Received 00th January 20xx,
Accepted 00th January 20xx

DOI: 10.1039/x0xx00000x

Lab-on-a-Drone: Remote voltammetric analysis of lead in water with real-time data transmission

João Paulo B. de Almeida[1], Vinicius de A. Carvalho[1], Leandro P. da Silva[1], Maysa L. do Nascimento[1,2], Severino B. de Oliveira[2], Matheus V. Maia[3], Willian T. Suarez[3], Carlos D. Garcia[4] and Vagner B. dos Santos[1,*]

Electronic Supplementary Information

[1]LIA[3] (Laboratório de Instrumentação e Automação em Analítica Aplicada) da Universidade Federal de Pernambuco- Recife-PE-Brazil.
[2]Universidade Federal Rural de Pernambuco- Recife-PE-Brazil.
[3] Universidade Federal de Viçosa-MG-Brazil,
[4]Clemson University- USA
† vagner.bsantos@ufpe.br. Av. Jornalista Anibal Fernandes, s/nº, Cidade Universitária, Recife, PE, 50740-560, Brazil.

```
int Vs= 6;    // Solenoid valve actuation pin
int Bd= 7;    // Micro Water pump actuation pin
String corrente;
String potencial;
int package_nr = 0;
String valorpotencial [350]; // String vector to save potential values applied during voltammetry
String valorcorrente[350];  // String vector to save current values measured during voltammetry
int nm=0;
int contagem=0;
int voltametria=1;     // Variable whose purpose is to identify whether the remote command to start electrochemical analysis was activated
int analise=0;
String maxcorrente= "0.9999999999999"; //The value of this variable will be updated with the actual value of the peak current measured in the
voltammetry
String maxpotencial;    // This variable will store the peak potential value
float correntedepico;
float concentracao;     // It stores the concentration value calculated by equation derived from linear regression
float cb= 1.3;
float vi;
```

Scheme S1. Part of the algorithm used to declare some variables.

```
for (int i = 0; i < package.nr_of_subpackages; i++){
PrintSubpackage(package.subpackages[i]);
if (nm>239){// this condition imposes that only the data measured after the pre-treatment step will be transmitted
 if(i==0){
valorpotencial[contagem]=potencial;
 }
 if(i==1){
  valorcorrente[contagem]=corrente;
   if(valorcorrente[contagem].substring(0,1)!="-"){
   if(valorcorrente[contagem].substring(7,9)<maxcorrente.substring(7,9)){
    maxcorrente=valorcorrente[contagem];
    maxpotencial=valorpotencial[contagem];
   }
   if(valorcorrente[contagem].substring(7,9)==maxcorrente.substring(7,9)){
   if(valorcorrente[contagem].substring(0,5)>maxcorrente.substring(0,5)){
    maxcorrente=valorcorrente[contagem];
    maxpotencial=valorpotencial[contagem];
   } } }
  contagem=contagem +1;
 } } }
nm=nm+package.nr_of_subpackages-1;
```

Scheme S2. Part of the algorithm developed to determine the peak potential and peak current measured in the voltammetric analysis.

```
correntedepico=(((maxcorrente.substring(0,5).toFloat())*pow(10.0,((maxcorrente.substring(8,9).toFloat())*(-1))))*pow(10,6));
vi=correntedepico-cb;// This line subtracts the measured peak current from the peak current of the supporting electrolyte, so: vi=(measured peak current)-1.3, both in µA.
concentration= (28.81*vi)-(8.73); // Equation concerning the linear regression developed to SWASV
// The above mentioned equation is derived from the linear regression of the calibration curve performed for SWASV of lead samples: Y=0.302 +0.0347*X
//Y is the current in µA, and X is the lead concentration in µg/L.
```

Scheme S3. Algorithm developed to supply the concentration of Pb^{2+} / (µg L^{-1}) in real time. For this, the peak current and linear equation obtained in Figure 4 of SWASV were used.


```
void serverWEB() { // This piece of code is responsible for creating the web server and displaying the data measured in the voltammetry on the smartphone screen

 if (client) {
  Serial.println("new client");
  String currentLine = "";
  while (client.connected()) {
   if (client.available()) {
    char t = client.read();
    Serial.write(t);
    if (t == '\n') {

     if (currentLine.length() == 0) {

      client.println("HTTP/1.1 200 OK");
      client.println("Content-type:text/html");
      client.println();
      client.print ("                 Sampling and analysis system <br><br><br>");
      client.print("Click <a href=\"/H\">here</a> to turn on the BD <br>");
      client.print("Click <a href=\"/L\">here</a> to turn off the BD<br><br>");
      client.print("Click <a href=\"/F\">here</a> to turn on the VS <br>");
      client.print("Click <a href=\"/D\">here</a> to turn off the VS<br><br>");
      client.print("Click <a href=\"/I\">here</a> to start voltammetry <br><br>");
     if(analise==1){
      client.print("Data measured using cyclic voltammetry <br><br>");
        for( int k=0; k<291; k++){
         client.print(k+1);
      client.print("  Potential(V): ");
      client.print(valorpotencial[k]);
      client.print("                        Current(A) : ");
      client.print(valorcorrente[k]);
      client.println("<br>");
        }

     }

      client.println();
      break;
     }
     else {
      currentLine = "";
     }
    }
    else if (t != '\r') {
     currentLine += t;
    }

    if (currentLine.endsWith("GET /H")) {
    digitalWrite(Bd, HIGH);
    }
    if (currentLine.endsWith("GET /L")) {
    digitalWrite(Bd, LOW);
    }
    if (currentLine.endsWith("GET /F")) {
    digitalWrite(Vs, HIGH);
    }
    if (currentLine.endsWith("GET /D")) {
    digitalWrite(Vs, LOW);
    }
     if (currentLine.endsWith("GET /I")) {
    analise=1;
    }
   }
  }
  client.stop();
  Serial.println("client disconnected");
 }
}
```

