG, IAEA: 1000"
dgn$(14)="Death in 2-12 mnt./5.0e-2 risk of lung cancer TALD PAG, IAEA: 6000"
dim dgl(15)
for j=0 to 14
dgl(j)=val(trim$(word$(dgn$(j),2,":")))
print dgn$(j),dgl(j)
next
return
                                        * * *
[resetcode]
if pop=1 then wpop=0: close #pop
if wopt=1 then wopt=0: close #opt
if lwin=1 then lwin=0: close #win

 if lmap=1 then
  lmap=0
  unloadbmp "map"
 end if
 if wof=1 then    '.elv
  close #o
  wof=0
 end if
 if wf=1 then     'MyGLOBE
  close #glb
  wf=0
```

```
end if
lwin=0
if wtss=1 then   'SRTM90
 close #9
 osstile$=""
 wtss=0
 ocol=-1
 olin=-1
end if
if wst=1 then    'SRTM30
 osftile$=""
 wst=0
 close #usgs
end if

goto [begin]

'HELP
‘ Comenzi Menu
'_____

[help1]
run "explorer "+DefaultDir$+"\public\docs-essentials\0-Source-Terms-Mix-Model.pdf"
wait
                                    * * *
[help2]
'run "explorer "+DefaultDir$+"\public\docs-essentials\1-A-Standard-European-Plume-Model.pdf"
run "explorer "+DefaultDir$+"\public\docs-essentials\Suppl-1.pdf"
wait
                                    * * *
[readings]
filedialog "Open a reference for reading",DefaultDir$+"\public\docs-essentials\*.pdf",pdfile$
if pdfile$="" then wait
run "explorer "+pdfile$
wait



'MISCELLANEA...
‘Redimensionari de control texteditor
'_____________________________

[rsz1]
#win.ee "!locate "+str$(xMare)+" "+str$(yMare)+" "+str$(wMare)+" "+str$(hMare)
#win "refresh"
wait
                                    * * *
```

```
[rsz2]
#win.ee "!locate "+str$(xMic)+" "+str$(yMic)+" "+str$(wMic)+" "+str$(hMic)
#win "refresh"
wait
                                        * * *
[mare]
#win.ee "!locate "+str$(xMare)+" "+str$(yMare)+" "+str$(wMare)+" "+str$(hMare)
#win "refresh"
return
                                        * * *
[mic]
#win.ee "!locate "+str$(xMic)+" "+str$(yMic)+" "+str$(wMic)+" "+str$(hMic)
#win "refresh"
return

'FUNCTII
'________

Function Expo(e)
    if abs(e)<=300 then
     Expo=exp(e)
    end if
    if e>300 then Expo=exp(300)
    if e<-300 then Expo=0
End Function

Function BitmapWidth(hBmp)
    struct BITMAP,_
    bmType as long,_
    bmWidth As long,_
    bmHeight As long,_
    bmWidthBytes As long,_
    bmPlanes as word,_
    bmBitsPixel as word,_
    bmBits as Long
    length=len(BITMAP.struct)
    calldll #gdi32, "GetObjectA", hBmp as ulong,_
       length as long,BITMAP as struct,_
       results as long
    BitmapWidth=BITMAP.bmWidth.struct
End Function

Function BitmapHeight(hBmp)
    struct BITMAP,_
    bmType as long,_
    bmWidth As long,_
    bmHeight As long,_
```

```
    bmWidthBytes As long,_
    bmPlanes as word,_
    bmBitsPixel as word,_
    bmBits as Long
    length=len(BITMAP.struct)
    calldll #gdi32, "GetObjectA", hBmp as ulong,_
      length as long,BITMAP as struct,_
      results as long
    BitmapHeight=BITMAP.bmHeight.struct
End Function

Function string$(n,c$)
  string$=""
  for j=1 to n
  string$=string$+c$
  next
End Function

Function SeparateFile$(f$)
    fileindex=Len(f$)
    filelength=Len(f$)
      While Mid$(f$, fileindex,1)<>"\"
        fileindex=fileindex-1
      Wend
    SeparateFile$=Right$(f$,filelength-fileindex)
End Function

