

NASDAQ: CLIR

# ClearSign

## The Future of Combustion



November, 2016

# Important Cautions Regarding Forward-looking Statements

All statements in this presentation that are not statements of historical fact are forward-looking statements, including any projections of earnings, revenue, profit margin, cash or other financial items, any statements of the plans, strategies and objectives of management for future operations, any statements regarding expectations for success in our market of the products we develop, any statements concerning proposed new products, any statements regarding future economic conditions or performance, the size of market opportunities, statements of belief and any statements of assumptions underlying any of the foregoing. These statements are based on expectations, assumptions, judgments and analysis as of the date of this presentation and are subject to numerous risks and uncertainties, which could cause actual results to differ materially from those described in the forward-looking statements.

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# What is ClearSign Combustion (CLIR)?

- ClearSign designs, develops and markets technologies that aim to improve the key performance characteristics of combustion systems, including emission, operational performance, energy efficiency and overall cost effectiveness.



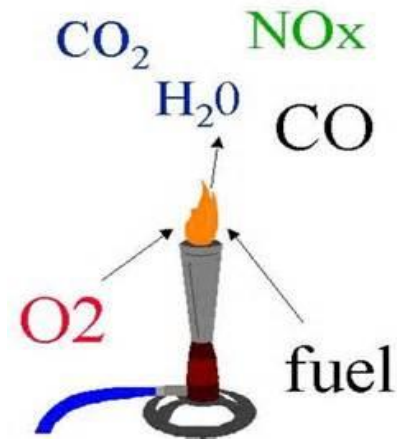
# Why are we invested?

- Our technology is a **disruptive, transformational, unique, patent-protected** technology that will **revolutionize a massive industry** on a global basis.



# Global Energy Market: Combustion Systems

- Combustion is a **fundamental** energy conversion process.
- **2/3 of energy** used in U.S. manufacturing is converted via **boilers, furnaces** and **process heaters**<sup>1</sup>: our core market focus.
- ClearSign's technology provides a **transformational improvement** in combustion systems with respect to **emissions** and overall **operating costs**.



<sup>1</sup> U.S. Department of Energy, 2011

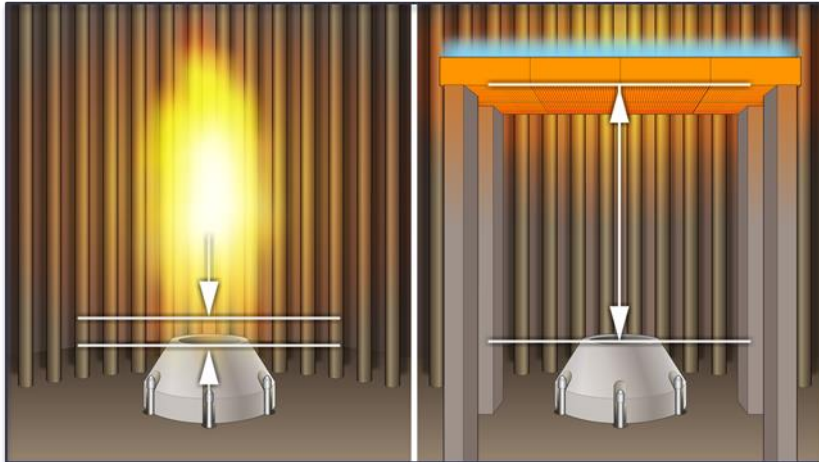
# Market Drivers

- **Environmental Compliance:** increasing regulation of NOx and other pollutants across the U.S., Canada, Europe and China
- **Operational Efficiency:**
  - ✓ Energy/Cost savings
  - ✓ Increased throughput
  - ✓ Reduced maintenance and downtime