Scheme S4. Algorithm to control the potentiostat and the sampling system, as well as display the measured data employing cyclic voltammetry and Wi-Fi data transmission to a smartphone.

```
void serverWEB() { // This piece of code is responsible for creating the web server and displaying the data measured in the voltammetry on the smartphone screen
 if (client) {
  Serial.println("new client");
  String currentLine = "";
  while (client.connected()) {
   if (client.available()) {
    char t = client.read();
    Serial.write(t);
    if (t == '\n') {
          if (currentLine.length() == 0) {
     client.println("HTTP/1.1 200 OK");
     client.println("Content-type:text/html");
     client.println();
     client.print ("                 Sampling and analysis system <br><br><br>");
     client.print("Click <a href=\"/H\">here</a> to turn on the BD <br>");
     client.print("Click <a href=\"/L\">here</a> to turn off the BD<br><br>");
     client.print("Click <a href=\"/F\">here</a> to turn on the VS <br>");
     client.print("Click <a href=\"/D\">here</a> to turn off the VS<br><br>");
     client.print("Click <a href=\"/I\">here</a> to start voltammetry <br><br>");
    if(analise==1){
     client.print("Data measured using square wave voltammetry <br><br>");
       for( int k=0; k<125; k++){
        client.print(k+1);
     client.print("  Potential(V): ");
     client.print(valorpotencial[k]);
     client.print("                       Current(A) : ");
     client.print(valorcorrente[k]);
     client.println("<br>");
       }
     client.print(" Measured peak current (A): ");
     client.print(maxcorrente);
     client.print(" , Peak potential (V): ");
     client.print(maxpotencial);
     client.println("<br>");
     client.print(" Lead concentration (µg L-1):  ");
     client.println(concentracao,10);
         }
     client.println();
     break;
    }
    else {
     currentLine = "";
   } }
   else if (t != '\r') {
    currentLine += t;
   }
   if (currentLine.endsWith("GET /H")) {
   digitalWrite(Bd, HIGH);
   }
   if (currentLine.endsWith("GET /L")) {
   digitalWrite(Bd, LOW);
   }
   if (currentLine.endsWith("GET /F")) {
   digitalWrite(Vs, HIGH);
   }
   if (currentLine.endsWith("GET /D")) {
   digitalWrite(Vs, LOW);
   }
    if (currentLine.endsWith("GET /I")) {
   analise=1;
  } } }
  client.stop();
  Serial.println("client disconnected");
 }}
```

Scheme S5. Part of the algorithm developed to control the potentiostat and the sampling system, as well as display the measured data employing SWASV in the smartphone screen such as: the peak current, peak potential and concentration of Pb^{2+} in µg L^{-1} and Wi-Fi data transmission to a Smartphone.

```
void serverWEB() { // This piece of code is responsible for creating the web server and displaying the data measured in the voltammetry on the smartphone screen
 if (client) {
  Serial.println("new client");
  String currentLine = "";
  while (client.connected()) {
   if (client.available()) {
    char t = client.read();
    Serial.write(t);
    if (t == '\n') {
       if (currentLine.length() == 0) {
      client.println("HTTP/1.1 200 OK");
      client.println("Content-type:text/html");
      client.println();
      client.print ("                  Sampling and analysis system <br><br><br>");
      client.print("Click <a href=\"/H\">here</a> to turn on the BD <br>");
      client.print("Click <a href=\"/L\">here</a> to turn off the BD<br><br>");
      client.print("Click <a href=\"/F\">here</a> to turn on the VS <br>");
      client.print("Click <a href=\"/D\">here</a> to turn off the VS<br><br>");
      client.print("Click <a href=\"/I\">here</a> to start voltammetry <br><br>");
     if(analise==1){
      client.print("Data measured using differential pulse voltammetry <br><br>");
        for( int k=0; k<240; k++){
         client.print(k+1);
      client.print("  Potential(V): ");
      client.print(valorpotencial[k]);
      client.print("                        Current(A) : ");
      client.print(valorcorrente[k]);
      client.println("<br>");
        }
      client.print(" Measured peak current (A): ");
      client.print(maxcorrente);
      client.print(" , Peak potential (V): ");
      client.print(maxpotencial);
      client.println("<br>");
      }
      client.println();
      break;
     }
     else {
      currentLine = "";
     }
    }
    else if (t != '\r') {
     currentLine += t;
    }
    if (currentLine.endsWith("GET /H")) {
    digitalWrite(Bd, HIGH);
    }
    if (currentLine.endsWith("GET /L")) {
    digitalWrite(Bd, LOW);
    }
    if (currentLine.endsWith("GET /F")) {
    digitalWrite(Vs, HIGH);
    }
    if (currentLine.endsWith("GET /D")) {
    digitalWrite(Vs, LOW);
    }
     if (currentLine.endsWith("GET /I")) {
    analise=1;
    } } }
  client.stop();
  Serial.println("client disconnected");
 }}
```

Scheme S6. Algorithm to control the potentiostat and the sampling system, as well as display the measured data employing DPASV and Wi-Fi data transmission to a Smartphone.