Function MyRun(runfile$,lparams$,ddir$,swflag,lwait)
 SEEMASKNOCLOSEPROCESS = 64 '0x40
 Struct s,_
 cbSize as long,_
 fMask as long,_
 hwnd as long,_
 lpVerb$ as ptr,_
 lpFile$ as ptr,_
 lpParameters$ as ptr ,_
 lpDirectory$ as ptr,_
 nShow as long,_
 hInstApp as long,_
 lpIDList as long,_
 lpClass as long,_
 hkeyClass as long,_
 dwHotKey as long,_
 hIcon as long,_
 hProcess as long

 file$=runfile$
```

```
s.cbSize.struct=len(s.struct)
s.fMask.struct=SEEMASKNOCLOSEPROCESS
s.hwnd.struct=0
s.lpVerb$.struct="Open"
s.lpFile$.struct=file$
s.lpParameters$.struct=lparams$
s.lpDirectory$.struct=ddir$
s.nShow.struct=swflag

calldll #shell32 , "ShellExecuteExA",_
s as struct,r as long

if r<>0 then
 hProcess=s.hProcess.struct
 MyRun=1
else
 MyRun=0
 goto [iesfn]
end if
if lwait=1 then
 waitResult=-1
 while waitResult<>0
 calldll #kernel32, "WaitForSingleObject",_
 hProcess as long,0 as long,_
 waitResult as long
 wend
end if
[iesfn]
end function
```

ANEXA 4

Supliment bibliografic

Vamanu D.V., Vamanu B.I., Acasandrei V.T., Maceika E., Plukis A. *EURISOL Desktop Assistant Toolkit (EDAT): A modeling, simulation and visualization support to the preliminary radiological assessment of RIB projects*. Eur. Phys. J. A (2010). DOI 10.1140/epja/i2010-10935-9.

U.S.EPA (1993). *External Exposure to Radionuclides in Air, Water, and Soil*, FRG-12 EPA-402-R-93-081 (U.S.A.).

U.S.EPA (1988). *Limiting Values of Nuclide Intake and Air concentration, and Dose Conversion Factors for Inhalation, Submersion and Ingestion*, FRG-11 EPA 520/1-88-020 (U.S.)

IAEA (2000). Generic Procedures for Assessment and Response During a Radiological Emergency. IAEA-TECDOC-1162, ISSN 1011–4289.

IAEA (2001). *Generic Models for Use in Assessing the Impact of Discharges of Radioactive Substances to the Environment*. Safety Reports Series No.19. International Atomic Energy Agency Vienna, 2001.

Vamanu D.V., Acasandrei V.T., and Vamanu B.I. *Safety risks in spent nuclear fuel road transportation: 'black swans' by malicious intent*. Romanian Reports in Physics, Volume 66, No. 3, 2014.

Vamanu D.V., Slavnicu D.S., Vamanu B.I., V.T., Acasandrei and Gheorghiu D. *Safety risks in spent nuclear fuel air transportation - a 'black swan' anatomy*. Romanian Reports in Physics, Volume 66, No. 2, 2014.

Gheorghe A.V., Vamanu D.V. *Resilience Governance through Serious Energy Gaming*. EAI Endorsed Transactions on Energy Web. January-June 2013, Volume 13, Issues 01-06, e3. doi: 10.4108/trans.ew.2013.01-06.e3, 2013.

Vamanu B.I., Vamanu D.V. and Acasandrei V.T. (2012). *Rationalizing disasters: the Standing Anticipation of Dynamic Vulnerabilities*. Conference and partnering event on resilience against disasters - CONCERT Japan. Oral and poster presentation. Tokyo, Japan, 10-11 september 2012.

Vamanu D.V., Slavnicu S.D, Galeriu D., Acasandrei V.T., Gheorghiu D. and Melintescu A. *Decommissioning Research Reactors: A Case of a Reference Accident Scenario.* Romanian Reports in Physics, Vol.63, No.1, pp. 50–66, 2011.

Vamanu D., Gheorghe A. *Situation Assessment Toolkit: the case of the Fukushima Accident*. Second International Conference on Integrated Disaster Risk Management, IDRIM, Reframing Disasters and Reflecting on Risk Governance Deficits, University of Southern California, Los Angeles, California, July 14 -16, 2011.
http://conference2011.idrim.org/IDRiM%202011%20Book%20of%20Abstracts%20With%20Cover1.pdf.

Vamanu D.V., Galeriu D., Slavnicu D.S., Stochioiu A., Acasandrei V.T., Melintescu A. and Gheorghiu D. *Fukushima. Monitorizare IFIN-HH*. IFIN-HH, Website IFIN-HH, martie-mai 2011. http://www.nipne.ro/fukushima_2011.

