```cpp
//-------------------------------------------------------------------
// application pour console de commande d'avion (FSX/P3D) 14/10/2016
//-------------------------------------------------------------------
// variables globales pour la conservation des valeurs
int joyX;
int joyY;
int neutre;
int addX;
int addY;
int moteur;
int rich;
int pas;
unsigned long temp;
bool boutonA;
bool boutonB;
bool boutonC;
bool boutonD;
bool boutonE;
bool boutonF;
bool boutonG;
bool start;
//-------------------------------------------------------------
void setup() {
  Serial.begin(9600);
  delay(50);
  // initialisation potentiometres
  neutre = 0;   // reglage pour retour à zéro du joystick (à ajuster selon)
  addX = 0;    // reglage decalage zero du joystick (à ajuster selon)
  addY = 0;    // reglage decalage zero du joystick (à ajuster selon)
  temp = 0;
  start = false;
  initPotar(joyX, 'X', 0, -511, 512, neutre, addX);
  initPotar(joyY, 'Y', 1, -511, 512, neutre, addY);
  initPotar(moteur, 'M', 2, 0, 1023, 3, 0);
  initPotar(rich, 'R', 3, 0, 1023, 3, 0);
  initPotar(pas, 'P', 4, -511, 512, 3, 0);
  // initialisation boutons
  initBouton(boutonA, 'A', 8);
  initBouton(boutonB, 'B', 9);
  initBouton(boutonC, 'C', 10);
  initBouton(boutonD, 'D', 11);
  // initialisation push-boutons
  initPush(boutonE, 5);
  initPush(boutonF, 6);
  initPush(boutonG, 7);
}
//-------------------------------------------------------------
void loop() {
  delay(50);
  // capture la valeur des potentiometres
  potar(joyX, 'X', 0, -511, 512, neutre, addX);
  potar(joyY, 'Y', 1, -511, 512, neutre, addY);
  potar(moteur, 'M', 2, 0, 1023, 3, 0);
  potar(rich, 'R', 3, 0, 1023, 3, 0);
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    potar(pas, 'P', 4, -511, 512, 3, 0);
    // capture l'état des boutons
    bouton(boutonA, 'A', 8);
    bouton(boutonB, 'B', 9);
    bouton(boutonC, 'C', 10);
    bouton(boutonD, 'D', 11);
    // capture l'état des push-boutons
    push(boutonE, 'E', 5);
    push(boutonF, 'F', 6);
    push(boutonG, 'G', 7);
    if (start) {
      initPotar(joyX, 'X', 0, -511, 512, neutre, addX);
      initPotar(joyY, 'Y', 1, -511, 512, neutre, addY);
      initPotar(moteur, 'M', 2, 0, 1023, 3, 0);
      initPotar(rich, 'R', 3, 0, 1023, 3, 0);
      initPotar(pas, 'P', 4, -511, 512, 3, 0);
      initBouton(boutonA, 'A', 8);
      initBouton(boutonB, 'B', 9);
      initBouton(boutonC, 'C', 10);
      initBouton(boutonD, 'D', 11);
      start = false;
    }
}
//-----------------------------------------------------------------
void initPotar(int &arg, char c, int canal, int q1, int q2, int ntr, int
add) {
  arg = map(analogRead(canal), 0, 1023, q1, q2) + add;
  if (abs(arg) <= ntr) arg = 0;
  Serial.print(" ");
  Serial.print(arg);
  Serial.print(c);
  Serial.print(".");
}
//-----------------------------------------------------------------
void potar(int &arg, char c, int canal, int q1, int q2, int ntr, int add) {
  int val = map(analogRead(canal), 0, 1023, q1, q2) + add;
  if (abs(val) <= ntr) val = 0;
  if (abs(arg - val) > 4) {
    arg = val;
    Serial.print(" ");
    Serial.print(arg);
    Serial.print(c);
    Serial.print(".");
  }
}
//-----------------------------------------------------------------
void initBouton(bool &arg, char c, int canal) {
  pinMode(canal, INPUT_PULLUP);
  arg = digitalRead(canal);
  Serial.print(" ");
  Serial.print(arg);
  Serial.print(c);
  Serial.print(".");
}
```

```cpp
//----------------------------------------------------------------
void bouton(bool &arg, char c, int canal) {
  bool val = digitalRead(canal);
  if (val != arg) {
    arg = val;
    Serial.print(" ");
    Serial.print(arg);
    Serial.print(c);
    Serial.print(".");
  }
}
//----------------------------------------------------------------
void initPush(bool &arg, int canal) {
  pinMode(canal, INPUT_PULLUP);
  arg = true;
}
//----------------------------------------------------------------
void push(bool &arg, char c, int canal) {
  if ((millis() - temp) < 200) return;
  bool val = digitalRead(canal);
  if (val != arg) {
    arg = val;
    if (!arg) {
      Serial.print(" ");
      Serial.print(1);
      Serial.print(c);
      Serial.print(".");
      start = (canal == 7);
      temp = millis();
    }
  }
}
//------------------------------------------ fin ----------------
```