Table S1. Data transmitted by Wi-Fi regards to 1.0 mmol/L $K_4Fe(CN)_6$ solution in 0.1 mol L^{-1} KCl employing cyclic voltammetry using the Lab-on-a-Drone. The scan rate was 100 mV s^{-1} from a potential window from -0.2 V to 0.9 V vs E Ag/AgCl.

Potential (V)	Current(A)	Potential (V)	Current(A)	Potential (V)	Current(A)
-0.1999	-0.000006135	0.2138	0.000003199	0.6275	0.00001038
-0.1923	-0.000005978	0.2213	0.000004637	0.635	0.00001029
-0.1848	-0.000005848	0.2289	0.000006314	0.6425	0.0000102
-0.1773	-0.000005729	0.2364	0.000008232	0.6501	0.00001011
-0.1698	-0.000005617	0.2439	0.00001034	0.6576	0.00001002
-0.1622	-0.000005512	0.2514	0.00001257	0.6651	0.000009943
-0.1547	-0.000005411	0.2589	0.00001484	0.6726	0.000009866
-0.1472	-0.000005316	0.2665	0.00001702	0.6801	0.000009796
-0.1397	-0.000005222	0.274	0.00001905	0.6877	0.000009723
-0.1322	-0.000005134	0.2815	0.00002082	0.6952	0.000009656
-0.1246	-0.000005047	0.289	0.00002225	0.7027	0.000009593
-0.1171	-0.000004959	0.2966	0.00002329	0.7102	0.00000953
-0.1096	-0.000004875	0.3041	0.00002396	0.7178	0.000009478
-0.1021	-0.000004795	0.3116	0.00002426	0.7253	0.000009422
-0.09455	-0.000004714	0.3191	0.00002425	0.7328	0.000009373
-0.08703	-0.000004637	0.3266	0.00002399	0.7403	0.00000932
-0.07951	-0.00000456	0.3342	0.00002353	0.7478	0.000009275
-0.07199	-0.000004487	0.3417	0.00002295	0.7554	0.000009226
-0.06447	-0.00000441	0.3492	0.00002229	0.7629	0.00000918
-0.05695	-0.00000434	0.3567	0.00002159	0.7704	0.000009138
-0.04943	-0.000004266	0.3642	0.00002088	0.7779	0.000009096
-0.0419	-0.000004196	0.3718	0.00002019	0.7854	0.000009054
-0.03438	-0.00000413	0.3793	0.00001952	0.793	0.000009019
-0.02686	-0.00000406	0.3868	0.00001888	0.8005	0.000008981
-0.01934	-0.000003993	0.3943	0.00001827	0.808	0.000008946
-0.01182	-0.000003927	0.4019	0.0000177	0.8155	0.000008914
-0.004298	-0.000003864	0.4094	0.00001717	0.8231	0.000008886
0.003223	-0.000003797	0.4169	0.00001667	0.8306	0.000008858
0.01074	-0.000003734	0.4244	0.00001622	0.8381	0.000008837
0.01827	-0.000003671	0.4319	0.00001578	0.8456	0.000008813
0.02579	-0.000003608	0.4395	0.00001539	0.8531	0.000008792
0.03331	-0.000003545	0.447	0.00001501	0.8607	0.000008767
0.04083	-0.000003482	0.4545	0.00001466	0.8682	0.000008753
0.04835	-0.000003419	0.462	0.00001434	0.8757	0.000008736
0.05587	-0.000003356	0.4695	0.00001403	0.8832	0.000008722
0.06339	-0.00000329	0.4771	0.00001375	0.8907	0.000008704
0.07092	-0.000003227	0.4846	0.00001348	0.8832	0.000008529
0.07844	-0.000003157	0.4921	0.00001322	0.8757	0.000008403
0.08596	-0.000003087	0.4996	0.00001298	0.8682	0.000008298
0.09348	-0.000003013	0.5072	0.00001276	0.8607	0.000008204
0.101	-0.000002933	0.5147	0.00001255	0.8531	0.000008116
0.1085	-0.000002845	0.5222	0.00001234	0.8456	0.000008036
0.116	-0.000002751	0.5297	0.00001215	0.8381	0.000007959
0.1236	-0.000002642	0.5372	0.00001197	0.8306	0.000007889
0.1311	-0.000002516	0.5448	0.00001181	0.8231	0.000007822
0.1386	-0.000002369	0.5523	0.00001164	0.8155	0.000007759
0.1461	-0.000002191	0.5598	0.00001149	0.808	0.000007696
0.1537	-0.000001977	0.5673	0.00001134	0.8005	0.000007637
0.1612	-0.000001711	0.5748	0.0000112	0.793	0.000007577
0.1687	-0.000001379	0.5824	0.00001107	0.7854	0.000007521
0.1762	-0.000000966	0.5899	0.00001094	0.7779	0.000007462
0.1837	-0.0000004445	0.5974	0.00001082	0.7704	0.000007402
0.1913	0.0000001995	0.6049	0.0000107	0.7629	0.000007346
0.1988	0.000001004	0.6125	0.00001059	0.7554	0.00000729
0.2063	0.000001991	0.62	0.00001049	0.7478	0.000007234