Vamanu D.V., Vamanu B.I., Acasandrei V.T., Maceika E. and Plukis A. *EURISOL Desktop Assisstant Toolkit (EDAT): A Modeling, Simulation and Visualization Support to the Preliminary Radiological Assessment of RIB Projects*. The European Physical Journal A – Hadrons and Nuclei, Volume 44, No.1, Springer Berlin/Heidelberg, ISSN: 1434-6001 (Print) 1434-601X (Online), DOI 10.1140/epja/i2010-10935-9, pp. 129–146, 2010.

Vamanu D.V., Slavnicu S.D, Gheorghiu D, Acasandrei V.T. and Slavnicu E. *The Hydrological Impact Assessment in the Decision Support of Nuclear Emergency Response*. Radiation Protection Dosimetry, Technical Note, doi:10.1093/rpd/ncq048, Online ISSN 1742-3406, Print ISSN 0144-8420, pp. 1-11, 2010.

Vamanu D.V., Gheorghe A.V. and Acasandrei V.T. *Urban vulnerabilities: think simple* International Journal Critical Infrastructures, Vol. 6, No. 3, pp. 304-325, 2010.

Slavnicu S.D, Vamanu D.V., Gheorghiu D., Acasandrei V.T. and Slavnicu E. *Assessing the Hydrological Impact in Nuclear Emergencies*. Proceedings of the Third European IRPA Congress, June 14 – 16, 2010, Helsinki, Finland. 2010.

Gheorghe A.V., Vamanu D. *Vulnerability of Critical Infrastructure Systems: A Physical Analogy for Modeling Complex Hysteresis Behavior*. Proceedings of The 10th International Probabilistic Safety Assessment & Management Conference (PSAM 10). June 7-11, 2010, Seattle Washington.

Slavnicu S.D, Vamanu D.V., Gheorghiu D., Acasandrei V.T. and Slavnicu E. *Nuclear Emergency Response Exercises and Decision Support Systems – Integrating Domestic Experince with International Reference Systems*. Proceedings of the European Nuclear Conference, May 30 – June 2, 2010, Barcelona, Spain, , ISBN 978-92-95064-09-6, 2010.

Slavnicu D.S., Vamanu D.V., D. Gheorghiu, V.T. Acasandrei and Vamanu B.I. *Decision support systems and emergency response exercises – lessons and issues.* Radioprotection, vol. 44, no. 5, pp 97–101, ISBN: 978-2-7598-0447-4, 2009.

Gheorghiu D., Slavnicu D.S., Vamanu D.V., Acasandrei V.T. *Rodos and Acolytes: Integrating Domestic Experience With International Reference Decision Support Systems.* Final Meeting of the EURANOS Project, "Final Contractors Meeting" and "Users Groups Meetings", CIEMAT, Madrid, Spain, 22-26 June 2009.

Gheorghe A.V., Vamanu D.V. *From Risk Governance to Resilience Governance* National Science Foundation (NSF) Meeting on Resilience, Sustainability and Critical Infrastructures, Alexandria, Virginia, USA, December 6, 2009.

Gheorghe A.V., Muresan L. Vamanu D.V. *Threats and Vulnerability Assessment of Maritime Infrastructure Systems.* USA Navy - GCC Meeting on Critical Maritime Infrastructure Protection, Bahrain, February 10, 2009.

Gheorghe A.V., Vamanu D.V. *International Activities on System of Systems Engineering: an European Perspective.* Workshop on System of Systems Engineering - State of the Art, University of New Mexico, New Mexico, USA, March 16 2009.

Gheorghe A.V., Vamanu D.V. *Critical Infrastructure Protection at Regional Level: Development and Use of DSS.* Workshop on Regional Assessment of Critical Infrastructures, Bucharest, November 13, 2009.

Slavnicu D.S., Vamanu D.V., Gheorghiu D., Acasandrei V.T. and Vamanu B.I. *Decision Support Systems and Emergency Response Exercises – Lessons and Issues.* International Conference on Radioecology and Environmental Radioactivity in Bergen, Norway, 15 – 20 June 2008.

Vamanu D.V., Slavnicu D.S., Gheorghiu D., Acasandrei V.T. and Vamanu B.I. *Decision Support Systems and Health and Environmental Impact in a Radioactive Release.* Sesiunea stiintifica "Stiinte aplicate in studiul mediului inconjurator si materialelor", Targoviste, 4-6 iunie, 2008.