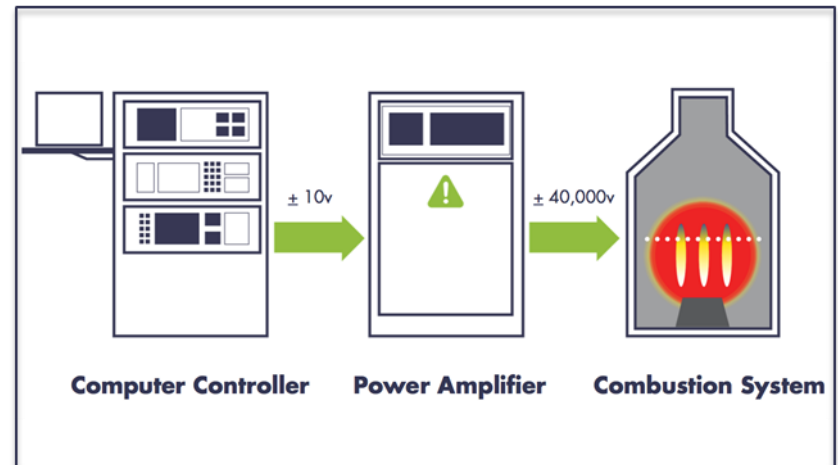


# Technology Platforms

Duplex™



Electrodynamic Combustion Control™

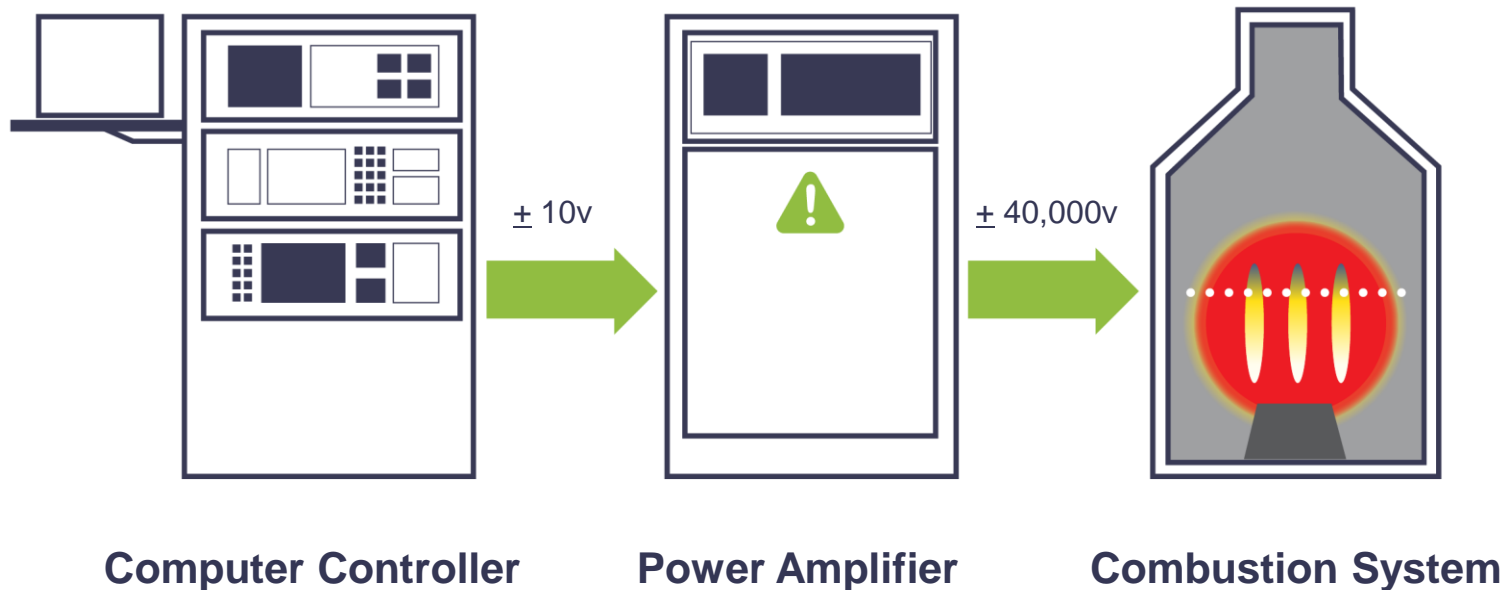


**Duplex was discovered during R&D on ECC**

# Electrodynamic Combustion Control™

A high-voltage pulsed electrical field is introduced directly into the combustion region:

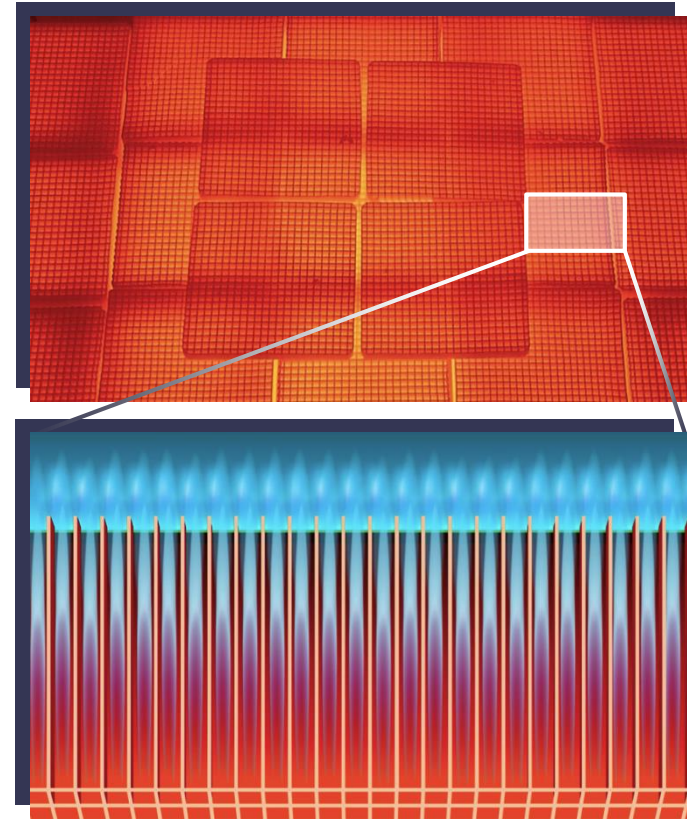
- ✓ Improves efficiency
- ✓ Reduces or eliminates pollution at the source
- ✓ Suitable for a wide range of fuel types (solid, liquid, Gas)



# Duplex™: Transformational Technology

**Duplex** is a unique technology that can reduce NOx to below 5 PPM **while increasing operational efficiency.**

- ✓ **Reduced emissions:** comply with the world's toughest regulatory standards
- ✓ **Increased operational efficiency:**
  - ✓ More efficient radiant heat transfer
  - ✓ Eliminates need for costly Flue Gas Recirculation (FGR)
- ✓ **Increased throughput:** greater furnace capacity
- ✓ **Reduced downtime:** lower maintenance cost
- ✓ **Retrofittable:** can use existing equipment



*Duplex™ - a revolutionary porous ceramic matrix replaces an open flame.*



# U.S. Target Market for Duplex™



## Refinery Segment

- 10 yr Serviceable Available Market:  
• up to \$826M<sup>1</sup>



## Enhanced Oil Recovery (EOR) Segment

- 10 yr Serviceable Available Market:  
• up to \$124M<sup>2</sup>



## Large Industrial Segment

- 10 yr Serviceable Available Market:  
• up to \$802M<sup>1</sup>



## ICI Boiler Segment

- 10 yr Serviceable Available Market:  
• up to \$1,723M<sup>1</sup>



## Flare Segment

- 10 yr Serviceable Available Market:  
• up to \$201M<sup>1</sup>

**10 Year Addressable  
Market of up to  
\$3.6 Billion**



ClearSign Duplex Technology in a California OTSG

- <sup>1</sup> Frost & Sullivan Market Assessment Report, June 2016  
<sup>2</sup> The EOR Segment includes Western Canada 10 yr SAM estimate by ClearSign of \$45M as well as the U.S. market SAM of \$79M determined by Frost & Sullivan Market Assessment Report, June 2016