Continuation of the Table S1

Potential(V)	Current(A)	Potential(V)	Current(A)	Potential(V)	Current(A)
0.7403	0.000007182	0.3793	0.000004448	0.01827	-0.000009628
0.7328	0.000007129	0.3718	0.000004207	0.01074	-0.000009422
0.7253	0.000007077	0.3642	0.000003906	0.003223	-0.000009226
0.7178	0.000007028	0.3567	0.000003535	-0.004298	-0.000009044
0.7102	0.000006982	0.3492	0.000003073	-0.01182	-0.000008869
0.7027	0.000006937	0.3417	0.000002481	-0.01934	-0.000008701
0.6952	0.000006891	0.3342	0.000001757	-0.02686	-0.00000854
0.6877	0.000006842	0.3266	0.000000861	-0.03438	-0.000008393
0.6801	0.0000068	0.3191	-0.0000002345	-0.0419	-0.000008246
0.6726	0.000006755	0.3116	-0.000001557	-0.04943	-0.000008109
0.6651	0.000006709	0.3041	-0.000003118	-0.05695	-0.00000798
0.6576	0.000006667	0.2966	-0.00000491	-0.06447	-0.000007854
0.6501	0.000006622	0.289	-0.000006909	-0.07199	-0.000007735
0.6425	0.00000658	0.2815	-0.000009061	-0.07951	-0.000007623
0.635	0.000006534	0.274	-0.00001132	-0.08703	-0.000007511
0.6275	0.000006489	0.2665	-0.00001358	-0.09455	-0.000007409
0.62	0.000006447	0.2589	-0.00001571	-0.1021	-0.000007308
0.6125	0.000006401	0.2514	-0.00001761	-0.1096	-0.000007213
0.6049	0.000006359	0.2439	-0.00001922	-0.1171	-0.000007122
0.5974	0.000006317	0.2364	-0.00002043	-0.1246	-0.000007035
0.5899	0.000006275	0.2289	-0.00002126	-0.1322	-0.000006951
0.5824	0.00000623	0.2213	-0.00002168	-0.1397	-0.00000687
0.5748	0.000006188	0.2138	-0.00002174	-0.1472	-0.000006793
0.5673	0.000006146	0.2063	-0.00002152	-0.1547	-0.000006716
0.5598	0.000006104	0.1988	-0.00002109	-0.1622	-0.00000665
0.5523	0.000006058	0.1913	-0.0000205	-0.1698	-0.000006583
0.5448	0.000006016	0.1837	-0.00001982	-0.1773	-0.00000652
0.5372	0.000005974	0.1762	-0.0000191	-0.1848	-0.000006461
0.5297	0.000005932	0.1687	-0.00001835	-0.1923	-0.000006405
0.5222	0.00000589	0.1612	-0.00001761	-0.1999	-0.000006349
0.5147	0.000005845	0.1537	-0.0000169		
0.5072	0.000005799	0.1461	-0.00001623		
0.4996	0.000005757	0.1386	-0.00001558		
0.4921	0.000005712	0.1311	-0.00001499		
0.4846	0.000005666	0.1236	-0.00001443		
0.4771	0.000005621	0.116	-0.00001391		
0.4695	0.000005575	0.1085	-0.00001343		
0.462	0.000005523	0.101	-0.00001298		
0.4545	0.00000547	0.09348	-0.00001256		
0.447	0.000005414	0.08596	-0.00001218		
0.4395	0.000005355	0.07844	-0.00001181		
0.4319	0.000005288	0.07092	-0.00001147		
0.4244	0.000005215	0.06339	-0.00001116		
0.4169	0.000005134	0.05587	-0.00001086		
0.4094	0.00000504	0.04835	-0.00001058		
0.4019	0.000004928	0.04083	-0.00001032		
0.3943	0.000004798	0.03331	-0.00001008		
0.3868	0.000004641	0.02579	-0.000009845		

Table S2. Results of the in situ analysis of Pb^{2+} using a Lab-on-a-Drone compared to the results obtained using a ICP-OES in laboratory.

Spiked water sample	Lab-on-a-Drone[1]/ (mg L^{-1}) (± SD)	ICP-OES / (mg L^{-1}) (± SD)	[2] RE (%)	[3]T-Test
1	6.37 ± 0.06	6.77 ± 0.01	- 5.91	0.006
2	6.53 ± 0.22	6.50 ± 0.02	0.46	0.864
3	6.91 ± 0.22	6.98 ± 0.01	-1.00	0.020

[1]The spiked water samples were diluted to fit in the linear range of the SWASV methods employed in the Lab-on-a-Drone.
[2]Relative error. [2]tabulated = 4.303 (*n* = 3)

Table S3. Data transmitted by Wifi regards to a spiked water sample with 30 µg L^{-1} of Pb^{2+} employing SWASV using the Lab-on-a-Drone. SWASV parameters: deposition potential = -1.4 V, time of deposition = 120 s, f = 10 Hz, a = 50 mV, ΔEs = 5 mV.