Gheorghe A.V. and Vamanu D.V. *Homeland Security Related Issues with 'Minor League' Nuclear Infrastructures: Critical Topics on the Decommissioning of Research Reactors.* 2nd Annual Homeland Defense and Security Education Summit, University of Maryland University College, USA, Summit sponsored and organized by The Naval Postgraduate School Center for Homeland Defense and Security, The Homeland Security/Defense Education Consortium, The U. S. Department of Homeland Security, and The University of Maryland University College, Mar 18-19, 2008.

Slavnicu D.S., Vamanu D.V., Gheorghiu D., Gheorghiu A., Acasandrei V.T., Vamanu B.I. *Decision support systems. The evaluation of environmental impact in a radioactive release.* National Conference of Physics, Magurele (Bucuresti), Romania, September 10 - 13, 2008

Slavnicu D.S., Vamanu D.V., Gheorghiu D., Vamanu B.I., Acasandrei V.T. and Gheorghiu A. *Decission Support Systems – the Evaluation of Health and Environmental Impact in a Radioactive Release* Romanian Reports in Physics, Volume 60, nr. 4, pp. 1115-1122, 2008

Gheorghe A.V. and Vamanu D.V. *Quantitative Vulnerability Assessment of Critical Infrastructures: watching for hidden faults.* International Journal of Critical Infrastructures, Vol. 4, Nos. 1/2, 2008, pp.144-152, 2008

Vamanu D.V., Gheorghe A.V., Acasandrei V.T. and Vamanu B.I. *Critical Issues with 'Minor League' Nuclear Infrastructures: The Back End of the Life Cycle.* International Journal of Critical Infrastructures, Volume 4, No. 4, ISSN (Print): 1475-3219, ISSN (Online): 1741-8038, pp. 368-391, 2008

Slavnicu D.S., Vamanu D.V., Gheorghiu D., Acasandrei V.T. and Vamanu B.I. *Decision Support Systems and Emergency Response Exercises – Lessons and Issue.* Proceedings of the International Conference on Radioecology and Environmental Radioactivity in Bergen, Norway, pp. 150-153, 15–20 June 2008.

Gheorghe A.V., Vamanu D.V. *Testing Critical Infrastructure Vulnerability: An Essay in Probabilistic Resilience Analysis*. Published in NATO Science for Peace and Security Series: Information and Communication Security – Volume 13 'Computational Models of Risks to Infrastructure', Editors: D. Skanata and D.M. Byrd August 2007, pp. 226-247, hardcover ISBN: 978-1-58603-766-6, IOS Press, The Netherlands, 2007.

Gheorghe A.V. and Vamanu D.V. *Risk and vulnerability games. The anti-satellite weaponery (ASAT).* International Journal of Critical Infrastructures, Vol. 3, Nos. 3/4, pp. 457-470, 2007.

Slavnicu D.S., Vamanu D.V., Gheorghiu D., Acasandrei V.T., Vamanu B.I. *CONVEX-3: A Case for Flexible Strategies in Nuclear Emergency Assessment*. Proceedings of the 11th International Conference on Harmonisation within Atmospheric Dispersion Modelling for Regulatory Purposes, London, U.K., pp. 91-95, July 2-6, 2007.

Vamanu B.I, Acasandrei V.T. and Vamanu D.V. *EURISOL – radioprotection tools – the Desktop Assistant.* Joint EURISOL-EURONS Town Meeting, Helsinki, Finland, 17 – 20 September, 2007. Poster presentation.

Vamanu D.V., Slavnicu D.S., Gheorghiu A., Vamanu B.I., Acasandrei V.T. *Exerciţiul de alertă nucleară "OLTENIA-2007"*. IFIN-HH Raport tehnic, octombrie 2007.

Gheorghe A.V., Vamanu D.V. *Critical Electricity Infrastructure: Current Experience in Europe,* in Critical Infrastructures at Risk. Securing the European Electric Power System, eds. A.V. Gheorghe, M. Masera, M. Weijnen, and L. De Vries (Springer, Netherlands), Topics in Safety, Risk, Reliability and Quality Series, ISBN-10 1-4020-4306-6 (HB), ISBN-13 978-1-4020-4306-2 (HB), ISBN-10 1-4020-4364-3 (e-book), ISBN-13 978-1-4020-4364-2 (e-book), Volume 9, pp.195-253, 2006.

