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June 16th, 2020

Damage in your supply chain?

Using RFID to Deter Detect and Diagnose

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Today's Presenters



Jan van Niekerk

VP Engineering, SpotSee.IO

Jan van Niekerk has directed the engineering team at SpotSee since January 2018. He brings over 20 years of experience in firmware, microcontrollers, analog, TCP/IP, RF/Rfid and security. Jan has managed the development of electronic solutions for tier-1 OEMs at Microchip Technology, Maxim Integrated Products, Intellex Corp. and RF Ops.

Today's Presenters



Todd Blumer Co-founder and President SDG Systems

Todd is an IT industry veteran with more than 30 years' experience with specialties in mobile, cloud and data collection, including RFID. He has significant industry experience in leadership, software and technical marketing at companies, such as FORE Systems, Marconi and Data General. Todd holds a Master's degree in Computer Science from Clemson University.



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Today's Presenters



Damage

RFID and Impact

Deter

Detect

Diagnose

Summary

Today's Presenters

Jan van Niekerk

VP Engineering, SpotSee

Todd Blumer

President, SDG Systems

Background: Jan van Niekerk

- Microchip Technology
 - Semiconductor/Remote Keyless Entry
- Maxim Integrated
 - Semiconductor/RFID
- Intellexflex
 - RFID
- RF OPS
 - Consulting



SpotSee: ShockWatch to RFID



1974

Glass tube



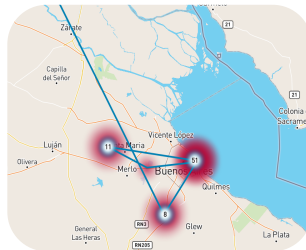
1995

ShockLog



2015-2016

Connectivity



2017-2018

Expanding
connected
portfolio



2019

RFID



Background: Todd Blumer



SDG Systems

- Co-founder and President
- Technologist with focus on RFID, mobile and IoT
- Business Development

FORE Systems / Marconi

- Technical marketing
- Software and firmware development



SDG Systems and TallyFlow

- SDG Systems' purpose is to help companies solve their business problems by uniting technology, service and relationships.
- Founded in 2001
- Expertise spans from IoT to the cloud with a focus on RFID
- TallyFlow – cloud-based tracking solution designed to reduce waste and improve productivity and safety.
- TallyPoint RAIN RFID Reader – intelligent edge reader built on technologies that focus on robustness and security.



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Damage

\$2.3 Trillion shipping damage annually!



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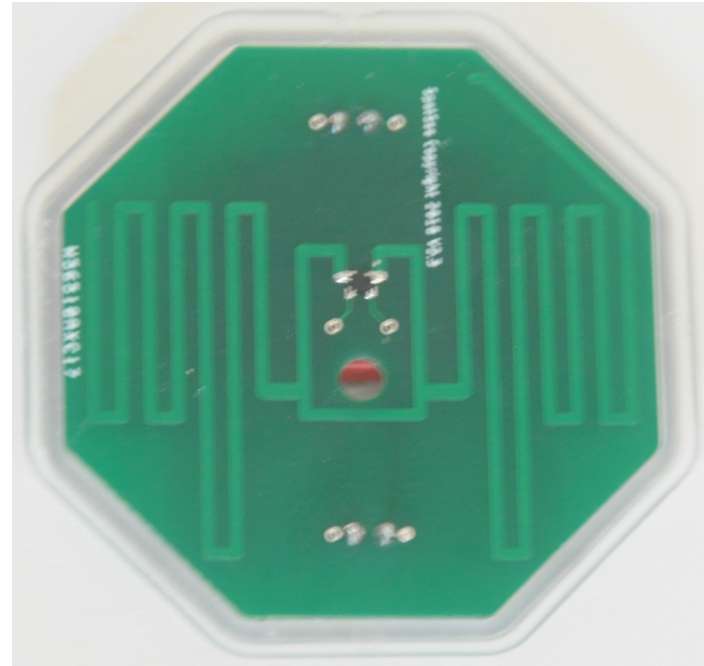
Summary

SpotSee's ShockWatch Indicator



Combining RFID + Impact

Bundling standard EPC GEN2 tag with impact detector



RFID tag has no battery (passive)

- Powered by RF energy from the reader
- Small Size
- Low Cost
- Unlimited shelf life
- Robust temperature behavior
- **Limited Range**

Chokepoints Concept

RFID chip requires
1/10th of a milliwatt.