Potential (V)	Current (A)	Potential (V)	Current (A)	Potential (V)	Current (A)
-0.8	0.00000147	-0.563	0.000001988	-0.3261	0.000001795
-0.7951	0.000001589	-0.5582	0.000002037	-0.3213	0.000001771
-0.7903	0.00000154	-0.5534	0.000002107	-0.3164	0.000001752
-0.7854	0.000001491	-0.5485	0.000002156	-0.3116	0.000001728
-0.7806	0.000001435	-0.5437	0.000002226	-0.3068	0.000001706
-0.7758	0.000001393	-0.5389	0.000002296	-0.3019	0.000001692
-0.7709	0.000001351	-0.534	0.000002352	-0.2971	0.00000168
-0.7661	0.000001309	-0.5292	0.000002408	-0.2923	0.000001662
-0.7613	0.000001274	-0.5243	0.000002464	-0.2874	0.000001648
-0.7564	0.000001239	-0.5195	0.00000252	-0.2826	0.000001634
-0.7516	0.000001218	-0.5147	0.000002555	-0.2778	0.000001617
-0.7468	0.000001197	-0.5098	0.000002597	-0.2729	0.000001605
-0.7419	0.000001176	-0.505	0.000002625	-0.2681	0.000001597
-0.7371	0.000001155	-0.5002	0.000002653	-0.2632	0.000001592
-0.7323	0.000001127	-0.4953	0.000002674	-0.2584	0.000001582
-0.7274	0.00000112	-0.4905	0.000002667	-0.2536	0.000001581
-0.7226	0.000001113	-0.4857	0.000002674	-0.2487	0.000001577
-0.7178	0.000001099	-0.4808	0.00000266	-0.2439	0.000001575
-0.7129	0.000001092	-0.476	0.000002639	-0.2391	0.000001568
-0.7081	0.000001085	-0.4712	0.000002632	-0.2342	0.000001571
-0.7032	0.000001085	-0.4663	0.000002604	-0.2294	0.00000157
-0.6984	0.000001071	-0.4615	0.000002583	-0.2246	0.00000157
-0.6936	0.000001078	-0.4567	0.000002548	-0.2197	0.000001572
-0.6887	0.000001078	-0.4518	0.000002523	-0.2149	0.000001575
-0.6839	0.000001092	-0.447	0.000002485	-0.2101	0.000001581
-0.6791	0.000001092	-0.4421	0.000002453	-0.2052	0.000001583
-0.6742	0.000001106	-0.4373	0.000002422	-0.2004	0.000001591
-0.6694	0.000001106	-0.4325	0.000002387		
-0.6646	0.000001127	-0.4276	0.000002355		
-0.6597	0.000001141	-0.4228	0.00000232		
-0.6549	0.000001169	-0.418	0.000002285		
-0.6501	0.000001183	-0.4131	0.00000225		
-0.6452	0.000001211	-0.4083	0.000002221		
-0.6404	0.000001239	-0.4035	0.000002186		
-0.6356	0.000001267	-0.3986	0.000002154		
-0.6307	0.000001302	-0.3938	0.00000213		
-0.6259	0.000001344	-0.389	0.000002103		
-0.6211	0.000001372	-0.3841	0.000002072		
-0.6162	0.000001407	-0.3793	0.00000205		
-0.6114	0.000001456	-0.3745	0.000002026		
-0.6065	0.000001505	-0.3696	0.000002002		
-0.6017	0.000001547	-0.3648	0.000001974		
-0.5969	0.000001589	-0.36	0.000001952		
-0.592	0.000001645	-0.3551	0.000001927		
-0.5872	0.000001694	-0.3503	0.000001902		
-0.5824	0.000001736	-0.3454	0.000001879		
-0.5775	0.000001799	-0.3406	0.000001854		
-0.5727	0.000001862	-0.3358	0.000001835		
-0.5679	0.000001925	-0.3309	0.000001814		

Table S4. Evaluation of ions commonly studied for metal quantification in environmental water samples by Voltammetry.

Ions	Interference / (%)
K^{+}	2.74 ± 0.10
Na^{+}	4.09 ± 0.15
Ca^{2+}	2.65 ± 0.18
Ba^{2+}	2.93 ± 0.20
Cu^{2+}	1.40 ± 0.12
SO_4^{2-}	0.59 ± 0.15
PO_4^{3-}	4.70 ± 0.08
CO_3^{2-}	4.81 ± 0.06
Cl^{-}	2.03 ± 0.15
NO_3^{-}	1.42 ± 0.22

Table S5. Data transmitted by Wifi regards to a spiked water sample with 65 µg L^{-1} of Pb^{2+} employing DPASV using the Lab-on-a-Drone. DPASV parameters: deposition potential = - 1.4 V, time of deposition = 120 s, interval pulse = 200 ms, pulse width = 40 ms, a = 10 mV, ΔEs = 4 mV.

