RSAConference2017
San Francisco | February 13 – 17 | Moscone Center

POWER OF OPPORTUNITY

SESSION ID: SBX3-W4

Anatomy of Industrial Cyber Attacks

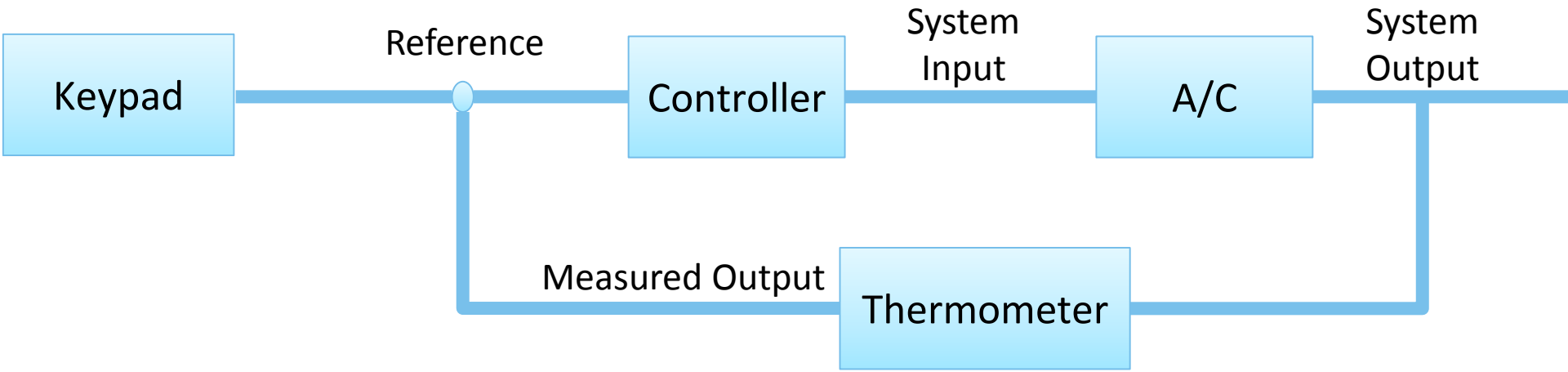
Mille Gandlesman
CTO
Indegy
@mgandelsman

Barak Perelman
CEO
Indegy
@BarakPerelman

Top Concerns as ICS Manager

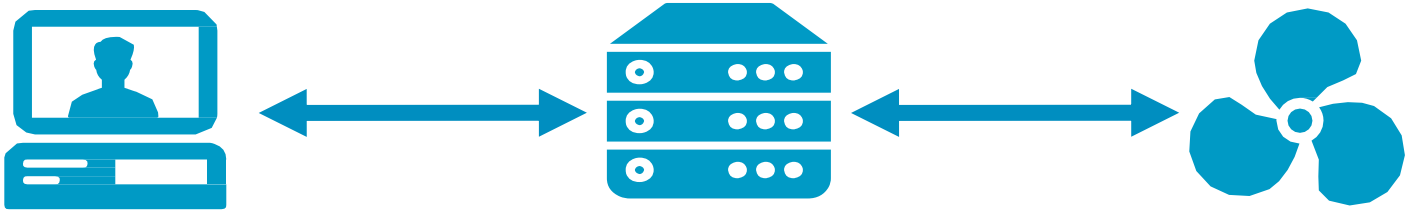
- How do I ensure my revenue generating process keeps running?
- How quickly will I discover a failure?
- How quickly can I pinpoint the source of the incident?
- How quickly can I recover?

How Would You Attack this System?