Gheorghe A.V., Vamanu D.V. *Another Tool in the Business of Spatial Framing of Illicit / Lost from Account Radioactive Material: Helping the AT (Anti-Terrorism) Paraphernalia Thrive.* International Journal of Critical Infrastructures, Vol.2, No.4, Pages 347-356, 2006.

Vamanu D.V., Slavnicu D.S., Gheorghiu D., Acasandrei V.T., Vamanu B.I. *Adaptive Strategies in Nuclear Emergency Assessment: The ConvEX-3 Case.* Romanian Reports in Physics. Vol.58, No.4, Pages 539-558, 2006

Gheorghe A.V., Vamanu D.V. *Vulnerability Assessment of Critical Infrastructures.* International Conference on Complex Systems, June 25-30, 2006.

Gheorghe A.V., Vamanu D.V. *Vulnerability of Critical Infrastructures Exposed to Technical Failures or Natural Hazards. Chernobyl and Katrina: Two Names to Make History.* Sixth Annual IIASA-DPRI

Forum on Integrated Disaster Risk Management: Risks and Challenges for Business and Industry, , Istanbul, Turkey, 13 – 16 August, 2006.

Gheorghe A.V., Vamanu D.V. *Modeling Vulnerability of Interdependent CriticalInfrastructure: from Graphs to Models with Strange Attractors.* NATO Meeting on Modeling Complex Systems, 15 – 18 May, Split, Croatia. Published in NATO Security through Science Series, IOS Press, Netherlands, 2006.

Vamanu D.V., Slavnicu D.S., Gheorghiu A., Vamanu B.I., Acasandrei V.T. *Evaluarea documentului "Revizia raportului final de securitate pentru DCNU"*. IFIN-HH Raport tehnic intern, comanda nr.523/10.03.2006, martie 2006.

Gheorghe A.V., Birchmeier J., Vamanu D.V., Papazoglou I., Kroeger W. *Comprehensive risk assessment for rail transportation of dangerous goods: a validated platform for decision support.* Reliability Engineering & System Safety, Elsevier, 88, pp. 247-272, 2005

Gheorghe A.V., Vamanu D.V. *On the Vulnerability of Critical Infrastructures: Seeing it Coming*. International Journal of Critical Infrstructures, Vol. Nos 2-3, 2005.

Gheorghe A.V., Vamanu D.V. *Reading vulnerability in phase portraits: an exercise in probabilistic resilience assessment.* International Journal of Critical Infrastructures, vol. 1, no. 4, pp. 312-330.

Gheorghe A.V., Vamanu D.V. *Risks in Business Design for Critical Infrastructures: the 'DASHBOARD' Concept.* International Journal of Critical Infrstructures, Vol.2, No.1, Pages 70-82, 2005

Acasandrei V.T., Vamanu B.I. and Vamanu D.V. *Cost assessment in nuclear decommissioning: a useful tool.* Analele Universitatii Bucuresti, LIV, 2005, pp.19-31 (publicata octombrie 2007), 2005.

Gheorghe A.V., Vamanu D.V. *Critical Infrastructures Protection: From Systems Engineering to System of Systems Engineering. Use of Cellular Automata Modeling.* International Conference on Resilient Infrastructures, Rotorua, New Zealand, September 2005.

Gheorghe A.V., Vamanu D.V. *Pixel as a Source of Input, Pixel as a Support of Output.* Gulf Area International Workshop on the Use of GIS, Al Kuwait, 2005.

Gheorghe A.V., Vamanu D.V. *GIS: Pixels, Analytic Models Cellular Automata: A New Kind of Modeling.* Gulf Area International Workshop on the Use of GIS, Al Kuwait, 2005.

Gheorghe A.V., Vamanu D.V. *Quantitative Vulnerability Assessment of Critical Infrastructures: Watching for Hidden Faults.* Task Force G8 Meeting on Critical Energy Infrastructures, Brussels, November, 2005.

Gheorghe A.V., Vamanu D.V. *Quantitative Vulnerability Assessment for Critical Infrastructures: Bridging Risk Management and Safety.* Proceedings of the International Conference on Risk and Safety Management, Hong Kong 2005.