Potential(V)	Current(A)	Potential(V)	Current(A)	Potential(V)	Current(A)
-0.8999	0.000000112	-0.7156	0.000000112	-0.5313	0.000003108
-0.8961	0.000000112	-0.7118	0.000000084	-0.5276	0.000003892
-0.8924	0.000000084	-0.7081	0.000000084	-0.5238	0.000004956
-0.8886	0.000000084	-0.7043	0.000000084	-0.52	0.000006328
-0.8848	0.000000084	-0.7006	0.000000084	-0.5163	0.000008008
-0.8811	0.000000112	-0.6968	0.000000112	-0.5125	0.00001009
-0.8773	0.000000084	-0.693	0.000000084	-0.5088	0.00001267
-0.8736	0.000000112	-0.6893	0.000000084	-0.505	0.00001567
-0.8698	0.000000084	-0.6855	0.000000112	-0.5012	0.0000192
-0.866	0.000000112	-0.6818	0.000000084	-0.4975	0.00002327
-0.8623	0.000000084	-0.678	0.000000112	-0.4937	0.00002787
-0.8585	0.000000112	-0.6742	0.000000084	-0.49	0.000033
-0.8547	0.000000112	-0.6705	0.000000112	-0.4862	0.00003867
-0.851	0.000000084	-0.6667	0.000000084	-0.4824	0.00004458
-0.8472	0.000000112	-0.663	0.000000084	-0.4787	0.00005047
-0.8435	0.000000084	-0.6592	0.000000112	-0.4749	0.00005659
-0.8397	0.000000112	-0.6554	0.000000084	-0.4712	0.00006237
-0.8359	0.000000084	-0.6517	0.000000084	-0.4674	0.00006783
-0.8322	0.000000112	-0.6479	0.000000112	-0.4636	0.00007279
-0.8284	0.000000084	-0.6442	0.000000112	-0.4599	0.000077
-0.8247	0.000000112	-0.6404	0.000000112	-0.4561	0.00008018
-0.8209	0.000000084	-0.6366	0.000000112	-0.4524	0.00008176
-0.8171	0.000000112	-0.6329	0.000000112	-0.4486	0.00008084
-0.8134	0.000000112	-0.6291	0.000000112	-0.4448	0.00007538
-0.8096	0.000000112	-0.6253	0.000000112	-0.4411	0.00006126
-0.8059	0.000000112	-0.6216	0.000000084	-0.4373	0.00004236
-0.8021	0.000000112	-0.6178	0.000000112	-0.4336	0.00002657
-0.7983	0.000000112	-0.6141	0.00000014	-0.4298	0.00001498
-0.7946	0.000000112	-0.6103	0.000000112	-0.426	0.00000798
-0.7908	0.000000084	-0.6065	0.00000014	-0.4223	0.000004312
-0.7871	0.000000112	-0.6028	0.00000014	-0.4185	0.000002436
-0.7833	0.000000112	-0.599	0.00000014	-0.4147	0.000001456
-0.7795	0.000000112	-0.5953	0.000000168	-0.411	0.000000924
-0.7758	0.000000112	-0.5915	0.000000168	-0.4072	0.000000658
-0.772	0.000000112	-0.5877	0.000000196	-0.4035	0.00000049
-0.7683	0.000000084	-0.584	0.000000196	-0.3997	0.000000385
-0.7645	0.000000112	-0.5802	0.000000224	-0.3959	0.000000322
-0.7607	0.000000084	-0.5765	0.000000252	-0.3922	0.000000294
-0.757	0.000000112	-0.5727	0.000000308	-0.3884	0.000000266
-0.7532	0.000000084	-0.5689	0.000000364	-0.3847	0.000000245
-0.7495	0.000000112	-0.5652	0.00000042	-0.3809	0.000000238
-0.7457	0.000000112	-0.5614	0.000000504	-0.3771	0.000000224
-0.7419	0.000000112	-0.5577	0.000000644	-0.3734	0.000000217
-0.7382	0.000000112	-0.5539	0.000000756	-0.3696	0.000000203
-0.7344	0.000000084	-0.5501	0.000000952	-0.3659	0.000000203
-0.7306	0.000000084	-0.5464	0.000001204	-0.3621	0.000000189
-0.7269	0.000000084	-0.5426	0.00000154	-0.3583	0.000000189
-0.7231	0.000000084	-0.5389	0.000001932	-0.3546	0.000000182
-0.7194	0.000000112	-0.5351	0.000002408	-0.3508	0.000000182

Continuation of the Table S5

Potential(V)	Current(A)	Potential(V)	Current(A)
-0.3471	0.000000175	-0.1628	0.00000009625
-0.3433	0.000000175	-0.159	0.0000000945
-0.3395	0.000000168	-0.1553	0.00000009275
-0.3358	0.000000168	-0.1515	0.00000009275
-0.332	0.000000161	-0.1477	0.00000009275
-0.3283	0.000000154	-0.144	0.00000009275
-0.3245	0.000000154	-0.1402	0.00000009187
-0.3207	0.000000154	-0.1365	0.00000009275
-0.317	0.000000147	-0.1327	0.00000009362
-0.3132	0.000000147	-0.1289	0.00000009362
-0.3095	0.00000014	-0.1252	0.00000009275
-0.3057	0.000000147	-0.1214	0.00000009275
-0.3019	0.000000133	-0.1177	0.00000009275
-0.2982	0.000000133	-0.1139	0.00000009187
-0.2944	0.0000001295	-0.1101	0.00000009187
-0.2906	0.000000133	-0.1064	0.00000009187
-0.2869	0.000000126	-0.1026	0.00000009275
-0.2831	0.000000126	-0.09885	0.000000091
-0.2794	0.0000001225	-0.09509	0.000000091
-0.2756	0.000000119	-0.09133	0.00000009012
-0.2718	0.0000001225	-0.08757	0.00000009012
-0.2681	0.0000001155	-0.08381	0.00000009012
-0.2643	0.0000001155	-0.08005	0.00000008969
-0.2606	0.000000119	-0.07629	0.00000008947
-0.2568	0.000000112	-0.07253	0.00000008947
-0.253	0.000000112	-0.06877	0.00000009034
-0.2493	0.000000112	-0.06501	0.00000008925
-0.2455	0.0000001085	-0.06125	0.00000008969
-0.2418	0.000000112	-0.05748	0.00000009034
-0.238	0.000000112	-0.05372	0.00000009034
-0.2342	0.0000001085	-0.04996	0.00000008991
-0.2305	0.0000001085	-0.0462	0.00000009012
-0.2267	0.000000105	-0.04244	0.00000009045
-0.223	0.0000001085	-0.03868	0.00000009012
-0.2192	0.000000105	-0.03492	0.00000009023
-0.2154	0.000000105	-0.03116	0.00000009067
-0.2117	0.0000001015	-0.0274	0.00000009078
-0.2079	0.0000001015	-0.02364	0.00000009155
-0.2042	0.0000001015	-0.01988	0.00000009012
-0.2004	0.0000001015	-0.01612	0.00000009177
-0.1966	0.000000098	-0.01236	0.00000009133
-0.1929	0.00000009975	-0.008596	0.00000009166
-0.1891	0.000000098	-0.004835	0.00000009231
-0.1853	0.000000098	-0.001074	0.00000009264
-0.1816	0.000000098		
-0.1778	0.000000098		
-0.1741	0.0000000945		
-0.1703	0.0000000945		
-0.1665	0.0000000945		