# Duplex™ fuel savings

## Duplex™ Fuel Saving Components OTSG



# Duplex™ Value Pricing

## Customer Receives 2-Year Payback

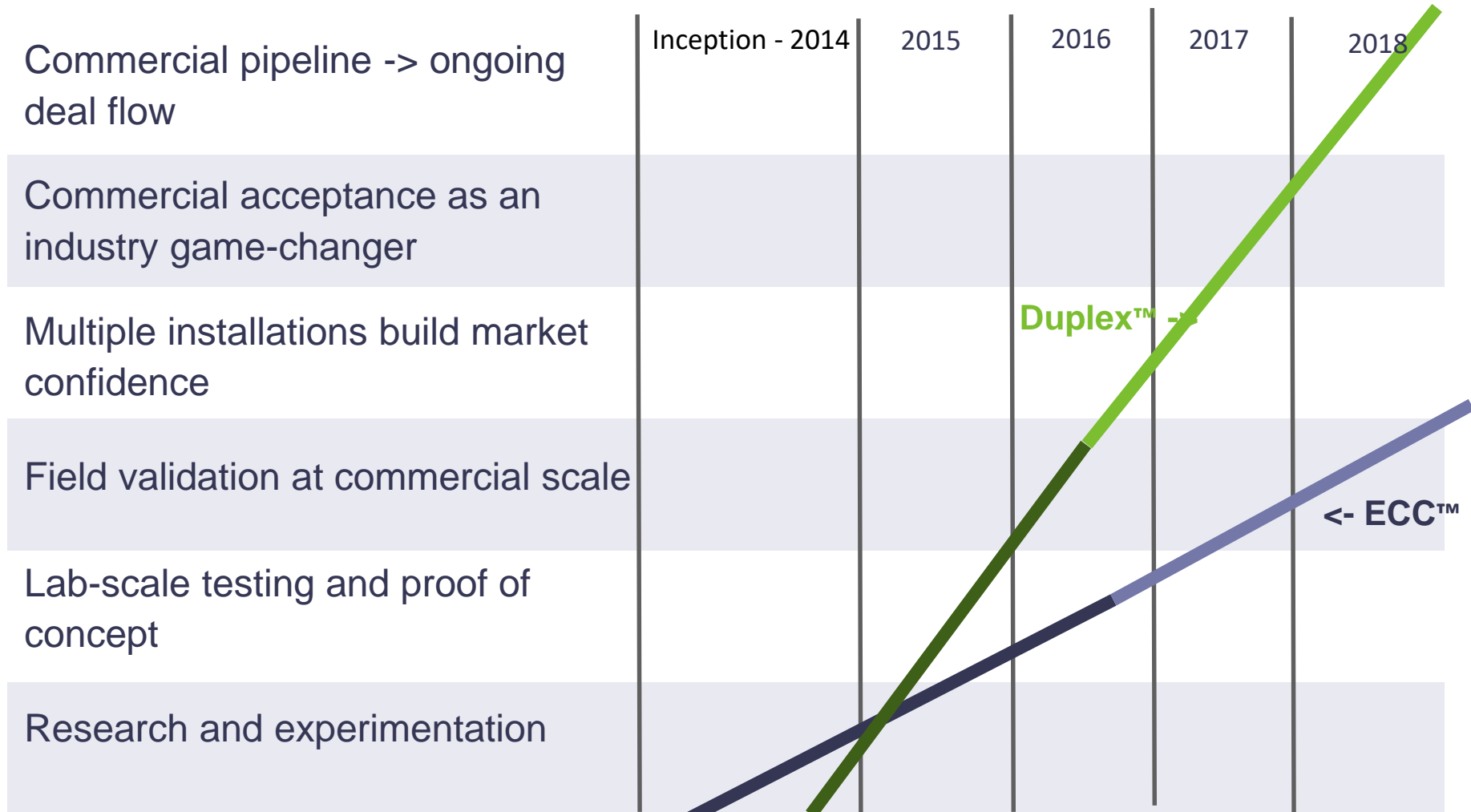
*Key attributes that may apply to customer's application:*

- Reduced fines or increased emission credits
- Elimination of flame impingement – increases throughput
- Eliminate FGR
- Reduced fuel usage/improved heat transfer
- Reduced downtime for repairs & maintenance