Gheorghe A.V., Vamanu D.V. *Towards a Standard Model of Societal Vulnerability to Natural Disasters. The Katrina Paradigm* OECD Workshop on Science and Technology for a Safer Society, Tokyo, Japan, December 5-6, 2005.

Gheorghe A.V., Vamanu D.V. *A cellular automaton approach to air flow dispersion in urban areas.* Proceedings on Systems Analysis for a More Secure World: Application of System Analysis and REMS to Security of Complex Systems, Giacomo G.M. Cojazzi, Editor, EC JRC Ispra, pp. 369-383. 2005.

Gheorghe A.V., Vamanu D.V. *Daily Regional Vulnerability of Infrastructures to Obnoxious Agents. How vulnerable are you today?* Proceedings of the Annual IIASA-DPRI Meeting on Integrated Disaster Risk Management, Beijing, September 2005.

Gheorghe A.V., Vamanu D.V. *GIS: Pixels, Analytic Models, Cellular Automata. Innovations in Science and Policy for Risk and Vulnerability Assessment of Critical Infrastructures* Proceedings of the Annual IIASA-DPRI International Meeting on Integrated Disaster Risk Management, September, 2005.

Vamanu D.V., Slavnicu D.S., Gheorghiu D., Acasandrei V.T., Vamanu B.I. *Riscuri eco-sanitare şi limite derivate de eliberare a radioactivităţii din activităţile de dezafectare a reactorului VVR-S, IFIN-HH*. IFIN-HH Raport tehnic intern, comanda nr.933/20.07.2005, iulie 2005.

Vamanu D.V., Slavnicu D.S., Gheorghiu D., Acasandrei V.T., Vamanu B.I. *ConvEX 3 International Emergency Management Exercise: IFIN-HH/NIPNE Decision Support*. A Technical Report, mai 2005.

Gheorghe A.V., Vamanu D.V. *Decision support systems for risk mapping: viewing the risk from the hazards perspective*. Journal of Hazardous Materials, Volume 111, Issues 1-3, pp.45-55, 2004

Gheorghe A.V., Vamanu D.V. *Complexity-Induced Vulnerability*. International Journal of Critical Infrastructures, Vol. 1, no. 1, 2004, pp.76-85, 2004

Vamanu D.V., Slavnicu D.S., Slavnicu E., Vamanu B.I. *Decision Support Systems in Nuclear Emergencies: A Scenario-Based Comparison of Domestic and Reference Tools.* Radiation Protection Dosimetry , 112, 209 – 218, December, 2004

Gheorghe A.V., Birchmeier J, Vamanu D.V., Papazoglou I, Kröger W. *Integrated Risk Assessment for Rail Transportation of Dangerous Goods: Decision Support Platform and an SBB Case Study.* Reliability Engineering and System Safety, Elsevier, 2004.

Gheorghe A.V., Birchmeier J., Kroeger W., Vamanu D.V., Vamanu B.I. *Advanced Spatial Modeling forRisk Analysis in the Transportation of Dangerous Goods.* PSAM7 – ESREL'04 Proceedings of the 7th International Conference on Probabilistic Safety Assessment and Management, 14-18 June 2004, Berlin, Germany (Published by Springer Verlag: London, Berling, Heidelberg, 2004).

Vamanu D.V., Slavnicu D.S., Acasandrei V.T., Vamanu B.I. *Radiological Assessment Assistance to Decommissioning.* International Atomic Energy Agency Technical Meeting, Vienna, 1-3 November, 2004. Poster presentation.

Vamanu D.V., Acasandrei V.T., Vamanu B.I. *Aplicaţia interjudeţeană "Muntenia-2004"*. Exerciţiu de protecţie civilă în caz de accident radiologic la IFIN-HH. Raport tehnic intern, septembrie 2004.

Vamanu D.V., Slavnicu D.S., Gheorghiu D., Acasandrei V.T., Vamanu B.I. IFIN-HH *Limite derivate de emisie ale instalaţiilor nucleare*. IFIN-HH Raport tehnic intern, comanda nr. 1590/30.04.2004, aprilie 2004.

Vamanu D.V., Gheorghe A.V., Vamanu B.I. *On a Generic Model in Quantitative Vulnerability Assessment.* Romanian Journal of Physics Supplement, Vol.48, pp 229-237, 2003.