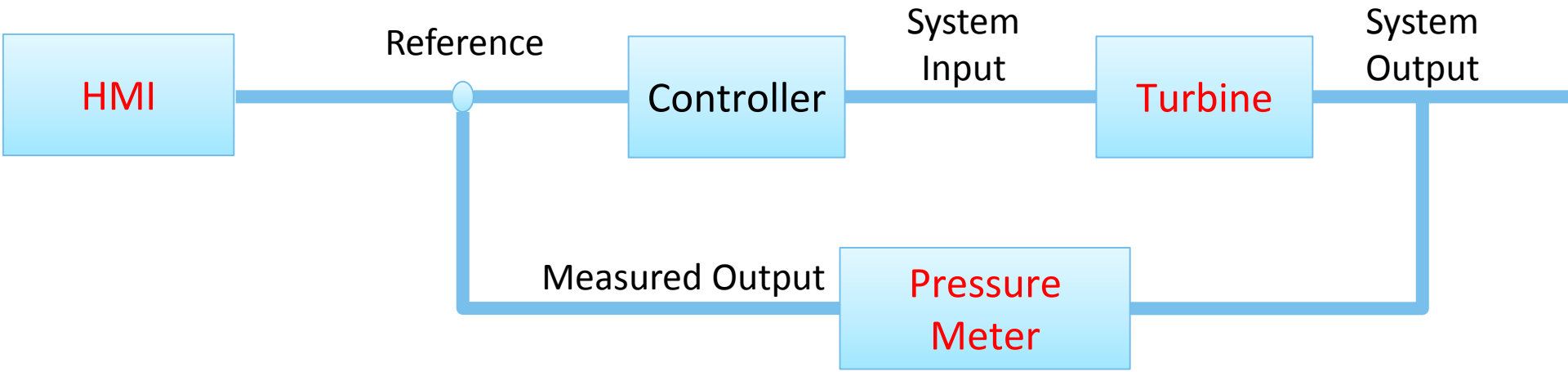


Vocabulary & Definitions

- SCADA / DCS –Supervisory, Control And Data Acquisition system (or a distributed one):
  - HMI, Engineering station – Windows machines for operators to interact with system
  - PLC/RTU/Controller – Dedicated 24/7 real time Industrial computers
  - Sensors/Actuators/IO – Industrial Equipment (Turbines, Pumps, Valves, etc.)

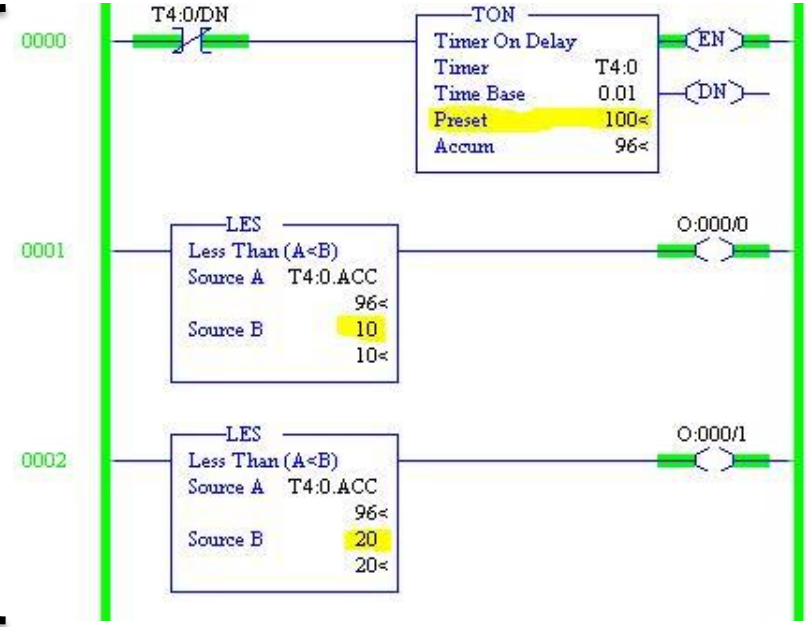


How Would You Attack this System?