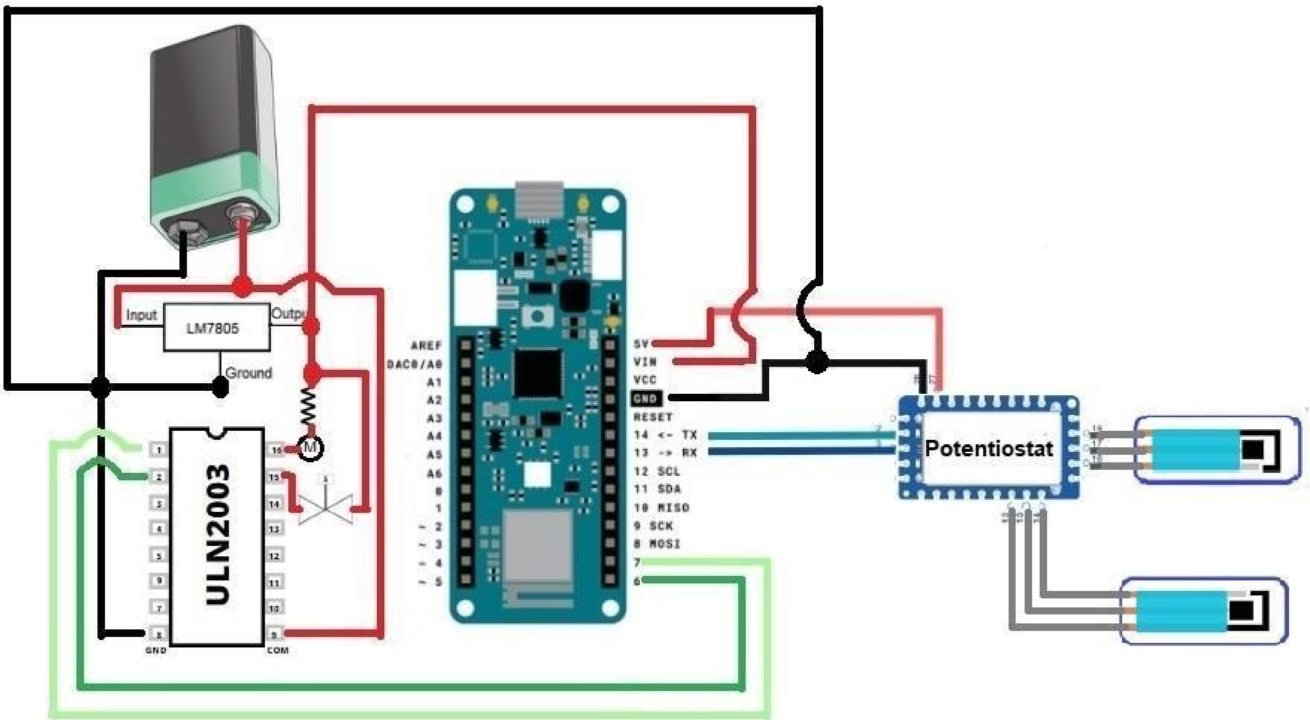

Figure S1. Electronic circuit to control the water sampling system and the electrochemical cell of the Lab-on-a-Drone to automatic control with real-time data transmission by Wi-Fi: the micropump (M), the solenoid valve (S), the miniaturized bipotentiostat (EmStat Pico) and the SP-BDDE.

Figure S2. The solar system, a stationary battery of 12 V 100 A, a solar charge controller 12 V, and an inverter module 12 VDC to 127 VAC. The solar plate with 60 W is not shown.