Gheorghe A.V., Vamanu D.V. *Risk'o Meter and Living Risk Assessment. Inteligent Monitoring Integration.* Workshop on Advancements in Accident Management Investigation. Invited presentation, Winterthur Insurance Company, Winterthur, Switzerland, 18 March 2003.

Gheorghe A.V., Vamanu D.V. *Risk, Vulnerability, Sustainability and Governance*. Invited paper presented at the Telecom DoCoMo Seminar, Tokyo, Japan, 24 March 2003.

Gheorghe A.V., Vamanu D.V. *Dealing with Integrated Risk and Vulnerability Management. A new Way in Corporate Governance.* Workshop in Corporate Governance, Zürich, ETH, Switzerland, 10 May 2003.

Gheorghe A.V., Doerig A., Vamanu D.V. *Towards a new Horizon in Corporate Governance.* Think Tank Paper, UBS, Wolfsberg, Switzerland, June 30, 2003.

Gheorghe A.V., Vamanu D.V. *Disaster Risk Management: Complexity Induced Vulnerability Management.* International Workshop on Risk and Vulnerability Management, Kyoto, Japan, 27 July 2003.

Gheorghe A.V., Vamanu D.V. *Satellite Assisting Risk and Vulnerability Assessment for the Transportation of Dangerous Goods: Setting the Issues for Models and DSS.* Joint Workshop ETH Zurich-Italian Space Agency on New Trends for Satellite Use in Risk Analysis, Zürich, Switzerland, 2 September 2003.

Gheorghe A.V., Vamanu D.V. *Decision Support System for Risk Management.* European Commission, International Workshop on Severe Accident Management, Petten, Holland, 15 September 2003.

Vamanu D.V., Isbasescu M., Berinde Al., Slavnicu D.S, Gheorghiu D., Acasandrei V.T, Vamanu B.I. *Plan dezafectare Reactor VVR-S. Cap. 3.4. Evaluarea impactului asupra mediului.* Raport tehnic intern, ianuarie 2003.

Vamanu D.V., Slavnicu D.S., Mateescu Ghe., Berinde Al., Acasandrei V.T. *A Code Comparison Exercise within the European Project RODOS: Harmonizing Domestic and Reference Tools.* International Journal of Risk Assessment and Management, vol.3, Nos 2/3/4, pp. 113-134, 2002
Gheorghe A.V., Vamanu D.V. *Integrated Risk Assessment and Safety Management; Transportation of Dangerous Goods.* International Journal of Risk Assessment and Management, Vol.3, Nos.2/3/4, 2002.

Gheorghe A.V., Vamanu D.V. *Vulnerability Assessment of Sustainable Energy Policies.* Invited Presentation, 'Technical Committee Meeting on Energy and Sustainable Development', International Atomic Energy Agency, Vienna, Austria, 11 May 2002.

Gheorghe A.V., Vamanu D.V. *Emergency Management and Planning: Use of DSS and Knowledge Based Systems.* Invited Presentation, the United Nations Office for Coordination of Humanitarian Affairs, Geneva, Switzerland, 18 June 2002.

Gheorghe A.V., Vamanu D.V. *Complexity Issues in Modelling of Vulnerability and Risk Management Processes.* Invited Lecture, 'The Future of Switzerland' Foundation, Zürich, Switzerland, 27 August 2002.

Gheorghe A.V., Vamanu D.V. *The Risk'o Meter Concept.* Proceedings of the 6th International Conference on Probabilistic Safety Assessment and Management, 23-28 June 2002, Vol. I, Elsevier, Amsterdam.

Gheorghe A.V., Vamanu D.V. *Quantitative Vulnerability Assessment for Critical Infrastructures.* Proceedings of the 6th International Conference on Probabilistic Safety Assessment and Management, 23-28 June 2002, Vol. I, Elsevier, Amsterdam, 2002.

Gheorghe A.V., Vamanu D.V. *Vulnerability of Vital Systems: Impacts to Governance*. Academia Europea Annual Meeting, 'The Sciences and the Understanding of Risk: Policies for Public Trust and Well Being', Lisbon, Portugal, 9-12 October 2002.

Gheorghe A.V., Vamanu D.V. *Disaster Risk and Vulnerability Management*. Invited Presentation, Nazional Alarm Zentrale (NAZ), Zürich, Switzerland, 10 April 2002.