Vocabulary & Definitions

- Process Parameters
- Logic
- Configuration
- Firmware



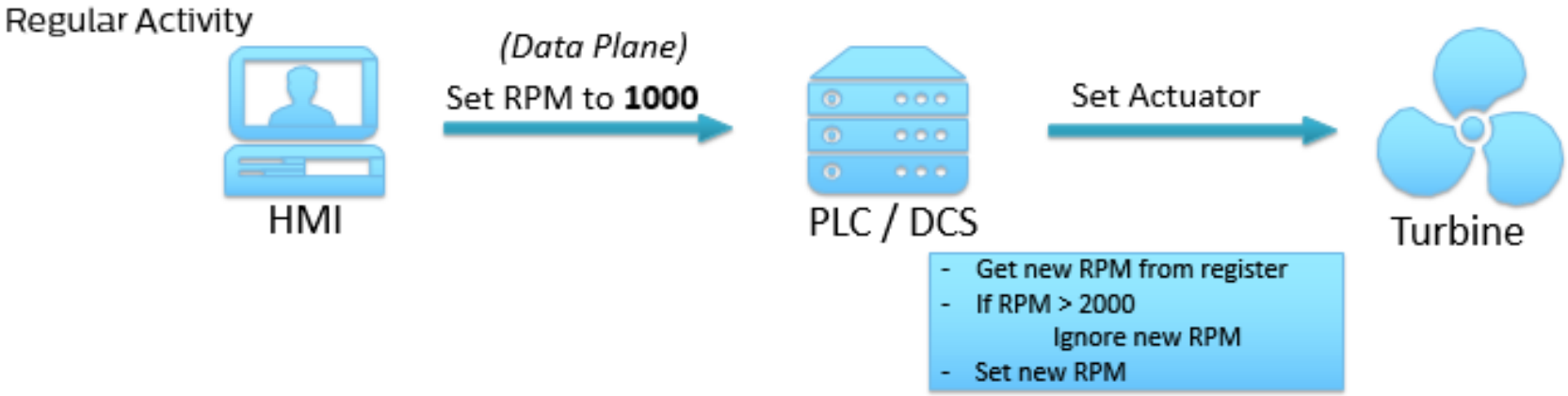
Security Gaps in an ICS Network

- Understanding what you have in your network
- No visibility into critical control-layer activity
- Blindspots of physical access to devices

#1: Understanding What You Have in Your Network

- System implemented a very long time ago
  - Changes made over years
  - Without documentation
- Or:
- It was recently inherited:
  - Nobody knows anything

#2: No Visibility into Critical Control Plane Activity



#2: No Visibility into Critical Control Plane Activity

Regular Activity

HMI

(Data Plane)

Set RPM to **1000**

PLC / DCS

Set Actuator

Turbine

- Get new RPM from register
- If RPM > 2000
  Ignore new RPM
- Set new RPM

Attack Scenario

HMI

(Control Plane)

Change Control Logic

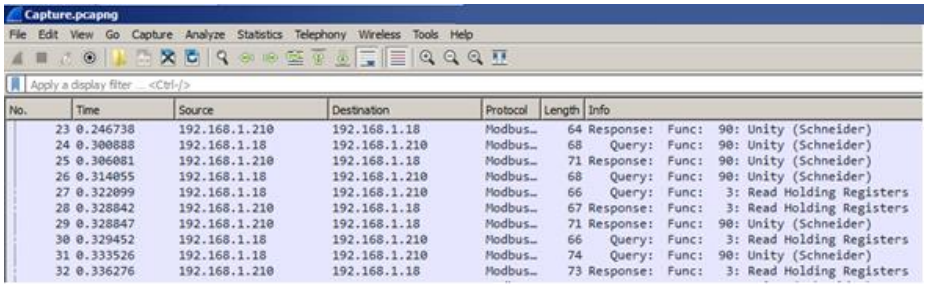
PLC / DCS

Turbine

- Get new RPM from register
- ~~If RPM > 2000~~
  ~~Ignore new RPM~~
- **Set RPM to 5000**

#2: No Visibility into Critical Control Plane Activity

- No Authentication Required:
  - Anyone with network access can change controller logic!



- Difficult to monitor:
  - The meaningful changes are the hardest to identify
- Note that there is no need to exploit vulnerabilities

#2: No Visibility into Critical Control Plane Activity

- Controller logic is the most critical part of an ICS network
  - Unfortunately it's also the weakest link there
- Sensor reading is not reliable for finding malicious activity
  - And also, might be too late
- Standard network monitoring is not enough
  - Control-layer aware deep packet inspection needed
  - Physical cyber attacks can occur

#3: Blindspots of Physical Access to Devices

- On-The-Fly-Changes:
  - What changed?
  - What was the previous configuration?
- System integrator access:
  - Who to blame on failure?

Apply What You Have Learned Today

- Next month you should:
  - Identify and create a backup of all your controllers
- Next quarter you should:
  - Keep track of control-layer actions in your ICS network
- Within six months you should:
  - Apply a security system that is aware to changes in controller logic, both those emerging from the network as well as locally