# An “Asset-Lite” Business Model

- Unique value proposition provides strong potential margins (> 50%)
- “Asset – lite” minimum working capital and CapEx requirements
- Simple, cost-effective designs
- Small Sales force and Regional Partners
- Designs allow subcontracting through existing regional partners trusted by customers
- Patented technology can be licensed through existing channel participants:
  - ✓ Major players become partners *not* competitors
  - ✓ Sales accelerate through existing channel infrastructure

# Commercialization Milestones



# Commercial Installations

Eight customers in California, Texas and Alberta

- Refinery: *US Market: Up to \$826M*

*Q4 Sales to date: \$260K at 2 refineries*



- Enhanced Oil Recovery: *US/Canada Market: Up to \$124M*

*Q4 Sales to date: \$101K*



- Enclosed Flares: *US Market: Up to \$201M*

*Q3 Sales: \$260K      Q4 Backlog: \$900K on 5 units*

- Packaged Boilers: *US Market: Up to \$1.7B    In Development*

- Large Industrial: *US Market: Up to \$802M    To Come*

# Strong Intellectual Property

- We believe our technologies represent a greenfield opportunity
- We believe we have complete freedom to practice
- Patent portfolio is expanding rapidly

**Duplex™**  
**Sept 2016**  
3 Patent Granted  
48 Patents Pending

**ECC™**  
**Sept 2016**  
18 Patents Granted  
32 Patents Pending



# Experienced Leadership Team



**Steve Pirnat**

**Chief Executive Officer**

- CEO, John Zink, div. Koch Ind.
- Managing Dir. EMEA, Quest Integrity Group



**Jim Harmon**

**Chief Financial Officer**

- CFO of Sabey Corporation
- CPA at Price Waterhouse



**Roberto Ruiz, Ph.D.**

**Chief Operating Officer**

- VP Commercial Development, John Zink
- COO of Onquest, Inc.



**Joe Colannino**

**SVP Engineering**

- Head of R&D, IP, and Learning for John Zink and Coen Combustion Companies



**Andrew Lee**

**SVP Business Development**

- Chief Revenue Officer Adapx, Inc.
- SVP Sales Microvision, Inc.



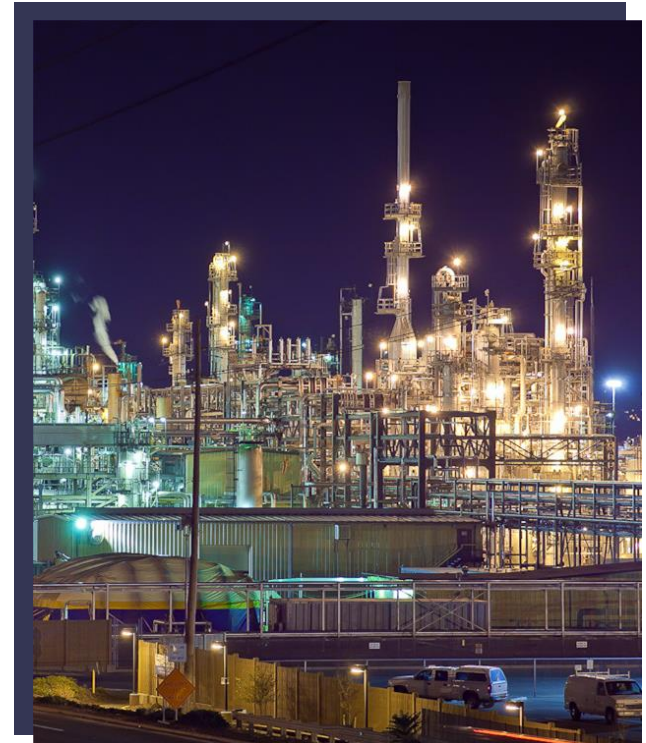
**Donald Kendrick, Ph.D.**

**Chief Technology Officer**

- CTO, Lean Flame Inc.
- Operations Manager, UTC (Pratt & Whitney)

# CLIR: Key Takeaways

- **Large** addressable market
- **Transformational** technology
- **Strong** intellectual property
- **Successful** commercial-scale installations with customer-validated economics in 3 of 5 target market verticals
- **“Asset-lite”** model – license or subcontract
- **Proven** leadership team with deep industry experience



Petrochemical Refinery