Gheorghe A.V., Vamanu D.V. *Sensors and Intelligent Monitoring Integration: Risk'o Meter.* Workshop on Sciences and Technology within Societal Context, University of Tokyo, Japan, 25 January 2002.

Gheorghe A.V., Vamanu D.V. *Vulnerability Assessment in the Context of Sustainable Development*. Annual Meeting of the Alliance for Global Sustainability (AGS), San Jose, Costa Rica, 21 March 2002.

Gheorghe A.V. and Vamanu D.V. *Adapting to new challenges: IDSS for emergency preparedness and management*. International Journal of Risk Assessment and Management, Volume 2, Numbers 3-4 / 2001, pp.211 – 223, 2001.
Gheorghe A.V., Vamanu D.V. *Indicators for Vulnerability Assessment and Management of Critical Infrastructures.* Proceedings of the 5 th International Conference on Technology, Policy and Innovation: Main Theme - Critical Infrastructures, The Hague, The Netherlands, June 26-29, 2001.

Gheorghe A.V., Vamanu D.V. *The Risk Cadastre from a Concept Outline to Effective Implementation*. Proceedings of the Conference and Workshops on Risk Analysis and Safety Management of Technical Systems, Gdansk, Poland 25-26 June 2001.

Vamanu D.V., Slavnicu D.S., Mateescu Ghe., Berinde Al. *Harmonizing Domestic and Reference Software Tools for Nuclear Accident Consequence Assessment.* 7th International Conference on Harmonising within Atmospheric Dispersion Modeling for Regulatory Purposes, JCR-EI Belgirate, Italy, May 28-31, 2001.

Gheorghe A.V., Vamanu D.V. *Decision-support software tools for integrated risk assessment of hazardous substances in complex terrain*. International Journal of Environment and Pollution, (4) 352-370, 1998.

Gheorghe A.V., Vamanu D.V. *Emergency Planning Knowledge.* Series: Dokumente/Polyprojekt Risiko und Sicherheit Nr. 13, VDF Verlag der Fachvereine Zurich, ISBN-10 3-7281-2201-7, p.239, 1996

Vamanu D.V., Gheorghe A.V. *A heuristic approach to particle flows in complex terrain.* International Journal of Environment and Pollution, (4-6) 462-490, 1996

Gheorghe A.V., Vamanu D.V. *Sophisticated and intelligent systems and approaches in emergency engineering and management*. International Journal of Global Energy Issues, (1-2) 82-98, 1995

Gheorghe A.V., Vamanu D.V. *A pilot decision support system for nuclear power emergency management*. Safety Science-Elsevier, Volume 20, Issue 1, pp.13-26, ISSN: 0925-7535, 1995

Vamanu D.V., Sandru P., Gheorghe A.V. *Risk Culture in Romania - How Bitter the Pill?* Proceedings of the 3rd International Conference of the Society for Risk Analysis (SRA), Paris, December 1991

Ursu I., Vamanu D.V., Gheorghe A.V., Purica I.I. *Socioeconomic risk in development of energy systems*. Risk Analysis, Risk Analysis, Volume 5, Issue 4, pp.315–326, 1985

Ursu I., Purica I.I., Vamanu D.V. *Towards More Safety: Observing Synergisms in Reactor Behaviour.* In “Nuclear Power Experience”, vol.IV, paper IAEA-CN-42-139, pp.255-266. International Atomic Energy Agency, Vienna, 1983

Vamanu D.V. *Energy Pattern, Options and their Articulation in Romania.* In Papers of the 12th Congress of the World Energy Conference, New Delhi, 18-23 September 1983.

Ursu I., Vamanu D.V. *Motivations and Attitudes in the Long-Term Planning of Alternative Energy Systems*. In Proc. UNITAR Conference on Long-Term Energy Resources, Montreal, 26 November-7 December 1979. Vol.II, paper CF7/XXI/2. UNITAR, New York. i.q. in “Long-Term Energy Resources”, vol.I. Pitman (Boston-London- Melbourne-Toronto), 1981.

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