Normal radio receiver
is a million times more
sensitive.



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Deter

DETER

The knowledge that cargo is actively being monitored deters bad handling behavior by supply chain participants.

40-60% typical reduction in damage!

Deter Example



ac·count·a·bil·i·ty

/əˌkoun(t)əˈbɪlədē/

noun

the fact or condition of being accountable; responsibility.
"their lack of accountability has corroded public respect"

Similar:

responsibility

liability

answerability

reporting

WARNING

MONITORED SHIPMENT



Patent # 8,234,984

RED
INDICATES
ROUGH
HANDLING.

RED
INDICATES
ROUGH
HANDLING.

SHOCKWATCH[®] RFID
A123456
INSPECT IF RED
15G
www.spotsee.io

IF SHOCKWATCH 2 INDICATOR IS RED:

- 1 Do not refuse shipment.
- 2 Make notation on delivery receipt and inspect for damage.
- 3 If damage is discovered, leave item in original container and packaging, and request immediate inspection from carrier within 15 days of delivery date (3 days for international).

SHOCKWATCH[®]

www.shockwatch.com 214.736.4580

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Detect

DETER

The knowledge that cargo is actively being monitored deters bad handling behavior by supply chain participants.

DETECT

Connected monitoring enables real-time damage detection so costs are minimized, and responsible parties are held accountable.

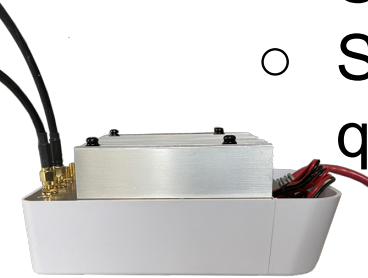
40-60% typical reduction in damage!