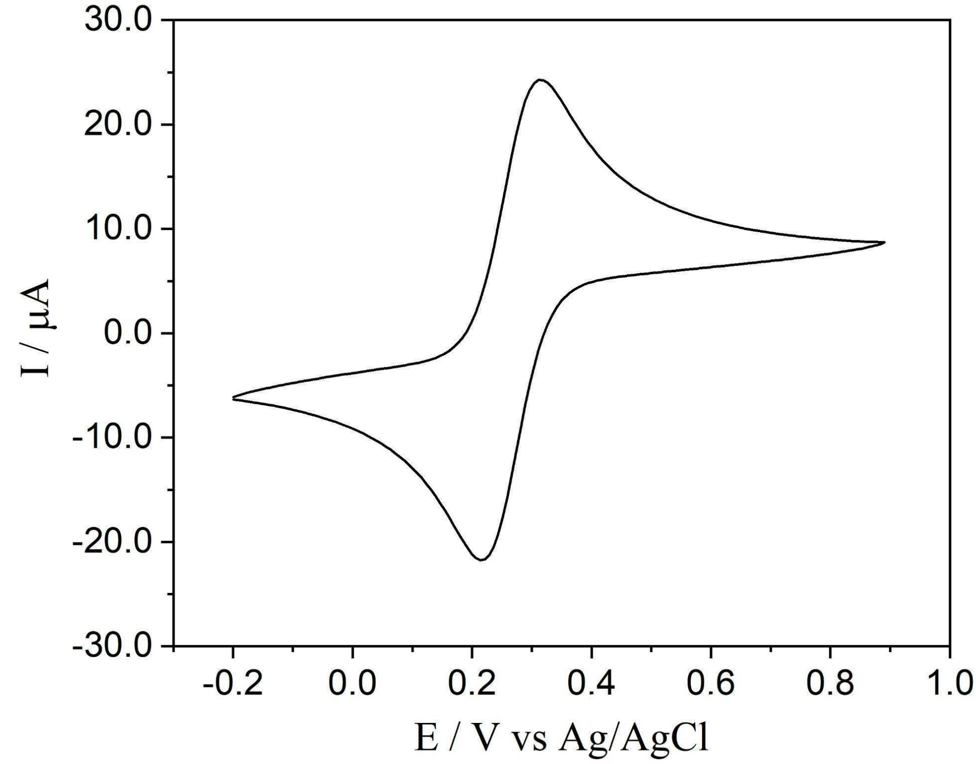

Figure S3. Voltammogram produced of a solution for determination of 1.0 mmol/L $K_4Fe(CN)_6$ solution in 0.1 mol L^{-1} KCl measured on SP-BDDE, with data transmitted by wifi (Table S1) from the Lab-on-a-Drone to a smartphone.

Figure S4. (A) Image of the lab-on-a-drone before the flight with the operator in control. (B) Lab-on-a-Drone flying over the region to collect water samples.

Figure S5. *In situ* analysis using the Lab-on-a-Drone. Satellite image of the Duas Una reservoir at Recife-PE-Brazil. The GPS coordinates of the sampling point 1: 8.01°81'33" S; 34.93°58'26" W; point 2: 8.01°93'86" S; 34.93°41'87" W and point 3: 8.02°06'50"S; 34°55'57" W, respectively.

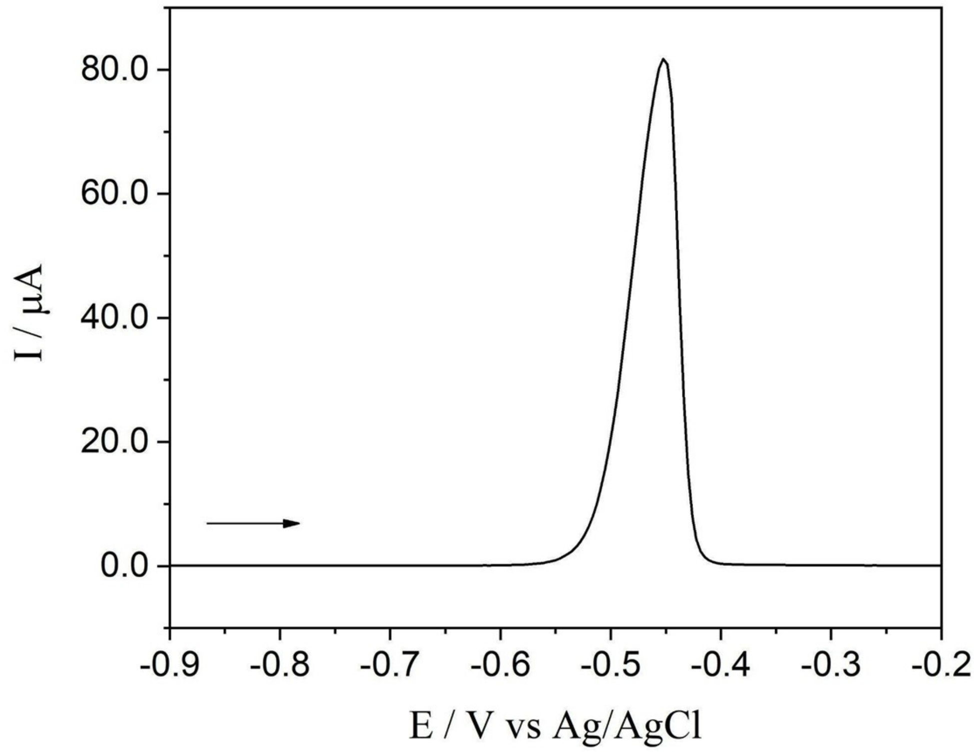

Figure S6. A plot of the DPASV data presented in Table S6 referred to a spiked water sample with 65 µg L^{-1} of Pb^{2+} measured and transmitted using the Lab-on-a-Drone to a smartphone. SDPASV parameters: DPASV parameters: deposition potential = -1.4 V, time of deposition = 120 s, interval pulse = 200 ms, pulse width = 40 ms, *a* = 10 mV, ΔEs = 4 mV.