Detect - TallyPoint RFID



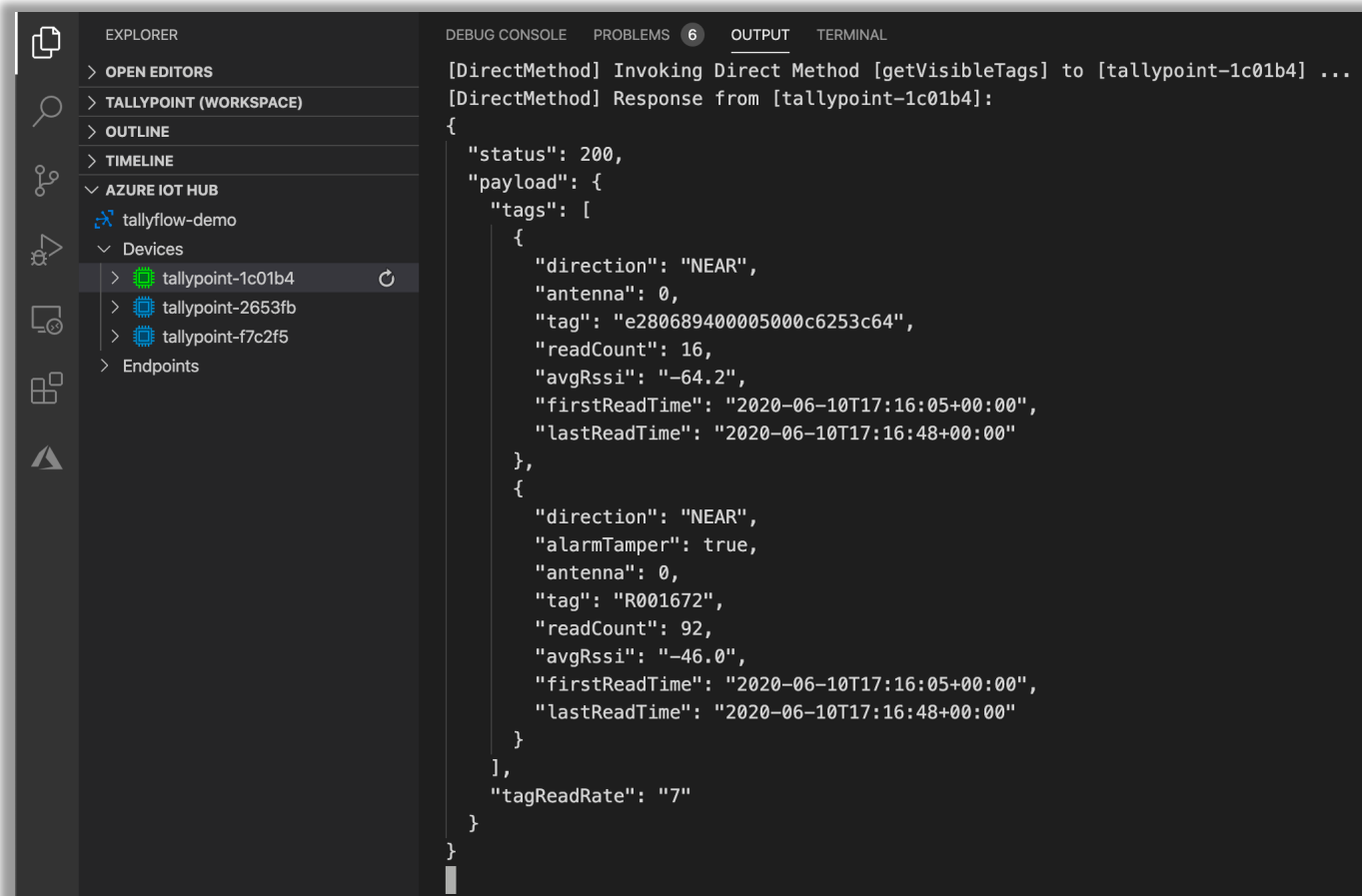
TallyPoint RF-1 RAIN RFID Reader

- Intelligent 4-port edge reader
- Focus on security and robustness
- Flexible plug-in software architecture
 - Send data to Azure, GCP, AWS
 - Send data to TallyFlow Cloud
 - Send JSON to any server over message queue (AMQP, MQTT)



Azure

For the geek!



The screenshot shows the Azure IoT Hub Explorer on the left and the Output window on the right. The Explorer shows the 'tallypoint-1c01b4' device selected under the 'Devices' section. The Output window displays the JSON response from the device's 'getVisibleTags' method.

```
DEBUG CONSOLE PROBLEMS 6 OUTPUT TERMINAL

[DirectMethod] Invoking Direct Method [getVisibleTags] to [tallypoint-1c01b4] ...
[DirectMethod] Response from [tallypoint-1c01b4]:
{
  "status": 200,
  "payload": {
    "tags": [
      {
        "direction": "NEAR",
        "antenna": 0,
        "tag": "e280689400005000c6253c64",
        "readCount": 16,
        "avgRssi": "-64.2",
        "firstReadTime": "2020-06-10T17:16:05+00:00",
        "lastReadTime": "2020-06-10T17:16:48+00:00"
      },
      {
        "direction": "NEAR",
        "alarmTamper": true,
        "antenna": 0,
        "tag": "R001672",
        "readCount": 92,
        "avgRssi": "-46.0",
        "firstReadTime": "2020-06-10T17:16:05+00:00",
        "lastReadTime": "2020-06-10T17:16:48+00:00"
      }
    ],
    "tagReadRate": "7"
  }
}
```

Detect - TallyFlow



TallyFlow Client and Server Software

- Item and personnel tracking and reports
- Reader assignment and management
- Zone creation and management
- Damage detection and notifications

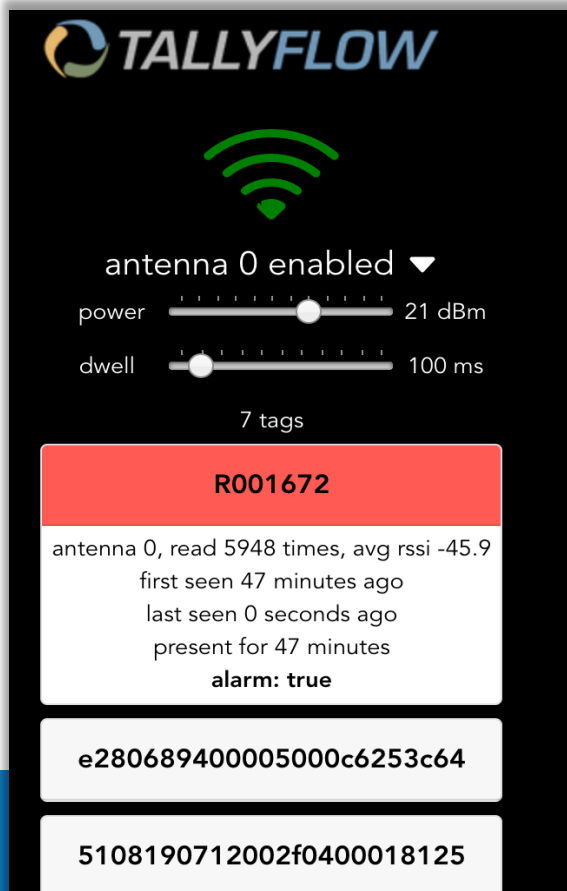


Tag	Time	Direction	Endpoint	Antenna	Zone
R001664X - ✓ - ⌚	2020-05-28 05:09:59 pm	NEAR	tallypoint-1c01b4	0	Todd's House

Detect – Live Demo



Using TallyPoint
Reader with TallyFlow
Software



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Solving The Problem

DETER

The knowledge that cargo is actively being monitored deters bad handling behavior by supply chain participants.

DETECT

Connected monitoring enables real-time damage detection so costs are minimized, and responsible parties are held accountable.

DIAGNOSE

Data and analytics provided by shipment monitoring enable the diagnosis and elimination of pain points within the supply chain.

40-60% typical reduction in damage!

Diagnose

TallyFlow

TALLYFLOW

PITTSBURGH

Home

Events

Items

Images

Reports

Workers

Admin

Configuration

Endpoints

Zones

Organizations

v1.4.3

×

SAVE

DELETE

BASIC

EVENTS

PHOTO

Name	Tag1	Tag2
Spotsee1664	e200680b0000000000000000	R001664X
Serial	Class	Time Created
R001664	item	2020-03-06T15:02:14.178Z
Time Modified		
2020-05-19T14:26:08.225Z		
Description		
Last Event	Last Endpoint Change	Last Zone Transition
2020-05-29T15:18:16Z	2020-05-28T21:09:59Z	2020-05-28T21:09:59Z
Zone	Endpoint	
Pittsburgh / Todd's House	tallypoint-1c01b4	
Alarm	Alarm Tag	Alarm Time
true	e200680b0000000000000000	2020-04-08T17:37:31Z

Diagnose

Regular supply chain data

- Source, Destination, Route Count, Weight, Volume, Value

+ Impact information

- Time & location of alarm choke point
- Magnitude of impact

Diagnose

Compound effects of big data

- What shipper causes most damage
- What routes cause more damage
- What storage & handling facilities cause damage
- What port
- Seasonal / diurnal / other periodic effects

Diagnose

Ability of RF to penetrate packaging enables internal/external impact detection and thus utility of packaging

Combine with more sophisticated SpotSee impact recorders to discover root causes of damage

Use Case

Data center provider

Server Racks



Use Case

Office furniture maker



Conclusion

DETER

The knowledge that cargo is actively being monitored deters bad handling behavior by supply chain participants.

DETECT

Connected monitoring enables real-time damage detection so costs are minimized, and responsible parties are held accountable.

DIAGNOSE

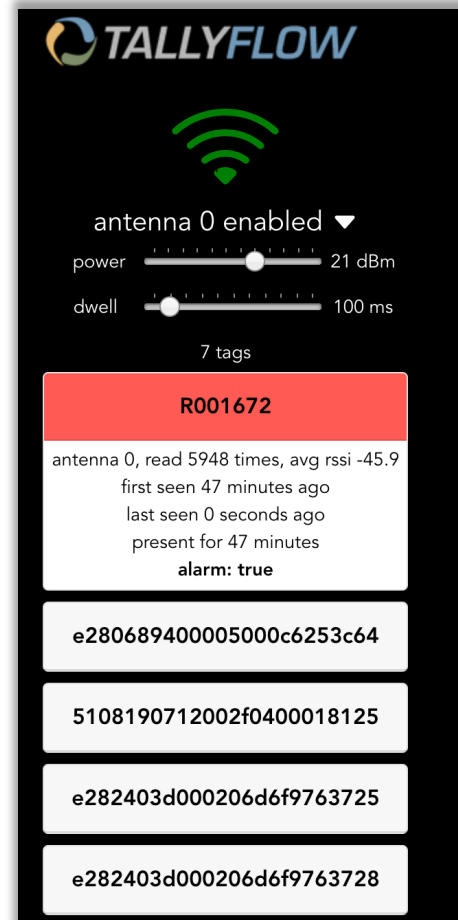
Data and analytics provided by shipment monitoring enable the diagnosis and elimination of pain points within the supply chain.

40-60% typical reduction in damage!

Contact Us

- SpotSee.io -
info@spotsee.io
- SDGSystems.com -
info@sdgsystems.com

Appendix – Tallyflow Screenshot 1



TallyFlow
✕

PITTSBURGH ▾

- Home
- Events
- Items
- Images
- Reports ▾
- Workers
- Admin ▾
- Configuration ▾

v1.4.3

Start Date
2020-06-10 12:00 AM
✕ End Date

✕ Endpoints ▾

Tag	Time	Direction	Endpoint	Antenna	Zone
20170200030 - ✓	2020-06-10 02:07:54 pm	NEAR	tallypoint-1c01b4	0	Pittsburgh / Todd's House
R001672 - ✗ ⏱	2020-06-10 02:07:54 pm	GONE	tallypoint-1c01b4	0	N/A
e200680b0000000000000000000000000 - ✓ - ⏱	2020-06-10 02:07:43 pm	NEAR	tallypoint-1c01b4	0	Pittsburgh / Todd's House
e200680b0000000000000000000000000 - ✓ - ⏱	2020-06-10 02:07:43 pm	NEAR	tallypoint-1c01b4	0	Pittsburgh / Todd's House
e200680b0000000000000000000000000 - ✓	2020-06-10 02:07:43 pm	NEAR	tallypoint-1c01b4	0	Pittsburgh / Todd's House
e28011700000020b901bac48 - ✗	2020-06-10 02:06:45 pm	GONE	tallypoint-1c01b4	0	N/A
e28011700000020b901bac48 - ✗	2020-06-10 02:06:29 pm	NEAR	tallypoint-1c01b4	0	Pittsburgh / Todd's House
R001672 - ✗ ⏱	2020-06-10 02:06:25 pm	NEAR	tallypoint-1c01b4	0	Pittsburgh / Todd's House
R001672 - ✗	2020-06-10 02:06:25 pm	NEAR	tallypoint-1c01b4	0	Pittsburgh / Todd's House
20170200030 - ✓	2020-06-10 02:06:15 pm	GONE	tallypoint-1c01b4	0	N/A

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